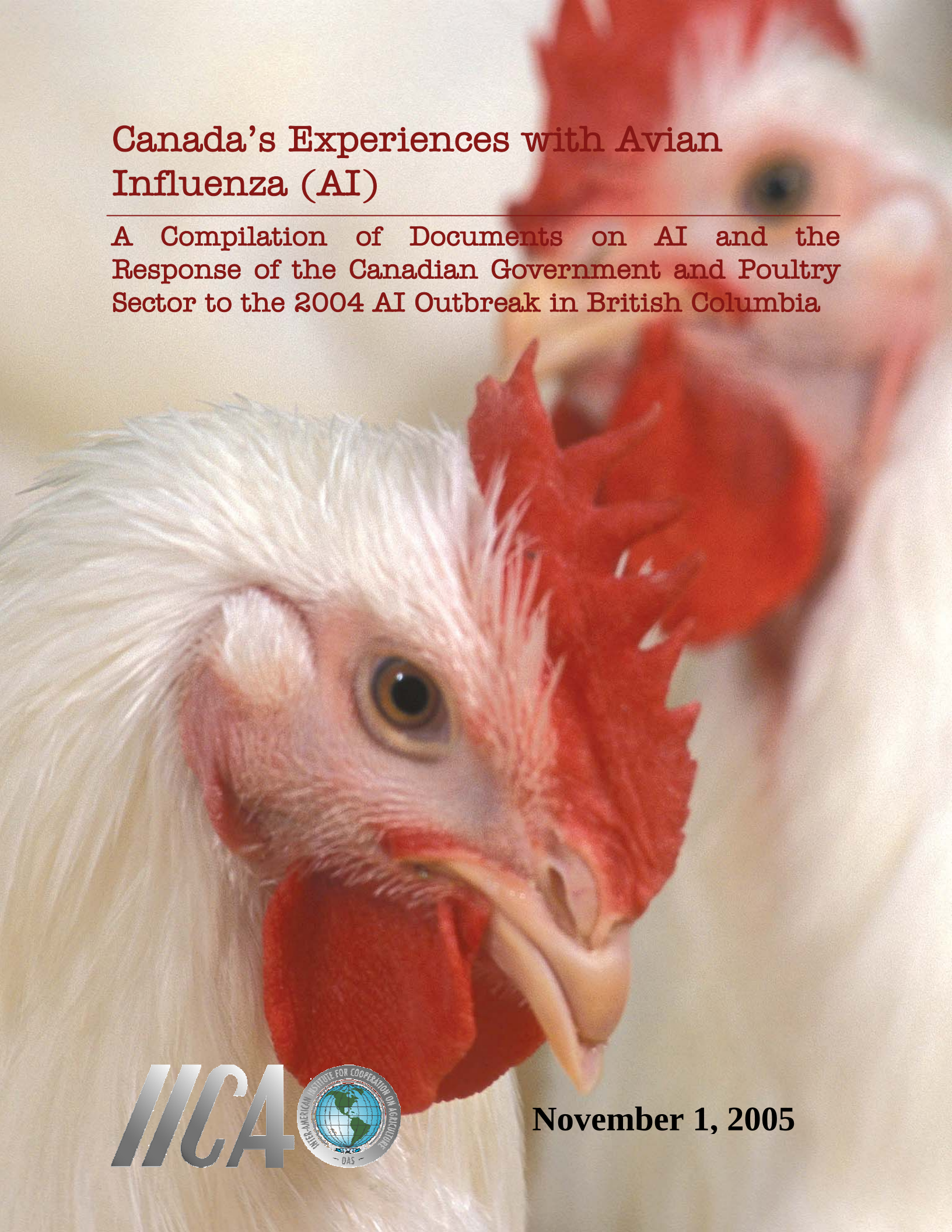
# Canada's Experiences with Avian Influenza (AI)

## A Compilation of Documents on AI and the Response of the Canadian Government and Poultry Sector to the 2004 AI Outbreak in British Columbia



IICA

INTER-AMERICAN INSTITUTE FOR COOPERATION ON AGRICULTURE

OAS

**November 1, 2005**

# Avian Influenza
# BREAKING NEWS

November 1, 2005

The Canadian Food Inspection Agency announced yesterday that a national survey of wild migratory ducks has detected the presence of AI virus H5 in 33 samples from the provinces of Quebec and Manitoba. Tests to confirm the H5 type and to determine the N type are on-going. The analysis is being conducted at the National Centre for Foreign Animal Diseases in Winnipeg.

The Public Health Agency of Canada has determined that there is no information to suggest any new threats to human health. Avian influenza viruses are often found in health wildfowl and do not represent a significant risk to human health.

The 2005-2010 National Surveillance Program for Influenza A viruses in Wild Birds of Canada is a joint initiative of the Canadian Cooperative Wildlife Health Centre, the Government of Canada, and provincial governments. Sampling of birds was conducted along migratory flight paths throughout Canada.

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# WILD BIRD SURVEY DETECTS AVIAN INFLUENZA IN DUCKS - NO NEW THREAT TO HUMAN HEALTH

Ottawa, October 31, 2005 - A national survey of wild migratory ducks has detected avian influenza. Preliminary results indicate that 28 of the positive reactions in Quebec and five in Manitoba were due to the H5 subtype. The Public Health Agency of Canada has determined that there is no information in these findings suggesting a new threat to human health.

The detection of H5 avian influenza is not unexpected: the virus is commonly seen in migratory bird populations around the world and various types and strains have been detected in North America over the last 30 years, with no impact on human health. The birds tested in this national survey were healthy, and there is no evidence of influenza-related illness among domestic or wild birds in the test areas.

Tests to confirm the H5 type and tests to determine the N type of the virus are ongoing. Definitive findings may not be possible if there is insufficient live virus remaining in the original samples. This analysis, which is being conducted at the National Centre for Foreign Animal Diseases in Winnipeg, will take up to a week.

Although this further testing is important to help us better understand the current situation, avian influenza viruses are found in healthy wild fowl and do not represent a significant risk to humans.

We know that subtypes of influenza have been detected in many species of apparently healthy wild birds, but we have no known cases where the virus was transmitted directly to humans.

Although the risk should therefore be considered low, an awareness of safety measures, among groups, such as hunters, that may be in contact with wild birds is important. There are several steps people can take to minimize any potential health risks from wild birds.

Persons handling wild birds should follow routine hand washing and safe food preparation practices. These include disinfecting surfaces, being careful to avoid cross contamination with other food products, keeping raw meat away from other food utensils, and thoroughly cooking all wild birds prior to eating. Following these steps is good practice to minimize risks associated with the handling and preparation of wild fowl.

The Canadian Food Inspection Agency (CFIA) continues to work with provincial governments to monitor the health of wild and domestic birds in and around the areas where sampling was conducted. The CFIA is also issuing a general notice to poultry producers, reminding them to always follow strict biosecurity practices.

The wild bird survey is a joint initiative of the Canadian Cooperative Wildlife Health Centre, the Government of Canada, and provincial governments. The goal of the project is to better understand the presence and characteristics of all avian influenza viruses circulating in Canada's wild bird population. Sampling of birds was conducted along migratory flight paths in seven provinces.

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2005-10-31

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Important Notices

# Current News

## Canada's Inter-agency Wild Bird Influenza Survey 2005

### Background

Avian influenza is an infection of birds caused by type A strains of influenza viruses, and is a major global concern to human and animal health. The recent outbreak of disease caused by an H5N1 strain of influenza virus in Asia, a strain capable of causing severe disease (highly pathogenic) in both birds and people, has resulted in mass culling of millions of domestic poultry. As of September of 2005, the World Health Organization had reported 60 confirmed human deaths due to this virus strain. Influenza A viruses are not limited to domestic poultry however; all birds are thought to be susceptible to infection with influenza A viruses to a lesser or greater degree, depending on the species. Migratory waterfowl, especially wild ducks, are thought to be the natural reservoir of the full range avian influenza viruses. Although many different strains of Influenza A have been found in wild birds, virus strains highly pathogenic to humans or poultry, or to the wild birds themselves, seldom have been detected in wild populations and are thought not to be maintained in wild birds; only mild virus strains that produce little or no disease when they infect people or poultry are thought to be maintained in the wildlife reservoirs. However, these mild virus strains may undergo genetic changes when they infect various other species, such as poultry, people and pigs, and, through these genetic changes, they can develop into disease-causing strains. In addition, wild birds may become infected with highly pathogenic strains from contact with infected poultry, and then may be capable of transporting those strains for short periods of time, including during migration (figure 1). A recent report by the O.I.E considers it at least possible that wild bird migration has contributed to the spread of the highly pathogenic Asian H5N1 virus strain westward across Asia to Europe.

On 20 December 2004, a teleconference among federal and provincial agencies representing public health, agriculture and wildlife was organized by the Canadian Cooperative Wildlife Health Centre at the request of participating federal agencies. At this teleconference, participants agreed that a survey of Influenza A viruses in wild birds, broadly across Canada, should be undertaken beginning in 2005. The Canadian Cooperative Wildlife Health Centre agreed to coordinate the planning and conduct of the survey, beginning with drafting and refining an operational proposal that would include objectives, methods, costs, and communications.

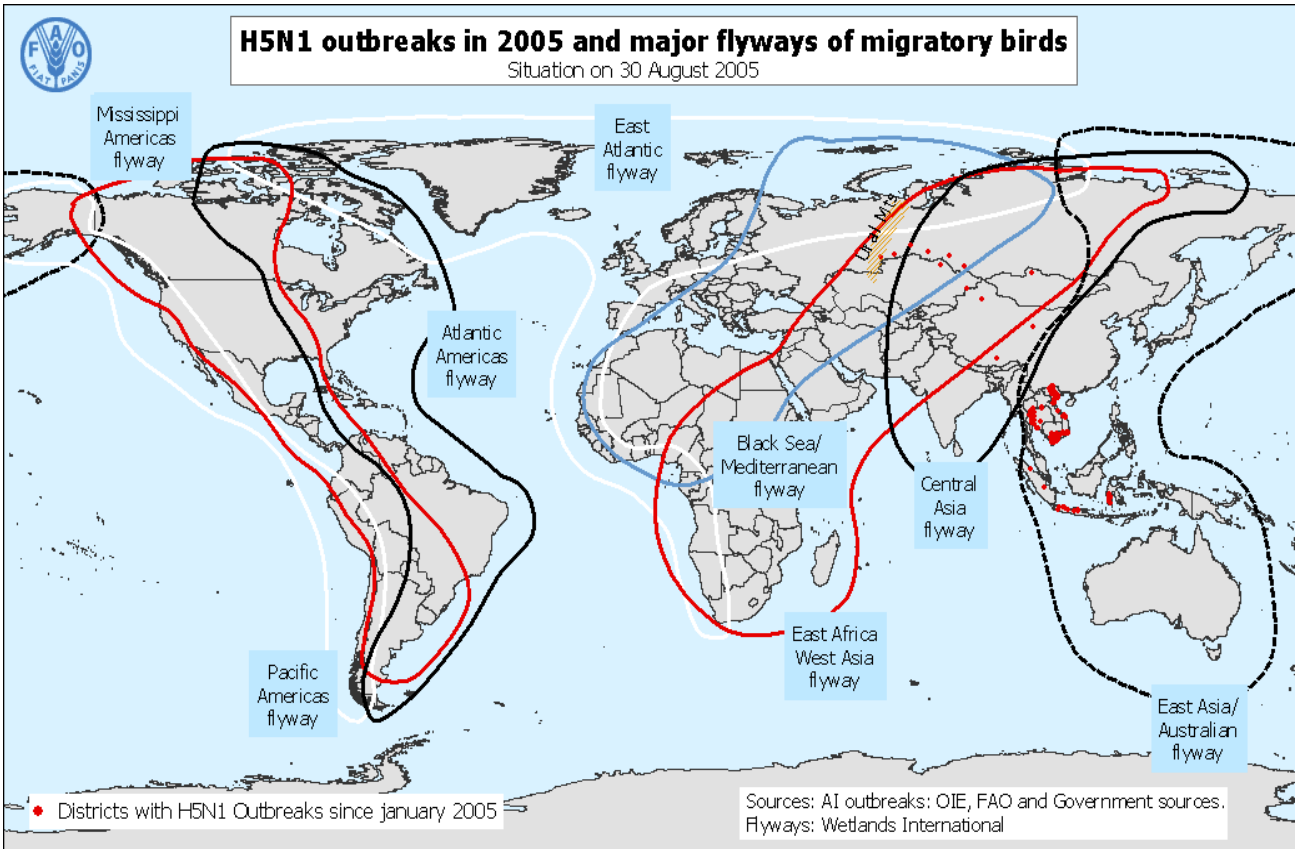


**Figure 1 showing the major flyways of migratory birds (UN Food and Agriculture Organization)**

## Objectives

The general objective of the program will be to make an inventory of the Influenza A viruses that occur in wild birds in Canada and to characterize these viruses sufficiently that it will be possible to determine if potential future Influenza A viruses highly pathogenic for humans or domestic animals have arisen in whole or in part from wild birds. Once characterized, an archive of Influenza A virus strains from Canadian wild birds will be established and these virus reference strains and typing reagents will be provided to public health and veterinary testing laboratories and will also be available to research scientists.

In furtherance of these objectives samples were obtained from 6 regions within Canada; British Columbia, Alberta, Manitoba, Ontario, Quebec and the Maritimes, during the months of August and September, 2005 (figure 2). 800 samples from each of these 6 regions were collected for a total of 4800 samples collected across Canada.

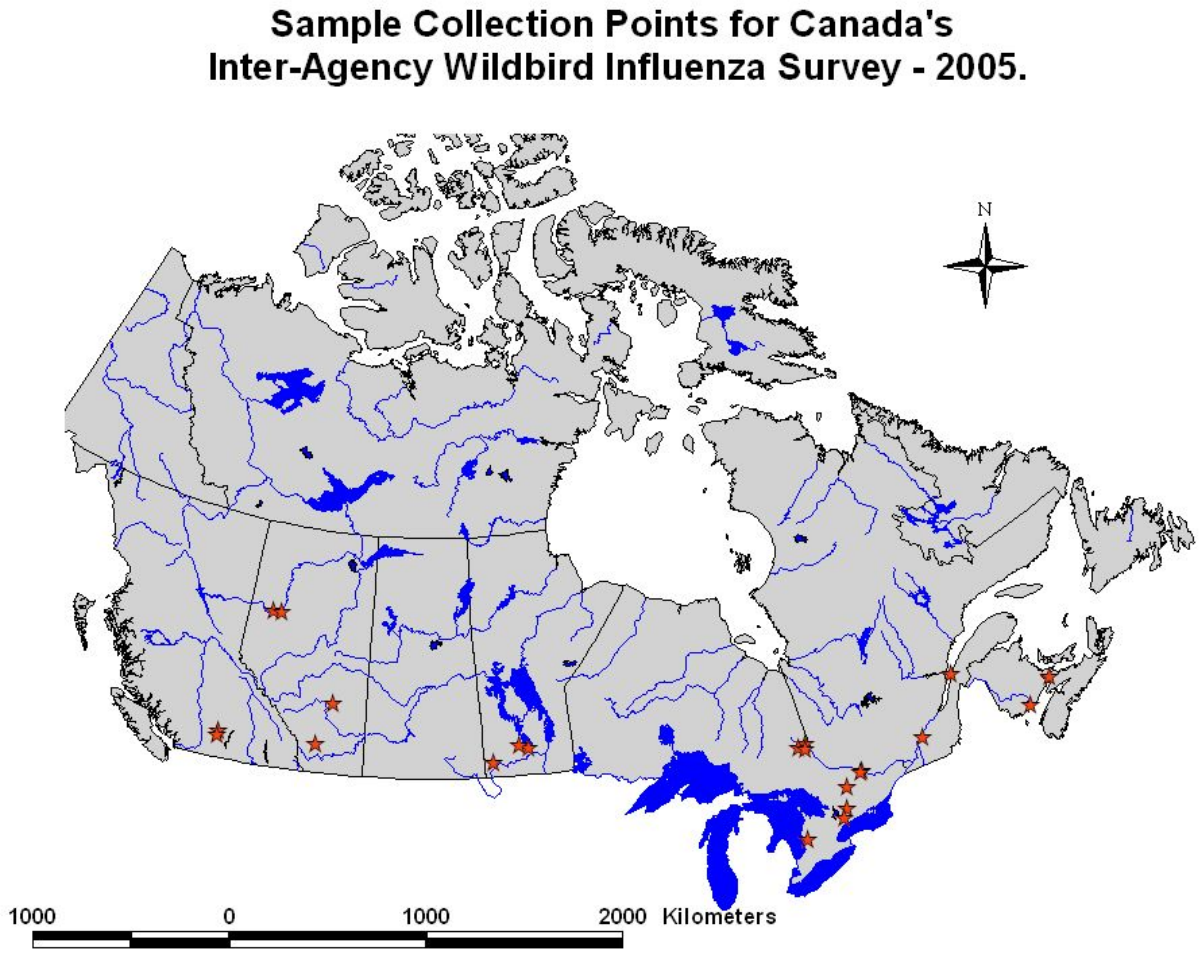


**Figure 2 showing the sample collection sites for 2005.**

## 2005 Participants

It is intended that this surveillance program will build health management capacity in Canada through collaboration among public health, agriculture and wildlife agencies within federal and provincial/territorial governments, and with universities.

**Primary Federal Participants:**

- Public Health Agency of Canada
- Canadian Food Inspection Agency
- Environment Canada - Canadian Wildlife Service

**Primary Provincial Participants:**

- Provincial Departments responsible for Public Health
- Provincial Departments responsible for Agriculture (animal health)
- Provincial/Territorial Departments responsible for Wildlife

**Primary Non-government Participants:**

- Canadian Cooperative Wildlife Health Centre (Canada's veterinary colleges)
- Centre for Coastal Health (Malaspina University, Nanaimo)

**Secondary Participants:**

- Agriculture and Agri-Food Canada

For further information please refer to a copy of the Operational Proposal or contact:

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## Links

- Food and Agriculture Organization of the United Nations
- World Health Organization
- Alaska IDeA Network of Biomedical Research Excellence
- World Organization for Animal Health

*Questions? Comments? E-mail us at ccwhc@usask.ca · This page was last modified: 2005-09-12 · Copyright © 2005, CCWHC*

# A National Surveillance Program for Influenza A viruses in Wild Birds in Canada, 2005-2010

Background Avian influenza is a major global concern to human and animal health. No Canada-wide surveillance for Influenza A viruses has been undertaken to date. Wild birds, especially wild ducks, are the ultimate reservoir of Influenza A viruses. Although virus strains highly pathogenic to humans or to poultry have never been detected in wild birds and probably are not maintained in wild bird populations, wild birds may become infected with highly pathogenic strains from contact with poultry and may be capable of transporting those strains for short periods of time during migration. Furthermore, influenza virus strains with the potential to become highly pathogenic through minor genetic alterations do circulate among wild birds. In 2003, data from regular wild bird surveillance permitted Dutch scientists to identify a low pathogenicity strain of Influenza A in wild ducks as the source of a low pathogenicity strain that infected the poultry industry, developed into a highly pathogenic strain within poultry barns, and became a major multi-nation outbreak in poultry and humans. Events around the 2004 avian Influenza outbreak in British Columbia highlighted the absence of any clear agency mandates to undertake Influenza virus surveillance in wildlife, as well as Canada's ignorance of the Influenza A viruses that are present in Canadian wild birds.

On 20 December 2004, a teleconference among federal and provincial agencies representing public health, agriculture and wildlife was organized by the Canadian Cooperative Wildlife Health Centre at the request of participating federal agencies. At this teleconference, participants agreed that a survey of Influenza A viruses in wild birds, broadly across Canada, should be undertaken beginning in 2005, and they agreed on the general approach and participation in the survey set forth in this proposal. The Canadian Cooperative Wildlife Health Centre agreed to coordinate the planning and conduct of the survey, beginning with drafting and refining a operational proposal that would include objectives, methods, costs, and communications.

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General Objectives:

1. To make an inventory of the Influenza A viruses that occur in wild birds, especially wild ducks, in Canada.

2. To characterize Influenza A viruses in Canadian wild birds sufficiently that it will be possible to determine whether or not Influenza A viruses highly pathogenic for humans or domestic animals, which may be recognized in Canada in the future, have arisen in whole or in part from Influenza A viruses transmitted to humans or domestic animals from wild birds.

3. To monitor Canadian wild bird populations for the presence of particular Influenza A viruses, or their genetic components, which are of national or international concern to human or animal health.

- To investigate the antigenic subtypes, and changes in the frequency of different subtypes and genotypes, present in different regions of Canada from year to year.

- To monitor the progress of antigenic drift, which is known to occur rapidly.

- To monitor the occurrence of viruses antigenically related to human strains.

- To identify influenza A viruses with the potential to cross species barriers.

- To monitor re-assortment events between avian influenza strains and influenza A strains being isolated from humans and swine.

- To maintain data on serotypes and genetic composition of novel influenza A strains.

4. To establish an archive of Influenza A virus strains from wild birds in Canada to permit rapid retrospective analysis in response to disease outbreaks and contribute to rapid epidemiological assessment.

- To provide these virus reference strains and typing reagents to public health and veterinary testing laboratories including, WHO, FAO, OIE and national reference laboratories, in regard to pandemic preparedness or in the event of newly emerging epidemic influenza A.

- To maintain this virus collection as a resource for development of potential pandemic vaccine strains.

5. To build and maintain the integrated, multi-agency field, laboratory, regulatory and communications capacity within Canada rapidly to carry out Influenza A virus sampling, identification, and molecular characterization on large volumes of samples under emergency conditions, in any species.

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Specific Objectives:

A. To sample six populations of wild ducks in the summer and fall of 2005 and 2006, and to characterize all Influenza A viruses detected in these samples.

B. To design and implement, as of 2007, a surveillance program for Influenza A viruses in Canadian wild birds that meets Canada's requirements, including its international obligations. Frequency and locations of sampling, degree of virus characterization to be undertaken, and potential new components of the program (e.g. additional or different bird species or populations) will be decided based on analysis of results obtained in 2005 and 2006.

Anticipated Participants:

It is intended that this surveillance program will build health management capacity in Canada through collaboration among public health, agriculture and wildlife agencies within federal and provincial/territorial governments, and with universities.

Primary Federal Participants:
- Public Health Agency of Canada
- Canadian Food Inspection Agency
- Environment Canada - Canadian Wildlife Service

Primary Provincial Participants:
- Provincial Departments responsible for Public Health
- Provincial Departments responsible for Agriculture (animal health)
- Provincial/Territorial Departments responsible for Wildlife

Primary Non-government Participants:
- Canadian Cooperative Wildlife Health Centre (Canada's veterinary colleges)
- Centre for Coastal Health (Malaspina University, Nanaimo)

Secondary Participants:
- Agriculture and Agri-Food Canada
- There may be others that should be added to this list.

Participant Responsibilities:

Governance: A program Steering Committee, with one representative from each participating agency, will be established as the governing body of this program. The Steering Committee will select a chair and a representative Executive Sub-committee which it will empower to make decisions on its

behalf as needed between meetings of the full Steering Committee. Such an executive committee might consist of one representative each from PHAC, CFIA, EC/CWS, one provincial health and one provincial agriculture representative and one representative from the CCWHC. The CCWHC will serve as secretariat to the Committee. It is anticipated that all meetings of the Committee and executive subcommittee would be by teleconference.

Central Coordination:

The Canadian Cooperative Wildlife Health Centre, as secretariat to the Steering committee, will coordinate program design, and will implement and coordinate the surveillance program itself, in accordance with the Steering Committee's decisions. This central coordination also will include managing the program's communications and the surveillance data generated during the program (see below).

Sample Collection:

The Canadian Wildlife Service (Environment Canada) will take the lead obtaining samples from wild ducks, trapped for banding and other purposes as part of its on-going waterfowl management programs.

Primary Virology:

Initial testing of samples for the presence of Influenza A viruses will be done in a laboratory (agriculture, health, university) that routinely serves the province or region in which the samples are collected. Primary screening will be via PCR, followed by isolation in embryonated SPF hen's eggs of all influenza viruses detected by PCR. Primary virus culture can be performed at biohazard level 2. The PCR protocol to be followed will detect of all forms and strains of Influenza A viruses. All laboratories will follow identical PCR and virus isolation protocols. CFIA (National Centre for Foreign Animal Diseases - NCFAD) will be responsible for establishing the primary virology protocols and quality assurance procedures through the *Avian Influenza Virus Laboratory Network*. collaboratively with the participating regional laboratories. Virus isolates will be divided into multiple aliquots and frozen at -70C. A minimum of 5 aliquots will be shipped to the National Microbiology Laboratory (NML) in Winnipeg for further characterization by both NCFAD and NML and for archiving of at least three aliquots.

It is intended that the establishment of PCR and virus isolation protocols between NCFAD and the regional laboratories will result in accreditation of the regional laboratories by CFIA such that these laboratories are certified to participate fully and immediately in responses to outbreaks of pathogenic influenza A viruses.

Further Characterization of Viruses:

NML will undertake virus genome sequencing to characterize virus isolates at the molecular level. NCFAD will identify H and N antigens of all isolates using serological typing and will undertake pathogenicity tests on any viruses that require this under the Health of Animals Act regulations or international conventions.

Specimen Archives and Access:

Multiple aliquots (3 or more) of all Influenza A viruses identified in this surveillance program will be held in an archive from which specimens can be provided to scientists in Canada or elsewhere for research purposes. The archive will be established at the National Microbiology Laboratory. The Executive Subcommittee of the program's Steering Committee will establish guidelines for access to these samples by scientists, to guide NML in administration of the archive.

Data Management:

Data generated by all participants (sample collection data, virus strain data, PCR product sequence data, pathogenicity data, specimen archive data) will be entered into a single database to which all participants will have password-protected access. The database will be developed and managed by the CCWHC in consultation with the survey's Steering Committee.

All genetic sequence data for Influenza A strains identified during this survey will be deposited as quickly as possible in Genbank.

Communication:

The Steering Committee will serve as the central vehicle for communications among the participants in the surveillance program. The Steering Committee will establish a protocol whereby the discovery of virus strains of public health or socio-economic concern will be communicated internally and externally. The communications policies of the participating government agencies will respected. Communications among participants in the surveillance program will be facilitated by a password-protected website established and maintained on behalf of the Steering Committee by the CCWHC. Access by participants to surveillance data will be through this site.

For communications and citation purposes, the name of this surveillance program shall be: "*Canada's Inter-agency Wild Bird Influenza Survey* " (acronym: CIWBIS)

Analysis and Reporting

The data generated by the survey in 2005 will be analysed and summarized by the staff of the CCWHC and the Centre for Coastal Health (Nanaimo, BC). A report on the survey will be written and made available to all participants. Similar analytical procedures will be applied to data from subsequent years.

Intellectual Property

Participants are encouraged to analyse survey data and publish the results. All use of the survey data should cite and acknowledge the source as "Canada's Inter-agency Wild Bird Influenza Survey ." All use of survey data for analysis and publication must be negotiated on a bi-lateral basis among those making such use of the data and the individuals and laboratories who have generated the samples and the data, following the norms of ethical scientific practise in Canada.

Target Sample Numbers:

Given below are the target sample sizes; sampling will emphasize young-of-the-year (hatch year) birds. In addition to the 500 mallard samples from each location, it is anticipated that there will be access to other species of ducks during procurement of the mallard samples. Up to 300 samples from other young-of-the-year ducks will be collected and processed in addition to the mallard samples in 2005 and 2006 to assess species differences and thus inform the design of the surveillance program in future years. 500 samples from mallards at each sampling site will permit detection of virus in at least one bird with 99% confidence if the prevalence of infection is at least 0.01 ( i.e.1%).

| | REGION | | | | | | |
|---|---|---|---|---|---|---|---|
| Bird Group | BC | AB | MB | ON | QC | Maritimes | Totals |
| Mallard | 500 | 500 | 500 | 500 | 500 | 500 | 3000 |
| Other Ducks | 300 | 300 | 300 | 300 | 300 | 300 | 1800 |
| Totals | 800 | 800 | 800 | 800 | 800 | 800 | **4800** |

October 31, 2005

Dear Reader:

Media attention to Avian Influenza (AI) has grown steadily in the latter part of 2005, with most of this attention being focused on the global human health consequences of a potential Avian Flu pandemic. While no one can deny that AI does indeed threaten human safety the world over, equally threatening, however, are the potential consequences of this animal disease to agriculture, to the livelihoods of rural people, and in particular to the poultry sector. Canada has not been sparred such consequences.

On Feb. 19, 2004, the Canadian Food Inspection Agency (CFIA) announced to the world the confirmed presence of the H7 AI virus on a single farm in British Columbia's Fraser Valley. Over the next six months, federal, provincial, municipal government leaders and the entire BC poultry industry would undertake unprecedented efforts to combat the spread of the virus – later confirmed to be the highly pathogenic AI strain H7N3 – to safeguard human health and the province's poultry industry. While these efforts were eventually to prove successful, with the virus being declared eradicated on August 18, 2004, in the end, more than 40 commercial operations would become infected with the virus, some 17 millions birds would be destroyed, for which more than 1100 producers would seek compensation, 30 countries would ban Canadian and BC poultry products, the BC poultry industry would suffer more than $400 million in damages, and several poultry workers would develop and fully recover from Avian Influenza.

Some two months after the official response to the AI outbreak concluded, the main players got together to examine how they collectively managed the response to the crises. At the conclusion of this meeting, they committed to strengthening future responses to animal disease outbreaks, to develop standardized biosafety protocols and to review legislation and producer compensation programs. Canada's experiences with AI and the results of the various reviews undertaken shortly thereafter represent an enormous wealth of lessons learned.

AI remains a human health issue for most people. On October 24 and 25, 2005, key Ministers of Health and other officials from 30 countries and organizations, including the World Health Organization, met in Ottawa to discuss ways of increasing global collaboration and coordination in advance of a possible human influenza pandemic. As host of this event and for the benefit of global human health, Canada shared the important insights it gained in successfully combating the 2004 outbreak of AI.

Yet, Canada must not lose site of the fact that AI is first an animal disease with important implications for agriculture. Just days prior to the meeting of these Health Ministers, Australia banned the importation of live birds and hatching eggs from Canada after Canadian pigeons in Australia were found to be carrying AI antibodies. Even though the birds were not infected with AI, trade between the two countries was disrupted for five days. The experiences of Canada's government and its poultry industry during the 2004 outbreak of AI can also be shared for the benefit of other Canadian agriculture sectors and those of other countries in the Americas.

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During our 2005 round of consultations, many of our stakeholders and partners strongly suggested that IICA Canada take on a more proactive role in facilitating information exchange in the priority areas of agriculture health and food safety. In particular, AI was singled out as one of the topics where IICA Canada could play an important role in facilitating information exchange. With this publication, a compilation of documents taken from government and industry sources, IICA Canada is providing a useful overview of Canada's response to the 2004 outbreak of Avian Influenza.

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## COMPILED DOCUMENTS

| Document | Authoring Organization |
|---|---|
| ***PART 1 – General Information on Avian Influenza*** | |
| 1. Fact Sheet on Avian Influenza | CFIA |
| 2. Fact Sheet on Avian Influenza Virus Subtypes | CFIA |
| 3. Avian Influenza and Human Health – Key Messages | CFC |
| 4. Outbreaks in North America | CDC |
| 5. Avian Influenza – Routes of Transmission | CFIA |
| 6. Avian Influenza – Preventing Avian Influenza Spread on Your Premises | CFIA |
| 7. Protect Your Poultry | CFIA |
| 8. The Chicken Farmer | CFC |
| 9. AgriSuccess Express | FCC |
| 10. Biosecurity For The Birds | APHIS |
| 11. Avian Influenza and Food Safety | CFIA |
| 12. Food Safety | OIE |
| ***PART 2 – The 2004 Outbreak of AI in the Fraser Valley, BC*** | |
| 13. Timeline of the 2004 AI Outbreak in Fraser Valley, BC | IICA - Canada |
| 14. A Short Summary of the 2004 Outbreak of High Pathogenicity Avian Influenza (H7N3) in British Columbia, Canada | CFIA |
| 15. Press Releases on AI (February 19, 2004 – October 21, 2005) | CFIA |
| 16. Avian Influenza – Latest Information | CFIA |
| 17. Avian Influenza in British Columbia | Alberta Agriculture |
| 18. Avian Influenza – B.C. Fraser Valley Control Area | CFIA |
| 19. Movement Controls for Avian Influenza Response | CFIA |
| 20. Learning from Avian Influenza | FCC |
| 21. Comprehensive Report on the 2004 Outbreak of High Pathogenicity Avian Influenza (H7N3) in the Fraser Valley of British Columbia, Canada | CFIA |
| 22. Lessons Learned Review: The CFIA's Response to the 2004 Avian Influenza Outbreak in B.C. | CFIA |
| 23. The Source and Means of Spread of the Avian Influenza Virus in the Lover Fraser Valley of British Columbia During an Outbreak in the Winter of 2004 – Interim Report | CFIA |
| 24. Questions and Answers CFIA Epidemiological Reports Avian Influenza Outbreak of 2004 | CFIA |
| 25. From a Management Crisis, to Becoming Better Crisis Managers: The 2004 Avian Influenza Outbreak in British Columbia | AAFC Standing Committee |
| 26. Recommended Code of Practice for the Care and Handling of Chickens, Turkeys and Breeders from Hatchery to Processing Plant | CARC |
| 27. Health of Animals Act | Government of Canada |

| Document | Authoring Organization |
|---|---|
| ***PART 3 – Other AI Reference Documents*** | |
| 28. Avian Influenza – Background | FAO |
| 29. Avian Influenza: A Threat to Rural Livelihoods, Agricultural Production and Human Health | FAO |
| 30. H5N1 Outbreaks 1-15 October 2005 | FAO |
| 31. Avian Influenza – Questions and Answers | FAO |
| 32. Technical Consultation on the Control of Avian Influenza | FAO/OIE/WHO |
| 33. Terrestrial Animal Health Code | OIE |
| 34. Draft Report of the Meeting of the OIE *Ad Hoc* Group on Avian Influenza | OIE |
| 35. The Use of Vaccination as an Option for the Control of Avian Influenza | OIE |
| 36. Canadian Pandemic Influenza Plan | PHAC |

# INTRODUCTION

**Avian Influenza** (AI) is a contagious infection caused by a series of Type "A" viruses which can infect many species of birds, including chickens, turkeys, pheasants, ducks, geese and other farmed and wild birds. First identified in Italy more than 100 years ago, AI is now known to occur worldwide.

Like all viruses, AI viruses can be classified into two categories according to the severity (pathogenicity) of the illness they cause: **low pathogenic** (LPAI) and **high pathogenic** AI (HPAI). Most AI viruses are LPAI and typically cause little or no clinical signs in the infected birds. However, as a Type "A" virus, some LPAI viruses are capable of mutating into the more pathogenic HPAI virus leading to an extremely infectious and fatal form of the disease. Epidemics of HPAI in bird populations can result in rapid and high mortality rates among those birds infected. There are many influenza subtypes, two of which are H5 and H7. These are the only known subtypes to have become high pathogenic in birds.

The list of symptoms of AI is long and not all birds infected with AI will show all of these clinical signs: sudden drop in egg production; soft-shelled or shell-less eggs; wattles and combs swollen and congested; swelling of the skin under the eyes; diarrhea; hemorrhages on the hocks; and others. Since these symptoms are similar to those of other diseases, laboratory diagnosis is important to confirm AI.

Waterfowl are known to be the natural reservoirs for AI viruses. These animals are more resistant to the disease, tend to shown none of the symptoms and can act as carriers of the virus. Waterfowl can be responsible for the primary introduction of the virus into domestic birds when they come into contact with poultry, which are more susceptible to AI. The disease can also be spread among poultry when healthy birds come in contact with infected birds or with poultry products, manure and litter containing high concentration of the virus. This also includes feed and water, and contaminated clothing, footwear, vehicles and equipment on the farm. Food markets where large numbers of poultry are stored for sale, such as those in Asia, can also be a significant cause for the spread of AI.

While this disease typically affects birds, human transmission has been confirmed and some of these cases have been fatal. People who have had prolonged exposure to environments heavily contaminated with certain types of AI viruses, such as H5 and H7, have become infected with AI. Transmission of the virus from person-to-person is extremely limited. H5N1 is one strain of HPAI that could lead to a human pandemic of AI.

As wild bird populations are the natural reservoir for AI viruses, it is critical that poultry producers implement and maintain strict biosecurity measures. These include limiting the exposure of poultry and all poultry farm personnel to areas frequented by wild fowl, particularly waterfowl; maintaining strict control over access to poultry facilities and equipment; keeping equipment cleaned and disinfected before moving it into the poultry areas; and maintaining high sanitation standards.

In Canada during the sixties, prior to the implementation of more stringent biosecurity measures, seasonal cases of LPAI were often reported among free-range turkeys. Since then, as methods changed and production moved indoors, cases of LPAI have been rare. Canada has had three confirmed cases of LPAI H5 and H7 since 1975, the latest case being reported in 2000. However, in 2004, the Canadian Food Inspection Agency (CFIA) confirmed the presence of both LPAI and HPAI H7 in the Fraser Valley of British Columbia.

This compilation of documents from government and industry is divided into three main parts. Part 1 provides background information on AI; Part 2 gives a detailed picture of how Canada's response to the outbreak of HPAI H7N3 in the Fraser Valley unfolded and led to changes; and Part 3 examines AI outbreaks from an international perspective, with a particular focus on the AI crisis in Asia.

In the introduction to the three sections, a short description of each document in the compilation is provided as well as links to the publishing organization's website, which should be consulted for more extensive electronic libraries on AI, and a direct link to the document.

# PART 1 – GENERAL INFORMATION ON AVIAN INFLUENZA

This section of the compilation contains a series of documents taken from various Canadian and other government sources and from Canadian poultry industry publications which provide general information on Avian Influenza, biosecurity and food safety.

## General Information on AI

Presented first is a **Fact Sheet on Avian Influenza** produced by the Canadian Food Inspection Agency (CFIA) in February 2004. The fact sheet discusses the difference between LPAI and HPAI, some of the signs of AI infection in poultry, the means of transmission to poultry and humans, the occurrence of AI in Canada, CFIA's role in controlling and preventing the disease, and measures to prevent infection. The CFIA also produced a **Fact Sheet on Avian Influenza Virus Subtypes**; this fact sheet was updated in September of 2005.

The Chicken Farmers of Canada (CFC) have also produced a useful background document called **Avian Influenza and Human Health – Key Messages**. Similar to the CFIA fact sheets, this document discusses the history of AI in North America, transmission among birds and to humans, food safety issues and vaccination.

The United States Centre for Disease Control and Prevention (CDC) published general AI information, such as **Outbreaks in North America**. This document briefly describes the Canadian outbreak of 2004 and the numerous US outbreaks in 2003 and 2004.

## Biosecurity

The CFIA has produced three documents on reducing the risks of transmission of the AI Virus. The first document **Avian Influenza – Routes of Transmission** provides general information on how the virus is spread in natural environments and by people and methods of preventing introduction or further spreading of the AI virus. The other is **Avian Influenza – Preventing Avian Influenza Spread on Your Premises**. The document deals with preventative measures that can be implemented on the farm to reduce the risk of further transmission. The CFIA has also produced a poster, **Protect Your Poultry** for the poultry industry that details specific steps to prevent infection and tips on detecting infection.

The CFC, in the September 2005 edition of its newsletter **The Chicken Farmer**, published two articles, *The Importance of Biosecurity in Avian Influenza Prevention* and *Biosecurity Reminder* which contain several recommendations to poultry producers on preventing the spread of AI.

In October 2005, Farm Credit Canada (FCC) made reference to the recommendations of CFC to poultry workers in the FCC newsletter **AgriSuccess Express**. This article also mentions recommendations from the Public Health Agency of Canada (PHAC) for poultry workers to receive the flu vaccination should another AI outbreak occur.

The US Department of Agriculture's Animal and Plant Health Inspection Service (APHIS) also produced a biosafety document called **Biosecurity for the Birds** which outlines several steps for keeping poultry healthy, as part of its national campaign to promote avian health.

## AI and Food Safety

In June 2004, the CFIA issued a news release on **Avian Influenza and Food Safety** which contains information on the food safety implications of AI in general and specific information on the 2004 BC outbreak.

The World Organization for Animal Health (OIE) published a short document simply called **Food Safety** on public health risks associated with AI and methods to ensure food safety.

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# Avian Influenza

## What is avian influenza?

Avian influenza (AI) is a contagious viral infection caused by the influenza virus Type "A", which can affect several species of food producing birds (chickens, turkeys, quails, guinea fowl, etc.), as well as pet birds and wild birds.

AI viruses can be classified into two categories: **low pathogenic (LPAI)** and **high pathogenic (HPAI)** forms based on the severity of the illness caused in birds, with AI causing the greatest number of deaths in birds. Most AI viruses are **low pathogenic** and typically cause little or no clinical signs in infected birds. However, some **low pathogenic** viruses are capable of mutating into **high pathogenic** viruses. There are many influenza subtypes, two of which include H5 and H7. Historically, only the H5 and H7 subtypes are known to have become **high pathogenic** in avian species.

## What are the signs of disease?

Some or all of the following clinical signs are evident in infected birds:

- quietness and extreme depression;
- sudden drop in production of eggs, many of which are soft-shelled or shell-less;
- wattles and combs become swollen and congested;
- swelling of the skin under the eyes;
- coughing, sneezing and nervous signs;
- diarrhea;
- oedema (swelling) and congestion of the combs;
- hemorrhages on the hock;
- a few deaths may occur over several days, but an outbreak may follow, killing hundreds or thousands of birds each day.

Diagnosis of avian influenza may be made on the basis of clinical signs and

events leading to the disease. However, since the signs and course of avian influenza are similar to other diseases, laboratory diagnosis is essential.

## How is the disease transmitted to birds?

Wild birds, especially waterfowl, are natural reservoirs for the influenza viruses - yet show no clinical signs - and can be responsible for the primary introduction of infection into domestic poultry.

The disease can also spread to birds through contact with infected poultry and poultry products, and through manure and litter containing high concentrations of the virus, for example through contaminated clothing and footwear, vehicles and equipment, and feed and water.

## Is avian influenza transmissible to humans?

Avian influenza viruses, such as the H5 virus present in Asia, may, on rare occasions, cause disease in humans. Human transmission has occurred to people having prolonged contact with heavily contaminated environments. Human to human transmission of avian influenza is extremely limited.

Due to the potential for human infection, it is recommended that those people working with or in contact with poultry suspected of being infected with avian influenza wear protective clothing, including face masks, goggles, gloves and boots.

For more information, visit the Public Health Agency of Canada Web site at: http://www.phac-aspc.gc.ca/influenza/avian_e.html.

## Does avian influenza occur in Canada?

In the sixties, when turkeys were often raised in ranges (outdoors), cases of low pathogenic avian influenza were often reported in the autumn. One of the viruses isolated in 1966 was later found to meet the modern criteria of a high pathogenic influenza virus. Since the sixties, the majority of turkeys have been raised in closed poultry houses to control other diseases and are managed under more stringent bio-security conditions. As a result, the cases of low pathogenic avian influenza have been rare. Canada has had three cases of low pathogenic H5 and H7 since 1975, the latest of which was reported in 2000.

In February 2004, the Canadian Food Inspection Agency (CFIA) identified the presence of a low pathogenic H7 avian influenza in the Fraser Valley area of southern British Columbia. Subsequent tests revealed the presence

of highly pathogenic H7 avian influenza in British Columbia in March 2004. The CFIA depopulated all infected premises (42 commercial and 11 backyard premises) on which highly pathogenic avian influenza was found and pre-emptively destroyed all birds in the surrounding three kilometre areas.

## What is the CFIA's role in controlling and preventing this disease from entering Canada?

AI is a reportable disease under the Health of Animals Act. This means that all suspected cases must be reported to the CFIA. All reported suspect cases are immediately investigated by inspectors from the agency. The CFIA imposes strict regulations on the import of poultry and poultry products from foreign countries. These regulations are enforced through port-of-entry inspections.

Canada's emergency response strategy in the event of an outbreak of a foreign animal disease is to eradicate the disease and re-establish the country's disease-free status as quickly as possible. In an effort to eradicate AI, the CFIA would employ its "stamping out" policy, which would include:

- The humane destruction of all infected and exposed animals;
- Surveillance and tracing of potentially infected or exposed animals;
- Strict quarantine and animal movement controls;
- Thorough decontamination of infected premises;
- Zoning to define infected and disease-free areas.

## What can travellers do to avoid bringing the disease into the country?

**While out of the country:**

Avoid visiting areas where you may come into contact with live birds, such as poultry farms, live bird markets or any other area where birds congregate. This is most important in countries experiencing an outbreak of high pathogenic avian influenza. (An updated list of countries affected by AI can be found at the World Organisation for Animal Health Web site at http://www.oie.int/eng/en_index.htm). If you are in contact with live birds infected with the AI virus, the virus may persist on clothing, footwear and in hair. Take appropriate personal hygiene measures including thorough hand washing and showering, wash clothing, and clean and disinfect footwear.

**On returning home:**

1. Ensure all birds and poultry products you wish to bring into Canada are eligible for entry and declare all animal products upon arrival.
2. If you visit an area where you have been in contact with live birds while abroad and/or you plan to go onto a live bird premises shortly after your return to Canada, make sure that any clothing and footwear you wear are free from soil and manure before entering Canada. Also, take appropriate personal hygiene measures including thorough hand washing and showering, wash clothing, and clean and disinfect footwear after arrival.

For more travel information, visit Public Health Agency of Canada Travel Medicine Program Web site at www.TravelHealth.gc.ca.

## What can livestock producers do to prevent infection on their farm?

Wild bird populations are the natural reservoir for the influenza viruses. Therefore, it is essential for commercial poultry producers to maintain strict bio-security practices.

On a farm:

- Keep away from areas frequented by wild fowl;
- Keep strict control over access to your poultry houses by people and equipment;
- Keep equipment cleaned and disinfected before taking it into poultry houses;
- Do not keep bird feeders and duck ponds on your farm. This will discourage wild birds.
- Maintain high sanitation standards.

If clinical signs are noticed or suspected in poultry, contact your veterinarian or the CFIA office in your area. Producers are obligated to report any suspicion of AI because it is a reportable disease under the *Health of Animals Act*.

## There are reports of H5N1 infections in domestic cats. Is it possible for household pets to contract avian flu?

Avian influenza typically affects species of food producing birds (chickens, turkeys, quails, guinea fowl, etc.), as well as pet birds and wild birds. Studies have shown that a small number of mammalian species, including pigs, seals, whales, mink, and ferrets, are susceptible to natural infection with avian influenza viruses. However, of these species, the pig is the only one

that has significance for human health. While there have been recent reports of avian influenza infection in domestic cats in Thailand, this is a rare event. The World Health Organization continues to investigate the case in Thailand but reports that is unlikely that H5N1 infection in cats presents a risk to human health.

## How to get more information?

Contact the Canadian Food Inspection Agency Area Offices:

| | |
|---|---|
| Atlantic Area: | (506) 851-7400 |
| Quebec Area: | (514) 283-8888 |
| Ontario Area: | (519) 837-9400 |
| Western Area: | (403) 292-4301 |

You can also find the telephone number of your local Canadian Food Inspection Agency District Office by consulting the blue pages of your local phone directory.

Health Canada Website links:

- http://www.phac-aspc.gc.ca/influenza/avian_e.html
- Main Page - Avian Influenza

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# Avian Influenza - Virus Subtypes

**What is avian influenza?**

Avian influenza (AI) is a contagious viral infection caused by the influenza virus Type "A", which can affect several species of food producing birds (chickens, turkeys, quails, guinea fowl, etc.), as well as pet birds and wild birds. All subtypes of influenza A viruses are naturally hosted by wild waterfowl.

**What's the difference between low and high pathogenicity?**

Avian influenza viruses can be classified into two categories: low pathogenic (LPAI) and high pathogenic (HPAI) forms based on the severity of the illness caused in domestic birds. The first causes mild illness, including ruffled feathers or reduced egg production. The second form, known as "high pathogenic avian influenza" is of greater concern. This form is extremely contagious in birds and rapidly fatal.

**How many variations of the virus exist?**

Influenza A viruses can be divided into subtypes based on two proteins on the surface of the virus - hemagglutinin (HA) and neuraminidase (NA). There are fifteen known HA subtypes (H1-H15) and nine NA subtypes (N1-N9). Any number of combinations are possible, as each virus has one HA and one NA antigen.

**Are all avian influenza viruses the same?**

Most avian influenza viruses are low pathogenic and typically result in little or no clinical signs in infected birds.

Only the H5 and H7 subtypes are of concern in domestic birds. Over the past 30 years only the H5 and H7 subtypes have been known to mutate into

high pathogenic forms, therefore affecting birds at a higher rate. All other subtypes (H1 through H4, H6 and H8 through H15) may cause disease and death in domestic birds. However, the illness spreads at a much slower rate than H5 and H7. Depopulation of birds infected with the H5 or H7 virus contributes significantly to reducing the amount of virus in the environment, therefore preventing the spread of the virus.

**How many variations have been associated with illness in humans?**

Some variations of the H5, H7 and H9 subtypes have also been associated with illness and disease in humans. Specifically H5N1 (most recently in Asia), H7N7 (previously in the Netherlands) and H9N2 (previously in Southern China and Hong Kong) have been known to cause illness in people.

For more information, visit the Public Health Agency of Canada Web site at:

- http://www.phac-aspc.gc.ca/influenza/avian_e.html

**Which subtypes are routinely tested for?**

The Canadian Food Inspection Agency has the capability to test for all fifteen subtypes of avian influenza. In the case of an epizootic (animal epidemic), the focus of testing would become the H5 and the H7 and their subtypes, which have caused disease in domestic birds in the past and which have historically been known to change from low to high pathogenic.

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# Avian Influenza and Human Health – Key Messages

**What is Avian Influenza?**

Avian Influenza (AI) is a viral infection which can affect birds. Many wild birds carry influenza viruses without becoming ill, due to a natural resistance, but the disease is significant to domestic poultry. Signs of the disease range from a mild infection with no symptoms, to a severe epidemic that kills up to 100% of infected birds.

AI viruses are classified into two categories: low pathogenic and highly pathogenic forms, based on the severity of the illness caused in birds. Pathogenicity refers to how contagious the virus is among birds – it does not indicate how contagious it is to humans.

It's important to remember that farmers take every precaution to protect human health regardless of how pathogenic a virus may be.

**Recent History of Avian Influenza**

AI has flared up several times in different parts of the globe in the past 20 years. Most notably, it appeared in late 2003 in Southeast Asia. A severe form of avian influenza first appeared in several different Asian countries in highly pathogenic form. This strain has been linked to over 50 human deaths – it has also led to millions of birds' deaths either by the disease or by depopulation in an effort to control the virus. The majority of the human cases were traced to direct contact with poultry.

This form of this virus has not been detected anywhere in North America.

**The Canadian Connection**

A different strain of avian influenza appeared in 2004 in British Columbia. Over a short period of time the virus mutated from low pathogenic to high pathogenic and became more virulent to the bird population.

By the end of May, three months after it was first detected, most of the 19 million chickens in the Fraser Valley were tested and then depopulated. Over 15 million tested negative and went to market as usual. Movement controls and surveillance systems were established while the government and industry worked to eradicate the disease.

Employees and contract workers were continually monitored throughout the depopulation, cleaning and restocking phases. Some minor cases of flu-like respiratory illness were identified and all infected persons recovered fully shortly after being diagnosed.

While trying to contain the outbreak, poultry personnel and animal health specialists were required to

wear personal protective equipment, much of it similar to what industry employees wear everyday, such as boots, coveralls, gloves, face masks, and head gear; they followed enhance security procedures when on premises known or suspected to be infected with AI.

At no time during the outbreak were there any severe cases of human illness. Moreover, Canadian chicken was, and is, safe to eat when prepared properly. Throughout the outbreak, chicken was raised and consumed among consumers throughout the country.

**Avian Influenza in North America**

Several other North American cases of AI have been detected over the past three years in Texas, Connecticut, Rhode Island and New Jersey – among others. Again, none of these were the same form as that which has affected Asia.

These were each a different type of AI and no links were ever found to connect the outbreaks. In each case, a “stamping out” (eradication) and vaccination process was effective in limiting the spread of the disease to a given area.

AI surveillance is seen as a priority in North America and is an integral part of a contagious animal disease response strategy.

**How does the disease usually affect humans that get infected?**

While AI viruses do not usually infect humans, there have been some instances of human infections during outbreaks over the past 10 years. Most cases of AI infection in humans are a result of direct contact with infected poultry or contaminated surfaces.

The symptoms in the majority of human cases range from typical flu-like symptoms (e.g., fever, cough, sore throat, and muscle aches) to eye infections (conjunctivitis). In the Asian avian influenza cases, symptoms grew to include pneumonia, acute respiratory distress, viral pneumonia, and other severe and life-threatening complications.

**How is the disease transmitted to birds?**

Infection in birds most commonly results from:

- Contact with wild birds, including waterfowl that sometimes display no symptoms;
- Contaminated clothing and footwear;
- Contaminated vehicles and equipment, feed and water;
- High concentrations of virus in manure and litter;
- Rodents or farm dogs and cats which may act as mechanical vectors.

**How is the disease transmitted to humans?**

Avian influenza viruses may be transmitted to humans in two key ways:

- Directly from birds or from avian virus-contaminated environments to people.
- Through an intermediate host, such as swine.

The possibility for human-to-human transmission exists in very close circumstances and there is also the remote chance that AI may adapt (or 'mutate') into a human type of influenza.

This mutability is of concern to doctors and scientists, since it might increase the level of contagion. The term "pandemic" has been used to describe increase in the spread of the disease. So far, the increase in human-to-human transmissions, that is an indicator of a pandemic, has not happened, but the World Health Organization and all public health agencies remain in a state of preparedness.

**What can people do to prevent the spread?**

Anyone can be vector for any virus if adequate biosecurity precautions are not followed. Biosecurity is of critical importance year-round, not just when there is a potential outbreak. To put the virulence in context, one gram of contaminated manure can contain enough virus to infect one million birds. (USDA)

Farmers are vigilant about restricting access onto their farm to only people that are necessary for the operation. To ensure restricted access, all doors must be kept locked and Controlled Access Zones are strictly enforced. Because AI can be transferred easily, farmers do not allow pets into the barn and must insist that all authorized visitors wear protective clothing.

Biosecurity is integral to stopping the spread of any virus. In the case of avian influenza, everyone in contact with a farm or birds (including farmers, feed representatives, poultry veterinarians, catching crews and spray crews) takes all precautions to prevent transmitting the disease on places like their boots, clothing, or on the tires of their vehicles. Since any and all visitors and equipment can provide a threat of transmission, the industry takes major precautions to ensure that steps are taken to prevent any spread.

**What is the risk of the Asian H5N1 coming to Canada?**

The risk of the Asian strain of AI coming to Canada is low. The system there is very different than the Canadian system. In Asian, people have regular and direct contact with live birds. In Canada, consumers are rarely exposed to live birds.

Some of the differences between the North American systems and those in many other countries are:

- Non-farmers don't have regular contact with chickens.
- Wild birds do not have any direct contact with chickens.
- Flocks are kept separate from each other.

Health Canada has issued a travel advisory that recommends that people visiting some Asian countries stay away from live poultry markets, and that they cook their poultry and egg products thoroughly, which they should always do.

**Is chicken safe to eat in Canada?**

AI has never been passed on to humans as the result of eating cooked poultry meat or eggs. It is usually transmitted via exposure to bird manure or through exposure to birds' nasal and eye discharges.

So, yes, chicken in Canada poses a very low risk for consumers, but there must be diligence.

As with all meats, Canadians should use proper cooking times and temperatures, by using proper handling techniques and by checking internal temperatures of meat with a meat thermometer whenever possible.

In the extremely unlikely event that the avian influenza (AI) virus was present on chicken meat, it would be destroyed during the cooking process. An internal temperature of 72°C (162°F) is sufficient to kill an AI virus, which is well below the normal internal temperature of fully cooked chicken (77-80°C or 170-176° F). In essence, if one uses the correct times to kill normal bacteria, one would ensure that any virus on the meat would be destroyed and the product would be safe. Again, though, it is extremely unlikely that the avian influenza virus would present itself on chicken meat in Canada.

**Is there a vaccine for the Asian H5N1 avian influenza virus?**

A vaccine is not currently available. At this point though, a genetically modified seed strain for vaccine development is available and vaccine manufacturers in several countries, including Canada have acquired this seed strain. Manufacturers are working now to develop a virus seed bank for future vaccine production.

**Is the Asian H5N1 virus, or any type of avian influenza, going to evolve into a strain of pandemic influenza?**

It is not clear yet whether or not H5N1 will evolve into a pandemic strain but, since it has shown the ability to mutate, it is a concern. Influenza viruses are constantly changing over time and it is possible that a virus that is more efficiently transmissible to and among humans may evolve.

Still, there is currently no indication that the virus has changed to a form that could result in a pandemic. It's important to know that public health agencies are closely monitoring this possibility.

If H5N1, or any other strain of AI, were to evolve into a pandemic strain of influenza, based on the scientific research that's been done, we would begin to see efficient and sustained human-to-human transmission of the virus. This means a large and growing number of new and unrelated cases increasing daily which, to date, has not been the case.

**Should individuals get a flu shot to guard against AI?**

The current season's  flu shot does not protect against AI.

Immunization with the current season flu vaccine is important, though, for those in close contact with infected poultry because it may reduce the likelihood that a worker would be infected with both the human and avian forms of influenza at the same time, which could pose a greater risk.

**NOTE:** Your Web browser does not allow you to properly view the navigation links provided here, but you can view the navigation links separately.

# Outbreaks in North America

October 17, 2005

**Avian Flu Outbreaks**

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- Asia
- Embargo of Birds
- Quarantine Executive Order (From the White House)
- Quarantine Executive Order Q & A

## Recent North American Outbreaks of Avian Influenza with Transmission to Humans

**H7N3 in Canada - 2004**

On February 19, 2004 , the Canadian Food Inspection Agency announced an outbreak of avian influenza A (H7N3) in poultry in the Fraser Valley region of British Columbia . Culling operations and other measures were performed in an effort to control the spread of the virus. Health Canada reported two cases of laboratory-confirmed influenza A (H7): one in a person involved in culling operations on March 13-14, and the other in a poultry worker who had close contact with poultry on March 22-23. Both patients developed conjunctivitis (eye infection) and other flu-like symptoms. Their illnesses resolved after treatment with the antiviral medication oseltamivir.

Although these are the only laboratory-confirmed cases of avian influenza A (H7) in humans during this outbreak in Canada , approximately 10 other poultry workers exhibited conjunctival and/or upper respiratory symptoms after having contact with poultry. Use of personal protective equipment is mandatory for all persons involved in culling activities, and compliance with prescribed safety measures is monitored. Epidemiologic, laboratory, and clinical evaluation is ongoing, as is surveillance for signs of avian influenza in exposed persons. There is currently no evidence of person-to-person transmission of avian influenza from this outbreak. For more information about this outbreak, visit the Canadian Food Inspection Agency website at http://www.inspection.gc.ca/english/anima/heasan/disemala/avflu/situatione.shtml .

**H7N2 in New York - 2003**

In November 2003, a patient with serious underlying medical conditions was admitted to a hospital in New York with respiratory symptoms. One of the initial laboratory tests identified an influenza A virus that was thought to be H1N1. The patient recovered and went home after a few weeks. Subsequent confirmatory tests conducted in March showed that the patient had been infected with an H7N2 avian influenza A virus.

## Recent Outbreaks among Poultry in the United States with No Transmission to Humans

***H5N2 in Texas – 2004***

In February 2004, an outbreak of highly pathogenic avian influenza (HPAI) A (H5N2) was detected and reported in a flock of 7,000 chickens in south-central Texas . This was the first outbreak of HPAI in the United States in 20 years.

***H7N2 in Delaware , New Jersey , and Maryland - 2004***

In February 2004, an outbreak of low pathogenic avian influena (LPAI) A (H7N2) was reported on 2 chicken farms in Delaware and in four live bird markets in New Jersey supplied by the farms. In March 2004, surveillance samples from a flock of chickens in Maryland tested positive for LPAI H7N2. It is likely that this was the same strain.

**For Additional Information**

For information about plans for preventing and responding to avian influenza outbreaks in poultry in the United States, visit "Safeguarding the United States from Highly-Pathogenic Avian Influenza" on the the United States Department of Agriculture (USDA) Web site.

For CDC guidance about protection for persons in the United States involved in poultry outbreaks or in disease control and eradication, see: Interim Recommendations for Persons with Possible Exposure to Avian Influenza During Outbreaks Among Poultry in the United States and Interim Guidance for Protection of Persons Involved in U.S. Avian Influenza Outbreak Disease Control and Eradication Activities.



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# AVIAN INFLUENZA - ROUTES OF TRANSMISSION

**What are the possible routes of transmission of avian influenza?**

There are two possible ways in which the virus can be transmitted: the natural environment, and people.

**How is the virus spread through the natural environment?**

The virus can be spread by wild birds or by water. Waterfowl and shorebirds are prone to the virus, and there is incidence of low pathogenic avian influenza in wild birds tested by the CFIA. The investigation to date has revealed that wild birds are the likely vector that first brought the virus into the region, and it has since mutated into the high pathogenic form. But the spread of the virus among wild fowl is considerably slower than what we have seen in the Fraser Valley in the past six weeks. While there remains a concern that the virus will be spread by wild birds, the CFIA does not believe that is the cause of the current spread of avian influenza.

Poultry feed may sometimes be exposed to droppings from wild birds. This risk might explain the outbreak in individual farms, but would not explain the rapid spread of the virus.

There is also a danger that wild birds may contaminate surface water, which might find its way to well water. This may be a risk for individual farms, but it is not likely the cause of the rapid spread of the virus among farms.

**How is the virus spread by people?**

There is a very broad range of people who come in contact with the avian influenza virus and could spread it if they do not take adequate biosecurity precautions. Owners and managers of multiple farms and farm workers who are employed on several farms must be very careful about following the biosecurity protocols. Feed representatives, poultry veterinarians, catching crews, spray crews and others having access to poultry premises could

transmit the virus on their boots, clothing, or on the tires of their vehicles. Casual visitors and relatives provide a threat of transmission as well. Equipment used by any person visiting a poultry farm also provides a vector for transmitting the virus.

**How can people prevent spreading or introducing the virus to poultry?**

Basic biosecurity procedures can slow down the spread of the virus, helping the CFIA to contain and stamp out the virus. Strict on-farm and personal biosecurity practices protect poultry operations of any size.

- Keep poultry in **closed** poultry houses
- Keep wild birds and their feces away from poultry and poultry feed
- Seal poultry house attics and cover ventilation openings with screens
- Thoroughly and routinely clean all equipment, vehicles, including service vehicles, clothing and footwear before and after coming into contact with poultry
- Ensure proper hygiene practices for all persons coming into contact with poultry
- Maintain high sanitation standards in and around poultry houses
- Isolate or avoid introducing new birds into existing poultry flocks if their health status is unknown
- Limit access to poultry houses, including farm workers, feed suppliers, poultry veterinarians, catching crews, sawdust and shavings suppliers, agricultural service personnel and casual visitors
- Avoid using water in poultry houses contaminated with feces from wild birds
- Ensure thorough cleaning and disinfection for all cages transporting birds
- Maintain a log of all visitors coming into contact with poultry

Within the control area, all premises where poultry are kept must also have a sign at the gate and at the entrance to all buildings forbidding entry without the owner's permission. This gives every poultry owner the chance to control

who enters the premises.

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# AVIAN INFLUENZA - Preventing Avian Influenza Spread on Your Premises

Vehicles, equipment and clothing can carry the avian influenza virus. As a general practice, poultry owners should strictly limit access to their premises. If visitors must enter, ensure that they take the following biosecurity precautions. These measures can significantly reduce the risk of avian influenza spread.

### Clothing

Clean coveralls or other clothing should be provided for all visitors. Require all visitors to wear these over their clothes while on your premises. Clean these clothes each day using normal laundering practices.

### Hygiene

Require all visitors to wash their hands before entering your barns.

### Footwear

Require all visitors to wear footwear you supply while on your premises. If this is not feasible, thoroughly clean all debris from footwear with soap and water followed by disinfectant*. As an added precaution, foot baths containing disinfectant should be placed at the entrance of poultry houses to clean entering and exiting footwear.

### Vehicles

Place a standard pump sprayer containing disinfectant at the entrance to your property. Require all visitors to thoroughly spray their vehicles – particularly the tires, wheel wells and undercarriage – before driving onto your premises.

## Equipment

Ensure all equipment brought onto your premises is clean. To further protect against avian influenza spread, spray equipment with disinfectant.

** Disinfectant: The Canadian Food Inspection Agency recommends using a solution of equal parts bleach and water.*

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# Protect Your Poultry

If you suspect that poultry may be infected, immediately contact your veterinarian, your provincial ministry of agriculture, or the Canadian Food Inspection Agency (CFIA) office in your area:

**Atlantic Area:** (506) 851-7400
**Quebec Area:** (514) 283-8888
**Ontario Area:** (519) 837-9400
**Western Area:** (403) 292-4301

## *Avian Influenza*

### Preventing Infection

Avian influenza can be introduced into domestic poultry through several routes of transmission. Strict on-farm and personal biosecurity practices protect poultry operations of any size.

- Keep poultry in **closed** poultry houses
- Keep wild birds and their feces away from poultry and poultry feed
- Seal poultry house attics and cover ventilation openings with screens
- Thoroughly and routinely clean all equipment, vehicles, including service vehicles, clothing and footwear before and after coming into contact with poultry
- Ensure proper hygiene practices for all persons coming into contact with poultry
- Maintain high sanitation standards in and around poultry houses
- Isolate or avoid introducing new birds into existing poultry flocks if their health status is unknown
- Limit access to poultry houses, including farm workers, feed suppliers, poultry veterinarians, catching crews, sawdust and shavings suppliers, agricultural service personnel and casual visitors
- Avoid using water in poultry houses contaminated with feces from wild birds
- Ensure thorough cleaning and disinfection for all cages transporting birds
- Maintain a log of all visitors coming into contact with poultry

### Detecting Infection

Infected birds may show a variety of clinical signs.

- Lack of energy and appetite
- Drop in production of eggs, many of which are soft-shelled or shell-less
- Swelling of the head, eyelids, comb, wattles, and hocks
- Coughing, sneezing and nervous signs
- Diarrhea
- Sudden death
- Lack of coordination

**For further information, please visit the CFIA Web site at:**

www.

**inspection.gc.ca/english/anima/heasan/disemala/avflu/avflue.shtml**

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Canada

THE CHICKEN FARMER

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# Animal Care on the Agenda

Public and farmer attitudes about animal care have evolved significantly over the past 25 years. Changes in these attitudes, as well as industry developments and enhancements, have resulted in ongoing and progressive developments in farm animal care practices.

Our studies show that, among consumers, animal rights issues concerning chickens have increased significantly over the last ten years, overtaking the prominence of issues regarding cows. At the same time, Canadians have lost touch with farming and food production issues. With most of us living in towns and cities today, people often don't realize how agriculture has changed, or even what route food follows on its way to the grocery store.

As a result, growing numbers of people have inaccurate notions of farming and food production. Whether these notions are nostalgic and romantic or negative and disconcerting, the realities of farming sometimes come as a real surprise.

Our mission is to dispel these myths and work with our industry partners to ensure that our commitments to high standards in the care and handling of chickens are met and followed. After all, it is in the best interest of all industry players to see that birds are raised in the most careful and conscientious manner.

Over the next few issues we will be featuring some of our industry partners who participated in the creation of the codes we follow.

### CFC Animal Care Committee

In March 2003, CFC established a committee to examine the development of an auditable animal care program based on the revised *Recommended code of practice for the care and handling of farm animals: Chickens, Turkeys and Breeders from Hatchery to Processing Plant*. The goal was to develop a comprehensive program designed to demonstrate the appropriate care given to Canadian chickens.

These nationally developed guidelines set out recommended standards for the care and handling of farm animals, based on current scientific knowledge and farming experience. The Code of Practice should not be considered complete or perfect and future updates to the Code may be needed in order to reflect new economic, technical, and practical considerations.

CFC's Animal Care Program is designed to be auditable and is based on the Code of Practice. In July 2004, the Animal Care Committee presented a draft program to the Board of Directors and was directed to conduct pilot projects of the draft program in all provinces to test its practicality and ease of implementation. The pilot projects began in January 2005. The program is currently being reviewed by industry partners and has received some positive initial feedback.

As an audited on-farm program, CFC anticipates that third party inspections will make the program more transparent.

### The Canadian Federation of Humane Societies

A key industry partner in the review of the Code of Practice is the Canadian Federation of Humane Societies (CFHS), a national charitable organization that serves as animal advocates rather than activists. The CFHS works from within to help improve the standards and regulations that govern the care and handling of animals.

As an advocate, the CFHS is willing to work alongside the industry to research and improve the living conditions under which animals are raised, handled and transported. Animal rights activists lean towards a more rigid, less cooperative approach.

With over 100 member societies and branches, representing some 400,000 individuals and with a mandate "to promote compassion and humane treatment for all animals," the CFHS participates on livestock committees and within varied animal care initiatives across Canada to provide a voice for animal welfare. They indeed see the big picture, that the Canadian culture involves the consumption of meat and are willing to work with our industries to adopt systems that offer improved animal welfare.

CFHS accepts only those practices which provide high levels of care for the animals, protect them from suffering at all stages of their lives, respect the welfare of individual

Please see CFHS, p.2

Chicken Farmers of Canada
Les Producteurs de poulet du Canada

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CFC's website is: www.chicken.ca

**Continued from p.1, CFHS ...**

animals and provide for the animals' physical and psychological well-being and behavioural needs.

Shelagh MacDonald, program director for CFHS, believes that there will always be a role to play for animal welfare advocates in the process of setting, evaluating and improving animal care guidelines. "We want to be involved in the humane treatment of animals," she said. "It is definitely more valuable to be at the table on many of these initiatives than to criticize from afar."

"We are participating in an attempt to guide and improve the industries," said MacDonald. "The Codes of Practice have played a role in establishing minimum standards for husbandry and we are pleased that recently there has been a clear move on the part of the farming industry to adopt auditable animal welfare standards in Canada."

MacDonald believes that CFC has been moving in the right direction with the implementation of an animal care program and is currently reviewing the draft program.

**The Canadian Federation of Humane Societies strives to:**

1. prevent cruelty and suffering to animals recognizing that all animals have intrinsic value, remarkable complexity, inherent dignity and are subjects of moral concern;
2. proceed from the principle that no one has the right to cause physical or mental pain or suffering to any animal;
3. work within the law and in cooperation with government, research and industry representatives; and
4. educate the general public, and improve conditions for animals while maintaining a balanced sensitivity towards both animal and human needs.

# Stakes are High at the WTO Negotiations

Once again, the month of July was very busy in terms of agriculture negotiations and other WTO events. The summer break seemed, once again, to be an informal deadline for mid-year results. Negotiators expected to achieve a lot. Or so they hoped.

Why? Because the stakes are getting higher. There is a firm deadline in place to achieve an agreement on full modalities at the next WTO Ministerial Conference in December in Hong Kong. These talks in Geneva were supposed to produce a first draft (called "first approximation") for these modalities by the end of the month. It did not happen.

After a very intense 6-month period, with countless meetings at all possible levels – technical experts, chief negotiators, ministers, prime ministers and even a G8 summit meeting – the negotiations could not advance as much as many had hoped.

At the end of June, Tim Groser, the Chair of agriculture negotiations, issued a preliminary status report that pointed out the major problem areas that need solving in order to move forward. It was clear that the level of ambition was going to be lowered: the "draft modalities" became "first approximation", which then became "refined assessment" and finally just a "report".

The major reason why so little progress was made this summer is that the market access pillar in these agriculture negotiations is the most complex and difficult one. Countries simply need more time to find an agreement in this area. In addition, many other smaller factors contributed to the slowdown.

- First, the U.S. postponed making any move on WTO negotiations before the Congress voted on the much-debated CAFTA Agreement – a free trade agreement with several Central American countries. While some saw the benefits of free trade, others pointed to thousands of job losses. It was only at the end of the month, the night of Wednesday, July 27, that the Congress finally passed this agreement with a very narrow margin of 2 votes.
- Second, because the U.S. was not making any move, the EU wasn't either. As simple as that.
- Third, it became clear that Tim Groser would no longer be the Chair of agriculture negotiations. Due to his decision to run for the opposition party in New Zealand's parliamentary elections, his government replaced him as ambassador to the WTO and would no longer support him as Chair of agriculture negotiations after July. The need for a new chairman in September diverted some focus from the negotiations. The new New Zealand ambassador to the WTO, Crawford Falconer, will replace Groser.
- Fourth, the trade organization itself renewed its leadership. As of September, Pascal Lamy, the former EU trade commissioner, becomes the new WTO Director General. With a very active and energetic nature, many await for his involvement to push this round of negotiations forward. The December deadline does not leave him much time.

**Moving Forward**

Of note this summer was the Dalian (China) mini-ministerial meeting at the beginning of July, when ministers agreed to use a G20 – a group of export-oriented developing countries – proposal on market access as a starting point for further negotiations. That proposal defined a tariff reduction formula with 5 tiers and proposed linear cuts for each tier (same percentage cut to apply to all tariffs within a given tier). It also proposed a tariff cap at the level of 100% for products subject to the general tariff reduction formula, but said little about the treatment of sensitive products.

Shortly after, the European Union suggested another idea of a reduction formula having 3 tiers and average cuts, with a minimum and a maximum, for each tier. The major EU objective was to see flexibility both in the reduction formula and with respect to the treatment of sensitive products, something which most countries opposed:

**Please see WTO, p.3**

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**Continued from p.2, WTO ...**

flexibilities are supposed to be negotiated only for sensitive products.

Both suggestions were rejected by Canada's poultry, dairy and egg farmers as both raised numerous concerns with respect to the general tariff reduction formula and the selection and treatment of sensitive products.

If July did not manage to produce much in these agriculture negotiations, it is possible that the same can be expected this autumn.

It was repeatedly made clear that the December Hong Kong Ministerial Conference remains a firm deadline for agreeing on a full modalities document and, after the summer break, negotiations are definitely going to pick up speed. Countries have already issued their positions, so everyone knows where the others stand. It is now only a matter of finding the common ground that can be accepted by all, and a first mini-ministerial meeting has already been planned for mid-October, with a second that might take place in mid-November.

CFC representatives were in Geneva at the end of July and, if necessary, will be there again this autumn, keeping in close contact with the Canadian negotiators, trying to influence a favourable modalities agreement and continuing to promote the interests of the Canadian chicken farmers. When negotiators get stuck, it is politicians' role to unlock the trade talks.

At that moment, we must all be ready to convey to our federal and provincial politicians this simple message: unlike other countries, we have no flexibility and no room to manoeuvre. Once again, no deal is better than a bad deal.

# Canada Day and Chicken — A Recipe for Success!

For the 13th consecutive year as national sponsor of Canada Day festivities in Ottawa, Chicken Farmers of Canada once again served nearly 10,000 chicken sandwiches at *The Great Canadian Chicken Barbecue*. As in previous years, the Boys and Girls Clubs of Canada received 50 cents from the sale of each chicken sandwich or Caesar salad, making the event a success on many levels.

After a rollercoaster year on the Hill, CFC also had the chance to pull out the seats, push up the umbrellas and play host to some of our government and industry colleagues and stakeholders. The chance to sit in the shadow of the Peace Tower, enjoy the food and celebrate in good company, has become a "must do" on many Canada Day agendas across the city.

One busy schedule in particular was that of Tina Lissemore, of Port Williams, Nova Scotia. Her winning sandwich, "The Taste of Summer Chicken Sandwich", won Tina and her family a trip to Ottawa for Canada Day in a nation-wide contest held in *Canadian Living* and *Coup de Pouce* magazines. The family enjoyed a day full of the events, sights and sounds that make celebrating July 1st in Ottawa a special experience.

As in previous years, CFC also had the chance to pair up with the Centurion Conference and Event Center.

Throughout the day crowds enjoyed the culinary skills of Chef Fouad El Jadayel, as he tempted audiences with the aroma of Mediterranean Shish Kebabs and Grilled Tuscan Chicken Breast.

For those who couldn't join us that day, and for those who would like to re-create the taste, the recipes used on Canada Day will be made available in the recipes section of the Chicken Farmers of Canada website at www.chicken.ca.

### Official Canada Day Charity

The Boys and Girls Clubs of Canada is one of this country's leading national, youth-serving organizations dedicated to providing high-quality services that promote the healthy growth and development of young Canadians and their families.

The Boys and Girls Clubs serve more than 150,000 children and youth in communities nationwide. Some three million young Canadians are club alumni. The 700 clubs, some over a hundred years old, are in large city centres, remote rural communities and on First Nations Reserves.

We are proud to be affiliated with such a distinguished and necessary organization.

See you next year!

CFC's website is: www.chicken.ca

# The Importance of Biosecurity in Avian Influenza Prevention

In early 2004, Canada suffered its worst outbreak of avian influenza ever. The highly pathogenic H7N3 virus swept through three clusters of egg and poultry operations in British Columbia's Fraser Valley. Over 13 million chickens, turkeys and other poultry were depopulated to contain the disease.

The economic and emotional toll left many wondering what caused the outbreak and what caused it to spread. Dr. Christine Power of the Animal Disease Surveillance Unit of the Canadian Food Inspection Agency issued an interim report in February 2005. She pulled together the expertise of several specialists throughout North America, many of whom were on the front lines of the Fraser Valley outbreak.

The report is preliminary and government officials continue their investigations. A clearer understanding of the outbreak is expected at the end of 2005 or early in 2006. The full interim report is available on the CFIA web site at: www.inspection.gc.ca/english/anima/heasan/disemala/avflu/2004rep/epie.shtml.

It is essential to note that the cause of the initial infection on a broiler breeder farm — known as the index farm — has not been determined. Likewise, the causes of the spread of the disease from one farm to the other have not been definitively determined though biosecurity and airborne transmission of the virus are thought to be the two most likely causes. The interim report is a good first step in determining what happened, why and for preventing another Fraser Valley-type incident in Canada.

The following highlights are provided to assist egg and poultry producers, and all who work with them, to review key production practices and avoid another outbreak of highly pathogenic avian influenza.

### The origins

An examination of the genes of the virus that got onto the index farm points to two potential sources: domestic poultry from Eastern North America and waterfowl from the Southern United States. In addition, the possibility that surface water contaminated by wild birds drained downward from a field into the index farm's well has not been ruled out. Government officials hope to have a better picture of the origins of the virus in the fall of 2005.

It is also possible that the low pathogenic form of the virus was introduced to the index farm by the re-using of hatchery egg racks and flats or by transferring roosters from one premise to another. These are only possibilities, however, and it is important to emphasize that investigations revealed hatcheries were not implicated in the spread of the virus after it became highly pathogenic.

Feed practices were also reviewed. Fecal contamination of grains is not likely to cause a multi-farm outbreak. Broiler breeder rations, however, are prepared as a mash that is not heat-treated. Therefore, it is possible that the virus can be introduced into those rations.

The bottom line is that the importance of protecting your flocks from both wild sources of disease as well as cross-contamination from other farms cannot be underestimated.

### The spread of the disease

Information gathered from managers of the first five farms infected ruled out that a common service provider spread the disease. However, it is quite possible that many different people actually contributed to the spread. A gram of infected feces can contain as many as ten billion virus particles, making it very easy to spread contaminated manure from one farm to another through the movement of people, equipment and vehicles. In addition, a small amount of contaminated dust on boots or clothing can transmit the virus from an infected barn to another premise.

An assessment of both surface water and ground water indicated only a low risk that the highly pathogenic virus spread from one farm to another by water. Officials reviewed drainage maps and tested water from ditches and sloughs. In addition, three of the first five infected farms were served by the municipal water system.

The CFIA report questions the backhauling of feed. If feed stored on-farm were contaminated and returned to the mill when the production cycle was over for recycling, it could contaminate other farms. In the case of the Fraser Valley outbreak, there was no association between any particular feed company and the way the disease spread among the first five farms.

### RECOMMENDATIONS

The Canadian egg and poultry industries' on-farm food safety programs recognize the importance of meticulous biosecurity in keeping disease away from flocks.[1] Although these programs have been developed to promote safe food, the criteria found in them are also those required to protect animal health.

You must consider several different ways the virus could get onto your farm including rodents, wild birds, insects and other pests, people, their clothing, equipment and vehicles. Correct deficiencies right away. Also, screen visitors and employees, monitor feed production and delivery and ensure proper clean-out and disinfection with downtime between flocks.

Please see AI, p.5

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**Continued from p.4, AI ...**

The CFIA report recommends that the risk of well beds becoming contaminated with water seeping from fields should be reviewed and the installation of barn water purifiers assessed. On feed practices, the report recommends reviewing backhauling as well as doing a risk assessment on the potential for grain crops to become contaminated in the field.

### Airborne Dispersion

A review of existing research in B.C. as well as an assessment of wind during the actual outbreak has revealed that airborne dispersion could have played a role.

A pre-outbreak study by the Sustainable Poultry Farming Group revealed that roughly 40% of dust near a poultry barn fan was invisible and could remain suspended in air for several days. CFIA, together with the Department of National Defence and Health Canada, collected over 240 air samples during the outbreak. One taken about 800 metres from an infected barn had very low levels of the avian influenza virus. It is not known if the virus was alive or dead.

The necessary operation of fans to ventilate birds and disposal crews over the many days and nights of the depopulation probably dispersed the virus into the air. The report also notes that the culling methods used on the first two infected premises had the potential to put the virus into the wind. CFIA examined meteorological data against the timing of infections and concluded that depopulation of the index farm resulted in a moderate risk for the virus to be carried by the wind to the second farm and a low risk for the fourth and fifth operations. In addition, there was a low risk of spread from the second premise to the fourth and fifth operations.

It will probably take several years to know for sure the degree to which airborne transmission is responsible for spreading avian influenza. Ultraviolet radiation, humidity and pollutants decrease the virus' survival rate while salinity found in coastal areas such as the Fraser Valley may protect it. Barns within 500 metres of each other are at higher risk for airborne transmission. In areas of high density, airborne transmission should be anticipated.

### RECOMMENDATIONS

In the case of a flock known to be infected with highly pathogenic avian influenza, or any H7 or H5 subtype, disposal must be under the authority of CFIA. Depopulation of infected flocks should occur as quickly as possible to avoid multiplication of the virus and should occur within barns to reduce windborne dispersion. Barn doors should be kept closed as much as possible during disposal. In addition, the CFIA's protocol now is to avoid moving carcasses off-farm and wherever possible to compost within the barns to reduce chances of disease spreading into the environment.

The closer you are to other poultry facilities, the more vigilant you need to be in your biosecurity. If you are planning new facilities, you need to consider proximity to other facilities and ways to reduce risks associated with proximity.

Given the current knowledge of livestock density and wind patterns in the Fraser Valley, the installation of barn inlet filters in the event of a second outbreak may be prudent. In addition, the report suggests the research and development of an air cleaning system that would disinfect or remove infected material from exhausted air of infected barns.

### Other findings

The report critically assesses other activities by CFIA that were brought into question during the outbreak. Dispatch records were studied to review inspectors' movements and no association could be found between on-farm activities of CFIA and increased spread of the disease.

Leakage from trailers hauling carcasses did occur. While the way this affected the disease spread is not known, the report recognizes the need for CFIA to identify materials and methods which would eliminate the chances of this happening again. The preferred protocol of on-farm composting where possible will address this problem in future outbreaks.

Leakage also occurred from trailers parked at an industrial site and the fluid entered a drainage ditch. This incident was potentially serious. The fluid, however, settled into the bottom of a ditch; a remediation service blocked the ditch and removed the organic fluid.

The time delays experienced in detecting infection, culling birds and disposing of carcasses may have contributed to the spread of the disease. Since the outbreak, CFIA has established an interim pre-emptive cull protocol to reduce delays.

### When avian influenza strikes

When avian influenza is found on a farm, the investigation must be broken down into priorities. The investigation must consider barn proximity. A barn in close proximity to other barns is at higher risk of infection than a barn in a low-density region.

**Please see AI, p.6**

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**Continued from p.5, AI ...**

Primary priorities: It must be determined quickly if new birds were introduced into the flock recently. In addition, you should examine your farm's biosecurity to determine if wild birds are gaining or have gained access to the barn. Other high-risk events must also be examined including the sharing of equipment and entrance to barns by producers, employees, catching crews, veterinarians and others.

Secondary priorities: Next, moderate risk activities must be assessed. These include individuals with access to the anteroom but not into the barn itself. These activities would include egg pick-up and visits by repair personnel.

Low-risk activities: Low-risk activities must also be assessed but after dealing with the primary and secondary priorities. Low-risk activities include feed deliveries, visits by feed salespersons, chick placements, manure or litter removal and delivery of litter, all when there is no entry into the poultry house.

In all cases, it is important that you practice heightened biosecurity by restricting all access to your farm and limiting travel to other poultry operations and businesses to avoid spreading the disease. Should avian influenza sub-types H5 or H7 be found on your farm, the Canadian Food Inspection Agency will implement its interim pre-emptive cull protocol and establish a movement restriction zone to stop the virus from spreading.

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[1]. On-farm food safety programs include *Start Clean-Stay Clean*™ for egg production; *Safe, Safer, Safest* for broiler production; *Canadian Hatching Egg Quality* (CHEQ™) for broiler hatching egg production; and the *On-Farm Food Safety Program* for turkey production.

# Biosecurity Reminder

For chicken farmers, *Safe, Safer, Safest*, our on-farm food safety assurance program (OFFSAP) is an excellent resource for biosecurity measures that are needed on the farm. The first line of defence is to limit what comes into contact with the flock. *Safe, Safer, Safest* requires both a restricted area (within the barn) and a controlled access zone (around the outside of the barn).

The fall is also a good time to review the biosecurity regimen of your farm. Recent incidents of intentional biosecurity breaches by members of the activist community, as well as the ongoing threat of contagious animal diseases both mean that our measures need to be kept up to date.

Recent history has shown that this is the time of year that the activist community can become more active and prone to trespassing, etc. Last year, incidents were reported across Canada and we now know that this type of activity has become widespread.

This notice should also benefit our partners in other areas of our industry, including board offices, processors, service providers, restaurants and others.

Please ensure that you take all necessary precautions to ensure the safety of your businesses, farms and animals.

Security reminders:

- Treat all unannounced visits by strangers with scrutiny. All requests for tours, employment, information or photographs should be verified with the highest standards for safety.
- Review all security and visitor protocols.
- Call the board office, and the police, to report any suspicious people who come onto private property, as well as any incidents, with as many details and photographs as possible.

These incidents often take place during the day, with visitors to farm properties wandering the grounds. They will sometimes acknowledge farmers who question them, saying that they are lost, or that they know the property from a long time ago, etc. Other times, they will run away without a word.

This reminds us of the importance of security, biosecurity and privacy on our farms.

Our job is to stay informed and to maintain the highest level of biosecurity possible on our farms.

**Be Vigilant!**

**CANADIAN SUPPLY CHAIN FOOD SAFETY COALITION**

On November 15, 2005, be a player in the Emergency Preparedness Session designed jointly by the Canadian Supply Chain Food Safety Coalition (CSCFSC) and the Canadian government (Canadian Food Inspection Agency, Health Canada).
Date: November 15, 2005
Time: 08:00-17:00
Place: Crowne Plaza Hotel, Ottawa, ON 101 Lyon Street
Guest room reservations: 1-800-227-6963 (Single room @ $129)

**Want more information?**

Contact Bryan Walton, Canadian Council of Grocery Distributors, Tel.: (613) 226-6690 or Marie-Claude Thibault, Canadian Produce Marketing Association, Tel.: (613) 226-4187, ext. 225.


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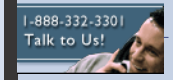




# AgriSuccess Express

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October 21, 2005

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**Negotiations intensify at WTO**

...by Kevin Hursh

Jim Peterson, International Trade Minister, and Andy Mitchell, Agriculture Minister, returned to Switzerland this week to participate in informal meetings of the World Trade Organization (WTO). Last week at mini-ministerial meetings in Zurich and Geneva, new momentum was added to the negotiations when the United States proposed a cut in farm subsidies in exchange for improved market access.

Also returning to Geneva this week were representatives of CAFTA, the Canadian Agri-Food Trade Alliance - an umbrella for agriculture and food organizations that favour a liberalized international trading environment.

“The U.S. proposal isn't perfect, but it did start things moving again,” said CAFTA President Liam McCreery. The American proposal was followed by new proposals from the European Union. “We hope that the momentum will continue this week, and that with the increased ministerial engagement, we will get movement towards an ambitious agreement for the Ministerial meeting in Hong Kong this December.”

Meanwhile, Canadian dairy, poultry and egg producers are calling on the Canadian government to categorically reject the trade proposals that have been presented by the Americans and Europeans.

“Despite the two largest subsidizers speaking of cutting subsidies, Canadian farmers should not expect the EU and U.S. to lower the actual amount they



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spend," said Jacques Laforge, President of the Dairy Farmers of Canada. "While the numbers sound big, even a 60 per cent cut in U.S. subsidy commitments would allow our neighbour to dole out more subsidies than it currently does."

Dairy, poultry and egg farmers across the country are meeting with their federal and provincial politicians to tell them that the current proposals could have a dramatic impact on supply management and the stability of those industries.

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**Poultry workers urged to take precautions**
...by Allison Finnamore

The discovery of avian influenza in birds in the European Union over the last week has renewed concerns of a global outbreak of avian influenza, both in flocks and humans. In Canada, Chicken Farmers of Canada is reiterating the need for tight biosecurity measures on the farm to keep avian influenza out of Canada.

Not only should producers keep their barn doors locked to prevent uncontrolled access, but they should also consider the various ways the avian influenza virus could be transmitted, such as rodents, wild birds, insects and other pests, people, their clothing, equipment and vehicles. Correct deficiencies right away, the group urges, and also be sure to screen visitors and employees, monitor feed production and delivery and ensure proper clean-out and disinfection with downtime between flocks.

According to Health Canada, flu viruses can mingle with one another and morph into a new strain. Although avian flu doesn't spread easily or quickly among humans, there is the possibly of someone with human flu becoming infected with avian flu and the theoretical possibility of the viruses combining to form a new strain. It's the threat of this new strain that's raising concerns about a global flu pandemic, since no one would have immunity to the new virus and it would take several months to develop a vaccine.

The World Health Organization states none of the 117 cases of avian influenza has been linked to consumption of cooked poultry or eggs.

A spokesperson with the Public Health Agency of Canada explains that in the rare chance that another outbreak of avian influenza occurs in Canada, the agency has recommended to provincial health organizations that poultry workers involved in the cull receive the flu vaccination, to prevent the possibility of a new virus strain forming.

More about biosecurity is available in the September issue of CFC's newsletter, The Chicken Farmer, in English at http://www.chicken.ca/DefaultSite/index_e.aspx?DetailID=18 or in French at http://www.chicken.ca/DefaultSite/index_f.aspx?ArticleID=18

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# BIOSECURITY FOR THE BIRDS

A national campaign to promote avian health through biosecurity.

Report Sick Birds! 1-866-536-7593 (toll-free)

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## Avian Influenza (AI)

**What Is AI?**

Worldwide, there are many strains of avian influenza (AI) virus that can cause varying amounts of clinical illness in poultry. AI viruses can infect chickens, turkeys, pheasants, quail, ducks, geese and guinea fowl, as well as a wide variety of other birds. Migratory waterfowl have proved to be a natural reservoir for the less infectious strains of the disease known as low pathogenicity avian influenza.

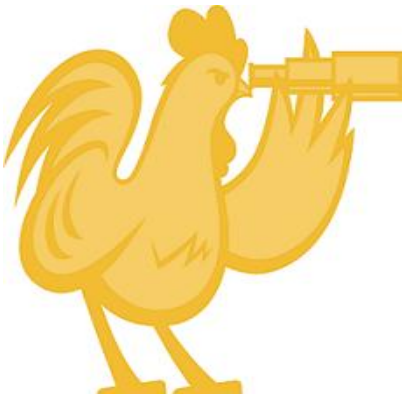
AI viruses can be classified into low pathogenicity (LPAI) and high pathogenicity (HPAI) based on the severity of the illness they cause. HPAI is an extremely infectious and fatal form of the disease that, once established, can spread rapidly from flock to flock. However, some LPAI virus strains are capable of mutating under field conditions into HPAI viruses, which cause more illness in infected birds.

The U.S. Department of Agriculture's (USDA) Animal and Plant Health Inspection Service (APHIS) works to keep HPAI from becoming established in the U.S. poultry population.

**What Are the Signs?**

The clinical signs of birds affected with all forms of AI may show one or more of the following:

- Sudden death without clinical signs



- Lack of energy and appetite
- Decreased egg production
- Soft–shelled or misshapen eggs
- Swelling of the head, eyelids, comb, wattles, and hocks
- Purple discoloration of the wattles, combs, and legs
- Nasal discharge
- Coughing, sneezing
- Lack of coordination
- Diarrhea

**How Is AI Spread?**

Exposure of poultry to migratory waterfowl and the international movement of

poultry, poultry equipment, and people pose risks for introducing AI into U.S. poultry. Once introduced, the disease can be spread from bird to bird by direct contact. AI viruses can also be spread by manure, equipment, vehicles, egg flats, crates, and people whose clothing or shoes have come in contact with the virus. AI viruses can remain viable at moderate temperatures for long periods in the environment and can survive indefinitely in frozen material. One gram of contaminated manure can contain enough virus to infect one million birds.

**What can you do to prevent AI?**

Materials that carry the AI virus can be picked up on shoes and clothing and moved from an area with sick birds to an area with healthy ones. Moving birds from one place to another can also spread diseases, especially because some birds can carry disease without looking sick. By making biosecurity a part of your daily routine while caring for your birds, you decrease the chance of AI showing up on your back doorstep.

In addition to international import restrictions, APHIS has increased surveillance efforts to detect AI if it is accidentally introduced into the United States. APHIS and State veterinarians trained to diagnose foreign animal diseases regularly conduct field investigations of suspicious disease conditions. This surveillance is enhanced by efforts from university personnel, State animal health officials, USDA-accredited veterinarians, and industry representatives.

To help keep your birds healthy:

**1. Keep Your Distance.**

Restrict access to your property and your birds. Consider fencing off the area where you keep your birds and make a barrier area if possible. Allow only people who take care of your birds to come into contact with them. If visitors have birds of their own, **do not** let them near your birds. Game birds and migratory waterfowl should not have contact with your flock because they can carry germs and diseases.

**2. Keep It Clean.**

Wear clean clothes, scrub your shoes with disinfectant, and wash your hands thoroughly before entering your bird area. Clean cages and change food and water daily. Clean and disinfect equipment that comes in contact with your birds or their droppings, including cages and tools. Remove manure before disinfecting. Properly dispose of dead birds.

**3. Don’t Haul Disease Home.**

If you have been near other birds or bird owners, such as at a feed store, clean and disinfect car and truck tires, poultry cages, and equipment before going home.

Have your birds have been to a fair or exhibition? Keep them separated from the rest of your flock for 2 weeks after the event. New birds should be kept separate from your flock for at least 30 days.

**4. Don't Borrow Disease From Your Neighbor.**

Do not share birds, lawn and garden equipment, tools, or poultry supplies with your neighbors or other bird owners. If you do, bring these items home clean and disinfect them *before* they reach your property.

**5. Know the Warning Signs of Infectious Bird Diseases.**

Early detection is important to prevent the spread of disease.

- Sudden death
- Diarrhea
- Decreased or complete loss of egg production, soft-shelled, misshapen eggs
- Sneezing, gasping for air, nasal discharge, coughing
- Lack of energy and appetite
- Swelling of tissues around eyes and in neck
- Purple discoloration of the wattles, combs and legs
- Depression, muscular tremors, drooping wings, twisting of head and neck, in coordination, complete paralysis

**6. Report Sick Birds.**

Don't wait. Early detection can make a difference. If your birds are sick or dying, call your local cooperative extension office, local veterinarian, the State Veterinarian, or U.S. Department of Agriculture (USDA) Veterinary Services office to find out why. USDA operates a toll-free hotline (**1-866-536-7593**) with veterinarians to help you.

Call your veterinarian or local extension agent to examine all of your sick birds or birds that die suddenly, especially if you have been around other people's birds or brought new birds home.

**What Is the U.S. Department of Agriculture's (USDA) Role in Preventing AI From Entering the United States?**

USDA requires that imported birds (poultry, pet birds, birds exhibited at zoos, and ratites) be quarantined and tested for the avian influenza virus before entering the country. This precaution is taken to prevent foreign strains of AI from being introduced in the United States.

In addition to international import restrictions, APHIS has increased surveillance efforts to detect highly pathogenic avian influenza if it is accidentally introduced into the United States. APHIS and State veterinarians trained to diagnose foreign animal diseases regularly conduct field investigations of suspicious disease conditions. This surveillance is enhanced by efforts from university personnel, State animal health officials, USDA-accredited veterinarians, and industry representatives.

**What should you do if your birds appear to have signs of AI?**

Report Sick Birds! If your birds show signs of AI or may have been exposed to birds with the disease, you should notify Federal or State animal health officials or call **1-866-536-7593** (toll-free) or your local agricultural extension agent.

**You are the best protection your birds have!**

# Avian Influenza and Food Safety

## Are humans at risk from eating eggs or meat from birds found to be infected with avian influenza?

There is no public health risk associated with the consumption of cooked poultry meat or eggs as a result of these cases.

Health Canada advises that poultry products and eggs from areas experiencing an outbreak of avian flu do not pose a risk to human health for avian flu.
The virus is known to be killed at temperatures above 72°C, however, Health Canada recommends cooking whole poultry to 85°C and other poultry products and eggs to 74°C to ensure microbial food safety.

## Some of the farms in B.C.'s Fraser Valley were poultry breeding operations. Can avian influenza be transferred from hen to offspring?

Research shows that transmission of avian influenza from hen to offspring through the egg does not commonly occur. However, the CFIA conducted trace-out investigations of eggs from the infected flocks following the detection of avian influenza in B.C.'s Fraser Valley in February 2004.

## What is done with the eggs from flocks infected with avian influenza?

When avian influenza was detected in B.C.'s Fraser Valley in February 2004, the CFIA tracked all eggs hatched from infected flocks as an additional safeguard. All eggs, excluding federally-graded table eggs, were destroyed as a part of the total depopulation within the Control Area. Federally-graded table eggs, which undergo a cleaning process, were allowed for human consumption.

## What happens to eggs from flocks infected with avian influenza that are sent to hatcheries?

When avian influenza was detected in B.C.'s Fraser Valley in February 2004, all eggs in hatcheries were destroyed as a part of the total depopulation within the Control Area. This means that these eggs were not sent to replace broiler and/or egg laying birds.

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## Food Safety

While countries that import poultry species and their products have imposed trade restrictions to protect animal health, in accordance with the recommendations of the OIE *Terrestrial Code*, the OIE and WHO conclude that any poultry products destined for human consumption (whole refrigerated or frozen carcasses, eggs and products derived from them) from countries currently experiencing outbreaks of avian influenza do not pose a risk to public health.

It has been established that influenza viruses are killed at temperatures of approximately 70°C. OIE and WHO would like to emphasise in this particular situation, the importance of respecting good hygiene practices during the handling of poultry products, including hand washing, and normal cooking.

## Sécurité sanitaire des aliments

Alors que les pays importateurs de volailles et de produits d'origine aviaire ont imposé des restrictions commerciales pour protéger la santé animale, conformément aux dispositions du *Code* de l'OIE, l'OIE et l'OMS estiment que les produits avicoles destinés à la consommation humaine (volailles entières réfrigérées ou congélées, oeufs et produits dérivés) en provenance des pays connaissant actuellement des épidémies de grippe aviaire ne présentent pas de risques particuliers pour la santé publique.

Il est établi que les virus grippaux ne résistent pas à des températures d'environ 70°C. L'OIE et l'OMS rappellent, à cette occasion, l'importance du respect de règles d'hygiène lors de la manipulation des produits avicoles notamment le lavage des mains et la cuisson normale des produits.

## PART 2 – THE 2004 OUTBREAK OF AI IN THE FRASER VALLEY, BC

The second part of the compilation contains a series of documents that collectively provide a historical overview of the outbreak of AI in the Fraser Valley of British Columbia in 2004, the response of both industry and government to that outbreak – from initial efforts to contain the spread, to decontamination and compensation, through to assessing how the crises was managed – and resultant changes to the operations in the poultry industry and Government regulations.

Timeline of the Outbreak

Using a variety of information sources, IICA Canada has prepared a **Timeline of the 2004 Outbreak of AI in British Columbia**, which chronicles the major events in the outbreak. The timeline begins in February with the discovery of the first infected farm and continues until Jan 17, 2005, with the release of CFIA's report on its management of the crisis.

As the outbreak was wrapping up in late June 2004, the CFIA prepared **A Short Summary of the 2004 Outbreak of High Pathogenicity Avian Influenza (H7N3) in British Columbia, Canada**. This summary contains not only a description of the major events but also background information on the BC poultry industry, results of the laboratory and epidemiological investigations, tables showing key features of the farms infected, an extended producer questionnaire used for tracking, the CFIA's methods for determining high risk contacts of infected premises, discussions on the role of hatcheries as a source of AI transmission during the 2004 outbreak, protocols for cleaning and disinfecting vehicles leaving the Control Area to the US, and information on the US Certification of Cleaning and Disinfection.

Also included in this compilation is a collection of CFIA and other government **Press Releases** on the AI outbreak. The first in the collection was issued on February 19, 2004, describing the detection of AI in British Columbia and the last was issued October 12, 2005, with regard to avian influenza antibodies discovered in Canadian pigeons in Australia. CFIA stores the Press Releases on its website. More detailed information on each of the developments referred to in the press releases can be found in the CFIA electronic document **Avian Influenza – Latest Information**.

The Alberta Department of Agriculture, Food and Rural Development also produced and posted on its website **Avian Influenza in British Columbia**, a document describing some of the key events in the 2004 outbreak.

Control Area and Movement Controls

An integral part of the CFIA's response to the outbreak was the establishment of a Control Area in and around the sites of infection. Authority to establish such Control Areas rests with the Minister of Agriculture and Agri-Food who is responsible for the CFIA. The CFIA released information on this in **Avian Influenza – B.C. Fraser Valley Control Area**, a document which outlines the rationale for declaring such an area, its geographic boundaries and the limits on product movement into and out of the area. A map is included depicting the Control Area. The CFIA also produced **Movement Controls for Avian Influenza Response**; this document contains greater details on permissible movement into and out of the High-Risk Zone of specific poultry and poultry products. A more detailed map is included.

Learning from the Outbreak

In October 2004, an Avian Influenza forum, convened by key federal and BC provincial government departments, brought together 200 government and poultry industry representatives to dissect the 2004 outbreak. As reported in the FCC article **Learning from Avian Influenza** in its November 4, 2004 edition of *AgriSuccess Express*, the outbreak devastated the industry but led to commitments to change.

As part of its own review, the CFIA prepared a **Comprehensive Report on the 2004 Outbreak of High Pathogenicity Avian Influenza (H7N3) in the Fraser Valley of British Columbia, Canada.** This report is a follow-up to **A Short Summary** (see above), which was written as the outbreak was wrapping

up. The Comprehensive Review provides additional details on the events of the outbreak, including epidemiology and results of follow-up studies.

Later, in January 2005, CFIA released **Lessons Learned Review: The CFIA's Response to the 2004 Avaian Influenza Outbreak in B.C.** This report was undertaken to analyze and document the effectiveness of the CFIA's management of the AI outbreak in order to learn from the experience, avoid making similar mistakes, repeat on the success, and identify potential improvements for future outbreaks.

CFIA's Animal Disease Surveillance Unit prepared an interim report released in February 2005 on **The Source and Means of Spread of the Avian Influenza Virus in the Lower Fraser Valley of British Columbia During an Outbreak in the Winter of 2004.** The CFIA also released an associated document, **Questions and Answers CFIA Epidemiological Reports Avian Influenza Outbreak of 2004,** which provided comments on the purposes of the Sources and Means of Spread report, its key findings and some next steps.

In April 2005, the House of Commons Standing Committee on Agriculture and Agri-Food tabled its report **From a Management Crisis, to Becoming Better Crisis Managers: The 2004 Avian Influenza Outbreak in British Columbia**.

Canada's poultry industry also reviewed its operations in light of the AI outbreak and has considered making modifications to the **Recommended Code of Practice for the Care and Handling of Chickens, Turkeys and Breeders from Hatchery to Processing Plant**. This Code of Practice was developed by industry with the support of government through the Canadian Agri-Food Research Council.

Government has also reviewed important legislation as a result of lessons learned during the AI outbreak of 2004. In particular, the legislation regarding the compensation of destroyed birds, the **Health of Animals Act** and the associated *Regulations on Compensation for Destroyed Animals*, which were amended to deal specifically with the BC outbreak, were amended again in April 2005 to increase the scope of poultry and bird species covered by the regulations.

# TIMELINE OF THE 2004 OUTBREAK OF AVIAN INFLUENZA IN POULTRY OF THE FRASER VALLEY, BRITISH COLUMBIA

**Feb 18-23, 2004**
**The Outbreak Begins**
Low pathogenic (LPAI) and high pathogenic (HPAI) strains of Avian Influenza (AI) virus H7N3 take hold on a poultry farm in BC's Fraser Valley. CFIA places the farm under quarantine, destroys and disposes of 16,000 birds, and establishes a 5 km radius surveillance zone.

**Mar 1, 2004**
**Foreign Markets React**
Japan, Singapore, China, Malaysia, Peru, Brazil and South Korea ban all Canadian poultry products; Romania, Mexico, Russia, Barbados, Philippines, Poland and Hong Kong limit ban to BC products only.

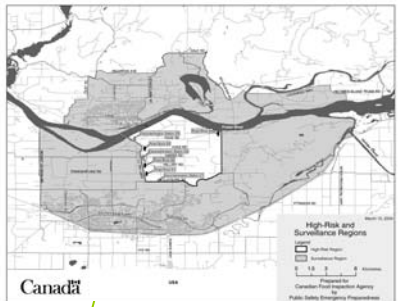
**Mar 9-12, 2004**
**The Virus Spreads**
CFIA confirms H7N3 infection on a second farm; the farm is also depopulated. Government declares a Control Area in the Fraser Valley, restricting movement of birds, chicks and eggs. A High-Risk Zone of 3km is established around each of the two farms and the surveillance zone is expanded to 10 km. CFIA encourages BC's poultry industry to take biosecurity measures to prevent further spreading, as the US bans BC poultry products.

**Mar 23-31, 2004**
**The Infection Grows**
CFIA confirms AI infection on 6 farms in the High-Risk Zone and decides to depopulate all remaining flocks within the Zone; 275,000 additional birds will be destroyed on 10 farms.
For the first time, AI is found on two farms outside of the High-Risk Zone but within the Control Area. Chickens from the first Control Area farm had already been sent to slaughter; inspection leads to removal of several birds from the food system. AI is also detected in non-commercial flocks which are then depopulated.

**Apr 2-5, 2004**
**Total Depopulation**
CFIA now confirms AI infection on a total of 18 farms – 12 in the High-Risk Zone, 4 in the surveillance region and 2 in the Control Area. Movement of people and equipment considered the likely vector. As a pre-emptive strike against further spreading, the Government decides to destroy all commercial and backyard poultry in the entire Control Area; some 19 million birds slated to be destroyed on a priority basis. Producers are to be compensated under Canada's *Health of Animals Act.* Farmers are required to control access to their premises.

**Jun 7, 2004**
**Recovery Begins**
The initial phase of the response focused on containing the spread of the virus, concludes and the depopulation process is completed. Efforts shift to decontamination, continued surveillance and producer compensation. In total, 42 commercial premises and 11 backyard flocks test positive for AI. Most of the destroyed birds, once inspected, were sent through normal commercial channels at market value. Producers are to be compensated for birds for which market value could not be recovered.

**Jul 9, 2004**
**Restocking**
High-Risk Zone farms are now permitted to being restocking. Farms in the rest of the Control Area have already begun the process. CFIA receives over 1100 claims, issuing some $56M in compensation.




**Aug 18, 2004**
**The Response Concludes**
The Government declares HPAI eradicated in the Fraser Valley and the response to AI officially ends. Some 17 million birds were destroyed and the economic impact to the BC poultry industry is estimated at $400M. CFAI continues to encourage farmers to take appropriate biosecurity measures. All remaining movement controls in the Control Area are lifted. Export conditions remain in place for some individual importing countries.

**Oct 28, 2004**
**Looking Back**
Government and poultry industry representatives conclude a two-day meeting examining the response to the HPAI H7N3 outbreak in the Fraser Valley. They commit to strengthen future responses and to develop standardized biosecurity protocols.

**Jan 17, 2005**
**Moving Forward**
CFIA releases its report on the review of its management of the 2004 AI outbreak. As a key priority, CFIA will review the compensation package for destroyed birds under the *Health of Animals Act*.

FEB 2004 | MAR | APR | MAY | JUN | JUL | AUG | SEP | OCT | NOV | DEC | JAN 2005

# A Short Summary of the 2004 Outbreak of High Pathogenicity Avian Influenza (H7N3) in British Columbia, Canada

**June 30, 2004**

Outbreak Overview | Outbreak Summary Report

## 1. Background

Previous cases of avian influenza in Canada

Canada has not previously reported a case of highly pathogenic avian influenza to the OIE. However, low pathogencity avian influenza (LPAI) was recognized in turkeys during the 1960's, when it was common for them to be raised in outdoor ranges. An avian influenza virus, isolated from two extensive turkey breeding establishments with common ownership in Ontario in 1966, was later found to meet the modern criteria of a highly pathogenic influenza (HPAI) virus.

Since then, turkeys have been raised in closed poultry houses under more stringent biosecurity precautions with the result that cases of low pathogenicity avian influenza are now rare. Canada has uncovered three cases of low pathogenicity H5 and H7 in domestic poultry since 1975. The latest was an H7N1 strain, isolated from turkeys in Ontario in November 2000. The turkey flock of origin experienced a drop in egg production, along with a slight increase in mortality.

### 1.1 Description of the poultry industry in the Fraser Valley (see attachment 1)

The poultry industry in the Fraser Valley of British Columbia is typical of the national poultry marketing system. Chickens and turkeys are grown to produce meat and eggs under a supply-managed quota administered by the

province. The poultry industry in the Fraser Valley is self-contained with 11 hatcheries and 10 abattoirs (8 under federal inspection, 2 under provincial inspection) and supplies a large local consumer market (the city of Vancouver).

## 2. Description of the outbreak (see attachments 2,3)

### 2.1 Infected Premises 1

Highly pathogenic avian influenza (H7N3) was confirmed on March 8, 2004, from samples collected on a farm north of Abbotsford, British Columbia. The farm was a chicken broiler breeder operation that supplied hatching eggs to a local hatchery. Two flocks of birds were on the farm when the disease first appeared, an older flock of 9200 birds (52 weeks of age) in one barn, and a younger flock of 9030 birds (24 weeks of age) in another.

The first signs of illness were a mild drop in egg production and feed consumption, and a slight increase in mortality (6 birds per day) in the older flock. The farm's veterinarian and the feed company representative investigated the case and samples were submitted to the British Columbia Ministry of Agriculture, Food and Fisheries (BCMAFF) diagnostic laboratory for routine post-mortem examination on February 9. Pathologic signs included meaty lungs and inflamed tracheas.

The clinical illness in the older flock appeared to resolve slightly over the next few days. However, on February 16 BCMAFF reported to CFIA that avian influenza virus had been detected on a polymerase chain reaction (PCR) test and within a day of this report mortality in the younger flock began to climb dramatically - from 25 dead birds one day, to 930 the next, and over 1500 on the third. Allantoic fluid specimens from both flocks were forwarded for further testing to the Canadian reference laboratory, the National Centre for Foreign Animal Disease (NCFAD) in Winnipeg, and on February 19 the H7 subtype of avian influenza was confirmed.

The farm had been placed under quarantine on February 16 and when the diagnosis was confirmed the entire population of approximately 16,000 birds were destroyed on February 19-20. A surveillance program, based on oropharyngeal and cloacal swabs and blood samples, was initiated on commercial farms within 5 km of the infected flock.

Ongoing work at NCFAD characterized the virus from the older flock as belonging to the H7N3 subtype (reported on February 23, 2004). It was further determined on March 1 as being a variety exhibiting low pathogenicity, with an intravenous pathology index (IVPI) of 0. On March 4 (and further confirmed on March 8) the isolate from the younger flock was

found to be highly pathogenic, with an IVPI index of 2.96. Gene sequencing analysis demonstrated the presence of a seven amino acid insertion within the cleavage site of this isolate.

### 2.2 Infected premises 2

On March 11, a second flock within the surveillance zone, approximately 3 km west of the first infected premises, was confirmed as also being infected with H7N3 avian influenza. The only clinical sign observed was increasing mortality in one barn - beginning at 5-10 dead birds per day, peaking at 150 on March 9, and then dropping back to 10 dead birds on the day before depopulation. As part of CFIA's investigation into this increased mortality, on March 9 samples were collected and the farm was placed under quarantine. The birds were destroyed a day after the laboratory confirmation of avian influenza was received.

This second broiler breeder premises had four barns, two with pullets and two with laying birds. Only one barn of 13 week old pullets showed clinical signs and virus was isolated only from that flock. Again, clinical signs were not consistent with a highly virulent virus - exhibiting less than 10% mortality, but IVPI and sequencing analysis demonstrated the same seven amino acid insertion, confirming that this isolate was also highly pathogenic.

### 2.3 Progression of the outbreak during March

On March 11, the Minister of Agriculture and Agri-food made a declaration, pursuant to subsection 27(1) of the Health of Animals Act, implementing a Control Area in the Fraser Valley of British Columbia that restricted the movement of any captive birds, including day-old chicks and hatching eggs, any products or byproducts of birds, and anything (i.e. equipment) that had been exposed to a bird. At the same time, the CFIA implemented 3 disease control zones. The 5 km zone around the original index case was designated as the High Risk Region (HRR). This was surrounded by a larger Surveillance Region (SR), and the Fraser Valley south of the Fraser River was designated as the Control Area (CA). Movement controls were established to prohibit removal of birds or infected material from the High Risk Region and cleaning and disinfection (C&D) stations were established at the perimeter.

Commercial and backyard flocks within the High Risk Region and commercial flocks within the Surveillance Region that were designated as high risk contacts were targeted for regular active surveillance. A sampling plan was implemented to enable detection if disease prevalence on the farm was 5% or higher. On all premises, a minimum of 60 birds were sampled; on those with 3 or more barns, 25 samples per barn were taken. The owners of

other commercial flocks in the Surveillance Region were interviewed by telephone and dead birds were collected and swabbed weekly. In addition, all birds intended for slaughter were tested (pre-slaughter) according to the same protocol.

The disease spread 2 km south and west to a cluster of three farms within the High Risk Region that tested positive between March 13 and 19. In the face of the outbreak, depopulation decisions were based on a positive PCR result regardless of whether or not clinical signs were expressed or virus was isolated.

On March 24, after 5 commercial farms and 2 backyard flocks had tested positive for avian influenza, the outbreak was declared to be an emergency and the CFIA activated its National Emergency Operations Centre in Ottawa. A decision was made to pre-emptively slaughter all poultry (275,000 birds) within the High Risk Region and active surveillance activities were redirected to dead bird pickup within Surveillance Region.

Sporadic cases were diagnosed over the next few days among a few outlying farms outside the High Risk Region and within a second small cluster of farms 7 km to the west, along North Lehman Road. These did not exhibit the dramatic clinical evidence that is typical of highly pathogenic avian influenza, but were discovered during the course of routine surveillance testing of dead birds.

By the end of March, a total of 20 commercial farms had been found to be positive by PCR testing - 13 within the High Risk Region, 5 within the surrounding Surveillance Region and 2 outside the Surveillance Region but within the Control Area. In addition to these, there were 6 positive backyard flocks - 4 within the High Risk Region and 2 within the Surveillance Region.

### 2.4 Progression of the outbreak during April-May

On April 5, a decision was made to depopulate the entire Control Area of poultry - an estimated 19 million birds. Further movement restrictions were imposed to stop the movement of poultry, poultry products and contaminated equipment within the Control Area and legal steps were taken to require poultry owners to control access to their property to prevent unauthorized entry.

By mid-April a third cluster of positive farms had emerged 5 km away, on South Lehman Road and Columbia Street. These were located in a very high density poultry area south of Abbotsford. Barns were often located within several hundred meters of each other and, once introduced, the disease appeared to spread locally from one farm to the next. Rapid

depopulation of poultry barns within 3 km of infected premises became a primary focus of the disease control efforts.

The progression of the outbreak slowed towards the end of April, approximately 2 months after confirmation of infection on the index farm. It appears that movement controls and pre-emptive slaughter of all birds within 3 km of an infected farm were effective in limiting spread of the outbreak. In a number of cases, surveillance conducted during pre-emptive depopulation revealed flocks that were positive to the PCR test but were not showing clinical signs.

The last commercial premises infected with H7N3 was discovered on May 13. A number of this owner's flocks were found to be positive when tested at depopulation, which was staged over several days. The last positive backyard flock was found on May 18. Of the 42 commercial farms that were depopulated on the basis of a positive PCR test, 11 were found during the course of surveillance for pre-emptive slaughter or depopulation. No clinical signs were seen in these flocks, and further work was undertaken to determine if active infection with H7N3 was present. By June 23, the laboratory had isolated H7 virus from 28 of the 42 commercial premises and 2 of the 11 backyard flocks deemed to be infected on the basis of a positive PCR test. Highly pathogenic avian influenza virus isolates were confirmed on 27 commercial farms (Attachment 2).

One flock of ducks, not reported in the Table of Infected Premises, tested positive for the H11N9 strain of avian influenza. These birds had been destined for slaughter for meat and were uncovered as a result of regular pre-slaughter surveillance. This finding was considered incidental to the outbreak; therefore, the ducks were slaughtered and their meat was processed for human consumption. Similarly, there was no regulatory action taken when a flock of geese were found to be serologically positive for the H6 strain of the virus.

By May 21, 2004, the last of the farms within 3 km of all infected premises had been depopulated, and on the week of May 23, the last commercial flock was slaughtered (70,000 ducks that were not infected, but that were designated as a dangerous contact to the 42$^{nd}$ infected farm). By then, approximately 17 million commercial poultry (90% of the estimated population) had been slaughtered within the Control Area. At the end of May, a few farms with replacement pullets coming into production were allowed to move birds within the Control Area under conditions specified in a permit. These conditions stated that:

- birds must originate from influenza-negative flocks (as confirmed through testing blood and swab samples),
- birds could not be moved or placed within 3 km of an infected

premises, and
- the flock must participate in an ongoing dead-bird surveillance program.

### 2.5 Conclusion of the outbreak in June

On June 3, twenty-one days had elapsed since the last infected farm was discovered. This gave additional confidence that the outbreak had been contained, so that on June 4 all depopulation actions were officially suspended and on June 10 a new High Risk Region (HRR) was named - the municipal boundary of the City of Abbotsford. This allowed for orderly repopulation of farms that were located within the Control Area, but outside the new HRR. Hatching eggs could be moved into, but not out of the HRR. In addition, chicks from approved hatcheries could be placed on farms that were located within the Control Area, but outside the HRR. Other controls were maintained prohibiting the movement of hatching eggs, birds for slaughter and pet birds out of the Control Area. Dead bird surveillance was continued on 12 layer and breeder farms within the new High Risk Region with the understanding that any flocks representing a new outbreak of disease would be depopulated immediately.

By June 11, all sites where dead birds and/or manure were composted had achieved the time and temperature requirements to be deemed virus-free. Compost piles containing dead birds were maintained until complete carcass breakdown had occurred. Cleaning and disinfection procedures were concluded on 41 of the infected premises by June 18. The remaining farm, outside the HRR, was to remain under quarantine until the cleaning and disinfection was completed (projected to be the end of June).

## 3. Laboratory findings

NCFAD's role in the B.C. avian influenza outbreak initially involved:

- the characterization of the virus isolated by the Animal Health Centre, BCMAFF that originated from an older flock located on the index premise, and
- isolation of virus from tissue specimens sampled from a younger flock located on the index premise.

Characterization of the original allantoic fluid specimen obtained from BCMAFF employed:

- real-time RT-PCR assays specific for H5 and H7 hemagglutinin sub-types,
- H-typing by hemagglutination-inhibition assay,

- N-typing by neuraminidase-inhibition assay,
- conventional RT-PCR and cycle-sequencing to determine the amino acid sequence of the hemagglutinin cleavage site, and
- intravenous pathogenicity indexing.

The isolate derived from the older flock on the index premise was an H7N3 virus that possessed the typical waterfowl cleavage sequence PENPKTR*GLF. This isolate was predicted to be of low pathogenicity based on the cleavage site, and was subsequently shown to have an IVPI of 0.0. Tissue specimens derived from the younger flock were processed and inoculated into 9 day old embryonating chicken eggs. The virus isolated was also H7N3, however, the cleavage site differed by possessing a 21 nucleotide/7 amino acid insert. It had an IVPI of 2.96 and produced plaques on QT-35 cell monolayers in the absence of exogenously added trypsin.

During the course of the outbreak the laboratory employed a number of diagnostic assays. The majority of samples submitted to the laboratory for analysis were oropharyngeal and cloacal swab specimens stored in avian transport medium. In the early part of the investigation these were processed for inoculation of 9 day old embryonating chicken eggs and testing by a real-time RT-PCR assay targeting the matrix gene. Submissions that tested positive by the matrix real-time RT-PCR assay were tested using the H7 type-specific RT-PCR assay. Virus isolates were H-typed and N-typed, the hemagglutin cleavage site sequenced, and the pathogenicity confirmed by IVPI. As the investigation progressed, the matrix real-time RT-PCR was used as a screening assay. Positive reactors were subsequently processed for virus isolation, H-typing, and nucleic acid sequencing of the H gene segment.

By June 23 H7 viruses had been isolated from 28 infected commercial premises and 2 backyard flocks. All of the highly pathogenic isolates possessed a 21 nucleic acid/7 amino acid insert at the cleavage site. To date, six PENPK variants have been identified that have arisen by point mutations within the insert. An additional isolate, a PENPR variant, contains an point mutation at the cleavage site outside of the insertion.

Nevertheless, variants identified to date are highly pathogenic based on the intravenous inoculation of 4 to 6 week old specific pathogen free chickens. The majority of isolates possess IVPIs in the 2.9 to 3.0 range. One isolate had a slightly lower IVPI of 2.17.

## 4. Epidemiological Investigation

### 4.1 Information on tracing forward and backward at the outset of the outbreak

Because the index case was a broiler breeder farm, a potentially significant part of the follow up investigation included tracing of hatching eggs, which were all being sent to a single hatchery located within the Control Area. Chicks hatched from eggs laid from January 12 through to February 16 were tested at hatch or, for chicks in broiler barns, monitored and tested in the barns. This procedure was also followed for the second infected premises, which was also a chicken broiler breeder farm. In the light of the uniformly negative results of testing of eggs hatched from these two infected broiler breeder flocks, the CFIA concluded that the movement of chicks and hatching eggs did not pose a risk. It is generally agreed that if influenza virus is present in the egg the embryo would be killed by the virus and if the virus is on the surface of the egg it would be killed during the incubation process.

### 4.2 Subsequent traceout investigations

Traceout investigations have been conducted on all infected farms for the movement of products, birds, equipment and people within 21 days preceding the onset of clinical signs, or a positive test. Farm owners/ operators were interviewed using a detailed questionnaire and, from the information obtained, a time line of events constructed for each farm. Attachment 4 shows the time line diagrams for all 12 farms infected in the critical period between January 12 (3 weeks in advance of clinical signs on the index premises) and March 31 (3 weeks after the imposition of movement controls on March 11).

The poultry industry in B.C. is highly integrated and localized in the Fraser Valley. During its investigation, the CFIA found only one example of potential risk products leaving the Control Area - eggs sent to hatcheries in another part in BC from a Leghorn breeder farm in the High Risk Region. The flock was depopulated on the basis of a positive PCR test, but virus could not be isolated and the eggs hatched outside the control area were deemed to be low risk

### 4.3 Transmission

Wild birds, especially waterfowl, act as reservoirs of avian influenza virus and may be the initial source of infection to domestic birds through direct contact or contamination of feed and water. Low pathogenicity viruses can acquire virulence over time due to antigenic drift (small mutations) or antigenic shift (larger genetic changes). Because the disease is highly contagious, it spreads rapidly through a confined commercial poultry flock.

High concentrations of virus are present in the respiratory and digestive tracts of infected birds. Fecal material from infected birds may contain up to $16 \times 10^{6}$ virions/gm of feces and one gram contains enough virus to infect

one million birds.

The routes of transmission of the virus between infected premises appear to be similar to those reported in outbreaks of highly pathogenic avian influenza overseas. Movement of people, equipment or birds is considered as the primary mode of transmission to new locations within the control area. Two positive farms have common ownership. Common usage of hatcheries, feed companies, and poultry industry service companies may also have contributed to the spread of disease. The investigation of each positive premises was based upon a veterinary visit, responses to a questionnaire (attachment 5) and follow up of movements of risk products and other potential avenues of disease transmission (attachments 6,7).

There were three clusters of infected farms all within a 20 kilometer radius:

- the High Risk Region, northwest of the City of Abbotsford
- a cluster directly west of the original high risk area, and
- a cluster south of the City of Abbotsford

In a few cases, outlying farms were positive, based on PCR tests, but did not show clinical signs and the disease did not spread locally. This was evident in the farms east and west of the Abbotsford region.

These three clusters have a diameter of 5-6 km. In this outbreak, it appears that once a farm within a densely populated poultry area became infected, nearby farms (often within several hundred meters of each other) also become infected. The majority of the Fraser Valley poultry producers (95%) use wood shavings and the remainder use sawdust for bedding material. Although wood shavings contain mainly coarse particles, they often contain extremely fine and light sawdust particles, which can readily become airborne if the bedding is disturbed. The large exhaust fans on modern poultry barns can evacuate high volumes of air and airborne dust could readily be drawn into the intakes of adjacent barns. Further studies are underway on the role of local, airborne spread of the virus on feathers or dust particles.

The working hypothesis of transmission in this outbreak is that LPAI was initially introduced into the older flock on the index farm. The virus then mutated into HPAI and infected the younger flock on the same farm. Transmission from farm to farm over large distances was likely due to the movement of infected birds (early in the outbreak) or the result of mechanical spread by movement of people and contaminated equipment.. However once infected, a flock of 8-10 thousand birds essentially becomes a "virus factory". If located in a densely populated area, it may produce enough virus to infect nearby flocks through airborne transmission of virus

on dust particles or feather debris.

## 5. Control Actions

CFIA controls were based on three major disease control principles, namely :

- rapid detection of infected flocks (surveillance)
- rapid destruction of infected flocks, high risk contact flocks and proximal flocks (within 3 km)
- effective biocontainment of infective material (carcasses, manure and feed).

### 5.1 Surveillance

Initially, a surveillance plan was developed for all commercial farms within 5 km of the index premises. Once the High Risk and Surveillance Regions were designated, the surveillance protocol was expanded to include all commercial farms within these regions. When the plan to depopulate the entire Control Area was announced, active surveillance targeted commercial farms within 3 km of an infected premises.

Active surveillance initially employed serological methods surveillance, but this was found to be operationally difficult and was considered to be relatively ineffective in detecting recently acquired infections.

Swabbing the oropharynx and cloaca was adopted as the method of choice for testing live and dead birds. PCR-based tests can be performed quickly and are very sensitive. Swabbing dead birds from commercial flocks on a weekly (or more frequent) basis was both operationally and epidemiologically efficient.

In addition to these active surveillance sampling strategies, a heightened level of passive surveillance was implemented throughout the area during the entire outbreak. Public information campaigns were used to educate poultry owners on the signs of avian influenza and to encourage prompt reporting of sick birds or increased mortality.

The poultry industry throughout Canada was also on the alert for AI, as evidenced by the marked increase in submissions to the National Centre for Foreign Animal Disease (NCFAD) from flocks outside the Control Area. In the period March 16 to April 22, NCFAD received 13 AI suspect submissions from Manitoba and Alberta, as compared to 15 submissions for the 5 years 1997-2002.

### 5.2 Destruction of infected and high risk flocks

Rapid destruction of high risk flocks was essential in controlling the spread of disease. High risk flocks included those with common ownership or shared equipment and those within a 3 km radius of the infected flock. The goal was to destroy these flocks within 24-48 hours of finding a positive flock.

Humane euthanasia of commercial flocks was accomplished in situ through the rapid application of carbon dioxide gas after sealing the barn. To facilitate disposal, layer hens were removed from cages before they were killed. A small portable carbon dioxide gas chamber was used to euthanise small backyard flocks. This method of destruction was used for all but one infected flock.

### 5.3 Disposal

Incineration, landfill and composting were the methods used for disposal of carcasses of infected birds. Some carcasses, most often layer hens, were removed from the barns and placed in biosecure containers to be transported to incineration or landfill sites. Wherever possible, birds, eggs and litter/manure were composted/bio-heat treated in the barn. Once the compost had been held at 30 degrees Celsius for a minimum 3 consecutive days, additional composting could take place outside the barn. Wood shaving or sawdust bedding was moistened to minimize aerosols prior to movement of the compost material out of the barn.

Where practical, tested free flocks were processed at designated slaughter facilities within the Control Area and their meat consigned direct to retail outlets within Canada. Poultry products processed within the Control Area could not be certified for export. If slaughter was not practicable, these flocks were euthanized on site and carcases taken to rendering, landfill or communal composting sites.

### 5.4 Cleaning and disinfection of facilities and equipment

Cleaning and disinfection (C&D) is physically and financially the responsibility of the poultry producer. Infected premises must be cleaned and disinfected before any restocking is allowed, and all producers have been provided with guidance and recommendations regarding the appropriate protocols to use. Equipment on infected premises must also be cleaned and disinfected and may not leave the premises until C&D has been approved by the CFIA. Farmers may chose to perform cleaning and disinfection procedures themselves or to hire the services of contracting agencies.

Before cleaning is commenced, a CFIA inspector visits the farm to make suggestions and to highlight any areas of particular concern. After the CFIA inspection team is satisfied with the cleanliness of the facility and equipment, disinfection is permitted. During disinfection CFIA inspectors ensure that Health Canada-approved virucidal disinfectants are applied according to label directions. Only then can the premises be officially declared as cleaned and disinfected.

### 5.5 Plans for Repopulation

After positive premises were satisfactorily cleaned and disinfected and CFIA was satisfied that there was no risk of reinfection, repopulation of poultry barns was scheduled to commence in the Fraser Valley Control Area. This process began on June 10, with the establishment of the new High Risk Region (City of Abbotsford) and the lifting of some movement restrictions (see attachment 10). Farms within the Control Area, but outside the new HRR were to be repopulated first (June 10). Farms inside the HRR could be restocked next (beginning July 9), 21 days after the last infected premises had satisfactorily completed cleaning and disinfection, on June 18.

All infected premises remained under quarantine and a surveillance plan was developed such that if poultry were restocked less than 60 days after the farm had been cleaned and disinfected, then birds would be tested at the end of the first, second, third and fourth weeks after the birds were placed. However, if the barns had been empty for more than 60 days after the farm's C&D was approved, then testing would not be required. Similarly, surveillance testing would not be required on uninfected farms that were being repopulated.

### 5.6 Actions taken at the US border (see attachments 8, 9)

In addition to the prohibition on the movements of poultry and poultry products across the Canada-US border additional logistic issues had to be resolved. Since the main supply depot of carbon dioxide (used for euthanizing birds) was located just south of the border, in Washington State, a protocol was developed in conjunction with USDA to ensure that carbon dioxide delivery vehicles were thoroughly cleaned and disinfected between visits to infected premises and re-entry into the US. A transfer system was developed whereby a large tanker would haul carbon dioxide from the depot to two smaller tankers. These smaller tankers would then deliver the gas to the farms.

There was a CFIA-designated truck wash station in the control area, approximately 5 kilometers north of the U.S. border. Any vehicles servicing the live poultry industry (e.g. carrying feed, litter, cages, or equipment) had

to be cleaned and had to obtain a CFIA certificate prior to crossing the border.

## 6. Ongoing investigations

In conjunction with other agencies, the CFIA continues to study topics relevant to the disease outbreak, including airborne transmission, the role of hatcheries, wild birds and service providers, disposal methods and database management/integration with GIS.

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## List of Attachments

1. BC Poultry Industry Profile
2. Table showing Infected Premises
3. Map of Infected Premises
4. Time lines - Infected Premises
5. CFIA Producer Questionnaire
6. High Risk Contact Determination
7. Hatchery as a potential source of AI transmission
8. Vehicle Cleaning and Disinfection Protocol
9. CFIA Certificate of Cleaning and Disinfection

10. Map of New High Risk Region (June 10)

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# Avian Influenza Detected in British Columbia

Ottawa, February 19, 2004 - The Canadian Food Inspection Agency (CFIA) has received test results confirming the presence of the H7 avian influenza virus on a farm in British Columbia. Further testing will confirm whether the virus is a low or highly pathogenic version of the virus.

Initial test results from a provincial laboratory in B.C. detected the avian influenza virus and the H7 subtype was confirmed at the CFIA's National Centre for Foreign Animal Diseases in Winnipeg. This is not the same virus which currently exists in Asia. Health Canada advises that the risk to human health remains low. At this stage the issue is focused on animal to animal transmission and the risk that poses to those who come in direct contact with animals who have H7 avian influenza.

The B.C. farm has been placed under quarantine to halt the spread of the disease and approximately 16,000 birds on the farm will be depopulated within the next few days. The farmer will be eligible for compensation under the *Health of Animals Regulations*.

The CFIA has established an active surveillance program in nearby farms and will continue to monitor all aspects of this case. The CFIA continues to work closely with Health Canada and the B.C. provincial government.

Avian influenza is a contagious virus affecting domestic and wild birds. While it may not be possible to identify the source of the virus, it was most likely transmitted by migratory waterfowl, which are natural hosts for the influenza viruses but do not get sick.

Canada has had three cases of low pathogenic H5 and H7 viruses since 1975, the latest of which was reported in 2000 in Ontario.

The CFIA will continue to keep the public informed on the investigation.

-30-

**For additional information:**

Canadian Food Inspection Agency - Media Relations: (613) 228-6682

CFIA Media Relations: (613) 228-6682

Health Canada Media Relations: (613) 957-1803

CFIA Web site at www.inspection.gc.ca

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# Low Pathogenic Avian Influenza in British Columbia

OTTAWA, February 20, 2004 -- The Canadian Food Inspection Agency (CFIA) has received test results indicating the presence of low pathogenic avian influenza on a farm in British Columbia. This low pathogenic H7 virus is a milder form than the highly pathogenic H5 which currently exists in Asia.

As part of the ongoing surveillance, the CFIA will be conducting additional tests that will provide additional information about the virus. These test results may assist animal health experts in investigating the origin of the virus, as well as any additional cases, should they exist.

Health Canada has confirmed today the presence of mild respiratory symptoms in some workers at the farm. Exposed persons initially reported no symptoms of respiratory illness but were advised to closely monitor their health. Out of the nine persons exposed on the farm, five have since reported mild respiratory symptoms. Those who have been exposed and have symptoms are being treated with the antiviral drug, oseltamivir. They have also been offered influenza vaccination. Health Canada, provincial and local health officials are working together to continuously monitor the situation.

The CFIA continues to take a precautionary approach to the animal health aspect of the situation and will maintain an active investigation. The B.C. farm has been placed under quarantine to halt the spread of the disease. Approximately 16,000 birds on the farm are being humanely destroyed and will be disposed of in accordance with provincial regulations, environmental management practices and internationally accepted disease control guidelines.

The CFIA has established an active surveillance program and will begin surveying all commercial poultry farms within a 5 km radius of the quarantined premises.

As an additional safeguard, the CFIA will also be tracking all eggs hatched

by the infected birds. These eggs would have been sent to one hatchery and not for direct human consumption. Although science has demonstrated that transmission from mother to offspring is generally not effective, the CFIA continues to address all possibilities in its investigation.

The CFIA has dedicated all needed resources to address this issue and will continue to keep the public informed on the investigation.

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For additional information:

Canadian Food Inspection Agency - Media Relations: (613) 228-6682

Health Canada Media Relations: (613) 957-1803 / (613) 957-2983

CFIA Web site at www.inspection.gc.ca

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# Low Pathogenic Avian Influenza in British Columbia

OTTAWA, February 23, 2004 -- The Canadian Food Inspection Agency (CFIA) has received additional test results further identifying the low pathogenic avian influenza virus in British Columbia as H7N3. This is not the same virus which currently exists in Asia or which has been found in the states of Delaware, New Jersey, Pennsylvania and Texas earlier this month.

The H7N3 avian influenza virus identified in B.C. is also different from the virus associated with the death of a Dutch veterinarian in 2003.

As part of the ongoing surveillance, the CFIA will be conducting additional tests that will provide more information about the virus.

The CFIA continues to take a precautionary approach to the animal health aspect of the situation and will maintain an active investigation. The B.C. farm remains under quarantine and approximately 16,000 birds on the farm have been humanely destroyed and are being disposed of in accordance with provincial regulations, environmental management practices and internationally accepted disease control guidelines.

The CFIA has established an active surveillance program and will begin surveying poultry farms identified as having had contact with the quarantined premises.

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For more information:

Canadian Food Inspection Agency - Media Relations: (613) 228-6682

CFIA Web site at www.inspection.gc.ca

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# Ongoing Testing on Fraser Valley, British Columbia Farm Reveals High Pathogenic Avian Influenza

OTTAWA, March 9, 2004 -- Since the Canadian Food Inspection Agency (CFIA) announcement on February 23 of low pathogenic avian influenza on a Fraser Valley, B.C. farm, ongoing tests have been performed as a part of the CFIA's investigation. These tests now indicate that both low and high pathogenic forms of the H7N3 virus were present on the same farm.

The high pathogenic virus was only found in the second barn containing the younger birds. The presence of both forms of the virus on the same premise is not unheard of but is rare. This ongoing testing indicated that the virus was in the process of changing from low to high pathogenic in these younger birds.

The risk to human health remains low. This is not the same virus which currently exists in Asia. Low and high pathogenicity refers to how the virus behaves in birds. Although the H7N3 virus has not been known to cause illness in humans, every possible precaution continues to be taken in order to protect human health regardless of the virus' pathogenicity.

The CFIA's stringent measures in response to the initial suspicion of low pathogenic avian influenza surpass current international guidelines. In fact, the actions taken by the CFIA follow international guidelines for high pathogenic cases of the disease and are in line with proposed changes to current World Organisation for Animal Health (OIE) guidelines with regards to the H5 and H7 forms of the virus. The CFIA continues to survey poultry farms in the area and has quarantined a second farm where a low level of illness appears to exist among some of the birds. Testing is currently underway.

The CFIA responded quickly to the initial discovery of low pathogenic avian influenza by placing the farm under quarantine on February 18, euthanizing all infected birds on February 20, disposing of them, and establishing an active surveillance program. The farm will remain under quarantine until

cleaning and disinfection is complete.

The CFIA has dedicated all needed resources to address this issue and will continue to keep the public informed on the investigation.

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**For more information:**

CFIA Media Relations: (613) 228-6682
Health Canada Media Relations: (613) 957-1803
CFIA Web site at www.inspection.gc.ca

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# MINISTER DECLARES AVIAN INFLUENZA CONTROL AREA IN SOUTHERN BRITISH COLUMBIA

OTTAWA, March 11, 2004 - Minister of Agriculture and Agri-Food and Minister Responsible for the Canadian Food Inspection Agency Bob Speller declared today the establishment of a control area in the Fraser Valley of British Columbia (B.C.) to prevent the spread of avian influenza. The declaration follows the detection of avian influenza on two farms in B.C.'s Fraser Valley.

Earlier this week, the Canadian Food Inspection Agency (CFIA) announced that low and high pathogenic strains of the H7 virus were found on the first farm. Today, the CFIA confirmed the detection of the H7 virus on a second farm. While the pathogenicity of the virus found on the second farm has yet to be confirmed, the CFIA is proceeding with the depopulation of the birds on that farm.

The movement of any bird that is in captivity, including pet birds, day-old chicks and hatching eggs, any product or by-products of a bird, and anything which has been exposed to a bird, into, out of or within the control area is now restricted.

Under certain conditions, the CFIA will issue permits to allow the movement of birds and other affected products within the area. Permits will also allow movement into the area. These conditions and instructions on obtaining movement permits will be available on March 12, 2004 through the CFIA's Website at www.inspection.gc.ca.

The control area is the Fraser Valley in British Columbia. This area is bordered on the north by the North Shore Mountain Range of the Fraser Valley, on the south by the United States border, on the West by the Georgia Strait, and on the East by a line running north south through the Hunter Creek Weigh Scale of the Province of British Columbia. The control area includes the Greater Vancouver Area, but not Vancouver Island or the Okanagan Valley.

Avian influenza is a highly contagious infection in birds and can spread quickly if not controlled. The risk to human health remains low.

For more information on the control area, please call the CFIA's regional office at (778) 808-1176, between the hours of 7 a.m. and 5 p.m.

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For more information:

CFIA Media Relations: (613) 228-6682 / (403) 813-6523 / (403) 589-8745

Health Canada Media Relations: (613) 957-1803
CFIA Web site at www.inspection.gc.ca

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# Highly Pathogenic Avian Influenza Confirmed on Fraser Valley Farm

OTTAWA, March 12, 2004 – Test results today confirmed the presence of highly pathogenic H7N3 avian influenza on a farm in southern British Columbia. Surveillance activities detected the disease earlier this week, but laboratory analysis was needed to determine the pathogenicity of the virus.

Pathogenicity level refers to the severity of the disease in birds. The risk to human health remains low. The Canadian Food Inspection Agency (CFIA) is euthanizing birds on the farm. All birds will be disposed of in accordance with provincial regulations, environmental management practices and internationally accepted disease control guidelines.

Once all the animals have been removed, the CFIA will begin a rigorous decontamination program, cleaning and disinfecting the premises, including vehicles and tools, to prevent any disease spread from infectious material that may remain.

Beyond this farm, additional steps are being taken to minimize the risk of further spread in area poultry. The Government of Canada yesterday declared a control area in southern BC to prevent further disease spread. The establishment of this area restricts the movement of domestic birds, bird products and bird by-products, providing a contained environment in which the virus can be isolated.

After detecting the first case of avian influenza on February 23, 2004, the CFIA initiated a surveillance program, inspecting and testing birds for the disease in the area surrounding the infected farm. Recognizing that additional cases can not be ruled out, this effort is being continued and expanded to a10 km radius.

The CFIA's disease response measures are consistent with international standards for avian influenza and align with proposed changes to current World Organization for Animal Health (OIE) guidelines with regards to the

H5 and H7 forms of the virus.

In addition, CFIA animal health experts are conducting an epidemiological investigation to determine whether there is any link between this recent case of avian influenza and the one detected last month. Although it may not be possible to determine the source of the virus, exposure of commercial birds to infected wild birds is considered to be the most likely route of infection.

Poultry owners are urged to take an active role in protecting their flocks as an added measure of prevention. Keeping poultry away from wild birds and areas frequented by wild birds is the most effective safeguard that can be taken. Maintaining strict biosecurity measures can eliminate any risk of infection.

People exposed to the infected flock are being managed appropriately. This is not the same avian influenza virus that is currently causing serious illness in people in Asia. Although the risk to humans is low, every precaution continues to be taken to protect human health as the CFIA's response proceeds.

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For more information:

Canadian Food Inspection Agency
Media Relations (613)228-6682

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# PUBLIC NOTICE

**Notice**

## PROTECT YOUR FARM AND THE POULTRY INDUSTRY FROM AVIAN INFLUENZA

**The Minister of Agriculture and Agri-Food and Minister Responsible for the Canadian Food Inspection Agency hereby provides notice that, under the authority of Section 7 of the *Health of Animals Act*, poultry owners within the Fraser Valley Control Area must restrict entrance to their property.**

**The movement of people and equipment** is likely contributing to avian influenza spread in the Fraser Valley. To reduce this risk, the CFIA has now taken legal steps that require poultry owners to control access to their premises. All poultry owners in the Control Area (Control Area map available at www.inspection.gc.ca) must affix a notice at the entrance of their property prohibiting unauthorized entry to their farm. It is therefore illegal to enter a premises without the owner's permission.

**Improperly cleaned and sanitized vehicles, equipment and clothing can carry the avian influenza virus. Before you allow anyone onto your premises, check to ensure the following measures have been taken to reduce the risk of avian influenza spread.**

- All vehicles, such as feed trucks and other suppliers, must be

thoroughly cleaned with approved disinfectant—especially underneath the truck and the tires.

- All workers and visitors (including catching crews, spray crews, supply representatives, veterinarians and farm workers) must wear clean protective clothing and footwear. If possible, provide coveralls and boots and always put a footbath at the entrance to poultry houses.
- Equipment entering and leaving the farm must be thoroughly washed and disinfected.

For more information on movement restrictions and approved disinfectants, please contact the B.C. office of the Canadian Food Inspection Agency (CFIA) at **(604) 557-4510**, between the hours of 8 a.m. and 4 p.m. PDT.

For general information on avian influenza, please call **1 800 442 2342**, or visit the CFIA's Web site at www.inspection.gc.ca

**Warning: This is a notice under Section 7 of the *Health of Animals Act*. All poultry owners must post a sign at the entrance of their property prohibiting entry. It is illegal for anyone to enter the property without the owner's permission.**

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# CFIA TO DEPOPULATE HIGH-RISK REGION TO LIMIT AVIAN INFLUENZA SPREAD

OTTAWA, March 24, 2004 – The Canadian Food Inspection Agency (CFIA) today announced that it will depopulate all remaining flocks in the high-risk region of British Columbia's Fraser Valley. The decision follows the detection yesterday of avian influenza on two farms, bringing the total number of infected premises in the high-risk region to five.

The depopulation is intended to contain further disease spread by eliminating the pool of infection and susceptible birds present in the high-risk region. The CFIA is working with provincial counterparts to address outstanding issues related to biosecurity, transportation and disposal. Activities will commence as soon as these discussions are complete. Approximately 275,000 birds will be destroyed and removed from 10 farms and 33 smaller flocks. All owners of birds depopulated will be compensated under the *Health of Animals Act*. Household pet birds are not being targeted for destruction, unless they show signs of disease.

All birds will be disposed of in accordance with provincial environmental regulations and internationally accepted disease control guidelines. The CFIA will continue to sample birds from flocks to be destroyed to gain additional information about the virus and the extent of spread within the high-risk region.

Bringing the spread of avian influenza to a halt is a priority for the Government of Canada. All required resources are being made available to aggressively protect the health of British Columbia's poultry industry.

To date, there has been no detected infection in poultry beyond the high-risk region. However, because the disease can be carried by wild birds, the possibility of finding the disease outside this area cannot be excluded. To monitor this risk, the CFIA is intensifying its surveillance activities, which include daily pickup and sampling of dead birds, in the area surrounding the high-risk region. Any premises where avian influenza infection is

suspected–based on high mortality rates or potential exposure to the virus–will be investigated.

The regional depopulation of animals in response to contagious diseases such as avian influenza reflects internationally accepted animal disease management strategies. Existing poultry and poultry product movement restrictions and biosecurity control measures, which have been in place in the Fraser Valley area since March 11, 2004, will be re-assessed as more information becomes available through surveillance and testing.

The risk to human health remains low. The H7 virus confirmed on the B.C. farms is not the same virus which currently exists in Asia. As a precaution, local health authorities have initiated an investigation to assess the health of people exposed to poultry in the high-risk region.

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For more information:

Canadian Food Inspection Agency
Media Relations (613)228-6682

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# FARM QUARANTINED AFTER AVIAN INFLUENZA SUSPECTED

OTTAWA, March 29, 2004 – The Canadian Food Inspection Agency (CFIA) today quarantined a farm in the control area of British Columbia's Fraser Valley. The action is a precautionary measure based on preliminary test results that indicate the possible presence of avian influenza. The risk to human health remains low. The strain of the virus detected in B.C. is not the same strain present in Asia.

B.C. authorities initially investigated the farm after observing a slight increase in flock mortality. Subsequent tests revealed a mild strain of Newcastle disease, a common bird disease. Inconclusive analysis by the CFIA suggested the birds may also have been infected with avian influenza. The CFIA is conducting additional tests to definitively confirm the presence or absence of avian influenza infection and has restricted all movement on or off the farm until the testing is complete.

The CFIA is examining any possible links that may exist between the newly quarantined farm and any of the premises in the high-risk region. As a further precaution, the CFIA is also investigating other premises that may be associated with the quarantined farm. The quarantined farm was repopulated with new flocks following the detection of Newcastle disease. Over the next several days the CFIA will monitor and test these birds for any signs of infection.

To date, avian influenza has been detected on six farms, all within the high-risk region. The presence of avian influenza on the sixth farm was confirmed today. All birds from this farm will be destroyed today and depopulation continues in this region.

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For more information:

Canadian Food Inspection Agency
Media Relations (613)228-6682

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# AVIAN INFLUENZA CONFIRMED IN CONTROL AREA

OTTAWA, March 31, 2004 – The Canadian Food Inspection Agency (CFIA) today confirmed that avian influenza was present on a farm in the control area of British Columbia's Fraser Valley. The CFIA quarantined the farm on Monday, March 29, after inconclusive tests suggested that birds on the farm may have been infected.

As well, the CFIA has quarantined a second farm in the control area on the basis of preliminary test results. The quarantine is a precautionary measure, and tests are ongoing to gain conclusive information about the farm's disease status.

The risk to human health remains low. The strain of the virus detected in B. C. is not the same strain present in Asia.

Birds from this first control-area farm had been sent to slaughter before the disease was suspected. As regular practice, all birds slaughtered in B.C.'s federal and provincial slaughter establishments are thoroughly inspected. Through these inspections several birds from this farm were condemned and removed from the food system.

The food safety risk related to infected birds is considered to be very low. Given the rapid onset of clinical signs observed with avian influenza, it is unlikely that any infected birds would have proceeded undetected through the slaughter system.

The Agency has now confirmed avian influenza infection on seven commercial farms–six within the high-risk region and one in the broader control area. Given the highly contagious nature of the disease the possibility of finding further cases cannot be excluded. Avian influenza has also been detected in three small non-commercial flocks in the high-risk region. All birds from these non-commercial flocks have been destroyed as part of the ongoing depopulation process. Cleaning and disinfection of these and other depopulated premises in the region is progressing.

All needed resources are being dedicated to control the spread of avian influenza in the control area, and the CFIA is continuing its rigorous surveillance activities.

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For more information:

Canadian Food Inspection Agency
Media Relations (613) 228-6682

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# Avian Influenza - Chief Veterinarian's Technical Briefing

**April 2, 2004**
**Abbotsford, B.C.**

## OPENING REMARKS

Thank you, Minister. I would like to give a short technical briefing. After that, we would be pleased to answer your questions. I would also like to acknowledge the presence today of both Dr. Ron Lewis, the Provincial Veterinarian for British Columbia who is a valued colleague and an integral part of the diagnostic response effort necessary to achieve elimination of the disease as well as Dr.. Con Kiley of the Agency who has been front and centre over the past five weeks in responding to the needs of many of you for timely and coherent explanation of the activities underway. Both of these gentlemen exemplify the professionalism, competency and commitment referenced by the Minister.

As the Minister outlined, we have now confirmed avian influenza on 18 premises since the original confirmation on February 19. The disease is spreading quickly. Part of our job is to determine how it is spreading, and to take the necessary steps to halt the spread, then to stamp it out. We are learning more about how this disease is behaving and spreading in the area daily, and we have the benefit of the lessons learned and experiences gained from other parts of the world that have been hit by avian influenza. We are drawing some conclusions on the most likely causes of the rapid spread. In fact, the speed with which the disease is spreading gives us some good insight into what is happening.

There are two possible ways in which the disease can be transmitted: the natural environment, and people. Let me go over each possibility in detail.

First, the environmental factors. The disease can be spread by wild birds or by water.

When we look at the transmission by wild birds, we know that waterfowl and shorebirds are prone to the disease, and there is incidence of low pathogenic avian influenza in wild birds we have tested. In fact, wild birds are the likely vector that may have first brought the disease into the region, and it has since mutated into the highly pathogenic form. But the spread of the disease among wild fowl is considerably slower than what we have seen in the Fraser Valley in the past six weeks. While there remains a concern that the disease will be spread by wild birds, we don't think that is the cause of the current spread of avian influenza.

Poultry feed may sometimes be exposed to droppings from wild birds. This risk might explain the outbreak in individual farms, but would not explain the rapid spread of the disease.

When we look at the possibility of waterborne disease, we understand there is a danger that wild birds may contaminate surface water, which might find its way to well water. This may be a risk for individual farms, but it is not likely the cause of the rapid spread of the disease among farms.

This leaves us with the human factors that might explain the spread of the disease. The bad news is that it seems likely that people and their equipment are the most significant factor behind the spread of avian influenza. The good news is that, by following the proper biosecurity protocols, we can take steps to stop the disease from spreading.

There is a very broad range of people who come in contact with the avian influenza virus and could spread it if they do not take adequate biosecurity precautions. Owners and managers of multiple farms and farm workers who are employed on several farms must be very careful about following the biosecurity protocols. Feed representatives, poultry equipment service and maintenance personnel, catching crews and spray crews could transmit the disease on their boots, clothing, or on the tires of their vehicles.

Strict on-farm and personal biosecurity practices protect poultry operations of any size. Some of these practices involve how a poultry operation is managed, such as keeping poultry in closed houses, whose attics have been sealed and ventilation openings screened, or cleaning and disinfecting all cages transporting birds. Some of the biosecurity practices involve personal hygiene of people coming into contact with birds, and the removal or disinfection of clothing that may have come in contact with the virus. The equipment used by any person visiting a poultry farm provides a vector for transmitting the disease. The biosecurity protocols contain measures to clean such equipment and minimize the risk that it will carry avian influenza to another location. Other biosecurity practices involve limiting the access to poultry houses, and maintaining a log of all visitors coming into contact with poultry. Casual visitors and relatives provide a threat of transmission, and

we urge producers to prohibit these visitors from entering the poultry barns.

We have made available lists of the biosecurity practices that can prevent the spread of infection. I urge everyone who is in any way associated with the poultry and poultry products industry – including those who are covering this story or are on official business – to familiarize themselves with these bioscecurity protocols. Take the measures that will help us contain and stamp out this disease.

The disease has been spreading, but we believe that, by following basic biosecurity procedures, we can slow it down, we can contain it, we can stamp it out. We cannot be certain we are on top of the situation until 21 days has passed without a new incident. We are looking forward to the day when we can look back at three weeks of no new confirmations of the disease. Then we will begin to take steps to get back to normal.

It may take longer to bring our trading relationships back to normal. The OIE, which is the international standard-setting body for animal diseases, allows for up to a six-month disease-free period for trading partners to consider Canada free of avian influenza and open their borders to our poultry.

But opening the borders to poultry and poultry products from the Fraser Valley is the challenge for another day. Right now, our preoccupation is to stop the spread of the disease, and to stamp it out.

We would be pleased to answer your questions.

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# DEPOPULATION OF ALL BIRDS IN BRITISH COLUMBIA'S FRASER VALLEY

OTTAWA, April 5, 2004 – The Honourable Bob Speller, Minister of Agriculture and Agri-Food and Minister responsible for the Canadian Food Inspection Agency (CFIA), today announced the depopulation of all commercial poultry flocks and other backyard birds in the Control Area established March 11 in British Columbia's Fraser Valley in an effort to eradicate avian influenza. The decision is based on the recommendation of the CFIA in consultation with the Province of British Columbia and the poultry industry.

"Due to the rapidly spreading nature of avian influenza, it is clear that a more aggressive approach is needed to control this highly contagious bird disease," said Minister Speller. "This is not a decision I take lightly, but it is important for the long-term viability of the poultry industry," he added.

Approximately 19 million birds will be destroyed. While it is possible that a significant number of the birds being destroyed are not infected, this measure is intended as a pre-emptive strike to control the spread of the disease. Poultry from non-infected flocks can be processed under full inspection in registered establishments and made available for sale.

The depopulation effort will require the assistance and cooperation of all partners. The CFIA will be working closely with those partners to move as quickly as possible in this effort. All farm owners whose birds are ordered destroyed will be compensated under the Health of Animals Act.

Last Friday, Minister Speller travelled to B.C's Fraser Valley and met with his provincial counterpart, B.C. Minister of Agriculture, Food and Fisheries John van Dongen, the poultry industry and CFIA technical experts to discuss optional control measures. Prior to the decision to proceed with depopulating all of the birds in the control area, other less aggressive options were considered. It is evident, however, that the rapid spread of this highly contagious virus requires much more aggressive actions to minimize any

additional spread.

"As the depopulation effort will take some time, it is critical that everyone – from the poultry producer to those involved in the disease control activities – continue to be vigilant in following strict biosecurity measures," said Minister Speller.

To reduce the risk of spreading the disease, the CFIA has now taken legal steps that require poultry owners to control access to their premises by affixing a notice at the entrance of their property prohibiting unauthorized entry to their farm.

Before allowing anyone onto their premises, poultry owners must check to ensure the following measures have been taken to reduce the risk of avian influenza.

- All vehicles must be thoroughly cleaned with approved disinfectant.
- Visitors must wear clean protective clothing and footwear. If possible, provide coveralls and boots and always put a footbath at the entrance to poultry houses.
- Equipment entering and leaving the farm must be thoroughly washed and disinfected.

The CFIA will continue to work closely with Health Canada, the B.C. Centre for Disease Control, the B.C. Ministry of Health Services and local health officials throughout the expanded depopulation efforts to ensure all appropriate measures are taken to monitor and protect the health of those involved in the avian influenza response.

While the risk to the general population remains low, health officials have emphasized that personal protective measures for those in close contact with infected birds are extremely important. To date two workers who had separate and known exposure to infected birds have tested positive for H7 infection. Both experienced mild symptoms and have since fully recovered.

Officials are optimistic that this new measure will be successful, however, it is still possible that additional infected farms will be identified while the depopulation effort is underway.

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For more information:

Canadian Food Inspection Agency

Media Relations (613) 228-6682

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# Avian Influenza: Trade and International Relations

**Has the detection of high pathogenic avian influenza disrupted trade?**
**A number of trading partners including Japan and South Africa have temporarily suspended the import of various poultry commodities from all of Canada, including live birds and poultry products, while other countries, such as the United States, have limited their restrictions to products from the province of British Columbia. In addition, the European Union has confirmed that it will regionalise its measures, thereby limiting import restrictions to the Control Area in British Columbia's Fraser Valley.**

**How has Canada reacted to the detection of high pathogenic avian influenza in other countries?**
Canada imposed temporary import restrictions on live poultry and poultry products from Texas as a precautionary measure following the confirmation of high pathogenic avian influenza in that state in February. On April 6, 2004, the Canadian Food Inspection Agency (CFIA) removed these import restrictions. This action follows the United States Department of Agriculture's (USDA) announcement that the outbreak in Texas has been completely eradicated. Canadian animal health officials have reviewed information provided by USDA and are satisfied that United States has effectively controlled this disease and that the United States is now free of high pathogenic avian influenza.

For many years prior to the current influenza outbreak in southeast Asia, the CFIA has had import restrictions for live birds from Asia to protect Canada's poultry industry against exotic Newcastle disease. These restrictions are still in place. On February 3, the importation of pet birds (psittacines and songbirds) was prohibited from the affected countries in southeast Asia. The importation of feather meals and raw poultry meat products is also prohibited from these infected countries.

**What volume of chicken meat does Canada export?**
In 2002, Canada exported approximately 119 million kilograms of chicken meat to numerous countries.

**www.inspection.gc.ca**

**Is this the same subtype of the disease currently present in Asia?**
No. The disease in Asia is the H5N1 subtype of avian influenza. The disease confirmed in Canada is the H7N3 subtype.

**Is avian influenza in British Columbia related to the recently detected cases in several U.S. states?**
There is no evidence to suggest that the Canadian and United States cases are linked. The virus on the first British Columbia farm, which has been identified as H7N3, is not the same subtype as the virus reported in the states of Delaware, New Jersey (H7N2) or Pennsylvania (H2N2). This is also different from the highly pathogenic H5N2 virus reported in Texas in February.

**When will Canada regain its status as being free of high pathogenic avian influenza?**
Current World Organisation for Animal Health (OIE) standards state that a country may be considered free from high pathogenic avian influenza six months after the slaughter of the last affected animal for countries in which a stamping-out policy is practised. Stamping-out practices include the humane destruction of all infected and exposed animals; surveillance and tracing of potentially infected or exposed animals; strict quarantine and animal movement controls; strict decontamination of infected premises; and zoning to define infected and disease-free areas. The resumption of trade, however, would be dependent upon the importing country.

**What do the new OIE recommendations propose?**
New proposals to the OIE, which may be approved in May, recommend a country may be considered free from Notifiable Avian Influenza (NAI) when it has been shown that NAI infection has not been present for the past 12 months. If infected poultry are slaughtered, this period shall be 90 days after the slaughter of the last affected animal.

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P0359-04E

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# GEESE ON BRITISH COLUMBIA FARM NOT INFECTED WITH H5 AVIAN INFLUENZA

OTTAWA, May 13, 2004 – Further testing has revealed that geese on a Fraser Valley farm were not infected with either H5 or H7 avian influenza. There is strong evidence indicating the geese were exposed to the H6 avian influenza virus. The H6 virus is not associated with serious animal or human illness.

Initial investigation gave cause for suspicion of an H5 infection on the farm. Further testing revealed with greater certainty that there was no H5 or H7 infection in the geese but rather a strong indication of exposure to H6. Additional tests currently underway may further define the virus type in the geese. Further testing will also determine the type of virus present in the ducks on the farm.

The flock was located within three kilometers of three known infected premises and was targeted for depopulation as part of the CFIA's avian influenza response. The regional depopulation of animals in response to contagious diseases such as avian influenza reflects internationally accepted animal disease management strategies.

Detecting various subtypes of the avian influenza virus is not surprising, particularly in birds such as geese and ducks that are usually raised outdoors. Under such conditions, commercial birds would have contact with wild birds, which are known to carry various subtypes of the virus. Most subtypes carried by wild birds are low pathogenic and do not cause serious illness in birds. Neither clinical signs nor high mortality were observed in this flock.

Bringing the spread of avian influenza to a halt is a priority for the Government of Canada. All required resources are being made available to aggressively protect the health of British Columbia's poultry industry.

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For more information:

Canadian Food Inspection Agency
Media Relations (613) 228-6682

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# COMPENSATION FOR BIRDS ORDERED DESTROYED IN AVIAN INFLUENZA OUTBREAK

OTTAWA, June 8, 2004 – The Canadian Food Inspection Agency today introduced its compensation package for birds ordered depopulated because of avian influenza in British Columbia's Fraser Valley.

Most birds ordered destroyed during the response were sent through normal commercial channels at market value. The Agency's compensation is intended to cover the cost of replacing the remaining birds ordered destroyed for which market value could not be recovered. The package reflects the unprecedented scope and scale of the outbreak, which has devastated the Fraser Valley poultry industry, from hatcheries through to processing plants. The package also includes compensation for rare or specialty birds that were depopulated due to the highly contagious nature of the outbreak.

The Agency is using three approaches to establish compensation values for Fraser Valley bird owners. Compensation for birds that are raised for meat will be determined based on bird age and current market prices, with maximums set by the *Compensation for Destroyed Animals Regulations*.

Compensation for birds that are used for eggs–broiler breeders and layers–will be determined using a specific formula. The widespread nature of the outbreak has limited the replacement market for these birds, making it difficult for owners to restock their flocks with adult birds. Compensation values will include the replacement cost of a young bird. Maximums for these birds are also established by the *Regulations*.

Rare or specialty birds not referenced by the *Regulations* will be valued through a joint assessment. An evaluator representing the Agency and one representing the bird owner will work together to establish a compensation amount. This process may also be used in other cases.

For more information on compensation, bird owners should call the Agency's B.C. office at **604-557-4809**, between the hours of 7 a.m. and 5 p.m. PT.

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For more information:

Canadian Food Inspection Agency
Media Relations (613) 228-6682

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- Regulations Amending the Compensation for Destroyed Animals Regulations
- Compensation for Certain Birds Destroyed in British Columbia (Avian Influenza) Regulations

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# Avian Influenza and Food Safety

## Are humans at risk from eating eggs or meat from birds found to be infected with avian influenza?

There is no public health risk associated with the consumption of cooked poultry meat or eggs as a result of these cases.

Health Canada advises that poultry products and eggs from areas experiencing an outbreak of avian flu do not pose a risk to human health for avian flu.
The virus is known to be killed at temperatures above 72°C, however, Health Canada recommends cooking whole poultry to 85°C and other poultry products and eggs to 74°C to ensure microbial food safety.

## Some of the farms in B.C.'s Fraser Valley were poultry breeding operations. Can avian influenza be transferred from hen to offspring?

Research shows that transmission of avian influenza from hen to offspring through the egg does not commonly occur. However, the CFIA conducted trace-out investigations of eggs from the infected flocks following the detection of avian influenza in B.C.'s Fraser Valley in February 2004.

## What is done with the eggs from flocks infected with avian influenza?

When avian influenza was detected in B.C.'s Fraser Valley in February 2004, the CFIA tracked all eggs hatched from infected flocks as an additional safeguard. All eggs, excluding federally-graded table eggs, were destroyed as a part of the total depopulation within the Control Area. Federally-graded table eggs, which undergo a cleaning process, were allowed for human consumption.

## What happens to eggs from flocks infected with avian influenza that are sent to hatcheries?

When avian influenza was detected in B.C.'s Fraser Valley in February 2004, all eggs in hatcheries were destroyed as a part of the total depopulation within the Control Area. This means that these eggs were not sent to replace broiler and/or egg laying birds.

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# ALL PREMISES IN FRASER VALLEY ELIGIBLE TO RESTOCK

July 9, 2004 – All premises in the High-Risk Region are eligible to begin restocking as of July 9. This date marks 21 days since the last infected premises was satisfactorily cleaned and disinfected. Birds brought onto previously infected premises must first be tested for avian influenza then tested weekly for four weeks if it has been less than 60 days since the premises was satisfactorily cleaned and disinfected.

"Today we are passing an important marker on our road to recovery," said Bob Speller, Minister of Agriculture and Agri-Food and Minister Responsible for the Canadian Food Inspection Agency. "The resiliency and strong cooperation of everyone affected by this unprecedented outbreak have played a key role in restoring the health of British Columbia's poultry industry. There is still work to do, but we are very near the end of this ordeal."

Now that all premises in the Control Area are free to restock, the following movement permits will apply uniformly throughout the Area, with the exception of previously infected premises, which will remain under quarantine.

**Movement Controls**

1. Live birds may be moved into and within the Control Area. Only pet birds and pigeons may be moved out of the Control Area.
2. Hatching eggs may be moved into and within the Control Area. Movement out of the Control Area is prohibited.
3. Federally-graded table eggs may be moved into and within the Control Area. Movement to retailers in BC is permitted. Movement outside of BC is prohibited.
4. Poultry products, such as meat, may be moved within the Control Area. Movement out of the Control Area is permitted under certain restrictions.

The Agency will continue to monitor the need for movement restrictions as ongoing surveillance provides further information about the disease status of the Fraser Valley. As well, discussions with industry and the provinces will evaluate the trade impacts of removing movement restrictions prior to Canada receiving its international disease-free status. The World Organization for Animal Health recommends that countries that practice "stamping out" be considered free of highly pathogenic avian influenza six months after the slaughter of the last infected flock.

**Additional information:**

Canadian Food Inspection Agency
www.inspection.gc.ca
Media relations (403) 813-6523

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# FRASER VALLEY AVIAN INFLUENZA RESPONSE CONCLUDES

OTTAWA, August 18, 2004 - The Honourable Andy Mitchell, Minister of Agriculture and Agri-Food and Minister responsible for the Canadian Food Inspection Agency, today lifted all remaining movement restrictions on birds, bird products and bird by-products in British Columbia's Fraser Valley. The removal of these restrictions brings an official end to the avian influenza response operation, which began on February 19, 2004.

The restrictions had applied to the Fraser Valley, where all cases of avian influenza infection were found. Surveillance indicates that highly pathogenic avian influenza has been eradicated from commercial and backyard flocks in this area.

Bird owners may now freely move any live birds. As well, hatching eggs, federally graded table eggs and poultry products, such as meat, are all eligible to be moved without restriction within Canada. Some international export restrictions remain in place and are being addressed on a country-by-country basis.

"Today marks the end of a very trying ordeal for the Fraser Valley," said Minister Mitchell. "Undoubtedly, the cooperation and contribution of affected bird owners, industry and our provincial and municipal partners were key to the success of our operation. We need to continue working together to help prevent a similar situation from re-occurring."

"This crisis brought industry, governments and the community together to tackle tremendous challenges," said John van Dongen, British Columbia Minister of Agriculture, Food and Fisheries. "The entire industry suffered heavy economic losses, including specialty growers and small flock owners. While the impact is not over yet, I believe that the Fraser Valley industry will fully recover and be stronger and even more resilient in the future."

The Agency contained the outbreak by depopulating infected or high-risk

birds and controlling the movement of birds and associated products that posed a risk of spreading the virus. As well, the Agency encouraged bird owners to follow strict biosecurity practices intended to protect flocks from the avian influenza virus.

Avian influenza can be carried by wild birds, making the eradication of the disease difficult, if not impossible. Faced with this reality, bird owners across Canada are being asked to maintain appropriate biosecurity controls.

The decision to conclude the response operation comes 60 days after the last infected premises was cleaned and disinfected. This timeframe reflects internationally recognized avian influenza recommendations.

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Media relations: (613) 228-6682

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# REVIEW OF AVIAN INFLUENZA OUTBREAK IDENTIFIES NEXT STEPS

ABBOTSFORD, October 28, 2004—Representatives from federal, provincial and municipal governments and the poultry industry concluded two days of meetings today with a commitment to strengthen future responses to animal disease outbreaks. The Canadian Poultry Industry Forum brought together more than 190 stakeholders to share perspectives on the avian influenza outbreak that affected the Fraser Valley last spring.

The forum opened with an overview of the outbreak, which clearly demonstrated the unprecedented challenges posed by the scope and scale of the situation. Senior officials from the Canadian Food Inspection Agency (CFIA); the British Columbia Ministry of Agriculture, Food and Fisheries (BCMAFF); and the poultry industry chaired the forum and commended the joint efforts of governments, industry and area residents in the face of such unpredictable adversity.

The response operation was successful in eradicating highly pathogenic avian influenza from domestic birds in the affected area, confronting the potential for human illness and working together with national industry agencies in mitigating disruptions to the Canadian poultry industry.

Forum participants shared the concern that today's global movement of people and commodities means that threats such as avian influenza will likely emerge more frequently in the future. This consensus underscored the ongoing need for coordinated emergency response capacity, and views were openly exchanged on how future operations should be strengthened.

Government and industry representatives pledged to review and enhance their respective emergency management plans. In particular the CFIA and the BCMAFF agreed to update and exercise the joint federal Foreign Animal Disease Eradication Support Plan. The parties recognized the need to collaboratively define roles and responsibilities with all levels of government and industry stakeholders during an emergency.

Federal and provincial governments also initiated discussions on strengthening linkages between laboratories participating in foreign animal disease testing and surveillance.

Avian influenza virus is present worldwide and carried by wild birds, making biosecurity the most important preventative measure that all stakeholders can take to protect the health of domestic flocks. The poultry industry proposed to work with national, provincial and local authorities to develop biosecurity protocols that enhance existing measures.

Industry also tabled a number of proposals for new approaches to animal disease management. These included the establishment of a national working group to standardize biosecurity in the poultry industry and the creation of mechanisms to help improve rapid response and containment initiatives for any future outbreaks.

Governments committed to review these proposals in detail, considering their compatibility with existing animal disease management strategies and regulations. In addition, the three parties agreed on the need to review compensation levels under the *Health of Animals Act*.

Forum participants discussed the complex threats to human and animal health posed by diseases such as avian influenza. The CFIA, Health Canada and the newly established Public Health Agency of Canada committed to form a closer working relationship. The federal government, with support from both provincial human and animal health authorities, will work toward the refinement of generic and disease-specific national emergency management plans, with a focus on prevention, early detection and rapid response.

The three co-chairs committed to produce a summary of the proceedings by mid-November. In addition, all participants committed to responding to all recommendations before Christmas.

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# RESPONSE TO AVIAN INFLUENZA “LESSONS LEARNED”

Ottawa, January 17, 2005 – The Minister of Agriculture and Agri-Food Canada (AAFC) and Minister Responsible for the Canadian Food Inspection Agency (CFIA) announced today the completion of the Agency’s review of its management of the 2004 Avian Influenza outbreak in British Columbia.

The CFIA has identified a series of commitments to respond to both its internal review findings, and those of the joint industry/government forum held in October 2004.

“This was an unprecedented event for industry, government officials, and local residents”, said Minister Mitchell. “Unlike other countries who have dealt with avian influenza, our response efforts contained the virus in a limited period of time and to a specific geographic area. However, we recognize there are always opportunities for improvement and we are committed to working with all stakeholders to follow-up on the lessons learned”.

As a key priority, the CFIA will be conducting a review of the current maximum values for the replacement of all livestock ordered destroyed as part of a disease investigation or outbreak response. This process is expected to be completed in 2005. The CFIA is committed to a regular review of the maximum compensation rates for all animals ordered destroyed under the authority of *Health of Animals Act*. The avian influenza experience has underlined the importance of this review. All stakeholders will be consulted throughout the review process. The CFIA will provide more details in the coming weeks.

The CFIA has already begun its follow-up activities to address other findings from its Lessons Learned report, including enhancements to its emergency preparedness plans and supporting industry in the development of enhanced bio-security measures.

Recently, CFIA officials met with the National Poultry Associations and agreed on a number of priority action items. Joint working groups are being established to look at approaches that will best limit the spread of disease during a potential outbreak.

Another key lesson learned from the outbreak is the need to broaden and update the Foreign Animal Disease Eradication Plans (FADES). As a result, the CFIA is developing a new template which will incorporate increased involvement of federal, provincial, territorial, municipal, and industry partners. The CFIA will be seeking input on the template prior to a full consultation process on the FADES plans.

For the full “Lessons Learned” report, visit the CFIA’s web site at www.inspection.gc.ca.

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# News Release

*for immediate release*

## CHINA LIFTS BAN ON POULTRY PRODUCTS AND APPROVES EXPORT FACILITIES FOR KEY BOVINE AND PORCINE PRODUCTS

**OTTAWA, January 21, 2005** – China has lifted its ban on imports of poultry and poultry products from Canada. Goods produced as of January 18 can now be exported. On bovine semen, bovine embryos, and porcine semen and blood products, China has approved Canadian collection centres and processing facilities thereby allowing trade to resume. This restores access to one of Canada's most important export markets in Asia.

"China is one of our most important Asian markets, and we are very pleased with their decision to immediately resume trade in these areas. The decision underlines the level of confidence in Canada's food safety systems and the measures we have put in place," said Minister of Agriculture and Agri-Food Andy Mitchell.

"I am pleased that our two countries are taking a science-based approach to resolving these important issues. We will continue discussions with China to open the border to remaining beef products and live animals," said International Trade Minister Jim Peterson, currently in China leading a Canadian Trade Mission.

In 2003, poultry and poultry products exports to China totalled over $5 million, and exports in semen and embryos totalled $3.5 million.

Imports of poultry and poultry products were halted in February 2004 following the discovery of highly pathogenic avian influenza in Canada. China's decision to lift the ban was based on evidence provided by Canada which showed that the disease had been eradicated and was consistent with the guidelines of the World Organization for Animal Health (OIE).

A ban on imports of bovine and certain porcine products followed the discovery of BSE in May 2003. China lifted the ban on a number of products in September 2004, following a series of technical discussions with Canadian officials. In October, during a visit to Beijing, Minister Mitchell signed two protocols establishing the animal health conditions for resumption of trade in bovine semen and embryos. The recently approved Canadian establishments can now begin immediately to export these products, as well as porcine blood products, to China.

"These developments are extremely positive news for both the poultry, the beef and the porcine industries, and reflects the success of recent efforts and discussions reinforcing the stringent measures we have in place to ensure the safety of Canadian products," said Minster Mitchell.

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# STATEMENT BY ANDY MITCHELL, MINISTER OF AGRICULTURE AND AGRI-FOOD, ON THE STANDING COMMITTEE ON AGRICULTURE AND AGRI-FOOD'S REPORT ON AVIAN INFLUENZA

Ottawa, April 21, 2005 – "On April 19, 2005, the all-party Standing Committee on Agriculture and Agri-Food (SCAAF) tabled their report entitled "From a Management Crisis, to Becoming Better Crisis Managers". This report analyses the Government of Canada's handling of Avian Influenza (AI) in the Fraser River area of British Columbia in 2004. I would like to commend the chair, Paul Steckle, and other committee members for their hard work and commitment to this issue.

The document outlines seven recommendations for the Government of Canada to better assist Canada in preparations to manage possible future animal health outbreaks more effectively.

I am pleased to note that work is already well underway to address many of the recommendations from the Standing Committee. Others are being evaluated by the Canadian Food Inspection Agency (CFIA) with appropriate actions being developed.

A review of the maximum compensation amounts under the *Health of Animals Act* began in February 2005. A number of biosecurity and emergency preparedness measures have been introduced since 2004, including a more inclusive approach to information sharing and decision making, quicker depopulations when clinical signs occur, and working with partners to develop biosecurity standards.

The committee has called for an independent commission of inquiry. The fact is that since the AI outbreak has occurred in BC three major reviews of the events have taken place. As minister I believe that our priority must now be to complete the work that is underway to address the broad range of recommendations that have been put forward. Although it is important to

continually review progress on our animal health emergency responses, our priority now should be action, not study.

The second recommendation calls for the Auditor General to examine the response to last year's crisis in order to provide benchmark information for emergency response effectiveness, as always. The government would welcome this review.

The CFIA acted in accordance with international standards and practices to control and eradicate the British Columbia AI outbreak in a timely manner. However, much more can be learned about the best ways to manage animal health crises. The Canadian Food Inspection Agency is committed to ensuring Canada is best prepared for future possible outbreaks by engaging partners from the poultry industry, provincial and municipal governments and the public in emergency preparedness strategies."

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Main Page - Avian Influenza in British Columbia (2004)

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# CHANGES TO COMPENSATION FOR CERTAIN BIRDS DESTROYED IN BRITISH COLUMBIA (AVIAN INFLUENZA) REGULATIONS

Ottawa, May 4, 2005 – The Canadian Food Inspection Agency (CFIA) has amended the *Compensation for Certain Birds Destroyed in British Columbia (Avian Influenza) Regulations* to add female duck breeders, duck layers and female goose breeders to the compensation schedule. The amendment was published today in the *Canada Gazette*, Part II, and is effective immediately.

The *Compensation for Certain Birds Destroyed in British Columbia (Avian Influenza) Regulations* were put in place in June 2004, to establish a formula for determining compensation for certain birds for which there is no readily available market, specifically female chicken broiler breeders and chicken table-egg layers. After consultations with affected stakeholders, it was determined that there were other types of commercial poultry, namely layer and breeder ducks and geese, that were ordered depopulated and that had no readily available market. This amendment will provide a formula to allow for compensation of producers whose female duck breeders, duck table-egg layers and female goose breeders were ordered destroyed in the affected area.

This regulation is in recognition that certain birds do not have a readily-available established market value. It is specific to producers of female duck breeders, duck layers and female goose breeders.

Compensation is intended to encourage owners to report diseases and to actively participate in eradication efforts, not to provide full replacement value. Early reporting of these diseases is essential to minimizing their spread and the potential impacts on human and animal health and the economic viability of Canada's livestock sectors.

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Copies of the regulations can be viewed or downloaded at:

http://canadagazette.gc.ca/index-e.html (see Part ll: Official Regulations) or
http://www.inspection.gc.ca/english/toce.shtml (see Acts and Regulations)

Main Page - Avian Influenza in British Columbia (2004)

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# LIVE AVIAN INFLUENZA VIRUS NOT PRESENT IN EXPORTED CANADIAN PIGEONS

## 2005-10-25 - Removal of import restrictions

Ottawa, October 21, 2005 - The Canadian Food Inspection Agency (CFIA) would like to clarify recent reports on the presence of avian influenza antibodies in three pigeons out of a shipment of 102 pigeons recently exported from Canada to Australia.

None of the exported pigeons were infected with or carrying live avian influenza virus. The birds were neither clinically ill nor capable of making other birds or humans ill. This determination was confirmed by Canadian and Australian animal health experts. As no threat to human or animal health is present, Canada believes the interim import restrictions are unfortunate as Canada followed all Australian certification requirements for importing live birds.

Canada remains free of highly pathogenic avian influenza, including the H5N1 strain, which has been the focus of international attention.

Additional blood tests conducted by Australian authorities had confirmed the presence of generic AI antibodies in the birds. This finding indicates that the birds were likely exposed to an AI virus at some point in their life. Because pigeons are commonly raised outdoors, this finding is not surprising. Exposure to wild birds, which are known carriers of the virus, would result in the development of antibodies.

Since the announcement by Australia, Canadian officials have had ongoing bilateral discussions with their Australian counterparts in hopes of resuming full trade in live birds as soon as possible. Canada and Australia are committed to working together, and animal disease experts from both countries will meet over the weekend to discuss what, if any, actions are required to lift the trade restrictions.

While both countries are sensitive to the international concerns associated with AI, actions must be based on sound science.

Canada takes seriously its responsibilities to meet the requirements of importing countries. Canada's internationally recognized export certification system reflects the requirements of the World Organization for Animal Health and is carried out by trained veterinarians. Furthermore, Canada is fully committed to contributing to global animal and public health security through the transparent and timely reporting of disease detection. Canada's avian influenza surveillance program monitors Canadian birds for the AI virus.

-30-

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# Avian Influenza - Latest Information

As of August 18, 2004, the control area established in British Columbia's Fraser Valley to contain and eliminate avian influenza is eliminated. All domestic movement restrictions placed on live birds, bird products and by-products have ceased.

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## Latest Information - January 17, 2005

- The Minister of Agriculture and Agri-Food Canada (AAFC) and Minister Responsible for the Canadian Food Inspection Agency (CFIA) announced today the completion of the Agency's review of its management of the 2004 Avian Influenza outbreak in British Columbia.

- The CFIA has identified a series of commitments to respond to both its internal review findings, and those of the joint industry/government forum held in October 2004.

- As a key priority, the CFIA will be conducting a review of the current maximum values for the replacement of all livestock ordered destroyed as part of a disease investigation or outbreak response.

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## Latest Information - October 28, 2004

- Representatives from federal, provincial and municipal governments and the poultry industry concluded two days of meetings today with a commitment to strengthen future responses to animal disease outbreaks.

- The parties recognized the need to collaboratively define roles and responsibilities with all levels of government and industry stakeholders during an emergency.

- The three co-chairs committed to produce a summary of the proceedings by mid-November. In addition, all participants committed to responding to all recommendations before Christmas.

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## Latest Information - August 18, 2004

- As of August 18, 2004, the control area established in British Columbia's Fraser Valley to contain and eliminate avian influenza is eliminated. All domestic movement restrictions placed on live birds, bird products and by-products have ceased.

- While live birds and products such as eggs and meat are free to move throughout British Columbia and Canada without restriction, existing export conditions remain in effect until further notice from individual importing countries.

- Surveillance activities indicate that highly pathogenic avian influenza has been eradicated from commercial and backyard flocks in the Fraser Valley. However, because avian influenza virus can be carried by wild birds, bird owners are urged to take appropriate biosecurity measures to prevent future avian influenza outbreaks.

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## Latest Information - July 26, 2004

- The Canadian Food Inspection Agency compensates owners of animals ordered destroyed during an animal disease response. The compensation is intended to cover the replacement costs of destroyed animals.

- Managing the recent outbreak of highly pathogenic avian influenza in British Columbia's Fraser Valley required the destruction of approximately 17 million birds. Most birds ordered destroyed during the response were sent through normal commercial channels and received market value. The Agency is providing compensation to cover the replacement costs of the remaining birds ordered destroyed for which market value could not be recovered.

- The Agency has received 1128 compensation claims. As of July 23, 2004, 973 compensation cheques have been issued, totalling approximately $56M.

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## Latest Information - July 21, 2004

- The Canadian Food Inspection Agency quarantined a farm in the Niagara region on July 20, 2004, after 60 ducks were found dead on the premises. This was a precautionary measure intended to limit movement on or off the farm until testing could determine if the birds were affected by avian influenza. The quarantine was lifted on July 21, 2004, after test results indicated that the bird deaths were not related to avian influenza.

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## Latest Information - July 9, 2004

- All premises in the High-Risk Region are eligible to begin restocking as of July 9. This date marks 21 days since the last infected premises was satisfactorily cleaned and disinfected. Birds brought onto previously infected premises must first be tested for avian influenza then tested weekly for four weeks if it has been less than 60 days since the premises was satisfactorily cleaned and disinfected.
    - Notice to Industry

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## Latest Information - June 21, 2004

- The avian influenza response operation in British Columbia has entered the recovery phase. All premises in the High-Risk Region on which highly pathogenic avian influenza virus was detected have been cleaned and disinfected. This important process minimizes risks posed by avian influenza virus that may remain in organic material such as manure, bedding, feed and dust.

- If no new cases of infection are detected, bird owners in the High-Risk Region will be able to begin restocking their premises on July 9, 2004. This 21-day stay on introducing new birds reflects the standards of the Office International des Epizooties, the World

Organization for Animal Health. Premises located beyond the High-Risk Region are not required to wait the 21-day period and are currently eligible for restocking under certain restrictions.

- Visit the following links for additional information about the recovery phase and cleaning and disinfection.

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## Latest Information - June 11, 2004

- The initial phase of the avian influenza response, which focused on containing the spread of the virus, has concluded. The Canadian Food Inspection Agency (CFIA) depopulated all premises on which highly pathogenic avian influenza was found and those in the surrounding three kilometre areas.

- The response is now entering the recovery phase. As an additional precaution, movement controls on birds and bird products will remain in effect, while some movement restrictions have been eased.

- Within the Control Area, the City of Abbotsford has been declared a High-Risk Region. The City of Abbotsford is bordered on the North by the Fraser River, on the South by the (U.S.) border, on the East at the Vedder Canal and to the West at 276 Street.

- The Control Area is bordered on the north shore by the North Shore Mountain Range of the Fraser River, on the south by the United States border, on the west by the Georgia Strait, and on the east by a line running north-south through the Hunter Creek Weigh Scale of the province of British Columbia. The specified control area does **not** include either Vancouver Island or the Okanagan Valley, but includes the Greater Vancouver Area.
    - More information - Movement Controls
    - More information - Recovery Phase

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## Latest Information - June 8, 2004

- The Canadian Food Inspection Agency today introduced its compensation package for birds ordered depopulated because of avian influenza in British Columbia's Fraser Valley.
- Most birds ordered destroyed during the response were sent through

normal commercial channels at market value. The Agency's compensation is intended to cover the cost of replacing the remaining birds ordered destroyed for which market value could not be recovered.
- For more information on compensation, bird owners should call the Agency's B.C. office at **604-557-4809**, between the hours of 7 a.m. and 5 p.m. PT.

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## Latest Information - May 28, 2004

- All infected birds have been depopulated.
- The response effort is now entering the recovery phase, shifting from depopulation to decontamination and surveillance.
- Active surveillance is increasing throughout the control area to detect any cases of infection that may remain. If present, infected birds will be depopulated immediately. As an additional precaution, movement controls on birds and bird products will remain in effect until surveillance activities have provided further information about the status of avian influenza in the Fraser Valley.

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## Latest Information - May 25, 2004

- The depopulation has focused on infected premises and those present in the surrounding three-kilometre areas. This virus is highly infectious and can move quickly, which is why the depopulation strategy has followed a pre-emptive approach to minimize further disease spread.
- Avian influenza has been detected on 42 commercial and 11 backyard premises, all within existing three-kilometre areas. All birds from infected premises have been depopulated.
- The depopulation of these highest-risk areas is nearing completion. All commercial flocks have been removed, and crews are now focusing on smaller backyard flocks.
- Finding further infection in birds remaining in the control area is a possibility that cannot be excluded.

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## Latest Information - May 18, 2004

- Avian Influenza infection has now been detected on 41 premises.
- The Avian influenza virus was isolated from a farm in close proximity to a known infected premises. This premises was depopulated on May 5, 2004, as part of the pre-emptive slaughter initiative.

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## Latest Information - May 13, 2004

- Further testing has revealed that geese on a Fraser Valley farm were not infected with either H5 or H7 avian influenza. There is strong evidence indicating the geese were exposed to the H6 avian influenza virus. The H6 virus is not associated with serious animal or human illness.
- The flock was located within three kilometers of three known infected premises and was targeted for depopulation as part of the CFIA's avian influenza response. The regional depopulation of animals in response to contagious diseases such as avian influenza reflects internationally accepted animal disease management strategies.

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## Latest Information - May 12, 2004

- To date, the confirmed number of infected commercial premises in the Control Area remains at 40. The number of infected smaller premises, commonly known as backyard flocks, remains at 10.
- There have been no new H7 infected premises identified since April 29, 2004.
- Testing continues in the Control Area. To date, more than 500 premises have tested negative for avian influenza.
- Depopulation of all premises within 1 km of an infected premises has been completed and the depopulation of premises within 3 km of an infected premises is nearing completion.
- The depopulation of backyard flocks continues. A total of 296 backyard flocks have been depopulated.
- Cleaning and disinfection has begun on 21 out of 40 infected commercial premises. Cleaning and disinfection was completed on the first premises on Friday May 7, 2004.
- To date, the Canadian Food Inspection Agency (CFIA) enforcement unit has received 133 referrals for investigation. Two fines - Administrative Monetary Penalties - have been issued for the illegal movement of product.
- To date, the CFIA has inspected 1,500 vehicles at ferry terminals and toll booths for the movement of birds or bird products out of the

Control Area.

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## Latest Information - May 4, 2004

- The United States Department of Agriculture (USDA) requires all **poultry-related vehicles** travelling from the control area into the United States to be cleaned and disinfected before crossing the border.
- The Canadian Food Inspection Agency has established a cleaning and disinfection station at the following location:

**Nielsen Powerwash Incorporated**
**6-380 Riverside Road**
**Abbotsford, British Columbia**

- Representatives from the Canadian Food Inspection Agency will be present at the station to verify that proper procedures are followed.
- For more information, see the Avian Influenza Border Requirements for Vehicles Entering the United States

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## Latest Information - April 29, 2004

- Ongoing surveillance efforts have led to the detection of avian influenza on 40 commercial premises. Depopulation continues on a priority basis for all positive premises.
- The disease has also been confirmed on 10 smaller premises, commonly known as backyard flocks. The CFIA has depopulated all of these premises.
- The CFIA is now depopulating the control area, targeting first those premises where infection is present or suspected.
- Testing continues in the control area. To date, over 200 farms have tested negative for avian influenza.

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## Latest Information - April 28, 2004

- Ongoing surveillance efforts have led to the detection of avian influenza on 39 commercial premises. Depopulation continues on a priority basis for all positive premises.

- The disease has also been confirmed on 10 smaller premises, commonly known as backyard flocks. The CFIA has depopulated all of these premises.
- The CFIA is now depopulating the control area, targeting first those premises where infection is present or suspected.
- Testing continues in the control area. To date, over 200 farms have tested negative for avian influenza.

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## Latest Information - April 23, 2004

- Ongoing surveillance efforts have led to the detection of avian influenza on 37 commercial premises. Depopulation continues on a priority basis for all positive premises.
- The disease has also been confirmed on 10 smaller premises, commonly known as backyard flocks. The CFIA has depopulated all of these premises.
- The CFIA is now depopulating the control area, targeting first those premises where infection is present or suspected.
- Testing continues in the control area. To date, over 200 farms have tested negative for avian influenza.

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## Latest Information - April 22, 2004

- Ongoing surveillance efforts have led to the detection of avian influenza on 36 commercial premises. Depopulation continues on a priority basis for all positive premises.
- The disease has also been confirmed on 10 smaller premises, commonly known as backyard flocks. The CFIA has depopulated all of these premises.
- The CFIA is now depopulating the control area, targeting first those premises where infection is present or suspected.
- Testing continues in the control area. To date, over 200 farms have tested negative for avian influenza.

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## Latest Information - April 21, 2004

- Ongoing surveillance efforts have led to the detection of avian influenza on 34 commercial premises. Depopulation continues on a

priority basis for all positive premises.
- The disease has also been confirmed on 10 smaller premises, commonly known as backyard flocks. The CFIA has depopulated all of these premises.
- The CFIA is now depopulating the control area, targeting first those premises where infection is present or suspected.
- Testing continues in the control area. To date, over 200 farms have tested negative for avian influenza.

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## Latest Information - April 19, 2004

- Through ongoing surveillance we have now detected avian influenza on 31 commercial premises. Depopulation continues on a priority basis for all positive premises.
- The disease has also been confirmed on 10 smaller premises, commonly known as backyard flocks. The CFIA has depopulated all of these premises.
- We are now depopulating the control area, targeting first those premises where infection is present or suspected.

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## Latest Information - April 16, 2004

- Through ongoing surveillance we have now detected avian influenza on 30 commercial premises. Depopulation continues on a priority basis for all positive premises.
- The disease has also been confirmed on 10 smaller premises, commonly known as backyard flocks. The CFIA has depopulated all of these premises.
- We are now depopulating the control area, targeting first those premises where infection is present or suspected.

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## Latest Information - April 14, 2004

- Through ongoing surveillance we have now detected avian influenza on 28 commercial premises - 13 in the high-risk region and 15 in the surveillance region and remainder of control area. Depopulation continues on a priority basis for all positive premises.
- The disease has also been confirmed on 10 smaller premises,

commonly known as backyard flocks. The CFIA has depopulated all of these premises.
- We are now depopulating the control area, targeting first those premises where infection is present or suspected.

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## Latest Information - April 13, 2004

- Through ongoing surveillance, avian influenza has been detected on 25 commercial premises. Birds have been depopulated on all but four of these locations.
- The disease has also been confirmed on 10 smaller premises, commonly known as backyard flocks. The CFIA has depopulated all of these premises.
- The CFIA has completely depopulated the entire high-risk region, which is believed to be the concentrated centre of infection.
- The CFIA is now depopulating the control area, targeting first those premises where infection is present or suspected.

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## Latest Information - April 9, 2004

- Fresh and frozen poultry meat will be allowed, under permit, to be shipped to the rest of Canada.
- Poultry products leaving the control area must not enter federally registered processing or storage establishments. Labels must be affixed to all poultry products leaving the control area which indicates the product is only for retail, hospital, restaurant or institutional use in Canada.

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## Latest Information - April 8, 2004

- The CFIA has confirmed the presence of avian influenza in 20 commercial flocks (all infected premises in the High Risk Region have been depopeulated). The disease has also been confirmed on six smaller premises, commonly known as backyard flocks. Only one of these remains to be depopulated.
- Tests are being conducted on samples from all flocks, and results will be turned around in 24 hours. Poultry that are free of avian influenza will be eligible for human consumption and sent to commercial

slaughter facilities.

- The first premises being depopulated are those on which we have detected avian influenza and if additional infected premises are found these will be depopulated as a priority. Next, our efforts will turn to those premises that may have had contact with infected birds or potentially contaminated equipment. We will then target premises in close proximity to any detected cases of avian influenza infection. Cleaning and disinfection will be ongoing as birds are removed.

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## Latest Information - April 7, 2004

- On April 6th, 2004, the CFIA removed all import restrictions related to highly pathogenic avian influenza (HPAI) from the State of Texas. This action follows the United States Department of Agriculture's (USDA) announcement that the outbreak in Texas has been completely eradicated. Canadian animal health officials have reviewed information provided by USDA and are satisfied that US has effectively controlled this disease and that the US is now free of HPAI.

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## Latest Information - April 5, 2004

- The Honourable Bob Speller, Minister of Agriculture and Agri-Food and Minister responsible for the Canadian Food Inspection Agency (CFIA), today announced the depopulation of all commercial poultry flocks and other backyard birds in the Control Area established March 11 in British Columbia's Fraser Valley in an effort to eradicate avian influenza.
- Approximately 19 million birds will be destroyed. Poultry from non-infected flocks can be processed under full inspection in registered establishments and made available for sale. All farm owners whose birds are ordered destroyed will be compensated under the *Health of Animals Act*.
- The CFIA has now taken legal steps that require poultry owners to control access to their premises by affixing a notice at the entrance of their property prohibiting unauthorized entry to their farm.

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## Latest Information - April 2, 2004

- The CFIA has confirmed avian influenza on 18 farms–12 in the high-risk region, four in the surveillance region and two in the larger control area.
- People and their equipment are likely the most significant factor behind this spread. By following the proper biosecurity protocols, steps can be taken to stop the disease.
- Additional measures are being planned to halt the spread of this disease. The CFIA will continue to evaluate the situation as new information becomes available.
- There will be strict movement measures to allow poultry producers to control who enters the premises.
- Technical Briefing - Chief Veterinarian

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## Latest Information - March 31, 2004

- The Canadian Food Inspection Agency (CFIA) today confirmed that avian influenza was present on a farm in the control area of British Columbia's Fraser Valley. The CFIA quarantined the farm on Monday, March 29, after inconclusive tests suggested that birds on the farm may have been infected.
- The CFIA has quarantined a second farm in the control area on the basis of preliminary test results.
- The risk to human health remains low. The strain of the virus detected in B.C. is not the same strain present in Asia.
- The Agency has now confirmed avian influenza infection on seven commercial farms–six within the high-risk region and one in the broader control area. Avian influenza has also been detected in three small non-commercial flocks in the high-risk region. All birds from these non-commercial flocks have been destroyed as part of the ongoing depopulation process.

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## Latest Information - March 29, 2004

- The Canadian Food Inspection Agency (CFIA) today quarantined a farm in the control area of British Columbia's Fraser Valley. The action is a precautionary measure based on preliminary test results that indicate the possible presence of avian influenza.
- B.C. authorities initially investigated the farm after observing a slight increase in flock mortality. Subsequent tests revealed a mild strain of Newcastle disease, a common bird disease. Inconclusive analysis by the CFIA suggested the birds may also have been infected with avian

influenza. The CFIA is conducting additional tests to definitively confirm the presence or absence of avian influenza infection and has restricted all movement on or off the farm until the testing is complete.
- To date, avian influenza has been detected on six farms, all within the high-risk region. The presence of avian influenza on the sixth farm was confirmed today. All birds from this farm will be destroyed today and depopulation continues in this region.

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## Latest Information - March 24, 2004

- The Canadian Food Inspection Agency (CFIA) today announced that it will depopulate all remaining flocks in the high-risk region of British Columbia's Fraser Valley. The decision follows the detection yesterday of avian influenza on two farms, bringing the total number of infected premises in the high-risk region to five.
- The depopulation is intended to contain further disease spread by eliminating the pool of infection and susceptible birds present in the high-risk region. The CFIA is working with provincial counterparts to address outstanding issues related to biosecurity, transportation and disposal. Activities will commence as soon as these discussions are complete.
- Approximately 275,000 birds will be destroyed and removed from 10 farms and 33 smaller flocks. All owners of birds depopulated will be compensated under the Health of Animals Act.

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## Latest Information - March 23, 2004

- The Canadian Food Inspection Agency (CFIA) has targeted for depopulation two additional farms within the high-risk region.
- All birds from these farms will be destroyed and disposed of in accordance with provincial environmental regulations and internationally accepted disease control guidelines.
- Following a precautionary approach, the CFIA decided to depopulate these farms after a significant number birds deaths were observed. Avian influenza has been confirmed on one of these farms. Test results, expected later this week, will provide more information about the presence of avian influenza on the other farm.
- The finding of multiple sites of infection in close proximity to one another is consistent with the highly contagious nature of the virus and is why the CFIA acted swiftly to implement strict movement restrictions and biosecurity measures in the high risk region.

- To date, five farms, all within the high-risk region, have been targeted for depopulation.

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## Latest Information - March 12, 2004

- Test results today confirmed the presence of highly pathogenic H7N3 avian influenza on a farm in southern British Columbia. Surveillance activities detected the disease earlier this week, but laboratory analysis was needed to determine the pathogenicity of the virus.
- The risk to human health remains low. The Canadian Food Inspection Agency (CFIA) is euthanizing birds on the farm. All birds will be disposed of in accordance with provincial regulations, environmental management practices and internationally accepted disease control guidelines.
- The Government of Canada yesterday declared a control area in southern BC to prevent further disease spread. The control area includes the Greater Vancouver Area, but not Vancouver Island or the Okanagan Valley.

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## Latest Information - March 11, 2004

- Minister of Agriculture and Agri-Food and Minister Responsible for the Canadian Food Inspection Agency Bob Speller declared today the establishment of a control area in the Fraser Valley of British Columbia (B.C.) to prevent the spread of avian influenza. The declaration follows the detection of avian influenza on two farms in B. C.'s Fraser Valley.
- The movement of any bird that is in captivity, including pet birds, day-old chicks and hatching eggs, any product or by-products of a bird, and anything which has been exposed to a bird, into, out of or within the control area is now restricted.
- The control area is the Fraser Valley in British Columbia. The control area includes the Greater Vancouver Area, but not Vancouver Island or the Okanagan Valley.

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## Latest Information - March 9, 2004

- Since the Canadian Food Inspection Agency (CFIA) announcement

on February 23 of low pathogenic avian influenza on a Fraser Valley, B.C. farm, ongoing tests have been performed as a part of the CFIA's investigation. These tests now indicate that both low and high pathogenic forms of the H7N3 virus were present on the same farm.

- The risk to human health remains low. This is not the same virus which currently exists in Asia. Low and high pathogenicity refers to how the virus behaves in birds. Although the H7N3 virus has not been known to cause illness in humans, every possible precaution continues to be taken in order to protect human health regardless of the virus' pathogenicity.
- The CFIA responded quickly to the initial discovery of low pathogenic avian influenza by placing the farm under quarantine on February 18, euthanizing all infected birds on February 20, disposing of them, and establishing an active surveillance program. The farm will remain under quarantine until cleaning and disinfection is complete.

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## Latest Information - March 1, 2004

- Disposal of the approximately 16,000 birds in British Columbia is complete.
- The CFIA continues to survey poultry farms identified as having had contact with the quarantined premises.
- The BC Centre for Disease Control (BCCDC) has advised that test results to date show that none of the individuals under their observation have been found to have evidence of avian influenza.
- Based on information received, Japan, Singapore, China, Malaysia, Peru, Brazil and South Korea have suspended the import of various poultry commodities from Canada, including live birds and poultry products.
- Romania, Mexico, Russia, Barbados, Philippines, Poland and Hong Kong have limited their ban to poultry commodities from British Columbia.
- CFIA export negotiators are working with these countries to limit or lift these restrictions at the earliest possible opportunity.

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Important Notices

# Avian Influenza in British Columbia



For further information please see the Avian Influenza fact sheet on the Chief Provincial Veterinarian website, or the CFIA website.

**August 19, 2004**

- The CFIA has lifted all movement restrictions on poultry in the Fraser Valley and has officially ended its control operation.
- Surveillance indicates that avian influenza has been eradicated from the area.
- Approximately 17 million chickens, turkeys and ducks were destroyed in the eradication operation.
- Poultry producers can begin to restock, but it may take up to a year to return to normal levels of production.
- It's estimated the B.C. poultry industry lost at least 400 million dollars as a result of the avian influenza outbreak.

**July 9, 2004**

- As of July 9, 2004, all premises in the High-Risk region are permitted to begin restocking their farms. It has been 21 days since the last premises has been cleaned and disinfected.
- Birds brought onto previously disinfected premises must be tested for avian influenza and then re-tested weekly for four weeks, if it has been less than 60 days since the premises has been cleaned and disinfected.
- The following movement permits will now apply:
  - Live birds may be moved into and within the Control Area. Only pet birds and pigeons may be moved out of the Control Area.
  - Hatching eggs may be moved into and within the Control Area. Movement out of the Control Area is prohibited.
  - Federally-graded table eggs may be moved into and within the Control Area. Movement to retailers in BC is permitted. Movement outside of BC is prohibited.
  - Poultry products, such as meat, may be moved within the Control Area. Movement out of the Control Area is permitted under certain restrictions.
- The World Animal Health Organization, the Office International des Epizooties (OIE) recommends that countries that practice “stamping out” of avian influenza can be considered disease-free six months after the slaughter of the last infected flock.

**June 21, 2004**

- All premises in the High-Risk area have been cleaned and disinfected to reduce the threat of potential re-infection by the avian influenza virus from dust, manure, feed and bedding.
- If no new cases of avian influenza are detected on these premises, poultry owners can begin to restock their farms on July 10, 2004. The Office International des Epizooties (OIE), the World Organization for Animal Health, requires farms to wait 21-days between cleaning and disinfection and restocking. Premises not in the High-Risk zone are not required to wait 21-days to restock and can do so under certain conditions.
- Birds placed on farms in the High-Risk area within 60 days of cleaning and disinfection, will be tested for avian influenza once a week for four weeks.
- Farms restocked 60 days or more, after cleaning and disinfection, will not require testing of birds.

**June 7, 2004**

- The depopulation process is now complete.
- The response effort is now shifting to the recovery phase, which involves decontamination and surveillance.
- Movement controls will remain in effect until surveillance activities have provided more information on the status of avian influenza in the Fraser Valley, B.C.

**May 27, 2004**

- Avian influenza has now been detected on 42 commercial premises and 11 backyard flocks.
- All birds from infected flocks have been depopulated and the CFIA is finishing up depopulating the high-risk areas (those areas within a 3-km radius of infected flocks).

**May 18, 2004**

- CFIA officials have detected avian influenza on another premises, bringing the total to 41 commercial flocks affected.
- Fortunately the infected flock was depopulated on May 5, as part of the pre-emptive slaughter initiative.

**May 14, 2004**

- Testing has indicated that the geese and ducks on a Fraser Valley farm are likely infected with an H6 strain of the avian influenza virus, which is not associated with serious animal or human illness.
- The farm is located in the control zone and had already been targeted for depopulation as part of CFIA's avian influenza response plan.

**May 12, 2004**

- To date, more than 500 flocks have tested negative for avian influenza.
- A total of 296 backyard poultry flocks have been depopulated.
- A new strain of avian influenza has been identified in a farm containing 600 ducks and 37,000 geese in the Fraser Valley, B.C.
- Laboratory testing is underway to determine what strain it is and results will be available in 48 hours.

**May 6, 2004**

- A total of 40 commercial flocks and 10 backyard flocks have been infected in the Fraser Valley, B.C. An additional 200 flocks have tested negative for the virus.
- Scientists have decoded the virus strain (H7N3) and have discovered that it is a rare and highly virulent strain. Normally, the H7N3 strain is not highly pathogenic, but a small genetic difference has made this particular strain highly contagious.
- The CFIA believes that the movement of people and equipment is contributing to the spread of the disease. Farmers are reminded that they are legally required to control access to their birds and that Avian Influenza Control Signs (white CFIA signs) are to be posted at the entrance of any premises containing poultry. More information is available on the CFIA website: http://www.inspection.gc.ca/english/toce.shtml

**April 28, 2004**

- Continuous surveillance of the control area in the Fraser Valley has resulted in the confirmation of 39 infected commercial flocks. Depopulation is ongoing.
- Avian influenza has been detected in ten backyard flocks, which have all been depopulated.
- The CFIA will be holding another PUBLIC INFORMATION EVENT for poultry producers on April 28, 2004. More information can be found at: http://www.inspection.gc.ca/english/anima/heasan/disemala/avflu/avflue.shtml#alder

**April 20, 2004**

- The CFIA has confirmed avian influenza in 31 commercial flocks, as well as 10 backyard flocks in B.C.
- Depopulation is continuing on a priority basis for all positive premises.
- The CFIA will be holding a second PUBLIC INFORMATION EVENT for poultry producers on April 24, 2004. More information can be found at: http://www.inspection.gc.ca/english/anima/heasan/disemala/avflu/avflue.shtml#alder

**April 13, 2004**

- The CFIA is holding a PUBLIC INFORMATION EVENT for poultry producers on April 15, 2004. Information about the meeting can be found on the CFIA website: http://www.inspection.gc.ca/english/anima/heasan/disemala/avflu/avflue.shtml
- A total of 22 commercial farms and 6 backyard flocks have now been infected with avian influenza virus (H7).

**April 5, 2004**

- The CFIA has announced a pre-emptive cull of 19 million birds in the avian influenza control area, encompassing the Fraser Valley, in B.C.
- All commercial and backyard flocks in the control area will be slaughtered to limit further spread of the disease. Poultry from non-infected flocks processed in fully inspected federally registered plants can be made available for sale.
- The measure was announced after 10 new flocks were confirmed positive for the virus over the weekend. In total, 18 farms have been affected, to date. Twelve flocks are in the high-risk area, four in the surveillance zone and two in the control area.
- It is believed that the new cases are due to contamination from people and their equipment.
- Poultry producers in B.C. are now legally required to control access to their premises by affixing appropriate signage prohibiting unauthorized entry onto their farm.

**April 2, 2004**

- Testing has confirmed that a commercial poultry farm outside of the high-risk region, but in the control area, has avian influenza. An eighth farm, also in the control area, is under suspicion, and has been quarantined.
- A total of seven commercial poultry farms, six in the high-risk area, and one in the control zone, are confirmed to have avian influenza. On-going testing will determine if the strains are low or high pathogenic.
- Two contract workers, both who have been in close contact with infected birds, have recovered from mild illnesses confirmed to have been caused by avian influenza virus (H7).

**March 29, 2004**

- A sixth farm in the high-risk region has been confirmed to have AI and the flock has been depopulated.
- The CFIA has quarantined a poultry farm outside of the high-risk region, but in the control area in the Fraser Valley, after preliminary testing indicated the possible presence of avian influenza virus. Additional testing is being conducted.

**March 24, 2004**

- The CFIA has decided to depopulate all poultry farms in the high-risk region of British Columbia's Fraser Valley as a precautionary measure to prevent the spread of highly pathogenic avian influenza, which has been detected in five farms in that region to date.
- Approximately 275,000 birds will be destroyed from 10 farms and 33 smaller flocks. Owners will be entitled to compensation under the federal *Health of Animals Act.*

**March 23, 2004**

- The CFIA has targeted two additional farms in the Fraser Valley Surveillance Zone for depopulation, as a high number of bird mortality has been observed.
- Avian influenza has been confirmed on one of the farms. Test results on the other farm are pending.
- In total, five farms, all within the high-risk region, have been targeted for depopulation, affecting approximately 90,000 birds since the outbreaks began.

**March 22, 2004**

- A third poultry farm in the Fraser Valley has been confirmed to have avian influenza.
- Approximately 8,500 chickens will be destroyed, bringing the total to 60,000, to date.
- The virus on the third farm has been identified as H7, although the specific strain is not yet known.

**March 15, 2004**

- The CFIA has confirmed a second case of Highly Pathogenic Avian Influenza (HPAI) in a Fraser Valley farm containing four flocks of diversified poultry.
- Testing has shown the strain to be H7N3, the same identified in the previous outbreak.
- Officials have established a 5-km High Risk area around the farm. Outside that is a 10-km Surveillance Zone and surrounding both, encompassing the Fraser Valley, is the Control Area, where strict movement controls are being enforced.
- All birds on the farm are to be depopulated.
- There has been no human illness linked to this outbreak.

**March 10, 2004**

- The final results of CFIA's ongoing testing to further identify the strain of avian influenza on the BC farm are available. Testing indicates that a highly pathogenic strain of the virus was present in the younger of the two affected flocks on the premises. The low pathogenic strain (H7N3) was found in the older flock.
- The presence of both forms of the virus on the same premises is not unheard of but is rare. This ongoing testing indicated that the virus was in the process of changing from low to high pathogenic in these younger birds.
- This newly announced highly pathogenic strain is NOT the same as the one affecting birds in Southeast Asia.
- The flock was quarantined and depopulated very quickly, limiting the risk of the virus spreading.
- The CFIA continues to conduct surveillance on farms in the area and has quarantined a second farm where a low level of illness exists. Testing is currently underway.

**March 01, 2004**

- Approximately 16,000 birds have been depopulated and disposed of.
- The CFIA continues to survey poultry farms identified as having had contact with the quarantined premises.
- Japan, Singapore, China, Malaysia, Peru, Brazil and South Korea have suspended the import of various poultry commodities from Canada, including live birds and poultry products.
- Romania, Mexico, Russia, Barbados, Philippines, Poland and Hong Kong have limited their ban to poultry products from British Columbia.

**February 24, 2004**

- The CFIA has received further test results identifying the low pathogenic strain of avian influenza as H7N3. This is not the same strain that affected poultry flocks in Delaware, Pennsylvania, New Jersey and Texas earlier this month.
- Testing has also confirmed that there is no link between the avian influenza virus and the five people who were exhibiting flu-like symptoms in B.C.

**February 23, 2004**

- The CFIA has confirmed the strain of avian influenza isolated in British Columbia to be a low pathogenic strain.
- It is considered a mild strain, meaning that it not linked to human illness.
- The affected farm provides fertilized eggs to other farms for hatching. No food products were sold into the human food chain.
- South Korea, Japan, Singapore and Hong Kong have placed temporary bans on Canadian poultry. Approximately 7% of Canada's poultry production (mostly dark meat) is exported.
- BC health officials are monitoring five people who have come down with flu-like symptoms near the farm where avian influenza was discovered. It is not clear whether their sickness is related to the outbreak of disease in birds. Health officials believe that in the remote chance that these people are sick because of the H7 virus, it is because they have been in extremely close contact with the infected birds. The chance of transmission to other humans is extremely low, if not nil.

**February 19, 2004**

- The Canadian Food Inspection Agency (CFIA) was notified of an outbreak of avian influenza in two 9,000-bird broiler-breeder flocks in British Columbia.
- The virus has been identified as the H7 strain, however, further testing will confirm whether the virus is low or highly pathogenic version.
- This is NOT the highly pathogenic avian influenza strain that has recently been reported in Southeast Asia. Health Canada reports that the risk to human health remains low.
- The H7 strain of low pathogenic avian influenza has recently been reported in Delaware and New Jersey in the United States.
- As a precaution, the farm has been quarantined and the birds will be destroyed.
- The CFIA is conducting surveillance of commercial and backyard flocks within a 5-km radius of the infected flock.
- The source of the virus is unknown, however, wild migratory waterfowl are natural hosts, who do not get sick.

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For more information about the content of this document, contact Lisa Morin.

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# AVIAN INFLUENZA - B.C. FRASER VALLEY CONTROL AREA

**What does the Ministerial declaration establish?**

On March 11, the Minister of Agriculture and Agri-Food and Minister responsible for the Canadian Food Inspection Agency (CFIA) established a control area in B.C.'s Fraser Valley to prevent the spread of avian influenza.

**What prompted this control area to be declared?**

This action followed the findings of low pathogenic avian influenza on a Fraser Valley farm in February, which was later found to be high pathogenic, as well as the presence of avian influenza on a second farm in the area in early March.

**What area of B.C. does the control area encompass?**

The control area is bordered on the north shore by the North Shore Mountain Range of the Fraser River, on the south by the United States border, on the west by the Georgia Strait, and on the east by a line running north-south through the Hunter Creek Weigh Scale of the province of B.C. The specified control area does **not** include either Vancouver Island or the Okanagan Valley, but includes the Greater Vancouver Area. (Map - Control Area)

**What products are restricted from being moved into, out of or within the control area?**

Initial movement restrictions applied to any bird that is in captivity, including pet birds, day-old chicks and hatching eggs, table eggs, and any bird products or by-products. As the response effort now enters the recovery phase, some movement restrictions have been eased. Details of the current product movement restrictions are available on the CFIA's Web site (http://

www.inspection.gc.ca/)

**What do I do if I want to move poultry or poultry products in or out of the control area?**

Verify with the Canadian Food Inspection Agency (CFIA) if the items are permitted to be moved by calling the B.C. office of the CFIA at (604) 557-4510, between the hours of 8 a.m. and 4 p.m. Pacific Time

**How is the movement of products enforced?**

Movement of products will be allowed through individual permits issued by the CFIA. These permits will be checked at critical exit points. Persons transporting restricted product without a permit can be prosecuted. Under the provisions of a general permit, some birds, bird products and bird by-products will move freely within the control area. This means that certain items do not require individual permits. For more information, see the General Movement Permits on the CFIA web site.

**When will the Control Area designation be lifted?**

Consideration will be given to removing Control Area restrictions 60 days after the last infected premises has been satisfactorily cleaned and disinfected. Quarantines on all previously infected premises may also be lifted at that time.

**If I live within the control area, what do I have to do?**

Within the control area, all premises where poultry are kept must have a sign at the gate and at the entrance to all buildings forbidding entry without the owner's permission. Anyone who enters a building or place without permission of the owner is violating the *Health of Animals Act*, and if prosecuted and convicted could be fined up to $50,000. This gives every poultry owner the chance to control who enters the premises. Poultry owners are obligated to disinfect any vehicle entering or leaving their premises. In this way we can help prevent the spread of avian influenza.

**How long do I have to keep my sign posted?**

Signs must be posted as long as the control area exists.

**Do I have to keep a log of visitors coming onto my premise?**

This is not a requirement. However, keeping a log of visitors coming onto

any poultry premise may help to manage the spread of the virus and may help in any eventual traceback investigation.

**What measures has the CFIA taken to ensure the safe transport of destroyed birds from infected farms**?

The CFIA followed strict biosecurity protocols during the transportation of destroyed birds. As a fundamental principle, destroyed birds were securely contained before being moved. Birds were sealed in water-proof containers and loaded into refrigerated trucks. Once the birds were frozen, transportation would commence.

**Were the trucks sprayed with disinfectant?**

Yes, trucks were thoroughly sprayed with a disinfectant solution when leaving the farm and after birds were unloaded. Trucks may have remained wet following disinfection and therefore could drip disinfectant during transportation.

**Why didn't the CFIA vaccinate all birds in the control area?**

Vaccination has not been an option for a number of reasons. Preventative vaccination was not economically feasible in this situation given the large number of birds affected. Should the birds have been vaccinated, the presence of antibodies from vaccination could not be distinguished from antibodies from natural infection. And, given that the effectiveness of vaccination could take up to two to three weeks, the virus could have persisted and spread during this timeframe.

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June 14, 2004

# Movement Controls for Avian Influenza Response

**Notice**

Map - Control Zone and High Risk Region

## Birds for Slaughter, Eggs, Live Birds not for Slaughter & Poultry Products

The Canadian Food Inspection Agency (CFIA) is now entering the recovery phase of its avian influenza response effort. As an additional precaution, movement controls on birds and bird products will remain in effect, while some movement restrictions have been eased.

Within the Control Area, the City of Abbotsford has been declared a High-Risk Region. This rezoning will allow orderly repopulation of poultry establishments outside of the City of Abbotsford using the provisions of a general permit.

Premises outside the High-Risk Region will be allowed to restock under general permit effective June 10. All premises within the High-Risk Region can be restocked 21 days after the last infected premises has been satisfactorily cleaned and disinfected. At that point, movement controls will be re-evaluated.

The Control Area is bordered on the north shore by the North Shore Mountain Range of the Fraser River, on the south by the United States border, on the west by the Georgia Strait, and on the east by a line running north-south through the Hunter Creek Weigh Scale of the province of British Columbia. The specified control area does not include either Vancouver Island or the Okanagan Valley, but includes the Greater Vancouver Area.

The City of Abbotsford, which is now the High-Risk Region, is bordered on the North by the Fraser River, on the South by the U.S. border, on the East at the Vedder canal and to the West at 276th Street.

## BIRDS FOR SLAUGHTER

Birds may be sent to slaughter **into and within the Control Area, including the High-Risk Region**, under general permit without restriction. Movement **out of the Control Area** is not permitted.

## EGGS

### Hatching Eggs

#### Inside the High-Risk Region

Hatching eggs may be moved **into the High-Risk Region**, under general permit, and set in approved hatcheries only.* Movement of hatching eggs **out of the High-Risk Region** is not permitted.

#### Remainder of Control Area

Hatching eggs may be moved **into and within the Control Area** under general permit without restriction. Movement of hatching eggs **out of the Control Area** is not permitted.

### Table Eggs

All table eggs may be moved:

- **into and within the Control Area, including the High-Risk Region**, under general permit;
- **out of the Control Area, including the High-Risk Region**, for distribution in BC only or for consumption on fishing boats, cruise ships and other vessels, under general permit.

Any other movement of table eggs outside of BC is not permitted.

## LIVE BIRDS NOT FOR SLAUGHTER

### Show Birds, Pet Birds, Zoo Birds, Raptors, Backyard & Commercial Birds not for slaughter

#### Inside the High-Risk Region

No movement of show birds, backyard flocks, or zoo birds **within, into or out of the High-Risk Region** is permitted.

Pet birds may be moved **into and within the High-Risk Region** under general permit with the following restrictions:

- The birds may move from a retail outlet, which sells pet birds directly to the public, to the residence of the purchaser;
- The birds may move from the owner's residence to a veterinary care facility, for the purposes of examination and treatment, and return to the owner's residence;
- Pet birds whose owners reside outside the Control Area may move in-transit, through the Control Area, including the High-Risk Region, under general permit.

**Remainder of Control Area**

Show birds, raptors, zoo birds, backyard and commercial birds not for slaughter may be moved **into and within the Control Area** under general permit without restriction. Movement out of the Control Area is not permitted.

Pet birds whose owners reside in the Control Area may be moved **into and within the Control Area** under general permit without restriction. Movement of pet birds **out of the Control Area** is not permitted.

## Pigeons

Pigeons may be moved **within the Control Area, including the High-Risk Region**, under general permit. Movement **out of the Control Area** is not permitted.

## Hatchlings (Chicks, Poults, Ducklings, Goslings)

**Inside the High-Risk Region**

Hatchlings originating from approved hatcheries may be moved **out of the High-Risk Region into the Control Area** only under general permit. Hatchlings cannot be moved onto farms in the High-Risk Region.

**Remainder of Control Area**

Hatchlings may be moved **into and within the Control Area** under general permit without restriction. Movement of hatchlings **out of the Control Area** is not permitted.

## POULTRY PRODUCTS

Movement controls for fresh / frozen and cooked poultry products remain unchanged.

## Fresh / frozen poultry products

Fresh or frozen poultry products may be moved:

- **into and within the Control Area, including the High-Risk Region**, under general permit without restriction;
- **out of the Control Area, including the High-Risk Region**, for use in hotels, restaurants or institutions or for consumption on fishing boats, cruise ships and other vessels, under general permit (Product must be labelled "For Retail/HRI

use only in Canada");
- in-transit through and out of the Control Area, including the High-Risk Region, under general permit, if the product originates from outside the Control Area and remains in its original box;
- **out of the Control Area, including the High-Risk Region**, into federal cold storage with a specific permit.*

## Cooked poultry products

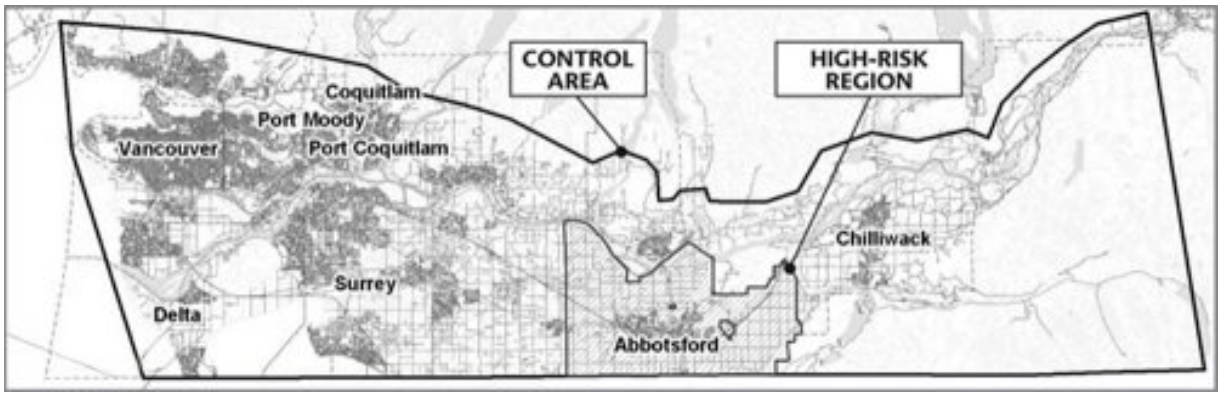
Cooked poultry or poultry products may be moved **out of the Control Area, including the High-Risk Region**, under general permit providing the products have been processed to render the product free of virus.

## Poultry litter and manure

Poultry litter and manure may be moved within and out of the Control Area, including the High-Risk Region, from farms not infected with avian influenza, under general permit.

**Contact the CFIA office at (604) 557-4510 or (604) 557-4500, between the hours of 8 a.m. and 4 p.m. PT for more information.*

## Map - Control Zone and High Risk Region

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This image shows a map of the Control Area and High Risk Region. Within the Control Area, the City of Abbotsford has been declared a High-Risk Region. The City of Abbotsford is bordered on the North by the Fraser River, on the South by the U.S. border, on the East at the Vedder Canal and to the West at 276 Street.

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# AgriSuccess Express

November 5, 2004

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**CAIS complaints investigated**

...by Allison Finnamore
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New Brunswick potato growers and the federal government have joined forces in an effort to improve CAIS delivery.

Concerns about the Canadian Agriculture Income Stabilization (CAIS) program have been festering among the country's agriculture producers for months. Problems like long delays in receiving funding or applications being returned to producers to be re-filed are some common complaints nation-wide.

"The delivery has been dismal," said Patton MacDonald, executive director of Potatoes New Brunswick (PNB), in an interview earlier this week.

PNB took the bull by the horns after growers in some parts of the province faced severe financial difficulties. They met with federal Agriculture Minister Andy Mitchell last week and convinced him something needed to change. This week, a team of six CAIS staff arrived in New Brunswick to work directly with growers in an attempt to solve the problems.

A market glut in 2003 drove potato prices into the ground and this year, various problems came up for growers during the season, including a freak hailstorm and storage problems. There was an urgent need for some potato growers to access the funds, MacDonald explained, but after their CAIS applications were made, the system seemed to grind to a halt. "We have growers who waited too long to be serviced," MacDonald said. "We simply can not let our growers just hang on endlessly."

Officials with the CAIS program confirmed that their staff will visit both the southeast and western sections of the province, holding one-on-one meetings with potato producers, group sessions with accountants and group sessions for producers of commodities. At the same time, a team of nine CAIS staff will be available specifically for phone inquiries from New Brunswick producers.

MacDonald believes the results from the intense look at New Brunswick's CAIS issues will be a telltale indicator of the program's potential for success across the country. And focusing on the province's potato industry will be an even stronger measure. Determining losses is straightforward, he explained.

"We know our industry really well. We just feel we're small enough to be a good focus to see if that program can be made to work," MacDonald said. "If this doesn't work for our industry, it won't work for any industry."

MacDonald said PNB is fully supportive of CAIS and is anxious to work with the federal and provincial governments to resolve the problems. He also acknowledged CAIS is a new program that was struck with several major agricultural disasters at once, like BSE and avian influenza, so some wrinkles in the system should be expected. However, producers need to be able to rely on the program, he said. And while the New Brunswick study may result in some national changes to the program, MacDonald's focus remains at home.

"Our goal is to make sure this program can be made to work for our growers," he stated. If the study is unsuccessful, then MacDonald said his growers will walk away. "If it doesn't work, we're going to look for alternatives and look for alternatives immediately ... we just don't want them to wait any longer."

The CAIS team was set to be in southeast New Brunswick in Moncton on Nov. 4. On Nov. 5, 6 and 8 to 10, the team will be in both Wicklow and Grand Falls, located in western N.B. in the heart of the potato belt.

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**Learning from Avian Influenza**
...by David Schmidt
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The Canadian poultry industry plans to develop and implement National Biosecurity Standards, a National Risk Management Insurance Plan and an Emergency Response Plan to deal with future outbreaks of Avian Influenza (AI) or other Foreign Animal Diseases (FAD).

At the same time, the Canadian Food Inspection Agency (CFIA) has promised to improve protocols for dealing with FAD outbreaks, review the

compensation policies under the Health of Animals Act and develop a national disposal strategy for mortalities.

Those were the main outcomes of the Canadian poultry industry AI forum, held October 27-28 in Abbotsford, British Columbia. Convened by the CFIA, the B.C. Ministry of Agriculture, Food and Fisheries (BCMAFF) and the B.C. Poultry Committee, the invitation-only forum brought together almost 200 government and industry reps from across Canada.

After getting overviews and "lessons learned" from the CFIA, BCMAFF and industry, the forum featured in-depth panel discussions on enhanced emergency management, animal/human health interface, biosecurity and industry and community economic recovery.

Producers told the forum the crisis "devastated" the industry, criticizing both the CFIA and government for not having effective plans in place and not providing enough support for producers and allied trades.

While the CFIA was reluctant to admit any errors, staff conceded improved protocols are required. As a first step, the CFIA will no longer remove any birds from infected premises until they have been neutralized (through on-farm composting or incineration). Early in the AI outbreak, birds were moved and this may have contributed to, or even caused, spread of the disease.

The CFIA will produce a list of detailed recommendations from the forum within weeks and hopes most of the recommendations can be implemented by the end of 2005.

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**BSE testing target exceeded**
...by Kevin Hursh
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The Canadian Food Inspection Agency says this year's national target for BSE surveillance has been surpassed. As of October 27, more than 8,600 cattle had been tested for the disease this year with all the results returning negative.

The target for 2004 was 8,000 tests. Starting next year, testing will be ramped up to at least 30,000 animals. The CFIA says that level of surveillance is required to adequately determine the prevalence of BSE in the national herd and to verify that national control measures are limiting the spread of the disease.

The surveillance program focuses on testing high-risk cattle: dead, dying, diseased and down cattle over 30 months of age and cattle showing neurological symptoms consistent with BSE.

In September, a BSE surveillance reimbursement program was announced to encourage producers to report animals for BSE testing. Producers across Canada can call 1-866-400-4244 to report animals for testing.

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**Saskatchewan alters Calf Set-Aside to match Alberta**

...by Rae Groeneveld

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On October 19 the Saskatchewan government announced the details of the new Feeder Calf Set-Aside program, but in a matter of weeks changes are already being made.

The Saskatchewan government is contributing $31 million to try and keep 400,000 calves out of the supply chain. The goal of the program is to prop up prices for the rest of the animals going to market.

When the province originally announced the details, cattle enrolled in the set-aside were to be kept from going to slaughter until January 1, 2006. The province has now given a second option where producers can send the set-aside calves to market as early as October 1, 2005.

Saskatchewan Agriculture Minister, Mark Wartman is not pleased the earlier date had to be added to the program and blames the Alberta government for going earlier than what the provinces and federal government had agreed to.

"Alberta went offside. They said basically to heck with everybody else we're going to go for an October 1 date," exclaimed Wartman who added because they didn't want to see Saskatchewan cattle producers disadvantaged, they took the similar step.

The government will, however, only provide $160 of the $200 per head set-aside if the livestock are sent to slaughter on October 1, 2005.

"We still believe the longer term set-aside (January 1, 2006) would have the impact on the market which is what the set aside programs were designed for. They were not designed just as a transfer of cash but were designed to have an impact on the markets so overall producers would be getting a better price for their animals."

Criticism has been directed at the Saskatchewan government for delaying their 40 per cent portion of the $200 per calf payment for calves entering the set-aside. The federal government is providing their entire 60 per cent portion up front. In Alberta, the full $200 is being paid upon enrolment.

The Saskatchewan Stock Growers Association is confident the set-aside

program will be used by cattle producers and will help prop up prices.

"I think it is an incentive for the people to background 30 per cent of their calves. Naturally if we're keeping 30 per cent of our calves off of the market it should increase the demand for all those who want to sell their calves," speculated Brian Ross, President of the Saskatchewan Stock Growers Association. (The set-aside in Alberta is 40 per cent.)

Ross believes the program will be used by cattle producers that normally background calves over the winter or by those who want to retain replacement heifers.

"Generally these set-aside cattle would go to market June, July or August. What this $200 does is pay you to keep those cattle an extra four or five months."

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# Comprehensive Report

# on the 2004 Outbreak of High Pathogenicity Avian Influenza (H7N3)

# in the Fraser Valley of British Columbia, Canada.

-

**June 30, 2004**
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**Canadian Food Inspection Agency**


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## Executive Summary

This *Comprehensive Report on the 2004 Outbreak of Highly Pathogenic Avian Influenza (H7N3) in the Fraser Valley of British Columbia, Canada* follows the *Short Summary* that was released June 30, 2004 and is available at:
http://www.inspection.gc.ca/english/anima/heasan/disemala/avflu/2004sum/summaryhpaie.shtml
.

The *Short Summary* was written as the outbreak was wrapping up and was intended to provide a brief overview of the major events. The *Comprehensive Report* was compiled after the outbreak was over. It adds a significant level of detail, serving both as a chronicle of events and as a descriptive epidemiology report. It was compiled from numerous interviews, notes and documents contributed by those acknowledged in the first few pages. Each section of the *Comprehensive Report* can be read independently or skipped, depending on the reader's field of interest.

Section 1 describes background information on avian influenza - the genetically unstable nature of the avian influenza virus, its ubiquitous presence in a wide variety of migratory waterbirds, its ability to infect swine, man and some other mammals, and its distribution throughout the world and in Canada. An overview is given of the structure of the highly integrated poultry industry in Canada with particular emphasis on the poultry industry in the Fraser Valley. A synopsis of poultry imports and exports shows that most of the poultry produced in British Columbia is consumed within the province but there is some international trade in specialty birds and products.

Section 2 describes the veterinary infrastructure in Canada. It outlines the roles and responsibilities of each of the three tiers of veterinary support, namely:

- federal regulatory programs for animal and plant health and food inspection,
- provincial and veterinary college diagnostic and species specialist support to industry, and
- private practitioner diagnostic and treatment support to individual farms.

Spelled out are Canada's regulatory framework concerning federally reportable diseases and Canada's role in reporting outbreaks to the World Organisation on Animal Health, the OIE.

Section 3 provides a summary of the infrastructure that was put in place to deal with the outbreak. Within CFIA, two emergency operations centres were established, one in Abbotsford and one in Ottawa. Although CFIA was the lead agency, there were many other departments, levels of government and private interest groups that played a role.

Section 4 outlines in chronological order the progression of the outbreak. The detailed clinical histories of the first two infected flocks are described and the progression of the outbreak from farm to farm is presented in a series of maps in Appendix 5. Appendix 4 tabulates the essential clinical data on each of the 42 commercial farms and 11 backyard flocks that were deemed to be infected.

Section 5 outlines the disease control measures that were implemented. These were based on the principles of:

- rapid detection of newly infected flocks
- halting the spread of infection - controlling the movement of birds and the rapid destruction of flocks adjacent to infected birds, and
- preventing reinfection through effective biocontainment.

A working hypothesis on spread of the disease was developed based on the pattern that emerged of infected farms. Three clusters of infected farms were observed - one north of Abbotsford (the origin of the outbreak), one west of Abbotsford, and one south of Abbotsford.

The working hypothesis of transmission in this outbreak is that low pathogenicity avian influenza virus was initially introduced into the older flock on the index farm, perhaps through indirect contact with feces from wild water birds. It appears that the virus then mutated into a high pathogenicity form and infected the younger flock on the same farm. Transmission from farm to farm over large distances was likely the result of mechanical spread by movement of people and contaminated equipment. However once infected, a flock of 8-10 thousand birds essentially becomes a “virus factory”. If located in a densely populated area, it may produce enough virus to infect nearby flocks through airborne transmission of virus on dust particles or feather debris. Further studies are underway to investigate this hypothesis.

During the outbreak, surveillance programs were initiated to detect newly infected flocks (for rapid containment purposes) and to differentiate infected from non-infected flocks (for disposal purposes). Euthanasia of commercial flocks was accomplished with $CO_2$ in all but one instance. A number of methods were used to kill backyard birds. Disposal of infected birds and products was accomplished through incineration, deep burial or composting. Disinfection of contaminated barns and equipment was carried out by the producer under the inspection of CFIA.

Section 6 summarizes the diagnostic test results, including the post-mortem findings and virology tests. H7 virus was isolated from 28 of the 42 commercial flocks and 1 of the 11 backyard flocks deemed to be infected (primarily on the basis of a positive PCR test). These isolates were highly pathogenic with an intravenous pathology index of 2.9 to 3.0.

Section 7 outlines the followup studies that were generated in the aftermath of the avian influenza outbreak. A number of projects will address questions about how the virus spread and specifically, the role of aerosol transmission.

Section 8 concludes that outbreaks of avian influenza can have a dramatic impact on the poultry industry and that this virus poses a risk to other animals and people.

Sections 9 and 10 list respectively, references and further readings on avian influenza.

# 1 INTRODUCTION

## 1.1 Background on avian influenza

### 1.1.1 Definition

Avian influenza (AI) is a viral infection of domestic and wild birds caused by type A influenza viruses. The severity of the disease depends on the strain of the virus and the avian species affected. It is a highly infectious and contagious disease of poultry characterized by a diversity of disease syndromes varying from subclinical to mild respiratory disease to loss of egg production to acute and generalized fatal disease.

Synonyms: Highly Pathogenic Avian Influenza (HPAI) is also called Fowl Plague

For Canadian Food Inspection Agency (CFIA) regulatory purposes, there are two categories of avian influenza virus based on the degree of pathogenicity: low pathogenicity (or lowly pathogenic) avian influenza (LPAI) and high pathogenicity (or highly pathogenic) avian influenza (HPAI). According to CFIA's *Highly Pathogenic Avian influenza Strategy* document (CFIA 2000), to satisfy the criteria for being classified as highly pathogenic, an avian influenza virus must meet the following requirements:

- to have an intravenous pathogenicity index (IVPI) in 6 week-old chickens greater than 1.2 or
- cause at least 75% mortality in eight 4- to 8-week-old chickens infected intravenously.

However, because these laboratory procedures require up to 10 days before completion, an emergency outbreak of HPAI in Canada may be declared if:

- a disease is seen in domestic poultry from which an influenza virus has been demonstrated and identified as an H5 or H7 subtype, and it has a basic amino acid motif at the hemagglutinin cleavage site that is similar to that observed in other HPAI isolates.

Isolates that do not meet these requirements are considered to be LPAI.

All of the outbreaks of HPAI reported since 1955 have been from subtypes H5 or H7 (Swayne and Halvorson, 2003) and there is evidence that LPAI subtypes H5 and H7 present a greater risk of converting to highly pathogenic virus. This has prompted the World Organisation for Animal Health (OIE) to redefine its reporting requirements for avian influenza. "Notifiable avian influenza" (NAI) now includes all influenza A viruses of H5 and H7 subtypes whether they are LPAI or HPAI.

### 1.1.2 History

According to Swayne and Halvorson in *Diseases of Poultry, 11th ed.*, fowl plague was first reported and described by Perroncito as a serious disease of poultry in Italy in 1878. The virus, as the causative agent of fowl plague, was discovered by Centanni and Savunozzi in 1901, but it was not until 1955 that the viruses were characterized and identified as Type A influenza viruses. The viruses related to the original fowl plague isolates that caused high mortality and morbidity among chickens, poultry and other birds, are found in most countries of the world where poultry is produced. However, the distribution of the AI viruses is clearly influenced by the distribution of both the domestic and wild avian species, the locality of poultry production, migratory routes, season, and disease reporting systems used. Accurate prevalence rates of infection are difficult to determine because different surveillance systems and procedures are used throughout the world.

Avian influenza viruses are frequently recovered from apparently healthy migratory waterfowl, shorebirds and seabirds throughout the world (Stallknecht, 1998). The epidemiologic significance of these occurrences relative to outbreaks in domestic poultry would suggest that waterfowl and other birds serve as a reservoir of AI (Webster et al., 1992).

### 1.1.3 Etiology

The causative agents of AI are viruses in the family Orthomyxoviridae. These are pleomorphic single-stranded RNA viruses with an envelope studded with symmetrical glycoprotein projections which have haemagglutinating (H) and neuraminidase (N) activity that undergo antigenic variation. These two surface antigens, HA and NA, are the basis for describing the serologic identity of the influenza viruses using the letter "H" and"N" with the appropriate numbers in the virus designation, e.g. H5N2. There are three antigenically distinct types of influenza virus: Types A, B, and C and there are now 15 (Swayne et al., 2003) haemagglutinating and 9 neuraminidase subtype antigens described in the Type A influenza viruses. The type specificity is determined by the antigenic nature of the nucleoprotein (NP) and matrix (M) antigens. Only influenza virus Type A has been isolated from birds. The definition of HPAI is dependant on defining the pathogenicity of the virus, however, marked discrepancies can and do occur

between clinical disease in the field and in experimental birds. Type A influenza viruses are found in humans, swine, horses, and occasionally other mammals such as mink, seals, whales and many avian species (Acha and Szyfres, 2003).

### 1.1.4 Worldwide distribution

Avian influenza viruses are worldwide in distribution, but the prevalence of LPAI H5 and H7 subtypes is difficult to assess because of the general lack of active surveillance in many countries of the world. The AI viruses are commonly isolated from the intestinal contents of apparently healthy migratory fowl and sea birds in several areas of the globe (Stallknecht, 1998). Although the precise distribution and prevalence of AI is difficult to determine, sporadic and infrequent outbreaks of HPAI occur worldwide with outbreaks having occurred in Australia, England, Scotland, Northern Ireland, United States and the former Soviet Union (Swayne et al., 2003). Since 2000, outbreaks of HPAI seem to be occurring more frequently, as witnessed in Italy (1999-2001, H7N1), Chile (2002, H7N3), and the Netherlands (2003, H7N7). More recently in 2003-2004, highly pathogenic H5N1 avian influenza has ravaged a number of countries in south-east Asia and has been responsible for a number of human fatalities (OIE, 2004).

### 1.1.5 Agent Survival

Avian influenza viruses are relatively sensitive to inactivation by lipid solvents such as detergents. The viruses are easily inactivated by heat, extremes of pH, non-isotonic conditions and dryness, however, their infectivity as well as their haemagglutinating and neuraminidase activities can be maintained for several weeks at $4^0$ C. Storage of the viruses at $-70^0$ C or by lyophilization also can maintain their infectivity and other biochemical properties for long periods. Additionally, the haemagglutinating and neuraminidase activities can be maintained even if the viruses are no longer infectious. Formalin and beta-propriolactone can be used to eliminate the infectivity of the viruses while preserving haemagglutinating and neuraminidase activity. In field situations AI-infected areas can be decontaminated with heat, sodium hypochlorite solution, formalin or commercial disinfectants, such as One-Stroke Environ®) (phenol) or Virkon®) (potassium peroxymonosulfate). Influenza viruses can survive for long periods in a cold and moist environment, such as in liquid manure, for up to 105 days after depopulation. Virus infectivity is retained in fecal matter for 30-35 days at $4^0$ C and for 7 days at $20^0$ C (Beard et al, 1987; Animal Health Risk Assessment -M13, 2004).

### 1.1.6 Pathogenesis

Susceptible avian species can be successfully infected with AI viruses by contact with exudates from infected birds as well as via parenteral inoculation. Many domestic species of birds are susceptible, but waterfowl can harbour avian influenza asymptomatically. Pigeons are not considered to be susceptible (Animal Risk Assessments M17 and M20, 2004; Acha and Szyfres, 2003).

Once introduced, HPAI virus spreads quickly throughout the body whereas LPAI strains may remain more confined to the respiratory and gastro-intestinal tracts. The HPAI virus is more likely to be present within or on the surface of eggs when hens are infected.

### 1.1.7 Clinical Manifestations

Clinical signs and economic consequences of AI depend on the species affected, age, sex, concurrent infections, virus strain, environmental conditions and other factors. The mild form (LPAI) produces a drop in egg production, listlessness, respiratory distress and diarrhea. The acute severe form (HPAI) produces air sacculitis, pulmonary congestion, as well as edema and petechial or ecchymotic hemorrhages throughout many internal organs. Avian influenza may resemble a number of other poultry diseases, including Newcastle disease, therefore laboratory confirmation is essential.

#### *1.1.7.1 Incubation period - mortality/morbidity*

Incubation period for the various diseases and/or syndromes caused by the AI viruses is highly variable and ranges from a few hours to 7 days. However, the World Organisation for Animal Health (OIE) *Animal Health Code* for 2003 uses 21 days as its maximum. The appearance of the initial clinical signs and the length of the incubation period is dependent upon the dose and virulence of the virus strain, route of exposure and species affected.

#### *1.1.7.2 Clinical signs and lesions*

Birds affected with AI show a variety of clinical signs that reflect abnormalities in the respiratory, enteric, reproductive or nervous systems. The signs most commonly observed in birds affected with HPAI are increased mortality, marked depression with ruffled feathers, decreased feed consumption and emaciation, excessive thirst, decreased or cessation of egg production, and watery diarrhea. Air sacculitis and respiratory signs are the most prevalent clinical signs in broilers and turkeys. Affected birds show mild to severe respiratory distress, coughing, sneezing, sinusitis, rales, excessive lacrimation and huddling. In severely affected mature birds, signs include greenish diarrhea, bloodstained oral and nasal discharge, edema and cyanosis of the head, wattles and comb, as well as ecchymotic discolouration of the shanks and feet. Nervous signs occur

infrequently and may include incoordination and the inability to walk and stand.

In some cases the disease is manifest as an acute, fulminating infection and birds are found dead without any observed signs. Mortality and morbidity of the disease are variable, depending on the strain of virus and the host species of bird, but in outbreaks of AI caused by a highly virulent strain of the virus (HPAI), the morbidity and mortality can reach 100%.

### 1.1.8 Prognosis

The prognosis of flocks of chickens or other susceptible avian species infected with HPAI is usually poor. The mortality and morbidity rates may reach 100% within 2 to 12 days after clinical signs first appear, however, the more frequent observation is one of high morbidity coupled with low mortality. Birds that survive are usually poor in condition and may resume laying only after several weeks.

## 1.2 Historical information on avian influenza in Canada

Canada has not previously reported a case of highly pathogenic avian influenza to the OIE. However, low pathogenicity avian influenza (LPAI) was recognized in turkeys during the 1960's, when it was common for them to be raised in outdoor ranges. An avian influenza virus (H5N9) isolated from two extensive turkey breeding establishments with common ownership in Ontario in 1966 was later found to meet the modern criteria of a highly pathogenic influenza (HPAI) virus (Lang, 1968).

Since then, more of these turkeys have been raised in closed poultry houses under more stringent biosecurity precautions, with the result that cases of low pathogenicity avian influenza are now rare. Canada has uncovered two cases of low pathogenicity H5 and H7 avian influenza in domestic poultry since 1975. The first case (H5 and neuraminidase unidentified) was on an emu farm. The diagnosis was made on the basis of serology and viral isolation was unsuccessful. The latest was an H7N1 strain, isolated from turkeys in Ontario in November 2000. The turkey flock of origin experienced a drop in egg production along with a slight increase in mortality.

Vaccination for avian influenza is not practiced in Canada. There are no avian influenza vaccines that are approved for use in this country, therefore it would be illegal for producers to vaccinate their flocks.

### 1.2.1 Surveillance in domestic poultry

Surveillance for avian influenza in domestic poultry in Canada presently relies on detection of clinical signs and pathological lesions in affected birds. Private poultry veterinarians conduct regular visits to commercial poultry farms to assess health and production and perform routine post mortem examination of dead birds. Samples and dead birds are often submitted to the provincial veterinary diagnostic laboratories. The provincial veterinary services have on staff certified veterinary pathologists and in some cases, poultry specialists. These experts have post-graduate training and are well acquainted with the signs of poultry diseases, including avian influenza.

Any suspicions of highly pathogenic avian influenza are reportable by law to the Canadian Food Inspection Agency and laboratory diagnoses of low pathogenicity H5 and H7 strains will soon become immediately notifiable. Such reports initiate an investigation by federal veterinarians along with the submission of samples to the National Centre for Foreign Animal Diseases (NCFAD) in Winnipeg. Table 1 indicates the avian influenza isolates received at NCFAD between 1997 and 2003.

In 2005, CFIA is planning to conduct a serological survey for avian influenza in commercial chickens, turkeys, ducks and geese. Serum samples will be collected from primary breeders, multipliers, table egg layers, and meat type birds. The samples will be tested at the NCFAD for antibodies to influenza A by competitive ELISA. Any positive or suspicious results found on ELISA will be confirmed by the agar gel immunodiffusion (AGID) test. AGID-positive sera from chickens and turkeys will be further tested using the hemagglutination inhibition test (HI) to identify if there are antibodies to subtypes H5 and H7. Reacting sera from waterfowl (ducks and geese) will be directly confirmed by the HI test as these species are poor producers of precipitating antibodies necessary for the AGID test. The information gained from this serological survey will be shared with the poultry industry. Discussions with various industry sectors will then be initiated toward establishing an ongoing surveillance system for notifiable avian influenza to meet the upcoming OIE requirements.

## Table 1

## Avian Influenza Viruses Characterized by the NCFAD Between 1997 and 2003

| Year | Month | Province | Type of Birds | Clinical Signs and Pathology | HA & NA Subtype | Pathogenicity Determination |
|---|---|---|---|---|---|---|
| 1997 | Mar. | B.C. | turkeys | -swollen faces, air sacculitis, ↑mortality in 5-10 wk old birds | H6N1 | Low path; IVPI = 0 |
| 1998 | Apr. | B.C. | chickens | -↑mortality, ↓egg production, mild illness | H1N1 | Low path; IVPI = 0 |
| | Oct. | Ont. | turkeys | -↓egg production, ↑morbidity & mortality (14%) | H6N1 | Low path; IVPI = 0 and 0.2 |
| 1999 | Jan. | Ont. | chickens | -↑mortality, air sacculitis, tracheitis, pneumonia, renal necrosis | H10N7 | Low path; IVPI = 0; no plaques on CEF cultures in absence of trypsin |
| | Apr. | B.C. | duck | -isolated from droppings | H4N6 | Low path; IVPI = 0.6; no plaques on CEF cultures in absence of trypsin |
| | Sept. | Sask. | gull & pelican | | H13N6 | ND |
| | Oct. | Ont. | gull | | H13N6 | ND |
| 2000 | May | Ont. | duck | -isolated from cloacal swabs | H3N2 | ND |
| | Jun. | Que. | pet birds[1] | | H3N8 | ND |
| | Aug. | Que. | pet birds[1] | | H3N8 | ND |
| | Nov. | Ont. | pet birds[1] | | H3N8 | ND |
| | Nov. | Ont. | turkeys | -↓egg production, ↑mortality, respiratory pathology | H7N1 | Low path; IVPI = 0; HA cleavage site = PENPKTR*GLF |

| Year | Month | Province | Type of Birds | Clinical Signs and Pathology | HA & NA Subtype | Pathogenicity Determination |
|---|---|---|---|---|---|---|
| 2001 | Mar. | Ont. | pet birds[1] | -↑mortality during quarantine | H3N8 | ND |
| | Jun. | Ont. | gulls | -research project on 3 gull colonies along Lake Ontario | H13N6 | ND |
| | Sept. | Ont. | finches[1] | -10% mortality during quarantine | H3N8 | ND |
| | Nov. | Ont. | pet birds[1] | | H3N8 | ND |
| 2002 | Apr. | Ont. | gulls | research project on 3 gull colonies along Lake Ontario | H13N6 | ND |
| 2003 | Apr. | Que. | pet birds | mortality during import quarantine (from UK) | H3 | ND |
| | Dec. | Ont. | turkeys | ↑mortality, air sacculitis, pneumonia | H6N8 | low path; IVPI =0 |

[1]Birds imported from the Netherlands from which diagnostic specimens were submitted during the quarantine period

Notes: courtesy Dr John Pasick, NCFAD

### 1.2.2 Wild bird surveillance

Wild birds are a natural reservoir for avian influenza viruses and many species of waterfowl carry these viruses without becoming ill. From 1976 to 1978, samples were collected for virus isolation from 720 ducks, 100 terns and 50 gulls in southern Ontario (Thorsen et al, 1980). Influenza viruses were isolated from 32 of the ducks, with at least 6 different hemagglutinins and 7 neuraminidases identified in 14 different combinations. Studies performed on ring-billed gulls (*Larus delawarensis)* in southern Ontario during the summer of 2000, involved sampling 360 birds (Velarde and Barker, 2000). Avian influenza viruses were isolated in 53 (14.7%) of these birds. A review of the role of wild birds as a source of highly pathogenic avian influenza is found in Appendix 1.

The Canadian Cooperative Wildlife Health Centre, headquartered in Saskatoon, Saskatchewan maintains a database of wildlife submissions to each of Canada's four veterinary colleges. A search of their database is presented in Table 2.

**Table 2**

**Influenza Isolated from Wild Birds**

| Year | Species | Location | Case # | Virus Identification |
|---|---|---|---|---|
| 1995 | Ring-billed Gull | Wadena, SK | W95214 | 1 |
| 1995 | Ring-billed Gull | Last Mountain Lake Simpson, SK | W95226 | 1 |
| 1999 | Gull - probably California Gull | Prince Albert National Park, SK | W99357 | 2 |
| 1999 | American White Pelican | Prince Albert National Park, SK | W99357 | 2 |

1. Chicken embryo lethal hemagglutinating agent, orthomyxovirus on electronmicroscopy, not neutralized with anti-Avian Paramyxovirus 1 antisera.

2. As in 1. Above. Identified further as H13 avian influenza virus by CFIA (submitted as case number D9922506 from Prairie Diagnostic Services via Saskatoon District Office)

Notes: records in the CCWHC Database 18 April 2002; courtesy Dr Ted Leighton, Canadian Cooperative Wildlife Health Centre, Saskatoon

## 1.3 Structure of the poultry industry in Canada

The poultry and egg industry in Canada operates under an orderly marketing system. Supply management is used to determine poultry meat and egg production levels within the country. The allocation of quota to each province is based on each province's share of national production. Production quotas are allocated to reflect the market share, which is closely linked to the population of the province. International and interprovincial trade is under federal jurisdiction, while the provincial and territorial governments administer their home markets.

Canada's orderly marketing system for poultry and eggs is governed by the following levels of legislation:

- Provincial and territorial legislation governing commodity and supervisory boards.
- Federal legislation controlling interprovincial and international trade in farm products.
- Federal proclamations to establish each of the national marketing agencies.

- Federal, provincial and territorial agreements administered by each national marketing agency.

*The Farm Products Marketing Agencies Act*, 1970-71-72, c. 65, s. 1, was enacted to establish the National Farm Products Marketing Council and to authorize the creation of the following marketing boards for poultry products:

- Canadian Broiler Hatching Egg Marketing Agency (CBHEMA)
- Chicken Farmers of Canada (CFC)
- Canadian Egg Marketing Agency (CEMA)
- Canadian Turkey Marketing Agency (CTMA)

In Canada, each province has some poultry production. Production levels in each of the regions: the West (British Columbia, Alberta, Saskatchewan and Manitoba), Centre (Ontario and Quebec) and East (New Brunswick, Nova Scotia, Prince Edward Island and Newfoundland) — roughly approximate their demographic weights (32%, 60% and 8% respectively). The provinces producing the most poultry are outlined in the map below, those being, Ontario, Quebec and British Columbia, respectively.

In Canada, provincial marketing boards have the authority to set prices. Farm-gate prices are established from current market conditions, input costs based on a cost of production formula, prices set in neighbouring provinces, and other factors. Interprovincial movement of poultry and poultry products is limited and movements that do occur tend to do so within the above- mentioned regions (West, Centre and East).

## 1.4. Structure of the poultry industry in the Fraser Valley of British Columbia

The poultry industry in the Fraser Valley of British Columbia is typical of the national poultry marketing system. Chickens and turkeys are grown to produce meat and eggs under a supply-managed quota administered by the province. The poultry industry in the Fraser Valley is self-contained with 12 hatcheries and 13 abattoirs (9 under federal inspection, 4 under provincial inspection), 17 feed manufacturers, 9 feed supplement suppliers and 3 pharmaceutical suppliers. It primarily supplies a large local consumer market, the city of Vancouver.

There are four major sectors - chicken meat, commercial table eggs, broiler hatching eggs and turkey meat- as well as a number of niche markets - waterfowl (ducks and geese), ratites (ostrich, emu, tinamou), game birds (squab, quail, pheasants and partridge) and specialty chickens (Taiwanese, black-skinned and silkie)(Appendix 17).

The four major sectors of the poultry industry consume 620,000 tonnes of feed a year worth $175 million, place chicks and poults worth $67 million and produce product valued at $403 million at the farm gate and over $875 million at the consumer level. (based on 2003 data supplied by S. Paulson, BCMAFF)

### 1.4.1 Chicken meat industry

Of the nearly 345 commercial producers of chicken meat (Cornish, broilers and roasters) in British Columbia (BC), approximately 83% are located in the Fraser Valley. They produce 87% of the commercial chicken meat grown in the province. The remainder of the producers are found in the interior of BC (in the Okanagan Valley) or on Vancouver Island. Together they place approximately 103 million chicks a year that will produce 100 million birds at slaughter or 201 million kg of live weight worth $620 million at the retail consumer level. Most of this product is consumed locally. The annual growth rate in production of chicken meat has been 5.7% for the last 10 years.

### 1.4.2 Commercial egg laying industry

In British Columbia, there are 132 producers with 2.48 million laying chickens. Ninety-seven producers are located in the Fraser Valley, 15 are on Vancouver Island and 20 are in the interior of BC. Annually, 2.48 million pullets are grown and 61.9 million dozen table eggs are produced. Eggs are sold to grading plants for grading and packing before being placed in the retail table egg market. Approximately 12.4 million dozen eggs are processed into egg products (2002), through a breaking station. The annual value of processed egg exports to countries such as Japan, United States, Austria and Australia is approximately

$42.8 million. Shell egg imports from the US and China are worth $19.3 million.

### 1.4.3 Broiler hatching egg industry

The broiler hatching egg industry supplies fertilized eggs to the hatcheries who in turn supply day-old chicks to the chicken growers. All but one of the 62 broiler hatching egg producers in BC is located in the Fraser Valley, and together they produce annually 111.5 million hatching eggs valued at $34.7 million. An additional 20.9 million hatching eggs are imported annually into BC. Hatching egg production has grown 4.5% annually for the last 10 years.

### 1.4.4 Turkey meat industry

There are 50 producers of turkey meat in BC, almost all of which are located in the Fraser Valley. Two flocks are on Vancouver Island and one flock is in the interior of BC. They produce 2.25 million turkeys a year or 19 million kg live weight, worth $29 million at the farm gate and in excess of $80 million at the retail level.

### 1.4.5 Layer breeders and turkey breeders

BC produces an estimated 55% of its turkey hatching eggs. The rest of the hatching eggs are obtained inter-provincially from Alberta, Manitoba and Ontario.

### 1.4.6 Other poultry species

The alternative poultry species sectors produce meat and products to meet the demands of specialty markets. In addition to partridges, tinamou, emus, ostriches, ducks and geese there is an annual production of:

- 500,000 squab
- 1.1 million silkie chickens
- 2 million quail and 3 million quail eggs, and
- 25,000 pheasants.

### 1.4.7 Feed mills

There are 7 major commercial feed mills in Fraser Valley, 6 of which supply broiler feeders. Six large poultry farms have on-farm feed mills. There are two subsidiary mills in the interior of BC and one on Vancouver Island and additionally, several small mills that mix organic feeds exclusively.

### 1.4.8 Hatcheries

The major broiler hatcheries in BC are owned by the processing industry, with three companies hatching 95% of the broilers. Most of the hatcheries are located in the Fraser Valley but there is one broiler hatchery in the interior of BC (Armstrong).

In 2003, BC imported 20.4 million broiler hatching eggs, all from the United States, while annual domestic production was 131.2 million broiler hatching eggs (Source: Agrifood and Agriculture Canada website. www.agr.gc.ca/poultry/ph03toc_e.htm#chicks, accessed July 8, 2004).

### 1.4.9 Poultry slaughter and processing plants

There are nine federally registered poultry slaughter plants in BC. Eight are located in the Fraser Valley and one is located in Armstrong. In addition, there are four provincially regulated poultry slaughter plants, two in the Fraser Valley and two in the interior. In BC, provincial slaughter inspection has been contracted to the CFIA and is performed by federal employees. Thirteen food processing plants that handle poultry products in their food manufacturing activities are also inspected by CFIA.

### 1.4.10 Poultry handling

There are 10 commercial poultry hauling companies, three of which offer catching services.

### 1.4.11 Egg grading and processing stations

There are 31 producers that produce and grade their own eggs, and 6 plants that purchase ungraded eggs from other producers. One plant handles 90% of the Fraser Valley egg production. There is also one plant that handles breaker eggs and produces egg products.

### 1.4.12 Poultry industry wastes

Poultry manure is used locally to fertilize other crops, such as mushrooms and row crops. One rendering plant, located in Vancouver, handles offal and deadstock.

## 1.5 Import/Export trade data

The following table presents a synopsis of Canada's international trade in poultry and egg products for 2003.

## Table 3

## Canadian Poultry and Egg International Trade in 2003

| | Exports | | Imports | | Trade Balance |
|---|---|---|---|---|---|
| **Description** | **Volume** | **$** | **Volume** | **$** | **$** |
| **LIVE BIRDS** | | | | | |
| Live chicken & mature chicken <185g | 8,564,224 | 11,202,636 | 20,629,989 | 26,901,686 | (15,699,050) |
| Live poults <185g | 8,352,247 | 22,958,438 | 4,748,732 | 7,932,556 | 15,025,882 |
| Live nes <185g | 250,685 | 309,074 | 308,701 | 690,859 | (381,785) |
| Total live <185g | 17,167,156 | 34,470,148 | 25,687,422 | 35,525,101 | (1,054,953) |
| Live chicken & mature chicken>2000g | 793,354 | 3,050,911 | 1,096,813 | 727,649 | 2,323,262 |
| Live poultry exc chicken | 835,039 | 8,088,848 | 16,991 | 18,598 | 8,070,250 |
| Total live >185g | 1,710,000 | 11,405,739 | 2,274,935 | 1,826,555 | 9,579,184 |
| **CHICKEN PRODUCTS** | **kg** | **$** | **kg** | **$** | **$** |
| Whole | 4,405,785 | 15,065,299 | 14,355,366 | 12,036,588 | 3,028,711 |
| Cuts | 63,884,096 | 67,455,940 | 74,271,590 | 189,124,133 | (121,668,193) |
| Livers /Paste | 356,957 | 321,316 | 114 | 155 | 321,161 |
| Prepared meals | 3,501,825 | 17,103,111 | 2,612,628 | 13,084,370 | 4,018,741 |
| Meat | 6,804,456 | 43,356,028 | 20,904,904 | 121,524,874 | (78,168,846) |
| Sausages | n/a | n/a | 678,541 | 2,823,569 | (2,823,569) |
| Fat | n/a | n/a | n/a | n/a | 0 |
| **Sub-total chicken & mature chicken** | 78,953,119 | 143,301,694 | 112,823,143 | 338,593,689 | (195,291,995) |

| | Exports | | Imports | | Trade Balance |
|---|---|---|---|---|---|
| **TURKEY PRODUCTS** | **kg** | $ | **kg** | $ | $ |
| Whole | 342,461 | 838,280 | 35,060 | 49,503 | 788,777 |
| Cuts | 15,342,158 | 12,487,308 | 3,146,990 | 10,889,933 | 1,597,375 |
| Livers/Paste | 60,416 | 31,174 | 12,324 | 19,655 | 11,519 |
| Prepared meals | 103,813 | 557,224 | 2,899,099 | 9,470,868 | (8,913,644) |
| Meat | 586,815 | 2,825,104 | 443,438 | 2,877,265 | (52,161) |
| Sausages | n/a | n/a | 191,155 | 1,544,642 | (1,544,642) |
| Fat | n/a | n/a | n/a | n/a | 0 |
| **Sub-total Turkey** | 16,435,663 | 16,739,090 | 6,728,066 | 24,851,866 | (8,112,776) |
| **DUCKS, GEESE AND GUINEA** | **kg** | $ | **kg** | $ | $ |
| Whole | 2,354,396 | 7,190,367 | 579,661 | 1,712,349 | 5,478,018 |
| Cuts | 641,134 | 2,314,236 | 558,032 | 1,683,748 | 630,488 |
| Livers/Paste | 292,928 | 2,348,044 | 706 | 1,180 | 2,346,864 |
| Prepared meals | 119,055 | 453,883 | 799,024 | 4,472,475 | (4,018,592) |
| Meat | 38,048 | 328,406 | 314,508 | 1,992,168 | (1,663,762) |
| Fat | n/a | n/a | 7,948 | 3,533 | (3,533) |
| **Sub-total Duck/geese/guinea** | 3,445,561 | 12,634,936 | 2,259,879 | 9,865,453 | 2,769,483 |
| **OTHER POULTRY PRODUCTS** | **kg** | $ | **kg** | $ | $ |
| Whole | n/a | n/a | n/a | n/a | 0 |
| Cuts | n/a | n/a | n/a | n/a | 0 |
| Livers/Paste | n/a | n/a | n/a | n/a | 0 |
| Prepared meals | n/a | n/a | n/a | n/a | 0 |
| Meat | 454,731 | 827,523 | 17,284 | 65,317 | 762,206 |
| Sausages | n/a | n/a | 8,251 | 30,886 | (30,886) |
| Fat | n/a | n/a | 3,956,930 | 3,181,325 | (3,181,325) |
| **Sub-total Other Poultry** | 454,731 | 827,523 | 3,982,465 | 3,277,528 | (2,450,005) |
| **SUB-TOTAL-All** | **99,289,074** | **173,503,243** | **125,793,553** | **376,588,536** | **(203,085,293)** |

## Table 3 continued

## Canadian Poultry and Egg International Trade in 2003

| EGGS | doz. | | doz. | | |
|---|---|---|---|---|---|
| Hatching Eggs | 2,946,477 | 32,045,389 | 11,641,610 | 28,445,765 | 3,599,624 |
| Shell Eggs fresh/preserved /cooked | 51,769 | 129,515 | 16,273,288 | 19,316,281 | (19,186,766) |
| Processed Eggs | **kg** | | **kg** | | |
| Dried Yolk | 1,734,766 | 7,361,844 | 67,730 | 289,285 | 7,072,559 |
| Liquid/Frozen Yolk | 2,788,125 | 7,121,603 | 1,779,610 | 3,820,221 | 3,301,382 |
| Dried Whole | 1,330,914 | 7,362,794 | 1,102,238 | 1,804,332 | 5,558,462 |
| Liquid/Frozen Whole | 1,074,204 | 1,830,337 | 764,824 | 1,212,271 | 618,066 |
| Dried Albumin | 2,004,475 | 17,102,851 | 181,677 | 1,642,032 | 15,460,819 |
| Liquid/Frozen Albumin | 1,729,450 | 2,048,873 | 7,169,453 | 6,412,501 | (4,363,628) |
| Egg preparations | n/a | n/a | 1,310,582 | 3,107,025 | (3,107,025) |
| **Sub-total Processed Eggs** | 10,661,934 | 42,828,302 | 12,376,114 | 18,287,667 | 24,540,635 |
| **GRAND TOTAL ALL POULTRY** | | **294,382,336** | | **479,989,905** | **(185,607,569)** |

Source: Statistics Canada / Agriculture and Agri-food Canada website:
http://www.agr.gc.ca/misb/aisd/poultry/tr03al_e.htm, accessed June 22, 2004

### 1.5.1 Poultry imports into Canada

According to the United Nations Food and Agriculture Organization (FAO), world imports of chicken products totaled 6,432,496 metric tonnes in 2002. Canada ranked 13th with 1.6% of world imports of chicken meat (103,632 metric tonnes).

Importations of live poultry are allowed from the United States (US), Cuba, Austria, Belgium, Germany, Denmark, Finland, France, Hungary, Ireland, Iceland, the Netherlands, St-Pierre and Miquelon, Switzerland, the United Kingdom and New Zealand. All poultry originating from countries other than the US require an import permit that lists specific conditions that must be met. Importations from eligible countries are suspended if the country gets an outbreak of either Exotic Newcastle Disease or Highly Pathogenic Avian Influenza. The requirements for US poultry are spelled out in the Import Reference Document which is a sub-set of the *Health of Animals Regulations*.

Based on 2003 import data (in value), more than 95% of imports into Canada are from the US. Imports from Brazil rank second, valued at more than $6 million and China is third with over $2 million of preserved shell eggs imported from that country. Imports from 12 other countries were all valued at less than $1 million.

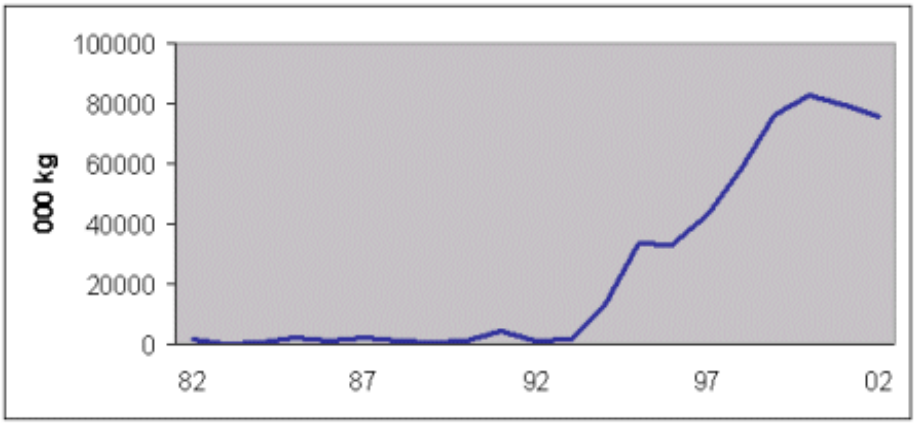
### 1.5.2 Poultry and egg exports out of Canada

Even though Canada exports chicken products to many countries, the bulk of our exports are still destined to a limited number of countries. Historically, Cuba has been Canada's largest exporting client, however in 2002 the US loosened its trade embargo against Cuba allowing them to purchase American chicken once again. As a result, Canada's top exporting market dropped from 44% in 2001 to 18% in 2002 with Russia now being our majority exporting client at 14,193,138 kg of Canadian chicken.

Canadian exports of chicken have increased dramatically over the past 10 years, from 949,000 kg in 1992 to 75,746,000 kg in 2002. Figure 1 shows this growth in Canadian chicken exports.

**Figure 1**

**Changes in Canadian Chicken Exports**




Source: Agriculture and Agri-food Canada website
http://www.agr.gc.ca/misb/aisd/poultry/tr03al_e.htm, accessed June 22, 2004

The United States remains Canada's largest importer of live poultry and eggs - $112 million (2002) - 53% of total exports. Six countries - the United States, Cuba, Japan, China, Germany and Hong Kong import 80% by value of Canada's exports.

Day old poults and hatching eggs are the United States' largest import from Canada; Japan's is dried eggs; Germany's is hatching eggs; and Cuba, China and Hong Kong import mostly chicken cuts.

**Table 4**
**Canadian Chicken Exports by Region**
(actual weight in kg)

| | 1999 | 2000 | 2001 | 2002 |
|---|---|---|---|---|
| **North America*** | 8,088,583 | 10,229,822 | 3,067,037 | 1,023,055 |
| **Central America and Caribbean** | 30,038,879 | 32,084,287 | 37,828,064 | 13,370,762 |
| **South America** | 1,058,770 | 566,130 | 1,051,218 | 1,934,341 |
| **Western Europe** | 28,980 | 4,680 | 2,144 | 4,032 |
| **Eastern Europe** | 3,577,318 | 5,031,291 | 10,065,450 | 22,925,300 |
| **Asia** | 22,445,031 | 22,975,211 | 21,973,150 | 22,274,665 |
| **Africa** | 9,475,703 | 9,904,265 | 5,218,254 | 13,862,867 |
| **Middle East** | 1,040 | 13,495 | 18,243 | 11,988 |
| **Other** | 1,888 | 1,342 | 2,073 | 3,714 |
| **Total** | **74,716,192** | **80,771,199** | **79,272,443** | **75,410,724** |

* Exports to the United States are not included for 2001 and 2002.

Source: CFIA / Data compiled by the AAFC Poultry Section
http://www.agr.gc.ca/misb/aisd/poultry/prindc5_e.htm, accessed June 22, 2004

### 1.5.3 British Columbia's interprovincial trade in poultry and poultry products

Tables 5 and 6 present a summary of poultry and poultry products traded between BC and other provinces during 2003.

**Table 5**
**Interprovincial movements of poultry and eggs into BC during 2003**

| Product | Amount | Province(s) of origin |
|---|---|---|
| **Pullet chicks for egg production** | 78 677 | AB, ON |
| **Male chicks commercial egg stock** | 665 | AB |
| **Chicks for broiler production** | 515 211 | AB, ON |
| **Chicken hatching eggs- broiler production** | 108 000 | AB |
| **Turkey Poults for Heavy Weights** | 776 780 | AB, MB, ON |
| **Turkey Hatching Eggs - heavy weight** | 489 029 | AB, MB, ON |
| **Table Eggs (dozen)** | 7 436 220 | (not available) |
| **Live turkey for slaughter (all of Western Provinces)** | 3 455 566 (kg - eviscerated weight | All from within the Western Provinces |

Source: Agriculture and Agri-food Canada, http://www.agr.gc.ca/misb/aisd/poultry/ipm_e.htm, accessed May 28, 2004

**Table 6**
**Interprovincial movements of poultry and eggs out of BC during 2003**

| Product | Amount | Province(s) of destination |
|---|---|---|
| **Pullet chicks for egg production** | 114 778 | AB, SK, MB |
| **Chicks for broiler production** | 35 528 | AB, ON |
| **Chicken hatching eggs- egg stock** | 59 920 | AB |
| **Turkey Poults for Heavy Weights** | 167 535 | AB, MB |
| **Turkey Hatching Eggs - heavy weight** | 207 400 | AB, MB |
| **Table Eggs** | 19 320 dozen | (not available) |
| **Live turkey for slaughter (all of Western Provinces)** | 3 455 566 (kg - eviscerated weight | All from within the Western Provinces |

Source: Agriculture and Agri-food Canada, http://www.agr.gc.ca/misb/aisd/poultry/ipm_e.htm, accessed May 28, 2004

## 2. THE VETERINARY INFRASTRUCTURE IN CANADA

Canada's veterinary infrastructure involves three tiers:

- federal regulatory authority for the control of animal and plant diseases, and inspection of food products rests with the Canadian Food Inspection Agency (CFIA)

- provincial veterinary diagnostic services and species specialists reside within the provincial ministries of agriculture and food; and veterinary colleges provide training and research

- private practitioners deliver veterinary services to agricultural producers. They are licensed by provincial associations and may be further accredited by CFIA to conduct federal regulatory functions.

### 2.1 The federal veterinary infrastructure

The CFIA is the Veterinary Administration, as defined in the *OIE Animal Health Code* (Article 1.1.1). It is a science-based federal regulator of food, animals and plants, and is committed to enhancing the safety of federally regulated food, contributing to the health and welfare of animals, and protecting the plant resource base.

With its headquarters in Ottawa and a program and operations network throughout Canada, the CFIA delivers its mandate through 4 area offices (Atlantic, Quebec, Ontario and Western), 18 regional offices, 185 field offices and hundreds of offices in non-governmental and commercial establishments. In addition, the CFIA has 21 laboratory and research facilities across Canada.

The CFIA controls specified animal diseases, regulates animal feed and veterinary biologics, performs tests on animals exported from and imported into Canada, and is also responsible for the control of zoonotic diseases. In addition, the CFIA monitors businesses engaged in the international or domestic movement of animals for compliance with regulations pertaining to the humane transportation of animals. Canada is a long-standing member of the OIE, consistently fulfilling its reporting requirements, and uses the Animal Health Code as the relevant standard for zoo-sanitary control (CFIA, 2001; Evans et al, 2003).

The CFIA has a comprehensive veterinary infrastructure that provides for disease surveillance and control:

- Canada has about 500 official veterinarians who are qualified and well-trained;

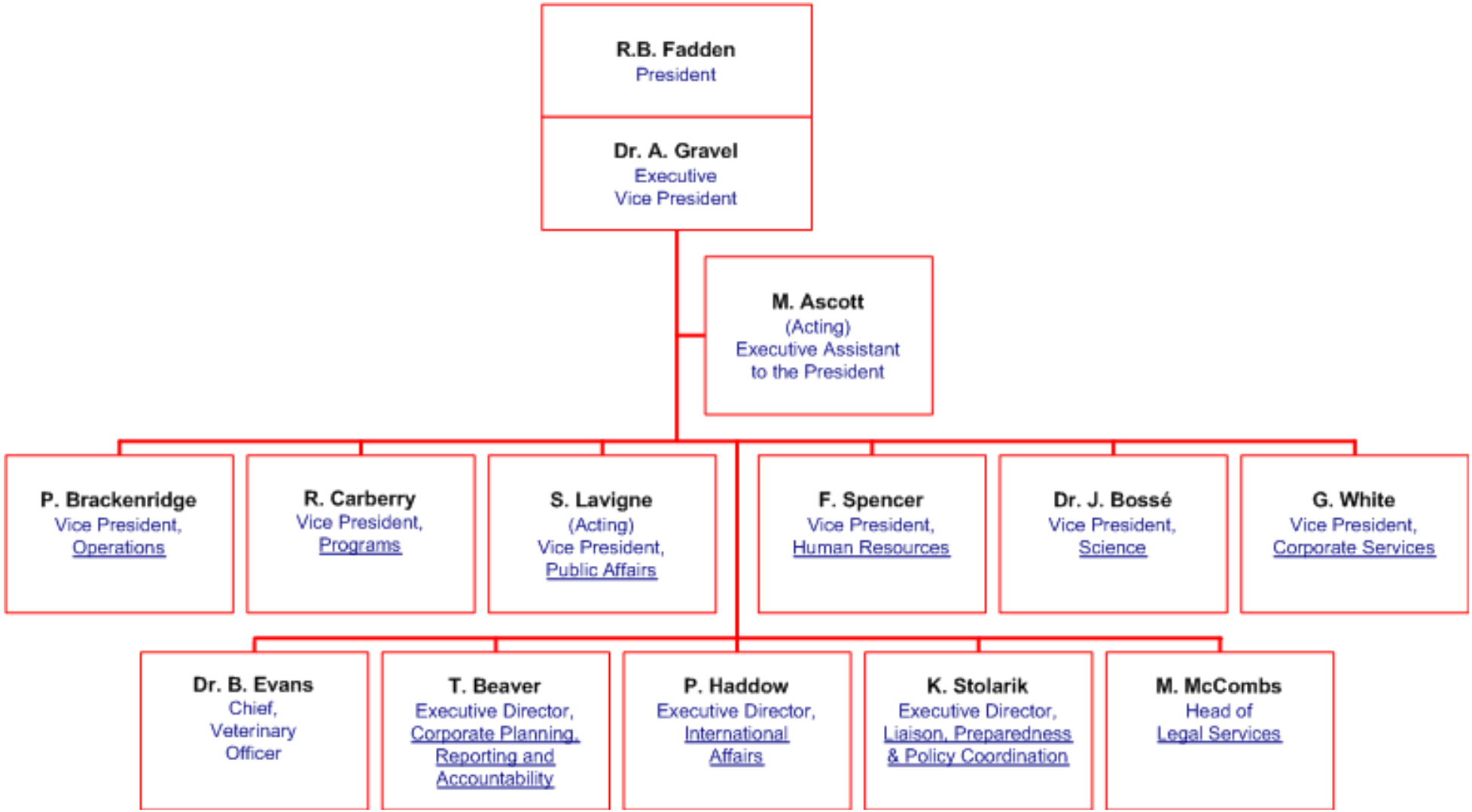
- official services are complemented by private sector and industry veterinarians;

- the legislation is modern and establishes controls over the entire food production continuum—from farm to plate; and

- Canada has effectively controlled or eradicated many serious animal diseases and enforces international standards relevant to the use of drugs and other treatments in animals.

A highly effective veterinary infrastructure is in place to verify that controls are being properly enforced, as values and ethics are considered important by the Government of Canada (Treasury Board of Canada, 2003). Canada is recognized internationally as having a very low level of corruption (Transparency International Secretariat, 2001).

**Figure 2**
**The Organizational Structure of the Canadian Food Inspection Agency**



### 2.1.1 Material (including financial) Resources

Material and financial allocations provide for well-qualified and well-equipped staff to deliver national veterinary services. Of a total of CDN $442 million in expenses in 2001, the CFIA spent CDN $88 million (or about 20%) on animal health programs.

The CFIA's effort to mitigate risks will continue to require a significant resource commitment, particularly when international circumstances call for heightened vigilance and protection.

### 2.1.2 Human Resources

The CFIA employs approximately 4,800 staff. These include highly trained front-line inspectors, veterinarians, agronomists, biologists, chemists, administrative staff, computer systems specialists, financial officers, communications experts, research scientists, laboratory technicians, and managers (CFIA Annual Report, 2001).

Over 500 veterinarians, along with over 1,000 lay inspectors, are employed in the various regions of Canada to implement animal health and meat hygiene programs and would therefore be involved with surveillance. Federal veterinarians are assisted in surveillance by a formal network of federal, provincial, academic and practising veterinarians.

Veterinarians employed by the CFIA must have a degree in veterinary medicine from a recognized university and be eligible for membership in the Canadian Veterinary Medical Association.

### 2.1.3 Laboratory Services

The CFIA operates 21 laboratories across Canada, providing both research and diagnostic services. Of these, 5 are directly involved in the provision of animal health diagnostic services supporting the Animal Health Program of the CFIA and have been accredited or are actively seeking accreditation by the Standards Council of Canada according to guidelines of the International Standards Organization (ISO 25 or 17025).

In addition to CFIA-operated laboratories, a number of private, provincial and veterinary college laboratories are accredited by the CFIA to perform specific diagnostic tests. These facilities must meet strict accreditation standards and are regularly assessed for quality control.

### 2.1.4 Legislative Authority

The Minister of Agriculture and Agri-Food is responsible for and has overall direction of the CFIA. The CFIA is responsible for the administration and enforcement of legislation related to food safety and animal health. The following acts and regulations are relevant in the prevention and control of avian influenza:

- *Health of Animals Act* and *Regulations* (1990, c. 21)
- *Meat Inspection Act* and *Regulations* (R.S. 1985, c. 25 (1st Supp.)
- *Feeds Act* and *Regulations* (R.S. 1985, c. F-9)
- *Agriculture and Agri-Food Administrative Monetary Penalties Act* and *Regulations* (1995, c. 40)

In general, the acts and regulations provide broader powers and specific actions and criteria are established in CFIA-issued policies and directives. This is an advantage in that policies and directives can be produced quickly and are relatively easy to amend in response to new scientific information. Legislative amendments, on the other hand, take much longer.

Unofficial versions of the legislation mentioned above may be viewed at http://laws.justice.gc.ca. The legislative material on this site has been prepared for reference only and may not reflect recent amendments. For the purpose of interpreting and applying the law, users should consult:

- the acts as passed by Parliament (http://www.parl.gc.ca), which are published in the "Assented to" Acts service, Part III of the *Canada Gazette* (http://canada.gc.ca/gazette/main.html) and the annual Statutes of Canada; and

- the regulations, as registered by the Clerk of the Privy Council and published in Part II of the *Canada Gazette* (http://canadagazette.gc.ca/index-e.html).

The following section gives a general overview of these acts and regulations.

#### *2.1.4.1 Health of Animals Act*

The *Health of Animals Act* is the principal authority that the CFIA applies to regulate animal diseases and toxic substances. The purpose of the Act and its Regulations is to prevent the introduction of animal diseases into Canada, to control and eliminate diseases that either affect human health or could have a significant economic effect on the Canadian livestock industry, and to provide for the humane treatment of animals during transport. The Act and Regulations regulate international trade in live animals, animal products and by-products, animal feed, veterinary biologic and biotechnology products. They provide for the approval and registration of private quarantine premises, for the control of infected places, and for approval and registration of establishments involved in importation (animals, animal products and veterinary biologic products).

The Act authorizes the development of regulations for the purpose of protecting human and animal health through the control or elimination of diseases and toxic substances. To prevent, control and eliminate serious diseases, such as avian influenza, the *Health of Animals Regulations*, the *Reportable Diseases Regulations*, and the *Compensation for Destroyed Animals Regulations* were set out under this Act.

CFIA inspectors are authorized under the Act to enter premises, open receptacles or things, require presentation of animals for inspection, examine any animal or thing, require production of documents, conduct tests or analyses, seize and detain animals, and enter a dwelling place with a warrant.

Offences and punishments are outlined for contravention of any provision of the Act and Regulations. Any violation to most provisions of this Act and Regulations may also be punishable under the *Agriculture and Agri-Food Administrative Monetary Penalties Act* and *Regulations*.

#### *2.1.4.2 The Health of Animals Regulations*

The *Health of Animals Regulations* specify requirements relating to the prevention, control and elimination of diseases and the humane treatment of animals during transport. These requirements are met by applying a broad range of rules, including, but not limited to, the control of animal movements; identification; quarantine; importation of animals, animal products and animal by-products; destruction of diseased animals; and control of veterinary biologics. The regulations are divided into ten parts and six schedules, of which the following are related to the control of avian influenza.

**Part I** (Segregation and Inspection of Animals) defines the inspector's authority to order the person having possession, care or custody of the animal to keep the animal separate for inspection and testing, to quarantine, to destroy, dispose of its carcass, and to request documentation.

**Part II** (Importation) regulates the import of live animals. The Minister may designate countries or parts of countries as free from the disease specified. Live animals imported from countries other than the US must be accompanied by an official certificate stating that the animal meets Canadian import requirements.

**Part III** (Importation of Animal Products) regulates the importation of certain products, including unfertilized eggs. Subject to subsection (3), no person shall import unfertilized bird eggs or egg products into Canada from a country other than the United States or from a part of such a country, unless

> (2*a*) the country of origin or part of such a country is designated as free of avian pneumoencephalitis (Newcastle disease) and fowl plague pursuant to section 7;
>
> (2*b*) the person produces a certificate of origin signed by an official of the government of the country of origin that shows that the country of origin or part of such a country is the designated country or part thereof referred to in paragraph (*a*); and
>
> (*2c*) the eggs are packed in containers that are clean and free from dirt and residue of eggs.
>
> (3) Paragraph (2*a*) does not apply to eggs imported into Canada if they are transported under seal of an inspector direct from the place of entry to a registered processed egg station approved by the Minister.

**Part IV** (Importation of Animal By-Products, Animal Pathogens and other things sets out the rules for importing animal by-products, such as rendered animal products, garbage, blood or serum (other than veterinary biologics) and other animal products. From countries other than the U.S., these products must be accompanied by an official certificate stating that they meet Canadian import requirements.

**Part VII** (Quarantine of Imported Animals) stipulates that all animals imported into Canada are subject to inspection, testing and treatment at a quarantine place approved by the Minister. The Minister also has the authority to order any imported animal quarantined and to request that such an animal be destroyed or removed from Canada if it fails to prove negative to any test for a disease.

**Part IX** (Eradication of Diseases) regulates the establishment of an eradication area and the obligation to possess a permit to move an animal from an eradication area. The Minister may designate the animals infected or contaminated by a disease and order them to be segregated, inspected, and tested. Subject to subsection (3), where the Minister has declared a control area pursuant to subsection 27(1) of the Act, the Minister may designate the animals or things likely to be infected or contaminated by the disease and, from the time the Minister makes the designation, no person shall, without the permission of an inspector or such other person as the Minister may designate, move

(*a*) any designated animal or thing

(i) into the designated area,

(ii) out of the designated area, or

(iii) from a place in the designated area except to a contiguous place in the designated area occupied by the same person; or

(*b*) any flesh, hides, hoofs, horns or other parts of animals designated in the order, or, in the case of poultry, the eggs thereof, or any hay, straw, fodder, cereal grain or other things used for feeding or caring for such animals

(i) out of the designated area, or

(ii) from a place in the designated area except to a contiguous place in the designated area occupied by the same person.

(2) Any permission to move an animal or any other thing referred to in subsection (1) given by an inspector or such other person designated by the Minister may be general or particular.

**Part X** (General Provisions) prescribes the quarantine notification to be given by an inspector and prohibits any person to do, or permit to be done, any of the listed actions on the animal, disease agent or thing quarantined, without authorization. A person who owns, has the possession, care or control of a quarantined animal has the responsibility to notify a veterinary inspector of any quarantined animal that appears sick and to comply with any notice of quarantine. Public sales, animal markets, and auctions (Sections 92 to 97) must maintain records for every animal received and sold. The use of edible residual material in feeding swine or poultry is regulated under Part X (Sections 111 to 113), as is the disposition of a diseased carcass (Section 114).

**Part XI** (Veterinary Biologics) requires that a permit be obtained to release and to import a veterinary biologic and that information be provided for the purpose of obtaining a permit. The manufacturer must show that a biologic is unlikely to pose a risk of harm to the environment or to human or animal health. The requirements to obtain an establishment and product licence and the conditions of operations in a licenced establishment are also set out in this part.

**Part XIII** (Permits and Licences) sets out the requirements to obtain a permit or licence.

***SCHEDULE VII*** *(Subsection 91.2(1)) IMMEDIATELY NOTIFIABLE DISEASES*

Immediately notifiable diseases are in general, diseases exotic to Canada for which a response policy is developed with other stakeholders, if a response is considered appropriate. Only laboratories are required to contact the CFIA regarding the suspicion or diagnosis of one of these diseases. This category also includes some rare indigenous diseases.

***SCHEDULE VIII*** *(Subsection 91.2(3)) ANNUALLY NOTIFIABLE DISEASES*

Annually notifiable diseases are diseases for which Canada must submit an annual report to the OIE indicating their presence in Canada. All veterinary laboratories are required to comment on Canada's report to the OIE. In general, these are diseases that are present in Canada, but are not classified as reportable or immediately notifiable.

*2.1.4.3 Reportable Diseases Regulations*

Pursuant to Section 2 of the *Health of Animals Act*, the Minister may designate diseases as being officially "reportable". If a disease is reportable, persons having the care of animals are obliged to notify without delay the nearest veterinary inspector of the presence of a reportable disease or the suspicion that an animal is infected with a reportable disease. All diseases that appear on OIE's List A are foreign to Canada and are designated as being officially reportable. Highly pathogenic avian influenza has been designated as a reportable disease in Canada for more than 25 years.

*2.1.4.4 Compensation for Destroyed Animals Regulations*

These regulations establish the maximum amount of compensation payable for an animal that is destroyed or required to be destroyed under the *Health of Animals Act* and *Regulations*. The *Compensation for Destroyed Animals Regulations* also set out rules to compensate for animal destruction and disposal costs paid by the owner.

*2.1.4. 5 Meat Inspection Act* and *Regulations*

The *Meat Inspection Act* and *Regulations* regulate:

- the international and interprovincial trade in meat and meat products;
- the registration of establishments (slaughterhouse, processing/packaging, and cold storage);
- the inspection of animals and meat products in registered establishments; and
- the standards for animals slaughtered and for meat products prepared in those establishments.

The Act and its Regulations play a role in animal health programs by regulating meat products, ante-mortem and post-mortem inspection, slaughter, animal condemnation, and disposition. Under the *Meat Inspection Act* and *Regulations,* federal inspectors are required to be present in federally registered slaughterhouses, may enter premises or vehicles, open packages, inspect and take samples, require production of documents, seize and detain meat, and enter a dwelling place with a warrant. The Act makes provision for offences and punishment for persons in contravention of the Act and Regulations.

*2.1.4.6 Feeds Act* and *Regulations*

The *Feeds Act* controls and regulates substances manufactured, imported, sold or represented for use for consumption by livestock. Feeds may only be manufactured, sold or imported into Canada if they are registered (with some exclusions), conform to standards and are labelled, or are exempt from these provisions, as prescribed in the regulations.

The CFIA regulates the use of ingredients in livestock feeds. Section 2 of the Act defines feeds as: “any substance or mixture of substances containing amino acids, anti-oxidants, carbohydrates, condiments, enzymes, fats, minerals, non-protein nitrogen products, proteins or vitamins, or pelletizing, colouring, foaming or flavouring agents and any other substance manufactured, sold or represented for use:

- for consumption by livestock;
- for providing the nutritional requirements of livestock; or
- for the purpose of preventing or correcting nutritional disorders of livestock, or any substance for use in any such substance or mixture of substances.”

Using the authority of the *Feeds Act*, the CFIA administers a national livestock feed program to verify that all livestock feeds manufactured and sold in Canada or imported into Canada are safe, effective and are labelled appropriately. The *Feed Regulations* outline feed registration requirements, standards as to composition, freedom from contamination, and labelling requirements. Regulated feeds are divided into two categories: feed ingredients and mixed feeds.

Inspectors designated under the *CFIA Act* may enter premises, open packages, examine feed, take samples, require documentation, seize and detain articles, and enter a dwelling place with a warrant. The Act also makes provisions of offences and punishment for every person who is guilty of contravening any provisions of the Act and Regulations.

*2.1.4.7 Agriculture and Agri-Food Administrative Monetary Penalties Act* and *Regulations*

The *Agriculture and Agri-Food Administrative Monetary Penalties Act* establishes a fair and efficient administrative monetary penalty system for the enforcement of the *Health of Animals Act* and other acts legislated by the agri-food acts. It is used as an alternative to the existing penalty system and as a supplement to existing enforcement measures. Administrative monetary penalties (AMPs) emphasize compliance rather than punitive action and provide for more immediate enforcement and corrective action.

## 2.2 The provincial veterinary infrastructure

Veterinary infrastructure at the provincial level consists of those veterinary support services provided by provincial governments to private veterinary practitioners (and sometimes directly to the public) as well as the educational, research and diagnostic services provided by Canada's veterinary colleges.

### 2.2.1 Provincial veterinary services

The provincial governments play important supporting roles in the areas of disease diagnosis, surveillance and control for the CFIA's national Animal Health Program. These provincial functions have their origins in a longstanding rapport with the federal government developed over many decades of disease control work. Provinces and veterinary colleges offer diagnostic laboratory services to veterinary practitioners and their clients. A nation-wide network of animal health laboratories across Canada includes laboratories operated by the federal and provincial governments, universities and private firms. Services provided include necropsy, histopathology, clinical immunology, microbiology, molecular biology, serology, and virology. Close relationships between federal and provincial animal health diagnostic laboratories ensure co-operation in disease control and consistency in diagnostic protocols.

Provincial veterinary services also take the lead role in detection and control of the several dozen OIE List B diseases that do not fall under the federal reportable disease list. Their diagnostic laboratories are likely to be the first point of recognition for new or emerging diseases. Communication among the provinces and CFIA pertaining to these "non-program" diseases is ongoing, through a formal mechanism called the Canadian Animal Health Network (CAHNet). The CFIA plays a supporting and coordinating role in this network.

### 2.2.2 Veterinary colleges

Canada has four veterinary colleges, located in Saskatoon (Saskatchewan), Guelph (Ontario), St Hyacinth (Quebec) and Charlottetown (Prince Edward Island). Each is accredited by the American Veterinary Medical Association. A minimum of two years of pre-veterinary studies are required before candidates can be admitted to the four-year veterinary program (five-year program in Quebec), and admission requests greatly exceed the available vacancies. Approximately 305 students are admitted annually to the Doctor of Veterinary Medicine degree in Canadian universities. The veterinary colleges have active research and teaching programs, and operate veterinary diagnostic laboratories.

## 2.3 The private veterinary infrastructure

In Canada there are approximately 8,720 veterinarians (Canadian Veterinary Medical Association, 2001) and approximately 3,000 registered animal health-veterinary technicians/ technologists (Canadian Association for Animal Health Technologists/Technicians, 2002).

In Canada, veterinary licensure is the responsibility of provincial and territorial veterinary bodies, authorized by acts of the provincial and territorial governments. In addition, there is a national organization, the Canadian Veterinary Medical Association (CVMA), which co-ordinates the National Veterinary Licensing Examinations. Licencing for veterinarians requires graduation from a recognized veterinary school, and may also require completion of all or part of the National Board Examination administered by the CVMA. In most provinces, maintenance of a general licence requires the demonstration of continuing education.

Although there are no specific statistics available for the veterinarians providing services to poultry farms, it should be noted that most commercial poultry farms are enrolled in health management programs that include regular visits by their veterinarian. Species specialists are commonly members of specialty veterinary associations that offer in-depth continuing education programs.

**SUMMARY - LEGISLATIVE AUTHORITY AND VETERINARY INFRASTRUCTURE**

- The Minister of Agriculture and Agri-Food is responsible and has overall direction of the CFIA, which administers and enforces pertinent legislation related to food safety and animal health.

- The *Health of Animals Act* and *Regulations* is the primary authority used by the CFIA to regulate animal diseases and toxic substances. The Act prevents the introduction of animal diseases into Canada, controls and eliminates diseases that affect human health or could have a significant economic impact on the Canadian livestock industry, and provides for humane treatment of animals during transport.

- The *Meat Inspection Act* and *Regulations* regulate meat products, ante- and post-mortem inspection, slaughter, animal condemnation and disposition

- The *Feeds Act* and *Regulations* regulate substances manufactured, imported, sold or represented for use for consumption by livestock. The CFIA administers a national livestock feed program under authority of the Act to verify that all livestock feeds manufactured and sold in Canada or imported into Canada are safe, effective, and labelled properly.

- The *Agriculture and Agri-Food Administrative Monetary Penalties Act* and *Regulations* establish a fair and efficient administrative monetary penalty system for the enforcement of the *Health of Animals Act*.

- In Canada there are approximately 8,720 veterinarians. There are four veterinary colleges, as well as a network of animal health laboratories across the country.

- The CFIA employs approximately 4,800 staff, including a comprehensive veterinary infrastructure of about 500 veterinarians, providing for disease surveillance and control.

- The provincial governments play a key supporting role in the areas of disease diagnosis,

# 3. INFRASTRUCTURE IN PLACE DURING THE OUTBREAK

## 3.1 The role of CFIA during the outbreak

The Canadian Food Inspection Agency takes the lead whenever a reportable animal disease, such as highly pathogenic avian influenza, is detected. Supportive roles are assumed by other federal, provincial and municipal agencies, veterinary associations and producer organizations.

### 3.1.1 CFIA's Foreign Animal Disease Plans

The CFIA has developed contingency strategies and operational plans to deal with potential incursions of foreign animal and reportable diseases. The *Foreign Animal Disease Eradication Support* (FADES) Plan is the framework of federal-provincial cooperative agreements that comes into force in the face of an emergency. The *Highly Pathogenic Avian Influenza Strategy* document forms part of the overall plan to deal specifically with an incursion of HPAI; it supplies background information on the disease itself as well as outlining the principles of control and eradication, disinfection of infected premises, and surveillance. The Emergency Response Organization and the detailed procedures to implement these contingency plans are set out in the *Foreign Animal Diseases - Manual of Procedures*.

### 3.1.2 Emergency Operations Centres established

When a high risk HPAI specimen is submitted for confirmation of diagnosis, the area and national emergency response teams are alerted. Once the diagnosis is confirmed, a sequence of events is activated which initiates the control and eradication procedures described in the *Highly Pathogenic Avian Influenza Strategy* and the *Foreign Animal Diseases - Manual of Procedures*. At the discretion of the Operations Director a local emergency operations centre (EOC) is established to deal with field investigation and disease control activities. In addition, a national EOC is established at Headquarters in Ottawa to support the field activities in terms of disease policy, legal aspects, communications, consultations with national producer groups, international relations and inter-provincial liaison.

#### *3.1.2.1 British Columbia EOC*

In this outbreak, the British Columbia Emergency Operations Centre (BCEOC) was activated in Abbotsford on February 18 at the CFIA District Office, 2 days after the highly pathogenic strain of avian influenza was suspected by British Columbia Ministry of Agriculture, Food and Fisheries (BCMAFF). As the size and scope of the outbreak expanded, so did the number of staff at the BCEOC. A recruitment drive was launched across Canada to bring in CFIA staff from other areas of the country to meet the needs of the disease control strategy. See organization Chart (Figure 3).

**Figure 3**
**Organizational Structure of BCEOC**

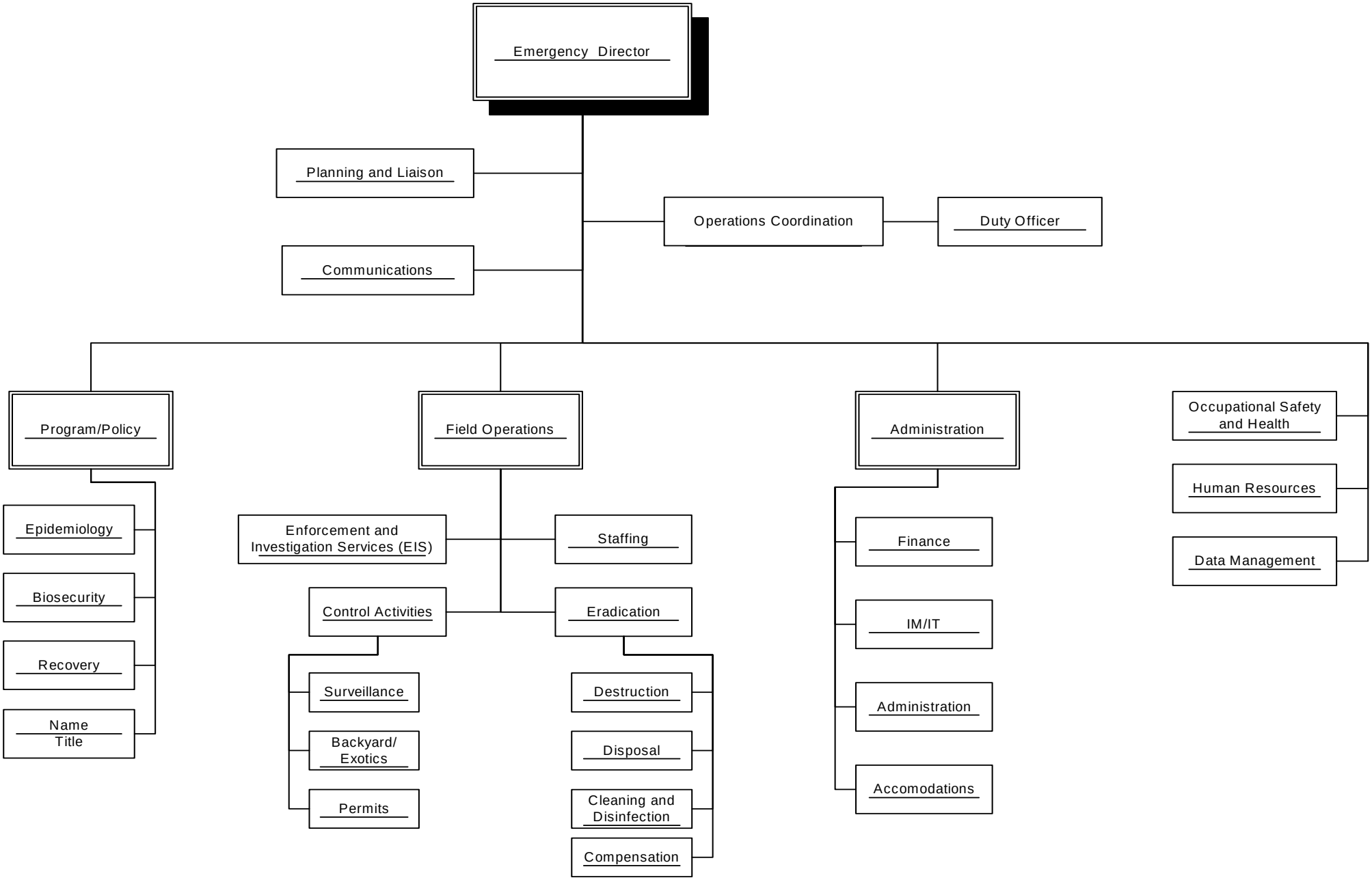


**Table 7**
**Staffing Requirements at BCEOC**
(approximate figures)

| | |
|---|---|
| Number of CFIA staff recruited to BCEOC from outside BC | 355 |
| Number of regional CFIA staff recruited from local offices | 35 - 40 |
| Number of general labourers hired | 148 |
| CFIA Staff remaining as of May 31, 2004 | 166 |
| Other Government Staff as of May 31, 2004 | 21 |
| Number of CFIA operational staff at BCEOC during peak operation | 210 - 245 |
| Total temporary clerical staff | 27 |
| Total staff of Provincial EOC | 102 |

**Table 8**
**Types of Staff Required at BCEOC (March 15 - May 28, 2004)**

| Designation | # of individuals | # of work days |
|---|---|---|
| **VM (veterinarians)** | 103 | 2433 |
| **EG (technical assistants)** | 154 | 3551 |
| **Management/Administration** | 59 | 1566 |
| **Total** | 316 | 7550 |

*3.1.2.2 National EOC*

On March 24, 2004, when the outbreak was declared to be an emergency, the National Emergency Operations Centre (NEOC) was activated. The NEOC management structure consists of:

- Emergency Director - this position is held by the Vice-President of Operations and is responsible for providing information to and from the Executive Committee.

- Emergency Manager - this position is held by the Executive Director of Operations and is responsible for the overall management of the operation, and is the key decision maker

- NEOC Manager - this position is responsible for the logistical support within NEOC including staffing of branch duty officers, and procuring necessary equipment and supplies

- NEOC Duty Officer - this position is the main point of liaison for communications between NEOC and various branches of the CFIA, responsible for the management of information as well as being the 24 hour contact person.

- Branch Duty Officers - these individuals act as the link between the NEOC and various branches involved with the emergency response.

During the outbreak, a decision record process was implemented. In Ottawa, the National Emergency Response Team (NERT), under the leadership of the Vice-president of Operations, operated out of the NEOC. On that team was a Programs advisory group who considered recommendations received from the disease control/epidemiology team at BCEOC and held daily teleconferences with them. Most decisions were made between these two groups and forwarded to the Chair of NERT for final approval. However, on occasion NERT would present these recommendations for final approval to CFIA's Executive Council, which consisted of CFIA's senior management and the President (see Figure 2, Section 2.1). Once approved, amended or rejected, the decisions would be relayed back through NEOC to the BCEOC.

### 3.1.3 Communications during the outbreak

Maintaining clear lines of communication was a constant challenge because there were so many different working groups, agencies and levels of government involved with the outbreak. Communications within CFIA's EOCs were facilitated by physically co-locating groups that worked closely together and by holding daily in-house briefings. To cement communication between BCEOC and NEOC, a number of daily teleconferences were held on issues such as disease control, epidemiology, public relations and laboratory support. These calls would often include CFIA staff from across the country.

In addition, daily interagency briefings were held at BCEOC that included CFIA staff section heads and representatives from provincial and municipal governments, public health agencies, producer groups, packing plants and hatcheries. These meetings proved to be an efficient method for keeping all participants informed, and for identifying solutions to the inevitable string of small operational problems that arose. Communications with foreign governments was handled through NEOC.

Communication with the public was handled through official CFIA spokespersons, who were designated at the beginning of the outbreak to handle all contacts with the reporting media. This ensured consistency in the comments and messages that were relayed to producers, the public and the press. In support of these spokespersons was a team of communications experts whose job it was to prepare information pamphlets, letters, public notices and press releases, and to coordinate regular press conferences, interviews and public town hall information sessions. The CFIA website was updated daily and a 1-800 toll-free number was activated to field enquiries from the general public. In addition, special events were scheduled for the media to increase public awareness, including a tour of the BCEOC and an information session on biosecurity. Any public health and disposal inquiries were forwarded to the respective authorities.

## 3.2 The role of provincial and municipal authorities during the outbreak

In response to the HPAI outbreak, a provincial emergency operations centre (PREOC) was established alongside CFIA's BCEOC (in the same building). This facilitated a close working relationship between federal, provincial and municipal agencies involved with human health, animal health, the environment, logistic support and information technology services.

An Operational Area Coordinator provided information to the all of the municipalities affected by the outbreak. The municipalities of Langley and Abbotsford had representatives present within BCEOC acting as liaisons. The City of Abbotsford was also instrumental in providing contact information for farmers, aerial maps, water for cleaning and disinfection activities, and traffic control.

The British Columbia Ministry of Agriculture, Food and Fisheries supplemented the diagnostic laboratory capacity of CFIA and provided expertise in veterinary epidemiology and disease control, virology, poultry medicine and poultry science, biosecurity, and geographical information systems. It was instrumental in linking the BCEOC with local governments, other provincial agencies, the local media and poultry industry groups. BCMAFF also investigated disposal options for both positive and negative birds and became the lead agency concerning the disposal of negative birds and litter. The Ministry continues to lead the work on economic impact assessment, recovery planning and improving biosecurity protocols.

Emergency assistance with logistics was provided both provincially and federally through two organizations - Provincial Emergency Preparedness, and Public Safety and Emergency Preparedness Canada. These organizations worked together to acquire the equipment and people necessary to mount surveillance, destruction and disposal operations in the field.

## 3.3 The role of private poultry and swine veterinarians during the outbreak

There is a small group of veterinary practitioners of the Fraser valley who offer consultative services to the poultry industry. These veterinarians are specialists in the principles of modern flock management and disease control who perform regular visits to their client's flocks to monitor the efficacy of vaccination, disease control and nutritional programs. They also have a close working relationship with the provincial diagnostic pathology laboratory and local feed companies.

Early in the outbreak, the poultry practitioners were invited to participate fully in the surveillance and disease control efforts and to act as a point of liaison between their clients and CFIA. They assisted in the outbreak in a number of ways:

- they collected pre-slaughter surveillance samples from clinically normal birds;
- they provided important background knowledge regarding the structure and operation of the poultry industry in the Fraser Valley;
- they were a trusted third party bridge to reach producers who were hesitant to cooperate in the disease control program.

During the course of the outbreak, one poultry practitioner accepted an appointment as a CFIA employee.

Swine practitioners in the area were also contacted to be aware of any clinically ill pigs showing respiratory symptoms that could be attributed to influenza. They were requested to alert CFIA and BCMAFF of any suspicions, but no such pigs were identified. There were 46 swine producers identified in the Fraser Valley and only 6 of them had poultry and swine on the same farm.

## 3.4 The role of poultry producer organizations during the outbreak

The poultry industry in the Fraser Valley is highly integrated structurally and economically, and in many cases, socially. However, before the outbreak each of the feather groups (broiler producers, egg producers etc) was represented by a separate organization, and one group, the specialty bird producers, had no official organization. As the outbreak progressed, these groups began to work more closely together to coordinate schedules for depopulation and to address issues of compensation. By the conclusion of the outbreak, they had united in a working group to address improvements in biosecurity and flock identification systems. The producer representatives on-site at BCEOC were key players in motivating producers to cooperate with disease surveillance and control programs.

## 3.5 Cooperation with USDA; other international visitors

Coming on the heels of reports of highly pathogenic H5N1 avian influenza throughout much of south-east Asia, Canada's outbreak with highly pathogenic H7N3 generated international attention from its trading partners. Early on, a number of consultations took place with experts in the Netherlands who had dealt with a similar situation the year previously. Later, site visitations were received from disease control specialists from Australia, New Zealand and Japan.

Due to the geographic location of the HPAI outbreak, near the Canada-US border, the United States Department of Agriculture (USDA) was also very interested in the course of the disease in Canada. A formal request was sent from the USDA headquarters to CFIA headquarters to request permission for a USDA presence within the BCEOC, and on April 13, 2004 a resident USDA liaison was stationed at the BCEOC. The main role of the liaison was to provide updates to the USDA regarding the situation, and to aid in disease prevention for the United States.

The USDA designated a surveillance zone in the State of Washington that extended from the Pacific Coast eastward to the Mount Baker Wilderness Area and from the US - Canada border southward for 10 miles. On April 27, 2004 surveillance testing began, following thorough canvassing and public awareness campaigns within the area to find all of the poultry present. Only 3 commercial facilities were present in the area, but there were approximately 650 other properties with poultry and 478 of these agreed to voluntary testing. Surveillance zones with a radius of 1 km were also erected around all commercial poultry facilities in Whatcom and Skagit Counties. An incident command post was initiated at Lynden, WA, to monitor the Canadian situation and to better prepare the US for a disease situation if avian influenza did cross the border. Two rounds of testing were initiated with a 2-3 week interval between each. A limited area, near the infected premises that were situated just north of the international border, was subjected to a third round of testing. The testing method used was at the discretion of the owner and involved agar gel immuno-diffusion (AGID) from egg samples, virus isolation or polymerase chain reaction from swabs, and ELISA from blood samples. Sick call surveillance was also initiated, to respond to any reports of sick poultry.

During the depopulation efforts in Canada, an additional logistic problem was addressed. Since the main supply depot of $CO_2$ was located just south of the Canada-United States border, in Washington State, a protocol was developed in conjunction with USDA to ensure that $CO_2$ delivery vehicles were thoroughly cleaned and disinfected between visits to infected premises and re-entry into the US (Appendix 2). A transfer system was developed whereby a large tanker would haul $CO_2$ from the depot to two smaller tankers. These smaller tankers would then deliver the gas to the farms.

A designated truck wash station, approximately 5 kilometers north of the U.S. border, was used for disinfecting trucks. Any vehicles servicing the live poultry industry (those carrying feed, litter, cages, or equipment) had to be cleaned and inspected before they could obtain a CFIA certificate that permitted them to cross the border to the US.

## 3.6 The role of human health authorities during the outbreak

### 3.6.1 Human health agencies involved

As some strains of avian influenza can be transmitted to people, contacts were initiated with local, provincial and federal human health authorities. These were respectively the Fraser Valley Health Authority, the British Columbia Centre for Disease Control (BCCDC) and Health Canada (Centre for Infectious Disease Prevention and Control; and the Workplace Health and Public Safety Program). When additional inspection staff was called in on February 20, 2004, the Medical Health Officer with the Fraser Valley Authority was contacted and all staff received the current human influenza vaccine and a presentation on the human health aspects of avian influenza.

On February 26, Health Canada, through its Workplace Health and Public Safety Program (WHPSP), released an Occupational Health Advisory for federal employees who were involved in avian influenza control. This stressed the importance of the proper use of personal protective equipment, hand hygiene, self-monitoring for influenza-like symptoms and if affected, self-isolation and reporting to public health authorities. The advisory also recommended vaccination with the current influenza vaccine and prophylactic use of antiviral medication while exposed to infected poultry and for a reasonable time afterward. Since that recommendation, taking antivirals and being vaccinate was a condition to work in areas potentially presenting a risk to humans of infection with avian influenza.

On March 16, 2004 the first human case of avian influenza A (H7) occurred in a worker who was involved in the culling of infected birds (Appendix 3; Tweed et al 2004). The worker had been accidently exposed in the eye on March 13, and reported conjunctivitis and nasal discharge. On March 25, a second worker developed conjunctivitis after close contact with infected birds on March 22. Treatment with oseltamavir was given to both workers, and symptoms fully resolved. On March 31, it was confirmed that the first case was caused by avian influenza H7 (and subsequently subtyped as H7N3). Health Canada reported the first human case to the World Health Organization at this time. On April 2, the second case (also H7N3) was confirmed and the WHO raised Canada's pandemic preparedness level to Phase 0, Preparedness Level 2, meaning that more than one human case of influenza had been diagnosed. On April 5, Health Canada reported on its website that the preparedness aspects of the Canadian Pandemic Influenza Plan were being implemented. This plan mapped out how Canada would prepare for and respond to an influenza pandemic. Although a number of exposed or potentially exposed individuals had reported symptoms of influenza-like illness and/or conjunctivitis, as of June 18 only two of these individuals met the laboratory-confirmed case definition.

On March 25, 2004, the BCCDC released an advisory letter to all workers in the poultry industry in BC who might be at risk for exposure to avian influenza. This letter addressed issues similar to those outlined in Health Canada's Advisory to federal employees. The key difference was that the letter specified that workers should receive this season's influenza vaccine and should take oseltamivir during and for 7 days after exposure to infected birds.

Also on March 25, CFIA requested that Health Canada Liason Officers be posted within the BCEOC to provide Occupational Health Services and support to CFIA workers. The WHPSP provided a full-time Occupational Health Nurse from the BC region and, when needed, several additional nurses and physicians. Their duties included instruction of employees in the public health implications of avian influenza, the administration of oseltamavir prophylaxis, administration of human influenza vaccinations, and surveillance of the workforce for illness. Tetanus vaccination was also offered to CFIA employees who had not received a tetanus vaccination in 10 years or more, and whose job duties required them to work outdoors.

A jurisdictional difficulty was encountered when CFIA wished to contract the services of private sector poultry companies (ie. catching crews) to assist with the disease control efforts. Workers of contracted companies did not fall under Health Canada's responsibility, and the mandate of the local Health Authority did not extend to the provision of vaccinations and anti-viral medications to private companies. This was overcome by directly hiring poultry workers as CFIA temporary employees. From April 6, 2004 to April 30, 2004, 148 labourers were hired by CFIA. In keeping with federal occupational health guidelines, each new CFIA labourer would require a medical assessment, so when each new group was hired, Health Canada dedicated the services of three physicians and two nurses to perform medical assessments and administer immunizations, prophylactic oseltamivir and medical advice.

### 3.6.2 Occupational Health and Safety

All CFIA staff were provided with training sessions on proper biosecurity precautions and the requirements of Occupational Safety and Health guidelines as outlined in the *Canada Labour Code*, Part II. To ensure consistency, all awareness sessions covered the same topics no matter what was the professional expertise or educational background of the participants. As conditions of work within poultry barns were often hot and physically demanding, the importance of good nutritional intake, drinking water, rest and respecting one's limitations were discussed.

Compliance was monitored and enforced regarding the proper use of personal protective equipment, safe work and hygiene practices and the reporting of accidents. The buddy surveillance system was implemented to minimize the risk of accidents or biosecurity breaches. Also monitored were the storage and use of

chemical products, materials and equipment, vehicle and pedestrian movement at the BCEOC.

Health Canada (WHPSP) also provided consultative occupational health and safety support to CFIA personnel and administered vaccinations and prophylactic medications as required.

### 3.6.3 Human surveillance

Human surveillance activities related to avian influenza outbreaks in poultry were designed to identify incidental human infections and the secondary possibility of person-to person transmission. As such, persons exposed to infected or potentially infected poultry or poultry products, as well as those who were exposed to symptomatic individuals, were actively sought. Symptoms of interest included any influenza-like illness (ILI) symptoms and/or conjunctivitis.

Surveillance measures varied depending upon the level of exposure and the most efficient means of follow-up.

- **Employees of the Canadian Food Inspection Agency (CFIA):** These workers were provided information on possible human symptoms of avian influenza infection, and were monitored by a Health Canada WHPSP occupational health nurse on-site at the BCEOC. If workers reported any symptoms, they were instructed to self-isolate and notify the Occupational Health Nurse by phone, who would inform the Fraser Health Authority for further follow-up.

- **Farmers, farm families and farm employees on avian influenza-infected farms:** Once infection was detected on a poultry farm, the CFIA notified the local public health office and public health nurses contacted the farmers. The nurses collected information on the recent and current health status of the farmer, his/her family and farm employees. If any of these individuals were symptomatic, further information was collected from them including the type and severity of symptoms, the type of exposure, the protective equipment used, anti-viral prophylaxis used (if any) and health status of any close or household contacts. Specimens were also collected whenever possible.

- **Farmers, farm families and farm employees of non-infected poultry farms:** All farmers in the region were provided with information on avian influenza and the possible human symptoms of avian influenza infection. These individuals were asked to share this information with all other members of their family, household and/or employees. All were advised to contact their local public health office should they experience any suspicious symptoms. To ensure broad communication of these recommendations, alerts were published in local newspapers.

- **Low-exposure workers:** Workers at slaughterhouses, processing plants and incinerators were considered low-exposure workers because they were unlikely to come in direct contact with infected poultry. However small the risk, in order to ensure that no exposure and/or infection was overlooked, these workers were also provided with information about avian influenza and its human symptoms and were advised to contact their occupational health service and/or the local public health office if they experienced any of those symptoms.

Table 9 provides a summary of the human health protection activities undertaken at BCEOC.

**Table 9**
**Health protection activities at BCEOC**

| Activity | Number of People |
|---|---|
| Persons assessed by Health Canada (WHPSP) | 521* |
| Physical examinations | 149 |
| Oseltamivir prophylaxis | 358 |
| Influenza vaccinations | 261 |
| Tetanus/diphtheria vaccinations | 124 |
| Total number registered at BCEOC | 640 |

* CFIA employees who did not visit poultry farms were not required to be assessed.

### 3.6.4 Employee Assistance Program

Throughout the outbreak a trauma counselor was available on-site for any employees having difficulties within the duties of their job. This included counseling for stress related situations such as overwork, dealing with hostile members of the public, and the psychological trauma involved with bird depopulation. This service was provided on a continual on-call basis and during regular office hours for the duration of the outbreak. Access to the counselor was also available for one month after the end of an employment term.

## 4. DESCRIPTION OF THE OUTBREAK

A summary of infected farms is described in Appendices 4a and 4b, and their locations are shown in Appendix 5. A progression of the outbreak is demonstrated in Appendices 6 and 7.

### 4.1 Infected Premises 1

Highly pathogenic avian influenza (H7N3) was confirmed on March 8, 2004, from samples collected on a farm north of Abbotsford, British Columbia. The farm was a chicken broiler breeder operation that supplied hatching eggs to a local hatchery. Two flocks of birds were on the farm when the disease first appeared, an older flock of 9200 birds (52 weeks of age) in one barn, and a younger flock of 9030 birds (24 weeks of age) in another.

The first signs of illness were a mild drop in egg production and feed consumption, and a slight increase in mortality (6 birds per day) in the older flock first observed on February 4, 2004. The farm's veterinarian and the feed company representative investigated the case and samples were submitted to the British Columbia Ministry of Agriculture, Food and Fisheries (BCMAFF) diagnostic laboratory for routine post-mortem examination on February 9. Pathologic signs included meaty lungs and inflamed tracheas.

The clinical illness in the older flock appeared to resolve slightly over the next few days, however on February 16 BCMAFF reported to CFIA that avian influenza virus had been detected on a polymerase chain reaction (PCR) test. This PCR result was obtained from embryos that had died during attempts at virus isolation. Within a day of this report mortality in the younger flock began to climb dramatically - from 25 dead birds one day, to 930 the next, and over 1500 on the third day. Allantoic fluid specimens from both flocks were forwarded for further testing to the Canadian reference laboratory, the National Centre for Foreign Animal Disease (NCFAD) in Winnipeg, and on February 19 the H7 subtype of avian influenza was confirmed.

When this disease was first discovered, CFIA's HPAI control strategy did not address the presence of low pathogenicity strains of avian influenza (no matter what the hemagglutinin sub-type). However, recent international events had made policy-makers aware that H5 and H7 sub-types of LPAI presented a greater risk of converting to highly pathogenic virus, and that in 2005 it was anticipated that the presence of these low pathogenicity strains would become reportable to the OIE. The recent outbreak of H5 N1 in SE Asia had also highlighted the zoonotic threat of avian influenza. These considerations weighed heavily in the decision to depopulate this farm.

The farm had been placed under quarantine on February 18 and when the diagnosis of H7 was confirmed the entire population of approximately 16,000 birds were destroyed the evening of February 19. A surveillance program, based on oropharyngeal and cloacal swabs and blood samples, was initiated on commercial farms within 5 km of the infected flock.

Ongoing work at NCFAD characterized the virus from the older flock as belonging to the H7N3 subtype (reported on February 23, 2004). It was further determined on March 2 as being a variety exhibiting low pathogenicity, with an intravenous pathology index (IVPI) of 0. On March 4 (and further confirmed on March 8) the isolate from the younger flock was found to be highly pathogenic, with an IVPI index of 2.96. Gene sequencing analysis demonstrated the presence of a seven amino acid insertion within the cleavage site of this isolate.

## 4.2 Infected premises 2

On March 10, a second flock within the surveillance zone, approximately 3 km west of the first infected premises, was confirmed as also being infected with H7N3 avian influenza. Increasing mortality was seen in one barn - beginning at 5-10 dead birds per day in early March, peaking at 150 on March 9, and then dropping back to 10 dead birds on March 11. As part of CFIA's investigation into this increased mortality, on March 9 samples were collected and the farm was placed under quarantine. The birds were destroyed on March 12.

This second broiler breeder premises had four barns, two with pullets and two with laying birds. Only one barn of 13 week old pullets showed clinical signs and virus was isolated only from that flock. Clinical signs in this flock were not typical of a highly virulent virus, but IVPI and sequencing analysis demonstrated the same seven amino acid insertion, confirming that this isolate was also highly pathogenic.

## 4.3 Progression of the outbreak during March

On March 11, the Minister of Agriculture and Agri-food made a declaration, pursuant to subsection 27(1) of the Health of Animals Act, implementing a Control Area in the Fraser Valley of British Columbia that restricted the movement of any captive birds, including day-old chicks and hatching eggs, any products or byproducts of birds, and anything (ie. equipment) that had been exposed to a bird. On March 10, the CFIA implemented 3 disease control zones (Appendix 6). The 5 km zone around the original index case was designated as the High Risk Region (HRR). This was surrounded by a larger Surveillance Region (SR), and the Fraser Valley south of the Fraser River was

designated as the Control Area (CA). Movement controls were established to prohibit removal of birds or infected material from the High Risk Region and cleaning and disinfection (C&D) stations were established at the perimeter.

Commercial and backyard flocks within the High Risk Region, commercial flocks within the Surveillance Region, and those that were designated as high risk contacts were targeted for regular active surveillance at least once a week . A sampling plan was implemented to enable detection if disease prevalence on the farm was 5% or higher. On all premises, a minimum of 60 birds were sampled; on those with 3 or more barns, 25 samples per barn were taken. The owners of other commercial flocks in the Surveillance Region were interviewed by telephone and dead birds were collected and swabbed weekly. In addition, all birds intended for slaughter were tested within 96 hours of the scheduled slaughter time according to the same protocol and were clinically re-inspected by a veterinarian within 24 hours of being transported to the plant.

The disease spread 2 km south and west to a cluster of three farms within the High Risk Region that tested positive between March 13 and 19. In the face of the outbreak, depopulation decisions were based on a positive PCR result regardless of whether or not clinical signs were expressed or virus was isolated.

On March 24, after 5 commercial farms and 2 backyard flocks had tested positive for avian influenza, the outbreak was declared to be an emergency and the CFIA activated its National Emergency Operations Centre in Ottawa. A decision was made to pre-emptively slaughter all poultry (275,000 birds) within the High Risk Region and active surveillance activities were redirected to dead bird pickup within Surveillance Region. Birds that tested negative for HPAI and that had salvage value were slaughtered for domestic consumption.

Sporadic cases were diagnosed over the next few days among a few outlying farms outside the High Risk Region and within a second small cluster of farms 7 km to the west, along north Mount Lehman Road. These did not exhibit the dramatic clinical evidence that is typical of highly pathogenic avian influenza, but were discovered during the course of routine surveillance testing of dead birds.

By the end of March, a total of 20 commercial farms had been found to be positive by PCR testing - 13 within the High Risk Region, 5 within the surrounding Surveillance Region and 2 outside the Surveillance Region but within the Control Area. In addition to these, there were 6 positive backyard flocks - 4 within the High Risk Region and 2 within the Surveillance Region.

## 4.4 Progression of the outbreak during April-May

With the discovery of infected flocks outside the High Risk Region, a decision was made on April 5 to pre-emptively slaughter the entire Control Area of poultry - an estimated 19 million birds. Further movement restrictions were imposed to stop the movement of poultry, poultry products and contaminated equipment within the Control Area and legal steps were taken to require poultry owners to control access to their property to prevent unauthorized entry.

By mid-April a third cluster of positive farms had emerged 5 km away, on south Mount Lehman Road and Columbia Street. These were located in a very high density poultry area south of Abbotsford. Barns were often located within several hundred meters of each other and, once introduced, the disease appeared to spread locally from one farm to the next. Rapid depopulation of poultry barns within 3 km of infected premises became a primary focus of the disease control efforts, starting with those within 1 km.

The progression of the outbreak slowed towards the end of April, approximately 2 months after confirmation of infection on the index farm. It appears that movement controls and pre-emptive slaughter of all birds within 3 km of an infected farm were effective in limiting spread of the outbreak. In a number of cases, surveillance conducted during pre-emptive depopulation revealed flocks that were positive to the PCR test but were not showing clinical signs.

Samples were collected from what would become the last infected commercial premises on May 13 and the birds were destroyed on May 20. The last infected backyard flock was sampled and destroyed on May 18. Of the 42 commercial farms that were depopulated on the basis of a positive PCR test, 11 were found during the course of surveillance for pre-emptive slaughter or depopulation. No clinical signs were seen in these flocks, and further work was undertaken to determine if active infection with H7N3 was present. By June 18, the laboratory had isolated H7 virus from 28 of the 42 commercial premises deemed to be infected on the basis of a positive PCR test. Highly pathogenic avian influenza virus isolates were confirmed on all 28 farms.

One flock of ducks, not reported in the Table of Infected Premises, tested positive for the H11N9 strain of avian influenza. These birds had been destined for slaughter for meat and were uncovered as a result of regular pre-slaughter surveillance. This finding was considered incidental to the outbreak; therefore, the ducks were slaughtered and their meat was processed for human consumption.

By May 21, 2004, when depopulation of all commercial farms within 3 km of infected premises had been completed, approximately 17 million commercial poultry (90% of the estimated population) had been slaughtered within the Control Area. At the end of May,

a few farms with replacement pullets coming into production were allowed to move birds within the Control Area under conditions specified in a permit. These conditions stated that:

- birds must originate from influenza-negative flocks (as confirmed through testing blood and swab samples),
- birds could not be moved or placed within 3 km of an infected premises, and
- the flock must participate in an ongoing dead-bird surveillance program.

## 4.5 Conclusion of the outbreak in June

On June 3, twenty-one days had elapsed since the last infected commercial farm was discovered. This gave additional confidence that the outbreak had been contained and depopulation of remaining backyard flocks within the 3 km zones was halted on June 4. On June 10 a new High Risk Region (HRR)was named - the municipal boundary of the City of Abbotsford (Appendix 8). This allowed for orderly repopulation of farms that were located within the Control Area, but outside the new HRR. Hatching eggs could be moved into, but not out of the HRR. In addition, chicks from approved hatcheries could be placed on farms that were located within the Control Area, but outside the HRR. Other controls were maintained prohibiting the movement of hatching eggs, birds for slaughter and pet birds out of the Control Area. Dead bird surveillance was continued on 12 layer and breeder farms within the new High Risk Region with the understanding that any flocks representing a new outbreak of disease would be depopulated immediately.

By June 11, all sites where dead birds and/or manure were composted had achieved the time and temperature requirements to be deemed virus-free (see section 5.7.1). Compost piles containing dead birds were maintained until complete carcass breakdown had occurred. Virus isolation was not attempted on composted materials because international documentation was available to establish the requirements for composted material to be deemed virus-free (Lu 2002, Senne, 1994). Cleaning and disinfection procedures were concluded on 41 of the infected premises by June 18. The remaining farm, outside the HRR, was to remain under quarantine until the cleaning and disinfection was completed (by the end of June).

## 4.6 Chronology of the outbreak

The major events of the outbreak are summarized below in Table 10. A complete chronology can be found in Appendix 9.

**Table 10**

**Chronological summary of significant actions**

| Date | Action |
|---|---|
| Feb 16 | BCMAFF notifies CFIA of positive PCR for avian influenza on Premises 1 |
| Feb 18 | Samples escorted to NCFAD; BCEOC opened |
| Feb 19 | Public announcement that LPAI was found in the Fraser Valley; NCFAD confirms H7 strain on Premises 1; Emergency Report sent to OIE; index flock depopulated |
| Feb 23 | NCFAD confirms N3 strain on Premises 1; Followup Report #1 sent to OIE |
| Mar 2 | NCFAD confirms LPAI on Premises 1; Followup Report #2 sent to OIE |
| Mar 8 | NCFAD confirms that both LPAI and HPAI were present on Premises 1 |
| Mar 9 | BCMAFF notifies CFIA of positive PCR on Premises 2 |
| Mar 10 | NCFAD confirms H7 on Premises 2; Followup Report #3 sent to OIE announcing HPAI; High Risk Region and Surveillance Region are designated |
| Mar 11 | NCFAD confirms HPAI on Premises 2; Ministerial Order establishes Control Area and movement restrictions. |
| Mar 24 | Emergency declared and National EOC activated; all flocks in High Risk Region will be depopulated |
| Mar 29 | Positive farm found outside the High Risk Region (but within Control Area) |
| Apr 1 | All flocks testing positive for avian influenza by matrix PCR will be depopulated without waiting for confirmation of H7 strain; news release from public health officials confirming H7 isolation in a poultry worker. |
| Apr 3 | Depopulation of all backyard flocks in the High Risk Region is complete |
| Apr 3 | Weybridge laboratory confirms the results of NCFAD |
| Apr 5 | Ministerial Order to depopulate the entire Control Area; poultry owners will be required to control access to their property; Provincial EOC activated. |
| Apr 8 | Destruction orders issued to hatcheries in the Control Area; poultry products from Control Area can now move directly to domestic retail outlets outside of Control Area (but these products are not eligible for export) |
| Apr 13 | Depopulation all commercial flocks in the High Risk Region is complete; depopulation will now target flocks within 3 km of infected premises |
| May 13 | Samples collected from what will become the last infected commercial farm. |

| | |
|---|---|
| May 16 | Samples collected from what will become the last infected backyard flock. |
| May 20 | Depopulation of the last infected commercial premises |
| May 21 | The last farm within the 3 km zones is depopulated. |
| Jun 4 | Depopulation activities within the Control Area are halted. |
| Jun 8 | Industry compensation package announced |
| Jun 10 | Revised High Risk Region is designated (municipal boundaries of the City of Abbotsford). |
| Jun 11 | All compost piles are deemed to be free of influenza virus. |
| Jun 18 | All 41 farms within the Revised High Risk Region have been cleaned and disinfected |
| Jun 30 | All infected premises remain under quarantine, cleaning and disinfection remains to be completed on one farm |
| July 9 | 21 days post cleaning and disinfection of infected premises. This meet the OIE standard for freedom in infected zone |
| Aug 18 | Ministerial control area order rescinded |

## 5. DISEASE CONTROL ACTIONS TAKEN

CFIA's disease control actions were based on three major disease control principles:

- rapid detection of newly infected flocks (surveillance),
- halting the spread of the disease, through movement controls and the rapid destruction of infected flocks, high risk contact flocks and proximal flocks (within 3 km), and
- preventing reinfection through the effective biocontainment of infective material (carcasses, manure and feed).

In the face of a rapidly spreading outbreak, it was imperative to remove high risk animals as quickly as possible to prevent further spread of disease. The polymerase chain reaction (PCR) test was used as a highly sensitive, rapid screening test for making depopulation decisions. Virus isolation and subsequent confirmatory tests for HPAI, which generally take several days to complete, were useful in determining which level of biosecurity was required for cleaning and disinfection. It was recognized that negative isolation could have resulted because HPAI was truly absent or conversely, may have resulted if the virus was present but not viable. Inability to isolate virus may have also occurred for reasons related to sample collection, transport and processing. The case definitions for the status of premises are outlined below:

**Negative Premises**
Flocks that did not demonstrate clinical signs consistent with HPAI and which tested negative on matrix PCR for influenza A were presumed to be negative.

**Presumptively Infected Premises**
For the Purposes of Depopulation:

- Birds, with the exception of domestic pigeons and waterfowl, which tested positive on matrix PCR for influenza A or demonstrated severe clinical signs consistent with HPAI, or which demonstrated clinical signs and were positive on the Directigen(TM) test (Becton, Dickinson and Co, Sparks, MD, USA), were presumed to be positive. These were depopulated in the Control Area.
- Domestic waterfowl which tested positive on matrix PCR for influenza A in the Control Area, and which did not display clinical signs consistent with HPAI, were quarantined until the H type of the virus was known. Flocks positive for H5 or H7 were depopulated.

**Confirmed Infected Premises**

- Birds (with the exception of domestic pigeons and waterfowl) in the control area which tested positive for influenza A by PCR were designated as positive and were subject to all conditions placed on infected premises.
- Domestic waterfowl premises which tested positive for influenza A by PCR and were typed H7 or H5 were also designated as positive and were subject to all conditions placed on infected premises.

## 5.1 Working hypothesis on transmission of the disease

Wild birds, especially waterfowl, act as reservoirs of avian influenza virus and may be the initial source of infection to domestic birds through direct contact or contamination of feed and water. Low pathogenicity viruses can acquire virulence over time due to antigenic drift (small mutations) or antigenic shift (larger genetic changes). Because the disease is highly contagious, it spreads rapidly through a confined commercial poultry flock. High concentrations of virus are present in the respiratory and digestive tracts of infected birds. Fecal material from infected birds may contain up to $16 \times 10^{6}$ virions/gm of feces and one gram contains enough virus to infect one million birds. Stallknecht et al (1990a) found that Muscovy ducks shed $1 \times 10^{10}$ $EID_{50}$ per gram of feces in 24 hours and that virus can persist in water up to 100 days (1990b, 1990c). Genetic characterization of the 2004 H7N3 virus from Canada shows a closer relationship with a Canadian H7N1 strain reported in turkeys in 2000 than with a Chilean H7N3 strain reported in 2002 (Appendix 10).

The routes of transmission of the virus between infected premises appeared to be similar to those reported in outbreaks of highly pathogenic avian influenza overseas. Movement of people, equipment or birds was considered to be the primary mode of transmission to new locations within the control area. A number of positive farms had common ownership and management and industry-wide common usage of hatcheries, feed companies, and poultry industry service companies also may have contributed to the spread of disease (Appendix 11). The investigation of each positive premises was based upon a veterinary visit, responses to a questionnaire (Appendix 12), tracing the movements of high risk products and investigating other potential avenues of disease transmission (Appendices 13 and 14).

There were three clusters of infected farms all within a 20 kilometer radius:

- the High Risk Region, north of the City of Abbotsford
- a cluster directly west of the original high risk area, and
- a cluster south of the City of Abbotsford.

In a few cases, outlying farms were positive, based on PCR tests, but did not show clinical signs and the disease did not spread locally. This was evident in the farms east and west of the Abbotsford region.

These three clusters have a diameter of 5-6 km. In this outbreak, it appears that once a farm within a densely populated poultry area became infected, nearby farms (often within several hundred meters of each other) also become infected. The majority of the Fraser Valley poultry producers (95%) use wood shavings and the remainder use sawdust for bedding material. Although wood shavings contain mainly coarse particles, they often contain extremely fine and light sawdust particles, which can readily become airborne if the bedding is disturbed. The large exhaust fans on modern poultry barns can evacuate

high volumes of air and airborne dust could readily be drawn into the intakes of adjacent barns. Further studies are underway on the role of local, airborne spread of the virus on feathers or dust particles.

The working hypothesis of transmission in this outbreak is that LPAI was initially introduced into the older flock on the index farm, perhaps through indirect contact with feces from wild water birds. The Fraser Valley lies on the Pacific migratory flyway and has a large population and variety of water birds. During February and March, the weather is cool and damp and many ducks, gulls and geese were observed in puddles that had collected in the nearby fields.

Once LPAI was introduced into the older flock, it appears that the virus then mutated into HPAI and infected the younger flock on the same farm. Transmission from farm to farm over large distances was likely the result of mechanical spread by movement of people and contaminated equipment. However once infected, a flock of 8-10 thousand birds essentially becomes a Avirus factory@. If located in a densely populated area, it may produce enough virus to infect nearby flocks through airborne transmission of virus on dust particles or feather debris. Further studies are underway to investigate this hypothesis.

## 5.2 Surveillance

### 5.2.1 Tracing forward and backward at the outset of the outbreak

Because the index case was a broiler breeder farm, a potentially significant part of the follow up investigation included tracing of hatching eggs, which were all being sent to a single hatchery located within the Control Area. Chicks hatched from eggs laid from January 12 through to February 16 were tested at hatch or, for chicks in broiler barns, monitored and tested in the barns. This procedure was also followed for the second infected premises, which was also a chicken broiler breeder farm. In the light of the uniformly negative results of testing of eggs hatched from these two infected broiler breeder flocks, the CFIA concluded that the movement of chicks and hatching eggs did not pose a risk. It is generally agreed that if influenza virus is present in the egg the embryo would be killed by the virus and if the virus is on the surface of the egg it would be killed during the incubation process.

### 5.2.2 Subsequent traceout investigations

Traceout investigations were conducted on all infected farms for the movement of products, birds, equipment and people within 21 days preceding the onset of clinical signs, or a positive test. Farm owners/operators were interviewed using a detailed questionnaire and, from the information obtained, a time line of events constructed for each farm. Appendix 14 shows an example of the time line diagrams that were constructed for all 12 farms infected in the critical period

between January 12 (3 weeks in advance of clinical signs on the index premises) and March 31 (3 weeks after the imposition of movement controls on March 11).

The poultry industry in BC is highly integrated and localized in the Fraser Valley. During its investigation, the CFIA found only one example of potential risk products leaving the Control Area - eggs sent to hatcheries in another part in BC from a Leghorn breeder farm in the High Risk Region. The Leghorn flock was depopulated on the basis of a positive PCR test, but virus could not be isolated and the eggs hatched outside the control area were deemed to be low risk.

### 5.2.3 Surveillance overview

After the first case of avian influenza was found, a surveillance plan was developed for all commercial farms within 5 km of the farm. Once the High Risk and Surveillance Regions were designated (March 11), surveillance expanded to include all commercial farms within these two regions. On April 5, when the plan to depopulate the entire Control Area was announced, surveillance was directed towards all flocks within 3 km of infected premises.

Active surveillance initially employed serological testing, but this was soon found to be operationally difficult and was considered to be relatively ineffective in detecting recently acquired infections. Swabbing the oropharynx and cloaca was adopted as the method of choice for testing both live and dead birds, as PCR-based tests can be performed quickly and are very sensitive. Swabbing dead birds from commercial flocks on a weekly (or more frequent) basis was both operationally and epidemiologically more efficient on a large scale, than was live bird testing.

In addition to these active surveillance sampling strategies, a heightened level of passive surveillance was implemented throughout the area during the entire outbreak. Public information campaigns were used to educate poultry owners on the signs of avian influenza and to encourage prompt reporting of sick birds or increased mortality. CFIA informed the public, governments and international agencies about the status of the outbreak through a series of official notifications, public announcements and significant milestones, presented in chronological order in Appendix 9.

The poultry industry throughout the rest of Canada was also on the alert for AI, as evidenced by the marked increase in submissions to the National Centre for Foreign Animal Disease (NCFAD) from flocks outside the Control Area. In the period March 16 to April 22, NCFAD received 13 AI suspect submissions from Manitoba and Alberta, as compared to 15 submissions for the 5 years 1997-2002.

### 5.2.4 Surveillance Protocols

Throughout the course of the outbreak, a number of surveillance strategies were employed. In commercial flocks these included dead bird surveillance, enhanced

flock (live bird) surveillance and weekly flock health questionnaires, pre-slaughter surveillance, and pre-emptive depopulation surveillance. In backyard flocks, surveillance was mainly accomplished by sampling birds at depopulation. CFIA crews investigated reports of sick birds from both backyard and commercial poultry flocks.

*5.2.4.1 Dead Bird Surveillance*

This program sought to detect early cases of avian influenza by sampling dead birds from commercial poultry flocks. After an initial flock survey was completed, up to 5 freshly dead birds from each barn on the premises were collected weekly or, in some cases, twice weekly. On the appointed day, dead birds were placed in biosecure containers at the end of the lane, where a CFIA surveillance team collected oropharyngeal and cloacal swabs from each bird (Appendix . Five samples were pooled in a vial of virus transport media for PCR testing and in some cases, a tracheal swab from each bird was placed in PBS media for Directigen testing. The bird carcasses were left for disposal by the flock owner.

*5.2.4.2 Enhanced Flock Surveillance Program (live bird testing and flock health questionnaires)*

To supplement the dead bird surveillance program, each commercial flock was also tested at least once using live bird sampling. At least 60 birds from each premises were selected, with a preference for choosing clinically ill birds. On premises with more than 2 barns, 25 birds per barn were sampled. A “barn” was defined as containing birds that shared a common airspace, so that each floor of a multilevel building constituted a barn and was sampled accordingly. If serological testing was used, 3 ml of blood was collected; if PCR testing was used, oropharyngeal and cloacal swabs were taken. For the reasons stated above, swabbing rapidly became the method of choice. Owners were also requested to report weekly on their flock’s health status by completing a questionnaire which was then faxed to the Surveillance Unit at the BCEOC.

*5.2.4.3 Pre-Slaughter Surveillance*

Pre-slaughter surveillance was carried out during the depopulation campaign to ensure that only healthy birds would move through the regular slaughter-for-consumption channels. The program was administered by industry and their private veterinary practitioners but overseen by CFIA using the same sampling strategy as outlined above. All barns on the premises had to be sampled in order to qualify any birds to move to slaughter. As with the other sampling protocols, any clinically ill birds were preferentially selected.

Before March 25, 2004, the pre-slaughter certification criteria were:

- negative serological flock test within 7 days before movement

- CFIA veterinary inspection within 24 hours of loading
- health sheet signed by the flock veterinarian
- CFIA approval of the route to slaughter at a federally or provincially registered slaughter plant, to avoid contact with poultry flocks en route.

After March 25, the criteria were modified slightly to require swabbing and PCR testing to be completed within 4 days (later shortened to 3 days) of scheduled movement to slaughter.

The majority of the birds that were depopulated in the Control Area were processed through regular slaughter facilities. In those instances where there was no economic advantage to salvage the meat, birds were killed in slaughter facilities and the carcasses were sent to rendering. Layers, replacement layer pullets, specialty birds, and young broilers and turkeys that were too small for the slaughter facilities were tested then euthanized on the farm.

*5.2.4.4 Pre-Emptive Depopulation Surveillance*

Pre-emptive depopulation was applied to so-called “high risk” or “dangerous contact” flocks - birds that were considered to be at high risk of becoming infected, but which had not yet been confirmed as positive. These included flocks that were in close proximity to infected premises or that might have contact with infected premises through common ownership, management or shared equipment. Following the same sampling strategy, swabs were collected and destruction was carried out within 72 hours. In these instances, the test results were used to determine the appropriate biosecurity and bird disposal procedures.

*5.2.4.5 Backyard Flock Surveillance*

Backyard flocks consisted of flocks that were smaller than 1000 birds that were not registered as commercial poultry operations. Typically they included hobby or pet birds, such as exotic breeds of domestic poultry, or alternative species, such as ratites, quail, pheasants, or peacocks.

Since there was no pre-existing registry of these flocks, survey teams had to go door-to-door to find them. The backyard flock surveillance and depopulation was implemented first within the High Risk Region, then expanded to include all flocks within the Control Area that were within 3 km of infected premises. On May 10, a grid search system was implemented to streamline the process of identifying the backyard flocks to be depopulated.

When flocks were located, a destruction order was presented to the owner and compensation forms were completed. The owner was also provided with cleaning and disinfection protocol guidelines, biosecurity precautions for backyard flocks, and a sign for the front gate to inform visitors of biosecurity measures that were in place. As the birds were euthanized, oropharyngeal and cloacal swabs were taken

for PCR testing, or blood was collected for serological testing using the same protocol as previously described.

*5.2.4.6 Sick Bird Calls*

Through public awareness campaigns, poultry producers and the public were encouraged to report cases of sick birds to the BCEOC. A CFIA veterinarian would contact the owner by phone and if avian influenza was suspected, a team would be dispatched to euthanize the birds and collect surveillance samples. This program was effective in the early detection of a number of diseased flocks.

## 5.3 Movement restrictions

On March 11, when the Fraser Valley was designated as a Control Area, and the High Risk Region (HRR) and Surveillance Region (SR) were delineated, general movement restrictions were put in place. These applied to any bird that was in captivity (including pet birds, day-old chicks and hatching eggs) and any bird products or by-products. Under the provisions of a general permit, most birds, bird products and bird by-products could move within the Control Area, but only a few products were allowed to move out (under permit). Roadblocks and disinfection stations were placed on the border of the High Risk Region, and no poultry or poultry products were allowed to leave. General movement of animals other than poultry was allowed, but a permit was required for animals coming from a farm under quarantine.

On April 5, when the Minister authorized the depopulation of the entire Control Area, movement restrictions and permits were amended to prohibit restocking and to stop movements of birds and materials exposed to birds. Legal steps were also initiated under Section 7 of the *Health of Animals Act* requiring poultry owners to control access to their property and fix a notice at the entrance of their property prohibiting unauthorized entry to their farm. These restrictions came into force on April 13.

Notwithstanding the general movement restrictions, when a flock tested positive for avian influenza the owner was officially informed that his/her premises was considered to be infected under the Health of Animals Act and that the farm was being placed under quarantine. This prohibited the movement off the farm of any poultry, poultry products and by-products (eggs), feed, or any equipment used in the care of poultry without written permission from the CFIA.

## 5.4 Destruction of infected commercial flocks

Methods for the humane destruction of poultry, as outlined by the American Veterinary Medical Association, included the use of barbiturates, inhalant anesthetics, $CO_2$, CO, gun-

shot (for free-range only) and cervical dislocation. It was clear that many of these methods would not be feasible logistically or economically for large-scale euthanasia, therefore carbon dioxide was selected as the most practical option for commercial poultry. Carbon dioxide, lethal injection and cervical dislocation was used in small, backyard flocks.

Once newly infected commercial premises were identified, the rapid depopulation of infected birds and all high risk or dangerous contact flocks became a top priority (Appendix 16). The goal was to destroy these flocks within 24-48 hours - a logistical challenge that required precise coordination among many teams of people. These teams were responsible for liaison with the owner, evaluation and compensation, preparation of the barn, euthanasia, removal of the birds, cleaning and disinfection, biosecurity and human safety. When dealing with infected flocks, all stages of the operation required adherence to strict biosecurity and human safety protocols. In the cases where non-infected flocks had to be euthanized, normal workplace safety practices were followed.

Before birds could be gassed, much preparatory work was required to seal the barn. Commonly, a door was removed and replaced with a temporary plywood structure with a viewing window that would serve as the entryway for the $CO_2$ delivery pipes. Then, water lines were drained, lights were turned off, and the barn was sealed with plastic sheeting. Sealing the fans was left to the very last step, then once all personnel were out of the barn and were accounted for, $CO_2$ was pumped into the barn from large tanker trucks. Special two-way piping was used for double decker barns in order to speed the time to death for the birds on the second level. $CO_2$ was pumped into the barn until there was no more noise from the birds and for 1-2 minutes afterwards. This usually took 8 - 20 minutes, depending on the number of birds and the layout of the barn. From video footage taken inside the barns, it appeared that there was no increase in vocalization when the gas first entered the barn, birds were quickly anesthetized and death ensued without struggle. The birds also remained distributed evenly throughout the barn, which would also suggest that they were not unduly stressed throughout the procedure.

Once $CO_2$ dispensing was completed, the barn was clearly marked to prohibit entry and was left sealed for a minimum of 10-12 hours. Then, specially trained workers in full protective gear entered the barn briefly to unseal and turn on the exhaust fans. The ventilation systems of modern poultry barns are designed to perform five full air exchanges per hour, so that after 15 minutes, the teams re-entered the barn to take readings of $CO_2$ and $NH_3$ levels. Once $CO_2$ levels were below 50,000 ppm and $NH_3$ levels were below 25 ppm, CFIA disposal staff were allowed to enter.

## 5.5 Destruction of backyard flocks

As backyard flocks were depopulated and sampled at the same time, the health status of these birds was unknown; therefore, the strict biosecurity protocols for infected birds were followed during backyard flock depopulations.

Depopulation of backyard flocks was accomplished by lethal injection, the use of carbon

dioxide chambers, or cervical dislocation, depending on species of bird and the owner's preference. Cervical dislocation were used for chickens, $CO_2$ was used for ducks and geese, and chemical euthanasia was used for large species, such as emu and ostriches, or for pet birds. Once birds had been killed, diagnostic samples were taken, and the carcasses were bagged and transported to an incineration site.

## 5.6 Exemptions to depopulation

The CFIA recognized that certain unique and irreplaceable collections of birds existed in the Fraser Valley Control Area, and therefore granted exemptions to depopulation for rare birds where there existed no national or international source for replacement stock. Owners were required to apply for a permit, on which they provided detailed information on the specific genetic merit of the birds in question, including the species, strains, bloodlines or international CITES information. They also had to provide a clear outline of their biosecurity measures in place. Submissions were reviewed by a committee and if an exemption was granted, a quarantine team went to the premises to evaluate the biosecurity and sample a representative number of birds. If they tested negative, the premises was quarantined and monitored for compliance. Pigeons and doves are not considered to be susceptible to avian influenza, therefore were exempted from depopulation, as were pet birds that were kept indoors.

## 5.7 Disposal activities

All commercial flocks were tested prior to destruction, whether they were going to routine slaughter, being depopulated as high risk contacts or situated within 3 km of an infected premises. Test results determined the method of destruction and disposal. Where practical, tested influenza- free flocks were processed at designated slaughter facilities within the Control Area and their meat was consigned directly to retail outlets within Canada. Poultry products processed within the Control Area could not be certified for export. If slaughter was not practicable, these flocks were euthanized on site and carcases taken to rendering, landfill or communal composting sites.

### 5.7.1 Disposal of infected birds and products

Incineration, burial and composting were the methods used for disposal of carcasses of infected birds. Carcasses of approximately 1.25 million birds from 42 infected commercial premises were disposed of during the outbreak, and of these, 46 % were composted on farm, 40% were incinerated off farm, while the remaining 14% was disposed of at a small landfill. Wherever possible, birds, eggs and litter/manure were composted in the barn, but the design of layer barns made this impossible. The carcasses of these birds, then, were removed from the barns and placed in biosecure containers to be transported to incineration or landfill sites. Poultry litter from the infected premises was composted on the farm.

Incineration was conducted at two main sites: the Simmilco mine site located in Princeton, BC and the Greater Vancouver Regional District Waste-to-Energy Facility. Chickens were bagged and taken to these sites in refrigerator trucks or in leak-proof hazardous material transportation vehicles.

On April 10th, 2004, a provincial Ministerial Order was issued to enlist the use of local landfill sites for disposal purposes. Chilliwack Landfill offered to receive 200 tonnes of material from infected premises. One-tonne bags of chicken carcasses were placed directly into 30x30x30 ft clay pits in layers alternating with 4 inches of clay, 4 inches of lime, and then another 4 inches of clay. This process continued in 3 separate pits to a depth of 20 feet, with the last 10 feet being filled with clay. The base layer of high quality clay afforded minimal risk of seepage but this method of disposal was quickly exhausted due to space restrictions.

After reviewing the scientific literature and performing tests on composted carcasses on the index farm, it was determined that composting represented a safe, biosecure and efficient means of dealing with infected birds and litter. Composting also had the advantage of keeping infected material on site. On April 2, 2004 the decision was made that infected birds and litter be composted on the farm wherever possible, and only when it was not possible should this material be trucked for incineration.

Partial composting, or bio-heat treatment, was also used. This involved the same process as composting but simply took less time. Virus inactivation was achieved but visually, the end-product had not matured to the same level of biological decomposition as true compost. Once the material had achieved a minimum of 30 degrees Celsius for 3 consecutive days (Stage 1), the viral load was considered to be greatly diminished and additional composting could take place outside the barn (Stage 2) without fear of spreading virus. Viral destruction was considered to be complete at:

- $25^{o}$ C for 10 days,
- $30^{o}$ C for 7 days,
- $40^{o}$ C for 5 days, or
- $55^{o}$ C for 30 minutes.

Compost piles composed of both chicken carcasses and litter were required to complete Stage 1 in the barn prior to entering Stage 2. Two exceptions did occur, but these involved enclosed facilities where the pile could be moved safely. Piles containing chickens were fully contained within a plastic liner and weeping tile was placed every 5-8 ft to provide passive aeration during Stage 2. All piles were also rimmed by a line of lime for rodent control.

Litter from infected premises was disposed either through bio-heat treatment or via chemical heat treatment. Litter included any loose waste from the barn including manure, sawdust, feed and eggs, but did not include chicken carcasses. The

material could be left in the barn for 7 days or it could be piled (Stage 1 bio-heat treatment) to accelerate the virus inactivation process, before it was moved outside to Stage 2. Maintaining a moisture content of 50-70% was important in this process and dry material, such as wood shaving or sawdust bedding was further moistened to minimize aerosols before it was moved. Infected eggs could be included in the pile but large quantities were often incinerated, for ease of disposal.

Litter and small quantities of wood chips could also be treated via chemical heat treatment. This was achieved by mixing moist manure with 15% quick lime (mass-to-mass ratio) in a vertical mixer for 5 min and then allowing the material to cool. A consistent minimum temperature of 84$^{o}$ C was reached during this process. This method of disposal was used sparingly however, as the chemicals were highly corrosive and damaged equipment.

### 5.7.2 Disposal of non-infected birds and products

CFIA supervised the disposal of non-infected birds but the logistics were carried out by the poultry industry and the Provincial Emergency Program. As mentioned previously, whenever possible these birds were slaughtered through commercial facilities but where this was impractical on-site euthanasia was used. In these instances both composting and rendering were used for disposal. A commercial composting site for non-infected birds began operating on April 21, 2004.

Since eggs from backyard flocks outside the 3 km zones were not allowed to be sold, they were picked up on a regular basis and taken for disposal. These eggs were transported under strict biosecurity protocols to a mink feed processing plant, where they were cooked for 30 minutes at 100$^{o}$ C, and incorporated into mink feed.

## 5.8 Cleaning and disinfection of facilities and equipment

On infected premises, cleaning and disinfection (C&D) activities were the physical and financial responsibility of the poultry producers but these had to meet the standards set out by CFIA in Section C.11 of the *Foreign Animal Diseases - Manual of Procedures*. These were enforced and documented through a series of inspections by CFIA personnel. All areas and equipment exposed to poultry or poultry by-products were to be included in the cleaning and disinfection protocol. Before they left infected premises, CFIA equipment and vehicles too were disinfected and staff observed strict biosecurity precautions.

Before any cleaning was started, a CFIA veterinary inspector visited the farm to perform a Site Evaluation, a detailed assessment of the property and equipment that noted any particular areas of concern. During this evaluation, the C&D protocol was reviewed, water and power supplies were identified, and instructions were given regarding personal safety and biosecurity precautions to be observed. Methods of cleaning, disinfection, and vector control were discussed with the owner.

The second inspection, designated as the Clean Inspection, took place after the cleaning had been completed. Before this stage could be approved, CFIA inspectors walked through the facilities to ensure that all organic material had been properly removed.

At the third inspection, the Disinfection Inspection, CFIA inspectors were again on hand to observe that a virucidal disinfectant effective against avian influenza virus was being properly applied at the required concentration. Once this was complete, the premises were officially declared as having been cleaned and disinfected, and a permit was granted so that restocking could take place.

Although formaldehyde fumigation is routinely used by the poultry industry in Canada, the CFIA does not condone the formaldehyde fumigation of buildings in the context of a foreign animal disease outbreak due to the difficulties in properly applying fumigation on a large scale. Considering the strong irritating effect of formalin and its allergenic and carcinogenic potential, the CFIA considered this method but rejected it for this outbreak.

## 5.9 Compensation

According to the Health of Animals Act, CFIA is responsible for providing compensation for any animal(s) that must be destroyed. The amount of compensation paid shall be the market value (as determined by the Minister) minus the value, if any, of the carcass, but this cannot exceed legislated maximum values. During the avian influenza outbreak, eggs and feed were also ordered destroyed and compensation was paid. All compensation claims must be validated by receipts or other written justification. A compensation package specifically developed for the avian influenza outbreak was announced on June 8.

## 5.10 Enforcement issues

During the outbreak, Enforcement and Investigation Services (EIS) officers were instrumental in enforcing compliance with Ministerial Orders and Health of Animals Regulations by responding to reports of violations and non-compliance. Their duties also included training new employees in the Health of Animals Act, establishing secure boundaries surrounding the Control Area, enforcing biosecurity regulations and establishing liaison with enforcement officials from other agencies.

Under the Health of Animals Act, law enforcement officers are required to assist CFIA inspectors in the execution of their duties under the Health of Animals Act. Coordination for enforcement was arranged with the Abbotsford Police Department, the Royal Canadian Mounted Police, and Conservation officers from the provincial Ministry of Land, Water, and Air Protection. To enforce the restrictions on the movement of poultry and poultry products out of the Control Area, cooperation was solicited from operators at highway weigh scales, toll booths and the BC Ferry Corporation. Signs were posted at the perimeter of the Control Area Perimeter notifying the public to report to a CFIA Avian Influenza Inspection Station.

EIS staff were also on hand to defuse confrontations between owners and CFIA operational staff. This was usually sufficient, however in a few menacing situations police officers were also called in. These incidents were usually precipitated by the presence of the media or especially aggressive flock owners. EIS was also involved to ensure compliance on the farms within the Control Area and violators were penalized with fines and warnings.

**Table 11**
**Statistical Summary of Disease Control Activities** (to June 30, 2004)

| **Status/Action** | | |
|---|---|---|
| # premises declared infected | 42 commercial | 11 backyard |
| # premises confirmed infected (H7N3 isolated) | 28 commercial | 2 backyard |
| # premises depopulated | 410 commercial | 553 backyard |
| # birds depopulated | 13,635,328 commercial | 17,977 backyard |
| # laboratory tests performed | 2959 at NCFAD; 629 Directigen | 690 at BCMAFF; |
| # permits issued | 1116 total | |
| # enforcement investigations | 206 investigations; | 18 penalties issued; (totaling $31,600) |

## 5.11 Lifting of restrictions

After positive premises were satisfactorily cleaned and disinfected, repopulation of poultry barns was scheduled to commence in the Fraser Valley Control Area. This process began on June 10, with the establishment of the Revised High Risk Region (municipal boundaries of Abbotsford) and the lifting of some movement restrictions (Appendix 8). Farms within the Control Area, but outside the Revised HRR were to be repopulated first (June 10). Farms inside the Revised HRR could be restocked next (beginning July 9), 21 days after the last infected premises had satisfactorily completed cleaning and disinfection (June 18).

All infected premises remained under quarantine and a surveillance plan was developed such that if poultry were restocked less than 60 days after the farm had been cleaned and disinfected, then birds would be tested at the end of the first, second, third and fourth

weeks after the birds were placed. However, if the barns had been empty for more than 60 days after the farm's cleaning and disinfection was approved, then testing would not be required. Similarly, surveillance testing would not be required on uninfected farms that were being repopulated. The poultry industry elected to leave barns that housed infected flocks vacant for the 60 day period after cleaning and disinfection, therefore no sentinel birds were placed during the restocking process.

## 6. DIAGNOSTIC FINDINGS

### 6.1 Clinical Signs

Clinical signs of avian influenza can vary according to the type of bird infected and the pathogenicity of the virus. In this outbreak, affected chickens showed feed refusal, a 10% drop in egg production, increased mortality along with reduced feed and water consumption. The flock was often depressed and quiet, and many birds exhibited signs of respiratory distress, coughing and sneezing, and watery diarrhea. Edema in the wattle and head was present in some birds but was not seen in the index flock. Some infected flocks showed no clinical signs at all, perhaps because the diagnosis was made very early in the course of the disease.

Turkeys showed similar, but less severe signs as chickens. They were often listless and depressed, with ruffled feathers, coughing and bright green, watery diarrhea. Ducks were asymptomatic.

### 6.2 Pathology Findings

Pathology findings from the older flock of the index farm (LPAI), submitted Feb 9, 2004 to the BCMAFF diagnostic laboratory are outlined below:

Gross pathology
- mild fibrinous peritonitis
- lungs are dark, congested and have a meaty texture
- tracheas are red

Histopathology
- marked congestion of all tissues
- no lesions present in the intestines, pancreas, gizzard or spleen

Liver
- mild generalized periportal aggregation of mononuclear inflammatory cells
- mild generalized single cell necrosis with minimal inflammation

Trachea
- mild generalized submucosal infiltration of lymphocytes and plasma cells
- epithelium intact
- no intranuclear inclusion bodies seen

Lung
- marked generalized congestion with mild interstitial edema in the hilar area
- hemorrhage in terminal airways
- mild generalized interstitial infiltration with mixed inflammatory cells

- some airways contain inflammatory cell debris
- no bacteria or intranuclear inclusion bodies seen

Bacteriology
- moderate mixed bacteria isolated from lung and oviduct

Findings from the younger birds on the same farm (HPAI), sampled Feb 17, 2004, showed:

Gross pathology
- hydration mildly reduced
- deep pectoral muscles have varying degrees of blanching and facial edema with occasional hemmorhage
- hilar consolidation of the lungs and tracheas are red
- air sacs are slightly opaque
- one bird has 2 cm band of hemmorhage in the distal colon

The PCR test conducted by BCMAFF on the first submission of birds identified the presence of avian influenza virus and further confirmation was received from NCFAD.

## 6.3 Diagnostic findings by NCFAD

NCFAD's role in the B.C. avian influenza outbreak initially involved:

- the characterization of the virus isolated by the Animal Health Centre, BCMAFF that originated from an older flock located on the index premises, and
- isolation of virus from tissue specimens sampled from a younger flock located on the index premises.

NCFAD's characterization of the original allantoic fluid specimen obtained from BCMAFF employed:

- real-time RT-PCR assays specific for H5 and H7 hemagglutinin sub-types,
- H-typing by hemagglutination-inhibition assay,
- N-typing by neuraminidase-inhibition assay,
- conventional RT-PCR and cycle-sequencing to determine the amino acid sequence of the hemagglutinin cleavage site, and
- intravenous pathogenicity indexing.

The real-time RT-PCR assay that was used by the NCFAD during the outbreak was one developed at the Southeast Poultry Research Laboratory (USDA) in Athens, Georgia (Spackman et al., 2002). Some very minor modifications were made in order to use it on the Applied Biosystems, 7900HT Sequence Detection System platform. This assay was transferred to the BCMAFF laboratory and a check panel was run to demonstrate proficiency by both laboratories. The NCFAD had been working with this assay for

approximately 11 months before the outbreak began. During this period, the NCFAD had begun work on estimating its diagnostic sensitivity and specificity using specimens collected from chickens and turkeys experimentally infected with different isolates of avian influenza virus. For the majority of the experimental isolates, the real-time RT-PCR diagnostic sensitivity and specificity compares favorably with that of virus isolation in chicken embryos.

The isolate derived from the older flock on the index premise was an H7N3 virus that possessed the typical waterfowl cleavage sequence PENPKTR*GLF. This isolate was predicted to be of low pathogenicity based on the cleavage site, and was subsequently shown to have an IVPI of 0.0. Tissue specimens derived from the younger flock were processed and inoculated into 9 day old embryonating chicken eggs. The virus isolated was also H7N3, however, the cleavage site differed by possessing a 21 nucleotide / 7 amino acid insert; PENPKQAYQKRMTR*GLF . It had an IVPI of 2.96 and grew in QT-35 cells in the absence of exogenously added trypsin.

During the course of the outbreak the laboratory employed a number of diagnostic assays. The majority of samples submitted to the laboratory for analysis were oropharyngeal and cloacal swab specimens stored in avian transport medium. In the early part of the investigation these were processed for inoculation of 9 day old embryonating chicken eggs and testing by a real-time RT-PCR assay targeting the matrix gene. Submissions that tested positive by the matrix real-time RT-PCR assay were tested using the H7 type-specific RT-PCR assay. Virus isolates were H-typed and N-typed, the hemagglutin cleavage site sequenced, and the pathogenicity confirmed by IVPI. As the investigation progressed, the matrix real-time RT-PCR was used as a screening assay. Positive reactors were subsequently processed for virus isolation, H-typing, and nucleic acid sequencing of the H gene segment.

By June 15, H7 viruses had been isolated from 28 infected commercial premises and 1 backyard flock. All of the highly pathogenic isolates possessed a 21 nucleic acid / 7 amino acid insert at the cleavage site. To date, six PENPK variants have been identified that have arisen by point mutations within the insert. An additional isolate, a PENPR variant, contains a point mutation at the cleavage site outside of the insertion.

Nevertheless, variants identified to date are highly pathogenic based on the intravenous inoculation of 4 to 6 week old specific pathogen free chickens. The majority of isolates possess IVPIs in the 2.9 to 3.0 range. One isolate had a slightly lower IVPI of 2.17. Appendices 4a and 4b summarize the findings regarding each flock deemed to be positive or presumptively positive.

## 7. FOLLOW-UP TO THE OUTBREAK

In conjunction with other agencies, the CFIA continues to study topics relevant to the disease outbreak including airborne transmission; the transmission potential of hatcheries, wild birds and service providers; the efficacy of disposal methods and database management/integration with geographical information systems (GIS). A number of follow-up investigations and actions have been generated in the aftermath of the avian influenza outbreak.

### 7.1 Case-Control Study (CFIA)

To explore various hypotheses about the relationship of management and other risk factors between positive and negative farms, a case-control study was initiated. Twenty-five farms from each of four categories were randomly selected to participate. Categories included positive farms, negative farms within 1 km of an infected premises, negative farms within 1-3 km of an infected premises, and negative farms outside of the 3 km zone.

Participating producers were asked to complete a questionnaire that covers much of the same content of the original traceback questionnaire but to a greater depth. The case-control study concerns practices that were in place from March15 to April 14, when the outbreak was expanding in scope.

### 7.2 Aerosol Sampling Project: (CFIA, HC, DRDC)

The Department of National Defense's research group, Defense Research and Development Canada (DRDC), used their experience gained from previous disease outbreaks (aerosol sampling studies conducted during the SARS outbreak at Sunnybrook Hospital in Toronto) combined with field observations of disease patterns from this outbreak to initiate aerosol sampling studies near three positive HPAI sites. The aim of the project was to determine if airborne avian influenza virus could be detected in a real-life situation. Sophisticated high-volume air sampling equipment was supplied and operated by DRDC, while virus testing and isolation was done by the Health Canada's National Microbiology Laboratory in Winnipeg.

### 7.3 Environmental spread model: (EC, HC and CFIA)

Environment Canada (EC) set up their portable weather station to evaluate the local weather conditions in the immediate vicinity of the first set of positive farms. They will use this data to participate with CFIA researchers in modeling the wind-borne spread of infectious diseases.

## 7.4 Evaluation of Disposal methods (CFIA)

Further work is being done to learn more about the efficacy of disposal methods, especially bio-heat treatment and composting that were used in the avian influenza outbreak. This is considered to form an important component in future disease control strategies as proper disposal is a major logistical problem in a large outbreak.

## 7.5 Information system linkages (CFIA)

One of the key lessons learned from the avian influenza outbreak was the need to have integrated data management systems that link GIS, laboratory data and emergency management.

### 7.5.1 GIS and MS Access (TM) database

Near the beginning of the outbreak, an MS Access (TM) database application was created to track premises and their health status. This database had to be constructed from scratch and was completed at the end of March. To populate the database, basic information was collected from the four poultry marketing board agencies in BC, local abattoirs and from telephone surveys of producers. Mapping information and aerial photography was obtained from many provincial and industry organizations, including the City of Abbotsford and the British Columbia Ministry of Agriculture, Food and Fisheries (BCMAFF). Soon other operational information was added and linked to GIS programs to produce daily maps of infected premises and their 3 km depopulation zones. These maps proved to be one of the most useful tools for managing the outbreak.

### 7.5.2 Laboratory information tracking system

Lab data has been tracked via the Lab Sample Tracking System (LSTS). This system has been used by the Agency laboratories since 2001, and is very familiar to laboratory staff. The system allows a continuous chain of possession to be established throughout the whole system, to ensure sample integrity. Unfortunately, the system does not easily export data to other computer packages and laboratory results were re-entered into MS Excel (TM) spreadsheets before being distributed to disease control staff.

### 7.5.3 Foreign animal disease outbreak management system

A relatively new Lotus Notes (TM) - based repository system, the Canadian Emergency Management Response System (CEMRS) was piloted during the outbreak. This program was adapted from the United States Emergency Management Response System (EMRS) that was shared with the Canadian government in 2002. This system was not activated until March 25, when it was realized that the extent of the outbreak was going to be larger than had been

expected. The initial population of data in CEMRS drew from all existing information sources from within the outbreak centre and external CFIA databases without re-duplicating data entry.

The CEMRS system is able to coordinate a large outbreak and can handle many aspects of emergency management including tracking personnel and materiels. It can also be accessed via the Internet, so it has the capability to coordinate multiple nation-wide outbreaks through one system. One of the major limitations to the Canadian EMRS system was the lack of an integrated GIS capability. On the heels of this outbreak, that capability is being added. Also, CEMRS does not lend itself to user-friendly queries or to easily exporting data to other epidemiological analysis programs. The USDA has overcome this limitation by adding in a simplified query interface (Intelliview (TM) ). Another issue concerned staff members' lack of familiarity with the system. It was recognized that an outbreak is no time to be learning a new computer program and that field staff need to be trained in the operation of this program if they are to be able to use it effectively.

## 8. CONCLUSION

Outbreaks of highly pathogenic avian influenza can have dramatic consequences for both animal and human health, as witnessed by recent the recent events involving H5N1 in south-east Asia. Canada's outbreak of highly pathogenic H7N3 likely originated from low pathogenicity strains that may have been circulating in either wild or domestic birds . The initial detection of both low and high pathogenicity strains in the first flocks affected, and the subsequent rapid circulation (and genetic variation) of the high pathogenicity variant serve to illustrate the unstable nature of influenza viruses and the risk they pose to animals and people.

At the time of writing, the avian influenza outbreak in British Columbia has been stamped out and repopulation of poultry is underway. The threat posed by possible re-infection or the emergence of new strains cannot be taken lightly; therefore, improved biosecurity and surveillance measures are being instituted, not just in British Columbia, but across the country.

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**Appendix 1. <u>The role of wild birds as a source of LPAI (H7N3)</u>**

Prepared by Dr Victoria Bowes, BCMAFF, April 13 2004

There are three distinct manners in which wild birds may have played a role in the current outbreak of Avian Influenza in the Fraser Valley.

1. As a primary and direct source of the of LPAI (H7N3) in the index case,

2. As donor of the original hemagglutinin (H7) with subsequent poultry-adaptation in small backyard flocks that commingle with wild waterfowl or their habitat,

3. As a secondary mode of transmission in the spread of HPAI (H7N3) between commercial poultry premises. (not the subject of this review)

In addressing #1 and #2, waterfowl and free-flying wild birds will be considered separately.

## A. <u>Avian Influenza Viruses in Wild Waterfowl</u>

Waterfowl are well established primary reservoirs for a wide variety of genetically and antigenically diverse strains of LPAI and in the past have been implicated in the spread of influenza to commercial poultry (5, 10, 18). In waterfowl, infection with AIV is inapparent with primary enteric replication and subsequent fecal shedding. Localized intestinal infection may also account for the relatively poor seroconversion rates of infected waterfowl. Occasionally the same bird can be infected with multiple subtypes.

Avian Influenza has been recovered from 20 of the 42 species of indigenous North American ducks, geese and swans (19). All fifteen HA subtypes have been isolated from wild waterbirds worldwide but the predominant HA subtypes in North American ducks include H3, H4 and H6 with **H5** and **H7** being poorly represented (0.4% and 0.7% of over 3100 isolates respectively). The continued recovery of H3, H4 and H6 subtypes, in significant proportion and over 30 years of accumulated data, suggests that these subtypes are host-adapted to waterfowl (6). Although genetically stable in its natural host, once an AI virus crosses the species barrier there is an accelerated mutation rate that gives rise to genetic diversity and the possible emergence of pathogenic strains, including strains that have increased capability of infecting humans (7).

To date, only subtypes **H5** and **H7** have been responsible for outbreaks of HPAI in poultry. The distinct absence of **H5** and **H7** subtypes in most waterfowl surveillance studies (see below) strongly suggests that waterfowl should be re-considered as primary sources of infection in HPAI outbreaks in commercial poultry (17). The exception seems to be those surveys done in Minnesota in which **H5** and **H7** subtypes are consistently recovered, albeit in significantly low numbers (5, 6). This may represent a subpopulation of AIV that have host-adapted to migratory waterfowl along the Central and Mississippi flyways (1).

In general, most waterfowl-origin AIV are host-adapted and do not readily cause disease in unnatural species, including poultry (18). Conversely, AI viruses isolated from poultry disease outbreaks have genetically changed enough that it is often difficult to induce infection in waterfowl (1). New information suggests that waterfowl-origin viruses can become significantly host-adapted to gallinaceous bird species by continuous low-level persistence in small groups of confined domestic birds such as backyard flocks, live bird markets and gamefowl. In this way it is the new host that can now serve as a reservoir of partially species-adapted viral infection for outbreaks of AI in commercial poultry (14, 18).

## Previous Waterfowl Surveillance Studies

There is no previous AIV waterfowl surveillance data for the Canadian provinces of BC, SK or MB.

The majority of North American wild bird surveillance studies, conducted mostly in the 1970s and 1980s, have relied on samples of convenience such as hunter-killed ducks or in partnership with concurrent biology studies that involve banding or trapping. Location is extremely important as most migratory waterfowl species move within very specific well-defined flyways which may harbor unique subpopulations of AI virus subtypes.

- The only identified Canadian record of AIV surveillance in waterfowl was conducted in the month of August in 1976, 1977 and 1978 (8). The location of sample collection was Vermillion, Alberta and represented migratory ducks that traveled the Mississippi flyway. Over the 3-year study period 4827 ducks (primarily mallards, pintails & teals) were tested and 1232 AI viruses, representing 27 subtypes, were isolated. Subtype recovery was not consistent as only 6 subtypes were present in each of the 3 years. Subtype H7N2 predominated in 1976-77 but was replaced by a previously undetected H6N2 in 1978 which then accounted for over 60% of the isolates. Virus isolation rates were highest in juveniles (18-60%) when compared to adult birds (4-27%). Twelve of 208 water samples were also positive for AIV. Interestingly, pre and post sampling serology for the field personnel handling the birds did not detect infection from this type of exposure.

- An AIV surveillance project in Maryland in 1998 involved the sampling of nonmigratory "resident" ducks and discovered that 233 cloacal swabs taken between May 28-July 15 were negative but 29 of 209 (13.9%) samples taken between Aug 27-Sept 2 were positive (17). This indicates a strong association between virus recovery rates and time of year. Resident ducks proved successful as sentinels in the early detection of AIV as it is introduced from migratory ducks traveling along the Atlantic flyway. Five HA subtypes (H2, H3, H6, H9 and H12) and six NA subtypes (N1, N2, N4, N5, N6 and N8) were recovered.

- Twenty-eight subtypes of AIV were recovered from 1389 hunter-killed ducks during the winter of 1986 and 1987 in Louisiana (overwintering site along the Mississippi flyway)) (19). Prevalence rates ranged between 3.1% (Sept), 2.0% (Nov) and 0.4% (Dec) indicating that AIV circulates within waterfowl populations during the winter. Nine HA subtypes were recovered which did not include any H5, H7 or H9. Subtype H4N6 was isolated most often (32%).

- During the month of September in years 1998-2000, a total of 1423 cloacal samples were taken from wild ducks during an annual banding project in a wildlife refuge in Minnesota (6). Avian Influenza viruses were isolated in 11%, 14% and 8% of samples in the 3-year study, with highest prevalence in juveniles. HA subtypes 2,3,4,5,6,7,9,10,11 and 12 were identified. This study is unique since the combined recovery rates of H5 and H7 was relatively high (10.5% of isolates).

- A Minnesota study conducted in 1982 proved the value of using sentinel ducks as an epidemiologic tool in associating environmental contamination by wild waterfowl and outbreaks of LPAI in adjacent commercial turkeys raised on range (a practice since discontinued) (5).

**Direct testing for the presence of AIV in waterfowl populations:**

1. **Detect virus in waterfowl or waterfowl habitat**. With the cooperation of trained bird biologists in CWS and MWLAP, identify which migratory waterfowl species would be present in the Abbotsford area during the time of the index case (Jan-Feb) and specifically target these species for direct testing. Problematic since these birds would have moved through the affected area by the time a coordinated testing protocol could be developed and implemented.

2. Alternatively, **actively test the "resident" waterfowl**, which have been shown in previous studies to pick up AIV viruses that are introduced into the shared habitat by transient migratory waterfowl. This phenomenon has been documented in Louisiana (19) and Maryland (17). The use of "sentinel ducks" was successful in demonstrating transmissibility of AIV from wild waterfowl in Minnesota (5) so this could also be considered.

3. There is limited survivability of **AIV in water** but this is another readily available source for sampling especially if the waterfowl using the habitat are continuously shedding virus.

**Cautionary note**: Since waterfowl are known to carry multiple subtypes of AIV, any testing of recovered virus should not only include subtype but genetic sequencing should be done before direct relatedness to this specific outbreak can be substantiated. It would be very tempting to assume that any H7 AIV isolated from Fraser Valley waterfowl habitat was proof of the source of LPAI in the index case and this may not be true.

4. Retrospective testing of **local "samples of convenience".** There are numerous caches of frozen birds in the freezers of local wildlife rehabilitators, CWS conservation offices and MWLAP district offices that could be sampled for AIV. It most likely that historical data (location & circumstances of collection) would be inconsistent since most of these collections are intended for eventual disposal. An on-going Trumpeter Swan Mortality Survey (CWS) does have several carcasses available for testing but serious consideration should be given for the applicability of these samples since these birds tend to seek seclusion from populated areas (although through the winter months they do frequent the arable fields of Matsqui and Sumas flats).

5. Develop an **active AIV waterfowl surveillance** study unrelated to this outbreak. The CCWHC currently has a proposal for a Canada-wide AIV surveillance program which would provide important background data for the prevalence of specific HA subtypes adapted to migratory waterfowl. Prospective data may or may not provide insight into the origin of this specific LPAI but studies like this should be supported for the information they could provide in the event of another significant outbreak of AI. The local Ducks Unlimited and private hunting clubs should be approached for assistance in sample collection.

**Indirect testing for AIV origins:**

1. *Molecular epidemiology*. This would involve genetic sequencing of the viruses isolated from the affected flocks and generating a phylogenetic tree to relate these viruses to other known viral isolates in the GenBank. Relatedness to other H7 subtypes may provide direct linkages to waterfowl-origin viruses and suggest a common ancestry with calculable degrees of separation. A highly unrelated ancestry would suggest that the index virus had undergone genetic drift in an unnatural (non-waterfowl) host species and the investigation into the primary source could be refocused.

   Suggested approach: Virologists at the NCFAD to genetically sequence both the LPAI and HPAI isolates and compare to the known waterfowl-origin viruses available from the GenBank. Statistically compare relatedness.

2. *Infectivity Rate*. A study comparing the relative pathogenicity of the recent Chilean low path and high path H7N3 viruses suggests that infectivity rate could be used to deduce the degree of species adaptation (9). A waterfowl-origin AIV, well adapted in this type of bird, requires abundantly more virus to cause infection in experimental chickens than an AIV that has become partially adapted to gallinaceous species.

   Suggested approach: Scientists at NCFAD to determine infectious dose of the LPAI isolate to assess ease of disease reproduction.

3. *HA receptor glycosylation.* After introduction into a poultry host, H5 and H7 subtypes have been shown to acquire additional glycosylation near the receptor-binding site of the hemagglutinin (2, 15). No waterfowl-origin AIVs have this. (Highly theoretical).

   Suggested approach: By determining the presence or absence of HA receptor glycosylation in the LPAI isolated from the index farm it may be possible to make some assumptions on the whether or not there is a direct link to waterfowl. Its presence and degree would then suggest that the LPAI had been previously been circulating in other chicken type birds and help refocus the investigation into the primary source.

4. *Study previous Pacific Flyway surveillance data*. Since migratory waterfowl in the Fraser Valley are primarily confined to routes along the Pacific Flyway, there may be extrapolative surveillance data available from Alaska, Washington, Oregon, California and Mexico (to be reviewed).

   Suggested approach: Compare genetic relatedness of Pacific Flyway isolates to the LPAI from this outbreak.

**Of particular interest would be Chile since that country experienced a significant outbreak of LPAI (H7N3) in 2002 that included an abrupt mutation into HPAI by a similar mechanism (30 base pair insertion into the HA-cleavage site).** A similar insertion mutation in the HA-cleavage site has been observed in the first HPAI (H7N3) isolated from the index farm in the current outbreak (a 21 base pair insertion originating from the start of the $M_2$ matrix protein).

Due to the distance involved other long distance fliers such as passerines should also be considered if there appears to be close genetic relatedness between both Canadian and Chilean LPAI viral isolates.

**B. <u>Avian Influenza in Other Wild Birds</u>:**

Avian Influenza viruses have been recovered from over 90 species of birds. Other than a single mortality event in Common Terns in South Africa in 1961 (H5N3), infections in wild birds are inapparent. Following waterfowl, AIVs are most often recovered from shorebirds and gulls (predominately H9 and H13 subtypes). Avian Influenza is isolated occasionally from wild gallinaceous birds (pheasants, quail) and ratites and rarely from raptors, cranes and songbirds (1).

It is unlikely that wild birds play a significant role in the secondary spread of AIV from commercial poultry outbreaks since the mutational changes acquired through serial passages in birds from the affected barns would reduce direct re-infectivity. There is strong epidemiological evidence from previous outbreaks that indicates secondary transmission between barns occurs most often through movement of infected poultry and virus-contaminated equipment, manure and people and not by wild birds (10).

There are few experimental susceptibility studies in wild bird species. Nasal inoculation of Laughing Gulls (Larus atricilla) with two HPAI strains (A/tern/South Africa/61 (H5N3) and A/chicken/Hong Kong/220/97 (H5N1)) failed to produce clinical signs of disease or appreciable seroconversion rates (12).

In similar disease reproduction studies pigeons have been found to be highly refractory in experimental infection. Occulonasal and intravenous challenges with both LPAI (CK/PA (H5N2) and emu/TX (H7N1)) and HPAI (CK/PA H5N2 and CK/Australia (H7N7) failed to produce clinical signs, virus recovery or seroconversion (14). Another study found pigeons highly resistant to challenge with HPAI CK/Hong Kong /220/97 (H5N1) that was shown to cause disease in many other bird species and humans (11). Since pigeons do not shed the virus it is unlikely that they would be a source of infection for other birds.

Infectivity studies were conducted in 17 avian and 2 mammalian species using HPAI CK/Hong Kong /220/97 (H5N1). Results indicated that this virus could infect multiple domestic gallinaceous species with variable virulence but species that resisted challenge were ducks, gulls (low level viral replication), starlings, pigeons, rats and rabbits (minimal virus recovery) (13).

**Surveillance for AIV in wild birds:**

- Concurrent with an Italian outbreak of HPAI (H7N1) in 1999-2000, wild birds in the vicinity of affected farms were tested for AIV. Between January and April 2000, cloacal swabs or viscera from 103 trapped or found dead wild birds were tested (40 Anseriformes (waterfowl), 8 Ciconiiformes (storks), 19 Columbiformes (pigeons & doves), 28 Passeriformes (songbirds), 2 Strigiformes (owls) and 26 non-specified). Two samples were positive for HPAI (H7N1); pooled viscera from 2 house sparrows found dead inside an infected barn and a swab from a collared dove within 1km of an infected premises. The remaining 101 samples were negative (3). Note: no diagnostic workup was performed to determine whether or not the HPAI caused disease in the birds from which virus was recovered.

- In 1999 and 2000, 8787 wild birds in Sweden and the Netherlands, covering 123 different species, were tested for AIV by either RT-PCR or virus isolation. Fresh droppings or trapped birds were sampled. Isolated viruses represented HA subtypes 1-7, 10, 11 and 13 and NA subtypes 1-8. H5 and H7 were only isolated once. Prevalence, dependent on time location and species, varied from 0% to 11% in the waterfowl and shorebirds. All 2007 samples from the non-specified category “others” (that included passerines and birds of prey) were negative (4).

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Canadian Food Inspection Agency

**Appendix 2**

# CLEANING AND DISINFECTION PROTOCOL FOR POULTRY RELATED VEHICLES LEAVING THE AVIAN INFLUENZA CONTROL AREA TO THE UNITED STATES

All poultry related vehicles leaving the British Columbia AI Control Area for entry into the United States shall be disinfected at the following CFIA supervised cleaning and disinfection site:

**Nielsen Powerwash Incorporated**
**6-380 Riverside Rd., Abbotsford**
**B.C., Canada**

The following procedures are completed by the cleaning and disinfection station under the supervision of the Canadian Food Inspection Agency (CFIA)

-All solid debris will be washed from the wheels, wheel wells, underside of the vehicle and all surfaces contaminated with such material.

-An inspection will be made of the entire vehicle including the tractor and trailer to ensure freedom from all farm debris.

-The vehicle is to be thoroughly cleaned with a commercial detergent under high pressure.

-The vehicle is then to be disinfected with Virkon with particular attention to wheels, wheel wells, and the underside of the vehicle. A contact time of ten minutes is required.

-The inside floor of the vehicle cab will be examined to be free of dirt and debris and shall be disinfected with Virkon.

Upon the satisfactory completion of this procedure, CFIA inspection personnel will issue a **Certificate of Cleaning and Disinfection.** This certificate is to be presented to the United States Department of Homeland and Security Customs and Border Protection for verification at the time of entry.

Canada

**Appendix 3. Interim Case/ Infection Definitions for Human H7 Avian Influenza Infections**
**Date: April 22, 2004**

**Introduction**:

The following definitions were developed to assist with the identification of human influenza A (H7) cases and infections associated with the current avian influenza A (H7) poultry outbreak in Fraser Valley, British Columbia which originated in February, 2004. It's expected that these definitions will need to be updated as more information is obtained on the laboratory methods from the National Microbiology Laboratory (NML) and Canadian Public Health Laboratory Network (CPHLN) or should the clinical presentation in humans change.

**Suspect Case:**
An individual presenting on or after February 6, 2004 with onset of two or more of conjunctivitis[1] and/or influenza-like illness (ILI)[2] symptoms occurring between 1 day after first exposure and 7 days after last exposure, inclusive, to a potential source of avian influenza[3] virus in the Fraser Valley area, British Columbia. Symptoms should not be fully attributable to another known etiology.

[1]Conjunctivitis symptoms:

- red eye
- eyelid/conjunctiva inflammation (swelling)
- tearful eye
- itching eye
- painful eye
- burning eye
- discharge from eye
- sensitivity to light

[2]ILI symptoms:

- fever (if measured, greater than 38C)
- cough
- rhinorrhea
- sore throat
- myalgia/arthralgia
- headache

[3]Potential source of avian influenza can be:

- infected or potentially infected poultry
- infected or potentially infected raw or under-cooked poultry products
- infected poultry manure
- contaminated surfaces
- contaminated vehicles, equipment, clothing and footwear at involved sites
- contaminated air space
- other infected or potentially infected animals (e.g., wild fowl, swine, etc.)
- individuals known to be infected

**Confirmed Case:**

An individual who fulfills the criteria of a suspect case and has laboratory confirmation of influenza A (H7) virus in specimen(s) from the eye (conjunctival swab), respiratory tract (nasal or nasopharyngeal swab or nasal wash) and/or serology by at least one of the following:

- Virus isolation in cell culture or
- RT-PCR (confirmed by another RT-PCR test on a second specimen sample) or
- Evidence of sero-conversion from acute and convalescent sera, taken at a 2 week interval, with a four fold rise in antibody titre

**Asymptomatic or Atypical Infection:**

An individual who either has no clinical symptoms or has a clinical presentation unique from that of a suspect case yet has laboratory confirmation (i.e. as detailed above for a confirmed case) of an infection with influenza A (H7).

**Notes:**

- Swab or nasal wash samples not to be taken immediately after exposure (> 12 hours recommended).

- When only convalescent sera is available, control sera can be used as a baseline to assess titre rise. Details on testing are to follow from the National Microbiology Laboratory (NML).

- Due to its higher reported sensitivity, microneutralization techniques are recommended relative to HI techniques. Specifics on use of microneutralization testing are to follow from the NML.

- Primary Case/Infection: Direct contact with infected or potentially infected poultry, material or poultry products.

- Secondary Case/Infection: Direct contact with an individual who is identified as a confirmed case, a suspect primary case or an asymptomatic/ atypical infection.

## Appendix 4a. Table of Avian Influenza Infected Premises - Commercial Flocks

| Farm | Region | Approx # of Birds | Species | Production type | Age of birds (weeks) | Mortality | Sampling date | Date of Positive Diagnosis | Directigen | PCR | HN Type | Patho type | Reason for sampling | Destruction Date | Disposal date | Disposal method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **C748** | HRR | 18000 | Chickens | Broiler Breeders | Flock 1: 24; Flock 2: 52 | F1: High F2: Increased | 17-Feb | 19-Feb | | Pos | H7N3 | HP | BCMAFF | 19-Feb | 20-Feb | Compost & Removal |
| **C745** | HRR | 40000 | Chickens | Broiler Breeders | 13 | High | 8&9-Mar | 10-Mar | | Pos | H7N3 | HP | Surveillance | 12-Mar | 13-Mar | Removal |
| **C749** | HRR | 8000 | Chickens | Broiler Breeders | 38 | High | 13-Mar | 16-Mar | | Pos | H7N3 | HP | Surveillance | 22-Mar | 23-Mar | Removal |
| **C750** | HRR | 8000 | Chickens | Broiler Breeders | 36 | Normal | 19-Mar | 23-Mar | | Pos | ** | ** | Surveillance | 23-Mar | 24-Mar | Removal |
| **C747** | HRR | 20000 | Chickens | Broiler Breeders | 20, 37 | High | 19-Mar | 24-Mar | | Pos | H7N3 | HP | Surveillance | 24-Mar | 25-Mar | Removal |
| **C723** | HRR | 13000 | Turkeys | Turkey Breeders | 31 | Increased | 25-Mar | 28-Mar | | Pos | H7 | HP | Surveillance | 2-Apr | 03-Apr | Removal |
| **C746** | HRR | 7500 | Chickens | Broiler Breeders | 48-50 | High | 28-Mar | 30-Mar | | Pos | H7N3 | HP | Surveillance | 30-Mar | 30-Mar | Removal |
| **C760** | HRR | 9000 | Chickens | Broilers | 10 | Normal | 28-Mar | 30-Mar | | Pos | ** | ** | Depopulation sample | 29-Mar | 30-Mar | Removal |
| **C761** | HRR | 64000 | Chickens | Broilers | 6 | Normal | 28-Mar | 30-Mar | | Pos | H7 | HP | Surveillance | 2-Apr | 10-Apr | Compost |
| **C720** | HRR | 85000 | Chickens | Broilers | 5 | Increased | 28-Mar | 01-Apr | | Pos | ** | ** | Sick bird call | 6-Apr | 11-Apr | Removal |
| **C724** | HRR | 17000 | Chickens | Leghorn Breeders | 35 | Normal | 28-Mar | 01-Apr | | Pos | ** | ** | Surveillance | 6-Apr | 12-Apr | Removal |
| **C006** | SR | 15000 | Chickens | Broilers | 6 | Normal | 28-Mar | 01-Apr | | Pos | ** | ** | Surveillance | 8-Apr | 13-Apr | Removal |
| **C015 A** | SR | 13000 | Chickens | Broilers | F1: 7 | Normal | 29-Mar | 01-Apr | | Pos | ** | ** | Preslaughter | 8-Apr | 13-Apr | Removal |
| **C036** | SR | 11000 | Chickens | Broilers | 16 | Normal | 29-Mar | 01-Apr | | Pos | ** | ** | Preslaughter | 7-Apr | 12-Apr | Compost |
| **C001** | SR | 32733 | Chickens | Broiler Breeders | 20,53 | Normal | 28-Mar | 01-Apr | | Pos | ** | ** | Surveillance | 5-Apr | 10-Apr | Removal |
| **C156** | CA | 39000 | Chickens | Broilers | 6 | Normal | 28-Mar | 29-Mar | | Pos | H7 | HP | Surveillance | 9-Apr | 13-Apr | Compost |
| **C725** | HRR | 15000 | Pigeons | Squab | 0 - 208 | Normal | 28-Mar | 01-Apr | | Pos | ** | ** | Surveillance | 1-Apr | 01-Apr | Removal |
| **C268** | CA | 42000 | Chickens | Table Egg Layers | 49 | Normal | 31-Mar | 02-Apr | | Pos | H7 | HP | Surveillance | 7-Apr | 11-Apr | Removal |
| **C018** | SR | 61000 | Chickens | Broilers | 5 | Normal | 31-Mar | 05-Apr | | Pos | ** | ** | Surveillance | 10-Apr | 12-Apr | Compost |
| **C719** | HRR | 65000 | Chickens | Broilers | 4 | Normal | 31-Mar | 05-Apr | | Pos | H7 | HP | Depopulation sample | 7-Apr | 12-Apr | Compost |

| Farm | Region | Approx # of Birds | Species | Production type | Age of birds (weeks) | Mortality | Sampling date | Date of Positive Diagnosis | Directigen | PCR | HN Type | Patho type | Reason for sampling | Destruction Date | Disposal date | Disposal method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **C227** | CA | 40000 | Chickens | Broilers | 4 | Normal | 05-Apr | 10-Apr | | Pos | ** | ** | Surveillance | 16-Apr | 19-Apr | Compost |
| **C767** | CA | 20000 | Chickens | Broiler Breeders | Flock 1: 32, Flock 2: 52 | Increased | 08-Apr | 10-Apr | | Pos | H7 | HP | Sick bird call | 12-Apr | 15-Apr | Removal |
| **C273** | CA | 26400 | Chickens | Table Egg Layers | Flock 1: 62, Flock 2: 38, Flock 3: 9. | Increased | 09-Apr | 11-Apr | | Pos | H7 | HP | Sick bird call | 13-Apr | 16-Apr | Removal |
| **C270** | CA | 61400 | Chickens | Table Egg Layers | Flock 1: 65, Flock 2: 35, Flock 9: 8. | Normal | 09-Apr | 11-Apr | | Pos | H7 | HP | Sick bird call | 14-Apr | 16-Apr | Compost & Removal |
| C063 | CA | 9900 | Chickens | Broiler Breeders | 55 | Increased | 10-Apr | 12-Apr | | Pos | H7 | HP | Preslaughter | 15-Apr | 18-Apr | Removal |
| **C289** | CA | 21000 | Chickens | Table Egg Layers | Flock 1: 25. Flock 2: 36 | High | 13-Apr | 15-Apr | Pos | Pos | H7 | HP | Sick bird call | 15-Apr | 19-Apr | Compost |
| **C027** | CA | 800 | Chickens | mixed breeders | 49 | High | 13-Apr | 14-Apr | Pos | Pos | H7 | HP | Sick bird call | 16-Apr | 18-Apr | Removal |
| **C265** | CA | 115000 | Chickens | Table Egg Layers | Flock 1:59,32. Flock 2: 32. Flock 3: 59. Flock 4&5: 6. | High | 13-Apr | 13-Apr | Pos | Pos | H7 | HP | Sick bird call | 17-Apr | 21-Apr | Compost & Removal |
| **C374** | CA | 10000 | Chickens | Asian chickens | | Increased | 13-Apr | 15-Apr | Neg | Pos | ** | ** | Sick bird call | 16-Apr | 21-Apr | Compost |
| **C261** | CA | 17200 | Chickens | Table Egg Layers | Flock 1: 55 Flock 2: 23 | Increased | 15-Apr | | Pos | Pos | H7N3 | HP | Sick bird call | 17-Apr | 22-Apr | Compost |
| **C314** | CA | 16300 | Chickens | Table Egg Layers | 38 | Increased | 15-Apr | 15-Apr | Neg | Pos | H7 | HP | Sick bird call | 17-Apr | 21-Apr | Compost |
| **C288** | CA | 47550 | Chickens | Table Egg Layers | Flock 14: 64 Flock 15: 38 Flock 16: 12 | Increased | 20-Apr | 21-Apr | Pos | Pos | H7 | HP | Sick bird call | 21-Apr | 24-Apr | Removal |
| **C302 A** | CA | 14000 | Turkeys | Hens | Flock 1: 3 Flock 3: 6 | Normal | 20-Apr | 21-Apr | Pos | Neg | ** | ** | Sick bird call | 21-Apr | 27-Apr | Removal |
| **C295** | CA | 51000 | Chickens | Table Egg Layers | Flock 1: 36 Flock 2: 60 Flock 3: 13 | Increased | 20-Apr | 21-Apr | Pos | Pos | H7 | HP | Sick bird call | 21-Apr | 23-Apr | Removal |
| **C057** | CA | 23000 | Chickens | Broiler Breeders | Flock 1: 55 Flock 2: 28 Flock 3: 55 Flock 4: 28 Flock 5: 28 Flock 6: 55 | High | 20-Apr | 21-Apr | Pos | Pos | H7 | HP | Sick bird call | 22-Apr | 27-Apr | Removal |
| **C347** | CA | 8000 | Turkeys | Heavy Hens | Flock 2: 13 Flock 3: 13 | Normal | 20-Apr | 21-Apr | | Pos | ** | ** | Preslaughter | 22-Apr | 26-Apr | Removal |

| Farm | Region | Approx # of Birds | Species | Production type | Age of birds (weeks) | Mortality | Sampling date | Date of Positive Diagnosis | Directigen | PCR | HN Type | Patho type | Reason for sampling | Destruction Date | Disposal date | Disposal method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **C262 B** | CA | 13000 | Turkeys | Mixed | Flock 1: 9<br>Flock 5: 9<br>Flock 6: 10 | Increased | 22-Apr | 22-Apr | Pos | Pos | H7 | HP | Sick Bird Call | 23-Apr | 26-Apr | Compost & Removal |
| **C322** | CA | 32000 | Chickens | Table Egg Layers | Flock 1A: 25<br>Flock 1B: 52<br>Flock 2: 3. | Increased | 23-Apr | 24-Apr | Pos | Pos | H7 | HP | Preslaughter | 26-Apr | 28-Apr | Removal |
| **C346 A** | CA | 15555 | Chickens | Table Egg Layers | Flock 21:36<br>Flock 22: 36 | Normal | 23-Apr | 24-Apr | Pos | Pos | H7 | HP | Preslaughter | 26-Apr | 28-Apr | Compost & Removal |
| **C342** | CA | 9500 | Turkeys | Broilers | 9 | Normal | 25-Apr | 27-Apr | | Pos | H7 | HP | Preslaughter | 27-Apr | 29-Apr | Compost |
| **C097** | CA | 1770 | Ducks | Meat | Mature | Normal | 04- May | 05-May | | Pos | H7 | LP | Preslaughter | 05-May | 05-May | Removal |
| **C791, 792,793 , 794** | CA | 9300<br>1200 | Ducks<br>Geese | Breeders | Mature | Normal | 13-May | 18-May | Neg | Pos | H7 | HP | Dangerous Contacts | 20-May | 21-May | Removal |

**Legend:**

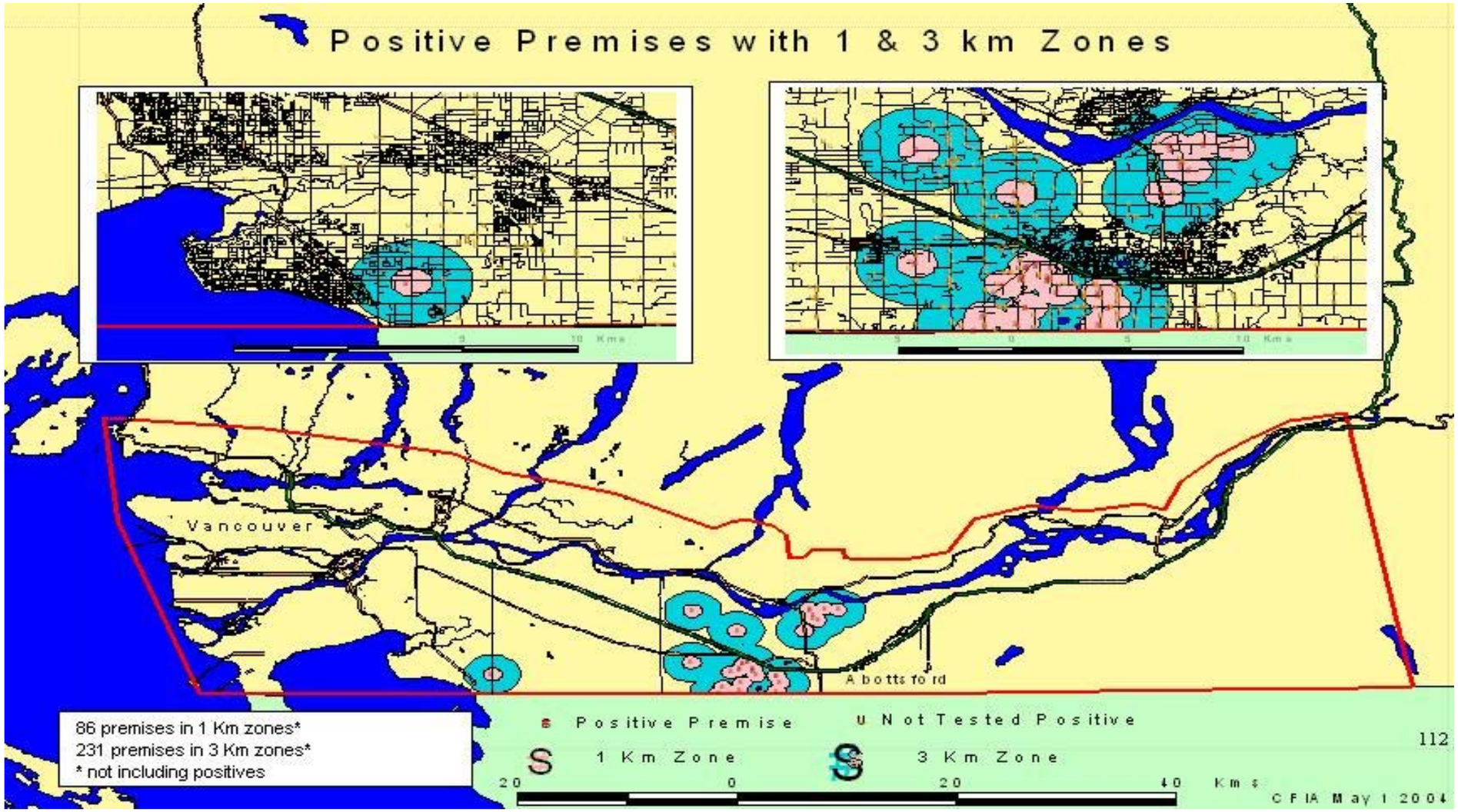
HRR - High Risk Region
SR - Surveillance Region
CA - Control Area
HP - High pathogenicity
** - Insufficient virus to determine type and pathogenicity

## Appendix 4b. Table of Avian Influenza Infected Premises - Backyard Flocks (updated June 23, 2004)

| Back-yard Flock | Region | Approx # of Birds | Species | First Positive | Serology | PCR | HN Type | Patho-type | Reason for sampling | Destruction Date | Disposal date | Disposal method |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| BY397 | HRR | 2 | Chickens | 13-Mar | | pos | H7 | ** | Surveillance | 30-Mar | 30-Mar | Removal |
| BY202 | HRR | 2 | Chickens | 19-Mar | | pos | ** | ** | Surveillance | 29-Mar | 29-Mar | Removal |
| BY393 | HRR | 23 | Chickens | 28-Mar | | pos | H7 | HP | Surveillance | 28-Mar | 28-Mar | Removal |
| BY429 | HRR | 2 | 1duck+ 1Goose | 29-Mar | pos | | ** | ** | Depopulation Sample | 29-Mar | 29-Mar | Removal |
| BY466 | SR | 15 | Chicks+ Ducks | 30-Mar | | pos | ** | ** | Surveillance | 03-Apr | 03-Apr | Removal |
| BY456 | SR | 18 | Chicks+ Ducks | 30-Mar | | pos | ** | ** | Surveillance | 11-Apr | 11-Apr | Removal |
| BY455 | SR | 25 | Chickens | 1-Apr | | pos | ** | ** | Surveillance | 08-Apr | 08-Apr | Removal |
| BY430 | HRR | 25 | Chickens | 1-Apr | | pos | ** | ** | Depopulation Sample | 01-Apr | 01-Apr | Removal |
| BY428 | HRR | 13 | Chickens/duck s | 1-Apr | | pos | ** | ** | Depopulation Sample | 01-Apr | 01-Apr | Removal |
| BY383 | SR | 22 | Fancy chickens | 2-Apr | pos | | ** | ** | Surveillance | 07-Apr | 07-Apr | Removal |
| BY925 | CA | 14 | Chickens | 18-May | | pos | ** | ** | 3K Depopulation Sample | 18-May | 18-May | Removal |

**Legend:**
HRR - High Risk Region
SR - Surveillance Region
** - Insufficient virus to determine type and pathogenicity

**Appendix 5. Positive Premises with 1 & 3 km Zones**

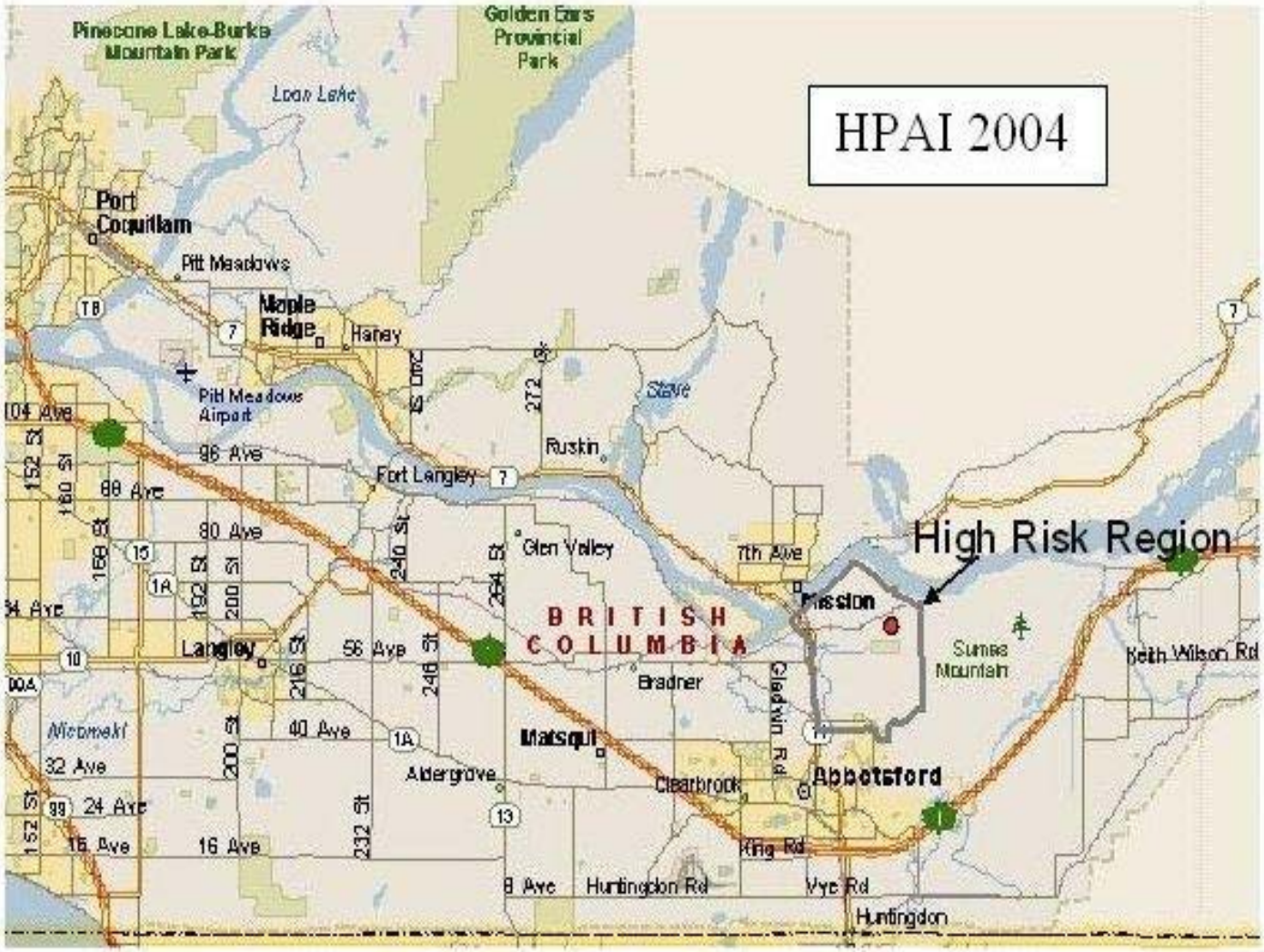


**Appendix 6 - Progression of the outbreak at key dates - showing infected farms**

**February** **Laboratory Confirmation**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | | | | | |

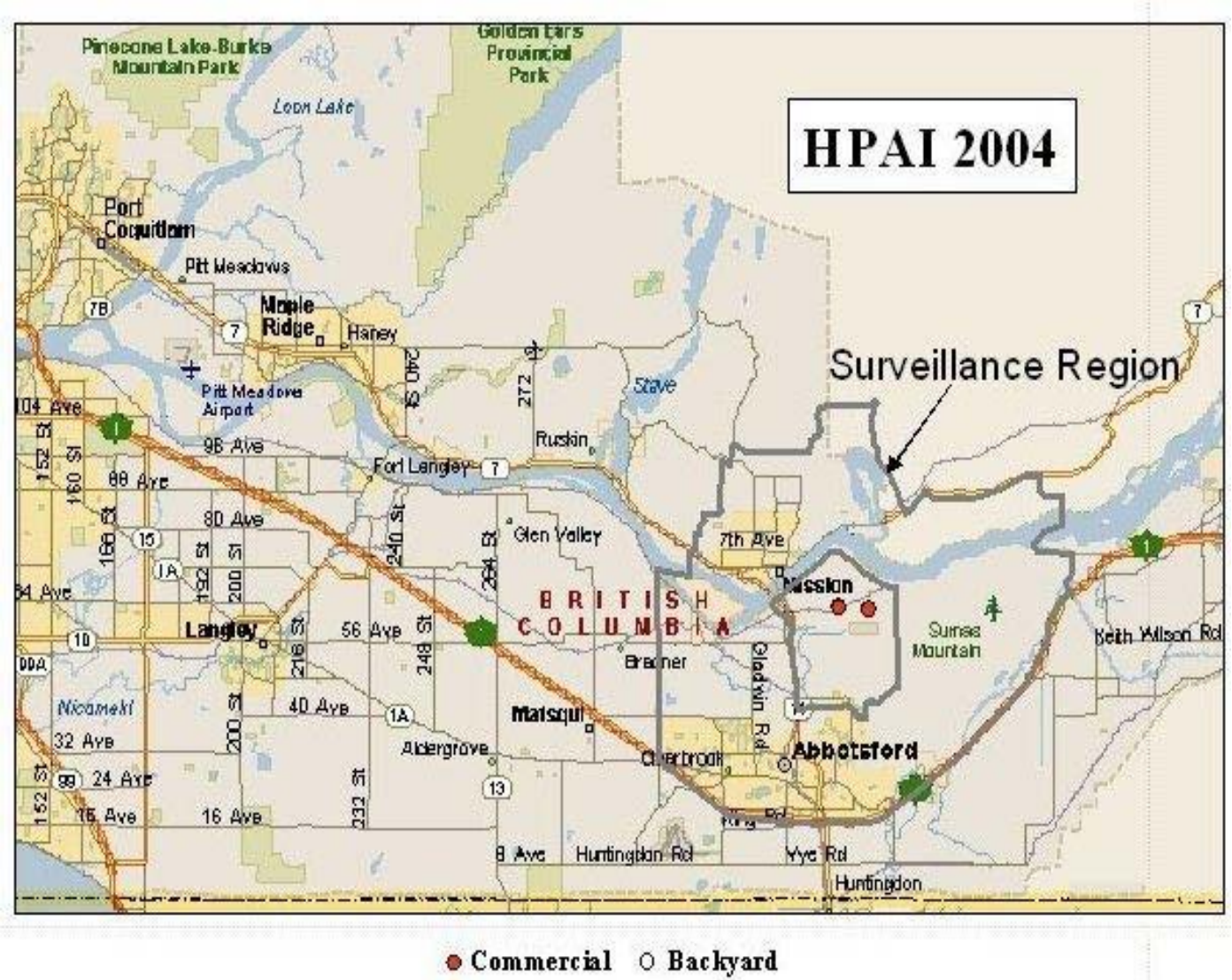
| Production Type | # of Farms |
|---|---|
| Broiler Breeder | 1 |
| Turkey Hatching | |
| Broilers | |
| Leghorn Breeder | |
| Squab | |
| Table egg | |
| Layers | |
| Layers/Pullets | |
| Asian Meat Birds | |
| Turkey | |
| Turkey Layers/Pullets | |
| Peking/Duck | |
| Turkeys/Layers | |
| **Total** | **1** |
| Backyard Flocks | |



**March** **Laboratory Confirmation**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

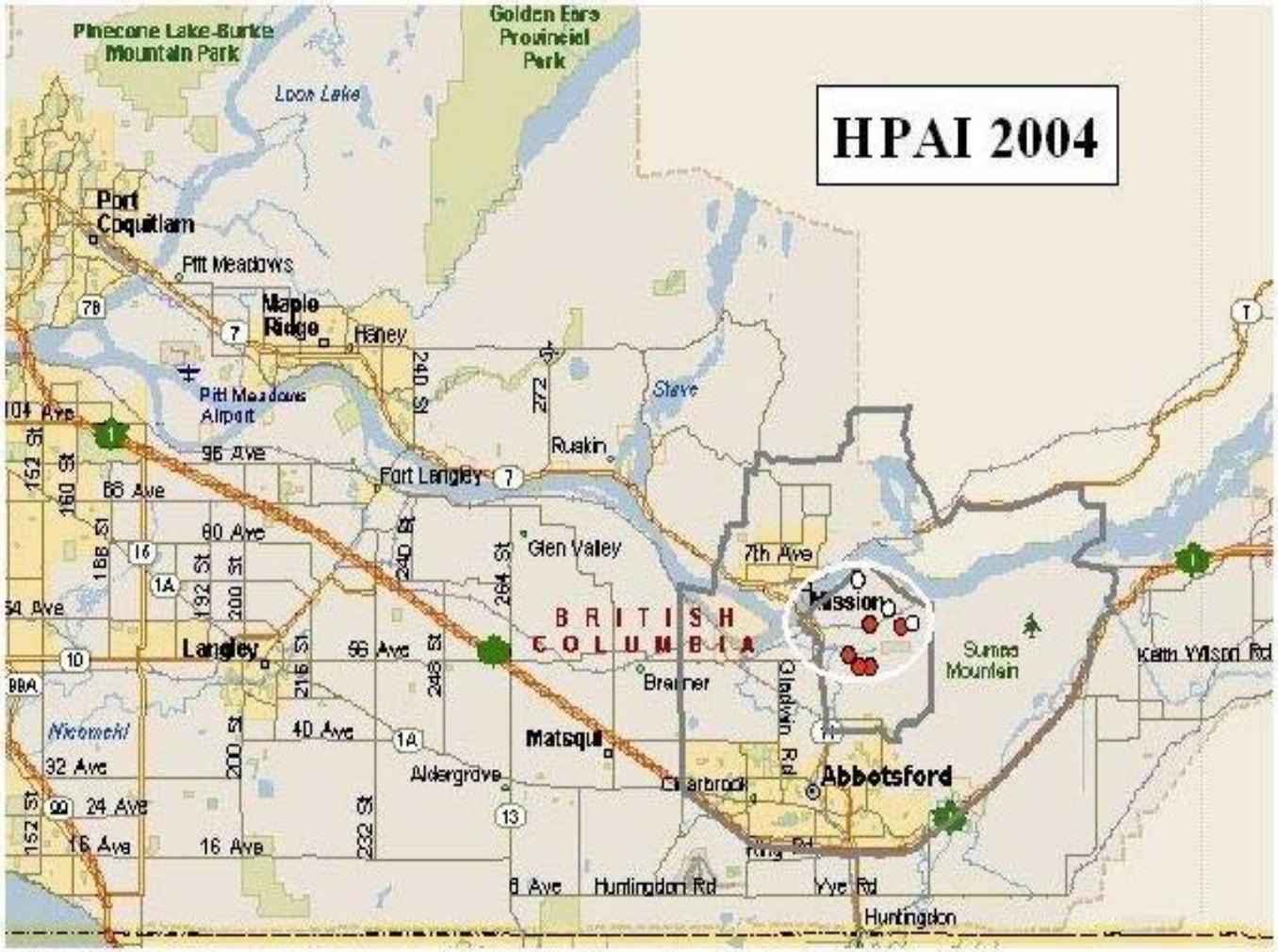
| Production Type | # of Farms |
|---|---|
| Broiler Breeder | 2 |
| Turkey Hatching | |
| Broilers | |
| Leghorn Breeder | |
| Squab | |
| Table egg | |
| Layers | |
| Layers/Pullets | |
| Asian Meat Birds | |
| Turkey | |
| Turkey Layers/Pullets | |
| Peking/Duck | |
| Turkeys/Layers | |
| **Total** | **2** |
| Backyard Flocks | |



**March** **Laboratory Confirmation**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

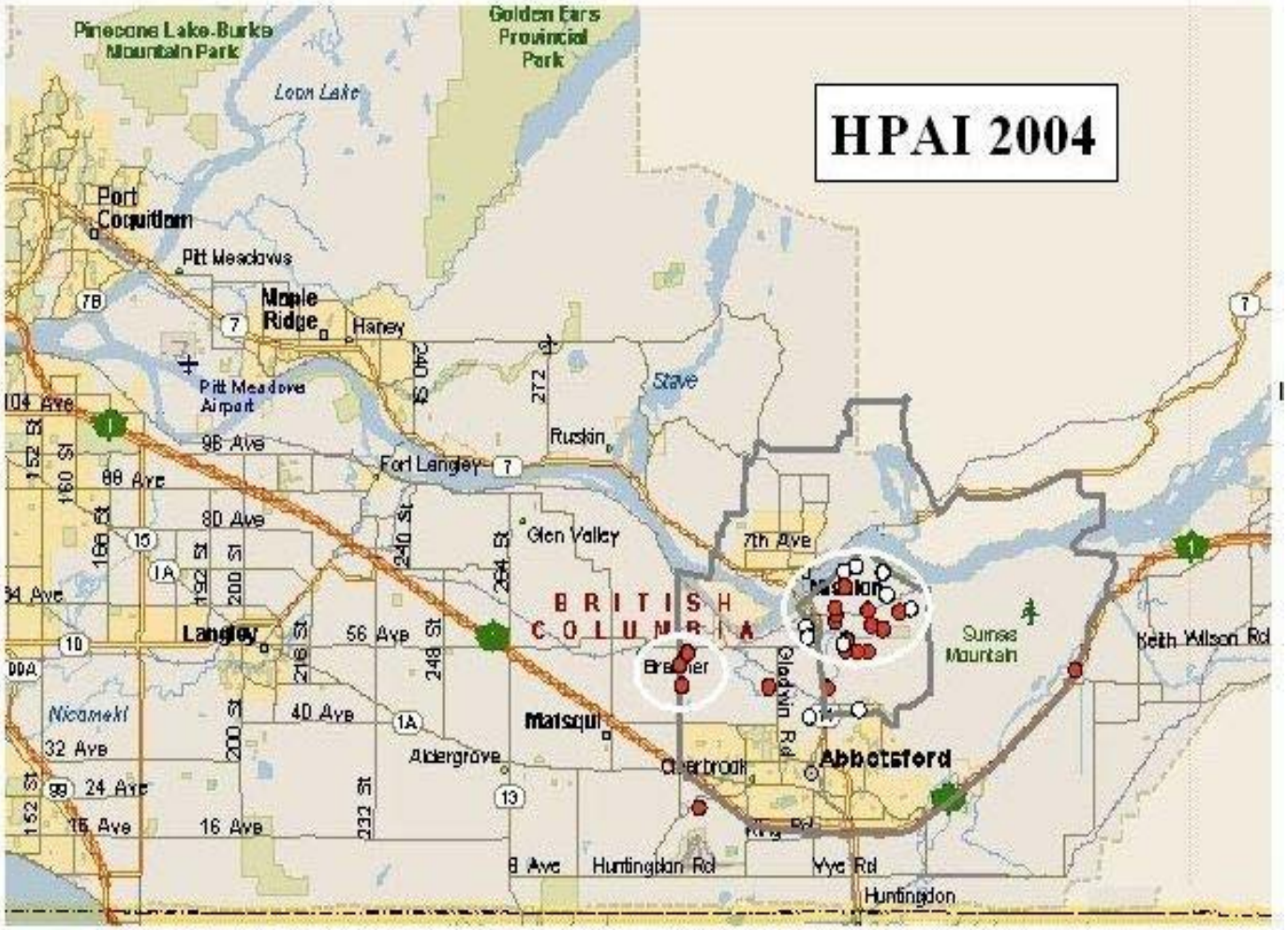
| Production Type | # of Farms |
|---|---|
| Broiler Breeder | 5 |
| Turkey Hatching | |
| Broilers | |
| Leghorn Breeder | |
| Squab | |
| Table egg | |
| Layers | |
| Layers/Pullets | |
| Asian Meat Birds | |
| Turkey | |
| Turkey Layers/Pullets | |
| Peking/Duck | |
| Turkeys/Layers | |
| **Total** | **5** |
| Backyard Flocks | 3 |



**April** **Laboratory Confirmation**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

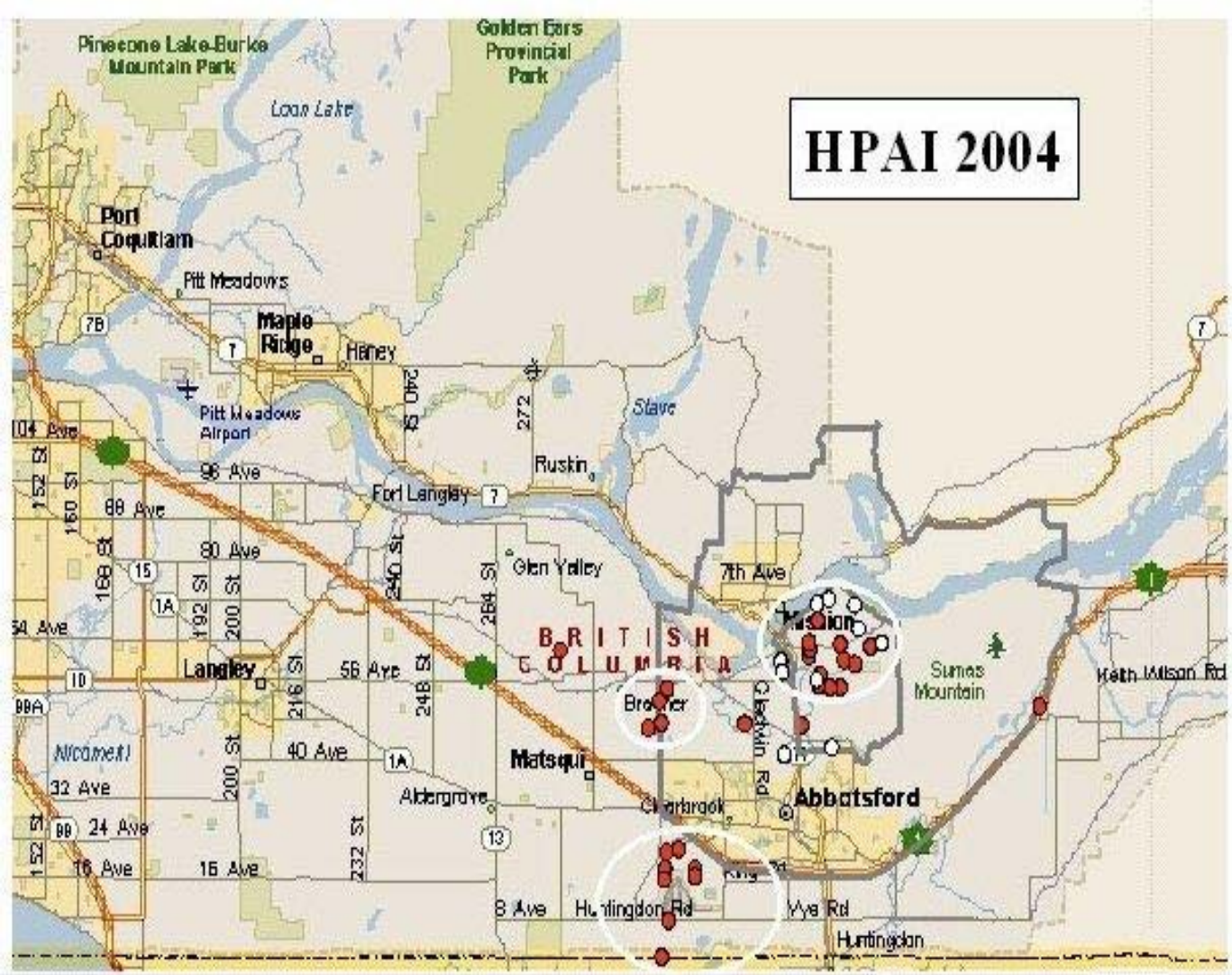
| Production Type | # of Farms |
|---|---|
| Broiler Breeder | 8 |
| Turkey Hatching | 1 |
| Broilers | 7 |
| Leghorn Breeder | 1 |
| Squab | 1 |
| Table egg | 1 |
| Layers | |
| Layers/Pullets | |
| Asian Meat Birds | |
| Turkey | |
| Turkey Layers/Pullets | |
| Peking/Duck | |
| Turkeys/Layers | |
| **Total** | **19** |
| Backyard Flocks | 10 |



**April** **Laboratory Confirmation**

| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

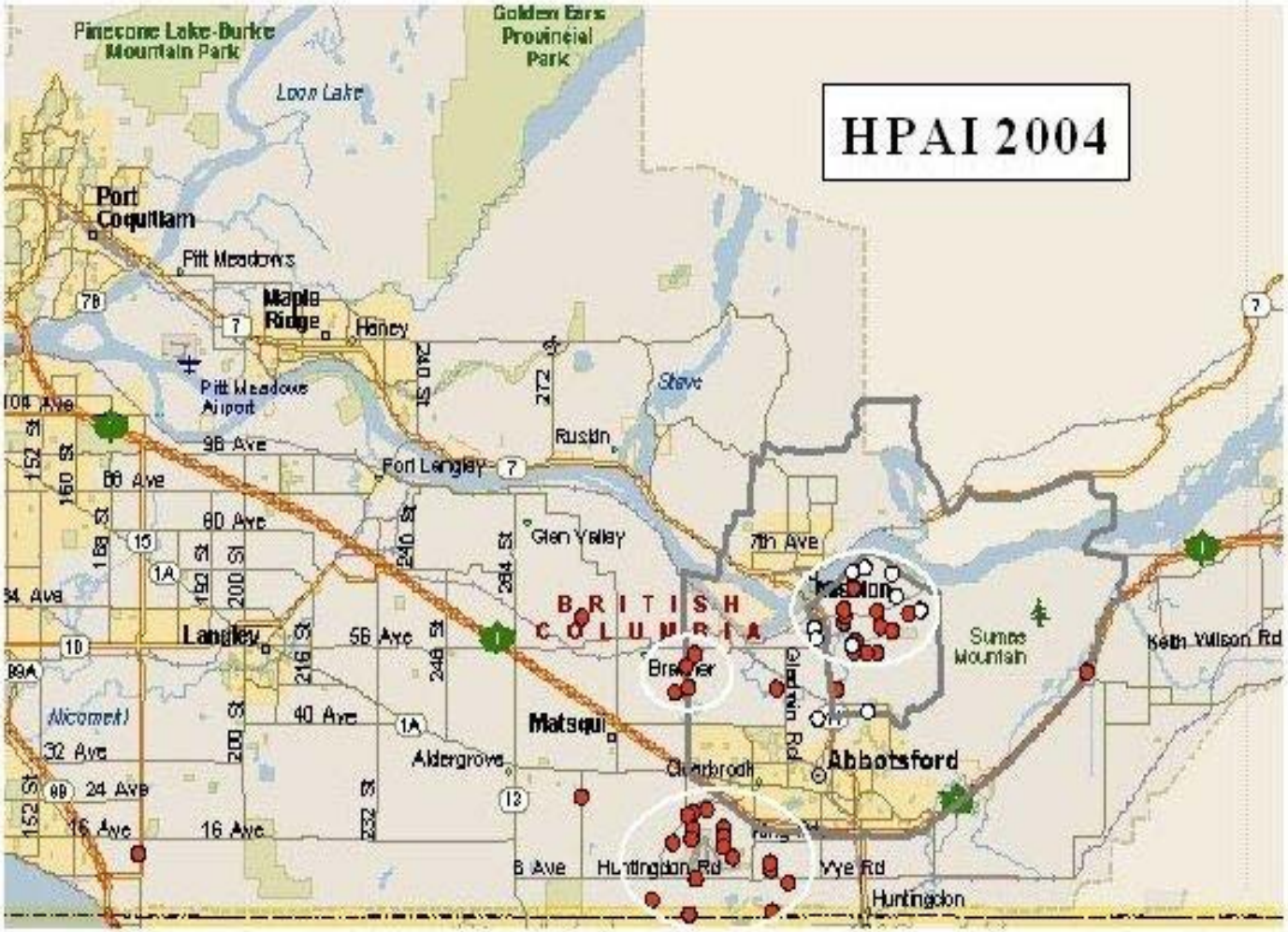
| Production Type | # of Farms |
|---|---|
| Broiler Breeder | 108 |
| Turkey Hatching | 1 |
| Broilers | 8 |
| Leghorn Breeder | 1 |
| Squab | 1 |
| Table egg | 1 |
| Layers | 3 |
| Layers/Pullets | 1 |
| Asian Meat Birds | 1 |
| Turkey | |
| Turkey Layers/Pullets | |
| Peking/Duck | |
| Turkeys/Layers | |
| **Total** | **27** |
| Backyard Flocks | 10 |



**April** **Laboratory Confirmation**

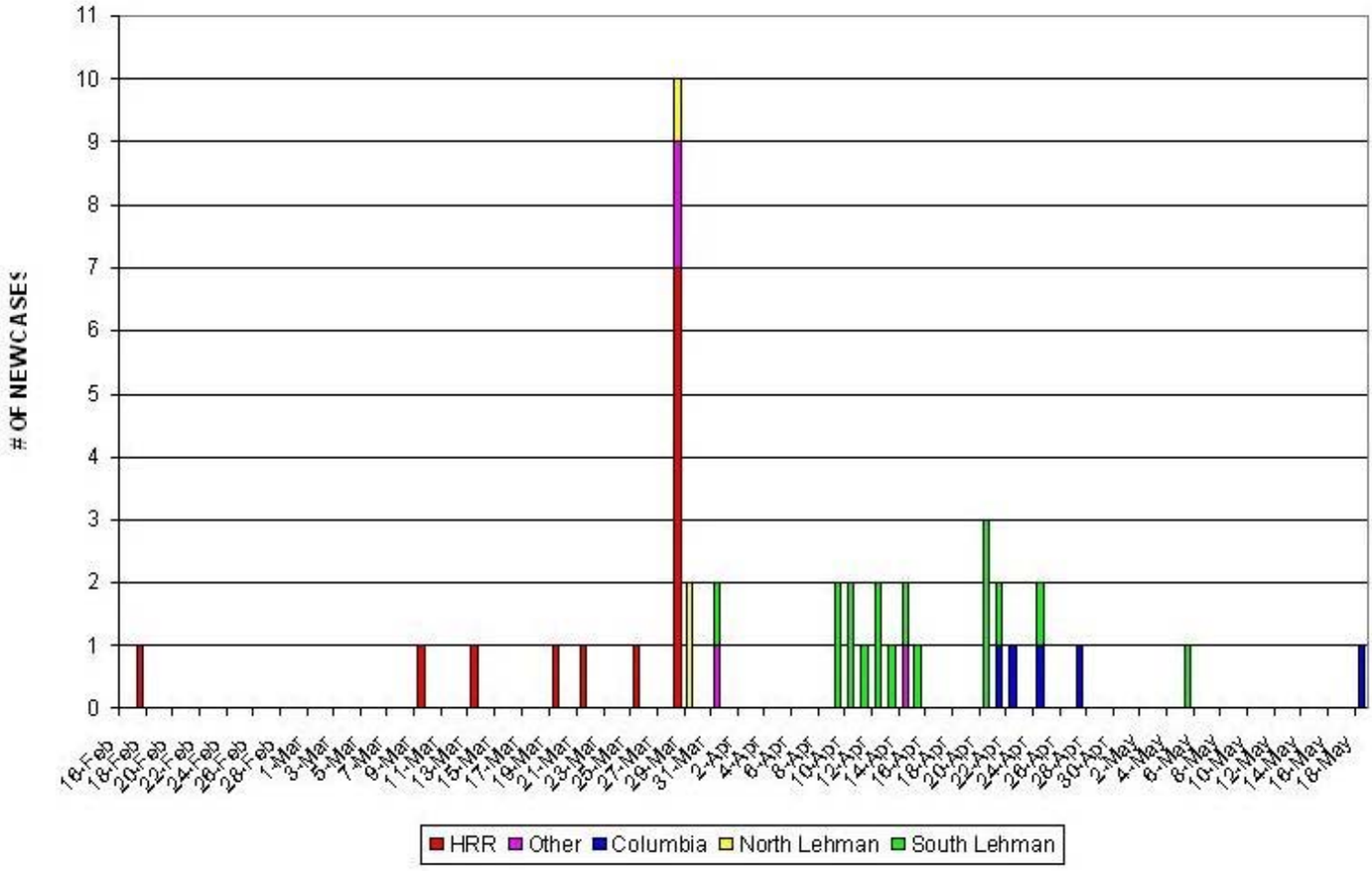
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

| Production Type | # of Farms |
|---|---|
| Broiler Breeder | 12 |
| Turkey Hatching | 1 |
| Broilers | 9 |
| Leghorn Breeder | 1 |
| Squab | 1 |
| Table egg | 1 |
| Layers | 2 |
| Layers/Pullets | 6 |
| Asian Meat Birds | 2 |
| Turkey | 1 |
| Turkey Layers/Pullets | 1 |
| Peking/Duck | |
| Turkeys/Layers | 3 |
| **Total** | **40** |
| Backyard Flocks | 10 |

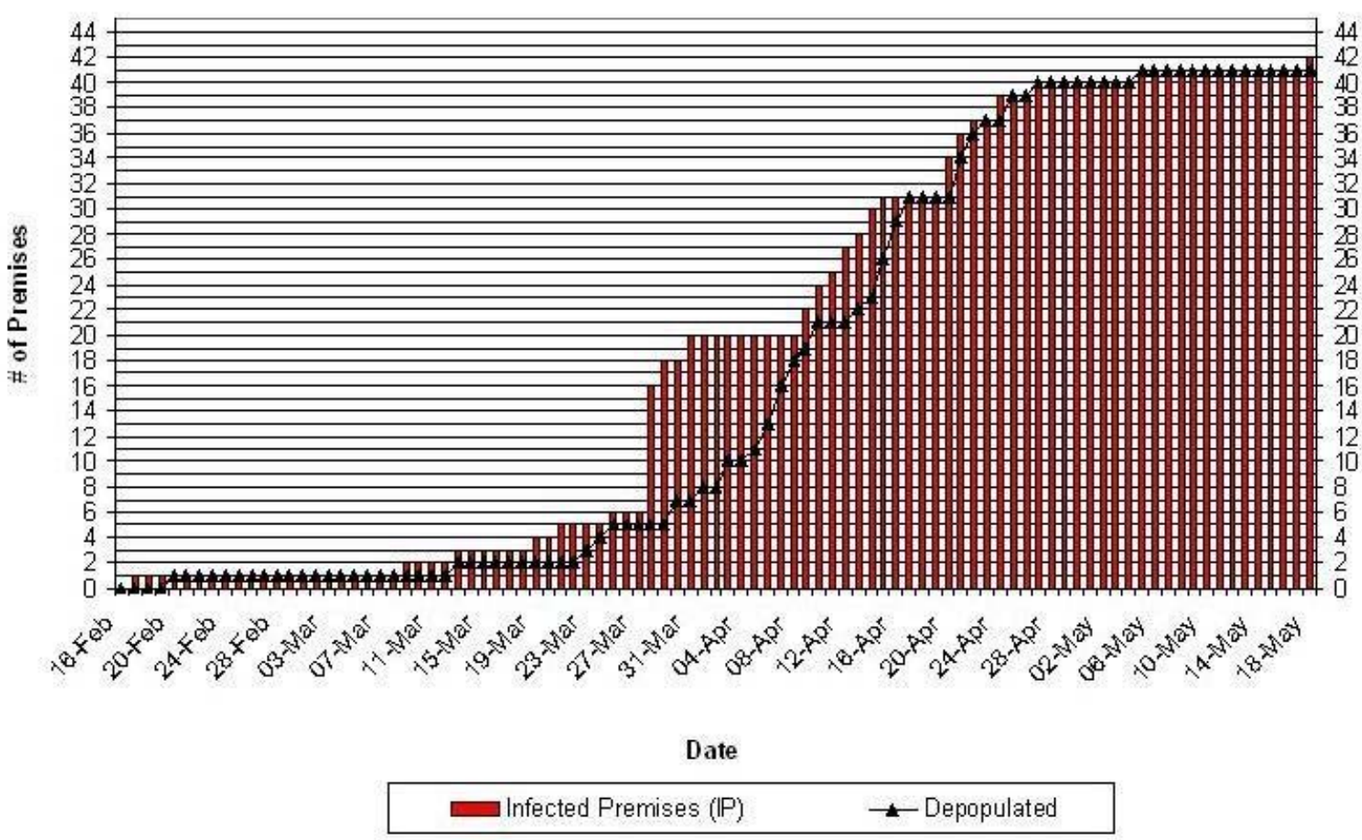


**Appendix 7. Epidemic Curve of the Outbreak in Commercial Flocks**

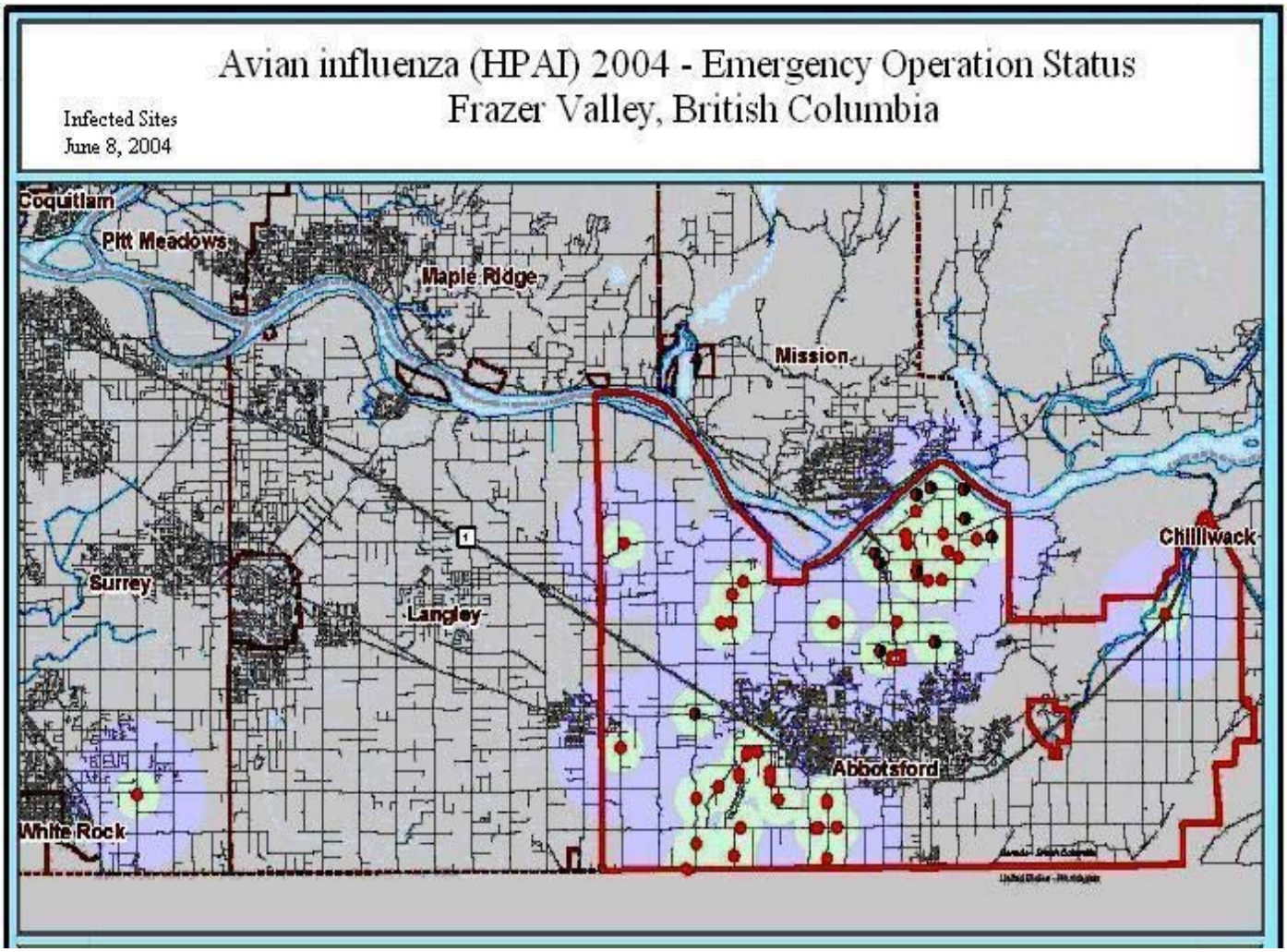
Temporal and Spatial Distribution of Positive Commercial Flocks




Cumulative Temporal Distribution of Positive Commercial Flocks



**Appendix 8. Revised High Risk Region**



**Appendix 9. Detailed chronology of events**

| DATE 2004 | # OF INFECTED PREMISES | ACTION |
|---|---|---|
| Feb 4-9 | None confirmed | Private practitioner called to Premises # 1; History of feed refusal, increased mortality from 8/day to 30/day<br>Samples submitted to BC Ministry of Agriculture, Food and Fisheries (BCMAFF) by private practitioner. |
| Feb 16 | 1 C | BCMAFF contacted CFIA District Veterinarian to report positive PCR for avian influenza<br>Provincial case pathologist reports clinical signs, post-mortem data<br>Private vet contacted for history - mortality back to 8/day so not considered emergency situation |
| Feb 17 | 1 C | CFIA District Veterinarian visits the farm and discusses avian influenza with the owner (disease characteristics, human health implications, high and low pathogenicity, H5 and H7, etc.)<br>Mortality back to normal in older flock; birds look normal<br>Considered to be LPAI due to above reasons<br>Suggest tighter biosecurity until confirmation that it is not HPAI<br>At 16h00, 120 dead birds found in younger flock<br>Preparations to quarantine the farm and hold eggs on site |
| Feb 18 | 1 C | BCEOC opened<br>CFIA notified approximately 800 dead birds in young flock overnight<br>Quarantine placed on Premises #1<br>Samples escorted to NCFAD lab in Winnipeg. |
| Feb 19 | 1C | NCFAD confirms H7 strain of low pathogenicity avian influenza<br>Emergency report sent to OIE<br>Communications with industry and provincial representatives<br>CFIA notified that approximately 1000 birds of the younger flock had died overnight<br>Received draft surveillance plan from HQ<br>Arrangements initiated for use of a portable $CO_2$ fumigator to euthanize birds |

| DATE<br><br>2004 | # OF INFECTED PREMISES | ACTION |
|---|---|---|
| Feb 19 - 20 | 1C | Depopulation of Index Premises<br>CFIA inspection staff called in, received orientation and briefing on AI, human influenza vaccine and anti-viral prophylaxis<br>Commence surveillance in surrounding 5km<br>Composting of destroyed animals from Premises 1, only 60% of birds are able to be composted due to structure of the building |
| Feb 21 | 1C | Pick and pack dead birds<br>Cleaning and disinfection of depopulation equipment on Premises 1 |
| Feb 23 | 1C | NCFAD confirms N3 strain of avian influenza<br>Followup report #1 sent to OIE<br>Known trace out properties in the 5 km region have been prioritized for testing. |
| Feb 24 | 1C | Remaining 40% of birds from premise #1 trucked to secure yard and incinerated (incineration completed on Feb 28) |
| Mar 2 | 1C | NCFAD confirms LPAI with intravenous pathogenicity index = 0.0<br>Followup report #2 sent to OIE |
| Mar 3 | 1C | BC EOC officially shut down |
| Mar 5 | 1C | Sampling and testing of known high risk contacts (Premises 1) completed |
| Mar 9 | 1C | CFIA notified by BCMAFF of an additional suspicious AI sample on a farm (Premises 2) approximately 3 km from Premises 1<br>BCEOC reopens<br>CFIA quarantines Premises #2<br>Further tests by NCFAD show that both Low Pathogenicity and High Pathogenicity AI were present on Premises 1 (IVPI = 0.0 and 3.0, respectively) |

| DATE<br><br>2004 | # OF INFECTED PREMISES | ACTION |
|---|---|---|
| **Mar 10** | **2 C** | **NCFAD confirms H7 avian influenza on Premises #2**<br>**Followup report #3 sent to OIE (published in *Disease Information*, March 12, 2004)**<br>**CFIA establishes a 10km Surveillance Region (SR), in addition to the 5km High Risk Region (HRR)**<br>**Breeder and commercial flocks in the 10km region, backyard flocks in the 5 km region will be tested** |
| **Mar 11** | **2 C** | **Minister announces Control Area in the Fraser Valley of British Columbia to prevent the spread of avian influenza.**<br>**CFIA implemented movement controls on certain poultry products in the High Risk Region, Surveillance Region and prohibited movement of poultry and products out of the Control Area.**<br>**HPAI confirmed on Premises #2** |
| **Mar 13** | **2 C/ 1 B** | **Depopulation on all 3 complexes at Premises #2 completed March 16**<br>**HPAI reconfirmed** |
| **Mar 15** | **2 C/ 1 B** | **Abbotsford City officials blocked 3 roads; 3 cleaning and disinfection stations were erected for traffic leaving the High Risk Region**<br>**27 countries have suspended imports from either all of Canada or only British Columbia**<br>**Toll free public inquiry line operational** |
| **Mar 16** | **3 C/ 1 B** | **Moved BCEOC to new building to accommodate large numbers of staff** |
| **Mar 20** | **3 C/ 2 B** | **Disposal begins at Princeton mine site using an air curtain incinerator.** |
| **Mar 24** | **5 C / 2 B** | **CFIA Vice-president declares Avian Influenza crisis in BC an emergency and the National Emergency Operations Center is fully activated.**<br>**Flocks within the High Risk Region will be depopulated.** |
| **Mar 29** | **6 C/ 2 B** | **Positive commercial farm found outside the High Risk Region.**<br>**35 countries have suspended imports from either all of Canada or only British Columbia** |

| DATE<br><br>2004 | # OF INFECTED PREMISES | ACTION |
|---|---|---|
| **Mar 31** | **9 C/ 6 B** | **8 commercial flocks and 16 backyard flocks in the high risk region have been depopulated** |
| **April 1** | **16 C/ 9 B** | **Positive premises found in Control Area outside of the HRR and SR**<br>**All flocks testing positive for avian influenza by matrix PCR will now be depopulated rather than waiting for H7 confirmation**<br>**Public health issued a news release confirming a second H7 isolation in a poultry worker** |
| **April 3** | **18 C/ 10 B** | **-Depopulation of backyard flocks in the HRR is complete** |
| **April 4** | **18 C/ 10 B** | **The Weybridge Laboratory has confirmed the results of NCFAD** |
| **April 5** | **20 C/ 10 B** | **Minister announced entire Control Area, established March 11, 2004, will be depopulated. This will encompass approximately 19 million birds. The current movement restrictions remain in place until midnight on April 13, 2004.**<br>**Legal steps taken to require poultry owners to control access to their premises by affixing a notice at the entrance of their property prohibiting unauthorized entry to their farm using Section 7 of the *Health of Animals Act***<br>**Provincial Emergency Program EOC activated** |
| **April 7** | **20 C/ 10 B** | **The first in-barn bio heat treatment of birds and litter is in progress.**<br>**Depopulation of all commercial flocks in the HRR completed**<br>**First compensation cheques issued to producers**<br>**Three kilometer zones placed around the infected premises located outside of the HRR. All poultry flocks in these 3 km zones will be depopulated as a priority, either through commercial slaughter or slaughter/rendering.**<br>**Pre-slaughter sampling required within 72 hours to move negative flocks to slaughter** |

| DATE<br><br>2004 | # OF INFECTED PREMISES | ACTION |
|---|---|---|
| April 8 | 20 C/ 10 B | Orders of destruction were issued to 5 commercial hatcheries in the Control Area.<br>Announced decision to allow movement of fresh and frozen product from federal establishments in the Control Area to the rest of Canada.<br>43 trading partners have taken action against Canada; 26 against all of Canada, 16 against live poultry and poultry products from BC |
| April 10 | 22 C/ 10 B | Policy on movement out of the Control Area of fresh and frozen poultry products and by products and general permit distributed to industry for immediate implementation |
| April 12 | 25 C/ 10 B | All positive backyard flocks depopulated and disposal complete<br>Landfill site at Chilliwack available for a maximum usage of 200 tonnes<br>Laboratory capacity at Winnipeg increased to 300 samples per day. BCMAFF at 120 samples per day |
| April 13 | 26 C/ 10 B | Depopulation of commercial flocks in the High Risk Region is complete, depopulation will now target flocks within 3 km of infected premises |
| April 14 | 27 C/ 10 B | The first commercial barn completed Cleaning and Disinfection activities today<br>Check points at ferry terminals in place |
| April 15 | 31 C/ 10 B | Check points at weigh scales and Coquihalla toll booth are in place<br>Samples from air filtration study sent to HC Winnipeg lab<br><br>Diagnostic capacity increased to 500 samples per day (300 CFIA Winnipeg and 200 BC MAFF)<br>Regulations being drafted for movement of ungraded eggs from US to BC Control Area |
| April 16 | 31 C/ 10 B | -Cleaning and Disinfection station for poultry-related vehicles going to the US is now operational |
| April 17 | 31 C/ 10 B | All positive premises have now been depopulated<br>Provincial Emergency Program (PEP) is setting up operations in the BCEOC to facilitate cooperation of operations |

| DATE<br><br>2004 | # OF INFECTED PREMISES | ACTION |
|---|---|---|
| April 20 | 31 C/ 10 B | Revised policy on movement out of the Control Area of fresh and frozen poultry products and by products and general permit to allow for properly labeled products to enter only federal cold storage facilities under special permit<br>46 trading partners have taken action against Canada; 28 against all of Canada, 17 against live poultry and poultry products from BC and EC has regionalized for the Control Area |
| April 22 | 37 C/ 10 B | First loads of negative birds delivered to central composting site |
| April 24 | 39 C/ 10 B | 37 positive premises have now been depopulated<br>Initiation of a phone survey of all producers to update the producer database : CFIA/BCMAFF lead |
| April 28 | 40 C/ 10 B | 40 positive premises have been depopulated<br>US announces surveillance centre to be set up in Washington State south of Abbotsford |
| May 1 | 40 C/ 10 B | -CFIA and Industry have completed the depopulation of the 1km zones around infected premises. Remaining premises in the 3km zones are being scheduled as the next priority.<br>- All infected premises have now either been transported off premises for incineration or are in some stage of bio-heat treatment on farm |
| May 6 | 41 C/ 10 B | -Dead bird surveillance is expanding to include all remaining broiler breeder and table egg layer facilities<br>-Producers are also being asked to send a weekly mortality and production report |
| May 8 | 41 C/ 10 B | Backyard depopulation crews shift to a grid system |
| May 13 | 41 C/ 10 B | Sample collected from what would become the last positive commercial flock. Case control studies will be conducted to complement the infected premises investigation |
| May 16 | 41 C/ 10 B | Sample collected from what would become the last positive backyard flock. 400 backyard flocks have been depopulated |
| May 18 | 42 C/ 10 B | Lab report received on the last positive commercial flock. |

| DATE<br><br>2004 | # OF INFECTED PREMISES | ACTION |
|---|---|---|
| **May 21** | **42 C/ 11 B** | **The last farm within the 3 km zones is depopulated. Turkey broiler premises have been added to the list of surveillance farms. Lab report received on the last positive backyard farm** |
| **May 24** | **42 C/ 11 B** | **Industry has hired two private restoration firms to complete the cleaning and disinfection of the remaining infected premises** |
| **May 29** | **42 C/ 11 B** | **Enhanced surveillance completed of the 83 premises remaining in the Control Area completed** |
| **June 4** | **42 C/ 11 B** | **Depopulation activities of Control Area halted** |
| **June 8** | **42 C/ 11 B** | **Compensation package announced** |
| **June 10** | **42 C/ 11 B** | **-Municipal boundaries of Abbotsford become the new High Risk Region. Dead bird surveillance continues in HRR. Eggs allowed to be set in hatcheries** |
| **June 11** | **42 C/ 11 B** | **-All compost piles have reached the time/temperature combination to be deemed as avian influenza virus-free** |
| **June 14** | **42 C/ 11 B** | **-Completed cleaning and disinfection of equipment at Princeton disposal site** |
| **June 18** | **42 C/ 11 B** | **-All infected commercial premises in the HRR (41) have been cleaned and disinfected**<br>**-One premises, that was only PCR positive and from which virus was not isolated, outside the HRR remains under quarantine** |

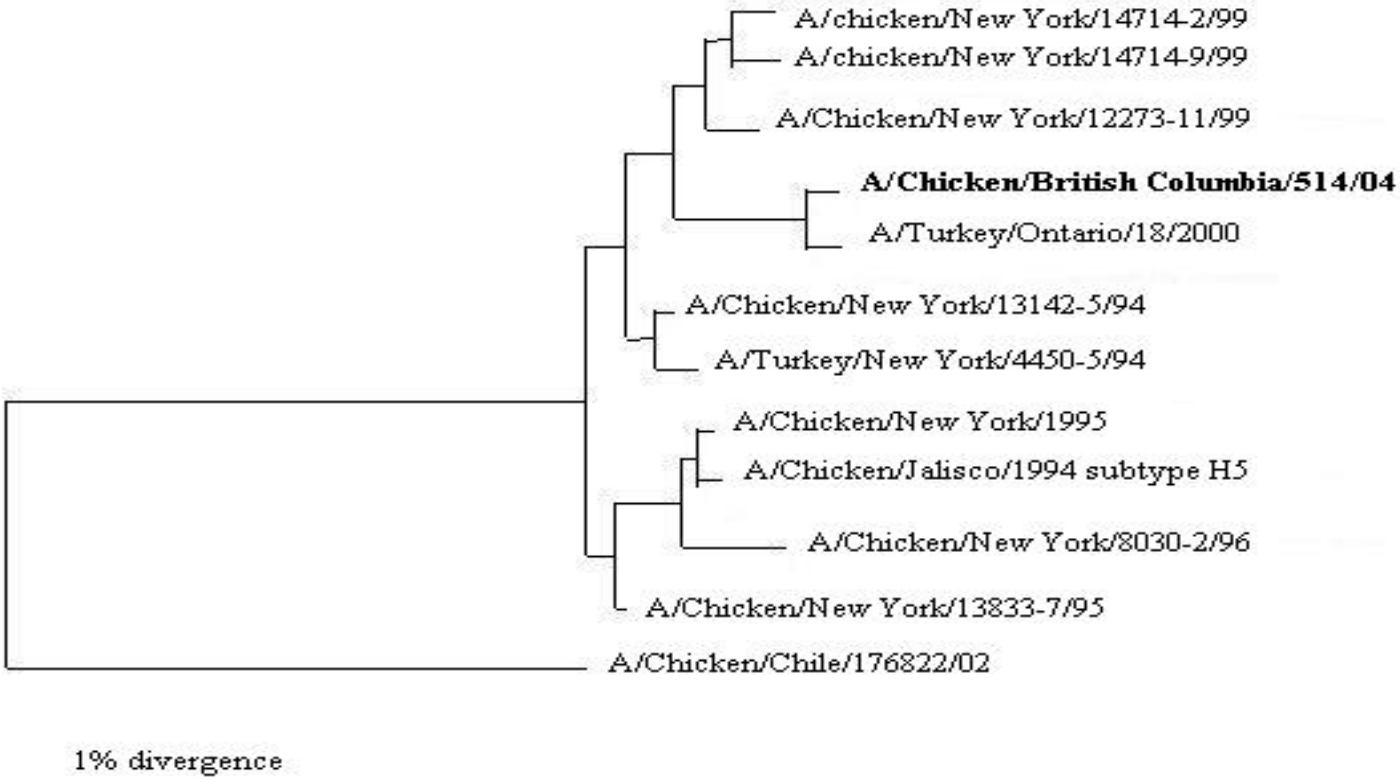
---

1. Confirmed premises are those confirmed by either BCMAFF or CFIA NCFAD
C = commercial,
BY = back yard.
Dates of sample submission are used to determine number of confirmed cases on date given.

**Appendix 10. Genetic relatedness of recent avian influenza isolates.**

Phylogenetic tree of North American strains most similar to the British Columbia LPAI (H7N3) index case based on a 143 base sequence region flanking the hemagglutinin cleavage site. Sequences were aligned and the tree was generated using Clustal V and the phylogenetic tree programs within the Megalign package. The 2002 Chilean (H7N3) avian influenza strain has been added for comparison.

Source: Drs Sean Byrne and John Robinson, BCMAFF



**Appendix 11.**
**The hatchery as a potential source of AI transmission in British Columbia**

March-April 2004

Avian influenza survivability:
Avian influenza virus prefers cool moist environment. Avian influenza virus can survive in chicken manure 8 – 12 hr at 28 – 30 C and can survive > 20 days at 4 C (refrigerator temp) (1). Different strains of avian influenza virus survive up to 207 days in water at 17C and up to 102 days at 28C (2).

BC Hatchery practices:
On farm, eggs are delivered from the laying house via a conveyor belt or by hand to a common room where settable eggs are put on flats, either on racks or in boxes. Then eggs are stored in a cooler until picked up by the hatchery. Eggs are picked up at the farm by hatchery trucks. Floor eggs may be included in the pickup. This is especially true in BC where producers are compensated based on the number of eggs set rather than the number that hatch. Racks and flats may be used on multiple farms.

Investigation of this outbreak:
Three different hatcheries served the first five farms to become infected with HPAI in BC. The distribution of hatcheries used among infected farms is relatively proportional to the percent of the broiler industry served by the hatcheries.

| Hatchery | % industry | pos BB | first 5 farms |
|---|---|---|---|
| A | 52 | 4 | 2 |
| B | 23 | 2 | 2 |
| C | 21 | 1 | 0 |
| D | 4 | 0 | 0 |
| E | <1 | 2 | 1 |

The first and second farms to become infected were both broiler breeder operations that used the same hatchery. The first farm began showing clinical signs on Feb. 6 and the last date eggs were picked up was Feb. 17. The second farm also had an egg pickup on Feb 17 and pickups twice weekly until Mar. 2. Clinical signs appeared Mar. 4.

It is possible that farm 2 may have become infected via a contaminated rack some time between Feb. 17 and Mar. 2. Egg material on a rack may serve as the source of infection. Since the hatchery is not overrepresented in positive farms, it seems unlikely that it served as major source of transmission to farms, however, given the practice of using the same racks on multiple farms, the potential to spread avian influenza or other pathogens is real. Trucks will move from farm to farm until full.

Other potential routes of infection include the hatchery trucks, drivers, and service

representatives. Service reps will make visits to farms and go into barns to do a walk-through and make assessments. They visit broiler growers as well as breeders, and may visit more than one farm in a day. Because AI does not survive long at incubator temperatures, day-old chicks are not a likely source of infection for broiler growers.

**References:**


1. Lu et al. Survival of avian influenza virus H7N2 in SPF chickens and their environments, Avian Dis. 47(3 Suppl):1015-21. 2003.

2. Stallknecht et al. Persistence of Avian Influenza viruses in water, Avian Dis. 34:406-411. 1990.

**Appendix 12**

**C.F.I.A. Extended Producer Questionnaire**
**Avian Influenza**

**22 march 2004**
**(all information provided is strictly confidential)**

**Note: This questionnaire covers the period from March 15 to April 14, 2004.**

1. Name of Farm: _____

2. Name of Owner:_____

3. Address of Owner & Farm:_____

4. Phone numbers (home and cell):_____

5. Manager (name and contact info if other than owner):_____

6. Are the birds owned by the farm or are they produced on a contract basis? Own ___ Contract ___

7. Do you own or manage other premises? Yes ___ No ___

8. If so, what are the addresses of the other premises:
_____
_____
_____

9. What is the size of your property? _____ acres / hectares (please check)

10. ***Date talked to the owner***:_____

11. Name of interviewer (CFIAperson)_____

**Farm Information**

12. Number of Barns:_____

13. Are the barns multilevel? Yes ___ No ___

14. If YES, describe_____

15. Are there barns on other sites? Yes ___ No ___

16. If YES, addresses:_____
_____

| Species of Bird: | (a) Chicken ___ | (b) Turkey ___ | (c) Other ___ | _____ |
|---|---|---|---|---|

**Type of Production**

a) broiler ___

b) breeder ___

c) layer ___

d) other ___ _____

Number of Birds/Barn -- Please indicate the usual **and**current number of birds in each barn. (If there is one barn, then fill in the space beside Barn #1 only, and leave the additional spaces blank.)

| Barn # | # of Birds in each Barn (usual and current) |
|---|---|
| 1 | _____ |
| 2 | _____ |
| 3 | _____ |
| 4 | _____ |
| 5 | _____ |

If to be shipped to slaughter:

a) when scheduled: _____

b) which establishment: _____

c) date of last shipment: _____

d) comments : _____

If egg production:

a) where shipped: _____

b) date of last shipment: _____

c) comments: _____

Has any machinery or farm equipment been imported for use on the premises? Yes ___ No ___
If YES, indicate origin and date of acquisition and describe the manner of disposal of crates, cartons and packing materials.

_____
_____
_____

**Other Animals on Farm**

Do you have any of the following domestic animals present on your farm site: (Check)

| | | | # Type |
|---|---|---|---|
| Other chickens (fancy chickens, etc .) | YES | NO | _____ |
| Other poultry (turkeys, geese, ducks, etc .) | YES | NO | _____ |
| Other domestic birds (ostrich, emu, peacocks, etc .) | YES | NO | _____ |
| Cattle | YES | NO | _____ |
| Horses or other equids | YES | NO | _____ |
| Sheep or goats | YES | NO | _____ |
| Pigs | YES | NO | _____ |
| Cats | YES | NO | _____ |
| Dogs | YES | NO | _____ |
| Other | YES | NO | _____ |

**People on Farm**

Since January 12, 2004, have you received bird health information from any of the following sources? (Check appropriate box)

| | | |
|---|---|---|
| Own farm service person | YES ___ | NO ___ |
| Private veterinarian | YES ___ | NO ___ |
| Provincial diagnostic laboratory | YES ___ | NO ___ |
| Technical service person ( e.g. , feed representative, hatchery representative) | YES ___ | NO ___ |
| Information from the internet | YES ___ | NO ___ |
| Other_____ | YES ___ | NO ___ |

Since Jan 12, 2004, have you had the following visitors on your farm? (Please check the appropriate boxes)

****Please provide all names and contact information for each of the persons below on a separate sheet.****

| | | |
|---|---|---|
| Catching crew | YES ___ | NO ___ |
| Barn cleaning crew | YES ___ | NO ___ |
| Feed representative | YES ___ | NO ___ |
| Hatchery representative | YES ___ | NO ___ |
| Family/friends | YES ___ | NO ___ |
| Veterinarian | YES ___ | NO ___ |
| Tours | YES ___ | NO ___ |
| Other producers | YES ___ | NO ___ |
| Sales representatives | YES ___ | NO ___ |
| Repairmen | YES ___ | NO ___ |
| Meter readers | YES ___ | NO ___ |
| Vaccination crew | YES ___ | NO ___ |
| Pest control crew | YES ___ | NO ___ |
| Media | YES ___ | NO ___ |
| CFIApersonnel | YES ___ | NO ___ |

Other_____ YES ___ NO ___

****Please provide all names and contact information for each of the above persons on a separate sheet.****

Are ***visitors*** to the farm required to do any of the following? (Please check the appropriate boxes)

| | | | |
|---|---|---|---|
| Park in a restricted area away from chicken housing | YES ___ | NO ___ | sometimes ___ |
| Clean or disinfect vehicles upon entering | YES ___ | NO ___ | sometimes ___ |
| Not to have been on another poultry farm that day | YES ___ | NO ___ | sometimes ___ |
| Sign in/Sign out | YES ___ | NO ___ | sometimes ___ |
| Shower before enter barns | YES ___ | NO ___ | sometimes ___ |
| Wear clean boots in barns | YES ___ | NO ___ | sometimes ___ |
| Wear clean coveralls in barns | YES ___ | NO ___ | sometimes ___ |
| Use a footbath before entering barns | YES ___ | NO ___ | sometimes ___ |
| Visitors ***not*** allowed in barns | YES ___ | NO ___ | sometimes ___ |
| Other_____ | YES ___ | NO ___ | sometimes ___ |

If these requirements for visitors do not apply to all persons entering the premises ( i.e. , you answered "sometimes"), please indicate in which situations or which people would be excluded ( e.g. chicken catchers, repairmen):

_____
_____
_____
_____

Are farm ***employees*** required to do any of the following? (Please circle)

| | | | |
|---|---|---|---|
| Different personnel for each barn | YES | NO | sometimes |
| Footbaths before entering barn | YES | NO | sometimes |
| Shower before entering barn | YES | NO | sometimes |
| Change clothes/coveralls prior to entering barns | YES | NO | sometimes |
| Wear clean boots in barns | YES | NO | sometimes |
| Use different equipment for each barn | YES | NO | sometimes |

| | | | |
|---|---|---|---|
| Not to be around other poultry ( e.g. , other farms, markets, slaughter plants) | YES | NO | sometimes |
| Cannot own their own poultry or birds | YES | NO | sometimes |
| Other_____ | YES | NO | sometimes |

Has anyone on the farm visited another poultry farm since January 12, 2004? Yes ___ No ___
If yes, name and address of site, contact person and phone number (use separate sheet if required):
_____
_____
_____
_____

Has anyone on the farm visited another *country* since January 12, 2004? Yes ___ No ___
If YES, indicate who, where and dates:_____
_____

Indicate whether they brought back any articles (specify) and indicate their disposition:
_____

Has anyone *from* a foreign country visited the farm, your family, or your employees since January 12, 2004?
Yes ___ No ___
If YES, identify the persons, country or countries of origin, dates of visit and indicate whether visitors brought meat or meat products with them (explain).
_____
_____

Have any members of the family or employees and their families received*food* from a foreign country within the past year?
Yes ___ No ___
If YES, identify the person, date, food, country of origin and explain its disposition.
_____
_____

Has there been any symptoms of respiratory illness among persons living on site or employees? Yes ___ No ___
Has/was medical attention sought and received? Yes ___ No ___

**Barn Management Information**

Do you use an 'all in - all out' management system for your barns -- that is, at the end of a flock cycle are all birds removed from the barn allowing complete cleaning before placing pullets/chicks for a new flock? (Please check)

YES NO

If you answered YES, please indicate the usual length of the 'down time' between flocks:

_____

_____

Have you placed chicks or pullets for new flocks on your farm since January 12, 2004 (Please check)

YES NO

If YES, provide the dates on which you placed chicks or pullets:

Dates:

_____

_____

_____

What is the source(s) of pullets for your egg operation? _____

_____

_____

What is the source(s) of chicks for your broiler operation? _____

_____

_____

Do you ever add additional birds into your flock **during** a flock production cycle? (Please circle)

YES NO

If you answered YES, please indicate the date(s) on which additional birds were added to your flock **during** a production cycle since May 1, 2000, and the type of bird added (e.g. replacement pullets, roosters, etc .):

| Date | Type of birds added |
|---|---|
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |
| _____ | _____ |

Do you know the health status of the farm of origin for birds brought onto your farm? (Please check)

YES NO Do not bring in birds

Are any bedding materials purchased? ( e.g. straw, shavings, other litter) Yes ___ No ___
If YES, give name and address of source, type and amount, date(s) of purchase (in last 2 months) and how delivered.

_____
_____
_____

Since January 12, 2004, on what date(s) has litter, manure, and/or dead birds (i.e. normal mortality and/or spent hens) been removed from your farm, and who removed it/them?

| Date(s) | litter | manure | dead birds | Removed by |
|---|---|---|---|---|
| _____ | ___ | ___ | ___ | _____ |
| _____ | ___ | ___ | ___ | _____ |
| _____ | ___ | ___ | ___ | _____ |
| _____ | ___ | ___ | ___ | _____ |
| _____ | ___ | ___ | ___ | _____ |
| _____ | ___ | ___ | ___ | _____ |

Please indicate where the litter, manure, and/or dead birds (i.e. normal mortality and/or spent hens) were taken for disposal, if known:
(e.g. Was litter/manure spread on nearby farms?)

_____
_____
_____

If dead birds from normal flock mortality were not immediately removed from the farm, how were they stored or disposed of?

___ Incinerated (burned)

___ Buried

___ Manure pit

___ Piled

___ Frozen

___ Composted

___ Other_____

Are any animal products purchased for animal feeding (e.g. milk products, eggs) Yes ___ No ___
If YES, give name and address of source, type and amount, date(s) of purchase (in last two months) and how delivered.

_____
_____
_____

Are pets fed meat, bones or any non-commercial foods? Yes ___ No ___
If YES, give name and address of source, type and amount, date(s) of purchase (in last two months) and how delivered.

_____
_____
_____

Has any manure or litter been brought onto the premises during the last two months? Yes ___ No ___
If YES, indicate name and address of source, where applied, method and date(s) of delivery.

_____
_____
_____

Has garbage been brought onto the premises for animal feeding over the past two months? Yes ___ No ___
If YES, describe the contents, whether its raw or cooked and give name and location of its source.

_____
_____
_____

**Feed Management**

Do you mix your own feed, pick up feed, or is feed delivered to your farm? (Please circle)

MIX OWN FEED PICK UP DELIVERERED

If you do not mix your own feed, which feed companies supplied your farm from March 15 to April 14? (Please indicate all suppliers if feed is purchased from more than one source)

_____
_____
_____
_____

How is leftover feed removed from the farm at the end of a production cycle?

_____
_____
_____

Are all your feed bins *closed* to the outside (or is there an opening in the feed bin/feed lines that a wild animal could access?)
Yes ___ No ___
If NO, describe: _____
_____

**Wild Birds & Animals**

Please indicate if the following animals ever gain access to:

- the ***inside*** of the barn(s)
- feed in bins, tanks, lines, hoppers, etc.***outside*** the barn(s)
- the property in general

(Please circle the appropriate answer)

| Animal Type | Inside the Barn | Feed Outside the Barn | Around the Property |
|---|---|---|---|
| Rodents | Yes / No | Yes / No | Yes / No |
| Wild birds | Yes / No | Yes / No | Yes / No |
| Cats | Yes / No | Yes / No | Yes / No |
| Dogs | Yes / No | Yes / No | Yes / No |
| Racoons, Foxes | Yes / No | Yes / No | Yes / No |
| Rabbits | Yes / No | Yes / No | Yes / No |
| Other (please specify) | Yes / No | Yes / No | Yes / No |

Are rats and mice:
Plentiful _____ Moderate _____ Few _____

What measures do you take to control *rodents* and *wild birds or wild animals* both inside and outside of your barn(s)?
Give dates and products used

_____
_____
_____

What measures do you take to control *insects* both inside and outside of your barn(s)?
Give dates and products used

_____
_____
_____

Have you noticed *feathers* on or around your property from March 15 to April 14, 2004? Yes ___ No ___
If YES, what birds (e.g. waterfowl, gulls, songbirds, raptors, starlings, other)

_____
_____
_____

**Water Source**

What is the water source for the water used in your barn for supplying drinking water to the birds?
(e.g. deep well, sand-point well, municipal system, private system):

_____
_____

What is the water source for all water used in the barns for cleaning barns and in the egg room?
Same as above? Yes ___ No ___
If NO, please indicate source (e.g. deep well, sand-point well, municipal system, private system):

_____

Has there been flooding on our around your property in the last few months? Yes ___ No ___
If YES, describe and indicate dates:

_____
_____

Are there creeks, ditches, ponds, standing water on or around your property? Yes ___ No ___
If YES, describe:

_____
_____
_____

Do you use any type of water treatment for the water used on your property ( i.e. filtration, ozonation, chlorination)
Describe

_____
_____
_____

**Diagram of Farm Property**

Include driveways and buildings, air intake and fans on buildings, feed bins, well heads, location of creeks & ditches and ponds, location of drainage tiles, etc .
Indicate and name roads, and indicate *north*.

**Clinical Signs and Course of Disease**

Describe any illnesses in your flock since Jan 12, 2004.
Clinical signs:

_____
_____
_____

Number and sex of birds affected:

_____
_____

Age of birds affected:

_____
_____

Was there a change (either increase or decrease) in feed consumption, water consumption, egg production or mortality?
Yes ___ No ___
If yes, describe:

_____
_____
_____

Describe the spread of avian influenza in your barn (e.g. did it start at one particular location or in several locations, direction of spread, any relationships with feed, water, ventilation?)

_____
_____
_____

Mortality:
Percent mortality for each week in the 2 weeks (prior to depopulation):

_____

Production:
Rate of lay for the 2 weeks prior to depopulation:

_____
_____

Hatchability (if applicable) for the 2 weeks prior to depopulation:

_____
_____

Date affected flock(s) was placed:

_____

_____

Source (i.e. : Hatchery):

_____

Have any other birds been received on farm in the last two months? Yes ___ No ___
If yes, record the source:

_____

Have any birds left the farm in the last two months (including single birds to auction)? Yes ___ No ___
If yes, record destination:

_____

_____

Poultry Veterinarian: (name and date of last visit)

_____

Feed Company: (name and date of last visit)

_____

Poultry Catching Company: (name and date of last visit)

_____

**Visitors to Farm**

*Use as many sheets as required.*

Include:

- Name
- Company name
- Address
- Phone numbers
- Cell phone number
- Date(s) of visit(s)
- Purpose(s) of visit(s)
- Describe if person entered house only, barn vestibule, egg room, barn proper, handled birds
- Describe biosecurity measures taken (footbath, disposable boots, disposable gloves, coveralls, etc .)
- Were any items brought into barn?
- Were any items removed from barn? (Including full blood tubes, unused items, scales, etc .)

## Appendix 13. Determining High Risk Contacts of Infected Premises

### TRACE OUT CONTACTS

**Individuals having direct contact with poultry on the infected premise:**
Includes vaccination crews, blood collection people, feed reps., veterinarians etc. anyone that may have entered the barns or its associated rooms

High Risk — Farms visited within the following **72 hours** are of most concern. The main concerns are:

- biosecurity measures used by the individual
- what is done with equipment taken into the barn.
- where they went/what they did on the next farm(s)

**Individuals with indirect contact with poultry on the infected farm:**
Includes feed trucks, feed sales reps, hatchery trucks, hatchery reps other service industry

Moderate Risk — Farms visited in the next **24 hours** are of concern (depending on where they were and what they did this may be limited to the next farm visited)

**Situations where an individual or company owns more than one poultry operation and where the owner and/or the workers and/or equipment travel between these premises. Trace ins and outs must be done for each of these premises as well.**

### TRACE IN CONTACTS:

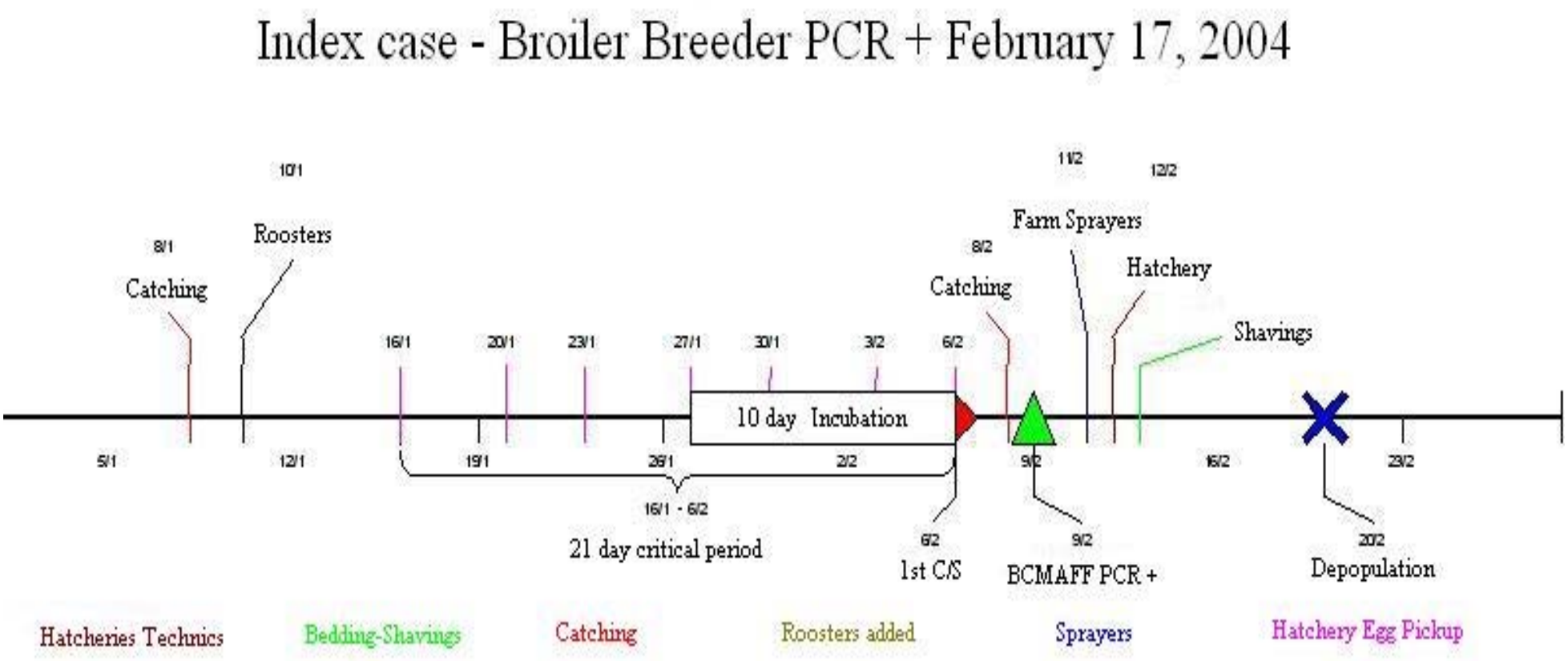
**Any visitors (including poultry service industry, utilities, repairmen, family and friend etc) to the premises in the 21 days preceding the first clinical signs.**

High Risk: Individuals that entered the barn or it attached rooms

Moderate Risk: Individuals that were in the yard immediately surrounding the poultry barns.

Low Risk: Individuals visiting the house.

**Appendix 14. Timeline of Contacts Prior to a Positive Diagnosis**



**Appendix 15. Dead bird surveillance**

CFIA ACIA CANADIAN FOOD INSPECTION AGENCY
AGENCE CANADIENNE D'INSPECTION DES ALIMENTS

CFIA Avian Influenza Emergency Operations Centre
30585B Progressive Way
Abbotsford, B.C.
V2T 6W3

DAILY DEAD BIRD SAMPLE PROGRAM

Dear Resident:

This letter is intended to inform you that a representative from the Canadian Food Inspection Agency visited your property today as part of the dead bird sample program.

The CFIA is supplying tote bins to the commercial farms in order to collect samples once a day from poultry that have died in the previous 24 hours. A tote bin will be supplied for each barn on your farm.

Protocol for sampling:

1. Daily, collect the dead birds from each barn to a maximum of five (5) from each barn a maximum of 24 hours prior to pickup. (Note: collect the most recent dead birds if possible).
2. Double bag dead birds and place into the tote supplied by CFIA and close lid tightly. If no dead birds, please place note in tote indicating as such.
3. Place totes with birds at the end of the driveway prior to the CFIA visit.
4. A CFIA Representative, wearing biosecurity equipment, will open tote, complete throat and cloacal swabs on the birds, and tape the bin closed with fluorescent tape to indicate sampling has been completed.
5. After sampling is complete, it is the responsibility of the owner to remove the birds from the tote bin and dispose in their regular manner and clean the tote as per attached protocol.

Thank you for your co-operation. Please call the Avian Influenza surveillance office at 604-557-4530 or 604-557-4531 if you have any questions.

Sincerely,

Regional Veterinary Officer
Canadian Food Inspection Agency

**Appendix 16. Protocol for Avian Influenza Positive Premises -May 1, 2004**

Sources for potential positive test result:

1. Pre-emptive slaughter (birds destined for disposal)
2. Pre-slaughter (birds destined for human consumption)
3. Surveillance (dead bird, high risk contacts)

Upon receipt of a positive result (PCR, C/S + serology, C/S + Directigen):

1. Contact owner (phone number available from database, red binder, CEMRS)
2. Complete Sick Bird Incidence Report with owner obtaining critical tombstone and farm information
3. Provide them with CFIA contact information where they can go with future questions and requests
4. Inform at that time on the phone that their premises is considered infected under the Health of Animals Act and therefore, movement of any poultry, poultry products and by-products (eggs), feed, and any equipment used in the care of their poultry and poultry farm is under quarantine and movement of these items is not allowed without written permission from the CFIA.
5. Inform them of sequence of events which will follow
    a) Delivery of declaration of infected place and license for removal of animals/things by EIS or Conservation Officers
    b) Contacted by investigating veterinarian to meet at the farm and complete the Epi Questionnaire as well as collect pre-depopulation samples (tissues (trachea, liver, lung, spleen, cecal tonsils) from sacrificed birds)
    c) Contacted by destruction crew to set up appointment for destruction (usually first thing next day, potentially later that day if result comes early in the morning)
    d) Contacted by disposal coordinator to do on-site evaluation to determine suitability for in barn composting or off site incineration
    e) Disposal crew would follow up on disposal mechanism
    f) At some later time (couple weeks), cleaning and disinfection coordinator will contact producer to discuss requirements and options
    g) Compensation will generally be processed and sent out in approximately 4-6 weeks.
6. Complete Forms 1612 and 1509 for delivery by EIS or Conservation Officer. Template available for both forms on the z: drive under Field Ops/Declarations. Also attach Bio-security Notice for delivery (blue folder). Legal land locations can be found on City of Abbotsford website or through GIS/mapping crew on second floor at north end of building (across from permits).
7. Distribution of forms:
    a) Sick bird incidence report - coordinator control activities, coordinator eradication activities
    b) Forms 1612/1509 - original to EIS, copy for our file, compensation, and central file (Krista Schuett)
    c) Epi questionnaire - leave with Epi support, they will distribute as necessary

**Appendix 17. A Profile of the BC Poultry Industry**
Prepared by: S. Paulson, BCMAFF Poultry Specialist, Sept 11, 2003

**There are four major sectors:**
Chicken Meat , Turkey Meat, Commercial Eggs, Broiler Hatching Eggs.

**Niche markets** - game birds, waterfowl and ratites sectors including squab (pigeons) silkie chickens, quail and quail eggs, pheasants, partridge and tinamou, ducks, geese, emu and ostrich.

The 4 major sectors of the poultry industry consume 600,000 tonnes of feed a year worth $170 million place chicks and poults worth $65.2 million and produce product valued at $382 million at the farm gate and over $850 million at the consumer level. These as well as following figures are 2002.

**Broiler hatching egg industry**

Supplies hatching eggs to the hatcheries who in turn supply chicks to the chicken growers.
There are 62 broiler hatching egg producers in the BC all but 1 is located in the Fraser Valley.
Utilize 880,000 breeder chicks worth $3.3 million.
Consume 50,000 tonnes of feed worth $12.5 million.
Produce 113.7 million hatching eggs valued at $33 million.
20 million additional hatching eggs are imported from the US worth $4.5 million (Cdn).

**Chicken meat industry**

294 producers with 80% BC production in the Fraser Valley.
Place 103.4 million in chicks a year worth $54 million
Consume 370,000 tonnes of feed a year at a cost of $112 million
Produce 100 million birds or 200 million kg of live wt a year worth $233 million at the farm gate
$460 million wholesale value
$620 million retail value at the consumer level

The growth rate in both value and production has been 7% compounded annually for the last 10 years.
Export 16.7 million kg of chicken worth $9.7 million

**Commercial egg laying industry**

132 producers with 2.4 million layers, 96 in the Fraser Valley, 15 Vancouver Island and 21 in the rest of BC.
Utilize about 2.6 million chicks in replacement operations costing $3.1 million
Grow out 2.4 million replacement pullets a year worth about $12 million
Sector consumes 120,000 tones of feed at a cost of $28.8 million
Produce 58.7 million dozen table eggs worth $ 90 million at the farm gate
Eggs are sold to grading plants for grading/packing ($13.5 million in packaging and grading value added)
Retail value of the table shell eggs is $104 million
Processed egg exports are $30.7 million balanced by value of shell egg imports

**Turkey industry**

50 turkey producers in BC - all but 3 flocks are in Fraser Valley
Place 2.4 million poults costing $4.8 million
Consume 43,000 tonnes of feed valued at $14.6 million
Produce about 2.2 million turkeys a year or 18.8 million kg live wt. worth $27 million at the farm gate level
$60 million at the wholesale level
In excess of $80 million at the retail level

**In addition alternative poultry species sectors produce:**

500,000 squab
over 1.1 million silkies
2 million quail
3 million quail eggs
25,000 pheasants
as well as some partridges and tinamou
emu meat, emu oil, ostrich meat and ostrich products
We also have a significant duck and goose industry in BC.

**Feed mills**

7 major commercial mills in Fraser Valley - 6 broiler feeder mills
There are also 6 large on farm feed mills which feed standard and organic layers, broilers

**16 Poultry hatcheries**

Western, Fraser Valley Chick Sales and Lilydale hatch 95% of the broilers. There is a significant size broiler hatchery in Armstrong (Okanagan).

Major broiler hatcheries are owned by the processing industry in BC.

**Chicken processing plants**

6 major chicken processing plants (1 in Armstrong) – 3 owned by Pollen group (52%), Sunrise (24%) and Lilydale (21%)
1 turkey processing plant – Lilydale, Abbotsford in Fraser Valley
3 processing plants that slaughter waterfowl – Fraser Valley Duck and Goose
3 game bird processing plants – Wingtat and K & R being the largest
Largest chicken value added further processors include JD Sweid, Sunwest, located in Langley and Abbotsford within the Control Area.

**Egg grading/processing stations**

31 producer graders-produce and grade their own eggs
6 plants purchase ungraded eggs from other producers
1 plant sell inedible egg product
2 plants sell reject eggs (used in animal feeds)
1 breaker plant

**Layer breeders and Turkey breeders**

BC produces an estimated 55% of its turkey hatching eggs (balance from US)
BC companies have major interests in layer hatching egg production and hatching.

BC Poultry Companies hold poultry industry interests in the US in the way of hatcheries, distribution capability, and layer hatching egg production.

# Lessons Learned Review: The CFIA's Response to the 2004 Avian Influenza Outbreak in B.C.

**News Release** - Response to Avian Influenza "Lessons Learned"

**Corporate Program Evaluation Directorate**
**Corporate Planning, Reporting and Accountability Branch**
**Canadian Food Inspection Agency**

**January 10, 2005**

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## 1.0 Executive Summary

In July 2004, the CFIA's Corporate Planning, Reporting and Accountability Branch initiated a "lessons learned" review to analyse and document the effectiveness of the CFIA's management of the recent Avian Influenza (AI) outbreak in the Fraser Valley of British Columbia (B.C.). The objective of this review was to:

- learn the most from the experience;
- avoid repetition of errors and emulate success; and
- identify potential improvements that may be implemented and institutionalized for response and management of future outbreaks.

The review identified issues, lessons learned and provided recommendations based on five critical topics of study:

- Leadership
- Intelligence and Information Management
- Processes and Protocols
- Communications and Linkages
- Capacity

The lessons learned approach and methodology was based on collecting observations from those directly involved in the AI outbreak. As such it is based on personal experiences and perspectives. A consistent data collection strategy was used to gather information from multiple sources and to try to create a balanced view of the experience.

This methodology was further supported by an analysis of the AI chronology, background documentation and the findings of other AI review processes which were taking place concurrently to the CFIA's lessons learned study. These reviews included: A scientific peer review of the CFIA's AI epidemiology report; a review by the European Commission's Food and Veterinary Office concerning Canada's control of the AI outbreak; and a multi-jurisdictional AI lessons learned forum (Canadian Poultry Industry Forum) held in Abbotsford, B.C. on October 27 and 28, 2004. The findings and recommendations of these reviews have been analysed and incorporated into this study, where appropriate.

## Summary of Findings

This report presents the findings of the lessons learned analysis according to the five critical topics of study. Feedback for each topic area is captured in three sections: What Worked Well, Areas for Improvement and Recommendations. Although some information is provided concerning the strengths of the Agency's response, the lessons learned focus of this review means that more detailed information is presented regarding identified areas for improvement. A summary of findings is presented below. Detailed analysis and recommendations are provided in the body of the report.

### Leadership

Focus group and interview participants indicated that effective leadership was provided at multiple levels in the organization (national, local, international). The CFIA President had the ultimate accountability for the Agency's response to the outbreak. One measure of effective leadership was the fact that the CFIA's risk management decisions (e.g. declaration of the control area, depopulation etc.) were supported by the industry, and that consumer and market confidence in Canadian poultry products were maintained throughout the crisis.

Some issues were raised, however, with respect to the respective roles, responsibilities and decision making accountabilities of the CFIA's area emergency response team (AERT), the national emergency response team (NERT) and the AI Executive group. Participants felt that the parameters around which decisions could be made locally versus nationally could be better defined. This lack of clarity may have contributed to the elevation of certain operational decisions to the national level.

The roles and responsibilities of strategic partners could have been better defined and understood by all at the outset of the response. Certain elements of the B.C. Foreign Animal Disease Eradication Support (FADES) plan which required the support of partner organizations (e.g. disposal strategies, laboratory testing, movement controls) may have worked more

effectively had they been better planned and exercised prior to the AI outbreak. However, it was also recognized that Canada has not been required to respond to a large-scale, infectious foreign animal disease outbreak since the outbreak of foot and mouth disease in 1952. The shared experience of the AI response has meant that the ability to engage partner organizations in planning and preparedness exercises is now greater than it would have been prior to the crisis.

The CFIA's existing foreign animal disease response plans did not fully address the zoonotic (diseases that can be transmitted from animals to humans) aspect of some animal diseases and therefore did not incorporate collaborative arrangements with public health authorities. As a result, protocols for the coordination of disease response activities with federal and provincial health authorities were established during the outbreak.

### Intelligence and Information Management

Despite several challenges experienced with information management systems, the Agency was able to meet critical information requirements using the available tools. The CFIA's emergency information management system (CEMRS) was piloted, at a later stage in the outbreak, to assist in AI information management. However, backlogs in data entry and a lack of user familiarity with the system prevented its successful application. As a result, many units created their own spreadsheets, maps and charts. GIS mapping proved to be a useful information management tool. However some key data, such as farm locations, were not immediately available to the Agency for data entry. This situation improved as industry associations helped to collect the required information.

Overall, it was recognized that a better anticipation of information needs and coordination of reporting activities could improve information flow. Privacy and confidentiality requirements may have precluded the transfer of some information amongst the various stakeholders. Improved information sharing protocols may be required in the future to facilitate the accurate and timely release of information.

### Processes and Protocols

Foreign animal disease plans were in place and were tailored to meet the unique circumstances posed by the outbreak. Innovative measures and improved procedures were incorporated to address situations that were not foreseen in the existing contingency plans. For example, novel composting techniques were introduced for the disposal of dead birds. These composting techniques worked effectively, minimized the need to transport mortalities off-farm and could be used as a best practice for future AI outbreaks.

Knowledge and understanding of existing emergency response plans was generally identified as an area for improvement. Some participants felt that there could be a better integration of the emergency management approaches used by the key partners in the response to AI. In addition, the need to formalize the advance planning function within the Agency's emergency management structure and to integrate disease control (including public health) experts within this planning cell was recognized.

While the CFIA carries the responsibility for the occupational health and safety of its employees, the responsibility to protect the broader community falls on public health authorities. CFIA worked with Health Canada and regional health authorities to ensure that appropriate bio-safety protocols were put into place to protect the health of CFIA personnel and contracted workers. Farmers and others working with infected poultry may not have applied similar precautions. In future outbreaks local health authorities will require additional support from Provincial health departments, Health Canada and the Public Health Agency of Canada, particularly with respect to providing personal safety information to protect all persons working with infected poultry.

The development of effective bio-security protocols was identified as a priority for the poultry industry. More effective bio-security compliance measures may be required in the future. Additional training of CFIA and industry personnel in bio-safety and bio-security was identified as a means to enhance personal protection and improve the effectiveness of bio-security measures and protocols.

Compensation policies and protocols were frequently raised during the focus groups, particularly in sessions with industry representatives. The primary concern was that the compensation amounts identified in the *Compensation for Destroyed Animals Regulations* may not reflect current market values of various types of farmed animals (i.e. specialty birds, breeders, layers). The CFIA was asked to review its compensation policies and protocols to support industry developed rapid containment strategies (pre-emptive culls) to limit the potential spread of future AI outbreaks.

### Communications and Linkages

Appropriate mechanisms were put into place at the outset of the emergency to allow for ongoing communication with partners and stakeholders. The CFIA's external communications approaches were comprehensive and well received. Protocols were also in place to communicate with international counterparts.

Multiple meetings and conference calls were organized daily to coordinate response activities, inform partners and stakeholders and meet escalating demands for information. The local emergency operation center had numerous enquiries for information from the public as well as the media. While media calls were directed to appropriate spokespersons, calls from the public were not handled in a similar systematic fashion. Industry representatives indicated that regular interface between the CFIA and the national industry associations has declined in recent years. Maintaining an ongoing interface was identified as critical to building relationships and maintaining a knowledge of key contacts. Assessments of the effectiveness of CFIA communication with federal and provincial partners varied. Most agreed that these linkages improved as the outbreak progressed.

### Capacity

The CFIA was able to collapse organizational barriers and employ staff from across Canada to respond to the outbreak. Agency partners and stakeholders became key team contributors. Despite initial delays, the Agency was successful in securing and increasing laboratory capacity through collaborative arrangements with the province of B.C. and by acquiring new equipment and technology.

Protocols for leveraging the support of partner organizations can be better planned and exercised. Representatives of federal and provincial emergency preparedness organizations indicated that CFIA requests for support were limited. Industry representatives also indicated that the Agency can make better use of industry personnel and resources.

CFIA planning to support the HR, financial and administrative functions of an Emergency Operation Center (EOC) can be improved. More structured personnel rotation and replacement protocols were required to reduce employee stress. Better employee orientation was required for new staff deployed to the EOC. Logistical support requirements for the EOC were initially underestimated. These emergency support functions were identified as being critical to the Agency's ability to quickly "ramp up" response capacity.

### Conclusion

This review has identified a number of areas where additional focus by the CFIA may bring about improvements in the effectiveness of future responses. The identified areas for improvement pertain primarily to emergency planning and preparedness, as well as strategies to improve data management and information flow. However, it important to note that overall, the effort to control the outbreak of AI was widely viewed as being successful. It was recognized that considerable effort was made by all

parties to respond to the outbreak, and that as a result, the spread of the disease was contained within the Fraser Valley of B.C. Innovative measures and improved procedures were developed to respond to problems that were not foreseen in the contingency plans. Consumer and market confidence in poultry products were maintained and movement of risk-free product out of the control zone continued. And finally, the effectiveness of Canada's control measures was recognized by trading partners, as evidenced by the fact that regionalisation was accepted by both the E.U. and the U.S.

## 2.0 Introduction

### 2.1 Background

Avian influenza (AI) is a contagious viral infection caused by the influenza virus Type "A", which can affect several species of food producing birds (chickens, turkeys, quails, guinea fowl, etc.), as well as pet birds and wild birds. AI viruses can be classified into two categories: low pathogenic (LPAI) and high pathogenic (HPAI) forms based on the severity of the illness caused in birds, with HPAI causing the greatest number of deaths in birds. Most AI viruses are low pathogenic and typically cause little or no clinical signs in infected birds. However, some low pathogenic viruses are capable of mutating into high pathogenic viruses. There are many influenza subtypes, two of which include H5 and H7. Historically, only the H5 and H7 subtypes are known to have become high pathogenic in avian species.

AI is a reportable disease under the *Health of Animals Act*. This means that all suspected cases must be reported to the Canadian Food Inspection Agency (CFIA). In February 2004, the CFIA identified the presence of a low pathogenic H7 avian influenza in the Fraser Valley area of southern British Columbia. Subsequent tests revealed the presence of highly pathogenic H7 avian influenza in British Columbia in March 2004. The CFIA depopulated all infected premises on which highly pathogenic avian influenza (42 commercial and 11 backyard premises) was found and pre-emptively destroyed all birds in the surrounding three kilometre areas.

Global efforts to mitigate the spread of influenza viruses in humans have placed increasing importance on the role of animal reservoirs as a source of new strains of virus that could be transmitted to humans. The strains of avian influenza viruses that can adapt to humans represent a severe threat since the human host will not have any initial immunity to these emerging pathogens. AI viruses, such as the H5 virus present in Eastern Asia, may, on rare occasions, cause disease in humans. Human transmission has occurred to people having prolonged contact with heavily contaminated environments.

In this context, the recent outbreak of AI in the Fraser Valley of B.C. raised considerable concern in the public health sector as well as economic hardship for the agricultural community. The corresponding efforts of Canada's federal, provincial and municipal response organizations required a major allocation of resources and expertise. The ability of public health and regulatory agencies in Canada to respond effectively to AI and other emerging animal and public health threats is critically important. As serious as the repercussions of AI were, and continue to be, management of the outbreak also provided a valuable opportunity to learn from experience.

### 2.2 Scope and Objectives

In July 2004, the CFIA initiated a "lessons learned" review to analyse and document the effectiveness the Agency's management of the AI outbreak. The objective of this review was to:

- learn the most from the experience;
- avoid repetition of errors and emulate success; and
- identify potential improvements that may be implemented and institutionalized for response and management of infectious diseases.

The scope of this review was to assess the effectiveness of the CFIA's animal health response and overall management of the AI outbreak. To focus the review process, input was sought and analysis was conducted based on five critical topics of study:

- Leadership
- Intelligence and Information Management
- Processes and Protocols
- Communications and Linkages
- Capacity

## 3.0 Methodology

This review was conducted by the Corporate Planning and Accountability Branch of the CFIA, under the direction of the AI Executive Group and with the support of an AI Lessons Learned Working Group comprised of representatives from the various branches involved in the response effort. The review process was initiated in July 2004 and concluded in December 2004.

The lessons learned approach and methodology was based on collecting observations from those directly involved in the AI outbreak. As such it is based on personal experiences and perspectives. A consistent data collection strategy was used to gather information from multiple sources and

to try to create a balanced view of the experience. This methodology was further supported by an analysis of the AI chronology, background documentation and the findings of other AI reviews.

The approach used to conduct the lessons learned analysis included the following:

1. A review of background documentation and chronology of the AI outbreak.
2. Identification of five critical topics of study. Design of data requirements and preparatory material.
3. Identification of group clusters based on involvement in AI outbreak (focus groups).
4. Identification of key positions/functions requiring one-on-one interviews (directed interviews).
5. Use of a consistent data collection strategy for all focus groups and interviews.
6. Summary of findings and lessons learned analysis.
7. Development of recommendations.

Eight focus group sessions were conducted in both Ottawa and B.C. The following groups participated in the Ottawa-based focus group sessions:

- CFIA - AI Executive Group
- CFIA - National Emergency Response Team
- Public Safety and Emergency Preparedness Canada (PSEPC)
- National Poultry Industry Associations
- Laboratories (CFIA and B.C. Ministry of Agriculture, Food and Fisheries)

The following groups participated in the B.C. focus groups:

- CFIA - Area Emergency Response Team (B.C. Emergency Operations Centre)
- B.C. Poultry Industry Associations
- CFIA/Health Canada Joint Session with B.C. partners (federal/provincial/municipal)

In addition to the focus groups, directed interviews were conducted with senior managers from the CFIA, as well as Health Canada and the Privy Council Office.

### 3.2 Data Collection Process

A standard data collection strategy was used for all focus groups and interviews. Participants were provided with preparatory material and were asked to explain their involvement and role in the event. The participants were also asked to provide feedback on the five critical topics of study (leadership, intelligence and information management, processes and protocols, communications and linkages, and capacity) and related questions. The review was conducted based on an analyses of the observations of direct participants in the AI outbreak regarding:

- What worked
- What did not work
- What improvements are required

As part of the data collection process, an "issues log" template was developed in order for the AI working group to provide additional analysis of issues consistently identified during the interviews, focus groups or document review.

### 3.3. Other AI Reviews

A number of other AI review processes were taking place concurrent with the CFIA's lessons learned study. The findings and recommendations of these reviews have been analysed and incorporated into this lessons learned study, where appropriate. These reviews included:

1. A CFIA led scientific peer review of the Agency's AI epidemiology report. The final evaluation report which summarizes the results of this peer review process is attached as Annex 1.

2. A review by the European Commission's (E.C.) Food and Veterinary Office concerning Canada's control of the AI outbreak. A final E.C. mission report was provided to the CFIA in December 2004 and is attached as Annex 2.

3. An AI forum entitled the "Canadian Poultry Industry Forum" was held in Abbotsford, B.C. on October 27 and 28, 2004. The forum was jointly convened by the CFIA, B.C. Ministry of Agriculture, Food and Fisheries (MAFF) and the B.C. Poultry Industry. The objective of the forum was to review and learn lessons from the AI outbreak in B.C., and to recommend strategies to improve the multi-jurisdictional response to future outbreaks. A summary of the proceedings and recommendations from this forum is attached as Annex 3.

## 4.0 Lessons Learned Analysis: Findings and Recommendations

Following the data collection phase of the AI review, a lessons learned analysis was conducted in order to provide a synopsis of key issues and conclusions. This analysis involved a review of the summary reports from the focus groups and interview sessions to identify common themes, issues and recommendations for improvement. This analysis was also supported by a review of the AI chronology and background documentation, as well as an analysis of the findings and recommendations of other AI reviews.

The findings of this lessons learned analysis are grouped below according to the five critical topics of study. Feedback for each topic area is captured in three sections: What Went Well, Areas for Improvement and Recommendations. Although some information is provided concerning the strengths of the Agency's response, the lessons learned focus of this review means that more detailed information is presented regarding identified areas for improvement.

### 4.1 Leadership

Leadership was identified as one of the five primary critical topics of the study. Specific aspects of leadership that were reviewed included: governance, collaborative arrangements, decision- making and accountability.

The following types of questions were used to guide focus group/interview participants:

1. Did you receive adequate direction/leadership? Were leaders accessible?
2. Were roles, responsibilities and delegation mechanisms clear?
3. How were decisions made?
4. Were decisions made in a timely fashion?
5. Did the CFIA provide adequate guidance to the leadership of the team?
6. How was coordination with other organizations/groups managed? Was it managed effectively?

#### What Worked Well:

Overall, participants indicated that effective leadership was provided at multiple levels in the organization (national, local, international). Leaders were engaged, accessible and provided adequate direction. It was clear that the CFIA President had the ultimate accountability for the Agency's response

to the outbreak. One measure of effective leadership was the fact that the CFIA's risk management decisions (e.g. declaration of the control area, depopulation etc.) were supported by the industry, and that consumer and market confidence in Canadian poultry products were maintained throughout the crisis.

It was also noted, particularly by representatives of the national poultry associations, that the CFIA's pre-established leadership role and reputation in the area of animal health helped facilitate the response to the outbreak. It was further indicated that maintaining this level of organizational credibility will require a sustained effort on behalf of the Agency to consult with and engage stakeholder associations. Participants also recognized the personal leadership demonstrated by CFIA and other personnel, through their professionalism and willingness to relocate and work long hours.

**Areas for Improvement:**

Some issues were raised with respect to the clarity of roles, responsibilities and delegation mechanisms. While the Agency's basic emergency response reporting structure is outlined in the CFIA's *Emergency Book*, it was felt that certain roles and responsibilities (e.g. Chief Veterinary Officer, epidemiology group, Area Emergency Director) could benefit from further clarification. For example, the role and reporting arrangements of CFIA epidemiological resources were not well understood and could have been more focussed on providing support to decision-making. In addition, the relative roles, responsibilities and decision making accountabilities of the area emergency response team (AERT), the national emergency response team (NERT) and the AI Executive group were not commonly understood.

Many participants felt that decision making could have been more localized and that the requirement for certain policy/strategic decisions to be made by the CFIA AI Executive group at headquarters impacted on the timeliness of decision-making. Others recognized that it was necessary for the AI outbreak to be managed as a national emergency with policy and domestic and international trade implications that extended beyond the province of B. C. Overall it was felt that the parameters around which decisions can be made locally (i.e. tactical) versus nationally (i.e. strategic) can be better defined. This lack of clarity may have contributed to the elevation of certain operational decisions to the national level.

With respect to collaborative arrangements it was noted that while partners and stakeholders (government and industry) actively participated in resolving the outbreak, some improvements can be made to the management of these relationships. The roles of public health authorities, provincial partners and emergency management organizations (federal and provincial) evolved over time and these relationships improved as the outbreak progressed. The fact

that provincial, local and industry representatives were co-located in the CFIA's Emergency Operations Center (EOC) in Abbotsford, B.C. was viewed as contributing positively to emergency response decision-making and information sharing. However, it was noted that the roles and responsibilities of strategic partners could have been better defined and understood by all at the outset of the response. For example, stakeholder acknowledgement and understanding of the existing B.C. Foreign Animal Disease Eradication Support (FADES) plan (2002) was limited. The FADES plan is a federal/provincial agreement which identifies the arrangements whereby federal, provincial and local agencies will provide the assistance required by the CFIA in the eradication of a foreign animal disease outbreak. Certain protocols in the FADES agreement which required the support of partner organizations (e.g. disposal strategies, movement controls) may have worked more effectively had they been better planned and exercised prior to the AI outbreak. However, it was also recognized that Canada has not been required to respond to a large-scale, infectious foreign animal disease outbreak since the outbreak of foot and mouth disease in 1952. The shared experience of the AI response has meant that the ability to engage partner organizations in planning and preparedness exercises is now greater than it would have been prior to the crisis.

It was also generally recognized that all response organizations need to fully understand the potential public health implications of AI outbreaks. Recent outbreaks of highly pathogenic AI in Eastern Asia have increased concerns around the potential transmission of new strains of the virus to humans. While federal and provincial health authorities were advised of the AI outbreak at an early stage (February 18, 2004) it took some time before the potential public health implications of the disease were fully recognized in the broader community (e.g. non-public health agencies, industry). This may have been due to the fact that the initial strain of virus detected during the outbreak was low pathogenic.

The CFIA's existing foreign animal disease response plans did not fully address the zoonotic (diseases that can be transmitted from animals to humans) aspect of certain animal diseases and therefore did not incorporate collaborative arrangements with public health authorities. As a result, protocols for the coordination of disease response activities with federal and provincial health authorities were established during the outbreak. The lessons learned analysis has identified the need to enhance the linkages between public health and veterinary health authorities and to integrate the various animal health/public health emergency response plans.

**Recommendations:**

1. *The CFIA should review protocols associated with the activation of local, area and national emergency response teams and formalize the roles and responsibilities, and decision-making accountabilities at each level.*

**CFIA Response:** Activation protocols for the various levels of emergency response are currently being reviewed by the Agency to ensure a nationally consistent approach. The CFIA is also reviewing the structure and function of its area and national emergency response teams to more clearly define the roles, responsibilities and delegated decision-making authorities at all levels. Public Safety and Emergency Preparedness Canada has been invited to participate in this review process. It is anticipated that updated emergency response structures and protocols will be recommended by the spring of 2005.

2.. *The CFIA should develop collaborative arrangements with Health Canada and the new Public Health Agency of Canada to increase federal capacity to respond to zoonotic disease outbreaks.*

**CFIA Response:** The CFIA has initiated discussions with Health Canada and the new Public Health Agency of Canada (PHAC) regarding collaborative arrangements for response to zoonotic disease outbreaks. The Agency will work with both Health Canada and PHAC to develop an updated roles and responsibilities framework and a Memorandum of Understanding (MOU) which will include an appendix considering response to zoonotic disease outbreaks, by December 2005. It is expected that this appendix to the MOU will also include protocols for liaising with provincial health authorities.

3. *The CFIA should engage stakeholders in the ongoing development and exercising of FADES plans in all provinces/territories.*

**CFIA Response:** The CFIA is currently developing a common template for FADES agreements which will be used to negotiate and finalize new or revised agreements with all provinces and territories. It is expected that the template will be completed by February 2005 and that consultations with partners and stakeholders will begin in March 2005. A fixed schedule for exercising the agreements will be a mandatory component of all FADES plans.

### 4.2 Intelligence and Information Management

Elements of intelligence and information management that were assessed include data ownership, data capture and analysis, information sharing and confidentiality. The following types of questions were used to guide focus

group/interview participants:

1. How was intelligence gathered?
2. What information management systems were available?
3. Was information accurate?
4. How did information flow?
5. Was information received on a timely basis?
6. What information sharing processes were in place?
7. How compatible were data collection and sharing processes with those of other organizations?
8. Did information sharing improve or deteriorate over the course of the outbreak?

**What Worked Well:**

Interaction with partners and stakeholders took place on a daily basis through CFIA coordinated conference calls and meetings. The co-location and daily briefing of federal, provincial, municipal and industry representatives in the local EOC was instrumental in keeping all parties informed. Within the CFIA, meetings, end of day situation reports, decisions documents and web site usage facilitated information flow. Geographical Information System (GIS) mapping proved to be a useful information management tool, however the availability of key data to populate GIS maps remained an issue. Throughout the outbreak the CFIA experienced several challenges with respect to information management systems. However, it appears that the Agency was able to meet critical information requirements using the available tools.

**Areas for Improvement:**

Weaknesses in data management/information technology hampered a fully efficient operation. The CFIA did not have an integrated information management system available for the timely collection and dissemination of disease control information (i.e. field data, laboratory results, GIS maps, status reports). For example, information collected through farm visits could be more systematically captured to enable roll up and analysis. The CFIA's emergency information management system [Canadian Emergency Management Response System (CEMRS)] was piloted at a later stage in the outbreak (end of March, 2004) to assist in AI information management. However, backlogs in data entry and a lack of user familiarity with the system prevented its successful application. As a result, many units created their own spreadsheets, maps and charts, creating some inefficiencies. It appears that despite these systems challenges, the Agency was able to meet critical information needs.

Laboratory data was captured via the Laboratory Sample Tracking System

(LSTS). The LSTS system does not currently have the capability of generating summary reports, and as a result, ad hoc spreadsheets were prepared. In addition, the LSTS "crashed" a number of times during the outbreak, requiring the labour intensive re-entry of data and results.

GIS mapping was used by the CFIA at both the local and national EOC levels. Support for GIS mapping was provided by Public Safety and Emergency Preparedness Canada (PSEPC) at headquarters, and by the B. C. MAFF at the Abbotsford EOC. Although the ability to create GIS maps was critical to providing decision makers with consistent situational awareness, some key data such as farm locations were not immediately available to the Agency for data entry. This situation improved as industry associations helped to collect the required data. However, the use of different GIS systems meant that the GIS maps used by the local and national EOCs were not entirely consistent.

As in most emergency response situations, the demand for information, briefings and reports quickly escalated throughout the AI outbreak. While protocols were in place to facilitate internal and external information flow, some focus group participants indicated that they were not satisfied with the timeliness and relevance of the information provided. In particular, laboratory testing results were identified as key information that was not being shared in a timely fashion. Problems with the LSTS system described above and the requirement for laboratory results to be reported at the headquarters level prior to being forwarded to the local EOC were identified as contributing to delays.

Overall it was recognized that a better anticipation of information needs and coordination of reporting activities could improve information flow. For example, the requirements of senior decision makers for information on the status of farms, number of birds depopulated, compensation costs etc. were entirely predictable. While situation reports were shared with federal and provincial partners, some felt that the information contained in these reports was outdated. However, it was also noted that regular AI updates were being posted on the Agency's website.

The recording and displaying of important EOC information (i.e. status boards, logs, maps etc.) should be more centrally available to the EOC manager to facilitate outbreak management and to help maintain a consistent level of situational awareness. This issue was raised with respect to both the national EOC in Ottawa and the local EOC in Abbotsford.

Privacy and confidentiality requirements may have precluded the transfer of some information (e.g. names of infected farms, farm owners) amongst the various stakeholders. Industry representatives indicated that lists of infected farms were required to effectively manage bio-security. A similar information

requirement was raised by public health officials, to permit early implementation of human health surveillance and protective measures. It was agreed that confidentiality issues and protocols should be addressed in updated foreign animal disease response plans. Information security also became an issue in the local EOC, following several breaches in protocols for release of information to the media. Improved information sharing/ security protocols may be required in the future to facilitate the accurate and timely release of information.

**Recommendations:**

4. *The CFIA should develop the relevant IM/IT capabilities to ensure more timely and efficient management and transmission of field and laboratory data (including geographic information) during an animal disease response.*

**CFIA Response:** The CFIA will develop and implement an action plan that includes both short-term and longer-term IM/IT solutions to improve information management during emergency response situations. As an interim measure, the Agency has also developed partnerships with other departments and agencies to obtain GIS services.

5. *The CFIA should improve information flow during an emergency response by:*

    - *Identifying a functional cell within the Agency's emergency response structure to anticipate and manage information needs and reporting;*
    - *Developing and implementing protocols for the appropriate release of key information (e.g. laboratory results) at both the national and field level; and*
    - *Addressing information sharing issues through pre-established agreements or protocols.*

**CFIA Response:** Based on the lessons learned from both avian influenza and BSE, the CFIA will be developing options to address information management and sharing issues. Protocols will be developed to improve both internal and external information flow. These protocols will be incorporated into new and updated FADES agreements as appropriate.

## 4.3 Processes and Protocols

Standard processes and protocols are those which are developed in the

preparedness phase and implemented during the emergency response. The types of processes and protocols addressed included generic and disease specific emergency response plans, as well as occupational health and safety, compensation and other protocols. The following types of questions were used to guide focus group/interview participants:

1. Were standard operating procedures (SOPs) in place for disease investigation and response. Were these SOPs followed?
2. How effective and applicable were the SOPs to the AI outbreak?.
3. Was there any flexibility in the application of the SOPs? Were SOPs tailored to circumstances?
4. What challenges did you face with respect to implementing the SOPs?
5. Did processes and protocols evolve over the duration of the outbreak. How were these changes communicated?

**What Went Well:**

Foreign animal disease plans such as the AI specific disease response plan and the FADES plan for B.C. (2002) were in place and were tailored to meet the unique circumstances posed by the outbreak (e.g. disposal volumes). Innovative measures and improved procedures were incorporated to address situations that were not foreseen in the existing contingency plans. For example, novel composting techniques were introduced for the disposal of dead birds during the outbreak. These composting techniques worked effectively, minimized the need to transport mortalities off-farm and can be used as a best practice for future AI outbreaks.

The CFIA Emergency Book, which describes the concepts and structure of emergency management in the Agency, had been in place since 2002 and generic emergency management training courses had been conducted nationally by the CFIA in 2002-03. Occupational health and safety (OHS) protocols for CFIA employees and contracted workers were in also place. CFIA personnel assigned to the EOC in B.C. were provided with OHS orientation and vaccination, medication and clothing protocols were in place to ensure personal safety.

**Areas for Improvement:**

Knowledge of existing emergency response plans was generally identified as an area for improvement. For example, industry and public health representatives indicated that they had little or no awareness of the B.C. FADES plan. The FADES plan was developed in 2002 and had not been exercised since that time. Amongst the CFIA focus group participants, knowledge and understanding of the CFIA Emergency Book, the AI specific response plan and the B.C. FADES agreement was not comprehensive. CFIA personnel were also unfamiliar with the existing Canadian Pandemic

Influenza Plan which was implemented by Health Canada to coordinate public health response activities. Ongoing training and exercises were recognized as being key to improving knowledge of emergency response plans and protocols, as well as building relationships between the CFIA and its partner organizations.

Some participants felt that there could be a better integration of emergency management approaches used by key partners in the response to AI (i.e. CFIA, B.C. MAFF, B.C. Provincial Emergency Program, Health Canada). For example, the province of B.C. has adopted an Incident Command System (ICS) approach as the basis for emergency response. The ICS approach is built around five major elements: command, planning, operations, logistics, finance and administration. The common organizational structure and terminology used by organizations which adopt ICS is believed to improve the interoperability of emergency responders. While the CFIA's emergency response approach has some similarities with the ICS model, particularly at the level of the Area Emergency Response Team, one principal difference was the lack of a formalized planning cell.

Focus group/interview participants identified the need to formalize the advance planning function within the Agency's emergency response structure and to integrate disease control experts within this planning cell. Separating the advance planning function from the operational response was viewed as necessary to allow for the improved development of contingency strategies and a better anticipation of required decisions. Inclusion of public health experts in the advance planning cell would help to ensure that both the human health and animal health implications of the outbreak were fully considered. It was also suggested that the CFIA's epidemiological investigation specialists could be focussed on contributing intelligence to the advance planning cell.

Some standard operating procedures for foreign animal disease response activities (e.g. disposal strategies, cleaning and disinfection, transportation of laboratory samples) could be better planned and exercised. For example, commercial airlines could not be relied upon to ship laboratory samples to the National Centre for Foreign Animal Disease (NCFAD) laboratory in Winnipeg, therefore a private carrier was required to be secured. Industry representatives also suggested that CFIA protocols for cleaning and disinfection of farms following an outbreak need to be more rigorous. Cleaning and disinfection procedures are currently the responsibility of the farm operator, with verification and approval by the CFIA once completed. The time frame within which cleaning and disinfection must be completed is not currently established within CFIA protocols. Concerns were also expressed about the subjective nature of CFIA verification (some farms had to start over several times). Industry representatives also questioned the policy of assigning the responsibility of cleaning and disinfection to farm

owners. Given the importance of this task to maintaining industry bio-security, it was suggested that professional teams be assigned.

The CFIA worked with Health Canada and regional health authorities to ensure that appropriate bio-safety protocols, including protective clothing, were put into place to protect the health of CFIA personnel and contracted workers. Regional workplace health staff were able to provide CFIA workers with pre-placement medical assessments, occupational health advice, influenza vaccine and anti-viral medication. One issue that was raised concerned protocols set by Health Canada for the use of anti-viral medication (oseltamivir). A maximum period of six weeks was recommended for the use of oseltamivir, after which workers were re-assigned to areas that did not put them into direct contact with infected poultry. During the outbreak it was not clear when workers who had initially taken anti-viral medication for the allowable period could resume taking the drugs. This was of particular concern since many of these same personnel could potentially be required to respond to a future outbreak . Health Canada has since advised that medication protocols for oseltamivir can be re-initiated after a break of two weeks.

Focus group participants raised the discrepancy between federal workers performing work on an infected farm in full bio-safety equipment while the farm owner and his/her staff had no protective gear. While the CFIA carries the responsibility for the occupational health and safety of its employees, the responsibility to protect the broader community falls on public health authorities. Representatives of the local health authority indicated that they had limited capacity to respond to the human health implications of AI. It was recognized that in future outbreaks local health authorities may require additional support from Provincial health departments, Health Canada and the Public Health Agency of Canada, particularly with respect to providing personal safety information to protect all persons working with infected poultry.

Effective bio-security protocols can prevent or minimize the spread of infectious diseases from farm to farm. They include measures such as sanitation and access or movement controls to prevent the spread of disease by people or equipment. The poultry industry does not currently have standards in place for on-farm bio-security. Industry representatives have proposed that an industry-led process be established to develop minimum bio-security standards, with technical approval by the CFIA. The CFIA has bio-security protocols in place for entering and leaving a farm and for the disposal of carcasses. Both CFIA and industry representatives identified what they believed to be breaches in bio-safety and bio-security protocols. More effective bio-security compliance measures may also be required in the future, including incentives or penalties. Additional training of CFIA and industry personnel in bio-safety and bio-security could enhance

personal protection and improve the effectiveness of bio-security measures and protocols.

Compensation policies and protocols were frequently raised during the focus groups, particularly in sessions with industry representatives. In particular, industry stressed the importance of producers understanding compensation schedules and amounts prior to receiving depopulation orders. Maximum compensation amounts are set out in the schedule of values for destroyed animals included in the *Compensation for Destroyed Animals Regulations*. The primary concern was that these compensation amounts may not reflect current market values of various types of farmed animals (i.e. specialty birds, breeders, layers). The CFIA was also asked to review its compensation policies and protocols to support industry developed rapid containment strategies (pre-emptive culls) to limit the potential spread of future AI outbreaks.

6. *The CFIA should review its emergency management approach to incorporate the lessons learned from AI and, where appropriate, best practices used by partner agencies (e.g. Incident Command System).*

**CFIA Response:** The CFIA is currently reviewing the structure and function of its area and national emergency response teams to incorporate lessons learned from both the avian influenza and BSE incidents. Public Safety and Emergency Preparedness Canada has been invited to participate in this review process, which will include an evaluation of the Incident Command System (ICS) approach. It is anticipated that updated emergency response structures and protocols will be recommended by the spring of 2005.

7. *The CFIA should formalize the advance planning function within its emergency management structure and ensure the integration of disease control experts (including public health experts) within this planning cell.*

**CFIA Response:** The CFIA's upcoming review of its emergency management structures and protocols will address the identified need to formalize the Agency's advance planning function during an emergency response situation. The development of a framework with Health Canada and the new Public Health Agency of Canada regarding collaborative arrangements for response to zoonotic disease outbreaks will also help to ensure the integration of public health experts into this planning cell.

8. *The CFIA should clarify the respective bio-safety responsibilities of the Agency and public health authorities in the response to zoonotic disease outbreaks.*

**CFIA Response:** The CFIA will review the applicable occupational health and safety protocols which are designed to ensure the health and safety of CFIA employees and contracted staff. The CFIA will also work with Health Canada and the Public Health Agency of Canada to identify and address biosafety issues which impact on the broader community.

9. *The CFIA should encourage the poultry industry's development of bio-security programs.*

**CFIA Response:** The CFIA will assist the poultry industry in their development of biosecurity programs by providing a technical review and assessment of the industry's proposed standards and plans. The Agency will be meeting with representatives of the poultry industry in January 2005 to discuss progress and next steps.

10. *The CFIA should conduct a review of compensation policies under the Health of Animals Act.*

**CFIA Response:** The CFIA is currently preparing to conduct a review of elements of the compensation program, including maximum compensation amounts. It is anticipated that this review will be completed in 2005.

11. *The CFIA should maintain a periodic review process for the schedule of values included in the Compensation for Destroyed Animals Regulations.*

**CFIA Response:** The CFIA will conduct a review of elements of the compensation program in 2005. Included in this review will be an assessment of the periodic review process for the schedule of values included in the *Compensation for Destroyed Animals Regulations.*

### 4.4 Communications and Linkages

Aspects of communication reviewed included media and public relations; communication across organizations and risk communication.

The following types of questions were used to guide focus group/interview participants:

1. What communications processes were in place?
2. Did communications improve or deteriorate over the course of the outbreak?
3. How important and how effective were communications with partners and stake holders?
4. How were communications with the media managed?

5. How were communications with the public managed?

**What Worked Well:**

Overall, participants noted that the appropriate mechanisms were put into place at the outset of the emergency to allow for ongoing communication with partners and stakeholders. Examples of these mechanisms included daily situation reports, web-site updates and teleconferences. Regular conference calls were coordinated by the CFIA with federal and provincial counterparts, as well as national and provincial industry associations. The initial CFIA/industry conference calls were difficult to manage, due to the large number of participants. However, the effectiveness of these conference calls improved as representatives for the various industry associations, speciality bird producers and backyard flock owners were identified.

The CFIA's external communication approaches were comprehensive and well received. They included activities such as press conferences and news releases, information-sharing meetings (open houses), web-site updates, information brochures, and advertising. Focus group participants indicated that these activities were well managed, and particularly noted the effectiveness of the "open house" information sessions held by the CFIA in Abbotsford. Risk communication was viewed as being appropriate to the circumstances. It was noted the Agency's effective risk communication approach likely contributed to conserving public confidence.

Protocols were also in place to communicate with international counterparts. Two USDA liaison officers were located in the Abbotsford EOC during the outbreak. In the past, Canada has similarly sent observers to the U.S. during foreign animal disease investigations. Liaison with the OIE and the Agency's international counterparts took place via the CFIA's Chief Veterinary Officer and International Affairs Directorate. In July 2004, representatives of the European Commission's (E.C.) Food and Veterinary office visited Canada, pursuant to the E.C./Canada Veterinary Agreement, to review Canada's control of the AI outbreak. The findings of the E.C. team (Annex 2) have been reviewed and incorporated into this lessons learned analysis. In addition, the CFIA's medical advisor participated with Health Canada in briefings of the World Health Organization (WHO), to reassure the international agency on the appropriateness of surveillance and control measures aimed at protecting public health.

**Areas for Improvement:**

Several meetings/teleconferences were held daily to coordinate and inform stakeholders and to facilitate communication between headquarters and the local area. Some CFIA staff were required to attend multiple 1-2 hour

meetings daily. Improved meeting coordination may have enhanced efficiency and reduced duplication. However, it was also recognized that the multiple meetings and conference calls were required to effectively coordinate response activities, inform partners and stakeholders and meet escalating demands for information.

The Abbotsford EOC had numerous enquiries for information from the public as well as the media. While media calls were directed to the appropriate spokespersons, calls from the public were not handled in a similar systematic fashion. These calls usually concerned the circumstances of individual poultry owners and were directed to available personnel. Focus group participants suggested that it may have been useful to have a dedicated person (e.g. a District Veterinarian) identified to respond to public enquiries. It was also suggested that EOCs should have a designated switchboard to handle and direct incoming calls.

Industry representatives indicated that regular interface between the CFIA and the national industry associations has declined in recent years. Maintaining an ongoing interface was identified as critical to building relationships and maintaining a knowledge of key contacts. Several industry representatives indicated that, at the outset, they did not know who to contact within the CFIA for information. Industry representatives also complained that teleconferences were too large, and not regularly scheduled. Those participating in the conference calls had different levels of need for information (i.e. sector vs. individual farm information). It was suggested that participation in the industry conference calls should be limited to representatives of associations.

Assessments of the effectiveness of CFIA communication with federal and provincial partners varied. Most agreed that these linkages improved as the outbreak progressed. Representatives from the Privy Council Office indicated that the CFIA communication with their office was immediate and thorough. Health Canada representatives indicated that while there was some initial confusion regarding appropriate contacts, communication worked well once linkages were established. Representatives from emergency management organizations such as PSEPC and the B.C. Provincial Emergency Program were not satisfied with the CFIA's inter-agency communications, indicating that much of the information being shared with them was either outdated or not relevant. Representatives of provincial ministries such as B.C. MAFF and B.C. Health also complained of inadequate information sharing. Some of these concerns may have been due to CFIA protocols which were in place to avoid the dissemination of preliminary or inconclusive results. CFIA participants indicated that it was sometimes difficult to determine when information could be shared externally. They also indicated that there was some confusion about whether information should be shared directly with provincial public health authorities,

or indirectly through Health Canada.

#### Recommendation:

*See recommendation #5, under intelligence and information management.*

### 4.5 Capacity

Specific aspects of capacity reviewed included training, surge capacity, staff well-being, and logistics. The following types of questions were used to guide focus group/interview participants:

1. Was a plan in place for ramping up capacity to handle response activities in advance of the outbreak?
2. What actions were taken to ramp up capacity for response activities and when?
3. Were extra pre-trained resources available to handle the surge in activity?
4. Were trained and qualified people available to do what was required during all phases of the outbreak?
5. Was it necessary to provide specific training as a result of AI – to whom and what type of training?
6. Was the necessary equipment available and provided to perform duties?
7. Were there any personal safety issues?
8. How well were personal "well-being" needs met during the response period and after?

#### What Worked Well:

The CFIA was able to collapse organizational barriers and employ staff from across Canada to respond to the outbreak. Agency partners and stakeholders became key team contributors, particularly within the Abbotsford EOC. Professionalism was displayed by staff, allowing the Agency to maintain organizational credibility during the crisis. Agency and other personnel worked long hours, demonstrating a high level of dedication in responding to the outbreak. Participants also recognized that the technical knowledge and expertise of the Agency personnel contributed to the successful response effort.

Despite some initial delays, the Agency was successful in securing and increasing laboratory capacity through collaborative arrangements with the province of B.C. and by acquiring new equipment and technology. Five CFIA scientists were assigned to work on-site with their provincial colleagues at the B.C. testing laboratory.

### Areas for Improvement

Protocols for engaging the support of partner organizations (e.g., municipal, provincial, federal or industry) can be better planned and exercised. In particular, laboratory testing and disposal were cited as examples of areas where pre-established strategies or agreements may have assisted response efforts. Representatives of the federal and provincial emergency preparedness organizations (PSEPC and the B.C. Provincial Emergency Program) indicated that CFIA requests for support were limited. Industry representatives also indicated that the CFIA can make better use of industry personnel and resources.

It was perceived by Health Canada that the CFIA epidemiology capacity was inadequate. While the CFIA has a core group of veterinary epidemiologists, they are located across the country. One proposal was that the CFIA assign trained teams of disease investigation specialists to be prepared to respond to animal disease outbreaks. It was also proposed that zoonotic disease scenarios be exercised with the involvement of disease control specialists from both the CFIA and the Public Health Agency of Canada.

Management of human resources was identified as an area for improvement. Better planned personnel rotation and replacement protocols were required to reduce employee stress and prevent "burn out". More structured personnel rotation may have also reduced the requirement for overtime. It was proposed that assignments to the EOC be limited to a set period of time (e.g. 3-6 weeks). In some cases, personnel assigned to the EOC became very involved in the crisis and did not wish to leave for a rest period. The Agency did not have a formalized succession plan in place to ensure the capacity to sustain a prolonged response. This would have entailed maintaining a roster of critical positions and identified replacement staff. Better employee orientation, including briefings and overviews of assigned responsibilities and reporting protocols, was required for new staff deployed to the EOC.

Planning to support the financial and administrative functions of an EOC can be improved. Logistical support requirements for the Abbotsford EOC were initially underestimated. The situation improved once support staff in areas such as finance (procurement) and IM/IT were identified and deployed to the EOC. These emergency support functions were identified as being critical to the Agency's ability to quickly "ramp up" response capacity. Based on the experience gained from BSE and AI, it was suggested that rapid response teams be identified to support the HR, financial and administrative functions of an EOC.

### Recommendation:

12. *The CFIA should review the procedures for providing HR, finance, IM/IT and administrative support to EOCs and develop standard operating procedures to support each of these functions.*

**CFIA Response:** The CFIA's Human Resource and Corporate Services Branches have each initiated reviews of their emergency response support procedures. It is anticipated that both branches will have standard operating procedures in place by the spring of 2005.

## 5.0 Findings of Other Avian Influenza Reviews

### 5.1 Scientific Peer Review of CFIA Epidemiology Report

In August, 2004 the CFIA initiated a scientific peer review of the Agency's AI epidemiology report. The final evaluation report which summarises the results of this peer review process is attached as Annex 1. Four internationally recognized experts on AI were asked to review the science which supported Canada's response to the outbreak and to assess how it compared to other countries which have experienced similar outbreaks and generally accepted international standards. A copy of the CFIA's outbreak summary report is available at: http://www.inspection.gc.ca/english/anima/heasan/disemala/avflu/2004sum/summaryhpaie.shtml

The peer review panel determined that, overall, the disease control actions taken by Canada were consistent with internationally accepted principles for HPAI control. Observations were made concerning both strengths and areas where Canada's response may have been improved. For example, the reviewers noted that Canada has an appropriate veterinary infrastructure and legislative authorities in place to respond to an outbreak of HPAI at an internationally recognized standard. It was also noted that, with hindsight, an earlier declaration of the control area with strict movement controls may have contributed to a better outcome. Timely reporting of laboratory results was also noted as an area for improvement. The surveillance plan and protocols conducted during the outbreak were found to be at the upper end of international standards and effectively executed. In addition, procedures for movement restrictions, depopulation, disposal, and cleaning and disinfection were found to be appropriate and consistent with international standards.

The recommendations provided by the peer review panel are largely consistent with those identified through the CFIA's lessons learned analysis and will be addressed by the Agency as described in this report. The peer review panel also recommended the development of a national AI

surveillance strategy, as well as further epidemiological studies to determine how the AI virus was introduced and spread.

### 5.2 European Commission Report

In July 2004, representatives of the European Commission's (EC) Food and Veterinary Office visited Canada pursuant to the EC/Canada Veterinary Agreement and conducted an evaluation of Canada's response to the AI outbreak. A final report of this mission was provided to the CFIA in December 2004 and is attached as Annex 2.

The report concluded that significant efforts were made to control the AI outbreak and that great commitment, innovation and technical ability were demonstrated during the response. There is a great deal of consistency between the findings and recommendations of the EC and the CFIA review. For example, both studies identified the need to update current contingency plans to incorporate the lessons learned from AI and to improve the Agency's emergency information management capabilities. The EC report also recommended that the full assistance of provincial authorities be assured at an earlier stage to allow the Agency to react more swiftly and effectively in the future.

In addition, the EC report contained some findings concerning the need to standardize some of the terminology used by the CFIA during the outbreak to be more consistent with international (OIE) definitions. The terminology used by the CFIA during the AI outbreak reflects the current Canadian legal framework. The discrepancies relative to the international terminology are recognized and attempts will be made by the CFIA to rectify the situation by means of a regulatory change.

Finally, the EC report recommended that the CFIA formalize the co-operation developed between the federal and B.C. laboratories, and use this as a model to establish a laboratory network within Canada with the necessary capability to assist fully in any future outbreak of notifiable avian disease. Bilateral arrangements currently exist between CFIA laboratories and provincial and private laboratories regarding testing for animal diseases. However, the importance of having a similar diagnostic network for avian diseases that operates under a defined quality assurance system (ISO) has been recognized and the CFIA is undertaking steps towards that objective.

The CFIA's full response to the recommendations of the European Commission is also included in Annex 2.

### 5.3 Canadian Poultry Industry Forum

On October 27 & 28, 2004, with the outbreak of AI in the Fraser Valley of B. C. entering the recovery phase, a lessons learned forum was jointly convened by the B.C. MAFF, the CFIA and the B.C. Poultry Industry. Approximately 190 participants, including representatives of the poultry industry (B.C. and national associations) and allied trades, as well as federal, provincial and municipal governments involved in the response to AI attended the two-day meeting. A summary of the proceedings, agreed-upon action items and follow-up leads is attached as Annex 3.

While the forum identified many of the same recommendations as those which have been described in this report, four additional recommendations were brought forward and accepted by the CFIA for follow-up. These include:

13. *Convene the first animal health/public health forum. (CFIA/Public Health Agency of Canada)*

**CFIA Response:** The CFIA supports this recommendation, and will be initiating discussions early in 2005 with the Public Health Agency of Canada to discuss this forum, develop objectives and proposed outcomes and determine how to organize.

14. *Implement a national AI survey for domestic poultry. Co-ordinate surveillance of wild fowl with the Canadian Wildlife Service. (CFIA/ Canadian Wildlife Service)*

**CFIA Response:** The CFIA's development and implementation of a small scale AI surveillance plan is well under way. The expectation is that samples will be collected in the spring of 2005. The development of a longer term plan for the active and ongoing surveillance of the commercial poultry industry is also underway.

The CFIA will be undertaking consultations with the Canadian Wildlife Service, Parks Canada and the Canadian Cooperative Wildlife Health Center to define the potential costs and benefits of wildlife surveillance.

15. *Examine the feasibility of establishing a pre-emptive cull program for suspect cases of AI to limit the potential spread of the disease. (CFIA/ Poultry Industry)*

**CFIA Response:** The CFIA will work with industry to examine proposals for pre-emptive slaughter. A preliminary meeting with national poultry representatives is scheduled for January 2005. The CFIA will also investigate vaccination protocols as an alternative to pre-emptive culls.

16. *Develop a national disposal strategy for all livestock species. (CFIA/ Livestock Industries)*

**CFIA Response:** The CFIA will continue to work with provincial and territorial governments, AAFC and livestock industries towards the development of a national disposal strategy for all livestock species. Disposal options in all areas of Canada are currently being examined by a federal/provincial/territorial agri-food inspection committee. The findings of this committee will support the development of a national disposal strategy.

## 6.0 Conclusion

This review has identified a number of areas where additional focus by the CFIA may bring about improvements in the effectiveness of future responses to foreign animal disease incursions. The identified areas for improvement pertain primarily to emergency planning and preparedness, as well as strategies to improve data management and information flow. However, it important to note that overall, the effort to control the outbreak of AI was widely viewed as being successful. It was recognized that considerable effort was made by all parties to respond to the outbreak, and that as a result, the spread of the disease was contained within the Fraser Valley of B.C. Innovative measures and improved procedures were developed to respond to problems that were not foreseen in the contingency plans. Consumer and market confidence in poultry products was maintained and movement of risk-free product out of the control zone continued. And finally, the effectiveness of Canada's control measures was recognized by our trading partners, as evidenced by the fact that regionalisation was accepted by both the E.U. and the U.S.

Lessons Learned Review | Annex 1 | Annex 2 | Annex 3

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Important Notices

Canadian Food Inspection Agency | Agence canadienne d'inspection des aliments

# The Source and Means of Spread of the Avian Influenza Virus in the Lower Fraser Valley of British Columbia During an Outbreak in the Winter of 2004

An Interim Report

February 15, 2005

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Canada

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## 1. Executive Summary

During the winter and spring of 2004, an avian influenza outbreak occurred in the Lower Fraser Valley of British Columbia. Over a three month period, approximately 13.6 million commercial poultry and 18 thousand backyard birds were destroyed as part of disease control measures implemented by the Canadian Food Inspection Agency (CFIA). Most of the commercial poultry were broilers from uninfected flocks and went directly to slaughter at maturity to be used for human consumption. While 42 commercial operations were found infected, constituting 5% of the operations in the Valley, a wider cull of 410 non infected poultry flocks took place which affected more than half of the producers in the region. The economic impact of this outbreak on the livelihoods of British Columbia (BC) poultry producers and the associated support industries was severe and recovery is expected to be protracted. Fortunately, the avian influenza subtype causing disease in the region had minimal effects on persons living in the area or those working directly with infected poultry. Only two confirmed cases of mild conjunctivitis were reported in disease control workers directly in contact with infected birds over the outbreak time span.

The outbreak of high pathogenicity avian influenza (H7N3) is thought to be caused by a mutation from a low pathogenicity avian influenza strain. The low pathogenicity virus circulated in one barn of an Abbotsford broiler breeder flock and became highly pathogenic as it moved to an adjacent flock on the same premises. Once a flock becomes infected with a high pathogenicity strain, sufficient virus is shed into the localized environment to make biocontainment difficult. The disease spread quickly in the Abbotsford area for two main reasons. Many flocks were not protected by acceptable on- farm biosecurity practices and with regular traffic on farms, transfer of dust from contaminated premises was made possible leading to disease transmission to these flocks. A second reason for the rapid spread of disease from flock to flock is thought to be through aerosolized dust emitted from poultry barns. The opportunity for air exchange between barns was highest in the poultry farm dense areas of the Lower Fraser Valley where barns were within several hundred metres of one another. The Agency, along with other stakeholders, may have contributed passively to the spread of avian influenza in the Lower Fraser Valley due to the time between detection of disease and the destruction and disposal of infected birds. The processes of disease detection, flock euthanasia and carcass disposal required significant human and material resource acquisition, inter department dialogue and problem solving, logistical planning, and communications in order to be implemented on the short notice demanded by the crisis.

The biggest vulnerabilities of the British Columbia poultry industry which contributed to this outbreak were the low level of biosecurity practised by some poultry sectors coupled with the very high density of poultry farms in the region. To address these weaknesses, all BC poultry sectors should develop and encourage their producers to implement comprehensive biosecurity programs. These programs should be established according to principles practised by Canadian poultry breeders of high security primary and multiplier flocks. The current evidence for the potential for windborne dispersal of avian influenza suggests that development of an air inlet filtration system for barns would be prudent in the event of a second outbreak. Municipal bylaws for land use could be reviewed in light of the outbreak with a view to restricting permits for new commercial operations when deemed too close to existing farms.

## 2. Introduction

During the outbreak of high pathogenicity avian influenza (H7N3) in the Lower Fraser Valley of British Columbia, the British Columbia Emergency Operations Centre (BCEOC) established an Epidemiology team. A key role of this team was to investigate the sources of the virus on the Matsqui Prairie and the multiple, potential modes of disease transmission of the virus from farm to farm. This was accomplished through the contributions of many professionals serving on the team and from other federal and provincial departments. We received more than fifteen fully referenced reports on key subjects of concern, each carefully written during the outbreak. These reports were used to steer a course through the crisis by providing answers to immediate questions. As well, they provided the knowledge and information required to ensure we were gathering the right data for the final epidemiological analysis of the avian influenza outbreak events.

The purpose of this report is to provide information to poultry producers on the current state of knowledge and the status of the analyses of the origin and spread of the avian influenza virus in the Lower Fraser Valley during the winter and spring of 2004. It represents a synthesis by the BCEOC Epidemiology Team Leader, Dr. Christine Power, of the information provided by the many investigators and consultants contributing to the outbreak investigation. In addition, its purpose is to provide interim biosecurity recommendations to the poultry industry in British Columbia based on the information available at this time. Section 6.0 contains the list of contributors and papers forming the foundation of this report.

## 3. Source of the Virus on the Matsqui Prairie

Avian influenza is a contagious viral infection caused by the influenza virus Type "A", which can affect most species of food producing poultry (chickens, turkeys, quail, guinea fowl, ostriches, emus, ducks, geese and pheasants), as well as pet birds and wild birds. Avian influenza viruses can be classified as low pathogenicity (LPAI) or high pathogenicity (HPAI) according to the severity of the illness caused in birds. LPAI strains are much more common than HPAI strains in bird populations and typically cause less severe and on occasion no clinical signs in infected birds. However, some LPAI strains are capable of mutating into HPAI strains which leads to a severe form of the disease with high mortality. There are many influenza subtypes, two of which include H5 and H7. Historically, only the H5 and H7 subtypes are known to have become highly pathogenic in avian species.

On February 9, 2004, on the north east corner of the Matsqui Prairie, British Columbia, a broiler breeder producer noticed a mild drop in egg production and feed consumption and a slight increase in mortality in a 52 week old flock of 9200 birds. The farm's veterinarian and the feed company representative investigated the case and samples were submitted to the British Columbia Ministry of Agriculture, Food and Fisheries (BCMAFF) diagnostic laboratory for routine post-mortem. Pathogenic findings included unusually firm lungs and inflamed tracheas. The clinical illness appeared to resolve over subsequent days.

A diagnosis of avian influenza was made by BCMAFF's poultry pathologist on February 16, 2004. Within a few days, the subtype of the virus was identified as H7N3 by the National Centre for Foreign Animal Disease (NCFAD). This disease event, though mild in impact on the flock, is believed to be the origin or starting point of the HPAI outbreak. Throughout this report we refer to this farm as the "index premises".

By February 17, 2004 an adjacent barn on the index premises containing a younger flock of 9030 birds (24 weeks of age) began to show an alarming rise in mortality such that by the 19$^{th}$, 1500 birds were found dead on that day alone. Laboratory testing conducted by the NCFAD in the weeks ahead revealed a different strain of the same virus found in the first barn. While the strain isolated in both barns was identical with respect to the subtype (H7N3), the pathogenicity of the viruses were markedly different. It was presumed at the time and confirmed later by testing that the second flock carried a high pathogenicity avian influenza virus (HPAI) that was a mutation of the low pathogenicity avian influenza virus (LPAI) found in the first flock.

In the first section of this report, the investigation into the source of the avian influenza virus during the outbreak focuses on the origin of the LPAI strain found in the first flock on the index premises. The HPAI viral strain is the focus of the second part of this report dealing with the means of spread of avian influenza in the Lower Fraser Valley.

### 3.1 Waterfowl Versus Domestic Poultry as the Source

Waterfowl are well established primary reservoirs for a wide variety of strains of avian influenza and in the past have been implicated in the spread of influenza to commercial poultry. In waterfowl, infection with avian influenza is unapparent with primary intestinal replication and subsequent shedding of virus in faeces. Occasionally the same bird has been found to be infected with multiple subtypes.

Avian influenza has been recovered from 20 of the 42 species of indigenous North American ducks, geese and swans. All fifteen hemaglutinin (H) subtypes have been isolated from wild waterfowl worldwide but the predominant H subtypes in North American ducks include H3, H4 and H6 with H5 and H7 being poorly represented (0.4% and 0.7% of over 3100 isolates respectively). The continued recovery of H3, H4 and H6 subtypes, in significant proportion and over 30 years of accumulated data, suggests that these subtypes are host-adapted to waterfowl. Host-adaptation implies that a waterfowl strain does not commonly transmit to domestic fowl. Although genetically stable in its natural host, once an AI virus crosses the species barrier there is an accelerated mutation rate that gives rise to genetic diversity and the possible emergence of pathogenic strains. The pathogenic strain which emerged in the second flock on the index premises is an example of such a mutation.
Given the Matsqui Prairie lies on a migration route and in the month of February waterfowl and other wild birds are a common sight in ditches and fields, the source of the virus was thought to be most likely derived from migratory or resident waterfowl carrying the virus and shedding it in their faeces to contaminate the environment. While very few surveys have been conducted in the area, information available suggests the H7 strain is rare in waterfowl along the west coast of North America and that peak influenza shedding is in juveniles in the fall of the year. Nevertheless, the documentation of the direct transmission of avian influenza from waterfowl to turkeys in past outbreaks in the US and Canada suggests serious consideration be given to migratory birds as the source of virus.

Secondly, since host adaptation is expected to reduce the infectiousness of the viral strain to domestic birds, another possibility is that the LPAI virus isolated on the first premises did not come directly from migrating waterfowl. Waterfowl-derived virus could act as a donor of the original hemagglutinin (H7) gene with subsequent poultry adaptation occurring in small backyard flocks that commingle with wild waterfowl or their habitat. It is possible for a virus strain of waterfowl origin to adapt to domestic poultry over time if waterfowl and backyard chickens have access to the same environment. With this kind of contact, a chicken- adapted strain could develop and then circulate in backyard flocks or live bird markets quite undetected until introduced into a commercial poultry flock.

Thirdly, domestic poultry could also have been the source of the LPAI virus on the index premises. The likelihood of this event may be very low but consideration of all avenues is required. While a small proportion of day old chicks and hatching eggs are imported to British Columbia, the vast majority are produced within the Lower Fraser Valley. The prevalence of LPAI in poultry flocks in BC prior to the outbreak is not known. Transfer of virus from a domestic poultry source to a broiler breeder operation could have (in theory) occurred through contaminated egg trays.

In BC, on these farms, eggs are delivered from the laying house via conveyor belt or by hand to a common room where settable eggs are put on flats, either on racks or in boxes. Then eggs are stored in a cooler until picked up by the hatchery. Eggs are picked up on the farm by hatchery trucks. Floor eggs may be included in the pick up. This is especially true in BC where producers are compensated based on the number of eggs set rather than the number they hatch. Racks and flats may be used on multiple farms. Egg racks and flats are reused and not necessarily sent back to the same farm. Although power sprayed and disinfectant applied, broken egg contents cling to racks and could provide a source of virus when racks are delivered to a farm. This was believed to be a route of transmission among commercial layer flocks in California during a recent incursion of Newcastle's disease. Their response was to develop a protocol whereby racks were color coded and returned to the same farm. The protocol also called for single use paper flats so that no flats would return to any farm.

It is important to point out that the Abbotsford outbreak data did not single out any hatcheries for increased association with HPAI infection on broiler breeder operations, which is to say that hatcheries were not implicated in the spread of the high pathogenicity form of the virus.

Another means of potentially moving LPAI from one broiler breeder flock to another is through the practice of "spiking" which involves transferring roosters from one premises to another during the laying period. This is a common practice among BC broiler breeders operators. Since LPAI is not always noticeable in a flock, there is a danger of inadvertently infecting a recipient flock in this way. Still another concern revolves around the reported practice of the illicit sale of ungraded eggs by some broiler breeders and commercial table egg producers. The movement of buyers from farm to farm in conducting egg pickup can lead to biosecurity breaches and inadvertent disease transmission to a flock.

### 3.2 The Genetic Profile of the LPAI Virus

The genetic make-up of the LPAI virus isolated on the index premises can help to answer the question of whether it most likely came from waterfowl or from domestic poultry. So far, two major genes have been sequenced by provincial and federal laboratories. What is known now is that the gene encoding the H protein of the virus has a nucleic acid sequence very similar to those of a virus strain found in domestic poultry from Eastern North America. On the other hand the gene encoding the matrix (M) protein of the virus has a sequence much like that from a virus strain found in waterfowl in the Southern United States. As mentioned earlier, different influenza virus strains can exchange their genetic material readily when they co-infect the same host (bird). While the information to date provides no definitive answer, the complete sequence of the remaining viral genes of the LPAI isolate will soon be available and will enable a comparison with the genetic profile of strains from around the world. This work should help to establish the predominance of wild versus domestic components of the viral genome. In this way we hope to obtain a clearer picture of where the original virus came from and whether it was of waterfowl or domestic origin. This information is expected to be available in the fall of 2005.

## 4. Considerations in the Spread of the Avian Influenza Virus from an Infected Premises to a Susceptible Flock

An adjacent barn on the index premises containing a younger flock of 9030 birds (24 weeks of age) began to show an alarming rise in mortality on February 17, 2004 such that by the 19$^{th}$, 1500 birds were found dead on that day alone. Infection of this second flock on the index premises with the mutated strain of the avian influenza virus constituted the beginning of the HPAI outbreak event. Three weeks later a second premises 1.6 km away showed signs of infection, then one week later three more premises (2-3 km) south and west became infected. Two weeks later 11 additional commercial premises were identified as infected and in this way the epidemic began slowly and picked up speed as more flocks became infected.

By the time the outbreak was brought under control, infected farms appeared in three clusters, each of which had a diameter of 5-6 km. In a few cases outlying farms were positive on the screening test but flocks did not show clinical signs or appear to contribute to local spread. The flocks themselves, once infected are known to shed enough live virus into their localized environments to be considered as virus factories.

From early on, the spread of the HPAI virus in the Abbotsford area was investigated from many points of view in order to establish the most probable means of disease spread during the outbreak event. The potential roles of wild birds, ground water, surface water, wind-borne particles, bio-security gaps (inter- farm movement of people, equipment), hatcheries, feed and feed mills, farm service personnel and CFIA staff in their eradication efforts were evaluated by the Epidemiology team during the course of the outbreak. This next section, under these key headings, provides the salient facts and observations for each mode of transmission along with preliminary biosecurity recommendations for the poultry industry.

### 4.1 Transmission Through Poultry Manure/Litter (Sawdust)

#### 4.1.1 Background

The avian influenza virus survives for many weeks in wet poultry manure at cool spring temperatures (4 °C), and for up to ten days at 25 °C. The virus dies within a day or two in very dry faeces. The concentration of virus shed in the faeces of infected poultry is very high. A gram of infected faeces can contain as many as ten billion infectious virus particles. Transmission of contaminated manure from an infected premises to a separate susceptible flock can an occur through the movement of people, equipment and vehicles. Barn to barn movement constitutes the highest risk activity for transfer, while deposition of contaminated manure in the vicinity of a susceptible flock is categorized as of somewhat lesser risk. It is thought that a small amount of contaminated dust adhering to boots, clothing or equipment is sufficient to transmit the virus from an infected barn to a susceptible flock.

A 2001 survey of biosecurity practices of poultry producers in the Lower Fraser Valley by BCMAFF revealed serious omissions which would leave producers vulnerable to disease incursions. For example, more than three quarters of commercial broiler and table egg operators indicated they do not provide disinfection footbaths or require a change of clothes/coveralls by employees on entering their barns.

During the outbreak, the CFIA investigation of each infected premises included a questionnaire of farm management practices and environmental observations very similar to that employed by BCMAFF in 2001. The time lines for the on-farm events were plotted and reviewed for common visits by feed companies, hatcheries, other service providers and guests. The information derived from the first five infected premises of the outbreak did not point to a common service provider (or visitor) as a means for spread of the virus. However, this does not rule out viral spread resulting from the movements of multiple parties during that time period. It is important to note that there was normally a great deal of traffic on and off farms in the Abbotsford area and if proper biosecurity practices were not used on farms, the potential to spread disease was very real.

### 4.1.2 Biosecurity Recommendations for the Poultry Industry

Considering the large number of poultry service providers coming and going on poultry farms during a normal production cycle coupled with the close proximity of poultry producers in the Lower Fraser Valley, comprehensive biosecurity programs for both poultry producers and service providers are strongly recommended. Canadian breeders of primary and multiplier flocks for the poultry sectors have long established standards of biosecurity which have evolved over decades of trial and error. These companies have the knowledge, expertise and experience to provide solid direction to the BC poultry producers as they develop programs of their own.

Biosecurity programs must address multiple potential avenues of disease (virus) entry on the farm. For example, a fifteen point program developed by Cuddy Farms contains the following components:

-Conditions of employee hiring
-Control and sequence of vehicle movement
-Control and sequence of employee movement
-Control and screening of visitors
-Location of farms
-Control of bird placement
-Biosecurity barriers
-Wild bird control
-Rodent control
-Insect control
-Control and monitoring of feed production
-Minimum down time. Monitoring of clean-out and disinfection
-Rapid diagnostics and high frequency of disease monitoring, disinfectant efficacy and concentration testing
-Biosecurity audits
-Employee education

In British Columbia, the BC Poultry Association has developed a Poultry Industry Biosecurity Manual which provides a producer self-assessment guide, minimum biosecurity standards for commercial poultry farms and a strategy for developing an on-farm biosecurity program.

## 4.2 Transmission Through Water

### 4.2.1 Background

The persistence of avian influenza virus in water under natural field conditions is not known. However, under experimental conditions the virus survives, to varying degrees, for months at temperatures between 4 °C and 28 °C. Considerable variation exists between viral strains with respect to changes in temperature, pH and salinity. Perpetuation of avian influenza virus in wild waterfowl is assumed to occur via contaminated water. Since virus replication is primarily within the digestive tract in waterfowl, transmission of virus is through the faecal-oral route.

While clear associations between waterfowl and free range and confined poultry and the transmission of disease have been established in Minnesota outbreaks in turkeys in the early ‘80s, the role of contaminated water from an infected premises causing transmission to another premises is not recorded in the literature. Nevertheless, the likelihood of surface water and ground water transmission on the Matsqui prairie were investigated with assistance from BCMAFF ’s Resource Management Branch in March 2004.

The concern was that run-off from infected premises may have entered either surface water or ground water. Since no manure was spread onto the fields after the discovery of HPAI, contaminated run-off would have to have occurred during times of depopulation, removal or composting of birds. Rainfall records from the periods of depopulation of the first two infected premises were analysed in the light of infections on three subsequent premises. The rationale was that contaminated surface water would have to travel in ditches downstream from one premises to another and then be introduced mechanically into the susceptible barn by a producer’s dirty boots or a wet farm dog fresh from taking a dip in a ditch. Using surface water drainage maps produced by Resource Management Branch showing the creeks and ditches and the direction of water flow along with farm activity information provided by the producers, it was concluded that transmission by surface water from one farm to another was possible but the risk was likely to be low. As well, several dozen water samples taken from ditches and sloughs scattered across the Matsqui Prairie in early April failed to demonstrate avian influenza virus through laboratory testing.

The concern that ground water could be a source of viral transmission was discussed with authorities from BC Water Land and Air Protection and the Drinking Water Program of the Fraser Health Authority. Both reported that while no measurements of ground water flow were being done in the area, given the flat topography and sand and fine gravel sediments in the area, expected groundwater flow would be less than one metre per day. Questionnaires administered to the owner/manager of each infected premises indicate that only Premises 1 and 2 used wells (sand point), while Premises 3-5 obtained their water from a municipal water system. Research on another type of virus (enteroviruses) indicate that they may traverse 60-70 meters in a vertical direction and 500 meters horizontally. Given the distances between the farms, slow ground water flows and only two premises using well systems, it was considered highly unlikely that contaminated ground water had spread the HPAI virus from one commercial operation to another.

However, it is not inconceivable that contaminated surface water from a field near the index premises drained downward into the farm well bed some 18 feet below the ground surface and through this means found its way into the water supply to the barn. In this way, the LPAI strain may have entered the index flock as an original point of entry in February.

### 4.2.2 Biosecurity Recommendations to the Poultry Industry

As part of the development of biosecurity programs by the Canadian poultry industries, continued consultation with local expertise in the BC government to appraise the risk of contamination of well beds from highly localized surface water seepage from fields is suggested. In addition, the merits of installing water purifiers in barns should be assessed.

## 4.3 Transmission Through Feeds

### 4.3.1 Background

Consideration of virus contaminated feed as a point source to the epidemic was evaluated through an investigation of two feed companies supplying feed to the affected producers. The types and sources of feed ingredients were reviewed with the feed mill operators against the chain of production, storage, milling and transportation to the farm. Since these feed mills were Hazard Analysis at Critical Control Points (HACCP) certified, the review of the process with respect to areas where bird droppings could have been introduced into the feeds was straight forward. Only a few areas were highlighted as unattended means of virus introduction and survival through the complex process of feed manufacture.

Feed company staff pointed out that protection of grains from wild birds during transit and storage is routine, yet as a field crop, grains are exposed to wild birds. Since these grains are purchased from all over North America, it is possible that grains could be contaminated in the field and then moved across large geographical distances. While broiler rations undergo a final heat treatment step in the process of pelletizing, broiler breeder rations are prepared as a mash feed which does not undergo heat processing. While faecal contamination of grains is not likely to ever cause an multi-farm outbreak, it is possible that the index farm (a broiler breeder operation) was infected through a tiny amount of contaminated grain in the feed. As more information becomes available as to the genetic makeup of the LPAI virus, it may be possible to find a connection with viral samples collected from surveys of waterfowl migration routes across North America.

Another area of concern revealed through the investigation was the practice of back hauling feed from farms to the mill and subsequent redistribution. This occurs when the producer reaches the end of the production cycle of the flock and there is a significant amount of feed left over. As courtesy to the producer, the mills back haul and recycle the feed. Contamination of stored feed at the producer level could be transmitted to other flocks through this process. Having stated this, there was no association between any particular feed company and the pattern of disease spread among the first five farms in the outbreak.

### 4.3.2 Biosecurity Recommendations to the Poultry Industry

A risk assessment could be done to assess the plausibility and likelihood of transmission of virus through contaminated grain crops. If a significant risk is determined, consideration of mitigating measures (ex heat treatment/irradiation) could follow.

Secondly, a review of the practice of back hauling feeds should be undertaken to ascertain the appropriate measures required to reduce the risk of recycling potentially contaminated feed.

## 4.4 Transmission through Aerosol/Airborne Dust Dispersion

### 4.4.1 Background

In the early stages of the outbreak, the infected premises were found to be fairly close together (within 2-3 km of one another) and down wind from the prevailing NE winds on the Matsqui Prairie at that time of year. While the scientific literature does not define wind movement as a principle source of avian influenza virus transfer, discussions with scientific leaders in the field of avian influenza from Italy, the Netherlands and United Kingdom in April 2004 revealed markedly divergent opinions from “highly sceptical” to “a considerable factor to deal with”. Clearly revealed was the absence of any testing to support or refute a windborne theory of transmission during recent outbreaks in Italy and the Netherlands.

Poultry barn emissions in the Lower Fraser Valley have long been a focus of interest by Air Quality Meteorologists in the BC Ministry of Water, Land and Air Protection due to concerns over their contribution to summertime air pollution. A consultation with Ministry staff in April proved very informative as they were able to answer many of our questions concerning the amount of dust emitted from poultry barns and the potential for windborne dispersion. Briefly, an aerosol consists of solid or liquid particles suspended in air. Dust, smoke and fog are examples of aerosols. Dust emissions can be broken down into two basic fractions: visible particles larger than 10 microns in diameter which settle out by gravity and invisible particles less that 10 microns which are light enough to be suspended in air for long periods.

In the Lower Fraser Valley, many poultry farms use sawdust, as the readily available by-product of the lumber industry, as litter for their flocks. Poultry feed, faecal material from birds along with feathers and dander also contribute to the dust emissions from barns.

Contained in this report were the results of a study conducted by the Sustainable Poultry Farming Group in which aerosol emissions from an Aldergrove, BC broiler operation were measured over a full growth cycle. While anyone observing dust emissions from a barn with dimensions of 40 x 400 feet with 20,000 birds bedded on sawdust would agree that they are substantial, of particular interest is the invisible portion which can be suspended in air and transported by wind. This fraction constitutes a particle size of less than 10 microns in diameter and is invisible to the naked eye. Emissions of this size range were measured from a 24 inch fan over 7 weeks revealing output of 25-40 $g/m^3$ per 24 hour period. To illustrate the magnitude, this represents a million fold elevated concentration of aerosolized dust near a poultry barn fan as compared to outdoor air in a semi-rural area such as Aldergrove. Of all measured total particulate matter (visible and invisible) emitted, 40% was found in the invisible size fraction of less that 10 microns in diameter. This indicates that a sizable portion of dust emissions from poultry barns have the potential to remain suspended in the air for up to several days. Given the spring time winds in the Fraser Valley often range between 5-10 km/hr, poultry barn dust could possibly be found tens of kilometers from their source.

Little is known about the survival of avian influenza viruses in dust particles due to limited experimental work conducted to date. Available published studies indicate that survival is best in dry air where the relative humidity is less than 50%-70%. It has been suggested that other factors capable of significantly decreasing the survival of the avian influenza virus in aerosols include ultra violet radiation, ozone reaction products, air ions and pollutants while high air salinity found in coastal areas may provide a protective effect on virus survival.

In early April, the Agency, as part of its epidemiological investigation, undertook a study to examine airborne spread of virus near infected barns. This study was conducted collaboratively with Defence Research and Development Canada-Suffield (DRDC) of the Department of National Defence, experts in sampling and detection of biological agents in aerosols and Health Canada, providing the laboratory testing expertise.

The goal of the study was to evaluate if avian influenza virus was being spread into surrounding areas on dust particles emitted from barns containing infected birds. Agency epidemiologists hypothesized that airborne transmission of the virus might be contributing to the rapid and extended spread of the outbreak.
Air sampling near infected barns: The study assessed air samples collected adjacent to three infected premises using low volume air samplers. On each farm, air samples were collected every fifteen minutes for a 24 hour period both upwind and down wind from the ventilation fans of the barns. Of a total of 240 air samples collected from fixed locations, all were determined to be negative for the avian influenza virus.

Air sampling inside an infected barn: Live virus- virus capable of causing disease- was detected in two of two samples collected by high volume air sampling inside an infected barn. A quantitative estimate of viral load per cubic metre of air was determined and found to be very high.

Air sampling in the surrounding area of infected barns: Nine air samples were collected within one kilometre of known infected premises using high volume air sampling. Very low levels of virus were detected in one of these samples some 800 metres from an infected barn. Testing was unable to determine if this remote sample of virus was alive or dead.

Although this study confirmed that avian influenza virus was circulating in the air outside barns during the outbreak, it remained unclear if the virus was alive and therefore potentially infectious. A complete report of this work will become available in the months ahead from the DRDC.

Evidence of what appeared to be windborne transmission in the third week of March, as the disease spread to the fourth and fifth premises, reinforced the Agency's resolve to minimize any potential airborne transmission. The Agency's on-farm activities were directed by the CFIA's HPAI disease control strategy such that once an infected flock was identified, efforts were made to destroy birds as quickly as possible to limit the amount of virus produced. During disposal activities, dead birds were collected indoors and sealed in boxes before being transported off the farm. Barn doors were kept closed as much as possible during the disposal process to prevent air currents from spreading virus. In-barn composting of birds and litter was introduced by Agency research staff early in the outbreak and conducted thereafter by Agency operational staff. Wherever possible composting took precedence over removal and incineration of birds.

At this point in the outbreak, the definition of infected flocks was expanded to include flocks that showed clinical signs or were positive on the screening test. Until this point, a confirmed diagnosis of avian influenza subtype H7 was required, involving a screening test (offering same day results) followed by an H7 confirmation test (requiring 1-5 additional days). Changing the case definition to include flocks which were positive to the screening test without the benefit of H7 subtype confirmation results in hand, permitted more rapid disease response actions. This modification was based on a high probability of correlation between the two tests. In other words, while the screening test would identify other subtypes of avian influenza if circulating in a flock, the likelihood of this occurring was relatively small. In order to clarify the disease status of the screening test-positive flocks which failed to demonstrate the H7 subtype, some 14 commercial and 9 backyard flocks, a retrospective analysis is planned.

### 4.4.2 Biosecurity Recommendations to the Poultry Industry

The current knowledge of the potential for wind dispersion of avian influenza in the Abbotsford area suggests that installation of a barn inlet filtration system would be prudent in the event a second outbreak. Ventilation engineers in the agricultural sector would be a good source of expertise and creativity for the design of an inlet filtration system. Realistically this may constitute a significant expenditure to poultry producers given that the air inlets of poultry barns usually run the entire length of the building. However, the cost-benefit ratio may make such a system an attractive outbreak protection option for producers.

A second suggestion arising from the outbreak experience is for the poultry industry to develop an air cleaning system to disinfect or remove infected material from exhausted air as it leaves an infected barn. This system would be used for known infected premises to allow the fans to run until the work of flock euthanasia, disposal and composting could be completed. Fans must run continuously for days while these activities are underway for humane reasons for the birds and for ventilation reasons for crews working in the barn during cleanup. The risk of airborne transmission could be greatly reduced with a practical means to disinfect the exhausted air.

## 4.5 Transmission Through CFIA Activities

### 4.5.1 Visits to farms by CFIA staff

Since the onset of the outbreak, the CFIA was warning of the dangers of industry service personnel visits on poultry farms as a potential means of transferring virus to susceptible premises. During the first month of the outbreak the CFIA dispatched crews to infected and non infected premises on a daily basis for collection of samples for disease detection, for removal of birds from contaminated flocks and related disposal activities. Strict biosecurity measures were employed by CFIA personnel entering poultry premises and barns. Training of all field staff in biosecurity practices was required. Single use coveralls, masks, eye protection and foot wear were mandatory. A biosecurity quarantine period was established such that no visits to poultry farms were permitted for 24 hours following a visit to a non infected farm and no visits to poultry farms were permitted for 72 hours following a visit to an infected farm.

In March, some producers expressed concern that the CFIA staff were infecting their flocks. To address these concerns, an objective analysis of the CFIA visits relative to subsequent flock infections was undertaken. At the time of some visits by the CFIA, a flock was believed to be non infected, but if infection was detected within 10 days of that visit, the flock may have been shedding virus at the time of that visit. In this type of situation the CFIA workers would have followed a 24 hour biosecurity quarantine period rather than the 72 hour period required for visits to infected premises. Using the dispatch records a review of the inspectors movements was carried out to identify this higher risk event for all workers. An assessment of the rate of infection observed in flocks following a high risk visit as compared to the rate of infection of flocks following a non high risk visit showed no significant difference in the rates of infection in both commercial and backyard flocks. Therefore no association could be found between the on farm activities of the CFIA and an increased spread of disease by their visits.

### 4.5.2 Dispersion of feathers and dust during disposal activities on the first two infected premises

In the early weeks of the outbreak, the CFIA tried out several procedures of euthanasia and carcass disposal on the first two infected premises to establish a humane depopulation method and a safe way to dispose of thousands of infected carcasses.

Barns on the index premises underwent bird removal by hand transfer to a conveyor belt which transported the carcasses to an open door at one end of the barn. The carcasses were loaded into a grinder which in turn was emptied into a dump truck for localised transportation for composting. This process of moving carcasses outside the barn followed by grinding for composting was recognized for the potential it held to transmit infected feathers and dust into the wind and surrounding environment. Carcass disposal activities were confined within barns afterwards.

On Premises 2, the CFIA tried out an established euthanasia method provided by a BC poultry industry which, because of the size of the equipment, required that birds be transported outdoors for the process. This lead to a significant amount of feather dispersion on the wind and in the surrounding environment. This method was never repeated and it, too, was held up by government and industry as an unfortunate learning experience.

Did these events contribute to the spread of virus to other premises? This question was investigated through a qualitative risk assessment which evaluated the likelihood of transmission during the known hours of high risk activity on these farms, considering the wind direction and speed at those times, and the timing of infection on Premises 2, 3, 4 and 5. Meteorological data were obtained from the Abbotsford airport hourly observations.

Recall from Section 4.41, that visible dust (including feathers) tends to settle to the ground just tens of metres from their source, while the invisible component of dust (less than 10 microns) can be carried on the wind long distances and have the have the potential to remain suspended in the air for up to several days. It is the invisible dust, once aerosolized, that is thought to carry the highest risk to neighbouring farms.

The assessment showed that wind directions and speed during high risk activities on Premises 1 provided a moderate risk rating for windborne dispersion to Premises 2, a low risk rating for Premises 3 and a negligible risk rating for Premises 4 and 5. The risk of transmission from Premises 2 were estimated as negligible for Premises 3 and low for Premises 4 and 5.

These events may have contributed to the spread of disease. However, in addition to the dust dissemination associated with these events, the volume of exhausted dust from these infected barns may ultimately have been more influential in transmission. The continuous operation of fans required to ventilate birds and disposal crews over many days and nights leads to significantly greater emissions than what would be expected by the outdoor activities alone. Recall also, that little is known about the survival of virus in aerosolised dust. Ultraviolet radiation from the sun during daylight hours is expected to kill virus quite effectively. While further clarification is anticipated through ongoing analysis of the outbreak data, basic research is also needed into the transmission dynamics of avian influenza to establish definitive answers to the mechanisms of viral spread.

### 4.5.3 Dispersion through transportation of infected poultry by trucks

A driver of a car travelling behind a convoy of trucks carrying poultry carcasses related that fluid emanated from the surfaces of a box trailer and that it sprayed onto the surface of his vehicle. He reported the event to the CFIA along with his concern that he may have been exposed to fluids from infected birds. This liquid most likely was disinfectant used to spray the outside of the box trailers prior to departure from an infected premises. However, there were known cases where poultry fluids leaked from the back of refrigerated box trailers en route to disposal sites.

Poultry carcasses were routinely protected by a triple sanitary barrier consisting of two layers of heavy duty plastic liners contained within an industrial strength cardboard box (1 $m^3$ volume). Boxes of carcasses on wooden palettes were placed in refrigerated box trailers. The box liners, consisting of a double layer of plastic, were designed for carrying boneless beef. Whole poultry carcasses have sharp beaks and claws which can cause perforations in the liners with subsequent leakage into the boxes and onto trailer floors. As a matter of routine, floor drains were plugged and 150-200 kilograms of clay litter was placed at the back of the trailer unit. This was done to absorb any potential fluid leakage moving from the front of the trailer unit to the back as occurs when a truck accelerates or climbs a hill. This level of containment was considered reliable in ensuring fluid leakage was prevented or minimized. However, there were occasions where fluid was observed dripping from the back of loaded box trailers on the highway by CFIA staff as they followed behind. These events were generally associated with transportation of birds from premises where collection delays and heat had caused decomposition and liquefaction of dead birds prior to packing and loading.

The likelihood of transmitting contaminated fluids discharged onto a road surface to the inside of a poultry barn is thought to be low. It would require a vehicle to drive over the fluid on the highway, then onto a farm, depositing fluid from the tires onto the farm driveway. From there a person on the farm would have to contaminate their shoes on the driveway, for example, and then track virus into a barn. If all the conditions were right, it could possibly happen. The actual contribution of trailer leakage to the outbreak is unknown but will be considered in future analysis.

While difficult to prevent leakage in every shipment given the prescribed packing materials of the day, steps should be taken by the CFIA to identify materials and methods which would eliminate fluid escape from trailers altogether. Also, the disposal of birds and litter through on-farm composting was used effectively during the outbreak. It offers enhanced bio-containment of virus on the farm and wherever possible should be used instead of removing birds for disposal at off-farm locations.

#### 4.5.4 Management of leakage from parked trailers on a Richmond industrial site

On March 15, 2004, infected birds from Premises 2 were boxed and hauled in refrigerated trailers to an industrial site in Richmond, BC some 70 kilometres south west of Abbotsford. The site was located south of the Vancouver airport. On March 16, 2004 two refrigerated trailer units were found to be leaking organic fluid (a strong red colour) onto the ground. This fluid was found on the asphalt and gravel surfaces surrounding the trailers, and had entered a drainage ditch which, itself, drained into a nearby stream some 75 metres away. This stream emptied into the Fraser River approximately one quarter of a kilometre away and the Fraser River emptied into the ocean about one kilometre from that point. An Environment Canada engineer was immediately called to assess the leakage situation. During the investigating of the site, leakage volumes were assessed, corrective actions were prescribed for immediate handling of fluid accumulations on the ground and recommendations were provided for fluid containment and remedial management of the drainage ditch. The CFIA implemented these recommendations as directed.

Briefly, the process consisted of applying absorbent clay particulate material (kitty litter) and disinfectant to the contaminated ground surface, waiting a day, followed by physical removal and bio-secure disposal of the material. The two offending trailers were chilled down to freezing temperatures over several days, packed to prevent further leakage and hauled to Princeton to dispose of their cargo on the evening of Saturday, March 20, 2004. At this time, a final application of dilute chlorine bleach was applied to the entire parking site.

The organic fluid which drained from the parking area into a nearby drainage ditch was found to have settled to the bottom of the ditch in a congealed state. Since the spill was deemed stable “as is”, disruption of the site was contraindicated until a remediation service could be contracted to block the ditch, remove the organic fluid and provide restoration. By April 7, 2004 such remedial action was completed at the site.

Overall, while the leakage was viewed as potentially serious, the management of the situation was prompt and appropriate. This helped the Agency identify precautions to be taken with future disposal and clean-up activities on a site that was remote from the poultry industry. It also helped develop future disposal procedures. While the offensive smell of the organic fluid caused concern among local Richmond residents, this event was not deemed to pose any significant risk to people, flocks owned by poultry producers nor to the water supply of the nearby Fraser River.

### 4.5.5 The role of time delays in the spread of disease

The Agency, along with other stakeholders, may have contributed passively to the spread of avian influenza in the Lower Fraser Valley due to the time between detection of disease and the destruction and disposal of infected birds. The processes of disease detection, flock euthanasia and carcass disposal required significant human and material resource acquisition, inter department dialogue and problem solving, logistical planning, and communications to be implemented on the short notice demanded by the crisis. On average, this process took seven days which is significantly more than the desired target of 24-48 hours. There are multiple reasons for this extended time frame which will be addressed by many of the recommendations contained in the Post-Incident Review of the CFIA's Response to the Avian Influenza Outbreak and the Report on the Canadian Poultry Industry Forum of October 27 and 28, 2004. The desirable rapid response time for disease management on farms requires a highly coordinated, emergency response program, exercised regularly by the Agency with all organizations partnering in the process. To be effective, everyone must be aware of their roles and responsibilities and act in a coordinated approach to control and eradicate the disease of concern.

## 4.6 Ranking of the Relative Importance of Possible Routes of Transmission

### 4.6.1 Preventing the introduction of avian influenza onto farms

When avian influenza is discovered on a poultry farm, the priority of investigative avenues are as follows:

Were poultry introduced into the flock recently? Seek a domestic source for the virus.

What is the biosecurity of the farm with respect to wild birds gaining access to the barn?

What is the biosecurity of the farm with respect to persons and objects gaining entry into the barn? Entrance to barns by persons and equipment constitute high risk activities for the flock. Producers, employees, bleeding and catching crews, veterinarians, equipment sharing events and visits inside the barn from outsiders all must be recognized as high risk persons/events.

What is the biosecurity of the farm with respect to moderate risk activities for the flock? Activities such as barn cleaning, egg pick up, repairman visits and media visits are considered of moderate risk because persons may enter the ante-room of the barn but don't usually gain entry to the flock.

What is the biosecurity of the farm with respect to low risk activities for the flock? Low risk activities include feed deliveries, feed representative visits, hatchery chick placements, manure/litter removal and sawdust/shavings delivery.

Once these avenues are reviewed and ruled out, the concerns can then turn to feed and water. The index premises was carefully managed with respect to most of the above biosecurity practices. This is an important fact to recognize. It is suggested that well water, feed source and hatchery crate recycling practices should not be overlooked as potential means of the original viral entry into the first flock on the index premises.

### 4.6.2 Preventing the spread of avian influenza from farm to farm during an outbreak

Once infected, flocks are known to shed enough live virus into their localized environments to be considered as virus factories. Therefore, during an outbreak of avian influenza , producers must ensure optimal biosecurity for all high, medium and low risk activities on their farm. This is essential for any producer who wants to avoid infection of their flock. Disease transmission is thought occur through breaches in flock biosecurity and through aerosol (dustborne) transmission from an infected barn to a susceptible one. The proportion of farms in this outbreak which acquired infection through each of these means is not yet known. Clarification is expected through further analysis (see Section 5.0). It would be fair to assume that barns within 500 metres of one another are at higher risk for aerosol transmission than those further apart. Poultry flock density in the Abbotsford area should be a very important consideration in the emergency preparedness planning for a future outbreak with respect to air inlet filtration and exhaust disinfection systems. In areas of high density, aerosol transmission should be anticipated. So overall, the key means of spread of the avian influenza virus during the outbreak is considered to be through high risk activities involving people and equipment and through dust emissions from infected poultry barns in close proximity.

## 5. Next Steps

This section provides descriptions of the key initiatives arising from the avian influenza outbreak. This is not an exhaustive list of planned projects.

### 5.1 Measuring avian influenza prevalence in domestic poultry and migratory waterfowl

Provincial government veterinary and laboratory services across the country conduct testing for avian influenza when indicated by clinical signs in a flock or by pathological findings of avian specimens. It was through such activity that the BCMAFF's poultry pathologist diagnosed the initial flock of avian influenza in Abbotsford. In spite of these activities, few studies have been conducted in recent decades assessing the prevalence of avian influenza in migrating waterfowl and domestic poultry in Canada. At this time, plans are under way by the CFIA to conduct a national serological survey in 2005 for avian influenza in the Canadian domestic poultry industries. Much of the sample collection is expected to be undertaken in federally registered slaughter plants across the country. Once completed, a clearer picture of the exposure of Canadian poultry to H5 and H7 avian influenza will be available.

Discussions between the Canadian Cooperative Wildlife Health Centre, Canadian Wildlife Service, Health Canada , the CFIA and others are under way at this time to establish the feasibility of conducting a national waterfowl survey for avian influenza in 2005. Since wild birds are the ultimate reservoir of the Influenza A viruses, identifying the strains carried by these birds is needed. Survey data derived from the Pacific flyway of BC may offer insight into the source of the virus on the Matsqui Prairie in February 2004.

### 5.2 Evaluating the role of poultry service providers in disease transmission

A study is underway to determine the relative influence of farm management practices, farm biosecurity, industry support sectors, social networks and environmental factors in the spread of disease in Abbotsford. Farm information collected during the outbreak is being used to ascertain the risk factors influencing the transmission of the virus. This work, carried out during the outbreak, uses the design of a case-control study which requires detailed information provided by producers whose poultry were infected with the virus and others who were spared the infection. The producers of 25 infected premises (case farms) were interviewed while 75 producers from uninfected farms (control farms) were questioned in the study.

In addition, predicted airborne dispersion effects from a study described below will then be introduced into the analysis of the case-control study to assess the relative impact of biosecurity breaches compared to airborne effects in transmission of disease in the Lower Fraser Valley. This analysis is underway in collaboration with the Faculty of Veterinary Medicine, University of Montreal. An interim account is expected in the fall of 2005 with final reporting expected in the winter of 2006.

## 5.3 Evaluating the role of windborne spread in disease transmission

The plausibility of airborne spread of virus in the Lower Fraser Valley is the subject of a second study. For eight weeks during the outbreak, a mobile weather station dispatched from Vancouver (Environment Canada), was placed on a farm on the Matsqui Prairie to capture local meteorological data for generating retrospective predictions of airborne movement during the outbreak period. In-barn viral concentrations measured in air (by DRDC) and the time sequence of infected premises events in the Lower Fraser Valley collected by the Agency will also be used in the analysis. An anticipated outcome of this work is clarification on the role of airborne dispersion in the early infections on the Matsqui Prairie (prior to March 19, 2004) and in the creation of the south and west clusters of infected premises that emerged in early to mid April. This study is being conducted in collaboration with Environment Canada's Environmental Emergency Response Division and the CFIA's Foreign Animal Disease group. A final report is expected in July 2005.

## 5.4 Assessment of the role of backyard flocks in the spread of avian influenza

During the outbreak some 553 backyard flocks were ordered destroyed as part the disease control measures exercised by the Agency. While more than 80% of these flocks contained less than thirty birds, a few flocks raised more than1000 birds. At the time of destruction, samples were taken from each flock for laboratory evaluation of disease status. This flock information will be used to conduct an assessment of the role of backyard flocks in the spread of the disease during the outbreak. Overall, this assessment will be used to appraise the Agency's current policy on backyard flock destruction and to direct policy renewal for future incidents. This work will be undertaken by the CFIA with a report anticipated in the fall of 2005.

### 5.5 Summary list of planned analyses, surveys and studies

| | |
|---|---|
| An aerosol sampling trial of avian influenza in the British Columbia Fraser Valley | Final report expected in February 2005. |
| A genetic sequencing study of the AI virus to clarify its most likely source | Preliminary results expected in fall 2005 |
| Risk factors for spread of highly pathogenic H7:N3 avian influenza among commercial poultry in Abbotsford, BC. | Preliminary results expected in October 2005 |
| The BC Avian Influenza Outbreak: atmospheric transport as a possible propagation mechanism. | Preliminary results expected in June 2005 |
| National serological survey for avian influenza in the Canadian domestic poultry industries | Survey to commence in the spring of 2005 |
| Nationwide survey of waterfowl for avian influenza | Discussions underway |
| The role of backyard flocks in the spread of avian influenza | Preliminary results expected in October 2005 |
| Evaluation of testing regimes employed during the outbreak | Preliminary results expected in October 2005 |
| Evaluating human, livestock and critical infrastructure exposures to biological agents (mosquito larvicide) applied by conventional spray techniques- Principal Investigator: University of Victoria (project will help to establish generic aerosol sampling techniques for field situations) | Grant application underway |
| On site composting for bio-containment and safe disposal of infectious animal carcasses and manure (project geared to build on the outbreak experience and address current knowledge gaps) | Grant application underway |

## 6.0 List of Investigation Reports and Contributors

1-Literature review of survival of avian influenza virus in aerosol/dust. Pascal Moreau, Animal Health Risk Analysis, Science Branch, May 2004.

2-Literature review of highly pathogenic avian influenza virus survival in manure. Pascal Moreau, Risk Analyst and Scientific Advisor, Animal Health Risk Analysis, Science Branch, March 2004.

3-Literature review of avian influenza survivability in water. Victoria Bowes, Poultry Pathologist, BC Ministry of Agriculture Food and Fisheries, April 2004.

4-Case series review: assessment of the role of wind in disease transmission. Nancy DeWith, Epidemiologist, CFIA contract, April 2004.

5-Case series review: assessment of the role of ground and surface water in transmission of avian influenza. Nancy De With, Epidemiologist, CFIA contract, May 2004.

6-Case series review: assessment of the role of service providers in the transmission of avian influenza. Connie Argue, Veterinarian, Peter Brassel, Veterinarian, Sandra Shearer, Veterinarian, CFIA. April 2004.

7-Case Series review: assessment of the role of hatcheries as a source of avian influenza. Lindsey Garber, Epidemiologist, CEAH, USDA, April 2004.

8-Case Series review: assessment of the role of feeds and feed mills in the transmission of avian influenza. Blaine Thompson, Veterinarian, CFIA. March 2004.

9- Risk of CFIA staff transferring avian influenza to uninfected flocks as a result of blood sampling and depopulating infected flocks. Sandra Shearer, Veterinarian, CFIA. April 2004.

10-Surface wind conditions in the Fraser Valley during the avian influenza (January 11-April 2, 2004), Stephanie Meyn, Air Quality Meteorolgist, BC Ministry of Water Land And Air Protection. April 2004.

11-Evaluation for the potential of dust borne barn to barn transmission of highly pathogenic avian influenza in the Fraser Valley, British Columbia. in March 2004. Carolyn Dubé, Epidemiologist , Animal Health and Production Division and Pascal Moreau, Risk Analyst and Scientific Advisor, Animal Health Risk Analysis, Science Branch, April 2004.

12-The role of wild birds as a source of low pathogenic avian influenza (H7N3). Victoria Bowes, Poultry Pathologist, BC Ministry of Agriculture Food and Fisheries, April 2004.

13-Wild birds as a source of transmission of avian influenza in the Fraser Valley, British Columbia. Pascal Moreau, Risk Analyst and Scientific Advisor, Animal Health Risk Analysis Unit, Science Branch, April 2004.

14-Report on the avian influenza aerosol sampling trial in the British Columbia Fraser Valley April 9-19, 2004. Laurie Schofield, Jim Ho, Bill Kournikakis, Research Scientists, Defence R and D Canada- Suffield, Department of National Defence, June 2004.

15-Comprehensive report on the 2004 outbreak of High Pathogenicity Avian Influenza (H7N3) in the Fraser Valley of British Columbia, Canada. Wayne Lees, Epidemiologist and Lawana Chown, student, Animal Disease Surveillance Unit, June 2004.

16-Avian Influenza. CAHNet Bulletin Edition 9. Animal Disease Surveillance Unit. Winter 2004.

17-Report on the Canadian Poultry Industry Forum of October 27 and 28, 2004, Abbotsford, B.C. Ross Hudson and Lynn Elwell, CFIA, December 2004.

18-Post-Incident Review of the CFIA's Response to the 2004 Avian Influenza Outbreak in B.C. Corporate Evaluation Directorate. CFIA. December 9, 2004. Draft.

## 7.0 Acknowledgments

Many people have contributed to the work referred to in this document and their efforts are gratefully acknowledged below.

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# Questions and Answers
# CFIA Epidemiological Reports
# Avian Influenza Outbreak of 2004

**Q1. What was the purpose of the *CFIA Source and Means of Spread Report*?**

A1. During the outbreak of high pathogenicity avian influenza (H7N3) in the Lower Fraser Valley of British Columbia, an epidemiology team was established in the British Columbia Emergency Operations Centre (BCEOC). A key role of this team was to investigate the sources of the virus and the multiple, potential modes of transmission of the virus from farm to farm.

The *CFIA Source and Means of Spread Report* synthesizes the information provided by investigators and consultants from various organisations that contributed to the outbreak investigation.

The report provides information to poultry producers on the current level of knowledge of the avian influenza virus and the findings of analyses that were done into its origin and spread. It also provides important information that will be used to direct future animal disease outbreak responses.

In addition, the report outlines a number of recommendations to the poultry industry to enhance biosecurity.

**Q2. What were the findings of the *Source and Means of Spread Report*?**

A2. The outbreak of high pathogenicity avian influenza (H7N3) is thought to be caused by a mutation from a low pathogenicity avian influenza strain circulating in an Abbotsford broiler breeder flock as it moved to an adjacent flock on the same premises.

Once a flock becomes infected, the shedding of the virus into the environment makes biocontainment difficult.

The two most likely causes leading to the rapid spread of the virus were:

- Poor on-farm biosecurity practices in some flocks including the regular traffic flow on farms;
- Aerosolised dust possibly contaminated with avian influenza virus between poultry barns that were in close proximity.

The high density of poultry farms in the region also contributed to the spread of the virus.

**Q3. Did the CFIA have its Source and Means of Spread report peer-reviewed?**

A3. Yes. The report underwent peer-review by leading experts at the BC Centre for Coastal Health, the BC Ministry of Agriculture, Food and Fisheries, and by experts from other countries, including the United States, the Netherlands, Australia, Hong Kong, the United Kingdom, and Italy.

**Q4. The *Source and Means of Spread* report indicates that there was a time lag between the detection of the avian influenza virus and depopulation and disposal. How will the CFIA rectify this for future outbreak responses?**

A4. The Agency, among other groups, may have passively contributed to the spread of the virus due to the time between detection of the virus and the depopulation and disposal of infected flocks. Better coordination of response efforts and clear roles and responsibilities between all organisations partnering in the process may have improved the time lags.

In 2005, the Agency is committed to reviewing its emergency management approach to incorporate the lessons learned from avian influenza and to adopt, where feasible, best practices used by partner agencies. There are plans to revise the structure of the CFIA's emergency response teams to more clearly define the roles, responsibilities and delegated decision-making accountabilities at all levels.

Foreign Animal Disease Eradication Support (FADES) plans for all provinces will be reviewed and completed using a common template to ensure consistency and to ensure all aspects of emergency preparation and response are considered. These plans will describe the roles and responsibilities of organizations that will support the CFIA during an emergency animal disease outbreak to ensure there are no gaps in the response process.

**Q5. What are your conclusions about the source of the virus in the Fraser Valley of British Columbia?**

A5. Waterfowl are well established primary reservoirs for a wide variety of strains of avian influenza and in the past have been implicated in the spread of influenza to commercial poultry. Given the Matsqui Prairie lies on a migration route and in the month of February waterfowl and other wild birds are a common sight in ditches and fields, the source of the virus was thought to be most likely derived from migratory or resident waterfowl carrying the virus and shedding it in their faeces to contaminate the environment.

Domestic poultry could also have been the source of the avian influenza virus on the index premises. The genetic make-up of the avian influenza virus isolated on the index premises can help to answer the question of whether it most likely came from waterfowl or from domestic poultry. This work is ongoing and should help to establish the predominance of wild versus domestic components of the viral genome. In this way we hope to obtain a clearer picture of where the original virus came from and whether it was of waterfowl or domestic origin.

**Q6. What are your conclusions on the factors that may have contributed to the spread of avian influenza in the Fraser Valley?**

A6. **Poultry Manure/Litter (Sawdust)**

Transmission of contaminated manure from an infected premises to another susceptible flock can occur through the movement of people, equipment, and vehicles, with barn to barn movement posing the highest risk of transfer. It is thought that it only takes a small amount of contaminated dust on clothing or equipment to transmit the virus.

In a 2001 BCMAFF survey of biosecurity practices in the Lower Fraser Valley, more than three quarters of the commercial broiler and table egg operators indicated they do not provide disinfection footbaths or require a change of clothes on entering their barns.

There was a great deal of traffic on and off farms in the Abbotsford area during the outbreak and if proper biosecurity practices were not used on farms, the potential to spread disease was very real.

**Aerosol/Airborne Dust Dispersion**

Little is known about the survival of avian influenza viruses in dust particles due to limited experimental work conducted to date.

In early April, as part of its epidemiological investigation, the CFIA undertook a study to examine airborne spread of virus near infected barns. The goal was to evaluate if AI virus was being spread into surrounding areas on dust particles emitted from barns containing infected birds. Although the study confirmed that AI virus was circulating in the air outside barns during the outbreak, it remained unclear if the virus was alive and therefore potentially infectious. A complete report of this work will follow.

Evidence of what may have been windborne transmission in the third week of March, as the disease spread to the fourth and fifth premises, reinforced the Agency’s activities to minimize any potential airborne transmission.

**Q7. How did the disease jump over large distances?**

A7. Vehicles, equipment and clothing can carry the avian influenza virus. It is likely that the cause of the disease jumping over large distances can be attributed to contaminated dust or other material on footwear or on vehicles that visited an infected premises and consequently travelled to another, non-infected premises.

Without appropriate biosecurity measures, the chances increase that the virus will travel to another location via persons or vehicles.

**Q8. What is biosecurity?**

A8. In the context of the avian influenza outbreak of 2004, biosecurity refers to the measures put in place that can significantly reduce the risk of introduction of the disease into a flock . This is accomplished by isolating the birds inside a barn from any potential source of contamination outside a barn. Biosecurity programs must address multiple potential avenues of disease (virus) entry on a farm such as wildbirds, rodents, feed, water, equipment, vehicles and people.

>

**Q9. Why did the CFIA insist on destroying birds from backyard flocks? Did these birds really pose a risk of spreading the virus?**

A9. While the CFIA recognized the concerns of owners of backyard flocks, including the fact that these birds are often considered pets, these birds were considered a potential source for disease transmission. The depopulation was intended to contain further disease spread by eliminating the pool of infection and susceptible birds present. Test results found avian influenza in 11 backyard flocks.

Furthermore, there is no clear definition of what comprises a "backyard" flock. These are flocks that operate outside the established industry quota system. Some backyard flocks may be small, but others may have up to five thousand birds.

Following depopulation, these birds were tested to draw conclusions on the risk associated with backyard flocks. The CFIA will use these results to revise current policies on how to deal with backyard flocks in future outbreaks.

**Q10. Influenza has been linked to the possibility of a pandemic. What is the government of Canada doing to protect Canadians against an influenza pandemic?**

A10. **Foreign Animal Diseases**

Early detection and eradication of outbreaks of avian influenza are key in preventing its spread which in turn can decrease the possibility that it would be transmitted to humans. The CFIA has already begun its follow-up activities to address findings from its Lessons Learned report, including enhancements to its foreign animal disease emergency preparedness plans and supporting industry in the development of enhanced bio-security measures.

Recently, CFIA officials met with the national poultry associations and agreed on a number of priority action items. Joint working groups are being established to look at approaches that will best limit the spread of disease during an outbreak.

Another key lesson learned from the outbreak is the need to broaden and update the Foreign Animal Disease Eradication Support (FADES) plans. As a result, the CFIA is developing a new template which will incorporate increased involvement of federal, provincial, territorial, municipal, and industry partners. The CFIA will be seeking input on the template prior to a full consultation process on the FADES plans.

**Public Health**

The Public Health Agency of Canada (PHAC), together with provincial and territorial governments and other federal government departments including the CFIA, continues to maintain the Canadian Pandemic Influenza Plan that maps out how Canada will prepare for and respond to a pandemic of influenza.

The PHAC also provides international leadership on pandemic preparedness. Canada is collaborating with the World Health Organisation (WHO), other international organizations and other countries to improve global pandemic preparedness.

The PHAC is also monitoring the global situation and verifies information received from the Global Public Health Information Network (GPHIN) alert system.

Canada is the first country worldwide to plan for a secure vaccine

supply through the contracting of a domestic supplier. Also, plans for the creation of a national antiviral stockpile for use against an influenza pandemic are underway.

Managing a real-time alert system for serious respiratory illnesses (SRIs), including SARS and avian influenza, to ensure timely dissemination of information to the provinces and territories.

**Q11. What are the next steps?**

A11. The *CFIA Source and Means of Spread Report* outlines a number of recommendations to the poultry industry to enhance farm biosecurity. The CFIA is committed to reviewing its own biosecurity protocols and is following up on all the recommendations outlined in its "Lessons Learned" report.

The CFIA has used its experience during the outbreak in B.C. to undertake new research into the source and transmissibility of the virus. This includes research to explore the potential role of airborne transmission of avian influenza.

During the course of the outbreak, the CFIA conducted a study to determine the risk factors for exposure to the avian influenza virus in commercial poultry operations in the B.C. Lower Fraser Valley. A report of the study's findings is expected in the fall of 2005.

In addition, a national serological survey of domestic poultry in Canada is scheduled to begin in the spring of 2005. This survey will measure the prevalence of avian influenza in a broad range of poultry sectors.

The CFIA is also exploring the feasibility of a conducting a national survey in 2005 to measure the prevalence of avian influenza in migratory waterfowl.

This ongoing research will contribute to the advancement of world knowledge on avian influenza. As additional research findings are compiled, they will be made publicly available.

**Q12. What is the purpose of the *CFIA Comprehensive Summary Report*?**

A12. The *CFIA Comprehensive Summary Report* was compiled shortly after the outbreak as a way to chronicle key events in the disease outbreak response.

The CFIA collected large amounts of data during the outbreak. This report includes:

- Background information on the B.C. poultry industry; avian influenza in Canada; the veterinary infrastructure in Canada; and import/export trade data
- The various roles of key partners in the outbreak response
- A description of the outbreak, including a series of maps showing the affected area and a timeline of key events during the response
- Disease control actions taken (ie. methods of destruction, carcass disposal options, compensation, movement restriction options, enforcement activities)
- Diagnostic findings

This report was completed in June of 2004, and a short summary of this report was first presented at the Abbotsford post-mortem meeting held on October 28, 2004.

- Canadian Food Inspection Agency Reports Following an Outbreak of High Pathogenicity Avian Influenza in the Lower Fraser Valley, BC in the Winter of 2004

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Important Notices

HOUSE OF COMMONS
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# FROM A MANAGEMENT CRISIS, TO BECOMING BETTER CRISIS MANAGERS: THE 2004 AVIAN INFLUENZA OUTBREAK IN BRITISH COLUMBIA

## REPORT OF THE STANDING COMMITTEE ON AGRICULTURE AND AGRI-FOOD

**PAUL STECKLE, M.P.**
**Chair**

**April 2005**

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## REPORT OF THE STANDING COMMITTEE ON AGRICULTURE AND AGRI-FOOD

**PAUL STECKLE, M.P.**
**Chair**

**April 2005**

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# THE STANDING COMMITTEE ON AGRICULTURE AND AGRI-FOOD

has the honour to present its

## THIRD REPORT

Pursuant to Standing Order 108(2), the Committee has undertaken a study on the Avian Flu. After hearing evidence, the Committee agreed to report to the House as follows:

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# CHAIR'S FOREWORD

For sanitary reasons, it was not appropriate for the Standing Committee to travel to British Columbia during the avian influenza (AI) outbreak that affected the Fraser Valley region in February 2004. The Standing Committee did, however, hold a briefing session in March 2004 in Ottawa, and its agenda called for an eventual fact-finding mission to the region. When the Standing Committee reconvened at the beginning of the 38th Parliament, members unanimously agreed on 14 October 2004 to travel to British Columbia.

The Standing Committee held hearings on 18 and 19 January 2005 in Abbotsford on the devastating AI outbreak (see Appendix 1 for a chronology of events). Over 35 individuals, farming associations and officials from both federal and provincial governments appeared before the Standing Committee.

The fact-finding mission provided a public forum for stakeholders to discuss the lessons learned from the outbreak. Some analysts view that event as the possible precursor of an even more serious outbreak that could eventually have worldwide ramifications. The Standing Committee therefore believes that it is imperative that the lessons learned be well understood and put into action, rather than just being compiled in another bureaucratic document. They must become the basis for implementing an enhanced animal health crisis management system at the federal level, particularly considering that the increasingly integrated nature of animal and human health policies requires a renewed emergency preparedness level. The AI outbreak in British Columbia can be seen as a warning; serious new measures must be taken in anticipation of the "next time."

The Standing Committee is pleased to present in these initial pages of its report some of the comments made by various stakeholders during the Abbotsford hearings:

> The outbreak was a learning experience for Canada – why should the B.C. industry bear the brunt of inexperienced management? Hopefully the lessons learned, and the resulting changes in emergency management will prevent a similar experience from happening again! Our view is that the cost for this learning experience should be shared nationally.
>
> Mr. Garnet Etsell, President
> B.C. Turkey Producers Association
> Hearings of the Standing Committee on Agriculture and Agri-Food on Avian Influenza
> Abbotsford, B.C.
> (Thereafter cited as "Hearings")
> 18 January 2005

It is the contention of the backyard farmers that the Avian Influenza outbreak and subsequent mutation from low to high pathogenic strain was a commercial industry problem with subsequent possible contamination of a single neighbouring backyard flock. Put in simple words, we believe that the backyard flocks have never been part of the problem but were made part of an inappropriate solution.

Barbara Fischer
on behalf of the Committee of
the Backyard Farmers Association
Hearings,18 January 2005

Proper management of AI is a public good as human and animal health authorities world-wide recognize the need to come to grips with AI. We believe one way Canada can act is by ensuring there are sufficient funds set aside to compensate for loss of birds and business interruption so nothing stands in the way of a quick, surgical pre-emptive cull.

Tim Lambert, Executive Director
Canadian Egg Marketing Agency
Presentation to the House of Commons
Standing Committee on Agriculture and Agri-Food
Abbotsford, B.C.
18 January 2005

Proper management of AI is a public good as human and animal health authorities world-wide recognize the need to come to grips with AI. We believe one way Canada can act is by ensuring there are sufficient funds set aside to compensate for loss of birds and business interruption so nothing stands in the way of a quick, surgical pre-emptive cull.

Tim Lambert, Executive Director
Canadian Egg Marketing Agency
Hearings, 18 January 2005

It was not managed at the beginning as an emergency situation.

Don Beer, Fire Chief
Hearings, 18 January 2005

Cleaning and disinfecting at CFIA requirements was a massive job at the charge of farmers, and these costs were not compensated.

Derek Janzen, President
BC Egg Producers Association
Hearings, 18 January 2005

Some of our breeding stocks that were depleted are irreplaceable.

Rob Donaldson
Bradner Farms
Hearings,
18 January 2005

As far as the OIE and the European Union,(…) I would look at our outbreak and absolutely congratulate the CFIA for being able to do this in 90 days and not have it breach the valley. But I want you to know that the only reason that CFIA can declare victory is for two key events that happened. April 1st when the industry was invited to the table, there were 20 positive farms. It had breached the high-risk zone, it was out of control. The declaration of a provincial (pause)…getting a provincial emergency team totally changed the tide. We finally had a group of people that were in the business of managing outbreaks, or managing emergencies, and they started to rein this back in. But I want to tell you that the reason this was contained was because of this poultry industry, their dedication and commitment. They presented to CFIA a plan. The reason this was contained was because it was through their efforts of clearing the barns, of getting rid of the negative birds so the flu had nowhere to go, is the reason that this was contained, and I want to go on record as saying it was this industry that turned this around.

Dr. Victoria Bowes
Hearings, 19 January 2005

If there is another outbreak? There should be a total lock-down – no movement of birds or manure. Compensation must be in place to allow drastic action.

Bruce Arabsky, Pollon Group
On behalf of Primary Poultry
Processors Association of BC
Hearings, 19 January 2005

It is ludicrous that the disease was not contained in the Matsqui flat area. Again it is because of procrastination and lack of common sense. We spent a huge amount of time waiting for decisions to come from Ottawa, and most of the time local CFIA staff didn't know how to interpret those decisions.

Dr Neil Ambrose, DVM
Hearings, 19 January 2005

The following report builds on these and many other practical suggestions, with the aim of preparing Canada to manage future animal health crises more effectively.

Paul Steckle
Chair
Standing Committee on Agriculture and Agri-Food

# LIST OF RECOMMENDATIONS

**RECOMMENDATION 1**

**That an independent commission of inquiry be struck with the mandate to investigate the 2004 avian influenza outbreak in British Columbia. To prevent the reoccurrence of outbreaks, the commission must review the effectiveness of the emergency preparedness and implementation strategies that were deployed in British Columbia, regarding zoonotic diseases.**

**RECOMMENDATION 2**

**That using the 2004 avian influenza outbreak in British Columbia as a benchmark, the Auditor General of Canada be asked to audit the effectiveness of various emergency preparedness strategies related to animal diseases, with an emphasis on strategies related to zoonotic diseases.**

**RECOMMENDATION 3**

**That the Canadian Food Inspection Agency establish a "Special Animal Disease Response Team," comprising CFIA, provincial and local experts, that can be quickly deployed with appropriate well-maintained equipment, and that is responsible for overseeing practices of emergency preparedness plans and procedures on a regular basis.**

**RECOMMENDATION 4**

**That the Canadian Food Inspection Agency be required to present a cost-benefit analysis, by the end of 2005, on the need to have an increased number of Containment Level 3 facilities in Canada.**

**RECOMMENDATION 5**

**That the Canadian Food Inspection Agency must ensure that its euthanasia techniques are compatible with internationally recognized humane best practices, and that its personnel conduct euthanasia exercises to remain well trained for carrying out these techniques.**

**RECOMMENDATION 6**

**That, in its review of the existing compensation program under the *Health of Animals Act*, the Canadian Food Inspection Agency must ensure fairness and consistency among all types of production. In recognizing the intrinsic value of the genetic material so important to some industries, flexibility must be allowed in compensation. The Agency, in consultation with the affected industries, should also consider how equitable compensation might be offered for forgone income, and for one-time losses.**

**RECOMMENDATION 7**

**That any industry recommendations/actions for a pre-emptive cull to limit the potential spread of an outbreak of animal disease must be submitted to the Canadian Food Inspection Agency. The Agency, in consultation with the affected provinces and industries, must be proactive and responsible for authorizing and supervising any such pre-emptive cull.**

# INTRODUCTION

As a follow-up to the avian influenza outbreak of February 2004 in British Columbia's Fraser Valley, the B.C. Ministry of Agriculture, Food and Fisheries (BCMAFF), the Canadian Food Inspection Agency (CFIA) and the B.C. poultry industry decided to organize a forum entitled "Avian Influenza — Lessons Learned and Moving Forward." On 27 and 28 October 2004, over 180 people participated in the Canadian Poultry Industry Forum in Abbotsford, B.C. They shared experiences and made recommendations covering four areas: the interface between animal and human health; biosecurity; enhanced emergency management; and industry and community economic recovery. The report on the Forum was tabled in December 2004 (see the list of recommendations in Appendix 2).

This comprehensive industry report and recommendations provide the basis for implementing new measures and policies aimed at improving the management of any eventual outbreak of animal disease in Canada. The report also served as a reference document for witnesses who appeared before the Standing Committee on 18 and 19 January 2005. By relating their own experiences to the information contained in the Forum report, witnesses were able to provide the Standing Committee with well-thought-out views that combined the immediacy of personal response with the advantages of hindsight and a broader context.

It became evident in the first hours of the hearings that two main themes would dominate the discussions. A large majority of witnesses raised these themes in relation to the role played by the CFIA during the AI outbreak:

- **Leadership** (or the lack thereof)
- **Communication** (or the absence of appropriate communication)

It was also evident that witnesses clearly understood that the Standing Committee, which has the mandate and powers to study and report on all matters relating to the mandate, management and operation of federal organizations concerned with agriculture and agri-food, was the appropriate open forum to continue the discussion on the role and approach of the CFIA throughout the outbreak.

If hindsight can provide a better view on a situation, it also offers more time to identify a target. For various reasons the CFIA has become that target. Many witnesses expressed to the Standing Committee — sometimes in a visceral way — their perceptions of various mismanagement practices during the crisis. For some, the management of the crisis became itself a management crisis. Already in the spotlight, the CFIA further exacerbated the debate by publishing on 17 January 2005 — the day before the Standing Committee hearings began in Abbotsford — its report entitled *Lessons Learned Review: The CFIA's Response to the 2004 Avian Influenza Outbreak in B.C.*[1] The report incorporates a series of commitments to respond to both the CFIA's internal review findings and those of the Canadian Poultry Industry Forum held in October 2004, and it offers a comprehensive and improved action plan for an enhanced emergency preparedness strategy. The timing of its release, however, has largely eclipsed its contents.

The objective of the present report is not to review the scientific issues of the outbreak or the entire list of "what went well and what went wrong," but rather to concentrate on the most politically sensitive issues. The recommendations, therefore, mainly focus on the two themes most often mentioned by witnesses during the Standing Committee hearings.

## LEADERSHIP

### A. Background

The leadership issues raised during the Standing Committee hearings were closely related to jurisdictions — federal, provincial and local — and the relationship between officials of these jurisdictions.

Although it was recognized that the CFIA had the legal authority, scientific mandate and international responsibilities that qualified it to play the lead role and, as mentioned in the CFIA *Lessons Learned* document, that "the CFIA President had the ultimate accountability for the Agency's response to the outbreak," many witnesses held that such a crisis should not have been managed from Ottawa. This centralization of decisions became a dominant theme during the hearings.

[1] The report is dated 10 January 2005, but it was released one week later accompanied by a press release dated 17 January 2005.

## B. Leadership Means Being Prepared

British Columbia Minister of Agriculture, Food and Fisheries John van Dongen referred to the 2004 AI outbreak as the "Fraser Valley's wildfire." Canada had not responded to such a large-scale foreign animal disease outbreak (i.e., a disease that is not indigenous to Canada) since the 1952 foot and mouth outbreak. Federal-provincial response plans to animal health issues had become obsolete by 2004, and some witnesses saw this as the result of a lack of leadership over the years. In a world where public and animal health policies are closely related, public authorities must always be prepared to react quickly to animal diseases.

One of the lessons learned is clearly that "effective preparation for, and response to, foreign animal disease outbreaks in Canada must be seen as a shared responsibility."[2] To identify and eradicate a disease, to compensate those affected by the outbreak, and to facilitate a quick return to normal operations require close collaboration between all levels of government, between agriculture and health authorities, and between industry and governments. Regular monitoring and updating of federal-provincial plans, such as the B.C. Foreign Animal Disease Eradication Support (FADES) plan, are imperative to ensure that shared responsibilities are well understood and respected. Management of a crisis such as the AI outbreak is a major challenge that requires decisive action by every stakeholder; focus and energy should not be dissipated through jurisdictional uncertainties.

> Whether in responding to disease outbreaks, improving bio-security standards and their enforcement, or delivering economic recovery assistance, we need to strengthen partnerships, clarify mandates and accountabilities and align resources with objectives.
>
> Rory McAlpine, Deputy Minister
> British Columbia Ministry of Agriculture,
> Food and Fisheries
> Hearings, 18 January 2005

Focus groups and participants who contributed to the CFIA *Lessons Learned* document [3] indicated that effective leadership was provided at multiple levels in the organization, and that one measure of effective leadership was the fact that the CFIA's risk management decisions were supported by the industry.[4] But risk management leadership is not only a matter of making the right decisions during the course of a crisis; it is also, if not more, a matter of vision and preparedness. The

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[2] Rory McAlpine, Deputy Minister, British Columbia Ministry of Agriculture, Food and Fisheries, Hearings, 18 January 2005.

[3] Please consult Appendix 4 for an exhaustive list of participants.

[4] Canadian Food Inspection Agency, *Lessons Learned Review: The CFIA's Response to the 2004 Avian Influenza Outbreak in B.C.*, Ottawa, 10 January 2005, p. 3.

relevant question to ask is then: if the CFIA had a lead role, why was the FADES plan, for instance, not up to date? The hearings did not provide a clear response to that question. Leadership, however, is a shared responsibility, and one may presume that both levels of government and, to a lesser extent, the industry, should bear part of the blame. This view is somewhat shared by the CFIA:

> Recently we [the CFIA] have been criticized for our handling of the AI outbreak in BC. I am not going to deny that there were shortcomings which included the Agency. As I mentioned in Abbotsford, I think all those involved could have been better prepared.
>
> Richard Fadden, President
> Canadian Food Inspection Agency
> Standing Committee on Agriculture and Agri-Food
> Meeting No. 21 — 15:35
> 1st Session, 38th Parliament
> Ottawa, 8 February 2005

In its *Lessons Learned* document, the CFIA reviewed the following specific aspects of leadership: governance, collaborative arrangements, decision-making and accountability, which are exactly the same ones mentioned by witnesses before the Standing Committee. Furthermore, the following excerpt from the CFIA document, based on comments made by participants in the focus groups, also reflects in part the concerns and irritants described by witnesses to the Standing Committee:

> Many participants felt that decision making could have been more localized and that the requirement for certain policy/strategic decisions to be made by the CFIA AI Executive group at headquarters impacted on the timeliness of decision-making. Others recognized that it was necessary for the AI outbreak to be managed as a national emergency with policy and domestic and international trade implications that extended beyond the province of B.C. Overall it was felt that the parameters around which decisions can be made locally (i.e. tactical) versus nationally (i.e. strategic) can be better defined. The lack of clarity may have contributed to the elevation of certain operational decisions to the national level. [5]

The CFIA *Lessons Learned* exercise resulted in three recommendations pertaining to leadership issues, to which the Agency responded.

- The first recommendation is on the review of protocols associated with the activation of local, area and national emergency response teams and on the roles and responsibilities, and decision-making accountabilities, at each level. The CFIA is currently reviewing the various levels of emergency response to

[5] Ibid., p. 12.

ensure a consistent national approach, and it has invited Public Safety and Emergency Preparedness Canada to participate in the review process. According to the CFIA, updated emergency response procedures and protocols should be recommended by the spring of 2005.

- The second recommendation is on the development of collaborative arrangements with Health Canada and the new Public Health Agency of Canada (PHAC) with the goal of increasing the federal capacity to respond to zoonotic[6] disease outbreaks. In its response, the CFIA mentioned that discussions have been launched with both Health Canada and the PHAC to develop an updated roles and responsibilities framework and a memorandum of understanding (MOU) on response to zoonotic disease outbreaks, including protocols for liaising with provincial health authorities. The framework and MOU will be ready by December 2005.

- Finally, the third recommendation concerns the ongoing development and practising of FADES plans in all provinces. The CFIA is committed to negotiating and finalizing agreements on this matter with all provinces and territories, and all FADES plans will contain a mandatory fixed schedule for their practice.

These three recommendations on the leadership issues, and the CFIA's responses, are certainly a step in the right direction. Unfortunately they are viewed as coming too late for the Fraser Valley poultry producers and citizens. Certainly, mistakes were made due to a certain lack of leadership during the 2004 AI outbreak in British Columbia. The Standing Committee hopes that the lessons learned will help avert similar mistakes in the future, because it is almost certain that there could be other outbreaks of animal diseases in the future. The main lesson learned by the people of the Fraser Valley is that proper management of AI, or other zoonotic diseases, is a matter of public health and safety, and it requires the proper reaction of public authorities. That realization prompted many witnesses at the hearings to request an independent inquiry into the mismanagement of the 2004 AI outbreak. Because of the integrated nature of human and animal diseases, and the high probability of other outbreaks, the Standing Committee endorses that request and therefore recommends:

**RECOMMENDATION 1**

**That an independent commission of inquiry be struck with the mandate to investigate the 2004 avian influenza**

[6] Zoonotic diseases are those transmissible from animals to humans.

**outbreak in British Columbia. To prevent the reoccurrence of outbreaks, the commission must review the effectiveness of the emergency preparedness and implementation strategies that were deployed in British Columbia, regarding zoonotic diseases.**

Furthermore, because it is important to look ahead and send guidelines to the government, the Standing Committee recommends:

**RECOMMENDATION 2**

**That using the 2004 avian influenza outbreak in British Columbia as a benchmark, the Auditor General of Canada be asked to audit the effectiveness of various emergency preparedness strategies related to animal diseases, with an emphasis on strategies related to zoonotic diseases.**

## C. Being Prepared Means Practising

> Conveners emphasized that there needs to be a collaborative approach to emergency management, that FADES plans need to be redesigned and there is a need to "Practice, Practice, Practice."
>
> Canadian Poultry Industry Forum report, *Avian Influenza — Lessons Learned and Moving Forward*, December 2004, p. 37

Another clear shortcoming that marked the AI outbreak is that some plans that were used had never been tested. The CFIA and the Province of British Columbia executed the existing emergency plans at the beginning of the outbreak, and the FADES was the plan that broadly guided the operations.

Many witnesses before the Standing Committee testified to a long list of situations that indicated a general lack of preparedness in the first, and most critical, days of the outbreak. For example: decisions were not always made based on science; infected carcasses were dumped in a large feed mixer not adapted to the disposal of such a volume of birds; infected carcasses were transported along a public road in unsealed containers; frequent delays in reaction worsened an already urgent situation; many vehicles left the high-risk zone without having their wheels sanitized. It was also mentioned that, while carbon dioxide ($CO_2$) gas was chosen as the method of euthanasia for the first flock, a mobile electric stunning machine normally used for the euthanasia of spent commercial egg-laying hens was employed on the second farm. Some observers interpreted this as indicating that the CFIA was testing another method of euthanasia, and perceived it as a further sign of lack of preparedness.

A large majority of witnesses who appeared before the Standing Committee — many of whom had seen these questionable activities at first hand — stated that the beginning of the outbreak was marked by a series of decisions that revealed that emergency plans had not been practised for a while, if at all.

> Despite the advantages of the quick diagnosis of AIV by the BCMAFF-AHC laboratory, the natural geographic boundaries (the index farm was bordered by a mountain and the Fraser River on two sides) and the on-farm provisions for self-quarantine, the authors speculate that biocontainment was not achieved due to the release of vast quantities of virus into the environment associated with the depopulation procedures employed and the delay in depopulating suspect positive farms until laboratory confirmation. Based on these observations, the depopulation methods employed during an outbreak of a highly infectious disease such as HPAI must not allow the opportunity for aerosol-assisted spread and the contamination of the environment, including roadways, people and vehicles.
>
> Dave K. Loewen, Trevor R. De Jong
> Stewart J. Ritchie, Victoria A. Bowes
> *Brief Communication: A Producers Account of the Euthanasia and Depopulation Procedures at the First and Second Farms Diagnosed with Highly Pathogenic Avian Influenza in British Columbia in 2004.*
> Draft report tabled with the Standing Committee on Agriculture and Agri-Food, Abbotsford, B.C., 18 January 2005

Witnesses also raised questions in relation to the respective roles, responsibilities and decision-making accountabilities of the CFIA's area emergency response team (AERT), the national emergency response team (NERT), and the AI Executive group. There was evidence of confusion about which team had the lead and which decisions could be made locally as opposed to nationally. This lack of clarity also points clearly to a lack of practice.

When the lessons have been learned, the real test is yet to come. Exercises and dry runs must be part of an integrated emergency preparedness strategy, as recognized by the CFIA regarding the FADES plans (see Recommendation 3 in Appendix 3). The Canadian strategy in this matter should be inspired by the European Union, where simulation exercises within the framework of "avian pests" are regularly conducted using various methods of euthanasia on spent egg-laying flocks. During the Standing Committee hearings in Abbotsford, and later in Ottawa, the idea of a "Special Animal Disease Response Team" was raised. Such a team would not only be quickly operational when an outbreak occurs, but would also be in charge of conducting regular exercises with provincial partners to ensure that all those who may be called upon during an outbreak are well trained and that bureaucratic plans are in fact applicable. For instance, it was mentioned that February 2004 was the first time that the CFIA had used chemical euthanasia, in this case $CO_2$, for a massive depopulation of birds in Canada. International scientific documents and field manuals all strongly recommend that chemical

euthanasia procedures be carried out only by trained individuals who are properly authorized to use the appropriate chemicals. The Standing Committee therefore recommends:

**RECOMMENDATION 3**

**That the Canadian Food Inspection Agency establish a "Special Animal Disease Response Team," comprising CFIA, provincial and local experts, that can be quickly deployed with appropriate well-maintained equipment, and that is responsible for overseeing practices of emergency preparedness plans and procedures on a regular basis.**

## COMMUNICATION AND CONSULTATION

### A. The Overall Approach

Many witnesses from the industry complained that the CFIA did not communicate information on protocols, procedures and compensation effectively to stakeholders. Another general complaint was that the CFIA excluded stakeholders and local authorities from discussions and meetings where important planning and logistics decisions were made that involved the poultry industry. The following excerpt from the CFIA *Lessons Learned* review reveals that focus groups consulted by the CFIA shared the same issues that witnesses raised before the Standing Committee:

> As in most emergency response situations, the demand for information, briefings and reports quickly escalated throughout the *AI* outbreak. While protocols were in place to facilitate internal and external information flow, some focus group participants indicated that they were not satisfied with the timeliness and relevance of the information provided. In particular, laboratory testing results were identified as key information that was not being shared in a timely fashion. Problems with the *LSTS* (Laboratory Sample Tracking System) system described above and the requirement for laboratory results to be reported at the headquarters level prior to being forwarded to the local *EOC* (Emergency Operations Center) were identified as contributing to delays.
>
> Overall it was recognized that a better anticipation of information needs and coordination of reporting activities could improve information flow. For example, the requirements of senior decision makers for information on the status of farms, number of birds depopulated, compensation costs etc. were entirely predictable. While situation reports were shared with federal and provincial partners, some felt that the information contained in these

reports was outdated. However, it was also noted that regular *AI* updates were being posted on the Agency's website.[7]

The shared jurisdiction and responsibility of the CFIA may be difficult to manage in some situations, and protecting the jurisdiction of one's organization is a normal reaction for a manager. However, at the same time, consultation and collaboration are imperative for a seamless strategy aimed at serving Canadians. As highlighted in its *Report on Plans and Priorities*, the CFIA recognizes the importance of a collaborative approach: "strong partnerships with other federal government departments, as well as provincial, territorial and municipal authorities are imperative to the Agency's success. All share responsibility for setting and/or enforcing standards that support the integrity of Canada's food safety, animal health and plant protection systems."[8]

The message heard by the Standing Committee in Abbotsford was that consultation and communication were problematic. For example, the CFIA did not always make adequate use of local resources such as veterinarians with vast expertise in poultry diseases, and it sometimes ignored industry suggestions on pre-emptive culls and disposal of carcasses.

The CFIA, however, told the Standing Committee that it consulted and communicated extensively. Agency officials stated that:

- The CFIA held 36 conference calls with the national and B.C. poultry associations between 9 March and 27 August 2004.

- The Agency held daily meetings with provincial and industry representatives at the Abbotsford Emergency Operations Centre, starting on 1 April 2004. As the pace of operations slowed, the meetings were reduced to three and two times per week until they were no longer necessary.

- Prior to April 1, several meetings on AI were held between the CFIA, BCMAFF and the industry.

- The industry and the province had representatives present in the CFIA's local Emergency Operations Centre in British Columbia from early April to late May.

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[7] Canadian Food Inspection Agency (2005), p. 15.

[8] Canadian Food Inspection Agency, *Report on Plans and Priorities 2005-2006*, Ottawa, p. 4.

- CFIA headquarters officials had eight face-to-face meetings with national and B.C. industry association representatives on a full range of issues, and responded to 118 letters and electronic messages from these groups. Several face-to-face sessions were also held in British Columbia with other levels of government, industry and the general public.

- The CFIA also held two open-house meetings in the Fraser Valley to promote understanding and provide practical demonstrations of biosecurity measures.[9]

Whether or not this is a dialogue of the deaf between the CFIA and stakeholders or, as stated by the CFIA President, "two ships passing in the night," the CFIA has nevertheless recognized the communication and consultation issues and addressed them, notably in Recommendations 1 and 5 of the *Lessons Learned* review. The Committee is pleased with those recommendations, but will monitor their implementation in its future meetings with the CFIA.

### B. Cooperation in Developing a Laboratory Network Within Canada

During the AI outbreak in the Fraser Valley, samples were sent by plane to the Canadian Science Centre for Human and Animal Health in Winnipeg. That Centre is located in Winnipeg precisely because it is approximately a midpoint in Canada. Although the Standing Committee recognized that this was probably the best approach during the outbreak, concerns were raised about the efficiency of such an approach, in terms of both cost and timing. At the Abbotsford hearings, an official from BCMAFF told the Standing Committee that the Ministry was in the process of upgrading its animal health laboratory to a Containment Level 3 facility. Three animal diagnosis laboratories are currently certified to work at Level 3 — Winnipeg, Nepean (Ottawa) and Lethbridge — and another is expected to be certified in Prince Edward Island.

The Standing Committee is aware that Level 3 facilities are very expensive to build. Maintenance costs are also high, not only for the infrastructure but also for the Level 3 operating process, especially if the facility is used just as a back-up in case of an emergency.

In its evaluation report on the outbreak, the European Commission recommended that:

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[9] Standing Committee on Agriculture and Agri-Food, Meeting No. 21 — 15:35, 1st Session, 38th Parliament, Ottawa, 8 February 2005.

> The Central Competent Authority (CCA) should consider formalising the co-operation developed between the British Columbia Ministry of Agriculture, Fisheries and Food and the National Centre for Foreign Animal Disease (NCFAD) and use this model to establish a laboratory network within Canada with the necessary capability to assist fully in any future outbreak of notifiable avian disease. [10]

In response to the EC recommendation, the CFIA noted that federal-provincial laboratory networks have been developed in Canada for federally reported diseases and for the purpose of information exchange among laboratory workers under the Canadian Animal Health Laboratorians Network. The CFIA also made a commitment in Recommendation 4 of its *Lessons Learned* review to improve its intelligence and information management capabilities "to ensure more timely and efficient management and transmission of field and laboratory data." Since the CFIA's Laboratory Sample Tracking System "crashed" several times during the AI outbreak, that recommendation is very appropriate. However, as mentioned in the foreword to this report, that outbreak might very well be followed by others in the near future. If so, an ever-tighter network of laboratories, including additional Level 3 facilities, might be required. Recognizing the importance of such a network, but also the potential costs associated with it, the Standing Committee recommends:

**RECOMMENDATION 4**

**That the Canadian Food Inspection Agency be required to present a cost-benefit analysis, by the end of 2005, on the need to have an increased number of Containment Level 3 facilities in Canada.**

### C. Allegations of Inhumane Treatment of Poultry

During the Abbotsford hearings, some witnesses accused the CFIA of inhumane treatment of birds, either when euthanizing large groups of birds or when destroying backyard flocks. An incident involving the shooting of birds, and another one involving the clubbing of birds to death, were reported to the Standing Committee. Some witnesses also questioned the use of $CO_2$ on waterfowl such as ducks. According to a witness from the Specialty Birds Association, 100,000 ducks and geese were gassed with $CO_2$, which the Association asserted was not an acceptable humane euthanasia method for waterfowl.

[10] European Commission — Health and Consumer Protection Directorate General, *Final Report of a Mission Carried Out In Canada from 5 to 9 July 2004 Concerning the Control of the Avian Influenza Epidemic*, DGg(SANCO)/7323/2004-MR-Final, 3 November 2004, p. 21.

The CFIA President clarified these allegations in a subsequent appearance before the Standing Committee, at which he emphasized that CFIA veterinarians are trained to handle and euthanize animals humanely:

> Throughout the entire crisis, we worked closely with the SPCA and provincial and private veterinarians. SPCA inspectors were regularly consulted and kept aware of the CFIA's challenges and decision-making. Various alternatives for depopulation were considered in consultation with the B.C. SPCA.
>
> We determined that carbon [dioxide ($CO_2$)] gas, an internationally recognized humane method for euthanizing large groups of birds, including ducks, would be [the] main method for depopulating.
>
> It has been suggested that untrained agency staff shot peacocks. Unfortunately, peacocks that could not be caught and euthanized with $CO_2$ had to be shot. We made sure that this was done as humanely as possible, and these animals were killed only by properly trained provincial conservation officers.
>
> It has also been suggested in the media that agency staff had been caught clubbing birds to death. I had this investigated. In fact, agency staff stopped contract employees doing this. They were stopped, and as a result, every euthanization operation subsequently had agency supervisors on site.
>
> Richard Fadden, President
> Canadian Food Inspection Agency
> Standing Committee on
> Agriculture and Agri-Food
> Meeting No. 21 — 15:35
> 1st Session, 38th Parliament
> Ottawa, 8 February 2005

While the above statement provides answers to some of the comments made by witnesses before the Standing Committee, the issue of the use of $CO_2$ as an appropriate humane euthanasia method on ducks remains unclear. The witnesses did not support their statements with precise scientific references, but the Standing Committee found various scientific sources, such as Dr. Mohan Raj, Senior Research Fellow at the Department of Clinical Veterinary Science, University of Bristol, that question the use of $CO_2$ on waterfowl. One source clearly states that $CO_2$ is not acceptable for waterfowl,[11] while the Scientific Committee on Animal Health and Welfare of the European Commission, in a report adopted on 23 June 1998, describes various methods using $CO_2$ as "unlikely to be acceptable on humanitarian grounds for ducks."[12] The European Commission report mentions that

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[11] Center for Animal Welfare, College of Agricultural and Environmental Sciences, University of California, Davis, *Euthanasia of Poultry: Considerations for Producers, Transporters, and Veterinarians,* http://animalwelfare.ucdavis.edu/publication/poultryeuth.html.

[12] http://europa.eu.int/comm/food/fs/sc/scah/out08_en.html.

"there is evidence that Argon alone or Argon/ $CO_2$ mixtures may be used satisfactorily for domestic ducks."

It is not the role of the Standing Committee to make a review of scientific literature; but clearly euthanasia techniques are changing over time, and some may become unacceptable and be replaced by new procedures as more scientific data are gathered and evaluated. In its AI policy comparison sent to the Standing Committee, the CFIA recognizes that "other gases and procedures will be tested for waterfowl to resolve the issue of ducks not responding well to $CO_2$." The Standing Committee is pleased with that approach but wants to ensure that continuous learning will be part of the action plan. The Standing Committee therefore recommends:

**RECOMMENDATION 5**

**That the Canadian Food Inspection Agency must ensure that its euthanasia techniques are compatible with internationally recognized humane best practices, and that its personnel conduct euthanasia exercises to remain well trained for carrying out these techniques.**

## ECONOMIC IMPACTS

### A. Overview

The AI outbreak resulted in the slaughtering of approximately 17 million birds in the Fraser Valley, or 90% of the estimated population. As of December 2004, the Agency had received more than 1,130 requests for compensation and paid out about $63.5 million. It is estimated that the loss of employment was roughly 3,000 full-time equivalent person years.

According to an economic impact study commissioned by the B.C. Poultry Industry Economic Impact Committee and conducted by Edmonton-based Serecon Management Consulting,[13] the depopulation of 125 poultry operations made up of commercial and backyard flocks of chickens, turkeys, ducks, geese, and other birds had dramatic impacts on both the short-term and long-term economic welfare of the industry and the provincial economy. Serecon divided the total impacts in three types:

[13] Serecon Management Consulting Inc, *Economic Impacts on British Columbia Poultry Industry Due to the Avian Influenza Outbreak*, Final Report, Edmonton, 19 August 2004.

### 1. Direct Impacts

Direct financial impacts on the entire poultry industry are estimated at $216.9 million. This sum comprises loss in output (farm gate receipts) with respect to breeding and grower operations, plus the cost impacts on hatching and processing activities, as relevant, within each industry sector. These impacts occurred primarily in 2004, with some residual impacts to be felt in 2005 and 2006. Direct impacts in the first year (to the end of March 2005) were calculated at $201.8 million, or 93% of the total direct impacts.

### 2. Secondary Impacts

Secondary impacts are estimated at $156.4 million. They have been determined using economic multipliers based on the poultry industry, developed from the B.C. government input-output model. They measure the impacts on wage re-spending and secondary impacts on other industries, both upstream and downstream in the economy.

### 3. One-Time Losses

One-time losses total $7.5 million. This amount reflects the industry's costs for cleaning and disinfecting, biosecurity, coordination and public relations.

The total economic impacts are the sum of these three types of costs, or $380.8 million.

## B. Review of Compensation Under the Health of Animals Act

The amount of compensation allocated for destroyed animals or birds as a result of an outbreak was raised at the Standing Committee hearings of January 2005, in a recommendation of the Canadian Poultry Industry Forum of October 2004, and in a CFIA recommendation resulting from its *Lessons Learned* review.

The incapacity of the *Health of Animals Act* to distinguish between the specifics of different industries, the lack of recognition of the value of genetic material and rare breeding stocks, and the absence of compensation for forgone income, are not new issues to the Standing Committee. During the scrapie outbreak in 1998, the Standing Committee urged the Minister of Agriculture and Agri-Food to increase the maximum compensation for sheep in order to better reflect the market value of purebred animals. Other issues relating to regulations under the *Health of Animals Act*, such as the cost of cleaning and disinfection and the cost of maintaining animals while in quarantine, were raised in 1998 and appear to be as current now as they were then.

One witness before the Standing Committee claimed that the CFIA was reopening the specialty bird compensation file just because the Standing Committee had planned a fact-finding mission to Abbotsford. Notwithstanding that statement, the Standing Committee is certainly pleased to see that the CFIA is currently preparing to examine elements of the compensation program, including maximum compensation amounts and the periodic review of the schedule of values under the *Compensation for Destroyed Animals Regulations.* As in 1998, the Standing Committee is concerned that there be fair and consistent compensation among industries, and that the value of genetic material be recognized. The Standing Committee therefore recommends:

**RECOMMENDATION 6**

**That, in its review of the existing compensation program under the *Health of Animals Act*, the Canadian Food Inspection Agency must ensure fairness and consistency among all types of production. In recognizing the intrinsic value of the genetic material so important to some industries flexibility must be allowed in compensation. The Agency, in consultation with the affected industries, should also consider how equitable compensation might be offered for forgone income, and for one-time losses.**

### C. Pre-emptive Culls

Another element related to government compensation pertains to pre-emptive culls recommended by some industries, notably the Canadian Egg Marketing Agency and the B.C. Specialty Birds Association. According to those organizations, protocols should allow pre-emptive culls even before tests are confirmed by a federal laboratory. Decisions on a pre-emptive cull would be based on symptoms in birds and the clinical experience of veterinarians.

One of the four Canadian Poultry Industry Forum recommendations that has been added to the CFIA's own list of recommendations concerns "the feasibility of establishing a pre-emptive cull program for suspect cases of AI to limit the potential spread of the disease." This would require amendments to the *Health of Animals Act* in terms of the threshold required to allow for the destruction of animals and the triggering of compensation. One major difficulty in amending the Act is that pre-emptive cull thresholds must be based on reasonable probabilities, in order to avoid undue waste of taxpayers' money every time an animal disease occurs in the country. The Standing Committee is, however, pleased to see that the CFIA and the industry are collaborating in examining proposals for pre-emptive slaughter, and that vaccination protocols are also being considered as an alternative to pre-emptive culls.

Pre-emptive culls are a controversial measure. The Standing Committee was made aware of allegations by the Vancouver Humane Society that the poultry industry had proposed to take responsibility for depopulating flocks without consulting the CFIA in the event of future outbreaks. For various ethical and legislative reasons, and in light of Canada's excellent international reputation regarding animal disease control, the Standing Committee cannot support such a unilateral approach to pre-emptive culls. The Committee therefore recommends:

**RECOMMENDATION 7**

**That any industry recommendations/actions for a pre-emptive cull to limit the potential spread of an outbreak of animal disease must be submitted to the Canadian Food Inspection Agency. The Agency, in consultation with the affected provinces and industries, must be proactive and responsible for authorizing and supervising any such pre-emptive cull.**

## CONCLUSION

The CFIA has recognized that there were shortcomings in the handling of the 2004 AI outbreak in British Columbia. In fact, all stakeholders could have been better prepared. This situation, however, is typical of all kinds of crises: no matter how careful the preparation, there are always uncontrollable events.

Canada's comprehensive and responsive food safety system is well recognized on the international scene, and our country is respected for its capacity to address challenges to that safety system. This capacity is noted in the conclusion to the final report of the European Commission mission to Canada concerning the control of the avian influenza epidemic:

> The effort made to control the AI outbreak has been considerable and great commitment/technical ability was demonstrated on-the-spot. Innovative measures and improved procedures were used that were not foreseen in the current contingency plan and a number of areas were identified that required improvement.

The Standing Committee is convinced that the stakeholders' input and recommendations that emerged from the Canadian Poultry Industry Forum held in Abbotsford on 27-28 October 2004, the CFIA's own *Lessons Learned* review, and the present report and its recommendations based on witnesses' comments during the Standing Committee's fact-finding mission to Abbotsford in January 2005, provide a comprehensive and effective list of measures that will help begin to build an even stronger emergency preparedness system. The Standing Committee believes that the best management approach to take for the CFIA, the provinces

and the industry is to keep learning, building on and, most of all, sharing what has been learned from the 2004 AI outbreak.

# APPENDIX 1
# CHRONOLOGY OF EVENTS — AVIAN INFLUENZA OUTBREAK

**February 2004**

| | |
|---|---|
| *16 February – First farm quarantined* | British Columbia Ministry of Agriculture, Food and Fisheries detects AI in a polymerase chain reaction (PCR) test and quarantines the farm. |
| *19 February – First case of AI confirmed* | The CFIA receives test results confirming the presence of AI on the farm. The entire flock, consisting of approximately 16,000 birds, is depopulated. |
| *20 February – Surveillance program established* | The CFIA launches a surveillance program of all poultry farms within a 5-km radius of the farm. The AI virus is identified as the low pathogenic form. |

**March 2004**

| | |
|---|---|
| *9 March – Second farm quarantined* | Further tests reveal that both low and high pathogenic forms of the AI virus were present on the first farm. The CFIA announces the quarantine of a second farm where low levels of illness have been detected. The birds are depopulated three days later after the presence of AI is confirmed. |
| *11 March – Control Area established* | In an attempt to control the spread of AI, Bob Speller, the Minister of Agriculture and Agri-Food, designates the Fraser Valley south of the Fraser River as a Control Area. The Control Area consists of a High-Risk Region (approximately 5 km around the first two infected farms) and a Surveillance Region (approximately 10 km surrounding the infected farms). Controls are put on the movement of birds in captivity, products or by-products of birds, and anything that has been exposed to a bird, into or out of the Control Area. |

| | |
|---|---|
| *24 March – Flocks in High-Risk Region to be culled and outbreak declared an emergency* | Five commercial farms and two backyard flocks have been confirmed to have AI. The CFIA announces that it will depopulate all the flocks in the High-Risk Region of the Fraser Valley (275,000 birds) in an effort to control the spread of infection. The outbreak is declared an emergency. |
| *29 March – Farm outside High-Risk Region quarantined* | AI has been detected on six farms in the High-Risk Region. A farm outside the High-Risk Region is put under quarantine as a precautionary measure. |
| *31 March* | A total of 20 commercial farms and 6 backyard flocks have tested positive for AI within the Control Area. |

**April 2004**

| | |
|---|---|
| *5 April – All flocks in Control Area to be depopulated* | On the recommendation of the CFIA, the Province of British Columbia and the poultry industry, Minister Speller announces the depopulation of all commercial poultry flocks and other backyard birds in the Control Area (approximately 19 million birds). Birds from non-infected farms will be processed under full inspection and be made available for sale. Access to farms is further controlled. |
| *8 April – Movement restrictions changed to allow sale of non-infected birds* | Movement restrictions within the Fraser Valley Control Area are changed to allow products from the Control Area to be shipped across Canada. Poultry that tests negative for AI will be sent to market. |
| *29 April* | By this time, AI has been detected on 40 commercial farms and 10 smaller premises. Depopulation of poultry continues on a priority basis. |

**May 2004**

| | |
|---|---|
| *25 May* | AI has been detected on 42 farms and in 11 backyard flocks, all of which have been depopulated. |
| *28 May – Depopulation suspended* | The CFIA suspends depopulation after slaughtering approximately 17 million birds in the Fraser Valley (90% of the estimated population). |

**June 2004**

| | |
|---|---|
| *8 June – CFIA introduces a compensation package for birds that were depopulated* | Most of the birds that were slaughtered were able to go through normal commercial markets and receive market value. The CFIA introduces a compensation package for individuals who were unable to recover market value for their slaughtered birds. |
| *11 June – Containment phase concluded* | The initial containment response is concluded, and the response is now entering the recovery phase. Movement controls on birds and bird products are still in effect. |
| *21 June – Cleaning and disinfection of premises in the High-Risk Region completed, restocking outside of High-Risk Region is allowed* | All premises in the High-Risk Region have been cleaned and disinfected. Owners must wait 21 days before restocking their farms. Farms outside the High-Risk Region may be restocked. |

**July 2004**

| | |
|---|---|
| *9 July – All premises in the High-Risk Region are allowed to restock their farms* | |
| *26 July – The CFIA compensates owners of destroyed birds* | As of 14 December, the Agency had received more than 1,130 compensation requests and paid out approximately $63.5 million. |

**August 2004**

| | |
|---|---|
| *18 August – Control Area eliminated* | The Control Area established to contain the outbreak of AI in the Fraser Valley has been eliminated and all domestic movement restrictions placed on birds and bird products have been lifted. Export restrictions remain in effect until further notice from importing countries. |

# APPENDIX 2
# SUMMARY OF RECOMMENDATIONS FROM THE CANADIAN POULTRY INDUSTRY FORUM



## Summary of Recommendations from the Forum

The following recommendations were summarized during the Forum and presented to participants by Ross Husdon, Forum Coordinator. Participants agreed that these were the necessary "next steps" in the four areas addressed by the panels. These recommendations will be further developed and implemented by individuals and teams in industry and government. Proposed "leads" for each project are noted in column two.

| 1. ANIMAL AND HUMAN HEALTH INTERFACE – ACTION | LEAD ORGANIZATION/S |
|---|---|
| a. Convene first Animal Health/Public Health Forum | CFIA/Public Health Agency of Canada (PHAC) |
| b. Animal and public health experts to combine capabilities to generate better integrated knowledge about zoonotic diseases | CFIA/PHAC |
| c. Establish protocols including occupational health measures that ensure animal outbreaks are investigated and controlled through a team approach encompassing animal and human health. | CFIA, PHAC, Health Canada (HC) Workplace Health and Public Safety Program (WHPSP) and Provincial agencies |
| **2. BIOSECURITY – ACTION** | |
| a. Establish a multi-stakeholder working group to develop national biosecurity standards and options for effective implementation | AAFC/Industry |
| b. Implement renewed biosecurity standards | Industry |
| c. Examine the feasibility of establishing a pre-emptive destruction policy and develop tools and approaches for rapid pre-emptive culls (BC Industry Emergency Response Plan) | CFIA, AAFC, Industry |
| **3. ENHANCED EMERGENCY MANAGEMENT – ACTION** | |
| a. Update FADES plan by implementing lessons learned and increasing emphasis on zoonotic potential of some diseases | BC Government/CFIA. CFIA to undertake with all provinces |
| b. Consult with BC Livestock Industries and other stakeholders to improve awareness of the FADES plan | CFIA and BC Government |
| c. Complete and adopt the Industry Emergency Response Plan | BC Industry |
| d. Develop a national mortality disposal strategy for all livestock specialties | CFIA/Industry |
| **4. INDUSTRY AND COMMUNITY ECONOMIC RECOVERY – ACTION** | |
| a. Undertake a review, in consultation with stakeholders, of the compensation policy available under the Health of Animals Act | CFIA |
| b. Maintain a periodic review process for the Health of Animals Act schedule of values including new types of farmed animals | CFIA |
| c. Government-Industry cooperation in the recovery phase to be enhanced by creating an integrated network of support services (financial, social, etc). | BCMAFF |
| d. Examine opportunities to mitigate community and allied trade economic impacts | BCMAFF |
| e. Develop and implement Industry Risk Management Insurance Plan | Industry |

Source: Poultry Industry Forum, *Avian Influenza — Lessons Learned and Moving Forward*, Abbotsford (B-C), December 2004, p. 36.

# APPENDIX 3
# COMPLETE RECOMMENDATIONS AND CFIA RESPONSES

The 12 recommendations and responses formulated in the CFIA's *Lessons Learned Review: The CFIA's Response to the 2004 Avian Influenza Outbreak in B.C.,* and the additional 4 recommendations and CFIA responses that emerged from the Canadian Poultry Industry Forum held on 27-28 October 2004 in Abbotsford, are as follows.

### CFIA Recommendations and Responses from the *Lessons Learned* Review

1. *The CFIA should review protocols associated with the activation of local, area and national emergency response teams and formalize the roles and responsibilities, and decision-making accountabilities at each level.*

**CFIA Response:** Activation protocols for the various levels of emergency response are currently being reviewed by the Agency to ensure a nationally consistent approach. The CFIA is also reviewing the structure and function of its area and national emergency response teams to more clearly define the roles, responsibilities and delegated decision-making authorities at all levels. Public Safety and Emergency Preparedness Canada has been invited to participate in this review process. It is anticipated that updated emergency response structures and protocols will be recommended by the spring of 2005.

2. *The CFIA should develop collaborative arrangements with Health Canada and the new Public Health Agency of Canada to increase federal capacity to respond to zoonotic disease outbreaks.*

**CFIA Response:** The CFIA has initiated discussions with Health Canada and the new Public Health Agency of Canada (PHAC) regarding collaborative arrangements for response to zoonotic disease outbreaks. The Agency will work with both Health Canada and PHAC to develop an updated roles and responsibilities framework and a Memorandum of Understanding (MOU) which will include an appendix considering response to zoonotic disease outbreaks, by December 2005. It is expected that this appendix to the MOU will also include protocols for liaising with provincial health authorities.

3. *The CFIA should engage stakeholders in the ongoing development and exercising of FADES plans in all provinces/territories.*

**CFIA Response:** The CFIA is currently developing a common template for FADES agreements which will be used to negotiate and finalize new or revised agreements with all provinces and territories. It is expected that the template will be completed by February 2005 and that consultations with partners and stakeholders will begin in March 2005. A fixed schedule for exercising the agreements will be a mandatory component of all FADES plans.

4. *The CFIA should develop the relevant IM/IT capabilities to ensure more timely and efficient management and transmission of field and laboratory data (including geographic information) during an animal disease response.*

**CFIA Response:** The CFIA will develop and implement an action plan that includes both short-term and longer-term IM/IT solutions to improve information management during emergency response situations. As an interim measure, the Agency has also developed partnerships with other departments and agencies to obtain GIS services.

5. *The CFIA should improve information flow during an emergency response by:*
   - *Identifying a functional cell within the Agency's emergency response structure to anticipate and manage information needs and reporting;*
   - *Developing and implementing protocols for the appropriate release of key information (e.g. laboratory results) at both the national and field level; and*
   - *Addressing information sharing issues through pre-established agreements or protocols.*

**CFIA Response:** Based on the lessons learned from both avian influenza and BSE, the CFIA will be developing options to address information management and sharing issues. Protocols will be developed to improve both internal and external information flow. These protocols will be incorporated into new and updated FADES agreements as appropriate.

6. *The CFIA should review its emergency management approach to incorporate the lessons learned from AI and, where appropriate, best practices used by partner agencies (e.g. Incident Command System).*

**CFIA Response:** The CFIA is currently reviewing the structure and function of its area and national emergency response teams to incorporate lessons learned from both the avian influenza and BSE incidents. Public Safety and Emergency Preparedness Canada has been invited to participate in this review process, which will include an evaluation of the Incident Command System (ICS) approach. It is anticipated that updated emergency response structures and protocols will be recommended by the spring of 2005.

7. *The CFIA should formalize the advance planning function within its emergency management structure and ensure the integration of disease control experts (including public health experts) within this planning cell.*

**CFIA Response:** The CFIA's upcoming review of its emergency management structures and protocols will address the identified need to formalize the Agency's advance planning function during an emergency response situation. The development of a framework with Health Canada and the new Public Health Agency of Canada regarding collaborative arrangements for response to zoonotic disease outbreaks will also help to ensure the integration of public health experts into this planning cell.

8. *The CFIA should clarify the respective bio-safety responsibilities of the Agency and public health authorities in the response to zoonotic disease outbreaks.*

**CFIA Response:** The CFIA will review the applicable occupational health and safety protocols which are designed to ensure the health and safety of CFIA employees and contracted staff. The CFIA will also work with Health Canada and the Public Health Agency of Canada to identify and address biosafety issues which impact on the broader community.

9. *The CFIA should encourage the poultry industry's development of bio-security programs.*

**CFIA Response:** The CFIA will assist the poultry industry in their development of biosecurity programs by providing a technical review and assessment of the industry's proposed standards and plans. The Agency will be meeting with representatives of the poultry industry in January 2005 to discuss progress and next steps.

10. *The CFIA should conduct a review of compensation policies under the Health of Animals Act.*

**CFIA Response:** The CFIA is currently preparing to conduct a review of elements of the compensation program, including maximum compensation amounts. It is anticipated that this review will be completed in 2005.

11. *The CFIA should maintain a periodic review process for the schedule of values included in the Compensation for Destroyed Animals Regulations.*

**CFIA Response:** The CFIA will conduct a review of elements of the compensation program in 2005. Included in this review will be an assessment of the periodic review process for the schedule of values included in the *Compensation for Destroyed Animals Regulations.*

12. *The CFIA should review the procedures for providing HR, finance, IM/IT and administrative support to EOCs and develop standard operating procedures to support each of these functions.*

**CFIA Response:** The CFIA's Human Resource and Corporate Services Branches have each initiated reviews of their emergency response support procedures. It is anticipated that both branches will have standard operating procedures in place by the spring of 2005.

**Canadian Poultry Industry Forum Recommendations and CFIA Responses**

13. *Convene the first animal health/public health forum. (CFIA/Public Health Agency of Canada)*

**CFIA Response:** The CFIA supports this recommendation, and will be initiating discussions early in 2005 with the Public Health Agency of Canada to discuss this forum, develop objectives and proposed outcomes and determine how to organize.

14. *Implement a national AI survey for domestic poultry. Co-ordinate surveillance of wild fowl with the Canadian Wildlife Service. (CFIA/Canadian Wildlife Service)*

**CFIA Response:** The CFIA's development and implementation of a small scale AI surveillance plan is well under way. The expectation is that samples will be collected in the spring of 2005. The development of a longer term plan for the active and ongoing surveillance of the commercial poultry industry is also underway.

The CFIA will be undertaking consultations with the Canadian Wildlife Service, Parks Canada and the Canadian Cooperative Wildlife Health Center to define the potential costs and benefits of wildlife surveillance.

15. *Examine the feasibility of establishing a pre-emptive cull program for suspect cases of AI to limit the potential spread of the disease. (CFIA/Poultry Industry)*

**CFIA Response:** The CFIA will work with industry to examine proposals for pre-emptive slaughter. A preliminary meeting with national poultry representatives is scheduled for January 2005. The CFIA will also investigate vaccination protocols as an alternative to pre-emptive culls.

16. *Develop a national disposal strategy for all livestock species. (CFIA/Livestock Industries)*

**CFIA Response:** The CFIA will continue to work with provincial and territorial governments, AAFC and livestock industries towards the development of a national disposal strategy for all livestock species. Disposal options in all areas of Canada are currently being examined by a federal/provincial/territorial agri-food inspection committee. The findings of this committee will support the development of a national disposal strategy.

# APPENDIX 4
# LIST OF PARTICIPANTS TO THE CFIA LESSONS LEARNED REVIEW

**15 April 2005**

**Focus Groups for the Canadian Food Inspection Agency (CFIA)**
***Lessons Learned Review:***
***The CFIA's Response to the 2004 Avian Influenza Outbreak in B.C.***

Eight focus group sessions were conducted in both Ottawa and British Columbia as part of the preparation of the *Lessons Learned Review.*

The following groups participated in the **Ottawa** focus group sessions:

- CFIA — Avian Influenza Executive Group (Section 1)
- CFIA — National Emergency Response Team (Section 2)
- Public Safety and Emergency Preparedness Canada (Section 3)
- National Poultry Industry Associations (Section 4)
- Laboratories — CFIA and B.C. Ministry of Agriculture, Food and Fisheries (Section 5)

The following groups participated in the **British Columbia** focus groups:

- CFIA — Area Emergency Response Team (Section 6)
- B.C. Poultry Industry Associations (Section 7)
- CFIA/Health Canada Joint Session with B.C. Partners (Section 8)

In addition to the focus groups, directed interviews were conducted with senior managers from the CFIA, as well as Health Canada and the Privy Council Office (Section 9).

**Avian Influenza Lessons Learned Initiative**

**Ottawa Focus Group with CFIA - AI Executive Group Invitees**

**Date: Monday Sept. 13, 2004**
**Location: CFIA HQ**

| Name | Title |
|---|---|
| Richard B. Fadden | President, CFIA |
| Dr. André Gravel | Executive Vice-President |
| Dr. Brian Evans | Chief Veterinary Officer of Canada |
| Robert Carberry | Vice-President, Programs |
| Peter Brackenridge | Vice-President, Operations |
| Dr. Judith Bosse | Vice-President, Science |
| Sandra Lavinge | Executive Director, Public Affairs |
| Paul Haddow | Executive Director, International Affairs |
| Gloria Mintah | Legal Counsel, Legal Services |
| Fiona Spencer | Vice-President, Human Resources |
| Kristine Stolarik | Executive Director, Liaison, Preparedness and Policy Coordination |
| Bill Anderson | Acting Director, Animal Health and Production Division |
| Doug Steadman | Executive Director, Atlantic Area, Operations |
| Jim Clark | Senior Staff Veterinarian, Animal Health and Production |
| Marnie Ascott | Executive Assistant to President |

**Avian Influenza Lessons Learned Initiative**
**Ottawa Focus Group Invitees**
**CFIA National Emergency Response Team (NERT)**

**Date: Friday Sept. 3, 2004**

| Representative | Branch/Title |
|---|---|
| Jim Clark | Senior Staff Veterinarian, Program Network |
| Carolyn Inch | National Manager, Animal Health Program |
| Gary Thiessen | Acing Chief, Meat Programs |
| Doug Steadman | Executive Director, Atlantic Area, Operations |
| Shane Morris | Operations Coordination Officer, Operations Coordination |
| Denis Allard | Senior Medical Advisor, Science |
| Denis Guitor | Manager, Office of Emergency Management |
| Lorraine Maissonneuve (for Wayne Outhwaite) | Director, Human Resources Operations Division |
| Matt Gaetz | Administrative Coordinator, Operations Coordination |
| Steve Palisek | Operations Coordination Officer, Operations Coordination |
| Sophie Bainbridge (alternate for Gary Paradis) | Manager, Monitoring and Financial Policy |
| Christianne Poirier | Chief Information Officer |
| Ward Chickoski | Director, Corporate Communications: Public Affairs |
| Jane Dudley | Legal Counsel, Legal Services |
| Claudine Page | Bilateral Relations Officer, International Affairs |
| Gilles Dulac | Senior Veterinarian, Disease Control |

**Section 3**

**Avian Influenza Lessons Learned Initiative**
**Public Safety and Emergency Preparedness Canada (PSEPC)**
**Focus Group Invitees**

| PSEPC Official | Title |
|---|---|
| Cameron Bouchard | Geomatics Officer |
| Donovan Arnaud | Director, Plans and Readiness Division, Operations Branch |
| Natalie Dole | Analyst, Incident Analysis |
| Richard Sarabura | Senior Programs Officer |
| Paul Crober | A/ Regional Director |

**Avian Influenza Lessons Learned Initiative**
**National Industry Associations Invitees**

| | Representative | Organization |
|---|---|---|
| 1. | Kristine Stolarik | CFIA |
| 2. | Paul Haddow | Executive Director, International Affairs |
| 3. | Ed De Jong | Canadian Broiler Hatching Egg Marketing Agency |
| 4. | Bryan Walton | Canadian Council of Grocery Distributors |
| 5. | Peter Clarke | Canadian Egg Marketing Agency |
| 6. | Giuseppe Caminiti | Canadian Poultry & Egg Processors Council |
| 7. | Stephanie Jones | Canadian Restaurant and Food Services Association |
| 8. | Phil Boyd | Canadian Turkey Marketing Agency |
| 9. | Lisa Bishop | Chicken Farmers of Canada |
| 10 | Robert de Valk | Further Poultry Processors Association of Canada |
| 11 | Matt Taylor | Canadian Animal Health Coalition |

**Avian Influenza Lessons Learned Initiative**
**Laboratory Focus Group Invitees**

**Tuesday August 24, 2004**
**10:30-1:00**

| Representatives | Organization/Branch |
|---|---|
| Liz Singh | CFIA - Science, Laboratories Directorate |
| Paul Kitching | CFIA - National Center for Foreign Animal Disease |
| Peter Wright | CFIA - National Center for Foreign Animal Disease |
| Ron Lewis | Director, BC MAFF, Abbotsford |
| Grant Maxie | CFIA - Laboratories Directorate |
| Stephen Norman | CFIA - Science - Biosecurity/Transport |
| Gilles Dulac | CFIA - Programs |
| Christine Power | CFIA - Epidemiology |
| Stuart Wilson | CFIA, Operations |
| Denis Guitor | CFIA, Liaison, Preparedness and Policy Coordination |
| Alice Bouffard | CFIA, Vet Biologics |

**Avian Influenza Lessons Learned Initiative**
**British Columbia Focus Group Invitees**

**British Columbia Emergency Operations Centre (BCEOC)**

**Date: Thursday, Sep. 23, 2004**
**Location: Garibaldi Room, R/O, Burnaby, BC**

| | Representative | CFIA Branch/Position |
|---|---|---|
| 1. | Phil Amundson | Operations - Executive Director |
| 2. | Stuart Wilson | Operations - Regional Director |
| 3. | Vance McEachren | Operations - Regional Director |
| 4. | Dr. Ken Stepuchyn | Programs - Animal Health |
| 5. | Dr. Wayne Lees | Programs - Epidemiologist |
| 6. | Dr. Sandra Stephens | Programs |
| 7. | Dr. Cornelius Kiley | Programs - Animal Health / Media Spokesperson |
| 8. | Gaetan Levesque | Occupational Safety & Health |
| 9. | Dr. Jim McClendon | Operations - Outbreak Field Manager |
| 10. | Andrea Dropko | Duty Officer |
| 11. | Bob Jackson | Duty Officer |
| 12. | Bruce Clarkson | Operations - Field Supervisor |
| 13. | Dave Zeust | Operations - Field Supervisor |
| 14. | Gordon Zosiuk | Operations - Staff Coordination |
| 15. | Dana Mosher | Operations - Lab logistics |

**Avian Influenza Lessons Learned Initiative**
**British Columbia Focus Group**

**British Columbia Industry Associations Invitees**

**Date: Thursday Sept. 23, 2004**
**Location: CFIA Burnaby Regional Office**

| | Organization | Representative |
|---|---|---|
| 1 | Fraser Valley Association of Specialty Bird Producers | Everet Van Den Born<br>Ken Falk<br>Rob Donaldson |
| 2 | Poultry Industry Liaison at BCEOC | Marvin Friesen |
| 3 | BC Poultry Council | Ray Nickel |
| 4 | BC Egg Producers | Peter M. Whitlock<br>Derek Jensen |
| 5 | BC Hatching Eggs | Jeff Regier<br>George Gray |
| 6 | BC Chicken Marketing Board | Bill Vanderspek |
| 7 | BC Turkey Marketing Board | Les Burm |
| 8 | BC Poultry Processors | Bruce Arabsky<br>Neil Ambrose, DVM |
| 9 | Agriculture Agri-Food Canada | John Berry |
| 10 | CFIA - Liason, Preparedness and Policy Coordination | Kristine Stolarik |
| 11 | CFIA - BC Emergency Operations Center | Stuart Wilson<br>Vance McEachren<br>Jim McClendon, DVM<br>Phil Owen, DVM<br>Andrea Dropko |

**Avian Influenza Lessons Learned Initiative**
**British Columbia Focus Group**

**British Columbia Federal, Provincial, Municipal Partners**
**(Joint Session with Health Canada)**

**Date: Friday, Sept. 24, 2004**
**Location: Radisson Hotel Burnaby, BC**

| | Name | Title |
|---|---|---|
| | **Province of BC Ministry of Health** | |
| 1 | Dr. Perry Kendall | Provincial Health Officer |
| 2 | Wayne Dauphinee | Executive Director, Emergency Management |
| | **Province of BC Ministry of Solicitor General** | |
| 3 | Scott Patch | Provincial Emergency Program |
| 4 | Cam Filmer | Deputy Director, Provincial Emergency Program |
| | **Province of BC Public Affairs Bureau** | |
| 5 | Michelle Stewart | Manager and PIO for Ministry of Health |
| | **BC Centre for Disease Control** | |
| 6 | Dr. Danuta Skowronski | Epidemiologist |
| 7 | Aleina Tweed | Epidemiologist |
| 8 | Sally Greenwood | Manager, Public Information |
| 9 | Dr. Ray Copes | Medical Director, Environmental Health |
| 10 | Dr. Larry Copeland | Director, Food Protection Services |
| | **BC Fraser Health Authority** | |
| 11 | Dr. Andrew Larder | Medical Health Officer |

| | | |
|---|---|---|
| 12 | Christine Halpert | Public Health Nurse |
| 13 | Dave Burgess | Manager, Emergency Planning and Management |

**Health Canada**

| | | |
|---|---|---|
| 14 | Dr. Arlene King<br>HC Co-chair | Director, Immunization and Respiratory Infectious Diseases Div. |
| 15 | Bill Douglas | Interim Emergency Preparedness Coordinator |
| 16 | Dr. Philip Prendergast | Occupational Health Physician |
| 17 | Harsh Thakore | Regional Manager, Workplace Health and Public Safety |
| 18 | Dr. Art Davies | National Medical Advisor |
| 19 | Blair Parkhurst | Regional Director, Communications |
| 20 | Betsy MacKenzie | Regional Director, Population and Public Health |
| 21 | Cathy Sabiston | Director General, Workplace Health and Public Safety |
| 22 | Dr. Theresa Tam | Medical Epidemiologist, Respiratory Diseases Div. |
| 23 | Claude Giroux | Senior Policy Advisor, Centre for Emergency Preparedness and Response |
| 24 | Jennifer Brioschi | Manager, Professional Services |
| 25 | Ruth Nicholson | Occupational Health Nurse |

**HRSDC**

| | | |
|---|---|---|
| 26 | Marlene Yemchuk | Health & Safety Officer |

**Public Safety and Emergency Preparedness Canada**

| | | |
|---|---|---|
| 27 | Paul Crober | Regional Director |
| 28 | Bill White | NCI Coordinator |
| 29 | Natalie Dole | Director, Operations Emergency Management and National Security |

**City of Langley**

| | | |
|---|---|---|
| 30 | Sheena Vivian | |

**City of Abbotsford**

| | | |
|---|---|---|
| 31 | Don Beer | |

**BC Water, Land and Air Protection**

| | | |
|---|---|---|
| 32 | Jennifer McGuire | Regional Manager |

**MAFF**

| | | |
|---|---|---|
| 33 | Chris Zabek | Regional Agrologist, Fraser Valley North |
| 34 | Rick Van Kleeck | Waste Management Engineer, Abbotsford |
| 35 | Ron Lewis | Director, Animal Health Centre |

**AAFC**

| | | |
|---|---|---|
| 36 | John Berry | Regional Director |

**Canadian Food Inspection Agency**

| | | |
|---|---|---|
| 37 | Philip H. Amundson<br>CFIA Co-chair | Executive Director, Operations-Western Area |
| 38 | Stuart Wilson | Regional Director, BC Mainland / Interior |
| 39 | Dr. Wayne Lees | Animal Health Program |
| 40 | Dr. Sandra Stephens | Animal Health Program |
| 41 | Dr. Ken Stepushyn | Animal Health Program |
| 42 | Dr. Cornelius Kiley | Program Network - West |
| 43 | D. Jim McClendon | Animal Health Veterinarian |
| 44 | Bob Jackson | Duty Officer, Regional Coordinator, BC Mainland / Interior |
| 45 | Andrea Dropko | Duty Officer, Inspection Manager, Fraser |

| | | |
|---|---|---|
| | | East, Abbotsford |
| 46 | Gaetan Levesque | National Occupational Health and Safety Coordinator |
| 47 | Dr. Denis Allard | Senior Medical Advisor |

## CFIA Avian Influenza Lessons Learned Initiative
## Other Directed Interviews

| Name | Title |
|---|---|
| **CFIA** | |
| Richard B. Fadden<br>Dr. André Gravel | President<br>Executive Vice-President |
| Dr. Bill Anderson<br>Dr. Brian Evans | Director, Food of Animal Origin Division<br>Chief Veterinary Officer |
| Doug Steadman<br>Kathy Scott | Executive Director (Atlantic Area), Operations<br>Operations Coordination |
| Phil Amundson and<br>Stuart Wilson | Executive Director (Western Area) Operations<br>Regional Director, (B.C.) Operations |
| Claudine Pagé | Bilateral Relations Officer, International Affairs |
| **EXTERNAL PARTNERS** | |
| **Health Canada** | |
| Dr. Frank Plummer | Acting Chief Public Health Officer<br>Population and Public Health Branch |
| Dr. Arlene King | Director<br>Immunization and Respiratory Infections Division<br>Population and Public Health Branch |
| **Privy Council Office** | |
| Anita Biguzs | Director of Operations |
| Ross Ezzeddin | Policy Analyst |
| **Agriculture and Agri-Food Canada** | |
| Gilles Lavoie | Senior Director General<br>Operations<br>Market and Industry Services Branch |
| **USDA** | |
| Dr. John Hahn and<br>Barry Meade | |
| **International Trade Canada** | |
| Geoff Adams | Deputy Director<br>Technical Barriers and Regulations |

# APPENDIX 5
# PARTICIPANTS AT THE ABBOTSFORD (B.C.) INFORMAL STANDING COMMITTEE HEARINGS

| Associations and Individuals | Date | Meeting |
|---|---|---|
| **B.C. Chicken Growers Association** | 18/01/2005 | 1 |
| Rick Thiessen, President | | |
| **B.C. Egg Producers Association** | | |
| Derek Janzen, President | | |
| **B.C. Hatching Egg Association** | | |
| Calvin Breukelman, President | | |
| **B.C. Poultry Association** | | |
| Ray Nickel, President | | |
| **B.C. Turkey Association** | | |
| Garnet Etsell, President | | |
| **Canadian Food Inspection Agency** | | |
| Philip Amundson, Executive Director, Operations, Western Area | | |
| Richard Fadden, President | | |
| **Ministry of Agriculture, Food and Fisheries of British Columbia** | | |
| Victoria Bowes, Avian Pathologist | | |
| Ron Lewis, Director, Chief Veterinarian | | |
| Rory McAlpine, Deputy Minister | | |
| **As Individuals** | | |
| Jeremy Johnston, Physician | | |
| Stewart Ritchie, Veterinarian and Producer | | |

| Associations and Individuals | Date | Meeting |
|---|---|---|
| **B.C. Egg Marketing Board** | 18/01/2005 | 2 |
| David Taylor, Chair | | |
| Peter Whitlock, Operations Manager | | |
| **Backyard Farmers Association** | | |
| Larry Blackhall | | |
| Bob Bradley | | |
| Jim Ferguson | | |
| Barbara Fischer | | |
| John Gilray | | |
| Susan Gorris | | |
| Paddy Head | | |
| Michael Kluckner | | |
| Louisa Nicholls | | |
| Fred Reid | | |
| **Bradner Farms Ltd.** | | |
| Rob Donaldson | | |
| **Canadian Egg Marketing Agency** | | |
| Bernadette Cox, Manager, Corporate and Public Affairs | | |
| Tim Lambert, Executive Director | | |
| **Fairline Development Canada Ltd.** | | |
| Allan Leung | | |
| **Fraser Valley Duck and Goose** | | |
| Ken Falk | | |
| **As Individuals** | | |
| Victoria Bowes, Avian Pathologist | | |
| Peter Fricker | | |

| Associations and Individuals | Date | Meeting |
|---|---|---|
| **Animal Nutrition Association** | 19/01/2005 | 3 |
| David Dyble, President | | |
| Marvin Friesen, Clearbrook Milling | | |
| Rob Jones, Marketing Manager | | |
| **B.C. Turkey Association** | | |
| Garnet Etsell, President | | |
| **Loewen Acres** | | |
| David Loewen | | |
| Louise Loewen | | |
| **Pollon Group** | | |
| Bruce Arabsky | | |
| **Primary Poultry Processors Ltd.** | | |
| Clarence Jensen, Secretary-Manager | | |
| **Sunrise Poultry Processors Ltd.** | | |
| Neil Ambrose, Director, Veterinary Services | | |
| **As Individuals** | | |
| Victoria Bowes, Avian Pathologist | | |
| Kathleen O'Lane | | |
| Lynn Perrin | | |

# APPENDIX 6
# LIST OF WITNESSES

| Associations and Individuals | Date | Meeting |
|---|---|---|
| **Canadian Food Inspection Agency** | 08/02/2005 | 21 |
| Judith Bossé, Vice-President, Science | | |
| Jim Clark, Senior Staff Veterinarian, Animal Health and Production Division | | |
| Richard Fadden, President | | |
| Theresa Iuliano, Manager, Corporate Program Administration | | |

A copy of the relevant Minutes of Proceedings (*Meeting n$^{os}$ 21, 32 and 34 including the present report)* is tabled.

Respectfully submitted,

Paul Steckle, M.P.
*Chair*

# MINUTES OF PROCEEDINGS

Thursday, April 14, 2005
(*Meeting No. 34*)

The Standing Committee on Agriculture and Agri-Food met *in camera* at 10:13 a.m. this day, in Room 307 West Block, the Chair, Paul Steckle, presiding.

*Members of the Committee present*: James Bezan, Claude Drouin, Roger Gaudet, Denise Poirier-Rivard, Gerry Ritz, Paul Steckle and Rose-Marie Ur.

*Acting Members present*: Peter Julian for Charlie Angus, Susan Kadis for Wayne Easter and Randy White for Larry Miller.

*In attendance*: *Library of Parliament*: Jean-Denis Fréchette, Principal.

Pursuant to Standing Order 108(2), the Committee resumed its study of avian flu — follow-up of the fact-finding mission to Abbotsford .

The Committee resumed consideration of a draft report.

It was agreed, — That the report be entitled: *From A Management Crisis, To Becoming*

*Better Crisis Managers: The 2004 Avian Influenza Outbreak in British Columbia*.

It was agreed, — That the draft report, as amended, be adopted.

It was agreed, — That the Chair, Clerk and researchers be authorized to make such grammatical and editorial changes as may be necessary without changing the substance of the report and that the Clerk inform the members of the final draft before it is tabled.

At 11:34 a.m., the Committee adjourned to the call of the Chair.

Bibiane Ouellette
*Clerk of the Committee*

carc crac
Canadian Agri-Food Research Council
Conseil de recherches agro-alimentaires du Canada

Recommended code of practice for
the care and handling of farm animals

# Chickens, Turkeys and Breeders from Hatchery to Processing Plant

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Printed 2003

*Available from*

Chicken Farmers of Canada
1007-350 Sparks Street
Ottawa, ON
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Facsimile: 613-241-5999

*For information on the process for the development of a Code, please write to*

Canadian Agri-Food Research Council
Heritage House
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Central Experimental Farm
Ottawa, Ontario
K1A 0C6
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*Also available in French*

Recommended code of practice for the care and handling of farm animals

# Chickens, Turkeys and Breeders from Hatchery to Processing Plant

*Coordinated by*
Canadian Agri-Food Research Council (CARC)
CARC Canada Committee on Animals
CARC Expert Committee on Animal Welfare and Behaviour
Canadian Federation of Humane Societies

*Review Committee*
Participants are listed in Appendix B

*Financial Contributions*
Agriculture and Agri-Food Canada (AAFC)
Canadian Food Inspection Agency (CFIA)

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# Acknowledgments

*The Canadian Agri-Food Research Council gratefully acknowledges the many individuals and organizations that contributed their valuable time, views and expertise to the development of this Code of Practice. The development of this Code was made possible only through teamwork and cooperation at the national level.*

# Preface

The Codes of Practice are nationally developed guidelines for the care and handling of the different species of farm animals. The Codes contain recommendations for housing and management practices for farm animals as well as transportation and processing. Institutions maintaining flocks for research should also be in compliance with the relevant Canadian Council on Animal Care guidelines and policies.

The Codes are voluntary and are intended as an educational tool in the promotion of sound management and welfare practices. The Codes contain recommendations to assist farmers and others in the agriculture and food sector to compare and improve their own management practices. It should be noted, however, that voluntary Codes have been accepted as the standard of practice and have been recognized as such by the courts. This code will be updated from time to time.

In 1980, the Canadian Federation of Humane Societies began co-ordinating the process of development of draft Codes of Practice for all livestock species with the introduction of a ***Recommended Code of Practice for Handling of Poultry from Hatchery to Slaughterhouse.*** The federal minister of Agriculture and Agri-Food Canada (AAFC) provided financial support for the undertaking at that time.

All Codes of Practice are presently developed by review committees with representatives from farm groups, animal welfare groups, veterinarians, animal scientists, federal and provincial governments, related agricultural sectors and interested individuals.

In 1993, Agriculture and Agri-Food Canada asked the Canadian Agri-Food Research Council (CARC) and its Canada Committee on Animals and Expert Committee on Farm Animal Welfare and Behaviour to take the lead in cooperation with the Canadian Federation of Humane Societies in updating existing Codes and developing new Codes. CARC officially agreed to take on this responsibility in February 1995 upon confirmation of funding from Agriculture and Agri-Food Canada.

In 1996, CARC with the support of the provincial governments began producing four page factsheets in both English and French for such uses as teaching agriculture in the classroom, agricultural fairs and exhibitions.

**Codes developed to date:**

| Species | Original | Revision |
|---|---|---|
| Poultry | 1983 | 1989 |
| Pullets, Layers, and Spent Fowl | - | 2003 |
| Chickens, Turkeys and Breeders | | 2003 |
| Pigs<br>SEW Addendum | 1984<br>2003 | 1993<br>- |
| Veal Calves | 1988 | 1998 |
| Ranched Mink | 1988 | - |
| Ranched Fox | 1989 | - |
| Dairy Cattle | 1990 | - |
| Beef Cattle | 1991 | - |
| Sheep | 1995 | - |
| Farmed Deer | 1996 | - |
| Horses | 1998 | - |
| Bison | 2001 | - |
| Transport | 2001 | - |

Further information on the process of Code development and revision can be obtained from the Canadian Agri-Food Research Council (CARC), Heritage House, Building 60, Central Experimental Farm, Ottawa Ontario K1A 0C6. Requests for copies of the Codes can be addressed to the Canadian Food Inspection Agency and/or specific provincial organizations.

The CARC Home Page is www.carc-crac.ca for further information.

## Disclaimer

Information contained in this publication is subject to periodic review in light of new technologies, enhanced husbandry and/or changing transportation practices, government requirements and regulations. No subscriber or reader should act on the basis of any such information without referring to applicable laws and regulations and/or without seeking appropriate professional advice. Although every effort has been made to ensure accuracy, the Review Committee shall not be held responsible for loss or damage caused by errors, omissions, misprints or misinterpretation of the contents hereof. Furthermore, the Review Committee expressly disclaims all and any liability to any person, whether the purchaser of this publication or not, in respect of anything done or omitted, by any such person in reliance on the contents of this publication.

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# READERS' COMMENTS AND SUGGESTIONS

The Canadian Agri-Food Research Council would like to receive your comments and suggestions on the Recommended Code of Practice for the Care and Handling of Farm Animals - Chickens, Turkeys and Breeders from Hatchery to Processing Plant. Please send the completed questionnaire to the Canadian Agri-Food Research Council at Building 60, Central Experimental Farm, Ottawa, Ontario, K1A 0C6, or fax: (613) 234-2330. Feedback will be considered in future editions.

1. My work involves:
   a) commercial transportation of chickens, turkeys or breeders ☐
   b) raising chickens, turkeys or breeders ☐
   c) chickens, turkeys or breeders care/handling at an auction market ☐
   d) other (please specify) ☐

2. The chickens, turkeys and breeder code is relevant or useful in my work.:
   a) highly ☐
   b) to some degree ☐
   c) not ☐

Additional comments:

_____

_____

_____

_____

_____

3. The organization of the code contents:
   a) is appropriate ☐
   b) needs improvement (please specify) ☐

4. The topics contained in the code cover all appropriate aspects of chickens, turkeys or breeders care and management:
   a) yes ☐
   b) no (please specify) ☐

5. The recommendations are presented:

a) in an unclear manner or with inadequate detail ☐

b) clearly and in adequate detail ☐

c) in excessive detail ☐

Additional comments:

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

6. I suggest the following changes to improve the chickens, turkeys and breeders code (use additional sheet if necessary):

# Introduction

Codes of Practice strive to promote acceptable standards of animal husbandry and handling. This code is intended to achieve a workable balance between the best interests of the animals and the poultry industry. This code recognizes the basic principle that the humane treatment of animals is the prime consideration in animal husbandry and handling and that animals, which are treated well and protected from stress, are growing in far better physical and mental condition. This translates into significant benefits and economic advantages to producers and processors as well.

As discussed in the preface, the code is voluntary. All provincial and federal acts and regulations take precedence. The word *must* is used to emphasize the importance of a specific practice or where there may be an enforceable statutory requirement.

Nearly all livestock husbandry systems impose restrictions on livestock, and some of these can cause an unacceptable degree of discomfort or distress by preventing the animals from fulfilling their basic needs. Meeting these needs, and others that must be considered, includes providing the following:

- comfort and shelter;
- readily accessible fresh water and a diet to maintain the animals in full health and vigor;
- opportunity for reasonable movement;
- company of other animals, particularly of like kind;
- opportunity to exercise most normal patterns of behaviour;
- light of appropriate duration and intensity;
- flooring that neither harms the animals nor causes undue stress;
- prevention, or rapid diagnosis and treatment, of abnormal behaviour, injury, parasitic infestation, and disease;
- prevention of infection contagious to others by the adoption of biosecurity measures;
- avoidance of unnecessary injury; and
- emergency arrangements to cover outbreaks of fire, the breakdown of essential mechanical services, and the disruption of supplies and unwanted visitors.

The recommendations in this code are provided in an attempt to define high standards of bird handling and well being in commercial, research, educational, or small-scale operations. The recommendations do not claim to be comprehensive for all circumstances, but rather they provide information and guidelines that should encourage operators in the poultry industry to examine or improve their own managerial routines.

Consideration should be given to the question of animal welfare before installing new equipment or adopting new husbandry systems. Technological advancements or increased automation in some applications can improve the flock's physiological comfort and well-being through less handling, improved speed in handling, better control over environmental conditions or improved uniformity and efficiency in feed or water distribution and sanitary condition. However, any system that results in greater restriction imposed on the animal or greater complexity in design or control over the environment must have safeguards built into the system to compensate for the possible increase in chance of suffering in the event of mechanical or electrical failure.

New technologies should only be installed only where farm personnel are adequately skilled in both animal husbandry and in the use of the equipment. Management should ensure that its personnel are trained to take full advantage of these systems and their fail-safe systems. The size and complexity of an operation should not be changed unless the welfare of the individual bird can be safeguarded.

Adequate facilities and resources must be available to supply proper housing, a consistent, appropriate, and reliable source of feed and water, treatment for injured or sick birds, and other factors necessary to ensure the well-being of the animals. Financial costs should not be considered a reason for neglecting a bird obviously in distress or for failing to secure prompt and appropriate medical treatment or other care when necessary.

This code has been prepared with recognition of current practices. It identifies the areas where the welfare of the animals could be at risk unless precautions are taken. The code sets out what these precautions should be, bearing in mind the importance to animals of a total environment and the fact that there is often more than one way in which their welfare can be safeguarded.

# Section 1 ◊ Hatcheries

## 1.1 Generalities

Hatcheries concentrate their efforts on maximizing hatchability of fertile eggs and on marketing healthy high quality chicks to their customer requirements. Environmental conditions for incubation are controlled automatically and are safeguarded by supplementary mechanisms activated in case of unexpected malfunction or disruption of energy sources. High standards of sanitation are essential for the production of high-quality chicks. Generally, economic interests of hatcheries favour the best care of marketable chicks, as this has an influence on the birds' future performance.

## 1.2 Training of Personnel

Every person working with birds in a hatchery should be able to understand and accept his/her responsibility to prevent avoidable suffering. Before duties are assigned, hatchery operators should be satisfied that personnel responsible for handling live chicks have the skills and training necessary to perform any required treatment or procedure without causing unnecessary pain, suffering, or distress to the chicks.

(Unless otherwise stated, "chicks" as referred to in this section applies to both chicks and poults.)

## 1.3 Handling of Chicks

1.3.1 Hatching trays with live chicks should always be moved smoothly. Tipping of trays to remove chicks and unhatched refuse must be done smoothly and slowly in such a way that the chicks do not pile or become trapped. Mechanical systems for separating chicks from unhatched refuse, transporting, vaccinating, counting or boxing chicks must be designed and maintained in such a way that the chicks are handled without causing injury or avoidable distress.

1.3.2 Chicks should never be squeezed, except for the purpose of excreta ejection during sexing by vent examination. When chicks are held for vaccination, treatment, banding and other procedures, the hand or mechanical device used should hold the chicks with care. Chicks being released should not be placed or dropped from a distance or in a way that is likely to cause injury.

## 1.4 Vaccination of Chicks

Vaccination programs must follow accepted veterinary practice. Persons conducting such procedures must be competent.

## 1.5 Morphological Alterations

1.5.1 Morphological alterations to the beak, toes, combs and snoods should be avoided, except when it is necessary to prevent either self-inflicted injury or injury to others in later stages.

1.5.2 Only competent persons should perform any such procedures. Generally, the method and timing of any of the above procedures should minimize the total number and duration of handlings, be performed as early in life as practical, minimize the production of secondary effects and correspond as closely as possible with the shortest recovery. Adaptation of new technologies or methodologies that can improve on these areas should be encouraged.

## 1.6 Identification Devices Attached to Chickens

1.6.1 Competent persons should conduct wing banding.

1.6.2 Identification devices that are permanently or temporarily attached to the chicken bodies must be lightweight and safe to both the identified chicken and to other chickens in the flock.

## 1.7 Euthanasia and Disposal of Nonsaleable Chicks

1.7.1 Live chicks that are to be disposed of must be handled in a manner comparable to the handling of saleable chicks.

1.7.2 In all circumstances, the planned termination of life must be humane and must be done in a manner that produces total and irreversible loss of consciousness, with a minimum level of distress to the chicks and to the person performing euthanasia.

1.7.3 High-speed maceration of chicks is a practical and humane method of euthanasia. When properly designed macerators are used, death occurs instantaneously. In addition, the method is safe for workers.

1.7.4 Chicks must be delivered to the macerator in a way that prevents a backlog of chicks at the point of entry into the macerator and without causing injury or avoidable distress to the chicks before maceration.

1.7.5 All macerators must be designed and operated to ensure immediate and complete destruction of every chick.

1.7.6 Carbon dioxide and/or combination with gases such as argon have been found to be suitable methods for euthanasia of unwanted chicks. High concentrations of carbon dioxide are required because day-old chicks are relatively resistant to the gas.

1.7.7 Containers or chambers used to euthanize chicks must be charged with gas before chicks are introduced.

1.7.8 Chicks must be put into the containers or chambers loosely to allow penetration of the gas.

1.7.9 Containers or chambers must be designed to allow continual refilling with carbon dioxide to maintain correct levels of the gas.

1.7.10 Chicks must be exposed to carbon dioxide gas for enough time to cause death or a state of unconsciousness that does not permit recovery.

1.7.11 In the design and operation of equipment using this method of chick euthanasia, it is essential that operator safety be duly considered.

1.7.12 For small number of birds, decapitation or cervical dislocation is acceptable when performed by competent personnel.

1.7.13 Carbon monoxide gas and electrocution, although humane when performed by trained and competent personnel in an appropriate setting, are not recommended for reasons of human safety.

1.7.14 Other methods of euthanasia may be considered, but regardless of which method is chosen, it must meet the criteria for euthanasia established in sections 1.7.1 and 1.7.2, and must allow for the pre-euthanasia handling of chicks without causing undue panic, pain, or distress.

1.7.15 Death by drowning, suffocation by piling chicks in disposal containers, chloroform, ether, cyanide, thermal exhaustion, or any other method resulting in an inhumane death is not acceptable.

## 1.8 Euthanasia and Disposal of Unhatched Embryos

1.8.1 Attention to the humane disposal of unhatched embryos must be a high priority of the hatchery. All unhatched embryos must be dead before disposal. The processing of unhatched embryos for disposal should be carried out without undue delay.

1.8.2 High-speed maceration is a practical, humane method of euthanizing a large number of unhatched embryos. (See sections 1.7.2-1.7.5).

1.8.3 Rapid cooling and freezing is an acceptable way of euthanizing unhatched embryos. Current industry practice is to expose embryos to temperatures less than 0°C until embryos show no signs of life. The length of exposure to cold varies, depending on the size and capacity of the freezer and the number of embryos being introduced. Equipment to be used must be of sufficient capacity to reduce the temperature to ensure euthanasia. Operators must verify the effectiveness of their procedures on a regular basis.

1.8.4 Crushing of unhatched embryos is acceptable, providing that, all unhatched embryos placed in the crusher, mechanically or vacuum operated, are crushed instantly and totally.

## 1.9 Transportation of Chicks

1.9.1 At hatching approximately 30% of the original nutrient reserve of the yolk will still be available and this lipid-rich depot will continue to be a major source of energy for the newly hatched chick during the first few days after hatching. Chicks held at a hatchery must be provided with an appropriate environment and should be placed within 48 h from the pull of the hatch. For young poultry (chicks) consumption of feed and water during transport is not always easy to arrange. It is noted, however, that some options are available, for example, fluid or water matrix product for chicks when necessary.

When boxes with live chicks are stacked, attention should be paid to temperature, ventilation, and spacing.

1.9.2 Delivery boxes, unless designed as paperless, should have clean, dry absorbent floor pads and should allow efficient ventilation. Transportation of delivery boxes containing live chicks should be conducted in environmentally controlled vehicles.

1.9.3 Outside temperature and duration of transport should be considered when determining the optimum density of chicks in the delivery boxes. The area of box floor space should not be less than 21cm²

(3 $in^2$) per chick. The maximum group size for a single compartment should be approximately 100 chicks and should be adjusted according to the equipment specifications.

1.9.4 Boxes with live chicks should not be tilted more than 20 degrees from horizontal at any stage of loading and unloading the vehicle. Boxes should always be moved smoothly and never be thrown or dropped.

1.9.5 If, during transportation, boxes are to be transferred between vehicles, the change in environment should be minimized.

1.9.6 Chick vehicles should be equipped to prevent overheating or chilling of chicks and provide adequate air exchange to minimize stress. Temperature should be appropriately monitored and the condition of chicks on pickup and delivery should be noted.

# Section 2 ◊ Production of Hatching Eggs

This section refers to multiplier flocks and includes broiler breeders and commercial egg-type breeders raised for hatching egg production. When the term "chicken breeders" is used, it includes both categories. Research reports and experience of successful producers indicate that a high standard of bird care is a basic requirement if egg production is to achieve its full potential. High standards of bird care, however, have to encompass both the metabolic needs of a particular species and other factors that evidently contribute to the well being of animals.

## 2.1 Receiving of Chicks on the Premises

2.1.1 Housing facilities should be prepared to receive the chickens at the time of their arrival. The brooding area should be cleaned and disinfected, and the heating equipment should be operating at the level necessary to maintain an environmental temperature suitable for chicks. Barns should be pre-heated to proper brooding temperature in advance of the arrival of the chicks.

2.1.2 Boxes of live chicks should always be handled in a level position and never thrown. The chicks can be removed by inclining the box slowly and then withdrawing it from under them with a smooth, swift movement. When removed by hand (with the hands forming a scoop), the chicks must not be

squeezed. They should not be dropped more than 15 cm (6 in.) on a hard floor or 30 cm (12 in.) on a soft floor.

2.1.3 Proper attention should be given to prevent chicks from crowding or piling on top of each other in the corners of floor pens.

## 2.2 Housing

2.2.1 Light intensity for the first 3 days of life should not be less than 20 lux (2 foot candles) to encourage chicks to start eating normally. Thereafter, light intensity in pens should provide adequate illumination for normal feed and water intake and normal activity.

During the growth period providing light controlled houses with 0.5 to 1 foot candles (5-10 lux) is recommended. Day length is strictly controlled to enable good light stimulation coming into lay. Note that it is not uncommon practice in the pullet period to distribute feed in the lights-off period to encourage more even distribution and less "rushing" from the flock. The birds will eat and drink in the dark once properly started.

2.2.2 The heating and ventilating systems should be able to maintain the recommended temperature with reasonable accuracy in order to prevent either overheating or chilling of the chicks.

Depending on the type of housing used, brooding temperature for the first week of life should range from 29° to 32°C (84°-90°F) at the eye level of the chicks. Thereafter, the temperature should be lowered by 2°-3°C, (4°-6°F) each week, down to approximately 21°-23°C (70°-75°F) at the age of 6 weeks, and thereafter preferably maintained relatively steady within the range of 10°-27°C (50°-80°F). Various strains of chickens can vary in their optimum temperature requirements. For this reason, the behaviour of chickens in a pen or brooding cage can be used as a reliable indicator of thermal comfort. The crowding of young chicks outside the perimeter of the heating zone usually indicates too high a temperature and, conversely, the gathering of chickens in close proximity to the heat source usually indicates too low an environmental temperature. A temperature close to optimal is present when the chickens are evenly distributed throughout the whole brooder area. Other behavioural signs that indicate too high a temperature are panting, frequent spreading of the wings, frequent wing flapping, and the occurrence of pasty excreta on the cloacal area. Signs of low environmental temperature include feather ruffling, rigid posture, trembling, huddling, distress vocalization, and piling on top of each other.

2.2.3 Chicken buildings should be capable of maintaining an adequate microclimate (as related to vapor condensation, dust level, ammonia, and carbon dioxide) over normal weather fluctuations in a given

locality. The concentration of ammonia in the air should not exceed 25 ppm as a maximum level, in order to maintain an adequate level of air quality. At this level, discomfort to attendants is generally evident. If the concentration is found to exceed this limit, corrective measures should be taken immediately.

Automatic heating and ventilation system fitted with alarms and fail safe devices including alternate power supply should be tested on a regular basis.

2.2.4 An emergency plan in the event of fire or natural disaster for each premise housing pullets and layers should be prepared and every attendant should be familiar with it.

2.2.5 Generators should be available as backup in the event of electrical failure to ensure all electrically dependent mechanical systems necessary for bird health and well-being continue to operate during a hydro failure.

2.2.6 Chicken breeders of all age groups should be protected against drafts or cold areas in the pen.

2.2.7 Chicken breeders should have enough freedom of movement to be able to stand normally, turn around, and stretch their wings without difficulty.

2.2.8 Chicken breeders should be provided with the following minimum feed, water and floor space per bird (Tables 1 & 2).

Feed and water space for broiler breeders should be similar to egg layer birds until the feed restrictions begin. With feed restrictions, feeder space must be increased and progressively maintained so that all birds are able to feed simultaneously.

**Table 1 Broiler Breeders**

| **Floor Space*** | | | | | | |
|---|---|---|---|---|---|---|
| | **Weight** | **Weight** | **Litter** | **Litter** | **1/2 - 3/4 Slat or Wire Flooring** | |
| | **g** | **lb** | **$m^2$** | **$ft^2$** | **$m^2$** | **$ft^2$** |
| **Age (weeks)** | | | | | | |
| 0 - 6 | 750 | 1.6 | 0.047 | 0.5 | n/a | n/a |
| 6 - 14 | 1600 | 3.6 | 0.116 | 1.25 | n/a | n/a |
| 14 - 20 | 2300 | 5 | 0.149 | 1.6 | n/a | n/a |
| Mature | 3600+ | 8.0+ | 0.186 | 2 | 0.167 | 1.8 |
| | | | | | | |
| **Nesting Densities**** | 1 nest per every 5 hens | | | | | |
| | | | | | | |
| **Feed Space** | Pans = 12 - 16 birds / pan | | | | | |
| | Troughs = 10 linear cm (4") per bird | | | | | |
| | | | | | | |
| **Water Space**<br>•Fountains/cups | Up to 50 chicks/cup with drinkers progressively increased to 25 birds/cup at 20 weeks | | | | | |
| •Nipples | Up to 20 birds/nipple with drinkers progressively increased to 10 birds/nipples at 20 weeks | | | | | |
| •Bell Drinkers | Up to 100 birds/bell | | | | | |

*Note: * Dwarf broiler breeders may be allocated 20% less than the above space.*

*Note: ** Equipment manufacturers' documentation should be consulted for best results.*

**Table 2 Commercial Egg-Type Breeders**

| **Floor Space** | | | |
|---|---|---|---|
| | Litter | | |
| **Age** | $m^2$ | $ft^2$ | |
| Mature | 0.081 | 0.9 | |
| | | | |
| **Nesting Densities*** | Number of nests adequate to ensure that eggs laid on the floor are kept to a minimum | | |
| | | | |
| **Feed Space** | Pans = 70 birds/pan | | |
| | Troughs = 5 linear cm (2") per bird | | |
| | | | |
| **Water Space**<br>•Fountain/cups | 2.5 linear cm/bird (1") | | |
| •Nipples | 5 to 20 birds/nipple | | |
| •Bell Drinkers | Up to 120 birds/bell | | |

*Note: * Equipment manufacturers' documentation should be consulted for best results.*

In assessing feeder space, it can be assumed that birds feed at both sides of open-trough feeders, i.e. one unit length of trough provides two units of feeder space. Round (tube or pan) feeders can replace open troughs; with each unit of diameter equaling 1.5 units of double-sided open-trough or chain feeder. For example, one pan feeder that is 40 cm, (16 in.) in diameter provides the same feed space as 60 cm, (24 in.) of chain feeder.

Water fountains, cups, or nipples are frequently used instead of open troughs. The watering device needs to be at a level suitable for the size of the birds and adjusted as the birds grow, with the allocation of waterers progressively increased.

Nesting space should be provided to accommodate hens without crowding. Allocations of community or rollaway nests should be based on the behaviour and comfort of the birds. Flocks with inadequate nesting space will lay excessive numbers of eggs on the floor, with a consequent loss of quality, cleanliness, and potential value. The base of nest boxes and the roosts should not be more than 50 cm (20 in.) above the floor. If it is not possible, then access ramps or roosts should be provided.

2.2.9 Caution must be exercised in choosing any materials used in the pen to which the chickens have access. Such materials should not contain compounds that are harmful and/or toxic.

2.2.10 Chicken breeders are not normally reared in cages in Canada. If stackable pens are being considered as an option, they should be designed to provide the birds with a safe and comfortable environment. The shape of the stackable pens should permit free head movement of standing birds anywhere in the pen. The pen doors should be designed for easy insertion and removal of birds. A pen floor that causes injuries or deformities to the birds' legs, feet, and toes during any period of the production cycle is unacceptable.

## 2.3 Feed and Water

2.3.1 In normal circumstances, all chickens should have access to water at all times. Drinking water must be fresh and should originate from an uncontaminated source. When pen temperature is over 26°, 28°, or 30°C (80°, 84°, or 86°F), any interruption of water supply should not exceed 12, 6 or 2 hours, respectively. The temperature of drinking water should not exceed 30°C (86°F).

2.3.2 In normal circumstances, all chickens should receive feed on a regular, daily basis. When feeding restriction is necessary, any interruption of feed only should not exceed 48 h. The diet must not contain ingredients that can cause illness or suffering. The producer must be prepared to replace immediately any diet proved harmful to the chickens or to marketed products.

2.3.3 When controlled restriction of feed and water is applied, the available feeding and watering space should be increased according to the degree of restriction. Whenever the amount of feed provided is restricted to less than 75% of the average ad libitum intake, space allowances should permit all the chicken to feed at the same time. Increasing feed and water space in such cases prevents severe social competition or aggression.

2.3.3.1 Restrictions longer than those described in section 2.3.1 and 2.3.2 must be avoided. Controlled-molting induced through feed and water deprivation is not currently practiced in Canada and is not recognized as a good production practice in broiler breeders.

## 2.4 Personnel

2.4.1 Persons working with chickens must understand and accept their responsibility to prevent any form of avoidable suffering. Before they are assigned their duties, workers should be instructed and be knowledgeable of the basic needs of the chickens entrusted to their care. Attendants should be able to recognize obvious behavioural signs that indicate health problems and discomfort.

2.4.2 To minimize excitement of the chickens, attendants working with the same groups of chickens should wear clothing of uniform appearance during the whole production cycle. Activities of attendants should be consistent and performed according to a schedule. Movement of people and equipment within the pens should be quiet and smooth. Pen alterations should be undertaken when buildings are empty.

2.4.3 It is highly recommended that workers, before entering a pen, give an easily perceptible signal to the chickens to prevent their being startled. This practice is particularly important when the light intensity or noise is greater outside the pen than inside.

2.4.4 Movement of equipment and personnel between buildings should be minimized, but if it is unavoidable, precautions should be taken to maintain sanitary conditions. On premises where strict sanitary measures (complete change of clothing after a shower) are not enforced, employees should generally avoid contact with poultry stock from other premises.

2.4.5 Admittance of visitors into the pen should be kept to a minimum. However, if their entry is necessary, biosecurity precautions must be enforced. Visitors must talk and move quietly.

Chicken premises should have an emergency plan, and every attendant should be familiar with it. Chicken facilities should also have arrangements for immediate repair of defective mechanisms by their own staff or by service persons under contract.

## 2.5 Supervision and Protection of Breeders

2.5.1 Breeders' flocks should be observed and monitored at least twice a day to ensure the well being of birds. The physical arrangement of a broiler breeder pen should permit easy inspection of all birds.

2.5.2 Mechanical and electronic devices that affect the welfare of breeders should be inspected daily.

2.5.3 Sick or injured chickens must be promptly treated or killed humanely. Cervical dislocation is an acceptable humane method. Dead chickens must be removed immediately and disposed of in an appropriate manner or according to regulations as they may apply.

2.5.4 Personnel should periodically check breeders for external and internal parasites. If parasites are detected, corrective treatment must be administered as soon as possible. Parasites can be detected by examination of a random sample of birds from various parts of a pen, by attention to behavioural

signs that indicate the presence of parasites, by attention to excreta, or by post-mortem examination of chickens suspected of infestation.

2.5.5 Live breeders with clinical signs suggesting disease or flocks with abnormal mortality rates should be submitted to a veterinarian or diagnostic laboratory for diagnosis and recommendations for treatment. Confirmation or suspicion of a reportable or notifiable disease must be brought immediately to the notice of a Canadian Food Inspection Agency (CFIA) veterinarian.

2.5.6 Breeders must be protected from other animals. This protection should prevent both direct and visual contact with animals that cause fear in breeders.

2.5.7 Precautions should be taken to minimize the presence of wild birds inside and around chicken buildings, as they may be carriers of infectious diseases.

2.5.8 Rodent control on breeder premises should be a continuing practice using appropriate, humane methods.

## 2.6 Litter Maintenance

2.6.1 Litter quality in floor pens should be monitored daily. If the quality is inadequate (that is, too wet or too dry), corrective measures should be taken promptly. Piled excreta below raised floors must be out of the breeders' reach.

2.6.2 Breeder pens should be cleaned between each flock. Before pens are restocked, litter or droppings should be removed and pens and equipment cleaned and disinfected.

## 2.7 Handling of Breeders

2.7.1 Broiler breeders should be handled in a manner to minimize stress. When breeders are being held they should be in a comfortable body position. Holding or carrying time in a vertical position with the head down should be minimized, and all movements with breeders should be smooth. Broiler breeders should be carried by both legs or both wings.

2.7.2 In floor pens, chickens with adequate feathering on their wings can be released from a short height provided they can land normally, feet first. Release that requires "flying" can excite or even panic other breeders in the pen and must be avoided. The recommended method of release is to set the breeders on the floor, preferably on their feet.

### 2.8 Social Environment

2.8.1 The formation of a social hierarchy in a small group of chickens is normally associated with a temporary increase in aggressive behaviour as individuals compete to determine their position in the hierarchy. To minimize readjustments in the hierarchy once formed, avoid movement of chickens between groups as much as possible.

2.8.2 An elevated level of aggression can occur when chickens are forced to compete for inadequate resources. To avoid this, make sure that the chickens are provided with enough feeding and watering space, an adequate and predictable supply of feed and water, and an adequate number of nest boxes and roosts.

2.8.3 In breeding flocks, ensure an appropriate male-to-female ratio to avoid fighting among males and injury to females.

2.8.4 Feather pecking can be a problem in chicken flocks, especially if it develops into cannibalism. The underlying cause of this behaviour is poorly understood. Reducing the male-to-female ratio, reducing the density, reducing light intensity, and providing environment enrichment (distractants) can reduce feather pecking. Make sure that the diet is nutritionally balanced. In some cases, beak trimming may be necessary to control feather pecking.

# Section 3 ◊ Broiler and Roaster Production

Research reports and experience of successful producers indicate that a high standard of bird care is a basic requirement if poultry production is to achieve its full potential. High standards of bird care, however, have to encompass both the metabolic needs of a particular species and other factors that evidently contribute to the well being of animals.

### 3.1 Receiving of Chicks on the Premises

3.1.1 Housing facilities should be prepared to receive the chickens at the time of their arrival. The brooding area should be cleaned and disinfected, and the heating equipment should be operating at the level necessary to maintain an environmental temperature suitable for chicks. It is recommended that the barn be pre-heated in advance of the arrival of the chicks.

3.1.2 Boxes of live chicks should always be handled in a level position and never thrown. The chicks can be removed by inclining the box slowly and then withdrawing it from under them with a smooth, swift movement. When removed by hand (with the hands forming a scoop) the chicks must not be squeezed. They should not be dropped more than 15 cm (6 in.) on a hard floor or 30 cm (12 in.) on a soft floor.

3.1.3 Proper attention should be given to prevent chicks from crowding or piling on top of each other in the corners of floor pens.

## 3.2 Housing

3.2.1 Light intensity for the first 3 days of life should not be less than 20 lux (2 foot candles) to encourage chicks to start eating normally. Thereafter, light intensity in the pens should provide adequate illumination for normal feed and water intake and normal activity. In order to avoid panic and pileup during power failures, there should be a period of darkness in each 24-h cycle.

3.2.2 The heating and ventilating systems should be able to maintain the recommended temperature with reasonable accuracy in order to prevent either overheating or chilling of the chicks.

Depending on the type of housing used, brooding temperature on the first day of life should range from 28° to 32°C (82°-90°F) at the eye level of the chicks. Thereafter, the temperature should be lowered by 2°-3°C (4°-6°F) each week, down to approximately 21°-23° C (70°-75° F) at the age of 6 weeks, and thereafter preferably maintained relatively steady within the range of 10°-27°C (50°-80°F). Various strains of chickens can vary in their optimum temperature requirements. For this reason, the behaviour of chickens in a pen or brooding cage can be used as a reliable indicator of thermal comfort. The crowding of young chickens outside the perimeter of the heating zone usually indicates too high a temperature and, conversely, the gathering of chickens in close proximity to the heat source usually indicates too low an environmental temperature. A temperature close to optimal is present when the chickens are evenly distributed throughout the whole brooder area. Other behavioural signs that indicate too high a temperature are the occurrence of panting, frequent wing flapping, frequent spreading of the wings, and pasty excreta on the cloacal area. Signs of low environmental temperature include feather ruffling, rigid posture, trembling, huddling, distress vocalization, and piling on top of each other.

3.2.3 Chicken buildings should be capable of maintaining an adequate microclimate (as related to relative humidity, dust level, ammonia, and carbon dioxide) over normal weather fluctuations in a given locality. The concentration of ammonia in the air should not exceed 25 ppm as a maximum level, in order to maintain an adequate level of air quality. At this level, discomfort to attendants is generally

evident. If the concentration is found to exceed this limit, corrective measures should be taken immediately.

3.2.4 Automatic heating and ventilation systems fitted with alarms and fail safe devices including alternate power supply should be tested on a regular basis.

3.2.5 An emergency plan in the event of fire or natural disaster for each premise housing chicken should be prepared and every attendant should be familiar with it.

3.2.6 Generators should be available as backup in the event of electrical failure to ensure all electricity dependent mechanical systems necessary for bird health and well-being continue to operate during a power failure.

3.2.7 Chickens of all age groups should be protected against drafts or cold areas in the pen.

3.2.8 Chickens raised in floor pens should have enough freedom of movement to be able to stand normally, turn around, and stretch their wings without difficulty.

3.2.9 Broilers and roasters should be provided with adequate space to feed and drink without restriction. The number and type of feeders and waterers need to be appropriate to the size of the birds and to manufacturer's recommendations.

3.2.10 Caution must be exercised in choosing any materials used in the pen to which the chickens have access. Such materials should not contain compounds that are harmful and/or toxic.

**Table 3 Suggested Feed and Water Space***

| Containers | Bird Density |
|---|---|
| **Feeders** | |
| pans | 70 birds per pan |
| troughs | 5 cm (2 in.) per bird |
| **Waterers** | |
| troughs / cups | 2.5 cm (1 in.) per bird |
| bell drinkers | 1 per 120 birds |
| nipples | 5-20 birds per nipple |

** The recommended weight per unit of floor space is 31 kg/m$^2$ (6.35 lb/ft$^2$). However, variations in stocking density up to 38 kg/m$^2$ (7.78 lb/ft$^2$) are acceptable if justified by adequate husbandry programs, feeding and watering equipment, ventilation systems, lighting programs and litter materials. Extra space is recommended in hot summer weather.*

3.2.11 Broilers are not normally reared in cages in Canada. If cages are being considered as an option, they should be designed to provide the birds with a safe and comfortable environment. The shape of the cages should permit free head movement of standing birds anywhere in the cage. The cage doors should be designed for easy insertion and removal of birds. A cage floor that causes injuries or deformities to the birds' legs, feet, and toes during any period of the production cycle is unacceptable.

## 3.3 Feed and Water

3.3.1 In normal circumstances, all chickens should have access to water at all times. Drinking water must be fresh and should originate from an uncontaminated source. It must be recognized that, in nature, chickens may go without water for short periods of time, however when pen temperature is over 26°, 28°, or 30°C (80°, 84° or 86°F), any interruptions of water supply should not exceed 12, 6 or 2 hours, respectively. The temperature of drinking water should not exceed 30°C (86°F).

3.3.2 In normal circumstances, all chickens should receive feed on a regular, daily basis. The diet must not contain ingredients that can cause illness or suffering. The producer must be prepared to replace immediately any diet proven to be harmful to the chickens or to marketed products.

## 3.4 Personnel

3.4.1 Persons working with chickens must understand and accept their responsibility to prevent any form of avoidable suffering. Before they are assigned their duties, workers should be adequately instructed

and be knowledgeable of the basic needs of the chickens entrusted to their care. Attendants should be able to recognize obvious behavioural signs that indicate health problems and discomfort.

3.4.2 To minimize excitement of the chickens, attendants working with the same groups of chickens should wear clothing of uniform appearance during the whole production cycle. Activities of attendants should be consistent and performed according to a schedule. Movement of people and equipment within the pens should be quiet and smooth. Pen alterations should be undertaken when buildings are empty.

3.4.3 It is highly recommended that workers, before entering a pen, give an easily perceptible signal to the chickens to prevent their being startled. This practice is particularly important when the light intensity or noise is greater outside the pen than inside.

3.4.4 Movement of equipment and personnel between buildings should be minimized, but if it is unavoidable, precautions should be taken to maintain sanitary conditions. On premises where strict sanitary measures (complete change of clothing after a shower) are not enforced, employees should generally avoid contact with poultry stock from other premises.

3.4.5 Admittance of visitors into the pen should be kept to a minimum. However, if their entry is necessary, biosecurity precautions should be enforced. Visitors must talk and move quietly.

### 3.5 Supervision and Protection of Chickens

3.5.1 Chicken flocks should be observed and monitored at least twice a day. The physical arrangement of a chicken pen should permit easy inspection of all chickens to ensure the well being of birds.

3.5.2 Mechanical and electronic devices that affect the welfare of chickens should be inspected daily.

3.5.3 Sick or injured chickens must be promptly treated or killed humanely. Cervical dislocation is an acceptable humane method. Dead chickens must be removed immediately and disposed of in an appropriate manner or according to regulations as they may apply.

3.5.4 Attendants should periodically check the chickens for external and internal parasites. If parasites are detected, corrective treatment must be administered as soon as possible. Parasites can be detected by examination of a random sample of chickens from various parts of a pen, by attention to behavioural signs that indicate the presence of parasites, by attention to excreta, or by post-mortem examination of chickens suspected of infestation.

3.5.5 Live chickens with clinical signs suggesting disease or flocks with abnormal mortality rates should be submitted to a veterinarian or diagnostic laboratory for diagnosis and recommendations for treatment. Confirmation or suspicion of a reportable or a notifiable disease must be brought immediately to the notice of a veterinarian of the Canadian Food Inspection Agency (CFIA).

3.5.6 Chickens should be protected from other animals. This protection should prevent both direct and visual contact with animals that cause fear in chickens.

3.5.7 Precautions should be taken to minimize the presence of wild birds inside and around chicken buildings, as they may be carriers of infectious diseases.

3.5.8 Rodent control on chicken premises should be a continuing practice using appropriate, humane methods.

### 3.6 Litter Maintenance

3.6.1 Chicken pens should be cleaned between each flock. Before pens are restocked, litter or droppings should be removed and pens and equipment cleaned and disinfected.

3.6.2 Litter quality in floor pens should be monitored daily. If the quality is inadequate (that is, too wet or too dry), corrective measures should be taken promptly.

### 3.7 Handling of Chickens

3.7.1 Chickens should be handled in a manner to minimize stress. When chickens are being held they should be in a comfortable body position. Roasters should be carried by both legs. Holding or carrying time in a vertical position with the head down should be minimized, and all movements with chickens should be smooth.

3.7.2 In floor pens, chickens with adequate feathering on their wings can be released from a short height provided they can land normally, feet first. Release that requires "flying" can excite or even panic other chickens in the pen and must be avoided. The recommended method of release is to set the chickens on the floor, preferably on their feet.

### 3.8 Social Environment

3.8.1 The formation of a social hierarchy in a small group of chickens is normally associated with a temporary increase in aggressive behaviour as individuals compete to determine their position in the

hierarchy. To minimize readjustments in the hierarchy once formed, avoid movement of chickens between groups as much as possible.

3.8.2 An elevated level of aggression can occur when chickens are forced to compete for inadequate resources. To avoid this, make sure that the chickens are provided with enough feeding and watering space, an adequate and predictable supply of feed and water (as per Table 4).

3.8.3 Feather pecking can be a problem in chicken flocks, especially if it develops into cannibalism. The underlying cause of this behaviour is poorly understood. Reducing the density, reducing light intensity, and providing environment enrichment (distractants) can reduce feather pecking. Make sure that the diet is nutritionally balanced. Beak trimming may be necessary to control feather pecking in small outside backyard flocks. It should be noted that beak trimming is not done for commercial broiler flocks.

# Section 4 ◊ Turkey Production

The successful breeding and production of turkeys depends on a high standard of bird husbandry that provides not only the essentials of life but also those elements that contribute to the well being of the birds.

## 4.1 Receiving of Poults on the Premises

4.1.1 Prior to receiving poults, the brooding area should be cleaned and disinfected, and the heating equipment should be operating at the level necessary to maintain an environmental temperature suitable for poults. It is recommended that barns be pre-heated prior to the arrival of poults.

4.1.2 Boxes of live poults should always be handled in a level position and never thrown. The poults can be removed by inclining the box slowly and then withdrawing it from under them with a smooth, swift movement. When removed by hand (with the hands forming a scoop) the poults must not be squeezed. They should not be dropped on a littered floor more than 30 cm (12 in.).

4.1.3 Proper attention should be given to prevent poults from crowding or piling on top of each other in the corners of floor pens.

## 4.2 Housing

4.2.1 Light intensity for the first 3 days of life should not be less than 50 lux (5 foot candles) to encourage poults to start eating normally. Thereafter, light intensity in the pens should provide adequate illumination for normal food and water intake and normal activity. For turkeys older than 3 weeks of age, in order to avoid panic and pileup during power failures, there should be a period of uninterrupted darkness in each 24-hour cycle.

4.2.2 The heating and ventilating systems should be able to maintain the recommended temperature with reasonable accuracy in order to prevent either overheating or chilling of the turkeys.

Depending on the type of housing, brooding temperature for the first week of life should range from 32°C to 35°C (90°-95°F) at the eye level of the poults. Thereafter the temperature should be lowered 2°-3°C (4°-6°F) per week down to approximately 21°C (70°F) at the age of 6 weeks, and thereafter preferably maintained relatively steady within the range of 10°-24°C (50°-75°F). Various strains of turkeys can vary in their optimal temperature requirements. For this reason, the behaviour of turkeys can be used as a reliable indicator of thermal comfort.

The crowding of turkeys outside the perimeter of the heating zone usually indicates too high a temperature, and conversely, the gathering of turkeys in close proximity to the heat source usually indicates too low an environmental temperature. A temperature close to optimal is evidenced by the even distribution of turkeys throughout the whole brooder area. Other behavioural signs that indicate high temperature include panting, frequent spreading of the wings, frequent wing flapping, and the occurrence of pasty excreta on the cloacal area. Signs of low environmental temperature include huddling, feather ruffling, rigid posture, trembling, and piling on top of each other.

4.2.3 Turkey buildings should be capable of maintaining an adequate microclimate (as related to relative humidity, dust level, ammonia, and carbon dioxide) over normal weather fluctuations in a given locality. The concentration of ammonia in the air should not exceed 25 ppm as a maximum level, in order to maintain an adequate level of air quality. At this level, discomfort to attendants is generally evident. If the concentration is found to exceed this limit, corrective measures should be taken immediately.

4.2.4 Automatic heating and ventilation systems fitted with alarms and fail safe devices including alternate power supply should be tested on a regular basis.

4.2.5 An emergency plan in the event of fire or natural disaster for each premise housing turkeys and breeders should be prepared and every attendant should be familiar with it. Turkey facilities should

also have arrangements for immediate repair of defective mechanisms by their own staff or by service persons under contract.

4.2.6 Generators should be available as backup in the event of electrical failure to ensure all electricity dependent mechanical systems necessary for bird health and well-being continue to operate during a hydro failure.

4.2.7 Turkeys of all age groups should be protected against drafts and cold areas in the barn.

4.2.8 Turkeys are grown in total confinement, semi-confinement, or on range. Finished market live weights for broiler turkeys, hen turkeys, light tom turkeys and heavy tom turkeys vary as follows:

**Table 4 Turkey Live Weights**

| Category | Live kg | Live lbs |
|---|---|---|
| Broilers | Under 6.2 kg | Under 13.7 lbs |
| Hens | 6.2 kg and under 9.8 kg | 13.7 lbs. and under 21.6 lbs. |
| Light Toms | 9.8 kg and under 13.3 kg | 21.6 lbs and under 29.3 lbs |
| Heavy Toms | 13.3 kg and over | 29.3 lbs and over |

Because of various rearing practices, and the four different weight categories of turkey grown, the stocking densities recommendations below should be viewed as guidelines. Variance from these guidelines may be required because of differing husbandry programs, feeding and watering equipment, ventilation systems, lighting programs, litter materials, final market weight and breed of turkey. In some situations the stocking density can be adjusted during rearing by marketing some birds in advance.

**Table 5 Turkey Recommended Stocking Densities**

| Category | $M^2$/Bird | Kg/$m^2$ |
|---|---|---|
| Broilers | 0.19 $m^2$ (2.0 $ft^2$) | 32.6 kg/$m^2$ (6.9 lb/$ft^2$) |
| Hens | 0.19 $m^2$ to 0.28 $m^2$<br>(2.0 $ft^2$ to 3.0 $ft^2$) | 32.6 kg/$m^2$ to 35.0 kg/$m^2$<br>(6.9 lb/$ft^2$ to 7.2 lb/$ft^2$)` |
| Light Toms | 0.28 $m^2$ to 0.37 $m^2$<br>(3.0 $ft^2$ to 4.0 $ft^2$) | 35.0 kg/$m^2$ to 35.8 kg/$m^2$<br>(7.2 lb/$ft^2$ to 7.3 lb/$ft^2$) |
| Heavy Toms | 0.37 $m^2$ (4.0 $ft^2$) | 35.8 kg/$m^2$ (7.3 lb/$ft^2$) |

Actual space allotments or densities should be determined considering the above listed variables and growth stage of the turkey. In all cases, turkeys grown in confinement must have enough space to be able to stand normally, turn around, and stretch their wings without difficulty. Extra space is recommended in hot summer weather.

4.2.9 Turkey feeding equipment includes a variety of sizes of hanging tube feeders, automatic troughs, and high-capacity tanks. Water is provided through bell-type waterers, automatic troughs, nipple/disc drinkers and range bowls. Actual feeding and drinking space per bird depends on the factors outlined above, including the growth stage of the turkey, as well as on the equipment design and size. Space allotment for feeding and drinking must be sufficient to allow the birds ease of access. An adequate number of waterers should be provided during hot weather, when consumption can increase significantly.

4.2.10 Caution must be exercised in choosing any materials used in the barn to which the turkeys have access. Such materials should not contain compounds that are harmful and/or toxic.

### 4.2.11 Semi-confined and Range Production

4.2.11.1 Shelters or natural shade are recommended for ranged production. If shelters are provided they must be adequate in number/space to avoid the overcrowding of birds.

4.2.11.2 Turkeys should be protected as best possible from other animals. This protection should prevent direct contact with wild animals that may cause fear or injury to turkeys. Fencing used for enclosures should be checked regularly and any holes sealed.

4.2.11.3 If possible, piping used for supplying water to birds should be buried underground to ensure that drinking water is kept fresh, clean and cool.

4.2.11.4 Enclosures must be kept free of all debris (e.g. fallen trees, branches); otherwise it may provide a sanctuary for pests, wild birds and animals.

4.2.11.5 Dead or sick birds must be removed immediately as they can attract wild birds and animals.

## 4.3 Feed and Water

4.3.1 In normal circumstances, all turkeys should have access to water at all times. Drinking water must be fresh and should originate from an uncontaminated source. It must be recognized that, in nature,

turkeys may go without water for short periods of time, however when pen temperature is over 26°, 28°, or 30°C (80°, 84°, or 86°F), any interruption of water supply should not exceed 12, 6, or 2 hours, respectively. The temperature of drinking water should not exceed 30°C (86°F).

4.3.2 In normal circumstances, all turkeys should receive feed on a regular, daily basis. The diet must not contain any ingredients than can cause illness or suffering. The producer must be prepared to replace immediately any diet proven to be harmful to the turkeys or to marketed products.

## 4.4 Turkey Breeders

4.4.1 In general, the care of breeder turkeys is similar to the care required in raising commercial birds. In addition, the following guidelines should be followed.

4.4.2 Controlled-molting is not currently practiced in Canada. However, in the event of a situation that endangers the survival of a strain or line, threatens the supply of hatching eggs and consequently where the life of a breeder flock must be extended, controlled-molting may be undertaken on healthy birds and under the supervision of an independent poultry veterinary practitioner. The supervision is to include regular, on-site monitoring of the bird's health and well being.

4.4.3 Feed and water restrictions longer than those described in sections 4.3.1 and 4.3.2 are to be avoided, except in the case of controlled molting. Turkeys that have not been in good health or did not produce at a high rate during the laying cycle are not to be considered for controlled molting.

4.4.4 The base of nest boxes and roosts should not be more than 60 cm (24 in.) above the floor. If this is not possible, access ramps or roosts should be provided.

4.4.5 In the case of artificial insemination, high standards of hygiene should be maintained at all stages of the program, and competent personnel should perform procedures. Care should be taken to use only birds that are in good physical condition.

4.4.6 In breeding flocks where natural mating is practiced, ensure an appropriate male-to-female ratio to avoid excessive fighting among males and injury to females.

4.4.7 Nesting space should be provided to accommodate birds without crowding. One nest is recommended for every seven (7) to eight (8) birds. Variance from these guidelines may be required because of the nesting equipment being used.

4.4.8 In assessing stocking densities for breeder turkeys it is important to consider the weight of the birds, which can range from 11-12 kg for hens and up to 35 kg for breeder toms. Recommended minimum stocking densities for breeder hens is 5 to 6 sq. ft/bird during the lay period and for breeder toms is, 7-8 sq. ft/bird during the breeding period. Variance from these guidelines may be required because of differing husbandry practices, barn and nesting equipment, and the final weight of the birds.

4.4.9 Because of the size and weight breeder turkeys can reach, it is highly recommended that during catching they be handled with extra care to prevent injury. If being caught manually, birds should be caught one bird at a time.

## 4.5 Personnel

4.5.1 Persons working with turkeys must understand and accept their responsibility to prevent any form of avoidable suffering. Before they are assigned their duties, workers should be adequately instructed and be knowledgeable of the basic needs of the turkeys entrusted to their care. Attendants should be able to recognize obvious behavioural signs that indicate health problems and discomfort.

4.5.2 To minimize excitement of the turkeys, attendants working with the same groups of turkeys should wear clothing of uniform appearance during the whole production cycle. Activities of attendants should be consistent and should be performed according to a schedule. Movement of people and equipment within the pens should be quiet and smooth. Pen alterations should be avoided during the production cycle.

4.5.3 It is highly recommended that workers, before entering the barn, give an easily perceptible signal to the turkeys to prevent their being startled. This practice is particularly important when the light intensity or noise is greater outside the barn than inside. (One of the simplest signals, to which turkeys can become easily conditioned, is a consistent number of distinct knocks on the door just before entry.)

4.5.4 Movement of equipment and personnel between buildings should be minimized, but if it is unavoidable, precautions should be taken to maintain sanitary conditions. On premises where strict sanitary measures (complete change of clothing after a shower) are not enforced, employees should generally avoid contact with poultry stock from other premises.

4.5.5 Admittance of visitors into the pen should be kept to a minimum. However, if their entry is necessary, biosecurity precautions required by the owner/operator should be enforced. Visitors must talk and move quietly.

## 4.6 Supervision and Protection of Turkeys

4.6.1 Turkey flocks should be observed and monitored at least twice a day to ensure the well being of birds. The physical arrangement of a turkey pen should permit easy inspection of all turkeys.

4.6.2 Mechanical and electronic devices that affect the welfare of turkeys should be inspected daily.

4.6.3 Sick or injured turkeys must be promptly treated or euthanized humanely. Sick or injured birds with no hope of recovery should be euthanized in an acceptable manner to prevent needless suffering and distress. Cervical dislocation, when performed by trained and competent personnel is an acceptable, humane method of disposing of younger turkeys. A quick firm blow to the head, administered by trained personnel, after the bird has been properly restrained, is recommended for euthanizing larger birds. Dead turkeys must be removed immediately and disposed of in an appropriate manner or according to regulations as they may apply.

4.6.4 Attendants should periodically check the turkeys for external and internal parasites. If parasites are detected, corrective treatment must be administered as soon as possible. Parasites can be detected by examination of a random sample of turkeys from various parts of a barn, by attention to behavioural signs that indicate the presence of parasites, by attention to excreta, or by post-mortem examination of turkeys suspected of infestation.

4.6.5 Live turkeys with clinical signs suggesting disease or flocks with abnormal mortality rates should be submitted to a veterinarian or diagnostic laboratory for diagnosis and recommendations for treatment. Confirmation or suspicion of a reportable or notifiable disease must be brought immediately to the notice of a veterinarian of the Canadian Food Inspection Agency (CFIA).

4.6.6 Turkeys should be protected from other animals. This protection should prevent both direct and visual contact with animals that cause fear in turkeys.

4.6.7 Precautions should be taken to minimize the presence of wild birds inside and around turkey buildings, as they may be carriers of infectious diseases.

4.6.8 Rodent control on turkey premises should be a continuing practice using appropriate, humane methods.

## 4.7 Litter Maintenance

4.7.1 Turkey barns should be cleaned and disinfected between each flock. Before barns are restocked, litter and droppings should be removed and equipment cleaned and disinfected.

4.7.2 Litter quality in barns should be monitored daily. If the quality is inadequate (i.e. too wet or too dry), corrective measures should be taken promptly.

## 4.8 Handling of Turkeys

4.8.1 Turkeys should be handled in a manner to minimize stress. When turkeys are being held they should be in a comfortable body position. Holding or carrying time in a vertical position with the head down should be minimized, and all movements with turkeys should be smooth. Heavy turkeys should be carried by both legs and one wing.

4.8.2 Smaller turkeys that can be picked up by hand may be set down on their feet. The recommended method for heavier turkeys is to set the turkeys on the floor, preferably on their breast.

## 4.9 Social Environment

4.9.1 The formation of a social hierarchy in a small group of turkeys is normally associated with a temporary increase in aggressive behaviour as individuals compete to determine their position in the hierarchy. To minimize readjustments in the hierarchy once formed, avoid movement of turkeys between groups as much as possible.

4.9.2 An elevated level of aggression can occur when turkeys are forced to compete for inadequate resources. To avoid this, make sure that the turkeys are provided with enough feeding and watering space, and an adequate and predictable supply of feed and water.

4.9.3 Although the underlying cause of feather pecking is poorly understood, it can be a problem in turkey flocks, especially if it develops into cannibalism. Feather pecking can be reduced by increasing feed availability, reducing group size, reducing light intensity, adding litter, and providing distractants such as straw bales. Make sure that the diet is nutritionally balanced. Beak trimming may be necessary, and is an acceptable practice, to control feather pecking.

# Section 5 ◊ Handling and Transportation of Live Poultry

These code provisions are intended as a guide for the transportation of poultry. These guidelines emphasize the responsibilities of the poultry producer, the catching crew, and the transporter. They are intended to encourage humane, efficient, and considerate treatment of birds so that transport stress and injury are minimized at all stages of handling and transport. For the purpose of this code, the transportation process commences with the planning, the scheduling, the processor-producer coordination and the catching of the birds.

Note: Any provisions pertinent to transportation of chicks are dealt with in Section 1 of this Code. Furthermore, general information regarding transportation of poultry (including emergency procedures) are covered in the *Recommended Code of Practice for the Care and Handling of Farm Animals: Transportation.*

## 5.1 Facilities for and Handling of Poultry

5.1.1 Owners and operators of poultry operations have a responsibility to provide facilities and equipment to make bird handling, loading and unloading possible without causing unnecessary injury or suffering to the birds. **Producer or a representative should be available throughout the catching and loading process.**

5.1.2 All poultry do not have the same equipment and facility requirements. Equipment specific to the species should be used.

5.1.3 Proper building design and accessibility to transport vehicles greatly improves the humane handling of loose-housed poultry. Producers are responsible for ensuring proper interior and exterior design of buildings to facilitate loading and unloading of poultry. Owners and operators should therefore ensure the following:

**Barn Design**

- building design discourages needless transfer of birds between handlers;
- building design should be adapted to the catching and loading equipment used and have sufficient number and size of doors or openings. For example, in the case of broiler chickens, barns where birds are loaded in crates, the building design should incorporate a door every 15m (49 ft.) of building length, and doors on first, second and third floors are not less than 120 cm (48 in.) and not less than 200 cm (78 in.) high, and;

- when birds have to be handed through floor openings, the openings are not less than 1 $m^2$ (10 sq. ft.) for chickens and not less than 1.2 $m^2$ (13 sq. ft.) for turkeys, and no obstructions, such as floor joists, hinder the transfer of birds.

**Farm Access**

- Laneway entrances should be of sufficient road-top width to accommodate a tractor-trailer. A minimum of 15.2 meter (50 ft.) at its widest point is proposed so the truck does not have to swing across the centreline and into oncoming traffic in order to come into the lane.
- Laneways should be constructed to support the weight and dimensions of the vehicles used to load birds under all weather conditions. A width of 3.7 m (12 ft) is proposed when tractor-trailers are to be used.

**Barn Access**

- The traveled portion of the yard and lane should be free of all overhead objects such as branches or wires to a height of 4.5 m (15 ft.) from the surface of the lane and yard.
- Snow should be removed from the driveways and loading/unloading areas and, when necessary, sand and salt should be applied before trucks arrive.

**Loading/Unloading Areas**

- Appropriate access to loading and unloading areas of poultry barns should be provided.
- Loading and unloading areas and ramps should be designed to permit proper bird handling.
- Loading areas should be designed and located to permit transport vehicles to turn around, to reach them without having to back in off a public road, and to leave them without having to back out onto a public road.
- Loading areas should be level and should be long enough to allow loading along the entire length of the vehicle being loaded.
- Feeders, drinkers, and heating pipes that are obstructions should be lifted to ceiling height or removed before birds are loaded.
- Fans in use immediately adjacent to loading doors should be turned off while birds are being loaded.
- When flooding problems occur in buildings, dry bedding should be provided to prevent shipping wet birds.

## 5.2 Catching and Loading

5.2.1 All members of catching and transporting crews should be properly instructed and knowledgeable about the basic aspects of animal welfare and in handling birds. An experienced supervisor should supervise all catching crews. Proper training and evaluation of personnel is the responsibility of the

employer. Catching and loading should take place in a timely and efficient manner to prevent bird injury.

5.2.2 Co-ordination between producer and processor should take place to determine the most appropriate feed withdrawal protocol.

5.2.3 Careless catching of birds can be a source of injury. Injured birds are particularly susceptible to transportation stress. In cold conditions, wet birds should not be loaded. This is inhumane and increases the loss of marketable product. Sick or injured birds should be disposed of humanely.

5.2.4 Piling of birds in corners can cause injury or mortality. Steps must be taken to prevent this from occurring.

5.2.5 The two most common procedures which facilitate easier catching of birds, are:

- lowering the light intensity in the pen or using blue bulbs to provide adequate illumination for humans but not for poultry; and
- corralling chickens with a net or screen/turkeys with solid partition at the loading door.

5.2.6 Turkeys can be loaded more easily by moving them in small groups.

5.2.7 When birds are transported in crates or modules, the design, construction available space and state of repair should allow the birds to be loaded, conveyed, and removed without injury. Birds should be loaded only into clean transporting crates and vehicles.

5.2.8 Crate doors and panels on liner trucks should be large enough to permit easy passage of birds, thus avoiding injury.

5.2.9 Construction of crates and modules should provide adequate, uniform ventilation but prevent protrusion of the head, wings and legs of birds.

5.2.10 When loaded into modules or crates, birds must be in an upright position to avoid smothering.

5.2.11 The number of birds per crate or module depends on available floor space, body size of birds, and prevailing environmental conditions at time of transport. Maximum density per crate or bin should permit all birds to rest on the floor at the same time if they are evenly distributed. Birds should be able to move their heads freely when sitting on the floor.

5.2.12 Weather conditions should be considered when determining load densities. For growing and adult birds, the recommended maximum live weight loading densities for crates and modules in cold weather are as follows:

| | |
|---|---|
| Chickens: | 63 kg / $m^2$ (139 lbs / 10 sq. ft.) |
| Chicken Breeders: | 66 kg / $m^2$ (145 lbs / 10 sq. ft.) |
| Broiler Turkeys: | 98 kg / $m^2$ (216 lbs / 10 sq. ft.) |
| Heavy Hens: | 98 kg / $m^2$ (216 lbs / 10 sq. ft.) |
| Heavy Toms: | 98 kg / $m^2$ (216 lbs / 10 sq. ft.) |

These maximum values are recommended for winter conditions and should be reduced during summer months by 15 - 20% for chickens.

In extreme cold weather, (-15°C and below), broiler chickens (1.8 kg and under) could be loaded up to 68 and 70 kg/$m^2$ for spent hens.

5.2.13 Birds should be protected from becoming wet, in cold conditions during loading. Covers on the trucks should be used to protect birds from adverse weather conditions. Extreme changes in temperature should be minimized to the extent possible.

5.2.14 Eavestroughs should be continuous across loading areas to prevent birds from getting wet during transfer from building to truck during a rainstorm.

5.2.15 Ideally, crates with live birds should be moved in a horizontal position. If a conveyor is used for loading crates of live birds, the conveyor angle should prevent tilting of crates that causes birds to pile up. Loaded crates must not be thrown or dropped. They should be moved smoothly during loading, transport, and unloading.

5.2.16 One possible way to alleviate catching and loading problems and to avoid the potential for damage to the birds is to collect the birds mechanically. Producers, catchers, and transporters should keep themselves informed of new technology. Only devices proven to be humane should be considered for use in gathering birds.

## 5.3 Transport

5.3.1 The driver should check the load and surrounding area for loose birds before departing.

5.3.2 The driver of the vehicle is responsible for the care and welfare of all birds during transport. The driver must take into consideration climatic conditions and must adjust coverings to allow birds to warm up or cool off, as required.

5.3.3 To minimize adverse transportation effects on birds, trucks should proceed immediately after loading, and proper care should be taken during transportation.

Birds in transit should not be required to sit in a parked vehicle for more than 2 hours when facilities are unavailable for protection from the weather at, for example, truck stops and border crossings.

5.3.4 The air temperature in a load of live poultry should be maintained between 5°C (42°F) and 30°C (86°F). Development and installation of environmental monitoring devices on live haul trailers should be encouraged to provide drivers with continual information on the load. Drivers should use this information in conjunction with his/her experience to respond appropriately.

5.3.5 To keep the temperature from dropping below 5°C (42°F) during cold weather, the load may have to be covered with protective material.

5.3.6 During hot weather (as mentioned in section 5.2.12), the number of birds per crate or bin may have to be reduced in order to keep load temperature within the acceptable range. When the temperature of the load exceeds 30°C (86°F), the vehicle should not be left stationary for more than 45 minutes. The vehicle should be driven at a minimum speed of 30 km/h (20 miles/h) for a short distance. When this is possible, the truck should be kept in shade and an alternative method of air circulation should be provided.

## 5.4 Emergency Procedures

5.4.1 The transporters should have a contingency plan and drivers aware of its content. If a transport truck is involved in an accident, the transporters should contact the identified, specialised catching crew as soon as possible.

5.4.2 If crates (cages) have been spilled and birds are still inside, turn the crates upright as soon as possible, ensure no heads, wings or legs are protruding from the opening and stack them neatly by the side of the road away from the vehicle as quickly as possible.

5.4.3 Birds may be severely affected by extremes of cold or heat. In cold weather, there will be weather protection in place on poultry trucks. Birds in a disabled truck may suffocate if the weather

protection is left in place on a stationary load. The birds must be closely monitored and weather protection should be adjusted if necessary to provide increased ventilation.

5.4.4 In the event of an accident involving a poultry transport truck or a roll-over of a poultry transport truck, the load should be pulled upright by a competent wrecker service as soon as it is safe to do so. If experienced handlers are available, rely upon their advice. Poultry shippers should usually provide catching crews to the accident site quickly. Birds should not be chased or caused to fly. It may be possible to gently, quietly and calmly herd or direct a small group of birds in a specific direction.

Severely injured birds should be humanely killed after dealing with the uninjured birds. Recommended methods include use of $CO_2$ euthanizing chambers by experienced personnel or cervical dislocation properly performed in a secure quiet area away from public view.

# Section 6 ◊ Processing Operations

Law requires the prevention of unnecessary suffering of birds before and during slaughter. In addition to welfare concerns, improper handling at this stage can seriously impair meat quality, visual appearance, and attractiveness to the consumer.

## 6.1 Receiving and Handling of Poultry

6.1.1 Appropriate arrangements must be made by processing plant operators for the holding and monitoring of birds upon arrival and, while waiting for unloading from transport vehicles, live birds must be protected against adverse weather conditions. Adequately trained personnel should be available to receive and monitor live birds. Shelters should be provided and be capable of protecting the birds from the elements in winter and provide sufficient shade and ventilation in summer months. A shelter also protects from rain.

6.1.2 Ideally, crates with live birds should be moved in a horizontal position. If a conveyor is used for unloading crates of live birds, the conveyor angle should prevent tilting of crates that causes birds to pile up. Loaded crates must not be thrown or dropped. They should be moved smoothly during loading, transport, and unloading.

6.1.3 All birds should be removed from the transporting crates, modules, dolly carts or liner trucks with all possible care to avoid injury. The birds should not be lifted by the head, neck, or wings.

6.1.4 Birds that escape during unloading should be caught as soon as possible to prevent injury by a moving truck or other vehicle.

6.1.5 All mechanical devices used for unloading and removing birds from transportation crates must be demonstrated to be humane before they are installed.

6.1.6 Stressed loads must, if at all possible, take precedence in the slaughter schedule. Flocks observed to be in distress during the transport or while awaiting slaughter at the abattoir should be slaughtered on a priority basis. Generally, it is accepted practice to schedule slaughter based on crate time.

6.1.7 Upon arrival at the plant, the driver should advise the receiver of any special instructions regarding tarping and the condition of the load.

## 6.2 Slaughter of Poultry

6.2.1 In preparation for slaughter and during slaughter, birds should not be subjected to any unnecessary suffering and should be hung carefully to avoid injury.

6.2.2 *The Meat Inspection Act and Regulations* permit the following methods for the slaughtering of poultry:

- the application of an electrical current in a manner that causes immediate loss of consciousness and that ensures the birds do not regain consciousness before death;
- electrocution;
- decapitation;
- ritual slaughter in accordance with Jewish or Islamic law;
- gas stunning.

6.2.3 All poultry-processing plants that are not subject to the *Meat Inspection Act and Regulations* should use only the same methods in accordance with recommendations outlined in the *Meat Hygiene Manual of Procedures* published by the Canadian Food Inspection Agency.

6.2.4 All instruments used to render birds unconscious and to slaughter them must be of an approved type and at all times must be maintained and functioning in a manner that avoids any unnecessary suffering.

6.2.5 Persons who use instruments to render birds unconscious or to slaughter them must have the appropriate skills and attitude to use the instruments without inflicting unnecessary suffering.

# Section 7 ◊ Areas for Further Research

During its review of the previous version the Recommended Code of practice for the care and handling of chicken, turkeys and breeders from hatchery to processing plant, the revision committee has identified the following points where research is needed to improve the welfare of the birds raised for human consumption.

7.1 Morphological alterations to chicks should be avoided but in certain circumstances they are necessary to prevent either self-inflicted injury or injury to others in later stages. Research should continue into new technologies and methodologies that can further enhance the morphological alterations in order to minimize pain and stress.

7.2 For various reasons, hatchery operators must dispose of a number of nonsaleable hatched and unhatched chicks on a daily basis. Standardized guidelines should be developed to ensure adequate equipment is used to ensure that no viable hatched or unhatched chicks remain live once submitted to the procedure.

7.3 Although controlled-molting is not practiced in Canada in the poultry meat production industry, the potential for exceptional circumstances, which would threaten the supply of hatching eggs, exists. In those cases, the life of breeder flocks must be extended. Research should be encouraged to develop alternative methods to controlled-molting involving feed deprivation.

7.4 Continuing nutritional research is recommended to promote on-going poultry health and welfare in areas such as skeletal strength and appetite management.

7.5 Although transportation of animals is regulated in Canada, changing weather conditions confront transporters with constant challenges to maintain optimal conditions in bringing live poultry from the farms to the plants. Research has been suggested to develop monitoring equipment for birds in transit, which would alert the drivers of changing conditions.

7.6 With respect to housing conditions for broiler and roaster production, changes in management techniques require that further research be conducted to provide accurate recommendations for ammonia, $CO_2$ and humidity levels and their correlation with density and ventilation rates to ensure the welfare of birds.

# APPENDICES

# Appendix A ◊ Wind-Chill Factors

The following is a list of some actual air temperatures, wind speeds, and resulting wind-chill factors that can adversely affect unprotected poultry in transit.

| | Actual Air Temperature (°C) | | | | | | |
|---|---|---|---|---|---|---|---|
| **Wind Speed (km/h)** | 10 | 4 | -1 | -7 | -12 | -18 | -23 |
| | **Wind-Chill Factor** | | | | | | |
| 8 | 9 | 2 | -3 | -8 | -15 | -21 | -26 |
| 16 | 4 | -2 | -8 | -15 | -22 | -29 | -34 |
| 24 | 2 | -5 | -12 | -21 | -28 | -34 | -41 |
| 32 | 0 | -8 | -16 | -23 | -31 | -37 | -45 |
| 40 | -1 | -9 | -18 | -26 | -33 | -39 | -48 |
| 48 | -2 | -11 | -21 | -28 | -36 | -42 | -51 |
| 56 | -3 | -12 | -21 | -29 | -37 | -44 | -54 |
| 64 | -3 | -12 | -22 | -29 | -38 | -47 | -56 |
| 72 | -4 | -13 | -22 | -30 | -39 | -48 | -57 |
| 80 | -4 | -13 | -23 | -31 | -40 | -48 | -58 |

# Appendix B ◊ Participants

Representatives of the following organizations provided input at various stages in the drafting of this code. However, the code does not necessarily have the unequivocal endorsement of any agency.

| *Representative* | *Organization* |
|---|---|
| Dr. Derek Anderson | CARC Canada Committee on Animals, Chairperson, |
| Alan Bentley (Chairperson) | |
| Bernadette Cox | Canadian Egg Marketing Agency |
| Ed De-Jong | Canadian Broiler Hatching Egg Marketing Agency |
| Conrad Van Dijk | Canadian Veterinary Medical Association |
| Dr. Gordon Doonan | Canadian Food Inspection Agency |
| Dr. Ian J. H. Duncan | Canadian Society of Animal Science |
| Dr. Gilly Griffin | Canadian Council on Animal Care |
| Dr. S. K. Ho | Agriculture and Agri-Food Canada |
| Murray Hundt | Canadian Poultry and Egg Processors Council |
| Waldie Klassen | Chicken Farmers of Canada |
| Yves Labbé | Chicken Farmers of Canada |
| Penny Lawlis | Ontario Ministry of Agriculture and Food<br>Representing the Provinces |
| Steve Leech | Chicken Farmers of Canada |
| Rachel Ouckama | Canadian Poultry and Egg Processors Council |
| Al Schaefer | Agriculture and Agri-Food Canada<br>Meat Research Section, Lacombe |
| Sateesh Singh | Canadian Turkey Marketing Agency |
| Dr. Gary Thiessen | Canadian Food Inspection Agency |
| Robert Van Tongerloo | Canadian Federation of Humane Societies |

# Notes

# Notes

Health of Animals Act ( 1990, c. 21 )
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Source: http://laws.justice.gc.ca/en/H-3.3/text.html
Updated to August 31, 2004
**Subject: Agriculture**

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# Health of Animals Act

## 1990, c. 21

An Act respecting diseases and toxic substances that may affect animals or that may be transmitted by animals to persons, and respecting the protection of animals

[*Assented to 19th June, 1990*]

Her Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:

SHORT TITLE

Short title

**1.** This Act may be cited as the *Health of Animals Act*.

INTERPRETATION

Definitions

**2.** (1) In this Act,

"analyst" « *analyste* »

"analyst" means a person designated as an analyst pursuant to section 32;

"animal" «*animal*»

"animal" includes an embryo and a fertilized egg or ovum;

"animal by-product" «*sous-produit animal*»

"animal by-product" includes blood or any of its components, bones, bristles, feathers, flesh, hair, hides, hoofs, horns, offal, skins and wool, and any thing containing any of those things;

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| "animal deadyard" «*atelier d'équarrissage*» | "animal deadyard" means a place where animal carcasses, animal by-products or disabled or diseased animals are brought when they are not to be prepared for human consumption; |
| "animal food" «*aliments pour animaux*» | "animal food" means any thing that is capable of being a nutriment for animals and includes any of the constituent elements of an animal ration; |
| "animal product" «*produit animal*» | "animal product" includes cream, eggs, milk, non-fertilized ova and semen; |
| "Assessor" «*évaluateur*» | "Assessor" means the Assessor or any Deputy Assessor appointed under Part II of the *Pesticide Residue Compensation Act*; |
| "conveyance" «*véhicule*» | "conveyance" means any aircraft, carriage, motor vehicle, trailer, railway car, vessel, cargo container or other contrivance used to move persons, animals or things; |
| "customs officer" «*agent des douanes*» | "customs officer" means a person employed in the administration and enforcement of the *Customs Act* and includes any member of the Royal Canadian Mounted Police; |
| "disease" «*maladie*» | "disease" includes<br><br>(*a*) a reportable disease and any other disease that may affect an animal or that may be transmitted by an animal to a person, and<br><br>(*b*) the causative agent of any such disease; |
| "dispose" *Version anglaise seulement* | "dispose" includes slaughter or otherwise destroy, bury or render; |
| "hatchery" «*couvoir*» | "hatchery" means, subject to any regulations made under subsection (2), a place where eggs are incubated or chicks are hatched; |
| "infected place" «*lieu contaminé*» | "infected place" means a place that is constituted to be an infected place under section 22 or 23 or under the regulations; |

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| "inspector" « *inspecteur* » | "inspector" means a person designated as an inspector pursuant to section 32; |
| "justice" «*juge de paix*» | "justice" means a justice as defined in section 2 of the *Criminal Code*; |
| "Minister" «*ministre*» | "Minister" means the Minister of Agriculture and Agri-Food; |
| "officer" « *agent d'exécution* » | "officer" means a person designated as an officer pursuant to section 32, but does not include an analyst; |
| "peace officer" «*agent de la paix*» | "peace officer" means a peace officer as defined in section 2 of the *Criminal Code*; |
| "penalty" « *sanction* » | "penalty" means an administrative monetary penalty imposed under the *Agriculture and Agri-Food Administrative Monetary Penalties Act* for a violation; |
| "place" «*lieu*» | "place" includes a conveyance; |
| "prescribed" *Version anglaise seulement* | "prescribed" means prescribed by regulation; |
| "rendering plant" «*usine de traitement*» | "rendering plant" means a place<br><br>(*a*) where animal by-products are prepared or treated for use in, or converted into, fertilizers, animal food, fats or oils, other than fats or oils used for human consumption,<br><br>(*b*) where a substance resulting from a process mentioned in paragraph (*a*) is stored, packed or marked, or<br><br>(*c*) from which a substance resulting from a process mentioned in paragraph (*a*) is shipped; |
| "reportable" «*déclarable*» | "reportable" means prescribed as reportable by the Minister; |
| "toxic substance" «*substance toxique*» | "toxic substance" means a substance prescribed as toxic by the Minister; |

"Tribunal" « *Commission* »

"Tribunal" means the Review Tribunal continued by subsection 4.1(1) of the *Canada Agricultural Products Act*;

"vector" «*vecteur*»

"vector" means an animal that has the potential to transmit a disease, directly or indirectly, from one animal or its excreta to another animal;

"veterinary biologic" «*produit vétérinaire biologique*»

"veterinary biologic" means

(*a*) a helminth, protozoa or micro-organism,

(*b*) a substance or mixture of substances derived from animals, helminths, protozoa or micro-organisms, or

(*c*) a substance of synthetic origin

that is manufactured, sold or represented for use in restoring, correcting or modifying organic functions in animals or for use in the diagnosis, treatment, mitigation or prevention of a disease, disorder or abnormal physical state, or the symptoms thereof, in animals;

"veterinary inspector" « *vétérinaire-inspecteur* »

"veterinary inspector" means a veterinarian designated as an inspector pursuant to section 32;

"violation" « *violation* »

"violation" means

(*a*) any contravention of any provision of this Act or of a regulation made under this Act, or

(*b*) any refusal or neglect to perform any duty imposed by or under this Act,

that may be proceeded with in accordance with the *Agriculture and Agri-Food Administrative Monetary Penalties Act*.

Ministerial regulations

(2) The Minister may make regulations excluding places from the definition "hatchery" and prescribing reportable diseases and toxic substances.

Incorporation by reference

(3) Toxic substances may be prescribed

(*a*) in terms of the quantity or concentration in which substances are contained in other substances; and

(*b*) by reference to substances specified in any published document, as amended from time to time.

1990, c. 21, s. 2; 1994, c. 38, s. 25; 1995, c. 40, s. 54; 1997, c. 6, s. 67; 2001, c. 4, s. 173(F).

## APPLICATION

Binding on Her Majesty

**3.** This Act is binding on Her Majesty in right of Canada or a province.

Limits of ports, etc.

**4.** The Governor in Council may, by order, define the limits of ports and of other places for the purposes of this Act.

## CONTROL OF DISEASES AND TOXIC SUBSTANCES

### *Notification and Samples*

Notification by owner, etc.

**5.** (1) A person who owns or has the possession, care or control of an animal shall notify the nearest veterinary inspector of the presence of a reportable disease or toxic substance, or any fact indicating its presence, in or around the animal, immediately after the person becomes aware of the presence or fact.

Notification by veterinarian, etc.

(2) Immediately after a person who is a veterinarian or who analyses animal specimens suspects that an animal is affected or contaminated by a reportable disease or toxic substance, the person shall so notify a veterinary inspector.

Samples of milk or cream

**6.** (1) The operator of a cheese factory, creamery or dairy shall, when requested to do so by the Minister, supply in the prescribed manner samples of milk or cream, identified as to the herd of origin, for inspection by an inspector.

Samples of animals or other things

(2) A person who owns or has the possession, care or control of an animal or of any other thing that is capable of being affected or contaminated by a disease or toxic substance shall supply in the prescribed manner such samples from the animal or other thing as the Minister may request.

Notice forbidding entry

**7.** (1) Where

(*a*) there exists in an area a disease or toxic substance that is capable of affecting animals, and

(*b*) reasonable steps have been taken by the Minister to

(i) bring the existence of the disease or toxic substance to the attention of persons having the possession, care or control of animals in the area, and

(ii) make those persons aware of the requirements of this subsection,

every person in that area who owns or has the possession, care or control of an animal shall affix at the entrance to the building or other enclosed place in which the animal is kept a notice forbidding entry without the person's permission.

Notice forbidding entry without permission

(2) A person who owns or has the possession, care or control of an animal shall affix at the entrance to the building or other enclosed place in which the animal is kept a notice forbidding entry without the permission of an inspector or officer where there exists in the area a disease or toxic substance that is capable of affecting the animal and the inspector or officer requires such a notice to be so affixed.

Prohibition

(3) No person shall knowingly enter a building or other enclosed place in contravention of a notice affixed under this section, unless the person has a right of entry or way into the building or place or any part thereof or an inspector or officer has authorized the entry.

*Prohibitions*

Concealment

**8.** No person shall conceal the existence of a reportable disease or toxic substance among animals.

Keeping diseased animals

**9.** No person shall turn out, keep or graze on any undivided or unenclosed land any animal that the person knows is affected or contaminated by, or has been exposed to, any reportable disease or toxic substance.

Bringing diseased animals to market

**10.** No person shall, without a licence issued by an inspector or officer, bring into any market, fair or other place any animal that is known by the person to be affected or contaminated by, or has been exposed to, any reportable disease or toxic substance.

Selling or disposing of diseased animals

**11.** No person shall, without a licence issued by an inspector or officer, sell or offer or expose for sale or otherwise transfer the ownership of

(*a*) any animal or any part of an animal that the person knows is affected or contaminated by, or has been exposed to, any reportable disease or toxic substance, or

(*b*) any animal product or animal by-product that the person knows was obtained from an animal that was affected or contaminated by, or was exposed to, any reportable disease or toxic substance at the time of its death,

whether or not the person is the owner of the animal, animal product or animal by-product.

Throwing carcasses into water

**12.** No person shall throw or place in any body of water the carcass or any part of an animal that at the time of its death was to the person's knowledge affected or contaminated by, or was exposed to, any disease or toxic substance, or that was destroyed because it was, or was suspected of being, affected or contaminated by a disease or toxic substance.

Digging up carcasses

**13.** (1) No person shall, without lawful authority or excuse, dig up all or any part of the buried carcass of an animal that died or is suspected of having died as a result of being affected or contaminated by a disease or toxic substance, or that was destroyed because it was, or was suspected of being, affected or contaminated by a disease or toxic substance.

Experimentation and examination

(2) The Minister may

(*a*) reserve for experimentation an animal required to be destroyed under this Act or the carcass of an animal destroyed under this Act; and

(*b*) authorize an inspector or officer to perform a *post mortem* examination of the carcass of an animal that has died or is suspected of having died from a disease or toxic substance and, if the carcass is buried, to dig it up for the purpose of the examination.

*Importation*

Regulations prohibiting importation

**14.** The Minister may make regulations prohibiting the importation of any animal or other thing into Canada, any part of Canada or any Canadian port, either generally or from any place named in the regulations, for such period as the Minister considers necessary for the purpose of preventing a disease or toxic substance from being introduced into or spread within Canada.

Prohibition of possession or disposition

**15.** (1) No person shall possess or dispose of an animal or thing that the person knows was imported in contravention of this Act or the regulations.

Presumption

(2) In any prosecution for an offence under subsection (1), an accused who is found to have been in possession of an animal or thing that was imported in contravention of this Act or the regulations shall be considered, in the absence of evidence to the contrary, to have known that the thing was so imported.

Importation into Canada

**16.** (1) Where a person imports into Canada any animal, animal product, animal byproduct, animal food or veterinary biologic, or any other thing used in respect of animals or contaminated by a disease or toxic substance, the person shall, either before or at the time of importation, present the animal, animal product, animal by-product, animal food, veterinary biologic or other thing to an inspector, officer or customs officer who may inspect it or detain it until it has been inspected or otherwise dealt with by an inspector or officer.

Regulations

(2) The Minister may make regulations for exempting animals or things from the application of this section and respecting the manner of presenting things for inspection.

Forfeiture of imports

**17.** Subject to section 18, where an animal or thing is imported or is attempted to be imported into Canada in contravention of this Act or the regulations, it shall be forfeited to Her Majesty in right of Canada and may be disposed of as the Minister may direct.

Removal of imports

**18.** (1) Where an inspector or officer believes on reasonable grounds that an animal or thing has been imported into Canada and that it

(*a*) was imported in contravention of this Act or the regulations,

(*b*) is or could be affected or contaminated by a disease or toxic substance, or

(*c*) is a vector,

the inspector or officer may, whether or not the animal or thing is seized, require the owner or the person having the possession, care or control of the animal or thing to remove it from Canada.

Notice

(2) A requirement under subsection (1) shall be communicated by personal delivery of a notice to the person being required to remove the animal or thing or by sending the notice to the person, and the notice may specify the period within which and the manner in which the animal or thing is to be removed.

Non-forfeiture

(3) An animal or thing that is required to be removed from Canada shall be deemed not to have been forfeited under section 17.

Forfeiture where non-compliance

(4) Where the animal or thing is not removed from Canada as required under this section, it shall, notwithstanding section 45, be forfeited to Her Majesty in right of Canada and may be disposed of as the Minister may direct.

*Exportation of Animals*

Certificate required

**19.** (1) No person shall export an animal from Canada by vessel or aircraft unless

(*a*) prior notice of the export of the animal has been given to a customs officer in charge of the place where the animal is to board the vessel or aircraft and the animal has been presented to a veterinary inspector in accordance with subsection (2) at that place; and

(*b*) a certificate of the veterinary inspector has been received by the person certifying that all the prescribed requirements respecting the health, protection and transportation of the animal have been complied with.

Presentation of animal

(2) An animal that is required to be inspected shall be presented in such manner and under such conditions as the veterinary inspector considers necessary to carry out the inspection.

Copy of certificate

(3) A copy of the certificate referred to in paragraph (1)(*b*) shall be delivered to

(*a*) the master or agent of the vessel or the pilot in command or operator of the aircraft; and

(*b*) the chief officer of customs of the port or airport from which the vessel or aircraft is to depart.

No departure without certificate

(4) Where a vessel or aircraft that is to depart from Canada has an animal on board,

(*a*) no person shall send the vessel to sea or the aircraft on its flight, and

(*b*) no person in charge of the vessel or aircraft shall take the vessel to sea or the aircraft on its flight,

unless a copy of a certificate in respect of the animal has been delivered in accordance with subsection (3).

Detention

(5) The chief officer of customs referred to in paragraph (3)(*b*) shall detain animals until a copy of the certificate referred to in paragraph (1)(*b*) has been delivered to that officer.

Exemptions

(6) The Minister may make regulations exempting animals or categories of animals and shipments and categories of shipments from the application of this section.

Certain Acts not affected

**20.** Nothing in this Act affects

(*a*) the provisions of the *Canada Shipping Act* respecting port wardens,

(*b*) chapter 33 of the Statutes of Canada, 1871, entitled *An Act to provide for the appointment of a Port Warden for the Harbor of Quebec*,

(*c*) chapter 11 of the Statutes of Canada, 1873, entitled *An Act to amend the Acts relating to Port Wardens at Montreal and Quebec*, or

(*d*) chapter 45 of the Statutes of Canada, 1882, entitled *An Act to amend and consolidate the Acts relating to the office of Port Warden for the Harbour of Montreal*,

and this Act shall, with respect to the ports to which the Acts referred to in paragraphs (*a*) to (*d*) apply, be construed as having been enacted in addition to and not in derogation from those Acts.

*International Assistance*

Assistance

**21.** The Minister may provide assistance, both financial and technical, to any person or government outside Canada in controlling or eradicating a disease or toxic substance that affects or could affect persons or animals in Canada.

INFECTED PLACES AND CONTROL AREAS

Declaration of infected place

**22.** (1) Where an inspector or officer suspects or determines that a disease or toxic substance exists in a place and is of the opinion that it could spread or that animals or things entering the place could become affected or contaminated by it, the inspector or officer may in writing declare that the place is infected and identify the disease or toxic substance that is believed to exist there, and such a declaration may subsequently be amended by the inspector or officer.

Delivery of declaration

(2) When the declaration is delivered to the occupier or owner of the place to which it relates, the place, together with all contiguous lands, buildings and other places occupied or owned by the occupier or owner, constitutes an infected place.

Further declaration

**23.** (1) For the purpose of preventing the spread of a disease or toxic substance, an inspector or officer may in writing declare that any land, building or other place, any part of which lies within five kilometres of the limits of a place declared to be infected under section 22, is infected and identify the disease or toxic substance that could spread there.

Delivery of declaration

(2) When the declaration has been delivered to the occupier or owner of any land, building or other place mentioned in subsection (1), the land, building or other place, together with all contiguous lands, buildings and other places occupied or owned by the same occupier or owner, constitutes an infected place.

Where occupier or owner not found

**24.** Where an inspector or officer cannot, after the exercise of due diligence, find the occupier or owner of any land, building or other place, delivery of a declaration may be effected by posting it on the building or on any building or conspicuous object on the land or at the place.

Animals and things not to be removed from or taken into infected places

**25.** (1) Subject to any regulations made under paragraph 64 (1)(*k*), no person shall, without a licence issued by an inspector or officer, remove from or take into an infected place any animal or thing.

Return

(2) Where an inspector or officer believes on reasonable grounds that any animal or thing has been removed from or taken into an infected place in contravention of subsection (1), the inspector or officer may, whether or not the animal or thing is seized,

(*a*) return it to or remove it from the infected place, or move it to any other place; or

(*b*) require its owner or the person having the possession, care or control of it to return it to or remove it from the infected place, or move it to any other place.

Notice

(3) A requirement under paragraph (2)(*b*) shall be communicated by personal delivery of a notice to the owner or person having the possession, care or control of the animal or thing or by sending the notice to the owner or person, and the notice may specify the period within which and the manner in which the animal or thing is to be returned or removed.

Declaration that a place is no longer infected

**26.** A place, or any part of a place, that has been constituted to be an infected place by the delivery of a declaration under section 22 or 23 ceases to be an infected place when an inspector or officer declares in writing that the disease or toxic substance described in the declaration

(*a*) does not exist in, or will not spread from, the place or the part of the place; or

(*b*) is not injurious to the health of persons or animals.

Control areas

**27.** (1) Where the Minister believes that a disease or toxic substance exists in an area, the Minister may declare the area to be a control area, describe the area and identify the disease or toxic substance that is believed to exist there.

Measures

(2) The Minister may take all reasonable measures consistent with public safety to remedy any dangerous condition or mitigate any danger to life, health, property or the environment that results, or may reasonably be expected to result, from the existence of a disease or toxic substance in a control area.

Regulations

(3) The Minister may make regulations for the purposes of controlling or eliminating diseases or toxic substances in a control area and of preventing their spread, including regulations

(*a*) prohibiting or regulating the movement of persons, animals or things, including conveyances, within, into or out of a control area;

(*b*) providing for the establishment of zones within a control area and varying measures of control for each zone; and

(*c*) authorizing the disposal or treatment of animals or other things that are or have been in a control area.

Return

(4) Where an inspector or officer believes on reasonable grounds that any animal or thing has been removed from, moved within or taken into a control area in contravention of a regulation made under subsection (3), the inspector or officer may, whether or not the animal or thing is seized,

(*a*) return it to or remove it from the control area, or move it to any other place; or

(*b*) require its owner or the person having the possession, care or control of it to return it to or remove it from the control area, or move it to any other place.

Notice

(5) A requirement under paragraph (4)(*b*) shall be communicated by personal delivery of a notice to the owner or person having the possession, care or control of the animal or thing, or by sending the notice to the owner or person, and the notice may specify the period within which and the manner in which the animal or thing is to be returned or removed.

Not a statutory instrument

**28.** For greater certainty, a declaration under section 22, 23, 26 or 27 is not a statutory instrument for the purposes of the *Statutory Instruments Act*, but the Minister shall take such steps as may be practicable in the circumstances to bring any declaration under section 27 to the notice of persons likely to be affected by it.

## ADMINISTRATION

### *Facilities*

Operation of services and facilities

**29.** The Minister may operate, provide or approve any diagnostic, research, laboratory or other services or facilities required for the purposes of this Act or any regulations.

Designation of facilities

**30.** The Minister may designate areas, offices, laboratories or other facilities inside or outside Canada for a specified purpose or generally for the administration of this Act or the regulations and may at any time amend, cancel or reinstate any such designation.

Definition of "international transportation undertaking"

**31.** (1) For the purposes of this section, "international transportation undertaking" means

(*a*) an undertaking that transports persons or things internationally;

(*b*) an international road, railway, bridge or tunnel;

(*c*) an airport that receives any aircraft operating on an international flight;

(*d*) a port that receives any ship sailing on an international voyage; and

(*e*) a warehouse or other facility that receives any international air, water, rail or road traffic.

Required facilities

(2) The owner or operator of an international transportation undertaking shall, where required in writing by the Minister, provide and maintain adequate areas, offices, laboratories and other facilities, including buildings, accommodation, equipment, furnishings and fixtures, for inspection or for any other purpose related to the administration of this Act or the regulations.

Powers of Minister

(3) The Minister may

(*a*) cause to be made such improvements as the Minister considers desirable to any area, office, laboratory or other facility provided pursuant to subsection (2);

(*b*) post, on or about the area, office, laboratory or other facility, any signs that the Minister considers appropriate for its operation or safe use or for the administration of this Act or the regulations; and

(*c*) continue to use the area, office, laboratory or other facility for as long as the Minister requires it for the administration of this Act or the regulations.

Construction and repairs

(4) Where an area, office, laboratory or other facility that is provided by an owner or operator pursuant to subsection (2) is not adequate for the purposes mentioned in that subsection, the Minister may require the owner or operator to carry out any construction or repairs in order to render the area, office, laboratory or other facility adequate for those purposes, and if the owner or operator fails to do so, the Minister may cause the construction or repairs to be carried out and the owner or operator shall be liable for all reasonable costs incurred by the Minister and those costs may be recovered by Her Majesty in right of Canada.

Notice

(5) A requirement under subsection (4) shall be communicated by personal delivery of a notice to the owner or operator or by sending the notice to the owner or operator, and the notice may specify the period within which or the manner in which the construction or repairs are to be carried out.

Arbitration

(6) Subject to subsection (7) and any regulations made under subsection (8), a dispute over the adequacy of any area, office, laboratory or other facility may be resolved by arbitration in accordance with the *Commercial Arbitration Act*.

*Canada Labour Code*

(7) Any area, office, laboratory or other facility that fails to meet the applicable requirements of Part II of the *Canada Labour Code* shall be deemed to be not adequate for the purposes mentioned in subsection (2).

Regulations

(8) The Governor in Council may make regulations for determining the adequacy of any area, office, laboratory or other facility for the purposes mentioned in subsection (2).

*Inspectors and Officers*

Designation

**32.** (1) The President of the Canadian Food Inspection Agency may designate under section 13 of the *Canadian Food Inspection Agency Act* analysts, inspectors, veterinary inspectors and officers for the purposes of this Act.

Certificate to be produced

(2) Inspectors, officers and veterinary inspectors shall be given certificates in a form established by the President of the Canadian Food Inspection Agency attesting to their designation and, on entering any place under this Act, an inspector, officer or veterinary inspector shall show the certificate to the person in charge of the place if the person requests proof of the designation.

1990, c. 21, s. 32; 1997, c. 6, s. 68.

Inspectors and officers may exercise Minister's powers

**33.** An inspector or officer may, subject to any restrictions or limitations specified by the Minister, exercise any of the powers and perform any of the duties or functions of the Minister under this Act, except the powers mentioned in section 27.

Agreements

**34.** For the purposes of this Act, the Minister may enter into an agreement with any qualified person to perform such duties or functions as the Minister may specify, on such terms and conditions as the Minister may specify.

Impeding analyst, inspector or officer

**35.** (1) No person shall obstruct or hinder or make any false or misleading statement either orally or in writing to an analyst, inspector or officer who is performing duties or functions under this Act or the regulations.

Assistance to inspectors and officers

(2) The owner or the person in charge of a place entered by an inspector or officer under section 38 and every person found in the place shall

(*a*) give the inspector or officer all reasonable assistance in the owner's or person's power to enable the inspector or officer to perform duties and functions under this Act or the regulations; and

(*b*) furnish the inspector or officer with such information relevant to the administration of this Act or the regulations as the inspector or officer may reasonably require.

Assistance of peace officer

(3) A peace officer shall provide such assistance as an inspector or officer may request for the purpose of enforcing this Act or the regulations.

Power of arrest

**36.** For the purpose of ensuring compliance with this Act and the regulations, an inspector or officer may exercise the power of arrest conferred on a peace officer under subsection 495(2) of the *Criminal Code* if the requirements of that subsection are complied with and, where the power is exercised, the inspector or officer is entitled to the benefit of subsection 495(3) of that Act.

*Seals*

Broken seal

**37.** (1) Where a seal or other identifying device authorized by the regulations has been affixed to a conveyance, container or other thing and the seal or device is broken, altered, tampered with or removed in contravention of the regulations, an inspector or officer may require that the conveyance, container or other thing, or any animal or thing contained in it, be placed in quarantine, disposed of or returned to its place of origin or to such other place as the inspector or officer may direct.

Notice

(2) A requirement under subsection (1) shall be communicated by personal delivery of a notice to the owner or person having the possession, care or control of the conveyance, container or other thing or by sending the notice to the owner or person, and the notice may specify the period within which and the manner in which it is to be quarantined, disposed of or returned.

*Inspection*

Inspection

**38.** (1) For the purpose of detecting diseases or toxic substances or ensuring compliance with this Act and the regulations, an inspector or officer may

(*a*) subject to section 39, at any reasonable time, enter and inspect any place, or stop any conveyance, in which the inspector or officer believes on reasonable grounds there is any animal or thing in respect of which this Act or the regulations apply;

(*b*) open any receptacle, baggage, package, cage or other thing that the inspector or officer believes on reasonable grounds contains any animal or thing in respect of which this Act or the regulations apply;

(*c*) require any person to present any animal or thing for inspection in such manner and under such conditions as the inspector considers necessary to carry out the inspection;

(*d*) examine any animal or thing in respect of which this Act or the regulations apply and take samples of it;

(*e*) require any person to produce for inspection or copying, in whole or in part, any record or document that the inspector or officer believes on reasonable grounds contains any information relevant to the administration of this Act or the regulations; and

(*f*) conduct any tests or analyses or take any measurements.

Operation of data processing systems and copying equipment

(2) In carrying out an inspection at any place under this section, an inspector or officer may

(*a*) use or cause to be used any data processing system at the place to examine any data contained in or available to the system;

(*b*) reproduce any record or cause it to be reproduced from the data in the form of a print-out or other intelligible output and take the print-out or other output for examination or copying; and

(*c*) use or cause to be used any copying equipment at the place to make copies of any record or other document.

Warrant required to enter dwelling-place

**39.** (1) An inspector or officer may not enter a dwelling-place except with the consent of the occupant of the dwelling-place or under the authority of a warrant.

Authority to issue warrant

(2) Where on *ex parte* application a justice is satisfied by information on oath that

(*a*) the conditions for entry described in section 38 exist in relation to a dwelling-place,

(*b*) entry to the dwelling-place is necessary for any purpose relating to the administration of this Act or the regulations, and

(*c*) entry to the dwelling-place has been refused or there are reasonable grounds to believe that entry will be refused,

the justice may at any time sign and issue a warrant authorizing the inspector or officer named in the warrant to

enter the dwelling-place, subject to any conditions that may be specified in the warrant.

Use of force

(3) The inspector or officer who executes a warrant shall not use force unless the inspector or officer is accompanied by a peace officer and the use of force is specifically authorized in the warrant.

Seizure

**40.** Where an inspector or officer believes on reasonable grounds that a violation, or an offence under this Act, has been committed, the inspector or officer may seize and detain any animal or thing

(*a*) by means of or in relation to which the inspector or officer believes on reasonable grounds the violation or offence was committed; or

(*b*) that the inspector or officer believes on reasonable grounds will afford evidence in respect of the commission of a violation, or of an offence under this Act.

1990, c. 21, s. 40; 1995, c. 40, s. 55.

*Search*

Warrant

**41.** (1) Where on *ex parte* application a justice is satisfied by information on oath that there are reasonable grounds to believe that there is in any place any animal or thing

(*a*) by means of or in relation to which a violation, or an offence under this Act, has been committed or is suspected of having been committed, or

(*b*) that there are reasonable grounds to believe will afford evidence in respect of the commission of a violation, or an offence under this Act,

the justice may at any time sign and issue a warrant authorizing an inspector or officer to enter and search the place for the animal or thing and, subject to any conditions that may be specified in the warrant, to seize and detain it.

Search and seizure powers

(2) The inspector or officer who executes a warrant may exercise the powers described in section 38 and may seize and detain, in addition to any animal or thing mentioned in the warrant, any animal or thing

(*a*) by means of or in relation to which the inspector or officer believes on reasonable grounds a violation, or an offence under this Act, has been committed; or

(*b*) that the inspector or officer believes on reasonable grounds will afford evidence in respect of the commission of a violation, or an offence under this Act.

Execution of search warrant

(3) A warrant shall be executed by day unless the justice authorizes its execution by night.

Where warrant not necessary

(4) An inspector or officer may exercise any of the powers mentioned in subsections (1) and (2) without a warrant if the conditions for obtaining a warrant exist but, by reason of exigent circumstances, it would not be practical to obtain a warrant.

1990, c. 21, s. 41; 1995, c. 40, s. 56.

*Disposition of Animals and Things Seized*

Notice of reason for seizure

**42.** An inspector or officer who seizes and detains an animal or thing under this Act shall, as soon as is practicable, advise its owner or the person having the possession, care or control of it at the time of its seizure of the reason for the seizure.

Storage and removal

**43.** (1) An inspector or officer who seizes and detains an animal or thing under this Act, or any person designated by the inspector or officer, may

(*a*) store it at the place where it was seized or remove it to any other place for storage; or

(*b*) require its owner or the person having the possession, care or control of it at the time of the seizure to remove it to any other place and to store it.

Notice

(2) A requirement under paragraph (1)(*b*) shall be communicated by personal delivery of a notice to the owner or person having the possession, care or control of the thing or by sending a notice to the owner or person, and the notice may specify the period within which and the manner in which the animal or thing is to be removed and stored.

Proceeds

(3) An inspector or officer who seizes and detains an animal or a perishable thing under this Act may dispose of it and any proceeds realized from its disposition shall be paid to the Receiver General.

Interference with seized animals or things

**44.** Except as authorized in writing by an inspector or officer, no person shall remove, alter or interfere in any way with an animal or thing seized and detained under this Act.

Detention

**45.** (1) An animal or thing seized and detained under this Act, or any proceeds realized from its disposition, shall not be detained after

(*a*) a determination by an inspector or officer that the animal or thing is in conformity with the provisions of this Act and the regulations, or

(*b*) the expiration of one hundred and eighty days after the day of seizure, or such longer period as may be prescribed,

unless before that time proceedings are instituted in relation to the animal or thing, in which case it, or the proceeds from its disposition, may be detained until the proceedings are finally concluded.

Application for return

(2) Where proceedings are instituted in accordance with subsection (1) in respect of the animal or thing and it has not been disposed of or forfeited under this Act, the owner of the animal or thing or the person having the possession, care or control of it at the time of its seizure may apply

(*a*) in the case of a violation, to the Tribunal, or

(*b*) in the case of an offence, to the court before which the proceedings are being held,

for an order that it be returned.

Order

(3) The Tribunal or court, as the case may be, may order that the animal or thing be returned to the applicant, subject to such conditions as the Tribunal or court may impose to ensure that it is preserved for any purpose for which it may subsequently be required, where the Tribunal or court is satisfied that sufficient evidence exists or may reasonably be obtained without detaining the animal or thing and that it is not, or is not suspected of being, affected or contaminated by a disease or toxic substance.

1990, c. 21, s. 45; 1995, c. 40, s. 57.

Forfeiture

**46.** (1) Where the Tribunal decides that a person has committed a violation, or a person is convicted of an offence under this Act, the Tribunal or the convicting court, as the case may be, may, on its own motion or at the request of any party to the proceedings, in addition to any penalty or punishment imposed, order that any animal or thing by means of or in relation to which the violation or offence was committed, or any proceeds realized from its disposition, be forfeited to Her Majesty in right of Canada.

Forfeiture without conviction

(2) Where the owner of an animal or thing seized and detained under this Act consents to its forfeiture, it is thereupon forfeited to Her Majesty in right of Canada and shall be disposed of as the Minister may direct.

1990, c. 21, s. 46; 1995, c. 40, s. 58.

Disposal of forfeited animals and things

**47.** (1) Where proceedings mentioned in subsection 45(1) are instituted within the time provided in that subsection and, at the final conclusion of those proceedings, the Tribunal, in the case of a violation, or the court, in the case of an offence, orders the forfeiture of an animal or thing that was seized and detained, it shall be disposed of as the Minister may direct.

Return of seized animals and things where no forfeiture ordered

(2) Where the Tribunal or court, as the case may be, does not order the forfeiture of an animal or thing, it or any proceeds realized from its disposition shall be returned to the owner of the animal or thing or the person having the possession, care or control of it at the time of its seizure.

Exception

(3) Where the Tribunal decides that the owner of an animal or thing or the person having the possession, care or control of it at the time of its seizure has committed a violation, or the owner of an animal or thing or the person having the possession, care or control of it at the time of its seizure is convicted of an offence under this Act, and a penalty or fine, as the case may be, is imposed,

(*a*) the animal or thing may be detained until the penalty or fine is paid;

(*b*) the animal or thing may be sold under execution in satisfaction of the penalty or fine; or

(*c*) any proceeds realized from its disposition under paragraph (*b*) or section 43 may be applied in payment of the penalty or fine.

1990, c. 21, s. 47; 1995, c. 40, s. 59.

DISPOSAL AND TREATMENT

Disposal of affected or contaminated animals and things

**48.** (1) The Minister may dispose of an animal or thing, or require its owner or any person having the possession, care or control of it to dispose of it, where the animal or thing

(*a*) is, or is suspected of being, affected or contaminated by a disease or toxic substance;

(*b*) has been in contact with or in close proximity to another animal or thing that was, or is suspected of having been, affected or contaminated by a disease or toxic substance at the time of contact or close proximity; or

(*c*) is, or is suspected of being, a vector, the causative agent of a disease or a toxic substance.

Treatment

(2) The Minister may treat any animal or thing described in subsection (1), or require its owner or the person having the possession, care or control of it to treat it or to have it treated, where the Minister considers that the treatment will be effective in eliminating or preventing the spread of the disease or toxic substance.

Notice

(3) A requirement under this section shall be communicated by personal delivery of a notice to the owner or person having the possession, care or control of the thing or by sending a notice to the owner or person, and the notice may specify the period within which and the manner in which the requirement is to be met.

## SAMPLES

Disposition of samples

**49.** A sample taken under this Act or the regulations may be disposed of in such manner as the Minister considers appropriate.

## LIMITATION ON LIABILITY

Her Majesty not liable

**50.** Where a person must, by or under this Act or the regulations, do anything, including provide and maintain any area, office, laboratory or other facility under section 31, or permit an inspector or officer to do anything, Her Majesty is not liable

(*a*) for any costs, loss or damage resulting from the compliance; or

(*b*) to pay any fee, rent or other charge for what is done, provided, maintained or permitted.

## COMPENSATION

Compensation to owners of animals

**51.** (1) The Minister may order compensation to be paid from the Consolidated Revenue Fund to the owner of an animal that is

(*a*) destroyed under this Act or is required by an inspector or officer to be destroyed under this Act and dies after the requirement is imposed but before being destroyed;

(*b*) injured in the course of being tested, treated or identified under this Act by an inspector or officer and dies, or is required to be destroyed, as a result of the injury; or

(*c*) reserved for experimentation under paragraph 13(2)(*a*).

Amount of compensation

(2) Subject to subsections (3) and (4), the amount of compensation shall be

(*a*) the market value, as determined by the Minister, that the animal would have had at the time of its evaluation by the Minister if it had not been required to be destroyed

minus

(*b*) the value of its carcass, as determined by the Minister.

Maximum value

(3) The value mentioned in paragraph (2)(*a*) shall not exceed any maximum amount established with respect to the animal by or under the regulations.

Additional compensation

(4) In addition to the amount calculated under subsection (2), compensation may include such costs related to the disposal of the animal as are permitted by the regulations.

1990, c. 21, s. 51; 1997, c. 6, s. 69.

Compensation to owners of things

**52.** The Minister may order compensation to be paid from the Consolidated Revenue Fund to the owner of a thing that is destroyed under this Act and the amount of compensation shall be the market value, as determined by the Minister, that the thing would have had at the time of its evaluation if it had not been required to be destroyed, up to a prescribed amount, less any amount received in respect of it.

1990, c. 21, s. 52; 1997, c. 6, s. 70.

Compensation for costs of treatment

**53.** The Minister may order compensation to be paid from the Consolidated Revenue Fund to a person for costs incurred with respect to treatment required under subsection 48(2) and the amount of compensation shall be the costs reasonably incurred by the person, as determined by the Minister.

1990, c. 21, s. 53; 1997, c. 6, s. 70.

Compensation withheld

**54.** (1) Compensation may be withheld in whole or in part where, in the opinion of the Minister,

(*a*) the owner of, or the person having the possession, care or control of, the animal or thing in respect of which compensation is claimed has committed a violation, or an offence under this Act, by means of or in relation to that thing;

(*b*) the animal or thing, at the time it was imported into Canada, was affected or contaminated by a disease or toxic substance; or

(*c*) the animal or thing was a vector, the causative agent of a disease or a toxic substance.

Compensation forfeited

(2) A person who contravenes section 16 or a regulation made under section 14 or 16, or who breaks, alters, tampers with or removes a seal or other identifying device in contravention of the regulations, forfeits any claim to compensation in respect of an animal or thing by means of or in relation to which the contravention occurred.

1990, c. 21, s. 54; 1995, c. 40, s. 60.

Regulations

**55.** The Minister may make regulations

(*a*) respecting the method of calculating the market value of animals for which the Minister considers there is no readily available market;

(*b*) establishing maximum amounts, or the manner of calculating maximum amounts, for the purpose of subsection 51(3) or section 52; and

(*c*) permitting compensation for any costs related to the disposal of animals and things and for determining the amounts of the compensable costs, including prescribing maximum amounts.

1990, c. 21, s. 55; 1997, c. 6, s. 71.

Appeal

**56.** (1) A person who claims compensation and is dissatisfied with the Minister's disposition of the claim may bring an appeal to the Assessor, but the only grounds of appeal are that the failure to award compensation was unreasonable or that the amount awarded was unreasonable.

Time limit for bringing appeal

(2) An appeal shall be brought within three months after the claimant receives notification of the Minister's disposition of the claim, or within such longer period as the Assessor may in any case for special reasons allow.

Powers of Assessor

**57.** (1) On hearing an appeal, the Assessor may confirm or vary the Minister's disposition of the claim or refer the matter back to the Minister for such further action as the Assessor may direct.

Costs

(2) Costs may be awarded to or against the Minister in an appeal.

Decisions final

(3) The decision of the Assessor on an appeal is final and conclusive and not subject to appeal to or review by any court.

Sittings and hearings

**58.** (1) The Assessor may sit and hear appeals at any place or places and shall arrange for sittings and hearings as may be required.

Travel allowances

(2) The Assessor is entitled to be paid such travel allowances as are payable for the attendances of a judge of the Federal Court under the *Judges Act*.

Procedure

**59.** (1) Subject to the approval of the Governor in Council, the Assessor may make rules respecting the conduct of appeals and the procedure for the bringing of appeals.

Transitional

(2) Subject to any rules made under subsection (1), all rules respecting the conduct of appeals and the procedure for bringing appeals to the Assessor made under section 18 of the *Pesticide Residue Compensation Act* that are in force at the time this section comes into force shall, to the extent that they are not inconsistent with sections 56 to 58, apply in respect of appeals brought under section 56.

Registrar

(3) The functions of the registrar of appeals and any other person necessary to carry out the purposes of sections 56 to 58 shall be carried out by the persons who carry out similar functions under Part II of the *Pesticide Residue Compensation Act*.

1990, c. 21, s. 59; 2001, c. 4, s. 173(F).

FEES, CHARGES AND COSTS

Fees, charges and costs for inspections, etc.

**60.** (1) Her Majesty, and any person who has entered into an agreement with the Minister under section 34, may recover from any person referred to in subsection (2) any prescribed fees or charges and any costs incurred by Her Majesty or the other person, as the case may be, in relation to anything required or authorized under this Act or the regulations, including, without restricting the generality of the foregoing,

(*a*) the inspection, treatment, segregation, quarantine, testing or analysis of a place, animal or thing, as the case may be, or the identification, storage, removal, disposal or return of an animal or thing, required or authorized under this Act or the regulations; and

(*b*) the forfeiture, disposal, seizure or detention of an animal or thing under this Act or the regulations.

Persons liable

(2) The fees, charges and costs are recoverable jointly and severally from the owner or occupier of the place or the owner of the animal or thing and from the person having the possession, care or control of it immediately before its inspection, treatment, segregation, detention, forfeiture, quarantine, testing, analysis, identification, storage, removal, return or disposal or, in the case of an animal or thing seized under this Act, immediately before its seizure.

Fees, charges and costs related to control areas

**61.** (1) Her Majesty may recover from any person mentioned in subsection (2) any prescribed fees or charges and any costs incurred by Her Majesty in relation to taking any measures under section 27 in respect of a control area.

Persons liable

(2) The fees, charges and costs are recoverable from any persons who through their fault or negligence, or that of others for whom in law they are responsible, caused or contributed to the causation of the existence or spread of the disease or toxic substance in respect of which the control area was declared.

Fees, charges, and costs for requested services

**62.** Her Majesty may recover from any person who requests a service or the issue, renewal or amendment of a licence, permit, approval, certificate or other document under this Act or the regulations any prescribed fee or charge and any costs incurred by Her Majesty in relation to rendering the service or issuing, renewing or amending the document.

Unpaid fees, charges or costs

**63.** Any fees, charges or costs that are recoverable by Her Majesty under this Act or the regulations may be recovered as a debt due to Her Majesty.

1990, c. 21, s. 63; 1993, c. 34, s. 75.

REGULATIONS

Regulations -- generally

**64.** (1) The Governor in Council may make regulations for the purpose of protecting human and animal health through the control or elimination of diseases and toxic substances and generally for carrying out the purposes and provisions of this Act, including regulations

(*a*) prohibiting or regulating the importation, exportation and possession of animals and things in order to prevent the introduction of any vector, disease or toxic substance into Canada or into another country from Canada;

(*b*) for subjecting animals and things that may transmit a disease or toxic substance to quarantine or requiring their destruction on importation into Canada and for requiring the disposal on importation into Canada of things that may transmit a disease or toxic substance;

(*c*) requiring proof of the fact that animals imported into or passing through Canada have not been brought from any place where there was, at the time of their embarkation, a disease or toxic substance;

(*d*) prohibiting or regulating the importation of garbage into Canada and regulating the handling and disposal of garbage imported into Canada;

(*e*) governing the use of food lockers on ships in Canadian waters in order to prevent the introduction of any disease or toxic substance into Canada;

(*f*) for controlling or eradicating, or preventing the spread of, vectors, diseases and toxic substances and for quarantining, segregating, treating or disposing of, or for dealing generally with, animals or things that

(i) are, or are suspected of being, affected or contaminated by a disease or toxic substance,

(ii) have been in contact with or in close proximity to animals or things that were, or are suspected of having been, affected or contaminated by a disease

or toxic substance at the time of contact or close proximity, or

(iii) are, or are suspected of being, vectors, the causative agents of disease or toxic substances;

(*g*) for segregating and confining animals within certain limits, establishing areas of inspection or quarantine and establishing eradication areas where animals may be inspected, segregated and tested for any disease or toxic substance;

(*h*) prohibiting or regulating the movement in Canada of

(i) animals, animal products, animal by-products, vectors, the causative agents of disease, animal food, hay, straw and fodder, and

(ii) things that are used in respect of animals and that may be affected or contaminated by a disease or toxic substance;

(*i*) for the humane treatment of animals and generally

(i) governing the care, handling and disposition of animals,

(ii) governing the manner in which animals are transported within, into or out of Canada, and

(iii) providing for the treatment or disposal of animals that are not cared for, handled or transported in a humane manner;

(*j*) for declaring as infected, and constituting as an infected place, any airport, market, pen, railway yard, stockyard, conveyance or wharf on or in which any animal, animal product, animal by-product, animal food, hay, straw or fodder, or any other thing used in respect of animals, is exposed for sale or is placed for the purpose of transit;

(*k*) prohibiting or regulating the movement of persons and conveyances within, into or out of infected places;

(*l*) for purifying any place or thing that is likely to contain a vector or be contaminated by any disease or toxic substance;

(*m*) for causing or requiring notice to be given of the appearance of any disease or toxic substance among animals;

(*n*) prohibiting or regulating the holding of markets, fairs, exhibitions or sales of animals;

(*o*) for exempting any disease or toxic substance from the operation of any of the provisions of this Act or any regulation, for the imposition of terms and conditions governing the exemption and for otherwise dealing with the disease or toxic substance;

(*p*) regulating the conduct and operation of zoos and game farms;

(*q*) prescribing sanitary and health measures for establishments in which animal semen and animal embryos are collected, stored, frozen or processed and generally regulating the manner in which they are collected, stored and distributed;

(*r*) prohibiting or regulating testing for diseases;

(*s*) prohibiting or regulating the importation, preparation, manufacturing, preserving, packing, labelling, storing, testing, transportation, sale, conditions of sale, advertising for sale, use and disposal of veterinary biologics and regulating their purity, potency, efficacy and safety;

(*t*) prohibiting or regulating the feeding to animals of any thing that could introduce or spread any disease or toxic substance to animals;

(*u*) regulating the construction, operation and maintenance of animal deadyards, rendering plants and animal food factories;

(*v*) regulating the importation, preparation, manufacturing, preserving, packaging, labelling, storing, distribution, sale, conditions of sale and advertising for sale of products of animal deadyards, rendering plants and animal food factories;

(*w*) governing the issue, renewal, amendment, suspension and revocation of licences, permits, approvals, certificates or other documents on such terms and conditions as may be required for the purposes of this Act;

(*x*) requiring animals and things to be marked or to have affixed to them tags, seals or other devices for the purposes of this Act, authorizing inspectors or officers to mark animals and things or to affix to them tags, seals or other devices for the purposes of this Act, and prohibiting the removal, breaking, tampering with or altering of those marks, tags, seals or other devices;

(*y*) establishing and governing a national identification system for animals that provides for standards and means of identification;

(*z*) requiring animals to be identified under the system established under paragraph (*y*) when the ownership or possession of them changes or when they are transported or otherwise dealt with;

(*z*.1) governing the manufacture, sale, distribution and use of the means of identification to be used in the system established under paragraph (*y*);

(*z*.2) governing the collection of information and statistics, the publication of studies and the conduct of surveys on any matter related to this Act or the regulations;

(*z*.3) requiring records to be kept respecting activities in respect of which this Act or the regulations apply;

(*z*.4) prescribing any fees or charges, or the manner of calculating any fees or charges, required for carrying out the purposes and provisions of this Act or the regulations; and

(*z*.5) prescribing anything required by this Act to be prescribed, other than anything to be prescribed by the Minister.

Regulations respecting birds

(2) The Governor in Council may make regulations for the purposes of maintaining or improving the quality of bird stock and of controlling or eliminating diseases and toxic substances among birds, including regulations

(*a*) regulating the production, marketing and distribution of birds and hatching eggs;

(*b*) prohibiting or regulating the movement of birds and hatching eggs;

(*c*) requiring hatchery operators to register with the Minister annually the names and addresses of persons who act as agents in the marketing of birds produced at the operators' hatcheries;

(*d*) prescribing the types, sizes, specifications and labelling of packages used by hatchery operators for the marketing of chicks; and

(*e*) governing sanitation in or about hatcheries.

Interpretation

(3) Subsection (2) shall not be construed so as to limit the application of subsection (1) in respect of birds.

Definitions of "bird" and "chick"

(4) For the purposes of subsections (2) and (3), "bird" means a bird that is or has been in captivity and "chick" means a bird that is less than seventy-two hours old.

1990, c. 21, s. 64; 1993, c. 34, s. 76.

## OFFENCES AND PUNISHMENT

General offence

**65.** (1) Every person who contravenes any provision of this Act, other than section 15, or the regulations or who refuses or neglects to perform any duty imposed by or under the Act or the regulations is guilty of

(*a*) an offence punishable on summary conviction and liable to a fine not exceeding fifty thousand dollars or to imprisonment for a term not exceeding six months, or to both; or

(*b*) an indictable offence and liable to a fine not exceeding two hundred and fifty thousand dollars or to imprisonment for a term not exceeding two years, or to both.

Possession and disposal

(2) Every person who contravenes section 15 is guilty of an offence punishable on summary conviction and liable to a fine not exceeding fifty thousand dollars.

No imprisonment

(3) Notwithstanding the *Criminal Code*, no person shall be committed to prison for default of payment of a fine imposed under subsection (2).

1990, c. 21, s. 65; 1995, c. 40, s. 61.

Failure to comply with notices

**66.** Every person who fails to comply with a notice delivered to the person under section 18, 25, 27, 37, 43 or 48 or the regulations is guilty of

(*a*) an offence punishable on summary conviction and liable to a fine not exceeding fifty thousand dollars or to imprisonment for a term not exceeding six months, or to both; or

(*b*) an indictable offence and liable to a fine not exceeding two hundred and fifty thousand dollars or to imprisonment for a term not exceeding two years, or to both.

1990, c. 21, s. 66; 1995, c. 40, s. 62.

Fine of vessel

**67.** Where a person is convicted of an offence arising out of a contravention of subsection 19(3) in relation to a vessel, the vessel is liable to a fine not exceeding fifty thousand dollars.

Limitation period

**68.** (1) Proceedings by way of summary conviction in respect of an offence under this Act may be instituted at any time within, but not later than, two years after the time when the Minister became aware of the subject-matter of the proceedings.

Minister's certificate

(2) A document purporting to have been issued by the Minister, certifying the day on which the Minister became aware of the subject-matter of any proceedings, is admissible in evidence without proof of the signature or official character of the person appearing to have signed the document and, in the absence of any evidence to the contrary, is proof of the matter asserted in it.

Ticket offences

**69.** The Governor in Council may make regulations designating the contravention of any provision of this Act or the regulations as an offence with respect to which, notwithstanding the provisions of the *Criminal Code*,

(*a*) an inspector or officer may lay an information and issue and serve a summons by completing a ticket in the prescribed form, affixing the inspector's or officer's signature thereto and delivering the ticket to the person alleged to have committed the offence specified therein at the time the offence is alleged to have been committed, or

(*b*) the summons may be served on an accused by mailing the summons to the accused at the accused's latest known address,

and any regulations made under this section shall establish a procedure for voluntarily entering a plea of guilty and paying a fine in respect of each offence to which the regulations relate and shall prescribe the amount of the fine to be paid in respect of each offence.

Recovery of fines

**70.** Where a person is convicted of an offence under this Act and a fine that is imposed as punishment is not paid when required, the prosecutor may, by filing the conviction, enter as a judgment the amount of the fine and costs, if any, in the superior court of the province in which the trial was held, and the judgment is enforceable against the convicted person in the same manner as if it were a judgment obtained by Her Majesty in right of Canada against the person in that court in civil proceedings.

Officers, etc., of corporations

**71.** Where a corporation commits an offence under this Act, any officer, director or agent of the corporation who directed, authorized, assented to or acquiesced or participated in the commission of the offence is a party to and guilty of the offence and is liable on conviction to the punishment provided for the offence, whether or not the corporation has been prosecuted or convicted.

Offences by employees or agents

**72.** In any prosecution for an offence under this Act, it is sufficient proof of the offence to establish that it was committed by an employee or agent of the accused, whether or not the employee or agent is identified or has been prosecuted for the offence, unless the accused establishes that

(*a*) the offence was committed without the knowledge or consent of the accused; and

(*b*) the accused exercised all due diligence to prevent the commission of the offence.

Place of trial

**73.** A prosecution for an offence under this Act may be instituted, heard and determined in the place where

(*a*) the offence was committed or the subject-matter of the prosecution arose;

(*b*) the accused was apprehended; or

(*c*) the accused happens to be, or is carrying on business.

EVIDENCE

Certificates and reports

**74.** (1) In any proceedings for a violation, or for an offence under this Act, a declaration, certificate, report or other document of the Minister or an analyst, inspector or officer, purporting to have been signed by the Minister or the analyst, inspector or officer, is admissible in evidence without proof of the signature or official character of the person appearing to have signed it and, in the absence of evidence to the contrary, is proof of the matters asserted in it.

Copies of documents

(2) In any proceedings for a violation, or for an offence under this Act, a copy of or an extract from any record or other document that is made by the Minister or an analyst, inspector or officer under this Act or the regulations and that appears to have been certified under the signature of the Minister or the analyst, inspector or officer as a true copy or extract is admissible in evidence without proof of the signature or official character of the person appearing to have signed it and, in the absence of evidence to the contrary, has the same probative force as the original would have if it were proved in the ordinary way.

Presumed date of issue

(3) Any document referred to in subsection (1) or (2) shall, in the absence of evidence to the contrary, be deemed to have been issued on the date that it bears.

Notice

(4) No declaration, certificate, report, copy, extract or other document referred to in this section shall be received in evidence unless the party intending to produce it has, before the trial, served on the party against whom it is intended to be produced reasonable notice of that intention, together with a duplicate of the declaration, certificate, report, copy or extract.

1990, c. 21, s. 74; 1995, c. 40, s. 63.

TRANSITIONAL

Orders continued as regulations

**75.** Any orders made under section 16 of the *Animal Disease and Protection Act* and in force immediately before the repeal of that Act by section 76 of this Act shall continue in force as if they were regulations made under section 14 of this Act.

1990, c. 21, s. 75; 1993, c. 34, s. 77(F).

CONSEQUENTIAL AMENDMENTS

**76.** [Repeal]

**77.** [Amendment]

COMING INTO FORCE

Coming into force

***78.** This Act or any provision thereof shall come into force on a day or days to be fixed by order of the Governor in Council.

*[Note: Act in force January 1, 1991, *see* SI/91-2.]

## AMENDMENTS NOT IN FORCE

**-- 1992, c. 47, s. 84 (Sch., s. 7):**

**7. Section 69 is repealed.**

**-- 2001, c. 26, s. 304:**

**304. Paragraph 20(*a*) of the *Health of Animals Act* is replaced by the following:**

(*a*) the provisions of the *Canada Shipping Act, 2001* respecting inspections authorized under paragraph 11(2)(*e*) of that Act to be carried out,

Compensation for Destroyed Animals Regulations ( H-3.3 -- SOR/2000-233 )
Disclaimer: These documents are not the official versions (more).
Source: http://laws.justice.gc.ca/en/H-3.3/SOR-2000-233/text.html
Updated to August 31, 2004

# Compensation for Destroyed Animals Regulations

SOR/2000-233

Registration 8 June, 2000

## HEALTH OF ANIMALS ACT

### Compensation for Destroyed Animals Regulations

The Minister of Agriculture and Agri-Food, pursuant to paragraphs 55(*b*)[a] and (*c*) of the *Health of Animals Act*[b], hereby makes the annexed *Compensation for Destroyed Animals Regulations*.

Ottawa, June 8, 2000

Lyle Vanclief
Minister of Agriculture and Agri-food

[a] S.C. 1997, c. 6, s. 71[b] S.C. 1990, c. 21

## COMPENSATION FOR DESTROYED ANIMALS REGULATIONS

## INTERPRETATION

**1.** In these Regulations, "Act" means the *Health of Animals Act*.

## MAXIMUM AMOUNTS

**2.** For the purpose of subsection 51(3) of the Act, the amount that is established as the maximum amount with respect to an animal that is destroyed or required to be destroyed under subsection 48(1) of the Act is

(*a*) if the animal is set out or included in column 1 of an item of the schedule, the amount set out in column 3 of that item; and

(*b*) in any other case, $30.

## COMPENSATION FOR COSTS OF DISPOSAL

**3.** (1) Compensation for the following costs related to the disposal of an animal may be paid to the owner of the animal:

(*a*) subject to subsection (2), if the animal is destroyed or required to be destroyed by slaughter at an abattoir under subsection 48(1) of the Act and it is transported to the abattoir within the period and in the manner specified in the notice of requirement delivered or sent under subsection 48(3) of the Act,

(i) the reasonable costs of transporting it to the abattoir that were paid or incurred by the owner of the animal, to a maximum amount equal to the amount that a commercial trucker would normally charge for transporting it to the abattoir if it had not been required to be destroyed, and

(ii) the reasonable costs of slaughtering it at the abattoir that were paid or incurred by its owner and that are related to the reason for which it was required to be destroyed; and

(*b*) if the animal is destroyed or required to be destroyed under subsection 48(1) of the Act other than by slaughter at an abattoir and it is destroyed and its carcass disposed of within the period and in the manner specified in the notice of requirement delivered or sent under subsection 48(3) of the Act,

(i) the reasonable costs of transporting the animal or its carcass to the place of destruction and to the place of disposal that were paid or incurred by its owner, to a maximum amount equal to the amount that a commercial trucker would normally charge for that service,

(ii) the reasonable costs that were paid or incurred by the owner of the animal for cleaning and disinfecting the conveyance used to transport it or its carcass, to a maximum amount equal to the amount that a commercial service would normally charge for that service, and

(iii) the reasonable costs, to a maximum amount equal to the amount that a commercial service would normally charge to destroy the animal and dispose of its carcass, that were paid or incurred by the owner of the animal

(A) if the owner destroyed the animal and disposed of its carcass, for the supplies, equipment and labour expended to do so, or

(B) if a commercial service was used to destroy the animal and dispose of its carcass, for that service.

(2) The maximum amount of compensation that may be paid under paragraph (1)(*a*) is an amount equal to

(*a*) if the carcass of the animal has not been condemned, the value of the carcass according to paragraph 51 (2)(*b*) of the Act; and

(*b*) if the carcass of the animal has been condemned, the value that the carcass would have had according to paragraph 51(2)(*b*) of the Act had it not been condemned.

## REPEAL

4. The ***Maximum Amounts for Destroyed Animals Regulations, 1992***[1] **are repealed.**

[1] SOR/93-492

## COMING INTO FORCE

**5.** These Regulations come into force on the day on which they are registered.

## SCHEDULE
*(Section 2)*

| | Column 1 | Column 2 | Column 3 |
|---|---|---|---|
| Item | Animal | Family | Maximum Amount ($) |
| | ANIMALS NOT LISTED BY ORDER | | |
| | COMPANION ANIMALS | | |
| 1. | Dog (*Canis familiaris*) | Canidae | 1000 |
| 2. | Cat (*Felix silvestrus*) | Felidae | 250 |
| | FARM ANIMALS | | |
| 3. | Cattle (*Bos taurus*) | Bovidae | 2500 |
| 4. | Cattle (*Bos indicus*) | Bovidae | 2500 |
| 5. | Bison (*Bison bison*) | Bovidae | 4000 |
| 6. | Sheep (*Ovis aires*) | Bovidae | 600 |
| 7. | Goat (*Capra hircus*) | Bovidae | 800 |
| 8. | Swine (*Sus scrofa*) | Suidae | 800 |
| 9. | Horse (*Equus equus*) | Equidae | 2750 |
| 10. | Chicken (*Gallus gallus*) | Phasianidae | 33 |

| | | | |
|---|---|---|---|
| 11. | Turkey (*Meleagris gallopavo*) | Meleagridae | 50 |
| 12. | Duck (*Cairina moschata*) | Anatidae | 30 |
| 13. | Goose (*Anser anser*) | Anatidae | 30 |
| 14. | Rabbit (*Oryctolagus cuniculus*) | Leporidae | 30 |
| 15. | Honeybee (*Apis mellifera*) | Apidae | 250/hive |
| 16. | Leafcutter Bee (*Megachile* species) | Megachilidae | 250/hive |
| 17. | Elk, Red Deer (*Cervus elaphus*) | Cervidae | 4000 |
| 18. | Moose (*Alces alces*) | Cervidae | 4000 |
| 19. | White-tailed Deer (*Odocoileus virginianus*) | Cervidae | 4000 |
| 20. | Mule Deer (*Odocoileus hemionus*) | Cervidae | 4000 |
| 21. | Fallow Deer (*Dama dama*) | Cervidae | 4000 |
| 22. | Reindeer, Caribou (*Rangifer tarandus*) | Cervidae | 4000 |
| 23. | Alpaca (*Lama pacos*) | Camelidae | 4000 |
| 24. | Llama (*Lama glama*) | Camelidae | 3000 |
| 25. | Ostrich (*Struthio camelus*) | Struthionidae | 1500 |
| 26. | Emu (*Dromaius novaehollandiae*) | Dromaiidae | 1500 |
| 27. | Rhea (*Rhea americana*) | Rheidae | 1500 |

FUR ANIMALS

| | | | |
|---|---|---|---|
| 28. | Mink (*Mustela vison*) | Mustelidae | 135 |
| 29. | Fox (*Vulpes vulpes*) | Canidae | 1500 |

| | | | |
|---|---|---|---|
| 30. | Chinchilla (*Chinchilla brevicadata*) | Chinchillidae | 30 |
| 31. | Chinchilla (*Chinchilla laniger*) | Chinchillidae | 30 |
| 32. | Nutria, Coypu (*Myocastor coypus*) | Capromyidae | 30 |

LABORATORY ANIMALS

| | | | |
|---|---|---|---|
| 33. | Guinea Pig (*Cava porcellus*) | Cavidae | 50 |
| 34. | Mouse (*Mus musculus*) | Muridae | 50 |
| 35. | Rat - white mutant (*Rattus norvegicus*) | Muridae | 50 |
| 36. | Rabbit (*Oryctolagus cuniculus*) | Leporidae | 30 |

ANIMALS LISTED BY ORDER

*Order Anseriformes*

| | | | |
|---|---|---|---|
| 37. | Other members of the anatidae family | | 500 |
| 38. | Other members of the anseriformes order | | 30 |

*Order Artiodactyla*

| | | | |
|---|---|---|---|
| 39. | Wart Hog (*Phachoerus aethiopicus*) | Suidae | 4000 |
| 40. | Other members of the suidae family | | 800 |
| 41. | Peccary (*Catogonus wagneri*) | Tayassuidae | 300 |
| 42. | Peccary (*Tayassu* species) | Tayassuidae | 300 |
| 43. | Other members of the tayassuidae family | | 300 |
| 44. | Hippopotamus (*Hippopotamus amphibius*) | Hippopotamidae | 4000 |
| 45. | Pigmy Hippopotamus (*Choeropsis liberiensis*) | Hippopotamidae | 4000 |

| | | | |
|---|---|---|---|
| 46. | Other members of the hippopotamidae family | | 4000 |
| 47. | Bactrian or Two-humped Camel (*Camelus bactrianus*) | Camelidae | 4000 |
| 48. | Dromedary or One-humped Camel (*Camelus dromedarius*) | Camelidae | 4000 |
| 49. | Other members of the camelidae family | | 4000 |
| 50. | Mouse Deer (*Hyemoschus aquaticus*) | Tragulidae | 500 |
| 51. | Other members of the tragulidae family | | 500 |
| 52. | Muntjac (*Muntiacus* species) | Cervidae | 500 |
| 53. | Other members of the cervidae family | | 500 |
| 54. | Okapi (*Okapii johnstoni*) | Giraffidae | 4000 |
| 55. | Giraffe (*Giraffa camelopardalis*) | Giraffidae | 4000 |
| 56. | Other members of the giraffidae family | | 4000 |
| 57. | Pronghorn (*Antilocapra americana*) | Antilocapridae | 3000 |
| 58. | Other members of the antilocapridae family | | 3000 |
| 59. | Bongo (*Tragelaphus euryceros*) | Bovidae | 4000 |
| 60. | Eland (*Taurotragus oryx*) | Bovidae | 3000 |
| 61. | Giant Eland (*Taurotragus derbianus*) | Bovidae | 4000 |
| 62. | Asian Water Buffalo (*Bubalus* species) | Bovidae | 4000 |
| 63. | African Buffalo (*Syncerus caffer*) | Bovidae | 4000 |
| 64. | Duiker (*Cephalopus* species) | Bovidae | 4000 |
| 65. | Waterbuck (*Kobus* species) | Bovidae | 1000 |

| | | | |
|---|---|---|---|
| 66. | Sable Antelope (*Hippotragus* species) | Bovidae | 1000 |
| 67. | Oryx (*Oryx* species) | Bovidae | 1000 |
| 68. | Addax (*Addax nasomasculatus*) | Bovidae | 1000 |
| 69. | Topi (*Damaliscus* species) | Bovidae | 4000 |
| 70. | Hartebeest (*Alcelaphus buselaphus*) | Bovidae | 4000 |
| 71. | Gnu or Wildebeest (*Connochaetes* species) | Bovidae | 3000 |
| 72. | Impala (*Aepyceros melampus*) | Bovidae | 3000 |
| 73. | Gazelle (*Gazella* species) | Bovidae | 2000 |
| 74. | Saiga (*Saiga tatarica*) | Bovidae | 2000 |
| 75. | Ibex (*Capra ibex*) | Bovidae | 3000 |
| 76. | Tahr (*Hemitragus* species) | Bovidae | 3000 |
| 77. | Mountain Goat (*Oreamus americanus*) | Bovidae | 3000 |
| 78. | Barbary Sheep or Aoudad (*Ammotragus lervia*) | Bovidae | 2000 |
| 79. | Rocky Mountain Bighorn Sheep (*Ovis canadensis*) | Bovidae | 1000 |
| 80. | Dall's Sheep (*Ovis dalli*) | Bovidae | 1000 |
| 81. | Muskox (*Ovibus moschatus*) | Bovidae | 4000 |
| 82. | Other members of the bovidae family | | 600 |
| 83. | Other members of the artiodactyla order | | 500 |

*Order Caprimulgiformes*

| | | | |
|---|---|---|---|
| 84. | Tawny Frogmouths (*Podargus strigoides*) and other members of the caprimulgiformes order | | 150 |

*Order Carnivora*

| | | | |
|---|---|---|---|
| 85. | Aardwolf (*Proteles cristatus*) | Hyaenidae | 2000 |
| 86. | Striped Hyena (*Hyaena hyaena*) | Hyaenidae | 3000 |
| 87. | Brown Hyena (*Hyaena brunnea*) | Hyaenidae | 3000 |
| 88. | Other members of the hyaenidea family | | 2000 |
| 89. | Lynx, Cougar and other Small Wild Cats (*Felis* species) | Felidae | 4000 |
| 90. | Snow Leopard (*Panthera uncia*) | Felidae | 4000 |
| 91. | Tiger (*Panthera tigris*) | Felidae | 4000 |
| 92. | Leopard (*Panthera pardus*) | Felidae | 4000 |
| 93. | Jaguar (*Panthera onca*) | Felidae | 4000 |
| 94. | Lion (*Panthera leo*) | Felidae | 4000 |
| 95. | Cheetah (*Acinonyx jubatus*) | Felidae | 4000 |
| 96. | Other members of the felidae family | | 250 |
| 97. | Fox (*Vulpes* species) | Canidae | 1500 |
| 98. | Wolf (*Canis* species) | Canidae | 1500 |
| 99. | Other members of the canidae family | | 1000 |
| 100. | Spectacled Bear (*Tremarctos ornatus*) | Ursidae | 3000 |
| 101. | Giant Panda (*Ailuropoda melanoleuca*) | Ursidae | 4000 |
| 102. | Other members of the ursidae family | | 3000 |

| | | | |
|---|---|---|---|
| 103. | Lesser Panda (*Ailurus fulgens*) | Procyonidae | 3000 |
| 104. | Raccoon (*Procyon lotor*) | Procyonidae | 75 |
| 105. | Other members of the procyonidae family | | 75 |
| 106. | Otter (*Lutrinae* species) | Mustelidae | 4000 |
| 107. | Other members of the mustelidae family | | 135 |
| 108. | Other members of the carnivora order | | 75 |

*Order Cetacia*

| | | | |
|---|---|---|---|
| 109. | Whales, Dolphins, Porpoises and other members of the cetacia order | | 4000 |

*Order Chelonia*

| | | | |
|---|---|---|---|
| 110. | Turtles and other members of the chelonia order | | 150 |

*Order Chiroptera*

| | | | |
|---|---|---|---|
| 111. | Bats and other members of the chiroptera order | | 300 |

*Order Ciconiformes*

| | | | |
|---|---|---|---|
| 112. | Storks | Ciconiidae | 2000 |
| 113. | Flamingos | Phoenicopteridae | 2000 |
| 114. | Ibis, Spoonbills and other members of the ciconiformes order | | 400 |

*Order Columbiformes*

| | | | |
|---|---|---|---|
| 114.1 | Pigeon | Columbidae | 80 |

*Order Coraciiformes*

| | | | |
|---|---|---|---|
| 115. | Kookaburra (*Dacelo novaeguineae*) and other members of the alcedinidae family | | 150 |
| 116. | Motmot (*Momotus momota*) | Momotidae | 4000 |
| 117. | Hornbill (*Tockus flavirostris*) | Bucerotidae | 4000 |
| 118. | Other members of the coraciiformes order | | 150 |

*Order Crocodylia*

| | | | |
|---|---|---|---|
| 119. | Crocodiles, Alligators and other members of the crocodylia order | | 1000 |

*Order Cuculiformes*

| | | | |
|---|---|---|---|
| 120. | Touracos, Cuckoos and other members of the cuculiformes order | | 1000 |

*Order Dermoptera*

| | | | |
|---|---|---|---|
| 121. | Flying Lemurs (*Cynocephalus* species) and other members of the dermoptera order | | 2000 |

*Order Falconiformes*

| | | | |
|---|---|---|---|
| 122. | Eagles, Falcons and other members of the falconiformes order | | 3000 |

*Order Galliformes*

| | | | |
|---|---|---|---|
| 123. | Pheasants, guinea fowl and other members of the galliformes order (except those referred to in items 10 and 11) | | 500 |

*Order Gruiformes*

| | | | |
|---|---|---|---|
| 124. | Cranes and other members of the gruiformes order | | 2000 |

*Order Hyracoidae*

| | | | |
|---|---|---|---|
| 125. | Hyraxes and other members of the hyracoidae order | | 500 |

*Order Marsupialla*

| | | | |
|---|---|---|---|
| 126. | Kangaroo (*Macropus* species) | Macropodidae | 2000 |
| 127. | Swamp Wallaby (*Wallabia bicolor*) | Macropodidae | 2000 |
| 128. | Other members of the macropodidae family | | 2000 |
| 129. | Koala (*Phascolaretus cinereus*) | Phascolarctidae | 3000 |
| 130. | Other members of the marsupiallia order | | 3000 |

*Order Monotremata*

| | | | |
|---|---|---|---|
| 131. | Echidna or Spiny Anteater (*Tachyglossus*) | Tachyglossidae | 750 |
| 132. | Duck-billed Platypus (*Ornithorhynchus anatinus*) | Ornithorhynchidae | 2000 |
| 133. | Other members of the ornithorhynchidae family | | 2000 |
| 134. | Other members of the monotremata order | | 750 |

*Order Passeriformes*

| | | | |
|---|---|---|---|
| 135. | Finches, Starlings, Shrikes and other members of the passeriformes order | | 300 |

*Order Perissodactyla*

| | | | |
|---|---|---|---|
| 136. | Zebras, donkeys and other members of the equidae family | | 4000 |
| 137. | Tapirs and other members of the tapiridae family | | 4000 |
| 138. | Rhinoceros | Rhinocerotidae | 4000 |
| 139. | Other members of the perissodactyla order | | 2750 |

*Order Pholidota*

| | | | |
|---|---|---|---|
| 140. | Scaly anteaters and other members of the pholidota order | | 500 |

*Order Piciformes*

| | | |
|---|---|---|
| 141. | Barbets, woodpeckers and other members of the piciformes order | 300 |

*Order Pinnipedia*

| | | |
|---|---|---|
| 142. | Sea Lions, Seals and other members of the pinnipedia order | 4000 |

*Order Primates*

| | | |
|---|---|---|
| 143. | Monkeys, Gorillas and other members of the primate order | 4000 |

*Order Proboscidea*

| | | |
|---|---|---|
| 144. | Elephants and other members of the proboscidea order | 4000 |

*Order Psittaciformes*

| | | |
|---|---|---|
| 145. | Parrots, Parakeets, Macaws and other members of the psittaciformes order | 4000 |

*Order Reptilia*

| | | |
|---|---|---|
| 146. | Snakes and other members of the reptilia order | 300 |

*Order Rheiformes*

| | | |
|---|---|---|
| 147. | Members of the rheiformes order other than those referred to in items 26 and 27 | 1500 |

*Order Sirenia*

| | | |
|---|---|---|
| 148. | Manatees, Sea Cows, Dugongs and other members of the sirenia order | 4000 |

*Order Sphenisciformes*

| | | |
|---|---|---|
| 149. | Penguins and other members of the sphenisciformes order | 4000 |

*Order Strigiformes*

| | | |
|---|---|---|
| 150. | Owls and other members of the strigiformes order | 300 |

*Order Tubilidentata*

| | | | |
|---|---|---|---|
| 151. | Aardvarks (*Orycteropyus afer*) and other members of the tubilidentata order | | 1000 |

*Order Xenarthra*

| | | | |
|---|---|---|---|
| 152. | Giant Anteater (*Myrmecophaga tridactyla*) | Myrmecophagidae | 4000 |
| 153. | Other members of the myrmecophagidae family | | 4000 |
| 154. | Three-toed Tree Sloth (*Bradypus* species) | Bradypodidae | 500 |
| 155. | Giant Armadillo (*Pridontes maximus*) | Dasypodidae | 500 |
| 156. | Other members of the xenarthra order | | 500 |

SOR/2003-257, ss. 2(E), 3(E); SOR/2004-151, s. 1.

Compensation for Certain Birds Destroyed in British Columbia (Avian Influenza) Regulations ( H-3.3 -- SOR/2004-150 )
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Source: http://laws.justice.gc.ca/en/H-3.3/SOR-2004-150/text.html
Updated to August 31, 2004

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# Compensation for Certain Birds Destroyed in British Columbia (Avian Influenza) Regulations

SOR/2004-150

Registration 4 June, 2004

## HEALTH OF ANIMALS ACT

### Compensation for Certain Birds Destroyed in British Columbia (Avian Influenza) Regulations

Whereas the Minister of Agriculture and Agri-Food considers that there is no readily available market for birds referred to in the annexed Regulations;

Therefore, the Minister of Agriculture and Agri-Food, pursuant to section 55[a] of the *Health of Animals Act*[b], hereby makes the annexed *Compensation for Certain Birds Destroyed in British Columbia (Avian Influenza) Regulations*.

Ottawa, June 4, 2004

Robert Speller

Minister of Agriculture and Agri-Food

[a] S.C. 1997, c. 6, s. 71[b] S.C. 1990, c. 21

## COMPENSATION FOR CERTAIN BIRDS DESTROYED IN BRITISH COLUMBIA (AVIAN INFLUENZA) REGULATIONS

## INTERPRETATION

**1.** The following definitions apply in these Regulations.

"Act" means the Health of Animals Act. (*Loi*)

"bird" means a female chicken broiler breeder or chicken layer. (*oiseau*)

"control area" means the area in British Columbia that is declared to be a control area under subsection 27(1) of the Act and in respect of which the Minister's declaration dated March 11, 2004 remains in effect. (*région contrôlée*)

## APPLICATION

**2.** These Regulations apply in respect of birds destroyed in the control area under subsection 48(1) of the Act because of the outbreak of avian influenza.

## METHOD OF CALCULATION

**3.** (1) For the purpose of paragraph 55(a) of the Act, the market value of a bird is determined as follows:

(*a*) in the case of a female chicken broiler breeder that is 25 weeks of age or younger and a chicken layer that is 19 weeks of age or younger, in accordance with the formula

$$B + [(A-B) / D] E$$

(*b*) in the case of a female chicken broiler breeder that is older than 25 weeks of age and a chicken layer that is older than 19 weeks of age, in accordance with the formula

$$A + [(C-A) / (F-D)] (E-D)$$

where

A is the maximum amount with respect to a chicken under section 2 of the *Compensation for Destroyed Animals Regulations*;

B is the value of a day-old female chicken broiler breeder or chicken layer, as the case may be;

C is the salvage value of the bird;

D is 25 weeks in the case of a female chicken broiler breeder and 19 weeks in the case of a chicken layer;

E is the age of the bird, in weeks, when it was destroyed; and

F is the length, in weeks, of the average production cycle of a female chicken broiler breeder or chicken layer, as the case may be.

(2) The market value of a bird shall not exceed the maximum amount with respect to a chicken under section 2 of

the *Compensation for Destroyed Animals Regulations*.

## COMING INTO FORCE

**4.** These Regulations come into force on the day on which they are registered.

Vol. 139, No. 9 — May 4, 2005

Registration
SOR/2005-113 April 19, 2005

HEALTH OF ANIMALS ACT

## Regulations Amending the Compensation for Certain Birds Destroyed in British Columbia (Avian Influenza) Regulations

Whereas the Minister of Agriculture and Agri-Food considers that there is no readily available market for the birds referred to in the annexed Regulations;

Therefore, the Minister of Agriculture and Agri-Food, pursuant to paragraphs 55(*a*) and (*b*) (see footnote a) of the *Health of Animals Act* (see footnote b), hereby makes the annexed *Regulations Amending the Compensation for Certain Birds Destroyed in British Columbia (Avian Influenza) Regulations*.

Ottawa, April 19, 2005

Andrew Mitchell
Minister of Agriculture and Agri-Food

### REGULATIONS AMENDING THE COMPENSATION FOR CERTAIN BIRDS DESTROYED IN BRITISH COLUMBIA (AVIAN INFLUENZA) REGULATIONS

AMENDMENTS

**1. (1) The definition "bird" in section 1 of the *Compensation for Certain Birds Destroyed in British Columbia (Avian Influenza) Regulations* (see footnote 1) is repealed.**

**(2) Section 1 of the Regulations is amended by adding the following in alphabetical order:**

"chicken" means a female chicken broiler breeder or a chicken table egg layer. (*poulet*)

"duck" means a female duck breeder or a duck table egg layer. (*canard*)

"goose" means a female goose breeder. (*oie*)

**2. Section 2 of the Regulations is replaced by the following:**

**2.** These Regulations apply in respect of chickens, ducks and geese destroyed in the control area under subsection 48(1) of the Act because of the outbreak of avian influenza.

**3. Sections 3 and 4 of the Regulations are replaced by the following:**

**3.** (1) For the purpose of paragraph 55(*a*) of the Act, the market value of a chicken is determined as follows:

(*a*) in the case of a female chicken broiler breeder that is 25 weeks of age or younger or a chicken table egg layer that is 19 weeks of age or younger, in accordance with the formula

$$B + [(A - B)/D]E$$

(*b*) in the case of a female chicken broiler breeder that is older than 25 weeks of age or a chicken table egg layer that is older than 19 weeks of age, in accordance with the formula

$$A + [(C - A)/(F - D)](E - D)$$

where

A is the maximum amount with respect to a chicken under section 2 of the *Compensation for Destroyed Animals Regulations*;

B is the value of a day-old female chicken broiler breeder or a day-old chicken table egg layer, as the case may be;

C is the salvage value of the chicken;

D is 25 weeks in the case of a female chicken broiler breeder and 19 weeks in the case of a chicken table egg layer;

E is the age of the chicken, in weeks, when it was destroyed; and

F is the length, in weeks, of the average production cycle of a female chicken broiler breeder or a chicken table egg layer, as the case may be.

(2) The market value of a chicken shall not exceed the maximum amount with respect to a chicken under section 2 of the *Compensation for Destroyed Animals Regulations*.

**4.** (1) For the purpose of paragraph 55(*a*) of the Act, the market value of a duck is determined as follows:

(*a*) in the case of a duck that is 22 weeks of age or younger, in accordance with the formula

$$B + [(A - B)/D]E$$

(*b*) in the case of a duck that is older than 22 weeks of age, in accordance with the formula

$$A + [(C - A)/(F - D)](E - D)$$

where

A is $73.34 in the case of a female duck breeder and $37.51 in the case of a duck table egg layer;

B is the value of a day-old female duck breeder or a day-old duck table egg layer, as the case may be;

C is the salvage value of the duck;

D is 22 weeks;

E is the age of the duck, in weeks, when it was destroyed; and

F is the length, in weeks, of the average production cycle of a female duck breeder or a duck table egg layer, as the case may be.

(2) Despite the *Compensation for Destroyed Animals Regulations*, the amount that is established for the purpose of subsection 51(3) of the Act as the maximum amount with respect to a duck is $73.34.

**5.** (1) For the purpose of paragraph 55(*a*) of the Act, the market value of a goose is determined as follows:

(*a*) in the case of a goose that is 22 weeks of age or younger, in accordance with the formula

$$B + [(A - B)/D]E$$

(*b*) in the case of a goose that is older than 22 weeks of age, in accordance with the formula

$$A + [(C - A)/(F - D)](E - D)$$

where

A is $149.59;

B is the value of a day-old goose;

C is the salvage value of the goose;

D is 22 weeks;

E is the age of the goose, in weeks, when it was destroyed; and

F is the length, in weeks, of the average production cycle of a goose.

(2) Despite the *Compensation for Destroyed Animals Regulations*, the amount that is established for the purpose of subsection 51(3) of the Act as the maximum amount with respect to a goose is $149.59.

COMING INTO FORCE

**4. These Regulations come into force on the day on which they are registered.**

## REGULATORY IMPACT ANALYSIS STATEMENT

(*This statement is not part of the Regulations*.)

### *Description*

The purpose of the *Health of Animals Act* (the "Act") is to prevent the introduction of animal diseases into Canada, to prevent the spread within Canada of diseases of animals that either affect human health or could have a significant economic effect on the Canadian livestock industry, and to provide for the humane treatment of animals during transport.

Section 55 of the Act allows the Minister of Agriculture and Agri-Food to make regulations with respect to calculating the market value of animals for which the Minister considers there is no readily available market. Compensation is paid to encourage owners to report diseases and to actively participate in eradication efforts. The compensation program is administered by the Canadian Food Inspection Agency (CFIA) under the authority of the Act as part of the National Animal Health program which prevents or controls animal diseases, including those that would have a significant economic impact, and thereby protects Canadians from diseases that can be transmitted by animals.

On February 19, 2004, the CFIA confirmed the presence of avian influenza in the Fraser Valley area of southern British Columbia.

Avian influenza is a contagious viral infection that can affect all species of birds (chickens, turkeys, guinea fowl, pet birds and wild birds). In intensive poultry rearing systems, young fattening turkeys and laying hens are usually the most affected species. Signs of the disease range from a mild infection with no symptoms to a severe epidemic that can kill all infected birds.

Due to the spread of the disease to other poultry farms, the government announced the depopulation of all commercial poultry flocks (approximately 19 millions birds) and other backyard birds in the Control Area established March 11 in British Columbia's Fraser Valley in an effort to eradicate avian influenza.

The *Compensation for Destroyed Animals Regulations* provide for compensation for certain commercial poultry for which there is a market value; however a different method is required to compensate producers in cases where there is no readily available market. In June 2004, the *Compensation for Certain Birds Destroyed in British Columbia (Avian Influenza) Regulations* were made to establish a formula for determining compensation for certain birds for which there is no readily available market (female chicken broiler breeders and chicken table egg layers).

After consultations with affected stakeholders, it was determined that there were other types of commercial poultry, namely layer and breeder ducks and geese, that were ordered depopulated and that had no readily available market. This amendment to the *Compensation for Certain Birds Destroyed in British Columbia (Avian Influenza) Regulations* establishes a formula to allow for compensation of producers whose female duck breeders, duck table egg layers and female goose breeders were ordered destroyed as part of the measures to control the outbreak of Avian Influenza in the Fraser Valley.

The method of calculating the market value of birds that have not yet reached or have reached the age of their peak production will be determined by the formula

$$B + ((A - B)/D)E$$

and for birds that have passed their age of peak production by the formula

$$A + [(C - A) / (F - D)] (E - D)$$

where

A is the maximum value for the birds at their peak of production;

B is the value of a day-old chick;

C is the salvage value of the bird;

D is the age of the bird, in weeks, at peak production value;

E is the age of the bird, in weeks, when it was destroyed; and

F is the length, in weeks, of the average production cycle of the bird.

***Alternatives***

Status Quo

Not enacting the Regulations is unacceptable as it would unduly penalize producers whose female duck breeders, duck layers or female goose breeders have been depopulated in an effort to control the spread of the disease. They would suffer a disadvantage with respect to chicken producers who have already been compensated for those of their birds for which there was no readily available market value.

Enact Compensation Regulations (preferred option)

This option was chosen as it establishes a mechanism for calculating market value for birds depopulated in an effort to control the spread of disease.

***Benefits and Costs***

Benefits

This amendment will continue to encourage owners to report diseases controlled under the Act by mitigating the economic impact that results from the destruction of animals as a result of reporting a disease under the Act.

Early reporting of these diseases to veterinary inspectors is essential to allow early intervention of Agency staff and to minimize the spread of the disease and the impact on human and animal health and the economic viability of Canada's livestock sector.

Costs

Under these Regulations, the estimated direct cost of compensation for these birds is estimated to be $300,000.

***Consultation***

There has been extensive consultation regarding compensation for birds ordered destroyed in the control area with national poultry associations and with local British Columbia poultry associations and individuals since the confirmation of the Avian Influenza outbreak in February 2004. These consultations are ongoing.

***Compliance and Enforcement***

All compensation paid under the Regulation is recommended by a veterinary inspector

designated under the Act. The veterinarian is advised by two experts, one identified by the owner and the other by the Agency. A mechanism for appeal of compensation awards exists under the Act.

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Footnote a

S.C. 1997, c. 6, s. 71

Footnote b

S.C. 1990, c. 21

Footnote 1

SOR/2004-150

**NOTICE:**
The format of the electronic version of this issue of the *Canada Gazette* was modified in order to be compatible with hypertext language (HTML). Its content is very similar except for the footnotes, the symbols and the tables.

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## PART 3 – OTHER AI REFERENCE DOCUMENTS

This final section of the compilation gives some insight into AI from an international perspective. Documents from the UN's Food and Agriculture Organization (FAO), the World Organization for Animal Health (OIE) and the World Health Organization (WHO) are included here. In the main, these documents consider AI from the Asian context. Given that AI is also (and some would argue more importantly) a human health issue, Canada's Pandemic Influenza Plan, which was released just prior to the 2004 AI Outbreak is also provided.

The first four documents presented in this section were all produced by the FAO. The first document, **Avian Influenza – Background**, provides some background information on the impact of AI to the Asian poultry industry as of January 2004. The second piece, **Avian Influenza: A Threat to Rural Livelihoods, Agricultural Production and Human Health** outlines the actions of the organization to combat the disease. The third is a map showing those countries in Asia experiencing an **H5N1 Outbreak** as of October 15, 2005. The fourth FAO document, **Avian Influenza – Questions & Answers**, deals with the origins of the Asian AI crisis, biosafety practices for preventing and controlling the disease, FAO's response to the crisis, and the prospect for a Regional solution.

The FAO, in partnership with the OIE and WHO, also produced a list of conclusions and recommendations as part of its **Technical Consultation on the Control of Avian Influenza**. This February 2004 document describes various control and eradication strategies, human health issues, including food safety, and a potential reorganization of the poultry production sector in Asia.

The OIE has recently revised its **Terrestrial Animal Health Code** to incorporate modifications agreed to during the 73rd General Session in May 2005, which included revised chapters and appendices on avian influenza. Included in this compilation are Chapter 2.7.12 Avian Influenza and Appendix 3.8.9 Guidelines for the Surveillance of Avian Influenza. These modifications were the end-result of work undertaken by the OIE Ad Hoc Group on Avian Influenza, which released **Draft Report of the Meeting of the OIE Ad Hoc Group on Avian Influenza** in November 2003. This report provides important technical information on AI and is therefore included in the compilation.

During the 71st General Session of the OIE, in May 2003, **The Use of Vaccination as an Option for the Control of Avian Influenza** was presented. This paper reviewed several possible strategies for controlling AI, discussing advantages and disadvantages of each approach and the implications for trade of a vaccination policy.

The last document presented in this section and compilation is the **Canadian Pandemic Influenza Plan**. This plan of the Public Health Agency of Canada (PHAC) was released in February 2004 just days prior to the discovery of AI in the Fraser Valley.

# ANIMAL HEALTH SPECIAL REPORT

## Avian Influenza - Background

Avian influenza was first identified over 100 years ago during an outbreak in Italy. Since then, the disease has cropped up at irregular intervals in all world regions. In addition to the current outbreak in Asia, recent epidemics have occurred in Hong Kong in 1997-1998 and 2003, in the Netherlands in 2003, and in the Republic of Korea in 2003.

Once domestic birds are infected, avian influenza outbreaks can be difficult to control and often cause major economic impacts for poultry farmers in affected countries, since mortality rates are high and infected fowl generally must be destroyed -- the technical term is "culled" -- in order to prevent the spread of the disease.

As a result of the ongoing outbreak in Asia, FAO estimates that around 20-25 million birds had been culled in the region as of 28 January 2004.

This figure accounts for less than 1 percent of the region's total inventories, FAO data show. However, the impact can be devastating to local economies and to both commercial poultry operations and smallholders -- particularly in Thailand, where the industry is heavily reliant on trade.

In 2003, poultry exports from Thailand accounted for nearly 7 percent of global poultry meat trade, with an export value of approximately US$1 billion.

**also in the AGA website...**

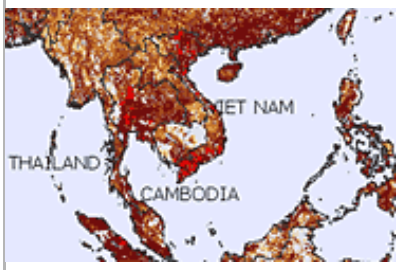
- **Factfiles Archive**

**see also...**

- History of H5N1 virus circulation in South-East Asia before 2004

**Related Links**

- Avian influenza: a threat to rural livelihoods, agricultural production and human health
- WHO - Avian Influenza Factsheet




**Click to view map of poultry density in South Asia**

print-friendly version

# Avian influenza: a threat to rural livelihoods, agricultural production and human health

## FAO forms task force to monitor crisis, sends technical support missions to affected countries, convenes urgent meeting

Avian influenza was first identified over 100 years ago during an outbreak in Italy. Since then, the disease has cropped up at irregular intervals in all world regions. In addition to the current outbreak in Asia, recent epidemics have occurred in Hong Kong in 1997-1998 and 2003, in the Netherlands in 2003, and in the Republic of Korea in 2003.

Once domestic birds are infected, avian influenza outbreaks can be difficult to control and often cause major economic damage to poultry farmers in affected countries, since mortality rates are high and infected fowl generally must be destroyed -- the technical term is "culled" -- in order to prevent the spread of the disease.

As a result of the ongoing outbreak in Asia, FAO estimates that around 45 million birds had been culled in the region as of 2 February 2004.

This figure accounts for just over 1 percent of the region's total inventories, FAO data show. However, the impact can be devastating to local economies and to both commercial poultry operations and smallholders -- particularly in Thailand, where the industry is heavily reliant on trade.

In 2003, poultry exports from Thailand accounted for nearly 7 percent of global poultry meat trade, with an export value of approximately US$1 billion.

**What is FAO doing to respond to the current crisis?**

In its response to the outbreak, FAO is emphasizing safety and prevention, assistance to affected countries and cooperation with other relevant international organizations.

FAO has established an Avian Flu Technical Task Force, led by its Animal Health Service and including technical staff at its Regional Office in Bangkok, in order to closely monitor the current situation in Asia, provide FAO's country representation offices and member countries with technical support for handling the crisis and facilitate communication between relevant international organizations, such as the World Organisation for Animal Health (OIE) and the World Health Organization (WHO).

FAO is also mobilizing emergency funds that will be used to send technical support missions to affected countries. On 2 February the first four missions -- to Cambodia, the Lao People's Democratic Republic, Pakistan and Viet Nam -- received the green light.

The Organization anticipates that additional missions will

**Related stories**

- Avian influenza: a threat to rural livelihoods, agricultural production and human health
- Wild birds should not be killed to fight bird flu
- Bird flu virus still not under control
- FAO/OIE/WHO call for targeted strategy including poultry vaccination to help curb avian flu
- Avian flu virus continues to spread in Asia
- Avian flu: FAO provides $1.6 million in emergency aid to four Asian countries
- FAO seriously concerned about new outbreaks of avian flu
- Bird flu: success of eradication depends on mass cullings
- High geographic concentration of animals may have favoured the spread of avian flu
- Unprecedented spread of avian influenza requires broad collaboration

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follow soon after, as official requests come in from governments.

These FAO technical missions will:

- assist governments in improving the capacity of laboratories to diagnose the disease;

- strengthen countries' abilities to conduct field investigation when new reports of possible infection are received;

- begin mapping outbreaks in order to predict possible spread patterns;

- deepen public awareness of proper food handling and disposal of birds;

- offer advice regarding handling of sick birds and, in collaboration with WHO and other partners, help provide countries with the necessary protective gear.

Beyond these national missions, a regional initiative aimed at improving epidemiological surveillance and monitoring of avian influenza in the region is being prepared by FAO.

The Organization also stresses that once the current crisis subsides, countries will need assistance in safely repopulating domestic bird flocks.

Technical support missions will be coordinated by the Organization's Asia office, located in Bangkok, Thailand. FAO's Asia office is also maintaining close communication with national governments in the region as well as other relevant international organizations in order to disseminate technical advice and help coordinate international responses.

FAO representatives based in every country of the region are playing a key role in regional communication and coordination regarding the situation.

Additionally, on 3-4 February 2004, FAO convened an urgent meeting with veterinary officials from affected countries, international experts, and representatives from the OIE, WHO, the United States' Centers for Disease Control and Prevention and other organizations in order to generate more detailed guidelines and recommendations for handling the crisis at the national and international levels.

(*For more on what FAO is doing to help, visit the Animal Production and Health Division's* ***special Web site*** *on Avian Influenza and the Asian outbreaks.*)

**What causes avian influenza?**

Avian influenza can be caused by 1 of around 23 different strains of virus, all of which are type A members of the *Orthomyxoviridae* virus family. However, serious outbreaks such as that currently affecting Asia usually involve only the H5 and H7 strains. These are highly pathogenic -- that is, easily spread -- and cause system-wide problems for infected birds; other strains mainly affect birds' respiratory systems and are neither as contagious nor as fatal as H5 and H7.

Domestic fowl and wild birds alike are susceptible to avian influenza. The virus is in all likelihood extremely widespread in wild populations, in much the same way that the Herpes Simplex A virus, which causes cold sores, is widespread among humans: Infection is common, but symptoms are mild and nonlethal. Fatal outbreaks occur most frequently in domestic fowl -- which are not as resistant to the virus -- when a pathogenic strain emerges in a wild flock and there is contact between the two populations.

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Once domestic birds are infected, bird flu can be difficult to control and often causes major economic impacts for poultry farmers in affected countries.

**Related links**

- Conclusions and recommendations: FAO/OIE/WHO Expert Consultation on Avian Influenza
- Questions and answers about Avian Influenza
- FAO Avian Flu Special Report
- FAO's Animal Production and Health Division
- World Organisation for Animal Health (OIE)
- World Health Organization (WHO)

Prevention and good farming practices are key to reducing risks of avian influenza outbreaks.

Once avian influenza is established in a domestic flock, it is highly contagious and wild birds are no longer an essential ingredient for spread, notes FAO. Infected birds excrete the virus in high concentrations in their faeces and discharges from the nose and eyes. Once introduced into one flock, the virus can spread to others through the movement of infected birds and contaminated equipment, egg flats, feed trucks or service crews.

**Recognizing infection**

The signs of avian influenza infection vary from case to case and are influenced by factors such as the virulence of the infecting strain, the bird species involved and the age and sex of infected fowl. The incubation period is usually three to seven days.

In virulent avian influenza, the disease usually appears suddenly, with many birds dying either without warning or after giving only small signs of distress: lack of appetite, ruffled feathers, fever.

But this pattern can vary.

Sometimes, birds show weakness and a staggering gait. Hens may lay soft-shelled eggs and then stop laying. Sick birds may sit or stand in a semi-comatose state with their heads touching the ground. Combs and wattles might be blue and puffy with some slight haemorrhaging at their tips. Profuse diarrhoea is frequently present, and birds are excessively thirsty. Respiration may be laboured.

The mortality rate for infected domestic fowl ranges from 50 to 100%. In addition to bird die-offs, control of outbreaks requires that infected animals be killed, and that other control measures are enacted -- these losses and extra costs mean a serious economic squeeze for affected farmers.

**Managing outbreaks**

Responses to outbreaks need to be tailored to local conditions; there is no silver bullet for all situations and places.

In the face of sudden, multiple outbreaks like those in China, the first step is raising biosecurity levels to order to contain breakouts and prevent their spread.

Practically, this means imposing immediate, temporary bans on shipments of birds in affected regions and countries, destruction of infected animals, and disinfection of facilities where infection occurred.

People working on farms or participating in eradication programmes such as the culling of sick birds should avoid close contact with the animals and should wear protective clothing.

Vaccines do exist that have been demonstrated to be effective in reducing mortality or preventing disease, or both, in chickens and turkeys.

Experts at the meeting in Rome on 3-4 February agreed that a targeted vaccination campaign for poultry at risk of being infected may be required in heavily affected countries to control the further spread of the epidemic. They emphasized that culling infected flocks remains the recommended response when the disease is detected, but added that vaccination, when used together with other control measures and appropriate surveillance, offers a suitable means to reduce the incidence of new cases and viral load in the environment and thereby reduce the potential of the disease

spreading to humans.

On a long-term basis, says FAO, prevention is key, and relies on good farming practices, veterinary and human health surveillance programmes that can sound the alarm at the first sign of infection, and mechanisms that allow for a rapid response to contain localized outbreaks.

**Avian flu and humans**

Avian influenza poses serious human health risks as well. It is a zoonotic illness -- native in animal populations but capable of being passed to humans via direct contact with infected birds.

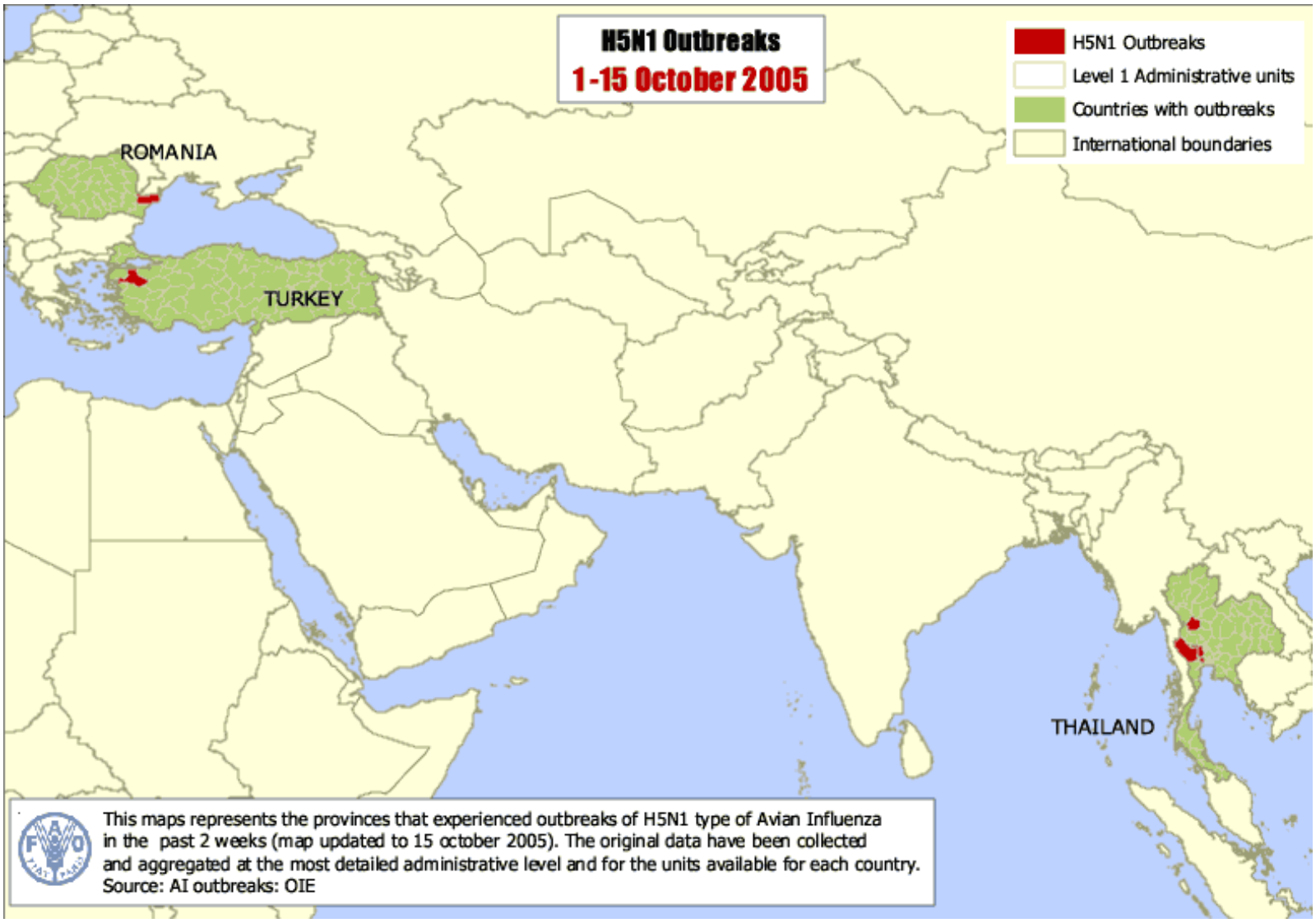
But even during serious outbreaks the virus rarely affects large numbers of people. Still, as the number of infected people increases, so too does the possibility that a new virus strain might evolve from an exchange between human influenza and avian flu genomes.

As of 28 January 2004, WHO was not recommending any restrictions on travel to countries experiencing outbreaks of H5N1 avian infection in poultry flocks, including countries that have also reported cases in humans. WHO does recommend that travellers to areas experiencing outbreaks of this disease in poultry should avoid contact with live animal markets and poultry farms.

*FAO's Animal Health Service has prepared an extensive list of answers to Frequently Asked Questions about bird flu that cover these and other issues in greater deal. Use the links that appear to the right to locate this and other information about the disease and FAO efforts to assist countries experiencing outbreaks of the virus.*

*6 February 2004*

**comments? please write to the FAO webmaster** **© FAO, 2004**


H5N1 Outbreaks
1-15 October 2005
H5N1 Outbreaks
Level 1 Administrative units
Countries with outbreaks
International boundaries
ROMANIA
TURKEY
THAILAND
This maps represents the provinces that experienced outbreaks of H5N1 type of Avian Influenza in the past 2 weeks (map updated to 15 october 2005). The original data have been collected and aggregated at the most detailed administrative level and for the units available for each country.
Source: AI outbreaks: OIE

# ANIMAL HEALTH SPECIAL REPORT

## Avian Influenza - Questions & Answers


| | |
|---|---|
| Q1. | **What is the origin of the avian influenza crisis in Asia?** |
| Q2. | **What should be done when an outbreak occurs?** |
| Q3. | **Why does another animal/human health problem seem to follow so quickly on another?** |
| Q4. | **What is the role of hygienic practises in prevention and containment of the disease?** |
| Q5. | **HPAI in Asia; is there a Regional solution?** |
| Q6. | **What is FAO doing in response to the avian influenza situation?** |
| Q7. | **Which disinfectant should I use against avian influenza?** |
| Q8. | **What can farmers do to protect their birds ? - Biosecurity practice** |


### What is the origin of the avian influenza crisis in Asia?

The origins are uncertain but from what is known of the general biology of the infection, and risk factors for its entry and spread, some areas stand out for further analysis. The presence of multiple virus types of high severity for poultry point at a supportive environment for disease agents to move in the poultry sector. Domestic poultry increasingly forms the basis for entry, spread and shift to high severity (virulence) of influenza viruses which in the past were mostly mild infections and confined to waterfowl. The dramatic growth in domestic poultry production is part of the explanation.

It is estimated that the Eastern and South-Eastern parts of Asia share a poultry population which approaches 6 billion birds (map). Major sub-populations are found around the rapidly expanding megacities. More than half of the domestic bird population is in medium to large scale intensive poultry holdings where fairly strict prevention and containment (Ôbio-securityÕ) measures are in place. However, a sizeable part of the poultry population remains with the smallholder sector and an estimated total of 200 million farmers, each keeping about 15 birds, mainly comprising ducks, chicken, geese, turkeys and quails. The backyard or village poultry is composed of scavenging birds and open pens and exposed to virus carried by wild birds. Seasonal seeding of influenza viruses into backyard poultry systems by waterfowl migrating in the east and central Asian flyways (recognised migration routes from northern China/Siberia to south-east Asia and south and west Asia) allows regular addition of new viruses to the diverse domestic poultry virus pool and may explain some of the geospatial features of regional virus distribution.

However, the rapid spread of certain virus types implicates dissemination mechanisms within the poultry subsector itself, such as live poultry movements or transports involving infected materials. The risks from live bird markets appear the most obvious and have in the past been incriminated as a critical risk, and control point . The circulation of virus in backyard poultry may thus be readily explained. The mechanism of entry into and between intensive units must be further elucidated, since such units would be expected to operate with high levels of prevention (bio-exclusion), and entry might involve other routes besides live birds. Once high density industrial poultry areas become affected infection can explosively spread within the units, and the very high quantities of virus produced may be easily carried to other units, to humans, and into the environment. The above, largely hypothetical transmission cycle may be summarised as virus shifting from "the flyways to the highways and byways".

**Back**

### What should be done when an outbreak occurs?

The general approach to be selected and the combination of actions to be taken with regard to controlling marketing, imposition of movement restrictions, quarantine measures, culling, and any vaccination, varies according to the local set of circumstances and from country to country. There is no single solution applicable to all scenarios, and a balance must always be found to find effective, feasible and socially acceptable control measures that safeguard the short and long term livelihoods of farmers and the health of the population. It remains, however, that in the face of an emergency with multiple outbreaks suggesting Highly Pathogenic Avian Influenza (HPAI), levels of bio-security ( prevention and containment) must immediately be raised appropriate to the risk, and there must be early detection and rapid plus safe culling of infected groups of birds, and those considered in contact with them, in order to halt disease spread.

FAO organizes international expert panels to review the state-of-the-art in terms of scientific progress and to translate these findings into practical recommendations for the control and prevention of the disease. Collaboration with the OIE enables the consensus scientific position to guide the formulation of international guidelines and standards. This is a continual and dynamic process. Therefore, it is essential that country emergency plans are reviewed frequently and regularly in order to assimilate new scientific knowledge in this fast-moving field.

Until now the consensus has been to consider the presence of any HPAI virus in commercial poultry unacceptable. The rationale for this finds its origin in the risk of catastrophic losses in poultry production and also human health.

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### Why does another animal/human health problem seem to follow so quickly on another?

Densely populated livestock areas are vulnerable to the introduction and spread of infectious diseases. Apart from livestock density also other factors are important such as the presence of forest reserves and open water bodies in the production area, movement of animals, contamination of lorries, feed and other supplies, and of course the hygiene on the farm, the processing chain and the markets. High concentrations of poultry and pigs are found in western Europe and eastern Asia. The Netherlands experienced a severe outbreak in the year 2003. Over twenty-five million birds had to be culled. Also some human infections occurred.

Hence, the current widespread infections of commercial poultry flocks in many countries of Asia is not a total surprise. The region is known to form an influenza epicentre where birds, other animals and humans live closely together in conditions where viruses have the greatest opportunity to pass from one species to another.

A number of conditions make transmission to humans of a variety of disease agents more likely, including poor sanitation of the chicken stalls in the retailed outlets, the presence of markets in the proximity to living areas, absence of central slaughtering facilities, and, the practice of slaughtering chickens at the retailed outlets.

More in general, the bird flu outbreaks can be considered as part of the process of global change. Traffic and trade dynamics create conditions for viruses, bacteria and parasites to hitch-hike around the world, affecting people, animals and ecosystems. Climate change alters the distribution and abundance of insect vectors, influences bird migration and livestock concentrations. Urbanization, income rise and dietary changes create an increase in the demand for animal production. Poultry industries are expected to continue to expand rapidly in most countries in Asia for the next two decades.

Outbreaks of Avian flu, SARS, foot-and-mouth disease, classical swine fever, Rift Valley Fever are all believed to reflect instabilities in the production environment and perhaps the general agro-ecology. FAO is exploring the linkages between disease occurrence, both in animals and for diseases in humans which are of animal origin, and environmental change, in order to better advise on health implications of production changes in the future.

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### What is the role of hygienic practises in prevention and containment of the disease?

- Avian influenza usually spreads when live birds carrying infection are bought and sold, and by contact of birds with bird droppings on dirty equipment, cages, feed, vehicles or shoes/clothing

- Practising good hygienic practises (bio-security) is therefore an extremely important safety measure to prevent infection entering domesticated poultry Ð all persons keeping or working with poultry should play their role in this

- Once the very severe type (HPAI) has been recognised in the trading environment or country, all persons working with poultry should greatly increase the level of hygienic practises to avoid bringing in virus (Ôbio-exclusionÕ) and to prevent virus exiting (Ôbio-containmentÕ) if it has already entered a flock, village or region

- Poultry keepers and communities can take practical measures to avoid bringing in virus, and to reduce the risk of spread if it has entered

- SLAUGHTER of poultry is one part of bio-containment since the purpose is to prevent virus leaving a farm/village in live birds

- If good hygienic practises to prevent entry and exit are not in place the effect of slaughter policy is usually greatly reduced Ð virus can leave a farm before signs are seen, and enter others

- Therefore hygiene practises are first line of defence and attack against epidemics of bird flu

- The main risks of virus entry are: bringing in live birds, bringing in objects such as animal and bird cages or feed that has been contaminated by birds, bringing in dirty (faeces contaminated) footware, vehicles, clothing, that has recently passed through animal markets or chicken or duck farms

- The main risks of virus leaving a region to another are: sale of birds to markets, exit of wild waterfowl which have visited backyard poultry units, people working or selling poultry carrying dirty footware, clothes, cages, to markets or bird farms

- The principles of bio-exclusion are to:

- to identify the most important routes by which virus can enter the unit
- to focus attention/actions to the most important routes of entry
- to keep up the level of activity until the risk period is over

The principles of bio-containment are:

- To To keep infection contained within poultry units, thereby reducing risk to neighbouring flocks, villages, zones and regions
- To act as soon as the risk is identified, since the flocks may already be infected before signs are seen
- To identify and apply practical means of reducing spread between birds
- To focus attention/actions to the most important routes by which virus could "move off the premises or village", and between groups or flocks
- Community-minded, since the act of containing infection assists the infection to die out, and speeds the work of authorities in control and eradication

- These principles can be used by responsible individuals and authorities at any level to develop practical guidance and advice

- Poultry keepers have a vital role in bio-containment, and authorities also to engage with livestock keepers (public awareness and communication) , and actions to promote compliance

- SLAUGHTER of infected poultry is only one part of bio-containment -the other part is played by people acting together to keep disease in and out

**Back**

### HPAI in Asia; is there a Regional solution?

Of course, in the current, fluid situation there is the urgency to stop the further spread of HPAI and revert to the situation of a more manageable level of incidence. As a next step, it will be important to reflect on the factors in the Asian poultry sector that led to this problem, and the health issues associated with further poultry sector development. Of paramount importance is the human health risks posed by HPAI flare ups and the threat emanating from the combination of wild bird reservoirs, backyard poultry and rapid industrialization.

Is there a means to effectively reduce the disease burden in the production environment? What can be done to separate and protect the health status of industrial poultry units in the proximity of urban centres? Are the concentrations of poultry and other livestock reaching levels whereby health threats require a re-thinking of where production is located? The importance of the smallholder sector must be taken into consideration - how to incorporate this important dimension of economic opportunity, where poultry form an integral part of sometimes complex agro-ecological systems vital to rural livelihood.

Ideally, risk management should encompass Sustainable Agriculture and Rural Development (SARD) considerations. This would start with a full recognition of the Regional dimension of the problem; . migratory birds, virus reservoirs and the poultry feed, production, processing and marketing circuitry, each span across the Region. The disease problems now arising may in part be explained by the dynamic structure of the poultry, and perhaps also pig sectors. The ongoing trends require to be clarified in order to identify the factors creating a higher risk of animal disease occurrence.

The HPAI crisis serves to indicate the need for a veterinary surveillance framework for early warning of disease risk at regional level, which should serve the needs of the agricultural and medical communities of the region, and the wider international community. Regional networks for epidemiological surveillance, typing of influenza and other infectious pathogens, vaccine banks, contingency stocks of ÔupdatedÕ vaccines may all be necessary for timely early warning and effective action. Novel approaches and thinking will almost certainly be required.

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### Which disinfectant should I use against avian influenza?

Soapy water and detergents are first choice for many items!!

- The avian influenza virus is more simple to destroy than many viruses since it is very sensitive to detergents which destroy the fat containing outer layer of the virus. This layer is needed to enter cells of animals and therefore destroys the infectivity.

- The virus survives well in water and simple washing may assist the virus to enter into areas where it is picked up by other birds.

- Therefore any washing to remove contamination should always be with detergents (soapy water) or specific disinfectants.

- The biggest danger is bird droppings -the virus likes moist, dirty conditions so it is essential to thoroughly disinfect items that have been in contact with bird droppings - cages, shoes, clothes before working with poultry/entry to a place where poultry are kept.

- Simple hygienic measures can reduce risk - but national authorities are encouraged to prepare and communicate specific guidance of each type of poultry enterprise.

- More guidance for veterinary services on selection and application of decontamination procedures is given in the reference below. Adaptation to the specific country circumstances will be needed.

**Items and procedures**
(source AUSVETPLAN Operational Procedures Manual, Decontamination - http://www.aahc.com.au/ausvetplan/decfnl2.pdf)

| Item | Disinfectant/chemical/procedure |
|---|---|
| Dead birds/Carcases | Bury or burn |
| Animal housing/equipment/cages | 1, 2a, 2b, 2c, 3 |
| Humans | 1 |
| Electrical equipment | 5c |
| Water tanks | Drain to pasture if possible |
| Ponds used by poultry/ducks | Drain to pasture if possible |
| Feed | Bury |
| Effluent, manure | Bury or burn, 4, 3 |
| Human housing | 1, 2a, 2b, 2c |
| Machinery, vehicles | 1,3 |
| Clothing | 1,2a,2b,2c,3 |
| Aircraft | 1,2c |

| Key | Form and final concentration | Contact time and notes |
|---|---|---|
| 1. Soaps and detergents | | Leave in contact 10 minutes |
| 2. Oxidising agents | | |
| 2a. Sodium hypochlorite | Liquid, dilute to final 2-3% available chlorine | Not good for organic materials. 10-30 minutes contact. |
| 2b. Calcium hypochlorite | Solid or powder , dilute 2-3% available chlorine (20 g/litre powder, 30g/l solid) | Not good for organic materials. 10-30 minutes contact. |
| 2c. Virkon¨ | 2% (20 g/litre) | 10 minutes. Excellent disinfectant |
| 3. Alkalis | | |
| 3a. Sodium hydroxide (caustic soda)(NaOH). Do not use with aluminium and like alloys | 2% (= 20 g/litre) | 10 mins. Do not use in presence of aluminium |

| | | |
|---|---|---|
| 3b. Sodium carbonate anhydrous (washing soda) (Na2CO3. 10 H20) | 4% (=40 g/litre) from powder 100 g/l from crystals | 10 mins. Recommended for use in presence of organic materials as above. 30 mins |
| 4. Acids | | |
| 4a. Hydrochloric | 2% (20 ml/litre) | Corrosive, use only when better not available. |
| 4b. Citric | 0.2% (2 g/l) | 30 mins, safe for clothes and body decontamination |
| 5c. Formaldehyde gas | Special generation required | 15-24 hrs. Toxic, only if others cannot be used. |

**Back**

## What can farmers do to protect their birds ? - Biosecurity practice

Biosecurity is a concept for prevention of disease entry/escape that must be practiced by all farmers, cooperatives, abattoirs etc. Lack of biosecurity measures increases the risk for disease or infection entry to the production unit, market, or any commercial operation.

### Prevent contamination via people

One of the most common breaks in biosecurity for many transboundary animal diseases, including Avian Influenza, is the entry of people bringing in contaminated materials (clothes, shoes, soiled hands) to where susceptible animals are housed.

Solution:

- Do not allow strangers access to where the animals are housed;

- Provide protective clothes to those that visit the flock, including boots;

- Provide baths with disinfectant for boots (use a pre-disinfectant bath to wash off the organic mater before entering disinfectant);

- Ideally, all farm workers and wanted visitors should take a full shower and use clothes from the farm before entering areas where poultry are kept; Clothes used on the farm, should not leave the farm.

- Producers who use outside workers for assistance on their farms, should ensure that these workers do not have poultry of their own;

- Animal health officials visiting affected premises should be extremely conscientious that they, through their work in epidemiological investigations or vaccination initiatives, could actually be infection and disease spreaders.

- The producers should know the origin of their feed and water. The quality of these should be periodically checked.

**Prevent contamination via materials**

Another method of disease entry into a flock is through the introduction of contaminated equipment or instruments such as lorries/trucks, egg trays, cages, or feeders. The reuse of equipment (i.e. egg trays) or the purchase of used equipment (i.e. feeders) represents high risk activities.

Solution:

- Clean and disinfect equipment and instrumentation to be used. If it is a cooperative group that brings in specific equipment on a regular basis (i.e. egg trays), insist that these be disinfected prior to introduction.

- Porous materials, such as wood and fibre, are more difficult to disinfect than synthetic materials.

**Prevent contamination via animals**

However, the most common method for disease introduction is when animals that are incubating or are diseased are brought onto a premise and mixed with susceptible animals.

Solution:

- Ensure the animals to be introduced to the farm/flock are healthy. If possible, a health certification should be obtained.

- Vaccinate only healthy animals.

- Establish a quarantine area where the new animals are not housed with the poultry already on the farm. These housing areas should be separated from each other as much as possible. Use separate workers to handle the different animals. If this is not possible, handle or feed the new animals last.

- Establish mechanisms to separate wildlife from poultry production farms (i.e. use of enclosures and nets). Establish mechanisms to exclude access of cats, dogs, rats and other vermin to where the poultry are raised or where there are laying hens.

**All-in-all-out ?**

The concept of "all-in-all-out" among biosecurity deserves special attention as it offers an additional safety mechanism. It basically refers to the exclusion of all introduction of new animals, and equipment or feed, once production has started thereby diminishing health risks to the growing broilers. Once the age for marketing the chickens is reached, all animals are removed and sent to the market or abattoir, thereby allowing the workers to clean, aerate, removal of old feed, and disinfect premises prior to the entry of new and highly susceptible chicks. This cycle is continuous and provides ease to systematically provide the necessary points for veterinary care, feed delivery, transportation entry, employee inputs, etc. If, and when, a disease was to enter the flock, the process of removal, cleaning, and disinfection is already established and can be quickly implemented with little down time faced by the farmer.

**A safe home**

Allowing poultry to have free access to their environment (roads, stagnant waters, plastic, cats and dogs) is perhaps the most difficult aspect to overcome when attempting to control disease and apply some level of biosecurity. In these cases, biosecurity should commence with making loose chickens truly backyard chickens (not "front-yard" or "under-house" chickens), in a place that they can be observed and properly cared for. Being in a known and comfortable enclosure is also likely to reduce their stress (competition with vehicular traffic and potential predators) and therefore gain weight, lay more eggs, and have less risk for contact with diseased animals.

Conceptually, biosecurity is most successful when a group of neighbours, commercial operators, or villagers practice it.

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Comments: AGA-Webmaster

# FAO/OIE/WHO Technical Consultation on the Control of Avian Influenza

## 3 - 4 February 2004

## Conclusions and recommendations

**4/2/04**

**Current situation**

1. The current epidemic is considered to be evolving, and it is anticipated to continue to expand both in geographical distribution and incidence.
2. Adequate epidemiological assessment is urgently required
3. The epidemic(s) are not considered to be under control, and therefore require a concerted emergency response.
4. Without the implementation of appropriate methods of disease control, the risk of epidemic spread to further countries including those in distant regions is likely to remain high, and that disease may persist as a result of infection becoming endemic in the domestic poultry population.
5. There will be a continuing threat to human health as long as the infection is present in the poultry production systems in Asia.

***Origins of the epidemic***

6. The sources of infection for each country are not yet clear, but the working hypotheses that require investigation include entry of infection from wild or domestic bird reservoirs, and spread as a consequence of failure of surveillance, early warning, and control of movement of infection between domestic poultry
7. The lack of timely reporting of infection to the national competent authorities, OIE and other international bodies has contributed to the scale of the problem.

**Control and Eradication Strategies**

1. Disease awareness, early detection and notification, are pre-requisites of effective control programs aimed at eradication of the infection in poultry. Biosecurity is an essential part of the control of avian influenza and must be given due importance in planning of control measures . Cooperation with the national stakeholders in poultry production will be important, as will efficient implementation and effective monitoring through the veterinary services
2. Stamping out is the preferred control option for an outbreak of HPAI and should be used on all flocks exhibiting clinical disease. It has been highly effective in controlling confined outbreaks of HPAI where there is limited spread and low risk of re-introduction. The issue of adequate and timely compensation must be addressed in planning programs involving stamping-out. There is no justification to recommend the systematic elimination of wildlife or swine for the management of HPAI outbreaks.
3. Recognising that it may not be either desirable or feasible to proceed with massive culling in some situations, vaccination is considered a suitable option. The rationale behind this is that vaccination reduces susceptibility to infection and shedding (both in duration and in titre) and is therefore an appropriate tool to reduce the incidence of new cases and viral load in the environment, and thus is expected to contribute to other measures to reduce the potential for spread to humans.
4. The use of vaccination must be seen as a tool to maximise biosecurity, be coupled to surveillance to promptly detect any change in virus properties (antigenic change), and must be carried out with appropriate products manufactured and quality controlled to ensure compliance with international standards as referred in the *OIE Manual of Standards* .
5. Vaccination can be used either as a tool to support eradication or as a tool to control the disease and reduce the viral load in the environment. Controlling the disease through vaccination may be a prelude to eradication. The appropriate management of a vaccination campaign under the control of the veterinary administration is compatible with international trade, if it is in compliance with the OIE *Terrestrial Animal Health Code*. Stamping-out and

vaccination are not mutually exclusive, and the mix or sequence of measures may differ between production systems and stages of a control program. Vaccination should be used in a strategic manner, with careful consideration to choice of target groups and areas based on the outcome decided by the national authorities.

6. The requirements for implementing emergency vaccination and the subsequent monitoring of impact should be quickly established and feasibility assessed. Vaccine manufacturers have the capability to respond to the emergency once an estimation of the requirements is available.
7. The "Differentiation of infected from vaccinated animals" (DIVA) approach is recommended either through an appropriate diagnostic test and/or with the use of sentinel birds. Only inactivated heterologous or homologous vaccines are the candidates for emergency use.

**Human Health issues including Food Safety**

1. Awareness needs to be raised of the need for immediate application of precautions to prevent human infection for persons working with poultry in infected areas.
2. Availability, training, and proper use of PPE should be ensured for the protection of persons working in suspect and infected premises, and involved in mass slaughter of animals, and the health of exposed persons should be monitored, in line with the WHO recommendations
3. Poultry from infected flocks should be disposed of by environmentally sound methods and should not be processed for animal and human food consumption
4. Processed poultry products and eggs in or arriving from areas currently experiencing outbreaks of H5N1 in poultry do not pose a risk to public health. Good hygienic practises during handling, including hand washing, prevention of cross contamination & thorough cooking of poultry products are emphasised as a general precautionary measure.
5. All countries affected by H5 infection should on a timely basis provide adequate numbers of representative isolates from animals to the OIE/FAO Reference Laboratories and from animals and humans to the WHO influenza surveillance system.
6. Poultry cullers should be have received influenza vaccination to reduce risk of dual infection and reassortment.

**Rehabilitation, re-stocking and reorganisation of the sector**

1. Templates for country control measures that will assist recovery of markets should be created through a joint organizational process,
2. For restoration of export opportunities the credibility of the veterinary administration and of veterinary services is a prerequisite.
3. Zoning and the compartmentalisation concept may assist recovery of marketing opportunities
4. Restocking of farms will require protection measures for poultry, and appropriate surveillance
5. Restructuring of the production sector may be necessary.

**The meeting recommends that:**

1. Animal and human health and rural livelihoods be taken into consideration when developing control and restructuring programmes
2. Public education and veterinary training, and national and regional capacity building be an important part of the development of long term surveillance and control of HPAI and other priority diseases
3. Control programs be immediately intensified and monitored
4. Each country establish a co-ordination centre such as a national avian influenza task force, to which medical and veterinary authorities report and discuss surveillance and control information
5. Measures including stamping-out, elevated biosecurity, vaccination and monitoring are important tools in control and eradication of infection in poultry
6. Improvement of surveillance and transparent and timely reporting of infection by the Veterinary Administration be required at national, regional and international levels
7. Extensive international coordination should be established for short and long term control of influenza viruses of human and animal health significance.
8. Donor support be urgently requested for control programmes that include relevant technical and institutional capacity building.

9. A Regional Emergency Meeting in the Asian Region be convened to support uptake and implementation of the recommendations, with FAO taking a lead role in co-ordination of field programmes, and in co-operation with OIE and WHO.
10. Collaborative research efforts, with interdisciplinary, international partnerships be supported to address the gaps in knowledge and tools required in the control of human and animal infection with avian influenza viruses, particularly in the area of vaccines, diagnostic tests, and epidemiology, particularly the role of domestic and wild animal hosts.

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*Updated: 26.07.05*



CHAPTER 2.7.12.

**AVIAN INFLUENZA**

Article 2.7.12.1.

1. For the purposes of this *Terrestrial Code*, avian influenza in its notifiable form (NAI) is defined as an infection of poultry caused by any influenza A virus of the H5 or H7 subtypes or by any AI virus with an intravenous pathogenicity index (IVPI) greater than 1.2 (or as an alternative at least 75% mortality) as described below. NAI viruses can be divided into highly pathogenic notifiable avian influenza (HPNAI) and low pathogenicity notifiable avian influenza (LPNAI):

    a. HPNAI viruses have an IVPI in 6-week-old chickens greater than 1.2 or, as an alternative, cause at least 75% mortality in 4-to 8-week-old chickens infected intravenously. H5 and H7 viruses which do not have an IVPI of greater than 1.2 or cause less than 75% mortality in an intravenous lethality test should be

sequenced to determine whether multiple basic amino acids are present at the cleavage site of the haemagglutinin molecule (HA0); if the amino acid motif is similar to that observed for other HPNAI isolates, the isolate being tested should be considered as HPNAI;

b. LPNAI are all influenza A viruses of H5 and H7 subtype that are not HPNAI viruses.

2. Poultry is defined as ‘all birds reared or kept in captivity for the production of meat or eggs for consumption, for the production of other commercial products, for restocking supplies of game, or for breeding these categories of birds’.
3. For the purposes of *international trade*, this Chapter deals not only with the occurrence of clinical signs caused by NAI virus, but also with the presence of infection with NAI virus in the absence of clinical signs.
4. The following defines the occurrence of infection with NAI virus:

    a. HPNAI virus has been isolated and identified as such or viral RNA specific for HPNAI has been detected in poultry or a product derived from poultry; or
    b. LPNAI virus has been isolated and identified as such or viral RNA specific for LPNAI has been detected in poultry or a product derived from poultry; or
    c. antibodies to H5 or H7 subtype of NAI virus that are not a consequence of vaccination have been detected in poultry. In the case of isolated serological positive results, NAI infection may be ruled out on the basis of a thorough epidemiological investigation that does not demonstrate further evidence of NAI infection.

For the purposes of the *Terrestrial Code*, ‘NAI free establishment’ means an *establishment* in which the poultry have shown no evidence of NAI infection, based on surveillance in accordance with Appendix 3.8.9.

For the purposes of the *Terrestrial Code*, the *incubation period* for NAI shall be 21 days.

Standards for diagnostic tests, including pathogenicity testing, are described in the *Terrestrial Manual*. Any vaccine used should comply with the standards described in the *Terrestrial Manual*.

Article 2.7.12.2.

The NAI status of a country, a *zone* or a *compartment* can be determined on the basis of the following criteria:

1. the outcome of a *risk assessment* identifying all potential factors for NAI occurrence and their historic perspective;
2. NAI is notifiable in the whole country, an on-going NAI awareness programme is in place, and all notified suspect occurrences of NAI are subjected to field and, where applicable, laboratory investigations;
3. appropriate surveillance is in place to demonstrate the presence of infection in the absence of clinical signs in poultry, and the risk posed by birds other than poultry; this may be achieved through an NAI surveillance programme in accordance with Appendix 3.8.9.

Article 2.7.12.3.

**NAI free country, zone or compartment**

A country, *zone* or *compartment* may be considered free from NAI when it has been shown that neither HPNAI nor LPNAI infection has been present in the country, *zone* or *compartment* for the past 12 months, based on surveillance in accordance with Appendix 3.8.9. The surveillance may need to be adapted to parts of the country or existing *zones* or *compartments* depending on historical or geographical factors, industry structure, population data, or proximity to recent *outbreaks*.

If infection has occurred in a previously free country,

*zone* or *compartment*, free status can be regained:

1. In the case of HPNAI infections, 3 months after a *stamping-out policy* (including *disinfection* of all affected *establishments*) is applied, providing that surveillance in accordance with Appendix 3.8.9. has been carried out during that three-month period.

2. In the case of LPNAI infections, poultry may be kept for slaughter for human consumption subject to specified conditions or a *stamping-out policy* applied; in either case, 3 months after the *disinfection* of all affected *establishments*, providing that surveillance in accordance with Appendix 3.8.9. has been carried out during that three-month period.

Article 2.7.12.4.

**HPNAI free country, zone or compartment**

A country, *zone* or *compartment* may be considered free from HPNAI when it has been shown that HPNAI infection has not been present in the country, *zone* or *compartment* for the past 12 months, although its LPNAI status may be unknown, when, based on surveillance in accordance with Appendix 3.8.9., it does not meet the criteria for freedom from NAI but any NAI virus detected has not been identified as HPNAI virus. The surveillance may need to be adapted to parts of the country or *zones* or *compartments* depending on historical or geographical factors, industry structure, population data, or proximity to recent *outbreaks*.

If infection has occurred in a previously free country, *zone* or *compartment*, free status can be regained 3 months after a *stamping-out policy* (including *disinfection* of all affected *establishments*) is applied, providing that surveillance in accordance with Appendix 3.8.9. has been carried out during that three-month period.

Article 2.7.12.5.

When importing from an NAI free country, *zone* or *compartment*, *Veterinary Administrations* should require:

for live poultry (other than day-old poultry)

the presentation of an *international veterinary certificate* attesting that:

1. the poultry showed no clinical sign of NAI on the day of shipment;
2. the poultry were kept in an NAI free country, *zone* or *compartment* since they were hatched or for the past 21 days;
3. the required surveillance has been carried out on the *establishment* within the past 21 days.

Information concerning the vaccination status of the poultry (including the dates of vaccination and the vaccine used) should be included in the veterinary certificate.

Article 2.7.12.6.

Regardless of the NAI status of the country, *zone* or *compartment* of origin, *Veterinary Administrations* should require:

for live birds other than poultry

the presentation of an *international veterinary certificate* attesting that the birds:

1. showed no clinical sign of infection with a virus which would be considered NAI in poultry on the day of shipment;
2. were kept in isolation approved by the *Veterinary Services* since they were hatched or for the 21 days prior to shipment and showed no clinical sign of infection with a virus which would be considered NAI in poultry during the isolation period;

3. were subjected to a diagnostic test 7 to 14 days prior to shipment to demonstrate freedom from infection with a virus which would be considered NAI in poultry;
4. are transported in new containers.

Article 2.7.12.7.

When importing from an NAI free country, *zone* or *compartment*, *Veterinary Administrations* should require:

for day-old live poultry

the presentation of an *international veterinary certificate* attesting that the poultry:

1. were kept in an NAI free country, *zone* or *compartment* since they were hatched;
2. were derived from parent flocks which had been kept in an NAI free country, *zone* or *compartment* for 21 days prior to and at the time of the collection of the eggs.

Information concerning the vaccination status of the poultry and the parent flocks (including the dates of vaccination and the vaccine used) should be included in the veterinary certificate.

Article 2.7.12.8.

When importing from an HPNAI free country, *zone* or *compartment*, *Veterinary Administrations* should require:

for day-old live poultry

the presentation of an *international veterinary certificate* attesting that the poultry:

1. were kept in an HPNAI free country, *zone* or *compartment* since they were hatched;
2. were derived from parent flocks which had

been kept in an NAI free *establishment* for 21 days prior to and at the time of the collection of the eggs;
3. are transported in new containers.

Information concerning the vaccination status of the poultry and the parent flocks (including the dates of vaccination and the vaccine used) should be included in the veterinary certificate.

Article 2.7.12.9.

When importing from an NAI free country, *zone* or *compartment*, *Veterinary Administrations* should require:

for *hatching eggs*

the presentation of an *international veterinary certificate* attesting that the eggs:

1. came from an NAI free country, *zone* or *compartment*;
2. were derived from parent flocks which had been kept in an NAI free country, *zone* or *compartment* for 21 days prior to and at the time of the collection of the eggs.

Information concerning the vaccination status of the parent flocks (including the dates of vaccination and the vaccine used) should be included in the veterinary certificate.

Article 2.7.12.10.

When importing from an HPNAI free country, *zone* or *compartment*, *Veterinary Administrations* should require:

for *hatching eggs*

the presentation of an *international veterinary certificate* attesting that the eggs:

1. came from an HPNAI free country, *zone* or *compartment*;
2. were derived from parent flocks which had been kept in an NAI free *establishment* for 21 days prior to and at the time of the collection of the eggs;
3. are transported in new packing material.

Information concerning the vaccination status of the parent flocks (including the dates of vaccination and the vaccine used) should be included in the veterinary certificate.

Article 2.7.12.11.

When importing from an NAI free country, *zone* or *compartment*, *Veterinary Administrations* should require:

for eggs for human consumption

the presentation of an *international veterinary certificate* attesting that the eggs come from an NAI free country, *zone* or *compartment*.

Article 2.7.12.12.

When importing from an HPNAI free country, *zone* or *compartment*, *Veterinary Administrations* should require:

for eggs for human consumption

the presentation of an *international veterinary certificate* attesting that the eggs:

1. come from a HPNAI free country, *zone* or *compartment*;
2. come from *establishments* in which there has been no evidence of NAI in the past 21 days;
3. are transported in new packing material.

Article 2.7.12.13.

When importing from an NAI free country, *zone* or *compartment*, *Veterinary Administrations* should require:

for egg products

the presentation of an *international veterinary certificate* attesting that the egg products come from, and were processed in, an NAI free country, *zone* or *compartment*.

Article 2.7.12.14.

Regardless of the NAI status of the country, *zone* or *compartment* of origin, *Veterinary Administrations* should require:

for egg products

the presentation of an *international veterinary certificate* attesting that the egg products:

1. are derived from eggs which meet the requirements of Articles 2.7.12.9., 2.7.12.10., 2.7.12.11. or 2.7.12.12.; or
2. were processed to ensure the destruction of NAI virus (under study), and the necessary precautions were taken after processing to avoid contact of the *commodity* with any source of NAI virus.

Article 2.7.12.15.

When importing from an NAI free country, *zone* or *compartment*, *Veterinary Administrations* should require:

for poultry semen

the presentation of an *international veterinary certificate* attesting that the donor poultry:

1. showed no clinical sign of NAI on the day of semen collection;
2. were kept in an NAI free country, *zone* or *compartment* for the 21 days prior to and at the time of semen collection.

Article 2.7.12.16.

When importing from an HPNAI free country, *zone* or *compartment*, *Veterinary Administrations* should require:

for poultry semen

the presentation of an *international veterinary certificate* attesting that the donor poultry:

1. came from an HPNAI free country, *zone* or *compartment*;
2. were kept in an NAI free *establishment* for 21 days prior to and at the time of semen collection.

Information concerning the vaccination status of the donor flocks (including the dates of vaccination and the vaccine used) should be included in the veterinary certificate.

Article 2.7.12.17.

Regardless of the NAI status of the country, *zone* or *compartment* of origin, *Veterinary Administrations* should require:

for semen of birds other than poultry

the presentation of an *international veterinary certificate* attesting that the donor birds:

1. were kept in isolation approved by the *Veterinary Services* for the 21 days prior to semen collection;
2. showed no clinical sign of infection with a virus which would be considered NAI in poultry

during the isolation period;
3. were tested between 7 and 14 days prior to semen collection and shown to be free of NAI infection.

Article 2.7.12.18.

When importing from an NAI free country, *zone* or *compartment*, *Veterinary Administrations* should require:

for *fresh meat* of poultry

the presentation of an *international veterinary certificate* attesting that the entire consignment of *fresh meat* comes from birds:

1. which have been kept in an NAI free country, *zone* or *compartment* since they were hatched or for the past 21 days;
2. which have been slaughtered in an *approved abattoir* and have been subjected to ante-mortem and post-mortem inspections for NAI with favourable results.

Article 2.7.12.19.

When importing from an HPNAI free country, *zone* or *compartment*, *Veterinary Administrations* should require:

for *fresh meat* of poultry

the presentation of an *international veterinary certificate* attesting that the entire consignment of *fresh meat* comes from birds:

1. which have been kept in an *establishment* since they were hatched or for the past 21 days and in which there has been no evidence of NAI in the past 21 days;
2. which have been slaughtered in an *approved abattoir* and have been subjected to ante-

mortem and post-mortem inspections for NAI with favourable results.

Article 2.7.12.20.

Regardless of the NAI status of the country, *zone* or *compartment* of origin, *Veterinary Administrations* should require:

for *meat products* of poultry

the presentation of an *international veterinary certificate* attesting that:

1. the *commodity* is derived from *fresh meat* which meet the requirements of Articles 2.7.12.18. or 2.7.12.19.; or
2. the *commodity* has been processed to ensure the destruction of NAI virus (under study);
3. the necessary precautions were taken to avoid contact of the *commodity* with any source of NAI virus.

Article 2.7.12.21.

Regardless of the NAI status of the country, *zone* or *compartment* of origin, *Veterinary Administrations* should require:

for products of poultry origin intended for use in animal feeding, or for agricultural or industrial use

the presentation of an *international veterinary certificate* attesting that:

1. these *commodities* come from birds which have been kept in an NAI free country, *zone* or *compartment* since they were hatched or for the past 21 days; or
2. these *commodities* have been processed to ensure the destruction of NAI virus (under study);
3. the necessary precautions were taken to avoid

contact of the *commodity* with any source of NAI virus.

Article 2.7.12.22.

Regardless of the NAI status of the country, *zone* or *compartment* of origin, *Veterinary Administrations* should require:

for feathers and down (from poultry)

the presentation of an *international veterinary certificate* attesting that:

1. these *commodities* come from birds which have been kept in an NAI free country, *zone* or *compartment* since they were hatched or for the past 21 days; or
2. these *commodities* have been processed to ensure the destruction of NAI virus (under study);
3. the necessary precautions were taken to avoid contact of the *commodity* with any source of NAI virus.

Article 2.7.12.23.

Regardless of the NAI status of the country, *zone* or *compartment*, *Veterinary Administrations* should require for the importation of:

*meat* or other products from birds other than poultry

the presentation of an *international veterinary certificate* attesting that:

1. the *commodity* has been processed to ensure the destruction of NAI virus (under study);
2. the necessary precautions were taken after processing to avoid contact of the *commodity* with any source of NAI virus.

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APPENDIX 3.8.9.

**GUIDELINES FOR THE SURVEILLANCE OF AVIAN INFLUENZA**

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Article 3.8.9.1.

**Introduction**

This Appendix defines the principles and provides a guide for the surveillance of notifiable avian influenza (NAI) in accordance with Appendix 3.8.1., applicable to countries seeking recognition for a declared NAI status, with or without the use of vaccination. This may be for the entire country, *zone* or *compartment*. Guidance for countries seeking free status following an *outbreak* and for the maintenance of NAI status are provided. This Appendix complements Chapter 2.7.12.

The presence of avian influenza viruses in wild birds creates a particular problem. In essence, no country can declare itself free from avian influenza (AI) in wild birds. However, the definition of NAI in Chapter 2.7.12. refers to the infection in poultry only and this Appendix was developed under this definition.

The impact and epidemiology of NAI differ widely in different regions of the world and therefore it is impossible to provide specific guidelines for all situations. It is axiomatic that the surveillance strategies employed for demonstrating freedom from NAI at an acceptable level of confidence will need to be adapted to the local situation. Variables such as the frequency of contacts of poultry with wild birds, different biosecurity levels and production systems and the commingling of different susceptible species including domestic waterfowl require specific surveillance strategies to address each specific situation. It is incumbent upon the country to provide scientific data that explains the epidemiology of NAI in the region concerned and also demonstrates how all the risk factors are managed. There is therefore considerable latitude available to Member Countries to provide a well-reasoned argument to prove that absence of NAI virus (NAIV) infection is assured at an acceptable level of confidence.

Surveillance for NAI should be in the form of a continuing programme designed to establish that the country, *zone* or *compartment*, for which application is made, is free from NAIV infection.

Article 3.8.9.2.

**General conditions and methods**

1. A surveillance system in accordance with Appendix 3.8.1. should be under the responsibility of the *Veterinary Administration*. In particular:
   a. a formal and ongoing system for detecting and investigating *outbreaks of disease* or NAI *infection* should be in place;
   b. a procedure should be in place for the rapid collection and transport of samples from suspect cases of NAI to a laboratory for NAI diagnosis as described in the *Terrestrial Manual*;
   c. a system for recording, managing and analysing diagnostic and surveillance data should be in place.
2. The NAI surveillance programme should:
   a. include an early warning system throughout the production, marketing and processing chain for reporting suspicious cases. Farmers and workers, who have day-to-day contact with poultry, as well as diagnosticians, should report promptly any suspicion of NAI to the *Veterinary Authority*. They should be supported directly or indirectly (e.g. through private veterinarians or *veterinary para-professionals*) by government information programmes and the *Veterinary Administration*. All suspected cases of NAI should be investigated immediately. Where suspicion cannot be resolved by epidemiological and clinical investigation, as is frequently the case with low pathogenicity notifiable avian influenza (LPNAI) virus infections, samples should be taken and submitted to an *approved laboratory*. This requires that sampling kits and other equipment are available for those responsible for surveillance. Personnel responsible for surveillance should be able to call for assistance from a team with expertise in NAI diagnosis and control. In cases where potential public health implications are suspected, notification to the appropriate public health authorities is essential;
   b. implement, when relevant, regular and frequent clinical inspection, serological and virological testing of high-risk groups of animals, such as those adjacent to an NAI infected country, *zone* or *compartment*, places where birds and poultry of different origins are mixed, such as live bird markets, poultry in close proximity to waterfowl or other sources of NAIV.

An effective surveillance system will periodically identify suspicious cases that require follow up and investigation to confirm or exclude that the cause of the condition is NAIV. The rate at which such suspicious cases are likely to occur will differ between epidemiological situations and cannot therefore be predicted reliably. Applications for freedom from NAIV infection should, in consequence, provide details of the occurrence of suspicious cases and how they were investigated and dealt with. This should include the results of laboratory testing and the control measures to which the animals concerned were subjected during the investigation (quarantine, movement stand-still orders, etc.).

Article 3.8.9.3.

**Surveillance strategies**

1. Introduction

The target population for surveillance aimed at identification of *disease* and *infection* should cover all the susceptible poultry species within the country, *zone* or *compartment*. Active and passive surveillance for NAI should be ongoing. The frequency of active surveillance should be at least every 6 months. Surveillance should be composed of random and targeted approaches using virological, serological and clinical methods.

The strategy employed may be based on randomised sampling requiring surveillance consistent with demonstrating the absence of NAIV infection at an acceptable level of confidence. The frequency of sampling should be dependent on the epidemiological situation. Random surveillance is conducted using serological tests described in the *Terrestrial Manual*. Positive serological results should be followed up with virological methods.

Targeted surveillance (e.g. based on the increased likelihood of *infection* in particular localities or species) may be an appropriate strategy. Virological and serological methods should be used concurrently to define the NAI status of high risk populations.

A country should justify the surveillance strategy chosen as adequate to detect the presence of NAIV infection in accordance with Appendix 3.8.1. and the prevailing epidemiological situation. It may, for example, be appropriate to target clinical surveillance at particular species likely to exhibit clear clinical signs (e.g. chickens). Similarly, virological and serological testing could be targeted to species that may not show clinical signs (e.g. ducks).

If a Member Country wishes to declare freedom from NAIV infection in a specific *zone* or *compartment*, the design of the survey and the basis for the sampling process would need to be aimed at the population within the *zone* or *compartment*.

For random surveys, the design of the sampling strategy will need to incorporate epidemiologically appropriate design prevalence. The sample size selected for testing will need to be large enough to detect *infection* if it were to occur at a predetermined minimum rate. The sample size and expected disease prevalence determine the level of confidence in the results of the survey. The applicant country must justify the choice of design prevalence and confidence level based on the objectives of surveillance and the epidemiological situation, in accordance with Appendix 3.8.1. Selection of the design prevalence in particular clearly needs to be based on the prevailing or historical epidemiological situation.

Irrespective of the survey approach selected, the sensitivity and specificity of the diagnostic tests employed are key factors in the design, sample size determination and interpretation of the results obtained. Ideally, the sensitivity and specificity of the tests used should be validated for the vaccination/infection history and the different species in the target population.

Irrespective of the testing system employed, surveillance system design should anticipate the occurrence of false positive reactions. If the characteristics of the testing system are known, the rate at which these false positives are likely to occur can be calculated in advance. There needs to be an effective procedure for following up positives to ultimately determine with a high level of confidence, whether they are indicative of infection or not. This should involve both supplementary tests and follow-up investigation to collect diagnostic material from the original sampling unit as well as flocks which may be epidemiologically linked to it.

The principles involved in surveillance for *disease*/*infection* are technically well defined. The design of surveillance programmes to prove the absence of NAIV infection/circulation needs to be carefully followed to avoid producing results that are either insufficiently reliable to be accepted by the OIE or international trading partners, or excessively costly and logistically complicated. The design of any surveillance programme, therefore, requires inputs from professionals competent and experienced in this field.

2. Clinical surveillance

Clinical surveillance aims at the detection of clinical signs of NAI at the flock level. Whereas significant emphasis is placed on the diagnostic value of mass serological screening, surveillance based on clinical inspection should not be underrated. Monitoring of production parameters, such as increased mortality, reduced feed and water consumption, presence of clinical signs of a respiratory disease or a drop in egg production, is important for the early detection of NAIV infection. In some cases, the only indication of LPNAIV infection may be a drop in feed consumption or egg production.

Clinical surveillance and laboratory testing should always be applied in series to clarify the status of NAI suspects detected by either of these complementary diagnostic approaches. Laboratory testing may confirm clinical suspicion, while clinical surveillance may contribute to confirmation of positive serology. Any sampling unit within which suspicious animals are detected should be classified as infected until evidence to the contrary is produced.

Identification of suspect flocks is vital to the identification of sources of NAIV and to enable the molecular, antigenic and other biological characteristics of the virus to be determined. It is essential that NAIV isolates are sent regularly to the regional Reference Laboratory for genetic and antigenic characterization.

3. Virological surveillance

Virological surveillance using tests described in the *Terrestrial Manual* should be conducted:

a. to monitor at risk populations;
b. to confirm clinically suspect cases;
c. to follow up positive serological results;
d. to test ‘normal’ daily mortality, to ensure early detection of infection in the face of vaccination or in *establishments* epidemiologically linked to an *outbreak*.

4. Serological surveillance

Serological surveillance aims at the detection of antibodies against NAIV. Positive NAIV antibody test results can have four possible causes:

a. natural infection with NAIV;

b. vaccination against NAI;
c. maternal antibodies derived from a vaccinated or infected parent flock are usually found in the yolk and can persist in progeny for up to 4 weeks;
d. positive results due to the lack of specificity of the test.

It may be possible to use serum collected for other survey purposes for NAI surveillance. However, the principles of survey design described in these guidelines and the requirement for a statistically valid survey for the presence of NAIV should not be compromised.

The discovery of clusters of seropositive flocks may reflect any of a series of events, including but not limited to the demographics of the population sampled, vaccinal exposure or infection. As clustering may signal infection, the investigation of all instances must be incorporated in the survey design. Clustering of positive flocks is always epidemiologically significant and therefore should be investigated.

If vaccination cannot be excluded as the cause of positive serological reactions, diagnostic methods to differentiate antibodies due to infection or vaccination should be employed.

The results of random or targeted serological surveys are important in providing reliable evidence that no NAIV infection is present in a country, *zone* or *compartment*. It is therefore essential that the survey be thoroughly documented.

5. Virological and serological surveillance in vaccinated populations

The surveillance strategy is dependent on the type of vaccine used. The protection against AI is haemagglutinin subtype specific. Therefore, two broad vaccination strategies exist: 1) inactivated whole AI viruses, and 2) haemagglutinin expression-based vaccines.

In the case of vaccinated populations, the surveillance strategy should be based on virological and/or serological methods and clinical surveillance. It may be appropriate to use sentinel birds for this purpose. These birds should be unvaccinated, AI virus antibody free birds and clearly and permanently identified. The interpretation of serological results in the presence of vaccination is described in Article 3.8.9.7.

Article 3.8.9.4.

**Documentation of NAI or HPNAI free status**

1. Countries declaring freedom from NAI or HPNAI for the country, zone or compartment

In addition to the general conditions described in the *Terrestrial Code*, a Member Country declaring freedom from NAI or highly pathogenic notifiable avian influenza (HPNAI) for the entire country, or a *zone* or a *compartment* should provide evidence for the existence of an effective surveillance programme. The strategy and design of the surveillance programme will depend on the prevailing epidemiological circumstances and should be planned and implemented according to general conditions and methods described in this Appendix, to demonstrate absence of NAIV or HPNAIV infection, during the preceding 12 months in susceptible poultry populations (vaccinated and non-vaccinated). This requires the support of a laboratory able to undertake identification of NAIV or HPNAIV infection through virus detection and antibody tests described in the *Terrestrial Manual*. This surveillance may be targeted to poultry population at specific risks linked to the types of production, possible direct or indirect contact with wild birds, multi-age flocks, local trade patterns including live bird markets, use of possibly contaminated surface water, and the presence of more than one species on the holding and poor biosecurity measures in place.

2. Additional requirements for countries, zones or compartments that practise vaccination

Vaccination to prevent the transmission of HPNAI virus may be part of a disease control programme. The level of flock immunity required to prevent transmission will depend on the flock size, composition (e.g. species) and density of the susceptible poultry population. It is therefore impossible to be prescriptive. The vaccine must also comply with the provisions stipulated for NAI vaccines in the *Terrestrial Manual*. Based on the epidemiology of NAI in the country, *zone* or *compartment*, it may be that a decision is reached to vaccinate only certain species or other poultry subpopulations.

In all vaccinated flocks there is a need to perform virological and serological tests to ensure the absence of virus circulation. The use of sentinel poultry may provide further confidence of the absence of virus circulation. The tests have to be repeated at least every 6 months or at shorter intervals according to the risk in the country, *zone* or *compartment*.

Evidence to show the effectiveness of the vaccination programme should also be provided.

Article 3.8.9.5.

**Countries, zones or compartments re-declaring freedom from NAI or HPNAI following an outbreak**

In addition to the general conditions described in Chapter 2.7.12., a country re-declaring for country, *zone* or *compartment* freedom from NAI or HPNAI virus infection should show evidence of an active surveillance programme depending on the epidemiological circumstances of the *outbreak* to demonstrate the absence of the infection. This will require surveillance incorporating virus detection and antibody tests described in the *Terrestrial Manual*. The use of sentinel birds may facilitate the interpretation of surveillance results.

A Member Country declaring freedom of country, *zone* or *compartment* after an *outbreak* of NAI or HPNAI (with or without vaccination) should report the results of an active surveillance programme in which the NAI or HPNAI susceptible poultry population undergoes regular clinical examination and active surveillance planned and implemented according to the general conditions and methods described in these guidelines. The surveillance should at least give the confidence that can be given by a randomized representative sample of the populations at risk.

Article 3.8.9.6.

**NAI free establishments within HPNAI free compartments**

The declaration of NAI free *establishments* requires the demonstration of absence of NAIV infection. Birds in these *establishments* should be randomly tested using virus detection or isolation tests, and serological methods, following the general conditions of these guidelines. The frequency of testing should be based on the risk of infection and at a maximum interval of 21 days.

Article 3.8.9.7.

**The use and interpretation of serological and virus detection tests**

Poultry infected with NAI virus produce antibodies to haemagglutinin (HA), neuraminidase (NA), nonstructural proteins (NSPs), nucleoprotein/matrix (NP/M) and the polymerase complex proteins. Detection of antibodies against the polymerase complex proteins will not be covered in this Appendix. Tests for NP/M antibodies include direct and blocking ELISA, and agar gel immunodiffusion (AGID) tests. Tests for antibodies against NA include the neuraminidase inhibition (NI), indirect fluorescent antibody and direct ELISA tests. For the HA, antibodies are detected in haemagglutination inhibition (HI) and neutralization (SN) tests. The HI test is reliable in avian species but not in mammals. The SN test can be used to detect subtype specific antibodies to the haemagglutinin and is the preferred test for mammals and some avian species. The AGID test is reliable for detection of NP/M antibodies in chickens and turkeys, but not in other avian species. As an alternative, blocking ELISA tests have been developed to detect NP/M antibodies in all avian species.

The HI and NI tests can be used to subtype AI viruses into 15 haemagglutinin and 9 neuraminidase subtypes. Such information is helpful for epidemiological investigations and in categorization of AI viruses.

Poultry can be vaccinated with a variety of AI vaccines including inactivated whole AI virus vaccines, and haemagglutinin expression-based vaccines. Antibodies to the haemagglutinin confer subtype specific protection. Various strategies can be used to differentiate vaccinated from infected birds including serosurveillance in unvaccinated sentinel birds or specific serological tests in the vaccinated birds.

AI virus infection of unvaccinated birds including sentinels is detected by antibodies to the NP/M, subtype specific HA or NA proteins, or NSP. In poultry vaccinated with haemagglutinin expression-based vaccines, antibodies are detected to the specific HA, but not any of the other AI viral proteins. Infection is evident by antibodies to the NP/M or NSP, or the specific NA protein of the field virus. Poultry vaccinated with inactivated whole AI vaccines may develop low titres of antibodies to NSP, but the titre in infected birds will be markedly higher. Alternatively, usage of a vaccine strain with a different NA subtype than the field virus can allow differentiation of vaccinated from infected birds (DIVA) by detection of subtype specific NA antibodies of the field virus. Vaccines used should comply with the standards of the *Terrestrial Manual*.

All flocks with seropositive results should be investigated. Epidemiological and supplementary laboratory investigation results should document the status of NAI infection/circulation for each positive flock.

A confirmatory test should have a higher specificity than the screening test and sensitivity at least equivalent than that of the screening test.

Information should be provided on the performance characteristics and validation of tests used.

1. The follow up procedure in case of positive test results if vaccination is used

   In case of vaccinated populations, one has to exclude the likelihood that positive test results are indicative of virus circulation. To this end, the following procedure should be followed in the investigation of positive serological test results derived from surveillance conducted on NAI-vaccinated poultry. The investigation should examine all evidence that might confirm or refute the hypothesis that the positive results to the serological tests employed in the initial survey were not due to virus circulation. All the epidemiological information should be substantiated and the results should be collated in the final report.

   Knowledge of the type of vaccine used is crucial in developing a serological based strategy to differentiate infected from vaccinated animals.

   a. Inactivated whole AI virus vaccines can use either homologous or heterologous neuraminidase subtypes between the vaccine and field strains. If poultry in the population have antibodies to NP/M and were vaccinated with inactivated whole AI virus vaccine, the following strategies should be applied:

      i. sentinel birds should remain NP/M antibody negative. If positive for NP/M antibodies, indicating AI virus infection, specific HI tests should be performed to identify H5 or H7 AI virus infection;
      ii. if vaccinated with inactivated whole AI virus vaccine containing homologous NA to field virus, the presence of antibodies to NSP could be indicative of infection. Sampling should be initiated to exclude the presence of NAIV by either virus isolation or detection of virus specific genomic material or proteins;
      iii. if vaccinated with inactivated whole AI virus vaccine containing heterologous NA to field virus, presence of antibodies to the field virus NA or NSP would be indicative of infection. Sampling should be initiated to exclude the presence of NAIV by either virus isolation or detection of virus specific genomic material or proteins.

   b. Haemagglutinin expression-based vaccines contain the HA protein or gene homologous to the HA of the field virus. Sentinel birds as described above can be used to detect AI infection. In vaccinated or sentinel birds, the presence of antibodies against NP/M, NSP or field virus NA is indicative of infection. Sampling should be initiated to exclude the presence of NAIV by either virus isolation or detection of virus specific genomic material or proteins.

2. The follow up procedure in case of positive test results indicative of infection for determination of infection due to HPNAI or LPNAI virus

   The detection of antibodies indicative of a NAI virus infection as indicated in point a)i) above will result in the initiation of epidemiological and virological investigations to determine if the infections are due to HPNAI or LPNAI viruses.

   Virological testing should be initiated in all antibody-positive and at risk populations. The samples should be evaluated for the presence of AI virus, by virus isolation and identification, and/or detection of influenza A specific proteins or nucleic acids (Figure 2). Virus isolation is the gold standard for detecting infection by AI virus and the method is described in the *Terrestrial Manual*. All AI virus isolates should be tested to determine HA and NA subtypes, and in vivo tested in chickens and/or sequencing of HA proteolytic cleavage site of H5 and H7 subtypes for determination of classification as HPNAI, LPNAI or LPAI (not notifiable) viruses. As an alternative, nucleic acid detection tests have been developed and validated; these tests have the sensitivity of virus isolation, but with the advantage of providing results within a few hours. Samples with detection of H5 and H7 HA subtypes by nucleic acid detection methods should either be submitted for virus isolation, identification, and in vivo testing in chickens, or sequencing of nucleic acids for determination of proteolytic cleavage site as HPNAI or LPNAI viruses. The antigen detection systems, because of low sensitivity, are best suited for screening clinical field cases for infection by Type A influenza virus looking for NP/M proteins. NP/M positive samples should be submitted for virus isolation, identification and pathogenicity determination.

Laboratory results should be examined in the context of the epidemiological situation. Corollary information needed to complement the serological survey and assess the possibility of viral circulation includes but is not limited to:

a. characterization of the existing production systems;
b. results of clinical surveillance of the suspects and their cohorts;
c. quantification of vaccinations performed on the affected sites;
d. sanitary protocol and history of the affected *establishments*;
e. control of animal identification and movements;
f. other parameters of regional significance in historic NAIV transmission.

The entire investigative process should be documented as standard operating procedure within the epidemiological surveillance programme.

*Fig. 1.* ***Schematic representation of laboratory tests for determining evidence of NAI infection through or following serological surveys***

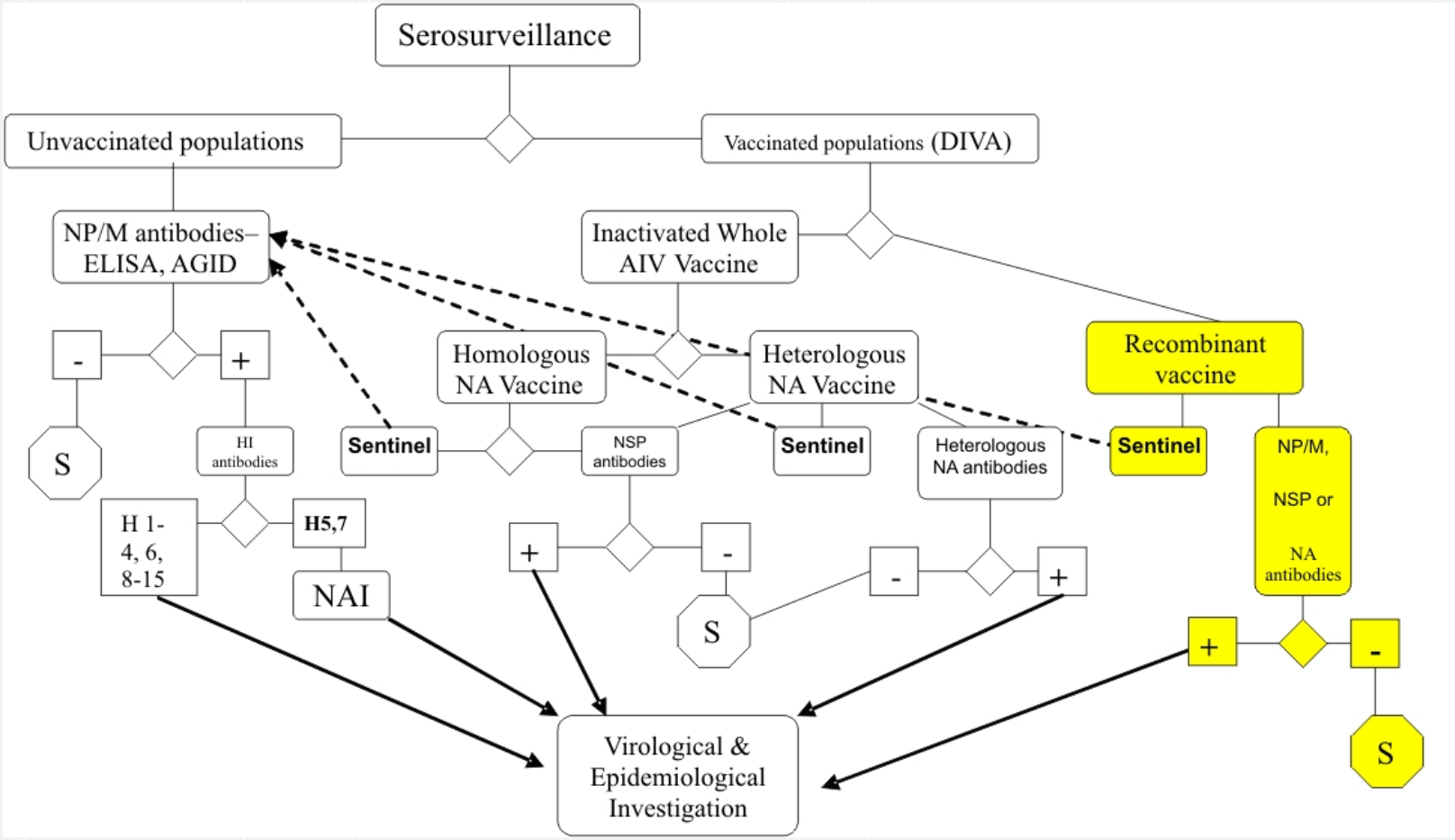
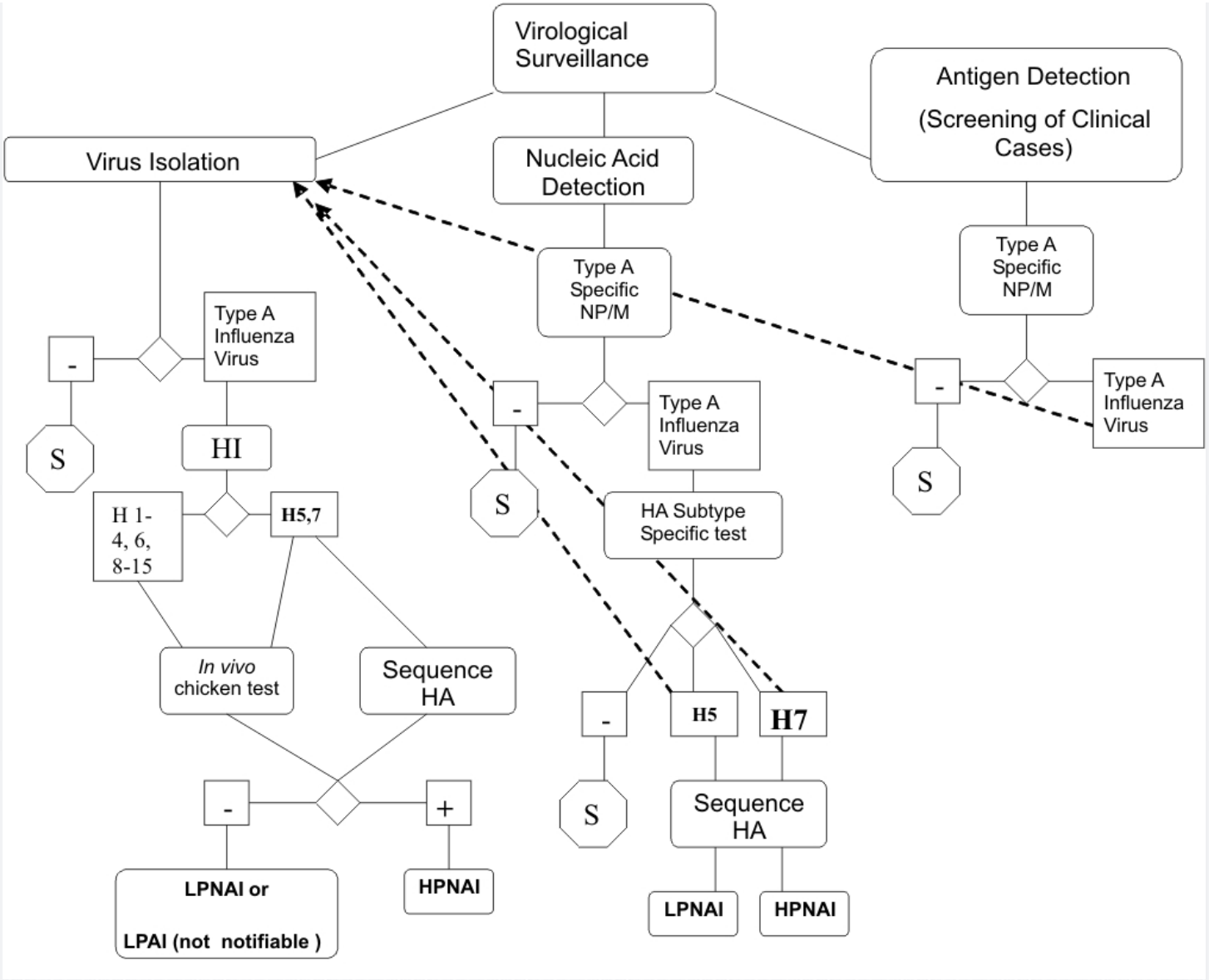



*Fig. 2.* ***Schematic representation of laboratory tests for determining evidence of NAI infection using virological methods***




The above diagram indicates the tests which are recommended for use in the investigation of poultry flocks.

| Key: | |
|---|---|
| AGID | Agar gel immunodiffusion |
| DIVA | Differentiating infected from vaccinated animals |
| ELISA | Enzyme-linked immunosorbant assay |
| HA | Haemagglutinin |
| HI | Haemagglutination inhibition |
| NA | Neuraminidase |

| | |
|---|---|
| NP/M | Nucleoprotein and matrix protein |
| NSP | Nonstructural protein |
| S | No evidence of NAIV |

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Organisation Mondiale de la Santé Animale
World Organisation for Animal Health
Organización Mundial de Sanidad Animal

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# DRAFT REPORT OF THE MEETING OF THE OIE AD HOC GROUP ON AVIAN INFLUENZA

***Paris, 12-14 November 2003***

The OIE *ad hoc* Group on avian influenza met at the OIE Headquarters from 12 to 14 November 2003.

The members of the OIE *ad hoc* Group and other participants are listed in Appendix I. The Agenda adopted is given in Appendix II.

On behalf of the Director General of the OIE, Dr D. Wilson welcomed the experts and thanked them for their willingness to address the requests from Member Countries to work further on revising the chapter of the OIE *Terrestrial Animal Health Code* (hereafter referred to as the "*Terrestrial Code*") on avian influenza (AI).

An updated document outlining the latest information on avian influenza, drawn up by several members of the *ad hoc* Group, is at Appendix III.

Based on the epidemiology of the disease, avian commodities usually traded and the comments received from Member Countries, the *ad hoc* Group revised the proposals made at its previous meeting (Appendix IV).

The *ad hoc* Group discussed the definition of AI and the consequent reporting obligations of Member Countries, and revised the definition taking into account the essential link with the concept of compartmentalisation in assessing the risks associated with trade. The *ad hoc* Group noted that a geographical approach to an outbreak of AI was still permitted but that an approach based on management was an additional option for Member Countries.

In addressing different disease control strategies, the *ad hoc* Group recognised vaccination as a useful tool to support eradication and set guidelines for trade in commodities from vaccinated poultry.

The *ad hoc* Group revised the commodity articles, taking into account the biological differences between low pathogenic notifiable avian influenza (LPNAI) and highly pathogenic notifiable avian influenza (HPNAI) regarding the likelihood of transmission of virus via various commodities and the likely consequences.

The *ad hoc* Group reviewed Article 2.1.14.2, recognising the need for targeted surveillance. It considered that targeted surveillance should focus on areas of high poultry density (especially turkeys), free-range poultry and establishments lying along wild bird migration pathways. The *ad hoc* Group felt, however, that it did not have the expertise to define detailed surveillance guidelines and strongly encouraged Member Countries to propose such guidelines to the OIE for examination by appropriate experts.

Appendix XXVI (contd)

The *ad hoc* Group recognised that fresh meat and table eggs probably present a much lower likelihood of transmitting LPNAI than HPNAI viruses, but, due to incomplete scientific data, the recommendations proposed for these commodities only partly reflect this difference. The *ad hoc* Group addressed this difference through a proposed new definition for '*NAI-free establishment*' which distinguishes between the two regarding permitted distances from establishments infected with LPNAI or HPNAI.

Articles 2.1.14.5 and 2.1.14.6 were combined as the *ad hoc* Group believed that the focus in both should be on the health status of the parent flock.

Regarding destruction of the NAI virus, the *ad hoc* Group recognised that parameters for destruction were dependent on virus strain, virus concentration and commodity characteristics, and noted that sufficient up-to-date scientific data were unavailable for most virus strains and the majority of commodities.

The *ad hoc* Group considered that recent developments in knowledge of the virus necessitated the text in the *Terrestrial Manual* on virus detection / isolation being reviewed.

Measures for commodities for human consumption address both the likelihood of transmission to other birds and the public health aspects. Birds with previous or current infections are not permitted to be traded, nor are meat nor eggs from such birds. The *ad hoc* Group noted that only two episodes of H9N2 virus infection had been reported in humans (consisting of two and five cases), despite the widespread occurrence of this subtype in poultry, especially in Asia; as a result, it did not take that subtype into account in its recommendations.

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.../Appendices

Appendix XXVI (contd)

Appendix I

# MEETING OF THE OIE *AD HOC* GROUP ON AVIAN INFLUENZA

***Paris, 12-14 November 2003***

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Appendix II

## MEETING OF THE OIE *AD HOC* GROUP ON AVIAN INFLUENZA

***Paris, 12-14 November 2003***

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**Agenda adopted**

1) Update on scientific and epidemiological information on avian influenza

2) Examination of comments from OIE Member Countries

3) Examination of revisions proposed by the Bureau of the OIE Terrestrial Animal Health Standards Commission

4) Other issues

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Appendix XXVI (contd)

Appendix III

## AVIAN INFLUENZA – Brief Review

### Introduction

The severe form of avian influenza [AI] termed highly pathogenic [HPAI], at one time known as "fowl plague", is throughout the world one of the two most feared diseases of poultry and other birds. This is not only because of the devastation it may cause, with flock mortality of up to 100%, but also the economic impact that may ensue due to trading restrictions and embargoes placed on infected areas. Many countries, including all those in the European Union, enforce statutory control measures in the event of outbreaks of either disease [CEC 1992] and it is recognised as an OIE list A disease.

### Aetiology

Influenza viruses are segmented, negative strand RNA viruses that are placed in the family Orthomyxoviridae and are divided into three types of influenza virus, A, B and C, which now have genus status. Only influenza A viruses have been reported to cause natural infections of birds. Type A influenza viruses are further divided into subtypes based on the antigenic relationships in the surface glycoproteins haemagglutinin (HA) and neuraminidase (NA). At present 15 HA subtypes (H1-H15) and nine neuraminidase subtypes (N1-N9) have been recognised. Each virus has one H and one N antigen, apparently in any combination. Although the range of subtypes and combinations occurring naturally in mammals appears to be restricted, all subtypes and the majority of possible combinations have been isolated from avian species.

### Host Range

Although influenza viruses have been isolated from a large number of species covering 12 of the 50 Orders of birds (Stallknecht, 1998), the number, variety and widespread distribution of influenza viruses has been far greater in waterfowl, Order Anseriformes, than in other birds. In the surveys listed by Stallknecht and Shane (1988) a total of 21,318 samples from all species resulted in the isolation of 2,317 (10.9%) viruses. Of these samples 14,303 were from birds of the Order Anseriformes and yielded 2,173 (15.2%) isolates. The next highest isolation rates were 2.9% and 2.2% from the Passeriformes and Charadriiformes respectively and the overall isolation rate from all birds other than ducks and geese was 2.1%. However, in shorebirds and gulls, the predominant influenza viruses are of subtypes different to those in waterfowl. Each year waterfowl congregate in huge flocks, usually on lakes, before migratory flights are undertaken. Data from the 3-year study by Hinshaw et al,. (1980) on ducks congregating on lakes in Alberta, Canada prior to their southern migration showed that influenza virus isolation rates from juvenile ducks may exceed 60%. The perpetuation of influenza viruses in free-living waterfowl is probably related to the passage of virus from adult to juvenile birds on lakes where the birds congregated before migration. Considerable quantities of the virus are excreted with the faeces, estimated up to $10^{8.7}$ mean egg infectious doses per g of faeces from infected ducks (Webster et al., 1978). This contaminates lake or pond water, to the extent that virus may be isolated from untreated lake water where large numbers of waterfowl are found.

Phylogenetic studies (Rohm et al., 1995; Banks et al., 2000a,b) of AI viruses show that lineages and clades of isolates are more related to geographical and temporal parameters than the host from which they were isolated and there is no distinction between wild and domestic bird isolates.

HPAI viruses have been isolated rarely from free-living birds and, apart from tern/S.Africa/61, when they have been isolated it has usually been close to known outbreaks in poultry.

### Disease

Influenza A viruses infecting poultry can be divided into two distinct groups on the basis of their ability to cause disease. The very virulent viruses HPAI in which mortality may be as high as 100%. These viruses have been restricted to subtypes H5 and H7, although not all viruses of these subtypes cause HPAI. There have been 19 reported primary isolates of such viruses from domestic poultry since 1959 (Table 1). All other viruses cause a much milder disease consisting primarily of mild respiratory disease, depression and egg production problems in laying birds. Sometimes other infections or environmental conditions may cause exacerbation of influenza infections leading to much more serious disease. For example, in outbreaks of LPAI in Italy in 1999, high mortality was often recorded in young turkeys, reaching 97% in one flock (Capua et al., 2000).

Appendix XXVI (contd)

Appendix III (contd)

**Molecular basis of virulence**

The haemagglutinin (HA) glycoprotein for influenza viruses has two important functions that are imperative for the infectivity of the virus. First it brings about attachment to host cell and then fusion between the host cell membrane and the virus membrane so that the viral genetic material is introduced into the host cell. This glycoprotein is produced as a precursor, HA0, which requires post translational cleavage by host proteases before it is able to induce membrane fusion and virus particles become infectious (Rott, 1992). The HA0 precursor proteins of avian influenza viruses of low virulence for poultry have a single arginine at the cleavage site and another at position -3 or -4. These viruses are limited to cleavage by host proteases such as trypsin-like enzymes and thus restricted to replication at sites in the host where such enzymes are found, i.e. the respiratory and intestinal tracts. HPAI viruses possess multiple basic amino acids [arginine and lysine] at their HA0 cleavage sites either as a result of apparent insertion or apparent substitution (Vey et al, 1992, Wood et al, 1993, Senne et al, 1996) and appear to be cleavable by a ubiquitous protease[s], probably one or more proprotein-processing subtilisin-related endoproteases of which furin is the leading candidate (Stieneke-Grober et al., 1992). These viruses are able to replicate throughout the bird, damaging vital organs and tissues which results in disease and death (Rott, 1992). For example, all H7 subtype viruses of low virulence have had the amino acid motif at the HA0 cleavage site of either -PEIPKGR*GLF- or -PENPKGR*GLF-, whereas examples of cleavage site amino acid motifs for HPAI H7 viruses are: -PEIPKKKKR*GLF-, PETPKRKRKR*GLF-, -PEIPKKREKR*GLF-, -PETPKRRRR*GLF-, -PEIPKGSRVRR*GLF-. The last example, from the Italian 1999-2000 outbreaks had what was considered the minimum requirement of two basic amino acids at position -1 and -2 plus a basic amino acid a -4.

Although the first 18 HPAI viruses in Table 1 have multiple basic amino acid motifs as do all HPAI viruses sequenced that were isolated prior to 1959, this is not true of the viruses isolated from the HPAI outbreaks in Chile in 2002. The H7N3 viruses isolated in these outbreaks had motifs with insertion of 11 amino acids but without the apparent minimum requirement of basic amino acids, as their sequences were either PEKPKTCSPLSRCRETR*GLF (4372) or PEKPKTCSPLSRCRKTR*GLF (4957).

Current theories suggest that AI subtype H5 and H7 viruses of high virulence emerge from viruses of low virulence by mutation (Garcia et al, 1996, Perdue et al., 1998) although there must be more than one mechanism by which this occurs. This is supported by phylogenetic studies of H7 subtype viruses, which indicate that HPAI viruses do not constitute a separate phylogenetic lineage or lineages, but appear to arise from non-pathogenic strains (Rohm et al., 1995; Banks et al., 2000a) and the *in vitro* selection of mutants virulent for chickens from an avirulent H7 virus (Li et al., 1990). It appears that such mutations occur only after the viruses have moved from their natural host to poultry.

**Spread**

Spread of AI viruses is related chiefly to the excretion of high concentrations of virus in the faeces of infected birds. All the indications for HPAI are that the viruses of H5 or H7 subtype are introduced initially from feral birds as viruses of low virulence and then they subsequently mutate to virulence. It follows that important control measures that can be taken are to prevent the introduction of LPAI viruses, prevent their spread and, if mutation to HPAI does take place, to prevent the spread of HPAI viruses.

*Primary Introduction*

All available evidence suggests that primary introduction of AI viruses into an area is by wild birds, usually waterfowl, but gulls and shorebirds have also been implicated. This may not necessarily involve direct contact as infected waterfowl may take the viruses to an area and these may then be introduced to poultry by a variety of mechanisms that may transfer the virus mechanically in infective faeces and respiratory secretions. Surface water used for drinking water may also be contaminated with influenza viruses and a source of infection. The occurrence of AI outbreaks in poultry is consistent with this: (1) there is a higher prevalence of infection of poultry on migratory waterfowl routes, e.g. Minnesota in USA, Norfolk in England; (2) there is a higher prevalence of infection of poultry kept in exposed conditions, e.g. turkeys on range, ducks on fattening fields; (3) surveillance studies in areas such as Minnesota have shown the same variation in virus subtypes in sampled waterfowl and turkey outbreaks; (4) influenza outbreaks show a seasonal occurrence in high-risk areas, which coincides with migratory activity; (5) in most documented specific outbreaks evidence has been obtained of probable waterfowl contact at the initial site.

Although waterfowl and other wild birds appear to be responsible, albeit indirectly, for most influenza introductions to domestic poultry, other possibilities should not be ruled out. For example, it seems highly likely that H1N1 viruses may pass readily between pigs, humans and turkeys and the introduction of viruses of this subtype to turkey flocks from infected pigs has been well documented.

Since wild birds are a source for primary introduction of AI viruses, it is preferable to design farms practices to minimise direct or indirect contact with wild birds. Since one of the major reservoirs of influenza viruses is in migratory waterfowl, ideally commercial farms should be located away from migratory routes. However, in many countries, particularly USA, Italy and other European countries at least part of the poultry industry has evolved, possibly from hunting origins, so that the greatest concentrations correspond precisely to these flyways. Similarly, poultry may be less likely to become infected with AI viruses if kept indoors (Lang, 1982), but there are strong pressures to rear them on range and for some species, e.g. ostriches, this is a necessity. Rearing of several species on the same farm, especially with one or more reared outdoors, is also a practice likely to attract infected wild birds and result in transfer of infective faeces inside. Use of surface drinking water and the presence of lakes that attracted waterfowl close to the farms were associated with the HPAI outbreaks in Australia (Westbury, 1998). On what was the index farm in the catastrophic outbreaks in Pennsylvania in 1983/4 the farmer had created an artificial pond to keep ducks and attract wild waterfowl (Webster and Kawaoka, 1988).

*Secondary spread*

Secondary spread of AI viruses is mainly by mechanical transfer of infective faeces, in which virus may be present at high concentrations and may survive for considerable periods (Utterback, 1984). Birds or other animals that are not themselves susceptible to infection may become contaminated and spread the virus. Shared water or food may also become contaminated. However, for domestic poultry the main source of secondary spread is man. In several specific accounts of HPAI infections strong evidence has implicated the movements of caretakers, farm owners and staff, trucks and drivers moving birds or delivering food, and artificial inseminators in the spread of virus both on to and through a farm (Wells 1963; Homme et al., 1970; Halvorson et al., 1980; Alexander and Spackman, 1981; Glass et al., 1981).

**Vaccination**

In some countries, vaccines designed to contain or prevent HPAI are specifically banned or discouraged by government agencies because they may interfere with stamping out control policies. However, most HPAI control regulations reserve the right to use vaccines in emergencies.

There is little doubt, both in experiments and in the field, that if birds are sufficiently well immunised against the HA subtype corresponding to that of the challenge virus they will be protected from the worst effects of HPAI and the clinical disease and mortalities associated with LPAI. There is therefore economic pressure to invest in vaccination to insure against a potential short term but significant economic loss whenever there is a perceived threat from AI. However, conversely the high cost of vaccination, since it is necessary to inject inactivated avian influenza virus or live recombinant fowlpox-avian influenza vaccines, means there is economic pressure to stop once the threat has lessened.

The existence of a large number of virus subtypes together with the known variation of different strains within a subtype pose serious problems when selecting strains to produce influenza vaccines. In addition, some isolates do not grow to a sufficiently high titre to produce adequately potent vaccines without costly prior concentration. The vaccines produced have either been autogenous, i.e. prepared from isolates specifically involved in an epizootic, or have been prepared from viruses possessing the same haemagglutinin subtype that yield high concentrations of antigen. In the USA, some standardisation of the latter has been carried out in that the National Veterinary Services Laboratories have propagated and hold influenza viruses of each subtype for use as seed virus in the preparation of inactivated vaccines (Bankowski, 1985). The vaccines used extensively in the USA (Halvorson, 1998) and in Italy (D'Aprile, 1986) against viruses of low pathogenicity, and against HPAI in Mexico (Garcia et al., 1998) and Pakistan (Naeem, 1998) have been prepared from infective allantoic fluid inactivated by betapropiolactone or formalin and emulsified with mineral oil.

Recently vaccines have been developed employing new technologies such as baculovirus derived H5 and H7 haemagglutinins (Crawford et al., 1999) and fowl poxvirus recombinants expressing H7 haemagglutinin (Boyle et al., 2000).

Appendix XXVI (contd)

Appendix III (contd)

In the USA since the 1970s there has been widespread use of inactivated vaccines produced under special licence on a commercial basis (Halvorson, 1998; McCapes & Bankowski, 1987; Price, 1982). These vaccines have been used primarily in turkeys against viruses that are not highly pathogenic but which may cause serious problems, especially in exacerbating circumstances. Significant quantities of vaccine have been used in Minnesota to protect turkeys against LPAI (Halvorson, 1998) This involves prediction and/or early detection of the subtype likely to cause problems each year for incorporation into the vaccine. Vaccine uptake has varied considerably and generally reflected the number of outbreaks of LPAI or the cost of LPAI to the industry. The 178 outbreaks of LPAI caused primarily by virus of H9N2 subtype occurring in turkeys in Minnesota 1995 resulted in the highest loss recorded of over US$ 6,000,000 (Halvorson et al., 1998).

Since July 1995, the use of vaccines of H5 or H7 subtype had been restricted in the USA, but they have been used within a control programme under federal, state and industry control (Myers & Morgan, 1998). Inactivated vaccine was prepared from the LPAI virus of H7N3 responsible for a series of outbreaks in turkeys in Utah in 1995 and used, with other measures, to bring the outbreaks under control (Halvorson et al., 1998).

Outside the USA, vaccination against AI has not been used widely or consistently. Zanella et al., (1981) described the production and testing of inactivated vaccines intended to combat the respiratory problems seen in turkeys in NE Italy and associated with LPAI influenza infections. Papparella et al., (1995,1996) reported that while vaccination against AI was only allowed officially in Italy in certain specific circumstances (i.e. as a ring vaccine), inactivated vaccines against H6N2 and H9N2, strains considered enzootic in Italian turkeys, were in common use in breeder birds. Werner (1999) reported use in turkeys of an inactivated vaccine to protect against H9N2 virus.

An inactivated H5N2 vaccine was used in Mexico as a result of the widespread HPAI outbreaks caused by H5N2 virus that began in December 1994 (Villareal & Flores 1997). Between the beginning of 1995 and May 1997 847 million doses of vaccine were licensed for use. Beginning in 1998, recombinant fowlpox vectored vaccine with avian influenza H5 gene insert has been used in Mexico, El Salvador and Guatemala. Inactivated H7N3 vaccine was also used extensively in Pakistan following the widespread HPAI outbreaks in 1995 (Naeem, 1998).

Recently in Italy an inactivated vaccine containing an H7N3 virus was used to vaccinate against a LPAI virus of H7N1 subtype. This enabled infected birds to be distinguished from vaccinated birds using a test to detect antibodies to N1 (Capua et al, 2002).

**Zoonotic potential**

Influenza is a highly contagious, acute illness in humans for which there are recognisable accounts of epidemics dating back to ancient times. In the 20$^{th}$ century the sudden emergence of antigenically different strains in humans, termed *antigenic shift*, occurred on 4 occasions, 1918 (H1N1), 1957 (H2N2), 1968 (H3N2) and 1977 (H1N1), resulting in pandemics. Frequent epidemics have occurred between the pandemics as a result of accumulated point mutations in the prevalent virus leading to gradual antigenic change, termed *antigenic drift*, which in turn results in infections in a proportion of the population that has become immunologically susceptible. The intra-pandemic influenza epidemics may have a considerable impact on a given population as a result of significant mortality, especially amongst the elderly and other vulnerable groups, and the severe economic cost associated with debilitating illness in a large portion of the population. However, the true influenza pandemics are unmistakable and by far the worst influenza pandemic was the one beginning in 1918. It has been estimated that during the pandemic between 20 to 40 million people died.

The RNA of influenza A viruses consists of 8 distinct segments that code for 10 proteins. Because the viral RNA is segmented, genetic reassortment can occur in mixed infections with different strains of influenza A viruses. This means that when two viruses infect the same cell, progeny viruses may inherit sets of RNA segments made up of combinations of segments identical to those of either of the parent viruses. This gives a theoretical possible number of $2^8$ (=256) different combinations that can form a complete set of RNA segments from a dual infection, although in practice only a few progeny virions possess the correct gene constellation required for viability. Demonstration that the H3N2 1968 pandemic virus differed from the 1957-1968 H2N2 virus in the substitution of two genes, PB1 and the important surface glycoprotein HA gene, with genes almost certainly from an influenza virus of avian origin, led to the suggestion that antigenic shift occurred as a result of reassortment of genes in dual infections with viruses of human and avian origin (Fang et al., 1981; Kawaoka et

al., 1989). However, although volunteer experiments had shown that transitory infections resulted when humans were infected with viruses of avian origin (Beare & Webster, 1991), no natural infections of humans with avian viruses had been reported. It was clear that there was some barrier to the establishment of avian influenza viruses in the human population that was related to one or more of the genome segments. Both human and avian viruses are known to infect pigs readily. It was, therefore, suggested that pigs acted as "mixing vessels" in which reassortment between human and avian influenza viruses could take place with the emergence of viruses with the necessary genome segments(s) from the virus of human origin to allow replication and spread in the human population, but with a different haemagglutinin surface glycoprotein, so that the human population could be regarded as immunologically naïve (Scholtissek, et al., 1985). This theory was also thought to account for the apparent emergence of pandemics in the 20$^{th}$ century in the Far East where agricultural practices mean high concentrations of people, pigs and waterfowl live closely together (Shortridge & Stuart-Harris, 1982).

However, in the last 6 years avian influenza virus infections of humans have been detected on four occasions, with three different subtypes.

In 1996 an H7N7 virus was isolated in England from the eye of a woman with conjunctivitis who kept ducks. This virus was shown to be genetically closest in all 8 genes to viruses of avian origin and to have >98% nucleotide homology in the HA gene with a virus of H7N7 subtype isolated from turkeys in Ireland in 1995 (Banks et al., 1998).

In May 1997 a virus of H5N1 subtype was isolated from a young child who died in Hong Kong and by December 1997 the same virus was confirmed by isolation to have infected 18 people, six of whom died (Shortridge et al., 2000). There was evidence of very limited human to human spread of this virus (Buxton Bridges et al., 2000), but clearly the efficiency of transmission must have been extremely low. There have been no new cases since December 1997. The viruses isolated from the human cases appeared to be identical to viruses first isolated from chickens in Hong Kong in March 1997 following an outbreak of highly pathogenic disease. Both human and avian isolates possess multiple basic amino acids at the HA0 cleavage site (Suarez et al., 1998).

In recent years outbreaks in poultry due to viruses of H9 subtype, usually H9N2, have been widespread. During the second half of the 1990s outbreaks, due to H9N2 subtype have been reported in Germany, Italy, Ireland, South Africa, USA, Korea, China, the Middle East, Iran and Pakistan (Banks et al., 2000b). These have often been associated with widespread and serious disease problems in commercial chickens. In March 1999 two independent isolations of influenza virus subtype H9N2 were made from girls aged one and 4 who recovered from flu-like illnesses in Hong Kong (Peiris et al., 1999a; 1999b). Subsequently, 5 isolations of H9N2 virus from humans on mainland China in August 1998 were reported.

The obvious inference is that the very high mortality, 6/18, amongst the people infected with the H5N1 virus in Hong Kong was because the virus was capable of systemic infection due to the presence of multiple basic amino acids at the HA0 cleavage site. This would allow cleavage to be mediated by a furin-like protease(s) and the virus to spread systemically. However, evidence that this was the case is lacking. Generally, the 18 patients presented with severe respiratory symptoms. For those that died, several of whom were vulnerable due to complicating medical conditions present prior to infection, pneumonia appeared to be the main cause as it often is in deaths occurring as a result of infections with influenza viruses "normally" in the human population. A serological survey after the outbreak identified 17% seroprevalence in poultry workers in Hong Kong but without any known occurrence of clinical disease.

The isolation of the H7 virus from the woman with conjunctivitis was fortuitous, the first isolation of H5N1 in Hong Kong as a result of the death of the patient and all other isolates of avian viruses from humans resulted from enhanced awareness and surveillance exercises. In all these cases there was no evidence of human to human spread except with the H5N1 infections where there was evidence of very limited spread. This is in keeping with the finding that all these viruses possessed all eight genes of avian origin. It may well be that infection of humans with avian influenza viruses occurs much more frequently than originally assumed, but due to their limited effect go unrecognised. For the human population as a whole the main danger appears to be if people infected with an "avian" virus are infected simultaneously with a "human" influenza virus. In such circumstances reassortment could occur with the potential emergence of a virus fully capable of spread in the human population, but with an HA for which the human population was immunologically naive. Presumably this represents a very rare coincidence, but one which could result in a true influenza pandemic.

Appendix XXVI (contd)

Appendix III (contd)

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Appendix XXVI (contd)

**A**ppendix III (contd)

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**Table 1: Primary HPAI virus isolates from poultry* since 1959**

| | |
|---|---|
| 1. | A/chicken/Scotland/59 (H5N1) |
| 2. | A/turkey/England/63 (H7N3) |
| 3. | A/turkey/Ontario/7732/66 (H5N9) |
| 4. | A/chicken/Victoria/76 (H7N7) |
| 5. | A/chicken/Germany/79 (H7N7) |
| 6. | A/turkey/England/199/79 (H7N7) |
| 7. | A/chicken/Pennsylvania/1370/83 (H5N2) |
| 8. | A/turkey/Ireland/1378/83 (H5N8) |
| 9. | A/chicken/Victoria/85 (H7N7) |
| 10. | A/turkey/England/50-92/91 (H5N1) |
| 11. | A/chicken/Victoria/1/92 (H7N3) |
| 12. | A/chicken/Queensland/667-6/94 (H7N3) |
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| 18. | A/turkey/Italy/99 (H7N1) |
| 19. | A/chicken/Chile/2002 (H7N3) |
| 20. | A/chicken/The Netherlands/2003 (H7N7) |

* Where outbreaks were widespread and affecting more than one species, the isolate from the first outbreak identified is listed.

Appendix XXVI (contd)

Appendix IV

# CHAPTER 2.1.14.

# AVIAN INFLUENZA

Article 2.1.14.1.

~~For the purposes of this *Code*, avian influenza (AI) is defined as 'an infection of poultry caused either by any influenza A virus which has an IVPI in 6-week-old chickens greater than 1.2 or by an influenza A virus of H5 or H7 subtype'.~~

For the purposes of this *Terrestrial Code*, notifiable avian influenza (NAI) is defined as an infection of poultry caused by any influenza A virus of the H5 or H7 subtypes or by any AI virus with an intravenous pathogenicity index (IVPI) greater than 1.2 (or as an alternative at least 75% mortality) as described below. NAI viruses can be divided into highly pathogenic notifiable avian influenza (HPNAI) and low pathogenicity notifiable avian influenza (LPNAI):

1) HPNAI viruses have an IVPI in 6-week-old chickens greater than 1.2 or, as an alternative, cause at least 75% mortality in 4 to 8 week-old chickens infected intravenously. H5 and H7 viruses which do not have an IVPI of greater than 1.2 or cause less than 75% mortality in an intravenous lethality test should be sequenced to determine whether multiple basic amino acids are present at the cleavage site of the haemagglutinin molecule (HA0); if the amino acid motif is similar to that observed for other HPNAI isolates, the isolate being tested should be considered as HPNAI.

2) LPNAI are all Influenza A viruses of H5 and H7 subtype that are not HPNAI viruses.

Poultry is defined as 'all birds reared or kept in captivity for the production of meat or eggs for consumption, for the production of other commercial products, for restocking supplies of game, or for breeding these categories of birds'.

For the purpose of *international trade*, this chapter deals not only with the occurrence of clinical signs caused by NAI virus, but also with the presence of infection with NAI virus in the absence of clinical signs. ~~Articles dealing with trade in *commodities* recommend different sanitary measures, depending on the presence or absence of clinical signs.~~

~~The following defines the occurrence of AI virus infection:~~

~~1) AI virus has been isolated and identified as such from poultry or a product derived from poultry, or~~

~~2) viral antigen or viral RNA specific to H5 or H7 subtype of AI virus has been identified in samples from poultry or a product derived from poultry, or~~

~~3) antibodies to H5 or H7 subtype of AI virus that are not a consequence of vaccination have been detected in poultry.~~

The following defines the occurrence of NAI virus infection:

1) HPNAI virus has been isolated and identified as such or specific viral RNA has been detected in poultry or a product derived from poultry, or

2) LPNAI virus has been isolated and identified as such or specific viral RNA has been detected in poultry or a product derived from poultry, or

Appendix XXVI (contd)

Appendix IV (contd)

3) antibodies to H5 or H7 subtype of NAI virus that are not a consequence of vaccination, nor indicative of a non-specific reaction, have been detected in poultry; in such cases, virus isolation should be attempted to establish whether the serological positivity is due to LPNAI or HPNAI; if appropriate samples are not available or if results are negative, this should be regarded as LPNAI.

NAI free establishment means an establishment in which there has been no clinical sign of NAI for the past 21 days; and which is not situated within 3 kilometres of an establishment infected with HPNAI and within one kilometre of an establishment infected with LPNAI.

For the purposes of this *Terrestrial Code*, the *incubation period* for NAI shall be ~~28~~ 21 days.

Standards for diagnostic tests are described in the *Terrestrial Manual*.

Any vaccine used should comply with the standards described in the *Terrestrial Manual*.

Article 2.1.14.1.bis

The NAI status of a country or compartment can be determined on the basis of the following criteria:

1) the outcome of a risk assessment identifying all potential factors for NAI occurrence and their historic perspective;

2) NAI is notifiable in the whole country, an on-going NAI awareness programme is in place, and all notified suspect occurrences of NAI are subjected to field and, where applicable, laboratory investigations;

3) appropriate surveillance is in place to demonstrate the presence of infection in the absence of clinical signs in poultry, and the risk posed by birds other than poultry; this may be achieved through an NAI surveillance programme in accordance with this chapter and Chapter 1.3.6.

Article 2.1.14.2.

**NAI free country or compartment**

A country or compartment may be considered free from NAI when it has been shown that NAI infection has not been present for the past 12 months. If ~~a *stamping out policy* is applied~~ infected poultry are slaughtered, this period shall be ~~6~~ 3 months after the slaughter of the last infected poultry.

The NAI status should be determined by an ongoing surveillance and monitoring programme (carried out in conformity with the provisions of Chapter 1.3.6.) based on virus isolation, virus detection or serology. The programme may need to be adapted to target parts of the country or compartment at a higher risk due to historical or geographical factors, population data, or proximity to recent outbreaks.

Freedom of infection in a country or zone can be demonstrated with random and/or targeted serological surveillance at a minimum interval of 6 months designed to provide at least a 95% level of confidence of detecting a prevalence of NAI infected enterprises of 1%. Freedom of infection in an enterprise can be demonstrated with an ongoing surveillance programme designed to provide at least a 95% level of confidence of detecting a prevalence of NAI infection of 10%. Each establishment should be sampled to provide a 95% level of confidence of detecting a prevalence of NAI of 20%. For commercial ducks the surveillance programme should be based on virus isolation or detection in the absence of validated serological methods.

In the case of a country or zone in which vaccination is being conducted, the ongoing surveillance and monitoring programme (carried out in conformity with the provisions of Chapter 1.3.6.) based on virus isolation, virus detection or serology should be carried out on all vaccinated flocks at a minimum interval of 6 months. In each vaccinated flock, the number of birds to be tested should provide at least a 95% level of confidence of detecting a prevalence of NAI infection of 20%. In the case of an enterprise in which vaccination is being conducted, the ongoing surveillance and monitoring programme (carried out in conformity with the provisions of Chapter 1.3.6.) based on virus isolation, virus detection or serology should be carried out to provide at least a 95% level of confidence of detecting a prevalence of NAI infection of 10%. If a serological test is used, it should be able to distinguish vaccinated birds from infected birds. Additional security should be provided by the use of ~~relevant serological tests in~~ identifiable sentinel birds which can be tested to help identify field infections in vaccinated flocks.

Article 2.1.14.3.

When importing from an NAI free country or compartment, *Veterinary Administrations* should require:

for live poultry (other than day-old poultry)

the presentation of an *international veterinary certificate* attesting that the poultry:

1) showed no clinical sign of NAI on the day of shipment;

2) were kept in an NAI free country or compartment since they were hatched or for the past ~~28~~ 21 days;

3) either have not been vaccinated against NAI, or have been vaccinated and the date of vaccination and the details of the vaccine are stated.

~~*[Note: If the poultry were vaccinated against NAI, the nature of the vaccine used and the date of vaccination should be stated in the certificate.]*~~

Article 2.1.14.4.

Regardless of the NAI status of the country of origin, *Veterinary Administrations* should require:

for ~~the importation of~~ live birds other than poultry

the presentation of an *international veterinary certificate* attesting that the birds:

1) showed no clinical sign of NAI on the day of shipment;

2) were kept in isolation approved by the *Veterinary Services* ~~a *quarantine station*~~ since they were hatched or for the ~~28~~ 21 days prior to shipment and showed no clinical sign of NAI during the isolation~~quarantine~~ period;

3) were subjected to a diagnostic test 7 to 14 days prior to shipment to demonstrate freedom from NAI.

Article 2.1.14.5.

When importing from an NAI free country or compartment, *Veterinary Administrations* should require:

for day-old live poultry

the presentation of an *international veterinary certificate* attesting that the poultry:

~~1) showed no clinical sign of NAI on the day of shipment;~~

2) were kept in an NAI free country or compartment since they were hatched;

Appendix XXVI (contd)

Appendix IV (contd)

3) were derived from parent flocks which had been kept in an NAI free country or compartment for 21 days prior to the collection of the eggs;

4) and/or the parent flock had/had not been vaccinated.

*(Note: If the day-old poultry or the parents of the poultry were vaccinated against NAI, the details of the vaccine and the date of vaccination should be provided.)*

Article 2.1.14.5.bis.

When importing from an NAI free country or compartment, *Veterinary Administrations* should require:

for *hatching eggs*

the presentation of an *international veterinary certificate* attesting that the eggs:

1) came from an NAI free country or compartment;

2) were derived from parent flocks which had been kept in an NAI free country or compartment for 21 days prior to the collection of the eggs;

3) were derived from parent flocks which had not been vaccinated against NAI, or had been vaccinated against NAI and the date of vaccination and the details of the vaccine are stated.

Article 2.1.14.6.

When importing from an NAI free country or compartment, *Veterinary Administrations* should require:

for ~~*hatching eggs* or~~ eggs for consumption

the presentation of an *international veterinary certificate* attesting that the eggs come from an NAI free country or compartment.

Article 2.1.14.6.bis.

When importing from a country or compartment not considered free from NAI, *Veterinary Administrations* should require:

for *eggs for consumption*

the presentation of an *international veterinary certificate* attesting that the entire consignment of eggs comes from birds:

1) which have been kept in an NAI *free establishment*;

2) which have been tested serologically or by virus detection to give a 95% probability of detecting a 5% prevalence of NAI infection, every 21 days, with negative results.

Article 2.1.14.7.

When importing from an NAI free country or compartment, *Veterinary Administrations* should require:

for egg products

the presentation of an *international veterinary certificate* attesting that the egg products come from, and were processed in, an NAI free country or compartment.

Appendix XXVI (contd)

Appendix IV (contd)

Article 2.1.14.8.

When importing from an NAI free country or compartment, *Veterinary Administrations* should require:

for poultry semen

the presentation of an *international veterinary certificate* attesting that the donor birds:

1) showed no clinical sign of NAI on the day of semen collection;

2) were kept in an NAI free country or compartment for the ~~28~~ 21 days prior to semen collection.

Article 2.1.14.9.

Regardless of the NAI status of the country of origin, *Veterinary Administrations* should require:

for ~~the importation of~~ semen of birds other than poultry

the presentation of an *international veterinary certificate* attesting that the donor birds:

1) were kept in isolation approved by the *Veterinary Services* ~~*quarantine*~~ for the ~~28~~ 21 days prior to semen collection;

2) showed no clinical sign of NAI during the isolation~~quarantine~~ period;

3) were tested between 7 and 14 days prior to semen collection and shown to be free of NAI.

Article 2.1.14.10.

When importing from NAI free country or compartment, *Veterinary Administrations* should require:

for *fresh meat* and processed meat of poultry, and poultry viscera

the presentation of an *international veterinary certificate* attesting that the entire consignment of meat comes from birds:

1) which have been kept in an NAI free country or compartment since they were hatched or for the past ~~28~~ 21 days;

2) which have been slaughtered in an *approved abattoir* and have been subjected to ante-mortem and post-mortem inspections for NAI with favourable results.

~~Article 2.1.14.11.~~

~~When importing from NAI free country or compartment, *Veterinary Administrations* should require:~~

~~for poultry viscera~~

~~the presentation of an *international veterinary certificate* attesting that the entire consignment of meat comes from birds:~~

~~1) which have been kept in an NAI free country or compartment since they were hatched or for the past 28 days;~~

~~2) which have been slaughtered in an *approved abattoir* and have been subjected to ante-mortem and post-mortem inspections for NAI with favourable results.~~

Appendix XXVI (contd)

Appendix IV (contd)

Article 2.1.14.12.

When importing from a country or compartment not considered free from NAI, *Veterinary Administrations* should require:

for *fresh meat* and viscera of poultry

the presentation of an *international veterinary certificate* attesting that the entire consignment of meat comes from birds:

1) which have been kept in a *free establishment* ~~for at least 28 days and regularly inspected by the official veterinarian~~;

2) which have been tested to give a 95% probability of detecting a 5% prevalence of NAI infection not more than 7 days prior to slaughter using virus detection or virus isolation tests, and serological tests, with negative results in all cases;

3) which have been slaughtered in an *approved abattoir* which has not processed poultry infected with NAI since last cleaned and disinfected, and have been subjected to ante-mortem and post-mortem inspections for NAI with favourable results.

~~Article 2.1.14.12 bis~~

~~When importing from a country or compartment free from clinical signs of NAI but not considered free from NAI infection, *Veterinary Administrations* should require:~~

~~for *fresh meat* of poultry~~

~~the presentation of an *international veterinary certificate* attesting that the entire consignment of meat comes from birds:~~

~~1) which have been kept in an country or compartment free from clinical signs of NAI but not considered free from NAI infection since they were hatched or for the past 28 days;~~

~~2) which have been slaughtered in an *approved abattoir* and have been subjected to ante-mortem and post-mortem inspections for NAI with favourable results.~~

Article 2.1.14.13.

When importing from country or compartment not considered free from NAI, *Veterinary Administrations* should require:

for processed *meat*, viscera and egg products of poultry

the presentation of an *international veterinary certificate* attesting that:

1) the commodity is derived from *fresh meat* and/or viscera which meets the requirements of Article 2.1.14.12.; or

2) the commodity is derived from eggs for consumption which meet the requirements of Article 2.1.14.6.bis; or

3) the commodity has been processed to ensure the destruction of the NAI virus, and the necessary precautions were taken after processing to avoid contact of the commodity with any source of NAI virus.

Appendix XXVI (contd)

Appendix IV (contd)

Article 2.1.14.14.

When importing from NAI free country or compartment, *Veterinary Administrations* should require:

for *products of animal origin* (from poultry) *intended for use in animal feeding*, or *for agricultural or industrial use*

the presentation of an *international veterinary certificate* attesting that these products come from birds which have been kept in an NAI free country or compartment since they were hatched or for the past ~~28~~ 21 days.

Article 2.1.14.15.

When importing from a country or compartment not considered free from NAI, *Veterinary Administrations* should require:

for meal containing meat and/or feathers and/or bones (from poultry)

the presentation of an *international veterinary certificate* attesting that:

1) the commodity has been processed to ensure the destruction of the NAI virus;
2) the necessary precautions were taken after processing to avoid contact of the commodity with any source of NAI virus.

Article 2.1.14.16.

When importing from an NAI free country or compartment, *Veterinary Administrations* should require:

for feathers and down (from poultry)

the presentation of an *international veterinary certificate* attesting that the entire consignment of feathers or down comes from birds which have been kept in an NAI free country or compartment since they were hatched or for the past 21~~28~~ days.

Article 2.1.14.17.

When importing from a country or compartment not considered free from NAI, *Veterinary Administrations* should require:

for feathers and down (from poultry)

the presentation of an *international veterinary certificate* attesting that that:

1) the commodity has been processed to ensure the destruction of the NAI virus;
2) the necessary precautions were taken after processing to avoid contact of the commodity with any source of NAI virus.

Article 2.1.14.18.

Regardless of the NAI status of the country of origin, *Veterinary Administrations* should require for the importation of meat or other products from birds other than poultry

the presentation of an *international veterinary certificate* attesting that:

1) the commodity has been processed to ensure the destruction of the NAI virus;
2) the necessary precautions were taken after processing to avoid contact of the commodity with any source of NAI virus.

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# Embedded Secure Document

The file *http://www.oie.int/eng/AVIAN_INFLUENZA/A_71 SG_12_CS3E.pdf* is a secure document that has been embedded in this document. Double click the pushpin to view.

# Canadian Pandemic Influenza Plan

The **Canadian Pandemic Influenza Plan** maps out how Canada will prepare for and respond to an influenza pandemic. Federal, provincial and territorial governments collaborated on its development.

The Canadian Pandemic Influenza Plan is designed for:

- federal, provincial and territorial departments of health
- emergency workers,
- public health officials, and
- health care workers

The plan includes guidelines and checklists that these groups can use in emergency response planning and creates a framework that guides the actions of all levels of government in the event of an influenza pandemic.

### The plan covers the following activities:

- Prevention activities, such as surveillance programs and the establishment of an infrastructure for manufacturing sufficient vaccines to protect all Canadians at the time of a pandemic.
- Preparedness activities, include the preparation of actual plans for a pandemic. The preparedness section addresses key activity areas, such as vaccine programs, surveillance and public health measures in terms of their current status and future requirements.
- Response/Implementation activities for controlling the pandemic, minimizing deaths and any social disruption it causes, including communication activities. Implementation also involves documenting the current activities and outcomes to determine if any changes need to be made to the response.

The plan describes the different phases of a pandemic and the roles and responsibilities for each level of government at each phase. The phases described in Canada's plan are based on the World Health Organization's

pandemic phases. These phases are helpful for planning concrete steps under key activity areas for each phase. When put together, the phases provide guidance on what needs to be done as a pandemic unfolds.

Throughout the plan, activities are organized by phases with specific levels defined under each phase. Currently, Canada is in what the plan describes as the "pre-pandemic" phase. The WHO describes this as Phase 0. The three levels in Phase 0 are:

to top

**Level 1 -** A new virus is identified in humans
**Level 2 -** Human infection with the new virus is confirmed
**Level 3 -** Human to human transmission of the new virus is confirmed

Canada is currently at Phase 0, Level 2. Work within this pre-pandemic phase focuses on preparation, such as monitoring the evolving situation and sharing of this information, looking at the availability of medical supplies and conducting global surveillance with international organizations like the World Health Organization.

The plan also includes a series of annexes that offer detailed guidance on specific areas such as infection control, clinical guidelines and communications. The annexes cover the following topics:

**Laboratory Procedures**
Describes laboratory testing, surveillance, data collection and the importance of sharing this surveillance data for each pandemic phase as well as co-operative agreements for emergency back-up of critical lab functions. Surveillance in Canada and abroad is essential for giving early warning signs of new influenza strains.

**Recommendations for Pandemic Vaccine Use in a Limited Supply Situation**
Provides technical information about the potential dose and administration of a pandemic influenza vaccine. This annex describes the priority groups for vaccination during a pandemic. The priority list would continually be reviewed during a pandemic and adjusted based on how the new influenza virus behaves.

**Planning Recommendations for the use of Antiviral Drugs in Canada during a Pandemic**
Details technical information on the two types of antiviral drugs known to be effective against influenza A viruses and how these drugs could be used in a pandemic. Like the vaccine annex, it identifies priority groups for the receipt of antiviral drugs if supplies are limited. Again, the priority list would be reviewed depending on the behaviour of the new influenza virus.

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**Infection Control and Occupational Health Guidelines During Pandemic**
Influenza in Traditional and Non-Traditional Health Care Settings
Offers guidelines designed to assist those responsible for managing pandemic influenza in traditional (e.g., acute care hospitals, nursing homes, walk in clinics) and non-traditional (e.g., triage settings, temporary influenza hospitals) health care settings. It details infection prevention and control policies and procedures that will be critical to minimize the spread of pandemic influenza within health care settings.

**Health Services: Clinical Care Guidelines and Tools**
It is important to remember that most physicians will not have seen pandemic influenza. This annex gives them guidance on what to look for and how to care for patients. It highlights the clinical presentations of influenza and provides guidelines on patient management.

**Resource Management Guidelines for Health Care Facilities during an Influenza Pandemic**
Provides guidelines for health care providers in planning the management of resources in health care facilities and the identification of additional human resources that would be required for the different phases of a pandemic.

**Guidelines for Non-Traditional Sites & Workers**
A non-traditional site is a site that is currently not a health care site or is a health care site that usually offers a different type or level of care. In a pandemic, a non-traditional site could provide care and support of influenza patients. This annex offers guidelines on how to establish, operate and manage these non-traditional sites.

**Communications Annex**
The objective of the Communication Annex is to ensure that Canada's health partners are prepared to respond to the enormous public communications challenges associated with an influenza pandemic. It sets out specific activities designed to promote consistent, coordinated and effective public communications of federal, provincial, territorial governments and other health partners.

**Federal Emergency Planning Documents**
This annex describes Health Canada's emergency response structure. The structure includes five groups responsible for identifying and working on the major steps for responding to an emergency:

- Coordination and Operations Group: initiates operations and manages the administrative and communications functions of the emergency response;
- Logistics and Support Group: provides security and logistics for supplies, equipment, and transportation;

- Emergency Communications Group: advises and provides media monitoring and leads public communication;
- Technical Advisory Group: develops and analyses scientific and medical information related to the event; and
- Advance Planning Group: provides risk management and looks ahead to identify issues that could emerge.

Last Updated: 2004-10-21

Important Notices

# Canadian Pandemic Influenza Plan

Public Health Agency of Canada (PHAC)

Pandemic Influenza
Pandémie d'influenza

**Canadian Pandemic Influenza Plan**

Please note that this document was published by Health Canada prior to the announcement of the establishment of the Public Health Agency of Canada on September 24, 2004. Any reference to Health Canada should be assumed to be to the Public Health Agency of Canada.

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## Preface

Influenza A viruses periodically cause worldwide epidemics, or pandemics, with high rates of illness and death. Advanced

planning for a large scale and widespread health emergency is required to optimize health care delivery during a pandemic. Unlike other public welfare emergencies, an influenza pandemic will impact on multiple communities across Canada simultaneously. Each local jurisdiction must be prepared to respond in the context of uncertain availability of external resources and support. Therefore, contingency planning is required to mitigate the impact of an influenza pandemic through planning and preparation by the co-ordinated efforts of all orders of government in collaboration with their stakeholders.

The *Canadian Pandemic Influenza Plan* (the Plan) consists of an introduction and a background section, followed by the preparedness, response and recovery sections, which are consistent with the general principals of emergency response. Each section aims to assist and facilitate appropriate planning at all levels of government for the next influenza pandemic. The Centre for Infectious Disease Prevention and Control (CIDPC), Public Health Agency of Canada (PHAC), Health Canada coordinated the development of the Plan in collaboration with the Centre for Emergency Preparedness and Response (CEPR), Health Canada, with direction from the Pandemic Influenza Committee (PIC).

The Plan and the annexed guidelines, checklists and other documents were developed to assist all jurisdictions with the main components of planning, including surveillance, vaccine programs, use of antivirals, health services, emergency services, public health measures and communications. The most effective public health intervention to mitigate the impact of a pandemic is through immunization with an effective vaccine against the novel virus, and, to a lesser extent, through the use of antiviral drugs. In addition, comprehensive planning requires that appropriate surveillance capacity is in place, and that the health sector, emergency services and communities as a whole are informed and equipped to deal with a pandemic.

The prevention and preparedness activities facilitate the response and recovery during and after an influenza pandemic. The response to a pandemic will require close cooperation between all levels of government. The response and recovery sections of the Plan were developed through a collaborative process between the Centre for Emergency Preparedness and Response, and the CIDPC, Health Canada. The response section of the Plan addresses the operational activities for an effective national response, including essential federal, provincial and territorial coordination. The recovery section provides guidance on coordinated post-event activities for the health and emergency response sectors.

The overall goal of pandemic influenza preparedness and response is first to minimize serious illness and overall deaths, and second to minimize societal disruption among Canadians as a result of an influenza pandemic.

The Plan is intended to be dynamic and iterative, and will be updated and revised regularly.

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**INFORMATION NOTICE**

The Canadian Pandemic Influenza Plan (the Plan) was developed through a collaborative process between Federal, Provincial, Territorial, local and regional governments and non-government stakeholders.

Development of the Plan was coordinated by Health Canada with direction from the Pandemic Influenza Committee, a federal, provincial and territorial advisory committee. The Plan is provided for information purposes only as an outline for the planning, preparedness and response to pandemic influenza by governments within their respective roles and responsibilities.

Terms and definitions contained in the Plan are for convenience only. It is the User's responsibility to determine if any term or definition contained in the Plan is appropriate for the purposes for which it is intended to be used by the User.

**DISCLAIMER**

The views and recommendations expressed in the Plan represent a collaborative effort between Federal, Provincial, Territorial, local and regional governments and non-government stakeholders.

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Last Updated: 2005-07-12

Important Notices

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The Canadian Pandemic Influenza Plan maps out how Canada will prepare for and respond to a pandemic influenza outbreak. It does so by clarifying the roles and responsibilities of those who would be involved in such a public health emergency – governments at all levels, public health officials and front-line health care workers. As a practical working tool, it also provides guidelines and checklists to assist various jurisdictions with their emergency planning.

The ultimate goal of the Plan is to minimize serious illness and death, in the event of an influenza pandemic, and also to ease any social or economic disruption that might be caused by a massive outbreak of the disease. Canada has had a pandemic influenza plan since 1988, and it continues to evolve based on research, evidence and lessons learned.

The **Canadian Pandemic Influenza Plan** is the product of extensive dialogue and collaboration within the *Pandemic Influenza Committee (PIC)*. Created in 2001, PIC consists of 17 voting members, including representatives from all provinces and territories. Expertise within PIC includes Chief Medical Officers of Health, epidemiologists, virologists, communicable disease specialists, clinical, public health and laboratory specialists.

Committee members, in turn, have been greatly assisted through a process of consultation with a wider group of stakeholders, including the health non-government organization community, local governments, emergency planners, and bioethicists.

For the past two years, we have had the privilege of serving as co-chairs of the Pandemic Influenza Committee. It has been an immensely enriching experience, to watch the current document take shape and to see the sheer amount of time, dedication and commitment poured into the creation of the current document. We would like to thank all those whose contribution helped bring the Plan off the "drawing board" and into reality.

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- Office of Critical Infrastructure Protection and Emergency Preparedness (OCIPEP)
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- Royal Canadian Mounted Police
- St. John Ambulance
- Solicitor General Canada
- The Salvation Army
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# PREFACE

Influenza A viruses periodically cause worldwide epidemics, or pandemics, with high rates of illness and death. Advanced planning for a large scale and widespread health emergency is required to optimize health care delivery during a pandemic. Unlike other public welfare emergencies, an influenza pandemic will impact on multiple communities across Canada simultaneously. Each local jurisdiction must be prepared to respond in the context of uncertain availability of external resources and support. Therefore, contingency planning is required to mitigate the impact of an influenza pandemic through planning and preparation by the co-ordinated efforts of all orders of government in collaboration with their stakeholders.

The *Canadian Pandemic Influenza Plan* (the Plan) consists of an introduction and a background section, followed by the preparedness, response and recovery sections, which are consistent with the general principals of emergency response. Each section aims to assist and facilitate appropriate planning at all levels of government for the next influenza pandemic. The Centre for Infectious Disease Prevention and Control (CIDPC), Population and Public Health Branch (PPHB), Health Canada coordinated the development of the Plan in collaboration with the Centre for Emergency Preparedness and Response (CEPR), Health Canada, with direction from the Pandemic Influenza Committee (PIC).

The Plan and the annexed guidelines, checklists and other documents were developed to assist all jurisdictions with the main components of planning, including surveillance, vaccine programs, use of antivirals, health services, emergency services, public health measures and communications. The most effective public health intervention to mitigate the impact of a pandemic is through immunization with an effective vaccine against the novel virus, and, to a lesser extent, through the use of antiviral drugs. In addition, comprehensive planning requires that appropriate surveillance capacity is in place, and that the health sector, emergency services and communities as a whole are informed and equipped to deal with a pandemic.

The prevention and preparedness activities facilitate the response and recovery during and after an influenza pandemic. The response to a pandemic will require close cooperation between all levels of government. The response and recovery sections of the Plan were developed through a collaborative process between the Centre for Emergency Preparedness and Response, and the CIDPC, Health Canada. The response section of the Plan addresses the operational activities for an effective national response, including essential federal, provincial and territorial coordination. The recovery section provides guidance on coordinated post-event activities for the health and emergency response sectors.

The overall goal of pandemic influenza preparedness and response is first to minimize serious illness and overall deaths, and second to minimize societal disruption among Canadians as a result of an influenza pandemic.

The Plan is intended to be dynamic and iterative, and will be updated and revised regularly.

- Preface
- Content Summary
- List of Annexes

## I. Introduction

*Who does this plan address?* ➔

*Who is responsible for Pandemic Planning?* ➔

- Goal of Influenza Pandemic Preparedness and Response
- Overview of the Canadian Pandemic Influenza Plan
- Roles and Responsibilities
  - The Pandemic Influenza Committee
  - The Pre-Pandemic Period
  - The Pandemic Period
  - The Post-Pandemic Period

*Where can I find guidelines and supporting documentation?* ←

## II. Background

*Why is this an important health issue?* ➔

- Epidemiology of Pandemic Influenza
- Estimated Impact of an Influenza Pandemic on Canadians
- Terminology
  - Pandemic Phases
  - List of Abbreviations
- Legal Considerations
- Ethical Considerations

## III. Preparedness Section

*What preparations are being made?* ➔

- Introduction (to Preparedness Section)
  - Background
  - Populations under Federal Jurisdiction
- Components of the Preparedness Section
  - Surveillance
  - Vaccine Programs
  - Antivirals
  - Health Services Emergency Planning
  - Emergency Services
  - Public Health Measures
  - Communications
- Planning Activities by Components
  - Pandemic Planning Checklists

*What principles and assumptions should planners consider?* ←

*What are the outstanding issues?* ←

## IV. Response Section

*What needs to happen in a comprehensive response?* ➔

- Introduction (to Response Section)
- Phased Approach
- Experience to Date
- Key Response Activities by Pandemic Phase

*What response activities should take place during each phase?* ←

## V. Recovery Section

*What will be involved in the recovery from a pandemic?* →

- Currently in development

## Annexes

- See "List of Annexes"

*Where can I find specific/technical information?* ←

Section One

# INTRODUCTION

## 1.1 Goal of Influenza Pandemic Preparedness and Response

The goal of influenza pandemic preparedness and response is:

> *First, to minimize serious illness and overall deaths, and second to minimize societal disruption among Canadians as a result of an influenza pandemic.*

This goal will only be realized through the co-ordinated efforts of all orders of government in planning and preparation.

The objectives of the Canadian Pandemic Influenza Plan are as follows:

To assist and facilitate appropriate planning and response at all levels of government by:

- developing a national Plan through a F/P/T collaborative process, which is acceptable and applicable to all stakeholders, and clearly identifies roles and responsibilities,
- developing a Plan that is sufficiently flexible to account for the unknown epidemiology of a pandemic and the needs of different stakeholders,
- recommending planning considerations for the appropriate prevention, care and treatment during a pandemic,
- recommending planning considerations for appropriate communications, resource management and preventive measures to minimize societal disruption.

To provide a Plan that is reviewed on an annual basis to ensure incorporation of new developments and ensure consistencies with best practices.

To provide an evaluated Plan that is sufficiently clear and comprehensive to ensure operational viability.

## 1.2 Overview of the Canadian Pandemic Influenza Plan

Pandemic contingency planning activities in Canada began in 1983. The first detailed draft of a plan, then referred to as the *Canadian Contingency Plan for Pandemic Influenza*, was completed in 1988; there have been several drafts since then. The latest plan, now referred to as the *Canadian Pandemic Influenza Plan* (the Plan), targets a wide range of people who will be involved in planning and responding to an influenza pandemic; emergency responders, health planners, health care workers, public health laboratories, as well as those involved in the manufacture, registration and supply of pharmaceuticals. However the primary audience for this plan are the provincial and territorial (P/T) Ministries of Health, as the provision of health care and essential services is the jurisdiction of the provinces and territories.

The Plan consists of an introduction and a background section, followed by the preparedness, response and recovery sections, which are consistent with the general principals of emergency response. Using this framework the types of planning and response activities needed for comprehensive pandemic planning can be summarized as follows:

- ***Prevention*** activities might be classified as planning actions to ensure that all existing or known or unavoidable risks are contained. Immunization with vaccines is the primary means of prevention and forms the basis of the pandemic response in Canada and many other countries. The annual vaccine infrastructure is the building block utilized to develop this pandemic vaccine response. A second component of prevention is mitigation – consequence management. These types of activities are undertaken to ensure that the consequences of a pandemic remain manageable and do not escalate beyond a control situation.
- ***Preparedness*** activities include preparing the actual plans, training, simulation exercises to pre-test the plans, communications and other interfaces to inform the public and other stakeholders.
- ***Response/Implementation*** of the plans, tested or untested, is the step where activities are directed to controlling the pandemic and repressing direct outcomes (mortality, morbidity due to influenza) and indirect associated effects (social disruption). It is the focus of the Response Section of the Plan and would involve a series of escalating and potentially varying (but harmonized) responses as the pandemic unfolds across the country. Implementation also involves documenting activities and outcomes to determine if a more extensive response is required or whether adjustments to the planned response are necessary.
- ***Post-Event Recovery/After Care*** activities may start at different times across the country as the pandemic waves move through the various jurisdictions. These activities involve the organization of post-event activities to ensure restoration. Dismantling of alternative care sites, phasing out of alternate care workers, and the commencement of new services that may be required to address the impacts are examples of these types of activities. Activities would continue through the declaration of the end of the pandemic in Canada until the pre-pandemic status is restored.

The Preparedness Section of the Plan addresses prevention and preparedness activities during the inter-pandemic period. This section is the result of work that began after the first national meeting on federal, provincial, territorial and local planning held in January 2000 and is based on the deliberations of a number of pandemic influenza working groups, as well as the input of other stakeholder groups and organizations. The purpose of this section of the Plan is to provide information and guidelines that can be used in the development of plans for federal, provincial and territorial (F/P/T) and local management of an influenza pandemic.

In the Preparedness Section, each component for a comprehensive pandemic influenza plan including, surveillance, vaccine programs, the use of antivirals, health services, emergency services, public health measures and communications, has been addressed in terms of current status, including outstanding issues, planning principles and assumptions. A list of potential planning activities in the form of a checklist has also been included.

The Response and Recovery Sections of the Plan were developed through a collaborative process between the Centre for Infection Disease Prevention and Control (CIDPC) and the Centre for Emergency Preparedness and Response (CEPR), Population and Public Health Branch (PPHB), Health Canada. The Response Section of the Plan will address the operational activities for an effective national response, including essential F/P/T

coordination. The Recovery Section will provide guidance on the coordinated post-event activities for the health and emergency response sectors.

This, the Introduction Section together with the Background Section of the Plan is designed to provide the conceptual and historical basis for the Plan and highlight over-arching principles, such as roles and responsibilities and terminology that will be referred to throughout the plan and annexes.

## 1.3 Roles and Responsibilities

A coordinated response to pandemic influenza requires collective infrastructures, response capacities and coordinated activities that will permit the F/P/T Ministers of Health and their representatives to anticipate problems, monitor for adverse outcomes and respond to minimize the impact of pandemic influenza within their jurisdictions.

The roles and responsibilities of the Pandemic Influenza Committee (PIC) and the F/P/T Ministers of Health were detailed in a Working Agreement between Deputy Ministers of Health in March, 2001.The Working Agreement is an iterative document which allows for roles and responsibility components to be adapted or added as they are developed. The sections that follow include updated excerpts from the Working Agreement that detail the roles and responsibilities for PIC (i.e., the joint F/P/T responsibilities), the federal government, and the provincial and territorial governments.

In general the roles and responsibilities of the respective jurisdictions are as follows:

- The federal government holds responsibility for the nationwide coordination of the pandemic influenza response, including surveillance, international liaison, and coordination of the vaccine response (infrastructure procurement, vaccine allocation, management and funding).
- Joint responsibilities of the F/P/T MOHs include ensuring distribution of plans to all organizations that may be involved in the pandemic response and liaison with these partners on an ongoing basis. They may also be involved in planning simulation exercises once plans are in place. Development of cost estimates and options for decision makers will also be a joint F/P/T responsibility.
- The P/Ts hold responsibility for mobilizing their contingency plans and resources. Health emergency response commences at the local level and escalates through P/Ts to the federal order of government.
- Local public health authorities are responsible for planning the local response to a influenza pandemic with direction from both the P/T and federal level. This involves liaising with local partners (e.g., emergency responders, hospitals, mortuary services) in advance of a pandemic to facilitate a coordinated response when pandemic influenza strikes in the community. It is likely that the local public health authorities, through existing or enhanced surveillance, may be the first ones to detect influenza in their community. It is essential that the lines of communication within the community and up the line to the P/T and federal levels are clear and established in advance of a pandemic.

### 1.3.1 The Pandemic Influenza Committee

The PIC is a F/P/T committee that first met by teleconference in March 2002. It is co-chaired by two individuals representing the federal and the provincial/territorial governments. The PIC is supported by the CIDPC and reports through the Advisory Committee on Population Health and Health Security (ACPHHS) to the F/P/T Deputy Ministers of Health during the pre-pandemic period. It is anticipated that PIC will report directly to the F/P/T Ministers of Heath at such time when PIC is asked to consult on a real, actual or perceived threat of pandemic influenza. The PIC would continue to report to said F/P/T Ministers of Health until such time as the threat or influenza pandemic is declared over.

The mandate of the PIC includes providing advice, expertise and recommendations, liaison and other activities associated with the pre-pandemic, pandemic and post-pandemic phases to support the health and safety mandates of all orders of government. PIC will also provide advice, assistance and expertise concerning the development, maintenance, testing and evaluation of the Canadian Pandemic Influenza Plan, and when requested to do so, any P/T contingency plan.

### 1.3.2 The Pre-Pandemic Period

***Joint F/P/T Responsibilities***

- developing, maintaining and enhancing routine surveillance activities for influenza and other related disease factors/events that are required, including adverse influenza vaccine and antiviral drug reactions;
- developing and maintaining coordinated communication strategies, plans and frameworks during the inter-pandemic period for use during pandemic periods;
- nominating their respective representatives to the PIC;
- developing and participating in coordinated training and simulation exercises, including the coordination of emergency and contingency plans, designed to achieve emergency preparedness and to test, assess, evaluate and adjust pandemic influenza response capacity;
- mobilizing required resources (e.g., medical, scientific, technical, emergency response and other resources, etc.) within their respective jurisdictions to respond to the influenza pandemic in the context of the CPIP;
- developing negotiation and indemnification strategies with Public Works and Government Services Canada to require through the contracting process that manufacturers/fabricators/suppliers provide indemnification or purchase commercial insurance coverages suitable to provide protection, particularly at the time of an influenza pandemic; and
- stockpiling essential emergency supplies that might be routinely and ordinarily associated with the planning and preparation for an influenza pandemic (e.g., mobile hospital beds, syringes, etc.); and
- developing and maintaining the CPIP.

In addition, the Federal Minister of Health through Public Works and Government Services Canada, and the P/T Ministers of Health are responsible for:

- identifying inter-pandemic and pandemic period manufacturers/fabricators/suppliers of influenza vaccine and antiviral drugs, as the case may be; and
- developing contracts with manufacturers/fabricators/suppliers, and coordinating and maintaining a secure supply of influenza vaccines and antiviral drugs for the pandemic period.

### *PIC Responsibilities*

- identifying and/or developing a framework for evaluating the process and the outcome of the individual and the collective responses of all parties to an influenza pandemic;
- drafting safety and performance evaluation criteria against which to evaluate the activities of all parties and their handling of pandemic influenza;
- coordinating preparatory activities;
- providing expertise, advice and recommendations concerning public health, care and treatment, microbiology, immunology, epidemiology, and ethics including:
  - ongoing and timely medical, scientific and public health advice;
  - review of the pandemic influenza response capacity;
  - modifications to pandemic influenza surveillance activities or special studies/investigations to be carried out by the parties and estimating resulting costs;
  - equitable allocation of available influenza vaccine during a pandemic; and
  - policy issues requiring immediate resolution and referring them to the F/P/T Ministers of Health.

### *Federal Responsibilities*

- entering agreements and arrangements with international organizations such as the WHO to support surveillance; coordination and investigation activities;
- producing, allocating, and overseeing the distribution of specialized diagnostic reagents and technical information to provincial and territorial public health laboratories;
- receiving and characterizing viral isolates and sending representative strains to the US CDC, a WHO collaborating centre;
- providing liaison with the CDC and the WHO for influenza surveillance and epidemiology, including issues related to laboratory diagnostic methods and the typing of strains;
- designing, organizing and supporting special national studies required to better define burden of disease or evaluate pandemic influenza response capacity;
- pursuant to Federal legislation, for licensing establishments and influenza vaccines and antiviral drugs for sale;
- instructing manufacturers/fabricators/suppliers pursuant to contractual provisions to obtain, from time to time, appropriate quantities of a specified seed virus identified by the WHO for the purpose of manufacturing domestic and/or off-shore influenza vaccine supplies;

- assisting in the identification of alternative potential sources of influenza vaccines, as required;
- instructing Public Works Government Services Canada (Canada's federal procurement arm) that administrative contractual services be provided to acquire influenza vaccine and antiviral drugs for the pandemic period;
- making reasonable efforts to enter into agreements with foreign governments and or international agencies that have sources of influenza vaccine supply in order to enhance the protection of Canadians during an influenza pandemic by identifying secure supplies of influenza vaccine and antiviral drugs during interpandemic periods;
- providing administrative support for PIC;
- developing and maintaining the Canadian Pandemic Influenza Plan;
- assisting in the planning for international coordination of influenza vaccine supplies during an influenza pandemic and consulting with P/T Ministers of Health on the potential impact of this activity on their influenza vaccine supply;
- enabling the establishment of a national (i.e., domestic) influenza vaccine capacity for pandemic needs of an amount up to 8.0 million doses per month, including ongoing monthly supply of fertilized hens' eggs needed for egg-based component of this capacity;
- making available influenza vaccine and antiviral drugs for specific populations (e.g., military, RCMP, First Nations, and others), and coordinating with P/Ts in the distribution and administration of influenza vaccine and antiviral drugs to those specific populations; and
- acting as lead Federal authority on this health matter, to involve all other appropriate Federal Ministers (e.g., Defence, Finance, Citizenship and Immigration, etc.) in effecting an emergency response.

### *P/T Responsibilities*

- providing Influenza prevention, treatment and control consistent with policies and procedures within their jurisdictions, including the distribution of influenza vaccine and antiviral drugs;
- coordinating with the Federal government about the distribution of influenza vaccine and antiviral drugs to First Nations and military and RCMP personnel;
- ensuring that their respective pandemic influenza contingency plans are developed and adopted and that these contingency plans and appropriate guidelines are regularly updated;
- participating in national surveillance activities by monitoring and reporting diseases caused by influenza virus and related diseases/conditions, and use their best efforts to take steps within their authority to cooperate with the Federal Minister of Health and PIC with regard to national surveillance activities;
- maintaining provincial and territorial surveillance activities, including, the isolation, antigen detection, serology, and strain identification for influenza viruses and the participation in Influenza proficiency tests;
- investigating outbreaks and clusters of influenza-like illness;
- sending influenza virus isolates and reporting the extent of influenza-like illness to Health Canada;

- designing, organizing and supporting special studies of provincial or territorial focus required to better define burden of disease or evaluate pandemic influenza response capacity;
- considering in a timely manner the recommendations of PIC and taking steps to adopt those that they have accepted and that fall within their scope of responsibilities as identified in the Working Agreement;
- undertaking promotional and other activities to decrease annual morbidity and mortality due to Influenza;
- acting as lead authorities in their respective jurisdictions on this health matter, to involve all other appropriate P/T Ministers in effecting an emergency response; and
- undertaking periodic reviews of immunization prioritization schemes for influenza vaccines and antiviral drugs.

### 1.3.3 The Pandemic Period

***Joint F/P/T Responsibilities***

- monitoring, reviewing and assessing any issues where immediate intervention may be required to ensure the health and safety of Canadians;
- ordering influenza vaccine and antiviral drugs and considering the need for, and ordering if necessary, any additional influenza vaccine in preparation for a second wave of pandemic influenza;
- refining coordinated and targeted communication strategies to keep the public, health professionals and any other persons or groups informed particularly in regards to the influenza pandemic and the recommendations on the use of influenza vaccines and antiviral drugs;
- disseminating communication and educational information concerning the first and second waves of the influenza pandemic and providing communication and educational information concerning the potential for a second wave of pandemic influenza; and
- deactivating their respective contingency plans for pandemic influenza.

***PIC Responsibilities***

- confirming that the conditions, based on an independent assessment of the information/intelligence and not necessarily subject to a declaration by the WHO, for an influenza pandemic have been met and recommending to the F/P/T Ministers of Health that contingency plans for pandemic influenza be activated;
- recommending vaccine composition, number of doses, priority groups to receive influenza vaccine and antiviral drugs, standards or acceptable rates for adverse influenza vaccine and antiviral drug reactions, mechanisms and time frames for reporting, the equitable distribution of available products to prevent or treat pandemic influenza, modifications to Influenza surveillance and communications strategies;
- assessing influenza vaccine coverage, disease impact, making recommendations concerning vaccine composition and updating guidance concerning use, and equitable distribution of influenza vaccines;

- taking into account influenza vaccines and antiviral drugs that may remain following the first and second waves of the influenza pandemic and making recommendations concerning their alternate use and redistribution;
- recommending enhanced surveillance and targeted studies to better monitor and define the influenza pandemic in Canada, and refine safety and performance evaluation criteria;
- proposing or developing criteria that can be used by itself or others to assist in the post pandemic evaluation of recommendations concerning processes and outcomes during the influenza pandemic; and
- recommending the influenza pandemic be declared over.

***Federal Responsibilities***

- declaring the activation of the pandemic phase of the CPIP;
- providing liaison with other countries and international organizations;
- allocating scarce influenza vaccine on an equitable basis to P/T based on the recommendations of PIC;
- collaborating with other government departments, in consultation with *Emergency Preparedness Canada* now known as the *Office of Critical Infrastructure and Protection and Emergency Preparedness* to activate emergency response teams (e.g., RCMP, military, others) as required;
- communicating on an urgent basis with P/T Ministers of Health to resolve any urgent policy and operational issues identified by PIC or others that will impact any pandemic influenza response capacity; and
- considering in a timely manner the recommendations of PIC and taking steps to adopt those that fall within the federal scope of responsibilities set out in the Working Agreement.

***P/T Responsibilities***

- activating, operationalizing and/or implementing their respective contingency plans; and
- communicating on an urgent basis together with their federal colleague to resolve any urgent policy and operational issues identified by PIC or others that will affect any pandemic influenza response capacity.

### 1.3.4 The Post-Pandemic Period

***Joint F/P/T Responsibilities***

- reviewing, evaluating and taking measures to improve or enhance their respective roles following the conclusion of an influenza pandemic; the pandemic influenza response capacity; and collaborative research activities.

***PIC Responsibilities***

- recommending post-pandemic studies to assist in evaluations of the pandemic influenza response capacity including, any medical, scientific and technical aspects; and submitting to F/P/T Ministers of Health a report together with its recommendations for future pandemics.

# Section Two

# BACKGROUND

## 2.1 Epidemiology of Pandemic Influenza

Influenza A viruses periodically cause worldwide epidemics, or pandemics, with high rates of illness and death. A pandemic can occur at any time, with the potential to cause serious illness, death and colossal social and economic disruption throughout the world. Experts agree that future influenza pandemics are inevitable but the timing of the next pandemic cannot be predicted. Since there may be little warning, contingency planning is required to minimize the devastating effects of a pandemic.

Historic evidence suggests that pandemics occurred three to four times per century. In the last century there were three influenza pandemics ("Spanish flu" in 1918–19; "Asian flu" in 1957–58 and "Hong Kong flu" in 1968–69), separated by intervals of 11 to 44 years. The worst, in 1918–19, killed an estimated 30,000 to 50,000 people in Canada and 20 to 40 million people worldwide. During each of the last three pandemics, the greatest increase in death rates occurred among persons less than 60 years of age; in 1918–19, the greatest number of deaths occurred in those 20 to 40 years of age.

Certain conditions make an influenza pandemic more likely:

- a new influenza A virus arising from a major genetic change i.e., an antigenic shift;
- a susceptible population with little or no immunity;
- a virus that is transmitted efficiently from person to person; and
- a virulent virus with the capacity to cause serious illness and death.

It is thought that new influenza viruses capable of causing pandemics in human populations arise through genetic mixing (reassortment) between human and avian influenza viruses. Pigs, which can be infected with both human and avian influenza viruses, may act as vehicles for such reassortment events. However, in 1997 direct transmission of avian H5N1 influenza from chicken to humans was demonstrated in the Hong Kong "bird flu" incident, indicating that contact with pigs is not essential for human infection with an avian virus. The majority of new influenza strains emerge in Southeast Asia where large human populations have close interactions with pigs and domestic fowl. The probability of a new strain emerging in North America is thought to be relatively low.

Based on the last two pandemics, it is estimated that the next pandemic virus will be present in Canada within three months after it emerges in another part of the world, but could be much sooner due to increases in the volume and speed of global air travel. Upon arrival, the virus may spread across Canada with great speed. In 1918, returning soldiers with influenza traveling on trains carried the virus from Quebec to Vancouver within a few weeks. The first peak of illness in Canada may occur within 2 to 4 months after the virus arrives in Canada. The first peak in mortality is expected to be approximately one month after the peak in illness. Based on past pandemics, in temperate climates when the pandemic virus arrives close to the usual annual influenza season (November to April) the interval from the arrival of the virus to the height of the epidemic can be very short.

In addition, it has been observed that an influenza pandemic usually spreads in two or more waves, either in the same year or in successive influenza seasons. A second wave may occur within three to nine months of the initial outbreak wave and may cause more serious illnesses and deaths than the first. In any locality, the length of each wave of illness is likely to be six to eight weeks.

## 2.2 Estimated Impact of an Influenza Pandemic on Canadians

The impact of the next influenza pandemic is difficult to predict, and is dependent on how virulent the virus is, how rapidly it spreads from population to population, and the effectiveness of prevention and response efforts. Despite the uncertainty about the magnitude of the next pandemic, estimates of the health and economic impact remain important to aid public health policy decisions and guide pandemic planning for health and emergency sectors.

During "normal" influenza epidemics which occur almost every winter in North America, an average of 5% to 20% of the population becomes ill, but as high as 30% to 50% of the population may become ill during severe influenza A epidemics. The highest rates of infection and clinical illness occur in children but serious complications and death occur mainly in the elderly. During a pandemic, historic data shows that over 50% of a population may become infected with the novel virus and the age-specific morbidity and mortality may be quite different from the annual epidemics with a higher proportion of deaths in persons under 65 years of age. In 1918–1919 pandemic, young adults had the highest mortality rates, with nearly half of the influenza-related deaths occurring persons 20-40 years of age. During the 1957–1958 and 1968–1969 pandemics in the U.S., persons under 65 years of age accounted for 36% and 48% of influenza-related deaths respectively.

An estimate of the health and economic impact of a pandemic in Canada has been performed using a model developed by Meltzer and colleagues, CDC, Atlanta, (available at http://www.cdc.gov/ncidod/eid/vol5no5/meltzer.htm) with assumptions based on U.S. epidemiologic data on various population health outcomes (death, hospitalization, outpatient treatment, and ill but no formal care) for severe influenza A epidemics, and data from previous pandemics. The model does not include the potential impact of antivirals drugs or an effective vaccine. These estimates may over- or under-estimate the potential impact in Canada; they are being provided for planning purposes only and to raise awareness regarding a very real possibility.

Based on the model an estimated 4.5 to 10.6 million Canadians would become clinically ill such that they would be unable to attend work or other activities for at least a half a day (Figure 1). This proportion, representing 15% to 35% of the population, does not include individuals who contract the virus and feel ill, but continue their usual activities. In addition, it is estimated that between 2.1 and 5.0 million people would require outpatient care, between 34 thousand and 138 thousand people would require hospitalization and between 11 thousand and 58 thousand people would die in Canada during an influenza pandemic (Table 1). These numbers are estimates and do not take into account the differences in the health care systems, practice patterns and health care seeking behaviour in Canada as compared to the U.S., nonetheless, they provide a picture of the magnitude and potential impact of the next influenza pandemic.

Figure 1
Estimated impact of Pandemic Influenza in Canada

4.5 to 10.6 Million - clinically ill (i.e., unable to attend work for at least half a day)

2 to 5 Million - require outpatient care

34,000 to 138,000 - require hospitalization

11,000 to 58,000 - deaths

Canadian estimates of resource use for patients with these health outcomes and Canadian resource unit costs were applied to provide and estimate of Canadian costs based on this American model. The economic impact (direct and indirect) on the health care system is estimated to be between 10 to 24 billion dollars.

Table 1
Estimated number of cases by outcome

| Outcome | Attack Rate 15% | | | Attack Rate 35% | | |
|---|---|---|---|---|---|---|
| | Mean number | 5th Percentile | 95th Percentile | Mean number | 5th Percentile | 95th Percentile |
| Death | 17,768 | 10,544 | 24,954 | 41,459 | 24,603 | 58,227 |
| Hospitalization | 46,639 | 34,042 | 59,166 | 108,824 | 79,431 | 138,053 |
| Outpatient Care | 2,086,327 | 2,027,496 | 2,145,282 | 4,868,097 | 4,730,825 | 5,005,657 |
| Ill, no formal care | 2,394,443 | 2,335,458 | 2,455,967 | 5,587,035 | 5,449,401 | 5,730,591 |
| **TOTAL** | 4,545,177 | 4,407,545 | 4,685,464 | 10,605,415 | 10,284,265 | 10,932,623 |

## 2.3 Terminology

### 2.3.1 Pandemic Phases

The World Health Organization (WHO) pandemic influenza phases (http://www.who.int/emc-documents/influenza/whocdscsredc991c.html) will be used throughout the Plan to assist with the organization of the staged response activities. This common terminology will facilitate communication especially for joint planning and response efforts between Canada, the U.S., and international stakeholders. Once a pandemic has began, different regions of the world may experience different phases at any given time.

For communication purposes the term "Canadian Pandemic Phase" may be used to denote the WHO phase which corresponds to the situation in Canada. Since it is unlikely that the novel influenza strain will first emerge in Canada, it is important to recognize that the declaration of the pandemic in Canada (Phase 1) will most likely occur some time after WHO Phase 1. Once Canada is affected, different communities may move through the phases at different times and rates, however the Canadian Pandemic Phase will continue to refer to the overall national situation.

Table 2 below describes the WHO phases.

For planning purposes, Phase 0 (Preparedness Levels 0 to 3) is considered to be the "interpandemic" period, Phases 1-4 correspond to the "pandemic period" and Phase 5 is the "post-pandemic" period.

Table 2
Pandemic Phases

| WHO pandemic phase (and abbreviated description) | Description |
|---|---|
| WHO Phase 0, Level 0<br>Inter-Pandemic | › No indications of any novel virus subtype have been reported |
| WHO Phase 0, Level 1<br>Novel virus identification in a human | › Novel virus detected in a person<br>› Little or no immunity in the general population<br>› Potential, but not inevitable precursor to a pandemic |
| WHO Phase 0, Level 2<br>Human infection confirmed | › Confirmation that the novel virus has infected two or more persons, indicating that the virus is infectious for humans |
| WHO Phase 0, Level 3<br>Human-to-Human Transmission Confirmed | › Novel virus demonstrates sustained person-to-person transmission with at least one outbreak over at least a two-week period in one country, or identification of the novel virus in several countries |

| WHO pandemic phase (and abbreviated description) | Description |
|---|---|
| WHO Phase 1<br>Pandemic confirmed | › WHO declaration of pandemic occurs when the novel virus is causing unusually high rates of morbidity and/or mortality in multiple, widespread geographic areas<br>(Note: This is likely to occur in Canada after the WHO declaration of a pandemic but may occur sooner if the novel virus emerges in Canada or is rapidly imported after its emergence outside Canada) |
| WHO phase 2<br>Outbreaks in multiple geographic areas | › Further spread of the virus with outbreaks reported in multiple geographic areas, resulting in the first peak of morbidity and mortality |
| WHO phase 3<br>End of first wave | › End of first wave when influenza activity has stopped or reversed in initially affected areas |
| WHO Phase 4<br>Second or later waves | › Recrudescence of outbreaks caused by the pandemic virus (within three to nine months in past pandemics) following the initial wave of infection; may affect different segments of the population |
| WHO Phase 5<br>Post-Pandemic / Recovery | › Return of the seasonal "epidemic" cycle with major disease impact on the elderly and very young |

### 2.3.2 List of Abbreviations

**ACPHHS** › Advisory Committee on Population Health and Health Security

**CCRA** › Canadian Customs and Revenue Agency

**CDC** › Centres for Disease Control and Prevention

**CEPR** › Centre for Emergency Preparedness and Response

**CIDPC** › Centre for Infectious Disease Prevention and Control

**CMOH** › Chief Medical Officer of Health

**CPIP** › Canadian Pandemic Influenza Plan

**CSIS** › Canadian Security Intelligence Service

**DND** › Department of National Defence

**EOC** › Emergency Operations Centre

**ERAP** › Emergency Response Action Plan

**ERP** › Emergency Response Plan

**F/P/T** › Federal/Provincial/Territorial

| | |
|---|---|
| **HERT** | › Health Emergency Response Team |
| **JBCRT** | › Joint Biological Chemical Response Team |
| **JTF2** | › Joint Task Force 2 |
| **MOH** | › Medical Officers of Health |
| **NACI** | › National Advisory Committee on Immunization |
| **NBC** | › Nuclear, Biological, Chemical |
| **NESS** | › National Emergency Stockpile System |
| **NML** | › National Microbial Laboratory |
| **NML4** | › National Microbial Laboratory Level 4 |
| **OCIPEP** | › Office of Critical Infrastructure and Protection and Emergency Preparedness |
| **PAHO** | › Pan American Health Organization |
| **P/T** | › Provincial/Territorial |
| **QTMH** | › Quarantine, Travel and Migration Health |
| **RCMP** | › Royal Canadian Mounted Police |
| **VAER** | › Vaccine Adverse Events Reporting |
| **WHO** | › World Health Organization |

## 2.4 Legal Considerations

The legal considerations linked to pandemic preparedness and response are complex, and need to take into account the existing federal legislation as well as legislation in the 13 provinces and territories.

In order to provide an informed and objective examination of these issues, Health Canada commissioned the services of several independent third parties to explore the key issues. One of the deliverables provides an overall legal framework within which the Canadian Pandemic Influenza Plan applies, others looked specifically at 1) patent, contract, tort and insurance issues and 2) labour and employment law issues. The legal considerations identified by the consultants will be considered in the next draft of the Plan.

## 2.5 Ethical Considerations

As part of the development of the latest version of the Plan, Health Canada, contracted an ethicist to provide "external" advice on some of the problematic ethical and related issues that have emerged as each of the planning components have been examined.

As a result of this process a report was generated that " *attempts to identify relevant ethical principles, rules and values, to develop a reasoned position on some previously articulated and morally problematic measures, and identifies some other moral concerns and questions raised by the planning activities. The report takes the position that the proper initial objective of planning for influenza response is to identify all measures that can diminish as much as possible the impact of the pandemic on our whole population and to assess the benefits and burdens, (including the costs) of these measures*".

The ethical considerations identified by the consultant, such as those surrounding the allocation or prioritization of scarce resources, are continuing to be considered in the next draft of the Plan.

# Section Three

# PREPAREDNESS

# 3.1 Introduction

## 3.1.1 Background

This document, the *Preparedness Section of the Canadian Pandemic Influenza Plan*, addresses prevention and preparedness activities during the inter-pandemic period. It is based on the deliberations of a number of pandemic influenza working groups, as well as the input of other stakeholder groups and organizations.

The national working groups and sub-committees, addressed specific issues in the Plan and developed the guidelines and reference documents annexed in the Plan. The current working groups include Surveillance, Vaccines, Antiviral Drugs, Public Health Measures, Communications and Health Services. Each annexed document has been created to address specific issues related to the overall goal of minimizing serious illness and overall deaths, and secondly, minimizing societal disruption among Canadians as a result of an influenza pandemic. The annexes were based on the data available and prevailing beliefs and approaches to pandemic planning at the time they were written; they may be updated separately as needed to ensure that they remain current and realistic.

The purpose of this section of the Plan is to provide information and guidelines that can be used in the development of plans for federal, provincial and territorial (F/P/T) and local management of an influenza pandemic.

## 3.1.2 Populations under Federal Jurisdiction

Across Canada, various federal departments and agencies provide a varied range of health services to a number of "populations". These "populations" (e.g., First Nations reserves, large military bases, federal prisons) could potentially cause a unprecedented increase in demand for health services in local health regions during a pandemic. Advanced planning is required to ensure that all P/Ts and regions in close proximity to these populations in addition to the appropriate federal authorities have agreed upon roles and responsibilities in the event of a pandemic.

The current status, outstanding issues and next steps for coordinated planning for First Nations communities will be addressed in Annex B (which is currently being revised). Federal level discussions have been initiated to ensure that the needs of other populations under federal jurisdiction are also addressed within the context of a co-ordinated pandemic response. These activities should not preclude discussions at the P/T and local level where many of the issues may have already been raised.

## 3.2 Components of the Preparedness Section

To date, the components of the Pandemic Influenza Plan have included surveillance, vaccine programs, the use of antivirals, health services, emergency services, public health measures and communications. Each of these components have been addressed in this section in terms of current status, including outstanding issues, and planning principles and assumptions. A list of potential planning activities has also been included.

It has been recommended that in order to make the Plan more comprehensive and similar in scope to other emergency plans, a component focusing on psycho-social issues should be added. It is anticipated that this new component will be developed and incorporated into future versions of this plan. In the interim, provincial/territorial and local planners are encouraged to think about the psycho-social implications of pandemic influenza when developing their own plans both in terms of preparedness and response activities.

### 3.2.1 Surveillance

Influenza surveillance is required to determine when, where, and which influenza viruses are circulating; the high risk populations; the intensity and impact of influenza activity; and to detect unusual events (e.g., infection by unusual influenza viruses, unusual syndromes caused by influenza viruses, and unusually large or severe outbreaks of influenza). Both virologic and disease surveillance are necessary for identifying influenza virus variants and for determining their ability to spread and cause disease. Surveillance data will drive the pandemic response as it will be used to determine the pandemic phase, and to track progression through the phases.

Laboratory surveillance involves the isolation of influenza viruses for analysis of antigenic and genetic properties. This activity is essential for monitoring the antigenic drift and shift of influenza viruses circulating among humans. Because the signs and symptoms of influenza are similar to those caused by other respiratory pathogens, laboratory testing must be conducted to definitively diagnose influenza. Rapid identification of a novel influenza virus and timely tracking of virus activity throughout the duration of the pandemic is critical to the success of a pandemic response. Prompt identification of a novel strain increases lead time for the development of a vaccine and implementation of prevention and control measures.

The collection of epidemiologic data regarding influenza-like illness (ILI) and influenza related hospitalizations and deaths is essential for determining the extent and severity of influenza epidemics and is particularly important during epidemics or pandemics associated with a newly recognized influenza variant. Epidemiologic data will help guide prevention and control strategies (e.g., the prioritization of limited vaccine supplies).

The objectives of Influenza surveillance are:

- to provide data on currently circulating strains and facilitate comparison with vaccine composition and vaccine recommendations,
- to describe the affected population thereby facilitating identification of high risk groups and comparisons between other populations or other influenza seasons,
- to detect unusual events including unusual or new strains, unusual outcomes/syndromes, or unusual distribution or severity of the disease within the population,
- to inform the pandemic response during a pandemic by tracking occurrence and progression of the pandemic through the population (by WHO phase).

#### 3.2.1.1 Current Status

The current national influenza surveillance system, "FluWatch", incorporates data from several sources including a sentinel physician network conducting surveillance for ILI, data from the national network of laboratories, and provincial/territorial activity level reporting. Laboratory data is provided on a weekly basis year-round.

On an ongoing basis, the national Respiratory Infections Surveillance Committee (previously known as the Surveillance Working Group) assesses the surveillance system, considers global influenza activity and makes recommendations to ensure preparedness for an influenza pandemic. One recommendation included the maintenance of national surveillance throughout the year to detect the arrival of novel influenza strains outside of the typical influenza season in Canada. This was implemented in 2003, when year-round surveillance began through the Fluwatch program, including the sentinel physicians network and the provincial and territorial Fluwatch representatives, in addition to the already year-round laboratory reporting through the Respiratory Virus Detections System. Thus year-round influenza surveillance presently consists of weekly reporting during the typical influenza season (October through April) and biweekly reporting during the typical "off season" (i.e., May to September).

As a result of the SARS outbreaks in early 2003, recommendations for the expansion of respiratory surveillance activities to include hospital-based surveillance for 1) unexplained clusters of severe respiratory illness within the facility, and 2) individual cases of severe respiratory illness in travellers recently returning from a potential zone of emergence of novel influenza strains, are also being implemented.

Other recommendations include improving the surveillance capacity to enable rapid assessment of the epidemiology of the pandemic once it arrives. Specifically this may include emergency room surveillance for ILI and unusual death due to respiratory disease, provisions for real-time influenza and pneumonia mortality surveillance and improved linkages between the sentinel and laboratory surveillance systems. In addition, there is a need to enhance laboratory-based surveillance including laboratory testing capacity and standardization of testing protocols. Once developed by the sub-group on Laboratory Testing, these will be shared with all appropriate laboratories. The Sub-group on Laboratory Testing has developed laboratory guidelines for pandemic planning and preparedness (Annex C).

The need to implement new initiatives, timing and feasibility will remain on the agenda of the Respiratory Infections Surveillance Committee. Recommendations from this group will be distributed through P/T representatives and will identify action items for the CIDPC and initiatives that should be considered for support by P/T and local governments.

The need for development of special study protocols that can be activated at the time of a pandemic (e.g., surveillance of returning travelers from areas affected by the pandemic virus) has been recognized by the committee and currently remains an outstanding issue.

At the federal level, regular environmental scanning for the detection of potentially significant influenza-like illness is conducted using official information sources for influenza surveillance (e.g., WHO and international government influenza surveillance programs) as well as unconfirmed reports from early warning systems (e.g., ProMed and other media scanning software such as the Global Public Health Intelligence Network (GPHIN). However, the sustainability of these systems, investigation and dissemination of information from these systems, and the streamlining of these processes to maximize efficiency, remains an outstanding issue.

#### 3.2.1.2 Planning Principles and Assumptions

Since surveillance data will drive the pandemic response it is important that physicians and other health care workers are educated and updated on an ongoing basis about the importance of ILI surveillance and their role in the system. Surveillance systems must be established in advance of a pandemic as there will be little time to augment capacity at the time of a pandemic. At the time of a pandemic, surveillance and laboratory testing capacity will be reduced (e.g., due to staff absenteeism and supply shortages) as compared to pre-pandemic periods, and only streamlined, resource efficient systems will continue to function. Special study protocols if required, (e.g., to determine epidemiology or to investigate reported vaccine-associated adverse events) at the time of a pandemic must be developed and pre-tested in the pre-pandemic period, recognizing that refinements may be necessary at the time of a pandemic.

The intensity and methods of virologic surveillance will differ depending on the phase of the pandemic. Initially, efforts should be directed toward detecting the arrival of the novel virus into previously unaffected areas and collecting epidemiologic data on infected persons. This data will be used to characterize virus activity and better target prevention and control measures. In addition, arrival of the novel virus into a particular area will guide the mobilization of resources needed to implement control measures. After the virus has spread throughout the country, virologic surveillance must continue in order to track the intensity of virus activity and detect any changes in the virus, including the development of resistance to antiviral drugs in different populations. Targeted studies may include serologic studies of immunity to the virus in different populations.

Studies of the etiologic agents responsible for secondary complications of influenza and their susceptibility to antimicrobial drugs will also be important, especially in times of short supply. In addition, surveillance data and targeted studies will be useful in assessing the impact of the pandemic on the health care system, as well as social and economic impact.

### 3.2.2 Vaccine Programs

Vaccination of susceptible individuals is the primary means to prevent disease and death from influenza during an epidemic or pandemic. The National Advisory Committee on Immunization (NACI) produces annual recommendations on the use of influenza vaccine in persons who are most at risk for influenza or those who could spread influenza to persons at greatest risk. These interpandemic recommendations are published annually in the Canada Communicable Disease Report. In the event of a pandemic, the Pandemic Influenza Committee, which includes representation from NACI, will provide recommendations to

F/P/T immunization programs on the use of the pandemic vaccine and priority groups for immunization. Efforts should be made to encourage all jurisdictions to adopt the national recommendations on priority groups at the time of a pandemic in order to facilitate equitable access and consistent messaging.

The objectives of the Pandemic Vaccine Program are:

- to provide a safe and effective vaccine program to all Canadians as soon as possible;
- to allocate, distribute and administer vaccine as rapidly as possible to the appropriate groups of people;
- to monitor safety and effectiveness of vaccination programs.

#### 3.2.2.1 Current Status

The annual influenza vaccine available in Canada is a trivalent vaccine, composed of two influenza A subtypes and one influenza B subtype. The vaccines contain 15 micrograms of hemagglutinin antigen for each constituent strain. For adults and older children previously exposed to viruses similar to those present in the vaccine, a single dose is normally recommended. In children (under the age of nine years) lacking such previous exposure, two doses are recommended.

Currently, Canada uses approximately 10 million doses of trivalent influenza vaccine a year (equivalent to 30 million monovalent doses of 15 micrograms), delivered predominantly through publicly-funded programs with established vaccine delivery infrastructures. Provinces and territories vary in their target populations for annual influenza programs, with the majority providing vaccines to NACI recommended high risk groups. Some provinces and territories have expanded their programs to include populations not currently identified as high risk groups (e.g., the Ontario "universal" program) and have experience in conducting large influenza vaccination campaigns.

The vaccine typically becomes available in October of each year and is currently provided by two suppliers. Annual influenza immunizations are administered in a variety of setting across Canada, including physicians' offices, public health clinics at schools or other community settings, workplace clinics, and other settings including pharmacies.

The Canadian approach to vaccine procurement and supply contingency planning includes the development of domestic infrastructure, a standby supply of fertilized hens eggs ready to convert into vaccines, the phasing in of new technologies, and further security of supply through multiple suppliers. Confirmatory study (clinical trial) protocols will be developed in order to ensure the most expeditious product licensure process while ensuring safety at the time of a pandemic.

The Vaccines Working Group has made recommendations regarding the priority groups for immunization in the event of a pandemic. These recommendations are discussed in Annex D. In addition, guidelines for planning a mass immunization campaign have been developed by P/T and local jurisdictions and can be adapted for use during a pandemic (e.g., Mass Immunization Campaigns: A 'How To' Guide, Capital Health Region of Alberta, April 2000 and Guidelines to Planning a Mass Immunization Campaign, Waterloo Region Community Health Department, Ontario, January 2001). The Vaccine working group will also develop guidelines for the monitoring of vaccine usage during a pandemic and identify issues around vaccine associated adverse event tracking and liability issues.

With respect to vaccine associated adverse events, the CIDPC maintains a vaccine associated adverse events surveillance system (VAAESS). Reports of adverse events associated with influenza vaccination are monitored through reports from P/T Ministries of Health (approximately 95%), with some being reported by health care professionals and by manufacturers direct to Health Canada (approximately 5%). The reporting is based mainly on voluntary notifications by clinicians and public health nurses. Data on hospitalizations in children possibly associated with vaccination are provided by the network of children's hospitals in Canada that participate in the Immunization Monitoring Program - Active (IMPACT). In addition, acute flaccid paralysis (including Guillain Barré Syndrome) is monitored by the Canadian Paediatric Surveillance Program.

Outstanding issues with respect to vaccine programs include the dose in micrograms required to achieve a protective response to a novel strain in a naive host, whether one or two doses of vaccine will be required, and timing of vaccine availability in conjunction with onset of pandemic activity in Canada. This information is unlikely to be available until the pandemic has begun. Continued international vaccine research efforts are a priority, including clinical studies to evaluate influenza vaccines containing novel subtypes (e.g., H5N3 vaccines) in immunologically naive populations, and the development and evaluation of new vaccine technologies (e.g., non-egg based production technologies, recombinant vaccines and adjuvant vaccines) to increase the capacity to produce an effective pandemic vaccine, reduce the lead time for vaccine production and increase the capacity to vaccinate larger populations.

Another outstanding issue is the development of a plan for equitable distribution of vaccine to provinces and territories. This plan would need to provide clear direction regarding the management of vaccine programs for populations under federal jurisdiction (First Nations, RCMP, Armed Forces & federal penitentiary inmates).

#### 3.2.2.2 Planning Principles and Assumptions

Currently the vaccines available in Canada are inactivated vaccines, manufactured in fertilized hens eggs. This production system is dependent on egg availability, and is characterized by stringent time requirements for identification of vaccine candidate strains, preparation of seed lots, testing and licensing, manufacturing and distribution. Manufacturers require approximately 56 days from seed strain availability to production of the first lot of vaccine for testing. Delays in the production of pandemic vaccine seed strains may occur, as highlighted by the difficulties encountered in trying to produce a vaccine against the H5N1 virus involved in the 1997 Hong Kong outbreak. As a consequence, vaccine may not be available when the first wave of the pandemic strikes Canada.

At the time of a pandemic, it is assumed that monovalent vaccines containing only the pandemic strain will be used. The dosage and schedule of the pandemic vaccine required to induce immunity in different populations must be determined through clinical testing. Where possible, clinical testing with vaccines for novel virus subtypes should be performed in the interpandemic period and confirmatory trial for the specific pandemic vaccine will be carried out at the time of a pandemic. This testing will probably be undertaken outside of Canada through international studies.

At this time, it is assumed that in a pandemic caused by a novel virus subtype, all persons will lack previous exposure and will likely require two doses of vaccine. It is unknown whether two 7.5 microgram doses or two 15 microgram doses or higher dosage will be needed. It is also unknown whether it might be possible to given an initial immunization with a generic vaccine

of the correct H type and then give a second dose with the specific antigen. If that is possible, domestic vaccine production and immunization could begin before Canada has the specific strain. Adjuvants could potentially enhance the immunogenicity of influenza vaccines and reduce the amount of antigen required; further research on adjuvanted vaccines is required.

During a pandemic, embargos on vaccine must be anticipated, as countries with production capacity are likely to see such an event as a national health emergency or a threat to national security. Canada has invested in a domestic supplier to offset this possibility. However it will not be known whether this supplier will be able to produce enough vaccine for the entire target population in a timely manner, until vaccine production with the novel strain commences. The possibility of multiple suppliers should be considered in the planning process.

When vaccine becomes available, initial supplies will not be sufficient to immunize the whole population and prioritization for vaccine administration will be necessary. The F/P/T governments will control the allocation and distribution of influenza vaccine during a pandemic and will implement specific recommendations regarding priority groups for immunization. Priority groups have been proposed in Annex D; however, these may change when more is known about the epidemiology the pandemic. It is assumed that with a two-dose program, completion of the second dose should be carried out as soon as possible to effect immunity and this should not wait until every priority group has received a first dose. This strategy will require extensive planning involving tracking and recall mechanisms.

In a pandemic, the current aim is to vaccinate the whole Canadian population over a period of four months on a continuous prioritized basis after receipt of the pandemic seed strain . This would require a minimum of 32 million monovalent doses (8 million doses per month). Vaccine clinical trials at the time of a pandemic will be needed to determine the amount of vaccine antigens per dose and the number of doses required to optimize immunity in various age groups. If two doses are needed to achieve protection, either the goal of immunizing the entire population over four months would have to be reassessed or the required quantities would need to be doubled to 16 million doses per month. Vaccine recommendations may not be finalized until pandemic activity has commenced. These recommendations will be distributed as national guidelines as soon as possible, with the expectation that they will be followed in order to ensure a consistent and equitable program.

For vaccine program planning purposes it is important to be prepared to immunize 100% of the population; however the actual proportion of the population that will voluntarily seek vaccination will depend on public perception of risk and severity of the disease. Therefore the demand, manifest as clinic attendance, will likely vary between jurisdictions and within each jurisdiction as the pandemic evolves. Previous experience with outbreak related immunization clinics indicates that it would be prudent to prepare for an initial demand of 75% of the target population. It is recommended that planning activities also focus on delivering a two-dose program to ensure that the public health response is ready to deal with this possibility.

In a pandemic, while immunization activities would be expected to greatly increase, reporting of vaccine associated adverse events through normal channels could be delayed due to reallocation of human resources or staff absenteeism. In this situation, information on potential vaccine associated adverse events must still be communicated in a timely manner from the local to P/T public health authorities and on to the Division of Immunization and Respiratory Diseases, CIDPC. CIDPC may need to contact other government departments (e.g., Biologics and Therapeutic Products Directorate, Public Works and Government Services Canada for the location for alternative suppliers) and stakeholders. Therefore there is a need to establish a plan to monitor vaccine safety and ensure timely communication of any potential vaccine associated adverse events during the pandemic. Specific targeted studies

and surveillance activities may be required if an adverse event suspected to be due to the new vaccine is detected.

Clinical trial protocols should be developed in advance of a pandemic and should be updated as needed based on available knowledge on influenza vaccines and changing technologies. Phase 3 clinical trials for vaccine efficacy may not be performed prior to the implementation of vaccine programs at the time of a pandemic. Estimation of vaccine effectiveness may need to be carried out by studying pre-determined target populations during the pandemic. Health Canada will coordinate studies on vaccine effectiveness with P/Ts, researchers and vaccine manufacturers.

In the inter-pandemic period consideration should also be given to improving pneumococcal vaccination coverage levels in NACI recommended "high-risk" groups. *Streptococcus pneumoniae* is a common cause of secondary bacterial pneumonia. The incidence and severity of secondary bacterial pneumonia during the pandemic may be reduced if there is a high level of immunity to the most common serotypes of *Streptococcus pneumoniae* in the high-risk groups.

### 3.2.3 Antivirals

Vaccines, when available, will be the primary public health intervention during a pandemic. However, vaccine may not be available as soon as required at the start of the pandemic and two doses of vaccine may be necessary to achieve an adequate immune response. Antivirals (anti-influenza drugs) are effective for both treatment and prophylaxis and may have a role as an adjunctive strategy to vaccination for the management of pandemic influenza. Antivirals will likely be the only virus-specific intervention during the initial pandemic response. Protection afforded by antivirals is virtually immediate and does not interfere with the response to inactivated influenza vaccines.

Two classes of antiviral drugs are currently available in Canada and have a role in the prevention and treatment of influenza infection: M2 ion channel inhibitors (cyclic amines) and neuraminidase inhibitors. M2 ion channel inhibitors interfere with the replication cycle of influenza A but are not effective against influenza B. Amantadine and rimantadine are examples of M2 ion channel inhibitors. Zanamivir and oseltamivir are examples of neuraminidase inhibitors. These drugs interfere with replication of both influenza A and B viruses, are well tolerated, and have been used effectively for the prophylaxis and treatment of influenza A and B infections.

Amantadine is approximately 70-90% effective in preventing illness from influenza A infection. When administered within two days of illness onset, it can reduce the duration of uncomplicated influenza A illness by approximately one day but it has not been shown to reduce the complications of influenza. Resistance to Amantadine has been shown to develop rapidly when this drug is used for treatment purposes.

When administered within two days of illness onset, zanamivir and oseltamivir can reduce the duration of uncomplicated influenza A and B illness by approximately one day. Current evidence suggests that the development of resistance during treatment of influenza is less likely with neuraminidase inhibitors than with amantadine. Recent community studies suggest that both neuraminidase inhibitors are similarly effective in preventing febrile laboratory-confirmed influenza illness. Further evidence is needed on the effectiveness of neuraminidase inhibitors in reducing complications of influenza. See Annex E for additional details on these antiviral drugs.

The objectives of the antivirals initiative are:

- to recommend a strategy for the use of antivirals during a pandemic
- to address issues around the security of supply of antivirals;
- to monitor drug resistance during the pandemic;
- to facilitate planning to ensure the distribution of available antiviral drugs to appropriate groups of people during the pandemic.

#### 3.2.3.1 Current Status

Only amantadine is licensed in Canada for both prophylaxis and treatment of influenza A infections. Rimantadine is not currently licensed in Canada and both zanamivir and oseltamivir are licensed for treatment purposes only. Neuraminidase inhibitors are much more expensive than amantadine at this time.

The national Antivirals Working Group has developed strategic options on the use of antivirals during a pandemic, including identification of priority groups. Security of supply is an issue that needs to be addressed as the existing supply of antivirals is very limited in Canada and globally and is primarily distributed within the private sector. It is expected that global supplies of antivirals will be consumed very rapidly at the start of a pandemic. Antivirals are prescribed by individual physicians on a first come first served basis. Prioritization of supplies and distribution and diversion of any available antivirals for public health use during a pandemic remains to be addressed. Other outstanding issues include the development of a protocol for monitoring of drug resistance during the pandemic.

#### 3.2.3.2 Planning Principles and Assumptions

An effective intervention with antivirals will require:

- a secure supply;
- a well planned distribution and monitoring system under the direction of F/P/T governments in collaboration with suppliers;
- ability to target priority groups;
- the availability of rapid diagnostic tests;
- enhanced surveillance for the detection of the virus, resistance of the virus to antivirals and drug associated adverse events;
- clinical guidelines for the appropriate use of antivirals;
- study protocols to further assess the effectiveness of antivirals for treatment and prophylaxis during a pandemic; and
- effective communication and education materials on antivirals for health care workers and the public.

Many of these issues are currently being addressed by the Antivirals working group.

Antiviral interventions will need to target specific populations, given that anticipated supply will be lower than anticipated demand. The PIC will make recommendations and provide advice concerning the identification and prioritization of individuals and groups of people to receive antiviral drugs for treatment and prophylaxis during the pandemic. Guidelines for the use of antivirals at times of short supply (priority groups) are being developed (see Annex E). It is

important that any antiviral response strategy be flexible given that the epidemiology (i.e., age-specific morbidity and mortality rates) of the pandemic and the availability of vaccine will only become evident once the pandemic has started. The timing of the use of antivirals during a pandemic should be guided by local surveillance data.

Suggested priority groups at this time will be in line with the overall goal of reducing morbidity and mortality. The role of antivirals in minimizing societal disruption is as yet unknown because current clinical evidence is limited and has yet to establish whether antivirals slow down or decrease viral transmission. Therefore, it may be most efficient to treat those patients who present within 48 hours of onset of influenza symptoms, with priority given to the severely ill and those with risk factors for severe complications.

During a pandemic, antiviral strategies should utilize all anti-influenza drugs available to Canadians and be adaptable to changing disease epidemiology and vaccine availability. It is recommended that amantadine be used for prophylaxis and the neuraminidase inhibitors be reserved for treatment of cases. This recommendation is based on the efficacy of these two types of drugs, which is approximately equal for treatment of cases, and the desire to minimize the development of amantidine resistance during the pandemic.

### 3.2.4 Health Services Emergency Planning

During the pandemic there will be a marked increase in demand for people (health care workers and others) to care for the sick and appropriate locations and equipment, to facilitate the provision of health care. Communities and health care organizations will need to have plans in place that will address what will be done when the health care system is overwhelmed and care must be provided by persons, both health care workers and volunteers, doing work which is not normally part of their daily activities and potentially in settings not usually used for health care.

The objectives of health services emergency planning are:

- to identify issues that will require multi-level collaborative planning during the interpandemic period;
- to facilitate awareness of the potential impact of a pandemic on the health care system;
- to prepare resources and guidelines that may be adapted during a pandemic.

#### 3.2.4.1 Current Status

Outbreaks of influenza occur annually in Canada. The morbidity and mortality during any given influenza season is largely dependent on the circulating strain(s) of influenza virus, and the susceptibility of the population. Those normally at high risk of influenza complications are the elderly, persons with chronic cardiac or respiratory conditions and the immunocompromised.

The spectrum of illness seen with influenza is extremely broad, ranging from asymptomatic infection to death, frequently due to secondary bacterial pneumonia or exacerbation of an underlying chronic condition. Many institutions in Canada are presently running at maximal or near maximal bed capacity. At the peak of the demand for health care during annual influenza seasons it is difficult for many facilities to manage the increased demand for beds and the demand for emergency room care. A report by the Manitoba Centre for Health Policy and Evaluation showed that the total number of hospital admissions and ambulatory visits

provided by the Winnipeg health care system increased only slightly (5% to 7%) during severe influenza seasons, however, the number of patients presenting with influenza-like illnesses increased substantially (approximately 70% for admissions, and 35% to 40% for physician visits). This indicates that there is an overall maximum of services which can be provided, which does increase somewhat in response to need, but also that the patient mix changes in response to the need for influenza care. (http://www.umanitoba.ca/centres/mchp/reports/reports_97-00/seasonal.htm) The scarcity of health resources will be exacerbated during a pandemic and may exceed the capacity of the current health care setting to cope.

Health services guidelines have been developed by the various PIC working groups to assist acute and chronic care institutions, health care planners, clinicians, and other stakeholders with planning for and coping with large numbers of influenza cases, some of whom may have severe disease or life-threatening complications. These documents are included as annexes to this plan for ease of use, and can be broadly classified into the following categories: clinical, infection control, resource management, and non-traditional settings and workers, which correspond to the main responsibilities of each of the working groups. The documents provide options, worksheets and guidelines to facilitate planning for a consistent and comprehensive response within the health sector.

These working groups will also be looking attraining and education modules for health care workers, volunteers and the public, and aftercare/recovery planning issues.

#### 3.2.4.2 Planning Principles and Assumptions

*Due to the broad scope of these planning activities this section has been sub-divided to correspond to the sub-groups that have been working on the different aspects of this component. Where relevant, documents or tools in the Annex will be referenced.*

i) **Infection Prevention and Control**

The incubation period for influenza usually ranges from one to three days. Influenza is spread from person-to-person by inhalation of small particle aerosols, by large droplet infection, by direct contact , or by contact with articles recently contaminated by nasopharyngeal secretions. Contact with respiratory secretions and large droplets, appears to account for most transmissions of influenza. The importance of the airborne route in influenza transmission is uncertain. Influenza is highly contagious; it can spread quickly in settings where large groups of people are gathered together, for example, among institutionalized populations.

The period of communicability for influenza virus is during the 24 hours before the onset of symptoms, and during the most symptomatic period, usually three to five days from clinical onset in adults and up to seven days in young children. In adults, the amount of viral particles shed for instance, while sneezing or coughing, is related to the severity of illness and temperature elevation. For those receiving antiviral therapy, the duration when virus particle are shed is likely to be shorter.

Survival of the influenza virus, outside the body, varies with temperature and humidity. It generally survives 24-48 hours on hard, non-porous surfaces, 8-12 hours on cloth, paper and tissue, and five minutes on hands. Survival of the virus is enhanced under conditions of low humidity and in the cold.

During the next pandemic it will be imperative to keep health care workers as healthy as possible. Occupational health issues which need to be considered include: vaccination of

health care workers, use of personal protective equipment, work exclusion/fitness to work criteria, and work reassignments (see Annex F).

The institutional infection control guidelines (Annex F) contain sections for both acute and long-term care institutions. The issues addressed include: immunization, hand hygiene, use of personal protective equipment (masks, gloves, gowns), patient isolation/accommodation, restriction of visitors, staff cohorting, environmental cleaning, and education for staff, patients and visitors.

The community infection control guideline (Annex F) contains sections pertaining to the general public, health care workers providing services in the community, as well as office-based medical and non-medical health care providers (public health clinics, physicians' offices, dental offices, physiotherapy clinics, and alternative health care providers). The issues addressed include: hand hygiene, the use of personal protective equipment (masks and gloves), cohorting persons with influenza-like illness (ILI), as well as temporary closure of schools, day cares and large, "non-essential" businesses.

### ii) Clinical Management of Influenza

The last two influenza pandemics occurred in 1957–1958 and 1968–1969. Therefore, the majority of currently practicing clinicians would have little or no experience with pandemic influenza disease and may not be aware of its potential variant presentation. The clinical guidelines that have been developed (Annex G) provide recommendations on the triage of pediatric and adult patients and on the management of patients within Long-Term Care Facilities (LTCF). Clinical Management of Influenza forms have been developed in order to assist health care staff with case management (Annex G). One form contains sections on investigations which should be considered, treatment recommendations, as well as information pertaining to the selection of patients (children and adults) for hospital admission and for admission to intensive care. Standardized admission and primary care forms, with a triage component, have also been developed to help to ensure consistency and minimize paper work (Annex G).

During a pandemic, it will be essential to inform both the public and health professionals about the symptoms and treatment of influenza, as well as when to seek advice and refer (see Annex G). Fact sheets regarding the clinical features of influenza and secondary complications have been developed to assist health care providers with diagnosis, and the general public with self-treatment (Annex G). These fact sheets include information pertaining to children, adults and the elderly. Any educational materials require advanced preparation in addition to an efficient and timely distribution plan.

### iii) Resource Management

Although the impact of a pandemic is unpredictable, for planning purposes it is advisable to expect a major disruption in critical community services. The health care system's response to this situation will be crucial. Regional, local and institutional planners will need to assess their health resource utilization and their health system capacity to cope during severe influenza epidemics and compare this to the estimated capacity required to response to a pandemic for their catchment area. The FluAid software using a U.S. model for estimating the health impact of a pandemic may be considered for resource planning purposes (http://www2.cdc.gov/od/fluaid/default.htm). In the U.S. model, however, health outcome was based on health care seeking behaviour or treatment received. It is expected that the treatment received in Canada for a person similarly ill with

flu may be quite different based on differences in the health care systems, practice patterns and health care seeking behavior. The model further assumed that health care was available for all persons seeking care, consistent with the U.S. demand-driven health economy.

It is expected that a substantial proportion of the work force may not be able to work for some period of time during the pandemic due to illness in themselves or in their family members. Health care workers are likely to be at higher risk of illness due to their exposures. During the 1957–1958 pandemic, the United Kingdom experienced an estimated 20% absenteeism rate in the general population and one-third of the staff in one hospital was ill during the peak of the pandemic.

Although in the majority of instances influenza is an acute, self-limiting upper-respiratory infection, complications do occur. In influenza epidemics and pandemics the overall attack rate is relatively high and occurs during a few weeks in any one location. Consequently, even a low frequency of complications result in marked increases in rates of hospitalizations. It is important to consider that while the waves of the pandemic tend to last for six to eight weeks in any locality, the demand on the health care system will not be at a constant rate during this period as the number of new cases seeking health services is likely to increase, peak, and then decline. The next pandemic wave may closely follow the first wave leaving little time for recovery. Resource needs will need to be reassessed continuously during this potentially overwhelming situation. It will be a challenge for acute care facilities to manage high ward census, high intensive care unit census, and high emergency department volumes in the face of reduced availability of health care workers and limited respiratory support equipment (see Annex H). Advanced consideration should be given to the management of adult and pediatric patients with respiratory distress when oximeters, ventilators, and other respiratory support equipment must be rationed.

Each facility needs to evaluate its human resources. As health care and hospital workers encompass a vast number of different individuals and occupations, a list of health care workers has been developed to assist with planning (Annex H). Emergency reallocation of staff and maintenance of staffing levels will be essential. Health care worker training and continuing education to encourage workers to maintain their skills, incentives to maintain training, and on-going communication are all important and should be planned for during the pre-pandemic period. During the pandemic, child care, emotional support and grief counseling needs to be addressed to facilitate maintenance of adequate staffing levels.

Elective medical and surgical admissions will need to be prioritized and possibly cancelled to meet some of the increased demands. A checklist of issues that should be considered during this prioritization process has been developed for Acute Care facilities (Annex H). Each institution will also need to evaluate their bed and ventilator capacity. A worksheet has been developed to assist facilities with determining their potential surge capacity (Annex H).

Pandemic influenza historically has been associated with excess mortality. It will be essential for jurisdictions to include a corpse management plan as part of their pandemic plan. Guidelines for the management of mass fatalities (Annex I) have been developed to assist with this process. Issues which are addressed include morgue capacity, corpse storage, transportation, management, burial/cremation, and grief counseling.

Planning needs to be undertaken by all orders of government and health service institutions throughout the country to anticipate and put into place strategies to meet a greatly increased demand for services in conjunction with staff shortages.

Recommendations on how to manage scare resources during an immunization pandemic are included in Annex H.

iv) **Non Traditional Workers: Health Care Workers and Volunteers**

Communities and health care organizations need to have strategies in place that will address what will be done when health care facilities are overwhelmed and medical care must be provided in non-traditional settings. Temporary hospitals and outpatient clinics may need to be set up to provide care. Guidelines for the provision of care in non-traditional settings have been developed to assist with this task (Annex J). The issues addressed include: administrative options for non-traditional hospitals, potential resources and sites, critical characteristics and support services needed, type of work done within the sites, and liability protection.

Guidelines have also been developed addressing the potential sources of additional labour during a pandemic, volunteer recruitment and screening, liability and personal insurance of workers, temporary licensing of workers, roles and responsibilities, and training programs (Annex J).

### 3.2.5 Emergency Services

Emergency services personnel should be engaged in all levels of pandemic planning. While it is expected that health authorities will lead the pandemic response in terms of surveillance, vaccine usage, use of antivirals and public health measures, and emergency service providers will play a critical role in coordinating the overall emergency response. The deployment of these services will be staged in accordance with the Canadian Pandemic Phases and will depend on the severity and impact of the pandemic.

The objectives of emergency service planning are:

- to encourage collaboration between emergency service personnel and public health authorities to ensure that the planned pandemic response will be coordinated;
- to facilitate a continuous state of "readiness" through ongoing education, testing and revision of response plans.

#### 3.2.5.1 Current Status

Emergency service authorities have been involved in the development of P/T pandemic plans. At Health Canada, the Centre for Infectious Disease Prevention and Control and the Centre for Emergency Preparedness and Response have worked together to ensure that the expertise contributed by each area is reflected in the development of this comprehensive plan.

#### 3.2.5.2 Planning Principles and Assumptions

Public Health authorities will need to work with those in the emergency service field in their jurisdiction in addition to other key stakeholders. The formation of a multi-disciplinary committee with clear authority and ability to coordinate pandemic planning and response in the P/T is essential. Roles and responsibilities during each pandemic phase need to be

assigned to individuals and organizations during the interpandemic period with mechanisms in place to compensate for staff turnover and attrition.

Each of the P/Ts have their own emergency preparedness legislation that deals comprehensively with emergency management issues within their boundaries. All planning will need to take the applicable legislation into consideration.

Response plans will need to be tested, likely in the form of emergency exercises involving all partners, on an ongoing basis.

### 3.2.6 Public Health Measures

There are certain decisions that will need to be made at each level of government as the threat of the pandemic emerges. Local public health officials will be asked about what measures can be taken by the public and within the community in order to prevent or control pandemic influenza in their jurisdiction. These decisions will range from population-based recommendations, for example whether to cancel public gatherings or close schools, to individual measures like whether members of the public should where masks. The effectiveness of these types of measures for the control of disease within a population have not, for the most part, been systematically evaluated. In addition, the potential impact of these measures will vary based on the phase of the pandemic in the particular community and the availability of other interventions such as vaccines and antivirals. The purpose and effectiveness of these measures may also be different in isolated communities compared to large urban centres.

The implications of these potential measures which range from local school closures to quarantine recommendations for ports of entry into Canada, must be recognized by all potential stakeholders and discussed during the interpandemic period.

The objectives of public health measures planning are:

- to make recommendations regarding public health measures such as quarantine, cancellation of public gatherings, and school closures,
- to foster development of a common approach within Canada and also, if possible, between the U.S. and Canada especially on issues for which there is a lack of scientific evidence to guide decision-making
- to encourage planning at all levels of government that will raise awareness regarding potential impact of these measures so that necessary partnerships and consultations with external stakeholders and take place during the interpandemic period.

#### 3.2.6.1 Current Status

The Public Health Measures Working Group was formed in November 2002 after a list of outstanding issues, classified for convenience as “public health measures”, was generated based on feedback from working group members and other reviewers of the draft. This new working group is currently refining the list of issues that need to be addressed and actively seeking literature and expert opinion on these issues. A guideline document will be developed once this consultation and review process has been completed and there is consensus on recommendations.

#### 3.2.6.2 Planning Principles and Assumptions

The Public Health Measures Working Group will be making recommendations to facilitate a consistent and optimal response to public health communicable disease control issues during a pandemic. Since there is a lack of scientific data on the effectiveness of these types of disease control measures, especially in conjunction with other influenza control measures, it is unlikely that the benefits of these measures will be quantifiable, especially in advance of the population being exposed to the pandemic virus. Therefore, in the absence of any conclusive data, the group will be making recommendations for the purpose of facilitating consistency between jurisdictions, which is considered to be valuable during the response phase.

P/T and local level planners are encouraged to explore the feasibility and implications of these types of control measures within their jurisdictions and to educate stakeholders (e.g., school boards, local business owners such as theatre owners etc.), should it become advisable to implement these types of restrictive measures during a pandemic.

### 3.2.7 Communications

During a pandemic two main messages will need to be expressed: what the ministry or other organization is doing and what the public can do. As the pandemic evolves the number of organizations that will become involved with the media on this issue will be enormous; there will be financial issues, human resource issues, social issues — issues affecting every area of society. Due to this broad scope it will be virtually impossible to have any "control" over the information. The focus instead should be on information management. Information management has three components: meeting the demand for information, acknowledging the limits of government capacity to solve every problem, and using consistent and complementary messages. Unlike other types of emergencies where the media coverage is much shorter, the information demands during a pandemic will be sustained over a long period, resulting in tremendous information demands. Sustaining public confidence over many months will be a huge challenge that will be based in part on consistency.

All key audiences (external, internal and international) must receive consistent, comprehensive and relevant information in a timely manner during any type of emergency. Planning activities are aimed at ensuring uniform and consistent messaging across Canada.

The objectives of communication planning are to:

- ensure that Canada's health partners are prepared to respond to enormous public communications challenges
- identify specific activities to promote consistent, coordinated and effective public communications
- describe options to ensure that the public communications demands of various scenarios are met clarify what activities should occur during the specific phases of the pandemic
- clarify what activities should occur during the specific phases of the pandemic

### 3.2.7.1 Current Status

#### *Provincial/Territorial/Local*

Most communication activities around influenza take place immediately preceding, and during, the typical influenza season from October to May each year. P/Ts produce materials to promote immunization each fall which are specific to the program they are offering in their jurisdiction. Most communication materials and strategies targeting the general public, media, health care workers and other community organizations (considered to be "external" key audiences) are geared at promoting immunization and reducing unnecessary hospital visits. These materials are developed at the P/T and local level with minimal federal input. To date, there has not been a centrally coordinated education campaign regarding pandemic influenza which targets the external key audiences.

#### *F/P/T*

A secure website has been set-up to facilitate pandemic planning and sharing of key resources among recognized stakeholders. The role of this website as a communication tool will likely be expanded during the pandemic.

Communication with "internal key audiences", mainly government decision makers and policy advisors, occurs at all levels of government. With respect to pandemic planning, the Pandemic Influenza Committee, which includes P/T representation, reports through the Advisory Committee on Population Health and Health Security to the Conference of Deputy Ministers. In addition, in February 2002 the role of Chief, Crisis Communications was established by Health Canada. This office is working on an "all-hazards approach" which is establishing protocols for F/P/T interaction. One initiative was the creation of a network of F/P/T communications contacts. This network was mobilized in during in response to the SARS outbreak and continues as a key component in communication planning for pandemic influenza and other health emergencies.

#### *Federal*

Federal communications on influenza currently focus on the dissemination of surveillance data, through FluWatch bulletins, which are directed to public health professionals but available to the public through the Health Canada website. These bulletins are produced on a weekly basis throughout the influenza season. Information regarding international influenza activity is disseminated by CIDPC, mainly through email or website postings, to key stakeholders as necessary. As well, fact sheets on influenza, including influenza vaccines, are posted on the Health Canada Website. Health Canada also communicate with "international key audiences" including the WHO and PAHO regarding influenza activity within and outside of Canada.

For emergency situations Health Canada does have a public information line which can be set up for "around -the-clock" coverage. Other communication issues are also being addressed as part of the "all-hazards approach" to crisis communications.

#### 3.2.7.2 Planning Principles and Assumptions

The Communications annex for the CPIP (Annex K) makes references to strategic considerations, target audiences, and recommended notification and public communication activities for consideration when planning for pandemic influenza.

It is important to ensure that all participants in the F/P/T communications network have identified fully trained back-up personnel that can step in if the original member is not available. When planning for this type of event, where the onset is unknown, succession training must be considered an ongoing activity.

The identification of spokesperson(s) and establishment of new, or evaluation of current distribution mechanisms (e.g., a toll-free phone number) also should occur during the inter-pandemic period. Templates for fact sheets, briefing notes and media communications may also be prepared in advance.

All governments should prepare to conduct their communications and public relations activities in a manner designed to retain public confidence, minimize disruption and anxiety.

Health Canada Communications would coordinate and facilitate Canada's response to pandemic influenza, with partners at the federal, provincial and local levels. Partners have varying roles and responsibilities, and coordination is crucial to ensure that messages are accurate and consistent and that jurisdictional boundaries are respected.

The development of the "all-hazards" communications plan is underway and would become a key part of communications planning for pandemic influenza. Health Canada would work with provincial and territorial ministries of health to develop key messages and mechanisms to communicate these messages to target audiences.

Health Canada Communications would identify departmental spokespersons and provide media training where necessary. All levels of government should agree to key messages and the role of spokespersons at all levels.

## 3.3 Planning and Preparedness Checklists

Planning and response activities can be broadly divided into four categories: prevention, preparedness, response/implementation and post-event recovery/after care. In the pre-pandemic period activities will focus on prevention and preparedness. Implementation of the response activities occur once an alert for a pandemic has been issued. Recovery and evaluation activities occur in the post-pandemic period. Front end investment of resources in prevention and preparedness activities will facilitate effective management of the pandemic and mitigation of negative outcomes.

In order to manage an emergency effectively it is essential to have comprehensive response plans in place. With respect to pandemic planning, the existence of these plans needs to be communicated to all potential stakeholders. Copies should be distributed to organizations and individuals that would be involved in the pandemic response and if possible advance testing of these plans should be coordinated with a mechanism to provide feedback to improve or update the plans.

This section of the document includes checklists specifically for influenza pandemic planning. This section is designed to facilitate P/T and local planning, possibly through the adaptation of existing emergency response plans.

To facilitate consistency the response plan will use the WHO pandemic phases to document the progression of the pandemic and need for specific actions in Canada. Most other countries have used this same approach.

### 3.3.1 Pandemic Planning Checklists

Planning for a pandemic involves consideration of what activities are necessary for optimal management of each stage of the pandemic. In this part of the document, activities have been listed and grouped according to the following components of the Plan:

- Surveillance
- Vaccine Programs
- Antivirals
- Health Services Emergency Planning and Response
- Communications

*(At time of publication a list corresponding to the Public Health Measures component had not yet been developed.)*

These lists have been developed to facilitate planning at the P/T and local levels and essential reflect planning activities that should be undertaken in the inter-pandemic period (i.e., Phase 0, Level 0). Actions corresponding to the other WHO Phases (starting with Phase 0, Level 1) are addressed in the response section of the Plan. Many of these activities and corresponding federal activities/responsibilities have been discussed and addressed by the various pandemic planning working groups. For further information on roles and responsibilities refer to the introduction/background section of the Plan.

Documents that have been developed by the working groups will be annexed in this preparedness section of the Plan or distributed as they become available. This is a preliminary

list of planning activities (aimed at P/T and local planners) that will need to be reviewed on a regular basis and updated as planning activities are completed. These planning activities should occur during the inter-pandemic period, recognizing that when novel strains are detected or pandemic activity starts plans will need to be reviewed and adapted as necessary.

#### 3.3.1.1 Surveillance Checklist

- Improve disease based surveillance, in collaboration with Health Canada's Centre for Disease Prevention and Control (CIDPC). Includes improvements to the current system and consideration of enhancements (e.g., emergency room surveillance and real-time influenza mortality surveillance)
- Improve virologic surveillance capability by ensuring at least one laboratory within the P/T has the capability to isolate and subtype influenza virus.
- Establish link with avian/swine influenza surveillance contacts within P/Ts.
- Develop protocols/guidelines for prioritization of laboratory services during times of high service demand and staff and supply shortages.
- Develop/improve communication mechanisms for the rapid and timely exchange of surveillance information between P/Ts, CIDPC and local stakeholders.
- Together with public health response consider how recovered cases, who are presumably immune to the novel virus, can be identified by occupation (e.g., health care provider or essential service worker) and location, thus facilitating development of a "list" of immune workers that may be strategically deployed.
- Consider how special studies, identified in collaboration with CIDPC, may be activated in your jurisdiction.
- Determine what information needs to be collected and how this will be done, to facilitate evaluation of surveillance activities in the post-pandemic period (including socio-economic evaluations).

#### 3.3.1.2 Vaccine Programs Checklist

- Enhance annual influenza vaccination coverage rates in NACI recommended "high-risk" groups, particularly groups with low coverage levels.
- Increase annual influenza vaccination coverage rates among health care and essential services workers.
- Increase pneumococcal vaccination coverage levels in NACI recommended "high-risk" groups (to reduce the incidence and severity of secondary bacterial pneumonia).
- Consider P/T modifications or refinements of nationally-defined priority target groups depending on local circumstances. For example, there may be specific groups of people in selected P/T whose absence due to influenza illness could pose serious consequences in terms of public safety or disruption of essential community services (e.g., nuclear power plant operators, air-traffic controllers at major airports, workers who operate major telecommunications or electrical grids).
- Modify/refine other aspect of the federal guidelines, as needed for P/T and local application.

- Develop contingency plans for storage, distribution and administration of influenza vaccine through public health and other providers to nationally-defined high-priority target groups, including:
  - Mass immunization clinic capability within P/T,
  - Locations of clinics (e.g., central sites, pharmacies, work place),
  - Vaccine storage capability – identify current and potential contingency depots,
  - Numbers of staff needed to run immunization clinics,
  - Plans to deploy staff from other areas from within and outside public health to assist in immunization,
  - Advanced discussions with professional organizations and unions regarding tasks outside routine job descriptions during a pandemic,
  - Training plan for deployed staff, and
  - Measures to be taken to prevent distribution to persons other than those in the priority groups.
- Determine how receipt of vaccine will be recorded and how a two-dose immunization program would be implemented in terms of necessary re-call and record-keeping procedures.
- Determine the number of people within the P/T who fall within each of the priority groups for vaccination (i.e., high-risk groups, health care workers, emergency service workers, specific age groups).
- Verify capacity of suppliers for direct shipping to health districts.
- Develop plans for vaccine security:
  - During transport
  - During storage
  - At clinics
- Ensure appropriate legal authorities are in place that will allow for implementation of major elements of the proposed distribution plan. (For example, will P/T laws allow for non-licensed volunteers to administer influenza vaccine? Do P/T laws allow for "mandatory" vaccination of certain groups, if vaccination of such groups is viewed by the P/T public health officials as being "essential" for public service?)
- Co-ordinate proposed vaccine distribution plans with bordering jurisdictions.
- Enhance VAAE surveillance, in collaboration with CIDPC.
- Determine what information needs to be collected and how this will be done, to facilitate evaluation of pandemic vaccine program activities in the post-pandemic period (including socio-economic evaluations).
- Review and modify plans as needed on a periodic basis.

### 3.3.1.3 Antivirals Checklist

- Consider the need for and availability of antiviral drugs including mechanisms for ensuring a secure supply of antiviral drugs.
- Modify/refine guidance provided by the Antivirals working group, as needed for P/T and local application (e.g., plan how to distribute available antivirals based on priority groups).
- Determine what information needs to be collected and how this will be done, to facilitate evaluation of an antiviral response in the post-pandemic period (including socio-economic evaluations).

### 3.3.1.4 Health Services Emergency Planning

- Develop P/T guidelines (modify federal guidelines) for prioritizing health care needs and service delivery, accessing resources and implementing infection control measures during a pandemic.
- Ensure that liability/insurance/ temporary licensing issues for active and retired health care workers and volunteers are addressed with P/T licensing bodies. Define the extent of care that health care workers/volunteers can perform according to P/T laws and union agreements.
- Bulk purchase and stockpile extra medical supplies. Explore the options for stockpiling extra medical supplies and identify sources for additional supplies.
- Develop mechanisms for coordinating patient transport and tracking/managing beds, e.g., central bed registries, call centre and centralised ambulance dispatch.
- Develop detailed regional and facility-level plans for providing health services during a pandemic, including the type of care to be delivered at different health care settings and the triage across sites; human resource, material and financial resource needs should be identified and consideration provided for prioritizing patient care.
- Assess health care personnel capacity: estimate number of HCW by type (physician, nurses, respiratory therapists, radiology technicians, etc), and by work setting (hospital, community, LTCF, paramedical); estimate number of non-active HCW (retired)
- Determine sources from which additional HCWs and volunteers could be acquired, include Emergency Measures Organizations and NGOs (Red Cross, St. John ambulance) in pandemic planning.
- Determine the number and type of health care facilities, and estimate their capacity: hospital beds, ICU beds, swing beds, emergency department, ventilatory capacity, oxygen supply, antibiotic supply.
- Determine potential alternative sites for medical care (possible sites could include shelters, schools, gymnasiums, nursing homes, day care centres).
- Identify sources of extra supplies needed to provide medical care in these non-traditional sites.
- Determine the capacity of mortuary/burial services, as well as social and psychological services for families of victims.
- Co-ordinate clinical care and health services plans with bordering jurisdictions to avoid migration to centres of perceived enhanced services.

- Consider establishing a Health Services Emergency Preparedness and Response group to ensure adequate participation by the health care sector and volunteer organizations in planning activities.
- Develop aftercare/recovery plans/guidelines.
- Ensure that guidelines are distributed to regional/local jurisdictions.
- Determine what information needs to be collected and how this will be done, to facilitate evaluation of the impact of the pandemic on health services in the post-pandemic period (including socio-economic evaluations).
- Review and modify plans as needed on a periodic basis.

#### 3.3.1.5 Emergency Planning and Response

- Identify the advantages of declaring a P/T emergency during a pandemic.
- Develop contingency plans to provide food, medical and other essential life-support needs for persons confined to their homes by choice or by direction from P/T/L health officials.
- Ensure communication between P/T Ministries of Health and Emergency Responders Organizations, as well as other P/T Ministries or Departments which would be impacted by a pandemic.
- Within P/T, estimate numbers of emergency services workers including police, fire, correctional, military, funeral services, utilities, telecommunications and F/P/T/L leaders (political leaders, managers of response teams) essential to pandemic response.
- Identify military personnel and voluntary organizations which would assist during a pandemic.
- Develop listing of essential community services (and corresponding personnel) whose absence would pose a serious threat to public safety or would significantly interfere with the ongoing response to the pandemic.
- Develop contingency plans for emergency back-up of such services and/or provision of replacement personnel.
  - Replacement personnel could come from lists of retired personnel and/or government or private-sector employees with relevant expertise.
  - Critical personnel in the non-health sector should also be considered as high-priority candidates for vaccination and/or chemoprophylaxis.
- Conduct environmental assessments of surge capacity of hospitals, alternate care sites, and other facilities.
- Develop aftercare/recovery plans/ guidelines.
- Determine what information needs to be collected and how this will be done, to facilitate evaluation of the emergency response in the post-pandemic period (including socio-economic evaluations).
- Conduct simulation exercise(s) .

#### 3.3.1.6 Communications Checklist

- Refine/modify F/P/T communication plans as needed and ensure consistency with the emergency preparedness and response framework to be established by the Special Task Force to the Conference of F/P/T Ministers of Health .
- Develop scenarios extending from the main Plan and for each circumstance establish 1) communications lead 2) strategic considerations 3) draft initial response.
- Translate messages into additional languages based on local demographics.
- Develop inventories of existing communication systems (hardware and software).
- Identify gaps in the existing systems that will require additional resources.
- Develop plans and mechanisms for communicating quickly and consistently with other jurisdictions and organisations.
- Develop plans and mechanisms for communications with all relevant audiences, including media, key opinion leaders, stakeholders, employees .
- Pilot test "single-window" points of contact in involved jurisdictions and organizations to ensure names/numbers/e-mails are up-to-date and document sharing is possible.
- Develop performance measurement criteria, to facilitate evaluation of the communication activities in the post-pandemic period (including socio-economic evaluations).

# Section Four

# RESPONSE

## 4.1 Introduction

In the previous sections of this Plan the conceptual and historical basis for pandemic planning were presented, the over-arching principles were highlighted, and preparedness activities corresponding to each component of the response were addressed in terms of current status, including outstanding issues, planning principles and assumptions.

In this, the Response Section of the Canadian Pandemic Influenza Plan, activities corresponding to each component (i.e., surveillance, vaccine programs, the use of antivirals, health services, emergency services, public health measures and communications), have been organized by Pandemic Phase. The tables presented include the key actions necessary to facilitate a comprehensive and consistent response to an influenza pandemic. It is recognized, however, that additional details and modifications will need to be added when the pandemic unfolds. For example, since it cannot determine in advance of a the appearance of a novel virus when an effective vaccine might be available, all activities listed under the "Vaccine Programs" component may occur at different phases than as currently listed in this document.

## 4.2 Phased Approach

The use of the WHO Pandemic Phases is helpful for planning purposes and to succinctly describe "the big picture" as the pandemic unfolds. For responders at the time of a pandemic, the focus will be on more localized "triggers" which may or may not correspond to the global situation. Furthermore within Canada there may be a period of time in Phase 2 where outbreaks have occurred in multiple but discrete locations as opposed to multiple nation-wide outbreaks. Therefore planners at all levels in the health and emergency service sectors, from municipal to federal, are encouraged to think about what "phase" their jurisdiction is in order to operationalize an appropriate response and also to recognize that their plans will be affected by the epidemiology of the pandemic nationally and globally. For example, the use of antiviral drugs may not be an option if global supplies are exhausted by other countries affected early in the pandemic.

Other unknown factors like the age distribution and severity of the illness caused by the pandemic strain and efficiency of transmission from human to human will also affect the response measures. This plan assumes the worst-case scenario and therefore may need to be significantly modified if the epidemiology does not support aggressive measures.

## 4.3 Federal Emergency Response

Planning at the federal level has resulted in the development of a generic emergency management structure. This structure, which indicates roles and responsibilities of specific groups in response to an emergency, is included in Annex L. It is envisioned that for pandemic influenza the PIC will provide technical advice, akin to the "Technical Advisory Group" (TAG) in the management structure. However, unlike the TAG, in the case of an influenza pandemic PIC would report to the Deputy Ministers of Health, not the Emergency Manager, as agreed upon in the current Working Agreement (see Introduction Section of the Plan for more detail on the role of PIC). The specific composition, roles and responsibilities of the "Advance Planning Group" still needs to be determined, however, members that can provide technical advice specific to pandemic influenza will be essential.

Also included in Annex L is a flow diagram that aligns response activities with the pandemic phases. This tool provides a visual overview of the response from a federal perspective.

The Canadian Pandemic Influenza Plan is a disease specific plan. It is the most specific, and therefore technical, type of emergency plan being developed as part of much larger initiative to create plans to deal with all types of national emergencies. By creating a set of plans that increase in specificity, that is, range from generic emergency response issues to more specific threats such as infectious diseases and finally to detailed disease-specific threats, it is anticipated that a set of "nested" or linked documents will be available that will be comprehensive enough and flexible enough to cover off any type of national emergency.

## 4.4 Experience to Date

Prior to March 2003, when Severe Acute Respiratory Syndrome (SARS) arrived in Canada, the vast majority of health care professionals and certainly the general public had limited personal experience with large outbreaks of serious respiratory infections. The SARS outbreak caused an exponential increase in the knowledge and experience with this type of health threat. Awareness of SARS, the severity of the illness, method of spread and implemented control measures penetrated Canadian society from coast to coast regardless of the actual case count in each province or territory. A previously largely unrecognized vulnerability was exposed in the headlines and on television as images of masked faces dominated the media.

Aware of the vulnerability, those involved in disease surveillance and pandemic planning saw this as a type of "dress-rehearsal" for pandemic influenza, recognizing that many of the response issues would be the same but on a much larger scale for influenza. Despite the high cost in terms of morbidity and mortality and economic losses due to SARS, pandemic influenza has the potential to be much worse. The response to pandemic influenza would need to be sustained for a longer period of time and would likely include a mass immunization effort on top of the acute care demands of caring for patients.

The SARS experience reinforced the need for preparedness activities as cited in the Preparedness Section of this plan. In particular the need for resources and surge capacity within the health system to deal with public health emergencies was highlighted. Advanced

preparation and removal any potential barriers in communication systems, data management technology, acquisition and mobilization of supplemental health care workers and settings, are just a few of the other needs identified in the Plan and validated by the SARS experience.

It is with this experience behind us that those involved in drafting this Plan have identified the key action items listed in this section of the Plan.

## 4.5 Key Response Activities by Pandemic Phase

The key response activities listed below have been organized by the component of the response that they relate to and the phase at which the action should take place. As previously discussed, there needs to be flexibility in the response since the availability of resources, such as vaccine or antiviral drugs, may necessitate deviation from the proposed sequence of response activities. It is expected that many of the response activities within each phase will need to occur simultaneously. The action items have not been prioritized within each phase.

The tables also include "Response level" designations (see Legend below) which have been provided for guidance only. It is likely that many activities, especially those currently designated as a "federal" level response, will be carried out by PIC or FPT-PIC sub-committees. Other non-governmental responders (e.g., Salvation Army, Red Cross) will likely be involved in the response but have not been specifically identified in this plan since it is anticipated that their respective roles/activities would be developed in conjunction with public health authorities.

***Legend:***

F = Federal  P/T = Province/Territory  L = Local

CPHLN = Canadian Public Health Laboratory Network
HPFB = Health Products and Food Branch
NACI = National Advisory Committee on Immunization
PPHB = Population and Public Health Branch
PWGSC = Public Works and Government Services Canada
CIHR = Canadian Institutes for Health Research

| Phase 0, Level 1 Novel virus identification in a human | | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Surveillance | Establish/heighten existing surveillance systems<br>Information sharing | › Collect and compile epidemiological data from involved countries<br>› Alert those currently involved in influenza surveillance (e.g., PIC, CCMOH, CPHLN, FluWatch)<br>➛ Messages from Health Canada to include information only<br>➛ Recommendations to be included by P/T or L level or, after consensus achieved, by PIC<br>➛ All correspondence to include list of recipients<br>› Review and confirm that all inter-pandemic (L0,P0) surveillance activities (via FluWatch) are operating optimally | F *(Lead: PPHB)*<br>F, P/T, L *(Lead: PPHB)*<br>F,P/T,L |
| Vaccine Programs | Mitigation of potential complications of influenza through use of current vaccine resources | › Promote pneumococcal vaccination of NACI recommended "high-risk" groups (to reduce the incidence and severity of secondary bacterial pneumonia) | P/T, L |
| Antivirals | Information gathering | › Assess/Re-assess availability of antiviral medications | F *(Lead: PPHB)* |
| Health Services | Evaluation of laboratory capacity<br>Information gathering | › Ensuring at least one laboratory within the P/T has the capability to isolate and subtype influenza virus and if not establish anticipatory "back-up" process<br>› Ensure that estimates of health care personnel capacity are current (i.e., estimated number of HCW by type (physician, nurses, respiratory therapists, radiology technicians, etc), and by work setting (hospital, community, LTCF, paramedical); estimated number of non-active HCW (retired)<br>➛ If possible identify HCW by type of work that they usually do | P/T *(Lead: CPHLN)*<br>F, P/T,L |
| Emergency Services | Information sharing | › Notification of emergency service managers of report of novel virus and current monitoring activities)<br>➛ Would include Emergency Health Services and Emergency Social Services managers at the P/T level | F, P/T *(Lead: Each P/T for their respective managers, PPHB for federal/national managers)* |

| Phase 0, Level 1 Novel virus identification in a human | | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Public Health Measures | Information preparation | › Review of existing public materials on influenza and influenza pandemics | F,P/T,L |
| | | › Review/Update educational materials on all aspects of influenza<br>➛ For health care professionals, other special audiences and the general public | F,P/T,L |
| Communications | Communication of findings with partners and stakeholders | › Notification of the Health Emergency Communications Network (HECN), as well as communications staff with international and non-governmental organizations | F *(Lead: Office of Crisis Communications, Health Canada)* |
| | Evaluation of emergency/rapid communication capacity | › Review existing communication systems (e.g., emergency contact lists, toll free capacity, dedicated Internet site capacity, information sharing systems) | F,P/T,L |
| | Information collection and dissemination | › Work with partners to improve the local, provincial/territorial and federal informatics infrastructure to support the potential information campaign (hardware and software) | F,P/T,L *(Lead: Office of Crisis Communications, Health Canada)* |
| | | › Ensure names/numbers/emails are up-to-date and document sharing is possible | F,P/T,L |

| Phase 0, Level 2 Human infection confirmed *(i.e., 2 or more human cases)* | | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Surveillance | Monitoring of evolving situation<br>Dissemination of data | › Ongoing collection and compilation of epidemiological data from involved country (s) | F *(Lead: PPHB)* |
| | | › Review/Revise standard reports for dissemination of epidemiological data | F *(Lead: PPHB)* |
| | | ➛ Consider common strategy for the communication of epidemiological data | F,P/T *(Lead: PIC)* |
| | | › Dissemination of epidemiological data | F,P/T |
| Vaccine Programs | Inventory and resource assessment<br>Preparation (Legal, Educational etc.) | › Conduct initial availability assessment of supplies (e.g., syringes, adrenalin, sharps disposal units), equipment and locations potentially required for a vaccine-based response (i.e., mass clinics) | F,P/T,L |
| | | › Develop list of currently qualified vaccinators and sources of potential vaccinators | F,P/T,L |
| | | › Review educational materials re. Administration of vaccines and adapt/update as needed | F,P/T,L |
| | | › Ensure that any legal issues that may impede rollout of a mass immunization program are addressed | P/T,L |
| | | › Collaborate on international vaccine development initiatives | F *(Lead: PPHB with vaccine manufacturers)* |
| | | › Ensure domestic vaccine manufactures are alerted and participating in international efforts | F *(Lead: PPHB)* |
| Antivirals | Antiviral strategy | › Perform an inventory assessment (drugs, formulations, and expiry dates)<br>› Determine the appropriate use of existing supplies | F, P/T *(Lead:PPHB* |

| Phase 0, Level 2 Human infection confirmed *(i.e., 2 or more human cases)* | | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Health Services | Guideline review/revision<br>Preparation (Legal, Educational etc.) | › Review protocols/guidelines for prioritization of laboratory services during times of high service demand and staff and supply shortages | F,P/T *(Lead: CPHLN)* |
| | | › Ensure that any legal/insurance issues that may impede recruitment and use of active and retired health care workers and volunteers have been addressed with P/T licensing bodies | P/T |
| | | › Prepare/update communications defining the extent of care that health care workers/volunteers can perform according to P/T laws and union agreements | P/T |
| Emergency Services | Education | › Review results of any previously conducted simulation exercises and consider what (if any) significant changes have occurred since the exercise was conducted | F,P/T,L |
| | | › Educate new staff about pandemic influenza | F,P/T,L |
| | | › Acquire (when available) and disseminate any laboratory testing materials (i.e., reagents) | F *(Lead: PPHB)* |
| Public Health Measures | Resource assessment and preparation | › Review staffing requirements for implementation of a pandemic response including mass immunization clinics, control measures, and public education | F,P/T,L |
| | | › Consider delaying introduction of public health programs that may not be adequately resourced if situation evolves into a pandemic or other alternatives such as contracting out | P/T,L |
| | | › Preparation of educational material for public inquiry phone-line staff | F,P/T,L |

| Phase 0, Level 2 Human infection confirmed *(i.e., 2 or more human cases)* | | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Communications | Ongoing communication with partners and stakeholders | › Activate inter- and intra-governmental response through national teleconferences (including the HECN, and the NGO health emergency communications group) | F *(Lead: Office of Crisis Communications, Health Canada)* |
| | | › Refine/modify F/P/T communication plans as needed and ensure consistency with the emergency preparedness and response framework to be established by the Special Task Force to the Conference of F/P/T Ministers of Health | FPT *(Lead: Office of Crisis Communications, Health Canada)* |
| | | › Ensure that rapid 24 hour translation capacity is in place and that all responders know how to access this resource | F *(Lead: PPHB &/or Co-ordination and Operations Group H.C.)* |
| | | › Ensure that web-site production staff are alerted to the potential need for development of sites and linkages | F,P/T |
| | | › Identify gaps in the existing systems that will require additional resources (e.g., funding for toll free lines, dedicated press conference facilities and HR support for comm. staff) | F,P/T,L |
| | | › Stage background technical briefings for media, external experts and other stakeholders | F,P/T |

| Phase 0, Level 3 Human to human transmission confirmed | | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Surveillance | Establish / Heighten enhanced surveillance systems | › Collect/compile/distribute epidemiologic data from involved country (s) | F *(Lead: PPHB)* |
| | Border issues | › Establish surveillance or increase current surveillance activities | F,P/T,L |
| | Plan for streamlined data collection | › Develop any new/updated case definitions | F,P/T *(Lead: PIC)* |
| | | › Implement border-based surveillance (depending on origin of cases)<br>➛ Including notifications to ill and well travellers | F, P/T *(Lead: PPHB)* |
| | | › Consider implementation of emergency room surveillance (especially in areas known to receive a lot of travelers from affected areas) | P/T,L |
| | | › Implement real-time influenza mortality surveillance | F,P/T,L |
| | | › Determine what information needs to be collected on cases and screening measures and how this will be done (e.g., data collection forms, database issues, data flow) | F,P/T,L |
| Vaccine Programs | Planning for vaccine distribution | › Ongoing involvement in vaccine development initiatives | F *(Lead: PPHB with vaccine manu-facturers)* |
| | Mass campaign infrastructure | › Review and modify if necessary, con-tingency plans for storage, distribu-tion and administration of influenza vaccine through public health and other providers to nationally defined high-priority target groups | F,P/T *(Lead: PIC)* |
| | | › Ensure staff are trained and infrastructure is in place to record immunizations, including requirements for a two-dose immunization program (i.e., re-call and record-keeping procedures) | P/T,L |
| | | › Review estimates of the number of people within the P/T who fall within each of the priority groups for vaccination (i.e., high-risk groups, health care workers, emergency service workers, specific age groups) and access strategies | F,P/T,L |

| Phase 0, Level 3 Human to human transmission confirmed | | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Vaccine Programs *(continued)* | | › Consider promotion of current (non-novel virus) influenza vaccination (to decrease the likelihood of re-assortment between the currently circulating strains and the novel strain | F,P/T *(Lead: PIC/NACI)* |
| Antivirals | Supply of antiviral drugs | › Perform an inventory assessment of available supplies | F,P/T *(Lead: PPHB)* |
| | Planning for antiviral drug distribution and tracking | › Review/revise recommended priority groups and plans for antiviral use based on available epidemiological data | F,P/T *(Lead: PIC)* |
| | | › Review and modify, if necessary, contingency plans for the availability, distribution and administration of antiviral drugs through public health and other providers to nationally defined high-priority target groups | F,P/T *(Lead: PIC)* |
| | | › Review estimates of the number of people within the P/T who fall within each of the priority groups for receipt of antiviral drugs (i.e., high risk groups, health care workers, emergency service workers, specific age groups) and access strategies | F,P/T,L |
| | | › Ensure staff are trained and infrastructure is in place to track who is receiving the drugs for the purpose of treatment and prophylaxis | P/T,L |
| Health Services | Management of suspect cases detected through enhanced surveillance | › Implement/Review infection control precautions for case management | F,P/T,L *(Lead: PPHB)* |
| | Preparation for increased demand on acute care sites | › Anticipate and plan to mobilize human and financial resources | F,P/T,L |
| | Preparation for providing supportive care in LTCFs | › Review/ update local and P/T data on the number & type of health care facilities, and capacity: hospital beds, ICU beds, swing beds, LTC beds with enhanced level of care, emergency department, ventilatory capacity, oxygen supply, antibiotic supply | P/T,L |
| | | › Review national recommendations for clinical management of cases and modify if necessary | F,P/T *(Lead: PIC)* |

| Phase 0, Level 3 Human to human transmission confirmed | | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Health Services *(continued)* | | › Conduct availability assessment of medications, supplies and equipment potentially needed for the response | P/T,L |
| | | › Review/modify/distribute P/T guidelines (or federal guidelines) for prioritizing health care needs and service delivery, accessing resources and implementing infection control measures during a pandemic | F,P/T,L |
| | | › Disseminate information on medical supply stockpiles and potential need for need and sources of additional supplies | F,P/T (Lead: PPHB) |
| | | › Review/modify/distribute detailed regional and facility-level plans for providing health services during a pandemic, including the type of care to be delivered at different health care settings and the triage across sites; human resource, material and financial resource needs, and directions regarding prioritizing patient care | P/T,L |
| | | › Disseminate strategy for collection/monitoring of data on health care service use/demands | P/T,L |
| | | › Disseminate strategy for tracking of recovered, presumably immune, cases | P/T,L |
| Emergency Services | Resource assessment and classification | › Ensure that estimates of numbers of emergency services workers including police, fire, correctional, military, funeral services, utilities, telecom-munications and F/P/T/L leaders (political leaders, managers of response teams) essential to pandemic response are current and that lists are available for dissemination | F,P/T,L |
| | | › Ensure that list of essential community services (and corresponding personnel) whose absence would pose a serious threat to public safety or would significantly interfere with the ongoing response to the pandemic, is up to date and available for distribution | L |

| Phase 0, Level 3 Human to human transmission confirmed | | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Emergency Services *(continued)* | | › Alert military personnel and voluntary organizations which would assist during a pandemic | F,P/T (Lead: PPHB) |
| | | › Consider international travel advisories | F *(Lead: PPHB)* |
| Public Health Measures | Preparation of educational materials and public health resources | › Review national recommendations for public health management of cases and other control measures and modify if necessary | F,P/T *(Lead: PIC)* |
| | | › Ensure adequate resources are available to implement recommended public health measures including isolation of cases | P/T,L |
| | | › Prepare/revise educational and guidance materials for public health partners (specifically provincial/territorial and local health departments who will be on the front lines with respect to prevention and control measures), the general public; some documents for the public should emphasize infection control in homes, schools, places of work | F,P/T,L |
| Communications | Ongoing timely communication with stakeholders | › Increased engagement with international partners | F *(Lead: Office of Crisis Communication H.C)* |
| | | › Establish ongoing communications with media, partners and public | F,P/T,L |
| | | › Activate Emergency Communications processes (as set out in the Emergency Communications Plans within each implicated organizations) | F |
| | | › Establish 1) communications lead 2) strategic considerations 3) draft initial response | F,P/T |
| | | › Recruit/supply additional resources to fulfill previously identified gaps in the existing systems | F,P/T,L |
| | | › Implement plans and mechanisms for communications with all relevant audiences, including media, key opinion leaders, stakeholders, employees | F,P/T |

| Phase 1 | Pandemic confirmed | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Surveillance | Timely collection, compilation and dissemination of epidemiological and clinical data | › Collect/compile/distribute epidemiologic data from involved country (s) (including Canada) | F *(Lead: PPHB)* |
| | | › Define clinical spectrum of disease (based on feedback from local level experts), revise case definitions as necessary | F,P/T,L |
| | | › Monitor surveillance activities; compile and report outcomes | F,P/T *(Lead: PPHB)* |
| | | › Distribute data collection forms and database transmission instructions/ protocols | F,P/T *(Lead: PPHB)* |
| | | › Review protocols for special studies and establish dedicated teams to activate the studies in collaboration with PPHB | F,P/T,L *(Lead: possibly PPHB, PIC, and/or CIHR)* |
| Vaccine Programs | Vaccine development<br>Preparation/Implementation of mass immunization clinics | › Ongoing involvement in vaccine development/testing/production initiatives | F *(Lead: PPHB, HPFB, manu-facturers)* |
| | | › Vaccine purchase | F,P/T *(Lead: PPHB* |
| | | › Review/revise recommended priority groups for immunization based on available epidemiologic data | F,P/T *(Lead: PIC)* |
| | | › Modify/refine of nationally defined priority target groups depending on local circumstances | P/T,L |
| | | › Modify/refine other aspect of the federal guidelines, as needed for P/T and local application | P/T,L |
| | | › Review and modify if necessary, plans for vaccine security (i.e., during, transport, storage and clinic administration) | P/T,L |
| | | **When vaccine is available…**<br>› Activate immunization clinic capability | P/T,L |
| | | › Implement streamlined VAAE surveillance, in collaboration with PPHB | F,P/T,L *(Lead : PPHB)* |
| | | › Arrange for direct shipping of vaccine to health districts | F *(Lead: PWGSC)* |

| Phase 1 | Pandemic confirmed | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Vaccine Programs *(continued)* | | › Communicate with bordering jurisdictions to facilitate awareness of the vaccine distribution plan and coordination of efforts as much as possible | F,P/T,L |
| Antivirals | Strategic and controlled use of antivirals | › Review/revise recommendations on antiviral use based on available epidemiologic data | F,P/T *(Lead :PIC)* |
| | | › Based on local epidemiology and available supplies, consider administering antiviral prophylaxis and treatment to priority groups | F,P/T,L |
| | | › Communicate with bordering jurisdictions to facilitate awareness of any antiviral distribution plans | F,P/T,L |
| | | › If antivirals are being used, implement adverse drug reaction reporting system | F,P/T *(Lead: HPFB)* |
| Health Services | Use of optimal infection control practices<br>Management of increased demand on health care system | › Evaluate infection control recommendations/practices and revise as necessary | F,P/T *(Lead: PPHB)* |
| | | › Implement protocols/guidelines for prioritization of laboratory services during times of high service demand and staff and supply shortages | P/T,L |
| | | › Review/implement mechanisms for coordinating patient transport and tracking/managing beds e.g., central bed registries, call centre and centralized ambulance dispatch | P/T,L |
| | | › Access sources of additional HCWs and volunteers i.e., Emergency Measures Organizations and NGOs (Red Cross, St. John ambulance) | F,P/T,L *(Lead: PPHB)* |
| | | › Acquire extra supplies needed to provide medical care in non-traditional sites and open non-traditional sites as needed | P/T,L |
| | | › Co-ordinate clinical care and health services activities with bordering jurisdictions to avoid migration to centres of perceived enhanced services | P/T,L |
| | | › Implement strategy for tracking of recovered, presumably immune, cases | |

| Phase 1 | Pandemic confirmed | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Emergency Services | Mitigation of potential health care and societal disruption due to pandemic activity/ public fear of influenza | › Open emergency operation centres | F,P/T |
| | | › Activate plans to provide food, medical and other essential life-support needs for persons confined to their homes by choice or by direction from P/T/L health officials | F,P/T<br>P/T,L |
| | | › Assist with preparation and operation of alternate care sites, and other "over-flow" facilities | F,P/T,L |
| | | › Consider travel advisories within Canada | F,P/T<br>*(Lead: CCMOH)* |
| Public Health Measures | Implementation of public health response | › Evaluate interventions and revise recommendations as necessary | F,P/T,L |
| | | › Integrate national recommendations for isolation into practice at the local level | P/T,L |
| | | › Implement use of mandatory isolation orders if necessary | F,P/T |
| | | › Review/update/disseminate national recommendations regarding containment strategies (i.e., cancellation of public gatherings, school closures) | P/T,L |
| | | › Monitoring/tracking of compliance with containment recommendations | F,P/T,L |
| | | › Participate in strategy for tracking recovered, presumably immune, cases | P/T,L |
| | | › Development/updating of educational materials for the public and health care providers as the pandemic evolves | F,P/T,L *(Lead: PIC)* |

| Phase 1 | Pandemic confirmed | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Communications | Ongoing communication with stakeholders and public | › Institute daily conference calls of the HECN, ensure it is integrated with PIC meetings | F *(Lead: Office for Crisis Communications, HC)* |
| | | › Ongoing communication with global partners | F |
| | | › Ongoing communications with media, partners and public | F,P/T,L |
| | | › Establishment of joint website/linkages | F,P/T,L |
| | | › Launch multi-media campaign targeting specific target groups including the general public, health care workers and local community support networks | F *(Lead: Office for Crisis Communications, HC)* |
| | | › Stage joint media and stakeholder briefings with representatives of Health Canada, relevant P/T officials, CMOH rep, etc. | F,P/T,L *(Lead: Office for Crisis Communications, HC)* |
| | | › Updating of public resources | F,P/T,L |

| Phase 2 | Outbreaks in multiple geographic areas (within Canada) | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Surveillance | Provision of up-to-date epidemiological data on evolving pandemic | › Collect/compile/distribute epidemiologic data from involved country (s) and jurisdictions within Canada | F *(Lead: PPHB)* |
| | | › Revise surveillance case definitions as necessary | F,P/T *(Lead: PIC)* |
| | | › Monitor surveillance activities; compile and report outcomes | F,P/T *(Lead: PPHB)* |
| | | › Monitor and modify (if necessary) data collection/transmission processes/protocols | F,P/T,L |
| | | › Monitor and report on progress of implemented special studies | F,P/T,L *(Lead: PPHB and/or CIHR)* |
| Vaccine Programs | Vaccine Development<br>Preparation / Implementation of mass immunization clinics | › Ongoing involvement in vaccine development/testing/production initiatives | F *(Lead: PPHB, HPFB, manufacturers)* |
| | | **If vaccine is available... (see Phase 1 above)** | |
| | | › Collect and compile reports of total people immunized with one and/or two doses | F,P/T,L |
| | | › Ongoing VAAE surveillance | F,P/T,L |
| | | › Monitoring of vaccine supply, demand, distribution and uptake | F,P/T |
| | | › Recruitment of trained immunization staff from unaffected jurisdictions to ease demand in affected areas | F,P/T |
| Antivirals | Strategic use of antiviral drugs | › Ongoing consideration of antiviral use based on priority groups, available supplies and local epidemiology | F,P/T,L |
| | | › Monitoring of antiviral availability, demand, distribution and uptake | F,P/T *(Lead: HPFB)* |
| | | › Monitoring for antiviral resistance | F,P/T,L |
| | | › Ongoing monitoring for adverse drug reactions | F,P/T,L |

| Phase 2 | Outbreaks in multiple geographic areas (within Canada) | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Health Services | Management of increased demand on health care system | › Consider prioritization of laboratory services across different jurisdictions in order to accommodate high-service demands and staff and supply shortages | P/T,L |
| | | › Open additional alternative sites for medical care as required | F,P/T,L |
| | | › Monitor capacity of mortuary/burial services, as well as need for social and psychologic services for families of victims, and implement/establish alternative sites for provision of services as necessary | P/T,L |
| | | › Track national stocks of medications as well as necessary medical equipment and supplies, including ventilators, oxygen, etc. Consider strategies to mitigate shortfalls | F,P/T,L *(Lead: PPHB)* |
| Emergency Services | Optimal use of available emergency resources | › Determine if international travel advisories are sufficient / still warranted | F *(Lead: PPHB)* |
| | | › Declare a P/T or National state of emergency (if necessary) | F,P/T |
| | | › Evaluate need for use of national stockpile system and distribute supplies as needed | F *(Lead: PPHB)* |
| | | › Evaluate need for military assistance with preparation and operation of alternate care sites, and other "over-flow" facilities | F *(Lead: PPHB)* |
| Public Health Measures | Optimization of the public health response | › Ongoing evaluation of interventions and revision of recommendations as necessary | F,P/T *(Lead: PIC)* |
| | | › Monitor effectiveness of isolation recommendations and other control measures | P/T,L |
| | | › Review/update/disseminate national recommendations regarding containment strategies (i.e., cancellation of public gatherings, school closures) | F,P/T *(Lead: PIC)* |
| | | › Monitoring/tracking of compliance with containment recommendations | P/T,L |
| | | › Sharing of educational and other resources across jurisdictions | F,P/T,L |

| Phase 2 | Outbreaks in multiple geographic areas (within Canada) | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Public Health Measures *(continued)* | | › Recruitment of trained public health Recruitment of trained immunization staff from unaffected jurisdictions to ease demand in affected areas staff from unaffected jurisdictions to ease demand in affected areas | F,P/T,L |
| Communications | Ongoing timely communication with stakeholders and public<br>Evaluation of adopted communication strategy | › Ongoing communication with HECN, international organizations and other health partners including NGOs | F *(Lead: Office of Crisis Communications)* |
| | | › Ongoing communications with media, partners and public | F,P/T,L |
| | | › Training of additional communication leads to allow for staff rotation | F,P/T,L |
| | | › Evaluation of implemented communication strategy | F,P/T,L |
| | | › Updating of public resources | F,P/T,L |
| | | › Ensure that all audiences, including media, key opinion leaders, stakeholders, employees are satisfied with the level of communication | F,P/T,L |
| | | › Daily joint briefings of media involving representatives of the implicated organizations | F,P/T |

| Phase 3 | End of first wave | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Surveillance | Review / evaluation of data and surveillance strategy<br>Ongoing surveillance (especially for un-linked cases) | › Estimate burden of disease during outbreak period<br>› Review/modify case definition<br>› Determine ongoing surveillance needs for both documentation of end of first wave and detection of any new cases/outbreaks<br>› Evaluate active surveillance systems | F,P/T<br>F,P/T<br>F,P/T<br>F,P/T |
| Vaccine Programs | Vaccine coverage, efficacy and safety | › Ongoing involvement in vaccine development/testing/production initiatives<br>**If vaccine was not available during earlier phases see Phase 1 & 2 above.**<br>**If vaccine was available and administered in earlier phases…**<br>› Expansion of vaccine programs to cover population not yet immunized<br>› Summarize and report coverage data (with one and/or two doses) and VAAE data<br>› Examine vaccine efficacy<br>› Ongoing VAAE surveillance<br>› Restocking of supplies and resumption of routine programs<br>› Review/revise guideline and/or protocols used during the mass campaigns | F *(Lead: PPHB, HPFB, manu-facturers?)*<br>P/T,L<br>F,P/T<br>F *(Lead: PPHB)*<br>F,P/T,L<br>P/T,L<br>F,P/T,L |
| Antivirals | Evaluation of antiviral use (if applicable) | › Perform inventory assessment and ongoing monitoring of antiviral availability<br>› Evaluate effectiveness of strategic antiviral use (in Canada and/or based on international reports)<br>› Summarize and report antiviral resistance data<br>› Summarize and report adverse drug reaction data | F,P/T,L<br>F,P/T<br>F,P/T *(Lead: PPHB)*<br>F *(Lead: HPFB)* |

| Phase 3 | End of first wave | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Health Services | Restocking, evaluation and preparation for next wave | › Review/revise clinical management guidelines | F,P/T *(Lead: PIC)* |
| | | › Review/revise infection control guidelines | F,P/T *(Lead: PIC)* |
| | | › Review/revise guidelines for management of mass fatalities (if applicable) | F,P/T *(Lead: PIC)* |
| | | › Across all health care services (including mortuary) - assess status of stocks, impact of first wave, reorder supplies, and ensure circulation of staff to avoid burnout | P/T,L |
| | | › Closure/reduction in use of "alternate care/over-flow sites" | F,P/T,L |
| | | › Restocking of laboratory supplies and resumption of routine laboratory services | F,P/T,L |
| | | › Develop projections for future laboratory requirements (i.e., human and physical resources including test kits etc.) | F,P/T |
| | | › Summarize/evaluate and report on the use of social and psychologic services for families of victims | P/T,L |
| | | › Track national stocks of medications as well as necessary medical equipment and supplies, including ventilators, oxygen, etc. Consider strategies to mitigate shortfalls in next wave | F,P/T *(Lead: PPHB)* |
| Emergency Services | Restocking, evaluation and preparation for next wave | › Review/revise travel advisories | F *(Lead: PPHB)* |
| | | › Assess need for ongoing state of emergency (if applicable) and criteria for ending the state of emergency | F,P/T *(Lead: PPHB)* |
| | | › Evaluate use of national stockpile system (if applicable) and restock supplies as needed | F *(Lead: PPHB)* |
| | | › Evaluate need for ongoing military assistance with operation of alternate care sites, and other "over-flow" facilities | F *(Lead: PPHB)* |
| | | › Review/revise emergency plans | F,P/T,L |

| Phase 3 | End of first wave | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Public Health Measures | Evaluation and preparation for next wave | › Review/revise public health management guidelines | F,P/T *(Lead: PIC)* |
| | | › Document and report lessons learned | F,P/T,L |
| | | › Update educational materials | F,P/T,L |
| | | › Resume routine public health activities/programs | F,P/T,L |
| | | › Promote immunization for influenza and other secondary infections observed during the first wave (if appropriate and applicable) | P/T,L |
| | | › Disseminate all revised guidelines to appropriate stakeholders | F,P/T,L |
| | | › Evaluate the effectiveness of public health measures (e.g., closure of schools or other institutions etc.) | F,P/T,L |
| Communications | Evaluation of communication activities | › Evaluate communication strategy | F,P/T,L |
| | | › Update public education materials and scripts for phone line staff | F,P/T,L |
| | | › Scale back staffing as need diminishes | F,P/T,L |

| Phase 4 | Second or later waves | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Surveillance | Early detection of second wave | › Ongoing surveillance<br>› As per Phases 1&2 | F,P/T,L |
| Vaccine Programs | Immunization of the non-immune | › Ongoing involvement in vaccine development/testing/production (if applicable)<br>**If vaccine is available…**<br>› As per Phases 1&2, immunization of non-immune population | F<br>*(Lead: PPHB, HPFB, Manufacturers)* |
| Antivirals | Strategic and controlled use of available antiviral drugs | › Based on local epidemiology and available supplies, and lessons learned from previous wave (s), recommend administering antiviral prophylaxis and treatment to priority groups<br>› As per Phases 1&2 | F, PT *(Lead: PIC)* |
| Health Services | Gearing up to meet increasing demands and control of spread | › Implement activities as per updated guidelines<br>› As per Phases 1&2 | F,P/T,L |
| Emergency Services | Optimal use of emergency resources | › As per Phases 1&2 | |
| Public Health Measures | Efficient and Strategic public health response | › As per Phases 1&2, building on lessons learned | |
| Communications | Ongoing communication with stakeholders and public | › As per previous phases | |

| Phase 5 | Post-pandemic/recovery | | |
|---|---|---|---|
| **Component** | **Focus** | **Actions** | **Response Level** |
| Surveillance | Review, evaluation and return to routine operations | › Resume routine ongoing laboratory and disease surveillance<br>› Estimate burden of disease during outbreak periods | F,P/T,L<br>F,P/T |
| Vaccine Programs | Review, evaluation, resumption of routine programs | › Provide recommendations for routine prevention and control including recommendations for vaccines | F,P/T *(Lead: PIC/NACI)* |
| Antivirals | Review and evaluation | › Provide recommendations for the strategic use of antivirals during a pandemic based on lessons learned within Canada and internationally | F,P/T *(Lead: PIC)* |
| Health Services | Review, evaluation, return to routine operations | › Review/activate aftercare/recovery plans/guidelines | F,P/T,L |
| Emergency Services | Review, evaluation, return to pre-emergency activity level | › Review/activate aftercare/recovery plans/ guidelines | F,P/T,L *(Lead: PPHB)* |
| Public Health Measures | Review, evaluation, resumption of routing programs | › Provide recommendations for routine prevention and control including recommendations for any control measures other than vaccines and antivirals<br>› Provide lessons learned for ourselves and the public and prepare for the next emerging infectious disease | F,P/T *(Lead: PIC)*<br>F,P/T,L |
| Communications | Review, evaluation, return to routine operations | › Review performance measurement criteria and evaluate response | F,P/T,L |

# Canadian Pandemic Influenza Plan

## Annexes

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# A Glossary of Terms and Acronyms

The following glossary of terms refers to terms used throughout the Plan, including the annexes.

| A | |
|---|---|
| **ACD** | Acute and Communicable Disease Prevention |
| **ACPHHS** | Advisory Committee on Population Health and Health Security |
| **Acute** | Short term, intense symptomatology or pathology, as distinct from chronic. Many diseases have an acute phase and a chronic phase. This distinction is sometimes used in treatments. |
| **Acute Care** | Acute care refers to services provided by physicians and other health professionals and staff in the community and in hospitals. These include emergency, general medical and surgical, psychiatric, obstetric and diagnostic services. |
| **Alternate Level of Care** *See also Acute Care, InterQual Criteria* | This term refers to alternative care that, had it been available, would have been more appropriate for a person in an acute care hospital who does not meet the criteria for acute care. |
| **Amantadine** | An antiviral agent indicated in adults and children >1 year for the treatment of illness due to influenza and for prophylaxis following exposure to influenza type A viruses. It has no effect against the influenza type B virus. |
| **Antigen** | Any molecule that is recognized by the immune system and that triggers an immune response, such as release of antibodies. |
| **Antigenic drift** | A gradual change of the hemagglutinin or neuraminidase proteins on the surface of a particular strain of influenza virus occurring in response to host antibodies in humans who have been exposed to it. It occurs on an ongoing basis in both type A and type B influenza strains and necessitates ongoing changes in influenza vaccines. |
| **Antigenic shift** | The movement of a type A influenza virus strain from other species into humans. The novel strain emerges by reassortment with circulating human influenza strains or by infecting humans directly. Because they flourish in the face of global susceptibility, viruses that have undergone antigenic shift usually create pandemics. |
| **Antibody** | Protein molecules that are produced and secreted by certain types of white cells in response to stimulation by an antigen. |
| **Antigen** | Any substance that provokes an immune response when introduced into the body. |

| B | |
|---|---|
| **Bed** *(Institutional Bed)* | In any institution a "bed" includes infrastructure support, including staffing, which is required to care for the patient in that "bed". Therefore the requirements for a "bed" in an intensive care unit, for example, include all the support required for a patient to be cared for at that level. |

| C | |
|---|---|
| **Case Weight** | A measure representing the relative resources consumed by different types of hospital cases, distinguishing simple from complex cases. (See Resource Intensity Weights). |
| **CCRA** | Canada Customs and Revenue Agency |
| **CDC** | Centers for Disease Control and Prevention – an American federal agency of the HHS |
| **CDPE** | Center for Disease Prevention and Epidemiology - OHS |
| **CEPR** | Centre for Emergency Preparedness and Response |
| **CIDPC** | Centre for Infectious Disease Prevention and Control |
| **CMOH** | Chief Medical Officer of Health |
| **CPIP** | Canadian Pandemic Influenza Plan |
| **Cross-resistance** | The development of strains of a pathogen that not only withstands the effects of a given antimicrobial agent, but other chemically related agents as well. |
| **CSIS** | Canadian Security Intelligence Service |

| D | |
|---|---|
| **DND** | Department of National Defence |

| E | |
|---|---|
| **Epidemic** | An outbreak of infection that spreads rapidly and affects many individuals in a given area or population at the same time. |
| **Epidemiology** | The study of epidemics and epidemic diseases |
| **EOC** | Emergency Operations Centre |
| **ERAP** | Emergency Response Action Plan |
| **ERP** | Emergency Response Plan |

| F | |
|---|---|
| **Flu** | Another name for influenza infection, although it is often mistakenly used in reference to gastrointestinal and other types of clinical illness. |
| **F/P/T** | Federal/Provincial/Territorial |

| G | |
|---|---|
| **Goblet cell** | A mucous gland in the epithelial lining of specific mucus-secreting passages of the respiratory tract. Mucigen droplets swell the upper portion of the cell, giving it a goblet-like shape. |

| H | |
|---|---|
| **H1N1** | A strain of influenza type A virus that caused the pandemic infection of 1918 1919 and that continues to circulate in humans. H3N2 A strain of influenza type A virus that caused the pandemic infection of 1968 1969. Of the three influenza viruses that currently circulate in humans, this type causes the greatest morbidity and mortality. |
| **H5N1** | A strain of influenza type A virus that moved in 1997 from poultry to humans. While the outbreak of this virus was rapidly contained, it produced significant morbidity and mortality in persons who became infected, probably from direct contact with infected poultry. |
| **Health Care Workers** *(Pandemic)* | Health Care Workers are professionals, including trainees and retirees, nonprofessionals and volunteers, involved in direct patient care; and/or those working/volunteering in designated health care facilities or services. For the purposes of this definition, Health Care Workers are those whose functions are essential to the provision of patient care, and who may have the potential for acquiring or transmitting infectious agents during the course of their work. This group would also include public health professionals during the pandemic. |
| **Health Status** | The state of health of an individual or a population, as in community health status. |
| **Hemagglutinin** | An agglutinating protein antigen spiking from the surface of the influenza virus. Differences in the amino acid sequencing of the HA antibody give rise to the different subtypes of type A virus. |
| **HERT** | Health Emergency Response Team |
| **High-Risk Groups** | Those groups in which epidemiologic evidence indicates there is an increased risk of contracting a disease. |

| I | |
|---|---|
| **Inactivated vaccine** | A vaccine prepared from killed viruses, which no longer retain their infective properties. |
| **Infection** | Condition in which virulent organisms are able to multiply within the body and cause a response from the host's immune defences. Infection may or may not lead to clinical disease. |
| **Infectious** | Capable of being transmitted by infection, with or without actual contact. |
| **Influenza** | A highly contagious, febrile, acute respiratory infection of the nose, throat, bronchial tubes, and lungs caused by the influenza virus. It is responsible for severe and potentially fatal clinical illness of epidemic and pandemic proportions. |
| **Influenza type A** | A category of influenza virus characterized by specific internal proteins and further subgrouped according to variations in their two surface proteins (hemagglutinin and neuraminidase). It infects animals as well as humans and has caused the pandemic influenza infections occurring in this century. |
| **Influenza type B** | A category of influenza virus characterized by specific internal proteins. It infects only humans, causes less severe clinical illness than type A, and spreads in regional rather than pandemic outbreaks. |
| **Influenza type C** | A category of influenza virus characterized by specific internal proteins. It does not cause significant clinical illness. |
| **Inpatient** | An individual who receives health care services while admitted in a health care facility overnight or longer. |
| **Isolate** | A pure specimen obtained by culture. |
| **InterQual Criteria** *(See also Alternate Level of Care)* | A set of measurable clinical indicators, as well as diagnostic and therapeutic services, reflecting the need for hospitalization. Rather than being based on diagnosis, they consider the level of illness of the patient and the services required; thus they serve as the criteria for all acute hospital care, regardless of location or size of the hospital. The criteria are grouped into 14 body systems, and there are three sets of criteria for each body system: Severity of Illness, Intensity of Service, and Discharge Screens. |

| J | |
|---|---|
| **JBCRT** | Joint Biological Chemical Response Team |
| **JTF2** | Joint Task Force 2 |

| L | |
|---|---|
| **Licensed Practical Nurse (LPN)** | A nursing school graduate who has been licensed by a provincial/territorial body; occasional synonym, licensed vocational nurse (LVN). |
| **Low Income Cutoff Point (LICO)** | The proportion of people in low-income households to the total population in private households. LICOs are set where families spend 20 percent more of their pre-tax income than the Canadian average on food, shelter and clothing. The LICO takes into account changes in the Consumer Price Index of the area and gives various LICOs according to different family sizes. |

| M | |
|---|---|
| **MD** *(Doctor of Medicine)* | An individual holding a doctoral degree in medicine. |
| **Mean** *(statistical)* | Commonly referred to as the "average", the mean of a set of quantities is the sum of the quantities, divided by the number of quantities summed. |
| **Median** *(statistical)* | The value such that for a series of ranked quantities, one half are above the median, and one half are below. |
| **MEDLARS** | Medical Literature Analysis Retrieval System: The computer on which "Medline" and "AIDS Line" reside at the National Library of Medicine. |
| **MEDLINE** | Medical Literature Analysis Retrieval System On-Line. A computer searchable database of published medical literature. |
| **MOH** | Medical Officers of Health |
| **Morbidity** | Departure from a state of well-being, either physiologic or psychologic illness. |
| **Morbidity Rate** | The number of cases of an illness (morbidity) in a population divided by the total population considered at risk for that illness. |
| **Mortality** | Death, as in expected mortality (the predicted occurrence of death in a defined population during a specific time interval). |
| **Mortality Rate** | The number of people who die during a specific time period divided by the total population. |
| **MOU** | Memorandum of Understanding |
| **Mutation** | A permanent, transmissible change in the genetic material of a cell. |

| N | |
|---|---|
| **NACI** | National Advisory Committee on Immunization |
| **NBC** | Nuclear, Biological, Chemical |
| **NESS** | National Emergency Stockpile System |
| **Neuraminidase** | A hydrolytic protein antigen spiking from the surface of the influenza virus. It dissolves the protective viscosity of cellular mucous lining, allowing release of new viruses into the respiratory tract. |
| **Neuraminidase inhibitors** | A new class of antiviral agents that selectively inhibit neuraminidase activity in both influenza type A and type B viruses, while having no effect on human neuraminidase. |
| **NML** | National Microbial Laboratory |
| **NML4** | National Microbial Laboratory Level 4 |
| **Non-traditional Site** | The following is a definition of a Non-traditional Site for the purposes of Pandemic Influenza planning: A Non-traditional Site is a site offering care for influenza patients. These sites are currently not an established health care site, or are established sites which usually offer a different type or level of care. The Functions of an Non-Traditional Site will vary depending on the needs of the community but will focus on monitoring, care and support of influenza patients. |

| O | |
|---|---|
| **OCIPEP** | Office of Critical Infrastructure and Protection and Emergency Preparedness |
| **Opportunistic Infections** | An infection in an immune compromised person caused by an organism that does not usually cause disease in healthy people. Many of these organisms are carried in a latent state by virtually everyone, and only cause disease when given the opportunity of a damaged immune system. |
| **Outpatient** | An individual who receives health care services without being admitted to a health care facility. |

| P | |
|---|---|
| **PAHO** | Pan American Health Organization |
| **Palliative** | A treatment which provides symptomatic relief, but not a cure. |
| **Pandemic** | Referring to an epidemic disease of widespread prevalence around the globe. |
| **Parenteral** | Not through the mouth. Intravenous, intramuscular, and intradermal administration are all parenteral. |
| **Pathogen** | Any disease-producing microorganism or material. |
| **Pathogenesis** | The natural evolution of a disease process in the body without intervention (i.e., without treatment); Description of the development of a particular disease, especially the events, reactions and mechanisms involved at the cellular level. |
| **PCR** *(Polymerase Chain Reaction)* | A highly sensitive test that can detect and/or DNA fragments of viruses or other organisms in blood or tissue. PCR works by repeatedly copying genetic material using heat cycling, and enzymes similar to those used by cells. |
| **Pediatric** | Relating to the medical specialty concerned with the development, care and treatment of children from birth through adolescence. |
| **Pneumocyte** | An alveolar epithelial cell in the lungs. |
| **Potential Years of Life Lost (PYLL)** | The PYLL rate per 1000 population is the ratio of the total years of life lost between ages 0 and 75 due to a specific cause to the total population. The cause of death selected is the underlying cause of death, which is the cause that initiated the sequence of events leading to death. |
| **Preventive Care** | A comprehensive type of care emphasizing priorities for prevention, early detection and early treatment of conditions, generally including routine physical examinations, immunization, and well-person care. |
| **Preventive Medicine** | Taking measures for anticipation, prevention, detection, and early treatment of disease. |
| **Primary Care** | Primary care is the first level of care, and usually the first point of contact, that people have with the health care system. Primary care involves the provision of integrated, accessible health care services by clinicians who are accountable for addressing a large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community. It includes advice on health promotion and disease prevention, assessments of one's health, diagnosis and treatment of episodic and chronic conditions, and supportive and rehabilitative care. |
| **P/T** | Provincial/Territorial |

| | |
|---|---|
| **Public Health** | The art and science of protecting and improving community health by means of preventive medicine, health education, communicable disease control, and the application of social and sanitary sciences. |
| ***P* Value** | The probability of obtaining a given outcome due to chance alone. For example, a study result with a significance level of $p < 0.05$ implies that 5 times out of 100 the result could have occurred by chance. |

| Q | |
|---|---|
| **QTMH** | Quarantine, Travel and Migration Health |
| **Qualitative** | Of, relating to, or expressed in relative or subjective terms‹impossible to precisely quantify. |
| **Quantitative** | Of, relating to, or expressed in terms of quantity. |

| R | |
|---|---|
| **Raw Data** | Measurements and observations recorded on study data forms. Unedited computer-generated listings of data from study data forms, prior to use of reduction and summary procedures needed for data analysis. |
| **RCMP** | Royal Canadian Mounted Police |
| **Record** | A paper or electronic document that contains or is designed to contain a set of facts related to some occurrence, transaction, or the like. |
| **Registered Nurse (RN)** | One who has graduated from a college or university program of nursing education and has been licensed by the state. |
| **Resistance** | The development of strains of a pathogen that are able to withstand the effects of an antimicrobial agent. |
| **Respiratory epithelium** | The pseudostratified coverup of internal body surfaces, which lines all but the finer divisions of the respiratory tract. |
| **Respiratory tract** | Structures contained in the respiratory system, including the nasopharynx, oropharynx, laryngopharynx, larynx, trachea, bronchi, bronchioles, and lungs. |
| **Rimantadine** | An antiviral agent indicated in adults for the treatment of illness due to influenza and for prophylaxis following exposure to influenza type A viruses. It has no effect against the influenza type B virus. |

| S | |
|---|---|
| **SARS** | Severe Acute Respiratory Syndrome |
| **Secondary Care** | Services given by a specialist, normally after a referral from a primary care physician, and often in an acute care hospital. It does not include the services of specialists whose services are only available in major urban centres; this level of service would normally be considered Tertiary Care. |
| **Significance** *(statistical)* | Infers that an observation was unlikely to have occurred by chance alone. Statistical significance is often based on a $p$ value $< 0.05$. Below this level, the smaller the p value, the greater the statistical significance. |
| **Standard Deviation** *(statistical)* | A statistic that shows the spread or dispersion of scores in a distribution of scores (i.e., a measure of dispersion). The more widely the scores are spread out, the greater the standard deviation. Standard deviation = the square root of the variance. |
| **Statistics, Descriptive** | The intent of descriptive statistics is to summarize and present data, e.g., measures of central tendency (mean, mode, median) and measures of variability (standard deviation, variance, standard error of the mean). |
| **STD** | Sexually Transmitted Disease |
| **Strain** | A group of organisms within a species or type that share a common quality. For example, currently circulating strains of influenza include type A (H1N1), type A (H3N2), and type B (H3N2). |
| **Subacute Care** | Comprehensive, cost-effective inpatient level of care for patients who: a) have had an acute event resulting from injury, illness or exacerbation of a disease process, b) have a determined course of treatment and, c) though stable, require diagnostics or invasive procedures but not intensive procedures requiring an acute level of care. Typically short term, subacute care is designed to return patients to the community or transition them to a lower level of care. Subacute care is offered in a variety of physical settings. The philosophy of subacute care is to ensure that patients are receiving the most appropriate services at the most appropriate phase of their illness while ensuring quality, cost-effective outcomes. |
| **Subtype** | A classification of the influenza type A viruses based on the surface antigens hemagglutinin (H) and neuraminidase (N). |
| **Symptoms** | Any perceptible, subjective change in the body or its functions that indicates disease or phases of disease, as reported by the patient. |

| T | |
|---|---|
| **Toxicity** | The extent, quality, or degree of being poisonous or harmful to the body. |
| **Toxin** | A harmful or poisonous agent. |
| **Triage** | A system whereby a group of casualties or patients is sorted according to the seriousness of their illness or injuries, so that treatment priorities can be allocated between them. In emergency situations it is designed to maximize the number of survivors. |
| **Type** | A classification of influenza viruses based on characteristic internal proteins. |

| V | |
|---|---|
| **Vaccination** | The act of administering a vaccine. |
| **Vaccine** | A substance that contains antigenic components from an infectious organism. By stimulating an immune response (but not disease), it protects against subsequent infection by that organism. |
| **VAER** | Vaccine Adverse Events Reporting |
| **Virology** | The study of viruses and viral disease. |
| **Virus** | A group of infectious agents characterized by their inability to reproduce outside of a living host cell. Viruses may subvert the host cells' normal functions, causing the cell to behave in a manner determined by the virus. |
| **Volunteers** *(Pandemic)* | A volunteer is a person registered with a government agency or government designated agency, who carries out unpaid activities, occasionally or regularly, to help support Canada prepare for and respond to a Pandemic Influenza outbreak. A volunteer is one who offers their service of their own free will, without promise of financial gain, and without economic or political pressure or coercion. |

| W | |
|---|---|
| **WHMIS** | The Workplace Hazardous Materials Information System (WHMIS) is Canadian legislation covering the use of hazardous materials in the workplace. This includes assessment, signage, labelling, material safety data sheets and worker training. WHMIS closely parallels the U.S. OSHA Hazcom Standard. Most of the content of WHMIS is incorporated into Canada's Hazardous Products Act and the Hazardous Materials Information Review Act which are administered by Health Canada. Certain provincial laws may also apply. Enforcement of WHMIS is performed by the Labour Branch of Human Resources Development Canada or the provincial/territorial OHS agencies. |
| **Wild type** | A naturally occurring strain of virus that exists in the population. |
| **World Health Organization (WHO)** | A specialised agency of the United Nations generally concerned with health and health care. |

# B Pandemic Influenza Planning Considerations in On-reserve First Nations Communities

## 1. Introduction

The national pandemic influenza plan provides a framework that will guide planning in all jurisdictions in Canada including on-reserve First Nations (FNs) communities[1]. Annex B of the plan has been developed based on a request to Health Canada's First Nations and Inuit Health Branch (FNIHB) from the Pandemic Influenza Committee (PIC) to describe some of the unique issues related to pandemic planning in FNs communities.

Annex B outlines some of the key activities needed to have sufficient pandemic influenza planning for on-reserve FNs communities and proposes the respective roles and responsibilities of various jurisdictions.

On-reserve FNs pandemic influenza planning needs to be integrated into a seamless system of planning across all Canadian jurisdictions.

This Annex B document is the result of extensive consultation with key stakeholders. Input on the draft document was sought from FNIHB regional public health staff (including medical officers and nurses), members of the federal/provincial/territorial Pandemic Influenza Committee, the Centre for Emergency Preparedness and Response at the Public Health Agency of Canada, the Assembly of First Nations, and the National Aboriginal Health Organization. The document was refined based on comments received from all of these groups.

## 2. Current Status

Health Canada's First Nations and Inuit Health Branch (FNIHB) delivers public health services to the First Nations who live on non-transferred federal reserves. In transferred communities that have accepted funding and responsibility for public health services, FNIHB provides the funding, but FNs communities are responsible for providing the services. In order to do this, transferred FNs communities can hire their own public health professionals or enter into agreements with provincial or regional health authorities for the provision of these services. It is important to note that FNIHB requires transferred communities to have an emergency preparedness plan as a condition of receiving federal transferred funding for public health. However, those emergency preparedness plans do not address specific public health emergencies, such as pandemic influenza. FNIHB, through its regional offices, will assume an intermediary role between provinces and transferred communities.

1 This document focusses on "on-reserve First Nations communities" living in the provinces for which there are concerns over clarity of roles and responsibilities for public health services (including pandemic influenza planning) among the various jurisdictions.

Provision of public health services, including pandemic influenza planning, to Inuit populations and to FNs communities living in the Territories is primarily the responsibility of the territorial governments[2]. Territorial governments provide public health services in an integrated fashion to all residents regardless of ethnicity.

Currently, the federal, provincial and territorial governments also share the delivery of other health services to the First Nations and Inuit population. Provinces provide universal insured health services (including physician and hospital services) to all citizens, including Aboriginal peoples on/off- reserve, except in remote isolated, isolated and some semi-isolated on-reserve communities where the primary health care is delivered by FNIHB-employed registered nurses.

While most of the FNIHB regions have been participating in the provincial committees for pandemic influenza planning, there are very few formal agreements between Health Canada FNIHB regional offices and the provincial governments on the management of outbreaks of pandemic influenza in FNs communities. Nevertheless, progress has been made in this area.

All FNIHB regions have developed draft or final regional pandemic influenza plans or guiding frameworks to assist FNs communities in developing their community pandemic influenza plans. Other FNIHB regions are in the process of negotiating roles and responsibilities with their respective provinces for dealing with pandemic influenza.

In some regions, meetings between FNIHB and FNs to raise awareness of the need for community-level planning on pandemic influenza have occurred and, as a result, some communities have developed their community plans. In other regions, health directors from FNs communities are engaged directly with their respective provincial/district/regional health authorities on pandemic influenza planning to clarify the issues of acute care and client management in the event of pandemic influenza outbreaks.

In practice, there have always been informal collaborations between provincial governments and FNIHB for management of public health emergencies and disease outbreaks in on-reserve FNs communities. It is important to emphasize, however, that there are some gaps in these collaborations. For example, there have been occasions when FNIHB medical officers have not been notified by provincial/regional counterparts of cases of communicable disease (e.g. meningitis) occurring on a reserve and where FNIHB regional medical officers are the identified lead for the public health response to such cases. Furthermore, this informal collaboration with provinces and FNIHB regions has not been tested during a massive national public health emergency, such as pandemic influenza.

## 3. Outstanding Issues

### Linkages with Provincial/Territorial (P/T) Public Health Authorities

- Formal agreements between provincial public health and FNIHB regional offices on co-ordination of roles and responsibilities during public health emergencies, including pandemic influenza.
- Formal agreements between provincial public health and FNIHB regional offices to include on-reserve FNs numbers into the provincial/regional plans for purchase of antivirals, vaccines (when developed), and other relevant emergency supplies, and to clarify who would be the gatekeeper for these limited supplies/products.

2 Seven Inuit communities and two Innu communities in Labrador fall under FNIHB's public health programming.

- Clear protocols for on-reserve FNs communities to access the anti-virals, vaccines and other emergency supplies in a coordinated fashion with the provinces.
- Communication protocols between FNIHB regional offices, transferred bands and provinces on issues related to communicable diseases and other public health concerns.

### Legal Authority

- Clarity among the provinces, regional health authorities, the First Nations, and FNIHB regional offices on the legally recognized medical officer of health for each on-reserve FNs community.

### Resources

- Capacity at the FNIHB regional level and at the FNs community levels to deal with outbreaks of pandemic influenza due to limited public health infrastructure for FNs communities and shortage of public health human resources.
- Surveillance, epidemiology and influenza vaccination program data of on-reserve population for proper pandemic planning.

## 4. Next Steps

While FNIHB is working on assessing and addressing the issue of public health infrastructure and the deficiency of public health human resources in FNs communities and at FNIHB regional levels, it is crucial that planning for management of pandemic influenza in FNs communities be a coordinated effort involving all jurisdictions. The on-reserve FNs communities, with the support of FNIHB and provincial/regional health authorities, are responsible for developing their community pandemic influenza plans. However, the successful implementation of these plans requires a coordinated effort involving all key stakeholders (i.e. the FNs communities, FNIHB and provincial/regional health authorities). FNIHB regional offices would lead in facilitating the process among stakeholders.

Table 1 illustrates some of the key activities required for adequate pandemic planning for on-reserve populations. It includes proposed roles and responsibilities of the various jurisdictions who will be facilitating the planning or be involved in the planning. This table was developed because for public health issues of on-reserve populations, the multiple jurisdictional involvement has often created confusion over roles and responsibilities. To effectively deal with pandemic influenza outbreaks in on-reserve FNs communities, the roles and responsibilities of the various jurisdictions must be clear to all in advance.

## Table 1: The Key Activities and Proposed Roles and Responsibilities of Partners on Management of Pandemic Influenza in On-reserve First Nations Communities

### 1. FNs Communities

1.1 Develop community pandemic influenza plans in collaboration with the respective FNIHB region and/or the local/regional health authority, specifically:

a) identify provincial/regional Medical Officer of Health (MOH) for the community and establish formal arrangements for ongoing MOH services;

b) identify partners and clarify their roles and responsibilities;

c) enhance community awareness;

d) train front line staff[3];

e) enhance community surveillance activities for early detection of influenza-like illness (ILI);

f) enhance triage/screening capacity;

g) develop capacity for patient isolation in health care facilities in FNs communities;

h) implement infection control guidelines and public health measures at the time of pandemic, in consultation with FNIHB regional medical officers, regional health authorities, and in accordance with the national pandemic plan;

i) develop and regularly update communication plan;

j) maintain ongoing stock and inventory of emergency supplies (e.g. masks, gloves, etc.);

k) calculate and regularly update the number of individuals (within FNs communities) in each priority group for vaccines and antivirals;

l) plan for mass immunization, in collaboration with FNIHB regional medical officers, and/or provincially recognized medical officers of health;

m) communicate and discuss with health authorities in neighbouring municipalities the transfer of severe pandemic influenza cases to hospitals and ensure equitable access for such cases;

n) assess the current means of patient transportation to provincial/regional health care system (when required) and examine their appropriateness during pandemic influenza (i.e. identify the gaps and develop strategies to address them);

o) plan ahead of time to ensure maintenance of essential services[4] in the community;

p) develop a contingency plan to enhance the knowledge of FNs people on how to deal with situations when there are severe shortages of health care workers and health care services[5] as a result of pandemic influenza;

q) develop formal partnership agreements between FNs communities to allow for mutual aid;

r) institute emergency response team;

s) participate in simulation exercises with the respective neighbouring municipalities for testing of preparedness and response plan for pandemic influenza at the community level; and

t) actively participate in local pandemic influenza planning (in neighbouring municipalities) to facilitate coordination of efforts and integration with provincial/regional systems in dealing with pandemic influenza.

3 Should include training of front-line health care workers on diagnosis and care, infection control, public health measures, surveillance and communication.

4 Such as maintenance of fire-fighting/policing, maintenance of water/energy/food availability, management of mass fatalities.

5 Should include monitoring of illness, provision of care at home and use of infection control measures and communication.

## 2. FNIHB Regions

2.1 Develop FNIHB regional pandemic influenza plans, in consultation with FNs communities and FNs regional organizations, and integrate with provincial systems where possible. More specifically:

2.1.1 Develop formal agreements, through negotiation, with provincial health authorities to clarify and co-ordinate mutual roles and responsibilities for:

a) procurement and distribution of vaccine/antivirals/emergency supplies (e.g. supplies for diagnosis, treatment, infection control, immunization);

b) enhanced surveillance capacities, in conjunction with provincial system, with the ability to separate out surveillance data for on-reserve FNs;

c) assistance with public health/medical care services in overwhelming situations;

d) clarity on the legally recognized medical officer of health for each FNs reserve;

e) two-way communication on case reporting;

f) defined roles and responsibilities of provincial/regional vs FNIHB public health authorities on needed activities for pandemic influenza preparedness and response; and

g) establishment of a means of transportation for respiratory specimens to provincial public health laboratories, when necessary.

2.1.2 develop partnership with INAC at the regional level towards integration of health emergencies with the overall emergency preparedness planning;

2.1.3 develop communications plans;

2.1.4 identify partners and clarify their roles and responsibilities;

2.1.5 participate in simulation exercises with province(s) for testing of preparedness and response plan for pandemic influenza at FNIHB regional level;

2.1.6 partner with FNIHB Headquarters to develop educational material;

2.1.7 identify current means of distribution of supplies to FNs communities and examine their appropriateness in health emergencies, such as pandemic influenza (i.e. identify gaps and develop strategies to address them);

2.1.8 identify and address the financial, human resource and legislative gaps in the current system;

2.1.9 plan for mass immunization of priority groups with pandemic influenza vaccine (when available);

2.1.10 support training of front-line staff in communities;

2.1.11 inform community leaders about pandemic influenza and its implications for their communities;

2.1.12 support and facilitate community planning by raising awareness, providing training sessions on planning, and providing educational material to FNs community leaders and regional FNs organizations;

2.1.13 provide public health services/recommendations/advice to FNs communities;

2.1.14 plan for provision of rapid diagnostic tests to health care facilities, if necessary;

2.1.15 provide names and contact information of FNIHB regional leads on pandemic influenza to other partners;

2.1.16 keep track of number of individuals (within FNs communities) in each priority group for vaccination; and

2.1.17 develop regional surveillance capacities (to be integrated with provincial system).

## 3. FNIHB Headquarters

3.1 Develop an overarching framework for Branch pandemic influenza preparedness and response plan, specifically:

a) combine regional and HQ plans into FNIHB organizational pandemic influenza plan;

b) based on the national pandemic influenza plan, develop generic training modules for community front-line health care workers and community leaders that are clear and culturally appropriate;

c) develop a cross-regional human resource mobilization plan (from HQ to FNIHB Regions);

d) develop communications plan; and

e) develop capacity for central data compilation and analysis to determine the overall burden of disease for FNIHB clientele.

3.2 Support and facilitate FNIHB regional pandemic planning by providing coordination and resources.

3.3 Work with provincial officials to clarify federal and provincial legislation and authorities in the event of pandemic influenza on reserves.

3.4 Identify national partners and work with them to define various roles and responsibilities.

3.5 Link with national FNs leaders/organizations to increase awareness of pandemic influenza and the necessity for community planning.

## 4. Provincial Public Health Authorities

4.1 Work with First Nations and FNIHB regional offices during the development of provincial pandemic influenza plans to define roles and responsibilities, coordinate efforts, and prevent gaps in the management of pandemic influenza in FNs communities.

4.2 Develop formal agreements, through negotiation, with FNIHB regional offices to incorporate on-reserve FNs people into the provincial planning activities, where possible, and specifically for:

a) procurement and distribution of vaccine/antivirals/emergency supplies (e.g. supplies for diagnosis, treatment, infection control, immunization);

b) enhanced surveillance capacities with the ability to separate out surveillance data specific to on-reserve FNs;

c) two-way communication on case reporting;

d) facilitation of on-reserve FNs communities' access to federal emergency services such as the National Emergency Stockpile System (NESS) and the Health Emergency Response Team (when it is established) when community and FNIHB resources are overwhelmed and where available[6];

e) if PH capacity permits, assistance in the provision of PH services to FN communities when community and FNIHB resources are overwhelmed[7]; and

f) clarity on the legally recognized medical officer of health for each FNs reserve.

4.3 Ensure equitable access to hospital care for transferred, severe pandemic influenza cases.

4.4 Work with federal officials to clarify federal and provincial legislation and authorities in the event of pandemic influenza on reserves.

4.5 Develop communication plan (with FNIHB regional offices and other key players).

6 FNIHB regional offices must make such requests to the provincial public health authorities, which would provide such services through coordination with the Centre for Emergency Preparedness and Response (CEPR).

7 For provinces that do not have a public health service delivery mandate at the provincial level, these responsibilities could be relevant to regional health authorities.

| 5. | Centre for Emergency Preparedness and Response (CEPR) |
|---|---|
| 5.1 | Communicate with FNIHB regularly and effectively on matters related to emergency preparedness and response. |
| 5.2 | Provide timely opportunities to FNIHB to input into the federal/provincial/territorial (FPT) Networks on Emergency Preparedness and Response and provide regular and timely feedback to FNIHB on developments at the FPT Networks on Emergency Preparedness and Response that affect FNIHB's progress on emergency planning (including pandemic influenza planning). |
| 5.3 | Invite FNIHB to FPT Network on Emergency Preparedness and Response when the focus of discussion has implications for FNIHB HQ, FNIHB regions, and FNs communities with regard to pandemic influenza planning. This will ensure that FNIHB, CEPR and Provincial health/social services authorities work together in an integrated/coordinated manner to prevent gaps and duplications when managing outbreaks of pandemic influenza in FNs communities. |
| 5.4 | In situations where FNIHB's regional capacity (including provincial aid) is exhausted, CEPR could deploy available Health Emergency Response Team (HERT), when it is established, to FNs communities (through provincial systems of deployment) to assist FNIHB regional health professionals in responding to public health emergencies, such as pandemic influenza[8]. |
| 5.5 | Through provincial system for access to the National Emergency Stockpile System (NESS) within a province, provide access to the federally-controlled pharmaceuticals and other emergency supplies/services for FNs communities. |
| 5.6 | Facilitate linkages between FNIHB and provincial authorities to discuss and clarify the provincial roles and responsibilities in FNs communities access to NESS and HERT, as per letter of agreement between Centre for Emergency Preparedness and Response, the Public Health Agency of Canada, and the First Nations and Inuit Health Branch, Health Canada. |
| 5.7 | Provide courses/training on pandemic planning and setting up clinics for mass immunization. |
| 5.8 | Provide technical consultations to FNIHB staff on development of educational modules and courses on pandemic influenza for community health care providers and other first responders in FNs communities and facilitate on-line delivery of courses through existing mechanisms. |
| 5.9 | Provide technical assistance to FNIHB HQ for development and testing of preparedness and response plan for pandemic influenza (e.g. taking part in federal/national simulation exercises). |

## 5. Conclusion

The management of a predictable pandemic influenza in FNs communities will require a coordinated effort involving all levels of government. Considerations of the unique needs of FNs communities must be reflected in plans at the local, P/T and federal levels. The goal of pandemic influenza preparedness and response is: "First, to minimize serious illness and overall deaths, and second to minimize societal disruption among Canadians as a result of an influenza pandemic." These goals will only be achieved if strategies and specific plans for FNs communities are integrated within the pandemic plans of all jurisdictions.

8 It is expected that federal assistance would be available to on-reserve FNs communities and the rest of the province in an equitable fashion.

Note: INAC (Indian and Northern Affairs Canada) has responsibility for overall emergency preparedness. In the event of a health emergency, including pandemic influenza, INAC's role is to facilitate communication with First Nations and support Health Canada and the Public Health Agency of Canada when required.

# C Canadian Pandemic Influenza Plan: Laboratory Procedures

In this document laboratory testing, surveillance and data collection, and communication issues are addressed for each WHO pandemic phase. The Laboratory Subcommittee has developed this document for pandemic planning purposes and to facilitate a consistent approach to laboratory testing for influenza during the interpandemic period.

## WHO Phase 0

### Interpandemic Phase

#### 1. Testing

Normal activities to include virus isolation by cell culture, direct antigen testing, and serology. The Laboratory Sub-committee encourages the use of rapid detection methods in conjunction with cell culture to aid in the timely diagnosis of influenza particularly in outbreak situations. The nasopharyngeal swab is generally recommended as the preferred specimen as it gives the best results in most direct detection kits as well as in tissue culture. However, other specimens such as throat swabs or nasopharyngeal washings may be acceptable or recommended by specific kit manufacturers.

Participation in the National Microbiology Laboratory (NML) proficiency programme is required for all laboratories performing cell culture and/or serology for influenza.

Up to 10% of all season influenza isolates, including at least five early season, five late season, and any unusual isolates, must be sent to the NML for viral sub-typing. These isolates must be submitted to the NML promptly, along with the results of any sub-typing done locally. The NML should give priority to processing these specimens. NML will report results of sub-typing to the submitting lab within a few days of receipt. All laboratories performing cell culture for influenza are expected to submit isolates for sub-typing as described above unless otherwise directed by NML.

Susceptibility testing will be performed on early season and late season isolates as appropriate, as well as others agreed upon by the NML, in conjunction with the provincial laboratory.

The NML will transfer subtyping and susceptibility-testing technology to selected Provincial Health Laboratories (PHLs) as appropriate.

The NML will develop rapid test(s) for detection of influenza, better sub-typing and molecular and susceptibility methods, and offer training in these methods to PHLs as appropriate.

#### 2. Surveillance and data collection

**All** testing labs must submit data on influenza testing to NML on a weekly basis, or more frequently if requested by the NML, during the influenza season. This data is reported on 'FluWatch' and accessible through the Health Canada and CPHLN websites.

Enhanced surveillance using sentinel physicians, and including laboratory testing, may be set up by NML in collaboration with local public health epidemiologists and provincial laboratories.

### 3. Communication

Enhanced communication must be set up by the CPHLN secretariat[1] to link the NML, PHLs and provincial epidemiologists using the CPHLN[2] website, email, fax and phone / teleconference communication. An up-to-date listing of laboratories must be maintained by NML and CPHLN.

Each province should have in place an influenza surveillance committee to ensure good communication between provincial epidemiologists, the provincial laboratory and the health units. The committee will deal primarily with influenza in the event of a pandemic, but will deal with other surveillance issues at other times as required. The committee should include (at a minimum) a provincial epidemiologist, the provincial laboratory director or designate, and the chief medical officer of health or designate.

### 4. Other

Laboratories will participate in regular disaster drills at the request of the National Pandemic Influenza Committee to test the plan and identify areas that need further attention.

## WHO Phase 0, Level 1, 2

### Novel Influenza Subtype Identified in One or More Human Cases

### 1. Testing

As in Phase 0.

Increased testing (particularly cell culture) to be encouraged to detect new virus rapidly. The NML to give priority to reagent preparation for the identification of the new strain in readiness for phase 2.

### 2. Surveillance and data collection

As in Phase 0 with heightened surveillance as determined by the NML and the Pandemic Influenza Committee.

### 3. Communication

Information from WHO, CDC, NML, or laboratories from areas affected by the new virus (information such as subtype, best cell lines to use, usefulness of direct testing, susceptibility pattern, morbidity, mortality, etc.) to be rapidly disseminated to PHLs by CPHLN secretariat using the CPHLN website, fax, email or telephone, depending on the circumstances.

PHLs will ensure that other testing labs in province are kept informed.

Meetings, teleconference of the laboratory subcommittee or the PHLs, will be coordinated as required by the CPHLN secretariat.

## WHO Phase 0, Level 3
### Canadian Human-to-Human Transmission Confirmed

#### 1. Testing

Increased testing (culture) will be required to detect the first isolate of the pandemic strain in Canada. Additional supplies of appropriate cell lines may be required.

NML will provide to PHLs reagents for identification of the pandemic virus, advise on cell lines, use of rapid test methodologies and biosafety level required etc.

Rapid sub-typing of isolates will be performed by NML and designated PHLs.

Note that supplies, including cell lines, test kits, and reagents may be in short supply as other North American labs gear up as well. NML should consider in house production of alternate sources of reagent. Also PHLs currently producing their own cells might act as suppliers to other PHLs temporarily.

#### 2. Surveillance and data collection

As in Level 1 and 2 with heightened surveillance as determined by the NML and the Pandemic Influenza Committee

#### 3. Communication

NML to rapidly inform labs of first identification of pandemic strain in North America *via* CPHLN, CPHLN website, CPHLN listserv fax, email, or telephone as appropriate.

NML to keep PHLs informed *via* CPHLN, CPHLN website, CPHLN listserv, fax, email, telephone re: activity of new virus, keep updated on cell lines, direct test methods which can be used. The PHLs will rapidly communicate via NML their first isolate of pandemic strain, as well as any other local influenza activity.

PHLs to ensure other testing labs in province are kept informed.

## WHO Phase 1,2,3
### Pandemic in Canada

#### 1. Testing

The PHLs will be handling increased testing during this phase of pandemic; they will need to redirect resources to give priority to influenza testing. Each laboratory will decide how to ensure influenza testing gets priority (e.g., restricted testing of other specimens, additional staffing, etc.)

Biosafety level required will be reassessed by NML and CPHLN using information from WHO and CDC.

Rapid sub-typing of isolates by NML (and designated PHLs).

Susceptibility testing of strains as determined by NML in collaboration with the PHLs.

#### 2. Surveillance and data collection

Continued heightened surveillance as in Phase 1 and 2.

### 3. Communication

As in Phase 0

NML will rapidly inform the PHLs of the first appearance of pandemic strain in Canada.

NML will collaborate with the provinces to notify bacteriology testing labs to prepare for an increase in testing for bacterial pneumonia (i.e., strategy for monitoring types of organisms, susceptibility patterns, and best antibiotics to use).

## WHO Phase 4

### Second or Later Waves in Canada

### 1. Testing

PHLs may have to restrict testing of specimens for influenza. The Laboratory Subcommittee to give guidelines on testing, depending on antiviral susceptibility of pandemic strain and other co-circulating strains.

### 2. Surveillance and data collection

As in Phases 1 – 3.

### 3. Communication

As in Phases 2 and 3.

The NML will keep the PHLs informed of influenza activity across the country, changes in susceptibility, other circulating strains, morbidity/mortality information, etc.

## WHO Phase 5

### Post-pandemic Period in Canada

Return to pre-pandemic activities.

Revised: Oct 14/03

1. The reason for using the CPHLN secretariat and the CPHLN website is because of the secretariat's role in communication among all PHLs and the NML as well as with CIDPC and others.
2. The CPHLN website is a more appropriate tool because its website does not dilute critical lab-related issues with other concerns. The CPHLN website will deliver specific-up-to-date and real-time lab info as a one-stop-shopping-for-lab-information site. This site can be accessed by anyone who will need access. This does not exclude the use of HC website, but www.cphln.ca would be faster for laboratory personnel by design.

# D Recommendations for Pandemic Vaccine Use in a Limited Supply Situation

Priorities for vaccination need to be established during the interpandemic period in order to facilitate planning for an efficient and consistent pandemic immunization strategy. In keeping with the overall goal of pandemic response, the prioritization process must consider the impact the vaccine will have on: 1) reducing morbidity and mortality by maintaining the health services response and by individual protection of high risk groups, and 2) minimizing societal disruption by maintaining the essential services upon which everyone depends. The pandemic vaccine will become available in lots and supply is likely to be limited during the early stage of the pandemic in Canada. Furthermore it is likely that two doses of vaccine will be required to achieve a protective response in the vaccinee. Therefore, when vaccine becomes available it is essential that it be distributed in a pre-defined equitable and consistent manner across all provinces and territories.

The Vaccines Working Group has developed the following recommendations for the use of vaccine in a limited supply situation to provide guidance to PIC and those involved in pandemic planning at the F/P/T and local levels. **The priority groups will need to be reassessed, and possibly altered, as soon as epidemiologic data on the specific pandemic virus becomes available to ensure that they are consistent with the overall goal of the pandemic response**. Once data on the epidemiology of the pandemic becomes available, the PIC will be the lead in the final identification and prioritization of population groups to receive influenza vaccine. These recommendations will be distributed as national guidelines as soon as possible, with the expectation that they will be followed by all jurisdictions in order to ensure a consistent and equitable program.

## Recommended Priority Groups

The estimates of population size made for each group are based on 1998 data. Each jurisdiction is encouraged to develop their own estimates for these priority groups as a part of their pandemic planning activities.

**Group 1:** Health care workers, paramedics/ambulance attendants and public health workers (approximately 600,000)

*Rationale:* The health care and public health sectors will be the first line of defence in a pandemic. Maintaining the health service response and the vaccine program is central to the implementation of the response plan, in order to reduce morbidity and mortality. Health services workers may be considered in the following work settings for vaccine program planning:

- acute care hospitals
- long term care facilities/nursing homes
- private physicians' offices
- home care and other community care facilities
- public health offices
- ambulance and paramedic services
- pharmacies
- laboratories

**Group 2:** Essential service providers (approximately one million)

*Rationale*: The ability to mount an effective pandemic response may be highly dependent on persons, within the groups listed below, being in place to maintain key community services. Those individuals that are essential to the response or to maintaining key community services may vary between jurisdictions. Local plans will likely reflect these differences, however they are likely to include:

- police
- fire-fighters
- the armed forces
- key emergency response decision makers (e.g. elected officials, essential government workers and disaster services personnel)
- utility workers (water, gas, electricity and essential communications systems)
- funeral service/mortuary personnel
- people who work with institutionalized populations (e.g., corrections)
- persons who are employed in public transportation and the transportation of essential goods (such as food)

Vaccine eligibility criteria should be defined based on the work/duties the individual performs rather than position label.

**Group 3:** Persons at high-risk of severe or fatal outcomes following influenza infection

*Rationale*: To meet the goal of reducing morbidity and mortality, persons most likely to experience severe outcomes should be vaccinated. For planning purpose we have based this priority group on the high risk groups identified by the National Advisory Committee on Immunization (NACI) for annual vaccine recommendations. Additional groups have also been included based on evidence indicating an elevated risk. For example, during the annual epidemics, young infants experience rates of hospitalization similar to the elderly.

Prioritization of the following subgroups within Group 3 would depend on the epidemiology of influenza disease in the time of a pandemic.

A: persons in nursing homes, long-term care facilities, homes for the elderly e.g. lodges (approximately 200,000);

B: persons with high-risk medical conditions living independently in the community (approximately 7 million);

C: persons over 65 years of age living independently and not included in 3A and 3B (approximately 1 million);

D: children 6 months to 23 months of age (current vaccines are not recommended for children under 6 months of age);

E: pregnant women * (approximately 200,000).

*Currently, NACI does not consider pregnant women as a high risk group in its recommendations for annual influenza vaccination. However, in a pandemic, pregnant women may be at elevated risk.

**Group 4:** Healthy adults (approximately 8.7 million)

*Rationale:* This group is at lower risk of developing severe outcomes from influenza during annual epidemics but is the major work force and represent the most significant segment of the population from an economic impact perspective. Vaccination of healthy adults would reduce demand for medical services and allow individuals to continue normal daily activities. Simultaneous absence of large numbers of individuals from their site of employment could produce major societal disruption even in non-essential personnel. Medical facilities could also be overwhelmed by demand, even for outpatient services. This might compromise care of those with complications.

**Group 5:** Children 24 months to 18 years of age

*Rationale:* This group is at the lowest risk of developing severe outcomes from influenza during annual epidemics but play a major role in the spread of the disease. While children's absence from school might not have the direct economic and disruptive impact of illness in adults, it could have that effect indirectly, since care for ill children would be required.

A decision to vaccinate healthy adults and healthy children (Groups 4 and 5) depends on having an adequate supply of vaccine. A much larger amount of vaccine would need to be used to prevent hospitalization and death than for older persons and those with underlying conditions, because of demographic considerations and differences in risks.

Consideration was given to prioritizing the family members of health care workers, however the decision was made that separating out these individuals would not be logistically feasible or ethically justifiable.

# E Planning Recommendations for the Use of Antivirals (Anti-Influenza Drugs) in Canada During a Pandemic

## Background

### General Considerations

Antivirals (anti-influenza drugs) are effective for both treatment and prophylaxis and could have a role as an adjunctive strategy to vaccination for the management of pandemic influenza. Antivirals will likely be the only virus-specific intervention during the initial pandemic response, given that vaccine is unlikely to be available for the early months of a pandemic. Protection afforded by antivirals is virtually immediate and does not interfere with the response to inactivated influenza vaccines.

Current supplies of antivirals, both within and outside of Canada, are very limited. At this time there is limited "routine" use of these drugs in Canada during annual influenza seasons; therefore providing little incentive for manufacturers to store significant amounts of these products in Canada. The issue of security of supply for a pandemic situation needs to be addressed during planning activities.

Prior to the 1997 Hong Kong avian influenza incident, antivirals were not considered as a component of the Canadian pandemic response, in light of costs and other factors. During the Hong Kong outbreak, several countries rapidly depleted global supplies of anti-influenza drugs. In light of the lessons learnt since 1997, and the licensure of new antivirals, the neuraminidase inhibitors, the Antivirals Working Group of the Pandemic Influenza Committee was formed to develop options, recommendations and guidelines for the use of antivirals.

The first "Pandemic Influenza Antiviral Drugs Supply Options" paper was developed in January 1999. This current document contains recommendations that were developed by the Antivirals Working Group in June 2000 and were updated in March 2002 and January 2003.

### Classes of Antivirals (Anti-Influenza Drugs)

Two classes of antivirals are currently available in Canada and have a role in the prevention and treatment of influenza infection: M2 ion channel inhibitors (cyclic amines) and neuraminidase inhibitors. There are important differences in pharmacokinetics, side effects and drug resistance between these two classes of antivirals. Such performance characteristics and costs should be considered in selecting the specific drugs to be used for prophylaxis or treatment.

1. **M2 Ion Channel Inhibitors (Cyclic Amines or Adamantanes)**

   M2 ion channel inhibitors interfere with the replication cycle of influenza A but are not effective against influenza B. Amantadine and rimantadine are examples of M2 ion channel inhibitors. Currently, only amantadine is licensed in Canada. Amantadine is approved in Canada for both prophylaxis and treatment of infection due to influenza A. Amantadine is approximately 70-90% effective in preventing illness from influenza A infection.

   When administered within 2 days of illness onset, it can reduce the duration of uncomplicated influenza A illness by approximately one day but it has not been shown to reduce the complications of influenza. Resistance to amantadine has been shown to develop rapidly when this drug is used for treatment purposes.

The Antivirals Working Group will be investigating the potential role of rimantadine for both prophylaxis and treatment during a pandemic, including whether special permission could be obtained to use this drug if it is not licensed in Canada at the time of the pandemic.

2. **Neuraminidase Inhibitors**

   Zanamivir and oseltamivir are examples of neuraminidase inhibitors. These drugs interfere with replication of both influenza A and B viruses in three ways: (1) they interfere with the release of virus from infected cells, (2) they cause the aggregation of virus, and (3) they may improve the inactivation of virus by respiratory mucous secretions. The drugs are well tolerated and have been used effectively for the prophylaxis and treatment of influenza A and B infections. When administered within 2 days of illness onset, zanamivir and oseltamivir can reduce the duration of uncomplicated influenza A and B illness by approximately 1 day. Further evidence is needed on their effectiveness in reducing complications of influenza. Recent community studies suggest that both drugs are similarly effective in preventing febrile laboratory-confirmed influenza illness (efficacy: zanamivir 84%; oseltamivir 82%). Both drugs were licensed in Canada in 1999 for the treatment of infection due to either influenza A or B virus. Since December 2003, oseltamivir has been approved for influenza prophylaxis in Canada. Zanamivr is not licensed for prophylaxis. Current evidence suggests that the development of resistance during treatment of influenza is less likely with neuraminidase inhibitors than with amantadine. Neuraminidase inhibitors are much more expensive than amantadine at this time.

## Recommendations of the Antivirals Working Group

The following is a list of recommendations that may assist with planning of the antivirals component of a pandemic influenza response plan.

1. Endorse the goal of influenza pandemic planning as follows:

   *First, to minimize serious illness and overall deaths, and second to minimize societal disruption among Canadians as a result of an influenza pandemic*

2. Vaccines, if and when available, should be considered the first line for prevention of pandemic influenza.
3. Security of supply for antiviral drugs should be considered as part of planning in the pre-pandemic period.
4. The F/P/T governments should control the supply and distribution of available anti-influenza drugs, to the end user, during a pandemic.
5. Antivirals should only be used in a community when the pandemic influenza virus is detected in the community. The trigger for starting the use of antivirals in the community will be decided at the local level in conjunction with the province/territory and will be dependent on availability.
6. During a pandemic, the amount of amantadine required by persons with Parkinson's disease should be reserved for this indication.

7. During a pandemic, the antivirals strategy should utilize all anti-influenza drugs available to Canadians. Either M2 ion channel inhibitors (e.g., amantadine) or neuraminidase inhibitors (e.g., oseltamivir) can be used for prophylaxis but only neuraminidase inhibitors should be used for treatment.
8. The following priority groups for the use of anti-influenza drugs in times of short supply should be used for planning purposes during the inter-pandemic period.

> The following groups, in descending order of priority, are offered as planning guidance but will need to be re-examined at the time of a pandemic alert when epidemiologic data about the pandemic virus is available.
>
> 1. Treatment of persons hospitalized for influenza
> 2. Treatment of ill health care and emergency services workers
> 3. Treatment of ill high-risk persons* in the community
> 4. Prophylaxis of health care workers
> 5. Control outbreaks in high-risk residents of institutions (nursing homes and other chronic care facilities)
> 6. Prophylaxis of essential service workers
> 7. Prophylaxis of high-risk persons* hospitalized for illnesses other than influenza
> 8. Prophylaxis of high-risk persons* in the community
>
> **Note: during a pandemic the definition of high-risk persons may change based on epidemiologic evidence.*
>
> The mass prophylaxis of children to control a pandemic is currently not recommended.

9. The susceptibility of circulating influenza strains to available antivirals should be monitored.
10. Given the rapidly changing scientific evidence, recommendations and options for treatment and prophylaxis with antivirals should be regularly reviewed.

## Rationales for Specific Recommendations

### Rationale for addressing supply issues (recommendation #3)

Vaccination with an effective vaccine is the primary public health intervention during a pandemic. However, vaccine production requires the acquisition of the seed virus and therefore cannot be initiated until the pandemic virus is already infecting humans. Once a suitable vaccine seed strain is available to manufacturers, it is anticipated that vaccine production will require at least 3 to 4 months and even then the availability of doses will be staggered and limited. Furthermore each individual may need to receive two doses of vaccine to be protected.

At this time antiviral drugs are the only specific medical intervention targeting influenza that will potentially be available during the initial pandemic response. Antiviral drugs can be used to prevent influenza and, unlike vaccines, can also be used to treat cases that are identified early in their illness. The strategic use of these drugs in identified priority groups, therefore, will

be critical to achieving the goal of minimizing serious illness and overall deaths, and secondly minimizing societal disruption among Canadians as a result of an influenza pandemic.

Current supplies of antivirals in Canada (and outside of Canada) are very limited and surge capacity is negligible. In 1997 when a strain of influenza that was believed to have pandemic potential was identified in Hong Kong, antiviral drugs rapidly became virtually unavailable for purchase world-wide.

### Rationale for governmental control of anti-influenza drugs during a pandemic (recommendation #4)

During a pandemic, governmental control of anti-influenza drugs will be essential to ensure equitable distribution and appropriate use of these drugs in limited supply. Without strict control over the use of these drugs, it is possible that amantadine will be used for treatment purposes, further increasing the risk of drug resistance. In addition, governmental control may reduce wastage including the use of these drugs on cases presenting more than 48 hours after onset of illness.

### Rationale for the roles of amantadine and neuraminidase inhibitors (recommendation #7)

Neuraminidase inhibitors are preferred for the treatment of pandemic influenza since the emergence of drug resistance during treatment is less likely to occur as opposed to amantadine where emergence of resistance occurs rapidly. In addition, neuraminidase inhibitors are associated with fewer side effects than amantadine. Neuraminidase inhibitors have been shown to be effective at preventing influenza and oseltamivir is now licensed for prophylaxis. These drugs will likely be better tolerated than amantadine, facilitating compliance, and will need to be available for this purpose should the circulating virus become resistant to amantadine.

### Rationale for priority groups (recommendation #8)

Priority groups have to be in keeping with the overall goal of reducing morbidity, mortality and secondly to reduce societal disruption. Since it will not be possible to determine a "risk level" for individuals until the pandemic virus has started causing illness in a population, these groups were identified based on past experience with severe influenza seasons and historic accounts of past pandemics. It is important to recognize that during a pandemic the definition of "high-risk persons" will be based on the epidemiologic data available at that time.

What is known is that in order to ensure an optimal pandemic response it will be imperative to provide as much protection as possible against influenza to health care workers and other essential emergency service workers. Since onset of the pandemic in Canada is expected to precede the availability of an effective vaccine, antiviral drugs represent one method of preventing infection until these workers can achieve protection through immunization. Typically immunity is assumed to have been conferred 2 weeks after influenza immunization; however, this may differ for the pandemic vaccine and it may be necessary to give two doses of vaccine to each individual before immunity is assured.

- ***Priority group 1***: To be consistent with the goal of reducing morbidity and mortality and considering the optimal use of these drugs in relation to onset of illness, those who are hospitalized within the first 48 hours of onset of illness should be highest priority for treatment.

- ***Priority group 2***: Considering the essential role that health care providers and emergency service workers will have in the pandemic response, influenza cases in these groups that are identified within the first 48 hours of onset of illness should be high priority for treatment.
- ***Priority group 3***: Persons with underlying heart and lung conditions or those who are immunocompromised, who present to ambulatory settings within 48 hours of onset of symptoms (before they get sick enough to be hospitalized) will also be considered high priority for treatment since they are at high risk for complications.
- ***Priority group 4***: Until an effective vaccine becomes available or during the interval between administration of an effective vaccine (or vaccine series) and induction of immunity, antivirals should be provided for HCWs, including public health staff, since their continuing functions are essential to the pandemic response plan and to the care of patients with other conditions.
- ***Priority group 5***: Reducing the impact of influenza outbreaks in institutions where the most vulnerable persons reside will contribute to the objectives of reducing morbidity and mortality and reduce health care demands.
- ***Priority group 6***: Emergency service workers (ESWs) will be important for maintaining the pandemic response, key community services and national defence. Prophylaxis of this group will minimise societal disruption. Each P/T should consider the list below as the "main" list and make additions as necessary based on their own unique needs and priorities for ESWs.
  - police, fire, correctional services
  - armed forces
  - key emergency response decision makers (e.g., elected officials, essential government workers and disaster services personnel)
  - funeral services
  - utilities (water, gas, electricity)
  - telecommunications
  - public transport and transportation of essential goods (e.g., food)
- ***Priority group 7***: High-risk persons hospitalized for conditions other than influenza related complications will be at risk for acquiring influenza while in hospital, given the large numbers of patients and hospital staff who may be infected during a pandemic. Influenza may result in influenza-related complications in such patients, an increase in severity of their underlying illness, prolonged hospital stay and death. Prophylaxis of this group will contribute to the objectives of reducing morbidity and mortality and reduce health care demands.
- ***Priority group 8***: Prophylaxis of high-risk persons who have not received influenza vaccine or for whom the effectiveness of the vaccine may be reduced is a current recommendation of NACI. This group is likely to experience severe illness during a pandemic and prophylaxis with anti-influenza drugs should be considered if an effective vaccine is not available. Prophylaxis of this group will contribute to the objectives of reducing morbidity and mortality and reduce health care demands.

## Outstanding Issues

The Antivirals working group has identified several outstanding issues. Some of these issues will be addressed through consultation with the other pandemic working groups, while others require research and consultation with the drug manufacturers.

There are several antiviral supply issues including:

- security of supply;
- bulk purchasing;
- control of inventory;
- possibility of domestic production (explore possibility for manufacturing of amantadine raw products in Canada);
- sequestering available supply for public health use and Parkinson's disease patients (need to know the amount of drug used by Parkinson's disease patients);
- buying more drugs at time of pandemic (likely availability and should this be pursued if drugs available)

These supply issues will be further examined by a sub-committee of the Antivirals working group.

All antivirals guidelines should be validated during the pre-pandemic period. The recommendations regarding the use of antivirals in short supply for targeted groups requires further consultation including ethics and public opinion. More specific definition of high-risk groups is also necessary.

Further data on neuraminidase inhibitors efficacy as prophylactic agents and evidence that they have a greater efficacy than amantadine for prophylaxis are required. As well, the reduction in cost of these drugs before they can be considered for prophylaxis.

While there has been no experience with the use of any of the antiviral drugs for pandemic influenza control, research during the inter-pandemic period is providing reasonable robust evidence upon which the pandemic antiviral drug strategy can be developed.

Communication with health care professionals and the public on the appropriate use of antivirals is needed during the pre-pandemic and pandemic periods. Clinical guidelines on the use of antivirals in the hospital and the community will be developed as part of the clinical care guidelines. Guidelines for delivery/administration of antivirals, the monitoring of drug distribution, uptake, and wastage, including antiviral security still needs to be addressed.

Communication materials for health care providers and the public on the appropriate use of antiviral drugs should be developed and circulated during the pre-pandemic period

Research during the pre-pandemic period and protocols for studies at the time of a pandemic are required to further evaluate the outcomes of specific antiviral prophylaxis and treatment strategies.

Research issues include:

- The outcomes of specific interventions and the value of antiviral prophylaxis versus treatment.
- The benefit of antivirals in reducing complications of influenza and death, especially in high-risk persons and in those with severe influenza illness (e.g., severe viral pneumonitis).

- The efficacy and safety of antivirals for the treatment and prophylaxis of children and select high-risk groups such as infants, pregnant women, immunocompromised persons, elderly with underlying disease.
- The minimum effective dose and duration for prophylaxis or treatment of complicated and uncomplicated influenza.
- The use of combination therapy in different populations.
- The mechanism for resistance to both classes of antivirals and assessment of the biological consequences (infectiousness, virulence) of resistance.
- The use of laboratory testing including rapid diagnostics to assist in decision making for use of antivirals.
- The effect of antiviral administration on the response to live attenuated influenza vaccines.
- The shelf life of antivirals and raw materials, beyond those estimated by manufacturer.

# F Infection Control and Occupational Health Guidelines During Pandemic Influenza In Traditional and Non-Traditional Health Care Settings

## Executive Summary

The *Infection Control and Occupational Health Guidelines During Pandemic Influenza in Traditional and Non-Traditional Health Care Settings* have been prepared by Health Canada's Nosocomial and Occupational Infections Section from the Centre for Infectious Disease Prevention and Control. These guidelines are one of the annexes of the Canadian Pandemic Influenza Plan.

These guidelines are designed to assist those responsible for managing pandemic influenza in traditional and non-traditional health care settings. Traditional health care settings include acute, long term, ambulatory and community care. Non-traditional health care settings are those settings that are designated for operation prior to an influenza pandemic and become operational only when an influenza pandemic is declared by the World Health Organization (WHO). Non-traditional settings include triage settings, self care settings and temporary influenza hospitals. Organizations that assume responsibility for non-traditional settings are referred to as "parent organizations" in this document. If there is no "parent" organization to plan or operate the non-traditional setting, it is expected another organization would assume this role. Public Health may be in the best position to plan or operate such facilities, although this would need to be negotiated and corroborated.

This document presents an overview of infection prevention and control policies and procedures that will be critical to minimize the transmission of pandemic influenza, with or without the availability of immunization or chemoprophylaxis, and for preventing other infectious diseases. Therefore, the *Infection Control and Occupational Health Guidelines During Pandemic Influenza in Traditional and Non - Traditional Health Care Settings* are based on previously published Health Canada infection control guidelines. It is recognized that certain recommendations may be feasible only in the early phases of the pandemic as they may not be achievable as the pandemic spreads and resources become scarce.

**Part A** describes a foundation to develop an infection control/occupational health (IC/OH) plan for the management of pandemic influenza with particular focus on influenza transmission, routine practices, pandemic influenza education and public health restrictions. Major attention is given to the management of health care workers during an influenza pandemic. Recommendations for the use of influenza vaccine and antivirals for health care workers (HCWs) and patients are not included in these guidelines because they are fully outlined in the vaccine and antiviral annexes (Annexes D and E) of the Canadian Pandemic Influenza Plan.

Part A also explains the lack of evidence to support the use of masks to prevent transmission of influenza during previous pandemics. The evidence shows that, in the early phase of an influenza pandemic, it may be prudent for HCWs to wear masks when interacting in close face-to-face contact with coughing individuals to minimize influenza transmission. This use of masks is advised when immunization and antivirals are not yet available but is not practical or

helpful when transmission has entered the community. Masks may be worn by HCWs to prevent transmission of other organisms from patients with an undiagnosed cough. For the purpose of this document, the term mask refers to surgical masks, not to special masks such as high efficiency dust/mist masks or respirators.

Hand Hygiene is emphasized throughout the guidelines because strict adherence to handwashing/hand antisepsis recommendations is the cornerstone of infection prevention. Proper hand hygiene may be the only preventative measure available during a pandemic.

**Part B** describes the Management of Pandemic Influenza in traditional settings. Acute care, long term care, ambulatory care and individual community settings are stand-alone sections and are designed to be used in conjunction with Part A to develop an IC/OH plan for the management of pandemic influenza. References to published guidelines are frequent because it is expected that personnel in traditional health care settings are well acquainted with the series of infection control guidelines published by Health Canada.

**Part C** outlines the Management of Pandemic Influenza in non-traditional settings. Triage, self care setting and temporary influenza hospitals are stand alone sections and are designed to be used in conjunction with Part A to develop an IC/OH plan for the management of pandemic influenza. Detailed recommendations, adapted from published infection control guidelines, are provided for non-traditional settings as the planning and operation of such settings will be a novel situation.

**Appendix I**. The "Guideline Rating System" describes the system of ranking the strength of the evidence used to support the recommendations made in these guidelines.

**Appendix II**. The "World Health Organization Pandemic Influenza Phases" is the outline of the staged plan for responding to a pandemic threat and is based on the WHO influenza surveillance program.

**Appendix III**. The "Hand Hygiene Procedures", A. How to Wash Hands and B. Decontaminating Hands with an Alcohol-based Hand Rub provide specific details related to hand hygiene.

**Appendix IV**. An "Influenza-Like-Illness (ILI) Assessment Tool" is provided to assist with immediate triage of patients or staff and accommodation/cohort of patients, prior to further OH or clinical management. This ILI triage tool should not be used for clinical management. Clinical management is specified in the "Clinical Care Guideline and Tools" annex of the Canadian Pandemic Influenza Plan.

**Appendix V**. Table A, "Cleaning Procedures for Common Items" provides examples of how common items are cleaned. Table B, "Directions for Preparing and Using Chlorine Bleach" describes recommendations for dilutions of specific products and their intended use.

These guidelines **do not** discuss **interpandemic** influenza. Infection control and occupational health recommendations for interpandemic influenza are addressed in other Health Canada guidelines, specifically in the *Infection Control Guidelines for the Prevention of Health Care-Associated Pneumonia.*, currently being developed.

| | |
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| **Antiseptic hand rub** | A waterless, antiseptic hand rub product that is applied to all surfaces of the hands to reduce the number of microorganisms present[1]. |
| **Biomedical waste** | Defined by the Canadian Standards Association[2] as waste that is generated by human or animal health care facilities, medical or veterinary settings, health care teaching establishments, laboratories, and facilities involved in the production of vaccines[3]. |
| **Cleaning** | The physical removal of foreign material, e.g., dust, soil, organic material such as blood, secretions, excretions and microorganisms. Cleaning physically removes rather than kills microorganisms. It is accomplished with water, detergents and mechanical action. In certain settings, (e.g., central service or dietetics), the terms decontamination and sanitation may be used for this process. Cleaning reduces or eliminates the reservoirs of potential pathogenic organisms. Cleaning agents are the most common chemicals used in housekeeping activity[3]. |
| **Cohort** | Two or more patients exposed to, or infected with, the same organism who are separated physically (e.g., in a separate room or ward) from other patients who have not been exposed to, or infected with, that organism[4]. |
| **Cohort staffing** | The practice of assigning specific personnel to care only for patients/residents known be exposed to, or infected with, the same organism. Such personnel would not participate in the care of patients/residents who have not been exposed to, or infected with, that organism[4]. |
| **Contact transmission** | Includes direct contact, indirect contact and droplet transmission as described below[5]:<br>› **Direct contact** occurs when the transfer of microorganisms results from direct physical contact between an infected or colonized individual and a susceptible host (body surface to body surface).<br>› **Indirect contact** involves the passive transfer of microorganisms to a susceptible host via an intermediate object such as contaminated hands that are not washed between patients, contaminated instruments or other inanimate objects in the patient's immediate environment. |
| **Critical items** | Instruments and devices that enter sterile tissues, including the vascular system. Critical items present a high risk of infection if the item is contaminated with any microorganism, including bacterial spores. Reprocessing critical items, such as surgical equipment or intravascular devices, involves meticulous cleaning followed by sterilization[3]. |
| **Droplet** | Refers to large droplets, greater than or equal to 5 m in diameter, generated from the respiratory tract of the source patient during coughing or sneezing, or during procedures such as suctioning or bronchoscopy. These droplets are propelled a short distance, less than 1 meter, through the air and deposited on the nasal or oral mucosa of the new host. |

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| **Decontaminate hands** | The reduction of bacterial counts on hands is accomplished by performing an antiseptic hand rub or antiseptic hand wash[1]. |
| **Decontamination** | The removal of disease-producing microorganisms to leave an item safe for further handling[3]. |
| **Disinfection** | The inactivation of disease-producing microorganisms. Disinfectants are used on inanimate objects; antiseptics are used on living tissue. Disinfection does not destroy bacterial spores. Disinfection usually involves chemicals, heat or ultraviolet light. Levels of chemical disinfection vary with the type of product used[3]. |
| **Exposure** | The condition of being subjected to a microorganism or an infectious disease in a manner that enables transmission to occur[6]. |
| **Fit for Work** | Terminology used in occupational health to communicate a worker's ability to remain at or return to work. This ability includes three categories: fit for work, unfit for work, fit with restrictions. This categorization allows the occupational health nurse to maintain confidentiality about a worker's diagnosis, symptoms, immune status, etc.[6]<br>› **Fit for Work** - Fit to work with no restrictions<br>› **Unfit for Work** – Defined as a restriction from patient care tasks, co-worker contact and restriction from the workplace.<br>› **Fit for work with restrictions** - Allows for the re-assignment of duties or re-integration into the workplace in a manner that will not pose an infection risk to the HCW or to the patients and or other individuals in the workplace. |
| **Hand antisepsis** | This term refers to either antiseptic handwash or antiseptic handrub[1]. A process for the removal or reduction of resident and transient microorganisms[3]. |
| **Hand hygiene** | A general term that applies either to handwashing, an antiseptic handwash, an antiseptic hand rub, or a surgical hand antisepsis[1]. |
| **Handwashing** | Washing hands with plain (i.e., non-antimicrobial) soap and water[1]. A process for the removal of soil and transient microorganisms from the hands[3]. |
| **Health Care Worker (HCW)** | HCWs are professionals, including trainees, and retirees, nonprofessionals and volunteers, involved in direct patient care; and/or those working/volunteering in designated health care facilities or services. For the purposes of this definition, HCWs are those whose functions are essential to the provision of patient care, and who may have the potential for acquiring or transmitting infectious agents during the course of their work. |
| **High level disinfection** | This term refers to the level of disinfection required when processing semicritical items.<br>High level disinfection processes destroy vegetative bacteria, mycobacteria, fungi and enveloped (lipid) and non-enveloped (non-lipid) viruses, but not necessarily bacterial spores. High level disinfectant chemicals (also called chemisterilants) must be capable of sterilization when contact time is extended. Items must be thoroughly cleaned prior to high level disinfection[3]. |

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| **Infectious waste** | The portion of biomedical waste that is capable of producing infectious disease. |
| **Influenza** | **Clinical Case Definition of Influenza**<br>When influenza is circulating in the community, the presence of fever and cough of acute onset are good predictors of influenza. The positive predictive value increases when fever is higher than 38°C and when the time of onset of the clinical illness is acute (less than 48 hours after the prodromes). Other symptoms, such as sore throat, rhinorrhea, malaise, rigors or chills, myalgia and headache, although unspecific, may also be present[1].<br>**Confirmed Case of Influenza**<br>Confirmed cases of influenza are those with laboratory confirmation (i.e., virus isolation from respiratory tract secretions, identification of viral antigens or nucleic acid in the respiratory tract, or a significant rise in serum antibodies) or clinical cases with an epidemiological link to a laboratory-confirmed case[7].<br>**Influenza-Like-Illness (ILI)**<br>For surveillance purposes, the ILI definition currently used in Canada says:<br>› Acute onset of respiratory illness with fever (>38 C) and cough and with one or more of the following: sore throat, arthralgia, myalgia or postration, which could be due to influenza virus as used by the National Influenza Surveillance Program (FluWatch) for the 2002-2003 season[8]. |
| **Intermediate level disinfection** | The level of disinfection required for some semicritical items. Intermediate level disinfectants kill vegetative bacteria, most viruses and most fungi but not resistant bacterial spores[3]. |
| **Low level disinfection** | The level of disinfection required when processing noncritical items or some environmental surfaces. Low level disinfectants kill most vegetative bacteria and some fungi as well as enveloped (lipid) viruses (e.g., hepatitis B, C, Hantavirus, and HIV). Low level disinfectants do not kill mycobacteria or bacterial spores. Low level disinfectants-detergents are used to clean environmental surfaces[3]. |
| **Mask** | A barrier covering the nose and mouth to protect the mucous membranes from microorganisms contained in large droplet particles (> 5 m in size) generated from a source person during coughing, sneezing, or talking and during the performance of certain procedures that generate droplets (e.g., suctioning) or are likely to generate splashes or sprays of blood, body fluids, secretions, or excretions. Masks may also be used to contain large droplet particles generated by coughing or sneezing persons. The term mask in this document refers to surgical masks, not to special masks, such as high efficiency dust/mist masks or respirators. |
| **Noncritical items** | Items that either touch only intact skin but not mucous membranes or do not directly touch the patient/resident/client. Reprocessing of noncritical items involves cleaning and or low level disinfection[3]. |

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| **Non traditional health care settings** | Non-traditional health care settings are those settings that are predetermined for operation prior to an influenza pandemic and operational only when an influenza pandemic is declared by the World Health Organization (WHO). |
| **Plain soap** | Products that do not contain antimicrobial agents, or contain very low concentrations of antimicrobial agents that are effective solely as preservatives[1]. |
| **Parent organization** | The organization responsible for the planning of a non-traditional setting operational only in the event of the declaration of an influenza pandemic. When there is no specific organization, another organization must be identified to assume the role of the parent organization. |
| **Personal protective equipment** | Attire used by the worker to protect against airborne or droplet exposure and exposure to blood and bloody body fluids, i.e., masks, eye goggles, face shields, gloves and gowns[5]. |
| **Precautions** | Interventions implemented to reduce the risk of transmission of microorganisms from patient to patient, patient to health care worker, and health care worker to patient[5]. |
| **Semicritical items** | Devices that come in contact with nonintact skin or mucous membranes but ordinarily do not penetrate them. Reprocessing semicritical items involves meticulous cleaning followed preferably by high-level disinfection[3]. |
| **Sterilization** | The destruction of all forms of microbial life including bacteria, viruses, spores and fungi. Items must be cleaned thoroughly before effective sterilization can take place[3]. |
| **Traditional health care settings** | Traditional settings include acute, long term, ambulatory and community care. |

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## Background Information

The following document provides infection prevention and control guidance for the management of **pandemic influenza** in traditional and non-traditional health care settings. Non-traditional health care settings are those that are pre determined for operation prior to an influenza pandemic and operational only when an influenza pandemic is declared by the World Health Organization (WHO).

Infection prevention and control guidelines for **interpandemic influenza** in traditional health care settings, (i.e., acute care, long-term care, ambulatory care and community care), will be addressed in other Health Canada infection control guidelines, specifically the Guideline for the Prevention of Health Care-Associated Pneumonia.

Infection prevention and control guidelines for the management of pandemic influenza in traditional and non-traditional health care settings are based on previously published Health Canada Infection Control Guidelines[3,5,6,9]. Although recommendations to prevent the transmission of infection during the delivery of health care, including during a pandemic are important, it is recognized that certain recommendations may be feasible only in the early phases of the pandemic as they may not be achievable when the pandemic spreads and resources become scarce. For the purpose of this document the term mask refers to surgical masks, not to procedure masks, special masks or respirators.

Throughout this document, the term "parent organization" refers to the organization that assumes responsibility for non - traditional settings. Where there is no "parent" organization to plan or operate the non - traditional settings, it is expected that another organization would assume this role. Public Health may be in the best position to plan or operate such facilities although this would need to be negotiated and corroborated.

In this document, individuals who have recovered from or have been vaccinated against the pandemic strain of influenza are considered immune with one important caveat regarding the immune status of the vaccinated individual. Because influenza vaccines are not 100% efficacious, if vaccinated individuals come in contact with influenza patients, the vaccinated individual should be monitored for ILI using the ILI Assessment Tool found in Appendix IV. Health Canada will coordinate studies on vaccine effectiveness (see the vaccine annex Annex D in the Canadian Pandemic Influenza Plan for further details).

During a pandemic, it may be necessary to recruit trainees and volunteers to take on specific responsibilities, for example, basic patient care, that is usually reserved for health care workers. The implication is that these workers will need to be considered, for infection control purposes, as being equivalent to health care workers (see glossary) in terms of risk of exposure and ability to transmit disease.

## 1.1 World Health Organization Phases for Pandemic Influenza

The World Health Organization has developed a staged plan, based on its surveillance program, for responding to a pandemic threat. Recognition of a novel influenza strain in humans triggers a series of responses, identified as phases and levels within phases that can ultimately lead to the declaration of a pandemic. Interpandemic activities are designated as Phase 0. Isolation of a novel virus subtype from a single human case, without evidence of spread, will result in WHO declaring pandemic influenza Phase 0: Preparedness Level 1. Phase 1 is the confirmation of a pandemic, Phase 3 is the end of the first pandemic wave and Phase 4 is the second or subsequent waves of the pandemic[10].

More than one wave of infection can occur in a pandemic[11] possibly due to seasonal influences and the existence of a large pool of susceptible individuals in the population[12].

Key stages of the WHO response are outlined in Appendix II.

# 2 Principles of Influenza Transmission

The following section has been adapted from the Health Canada Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*, 1999[5].

Modes or routes of transmission of infectious agents have been classified as contact, droplet, airborne, common vehicle and vectorborne. Routes pertinent to influenza are contact, droplet and airborne.

## 2.1 Contact Transmission

Includes direct contact, indirect contact and droplet (large droplet transmission). Routine practices should prevent most transmissions by the contact route. Although droplet transmission is a type of contact transmission, it is considered separately as it requires additional precautions.

- **Direct Contact Transmission** occurs when the transfer of microorganisms results from direct physical contact between an infected or colonized individual and a susceptible host.
- **Indirect Contact** involves the passive transfer of microorganisms to a susceptible host via an intermediate object such as contaminated hands that are not washed between patients or contaminated instruments or other inanimate objects in the patient's immediate environment.

## 2.2 Droplet Transmission

Refers to large droplets, greater than or equal to 5 m in diameter, generated from the respiratory tract of the source (infected individual) during coughing or sneezing, or during procedures such as suctioning or bronchoscopy. These droplets are propelled a distance of less than one meter through the air and are deposited on the nasal or oral mucosa of the new host (newly infected individual) or in the immediate environment. These large droplets do not remain suspended in the air, therefore, special ventilation is not required since true aerosolization (see below) does not occur.

## 2.3 Airborne Transmission

Refers to the dissemination of microorganisms by aerosolization. Organisms are contained in droplet nuclei, airborne particles less than 5 m that result from the evaporation of large droplets, or in dust particles containing skin squames and other debris that remain suspended in the air for long periods of time[13]. Such microorganisms are widely dispersed by air currents and inhaled by susceptible hosts who may be some distance away from the source patients or individuals, even in different rooms or hospital wards. Control of airborne transmission is the most difficult as it requires control of air flow through special ventilation systems.

## 2.4 Evidence for the Mode of Influenza Transmission

The following section has been adapted from the Health Canada Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*, 1999[5].

Organisms, especially respiratory viruses expelled in large droplets, remain viable in droplets that settle on objects in the immediate environment of the patient. Both influenza A and B viruses have been shown to survive on hard, non-porous surfaces for 24-48 hours, on cloth paper and tissue for 8-12 hours and on hands for 5 minutes[14]. The virus survives better at the low relative humidity encountered during winter in temperate zones.

Contact with respiratory secretions and large droplets, appears to account for most transmissions of influenza. In a report of an outbreak in a nursing home, the pattern of spread was suggestive of contact rather than airborne transmission because patients who were tube fed or required frequent suctioning had higher infection rates than those who did not require such care[15].

Whether or not influenza is naturally transmitted by the airborne route is controversial[16,17]. An outbreak of influenza on an airliner has been attributed to airborne spread; however, large droplet spread could have been responsible because the passengers were crowded together and moved about for several hours in a small, grounded airplane[18]. Although experimental airborne transmission of influenza A virus to mice has been reported, there is no evidence of such transmission in humans[19].

### 2.4.1 Mode of Influenza Transmission

Influenza is directly transmitted primarily by droplet contact of the oral, nasal, or possibly conjunctival mucous membranes with the oropharyngeal secretions of an infected individual. Influenza is indirectly transmitted from hands and objects freshly soiled with discharges of the nose and throat of an acutely ill and coughing individual[6].

## 2.5 Routine Practices and Additional Precautions to Prevent the Transmission of Influenza

The following section has been adapted from the Health Canada Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*, 1999[5].

Routine practices outline the importance of handwashing before and after caring for patients; the need to use gloves, masks/eye protection/face shields, and gowns when splashes or sprays of blood, body fluids, secretions or excretions are possible; the cleaning of patient-care equipment, the patient's physical environment and soiled linen; the precautions to reduce the

possibility of HCW exposure to bloodborne pathogens and patient placement. Routine practices are the infection prevention and control practices for use in the routine care of all patients at all times in all health care settings.

Additional precautions are required when routine practices are not sufficient to prevent transmission. In interpandemic years, the Health Canada guidelines recommend that in addition to routine practices, which should be taken for the care of all patients, additional precautions (droplet and contact precautions) should be taken for pediatric[5] and adult patients with influenza (personal communication, Consensus Meeting for infection control measures with patients presenting with acute, respiratory illness, Gatineau, Quebec, November 24, 2003). This recommendation represents a change because, in the past, it was unclear as to whether or not additional precautions were indicated for adults with influenza.

Children and adults who have the physical and cognitive abilities, should be encouraged to practice good hygiene: i.e., use disposable, one-use tissues for wiping noses; cover nose and mouth when sneezing and coughing; hand washing/hand antisepsis after coughing, sneezing or using tissues; and, keep hands away from the mucous membranes of the eyes and nose. Therefore, preventing the transmission of influenza is best achieved through strict compliance with routine practices, (i.e., good hygiene) and the use of additional precautions[5].

Routine practices and additional precautions to prevent the transmission of infection during the delivery of health care in all health care settings during a pandemic are important. Certain routine practice and additional precaution recommendations may be feasible only in the early phases of the pandemic as they may not be achievable as the pandemic spreads and resources (equipment, supplies and workers) become scarce. Because the complexity of managing high risk patients will be greatest in acute care hospitals, it seems reasonable that the highest priority for infection control resources should be given to the acute care settings.

**Strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventive measure available during a pandemic.** Hand hygiene procedures should be reinforced according to Appendix III.

## 2.6 Use of Masks During a Pandemic

Although there is a lack of evidence that the use of masks prevented transmission of influenza during previous pandemics; in the early phase of an influenza pandemic, it may be prudent for HCWs to wear masks when interacting in close face-to-face contact with coughing individuals to minimize influenza transmission. This use of masks is advised when immunization and antivirals are not yet available but is not practical or helpful when pandemic influenza has entered the community. There is no evidence that the use of masks in general public settings will be protective when the virus is circulating widely in the community.

Masks may be worn by HCWs to prevent transmission of other organisms from patients with undiagnosed cough. For the purpose of this document the term mask refers to surgical masks, not to special masks or respirators. Special masks, i.e., high-efficiency dust/mist masks are required for patients with infectious tuberculosis and for non-immune HCWs entering the room of a patient with measles or disseminated varicella.

When using surgical masks[5]:

- They should be used only once and changed if wet (because masks become ineffective when wet).
- They should cover both the nose and the mouth.

- Avoid touching it while it is being worn
- Discard them into an appropriate receptacle.
- They must not be allowed to dangle around the neck.

## 2.7 Infectivity of the Influenza Virus

The **incubation period** for influenza is from 1-3 days. The **period of communicability** (duration of viral shedding) continues for up to 7 days after the onset of illness[5], probably from 3-5 days from clinical onset in adults and up to 7 days in children[20].

Individuals infected with influenza tend to shed more virus in their respiratory secretions in the early stages of the illness[21,22] and patients are most infectious during the 24 hours before the onset of symptoms and during the most symptomatic period[23]. Viral shedding may be longer in infants[5], and prolonged in young children and immunodeficient patients[20]. It has not been well established whether elderly long term care residents shed viruses longer than other adult populations[24].

There is no information to determine if the period of communicability will be different with pandemic influenza. The duration of shedding of a novel virus (pandemic strain) is unknown. It is possible that prolonged shedding could occur with pandemic influenza because the immune system would not have had prior experience with related strains[25].

Hands can be contaminated with influenza virus by contact with inanimate surfaces or objects in the immediate environment of a patient with influenza infection. Influenza A and B viruses have been shown to survive for 24-48 hours on hard, nonporous surfaces; for up to 8 to 12 hours on cloth, paper and tissues; and on hands for up to 5 minutes after transfer from environmental surfaces[14].

**"The influenza virus is readily inactivated by hospital germicides, household cleaning products, soap, hand wash or hand hygiene products."** Therefore, neither antiseptic hand wash products in health care settings nor antibacterial hand wash products in home setting are required because routine products, along with proper hand washing procedures, will inactivate the influenza virus.

Infectivity of the Influenza Virus

| | |
|---|---|
| 1. Incubation period: | 1-3 days. |
| 2. Period of communicability: | Infectious 1 day before onset of symptoms and may be longer than 7 days after the onset of symptoms. |

# 3 Occupational Health and Infection Control Management of Pandemic Influenza in Traditional and Non-traditional Health Care Settings

## 3.1 Occupational Health and Infection Control Pandemic Influenza Planning

A broad consensus has emerged regarding plans for pandemic influenza: the plans should be aimed at reducing influenza-related morbidity, mortality and social disruption. It is widely recognized that preparation for the next pandemic requires that an infrastructure be in place during the interpandemic period for the following reasons:

(a) the rapid detection of novel variants and disease caused by them,

(b) the production and delivery of influenza vaccines and antiviral agents to high priority target groups,

(c) the rapid dissemination and exchange of information; and

(d) emergency preparedness.

Pandemic plans should outline the responsibilities of the institutions that will be involved in the pandemic response. The plan should be divided into phases that describe, in detail, a step-wise response to the identification and subsequent spread of a novel virus, as well as the ability to cut back the response if a novel virus fails to spread as occurred in 1976 and 1977[10].

Planning for and the management of pandemic influenza is directly related to the strength of the strategy in place for the management of interpandemic influenza; a strong interpandemic plan will affect the outcome of the pandemic plan[12].

"The trends of modern society, including the increasing availability of rapid human transportation and the urbanization of the rapidly expanding human population, tend to facilitate the spread of influenza and increase morbidity. Modern medicine can reduce the mortality that resulted from complications of infection with influenza virus during earlier epidemics, but the cost of medical interventions has increased to the point that effective methods of epidemic control should be considered. **This challenge provides an opportunity to develop, test, and have in place a strategy for control of interpandemic influenza before the next pandemic"[12].**

During an influenza pandemic, adherence to infection prevention and control policies and procedures is critical to minimize the transmission of influenza and other infectious diseases. It is anticipated that neither influenza immunization nor chemoprophylaxis will be available in the early stages of a pandemic and perhaps not even available in later stages, necessitating an emphasis on infection prevention and control practices.

### 3.1.1 Recommendations

1. All organizations responsible for traditional health care settings (i.e., acute, long term, ambulatory, home and community care) and organizations (i.e., parent organizations) responsible for the planning of non-traditional settings (i.e., triage settings, self care settings and temporary influenza hospitals) operational only during an influenza pandemic, should develop an Infection Control and Occupational Health (IC/OH) plan for the management of pandemic influenza. The plan should be developed according to previously published Health Canada Infection Control Guidelines[3,5,6,9] and federal/provincial/territorial/municipal/regional contingency plans with a multi-disciplinary group that includes, but is not limited to:

   (a) representatives from traditional and non traditional organizations including:

   - medical administration
   - nursing administration
   - physicians
   - nursing services
   - physical plant and housekeeping
   - occupational health
   - infection prevention and control
   - pharmacy services
   - emergency services
   - respiratory services
   - public affairs
   - educational services
   - laboratory services;

   (b) public health personnel;

   (c) community care providers;

   (d) local pandemic planners;

   (e) funeral service workers;

   (f) local disaster planners.

   ↑A I I I

2. Non traditional settings that are not associated with a "parent" organization must develop their IC/OH plan for the management of pandemic influenza with an organization that would assume this role of "parent" organization. Public Health may be in the best position to plan or operate such facilities although this would need to be negotiated and corroborated.

   ↑A I I I

3. The IC/OH plan for the management of pandemic influenza for traditional and non-traditional settings should be reviewed every 3 years and updated according to current legislation and relevant publications.

   ↑A I I I

4. The IC/OH plan for the management of pandemic influenza for traditional and non-traditional settings should include the preparation of educational information for

health care workers (see glossary for HCW definition, see section 4.1 for HCW education and see section 3.5 for management of HCWs during a pandemic).

↑A I I I

5. The IC/OH plan for the management of pandemic influenza should include recommendations for the use of influenza vaccine and chemoprophylaxis for health care workers according to the vaccine (Annex D) of the Canadian Pandemic Influenza Plan.

↑A I I I

6. Pandemic influenza planning should include support for programs to meet Canadian target coverage rates for pneumococcal immunization[26-28].

↑A I I I

7. **Strict adherence to hand washing/hand antisepsis recommendations (see Appendix III) is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.**

   Planning should include ensuring that adequate supplies of hand hygiene products are a priority for all health care settings as there may be an interruption to the supply or shortages of hand antisepsis products, soap and hand towels

↑A I I

8. Planning should include the priority of maintaining adequate resources for infection control in acute care hospitals (soap, antiseptic products, masks/eye protection/face shields, gloves, gowns) due to the increased complexity and management issues of hospitalized patients.

↑A I I

9. Planning should include ensuring all HCWs (see glossary for HCW definition) are offered hepatitis B immunization[6,9]. As resources permit, HCWs should also receive TB skin testing, should have proof of measles, mumps, rubella (MMR) immunity and receive a tetanus booster if appropriate[6].

↑A I I

## 3.2 Definitions for Infection Control/Occupational Health Management of Patients/Staff with Influenza-Like Illness (ILI)

### 3.2.1 Influenza-Like-Illness

See glossary term “influenza”.

Refer to Appendix IV for an ILI Assessment Tool. An ILI Assessment Tool is to be used for immediate triage of patients or staff and accommodation/cohort of patients, prior to further OH or clinical management.

### 3.2.2 Clinical Case Definition

See glossary term “influenza”.

### 3.2.3 Confirmed Case of Influenza

See glossary term “influenza”.

### 3.2.4 Immunity to Influenza

During a pandemic, it is likely that most cases of influenza will be caused by the pandemic strain. Data from the 1957 and 1968 pandemics show that the previously circulating influenza strain disappeared from human circulation when the pandemic strain of influenza virus emerged[25]. Therefore, HCWs who have recovered from an ILI during an earlier pandemic phase, may be assumed to be immune to the pandemic influenza strain.

Individuals who have been immunized against the pandemic strain of influenza will also be considered immune, recognizing that the influenza vaccine may not be fully protective. Therefore, unlike individuals who have recovered from pandemic influenza or ILI, vaccinated individuals should be monitored for ILI using the ILI Assessment Tool found in Appendix IV.

## 3.3 Use of Influenza Immunization During an Influenza Pandemic

See the vaccine annex (Annex D) of the Canadian Pandemic Influenza Plan. Influenza vaccine availability in the early phase(s) of the pandemic is uncertain. When available, vaccine will be provided according to priority groups set by recommendations from the Vaccine Working Group. Health Care Workers and those trainees, volunteers, etc. who are recruited to perform the duties of a HCW are considered to be a high priority.

## 3.4 Use of Antivirals During an Influenza Pandemic

See the antivirals annex (Annex E) of the Canadian Pandemic Influenza Plan. Antiviral availability in the early phase(s) of the pandemic is uncertain. When available, antivirals will be provided according to priority groups set by recommendations from the Antiviral Working Group. Health care workers and those trainees, volunteers, etc. who are recruited to perform the duties of a HCW are considered to be a high priority.

## 3.5 Occupational Health Management of Health Care Workers During an Influenza Pandemic

The phrases “fit for work”, “unfit for work”, and “fit to work with restrictions” are used by Occupational Health to communicate a worker’s ability to remain at or return to work depending upon their susceptibility to influenza, immunization status and agreement to use antivirals[6]. During the early phases of a pandemic, vaccine and antiviral availability will be limited and will be provided to priority groups. Health Care Workers, and those trainees, volunteers, etc. who are recruited to perform the duties of a HCW, are to be one of the priority groups. (See Annexes D and E of the Canadian Pandemic Influenza Plan.)

### 3.5.1 Recommendations

#### *1. Fit for Work*

(a) Ideally, HCWs are fit to work when one of the following conditions apply:

- (i) they have recovered from ILI (see glossary for definition and ILI Assessment Tool, Appendix IV) illness during earlier phases of the pandemic;

(ii) they have been immunized against the pandemic strain of influenza as outlined in Annex D of the Canadian Pandemic Influenza Plan; or,

(iii) they are on appropriate antivirals as outlined in Annex E of the Canadian Pandemic Influenza Plan.

Such HCWs may work with all patients and may be selected to work in units where there are patients who, if infected with influenza, would be at high risk for complications.

↑A I I I

(b) Whenever possible, well, unexposed HCWs should work in non-influenza areas.

↑A I I I

(c) Asymptomatic HCWs may work even if influenza vaccine and antivirals are unavailable. Meticulous attention should be paid to hand hygiene and HCWs should avoid touching mucous membranes of the eye and mouth to prevent exposure to the influenza virus and other infective organisms.

↑A I I I

### *2. Unfit for Work*

Ideally, staff with ILI should be considered "unfit for work" and should not work; nonetheless, due to limited resources, these HCWs may be asked to work if they are well enough to do so (see 3(b) below).

↑A I I I

### *3. Fit to Work with Restrictions*

(a) Ideally, symptomatic staff who are considered "fit to work with restrictions" should only work with patients with ILI. Health Care Workers who must work with non-exposed patients (non-influenza areas) should be required to wear a mask if they are coughing and must pay meticulous attention to hand hygiene.

↑A I I I

(b) Symptomatic HCWs who are well enough to work should not be redeployed to intensive care areas, nurseries[29-31] or units with severely immunocompromised patients, i.e., transplant recipients[32], hematology/oncology patients[33-35], patients with chronic heart or lung disease, or patients with HIV/AIDS and dialysis patients.

↑A I I

# 4 Pandemic Influenza Education

## 4.1 Pandemic Influenza Education for Health Care Workers (Including Emergency Medical Services, mortuary workers, and HCWs in correctional settings)

### *Recommendations*

1. Educational information for workers should be provided as soon as WHO Pandemic Phase 0 Level 1 is declared (see Appendix II) and repeated at frequent intervals to all staff levels and during all shifts.

   ↑A I I I

2. The pandemic influenza information should be appropriate to the audience and be provided using a variety of methods, e.g., postings in elevators, at facility entrances, brochures, newsletters and web sites.

   ↑A I I I

3. The educational information prepared and provided for workers should include:
   (a) an explanation that pandemic influenza is a novel strain of influenza and what a pandemic is;
   (b) the facility-specific pandemic influenza plan;
   (c) information regarding triage settings (see Section 7.1 ), self care (see Section 7.2) and temporary influenza hospitals ( see Section 7.3).
   (d) the difference between an upper respiratory infection and influenza (see the introduction to the Preparedness Section of the Canadian Pandemic Influenza Plan);
   (e) the mode of influenza transmission (see Section 2.4);
   (f) the criteria for determining, influenza-like-illness (ILI) ( see glossary for definition and Appendix IV for an ILI Assessment Tool) and influenza (see glossary for definition);
   (g) the risk of infection and subsequent complications in high-risk groups;
   (h) the message that **strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during early phases of the pandemic** ( see Appendix III);
   (i) information about the importance of hygienic measures (see Section 2.5) to minimize influenza transmission because influenza immunization and/or prophylaxis may not be available until later in the pandemic;
   (j) information indicating that, during the early phase of an influenza pandemic, it may be feasible for HCWs to wear masks when face-to-face with coughing individuals to minimize influenza transmission (particularly when immunization and antivirals are not yet available) but not practical or helpful when transmission has entered the

community (see Section 2.6). Masks may be worn by HCWs to prevent transmission of other organisms from patients with undiagnosed cough;

(k) who will be given the highest priority for immunization when vaccine is available,

(l) the importance of being immunized and safety of immunization (see Annexes D and E of the Canadian Pandemic Influenza Plan);

(m) who will be given what priority for prophylaxis when antivirals are available, the importance of prophylaxis and safety of prophylaxis (see Annexes D and E of the Canadian Pandemic Influenza Plan).

↑B I I I

4. Information about the importance of routine practices and additional precautions to prevent the transmission of infection during the delivery of health care in all health care settings during a pandemic. This information should include the caveat that some routine practice and additional precaution recommendations may be achievable only in the early phases of the pandemic and other recommendations may not be achievable as the pandemic spreads and resources (equipment, supplies and workers) become scarce.

↑B I I I

5. Priority for infection control resources should be assigned to acute care settings because of the complexity of managing high risk patients in acute care settings.

↑B I I I

6. Education about routine practices for those expected to work in non-traditional settings, as outlined in this document, should be available. Refer to Section 7.1 for Triage Settings, Section 7.2 for Self Care Settings and Section 7.3 for Temporary Influenza Hospitals.

↑B I I I

7. Education about Routine Practices in traditional health care settings, as outlined in Health Canada Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*, 1999, should be ongoing.

↑B I I I

8. HCWs should be provided with the recommendations for Occupational Health Management of workers during a pandemic (See Section 3.5).

↑B I I I

## 4.2 Pandemic Influenza Education for the Public (including child care workers, teachers, shelter workers, correctional workers, etc.)

### *Recommendations*

1. Provide education appropriate to the recipient, as soon as WHO Pandemic Phase 0 Level 1 is declared (see Appendix II). Include information about the epidemiology and mode of transmission of influenza using a variety of methods, e.g., postings at facility entrances, brochures, newsletters, web sites, television and radio stations.

↑A I I I

2. Educational information prepared and provided for the public should include:

   (a) an explanation that pandemic influenza is a novel strain of influenza and what a pandemic is;

(b) information regarding Self Care (see Section 7.2 and Annex G of the Canadian Pandemic Influenza Plan) and for the purpose of Triage Settings and Temporary Influenza Hospitals (see Annex G of the Canadian Pandemic Influenza Plan);

(c) the difference between an upper respiratory infection and influenza (see the introduction to the Preparedness Section of the Canadian Pandemic Influenza Plan;

(d) the mode of transmission of influenza (see Section 2.4);

(e) the criteria for determining, influenza-like-illness (ILI) (see glossary for definition and Appendix IV for an ILI Assessment Tool) and influenza (see Glossary for definition);

(f) the risk of infection and subsequent complications in high-risk groups;

(g) the message that **strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during the pandemic;**

(h) information about the importance of hygienic measures, i.e., using disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; hand washing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose to minimize potential influenza transmission because influenza immunization and/or prophylaxis may not be available until later in the pandemic;

(i) information that the influenza virus is readily inactivated by plain soap and common household cleaning products;

(j) information indicating that during the early phase of an influenza pandemic, it may be feasible for HCWs to wear masks when coming face-to-face with coughing individuals to minimize influenza transmission (particularly when immunization and antivirals are not yet available) but not practical or helpful when transmission has entered the community. In health care settings, HCWs should wear masks to prevent transmission of other organisms from patients with undiagnosed cough (see Section 2.6);

(k) who will be given the highest priority for immunization when a vaccine is available, importance of being immunized and safety of immunization (See the Preparedness Section of the Canadian Pandemic Influenza Plan);

(l) who will be given what priority for prophylaxis when antivirals are available, the importance of prophylaxis and safety of prophylaxis (see Annex E of the Canadian Pandemic Influenza Plan).

↑A I I I

3. Provide information to encourage those who are symptomatic with ILI (see Appendix IV for an ILI Assessment Tool) but do not require formal health care, to remain at home until their symptoms have resolved.

↑B I I I

4. Provide information to encourage those with ILI (see Appendix IV for an ILI Assessment Tool) to avoid visiting those who are at high risk for complications if they developed influenza in institutional settings (acute care and long term care) until their symptoms have resolved.

↑B I I I

5. Inform the public to avoid public gatherings, as discussed in the following section, to minimize exposure.

↑B I I I

## 5 Public Health Restrictions on Public Gatherings

Medical Officers of Health, through their provincial/territorial Public Health Acts, have the authority to quarantine individuals or groups, as deemed necessary, to control infectious diseases. During the 1918 influenza pandemic in Alberta, drastic control measures were taken; masks were required when going out in public; all schools, churches and theatres were closed, public meetings banned and towns were quarantined (Alberta Pandemic Influenza Planning overhead presentation given by Dr. K Grismsrud at the Canadian Pandemic Planning, meeting held in Montreal, May, 2001).

In an historical review of the 1918 pandemic in the United States, Keen-Payne[36] noted that many other centres used similar measures to attempt to curb transmission. In Chicago, persons who sneezed openly or who spit were threatened with arrests and fines. Churches were not closed, but parishioners were requested to stay home if ill, and windows were opened for ventilation during services. By the third week in October 1918, (the peak of the second wave) closing had extended to theaters, banquets, lecture halls, restaurants and movie shows.

In Newark, the state simply banned all public gatherings on October 10. Confusion developed when liquor stores were allowed to remain open for sales but churches were not open for congregating. The churches protested and the ban was lifted on October 21. In San Diego, all public facilities were closed (libraries, pool halls, women's weekly club meeting halls) as were all outdoor meetings except those convened to sell liberty bonds. The ban was lifted and then imposed again as new cases of influenza increased. Citizens were never strongly supportive of these measures[36].

The suggestion that the spread of influenza from US military camps in the summer of 1918 did not occur until school returned in the fall, has been noted[37]. In the United States, illness rates of nearly 40% were reported among schoolchildren during the autumn wave[38].

Following the 1957 epidemic in Japan, the policy on influenza immunization was changed as it was determined that school attendance played an important part in spreading that epidemic. There were wide-spread school closures, with attack rates as high as 60% in some areas and approximately 8,000 deaths. The new policy stated that "because schoolchildren are the major disseminators of the disease, they should be immunized". In a study to review whether the policy of vaccination of school children in Japan (over a 25-year period) reduced the incidence and mortality attributed to influenza among older persons, the authors concluded that the vaccination of schoolchildren in Japan disrupted the spread of influenza to older persons[39].

There is evidence that closing schools may change the course of transmission[12,40,41]. Studies conducted both during pandemic years and interpandemic years demonstrate that age-specific attack rates are highest among school children[12]. Additional studies noted that the age distribution of culture-positive patients changed during the course of epidemics. Initially, school children were culture positive, followed by a shift to preschool children and adults during the latter part of the epidemic[42]. The authors observed that school absenteeism was often followed by employee absenteeism during the influenza epidemics studied.

It is thought that management of exposure, as an approach to the prevention of a pandemic, is not possible because of the current high levels of international travel and the expansion of populations into many regions of the world. Options for slowing the spread of pandemic influenza have been suggested and include the use of antiviral prophylaxis, limiting congregations of people and, possibly, quarantine[43].

In preparation of an influenza pandemic and in an attempt to curtail community transmission, there are neither data nor guidelines to determine which public gatherings to close and when to close them. What constitutes a public gathering and whether some gatherings may be defined as essential versus non-essential needs to be clarified. Examples of public gatherings from the above included: transportation (ground, rail and air), childcare, schools, retail settings, workplaces, places of worship, funerals and community events (cultural/sporting).

The principles to determine when, how, and which public gatherings will be restricted in order to curtail community transmission ought to be based on common sense strategies, and should be consistently applied within, and across, jurisdictions. The severity of the pandemic strain and the stage of the pandemic, as it unfolds globally, should be considered when making this determination. Refer the to Public Health Measures document of the Preparedness Section of the Canadian Pandemic Influenza Plan for more comprehensive public health recommendations than those listed below.

## 5.1 Recommendations

1. Medical Officers of Health should develop a predetermined strategy for closing public gatherings. If public gatherings are restricted they should be restricted early enough to affect transmission. The strategy should include but is not limited to:
   (a) the definition of what constitutes a public gathering;
   (b) specifying the time period within the pandemic phases to implement the strategy;
   (c) applicability and consistency across jurisdictions;
   (d) availability of and priority use of vaccine and antivirals as outlined in Annexes D and E of the Canadian Pandemic Influenza Plan;
   (e) consideration as to whether or not school age children are to be considered a high priority for immunization or antivirals in the early phase of the pandemic.

B I I I

# Management of Pandemic Influenza in Acute Care Settings

Acute care settings group patients together who have a high risk of developing serious, sometimes fatal, complications related to influenza. In addition, morbidity and mortality related to hospital-acquired (i.e., nosocomial) infections is much greater in acute care populations than in other populations.

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases in the acute care setting with or without availability of immunization or chemoprophylaxis.

## Recommendations

### 1.1 Prevention of Pandemic Influenza

#### *A. Immunization and Antivirals*

Adherence to recommendations for vaccine and antivirals for patients and HCWs, as outlined in Annexes D and E of the Canadian Pandemic Influenza Plan, is of paramount importance.

### 1.2 Control of Pandemic Influenza

#### *A. Physical Setting*

1. When Pandemic Phase 2 is declared (see Appendix II), open Triage Settings in acute care hospitals as predetermined in the Preparedness Section of the Canadian Pandemic Influenza Plan.

   ↑AIII

2. When Pandemic Phase 2 is declared (see Appendix II) open cohort areas/units[4] in the hospital (See Sections F. and G. below) as predetermined in the IC/OH Pandemic Plan.

   ↑AIII

#### *B. Management of Staff*

1. Provide education, as outlined in Section 4.1.
2. Adhere to Occupational Health Management, as outlined in Section 3.5.

## C. *Infection Control Practices*

### 1. Routine Practices

Using a program to prevent hospital-acquired (i.e., nosocomial) infections, acute care facilities should adhere to published guidelines including Health Canada Infection Control Guidelines. *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5].

### 2. Additional Precautions

Although droplet and contact precautions are recommended in preventing the transmission of influenza during an interpandemic period, these precautions will not be achievable during a pandemic. In contrast, adherence to routine practices is achievable during a pandemic.

Routine Practices are summarized below:

(a) Hand Hygiene

Staff, patients and visitors should **recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.**

i. Hand hygiene procedures should be reinforced according to Appendix III.

↑A I I

ii. Hands should be washed or hand antisepsis performed after direct contact with patients/workers with ILI and after contact with their personal articles or their immediate environment.

↑A I I

(b) Hygiene Measures to Minimize Influenza Transmission

i. Patients, staff and visitors should be encouraged to minimize potential influenza transmission through good hygienic measures, e.g., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; hand washing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

↑A I I I

(c) Personal Protective Equipment (PPE)

i. Masks

1. **Masks to minimize the transmission of influenza may be worn** when face-to-face with coughing individuals during the early phases of the pandemic but are not practical or helpful when influenza transmission has entered the community.

↑B I I I

2. **Masks should be worn to prevent the transmission of other organisms** when HCWs are face-to-face with undiagnosed coughing patients.

↑B I I I

3. Masks and eye protection, or face shields **should be worn** to prevent HCW exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose[9,44,45].

↑B I I I

4. HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.
5. Use masks, as outlined in Section 2.6

ii. Gloves

1. Gloves are not required for the routine care of patients suspected or confirmed to have influenza. Meticulous hand washing with soap and water or performing hand antisepsis will inactivate the virus.

↑A I I I

2. Gloves **should be worn** to provide an additional protective barrier between the HCWs hands and blood, body fluids, secretions, excretions and mucous membranes to reduce the potential transfer of microorganisms from infected patients to HCWs and from patient-to-patient via HCWs' hands.

↑A I I

3. Gloves **are necessary** for HCWs with open lesions on their hands when providing direct patient care.

↑A I I

4. Gloves **should be** used as an additional measure, not as a substitute for hand hygiene[46,47].

↑B I I

5. Gloves should not be reused or washed[47].

↑A I I

iii. Gowns

1. Gowns are not required for the routine care of patients suspected or confirmed to have influenza.

↑A I

2. **Long sleeved gowns should only be used** to protect uncovered skin and prevent soiling of clothing during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions[9,45].

↑B I I I

3. HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretions or excretions should be washed as soon as possible, thoroughly, but gently with soap and warm running water.

↑B I I I

(d) Cleaning, Disinfection, and Sterilization of Patient Care Equipment

i. Acute care settings should adhere to the recommendations for cleaning, disinfection and sterilization of patient care equipment, as outlined in the Health Canada Infection Control Guidelines *Handwashing, Cleaning Disinfection and*

*Sterilization in Health Care*[3] and *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5].

↑A I I I

(e) Environmental Control (Housekeeping, Laundry, Waste)

i. Acute care settings should adhere to the recommendations for housekeeping, laundry and waste management as outlined in the Health Canada Infection Control Guidelines *Handwashing, Cleaning Disinfection and Sterilization in Health Care*[3] and *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5].

↑A I I I

ii. Equipment and surfaces contaminated with secretions from patients suspected or confirmed to have influenza should be cleaned before use with another patient.

↑B I I I

iii. Special handling of linen or waste contaminated with secretions from patients suspected or confirmed to have influenza is not required.

↑A I I

## D. Accommodation

1. Single rooms in acute care settings[5] are limited and should be for those suspected of having or confirmed to have airborne infections, e.g., tuberculosis, measles, varicella and disseminated zoster and those who visibly soil the environment for whom appropriate hygiene cannot be maintained.

↑A I I

2. Minimize crowding (i.e., maintain a one metre spatial separation) between patients, visitors and workers whenever possible.

↑A I I I

## E. Patient Triage/Cohorting

1. When Pandemic Phase 2 is declared (see Appendix II) open the following specified *cohort areas/units*[4] in the hospital, as predetermined in the IC/OH Pandemic Plan:

(a) **Influenza-Like-Illness (ILI), Assessment Area** (see Glossary for definition and Appendix IV for an ILI Assessment tool).

(b) **Non ILI Assessment Area** (patients require acute care assessment for other conditions).

(c) **Suspected/Exposed to ILI, In-patient Units.**

(d) **Confirmed Influenza** (see Glossary for definition), In-patient Units.

(e) **Not Exposed/Immune* to Influenza, In-patient Units**;

(f) **Not Exposed to ILI but at very high risk of complications, In-patient Units** (e.g., intensive care areas; nurseries[29-31] or units with severely immunocompromised patients, e.g., transplant recipients[32] hematology/oncology patients[33-35], patients with chronic heart or lung disease or patients with HIV/AIDS and dialysis patients).

↑A I I I

Note: *Immune are those recovered from the pandemic strain of influenza or those immunized against the pandemic strain of influenza (see Section 3.2.4). As noted, the influenza vaccine may not be 100% efficacious in providing immunity.

2. In acute care settings, (hospitals), triage ILI patients promptly to a separate designated influenza assessment area onsite, to minimize transmission to others in the waiting room.

   ↑A I I I

3. In acute care settings,(hospitals), triage non ILI patients (but requiring acute care assessment) promptly to specific non ILI waiting and examining areas physically separate from the ILI assessment area to prevent their exposure to ILI.

   ↑A I I I

### *F. Patient Admission*

1. When Pandemic Phase 2 is declared (see Appendix II), eliminate or curtail elective medical and surgical acute care (hospital) admissions and restrict cardiovascular and pulmonary surgery to emergency cases[17].

   ↑A I I I

2. Patients who have recovered from influenza can be moved into the "Non Influenza" cohort areas after the period of communicability of the pandemic strain has passed.

   ↑A I I I

3. As the pandemic progresses, the "Suspect/Exposed" Cohort and the "Confirmed Influenza" cohort may be merged.

   ↑A I I I

4. Maintain cohort principles until the pandemic wave has been declared over.

   ↑A I I I

### *G. Patient Activity Restrictions*

1. Limit movement/activities of patients including transfers within the hospital, unless the patient has recovered from pandemic influenza.

   ↑A I I I

2. Patients with ILI who are coughing should only leave their room for urgent/necessary procedures.

   ↑A I I I

3. Patients with ILI who are coughing should wear a surgical mask whenever they need to be out of their room until the period of communicability of the pandemic strain has passed.

   ↑A I I I

### *H. Visitor Restrictions*

1. There are no restrictions for asymptomatic visitors who have recovered from pandemic influenza or who have been immunized against the pandemic strain of influenza.

   ↑A I I I

2. Visitors with ILI should not visit until they are asymptomatic. Close relatives of terminally ill patients can be exempt, but should put a mask on upon entry into the facility and their visit shall be restricted to that patient only.

   ↑A I I I

3. Visitors should be informed when the acute care facility has influenza activity. Those who have not yet had the pandemic strain of influenza or who have not been immunized against the pandemic strain, should be discouraged from visiting. Close relatives of terminally ill patients can be exempt, but they should restrict their visit to that individual only and they should wash their hands on exit from the patient's room. Wearing a mask upon entry to the facility is only useful if there is no influenza in the community.

↑AIII

# 2 Management of Pandemic Influenza in Long Term Care Settings

Interpandemic influenza is a major cause of illness and death in residents of long term care facilities for the elderly, in part, because the resident's age and underlying illness increase the risk of serious complications and, in part, because institutional living increases the risk of influenza outbreaks[24,48,49]. It is reasonable to anticipate that pandemic influenza would have the same impact in long term care settings.

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases in the long term care setting with or without the availability of immunization or chemoprophylaxis.

## Recommendations

## 2.1 Prevention of Pandemic Influenza

### *A. Immunization and Antivirals*

Adherence to the recommendations for vaccine and antivirals for residents and HCWs, as outlined in Annexes D and E of the Canadian Pandemic Influenza Plan, is necessary.

## 2.2 Control of Pandemic Influenza

### *A. Physical Setting*

When Pandemic Phase 2 is declared (see Appendix II), open the area for the care of residents who will require "acute influenza care" as predetermined in the Infection Control/Occupational Health (IC/OH) Pandemic Plan to minimize transfer to acute care hospitals (also See Section F below and the Preparedness Section of the Canadian Pandemic Influenza Plan).

↑AIII

### *B. Management of Staff*

1. Provide education, as outlined in Section 4.1.
2. Adhere to Occupational Health Management, as outlined in Section 3.5.

## C. *Infection Control Practices*

1. Using a program to prevent health care-acquired (i.e.nosocomial) infections, long term care facilities should adhere to published guidelines[50,51], including Health Canada Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5].

2. Additional Precautions

   Although droplet and contact precautions are recommended in preventing the transmission of influenza during an interpandemic period, these precautions will not be achievable during a pandemic. In contrast, adherence to routine practices is achievable during a pandemic.

   Routine Practices are summarized below:

   (a) Hand Hygiene

   i. Staff, residents and visitors should **recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.**

   Hand Hygiene procedures should be reinforced according to Appendix III.

   ↑A I I

   ii. Hands should be washed or hand antisepsis performed after direct contact with residents/workers with ILI (see Appendix IV for ILI an Assessment Tool) and after contact with their personal articles or their immediate environment.

   ↑A I I

   (b) Hygiene Measures to Minimize Influenza Transmission

   i. Staff, residents and visitors should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

   ↑A I I I

   (c) Personal Protective Equipment

   i. Masks

   1. **Masks to minimize the transmission of influenza may be worn** when face-to-face with coughing individuals during the early phases of the pandemic but are not practical or helpful when transmission has entered the community.

   ↑B I I I

   2. **Masks should be worn to prevent the transmission of other organisms** when HCWs are face-to-face with undiagnosed coughing patients.

   ↑B I I I

3. **Masks and eye protection, or face shields should be worn** to prevent HCW exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose[9,44,45].

↑B I I I

4. HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.
5. Masks should be worn, as outlined in Section 2.6.

ii. Gloves

1. **Gloves are not required for the routine care of residents suspected of having or confirmed to have influenza**. Meticulous handwashing with soap and water or performing hand antisepsis will inactivate the virus.

↑A I I I

2 **Gloves should be worn** to provide an additional protective barrier between the HCWs hands and blood, body fluids, secretions, excretions and mucous membranes to reduce the potential transfer of microorganisms from infected residents to HCWs and from resident to resident via HCW hands.

↑A I I

3. **Gloves are necessary** for HCWs with open lesions on their hands when providing direct resident care.

↑A I I

4. **Gloves should** be used as an additional measure, not as a substitute for hand hygiene[46,47].

↑B I I

5. **Gloves** should not be reused or washed[47].

↑A I I

iii. Gowns

1. **Gowns are not required for the routine care of residents suspected of having or confirmed to have influenza.**

↑A I

2. **Long sleeved gowns should only be used** to protect uncovered skin and prevent soiling of clothing during procedures and resident care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions[9,45].

↑B I I I

3. HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretions or excretions should be washed as soon as possible, thoroughly but gently with soap and warm running water.

↑B I I I

(d) Cleaning Disinfection Sterilization of Resident Care Equipment

i. Long term care settings should adhere to the recommendations for cleaning, disinfection and sterilization of resident care equipment as outlined in the Health Canada Infection Control Guidelines *Handwashing, Cleaning Disinfection and*

*Sterilization in Health Care*[3] and *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5].

↑A I I I

(e) Environmental Control (Housekeeping, Laundry, Waste)

i. Long term care settings should adhere to recommendations for housekeeping, laundry and waste management as outlined in the Health Canada Infection Control Guidelines *Handwashing, Cleaning Disinfection and Sterilization in Health Care*[3] and *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5].

↑A I I I

ii. Equipment and surfaces contaminated with secretions from residents suspected of having or confirmed to have influenza should be cleaned before use with another patient.

↑B I I I

iii. Special handling of linen or waste contaminated with secretions from residents suspected of having or confirmed to have influenza is not required.

↑A I I

## D. *Transfer to Acute Care*

1. Residents with influenza (see Glossary for definition) or Influenza-Like Illness (ILI)(see Glossary for definition and Appendix IV for an ILI Assessment Tool) requiring more acute care should *not* be transferred to acute care settings. Such residents should be cared for in "acute influenza care" areas within the LTC facility as described in the IC/OH Pandemic Influenza Plan.

↑B I I I

## E. *Admission/Re-Admission*

1. Patients from acute care who have recovered from pandemic influenza or who are immunized against the pandemic influenza strain may be admitted into the LTC facility without restrictions.

↑A I I I

2. Residents who were transferred to acute care and who have recovered from pandemic influenza or who have been immunized against the pandemic influenza strain may be re-admitted into the LTC facility without restrictions.

↑A I I I

3. LTC facilities that have already had pandemic influenza through their facility may admit individuals from the community or acute care without restrictions.

↑A I I I

4. LTC facilities that have remained "influenza free" may admit patients from acute care or the community who have been potentially exposed to influenza. However, such residents must be managed using influenza precautions (maintain one metre of spatial separation, mask if within one metre of the resident and emphasize hand hygiene) for 3 days until past the incubation period if no influenza symptoms occur and until 7 days after the onset of symptoms if influenza develops.

↑A I I I

## F. *Cohorting*

1. Cohorting resident groups (i.e., confirmed/suspected influenza, exposed/not exposed to influenza) is not a feasible measure to control pandemic influenza in a LTC facility. When influenza has been identified in one area of the LTC facility (via residents, staff or visitors) it can be assumed that the facility has been exposed and the following measures should occur:

   (a) Cancel or postpone inside and outside facility procedures, appointments and activities until influenza activity has stopped.

   (b) Encourage coughing residents to remain in their own rooms to prevent the spread of influenza in common areas.

   ↑A I I I

## G. *Visitor Restrictions*

1. There are no restrictions for asymptomatic visitors who have recovered from pandemic influenza or have received immunization against the pandemic strain of influenza.

   ↑A I I I

2. If the LTC facility has remained "influenza free", visitors with ILI (see Glossary for definition and Appendix IV for an ILI Assessment Tool) should not visit until they have recovered. Visitors for terminally ill residents may be exempt, but should put a mask on upon entering the facility and restrict their visit to that resident only.

   ↑A I I I

3. Visitors should be informed when the LTC facility has experienced influenza activity. Those visitors who have not yet had the pandemic strain of influenza and are not immunized against the pandemic strain, should be discouraged from visiting. Visitors for terminally ill residents can be exempt, but should restrict their visit to that resident only and wash their hands on exit from the resident's room. Wearing a mask upon entering the facility is only useful if there is no influenza in the community.

   ↑A I I I

# 3 Management of Pandemic Influenza in Ambulatory Care Settings

A comprehensive infection prevention and control program forms the basis for a successful pandemic plan. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases in the ambulatory care setting with or without availability of immunization or chemoprophylaxis.

## Recommendations

## 3.1 Prevention of Pandemic Influenza

### *A. Immunization and Antivirals*

Adherence to the recommendations for vaccine and antivirals for patients and HCWs, as outlined in Annexes D and E of the Canadian Pandemic Influenza Plan is required.

## 3.2 Control of Pandemic Influenza

### *A. Administration*

1. When Pandemic Phase 2 is declared (see appendix II), non-urgent and routine ambulatory care visits should be cancelled.

   ↑B I I I

2. Consider creating a dedicated "hot line" to provide consistent pandemic influenza information explaining symptoms of Influenza-like-illness (ILI) (see Glossary for definition and Appendix IV for an ILI Assessment Tool), the purpose of Triage Settings (see Annex G of the Canadian Pandemic Influenza Plan) and Self-care guidelines (See 7.2 and Annex G of the Canadian Pandemic Influenza Plan).

   ↑A I I I

3. When Pandemic Phase 2 is declared (see Appendix II), open Triage Settings in Ambulatory Care, as described in the Preparedness Section of the Canadian Pandemic Influenza Plan).

   ↑A I I I

4. Patients attending ambulatory settings for concerns related to ILI should be assessed according to an ILI Assessment Tool, (see Appendix IV).

   ↑A I I I

## B. *Physical Setting*

1. If possible, separate well patients from those with ILI by considering the following strategies: (a) minimizing time spent in waiting rooms; (b) providing separate entrance/waiting areas for patients with ILI; (c) placing patients with ILI directly into a single room; or, (d) separating patients as quickly as possible by placing ILI patients in an area of the waiting room separated from non ILI patients by at least 1 metre.

   ↑A I I I

2. Remove magazines and toys from the waiting rooms.

   ↑A I I I

3. Clean equipment and environmental surfaces, potentially contaminated by coughing patients, as frequently as possible, preferably after each patient.

   ↑A I I

## C. *Management of Staff*

1. Provide education as outlined in Section 4.1.
2. Adhere to Occupational Health Management of staff as outlined in Section 3.5.

## D. *Infection Control Practices*

1. Ambulatory care settings should adhere to published infection control guidelines[52-58] to prevent infections, including Health Canada Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5].
2. Additional Precautions

   Although droplet and contact precautions are recommended in preventing the transmission of influenza during an interpandemic period, these precautions will not be achievable during a pandemic. In contrast, adherence to routine practices is achievable during a pandemic.

   Routine Practices are summarized below:

   (a) Hand Hygiene

   i. Staff, patients and those attending to a patient should recognize that **strict adherence to hand washing/ hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.** Hand hygiene procedures should be reinforced according to Appendix III.

   ↑A I I

   ii. Hands should be washed or hand antisepsis performed after direct contact with ILI patients, after contact with their personal articles or their immediate environment.

   ↑A I I

   (b) Hygiene Measures to Minimize Influenza Transmission

   i. Ambulatory care workers and their patients should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; hand washing/hand antisepsis after coughing, sneezing

or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

↑A I I I

(d) Personal Protective Equipment

i. Masks, Eye Protection and Face Shields

1. **Masks to minimize the transmission of influenza may be worn** when face-to-face with coughing individuals in the early phase(s) of the pandemic but are not practical or helpful when influenza transmission has entered the community.

↑B I I I

2. **Masks should be worn to prevent the transmission of other organisms** when HCWs are face-to-face with undiagnosed coughing patients.

↑B I I I

3. **Masks and eye protection, or face shields should be worn** to prevent HCW exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose[9,44,45].

↑B I I I

4. HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.

5. Masks should be worn, as outlined in Section 2.6

ii. Gloves

1. **Gloves are not required for the routine care of patients suspected of having or confirmed to have influenza**. Meticulous hand washing with soap and water or performing hand antisepsis will inactivate the virus.

↑A I I I

2. **Gloves should be worn** to provide an additional protective barrier between the HCWs hands and blood, body fluids, secretions, excretions and mucous membranes to reduce the potential transfer of microorganisms from infected patients to HCWs and from patient to patient via HCWs' hands.

↑A I I

3. **Gloves are necessary** for HCWs with open lesions on their hands when providing direct patient care.

↑A I I

4. **Gloves should be** used as an additional measure, not as a substitute for hand hygiene[46,47].

↑B I I

5. **Gloves** should not be reused or washed[47].

↑A I I

iii. Gowns

1. **Gowns are not required for the routine care of patients with suspected of having or confirmed to have influenza.**

   ↑A I

2. **Long sleeved gowns should only be used** to protect uncovered skin and prevent soiling of clothing during procedures and resident care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions[9,45].

   ↑B I I I

3. HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretions or excretions should be washed as soon as possible, thoroughly, but gently with soap and warm running water.

   ↑B I I

### *E. Patient Activity/Transport*

Patients with ILI should not leave the ambulatory care area, except for essential procedures.

↑A I I I

# 4 Management of Pandemic Influenza in Home Care Settings (Care Provided by Regulated and Unregulated HCWs)

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases in the home care setting with or without availability of immunization or chemoprophylaxis.

## Recommendations

## 4.1 Prevention of Pandemic Influenza

### *A. Immunization and Antivirals*

1. Adherence to the recommendations for vaccine and antivirals for patients and HCWs, as outlined in Annexes D and E of the Canadian Pandemic Influenza Plan, is necessary.

## 4.2 Control of Pandemic Influenza

### *A. Physical Setting*

1. When Pandemic phase 2 (see Appendix II) is declared, cancel home care visits that are not absolutely necessary.

   ↑B I I I

## B. *Management of Staff*

1. Provide education, as outlined in Section 4.1.
2. Adhere to Occupational Health Management of staff as outlined in Section 3.5.

## C. *Infection Control Practices*

1. Home care settings should adhere to published infection control guidelines[59-62] including Health Canada Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5].
2. Additional Precautions

   Although droplet and contact precautions are recommended in preventing the transmission of influenza during an interpandemic period, these precautions will not be achievable during a pandemic. In contrast, adherence to routine practices is achievable during a pandemic.

   Routine Practices are summarized below:

   (a) Hand Hygiene

   i. HCWs, clients and household members should **recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.** Hand hygiene procedures should be reinforced according to Appendix III.

   ↑A I I

   ii. Hands should be washed or hand antisepsis performed following direct contact with a client with ILI, articles contaminated by the client and the client's immediate environment.

   ↑A I I

   iii. If running water is not available or when hand-washing facilities are inaccessible, use the following steps for effective hand antisepsis:

   - Apply an alcohol-based hand hygiene product to dry hands (moisture dilutes the alcohol) and rub vigorously for the period of time specified by the manufacturer, or until dry.
   - If there is heavy microbial soiling, first wipe hands with a towelette to remove visible soiling.

   ↑A I

   (b) Hygiene Measures to Minimize Influenza Transmission

   Home care workers and their clients should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

   ↑A I I I

(c) Personal Protective Equipment

i. Masks, Eye Protection and Face Shields

1. **Masks to minimize the transmission of influenza may be worn** when face-to-face with coughing individuals in the early phase(s) of the pandemic but are not practical or helpful when influenza transmission has entered the community.

   ↑B I I I

2. **Masks should be worn to prevent the transmission of other organisms** when HCWs are face-to-face with undiagnosed coughing clients.

   ↑B I I I

3. **Masks and eye protection, or face shields should be worn** to prevent HCW exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose[9,44,45].

   ↑B I I I

4. HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.

5. Masks should be worn, as outlined in Section 2.6.

ii. Gloves

1. **Gloves are not required for the routine care of clients suspected of having or confirmed to have influenza**. Meticulous handwashing with soap and water or performing hand antisepsis will inactivate the virus.

   ↑A I I I

2. **Gloves should be worn** to provide an additional protective barrier between the HCWs hands and blood, body fluids, secretions, excretions and mucous membranes to reduce the potential transfer of microorganisms from infected clients to HCWs.

   ↑A I I

3. **Gloves are necessary** for HCWs with open lesions on their hands when providing direct client care.

   ↑A I I

4. **Gloves should be used as an additional measure,** not as a substitute for handwashing[46,47].

   ↑B I I

5. **Gloves** should not be reused or washed[47].

   ↑A I I

iii. Gowns

1. Gowns are not required for the routine care of clients suspected of having or confirmed to have influenza.

   ↑A I

2. **Long sleeved gowns should only be used** to protect uncovered skin and prevent soiling of clothing during procedures and patient care activities likely

to generate splashes or sprays of blood, body fluids, secretions or excretions[9,45].

↑B I I I

3. HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretion or excretions should be washed as soon as possible, thoroughly but gently with soap and warm running water.

↑B I I I

### *D. Triage*

1. Perform an ILI assessment (see appendix IV for an ILI Assessment Tool and glossary for definition of ILI) of the client and their household contacts by phone (if possible) prior to the appointment or before going into the home. Assess the risk of influenza in the client or household contacts

↑A I I I

2. Provide clients and family members with information regarding symptoms of ILI and Self Care Guidelines and the purpose of Triage Settings (see Annex G of the Canadian Pandemic Influenza Plan).

↑A I I I

3. Counsel clients and household contacts to avoid public gatherings to minimize exposure.

### *E. Visitors*

1. Only well (asymptomatic/unexposed) visitors should visit severely immunocompromised patients in the home, e.g., transplant recipients[32], hematology/oncology patients[33-35], patients with chronic heart or lung disease or patients with HIV/AIDS and dialysis patients as these patients are at risk of serious complications if infected with influenza.

↑A I I I

2. Visitors for the terminally ill can be exempt.

↑A I I I

# 5 Management of Pandemic Influenza in Community Settings

## 5.1 Management of Pandemic Influenza in Emergency Responder Settings

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Emergency Responders (see Glossary for definition) are to be a priority group to receive influenza vaccination and chemoprophylaxis when, and if, it is available during a pandemic. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases with or without the availability of immunization or chemoprophylaxis.

## Recommendations

### *A. Pandemic Planning*

1. Management should ensure the responsibility for Infection Control (IC) and Occupational Health (OH) in the emergency responder setting is assigned to a specific individual.

   ↑A I I I

2. Management should develop an interpandemic influenza plan and review it yearly. In addition, an IC/OH Pandemic Influenza Plan should be developed as outlined in Section 3.1 and reviewed every 3 years.

   ↑A I I I

3. Provide education, as outlined in Section 4.1.
4. Occupational Health management of emergency responder workers should be in keeping with OH Section 3.5.

### *B. Control of Pandemic Influenza*

1. **Immunization/Chemoprophylaxis**

   In the early phases of the pandemic, vaccine and antivirals may not be readily available. Essential workers (including EMS) will be given high priority for immunization when vaccine is available (see Annexes D and E of the Canadian Pandemic Influenza Plan).

2. **Infection Control Practices**

   Emergency Service Workers should adhere to routine infection control practices[5,63,64]. All patients' blood and body secretions should be considered infectious, thus personal protective equipment and barrier techniques should be used accordingly.

   **Additional Precautions**

   Although droplet and contact precautions are recommended in preventing the transmission of influenza during an interpandemic period, these precautions will not be achievable during a pandemic. In contrast, adherence to routine practices is achievable during a pandemic.

   Routine Practices are summarized below:

   (a) Hand Hygiene

   i. Strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.

      Hand hygiene procedures should be reinforced according to Appendix III.

      ↑A I I

   ii. Hands should be washed or hand antisepsis performed after direct contact with individuals with suspected or confirmed influenza and after contact with their personal articles or their immediate environment.

      ↑A I I

   iii. Waterless antiseptic hand rinses are superior to soap and water for reducing hand contamination[65-68] and should be made available as an alternative to hand

washing. Antiseptic hand rinses are especially useful when time for hand washing or access to sinks is limited.

↑B I I I

iv. When there is visible soiling, hands should be washed with soap and water before using waterless antiseptic hand rinses. If soap and water are unavailable, cleanse hands first with detergent-containing towelettes.

↑B I I I

v. Wearing gloves does not eliminate the need for proper hand hygiene after care is rendered. As soon as feasible, hands must be washed after the removal of gloves.

↑A I

(b) Hygiene Measures to Minimize Influenza Transmission

i. Emergency Responders should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

↑A I I I

(c) Personal Protective Equipment

i. Masks

1. **Masks may be worn to minimize the transmission of influenza** when face-to-face with coughing individuals in the early phase(s) of the pandemic but are not practical or helpful when influenza transmission has entered the community.

↑B I I I

2. Masks should be worn to prevent the transmission of other organisms when HCWs are face-to-face with undiagnosed coughing patients.

↑B I I I

3. **Masks and eye protection, or face shields should be worn** to prevent HCW exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose[9,44,45].

↑B I I I

4. HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.

5. Masks should be worn, as outlined in Section 2.6.

ii. Gloves

1. **Gloves are not required for the routine care of patients suspected or confirmed to have influenza**. Meticulous handwashing with soap and water or performing hand antisepsis will inactivate the virus.

↑A I I I

2. **Gloves should be worn** to provide an additional protective barrier between the HCWs hands and blood, body fluids, secretions, excretions and mucous

membranes to reduce the potential transfer of microorganisms from infected clients to HCWs.

↑A I I

3. **Gloves are necessary** for HCWs with open lesions on their hands when providing direct patient care.

↑A I I

4. **Gloves should be used as an additional measure,** not as a substitute for hand hygiene[46,47].

↑A I I

5. **Gloves** should not be reused or washed[47].

↑A I I

iii. Gowns

1. Gowns are not required for the routine care of patients with ILI.

↑A I

2. **Long sleeved gowns should only be used** to protect uncovered skin and prevent soiling of clothing during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions[9,45].

↑B I I I

3. HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretion or excretions should be washed as soon as possible, thoroughly, but gently, with soap and warm running water.

↑B I I I

(d) Patient Triage

Whenever feasible, personnel responsible for answering emergency calls related to influenza-like-illness (ILI) should triage patients according to an ILI Assessment Tool (see Appendix IV).

↑A I I I

(e) Environmental Control (Housekeeping, Laundry, Waste)

i. Emergency Responders should adhere to the recommendations for housekeeping, laundry and waste management, as outlined in the Health Canada Infection Control Guidelines *Handwashing, Cleaning Disinfection and Sterilization in Health Care*[3] and *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5].

↑A I I I

ii. Equipment and surfaces contaminated with secretions from patients suspected or confirmed to have influenza should be cleaned before use with another patient.

↑B I I I

iii. Special handling of linen or waste contaminated with secretions from patients suspected of having or confirmed to have influenza is not required.

↑A I I

(f) Patient Care Equipment (Cleaning Disinfection Sterilization)

i. Emergency Responders should adhere to the recommendations for cleaning, disinfection and sterilization of patient care equipment, as outlined in the Health Canada Infection Control Guidelines *Handwashing, Cleaning Disinfection and Sterilization in Health Care*[3] and *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5].

↑A I I I

## 5.2 Management of Pandemic Influenza in Mortuary Care Settings

The risk of influenza transmission to Funeral Service Workers will be through their contact with families and friends of the deceased, not the deceased. There is no additional risk of transmission of influenza to funeral home workers related to handling of bodies of persons suspected of having or confirmed to have died from influenza. Deceased bodies (confirmed of having or suspected to have influenza during interpandemic or pandemic years) require routine handling only. Infection control recommendations for Funeral Services Profession have been published[9,69].

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases with or without the availability of immunization or chemoprophylaxis.

### Recommendations

#### *A. Planning for Pandemic Influenza*

1. Management should ensure the responsibility for Infection Control (IC) and Occupational Health (OH) in a funeral home setting is assigned to a specific individual; preferably an individual who has had professional training.

↑A I I I

2. Management should develop an interpandemic influenza plan and review it yearly. In addition, an IC/OH Pandemic Influenza Plan should be developed as outlined in Section 3.1 and reviewed every 3 years.
3. Management should provide education as outlined, in Section 4.1.

#### *B. Control of Pandemic Influenza*

**Immunization/Chemoprophylaxis**

1. In the early phases of the pandemic, vaccine and antivirals may not be readily available. Essential workers (including funeral service workers) will be given high priority for immunization when vaccine is available (see Annexes D and E of the Canadian Pandemic Influenza Plan).

**Infection Control Practices**

1. Funeral Service Workers should adhere to routine infection control practices[9,69] in the handling of all deceased bodies regardless of the confirmed or suspected cause of death.

All patients' blood and body secretions should be considered infectious, thus personal protective equipment and barrier techniques should be used accordingly.

↑A I I I

(a) Hand Hygiene

i. Strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.

Hand hygiene procedures should be reinforced according to Appendix III.

↑A I I

ii. Hands should be washed or hand antisepsis performed after direct contact with individuals with suspected or confirmed influenza and after contact with their personal articles or their immediate environment.

↑A I I

(b) Hygiene Measures to Minimize Influenza Transmission

i. Funeral Service Workers should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

↑A I I I

(c) Personal Protective Equipment

i. Masks

1. Wearing masks when handling bodies suspected of having or confirmed to have influenza during a pandemic to minimize the transmission of influenza is not required.

↑B I I I

2. Wearing masks when face-to-face with coughing individuals to minimize influenza transmission during a pandemic will not be practical or helpful when transmission has entered the community.

↑B I I I

## 5.3 Management of Pandemic Influenza in Child Care Settings

Infectious diseases occur with increased frequency in child care settings. The incidence is affected by the age and immune status of children, the number of children and group size, the degree of close contact between children and attendants and the hygienic habits of children and attendants. Infections acquired in the child care setting may spread to attendants, family members and the community.

Influenza in child care settings can be significant because viral shedding in the nasal secretions usually continues for about 7 days from the onset of illness and can be more prolonged in young children[23]. Attack rates of influenza in healthy children have been estimated at 10%-40% each year, with approximately 1% resulting in hospitalization.

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Adherence to infection prevention and control policies and

procedures is imperative to minimize the transmission of influenza and other infectious diseases in the child care setting with or without availability of immunization or chemoprophylaxis.

## Recommendations

### *Planning for Pandemic Influenza*

1. One person in the program must be designated as the individual responsible for the Infection Control (IC)[70] and Occupational Health (OH) program.

   ↑A I I I

2. Management should develop an interpandemic influenza plan and review it annually. In addition, an IC/OH Pandemic Influenza Plan should be developed, as outlined in Section 3.1 and reviewed every 3 years.
3. Education should be provided, as outlined in Section 4.2.

## Control of Pandemic Influenza

### *A. Immunization/Chemoprophylaxis*

1. In the early phases of the pandemic, vaccine and antivirals may not be readily available. (See Annexes D and E of the Canadian Pandemic Influenza Plan).

### *B. Infection Control Practices*

1. Child Care Workers should adhere to routine infection control practices[71-77] including procedures for washing toys.
   (a) Hand Hygiene
      1. Workers, children and their families should recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic. Hand hygiene procedures should be reinforced according to Appendix III.

         ↑A I I

      2. Hands should be washed or hand antisepsis performed after direct contact with individuals with ILI (see glossary for definition and Appendix IV for an ILI Assessment Tool) and after contact with their personal articles or their immediate environment.

         ↑A I I

   (b) Hygiene Measures to Minimize Influenza Transmission
      1. Child care workers, children and their families should be encouraged to minimize potential influenza transmission through good hygienic measures, ie. use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

         ↑A I I I

(c) Masks

1. Wearing masks, when face-to-face with coughing children/individuals, to minimize influenza transmission during a pandemic will not be practical or helpful when transmission has entered the community.

↑B I I I

(d) Staff/Child Management

Child care settings may be closed depending on the epidemiology of the pandemic strain, e.g., severity of infection, high attack rates and severe complications (see Section 5.).

1. Children:

   a. When pandemic phase 2 has been declared (see Appendix II), do not send children to day care if at all possible until the pandemic phase has ended; the child has recovered from ILI (see Glossary for definition, Appendix IV for an ILI Assessment Tool) or the pandemic has gone through the child care centre.

   b. Do not send children with signs of ILI to day care and notify the day care of the reason for their absence (unless the pandemic has gone through the centre).

   c. Do not send children who have been exposed in the past 3 days to an individual with ILI, (unless the pandemic has gone through the centre), to day care.

↑A I I I

2. Staff

(a) Inform Public Health authorities of staff absence(s) due to ILI.

Ideally, staff with ILI should not go to work until their symptoms have resolved.

↑A I I I

## 5.4 Management of Pandemic Influenza in Schools and Student Residences

Risk of influenza transmission in schools can increase with crowded classrooms, poor ventilation and limited emphasis on hygienic practices. Dormitory living enhances this risk due to increased numbers of those considered to be household contacts.

### Recommendations

(a) Planning for Pandemic Influenza

1. Health Services in residence settings should develop an interpandemic influenza plan and review it annually. In addition, an Infection Control (IC) and Occupational Health (OH) Pandemic Influenza Plan should be developed as outlined in Section 3.1 and reviewed every 3 years.

   Education should be provided, as outlined in Section 4.2.

(b) Control of Pandemic Influenza

1. Immunization/Chemoprophylaxis

   In the early phases of the pandemic, vaccine and antivirals may not be readily available. (See Annexes D and E of the Canadian Pandemic Influenza Plan).

2. Infection Control Practices

   a. Hygiene Measures to Minimize Influenza Transmission

      i. Staff, students and their household members should recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.

         Hand hygiene procedures should be reinforced according to Appendix III.

         ↑A I I

      ii. Hands should be washed or hand antisepsis performed after direct contact with individuals with ILI (see Glossary for definition, see Appendix IV for an ILI Assessment Tool) and after contact with their personal articles or their immediate environment.

         ↑A I I

      iii. Staff, students and their household members should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

         ↑A I

   b. Masks

      i. Wearing masks when face-to-face with coughing individuals to minimize influenza transmission during a pandemic will not be practical or helpful when transmission has entered the community.

         ↑B I I I

   c. Staff/Student Management

      i. Schools may be closed depending upon the epidemiology of the pandemic strain, e.g., severity of infection, high attack rates and severe complications (See Section 5.0).

         ↑A I I I

      ii. When pandemic phase 2 is declared (see Appendix II) consider the following:

      Students

      i. When pandemic phase 2 has been declared do not send students to school if at all possible until the pandemic phase has ended; the student has recovered from ILI (see Glossary for definition and Appendix IV for an ILI Assessment Tool) or, the pandemic has gone through the school.

ii. Do not send students who have been exposed in the past 3 days to an individual with ILI to school unless the pandemic has already been through the school/residence.

iii. Do not send children with signs of ILI to school (unless the pandemic has gone through the school) and notify the school of the reason for their absence.

iv. Well students should avoid contact with students who have ILI (e.g., not visit in rooms of symptomatic students).

↑A I I I

Staff

i. Inform Public Health authorities of absence(s) due to ILI.

ii. Ideally, staff with ILI should not go to work until their symptoms have resolved.

↑A I I I

Resident Health Services

i. Assess symptomatic students according to an ILI Assessment Tool, see Appendix IV.

ii. Encourage students with ILI who are well enough to remain in residence to remain in their room while symptomatic (e.g., not congregate in common areas).

↑A I I I

## 5.5 Management of Pandemic Influenza in Workplaces

### Planning for Pandemic Influenza

1. Provide education, as outlined in section 4.2 of Part A.

### Control of Pandemic Influenza

#### *A. Immunization/Chemoprophylaxis*

1. Immunization will not be available to the general public in the early phases of the pandemic. See Annex D of the Canadian Pandemic Influenza Plan.

#### *B. Hygiene Measures to Minimize Influenza Transmission*

1. Workers and their household contacts should recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.

   Hand hygiene procedures should be reinforced according to Appendix III.

   ↑A I I

2. Hands should be washed or hand antisepsis performed after direct contact with individuals suspected of having or to have confirmed influenza and after contact with their personal articles or their immediate environment.

   ↑A I I

3. Workers and their household members should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., using disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and understanding the importance of keeping hands away from the mucous membranes of the eyes and nose.

↑A I I I

### Masks

1. When face-to-face with coughing individuals, wearing masks to minimize influenza transmission during a pandemic will not be practical or helpful when transmission has entered the community.

↑B I I I

### Education

1. Provide education, as outlined in Section 4.2 of Part A.

## 5.6 Management of Pandemic Influenza in Shelters

The risk of influenza transmission in a shelter setting during a pandemic will be high because of the crowded physical conditions, inadequate health and hygiene of clients and the reduced priority for immunization or chemoprophylaxis in this population.

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. The promotion of hand washing and hygienic practices is imperative to minimize the transmission of influenza and other infectious diseases in the shelter with or without availability of immunization or chemoprophylaxis during a pandemic. Guidelines for Infection Control in shelters have been published[78-81].

### Recommendations

#### *Planning for Pandemic Influenza*

1. Designate one person responsible for the infection control program[78,80] and liaise with local public health. The program should prevent or minimize the occurrence and transmission of communicable diseases such as influenza[79,81].

↑A I I I

2. An interpandemic influenza plan should be developed and reviewed annually. In addition, an Infection Control and Occupational Health Pandemic Influenza Plan should be developed as outlined in Section 3.1 and reviewed every 3 years.
3. Shelters that are in the process of being planned should pay special attention to the number and placement of hand washing sinks and methods to reduce overcrowding[80,81].

↑A I I I

4. Provide education, as outlined in Section 4.2.

### Control of Pandemic Influenza

#### *A. Immunization/Chemoprophylaxis*

1. Immunization may not be readily available to this setting in the early phases of the pandemic (See Annexes D and E of the Canadian Pandemic Influenza Plan).

#### *B. Infection Control Practices*

**Hygiene Measures to Minimize Influenza Transmission**

1. Workers and clients should recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.

   When planning for a pandemic, operators should ensure that adequate supplies of hand hygiene products is a high priority as there may be an interruption to the supply or shortages of soap and hand towels.

   Hand hygiene procedures should be reinforced according to Appendix III.

   ↑A I I

2. Hands should be washed or hand antisepsis performed after direct contact with individuals with ILI (see Glossary for definition, see Appendix IV for an ILI Assessment Tool) and after contact with their personal articles or their immediate environment.

   ↑A I I

3. Workers and clients should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

   ↑A I I

**Masks**

1. When face-to-face with coughing individuals, wearing masks to minimize influenza transmission during a pandemic will not be practical or helpful when transmission has entered the community (also see Section 2.6).

   ↑B I I I

**Triage**

1. Clients and workers with influenza-like illness should be assessed using an ILI Assessment Tool, (see Appendix IV).

   ↑A I I I

## 5.7 Management of Pandemic Influenza in Correctional Facilities

A comprehensive infection prevention and control program forms the basis for a successful pandemic influenza plan. Adherence to infection prevention and control policies and procedures is imperative to minimize the transmission of influenza and other infectious diseases with or without the availability of immunization or chemoprophylaxis.

## Planning for Pandemic Influenza

1. Designate one person responsible for the infection control program and liaise with local public health authorities. The program should prevent or minimize occurrence and transmission of communicable diseases such as influenza.

   ↑A I I I

2. Develop an interpandemic influenza plan and review it annually. In addition, an Infection Control and Occupational Health Pandemic Influenza Plan should be developed, as outlined in Section 3.1 and reviewed every 3 years.

   ↑A I I I

3. See Section 3.5 for Occupational Health management of correctional workers.

   ↑A I I I

4. When Pandemic Phase 2 is declared (see Appendix II), provide additional education to health care workers and inmates, as outlined in Section 4.0.

   ↑A I I I

## Control of Pandemic Influenza

### *A. Immunization/Chemoprophylaxis*

1. In the early phases of the pandemic, vaccine and antivirals may not be readily available. Essential service workers (including correctional officers) will be given high priority for immunization when vaccine is available. See Annexes D and E of the Canadian Pandemic Influenza Plan.

### *B. Infection Control Practices*

1. Adhere to published infection control recommendations for correctional settings.

   ↑A I I I

## Hygiene Measures to Minimize Influenza Transmission

1. Workers and inmates should recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.

   When planning for a pandemic, administrators should make ensuring adequate supplies of hand hygiene products a priority as there may be an interruption to the supply or shortages of soap and hand towels. Hand hygiene procedures should be reinforced according to Appendix III.

   ↑A I I

2. Hands should be washed or hand antisepsis performed after direct contact with individuals with suspected or confirmed influenza and after contact with their personal articles or their immediate environment.

   ↑A I I

3. Workers and inmates should be encouraged to minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; hand washing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

   ↑A I I I

### Masks

1. Wearing masks when face-to-face with coughing individuals to minimize influenza transmission during a pandemic will not be practical or helpful when transmission has entered the community (also see Section 2.6).

↑B I I I

### Triage/Cohorting

1. Provide a separate triage area to assess inmates and workers with ILI (see Glossary) according to an ILI Assessment Tool, (see Appendix IV).

↑B I I I

2. Place inmates with ILI in cohort units/areas whenever possible. Good hygiene should be emphasized.

↑B I I I

### Visitors

1. Visitors with febrile respiratory illness should be discouraged from visiting if there is no pandemic activity in the facility.

↑A I I I

2. Visitors should be made aware of pandemic activity in the facility and discouraged from visiting unless they have recovered from ILI or been immunized against the pandemic strain of influenza.

↑A I I I

## Infection Control and Occupational Health in Triage Settings

Upon declaration of WHO pandemic phase 2 (see Appendix II), triage settings will be established in locations as predetermined in the Canadian Pandemic Influenza Plan. The purpose of triage settings is to facilitate efficient and consistent assessment for those with influenza-like illness (ILI) (see Glossary for definition and see Appendix IV for an ILI Assessment Tool).

It is important to note that the influenza virus can survive on hands for 5 minutes following the transfer from environmental surfaces[14].**The importance of hand washing/hand antisepsis during a pandemic cannot be overemphasized. See Appendix III.** Hand washing/hand antisepsis is the single most important method to prevent the transmission of infection including influenza and will be even more important because of the unavailability of influenza vaccine and antiviral prophylaxis early, during or even late in the pandemic.

There is evidence that overcrowding has contributed to the transmission of respiratory-transmitted infections[82]. Crowding and breathing recycled air was identified as risk factors for influenza transmission in a grounded airplane[18] and in a long term care facility[83].

### Recommendations

#### 1.1 Prevention of Pandemic Influenza

#### *A. Immunization and Antivirals*

Adherence to the recommendations for vaccine and antivirals for patients and HCWs, as outlined in Annexes D and E of the Canadian Pandemic Influenza Plan, is required.

#### 1.2. Control of Pandemic Influenza

#### *A. Physical Setting*

1. When Pandemic Phase 2 is declared (see Appendix II), open triage settings in hospitals and community locations as predetermined in the Preparedness Section of the Canadian Pandemic Influenza Plan.

↑AIII

2. When planning for the location of a triage setting, emphasize the need for spatial separation between patients, those accompanying them and care givers/triage workers.

↑A I I

   a. Ideally, triage settings should only be placed in an area that has a well maintained ventilation system.

↑A I I

   b. Prevent crowding in triage settings by ensuring ample room is available in waiting and assessment areas in order to maintain spatial separation of at least 1 metre.

↑A I I

   c. Consider the need for a separate area for temporary storage of deceased bodies.

↑A I I I

## B. *Management of Staff*

1. Adhere to Occupational Health Management, as outlined in Section 3.5.
2. Provide education, according to Section 4.1 of Part A.

## C. *Infection Control Practices*

1. Hygiene Measures to Minimize Influenza Transmission

   a. Patients, staff and visitors should minimize potential influenza transmission through good hygienic measures, i.e., use disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; handwashing/hand antisepsis after coughing, sneezing or using tissues; and the importance of keeping hands away from the mucous membranes of the eyes and nose.

↑A I I I

   b. To prevent nosocomial infections, triage settings should adhere to published guidelines[6,9,84]. Infection Control Practices adapted from Health Canada Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5] and *Hand Washing, Cleaning, Disinfection and Sterilization in Health Care*[3] are summarized below:

2. Hand Hygiene

   a. Staff, patients and visitors should recognize that strict adherence to hand hygiene recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic.

      Hand hygiene procedures should be reinforced according to Appendix III.

↑A I I

   b. Hands should be washed or hand antisepsis performed after direct contact with ILI patients and after contact with their personal articles or their immediate environment.

↑A I I

   c. Ideally, hand washing facilities should be conveniently located throughout the triage setting. Sinks for hand washing should be used only for hand washing and not for any other purpose, e.g., as a utility sink. There should be access to adequate

supplies and soap and towel dispensers in good working order, or liberal use of waterless hand antiseptic agents[85-87].

↑B I I

d. Plain soap may be used for routine hand washing[88,89].

↑B I I

e. Hand antisepsis with an antiseptic soap or antiseptic hand rinse is indicated[88,90] before performing invasive procedures such as starting an intravenous (maximal barrier technique in addition to hand antisepsis is required for insertion of central lines).

↑B I I I

f. When access to sinks is limited, antiseptic hand rinses should be used. Waterless antiseptic hand rinses are superior to soap and water in reducing hand contamination[66-68,91] and should be made available.

↑A I I I

g. When there is visible soiling, hands should be washed with soap and water before using waterless antiseptic hand rinses. If soap and water are unavailable, cleanse hands first with detergent-containing towelettes[92].

↑B I I I

h. Health Care Workers can reduce the frequency of hand washing required by minimizing unnecessary direct contact with patients and their immediate environments.

↑B I I I

i. Hands must be washed[93,94]:

   i. between patients,

   ii. after contact with blood, body fluids, secretions (e.g., respiratory secretions),

   iii. after contact with items known or considered likely to be contaminated with blood, body fluids, secretions (e.g., respiratory secretions), or excretions,

   iv. immediately after removing gloves[46],

   v. between certain procedures on the same patient in which soiling of hands is likely, to avoid cross-contamination of body sites[91,95],

   vi. when hands are visibly soiled.

↑A I I

j. Hand lotion may be used to prevent skin damage from frequent hand washing[96]. Lotion should be supplied in disposable bags in wall containers by sinks or in small, non-refillable containers to avoid product contamination. Inappropriate handling and management of skin lotions for patient's and care giver's use have been reported as sources of outbreaks[97-101].

↑B I I

k. Liquid hand wash products should be stored in closed containers and dispensed from either disposable containers or containers that are washed and dried thoroughly before refilling.

↑A I I

3. Personal Protective Equipment

a. Masks, Eye Protection and Face Shields

i. Masks and eye protection, or face shields should to prevent the transmission of influenza should be worn by triage personnel when face-to-face with individuals for ILI assessment.

↑B I I I

ii. Masks and eye protection, or face shields should be worn by triage personnel to prevent exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose[9,44,45].

↑B I I I

iii. HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.

iv. Masks should be worn by triage personnel to prevent the transmission of other organisms when HCWs are face-to-face with undiagnosed coughing patients.

↑B I I I

v. Wear masks, as outlined in Section 2.6

b. Gloves

i. Gloves are not required for the routine care of patients suspected of having confirmed to have influenza. Meticulous hand washing with soap and water or performing hand antisepsis will inactivate the virus.

↑A I I I

ii. Appropriate use of clean, non-sterile gloves includes[9,44,102-105]:

a. for contact with blood, body fluids, secretions (e.g., respiratory secretions) and excretions, mucous membranes, draining wounds or non-intact skin (open skin lesions or exudative rash);

b. when handling items visibly soiled with blood, body fluids, secretions (e.g., respiratory secretions) and excretions;

c. when the health care worker has open skin lesions on the hands.

↑A I I

iii. Gloves should be used as an additional measure, not as a substitute for hand washing[46,47].

↑B I I

iv. When indicated, gloves should be put on directly before contact with the patient or before the procedure requiring gloves[95,106,107].

↑A I I

v. Potentially contaminated gloves should be removed and disposed of immediately after completion of care, procedure or specific task, at the point of use prior to touching clean environmental surfaces (e.g., blood glucose or temperature machines, blood pressure cuffs)[46,95,106-108].

↑A I I

vi. Hands should be washed immediately after removing gloves[46,47].

↑A I I

vii. Single-use disposable gloves should not be reused or washed[46].

↑A I I

c. Gowns

i. Gowns are not required for the routine care of patients with suspected of having or confirmed to have influenza.

↑A I

ii. Long sleeved gowns should only be used to protect uncovered skin and prevent soiling of clothing during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions[9,45].

↑B I I I

iii. HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretions or excretions should be washed as soon as possible, thoroughly but gently with soap and warm running water.

↑B I I I

4. Environmental Control
(Patient Care Equipment, Housekeeping, Laundry and Waste)

The influenza virus survives well in the environment and patients may contaminate their environment with respiratory secretions. On hard porous surfaces the virus can survive for 24-48 hours, can then be transferred to hands and survive for up to 5 minutes[14].

Equipment and surfaces (i.e., desks, arm rests, etc.) contaminated with secretions from patients suspected of having or confirmed to have influenza should be cleaned before use with another patient.

## Recommendations

a. Process

i. "Parent" organizations must provide a specially trained, knowledgeable person to be responsible for the reprocessing patient care equipment, housekeeping, laundry and waste services. Where there is no "parent" organization to plan or operate the triage settings, it is expected another organization would assume this role.

↑A I I I

ii. Reprocessing (i.e., disinfection or sterilization) equipment is not recommended in the Triage Setting but if considered, the "parent" organization must provide a specially trained, knowledgeable person to be responsible for the processes. If soiled equipment is to be transported for disinfection or sterilization, the parent organization must develop processes for the separation of soiled and clean/sterile equipment and the safe handling/transport of contaminated equipment.

↑A I I I

iii. Procedures should be established for assigning responsibility and accountability for the routine cleaning of all patient care equipment[109-112] and housekeeping services.

↑B I I I

iv. Reuse of single use items is strongly discouraged.

↑A I I

b. Patient Care Equipment (Cleaning, Disinfection and Storage)

i. Equipment that touches the patient's intact skin should be clean. Equipment that is shared should be cleaned between patients. A hospital grade germicide should be used for routine cleaning. Pleases refer to Appendix V, Table A Cleaning Procedures for Common Items.

↑B I I I

ii. Equipment that is visibly soiled should be cleaned promptly.

↑B I I I

iii. Soiled equipment should be handled in a manner that prevents exposure of the skin and mucous membranes and contamination of clothing and the environment.

↑B I I I

iv. Reuseable equipment touching mucous membranes, e.g., respiratory therapy equipment or equipment contacting non-intact skin, should be discarded or it should be treated appropriately using high level disinfectant between patients[3,113-116].

↑A I I I

v. Reuseable equipment must be thoroughly cleaned (washed with hot soapy water, using an enzymatic cleaner), rinsed and dried before disinfection or sterilization[117] and dried before storage.

↑A I I

vi. Manufacturers' written recommendations for use of chemical disinfectant should be strictly followed.

vii. Only disinfectants with a DIN (disinfectants approved for use in Canada) should be used.

viii. Sterile items must remain sterile until they are used[118-120].

↑A I I

ix. Sterile and clean supplies should be stored in a clean dry area.

↑A I I

c. Housekeeping

i. Surfaces that are frequently touched by the hands (i.e., contaminated) of health care providers and patients/residents/clients, such as the surfaces of medical equipment and knobs for adjustment or opening, should be cleaned at least twice daily and when known to be contaminated, i.e., after use[121-123].

↑B I I I

ii. Careful vigorous cleaning of environmental surfaces is effective in removing many contaminants from surfaces.

↑A I I

iii. A barrier (sheet or paper) should be placed on the examining or procedure table and changed between patients. Alternatively, the table should be cleaned between patients.

↑B I I I

d. Laundry (linen)

i. When reusable linen is used, it should be changed between patients. Special handling of linen contaminated with secretions from patients suspected of having or confirmed to have influenza is not required.

↑A I I

e. Waste

i. Special handling of waste contaminated with secretions from patients with suspected or confirmed influenza is not required.

↑A I I

ii. Used needles and other sharp instruments should be handled with care to avoid injuries during disposal or reprocessing. Used sharp items should be disposed of in designated puncture-resistant containers located in the area where the items were used[9,124,125].

↑A I I I

5. Care of the Deceased

Attention to routine infection prevention and control practices is sufficient for handling bodies of individuals who have died from influenza. There is no additional risk of transmission of influenza infection.

## Recommendations

i. Adherence to routine infection control practices for hand washing/hand hygiene, mask/eye protection/face shields, glove and gown use, as outlined above for handling a deceased body, is highly recommended.

↑A I I I

ii. The body of the deceased should be placed in a body bag or wrapped in a sheet when a body bag is unavailable and, preferably, kept in a cool, dry location until picked up by funeral services.

↑A I I I

# 2 Infection Prevention and Control in Self Care Settings (Care provided by Self, Family or Friends/Volunteers)

Providing care to an individual with influenza like-illness (ILI) who are well enough to be cared for at home will be common during an influenza pandemic. Care may be provided by family members, neighbors, volunteers or individuals themselves. Therefore, adapting Routine Practices to the home setting to prevent transmission of other infections (including blood borne pathogens) to those providing care is necessary.

It is important to note that the influenza virus can survive on hands for 5 minutes following the transfer from environmental surfaces[14]. **The importance of hand washing/hand antisepsis during a pandemic cannot be overemphasized. See Appendix III.** Hand washing/hand antisepsis the single most important method to prevent the transmission of infection including influenza and will be even more important because of the unavailability of influenza vaccine and antiviral prophylaxis early, during or even late in the pandemic.

## Recommendations

## 2.1 Prevention of Pandemic Influenza

### *A. Immunization and Antivirals*

Adherence to recommendations for vaccine and antivirals for patients and individuals providing self care as outlined in Annexes D and E of the Canadian Pandemic Influenza Plan.

## 2.2 Control of Pandemic Influenza

### *A. Physical Setting*

1. When Pandemic Phase 2 is declared (see Appendix II), Triage Settings will be opened as indicated in the Preparedness Section of the Canadian Pandemic Influenza Plan. Patients with influenza-like-illness (ILI) (see an ILI Assessment Tool, Appendix IV) not directed to hospital or temporary influenza settings and will be provided with Self Care guidelines.

   ↑A I I I

2. In the home setting, it is recommended that an attempt be made to maintain spatial separation of one metre unless providing direct care. Where feasible, the individuals with ILI (see glossary) should stay in their room.

   ↑B I I

3. In a household where well (non-ILI) individuals (e.g., an elderly or immunocompromised person, or an infant) require care, it is important to provide their care prior to caring for individuals with ILI.

   ↑A I I I

### *B. Management of Individuals Involved in Self Care*

1. Provide education as outlined in Section 4.2 of Part A .

### *C. Infection Control Practices*

To prevent the transmission of infections, individuals providing care should adhere to the following recommendations adapted from *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5] and *Hand Washing, Cleaning, Disinfection and Sterilization in Health Care*[3].

1. Hand Hygiene

   a. Wash hands before, and after, the care of the individual who has ILI. See Appendix III.

   ↑A I I

   b. Plain soap may be used for hand washing[88,89]. Soaps containing antiseptics are not required.

   ↑B I I

   c. Bar soap should be stored in such a manner as to allow for drying after use. Liquid hand wash products should be stored in clean closed containers and dispensed from either disposable containers or containers that are washed and dried thoroughly before refilling.

   ↑A I I

   d. A waterless antiseptic hand rinse for hand hygiene should be used if hand washing facilities (sink and running water) are inaccessible[66-68,91]. If there is visible soiling of the hands, first wipe with detergent containing towelettes, then use the antiseptic hand rinse[92].

   ↑A I

2. Personal Protective Equipment

   a. Masks, Eye Protection and Face Shields

      i. Masks to prevent the transmission of influenza are not helpful when transmission has entered the community.

      ↑B I I I

      ii. Wear masks and eye protection, or face shields to protect the mucous membranes of the eyes, nose and mouth during procedures and care activities that are likely to generate splashes or sprays of blood, body fluids, secretions or excretions[9,44,45].

      ↑B I I I

      iii. Avoid touching the eyes with the hands to prevent self-contamination with pathogens.

      iv. Wear masks, as outlined in Section 2.6.

   b. Gloves

      i. Gloves are not routinely necessary in the care of an individual with ILI. Hand washing is sufficient.

      ↑A I I I

      ii. Gloves are an additional measure to protect hands from soiling with secretions and excretions but are not a substitute for hand washing.

      ↑A I I I

iii. Individuals should avoid touching the mucous membranes of their eyes and mouth with their hands; especially when providing care to individuals with ILI.

↑A I I I

iv. Dishwashing or utility household gloves may be worn in place of single-disposable medical gloves. They should be used by one individual only and washed and dried between use.

↑A I I I

v. Single-use disposable medical gloves should not be reused or washed[47].

↑A I I

vi. Single use plastic bags can also be used as gloves to protect hands from gross soiling.

↑A I I I

vii. Appropriate use of clean non-sterile gloves includes the following[9,44,102,103,105]:

a. for contact with blood, body fluids, secretions and excretions, mucous membranes, draining wounds or non-intact skin (open lesion or oozing rash),

b. when handling items visibly soiled with blood, body fluids, secretions and excretions,

c. when the care provider has open skin lesions on the hands.

↑A I I

viii. Gloves should be removed immediately after completion of the procedure for which they were worn and before touching clean environmental surfaces[95,106,107].

↑A I I

viv. Hands should be washed immediately after removing gloves[46,47]. If not gloves are available, plastic bags may be worn as gloves.

↑A I

c. Gowns

i. Over-garments such as aprons, or gowns are not required for the care of an individual with ILI.

↑A I

ii. Over-garments should be used to protect uncovered skin and prevent soiling of clothing during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions[9,45] (also see laundry instructions below).

↑B I I I

iii. Caregivers should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretions or excretions should be washed as soon as possible, thoroughly, but gently, with soap and warm running water.

↑B I I I

3. Environmental Control (Housekeeping, Laundry and Waste)

The influenza virus survives well in the environment and patients may contaminate their environment with respiratory secretions. On hard porous surfaces the virus can survive for 24-48 hours, can then be transferred to hands and survive for up to 5 minutes[14]. Equipment and surfaces contaminated with secretions from patients suspected of having or confirmed to have influenza should be cleaned before use with another individual.

a. Housekeeping

i. Environmental surfaces and objects that have been touched by an individual with ILI or the caregiver should be cleaned daily with a regular household cleaning agent.

↑A I I

ii. Products that are labeled "antibacterial" are not necessary.

↑A I I I

b. Laundry

i. Special handling of clothing or linen used during the care of an individual with ILI is not necessary.

↑B I I I

ii. Heavily soiled linen should be rolled or folded to contain the heaviest soil in the centre of the bundle[126,127]. Large amounts of solid soil, feces, or blood clots should be removed from linen with a gloved hand and toilet tissue then placed into a bed pan or toilet for flushing. In order to prevent splashing, excrement (e.g., from clothing, reusable incontinence pads) should not be removed by spraying with water.

↑B I I I

iii. Use of a commercial laundry detergent with household bleach (according to product instructions and where suitable for fabrics) and a normal machine wash and machine dry are sufficient to clean soiled linen in a home care setting[50,128-131].

↑B I I I

iv. Machine drying or hanging clothing and linens on a clothes line at the home care site is a suitable method for drying.

↑B I I I

c. Waste

i. Garbage generated during the care of an individual with ILI does not require special handling and may be placed with household waste for disposal.

↑A I I I

ii. Medical sharps, i.e hypodermic needles used in the care of an individual with ILI should be placed in an impervious container (e.g., coffee can) with household waste prior to disposal

↑A I I

4. Care of the Deceased

Attention to routine infection prevention and control practices is sufficient for handling bodies of individuals who have died from influenza. There is no additional risk of transmission of influenza infection.

## Recommendations

a. Adherence to the routine infection control practices for hand washing/hand hygiene, mask/eye protection/face shields, glove and gown use as outlined above during the care of the deceased body is recommended.

↑AIII

b. Individuals who die in a home setting should be wrapped in a sheet (ideally using a plastic bag to protect the mattress) and preferably kept in a cool, dry location until pick up by funeral services.

↑AIII

# 3 Infection Control and Occupational Health in Temporary Influenza Hospitals

Patients triaged as unable to be cared for at home and not ill enough for an acute care hospital will be sent to Temporary Influenza Hospitals as predetermined in the Canadian Pandemic Influenza Plan. Therefore, patients in these settings will either be ill with the pandemic strain of influenza or will have recovered from the pandemic strain of influenza; thus, patient-to patient transmission of influenza will not be a concern. In this setting, the risk of acute infections other than influenza (e.g., gastroenteritis, other respiratory infections, ectoparasites) will be of concern. Adherence to current Infection Control Guidelines to prevent the transmission of infection is required[3,5,6,9,84].

It is important to note that the influenza virus can survive on hands for up to 5 minutes following the transfer from environmental surfaces[14]. **The importance of hand washing/hand antisepsis during a pandemic cannot be overemphasized. See Appendix III.** Hand washing/hand antisepsis is the single most important method to prevent the transmission of infection including influenza and will be even more important because of the unavailability of influenza vaccine and antiviral prophylaxis early, during, or even late, in the pandemic.

Maintaining spatial separation of at least 1 metre between patients in this setting should be maintained because there is evidence that overcrowding has contributed to the spread of respiratory-transmitted infections[82].

## Recommendations

### 3.1 Prevention of Pandemic Influenza

#### *A. Immunization and Antivirals*

Adherence to the recommendations for vaccine and antivirals for patients and HCWs, as outlined in Annexes D and E of the Canadian Pandemic Influenza Plan, is vital.

## 3.2 Control of Pandemic Influenza

### *A. Physical Setting*

1. When Pandemic Phase 2 is declared (see Appendix II), open Temporary Influenza Hospitals as predetermined in the Canadian Pandemic Influenza Plan.

   ↑A I I I

2. When planning for the location of a temporary influenza hospital, emphasize the need for spatial separation between patients, their families and care givers.

   ↑A I I

3. Maintain at least a 1 metre spatial separation between beds in patient care areas and chairs in waiting areas[82].

   ↑A I I

4. Plan for separate soiled and clean utility rooms; clean storage areas; dedicated sinks for utility purposes versus hand washing; designate food preparation areas including, dedicated utility versus hand washing sinks; provide an adequate number of toilets; set p a bereavement room and a location to store deceased bodies prior to pick up for funeral services.

   ↑A I I

5. Settings with carpeted floors are discouraged.

   ↑B I I I

### *B. Management of Staff*

1. Provide education, as outlined in section 4.1.
2. Adhere to Occupational Health Management, as outlined in Section 3.5.

### *C. Infection Control Practices*

1. Hygiene Measures to Minimize Influenza Transmission

   a. Temporary Influenza hospitals should adhere to published guidelines[3,6,9] to prevent nosocomial infections. Infection Control Practices adapted from Health Canada Infection Control Guidelines *Routine Practices and Additional Precautions for Preventing the Transmission of Infection in Health Care*[5] are summarized below:

   b. Patients, staff and visitors should minimize potential influenza transmission through good hygienic measures, i.e., using disposable, one-use tissues for wiping noses; covering nose and mouth when sneezing and coughing; hand washing/hand antisepsis after coughing, sneezing or using tissues; and keeping their hands away from the mucous membranes of the eyes and nose.

   ↑A I I I

2. Hand Hygiene

   a. Staff, patients and visitors should recognize that strict adherence to hand washing/hand antisepsis recommendations is the cornerstone of infection prevention and may be the only preventative measure available during a pandemic. Hand hygiene procedures should be reinforced according to Appendix III.

   ↑A I I

b. Hands should be washed or hand antisepsis performed after direct contact with ILI patients (see Glossary) and after contact with their personal articles or their immediate environment.

↑A I I

c. When planning for the location and operation of a Temporary Influenza Hospital, it is important to note that, ideally, hand washing facilities should be conveniently located.

Note: See g. below if hand washing facilities are not available.

↑B I I

d. Hand washing facilities should be available in, or adjacent to rooms where care is provided. If a large room is used for several patients, more than one sink may be necessary. Sinks for hand washing should be used only for hand washing and not for other purposes, e.g., as a utility sink. There should be access to adequate supplies as well as soap and towel dispensers should be in good working order[85-87].

↑B I I

e. To avoid re-contaminating hands, single-use towels should be supplied for users to turn off faucets.

↑B I I I

f. Plain soap may be used for routine hand washing[89,132].

↑B I I

g. When access to sinks is limited, supplies of antiseptic hand rinses and detergent containing towelettes are necessary. Waterless antiseptic hand rinses are superior to soap and water in reducing hand contamination[66-68,91] and should made available in prominent areas throughout the temporary hospital.

↑A I

h. If there is visible soiling, hands should be washed with soap and water before using waterless antiseptic hand rinses. If soap and water are unavailable, cleanse hands first with detergent-containing towelettes[92].

↑B I I I

i. Health Care Workers can reduce the required frequency of hand washing by minimizing unnecessary direct contact with patients and their immediate environments. This can be accomplished by the organization of care activities and avoiding touching surfaces in the patient's environment, e.g., bedrails, tabletops.

↑B I I I

j. Hands must be washed[93,94] or antiseptic hand rinse used in the following situations:

   i. after any direct contact with a patient or their immediate environment and before contact with the next patient;

   ii. after contact with items known or considered likely to be contaminated with blood, body fluids, secretions, or excretions (e.g., bedpans, urinals, wound dressings, suction apparatus);

   iii. immediately after removing gloves[46];

   iv. between certain procedures on the same patient if soiling of hands is likely, to avoid cross-contamination of body sites[91,95];

v. before preparing, handling, serving or eating food and before feeding a patient;

vi. when hands are visibly soiled; and,

vii. after personal use of toilet, wiping nose, coughing or sneezing.

↑A I I

k. Patients and family members and visitors should be taught how and when to wash their hands, e.g., after personal use of toilet, wiping nose, coughing or sneezing.

↑A I I

l. When patient hygiene is poor, they should have their hands washed for them. Patients should be helped to wash their hands before meals, after going to the bathroom, when soiled and before leaving their bedspace.

↑B I I I

m. Hand antisepsis, with an antiseptic soap or antiseptic hand rinse, is indicated before performing invasive procedures[92,132].

↑B I I I

n. Hand lotion may be used to prevent skin damage from frequent hand washing[96]. Lotion should be supplied in disposable bags in wall containers by sinks or in small, non-refillable containers to avoid product contamination. Inappropriate handling and management of patients' or care givers' skin lotions have been reported as a source of outbreaks[97-101].

↑B I I

o. Liquid hand-wash products should be stored in closed containers and dispensed from either disposable containers or containers that are washed and dried thoroughly before refilling.

↑A I I

3. Personal Protective Equipment

a. Masks, Eye Protection, and Face Shields

i. Masks to minimize the transmission of influenza may be worn when face-to-face with coughing individuals in during the early phases of the pandemic but are not practical, or helpful, when transmission has entered the community and temporary hospitals have been opened.

↑B I I I

ii. Masks should be worn in the temporary influenza hospital to prevent the transmission of other organisms when HCWs are face-to-face with undiagnosed coughing patients.

↑B I I I

iii. Masks and eye protection, or face shields should be worn to prevent HCW exposure to sprays of blood, body secretions or excretions. Surgical masks are considered adequate for this purpose[9,44,45].

↑B I I I

iv. HCWs should avoid touching their eyes with their hands to prevent self-contamination with pathogens.

v. Wear masks, as outlined in Section 2.6.

b. Gloves

i. Gloves are not required for the routine care of patients suspected of having or confirmed to have influenza. Meticulous hand washing with soap and water or performing hand antisepsis will inactivate the virus.

↑A I I I

ii. Gloves should be used as an additional measure, not as a substitute for hand hygiene[46,47].

↑B I I

iii. Gloves are not required for routine patient care activities in which contact is limited to a patient's intact skin, e.g., when transporting patients.

↑B I I I

iv. Appropriate use of clean non-sterile gloves includes the following situations[9,44,102-105]:

a. for contact with blood, body fluids, secretions and excretions, mucous membranes, draining wounds or non-intact skin (open skin lesions or oozing rash);

b. for handling items visibly soiled with blood, body fluids, secretions or excretions;

c. when the health care worker has open skin lesions on the hands.

↑A I I

v. When indicated, gloves should be put on directly before contact with the patient or just prior to starting the task or procedure requiring gloves[95,106,107].

↑A I I

vi. Gloves should be changed between care activities and procedures with the same patient after contact with materials that may contain high concentrations of microorganisms[46,95], e.g., after handling an indwelling urinary catheter.

↑B I I I

vii. Worn gloves should be changed:

a. between patient contacts,

b. if a leak is suspected or the glove tears.

↑A I I

viii. Potentially contaminated gloves should be removed and disposed of immediately after completion of care or a specific task, at the point of use prior to touching clean environmental surfaces (e.g., blood glucose or temperature machines, blood pressure cuffs)[46,95,106,107,133].

↑A I I

ix. Hands should be washed immediately after removing gloves[46,47].

↑A I I

x. Single-use disposable gloves should not be reused or washed[47].

↑A I I

c. Gowns

i. Gowns are not required for the routine care of patients with suspected or confirmed to have influenza.

↑A I

ii. Long sleeved gowns should only be used to protect uncovered skin and prevent soiling of clothing during procedures and patient care activities likely to generate splashes or sprays of blood, body fluids, secretions or excretions[9,45].

↑B I I I

iii. HCWs should ensure any open skin areas/lesions on forearms or exposed skin is covered with a dry dressing at all times. Intact skin that has been contaminated with blood, body fluids, secretions or excretions should be washed as soon as possible thoroughly, but gently, with soap and warm running water.

↑B I I I

### *D. Patient Activity Restrictions*

1. There are no patient activity restrictions as patients and staff will have already been exposed to or infected with influenza.

↑A I I I

### *E. Visitor Restrictions*

1. Notices should be placed at the entrances to the temporary hospital:

   a. warning visitors that they may be at risk of acquiring influenza and requesting visitors who have not had influenza-like-illness not to visit. Close relatives of terminally ill patients are exempt.

   b. requiring that visitors with acute respiratory illness not visit as other respiratory illness may be circulating.

↑A I I I

### *F. Patient Care Equipment (Cleaning, Disinfection and Sterilization)*

Sterilization and high-level disinfection requires supervision by a trained professional, dedicated space and specialized equipment. Items requiring sterilization or high level disinfection should be disposable or managed by the "parent" organization.

The appropriate cleaning, disinfection sterilization, storage and handling of patient care equipment is an obligatory component of health care and cannot be overemphasized. Equipment and surfaces contaminated with secretions from patients suspected of having or confirmed to have influenza should be cleaned before use with another patient. The following recommendations apply in all circumstances. Please refer to the Glossary for definition of terms.

## Recommendations

1. Process

   a. Reprocessing equipment (i.e., disinfection or sterilization) is **not** recommended but, if considered, the "parent" organization must provide a specially trained, knowledgeable person to be responsible for the processes. Where there is no "parent" organization to plan or operate the Temporary Influenza Hospital, it is expected that another organization would assume this role. If soiled equipment is to be transported for disinfection or sterilization, the parent organization must develop processes for the separation of soiled and clean/sterile equipment and safe handling/transport of contaminated equipment.

   ↑A I I I

   b. Procedures should be established for assigning responsibility and accountability for routine cleaning of all patient care equipment[109,111,112,134].

   ↑B I I I

   c. Reuse of single use items in this setting is strongly discouraged.

   ↑A I I

2. Cleaning

   a. Items that are shared, should be cleaned between patients. A hospital grade germicide should be used for routine cleaning. Please see Appendix V, Table A *Cleaning Procedures for Common Items.*

   ↑B I I I

   b. Reuseable items must be thoroughly cleaned before disinfection or sterilization[135-137]. Items should be washed with hot soapy water, using an enzymatic cleaner.

   ↑A I I

   c. Equipment that is visibly soiled should be cleaned promptly.

   ↑B I I I

   d. Soiled patient care equipment should be handled in a manner that prevents exposure of skin and mucous membranes and contamination of clothing and the environment.

   ↑B I I I

   e. Commodes and toilets should be cleaned twice daily and when soiled. Ideally, bedpans should be reserved for use by a single patient, labeled appropriately or cleaned between uses.

   ↑B I I I

   f. Personal care supplies (e.g., lotion, creams, soaps) should not be shared between patients.

   ↑B I I I

3. Disinfection

   a. Reuseable items must be adequately rinsed and dried before disinfection or sterilization and dried before storage.

      ↑A I I

   b. Manufacturers' written recommendations for the use of chemical disinfectant should be followed.

   c. Only disinfectants with a DIN (disinfectants approved for use in Canada) should be used.

   d. Respiratory therapy and anesthesia equipment require, at a minimum, high level disinfection[113-116].

      ↑A I I I

4. Sterilization

   a. Critical items must be sterile[135].

      ↑A I I I

   b. The steam sterilization process must be monitored by biologic indicator testing at least daily[137].

      ↑A I I I

   c. The sterilization process must be monitored at each cycle by mechanical and chemical indicators[118]. Each pack must contain a chemical indicator[137].

      ↑A I I I

   d. A procedure for the recall of items processed from a load that contained a positive biological indicator should be established and followed[137].

      ↑A I I I

   e. Flash sterilization is **not** recommended.

      ↑A I I I

   f. Microwave ovens, glass bead sterilizers and boiling for sterilization should not be used[138].

      ↑A I I I

5. Storage

   a. After reprocessing, sterility must be maintained until point of use[118].

      ↑A I I I

   b. Sterile items must be maintained sterile until use[118-120].

      ↑A I I

   c. Sterile and clean supplies should be stored in a clean dry area.

      ↑A I I

   d. Clean and sterile supplies should not be hoarded.

      ↑A I I

   e. Soiled equipment should be kept physically separate from clean/sterile supplies and equipment.

      ↑A I I

### *G. Environmental Control (Housekeeping, Laundry and Waste)*

The influenza virus survives well in the environment and patients may contaminate their environment with respiratory secretions. On hard porous surfaces the virus can survive for 24-48 hours, can then be transferred to hands and survive for up to 5 minutes[14].

Equipment and surfaces (i.e., desks, arm rests, etc.) contaminated with secretions from patients suspected or confirmed to have influenza should be cleaned before use with another patient.

1. Housekeeping

   Appropriate housekeeping is a required component of health care and cannot be overemphasized. The following recommendations apply in all circumstances. Please refer to the glossary for a definition of terms.

## Recommendations

a. Process

   i. "Parent" organizations must provide a specially trained, knowledgeable person responsible for housekeeping and the policies for cleaning schedules and methods.

      When there is no "parent" organization to plan or operate the triage settings, it is expected another organization would assume this role.

      ↑A I I I

   ii. Products and procedures should be aligned with, or approved by, the "parent" organization

      ↑A I I I

   iii. An education program for those providing housekeeping services should help them to understand the effective methods of cleaning and the importance of their work.

      ↑B I I I

   iv. Housekeepers, as with other health care workers, should be offered immunization against hepatitis B[6,9].

      ↑A I I

b. Cleaning

   i. Daily cleaning of environmental surfaces and noncritical patient care items should be sufficient to keep surfaces clean and dust free[121-123]. Surfaces that are frequently touched (i.e., contaminated) by the hands of health care providers and patients/residents/clients, such as surfaces of medical equipment and knobs for adjustment or opening, should be cleaned twice daily or when known to be contaminated.

      ↑B I I I

   ii. Careful vigorous cleaning of environmental surfaces is effective in removing many contaminants from surfaces.

      ↑A I I

   iii. Damp rather than dry dusting or sweeping should be performed, whenever possible, in order not to generate dust particles. Any dry cleaning should be done carefully with a chemically treated dry mop or vacuum cleaner

(equipped with exhaust filter) rather than a broom. (Note: carpets are discouraged in this setting).

↑B I I I

iv. Vacuum cleaners, equipped with exhaust filters, should be used on carpeted areas. Expelled air from vacuum cleaners should be diffused so that it does not aerosolize dust from uncleaned surfaces.

↑B I I I

v. During wet cleaning, cleaning solutions and the tools with which they are applied soon become contaminated. Therefore, a routine should be adopted that does not redistribute microorganisms. This may be accomplished by cleaning less heavily contaminated areas first and also by changing cleaning solutions and cloth/mop heads frequently.

↑B I I I

vi. Wet mopping is most commonly done with a double-bucket technique, i.e., one bucket for soil, one for rinsing. This technique extends the life of the solution because fewer changes are required. When a single bucket is used, the solution must be changed more frequently because of increased soil.

↑B I I I

vii. Tools used for cleaning and disinfecting must be cleaned and dried between uses.

↑B I I I

viii. Mop heads should be laundered daily. All washed mop heads must be dried thoroughly before storage[121] or reuse.

↑B I I I

c. Cleaning agents

i. In most areas, detergents are acceptable for surface cleaning. Please refer to Appendix V, Table A, Cleaning Procedures for Common Items.

ii. Cleaning and disinfecting agents must be mixed and used according to manufacturers' recommendations.

↑A I I I

iii. Protective apparatus: Household utility gloves should be worn during cleaning and disinfecting procedures. Manufacturers' directions should be followed for product use to ensure safe handling practices.

↑B I I I

iv. Disinfectant fogging (spraying disinfectant in a closed area) is not necessary and should not be done[139].

↑A I I I

d. Blood Spills[9]

i. Appropriate personal protective equipment should be worn for cleaning up a blood spill. Gloves should be worn during the cleaning and disinfecting procedures. Care must be taken to avoid splashing or generating aerosols during the clean up. If the possibility of splashing exists, the worker should wear a face shield or safety glasses/mask and gown. For large blood spills, overalls, gowns or aprons as well as boots or protective shoe covers should be worn. Personal protective equipment should be changed if torn or soiled, and

always removed before leaving the location of the spill, then hands should be washed immediately.

↑B I I I

ii. The blood spill area must be cleaned of obvious organic material before applying a disinfectant, as hypochlorites and other disinfectants are substantially inactivated by blood and other materials[9,140,141]. Excess blood and fluid capable of transmitting infection should be removed with disposable towels. Discard the towels in a plastic-lined waste receptacle.

↑A I I

iii. After cleaning, areas should be disinfected with a low level chemical disinfectant (e.g., chemical germicides approved for use as 'hospital disinfectants', such as quaternary ammonium compounds) or sodium hypochlorite (household bleach). Concentrations ranging from approximately 500 ppm (1:100 dilution of household bleach) sodium hypochlorite to 5000 ppm (1:10 dilution of household bleach) are effective, depending on the amount of organic material (e.g., blood or mucous) present on the surface to be cleaned and disinfected. Please refer to Appendix V, Table B, Directions for Preparing Using of Chlorine-based Disinfectants.

Commercially-available chemical disinfectants may be more compatible with certain medical devices that might be corroded by repeated exposure to sodium hypochlorite, especially the 1:10 dilution[62,140,142]. Manufacturers' recommendations for dilutions and temperatures of chemical disinfectants approved for use as hospital disinfectants must be followed. Sodium hypochlorite or chemical germicide should be left on surface for at least 10 minutes.

↑A I I

iv. The treated area should then be wiped with paper towels soaked in tap water. Allow the area to dry. The towels should be discarded in a plastic lined waste receptacle.

↑A I I I

v. Hands must be thoroughly washed after gloves are removed.

↑A I I

2. Laundry

Special handling of linen contaminated with secretions from patients suspected of having or confirmed to have influenza is not required. The following recommendations apply in all circumstances.

## Recommendations

a. Process

i. Parent organizations must provide a specially trained, knowledgeable person responsible for laundry. Where there is no "parent" organization to plan or operate the triage settings, it is expected that another organization would assume this role.

↑A I I I

b. Collection and handling

i. There is no special handling required for linen from patients suspected of having or confirmed to have influenza.

↑A I I

ii. All soiled linen should be handled in the same way for all patients.

↑A I I

iii. Linen should be handled with a minimum of agitation and shaking[126,127,143].

↑B I I I

iv. Sorting and rinsing of linen should not occur in patient care areas.

↑B I I I

v. Heavily soiled linen should be rolled or folded to contain the heaviest soil in the centre of the bundle[126,127]. Large amounts of solid soil, feces or blood clots should be removed from linen with a gloved hand and toilet tissue then placed into a bed pan or toilet for flushing. In order to prevent splashing, excrement (e.g., from clothing, reusable incontinence pads) should not be removed by spraying with water.

↑B I I I

c. Bagging and containment

i. Soiled linen should be bagged at the site of collection[126,127,144].

↑C I I I

ii. To prevent contamination or soaking through, a single, leakproof bag[126,144,145] or a single cloth bag can be used[143]. A second outer bag is only required to contain a leaking inner bag[126,127,145,146].

↑B I I

iii. Use of water soluble bags is not recommended. These offer no benefit for infection control and add additional costs[126,127].

↑B I I I

iv. Laundry carts or hampers to collect or transport soiled linen do not need to be covered[127] unless odor control is a factor.

↑B I I I

v. Bags should be tied securely and not over-filled when transported either by chute or cart[126].

↑B I I I

vi. Linen bags should be washed after each use and can be washed in the same cycle as the linen contained in them[127].

↑B I I I

d. Transport

i. When linen is commercially laundered, adequate separation of clean and dirty laundry in the truck is essential to ensure that there is no opportunity for mixing clean and dirty linen.

↑B I I I

ii. Linen transported by cart should be moved in such a way that the risk of cross contamination is minimized[121,127].

↑B I I I

iii. Separate carts should be used for dirty and clean linens. Carts used to transport soiled linens should be cleaned after each use with a cleaning product specified for use in the health care setting.

↑B I I I

iv. Clean linen should be transported and stored in a manner that prevents its contamination and ensures its cleanliness[121,126,127].

↑B I I I

e. Washing and Drying

i. If low temperature water (less than 71.0° C) is used for laundry cycles, chemicals suitable for low temperature washing at the appropriate concentration should be used.

↑B I I I

ii. High temperature washes (more than 71.1° C) are necessary if cold water detergents are not used[127].

↑B I I I

iii. To achieve a level of at least 100 ppm of residual chlorine with household bleach, 2 mL of household bleach should be added for every litre of water. See Appendix V, Table B, Directions for Preparing and Using Chlorine-based Disinfectants.

↑B I I I

iv. In institutional laundry areas, the addition of a mild acidic "souring" agent neutralized the alkalinity from the fabric, water and detergent. This shift in pH, from approximately 12 to 5, may inactivate any remaining bacteria and reduce the potential for skin irritation[127].

↑B I I I

f. Protection of laundry workers

i. Workers should protect themselves from potential cross infection from soiled linen by wearing appropriate protective equipment, such as gloves, gowns or aprons, when handling soiled linen. Reuseable gloves should be washed after use, allowed to hang to dry, and discarded if punctured or torn.

↑B I I I

ii. Hand washing facilities should be readily available.

↑B I I

iii. Personnel should wash their hands whenever gloves are changed or removed[3,5,9].

↑B I I

iv. Staff in care areas need to be aware of sharps when placing soiled linen in bags. Workers are at risk from contaminated sharps, instruments or broken glass that may inadvertently be contained with linen in the laundry bags[126,127].

↑B I I I

v. Laundry workers, as other health care workers, should be offered immunization against hepatitis B[6,9].

↑A I I

vi. All caregivers and laundry workers should be trained in procedures for handling soiled linen[9].

↑B I I I

3. Waste

Waste generated in temporary hospitals is no more hazardous than household waste. Only sharps contaminated with body fluids[9] require special handling and treatment. Appropriate waste handling is a required component of health care and cannot be overemphasized. Special handling of waste contaminated with secretions from patients with suspected or confirmed influenza is not required. The following recommendations apply in all circumstances.

See Glossary for terms.

## Recommendations

a. Process

i. Parent organizations must provide a specially trained, knowledgeable person responsible for waste. Where there is no "parent" organization to plan or operate the triage settings, it is expected that another organization would assume this role.

↑A I I I

ii. Written policies and procedures to promote the safety of waste handlers should be established.

↑B I I I

iii. Special handling of waste contaminated with secretions from patients with suspected or confirmed influenza is not required.

↑A I I

b. Regulations

i. Local environmental and health regulations should be followed when planning and implementing treatment and disposal policies for biologic waste.

↑B I I I

ii. Specific categories of biologic waste may be disposed of in a properly managed landfill provided that there are procedures in place to protect workers and the public from contact with the waste.

↑B I I I

iii. Medical waste, (e.g., gloves, sponges, dressings, or surgical drapes that are soiled or soaked with blood or secretions) may be contained in impervious waste-holding bags or double bags and may be disposed of in a landfill[147-149].

↑B I I I

iv. If local regulations permit it, blood, suctioned fluids, excretions and secretions may be disposed of in a sanitary sewer.

↑B I I I

v. Used needles and other sharp instruments should be handled with care to avoid injuries during disposal. Used sharp items should be disposed of

immediately in designated puncture-resistant containers located in the area where the items were used[9,125].

↑A I I I

vi. A biohazard symbol is required on all sharp containers. Provincial or territorial regulations regarding colour coding must be followed.

↑B I I I

vii. The transportation of infectious waste must comply with the *Transportation of Dangerous Goods Act and Regulation,* Transport Canada[150].

viii. Infectious waste must be stored in a designated location with access limited to authorized personnel. Refrigerated space should be provided for lockable, closed storage of laboratory waste that will be disposed of off site[151]. Provincial/territorial regulations for specific storage requirements must be followed.

↑B I I I

ix. As the waste generator is accountable for waste disposal, ensure careful selection of waste hauling, treatment and disposal firms so all stages of transportation and disposal are carried out in a safe and legal manner[151].

↑B I I I

c. Waste Handlers

i. Waste handlers should wear protective apparatus appropriate to the risks involved, (e.g., protective footwear and heavy work gloves).

↑B I I I

ii. Waste handlers, as with other HCWs, should be offered hepatitis B immunization[6,9].

↑A I I

## *H. Care of the Deceased*

Attention to routine infection prevention and control practices is sufficient for handling bodies of individuals who have died from influenza. There is no additional risk of transmission of influenza infection.

### Recommendations

1. Adherence to the routine infection control practices for hand washing/hand hygiene, mask/eye protection/face shields, glove and gown use, as outlined above during the care of the deceased body, is required.

↑A I I I

2. The body of the deceased should be placed in a body bag or wrapped in a sheet when a body bag is unavailable and, preferably, kept in a cool, dry location until pick up by funeral services.

↑A I I I

## Health Canada Guideline Evidence-Based Rating System

Three categories rank the strength of evidence for a recommendation and three grades describe the quality of supportive studies for that recommendation. This format uses an evidence-based approach through the critical scrutiny of evidence from clinical trials research, well designed experimental and observational studies, and places less emphasis on descriptive studies, clinical intuition, and recalled experiences. The rating scale is outlined in the table below.

Table: Strength and Quality of Evidence for Recommendations

| Categories for strength of each recommendation | |
|---|---|
| **CATEGORY** | **DEFINITION** |
| A | Good evidence to support a recommendation for or against use |
| B | Moderate evidence to support a recommendation for or against use |
| C | Insufficient evidence to support a recommendation for or against use |
| **Categories for quality of evidence** | |
| **GRADE** | **DEFINITION** |
| I | Evidence from at least one properly randomized, controlled trial |
| II | Evidence from at least one well-designed clinical trial without randomization; from cohort or case-controlled analytic studies, preferably from more than one centre, from multiple time series; or from dramatic results in uncontrolled experiments |
| III | Evidence from opinions of respected authorities on the basis of clinical experience, descriptive studies, or reports of expert committees |

Note: If established regulations are quoted in a document, no ratings are assigned to these legislative requirements

# Appendix II.
# World Health Organization (WHO) Definition of Preparedness Levels

## Phase 0: Interpandemic activities

No indication of any new virus type has been reported.

## Phase 0: Preparedness Level 1

New influenza strain in a human case.

No clear evidence of spread or outbreak activity.

## Phase 0: Preparedness Level 2

Human infection confirmed.

Two or more human infections have occurred with a new virus sub-type, but the ability of the virus to readily spread from person-to-person and cause multiple outbreaks of disease leading to epidemics remains questionable.

## Phase 0: Preparedness Level 3

Human transmission of the new virus sub-type has been confirmed through clear evidence of person-to-person spread in the general population, such as secondary cases resulting from contact with an index case, with at least one outbreak lasting over a minimum two week period in one country.

## Phase 1: Confirmation of onset of pandemic

The pandemic will be declared when the new virus sub-type has been shown to cause several outbreaks in at least one country, and to have spread to other countries with consistent disease patterns indicating that serious morbidity and mortality is likely in at least one segment of the population.

## Phase 2: Regional and multi-regional epidemics

Outbreaks and epidemics are occurring in multiple countries, and spreading region by region across the world.

## Phase 3: End of the first pandemic wave

The increase in outbreak activity in the initially affected countries or regions has stopped or reversed, but outbreaks and epidemics of the new virus are still occurring elsewhere.

### Phase 4: Second or later waves of the pandemic

Based on past experiences, at least a second severe wave of outbreaks caused by the new virus would be expected to occur within 3-9 months of the initial epidemic in many countries.

### Phase 5: End of the pandemic (back to Interpandemic phase; Phase 0)

WHO will report when the Pandemic Period has ended, which is likely to be after 2-3 years. The indications for this will be that indices of influenza activity have returned to essentially normal inter-pandemic levels and that immunity to the new virus subtype is widespread in the general population.

## A. How to Wash Hands (using non antimicrobial soap and antimicrobial soap)

| |
|---|
| Remove jewellery before hand wash procedure[152,153]. |
| Rinse hands under warm running water.<br>Rationale: This allows for suspension and washing away of the loosened microorganisms. |
| Lather with soap and, using friction, cover all surfaces of the hands and fingers.<br>Rationale: The minimum duration for this step is 10 seconds[154]; more time may be required if hands are visibly soiled.<br>For antimicrobial agents 3-5mL are required[152].<br>Frequently missed areas are thumbs, under nails, backs of fingers and hands. |
| Rinse under warm running water.<br>Rationale: To wash off microorganisms and residual hand washing agent. |
| Dry hands thoroughly with a single-use towel.<br>Drying achieves a further reduction in number of microorganisms[155,156].<br>Re-useable towels are avoided because of the potential for microbial contamination. |
| Turn off faucet without re-contaminating hands, e.g., use single use towel.<br>Rationale: To avoid re-contaminating hands |
| Keep fingernails short[157,158] and do not use fingernail polish or artificial nails.<br>Rationale: Chipped nail polish may increase bacterial load[158]. Artificial nails including wraps, acrylics or tips increase bacterial load[159-161]. Nail polish and artificial nails impede visualization of soil under nails. |

Adapted from Health Canada Infection Control Guidelines: *Hand Washing, Cleaning, Disinfection and Sterilization in Health Care*, 1998[3].

## B. Decontaminating Hands with an Alcohol-based Hand Rub

To decontaminate hands that are not visibly soiled* using an alcohol-based hand rub:

- Follow the manufacturer's recommendations on the volume of product to use;
- Apply product to palm of one hand and rub hands together, covering all surfaces of hands and finger, until hands are dry.

Note: * Hand wash if hands are visibly dirty or contaminated with proteinaceous material or are visibly soiled with blood or other body fluids by washing with either a non-antimicrobial soap and water or an antimicrobial soap and water as outlined in Appendix III A, How to Wash Hands.

(adapted from[1])

# Appendix IV. An Influenza-like Illness (ILI) Assessment Tool

An ILI assessment tool is to be used for immediate triage of patients or staff and for accommodation/cohort of patients prior to further OH or clinical management. This is not intended to be used as a clinical management tool. A clinical management assessment tool can be found in Annex G of the Canadian Pandemic Influenza Plan.

## ILI Assessment Tool

Please check the following.

**ILI in the general population is determined by the presence of 1, 2 and 3 and any of 4., a – c, which could be due to influenza virus:**

___ (  ) 1. Acute onset of respiratory illness

___ (  ) 2. Fever (>38 C)*

___ (  ) 3. Cough

4. One or more of the following:

___ (  ) a. sore throat

___ (  ) b. arthralgia

___ (  ) c. myalgia or prostration

* May not be present in elderly people

Adapted from the ILI surveillance definition currently used by FluWatch for the 2002-2003 season[8].

Table A. Cleaning Procedures for Common Items

| Surface/object | Procedure | Special considerations |
|---|---|---|
| Horizontal surfaces such as over bed tables, work counters, baby weigh scales, beds, cribs, mattresses, bedrails, call bells | 1. Thorough regular cleaning<br>2. Cleaning when soiled<br>3. Cleaning between patients/ clients and after discharge | Special procedures sometimes called carbolizing are not necessary.<br>Some environmental surfaces may require low level disinfection (e.g., in nurseries, pediatric settings, critical care, burn units, emergency rooms, operating rooms and bone marrow transplantation facilities). |
| Walls, blinds, curtains | Should be cleaned regularly with a detergent and as splashes/visible soil occur. | |
| Floors | 1. Thorough regular cleaning<br>2. Cleaning when soiled<br>3. Cleaning between patients/ clients and after discharge.<br>Damp mopping preferred | Detergent is adequate in most areas.<br>Blood/body fluid spills should be cleaned up with disposable cloths followed by disinfection with a low level disinfectant. |
| Carpets/upholstery | Should be vacuumed regularly and shampooed as necessary. | |
| Toys | Should be regularly cleaned, disinfected with a low level disinfectant, thoroughly rinsed, and dried (between patients in acute care setting). | For pediatric settings, toys should be constructed of smooth, nonporous (i.e., not plush) materials to facilitate cleaning and decontamination.<br>Do not use phenolics. |
| Toilets and commodes | 1. Thorough regular cleaning<br>2. Cleaning when soiled<br>3. Clean between patients/ clients and after discharge.<br>Use a low level disinfectant | These may be the source of enteric pathogens such as *C. difficile* and *Shigella*. |

Table B. Directions for Preparing and Using Chlorine-based Disinfectants[3]

| Product | Intended use | Recommended dilution | Level of available chlorine |
|---|---|---|---|
| Household bleach (5% sodium hypochlorite solution with 50,000 ppm* available chlorine | Cleanup of blood spills | Use concentrations ranging from 1 part bleach to be mixed with 99 parts of tap water (1:100) or one part of bleach to be mixed with 9 parts of tap water (1:10), depending on the amount of organic material (e.g., blood or mucus) present on the surface to be cleaned and disinfected. | 0.05% or 500 ppm<br>0.5% or 5,000 ppm |
| | To add to laundry water | One part (one 8 ounce cup) of bleach to be mixed with about 500 parts (28 gallons†) of tap water | 0.01% or 100 ppm |
| | Surface cleaning<br>Soaking of glass-ware or plastic items | One part (one 8 ounce cup) to be mixed with about 50 parts (2.8 gallons) of tap water | 0.1% or 1,000 ppm |
| NaDCC (Sodium dichloroisocyanurate) powder with 60% available chlorine | Cleanup of blood spills | Dissolve 8.5 g in one litre of tap water | 0.85% or 5,000 ppm |
| Chloramine-T powder with 25% available chlorine | Cleanup of blood spills | Dissolve 20 g in one litre of tap water | 2.0% or 5,000 ppm |

** Parts per million*
*† Imperial gallon (4.5 litres)*

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## Case definition

The spectrum of illness associated with influenza virus infections is wide, and ranges from asymptomatic infection to fatal disease, frequently associated with viral pneumonia. The previous experience of a population with antigenically related virus variants is a determinant of the severity of the disease. ***Therefore, with a pandemic strain, which would be new in the population, the anticipated clinical spectrum will be more severe***. Age and pre-existing co-morbidities (Table 1) also influence the outcome. Young children, elderly adults, pregnant women, and individuals with chronic diseases are at greatest risk of complicated influenza [77,151,78,71,79,80,1,183,158].

A general "Clinical Case Definition" for an influenza-like illness (ILI) and a review of recent literature describing the most common presentations and complications of influenza in adults and children are given below. This is a general definition and applies mainly to the clinical presentation of interpandemic influenza; it may need modification once the pandemic occurs[17,42,28,85,146,71,1,235,207,92].

**Clinical Case Definition**:

When influenza is circulating in the community, the presence of fever and cough of acute onset are good predictors of influenza. The positive predictive value increases when fever is higher than 38 C and when the onset of the clinical illness is acute (less than 48 hours after the prodromes). Other symptoms, such as sore throat, rhinoorhea, malaise, rigors or chills, myalgia and headache, although non-specific, may also be present.

**Confirmed cases of influenza** are cases with laboratory confirmation (i.e., virus isolation from respiratory tract secretions, identification of viral antigens or nucleic acid in the respiratory tract, or a significant rise in serum antibodies) or clinical cases with an epidemiological link to a laboratory confirmed case[59,77,151].

For **surveillance** purposes, the Health Canada definition of ILI is:

- Acute onset of respiratory illness with fever (>38 C) and cough accompanied by one or more of the following: sore throat, arthralgia, myalgia or prostration, which could be due to an influenza virus (used by FluWatch for the 2000-2001 season[67].

For the 2001-2002 season, the Centers for Disease Control and Prevention (CDC) used the following case definition for **surveillance** in the USA (as of November 29, 2001):

- Temperature of >100°F (>37.8°C) and either cough or sore throat in the absence of a known cause[30].

## Pathogenesis of influenza

The major site of infection by influenza viruses is the ciliated epithelial cell in the mucous layer of the respiratory tract. In the first few days after infection, necrosis of these cells and local edema occur, followed by infiltration by lymphocytes, plasma cells, histiocytes and polymorphonuclears. The incubation period may last 24h or up to 4-5 days (average of two days), varying with the infecting virus, size of the viral inoculum, and immunological status of the individual. The infectious period starts, typically, one day before the symptoms appear, and lasts approximately five days after the onset of clinical illness[77,151,1]. This may be longer for children and elderly patients. Infectious virus has been recovered from respiratory secretions 2-3 weeks after the onset of disease. Viral antigens have been detected in cells and secretions for several more days[21,183,135,70,29]. Asymptomatic carrier state, however, is not associated with influenza[183].

In uncomplicated influenza, repair starts 3-5 days after the beginning of symptoms; however, restoration of ciliated cells and mucous production are not restored until up to 15 days. If there is secondary bacterial infection, the inflammatory destruction of the basal cell layer is greater and the regeneration of the epithelia may take much longer[210,151].

Fatal cases of viral pneumonia have varying degrees of interstitial cellular infiltrate, alveolar edema, and hyalin membrane deposition. The virus also infects polymorphonuclear and mononuclear leucocytes, depressing their response to chemotactic stimuli and decreasing cellular functions (phagocytosis, proliferation, costimulation, etc.). This, together with the necrosis and desquamation of the ciliated epithelial cells and the general distortion in mucus secretion, favours the development of bacterial pneumonia (or combined viral/bacterial pneumonia). Bacterial sinusitis and/or otitis media following influenza apparently result through similar mechanisms[151,77,210].

The virus replicates throughout the respiratory tract and it is possible to recover infectious particles from the upper and lower tract of individuals naturally or experimentally infected with influenza[151,77,210]. The hemagglutinin of the virus (HA) binds to the receptor molecules of cells, while the neuraminidase (NA) facilitates release of viral particles, liquefying the mucous secretions to promote access to new cells. At 1-2 days post infection, there is a peak in virus replication, which decreases over the next 5-10 days. There is a direct correlation between virus shedding and severity of disease, with higher titres and longer shedding, in severely ill individuals (up to $10^9$ in severe influenza pneumonia[77,109]. Children and elderly patients generally have high titres of virus in their secretions, and continue shedding viruses for longer periods of time (8-13 days); promoting transmission[21,183,135,232]. In some patients, viral antigens may be detected in secretions and cells for prolonged periods, even when virus isolation is negative[151].

Influenza viruses have been isolated from blood only on rare occasions[153,118,179,178,179,176,151]; however, it is possible to isolate the virus from the muscles of patients with rhabdomyositis and from other extrapulmonary sites in individuals with fatal influenza. Foetal transmission is also possible[77,117,189,151]. It has been suggested that the virus may circulate in infected lymphocytes[227,77].

An increase in the number of leukocytes in blood is usually detected between days 1 and 3 after influenza infection, with a rise in neutrophils and a fall in lymphocytes. This lymphopenia includes T cells, B cells, and null cells[48,128]. A recently described protein, encoded by some influenza A virus, is a candidate for inducing apoptosis of human monocytic cells with the CD8+T cell phenotype, and may be related to the high lethality of some strains[33].

The severity of clinical disease during an influenza pandemic is determined by the immunological status of the population and viral factors. For example, the cleavage of the HA molecule in Influenza A, is critical in determining the virulence of two avian strains: the H5 strain, which is very virulent, and the H7 strain, which is almost avirulent. In the less virulent strains, proteases able to cleave the HA were present only in the respiratory and gastrointestinal tracts of poultry, thus limiting virus replication to these areas. Changes in the amino acid composition of the HA (as seen in H5 virions), rendered this protein cleavable by more ubiquitous enzymes and allowed the virions to replicate systemically, causing a generalized, fatal disease[210]. A similar mechanism, i.e., high cleavability of the HA glycoprotein, has been suggested to explain the high human-lethality of H5N1 influenza A infections in Hong-Kong in 1997[95]. Recently, a new viral protein, PB1-F2, was described in some avian influenza virus; this protein may be involved in the ability of avian H5N1 and H9N2 influenza A virus to infect humans and cause disease[190,33].

Following infection by influenza virus, antibodies are produced against four major components of the virion: HA (hemagglutinin), NA (neuraminidase), NP (the predominant protein of the nucleocapsid), and M protein (matrix protein). Nevertheless, only antibodies against HA and NA have been linked with resistance to infection by influenza[151]. Anti-HA antibodies are the primary neutralizing antibodies and participate in complement-mediated lysis of infected cells, aggregation of virions, and cell cytotoxicity. Anti-NA, on the other hand, reduce the number of new infectious units released from infected cells, and may reduce the severity of disease and even prevent clinical illness if present in high titre.

In nasal secretions, the neutralizing antibodies are predominantly IgA, but IgM and IgG are also secreted locally. Local antibodies are associated with resistance to infection and can be detected for 3-5 months after illness. There is also local memory.

B cells producing specific IgG, IgA, and IgM can be detected in peripheral blood of normal individuals and of subjects with influenza infection. The level of anti HA and anti NA antibodies in blood has been associated with resistance to infection and with recovery from the disease[41,151]. A protective effect for maternally transmitted antibodies can be inferred from the relation existing between age in months of infants and symptomatic influenza, and is supported by studies measuring levels of maternal antibodies in cord serum[174].

The replication of influenza viruses in a new host activates a cascade of inflammatory cytokines, which is followed by fever and by the symptoms of the disease. Nasal lavage specimens from humans infected with influenza A contain interleukin-6 (IL-6), tumour necrosis factor- (TNF- ), gamma interferon (IFN- ), interleukin-10, monocyte chemotactic protein 1, and macrophage inflammatory proteins 1 and 1- . Studies performed in volunteers with experimental infection and in patients with influenza A of less than 36 h of duration, showed that the levels of IL-6 and of TNF- in upper respiratory secretions correlate directly with virus replication, fever, respiratory and systemic symptoms, and with an increase in respiratory secretions. High levels of IFN- , on the other hand, were associated with an early decrease in viral titre[109,97]. IL-6 is a potent pyrogen that induces fever, chills and fatigue when administered to humans[220], it is also involved in the initiation of the immune response to the virus[109]. TNF- , on the other hand, correlates with fever but not with symptoms, and recent experiments demonstrated that it has potent anti-influenza activity[109,187]. Very high levels of both cytokines, IL-6 and TNF- , were also found in serum and cerebrospinal fluid (CSF) of patients with influenza-associated encephalopathy. In a study done in Japan, Il-6 levels were used for diagnosis and prognosis of the course of the disease: the lower the level of IL-6, the milder the CNS participation. Values higher than 6,000 pg/mL were found in children with brain stem dysfunction, about 150 pg/mL were present in children without brain stem

dysfunction and less than 80 pg/mL in controls; children with values higher than 15,000 pg/mL did not survive[2].

Human monocytes are highly susceptible to influenza A virus and die 24-48 hours after infection. Although the release of complete virus particles from these cells is very low, they secrete several pro-inflammatory cytokines (TNF- , IL-1 , IL-6, interferon / ) and chemotactic factors responsible for the mononuclear infiltrate characteristic of influenza infected tissues[115]. In addition, secondary trigger signals, such as very small amounts of LPS (or other secondary bacterial products) could cause an excessive increase in cytokine production and secretion by the monocytes. This priming-triggering effect may be responsible for the severe complications of secondary bacterial super-infections observed after influenza A infections[115].

It has been shown that H5N1 influenza viruses infecting humans in 1997 can avoid the antiviral activity exerted by TNF- and by the interferons[186]. Post-mortem reports from two patients suggested that virus replication in the respiratory tract caused an increase in the level of inflammatory cytokines, resulting in a reactive hemophagocytic syndrome that was the main cause of death. The authors propose that the synthesis of high levels of cytokines was stimulated after the virus could escape their antiviral effect and continued to replicate[186].

## 1.1 Most Common Clinical Presentations

### 1.1.1 Adults

The typical clinical presentation of uncomplicated influenza is tracheobronchitis with some small airway involvement. The onset of disease is usually abrupt: headache, chills and dry cough, followed by fever of 38-40°C that may peak as high as 41 C within the first 24 hours, together with myalgia, malaise, and anorexia. Physical signs include hot and moist skin, flushed face, injected eyes and clear nasal discharge. Some patients also have nasal obstruction, sneezing, pharyngeal inflammation, excessive tearing and mild cervical adenopathy[77,151,1,17,42,28,183,26,147,27,146]. Chest x-rays and auscultatory findings are usually normal, with occasional crackles and wheeze. In uncomplicated influenza, the airflow in large airways remains relatively normal. There is, however, a transient increase in bronchial reactivity and some temporary alterations in gas exchanges in small peripheral airways[151,133,104]. Bronchial hyper reactivity may continue well beyond the clinical illness, even in subjects without a history of bronchospasm[133].

In uncomplicated influenza the fever usually declines after 2-3 days and disappears by the 6th day (median three days). Biphasic fever patterns are usually associated with secondary bacterial infections, but may be observed in some cases of uncomplicated influenza. While the temperature declines, some respiratory symptoms, like cough and rhinorrhea, may increase, followed by the production of small amounts of, usually mucoid, sputum. Cough, weakness and fatigue can persist for 1 to 2 weeks and up to 6 weeks[77,151,1,17,42,28,183].

The disease is more severe in individuals younger than 5 years or older than 65 years[1,183,12,13,193,195,196]. The risk of lower respiratory tract infection (LRTI) is much higher in young children, smokers, geriatric patients and persons with underlying cardio-respiratory disorders (most frequently asthma in younger patients and chronic bronchitis and emphysema in older persons[78,71,119,42,56,135,158,11,57,112]. Viral pneumonitis is most frequent in young children, while bacterial superinfection is common in the elderly. *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Moraxella catarrhalis*, and *Staphylococcus aureus* are the most common agents of secondary bacterial pneumonia. Gram-negative bacteria,

*Chlamydia pneumoniae* and *Mycoplasma pneumoniae* are also found in some patients[77,78,80,130,140,16].

Different strains of influenza may be associated with different symptoms or severity of disease[71,42,28]. Two influenza A subtypes: A (H1N1) and A (H3N2), and one influenza B strain, have been circulating worldwide in the last decade (with minor strain variations) and are associated with yearly epidemics. Influenza A (H3N2) is frequently associated with more severe clinical diseases and pneumonia[71,76,135,42,158,11,196,122]. It affects young and old equally, and accounts for up to 28% of acute cardiopulmonary hospitalizations of older persons[135,11]. Focal outbreaks in nursing homes are usually caused by A (H3N2) viruses[56,102,9]. Influenza A (H1N1), on the other hand, infects children every year but has only a minor impact in the elderly, and influenza B preferentially causes disease in children, with frequent gastrointestinal symptoms[135,11,26,69,195].

During the 2001-2002 season, a new subtype, influenza A (H1N2) was isolated in several countries. These new viruses resulted from gene reassortment between the circulating A (H1N1) and A (H3N2) viruses. Because both viral proteins were similar to the homologous antigens in the circulating strains and in the vaccine strains, the new viruses did not cause more severe illness or higher influenza activity in this season[32].

Human infections by influenza A (H5N1) were first detected in Hong Kong in 1997, where six of 18 patients admitted to hospital died[42,35,235]. These infections were characterized by a high case-fatality rate, a high incidence of gastrointestinal symptoms in adults, and a high rate of pulmonary, renal, hepatic and haematologic complications in patients without previously identified high risk conditions[42,235,95].

Influenza C viruses are usually associated with mild illnesses, which are sometimes asymptomatic. For that reason, virus isolation has not been performed regularly, and the spectrum of diseases produced by influenza C is not well characterized. Studies in Japan found temperatures of 38-40 C for 2-3 days in young children, who also had coryza and cough lasting for a period of 2 weeks in up to 50% of the patients[183,114]. Adults had similar but milder symptoms, and complained mainly of malaise, sore throat and headache. In another study, however, the symptoms reported in young adults were as severe as those associated with influenza A infection and lasted longer[51].

***Only influenza A has been associated with pandemics, however interpandemic epidemics can be attributed to both A and B viruses***[42,75,151].

Although almost all deaths related to annual epidemics of influenza occur in the elderly or in the very young, and approximately 90% of excess deaths during epidemics occur among persons older than 65 years[12,122], in pandemic periods, adults younger than 65 years have accounted for 50% of the deaths[193]. For example, nearly half of the influenza-related deaths during the 1918-1919 influenza A (H1N1) pandemic occurred in the 20-40 years olds. Most of the deaths during the 1968-1969 influenza A (H3N2) pandemic occurred in adults 45-65 years old (half of them were previously healthy and without any detectable co-morbid illness[192,193], and a large proportion of influenza-related deaths during the 1957-1958 influenza A (H2N2) pandemic occurred among persons younger than 65 years[85,193,195,122,196].

### 1.1.2 Children

Children have the highest rates attack rates of influenza, and are the major disseminators of the virus[192]. In a regular "influenza season", influenza infections are the most important causes of consultation in outpatient clinics and account for one half of lower respiratory tract infections that result in hospitalizations of children[80,183]. During most influenza epidemics,

influenza viruses supplant all other major respiratory viruses as causes for consultation for respiratory infection in children[80,183,205].

The highest rate of influenza-related serious illness in children occurs in the 6-12 months old age group, after the waning of maternal antibodies[183,192,82]. Although uncomplicated influenza in children may be similar to the disease in adults, there are some age related differences in toddlers and infants[77,151,1,147]:

1) Young children usually develop higher temperatures (over 39.5 C) and may have febrile seizures[151,80,233,21,42].
2) Unexplained fever can be the only manifestation of the disease in neonates and infants[151,80,233,21,119,170,29,110,7,18].
3) Influenza viruses are an important cause of laryngotracheobronchitis (croup), pneumonia and pharyngitis-bronchitis in young children. Both types, A and B, are significant causes of low respiratory tract infections[151,78,80,76,233,21,119,170,183].
4) Gastrointestinal manifestations, such as nausea, vomiting, diarrhoea and abdominal pain, are found in 40-50% of patients, with an inverse relation to age (mainly in 3 years old or younger)[151,170,42,183].
5) Otitis media and non-purulent conjunctivitis are more frequent in young ages[151,233,21,119,170,36,101].
6) A variety of central nervous system findings, including apnea, opisthotonos and seizures may appear in as many as 20% of the infants[183]. Children may also present with symptoms suggestive of meningitis, e.g., headache, vomiting, irritability and photophobia[77,171].
7) Myositis is a complication in young children, especially after infection with influenza B.

In children over 5 years and adolescents the most frequent symptoms are fever, cough, non-localized throbbing headache, chills, myalgia and sneezing. The fever is usually in the 38-40 C range and a second peak, without bacterial superinfection, may occur around the fourth day of illness. Backache, sore throat, conjunctival burning with watery eyes and epistaxis may be present, but gastrointestinal symptoms are infrequent. Chest auscultation is usually normal, but occasionally coarse breath sounds and crackles may be heard[183].

Respiratory illness caused by influenza is non-specific and difficult to distinguish from illness caused by other respiratory pathogens on the basis of symptoms alone. Many viral infections (respiratory syncytial virus [RSV], parainfluenza, adenovirus and rhinovirus), as well as other pyrexial diseases, can cause an illness that is clinically indistinguishable from influenza[183,135,219,191,161].

### 1.1.3 Special Populations: High-risk Conditions (Table 1)

The Canadian National Advisory Committee on Immunization (NACI) considers the following groups to be at "increased risk for complications from influenza"[152]:

- **Adults and children with chronic cardiac or pulmonary disorders (including bronchopulmonary dysplasia, cystic fibrosis and asthma) severe enough to require regular medical follow-up or hospital care**. Chronic cardiac and pulmonary disorders are by far the most important risk factors for influenza-related death.

- **People of any age who are residents of nursing homes and other chronic care facilities**. Such residents often have one or more of the medical conditions outlined in the first group. In addition, their institutional environment may promote spread of the disease.
- **People ≥ 65 years of age**. The risk of severe illness and death related to influenza is moderately increased in healthy people in this age group, but is not as great as in people with chronic underlying disease.
- **Adults and children with chronic conditions, such as diabetes mellitus and other metabolic diseases, cancer, immunodeficiency, immunosuppression (due to underlying disease and/or therapy), renal disease, anemia, and hemoglobinopathy**. Immunosuppressed patients are at increased risk for influenza infection, morbidity and mortality. Influenza may result in significant morbidity and mortality among HIV-infected individuals.
- **Children and adolescents (6 months to 18 years of age) with conditions treated for long periods with acetylsalicylic acid (e.g., Kawasaki disease, juvenile rheumatoid arthritis, acute rheumatic fever, and others**[59]. This therapy might increase the risk of Reye's syndrome after influenza.

The Advisory Committee on Immunization Practices (ACIP) and the CDC in the USA also include as "persons most susceptible to complications or death from influenza":

- **"Women who will be in the second or third trimester of pregnancy during the influenza season (fall or winter)**[1,29].
- **"Children younger than 2 years of age"**[29].
- **The CDC also include people ≥ 50 year old rather than ≥ recommended by NACI**[29]

#### 1.1.3.1 Pregnant women

Women with influenza infection in their second and third trimesters of pregnancy are at increased risk of hospitalization for cardio-respiratory disorders[158,159,40]. This is probably due to the increase in heart rate, stroke volume, and oxygen consumption observed in these months, as well as to decreases in lung capacity and changes in immunological function[1,123,144,189,120]. Fatal influenza in pregnant women is characterized by the rapid development of cardiovascular and/or pulmonary insufficiency after several days of classical ILI. Fulminating viral or bacterial pneumonia may follow the initial viral infection[123,144,189,120]. In some cases the virus has been isolated from the offspring[86].

An increase in mortality of pregnant women, miscarriages, premature births and stillbirths was documented during the 1918-1919 and the 1957-1958 pandemics[42,94,231,86,144,224]. The reported mortality rate of pregnant women admitted to hospital with influenza in 1918 was 51.4% compared with 33.3% in hospitalized influenza patients from the general population[94,231]. Mortality rates among these hospitalized women were higher if pneumonia was present, with a peak at 61% during the last month of gestation[94,231,144,42]. Influenza deaths in pregnant women represented 50% of all deaths in women of childbearing age, and 10% of deaths from influenza during the epidemics of 1957-1958 in New York City and Minnesota[86,72]. These women experienced illness lasting 1-10 days and died from respiratory insufficiency associated with pulmonary edema and pneumonia (bacterial and/or viral). A review of 30 deaths from pneumonia and influenza in pregnant women in Massachusetts between 1954 and 1974 showed more fatalities towards the last trimester and early puerperium (no deaths occurred in the first trimester), and the risk was higher with increasing

maternal age[189]. Only four of the thirty women who died had underlying medical pulmonary or cardiac conditions.

During 17 inter-pandemic influenza seasons[159] the relative risk for hospitalization for selected cardio-respiratory conditions among pregnant women increased more than three times between weeks 14-20 and weeks 37-42 of gestation. The respective increased rates of hospitalization were 1.4 and 4.7 compared with women who were 1-6 months postpartum. Women in their third trimester of pregnancy were hospitalized at a rate comparable with that of non-pregnant women who had high-risk medical conditions (i.e., 250/100,000 pregnant women[159].

#### 1.1.3.2 Elderly adults in long-term facilities

Excess hospitalization and death, and functional decline, occur in elderly individuals after epidemics of influenza. Community dwelling adults 65 years of age or older, and particularly frail elderly in long-term care institutions, are at increased risk of influenza complications[56,10,65,8,58,57,13,12,102,196].

Although influenza pneumonia and bacterial pneumonia following influenza are considered the main causes of influenza related hospitalization in the elderly, many influenza related hospitalizations are attributed to the exacerbation of chronic obstructive pulmonary disease or congestive heart failure following the viral infection[56,11].

The symptoms and signs seen in older adults are similar to those in younger individuals, but most cases are characterized by the presence of dyspnea, wheezing, sputum production, and temperatures of 38 C[56,207]. In addition, any unexplained acute deterioration in health status associated with fever, may be a manifestation of influenza infection in elderly individuals[11].

Influenza-like illness in older adults can also be caused by other viruses, mainly RSV or parainfluenza. RSV infections are an important cause of hospitalization and death of elderly individuals and it is impossible to distinguish between RSV and influenza on the basis of clinical manifestations alone[56,135,11,65,57,219].

### 1.1.4 Preexisting co-morbidity

#### 1.1.4.1 Respiratory

Patients with chronic pulmonary conditions constitute the largest high-risk group, and the exacerbation of pulmonary diseases is the most frequent cause of hospitalization after influenza infection[77,151,78,1,79,158]. Among children and young adults ( 35 years), asthma is the most common co-morbidity requiring hospitalization for complicated influenza; emphysema and COPD predominate in individuals older than 45 years, and chronic bronchitis is observed in all ages[160,77,208,78,93]. Clinical studies have shown that influenza can trigger wheezing episodes in children with asthma[77,78]. A decrease in mucociliary clearance and phagocytic function (with the consequent reduction in local defences and local immunity) are frequently observed after influenza infection, and can be particularly severe in patients with chronic bronchitis or COPD[93,155].

#### 1.1.4.2 Cardiovascular

In several population studies, cardiac disorders were the most common co-morbidity reported as a cause of death in influenza patients[78,158,13,93,162,154]. Deaths attributed to heart disease increase during the peak period of culture positive influenza, and precede by two weeks the peaks of pneumonia and influenza deaths[81].

Although pre-existing cardiovascular pathology is the most frequent cause of death in individuals older than 65 years, serious and sometimes fatal myocarditis may be a complication of influenza infection in otherwise healthy people[93,154].

### 1.1.4.3 Diabetes

Individuals 25 to 64 years old with diabetes were 3.7- 4.0 times more likely than those without diabetes to have pneumonia and influenza as a cause of death during influenza seasons[216]. In addition, individuals 65 years old or older with diabetes were twice as likely to die from pneumonia and influenza than their non-diabetic counterparts[216]. The elevated morbidity and mortality attributed to influenza in diabetics is expected, given the high risk of complications from respiratory infections in this group[158,74,216,124, 46,136]. Mechanisms of defence like phagocytosis and intracellular killing may be decreased in these patients[46]. *Staphylococcus aureus* and *Streptococcus pneumoniae* are the most frequent causes of bacterial infection. In addition, combinations of risk factors increase mortality rates exponentially, and diabetes is frequently associated with secondary cardiac and/or pulmonary diseases and with immune impairment[46]. Influenza infection may also provoke severe metabolic deterioration and ketoacidosis in diabetic patients, increasing the risks for complications of the diabetes[46.93,54].

### 1.1.4.4 Immunocompromised patients and patients with HIV

Influenza virus infections in immunosuppressed individuals and transplant recipients may be similar to the immunocompetent population. However, an extended clinical course and prolonged shedding of virus is more common in these patients, as well as more severe, life threatening, diseases[132,184,14,55,141,134,180,221].

**Persons Infected with HIV**: Influenza in AIDS patients is prolonged and more frequently associated with complications[184,14,55,175]. In a cohort of young and middle-aged women HIV infected, the risk for cardiopulmonary hospitalization was higher during influenza seasons than during the peri-influenza periods. This risk was even higher than for women with other high-risk conditions, like chronic heart and lung diseases[158]. Influenza-associated excess mortality was found for the adult and adolescent US population with AIDS during three influenza seasons. Among persons aged 25-54 years, the risk for influenza-related death was estimated at 9.4-14.6/10,000 persons with AIDS compared with 0.09-0.10/10,000 in the general population, and 6.4-7.0/10,000 for persons older than 65 years[132]. Deaths of AIDS patients due to pneumonia and influenza followed a seasonal pattern (and also a virus isolation pattern) with peaks in December-January, as in the general adult population. More than 90% of AIDS deaths occurred in the 25-54 years age group. The excess death rate in this age group was 81-155 times higher in AIDS patients than for the general US population in this age range, compared with the summer. These death rates are comparable and even higher than those seen in the general population 65 years or older[132]. Other studies reported that AIDS patients experience more severe respiratory symptoms and prolonged duration of illness with an increased risk of complications[184,14,55,141].

**Immunocompromised children**: No prospective studies of influenza in immunosuppressed children or in children with AIDS have been published. It is known, however, that children with HIV commonly have severe and persistent viral respiratory infections, including influenza. Children with cancer receiving immunosuppressive therapy had similar clinical manifestations to control populations, but the duration of the disease was longer[183,134,180]. In a study of transplant recipients, two of 19 patients

developed severe infections, one child died and the second was febrile for 21 days with persistent virus isolation in respiratory secretions[183,134,180].

#### 1.1.4.5 Other chronic illnesses, neoplastic diseases, renal diseases, etc.

Any patient suffering from a chronic disease that compromises the immune and/or metabolic homeostasis (other than the mentioned above) may develop complications of influenza. These include neoplastic diseases, renal diseases, hemoglobinopathies, some congenital diseases, and illnesses due to autoimmunity[183,61,116,134,64].

## 1.2 Complications of Influenza (Tables 2 and 3)

Influenza can exacerbate underlying medical conditions (e.g., pulmonary or cardiac disease), lead to secondary bacterial pneumonia, or cause primary viral pneumonia[77,151,1,13,193,195,196,194,81]. Influenza infection has also been associated with encephalopathy, transverse myelitis, Reye's syndrome, myositis, toxic shock syndrome, myocarditis, and pericarditis[1,159,193,195,196,194,81,192,93,167,154,176,53,52,105,68,138,37]. Hospitalization rates for children aged 0-4 years ranged from approximately 100/100,000 for those without high-risk conditions to 500/100,000 individuals, for those with high-risk conditions respectively[78,160]. Hospitalization rates are highest among children younger than 1 year of age and adults older than 65 years[1,160,106,96].

Since the influenza A (H3N2) virus pandemic in 1968, influenza-associated hospitalizations have been highest during epidemics caused by type A(H3N2) viruses[195,196]. Influenza-related deaths during influenza epidemics can result from pneumonia as well as from exacerbations of cardiopulmonary conditions and other chronic diseases. Older adults account for >90% of deaths attributed to pneumonia and influenza[1,193,10,65,8,58,57,13,12]. Sudden deaths have also been observed during influenza epidemics[167,68,171].

### 1.2.1 Lower respiratory tract complications

Involvement of the respiratory tract is found in 10% of cases in individuals 5-50 years old and up to 73% after 70 year of age[210]. Three different syndromes of severe pneumonia have been described as influenza-associated complications in adults and children (Table 3). Additional presentations of viral and/or bacterial respiratory tract infection are also seen frequently during interpandemic outbreaks of influenza (Table 2).

a) **Primary viral pneumonia:**

This is actually a manifestation of the disease at the more severe end of the spectrum[77,151,183]. It occurs mainly in high-risk patients, although 25% of reported cases are in young healthy individuals, and 13% in healthy pregnant women. Primary viral pneumonia develops abruptly following the onset of influenza illness and progresses within 6 to 24 hr to a severe pneumonia with tachypnea, tachycardia, cyanosis, high fever (>39-40 C) and hypotension. The illness may progress to hypoxemia and death in 1-4 days. Frothy haemoptysis, tachypnea and cyanosis are poor prognostic signs.

Clinical, physiological and laboratory findings are not specific. Bilateral crepitant inspiratory crackles are frequent, as well as mottled densities and diffuse symmetrical interstitial infiltrates or areas of consolidation in the X-rays. The presence of cavitations or pleural infiltrates, suggests bacterial superinfection. The pathology reveals interstitial pneumonitis with severe hyperaemia, broadening of the walls of the alveoli with edema and exudates, intraalveolar haemorrhage and hyaline membranes, infiltration

predominantly mononuclear, and capillary dilatation and thrombosis. Autopsy specimens usually have high virus titres. Nonfatal cases recover 5 to16 days after the onset of pneumonia, but require up to 4 months for resolution of the x-rays and residual lung damage is frequent[77,151,183].

Milder forms of influenza viral pneumonia involving only one lobe or segment have been described (Table 3). This "localized viral pneumonia" is less serious than the primary pneumonia described above and is frequently confused with pneumonia due to *Mycoplasma pneumoniae*[210].

b) **Combined viral-bacterial pneumonia**

This is three times more common than viral pneumonia, from which it may be clinically indistinguishable. The symptoms usually appear later; chest x-rays frequently show cavitations or pleural effusion. The diagnosis requires isolation of pathogenic bacteria in the sputum or pleural fluid and the radiological findings. The most frequent agents are: Streptococcus pneumoniae, *Staphylococcus aureus* or *Haemophilus influenzae*. Mortality of viral or combined viral-bacterial pneumonia is ~10-12%. Some strains of Staphylococcus aureus have a synergistic effect with the virus and increased pathogenicity[77,151]. Decreased leukocyte chemotaxis and tracheobronchial clearance increases the severity of bacterial infections and may lead to the development of fatal pneumonia and toxic shock syndrome (TSS) in healthy young individuals.

c) **Secondary bacterial pneumonia**

After initial improvement from viral infection (~ 4 days), the patient develops chills, pleuritic chest pain, increased productive cough and purulent or bloody sputum. Chest x-rays reveal local areas of consolidation and leukocytosis is common. The fatality rate is about 7%. These patients are more often elderly and have chronic diseases (i.e., pulmonary, cardiac, metabolic, etc.). Gram staining and culture of sputum usually show a bacterial pathogen, most frequently *Streptococcus pneumoniae*, or *Haemophilus influenzae*[84,77,151,210].

d) **Other pulmonary complications**

In children, pneumonia is less common, although bronchitis or bronchiolitis may also occur as manifestations of influenza infection. It may be difficult to distinguish influenza from RSV or parainfluenza infections. Croup associated with influenza A seems to be more severe, but less frequent than after parainfluenza or RSV[210].

Acute exacerbation of chronic obstructive pulmonary disease is frequent seen with influenza infection and can result in permanent loss of function, mainly in elderly patients. Other diseases exacerbated by the virus are asthma and cystic fibrosis[148,210,131,62,208].

### 1.2.2 Otitis media and conjunctivitis

Any viral or bacterial infection of the upper respiratory tract, including influenza A and B, increases the likelihood of otitis media in children[36,101]. Influenza A and B may cause otitis media either by direct viral invasion or by predisposing to bacterial superinfection. Little is known about influenza conjunctivitis, but the virus has been isolated from the conjunctiva in some patients[77,125].

### 1.2.3 Cardiovascular

Sudden death of young patients has been reported after influenza myocarditis or pericarditis, probably due to arrhythmia[167]. Even though influenza primarily involves the respiratory system, 43% of patients with confirmed influenza A had transient electrocardiographic changes in one community with epidemic disease[167,218]. During the Asian pandemic in 1957, one third of fatal cases with autopsies had signs of focal or diffuse myocarditis.

In a case study of nine patients with influenza-like symptoms and serological conversion for influenza A, cardiac involvement with increasing dyspnea was found after 4-7 days post infection[169]. The ECG and echocardiography showed abnormalities and serum creatine kinase (CK) levels were increased. Two of the patients had fulminant myocarditis and a third patient died of pneumonia. The remaining six patients returned to normal left ventricular function.

Theories explaining the pathogenesis of viral myocarditis include direct invasion of the cardiac muscle, autoimmune mechanisms, or vascular damage[167]. In some cases of myocarditis, the virus could be grown from heart tissue[167,176,53]. The most frequent finding in adults, however, is the aggravation of pre-existing cardiac pathologies. Atrial fibrillation is common in older patients, and myocardial infarction may occur following influenza infection[162,154].

### 1.2.4 Central Nervous System (CNS)

Influenza infection of the CNS has been associated with a wide spectrum of manifestations, from drowsiness and irritability to seizures and severe coma. Two specific syndromes have been described: a sometimes-fatal encephalopathy occurring at the peak of the disease, and occasional postinfluenzal encephalitis, seen 2-3 weeks after recovery.

There is high incidence of serious neurologic manifestations in children in Japan, that has not been observed in other countries[43,188,66,103,73,142]. In 5 influenza seasons in this country, 64 infants and children were identified with influenza-related encephalitis or encephalopathy. Forty-three percent of these children died and 20% had neurological sequellae[43]. Generalized vasculopathy was found in an autopsy. Another study identified 217 cases of encephalopathy/encephalitis in children in an epidemics of A H3N2 in Japan, 82.5% were younger than 6 years. Some of these cases were associated with acute necrotizing encephalopathy[43,113].

Another complication associated with influenza is Reye's syndrome: acute encephalopathy with fatty micro-infiltration of the liver and liver failure. It has been described in children and adolescents younger than 18 years of age (most commonly in the 4-12 year range) with influenza and receiving acetylsalicylic acid (also after acetylsalicylic acid administration to children with chickenpox or other viral diseases). It is rare in adults[15,105,129,151,5]. The classic presentation is a change in mental status, ranging from lethargy to delirium, seizures and respiratory arrest. The most frequent laboratory abnormality is the elevation of ammonia in blood, seen in almost all patients. As death is usually due to cerebral edema, lowering intracranial pressure is the most effective treatment. The recognition of the association of this syndrome with the use of acetylsalicylic acid lead to the recommendation for the use of other agents to manage children with influenza, and to a decrease in the number of cases.

Guillain-Barre Syndrome and myelitis have also been reported after influenza infections, but epidemiological studies supporting a causal association are lacking[66,103,77,185].

### 1.2.5 Muscular system

Acute rhabdomyolisis, with tender leg muscles and elevated serum CK occurs most frequently in children with influenza B infections; but it is also observed, occasionally, in adults or after influenza A infections. The course is usually benign, but sometimes-severe myonecrosis and myoglobinuria may lead to acute, occasionally fatal, renal failure. Influenza viruses have been recovered from affected muscles of some patients[117,145,47,151,150,234,45,182].

### 1.2.6 Systemic: Toxic shock syndrome

Toxic shock syndrome (TSS) is characterized by fever, hypotension, erythroderma followed by desquamation, and multiorgan failure. This syndrome is associated mainly with infections by *Staphylococcus aureus* and the production of an exotoxin (TSST-1or exotoxin B); group A *Streptococcus* may also be involved. TSS was originally associated with cutaneous and subcutaneous infections, and with menstruating and postpartum women. A link with post-influenza complications in previously healthy children and adults was found recently, after outbreaks of influenza A and B. The supposed pathogenic mechanism is a change in the colonization and replication of *S. aureus* (patients may be asymptomatic carriers of *S. aureus*) facilitated by the influenza infection. The patient may develop staphylococcal tracheitis or pneumonia and only a superficial infection of the tracheobronchial tree is required for the development of TSS[199,138].

### 1.2.7 Other

Another complication that has been related to influenza infection is the sudden infant death syndrome (SIDS), but a usal relationship has not been demonstrated[236,49,225,19,156].

Table 1.1. Patient factors which may delay recovery from influenza infection and facilitate the development of influenza-related complications

| High-risk conditions: (Co-morbidity) | References |
|---|---|
| Age: 2 or 65 years | 59, 29, 1, 152, 183, 192, 82, 57, 10, 9, 196 |
| Pregnancy (2nd and 3rd trimesters) | 159, 158, 1, 123, 144, 42 |
| Cardiovascular diseases: Congenital, rheumatic, ischemic heart disease, congestive heart failure | 78, 158, 13, 93, 162, 154, 81 |
| Bronchopulmonary diseases: asthma, bronchitis, bronchiectasis, emphysema, cystic fibrosis | 78, 158, 79, 77, 151, 93, 160 |
| Metabolic diseases: diabetes | 216, 158, 74, 124, 46, 136, 93 |
| Renal diseases | 79, 77, 78, 93, 24, 163 |
| Malignancies | 221, 61, 116 |
| Immunodeficiency, AIDS, immunosuppression, transplant recipients | 132, 184, 141, 134, 158, 183, 180, 210, 175 |
| Diseases of the blood, anemia, hemoglobinopathy, oncologic disorders | 230, 215, 4, 23, 22 |

| High-risk conditions: (Co-morbidity) | References |
|---|---|
| Hepatic diseases, cirrhosis | 50 |
| Long-term salicylate therapy and younger than 18 years of age (Kawasaki disease, rheumatoid arthritis, acute rheumatic fever, others) | 59, 5, 151, 77 |

Table 1.2. Complications of Influenza

| Complications of Influenza | Major Clinical Category | References |
|---|---|---|
| **Respiratory** | › Upper respiratory: Otitis media, sinusitis, conjunctivitis<br>› Acute laryngotracheo bronchitis (croup)<br>› Bronchitis<br>› Bronchiolitis<br>› Pneumonia: Primary viral, secondary bacterial, combined<br>› Complication of pre-existing disease | 36, 77, 77, 151, 183, 76, 68, 21, 162, 93, 162, 130, 132, 84, 60, 168, 204 |
| **Cardiovascular** | › Pericarditis<br>› Myocarditis<br>› Complication of pre-existing disease | 167, 218, 176, 53, 154, 169 |
| **Muscular** | › Rhabdomyositis<br>› Rhabdomyolisis with myoglobinuria and renal failure | 117, 145, 47, 150, 234, 45, 182 |
| **Neurologic** | › Encephalitis<br>› Reye's syndrome<br>› Guillain-Barre<br>› Transverse myelitis | 43, 188, 66, 73, 103, 113, 105, 151, 77 |
| **Systemic** | › Toxic shock syndrome<br>› Sudden death | 138, 199, 167, 149, 49, 236, 225, 19, 156 |

Table 1.3. Comparative features of pulmonary complications of Influenza [210]

| | Primary Viral Pneumonia | Secondary Bacterial Pneumonia | Mixed Viral-Bacterial Pneumonia | Localized Viral Pneumonia |
|---|---|---|---|---|
| **Setting** | › Cardiovascular disease<br>› Pregnancy<br>› Young adult | › 65 yr<br>› Pulmonary disease | Any, associated with influenza A or B | ? Normal |
| **Clinical history** | Relentless progression from classic 3-day flu, rapid deterioration | Improvement and then worsening | Progression from classic influenza or biphasic pattern | Continuation of classic 3-day syndrome |
| **Physical examination** | Bilateral findings, no consolidation | Consolidation | Consolidation | Area of crackles |
| **Sputum bacteriologic findings** | Normal flora | › Pneumococci<br>› *Staphylococcus aureus*<br>› *Haemophilus influenzae* | › Pneumococci<br>› *Staphylococcus aureus*<br>› *Haemophilus influenzae* | Normal flora |
| **Chest x-ray infiltrate** | Bilateral findings | Consolidation | Consolidation | Segmental |
| **White blood cell count** | Leukocytosis with shift to the left | Leukocytosis with shift to the left | Leukocytosis with shift to the left | Usually normal |
| **Isolation of Influenza virus** | Yes | Yes/no | Yes | Yes |
| **Response to antibiotics** | No | Yes | Often | No |
| **Mortality** | High | Low | Variable | Very low |

## 2.1 Initial Assessment Management

The algorithms shown in this chapter were designed to be used by healthcare staff and also by volunteers with minimal triaging experience to identify influenza patients who present to the health clinics, doctor's offices, emergency rooms, temporary emergency services, or other influenza triaging centres. Assuming that there will be a large number of cases and limited resources during a pandemic, the assessment guidelines are intended to evaluate the needs of each individual, and triage influenza patients efficiently in a crisis situation. Triage personnel will decide when patients can be managed in an ambulatory setting, redirected home, sent to an alternate care site, or admitted to an acute care hospital.

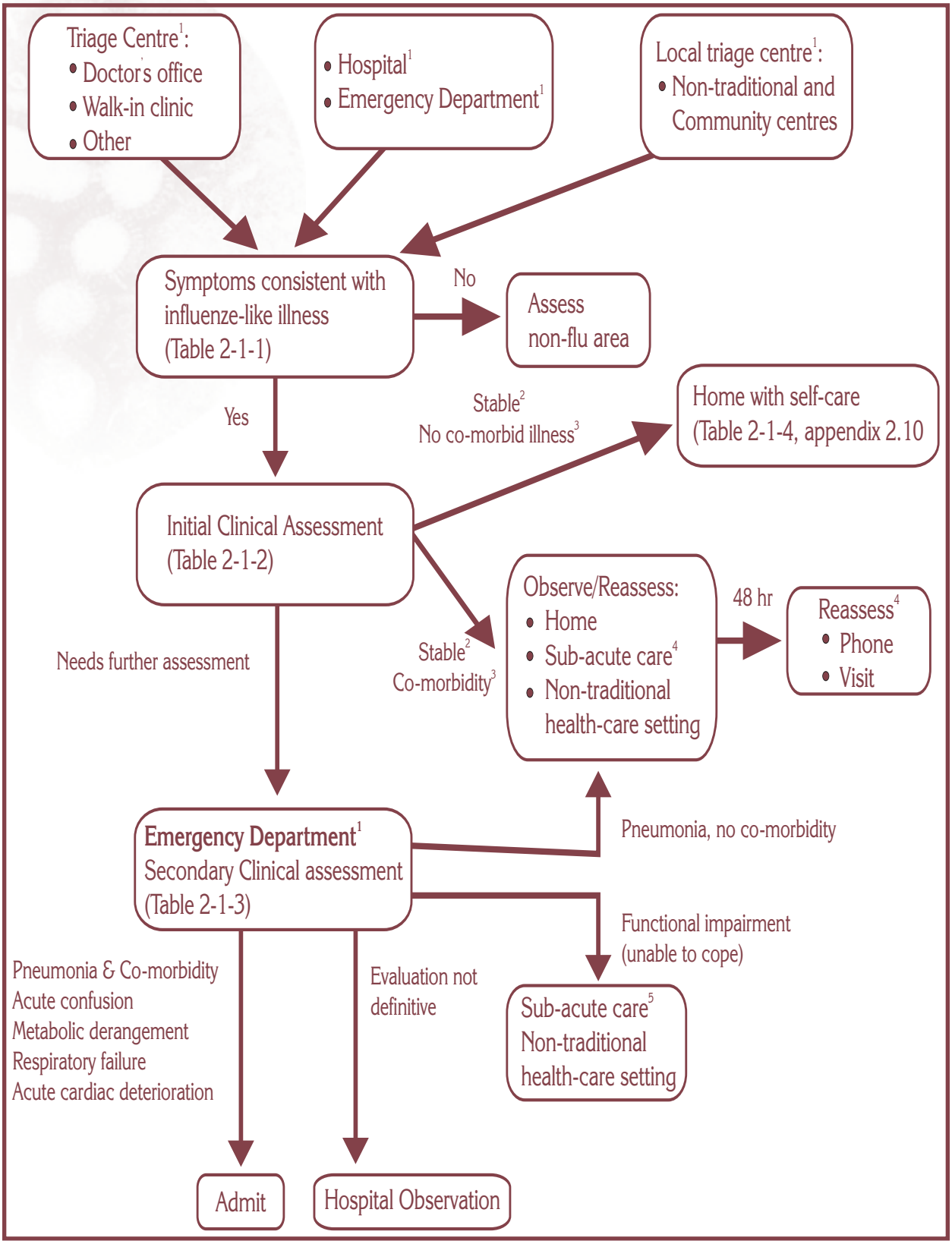
Two algorithms are included in this chapter, one for adults and adolescents (Section 2.1), and a second for children (Section 2.2). There is no clear age limit for the use of these algorithms. Depending on the age of the patient, place of consultation, and on the number of cases of influenza in a given community, young children and adolescents may be seen by personnel specialized in childcare or by the same staff and volunteers who assess the adult population. Nevertheless, influenza can be more severe in youngsters, and different criteria should be used to judge the seriousness of the illness in children (Section 2.2).

Healthy seniors living in the community can be evaluated as other adults (Section 2.1). Nevertheless, elderly individuals are also at increased risk for complications of influenza and those over 65 years of age should be monitored closely (see Chapter 1).

Management of patients/residents in long-term care facilities is discussed in Chapter 3. Because of their age and/or underlying medical condition, most individuals living in long-term care facilities are at increased risk for developing complications after influenza infection. In a pandemic situation it is expected that long-term care residents will remain in the long term care facility for treatment.

These algorithms were designed mainly for urban centres that have a variety of health resources as well as alternative sources of assistance. See Chapter 6 for assessment recommendations tailored to the health care resources found in rural and isolated communities.

*Triage of adults (≥ 18 years)*



**Legend:**

1) Triage centres may be located at doctor's offices, clinics, and in non-traditional (NT) sites such as schools, churches, community centres, military field hospitals, etc. When possible, hospitals should assign a special "emergency" area for the triage, secondary assessment and treatment of influenza patients, avoiding the passage of these patients through the regular Emergency Department.
2) Stable: Patient with ILI but without abnormalities meeting the criteria for secondary assessment (Table 2.1.2).
3) Co-morbidity:
   - 65 yr
   - pregnancy
   - chronic lung disease (e.g., chronic obstructive pulmonary disease, cystic fibrosis, asthma)
   - congestive heart failure
   - renal failure
   - immunosuppression (due to underlying disease or therapy)
   - haematological abnormalities (anemia, haemaglobinopathies)
   - diabetes
   - hepatic disease
   - socially unable to cope (i.e., without personal support at home, such patients may need an alternative centre of care). An alternate care arrangement may also be considered if a high-risk individual lives in the same household as the influenza patient.
   - Patients on long-term acetylsalicylic acid therapy (increased risk of Reye's syndrome).
4) Neighbourhoods should develop local plans for the support, assessment and control of influenza patients at home (e.g., "Flu-block" watch). Some individuals may not be able to self-care at home and will therefore need community support or an alternate care centre. When possible, individuals from the same household should be kept together.
5) In addition to providing sub-acute care, some local NT sites may be able to handle patients more critically ill (Please see Non-traditional Site Guideline, Annex J).

## *Symptoms consistent with flu like illness*

**Clinical Case Definition**:

When influenza is circulating in the community, the presence of fever and cough of acute onset are good predictors of influenza. The positive predictive value increases when fever is higher than 38 C and when the onset of clinical illness is acute (less than 48 hours after the prodromes). Other symptoms, such as sore throat, rhinorrhea, malaise, rigors or chills, myalgia and headache may also be present. Any case definitions developed prior to the pandemic may need to be modified once the pandemic occurs. A history of contact with another patient with influenza-like illness or with an influenza case confirmed by the laboratory should be sought. If present, it is of diagnostic value.

### Adults ((18 years)

a) **Systemic**

- Fever
- Chills
- Headache
- Aching muscles and joints
- Stiffness
- Weakness

b) **Respiratory**

- Cough
- Sore throat
- Hoarseness
- Stuffy or runny nose
- Shortness of breath (patients with influenza and shortness of breath should undergo chest radiography)
- Chest symptoms: thoracic pain when taking a deep breath, retrosternal tracheal pain, pleuritic pain (see legend of Table 2.1.2)
- Red and/or watery eyes
- Earache

c) **Digestive (seen mainly in children and elderly)**

- Vomiting
- Diarrhoea
- Abdominal pain

d) **Neurological**

- Confusion, drowsiness
- Convulsions
- Symptoms suggestive of meningitis (mainly in children)

*Initial influenza illness assessment (≥ 18 years)*

| Primary Assessment | Results Requiring Secondary Assessment |
|---|---|
| Temperature[a] | 35°C or 39°C |
| Pulse | New arrhythmia (irregular pulse)<br>>100 beats/min (if 16 years) |
| Blood pressure | 100 systolic<br>Dizziness on standing |
| Respiratory rate | 24/minute (tachypnea) |
| Skin colour (lips, hands) | Cyanosis |
| Chest signs or symptoms[b] | Any abnormality on auscultation or chest pain |
| Mental status | New confusion[c] |
| Function | New inability to function independently[c]<br>Persistent vomiting ( 2-3 times/24 hr.)[d] |
| Oxygen saturation[e] | 90% room air |

[a] For indications about types of thermometers and how to take the temperature see Appendix 2.I. High fever ( 39 C) in adults or in adolescents needs further assessment.

[b] Chest pain should always be investigated because it may be a sign of pneumonia (chest pain on inspiration), or may be a sign of cardiac failure. It may also appear as retrosternal pain (tracheal/bronchial pain) or as a pleuritic pain. When positive, it is an indication for secondary evaluation.

[c] A deterioration in level of consciousness or inability to function independently compared with previous functional status should be further investigated, particularly in elderly patients.

[d] Vomiting ( 2-3 times/24 hr.), particularly in elderly patients, requires further assessment.

[e] Determination of blood gases by pulse oximetry as sign of respiratory failure (see Appendix 2.III)

- If no abnormality and no co-morbidities are found: send home with instructions for self-care (2.1.4 and Appendix 2.I).
- If no abnormality, but co-morbidity: send home with instructions for self-care (2.1.4 and Appendix 2.I) and with reassessment after 48 hr; or send to non-hospital domicile. Follow-up.
- Co-morbidities: >65 yr, pregnancy, chronic lung disease, congestive heart failure, renal failure, immunocompromised, haematological abnormalities, diabetes, neoplastic disease, hepatic diseases, socially unable to cope (i.e., non supportive household).
- If secondary assessment is required, and the patients are sent to another centre/ward for complementary evaluation (see 2.1.3) each individual should be provided with a summary of the clinical/laboratory data. Some triage centres may have the facilities to perform secondary assessment and treatment without transferring patients.

### *Secondary influenza illness assessment (≥ 18 years)*

When the patient's secondary assessment has to be completed in a different setting, a new clinical evaluation to confirm the diagnosis at the primary triage centre should precede laboratory studies. Not all the tests mentioned below will be needed for all patients, and clinical assessment should determine which procedures are done, particularly if resources are scarce:

| Complementary laboratory studies | Results requiring supervision or admission |
|---|---|
| CBC (core battery, if appropriate)[a] | Hgb 80 g/l<br>WBC 2.500 or 12, 000<br>Bands[b] >15%<br>Platelets 50,000/ L |
| Electrolytes | Na 125 meq/L or 148 meq/L<br>K 3 meq/L or 5.5 meq/L |
| BUN, creatinine | BUN 10.7 mmol/L<br>Creatinine 150 mol/L |
| Glucose | 3mmol/L or 13.9 mmol/L |
| CPK (only in patients with severe muscle pain) | CKMB 50%<br>Total CK 1,000 /L |
| Blood gases, O2 saturation (see Appendix 2.III) | Blood gases p02 60 room air<br>O2 saturation 90% room air |
| Chest x-ray (CXR)[a] | Abnormal, consistent with pneumonia or with congestive heart failure |
| EKG (clinical criteria) | Evidence of ischemia, new arrhythmia |

[a] Under optimal circumstances, blood work and CXR should be obtained before admission. If resources are limited, priority should be given to patients with co-morbidity or suspected complications (i.e., pneumonia, etc.). Patients with normal gases and normal chest auscultation do not need CXR. Likewise, when the clinical diagnosis of pneumonia is unquestionable and the resources are scarce, no CXR need to be taken unless there is suspicion of a complication of the pneumonia (i.e., empyema). If antibiotics are limited, however, CXR may be indicated to confirm pneumonia before prescribing any drug. Conversely, if pneumonia is suspected but the radiology resources are limited, antibiotics may be prescribed without radiological confirmation.

[b] An increase in the number of circulating neutrophil-bands (i.e., immature neutrophils, with an elongated, non-segmented nucleus) suggests bacterial infection. Mean normal values of bands are 12.4% (range 9.5-15.3%)[229]. In a typical acute bacterial infection, the ratio bands/segmented neutrophils may go up to values of 16-17%[228].

### Microbiologic Diagnostic tests

Microbiologic diagnostic tests (bacteriologic and/or virologic) may be appropriate for secondary assessment. They will be performed depending on the clinical presentation and availability of resources. Once the pandemic strain is confirmed in a community, virologic tests will be needed only to confirm diagnosis in atypical cases and for surveillance purposes. Rapid tests are useful for diagnostic and treatment decisions (see Appendix 5.II). Isolation and culture of the virus is needed for surveillance purposes.

Ideally, purulent sputum will be analysed by Gram staining and culture to identify infecting bacteria and their susceptibility. In a pandemic, these studies should be reserved for patients admitted to hospitals, especially those in intensive care or those failing initial antibiotic therapy. If culture is not possible, Gram staining should be attempted.

Ideally, blood cultures should be obtained prior to antibiotic therapy in patients with pneumonia. If resources are scarce, blood cultures will be reserved for patients who are very ill, with toxic signs and low blood pressure; for patients who fail to recover after 48 hours of treatment with antibiotics; or for patients admitted to intensive care units.

| Sample | Test |
|---|---|
| Sputum (purulent) | Bacteriologic: Gram and culture |
| Blood (only for very ill patients or for patients who do not respond to 48h of treatment with antibiotics) | Bacteriologic: Culture |
| Nasopharyngeal aspirate (only for atypical cases or for surveillance) | Virologic: Virus antigens, RNA, culture |

### *Instructions for self-care of subjects sent home (≥ 18 years)*

No co-morbidity:

- Acetaminophen (adults or children), ibuprofen or acetylsalicylic acid (adults only), to treat myalgia and arthralgia*.
- Fluids
- Bed rest
- Drink hot liquids
- Decongestants
- Do not smoke or expose to second hand smoke
- Seek help if:
  - Increasing shortness of breath
  - New pleuritic, chest pain
  - New purulent sputum
  - Persistent vomiting

Co-morbidity: in addition to above

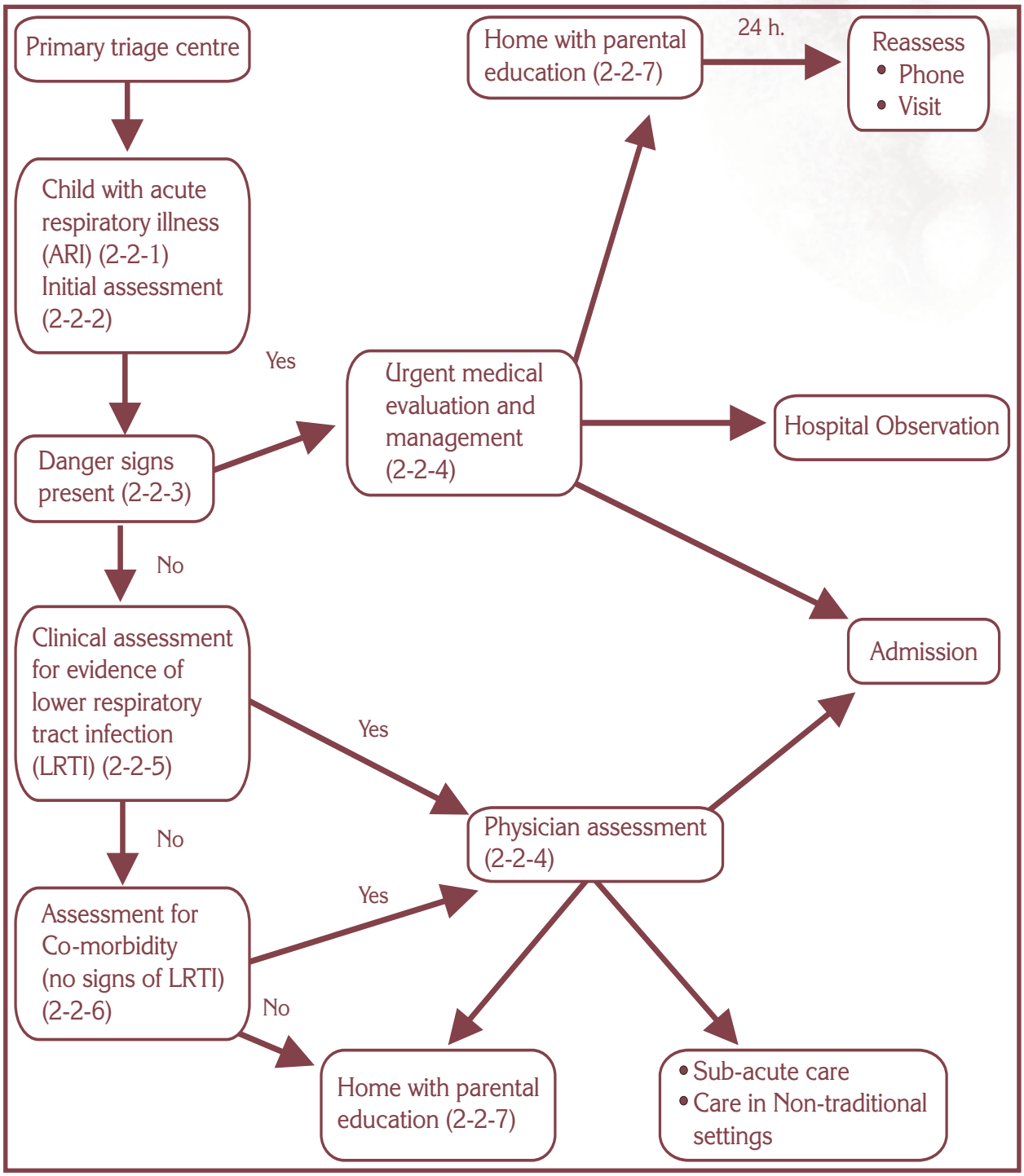
- Supervision (family, friends, allied health, nurse)
- Antiviral therapy (if seen before 48 hours of onset, contingent on pandemic priorities)
- Follow-up after 48 hours by phone call/ health care worker visit.

* A syndrome characterized by acute encephalopathy with fatty micro-infiltration and liver failure, **Reye's syndrome**, has been described in children and adolescents younger than 18 years of age (most commonly in the 4-12 year range) with influenza and receiving acetylsalicylic acid (ASA) e.g., Aspirin[15,105,129,151,5]. The classic presentation is a change in mental status, ranging from lethargy to delirium, seizures and respiratory arrest. The recognition of the association of this syndrome with the use of acetyl salicylic acid to treat viral symptoms, lead to the recommendation for the use of other agents and a decrease in the number of cases.

The province of Alberta developed a self-care plan for the management at home of uncomplicated cases of influenza[200]. It has been developed for interpandemic influenza and will be evaluated during the 2002-2003 influenza season. Appendix 2.I. is a summary of this plan, which has been adapted to be used nationwide, and in a pandemic.

## 2.2 Pediatric Triage

This algorithm was designed to help medical and healthcare staff, as well as lay persons with minimal knowledge and experience, to manage children with influenza-like illness during a pandemic. Triage centres may be located at the doctor's offices, clinics, hospitals, and in non-traditional care settings (schools, churches, community centres, military field hospitals, etc). The numbers in each of the following boxes refer to sections within this document where additional information can be found.



### *Child with acute respiratory illness (ARI,[107]) (i.e., one respiratory symptom and fever)*

**The most common presentation of influenza in children is fever and cough of sudden onset. The term ARI is preferred for children since most distinguishing features in adults are not characteristic in children until the second decade. Young infants (less than 2 months old) can become ill and progress to severe illness rapidly. They are much less likely to cough with pneumonia and frequently have only non-specific signs such as poor feeding, apnea, and fever or low body temperature.**

**Systemic:**

- Fever (  38  C core temperature)
- Apnea

**Respiratory symptoms:**

- Cough,
- Nasal congestion and/or rhinorrhea (second most common presentation),
- Difficulty breathing (including chest retractions, stridor, etc.)
- Fast breathing* (tachypnea)
- Hoarse voice
- Earache

*Definitions of fast breathing (tachypnea)[222]

< 2 months = >60 breaths per minute
2-12 months = >50 breaths per minute
> 12 months to 5 years = >40 breaths per minute
> 5 years = > 30 breaths per minute

**Associated non-respiratory symptoms:**

- Not feeling well, malaise
- Low energy, lethargic
- Not playing,
- Needing extra care
- Poor feeding
- Vomiting, diarrhoea
- Irritability, excessive crying, fussy

### *Initial influenza illness assessment (<18 years)*

| Primary Assessment | Results Requiring Secondary Assessment |
|---|---|
| Temperature[a] | C or 9°C |
| Respiratory rate | < 2 months = >60 breaths per minute<br>2-12 months = >50 breaths per minute<br>> 12 months to 5 years = >40 breaths per minute<br>> 5 years = > 30 breaths per minute |
| Skin colour and temperature (lips, hands) | Cyanosis, sudden pallor, cold legs up to the knee |
| Chest signs and symptoms[b] (pain may be difficult to detect in young children) | Chest indrawing, wheezing, grunting, inquire for chest pain |
| Mental status | Lethargic or unconscious, confused[c] |
| Function | Unable to breastfeed or drink, persistent vomiting (>2-3 times/24 hr.)[d]<br>Inability to function independently[c] |
| Neurologic symptoms and signs | Convulsions, full fontanelle, stiff neck, photophobia |
| Oxygen saturation[e] | 0% room air |

a For indications about types of thermometers and how to take the temperature see Appendix 2.I. High fever ( 9 C) in adolescents is a warning sign and needs further assessment.

b Children with ARI and chest pain should always have medical evaluation, since it may be a sign of pneumonia (chest pain on inspiration). It may also appear as retrosternal pain (tracheal/bronchial pain) or as a pleuritic pain.

c A deterioration of consciousness and functional status, lack of interest in playing and inappropriate sleepiness should be further investigated.

d Vomiting (>2-3 times/24 hr.), particularly if the children are not feeding or drinking well, requires secondary assessment.

e Determination of blood gases by pulse oximetry as sign of respiratory failure (see Appendix 2.III)

Note: If the child must be transported for secondary assessment (see 2.1.3) a summary of the clinical/laboratory data should accompany the patient. Some triage centres, however, may have the facilities to perform secondary assessment and treatment without moving the patients.

### *Danger signs (paediatrics): (2 months to 5 years old)*[222]

- Difficulty breathing (chest indrawing or nasal flaring or grunting or stridor or fast breathing)
- Cyanosis
- Unable to breastfeed or drink
- Vomiting everything (continuous vomiting)
- Lethargic or unconscious or confused
- Convulsions/seizures
- Full fontanelle

- Stiff neck, photophobia

When these danger signs are present in infants younger than 2 months, they suggest very severe disease and may be life threatening. These children should always be referred immediately for physician assessment. Additional danger signs in children under 2 months include:

- The child stopped feeding well (less than half of the usual amount of fluids)
- Fever or low temperature (high fever can represent a serious infection, but low temperature may also be present)
- Wheezing
- Grunting or stridor when calm
- Severe chest indrawing
- Abnormally sleepy or difficult to wake
- Poor circulation: sudden pallor, cold legs up to the knees
- Less than four wet diapers in 24 hours
- Signs of pneumonia (pneumonia in young infants is considered very serious and these children should be referred urgently to a hospital for evaluation)

### *Urgent medical assessment (paediatrics)*

While a primary care provider may give first aid, children with danger sign must be seen by a physician.

### *Secondary assessment (<18 years)*

When the patient's secondary assessment has to be completed in a different setting, a new clinical evaluation to confirm the primary assessment should precede laboratory studies. Not all tests will be needed for all patients, and clinical judgement should be used, particularly if resources are scarce.

| Complementary laboratory studies | Results requiring supervision or admission |
|---|---|
| CBC (core battery, if appropriate)[a] | Hgb[b] 8.0 g/dL<br>WBC[c] 2,500 or 12, 000 cells/ l<br>Bands[d] >15%<br>Platelets[e] 0,000/ l |
| Electrolytes | Na[f] 25 meq/L or 148 meq/L<br>K[f] 3 meq/L or 5.5 meq/L |
| BUN, creatinine | BUN[f] 0.7 mmol/L<br>Creatinine[f] 50 mol/L |
| Glucose[f] | 3mmol/L or 13.9 mmol/L |
| CPK[f] (only in patients with severe muscle pain) | CKMB 0%<br>Total CK ,000 mol/L |
| Blood gases, O2 saturation | Blood gases p02 0 room air<br>O2 saturation 0% room air |
| Chest x-ray (CXR)[a] | Abnormal, consistent with pneumonia |

**Legend:**

a) Under optimal circumstances, blood work and CXR should be obtained for all patients before admission. When resources are restricted, priority should be given to patients with co-morbidity or suspected complications (i.e., pneumonia, etc.). Similarly, when the clinical diagnosis of pneumonia is definite and resources are scarce, no CXR is needed, unless there is suspicion of a complication of the pneumonia (i.e., empyema). When antibiotics are limited, CXR may be an indication to confirm pneumonia before prescribing any drug and, if pneumonia is suspected but the resources for CXR are in short supply, antibiotics may be prescribed without radiological confirmation.

b) Values of haemoglobin for young children are age related. Normal values for different ages are[157]:

| Age | Haemoglobin g/dL | Reference values (SI) mmol/l |
|---|---|---|
| 1-3 days | 14.5 - 22.5 | 2.25 - 3.49 |
| 2 month | 9.0 - 14.0 | 1.40 - 2.17 |
| 6 - 12 years | 11.5 - 15.5 | 1.78 - 2.40 |
| 12 - 18 years (M) | 13.0 - 16.0 | 2.02 - 2.48 |
| 12 - 18 years (F) | 12.0 - 16.0 | 1.86 - 2.48 |

c) Values of WBC for young children are age related. Normal values for different ages are[157]:

| Age | Cells/μ L (limits) | Reference values (SI) $10^9$ cells/L |
|---|---|---|
| Birth | 9,000 - 30,000 | 9.0 - 30.0 |
| 24 h | 9,400 - 34,000 | 9.4 - 34.0 |
| 1 month | 5,000 - 19,500 | 5.0 - 19.5 |
| 1-3 years | 6,000 - 17,500 | 6.0 - 17.5 |
| 4-7 years | 5,500 - 15,500 | 5.5 - 15.5 |
| 8-13 years | 4,500 - 13,500 | 4.5 - 13.5 |
| > 13 years | 4,500 - 11,000 | 4.5 - 11.0 |

d) In a typical acute bacterial infection, the ratio bands/segmented neutrophils may increase up to 16-17%[228]. Mean values of bands in normal individuals are 12.4 % (range 9.5-15.3%)[229].

e) Normal values for children older than one week are the same as for adults[157].

f) Values normal for infants/children[157].

| Analyte | Age ranges | Normal values |
|---|---|---|
| Sodium | Infants<br>Children<br>Thereafter | 139 - 146 mmol/L<br>138 - 145 mmol/L<br>136 - 146 mmol/L |
| Potassium | < 2 months<br>2 -12 months<br>> 12 months | 3.0 - 7.0 mmol/L<br>3.5 - 6.0 mmol/L<br>3.5 - 5.0 mmol/L |
| BUN | Infant/child<br>Thereafter | 1.8 - 6.4 mmol urea/L<br>2.5 - 6.4 mmol urea/L |
| Creatinine | Infant<br>Child<br>Adolescent | 18 - 35 mol/L<br>27 - 62 mol/L<br>44 - 88 mol/L |
| Glucose | Child | 3.3 - 5.5 mmol/L |

## Microbiologic Diagnostic tests

See adult assessment

### *Clinical assessment for evidence of LRTI (paediatrics)*

a) **Clinical assessment**

- Crackles
- Wheeze
- Tachypnea (fast breathing), use of accessory muscles
- Consolidation
- Poor air entry

Any young infant (< 2 months) with pneumonia has a severe, life threatening infection. The most important signs to consider when deciding if a young infant has pneumonia are:

- Breathing rate (  60 times/minute)
- Severe chest indrawing, use of accessory muscles

b) **Secondary assessment (laboratory):**

- Chest radiograph (CXR)
- Respiratory tract specimen for diagnosis (e.g., nasopharyngeal aspirate, sputum on children over 7 years of age)
- Blood work
- Other diagnostic tests (as required).

### *Determine if patient has co-morbidity of concern*

(No evidence of lower respiratory tract infection).

According to NACI, patients at "high risk for complications from influenza" include[152]:

- Chronic cardiac or pulmonary disorder (bronchopulmonary dysplasia, cystic fibrosis, asthma) severe enough to require regular medical follow up or hospital care,
- Chronic conditions such as diabetes and other metabolic diseases,
- Cancer,
- Immunosuppression (due to underlying disease and/or therapy),
- Renal disease,
- Anaemia, hemoglobinopathy,
- Residents of chronic care facilities,
- Patients on long-term acetylsalicylic acid therapy (increased risk of Reye's syndrome).

Asthma and diabetes are the most frequent co-morbidities found in young children. Premature babies and low-weight infants should also be included in this list. All children younger than 2 years of age may be considered as high-risk patients[29].

Socio-economic issues such as age and education of the parents, single parents, multiple young siblings, support at home by other family members, etc., should also be taken into account when sending a child back home. Similarly, whether other individuals at home have high risk of influenza associated complications (siblings with chronic diseases, elderly grandparents, etc.) should be evaluated.

**Children at risk for influenza-associated complications** (no signs of LRTI). Consider physician assessment to determine eligibility (in agreement with the pandemic guidelines) for:

- Antiviral therapy (within the framework of antiviral prioritization for pandemic influenza, Appendix 5.III).
- Stopping ASA *
- Immunization of patient and family if not already done (according to the pandemic guidelines).
- Plan follow up
- Setting for care (admission, home, institution etc). When possible, members of the same household should be kept together.

### *Parental/patient education*

Children without co-morbidities presenting with uncomplicated influenza infection may be sent home with parental education regarding:

- Maintaining hydration
- Fever management (avoid salicylic acid*)
- Watching for signs of deterioration, failure to improve
- When to return
- Follow up plan if necessary
- Mothers of young infants should be told to return to the health centre immediately if the child worsens or does not feed well, or if breathing becomes difficult.
- Immunization/prophylactic treatment of high-risk contacts in the household (abide by existing pandemic guidelines).
- Infection control practices such as avoiding close contact with othersand paying attention to hand hygiene, proper disposal of tissues, etc.

See Appendix 2.I.: CARING FOR YOUR-SELF: "When a child is unwell" and "how to take a child's temperature".

* A syndrome characterized by acute encephalopathy with fatty micro-infiltration and liver failure, **Reye's syndrome**, has been described in children and adolescents younger than 18 years of age (most commonly in the 4-12 year range) with influenza and receiving salicylates (ASA)[15,105,129,151,5]. The classic presentation is a change in mental status, ranging from lethargy to delirium, seizures and respiratory arrest. The recognition of the association of this syndrome with the use of acetyl salicylic acid to treat viral symptoms, lead to the recommendation for the use of other agents and a decrease in the number of cases.

*This appendix is prepared from a draft written by Ms. Diane Spillett for Alberta Health and Wellness (September 2001). The original document was designed for the province of Alberta, to reduce hospital overload during interpandemic influenza. It has been adapted to be used nationwide in a pandemic situation.*

# I. Staying Well

## A. Be Informed About Influenza

### *What is Influenza?*

Influenza (flu) is an infection of the cells that line the lungs and airways (the respiratory system). In North America it usually affects people during the winter (November - April). It is caused by one of three types of viruses - Influenza A, Influenza B, and Influenza C. Influenza A usually causes the worst illness, Influenza B is more common in children and Influenza C is rare. **Only influenza A has been associated with pandemics**.

The influenza viruses that circulate every winter are related to those from the preceding epidemics. These viruses spread among people with varying levels of immunity (body defences) following infections earlier in life. Over a period of 2 or more years, this circulation promotes the selection of new viruses that have changed enough to again cause epidemic infection among the general population.

At unpredictable intervals, "**novel influenza viruses emerge, which are totally different from strains circulating the year before. If such viruses have the potential to spread readily from person-to-person, then more widespread and severe epidemics may occur, usually to a similar extent in every country within a few months to a year, resulting in a pandemic**."[223]

### *How is Influenza Spread?*

Influenza is very contagious. People can pass the virus for up to seven days or more, beginning from the day before they have the first symptoms of the illness. People breathe-in the virus from particles in the air when they are around those who have the flu and who have been talking, coughing, or sneezing. The virus can travel from 1 - 2 meters in the air, and can live several hours on your hands and surfaces. People can also become infected when they touch those who are ill (e.g., kiss them or shake their hand), or contact objects on which viruses have landed (e.g., telephones, door knobs, dishes, handrails), and then touch their own nose, mouth or eyes. It is especially easy for the virus to spread where there are crowds or where people live or work/study close together. The flu virus lives longer in cool, dry places. It can live for one or two days on hard surfaces, and 8-12 hours on cloth, tissue and paper.

### *What are the Symptoms of Influenza?*

A person develops symptoms of the flu within one to three days after becoming infected with the virus. They suddenly develop a fever and possibly chills, and may have a headache and aching muscles, especially in the back and legs. They usually have a dry cough and feel weak and tired. Some people have a sore throat and a runny or stuffy nose. They probably won't feel like eating. In general, people feel very sick and want to stay in bed. The fever usually falls in three to five days, and the person begins to feel better. However, tiredness and a cough can sometimes continue for several weeks.

People often mistakenly refer to stomach upsets and colds as "the flu". Influenza is quite different from both of these. It rarely causes vomiting and diarrhoea, but may do so in young children or elderly individuals. Unlike influenza, the common cold comes on gradually, rarely causes a fever, and is usually limited to a sore throat, coughing and sneezing, and a stuffy, runny nose. It is generally milder than influenza and people can carry on with their usual activities.

### *How Serious is Influenza?*

Most healthy people recover from influenza without any serious problems. However, there are certain groups of people who are "at risk" of developing complications which can be very serious, and even cause death.

Some people, such as very young children and the elderly, are "at risk" because they have weaker body defences (immune systems). Pregnant women, particularly those who are in the second and third month of their pregnancies, have also increased risks of pneumonia, lung insufficiency, and death after influenza infections. Similarly, those with diseases such as cancer and HIV/AIDS, people who have had organ transplants and persons who take certain medications frequently develop complications.

Another group of people "at risk" are those who have chronic (long term) conditions such as heart disease, lung disease (asthma, cystic fibrosis, emphysema), kidney disease and diabetes. When a body system is not strong, it is easier for bacteria to invade the cells that have been damaged by the flu virus and cause other illnesses such as pneumonia. Influenza can also stress the body so much, that the underlying chronic illness may be worsened.

Children under the age of eighteen years and who have influenza **should avoid taking acetylsalicylic acid (ASA), e.g., Aspirin**, because they can develop a very serious illness affecting the nervous system and liver, called Reye's syndrome. It is important for parents of children who need to take ASA on a regular basis for a health problem, to discuss possible complications associated with influenza with their doctor, and find out what they can do to reduce the risk.

### *For More Information*

If there is an outbreak of pandemic influenza in your community, watch the television or listen to the radio for up to date information, or access the Health Canada website at http://www.hc-sc.gc.ca/.

If you have questions about somebody in your household that may have the flu, call the Public Health Centre in your area.

## B. Protect Yourself Against Influenza

### Immunization

***Vaccination is the best way to avoid or to lessen the severity of influenza.***

Vaccination is advised once a vaccine with the pandemic strain becomes available. Priorities for vaccination, including the types of individuals that should be immunized first if vaccine supply is limited, have been identified in the Canadian Pandemic Influenza Plan and will be confirmed at the time of a pandemic.

### *Who Should Get the Flu Vaccine?*

Vaccine supply may be limited during the early stages of the pandemic; therefore the Pandemic Influenza Committee (PIC) will define priority groups, which should be immunized first. This prioritization will evaluate the impact that the vaccine may have on: a) reducing morbidity and mortality by maintaining the health services response, and by individual protection of high-risk groups, and b) minimizing societal disruption by maintaining essential services (as stated in the pandemic guidelines, Vaccines section).

Call the Public Health Centre in your area to learn about vaccine availability and to find out if any of the members of your household belongs to a priority group. They will also inform you where they are holding "Flu Clinics" for immunization. Some doctors may provide the vaccine to their patients. Two shots may be required (as per pandemic guidelines).

The vaccine is safe for pregnant women, breast-feeding mothers and children. It is not effective for children under the age of 6 months.

### *Who Should NOT get the Flu Vaccine?*

People who are severely allergic to eggs should not receive the vaccine, as viruses used in making the vaccine are grown in eggs. Rarely, a person has had an allergic reaction to some other ingredient in the vaccine - a raised itchy rash, swollen throat or tongue, red itchy eyes or possibly a swollen face within 12 hours of getting the injection. These people should not get be vaccinated again.

If a person is "at risk" for getting serious complications from influenza and cannot be vaccinated, their doctor may wish to prescribe an antiviral drug to give them some protection during the pandemic. Antivirals stop the flu virus from multiplying. It is a good idea to ask your doctor about this medication, if you are allergic to the vaccine. He/she will need to consider your medical problems, available medications (the Pandemic Influenza Committee will also define priority groups, if antivirals are in short supply), and possible side effects of the drug.

Doctors may also prescribe antivirals for:

1. People at high-risk even though they were vaccinated, if they need extra protection,
2. People who were vaccinated after the virus was present in the community, and need to be protected for the two weeks required for a response to the vaccine.
3. The public at large, if there is a pandemic and the vaccine with the pandemic strain is not available or is insufficient.

If a person has a minor illness, they can still get the flu shot. However, tell your doctor if you have a temperature of 37.8 C (100 F) or more or if you have other symptoms.

### *What Reactions do People have to the Flu Shot?*

Some people think that they will get the flu from the flu shot. This is not possible, because the virus in the vaccine has been killed. The most common reaction to the flu shot is some redness and soreness where the needle entered the skin. This is usually gone in two days. Some people may develop a fever, tiredness and aching after six to twelve hours that may last for a day or two. More serious reactions are rare. The benefits and risks of this vaccine should be discussed with your vaccine provider as part of the informed consent process.

## Hygiene

***In addition to getting vaccinated, the single most important step people can take to prevent the flu is to wash their hands often.***

Wash your hands often, especially after being in contact with someone who has a respiratory infection, or with children who get the virus easily and are the main spreaders of the virus in the community. Do not shake hands. It is good for everyone to get into the habit of washing their hands before meals, after using the toilet, and after they cough or sneeze or blow their nose. The sooner children are taught this, the better. It is best to wash your hands with warm soap and water, scrubbing your wrists, palms, fingers and nails for ten to fifteen seconds. Rinse and dry with a clean dry towel.

Be aware of the times you rub your eyes or touch your nose or mouth, and try to avoid these habits. This can bring the virus into your airways, if you have recently touched someone who has the flu, an object that they have used, or a surface on which the virus has settled.

### *Remember not to share eating utensils or drinks.*

Don't visit people who have the flu unless it is absolutely necessary. If a member of your family has the flu, keep their personal items, such as towels, separate from the rest of the family. Clean surfaces (such as bathroom sinks and taps, kitchen sinks and counters) after the ill person has handled them. Wash hands after cleaning a child's nose.

### *Avoid large crowds.*

## Care for Your Self

Taking good care of yourself physically and emotionally strengthens your overall well-being and the ability of your body to fight off infections and to stay healthy. Not smoking is particularly important for the health of the lungs and airways, and drinking plenty of water helps to keep the airways moist and able to cleanse the system of unwanted material.

## C. Plan Ahead

Spend a little time thinking about what you would need if you got the flu.

If you live alone, or are a single parent of young children, or are the only person caring for a frail or disabled adult, it might be a good idea to:

- Have enough fluids (juices, soups etc.) on hand to last you and your family for 1-2 weeks.
- Have enough basic household items (e.g., tissues) to last for 1-2 weeks.
- Have acetaminophen and a thermometer in your medicine cabinet. Do you know how to use/read a thermometer correctly? If not, don't be shy about asking someone to show you how.
- Think of someone you could call upon for help if you became very ill with the flu and discuss the possibility with him or her.
- Think of someone you could call upon to care for your children if their school or daycare was closed because of the pandemic, and you were required to work, and discuss the possibility with them. If you cannot think of anyone who could help you in such a situation, you can call the Public Health Centre in your area to find out what is available in the community to help with these difficulties.

## II. If You Are Unwell

### A. Is It The Flu?

The most prominent characteristics of the flu are the sudden appearance of a fever (38°C or 100.4°F or more), a dry cough and aching in the body, especially in the head and lower back and legs. Usually the person feels extremely weak and tired and doesn't want to get out of bed. Other symptoms can be chills, aching behind the eyes, loss of appetite, a sore throat and a runny, stuffy nose. After your symptoms first appear you can spread the virus to others for 4-6 days or more.

### B. What Can You Do For Yourself?

- **Rest** - Probably, you will feel very weak and tired until your temperature returns to normal (about three days), and resting will provide comfort and allow your body to use its energy to fight the infection. You should avoid contact with others while the infection is contagious (at least six days after the first symptom appears).
- **Drink plenty of fluids** - Extra fluids are needed to replace those lost because of the fever (sweating). If your urine is dark, you need more to drink. Liquids, especially warm ones like chicken soup, help loosen mucus. Try to drink a glass of juice/water or an equal amount of some other fluid every hour while you are awake.
- **Take acetaminophen or ibuprophen** as recommended on the package to bring down your fever and ease your muscle pain (unless your doctor says otherwise). **CHILDREN UNDER 18 YEARS OF AGE SHOULD NOT TAKE ACETYLSALICYLIC ACID (ASA) OR ANY PRODUCTS CONTAINING ASA**. The combination of influenza and ASA in this age group has been known to cause Reye's syndrome, a very serious condition affecting the nervous system and liver. **ANTIBIOTICS ARE NOT EFFECTIVE AGAINST INFLUENZA** because it is a virus, and antibiotics fight bacteria. A hot water bottle or heating pad may also relieve muscle pain. A cup of Epsom salts in a warm bath may be soothing.
- **Gargle** - with a glass of warm water to ease a sore throat. Sugarless hard candy also helps, as do lozenges.
- **Use saline nose drops or spray** (ones that contain salt water but no medicine) to help soothe or clear a stuffed nose. Try not to blow your nose as this could send infected secretions into your sinuses. Wipe your nose with disposable tissues and put them in the garbage can immediately. Cover your nose and mouth with tissues when you cough or sneeze and throw them in the garbage as well. **Wash your hands often**.
- **Do not smoke** - it is very irritating to the damaged airways.
- **If you are a single parent, or you are responsible for the care of someone who is frail or disabled, you may need to call someone to help you until you are feeling better**.
- If you buy medicine at the drug store to treat your symptoms ("over-the-counter" medications), check with the pharmacist to see if it is the best one for you. Mention if you have a chronic illness or are taking any other medicine. Take into consideration that:
  - It is better to buy a remedy that treats only one symptom. This way you are not taking in substances that are doing nothing, or that may trigger an adverse reaction.

- Read the label to be sure that the ingredient treats the symptom you have.
- Extra strength remedies contain a higher dose of the ingredient. Try the standard dose first. It may work fine and not have the same risk of side effects.
- Long acting medications tend to have more side effects than short acting medications.
- Read the label and note any possible side effects or interactions with other drugs or health conditions.
- If you have a chronic condition and are taking prescription medications, it is a good idea to ask the pharmacist to suggest a medication that would be safe for you to take, if you have not already discussed this with your doctor.

**Muscle pain and fever** - Acetaminophen is a good choice because it causes less stomach irritation than other drugs. **Acetylsalicylic acid should not be given to children under the age of eighteen**.

**A cough** can be helpful if it gets rid of mucus. If a dry cough is keeping you awake, a cough suppressant, Dextromethorphan is safe and effective. If you need help loosening mucus, an expectorant such as Guaifenesin is good. It is not helpful to take a suppressant and an expectorant together.

**A stuffy nose** - Decongestants help shrink swollen blood vessels in the nose. There are two kinds pills and nose drops/sprays. Nose drops/sprays act in minutes. They work better and have fewer side effects than the pills. However, *they only work for 2 or 3 days, and then they make matters worse*. Oxymetazoline, Phenylephrine and Xylometazoline are nose drops/sprays. If your nose is still stuffy after three days, you may want to switch to the pills. The pills take 1/2 hour to work. They may cause dry mouth, sleep disturbances and other side effects. Pseudoephrine is a decongestant in pill form.

**Sore throat** - Some medications work by numbing the throat, Dyclonine works the best. Others are Benzocaine, Hexylreorcinol, Menthol and Phenol. These are lozenges or throat sprays. Other lozenges act by coating the throat. They may contain honey, herbs or pectin.

**Ingredients to avoid**:

- Phenylpropanolamine (PPA) has been linked with strokes.

Note: Older people may become much more sensitive to medications in general and may experience more side effects, especially to the nervous system (e.g., confusion). It is best to take no more than three or four medications at a time. This includes both prescription and over the counter drugs.

**If you have any questions at all about medications, don't hesitate to talk to your pharmacist.**

Generally, people begin to feel better after their temperature returns to normal, in about three days, and are ready to return to their normal activities/work in about a week. It is common for tiredness and a cough to linger on for several more weeks.

## C. When To Seek Medical Attention

If you are a normally healthy person **and have been suffering with the flu, it is time to call the doctor, EMS or health help line if**:

- **You become short of breath while resting or doing very little;**
- **Breathing is difficult or painful;**
- **You are coughing up bloody sputum;**
- **You are wheezing**
- **You have had a fever for three or four days and you are not getting better - or you may be getting worse;**
- **You have started to feel better, and suddenly you get a high fever and start to feel sick again;**
- **It is noted by yourself or others that you are extremely drowsy and difficult to wake up or that you are disoriented or confused;**
- **You have extreme pain in your ear.**

**Seek medical care as soon as possible, in order to prevent your condition from worsening. Bacteria may have invaded your damaged tissues. At this point your doctor may consider giving you an antibiotic.**

**If you have heart or lung disease or any other chronic condition that requires regular medical attention, if you are frail, or if you have an illness or are on treatments or medications that affect your immune system and you get the flu, call your doctor**. If you are living with a long-term illness, your doctor may suggest changes to your usual management routine and/or provide you with extra help in treating the flu and preventing complications e.g., antiviral drugs. **These medications must be taken within 48 hour of the first symptoms to be effective so call your doctor right away**.

### *What your Doctor May Prescribe:*

Recently, drugs called antivirals have been developed which can fight viruses. ***To treat influenza, they must be started within 48 hours of the first symptoms of the flu*** - the sooner, the better.

At the time of a pandemic, antivirals will likely be in short supply. Health Canada will provide advise as to who should get antivirals as a priority. For example, persons with underlying chronic diseases may be one of the first groups to receive treatment with antivirals. If you are in a priority group and you have symptoms of the flu, you should call your doctor straight away. If you are a healthy person and have not been identified as being in a priority group for antivirals, you do not need to call your doctor unless you have the more severe symptoms listed above.

## D. When A Child Is Unwell

Older children and teens have the same symptoms of the flu as adults. Very young children and infants probably have similar symptoms, but do not know how to tell people they have sore muscles or a headache. These children may be irritable and eat poorly. They sometimes develop a hoarse cry and barking cough (croup). Younger children may also have diarrhoea, vomiting and stomach pain - especially children under 6 months.

**Some of the things you can do for your child are**:

- Give acetaminophen or ibuprofen every four to six (ibuprofen) hours for the fever in the dose recommended on the package (unless your doctor says otherwise). **DO NOT GIVE ACETYLSALICYLIC ACID CONTAINING MEDICATION (e.g., Aspirin, Bufferin etc.)** Your pharmacist can provide advice on appropriate over-the-counter medications for treating fever.
- Do not expect to be prescribed antibiotics for uncomplicated influenza, as they will have no benefit. Antibiotics may be prescribed for complications of influenza such as pneumonia or ear infection.
- Dress the child in lightweight clothing and keep the room temperature at 20 C.
- Offer cool fluids frequently when the child is awake.
- Avoid cool baths.
- Allow the child to rest and stay at home if possible for 6 days or more, so the virus isn't spread to other children.
- Use salt-water nose drops to treat a stuffy nose. Throw away tissues as soon as you have wiped your child's nose. Teach the child to cover their mouth when they cough or sneeze and then to throw the tissue away. Wash your hands often and teach your child to do so after wiping the nose.

**Take your child to the doctor if your child**:

- Has heart or lung disease or any chronic illness requiring regular medical care; has a disease or is taking drugs or treatments that affect the immune system; takes acetylsalicylic acid (ASA) e.g., takes ASA regularly for a medical condition;
- Has trouble breathing;
- Is less than 6 months old and has any temperature over 38.5 C;
- Is constantly irritable and will not calm down;
- Is listless and not interested in playing with toys;
- Has a fever that lasts more than 5 days;
- Drinks so little fluid that they are not urinating at least every 6 hours when awake;
- Has vomiting for more than 4 hours, or has severe diarrhoea;
- Note: green or yellow nasal discharge does not mean a child has a bacterial infection and needs antibiotics.

**TAKE YOUR CHILD TO THE HOSPITAL EMERGENCY DEPARTMENT OR CALL 911 IF YOUR CHILD:**

- Has severe trouble breathing not caused by a stuffy nose
- Has blue lips
- Is limp or unable to move
- Is hard to wake up, unusually quiet or unresponsive
- Has a stiff neck
- Seems confused
- Has a seizure (convulsion/fit)
- Has not had a wet diaper in 12 hours.

## A) How To Take A Child's Temperature

There are 4 ways to take a child's temperature:

- by the mouth (oral)
- by the bum (rectal)
- under the armpit (axillary)
- in the ear (tympanic)

The best method to choose depends on your child's age:

- **Birth to 2 years**: best choice for an exact reading-rectal, second choice -armpit (to check for fever)
- **Between 2 and 5 years**: best choice-rectal, second-ear, third-armpit
- **Older than 5 years**: first choice-oral, second-ear, third-armpit

There are two types of glass thermometers: one for oral and axillary temperatures (it has a long slender bulb at one end, containing mercury) and one with a short, stubby, larger bulb for rectal temperatures. As the mercury expands, in response to the heat from the child's body, it moves up the column.

A digital thermometer can be used for rectal, oral and armpit temperature taking. It is made of unbreakable plastic, is easy to read and measures temperature faster than glass. Ear thermometers are available but are expensive.

A fever strip is not recommended because it does not give an accurate temperature reading.

### Rectal Method

- *If you are using a glass thermometer*, be sure it is a rectal thermometer.
- Clean the thermometer with cool, soapy water and rinse (hot water causes the mercury to expand and may burst the thermometer).
- Hold the thermometer at the end away from the mercury and shake it with firm downward flicks of the wrist so that the mercury goes below 36 C (96.8 F).
- Cover the silver tip with petroleum jelly (such as Vaseline)
- Place the baby on his/her back with his knees bent.
- Gently insert the thermometer in the rectum, about 2.5 cm (1 inch), while holding it with your fingers.
- Hold for at least two minutes. Remove the thermometer. Hold it near the light and slowly turn it until the line of mercury is seen. Read the temperature where the line of mercury ends.

- Clean the thermometer with cool soapy water and rinse. Use a cotton swab soaked in alcohol to rub down the thermometer.
- Store the thermometer in a container to prevent breakage.
- NB. This method is not recommended for children with illnesses/treatments affecting their immune system.

### Armpit Method

- Use an oral glass thermometer.
- Clean the thermometer and shake down the mercury as in "rectal method".
- Place the silver tip of the thermometer in the center of the armpit.
- Make sure your child's arm is tucked snugly against his/her body.
- Leave the thermometer in place for at least 4 minutes.
- Remove, read, clean and store the thermometer as in "rectal method".

To use a digital thermometer:

- Press the button to turn the thermometer "on".
- Put the thermometer under your child's armpit. The silver tip must touch the skin.
- Hold the top of the thermometer with one hand and hold down your child's arm with the other hand.
- Wait for the thermometer to beep.
- Read the temperature on the display.
- To clean a digital thermometer, wash only the tip with soap and warm (not hot) water and wipe off with alcohol after use. Dry well.

### Mouth Method

- Clean the thermometer and shake down the mercury as in "rectal method".
- Do not give the child cold or hot liquids for 1/2 hour before taking his/her temperature.
- Carefully place the tip of the thermometer under the child's tongue. Tell him/her to close the mouth but not to bite down. (NB. This method is not recommended for children under 5 years of age.)
- With the child's mouth closed, leave the thermometer in place for 3 to 4 minutes. Stay with child and make sure he/she remains still.
- Remove thermometer, Read, clean and store as in rectal method.

### Ear Method

- Use a clean probe tip each time, and follow the manufacturer's instructions carefully.
- Gently tug on the ear, pulling it up and back. This will help straighten the ear canal, and make a clear path inside the ear to the eardrum.
- Gently insert the thermometer until the ear canal is fully sealed off.

- Squeeze and hold down the button for one second.
- Remove the thermometer and read the temperature.
- NB. This method is not recommended for children under one year of age.

Ask the pharmacist any questions you may have when you purchase your thermometer. If you are purchasing a glass thermometer, look for one with a mercury column that is easy to see, and degree markings that are easy to read.

What is a normal temperature?

The normal temperature range varies, depending on the method you use:

**Rectum**: 36.6 C to 38 C (97.9 F to 100.4 F)

**Armpit**: 34.7 C to 37.3 C (94.5 F to 99.1 F)

**Mouth**: 35.5 C to 37.5 C (95.9 F to 99.5 F)

**Ear**: 35.8 C to 38 C (96.4 F to 100.4 F)

## B) How To Take An Adult's Temperature

Normal body temperature is regulated between 35.8 C and 37.2°C in healthy persons, it may vary by 0.5-1 degree during the day. Body temperature shows a definite pattern: low in the morning, gradually increasing during the day, and reaching its maximum during the late afternoon or evening.

There are 3 ways in which an adult's temperature is usually taken:

- by the mouth (oral)
- in the ear (tympanic)
- under the armpit (axillary). This method is less accurate, and is usually only used if the person is extremely drowsy or not clear mentally.

There are two types of glass thermometers: one for oral and axillary temperatures (it has a long slender bulb at one end, containing mercury) and one with a short, stubby, larger bulb for rectal temperatures. (These are usually used with children). As the mercury expands, in response to the heat from a person's body, it moves up the column.

A digital thermometer can be used for oral, armpit (and rectal) temperature taking. It is made of unbreakable plastic, is easy to read and measures temperature faster than glass. Ear thermometers are available but are expensive.

A fever strip is not recommended because it does not give an accurate temperature reading.

### Oral Method

- *If you are using a glass thermometer*, be sure it is an oral thermometer.
- Clean the thermometer with cool, soapy water and rinse (hot water causes the mercury to expand and may burst the thermometer).
- Hold the thermometer at the end away from the mercury and shake it with firm downward flicks of the wrist so that the mercury goes below 36 C.

- Make sure that you/the person whose temperature is being taken has not smoked a cigarette, had a hot or cold drink or taken a hot bath for 1/2 hour, or the reading will not be accurate.
- Carefully place the silver tip of the thermometer under tongue. Close mouth but do not to bite down. (NB. This method is not recommended for children under 5 years of age.)
- With mouth closed, leave the thermometer in place for 3 to 4 minutes.
- Remove the thermometer. Hold it near the light and slowly turn it until the line of mercury is seen. Read the temperature where the line of mercury ends.
- Clean the thermometer with cool soapy water and rinse. Use a cotton swab soaked in alcohol to rub down the thermometer.
- Store the thermometer in a container to prevent breakage.

If you are using a digital thermometer:

- Press the button to turn the thermometer "on".
- Put the thermometer tip under tongue and close mouth.
- Wait for the thermometer to beep.
- Read the temperature on the display.
- To clean a digital thermometer, wash only the tip with soap and warm (not hot) water and wipe off with alcohol after use. Dry well.

### Ear Method

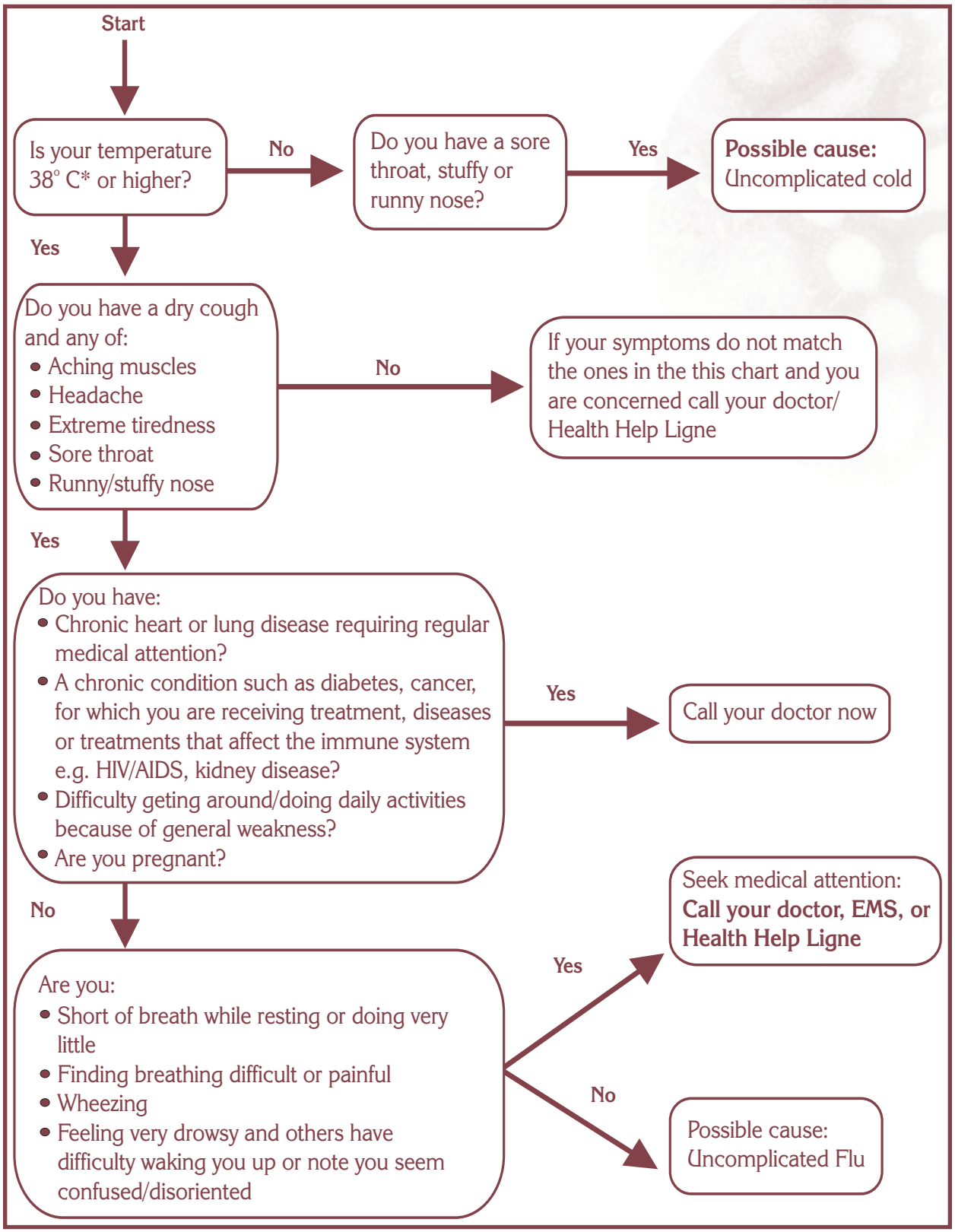
- Use a clean probe tip each time, and follow the manufacturer's instructions carefully.
- Gently tug on the ear, pulling it up and back. This will help straighten the ear canal, and make a clear path inside the ear to the eardrum.
- Gently insert the thermometer until the ear canal is fully sealed off.
- Squeeze and hold down the button for one second.
- Remove the thermometer and read the temperature.

### Axillary Method

- Use an oral glass thermometer.
- Clean the thermometer and shake down the mercury as in "oral method".
- Place the silver tip of the thermometer in the center of the armpit.
- Make sure the person's arm is held snugly against his/her body (forearm across chest).
- Leave the thermometer in place for at least 4 minutes.
- Remove, read, clean and store the thermometer as in "oral method".

Ask the pharmacist any questions you may have when you purchase your thermometer. If you are purchasing a glass thermometer, look for one with a mercury column that is easy to see, and degree markings that are easy to read.

## C) Self-care Algorithms, Adults




*For people older than 75 years, the temperature may be lower, e.g., 37.2°C

### What you can do for yourself (uncomplicated flu)

- Rest-you will probably feel very weak until your temperature returns to normal.
- Fluids-extra fluids are needed to replace those lost in sweating. If your urine is dark, you need more to drink. Warm fluids help loosen mucus.
- Take acetaminophen 1 or 2 tablets every 6 hours or ibuprophen as recommended on the package for fever and muscle pain. Children under 18 years of age should not take acetylsalicylic acid (ASA) or any products containing acetylsalicylic acid (ASA). Antibiotics won't help.
- Treat your symptoms, e.g., cough suppressant.
- Stay home from work/school for 6 days (while you are contagious), or until you are feeling better.
- Ask for help from family/friends if you live alone, are a single parent with small children, etc. and are having a hard time taking care of your own/your family's needs.

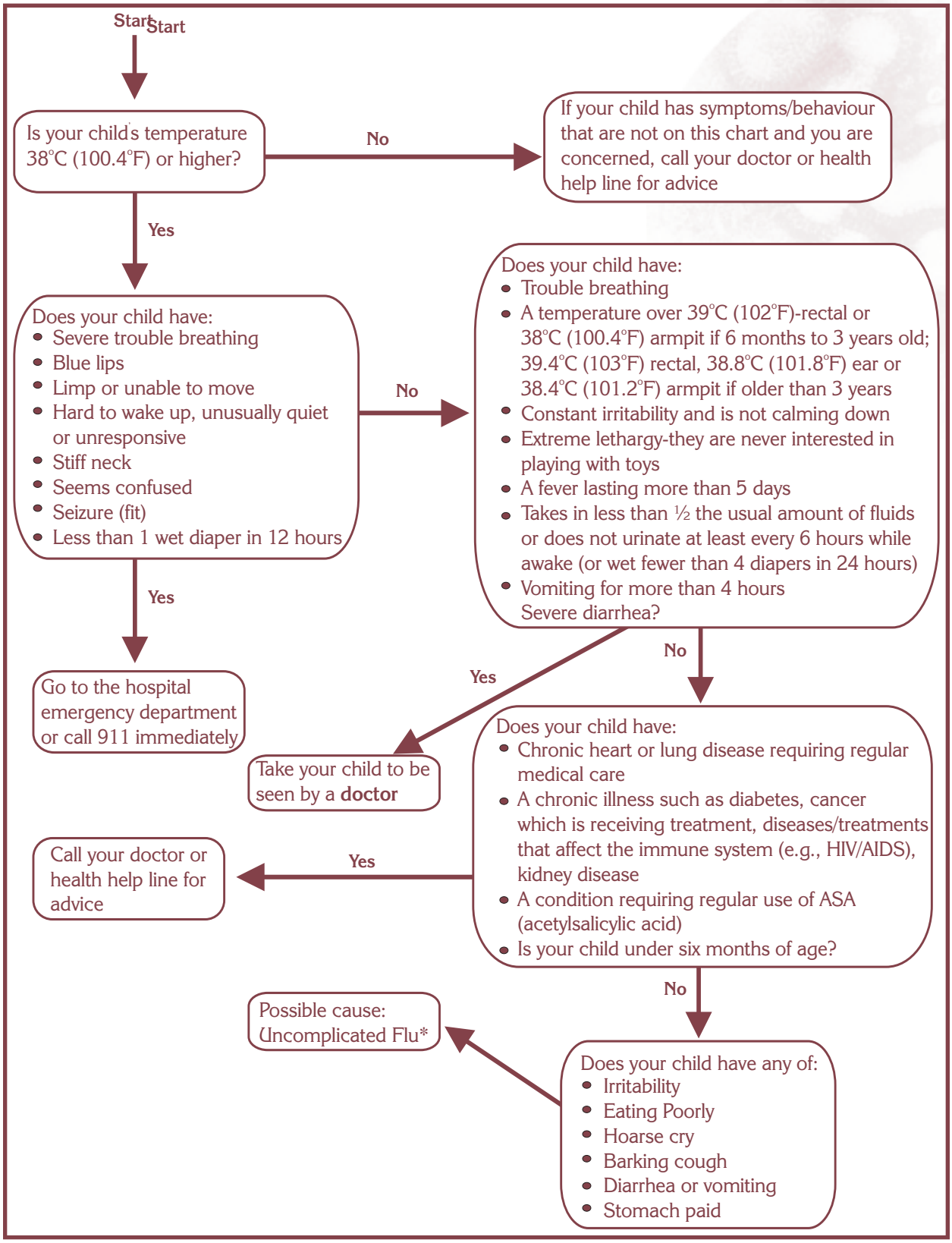
### What to expect

- **Day 1-3**: Sudden appearance of fever, headache, muscle pain and weakness - also dry cough, sore throat and stuffed nose (but overshadowed by previous symptoms)
- **Day 4**: Fever and muscle aches decrease. Hoarse, dry or sore throat, cough and possible mild chest discomfort become more noticeable
- **Day 8**: Symptoms decrease. Cough and tiredness may last 1-2 weeks or more.

**If any of the following happen during the flu, SEEK MEDICAL ATTENTION (Call your doctor, EMS, Health Helpline or go to the Emergency Room)**:

- You are short of breath even while resting.
- You have pain in your chest when you breathe.
- If you have heart disease and develop chest pain.
- You are coughing up bloody sputum.
- You are wheezing.
- You still have a fever and are not feeling better after 5 days.
- You are feeling better and suddenly you develop a fever.
- You or others note that you are extremely drowsy or are confused/disoriented.

## Does Your Infant or Young Child (Birth to 6 Years) Have The Flu?

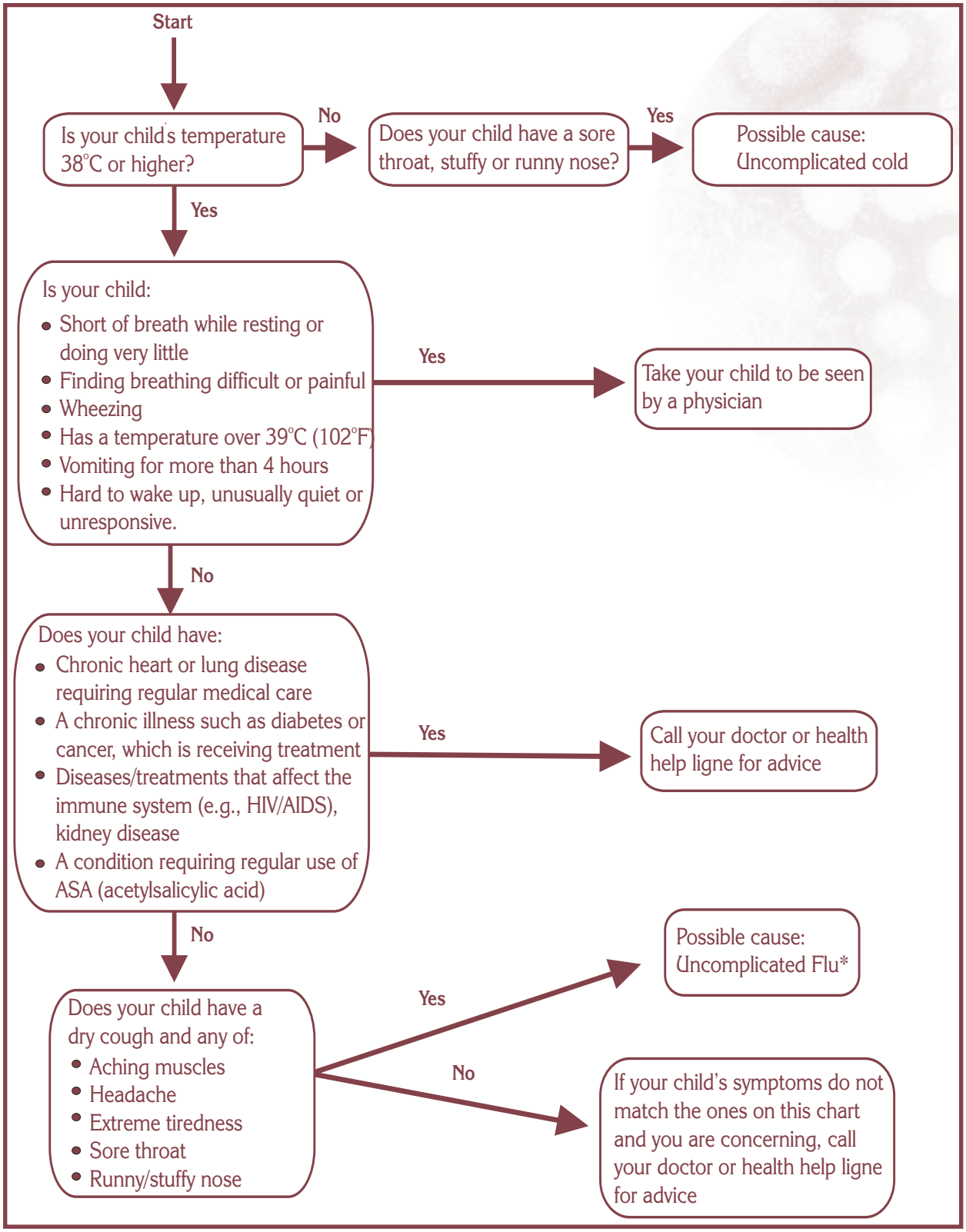


**If your child has symptoms/behavior that are not on this chart and you are concerned, call your doctor or health help line for advice.**

**Uncomplicated Flu**: Usually the symptoms start to clear up in 5 to 7 days

- Give acetaminophen or ibuprofen for fever (in the dose recommended on the package every 4-6 hours until the child's temperature comes down, unless your doctor says otherwise; do not give more than 5 doses in 24 hours). Do not give ASA. Antibiotics will not help.
- Dress in light-weight clothing and keep room at 20 C.
- Offer cool fluids frequently while awake.
- Allow to rest. Keep home for 6 days so the virus isn't spread.
- Use salt-water nose drops to treat a stuffy nose. Teach the child to cover their mouth when they cough and then to throw the tissue away. Wash your hands often and teach your child to do so as well.
- Avoid cool baths.

## Does Your Older Child (Age Six Years to Adolescence) Have the Flu?



## What You Can Do For Your Child

- Allow your child to rest. He/she will probably feel very weak until their temperature returns to normal.
- Offer fluids frequently while awake; extra fluids are needed to replace those lost in sweating. If your child's urine is darker than usual, they need more to drink.
- Give your child acetaminophen every 6 hours or ibuprophen as recommended on the package for fever and muscle pain. Children under 18 years of age should not take acetylsalicylic acid (ASA) or any products containing ASA. Antibiotics won't help.
- Treat your child's symptoms e.g., cough suppressant, salt water nose drops . Teach the child to cover their mouth when they cough and then throw the tissue away. Wash your hands often and teach your child to do so as well.
- Keep your child home from school for 6 days (while they are contagious), or until they are feeling better.

## What to Expect

- Day 1-3: Sudden appearance of fever, headache, muscle pain and weakness - also dry cough, sore throat and stuffed nose (but overshadowed by previous symptoms)
- Day 4: Fever and muscle aches decrease. Hoarse, dry or sore throat, cough and possible mild chest discomfort become more noticeable
- Day 8: Symptoms decrease. Cough and tiredness may last 1-2 weeks or more.

**If any of the following happen during the flu, TAKE YOUR CHILD TO SEE A DOCTOR**:

Your child:

- Is short of breath even while resting.
- Has pain in the chest when breathing.
- Is coughing up bloody sputum.
- Is wheezing.
- Still has a fever and is not feeling better after 5 days.
- Is feeling better and suddenly develops a fever.
- Is hard to wake up, unusually sleepy or unresponsive.

1. **Primary triage centre**
   a) Adults ( 18 years)

## Identification

| |
|---|
| **Health Care Number:** |
| **Name:** _____ Surname/Family Name First Name |
| **Age** _____ **(yrs)** **DOB** ____/____/____ DD MM YYYY |
| **DATE OF CONSULTATION** ____/____/_____ DD MM YYYY |

## Risk Assessment For Complications Of Influenza

› Does this patient fall into a "high risk group" for complications of influenza? **Y/N**

| High-Risk Groups | Tick all relevant |
|---|---|
| Women in the second or third trimester of pregnancy | |
| Chronic cardiac disease (hypertension is not enough) | |
| Chronic pulmonary disease - asthma | |
| Chronic pulmonary disease - COAD or emphysema | |
| Chronic pulmonary disease - other than asthma, COAD or emphysema | |
| Chronic renal disease | |
| Non insulin dependent diabetes mellitus | |
| Insulin requiring diabetes mellitus | |
| Receiving immunosuppressive therapy, AIDS patients | |
| Neoplastic disease | |
| Hepatic disease | |
| Resident of nursing home | |
| Resident of other chronic care facility | |
| 65 year old | |

| Details of vaccination | Yes | No | N/A | Batch number | Date given DD/MM/YYYY | Tick if given >14 days ago |
|---|---|---|---|---|---|---|
| **INFLUENZA** vaccine within the last 12 months? | | | | | | |
| **PNEUMOCOCCAL** vaccine within the last 5 years? | | | | | | |

| Details of antivirals: Within last 3 months? | Yes | No | N/A | Date commenced DD/MM/YYYY | Date ceased DD/MM/YYYY | Tick if still taking | Dose |
|---|---|---|---|---|---|---|---|
| **AMANTADINE** | | | | / / | / / | | |
| **RIMANTADINE** | | | | / / | / / | | |
| **ZANAMAVIR** | | | | / / | / / | | |
| **OSELTAMAVIR** | | | | / / | / / | | |

## Symptoms (adults ≥ 18 years)

Date and time of onset of first symptoms:

| Clinical features on history | YES | NO | N/A | DETAILS: e.g., Date of onset, symptoms that predominate |
|---|---|---|---|---|
| In contact with someone with influenza in the last 3 days? | | | | |
| Fever | | | | |
| Chills | | | | |
| Aching muscles and joints | | | | |
| Stiffness | | | | |
| Headache | | | | |
| Fatigue | | | | |
| Runny/stuffy nose | | | | |
| Cough | | | | |
| Sore throat, hoarseness | | | | |
| Purulent sputum | | | | |
| Thoracic pain when taking a deep breath | | | | |
| Retrosternal soreness (tracheitis) | | | | |
| Breathlessness | | | | |

| Clinical features on history | YES | NO | N/A | DETAILS: e.g., Date of onset, symptoms that predominate |
|---|---|---|---|---|
| Anorexia | | | | |
| Vomiting | | | | |
| Diarrhoea | | | | |
| Confusion, drowsiness | | | | |
| Rash | | | | |

## Examination Findings (adults ≥ 18 years)

**Date** _____/_____/_____ **Time:** _____:_____
DD MM YYYY HH MM

## Vital signs

| Description | Threshold for indication of secondary assessment | Values for this patient |
|---|---|---|
| Temperature | <35 C or (39 C | |
| Respiratory Rate | (24/minute | |
| Heart rate | (100/minute | |
| Blood pressure | <100 mmHg Systolic | |
| Altered mental status | New confusion | |
| Function | New inability to function independently | |
| Skin colour | Cyanosis (bluish colour) | |
| Oxygen saturation* | <90% on room air | |

* Some primary or secondary triage centres may be able to perform pulse oximetry (see Appendix 2.III).

## Provisional Diagnosis

Please Tick All That Apply

| | Yes | No |
|---|---|---|
| **Influenza** | | |
| Suspected | | |
| Recent contact (could be incubating) | | |
| Unlikely but at risk of complications and not immunized | | |
| Unlikely but at risk and immunized | | |
| Unlikely (recovered from documented influenza) | | |
| **Other** | | |
| Pregnant | | |
| Breastfeeding | | |

Note: If secondary assessment is required, and patients are sent to another centre/ward for complementary evaluation, each individual should be provided with a summary of the symptoms and signs detected at the primary triage centre.

b) Children 18 years:

## Identification

| Health Care Number: | |
|---|---|
| Name: _____ Surname/Family Name First Name | |
| Age _____ (yrs) | DOB ____/____/____ DD MM YYYY |
| DATE OF CONSULATION ____/____/_____ DD MM YYYY | |

## Risk Assessment for Complications of Influenza

- Does this patient fall into a "high risk group" for complications of influenza? **Y/N**

## Child with

| High-Risk Groups | Tick all relevant |
|---|---|
| Chronic cardiac disease | |
| Chronic pulmonary disease - asthma | |
| Chronic pulmonary disease - other than asthma | |
| Chronic renal disease | |
| Diabetes mellitus | |
| Child with cyanotic congenital heart disease | |
| Receiving immunosuppressive therapy, AIDS patients | |
| Neoplastic disease | |
| Hepatic disease | |
| Resident of long-term care facility | |
| < 2 years old | |

| Details of vaccination | Yes | No | N/A | Batch number | Date given DD/MM/YYYY | Tick if given >14 days ago |
|---|---|---|---|---|---|---|
| **INFLUENZA** vaccine within the last 12 months? | | | | | | |
| INFLUENZA vaccine within the last 12 months? | | | | | | |
| **PNEUMOCOCCAL** vaccine within the last 5 years? | 7-valent<br>23-valent | | | | | |
| PNEUMOCOCCAL vaccine within the last 5 years? | 7-valent<br>23-valent | | | | | |
| PNEUMOCOCCAL vaccine within the last 5 years? | 7-valent<br>23-valent | | | | | |
| PNEUMOCOCCAL vaccine within the last 5 years? | 7-valent<br>23-valent | | | | | |
| PNEUMOCOCCAL vaccine within the last 5 years? | 7-valent<br>23-valent | | | | | |

| Details of antivirals: Within last 3 months? | Yes | No | N/A | Date commenced DD/MM/YYYY | Date ceased DD/MM/YYYY | Tick if still taking | Dose |
|---|---|---|---|---|---|---|---|
| **AMANTADINE** | | | | / / | / / | | |
| **RIMANTADINE** | | | | / / | / / | | |
| **ZANAMAVIR** | | | | / / | / / | | |
| **OSELTAMAVIR** | | | | / / | / / | | |

### Symptoms (children ≤ 18 years)

Date and time of onset of first symptoms:

| Clinical features on history | YES | NO | N/A | DETAILS: e.g., Date of onset, symptoms that predominate |
|---|---|---|---|---|
| In contact with someone with influenza in the last 3 days? | | | | |
| Fever | | | | |
| Chills | | | | |
| Aching muscles and joints | | | | |
| Stiffness | | | | |
| Headache | | | | |
| Fatigue | | | | |
| Runny/stuffy nose | | | | |
| Cough | | | | |
| Sore throat, hoarseness | | | | |
| Purulent sputum | | | | |
| Thoracic pain when taking a deep breath | | | | |
| Retrosternal soreness (tracheitis) | | | | |
| Breathlessness | | | | |
| Anorexia | | | | |
| Vomiting | | | | |
| Diarrhoea | | | | |
| Confusion, drowsiness | | | | |
| Rash | | | | |

## Examination Findings (children ≤ 18 years)

**Date** _____/_____/_____ **Time:** _____:_____
DD MM YYYY HH MM

## Vital signs

| Primary Assessment | Results Requiring Secondary Assessment | Vital signs for this patient |
|---|---|---|
| Temperature[a] | 35 C or 39 C | |
| Respiratory Rate | < 2 months = >60 breaths per minute<br>2-12 months = >50 breaths per minute<br>> 12 months to 5 years = >40 breaths per minute<br>> 5 years = > 30 breaths per minute | |
| Skin colour and temperature (lips, hands) | Cyanosis, sudden pallor, cold legs up to the knee | |
| Chest symptoms[b] (pain may be difficult to detect in young children) | Chest indrawing, wheezing, grunting, inquire for chest pain | |
| Mental status | Lethargic or unconscious[c] | |
| Function | Unable to breastfeed or drink, persistent vomiting (>2-3 times/24 hr.)[d]<br>Inability to function independently[c] | |
| Neurologic symptoms and signs | Seizures, full fontanelle, stiff neck | |
| Oxygen saturation[e] | 90% room air | |

a For indications about types of thermometers and how to take the temperature see Appendix 2.I. High fever ((39 C) in adolescents is a warning sign and needs further assessment.

b Signs of dehydration: sunken eyes, no saliva, doughty skin

c Chest pain may be a sign of pneumonia, even in the absence of crackles or wheeze . It may also appear as retrosternal pain (tracheal/bronchial pain) or as a pleuritic pain. When positive, it is an indication for secondary evaluation.

d A deterioration of the consciousness and inability to function, lack of interest in playing and sleepiness should be further investigated.

e Vomiting (>2-3 times/24 hr.), particularly if the children are not breast-feeding or drinking well, is a warning sign and requires a secondary assessment.

f Determination of blood gases by pulse oximetry as sign of respiratory failure (see Appendix 2.III).

## Provisional Diagnosis

Please Tick all that Apply

| | Yes | No |
|---|---|---|
| **Influenza** | | |
| Suspected | | |
| Recent contact (could be incubating) | | |
| Unlikely but at risk of complications and not immunized | | |
| Unlikely but at risk and immunized | | |
| Unlikely (recovered from documented influenza) | | |

2. **Secondary clinical assessment:**

   a) Adults ( 18 years):

## Identification

| |
|---|
| **Health Care Number:** |
| **Name:** _____ Surname/Family Name First Name |
| **Age** _____ **(yrs)** **DOB** ____/____/____ DD MM YYYY |
| **DATE OF CONSULTATION** ____/____/_____ DD MM YYYY |

## Risk Assessment for Complications of Influenza

- Does this patient fall into a "high risk group" for complications of influenza? **Y/N**
- Which symptoms and/or signs were found at the primary triage centre that required secondary assessment?

Note: When the secondary assessment has to be completed in a different setting, a new clinical evaluation of the patient, to confirm the diagnosis done at the primary triage centre, should always precede the laboratory studies mentioned below. **NOT ALL THE TESTS MENTIONED UNDERNEATH WILL BE NEEDED FOR ALL PATIENTS, AND CLINICAL JUDGEMENT SHOULD ALWAYS PRECEDE ANY PROCEDURE, PARTICULARLY IF RESOURCES ARE SCARCE.**

***The primary assessment forms, or part of these forms, may be repeated here.***

## Investigations in Adults (≥ 18 years)

| Complementary laboratory studies | Results requiring supervision of patient or admission | Results for this patient |
|---|---|---|
| CBC (core battery, if appropriate) | Hgb 80 g/L | Hgb: |
| | WBC 2,5000 or 12, 000 cells/ L | WBC: |
| | Bands 15% | Bands: |
| | Platelets 50,000/( L | Platelets: |
| Electrolytes | Na 125 meq/L or 148 meq/L | Na: |
| | K 3 meq/L or 5.5 meq/L | K: |
| BUN, creatinine | BUN 10.7 mmol/L | BUN : |
| | Creatinine 150 mol/L | Creatinine: |
| Glucose | 3mmol/L or 13.9 mmol/L | |
| CPK (only in patients with severe muscle pain) | CKMB 50% | CKMB: |
| | Total CK 1,000 mol/L | Total CK: |
| Blood gases, O2 saturation | Blood gases p02 60 room air<br>PH <7.35 | PO2:<br>PH: |
| | O2 saturation 90% room air* | O2 saturation: |
| Chest x-ray (CRX) | Abnormal, consistent with pneumonia<br>Pleural effusion | |
| EKG | Evidence of ischemia, new arrhythmia | |

*Some primary or secondary triage centres may be able to perform pulse oximetry (see Appendix 2.III)

Under optimal circumstances, blood work and CRX should be done to all patients before admission. If resources are restricted, however, priority should be given to patients with co-morbidity or if complications of the disease are suspected (i.e., pneumonia, etc.). Patients with normal gases in blood and with clear lungs during auscultation do not need CRX. Similarly, when the clinical diagnosis of pneumonia is unquestionable and the resources are scarce, no CRX need to be taken, unless there is suspicion of a complication of the pneumonia (i.e., empiema).

## Provisional Diagnosis

Please Tick all that Apply

| | Yes | No |
|---|---|---|
| **Influenza** | | |
| Suspected | | |
| Recent contact (could be incubating) | | |
| Unlikely but at risk of complications and not immunized | | |
| Unlikely but at risk and immunized | | |
| Unlikely (recovered from documented influenza) | | |
| Pneumonia, confirmed (C)/suspected (S)/unlikely (U) | C / S / U | |
| Viral | | |
| Bacterial | | |
| Other | | |
| Pregnant | | |
| Breastfeeding | | |

## Bacterial pneumonia

Confirmed (by chest radiograph), suspected, unlikely.

## Influenza viral pneumonitis

Confirmed (by chest radiograph and oxygen transfer), suspected (by oxygen transfer), unlikely.

## Admission

**Yes**:

- Suspected Flu ward
- Confirmed Flu ward
- General ward
- Observation
- ICU Admission
- CCU Admission

If not admitted:

Sent to:

- Home care with self-care
- Health worker/Volunteer contacted
- Not Traditional care centre: Hotel, School, Community Centre, etc.

Provide copy of:

- Assessment sheet
- Instruction sheet
- Contact names/numbers (if get more breathless/deteriorate)

b) Children ( 18 years):

## Identification

| Health Care Number: | |
|---|---|
| Name: _____ Surname/Family Name First Name | |
| Age _____ (yrs) | DOB ____/____/____ DD MM YYYY |
| DATE OF CONSULTATION ____/____/_____ DD MM YYYY | |

## Risk Assessment for Complications of Influenza

- Does this patient fall into a "high risk group" for complications of influenza? **Y/N**
- Which symptoms and/or signs were found at the primary triage centre that required secondary assessment?

When the secondary assessment has to be completed in a different setting, a new clinical evaluation of the child, to confirm the diagnosis done at the primary triage centre, should always precede the laboratory studies mentioned below. **Not all the tests mentioned underneath will be needed for all patients, and clinical judgement should precede any procedure, particularly if resources are scarce**.

***As with adults, part of the primary assessment forms may be added here***.

## Investigations

| Complementary laboratory studies | Results requiring supervision of patient or admission* | Results for this patient |
|---|---|---|
| CBC (core battery, if appropriate) | Hgb: Values of Hemoglobin for young children are age related, see Table 2.2.4 | Hgb: |
| | WBC: Values of WBC for young children are age related, see Table 2.2.4 | WBC: |
| | Bands 15% | Bands: |
| | Platelets 50,000/ l | Platelets: |
| Electrolytes (see Table 2.2.4) | Na 125 meq/L or 148 meq/L | Na: |
| | K 3 meq/L or 5.5 meq/L | K: |
| BUN, creatinine (see Table 2.2.4) | BUN 10.7 mmol/L | BUN: |
| | Creatinine 150 mol/L | Creatinine: |
| Glucose (see Table 2.2.4) | 3mmol/L or 13.9 mmol/L | Glucose: |
| CPK (only in patients with severe muscle pain) | CKMB 50% | CKMB: |
| | Total CK 1,000 mol/L | Total CK: |
| Blood gases, O2 saturation | Blood gases p02 60 room air<br>PH <7.35 | PO2:<br>PH: |
| | O2 saturation 90% room air | O2 saturation: |
| Chest x-ray (CRX) | Abnormal, consistent with pneumonia<br>Pleural effusion | |

*Some of these values are age-dependant and appropriate values for each age should be consulted (see Chapter 2, Table 2.2.4).

Under optimal circumstances, blood work and CRX should be done to all patients before admission. If resources are restricted, however, priority should be given to patients with co-morbidity or if complications of the disease are suspected (i.e., pneumonia, etc.). Patients with normal gases in blood and with clear lungs during auscultation do not need CRX. Similarly, when the clinical diagnosis of pneumonia is unquestionable and the resources are scarce, no CRX need to be taken, unless there is suspicion of a complication of the pneumonia (i.e., empiema).

## Provisional Diagnosis

Please Tick all that Apply

| | Yes | No |
|---|---|---|
| **Influenza** | | |
| Suspected | | |
| Recent contact (could be incubating) | | |
| Unlikely but at risk of complications and not immunized | | |
| Unlikely but at risk and immunized | | |
| Unlikely (recovered from documented influenza) | | |
| Pneumonia, confirmed (C)/suspected (S)/unlikely (U) | C / S / U | |
| Viral | | |
| Bacterial | | |
| Other | | |
| Pregnant | | |
| Breastfeeding | | |

## Bacterial pneumonia

Confirmed (by chest radiograph), suspected, unlikely.

## Influenza viral pneumonitis

Confirmed (by chest radiograph and oxygen transfer), suspected (by oxygen transfer), unlikely.

## Admission

**Yes**:

- Suspected Flu ward
- Confirmed Flu ward
- General ward
- Observation
- ICU Admission
- CCU Admission

**If not admitted**:

Sent to:

- Home care with self-care
- Health worker/Volunteer contacted
- Not Traditional care centre: Hotel, School, Community Centre, etc.

Provide copy of:

- Assessment sheet
- Instruction sheet
- Contact names/numbers (if get more breathless/deteriorate)

# Appendix 2.III. Pulse Oximetry and Trans-cutaneous Oximetry

Although the measurement of the "in vitro" saturation of arterial blood is still the golden standard for measuring arterial oxygen, it involves repeated sampling of arterial blood, is costly and time consuming, and only gives intermittent and delayed results. Two non-invasive procedures have been developed recently for continuous monitoring of oxygen saturation: pulse oximetry and trans-cutaneous oximetry. Both procedures, however, have some shortfalls; and, ideally, they should be used in combination[214,172]. In a pandemic situation, this will not be possible in most facilities, and, therefore, clinicians should be aware of the limitations of each device, particularly when testing critically ill patients. Taking the mean of two or more measurements, if possible, can reduce variability and increase reliability[172].

1. **Pulse oximetry** is a non-invasive, continuous monitoring procedure that has supplanted arterial sampling methods for studying patient's oxygen saturation. It allows the estimation of the arterial tension of oxygen [SPO2 is the oxygen saturation (PO2) measured with a pulse oximeter, given in %] in the ranges that are clinically relevant (i.e., 75-95%, Fig. 2.1). It has been reported to be accurate within 5% ( 2% for SPO2 > 70%, and responds to cardiopulmonary changes that affect tissue oxygenation[181,165,172,108]. Pulse oximetry has, however, some limitations:

   - It does not provide information regarding patient's ventilation and carbon dioxide tension. The patient may have a normal reading and still be hypercapnic and have respiratory failure. Carboxyhemoglobin and methemoglobin, on the other hand, have light absorption similar to oxyhemoglobin, and, therefore, both can modify the SPO2 readings (similarly: extreme anemia, intravenous dyes used in diagnostic and hemodynamic testing, bilirubin, skin colour, and brown-red nail polish, can also modify the readings[108]).
   - Pulse oximeters require careful sensor placement and adequate pulse pressures (> 20 mm Hg), and they are prone to movement artefacts (which is a serious shortcoming with young children). Sensors should be placed 2-3 mm apart from each other, and any optical shunt should be avoided (i.e., light received by the sensors without passing through the skin). It must be ensured that all light emitted pass through the tissues, that the receiving diode is located exactly opposite to the emitter, and that both are shielded from ambient light[172].
   - Skin burns are possible and, therefore, the sensors should be checked carefully before use, and patients should be checked each 6-8 hours[172]. Probes may be placed in the ear or in the fingers, although finger probes are considered more accurate[108].
   - Patients with low perfusion states may hinder the performance of pulse oximeters. In these patients the results become blood-flow dependent. During shock, the proportion of wrong or missing values sharply increases[172]. Increased venous pulsations may occur if probes are secured too tightly, or in cases of right heart failure, tricuspid regurgitation, etc. and they may, mistakenly, be detected by the pulse oximeter[108].
   - Although the response time is the time it takes for the blood to travel from the lungs to the sensor, pulse oximeters usually average their values over periods from 2-15 seconds or from 4-32 heartbeats. This intends to level out any erroneous

measurements and minimize false alarms; however, this procedure prolongs the response time, and also may lead to false readings after body movements or may mask intermittent hypoxemia[172]. Some brands have the option to be used in a beat-to-beat mode (i.e., without averaging their readings), what may be preferred for same patients.

- Pulse oximeters derive their results from an "empiric" table elaborated with data from healthy adults. Therefore, each instrument should be validated if measurements are done in infants and young children. In addition, saturations < 70-80% were not attained in healthy volunteers, and are, therefore, extrapolated, which may lead to an underestimation of the true degree of hypoxemia.
- There are considerable differences in bias (or systematic error, this indicates the overestimation or underestimation of one brand relative to the other) and precision (variability or random error) between brands, and it is important to determine which brand of oximeters is used, mainly when the values of PO2 are in the low ranges[165]. Available data shows considerable differences not only between instruments but also between studies[172]. The algorithms used to calculate the SPO2, and the way these measurements are displayed can partially explain these differences. Users should be aware of this fact and know the brand of oximeter and software they are using. Data from one brand cannot be transferred to another brand.

2. **Transcutaneous sensors** may also be used to determine the tcPO2 (transcutaneous tension of oxygen, given in mm Hg), a variable that reflects the PO2 in the peripheral tissue. Sensitivity to PO2 < 50 mm (hypoxemia) and > 80 mm (hyperoxemia) is approximately 85%[172]. Limitations of tcPO2 are:

   - The tcPO2 decreases relative to arterial PO2 with increasing patient's age[172].
   - Values are influenced by skin thickness (results will be low in areas of thick or poorly perfused skin), sensor temperature (should not be <44(C and it takes 15 minutes to heat the skin, otherwise the values will be unreliable), amount of gel used (if too much gel is used, the values will be wrongly high), and peripheral perfusion[172]. Additionally, the sensor must be regularly relocated (particularly in young children) to avoid skin burns.
   - In the presence of severely reduced cardiac output and peripheral perfusion, the tcPO2 values deviate from the arterial PO2 and become blood flow dependent. If interpreted correctly, it may provide an early warning of cardiac failure, hypotension, or acidemia[214].
   - Response times are delayed, caused by the time required for the oxygen to travel from the capillaries through the skin into the electrodes. The average response time to a rapid decrease in the PO2 is approximately 16 seconds and up to 30 seconds.

### Normal values (Fig. 2.1)

Normal values for children and adults are published in some papers (see below). However, the interpretation of the results obtained with the different brands should follow instructions included with the instrument's manuals.

1. **Pulse oximetry** (always refer to instrument's manuals):

   - Data on baseline SPO2, controlled for movement artefacts and taken in a beat-to-beat mode, for neonates, infants and children, was obtained with one brand, Nellcor oximeters. Baseline SPO2, during quiet sleep and away of apneic pauses is between 95-100% in preterm infants and 97-100% in older infants and children. The frequency of episodic desaturation varies considerably with age. In children 2-16 years SPO2 almost never reaches 80% and even reductions to 90% are infrequent, while in newborns short episodes of SPO2 ( 80% are quite common[172].
   - In healthy newborns, the mean SPO2 was 97.2% ( 1.6% with a median value of 97%. Only age and activity affected the SPO2 significantly; values obtained while the infants were fussy and crying were lower compared to measurements done when they were sleeping[127]. Values measured in 60 term infants (with a Nellcor N200) in the first 4 weeks of life, detected episodes of desaturation ( 80% for 4s) in 35% of the recordings obtained in the first week and 60% in weeks 2-4. The clinical significance of these values remains to be determined[173].
   - Values taken from 150 normal adult volunteers (not arterialised in advance) with a pulse oximeter, resulted in 13.3% individuals with values <94%, none below 90%. When patients receiving anaesthesia were studied, only 1.1% of the patients who received O2 following anaesthesia had values below 90%, while this value was 16.7% for patients not receiving O2. The alarm limit for Criticalcare Systems 501 oximeter, used for this study, is 90%[198].
   - In a study of stroke patients, the overall SPO2 was above 90%, and similar to controls of the same age, when patients were sitting up[197]. Episodes of desaturation were defined as SPO2 < 90%.
   - All night pulse oximetry values from a total of 350 healthy subjects with ages ranging from 1 month to 85 years were compared to 25 individuals with obstructive sleep apnea (OSA) and 21 individuals with asthma. Mean values +/- SD for the healthy patients were: 1) the lowest saturation recorded during the night = 90.4% +/- 3.1; the saturation below which the individuals spent 10% of the night was 94.7% +/- 1.6; and the median saturation was 96.5% +/- 1.5%. No relation was found with sex, obesity, or race. Asthma patients did not have differences with healthy controls, but OSA had significantly lower saturation values. Healthy older subjects (>60 years) had lower O2 saturation than younger individuals[87].

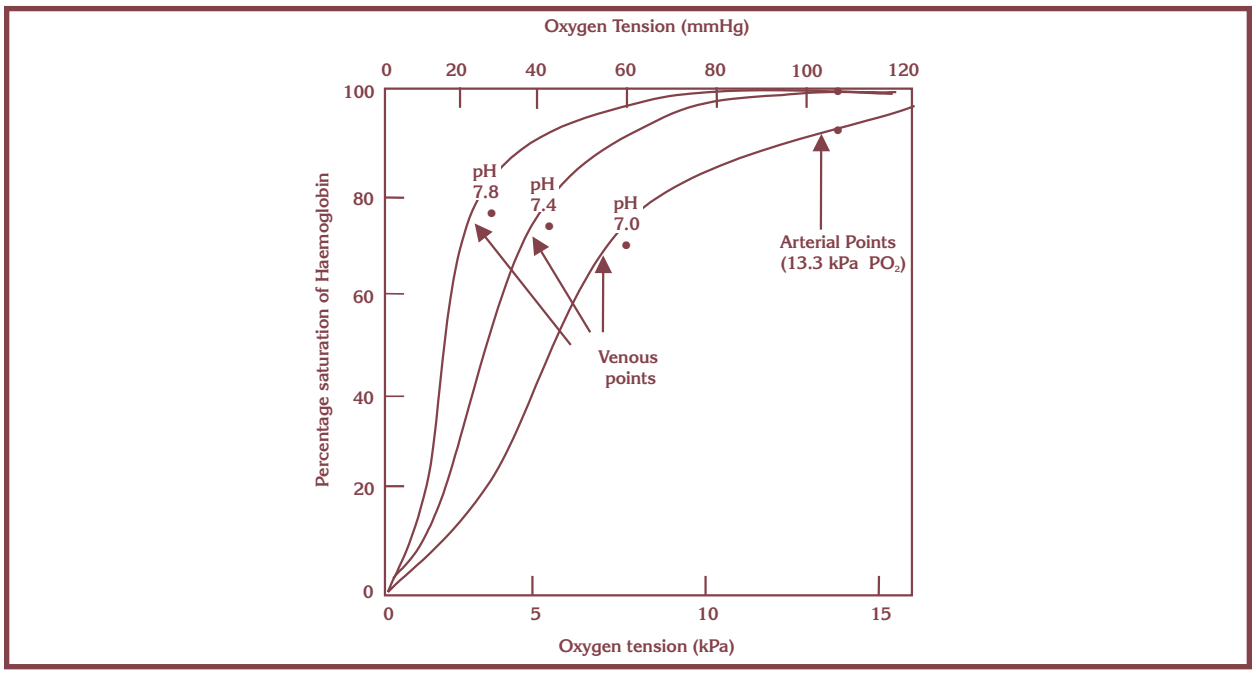
2. **Trans cutaneous PO2 monitoring**

- Mean tcPO2 of newborns and infants during both, quiet sleep and wakefulness (excluding feeding or crying) was about 70-80 mm of Hg with a deviation of 6-10 mm of Hg[172].
- Index values for tcPO2 in adults have been reviewed by Tremper and Barker[214].

## O2 in blood

Blood concentration of haemoglobin (Hb) in adults is 14(2 g/dL blood (140 20 g/L) and it can carry about 20ml oxygen per dL, as oxyhemoglobin. The Hb binding sites bind oxygen in accordance with the partial pressure of the gas in solution (PO2), and the percentage of saturation of the Hb is given by the percentage of binding sites occupied. The relation between the PO2 and the Hb saturation is non-linear and has the shape of an S (Figure 2.1), which has physiological advantages: In the arterial part of the graph, it is fairly flat, what means that moderate changes in PO2 cause only small decrements in saturation. However, the curve is fairly steep in the normal ranges for venous PO2, which allows delivery of oxygen to the tissues with minor changes in the PO2 (Figure 2.1)[44,137]. The relative affinity of the Hb for oxygen is given by the parameter $P_{50}$, i.e., PO2 at 50% saturation; it is decreased by physiologic factors like pH, PCO2 and temperature (Figure 2.1). In clinical practice, patients requiring blood gas measurements also have altered temperatures, blood pH and CO2 excess. Blood gas machines usually take these factors under consideration[44,137].

Figure 2.1




***Legend***. The centre curve is the normal curve under standard conditions. The other graphs show the displacements caused by changes in blood pH, with all other parameters remaining constant. Venous and arterial saturation points are also shown, based in an arterial/mixed venous oxygen saturation difference of 25%. Arterial saturation for these graphs corresponds to a PO2 of 13.3 kPa (100 mm Hg). Temperature 37 C, base excess =0[137].

## Management of Patients in Long Term Care Facilities

### 3.1 Long-Term Care Facilities

Long-term care facilities (LTCF) include a heterogeneous group of establishments. Although they accommodate mainly elderly individuals (nursing homes are the most common), the spectrum of services provided is wide and there are establishments for residents with physical or psychiatric disability, pediatric centres and geriatric centres. Some institutions provide permanent custodial care, however other organizations provide only temporary rehabilitation care[166,100].

Because of their age and underlying medical conditions, most individuals living in long-term care facilities are at increased risk for developing complications after influenza infection. Health-care personnel and visitors may introduce the virus, and the closed environment will favour transmission[88,166]. During influenza outbreaks in hospitals or nursing homes, as many as 70% of individuals (either personnel or patients) may become infected. The increased use of invasive devices such as central lines, chronic respirators, feeding devices, etc. facilitate the development of infections and complications[88,166].

**A goal, in the pandemic situation, will be to manage patients within the facility without transferring them to an acute care facility. This may require that the long-term care facility designate an area for more acute care, where closer monitoring and more intensive nursing care can be provided, and where parenteral therapy and oxygen therapy may be given.**

Prior to any pandemic, long-term care facilities should have in place policies to support appropriate management of residents and personnel. The inter-pandemic epidemics suffered almost every year are an opportunity to develop such policies and test their efficacy.

They should include:

a) An institutional policy for the management of influenza outbreaks;

b) Immunization of residents and staff;

c) Plans to establish an area within the facility for management of more acutely ill patients;

d) Advanced directives for all residents, which should be completed and updated regularly and are consistent with provincial legislation and institutional policy.

The goals of an institutional influenza plan are:

- To prevent influenza illness and complications in residents and staff;
- Timely diagnosis and appropriate management of influenza infection in patients;
- Timely diagnosis and management of an influenza outbreak within the LTCF;
- To provide care for ill residents within the facility without transfer to another facility.

## 3.2. Assessment and management of long-term facility residents

### 3.2.1 Prevention

a) Yearly influenza vaccine for all residents and staff according to national/local recommendations (interpandemic influenza). If a pandemic is declared, pandemic vaccine priorities will be considered.

b) Pneumococcal vaccination of all residents, consistent with NACI guidelines.

c) Comprehensive, timely surveillance for influenza-like illness in residents and staff, including rapid laboratory confirmation and viral culture (interpandemic influenza). Microbiological tests (bacteriologic and/or virologic determination) may be required depending on the clinical presentation and on the availability of resources. Once the presence of the pandemic strain has been confirmed in the facility, virologic tests will be needed only to confirm diagnosis in atypical cases, and for surveillance purposes. Current rapid tests may be useful for confirmation of diagnosis and treatment decisions (see Appendix 5.II).

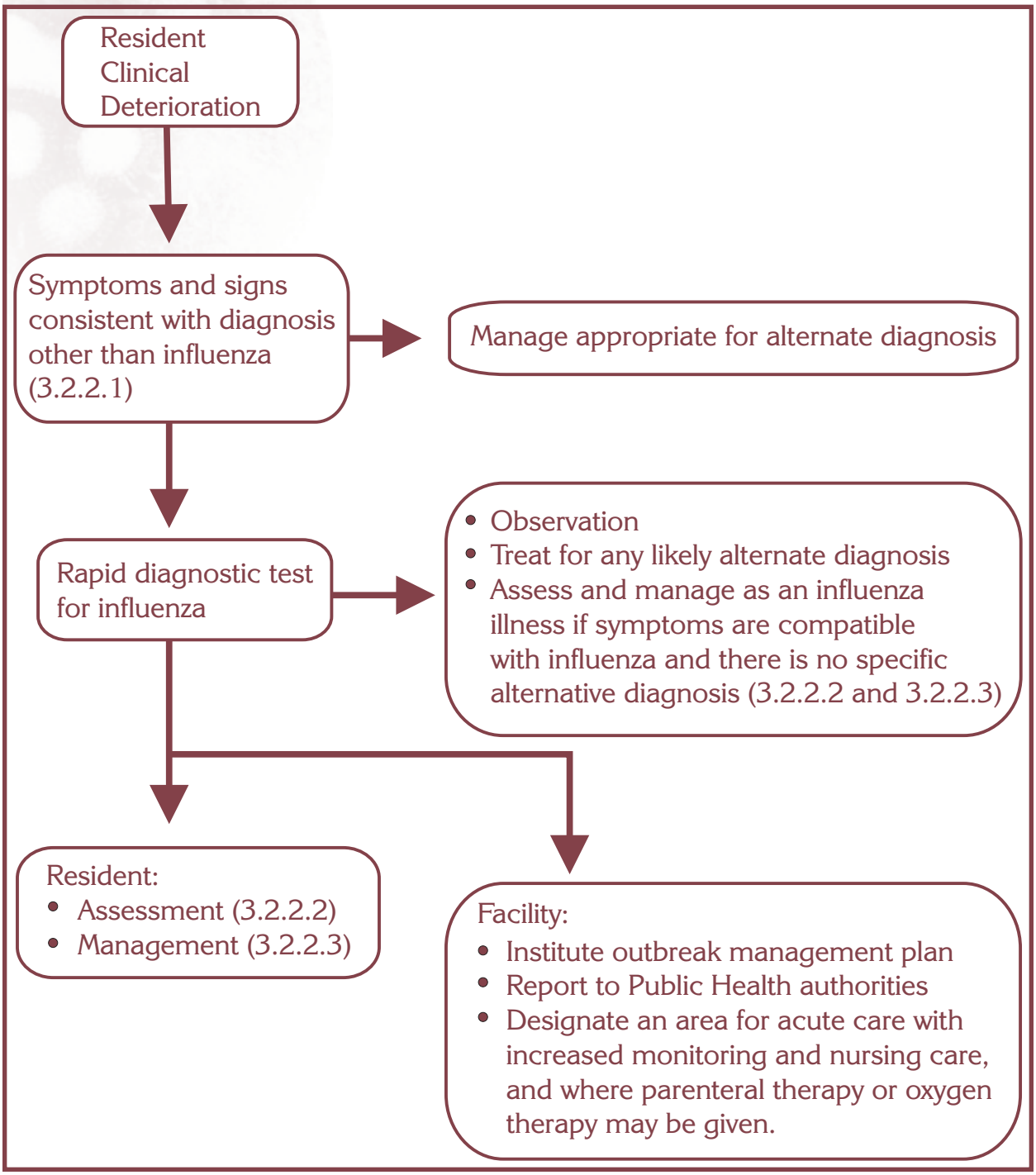
d) Facility guidelines for use of prophylactic antivirals, within the framework of antiviral prioritization for pandemic influenza, should be in place in all LTCF.

The following algorithms are general, and designed for "nursing homes", where residents are elderly and have multiple co-morbidities. Nevertheless, the approach is applicable to other LTCFs, although specific needs for other populations should be considered in advance.

### 3.2.2 Diagnosis and management of residents with influenza

*Triage of long term care facility residents*

The algorithm suggested in this page is intended to help personnel in LTCFs to identify patients with influenza, to assess the severity of the disease, and to determine follow up during a pandemic.



### 3.2.2.1 Symptoms consistent with flu like illness. Long-term care facility residents

These recommendations assume that influenza is known to be present in the community or region. In this situation, any resident of a long-term facility who deteriorates clinically and for whom there is no clear alternate diagnosis may have influenza illness[84].

**The clinical presentation of any infectious illness in an elderly impaired long-term care facility resident may be non-specific, and non-classical. Alternate diagnoses must be considered when the patient is initially assessed, including non-infectious causes such as deterioration of co-morbid illness or medication adverse effects. A diagnosis of influenza should be excluded with any non-specific presentation.**

Influenza infection of elderly residents in a long-term care facility may present with:

a) Fever (could be only a low grade fever) or hypothermia.

b) Anorexia

c) Vomiting

d) Increased confusion or decreased functional status e.g., a decreased ability to walk independently.

e) White cell count may be normal, with or without a shift to the left.

Rapid diagnostic tests are useful to confirm or discard influenza in elderly patients with uncertain clinical presentations. They are helpful if antiviral therapy is considered, as these should be started shortly after the onset of disease (within the 48 hours of onset) to get maximum results (see Appendix 5.II). Rapid tests may not be available in a pandemic situation and there may be many false negatives tests. Therefore, patients with symptoms compatible with influenza should be assessed and managed as such, especially if there are no other obvious diagnoses.

### 3.2.2.2 Influenza illness assessment. Long-term care facility residents

The **initial assessment** and evaluation of the residents should be consistent with advance directives, and include the following:

a) History: age, duration of residence in the facility, co-morbid illnesses, documentation of last influenza vaccination, documentation of pneumococcal vaccination, time of onset of symptoms.

b) Physical assessment: temperature, skin colour, pulse, blood pressure, respiratory rate, peripheral oedema, chest auscultation, chest pain on inspiration, mental status, function (ability to function independently, continuous vomiting, etc.).

c) Diagnostic testing should include 02 saturation. For residents who are clinically stable and not judged to be severely ill this may be sufficient.

In residents where there are concerns about metabolic status, or the degree of illness, additional tests which may be considered include a CBC with white cell count, electrolytes, blood glucose, CPK, BUN and creatinine, an EKG if there is a new arrhythmia or evidence of significant deterioration in cardiac status. A chest x-ray should be considered for all residents with an oxygen saturation of (90% on room air, with new purulent sputum, or respiratory rate (30 per minute. A sputum culture may be helpful for residents producing sputum, and blood

cultures should be considered in individuals who appear to be severely toxic (depending on the availability of resources, see Chapter 2).

Long-term care facilities should have in place arrangements by which portable chest x-rays may be obtained, and should consider a phone reporting system to ensure that results are returned promptly and in a standardized fashion.

In addition to nursing homes, some elderly adults live in residences for the old, where there are basic health services. These residences should be considered as potential sites for triage and care of residents (non-traditional sites) in a pandemic, and should be equipped to provide basic diagnostic tests and healthcare services to residents with influenza.

#### 3.2.2.3 Instructions for the management of subjects remaining in the long term care facility

A written plan for the timely management of patients should be in place. This will include diagnostic and follow-up tests, responsibilities of medical and non-medical personnel, and use of medications.

a) **Diagnostic and follow-up tests** (in selected patients, see Chapter 2):

- Chest X-Rays (as required, see Chapter 2)
- Blood tests, urine analysis, etc. (as required)
- Viral/Bacterial studies: sputum, cerebrospinal liquid, nasopharyngeal aspirate , blood culture (see Chapter 2).

b) **General management**: The goals of general management are to maintain comfort, to preserve functional status, and to limit complications[60,84,204]. Specific aspects of management for influenza and its complications include:

1. **Maintenance of hydration**. This may be achieved through oral fluids or if necessary through parenteral fluids. Where parenteral fluids are necessary hypodermoclysis is an option rather than intravenous therapy and may be more practical in the long-term care setting.
2. **Oxygenation**. Patients with an oxygen saturation of <90% on room air should have oxygen supplementation. This may usually be given by portable oxygen with nasal prongs. Where this is insufficient, patients may require more aggressive efforts of oxygenation including non-intubation methods of respiratory therapy.
3. **Antipyretics and analgesics** may be required to limit discomfort associated with myalgia and arthralgia. Usually acetaminophen will be sufficient.
4. **Other therapies** such as antitussives may occasionally be indicated depending on the clinical features of the given patient.

c) **Specific therapy**: Specific therapy is directed at the influenza infection itself and influenza complications including secondary pneumonia and/or aggravation of pre-existing disease. During the early stages of the pandemic, LTCFs should determine access to antivirals and antibiotics. When antivirals/antibiotics are not available, symptom control and oxygenation may be the only management approaches. Strategies to manage patients pending antivirals should be developed.

1. **Antiviral agents** including amantadine (for prevention), zanamivir, and oseltamivir (for treatment) may be given for the prevention and treatment of influenza. Treatment with these drugs is, usually, only indicated if symptoms have been present for less than 48 hours. They may not be available, depending on supplies and on the priorities for the pandemic situation. When amantadine is used, dosage adjustment for renal function is necessary. Zanamivir may be impractical because it requires cooperation from the individual to use an inhaler. This may not be achievable in many long-term care facility patients, especially those who are acutely ill. (See Appendix 5.III)
2. **Antibiotics** should be given only for the management of presumed or diagnosed secondary bacterial pneumonia (see Chapter 2 and Appendix 5.IV).
3. **Management of preexisting disease**: Cardiovascular, respiratory, metabolic, etc.
4. **For patients who are acutely confused** and in whom correction of oxygenation or limitation of fever are not sufficient to control confusion, management for acute confusion may be necessary.

### 3.2.3 Discharge Criteria: (from the care sector designated for influenza patients)

It is important to define when patients are clinically stable and can be moved back to the usual residential area. Patients will be considered clinically stable when, in the preceding 24 hours[171]:

- They are not acutely confused
- They are able to be fed orally or by naso-gastric tube
- Their vital signs are stable. Values should be established (e.g., O2 saturation > 90%, heart rate < 100/minute, respiratory rate < 24/minute, blood systolic pressure > 90 mm Hg, temperature < 38°C).

Once the patients have been clinically stable for 48 hours and intravenous medication has been switched to oral therapy, the attending personnel should consider discharge from the "acute care area". In the pandemic setting, prioritization for earlier discharge may be necessary due to limitations in resources.

### 3.2.4 Transfer to and from Acute Care facilities

A goal, in the pandemic situation, will be to manage patients within the same facility. In some special circumstances, however, the transfer to acute care services may be considered and this has to be planned in advance.

## 3.3 Timely diagnosis and management of an influenza outbreak within the LTCF

The early detection of any outbreak occurring in a LTCF is essential to implement control measures and to stop the diffusion of the disease. In a pandemic situation, the first case of confirmed influenza would likely lead to outbreak management for pandemic influenza.

Every LTCF should have in place surveillance for the early detection and control of an outbreak. This includes[88]:

1) Preparation of a written plan for the management of an influenza outbreak, avoiding unnecessary delays. This will include the identification of diagnostic tests, responsibilities of medical and non-medical personnel, and use of antiviral medication.
2) Identification of personnel responsible for the surveillance and for the transmission of information within the establishment. This will usually be the individual with responsibility for infection control in the facility. The Public Health authorities will inform this individual if influenza is circulating in the community and he/she will report to the authorities when an outbreak has been detected in the facility.
3) Education of all staff and attending physicians in the importance of early identification and notification if a case is suspected.
4) A response capacity maintained 7 days per week.
5) Specific reporting mechanisms and standardized data collection (Appendix 3.I).

Once the outbreak is confirmed, the authorities responsible should take all the measures required to control the propagation of the virus within the facility (among the residents, and to personnel and visitors; see Infection control guideline). Studies and treatment of patients will be done in the area of the facility assigned for this purpose; and prophylactic treatment of some residents may be initiated (following the existing framework for antiviral prioritization during the pandemic).

Unit/ Sector: _____ Date: _____

| RESIDENTS or PERSONNEL | | | Flu Vaccination | | Date of onset (m/day) | Signs and symptoms (use letter) | | | Antibiotics or Antivirals | Diagnostic tests | | Comments: death complications, other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Name | Sex | Age | +/- | Date (y/m/d) | | (F) | (C) | (M)/(A)/(H)/(Ch)/(S) | Drug & Date (m/day) | Date | Results | |
| | | | | | | | | | | | | |
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Legend: Fever = (F); Cough = (C); Myalgia = (M); Arthralgia = (A); Headache = (H); Chills =(Ch); Sore throat = (S)

**Note**: If a resident appears with an ILI (fever of acute onset with cough), start with the infection control measures and inform the individual responsible for the influenza surveillance.

Completed by: _____ Date: _____

# Management of patients in Non-traditional Facilities and Telephone advice

## 4.1 Non-traditional facilities (NTF)

### Definition

**A Non-Traditional Site is a site that is**:

a) currently not an established health care site, or

b) is an established health care site that usually offers a different type or level of care.

The functions of an Non-Traditional Site will vary depending on the needs of the community but will focus on monitoring, care and support of influenza patients during an influenza pandemic. (see annex on Non-Traditional Sites and Workers).

It is expected that the number of individuals requiring care during pandemic influenza will exceed the number of beds available in health care institutions. Admitting to hospitals only the seriously ill requiring specialized medical care (Chapter 2), and making use of alternative centres (such as rehabilitation facilities, community centres, schools, churches and hotels) for less ill patients, will optimize the provision of care.

Non-traditional health care facilities will be used for two main purposes:

a) As an extension of overloaded hospitals and clinics, for the care of influenza patients that are not critically ill or not yet well enough to return home, and

b) As domiciliary care, for individuals unable to care for themselves at home.

Rehabilitation facilities, hotels, and other sites, should be provided with additional basic support equipment (like oxygen therapy supplies). Community halls and schools are equipped with toilets and have some cooking facilities; they may be an alternative to hospitals in case of need.

## 4.2 Telephone advice

Section to be developed.

## Hospital Management: Emergency Room, Short-term observation and Ward management, Intensive Care Unit

Patient management in the hospitals will be similar to interpandemic- influenza care. Changes may be required, however, to operate with limited resources, or if the pandemic strain shows an unusual pattern of disease. Prior planning should consider actions to follow in the event of insufficient resources (beds, personnel, equipment and/or drugs), and alternatives. Cancellation of non-urgent admissions and elective surgery will help to relieve pressure for supplies. Unnecessary admissions of influenza patients should be avoided, and alternative community services should be used appropriately. The pandemic influenza committee and the communications network will activate the influenza contingency plan after the WHO informs them of the onset of the pandemic, and will update the provinces about the evolution of the pandemic[206,223].

### 5.1 Emergency Room

A separate assessment/admission area should be identified for patients with suspected influenza. These patients should be rapidly diverted there to minimize disease transmission. Admission forms will be completed at this point[171] (Appendix 5.I). Patient-triaging and initial assessment are discussed in Chapter 2.

If the patient is not admitted to hospital and is sent home, or to an alternative care centre, provide the patient a copy of:

a) Assessment sheet

b) Instructions for self-management

c) Contact names/numbers to notify if they deteriorate clinically

d) Arrangements for follow-up as required: usually 48 hours later for adults and 24 hours for children.

### 5.2 Short-term observation

A special area of the hospital should be assigned for “short-term” observation of those patients whose clinical assessment does not lead to a definitive admission (see patient-triaging in Chapter 2).

## 5.3 Ward management

Standard ward management of influenza patients should occur. Local plans to address potential shortages of beds, personnel, equipment and/or drugs should be in place.

### 5.3.1 Diagnostic and follow-up tests

The following tests and criteria for patient management, based on clinical assessment of each case, should be considered on admission to hospital. Availability of resources and the pandemic guidelines must be considered. Tests may include (as required, see Chapter 2)

- Chest Radiograph
- Blood cells count
- Urea, creatinine, electrolytes
- Nasopharyngeal aspirate, sputum, cerebrospinal fluid for viral studies (antigen/nucleic acid determination, virus culture), and/or bacterial Gram stain and culture
- Blood culture
- Electrocardiogram, urine analysis, blood glucose.

### 5.3.2 Specific management

#### 5.3.2.1 Anti-viral therapy (see pandemic guidelines)

Antivirals are most efficient when started within 48 hours of onset of symptoms. Since supply is expected to be limited, drugs may be reserved for patients severely ill or those with high risks for influenza-related complications (for priority groups, see section Antivirals in the pandemic guidelines). Clinical guidelines for the use of antivirals are in Appendix 5.III.

#### 5.3.2.2 Antibiotics

Antimicrobial therapy is indicated for treatment of patients with secondary bacterial pneumonia (Appendix 5.IV)[130,140,63]. In any upper respiratory tract infection, runny nose and sinus inflammation (Rhinosinusitis) are common. In some cases, when severe symptoms are present or persist for more than 10-14 days, a bacterial sinusitis may be present. Acute sinusitis presents clinically with purulent nasal discharge, maxillary tooth or facial pain (especially unilateral), unilateral sinus tenderness, and worsening of these symptoms after initial improvement of influenza. In children, suspected sinusitis at 10 days to 2 weeks of symptoms would likely be treated, although it may not be in adults. Antibiotics may also be needed to treat bacterial otitis media, which is uncommon in adults but can complicate influenza in children younger than 12 years[36,101]. Clinical guidelines for the use of antibiotics are in Appendix 5.IV.

### 5.3.3 General management

- Fluid therapy. Ensure adequate fluid intake (fluid management in patients with primary viral pneumonia must be well assessed and closely monitored, because some of these patients may develop adult respiratory distress syndrome (ARDS), and under these circumstances restricted intake of liquids may be indicated[171].
- Oxygen therapy based on pulse oximetry
- Management of associated cardiovascular illness

### 5.3.4 Symptom control

### 5.3.5 Discharge Criteria and follow-up

A shortage in hospital beds is anticipated; therefore identification of patients who can be discharged or transferred to an alternative care centre must be timely. Patients will be considered clinically stable when, in the preceding 24 hours[171]:

- Their mental state returned to normal (or baseline)
- They are able to maintain oral intake
- Their vital signs remained within a specified threshold. Cut-off values should be established (e.g., $O_2$ saturation > 90%, heart rate 100/minute, respiratory rate 24/minute, blood systolic pressure 90 mm Hg, temperature 38°C).

Once the patients are clinically stable for at least 24 hours, symptoms and signs have improved, oral therapy is being given, and they are functionally independent, discharge from the hospital with designated follow up may be considered. The use of an alternative centre of care (domiciliary care) should be contemplated if more prolonged observation is necessary for patients with pneumonia, co-morbidities, or for individuals who are not functionally independent.

**Release and follow-up:**

If the patient is sent home, provide a copy of:

a) Assessment sheet

b) Instructions for self-management

c) Contact names/numbers to notify if they deteriorate clinically

d) Arrangements for home care/follow-up as required: usually 48 hours later for adults and 24 hours for children.

e) Arrangements for alternate care may be required by some patients

## 5.4 Intensive Care Unit (ICU)

Management of patients in the ICU will be similar to interpandemic influenza care. The clinical presentation of the disease and the availability of resources will determine which changes may be desirable throughout the pandemic. Infection control in the ICU, on the other hand, will be essential to avoid transmission of the virus to critically ill, non-influenza, patients. The isolation of influenza patients should be planned in advance .

## 5.5 Death Registration

**(see Infection control guideline for information on mortuary care)**

A substantial increase in mortality throughout the pandemic is anticipated. To ensure appropriate handling of bodies, a plan for death registration must be developed beforehand.

Death registration is a provincial/territorial (P/T) responsibility and each P/T has its own laws, regulations, and administrative practices to register a death. Therefore, provincial regulations must be followed.

In the pandemic situation, each jurisdiction should have a body collection plan in place to ensure that there is no unnecessary delay in moving a body to the (temporary) morgue. If the person's death does not meet any of the criteria for needing to be reported to a coroner, then the person could be moved to a holding area soon after being pronounced dead. Then, presumably on a daily basis, a physician could be found to complete the death certificate.

Funeral directors generally have standing administrative policies that prohibit them from collecting a body from the community or an institution until there is a completed certificate of death. In the event of a pandemic with many bodies, it seems likely that funeral directors could work out a more flexible practice if directed to do so by some central authority (e.g., provincial attorney general). These special arrangements must be planned in advance of the pandemic and take the regional differences in resources, geography, and population into consideration.

## Identification

| Health Care Number: | Hospital: |
|---|---|
| Name: _____ Surname/Family Name First Name | |
| Age _____ (yrs) | DOB ____/____/____ DD MM YYYY |
| DATE OF THIS ADMISSION ____/____/_____ DD MM YYYY | |

## Risk Assessment for Complications of Influenza[152,1,171,29]

- Does this patient fall into a "high risk group" for complications of influenza? **Y/N**
- Tick all relevant conditional/groupings.

| High-Risk Groups (adult/children) | Tick all relevant |
|---|---|
| Chronic cardiac disease (hypertension is not enough) | |
| Chronic pulmonary disease - asthma | |
| Chronic pulmonary disease - COAD or emphysema | |
| Chronic pulmonary disease - other than asthma, COAD or emphysema | |
| Chronic renal disease | |
| Non insulin dependent diabetes mellitus | |
| Insulin requiring diabetes mellitus | |
| Child with cyanotic congenital heart disease | |
| Adult/child receiving immunosuppressive therapy, AIDS patients | |
| Neoplastic disease | |
| Hepatic disease | |
| Anemia, Hemoglobinopathy | |
| Children or adolescent (<18 years) treated for long periods with ASA | |
| Women in the second or third trimester of pregnancy | |
| Resident of nursing home | |
| Resident of other chronic care facility | |
| 65 year old or 2 years old | |

| Details of vaccination | Yes | No | N/A | Batch number | Date given DD/MM/YYYY | Tick if given >14 days ago |
|---|---|---|---|---|---|---|
| **INFLUENZA** vaccine within the last 12 months? | | | | | | |
| **PNEUMOCOCCAL** vaccine within the last 5 years? | | | | | | |

| Details of antivirals: Within last 3 months? | Yes | No | N/A | Date commenced DD/MM/YYYY | Date ceased DD/MM/YYYY | Tick if still taking | Dose |
|---|---|---|---|---|---|---|---|
| AMANTADINE | | | | / / | / / | | |
| RIMANTADINE | | | | / / | / / | | |
| ZANAMAVIR | | | | / / | / / | | |
| OSELTAMAVIR | | | | / / | / / | | |

## Current Medications

| Drug | Details |
|---|---|
| | |
| | |
| | |

## Symptoms

**Date and time of onset of first symptoms** _____

| Clinical features on history | YES | NO | N/A | DETAILS: e.g., Date of onset, symptoms that predominate |
|---|---|---|---|---|
| In contact with someone with influenza in the last 3 days? | | | | |
| Fever | | | | |
| Chills | | | | |
| Myalgia | | | | |
| Arthralgia | | | | |
| Headache | | | | |
| Runny/stuffy nose | | | | |
| Fatigue | | | | |
| Cough | | | | |
| Purulent sputum | | | | |
| Pleuritic chest pain | | | | |
| Retrosternal soreness (tracheitis) | | | | |
| Breathlessness | | | | |
| Anorexia | | | | |
| Vomiting | | | | |
| Diarrhea | | | | |
| Fluid intake | | | | |
| Rash | | | | |
| Other symptoms | | | | |

## Examination Findings

**Date** _____/_____/_____ **Time:** _____:_____
DD MM YYYY HH MM

## Vital signs

| Description | Vital signs for this patient | Outside Boundaries | Values for this patient |
|---|---|---|---|
| Temperature | | <35 C or 39 C | |
| Respiratory Rate | | 24/minute | |
| Heart rate | | 100/minute (>16years) | |
| Blood pressure | | Systolic BP <100 mmHg | |
| Altered mental status | | | |
| Oxygen saturation | | <90% on room air | |
| **Total score** | | | |

## Respiratory examination

| | Left | | Right | |
|---|---|---|---|---|
| | Yes | No | Yes | No |
| Reduced chest expansion | | | | |
| Wheezes | | | | |
| Crackles | | | | |
| Bronchial Breathing | | | | |
| Increased vocal resonance | | | | |
| Reduced breath sounds | | | | |

## Investigations

(Not all tests will be needed for all patients, and clinical judgement should be used, particularly if resources are scarce. Under optimal circumstances, blood work and CXR should be obtained before admission).

| Description | Detailed findings | Outside Boundaries | Values for this patient |
|---|---|---|---|
| Chest radiograph | | Pleural effusion<br>Consistent with pneumonia<br>Congestive heart failure | |
| Arterial Blood Gas[a] | pH<br>$p0_2$<br>$pC0_2$ | PH <7.35<br>< 90% room air<br>> 45 mm Hg | |
| Pulse oximetry | | < 90% room air | |
| Chemistry | Na<br>K<br>Creatinine<br>Urea | Na 125meq/l or 148meq/l<br>K 125meq/l or 5.5meq/l<br>Creatinine 150mmol/l[b]<br>BUN 10.7mmol/l[b] | |
| Liver function | Albumin<br>ALT (alanine minotransferase)<br>AST (aspartate aminotransferase) | < 35 g/l<br>> 35 U/L<br>> 35 U/L | |
| Glucose | | Glucose 3mmol/l or 13.9mmol/l | |
| CBC | Hgb<br>WBC[c]<br>Platelets | Hgb 80g/l; Haematocrit <30%<br>WBC 2,500 or 12,000<br>Platelets 50,000 | |

[a] Usually not required, except in COPD.

[b] One of these tests is enough

[c] Laboratories will do cell differentiation only on request.

## Other investigations

| Investigation | Requested Y/N | Specimen collected Time/date | Result |
|---|---|---|---|
| Sputum Gram stain | | | |
| Culture | | | |
| Acute serology | | | |
| Blood culture X 1 | | | |
| Rapid viral test NPA | | | |
| Viral culture NPA | | | |
| Viral culture nasal swab | | | |
| CK total | | | |
| Electrocardiogram | | | |

Microbiologic diagnostic tests (bacteriologic and/or virologic) will be performed depending on the clinical presentation and availability of resources. Once the pandemic strain is confirmed in a community, virologic tests will be needed only to confirm diagnosis in atypical cases and for surveillance purposes. Rapid tests are useful for diagnostic and treatment decisions (see Appendix 5.II). Isolation and culture of the virus is needed for surveillance purposes.

Ideally, all purulent sputum will be analysed by Gram staining and culture (and in some cases, sensitivity tests), to identify infecting bacteria and their susceptibility. If culture is not possible, at least Gram staining should be attempted.

Ideally, blood cultures should be obtained when the white blood cell number is over 12,000/ml, or less than 3,000/ml, the percentage of bands is higher than 15%, or if pneumonia is suspected. If resources are scarce, blood cultures will be reserved for patients who are very ill, with toxic signs and low blood pressure; for patients who fail to recover after 48 hours of treatment with antibiotics; or for patients admitted to intensive care units.

## Provisional Diagnosis

Please tick all that apply

| | Yes | No |
|---|---|---|
| **Influenza** | | |
| Confirmed (by rapid viral test, other) | | |
| Suspected | | |
| Recent contact (could be incubating) | | |
| Unlikely but at risk of complications and not immunized | | |
| Unlikely but at risk and immunized | | |
| Unlikely (recovered from documented influenza) | | |
| **Influenza Pneumonitis** | | |
| Confirmed (by chest radiograph and oxygen transfer) | | |
| Suspected (by oxygen transfer) | | |
| Unlikely | | |
| **Bacterial Pneumonia** | | |
| Confirmed | | |
| Suspected | | |
| Unlikely | | |
| **Other** | | |
| Pregnant | | |
| Breastfeeding | | |
| Other diagnosis | | |

## Disposition

### Admitted

- ICU
- General Ward
- Other

### Not admitted

Sent to:

- Hospital in the Home
- Home care with self-care
- Health worker/Volunteer contacted
- Not Traditional care centre: Hotel, School, Community Centre, etc.

Provide copy of:

- Assessment sheet
- Instruction sheet
- Contact names/numbers (if get more breathless/deteriorate)

After the first isolation of the pandemic strain in Canada, diagnostic tests will be needed to follow the course of the pandemic in the country and for the timely detection of the virus in different communities. Early diagnosis will direct prophylaxis and may allow limiting the pandemic spread until vaccines are available. Similarly, in isolated rural areas and in northern communities as well as in semi-closed groups in urban areas (e.g., jails and long term care facilities), the early detection of the virus will permit the institution of appropriate measures to control the spread of the outbreak and to start prophylaxis and/or treatment of high-risk contacts and of indispensable individuals.

Once the pandemic strain has been isolated in a community, virologic tests will be required only for surveillance purposes (virus isolation), and to test atypical cases if the result of the test will change the management of the patient and/or contacts (rapid tests and, in some cases, virus isolation).

Rapid diagnostic tests detect influenza antigens or viral nucleic acids in nasopharyngeal secretions or swabs, nasal wash, or sputum (see Table). Rapid tests for novel viruses of pandemic potential should be developed during the inter-pandemic period. At the time of a pandemic, rapid methods that will detect the new pandemic strain will have to be identified; information regarding the reliable and affordable methods should be communicated to the front-line diagnostic laboratories. Samples should be collected within the first 4 days of illness. The quality of the sample is critical for the sensitivity of the test, and nasopharyngeal aspirates are the best samples.[226,31].

Using culture as the gold standard, the sensitivity for most rapid tests that can be done in a physician's office is approximately 70% and the specificity is about 90% (i.e., that ~ 30% of samples that will be positive by viral culture may give negative results by rapid tests, and about 10% of positive tests will be false-positives[31]).

Point-of-care tests have a role in the timely diagnosis of outbreaks and in providing guidance for antiviral treatment or prophylaxis. However, rapid tests cannot replace culture but need to be used in combination with viral culture. This is because presently only culture can identify subtypes and aid with surveillance and vaccine planning.

## Table 5.1. Diagnostic tests for influenza[a]

| Procedure | Influenza types | Specimens | Time for results | Point-of-care |
|---|---|---|---|---|
| Viral culture | A and B | NP[b] swab, throat swab, nasal wash, bronchial wash, nasal aspirate, sputum | 5-10 days[c] | No |
| Immunofluorescence | A and B | NP[b] swab, nasal wash, bronchial wash, nasal aspirate, sputum | 2-4 hours | No |
| Influenza Enzyme Immuno-Assay (EIA) | A and B | NP[b] swab, throat swab, nasal wash, bronchial wash | 2 hours | No |
| Directigen Flu-A Bencton-Dickinson | A | NP[b] swab, throat swab, nasal wash, nasal aspirate | < 30 minutes | Yes |
| Directigen Flu-A+B Bencton-Dickinson | A and B | NP[b] swab, throat swab, nasal wash, nasal aspirate | < 30 minutes | Yes |
| Flu OIA (Biostar) | A and B[d] | NP[b] swab, throat swab, nasal aspirate, sputum | < 30 minutes | Yes |
| Quick Vue (Quidel) | A and B[d] | NP[b] swab, nasal wash, nasal aspirate | < 30 minutes | Yes |
| Zstat Flu (Zyme Tx) | A and B[d] | Throat swab | < 30 minutes | Yes |
| RT-PCR[e] | A and B | NP[b] swab, throat swab, nasal wash, bronchial wash, nasal aspirate, sputum | 1-2 days | No |
| Serology: Hemag-glutination Inhibition (HAI)/ Complement fixation (CF) | A and B | Paired acute and convalescent serum samples | > 2 weeks | No |

[a] List published by the CDC[31], it may not include all test kits approved in Canada.

[b] NP = nasopharyngeal

[c] Shell vial cultures, if available, may reduce the time for results to 2 days

[d] Does not distinguish between influenza A and B

[e] RT-PCR = reverse transcriptase polymerase chain reaction

Two classes of drugs, adamantanes (amantadine and rimantadine) and neuraminidase inhibitors (NI, zanamivir and oseltamivir) are currently available for prevention and treatment of influenza[211,3]. Adamantanes act by inhibiting the activity of the M2 protein, required for the release of viral genetic material inside the cells[126,211]. These drugs reduce viral shedding and decrease the duration of illness by approximately one day if started within 48 hours of illness onset[40,164,213]. However, reduction of complications, or improved outcomes for hospitalized patients has not been adequately evaluated yet. Amantadine is the only adamantane approved in Canada for prophylaxis and treatment of influenza; it is active only against influenza A[126,34].

Intolerance, and the rapid development of resistance to amantadine and rimantadine are major limitations to the use of these agents. Resistance is the consequence of a single point mutation in the M2 gene that completely abolishes the binding of the drug without affecting the transmission to susceptible contacts[98]. Adamantanes have a relatively long half-life, and, since amantadine depends on renal function for excretion, dose adjustments and close supervision are required in cases of renal insufficiency. In addition, central nervous system side effects are relatively frequent after amantadine (10-30%)[40,211]. Teratogenicity as well as embryo-toxic effects have been reported in animals, and studies of pregnant women receiving amantadine to treat Parkinson's disease, show variable adverse effects in the offspring, including miscarriage[83,91].

Neuraminidase inhibitors (NI), on the other hand, inhibit the neuraminidase molecule (NA), indispensable for the release of new-formed virus from infected cells. Neuraminidase inhibitors are active against human influenza A (all 9 known NA molecules) and B viruses, and also against avian viruses[210,212,211]. Two drugs of this group are presently approved in Canada for the treatment of influenza infections: zanamivir, which is delivered by an aerosol and oseltamivir, an oral drug. Zanamivir has a short plasma half-life, but it can be found in the tracheobronchial tree for over 24 hours after inhalation of a single dose. It should be used with caution in patients with underlying airway disease (asthma or COPD) because of the possibility of bronchospasm, an infrequent but potentially serious side effect[211,40]. Oseltamivir, on the other hand, requires dose reduction for patients with low creatinine clearance (<30 mL/min)[1]. Gastrointestinal intolerance (usually lasting less than a day) occurs in 5-15% of oseltamivir recipients but seldom (< 2%) leads to drug discontinuation. Oseltamivir causes no other important side effects[213].

Neuraminidase inhibitors decrease the duration of illness approximately by one day, when used within 48 hours of the onset of illness[211]. Although there are no studies to date demonstrating improved outcomes after hospitalizations or reduced mortality after treatment of patients with influenza with NI, a drop in antibiotic use for lower respiratory complications, and fewer secondary complications such as clinically diagnosed bronchitis and sinusitis have been reported[213]. Neuraminidase inhibitors have been approved for clinical use only recently (1999[1]), therefore, more studies are required to confirm their safety and activity in preventing and treating influenza in high-risk individuals.

## Prophylaxis and Treatment with Antiviral Drugs

### Indications, Doses, Toxicity

The current indications (year 2002) for the use of antivirals in the prophylaxis and treatment of influenza in Canada are[3]:

1. **Amantadine (Symmetrel[R]):**

   *Prophylaxis*: Prevention of respiratory infections caused by influenza A virus strains.

   *Treatment*: Treatment of respiratory infections caused by influenza A strains.

2. **Zanamivir (Relenza[R]):**

   Treatment of **uncomplicated acute illness due to influenza virus in patients 12 years and older who have been symptomatic for no more than 2 days**.

3. **Oseltamivir (Tamiflu[R]):**

   *Prophylaxis*: Since December 2003, oseltamivir is licensed in Canada for prophylaxis in adults and adolescents 13 years of age and older. The safety and efficacy of oseltamivir for prophylaxis in pediatric patients younger than 13 years of age have not been established. Please refer to the Health Canada website http://www.hc-sc.gc.ca/ for future recommendations by the National Advisory Committee on Immunization.

   *Treatment*: of uncomplicated acute illness due to influenza infection in adults who have been symptomatic for no more than 2 days.

Amantadine is protective when used for prophylaxis up to a 6-week period. When used for treatment, the drug does not interfere with the development of protective antibodies. Drug resistance has been induced with amantadine, when used for prophylaxis and concurrent treatment in outbreaks. Special issues need to be considered when amantadine is used for prophylaxis, especially for a long period (6 weeks was the longest period formally studied in controlled trials). These issues include[1] the need for individualized prescriptions for amantadine use due to its low toxic: therapeutic ratio and its dependency on renal function for elimination[2], the need to monitor subjects for side effects and[3] the need to consider the relatively high risk of emergence of drug-resistant virus and to adjust the management of patients when prophylaxis fails and treatment has to be started[3].

Neuraminidase inhibitors showed efficacy for post-exposure prophylaxis and for treatment of influenza infections. To date, resistance to zanamivir and oseltamivir has been shown to occur infrequently in normal hosts[210,211]. In one immunocompromised child treated with zanamivir for influenza, zanamivir resistant virus was detected[210,89], but to this time, intensive surveillance for resistant mutants has demonstrated that NI-resistance emerges uncommonly during therapy. Intense surveillance for NI-resistance emergence is ongoing (F. Aoki, personal communication). On the other hand, viruses resistant to zanamivir have been isolated in vitro, after passages in cell cultures, and the mutations that abolish the binding of the drug have been characterized[210,90]. Since the functional groups of the two neuraminidase-inhibitors have some differences in their binding sites, mutants resistant to one drug may be susceptible to the other[210,90].

## Table 5.2. Recommended doses* [1,152]

| Drug (trade name) | Prophylaxis (P)*, Doses | Treatment (T)*[c], Doses | Level of evidence and Grade of Recommendation** |
|---|---|---|---|
| Amantadine (Symmetrel[R]) | Children: 1-9 years, according to their weight[a] | Children: 1-9 years, according to their weight[a] | Children: Prophylaxis: I/A<br>Treatment: I/A |
| | Adults: 100 mg/2 times per day[a] | Adults: 100 mg/twice daily, 5 days[a]<br>65 years: 100mg/day[a] | Adults: Prophylaxis: I/A<br>Treatment: I/A |
| Zanamivir[b] (Relenza[R]) | Not yet approved | Children: 7 years,10 mg/ 2 times per day, 5 days[b] | Children: Prophylaxis: no data<br>Treatment: I/A |
| | | Adults: 10 mg (2 puffs)/2 times per day, 5days[b] | Adults: Prophylaxis: I/A<br>Treatment: I/A |
| Oseltamivir (Tamiflu[R]) | Adults and adolescents older than 13 years of age[d] | Children: (1 year according to their weight[e] | Children: Prophylaxis: no data<br>Treatment: I/A |
| | | Adults: 75 mg/2 times per day, 5 days | Adults/adolescents:<br>Prophylaxis: I/A<br>Treatment: I/A |

*As currently recommended in Canada. Please refer to the current product monographs for dosage recommendations.

** Level of evidence (I-V) and Grade of Recommendation (A-C)[3]. Grade A recommendation for therapy (i.e., good support) requires the support of level I evidence (i.e., evidence from at least one properly randomized controlled trial, or from trials with large samples, or from meta-analysis of multiple smaller studies with consistent results).

[a] For children 1-9 years of age the recommended doses of amantadine are: 5.0 mg/kg per day, up to a maximum of 150mg/day, in two divided doses. For children (10 years old, who weigh > 40 kg, the recommended doses are 200 mg/day in two doses[1,3,152]. Treatment will continue until defervescence, up to a maximum of 3-5 days. For prophylaxis up to 6 weeks. Doses have to be reduced and monitored in individuals with seizures (100 mg/day) and in individuals with renal dysfunction. The amantadine hydrochloride dosages recommended by NACI for patients of different ages, and according to renal status are in Table 5.3[152]:

[b] Zanamivir is inhaled orally; therefore, children younger than 5 years and elderly adults may require assistance in the use of the Diskhaler[TM] provided by the manufacturer.

[c] Treatment should be initiated as soon as possible and no more than 48 hours after onset of symptoms (better after 36 hours or less), because the earlier is the start the more effective are the results[213,164].

[d] Please refer to the current product monograph for dosage recommendations.

[e] Recommended dose of oseltamivir oral suspension for pediatric patients 1 year.

Table 5.3 Amantadine dosage

| No renal impairment | | |
|---|---|---|
| **Age** | **Dosage** | |
| 1-9 years | 5 mg/kg once daily, or divided twice daily, total daily dose not to exceed 150 mg | |
| 10-64 years | 200 mg once daily, or divided twice daily | |
| 65 years | 100 mg once daily | |
| **Renal impairment** | | |
| **Creatinine clearance ml/min/1.73 m²** | **Dosage for those 10-64 years of age** | **Dosage for those ≥ 65 years of age** |
| 80 ml/min | 100 mg twice daily | 100 mg once daily |
| 60-79 ml/min | Alternating daily doses of 200 mg and 100 mg | Alternating daily doses of 100 mg and 50 mg |
| 40-59 ml/min | 100 mg once daily | 100 mg every two days |
| 30-39 ml/min | 200 mg twice weekly | 100 mg twice weekly |
| 20-29 ml/min | 100 mg three times/week | 50 mg three times/week |
| 10-19 ml/min | Alternating weekly doses of 200 mg and 100 mg | Alternating weekly doses of 100 mg and 50 mg |

Table 5.4. Doses of oseltamivir in children

| Body Weight in kg | Recommended dose for 5 days |
|---|---|
| 15 kg | 30 mg twice daily |
| > 15 to 23 kg | 45 mg twice daily |
| > 23 to 40 kg | 60 mg twice daily |
| > 40 kg | 75 mg twice daily |

Doses should be reduced by one-half in patients with creatinine clearance <30 mL/min[1], although oseltamivir does not cause dose-related side effects (specifically more nausea and vomiting at higher doses).

Table 5.5. Side effects and adverse reactions

| Side effects | Amantadine* | Zanamivir** | Oseltamivir |
|---|---|---|---|
| Gastrointestinal | Vomiting<br>Nausea<br>Anorexia | | Nausea<br>Vomiting (less severe if taken with food) |
| CNS | Nervousness<br>Anxiety<br>Insomnia<br>Seizures<br>Delirium<br>Hallucinations | | |
| Cardiovascular | Arrhythmias, in over dosage | | |
| Respiratory | | Bronchospasm<br>Exacerbation of underlying chronic respiratory disease | |

* Side effects are usually mild and diminish or disappear after one week taking the drug. Serious effects have been observed, however, associated with high plasma concentrations of the drug. Toxicity is observed more frequently in individuals with renal insufficiency, seizures, in the elderly, or after higher doses.

** Zanamivir is not recommended in individuals with asthma or chronic obstructive pulmonary disease; however, if the benefits surpass the risks, the drug should be used with caution and under proper monitoring and supportive care.

### Drug interactions

Limited clinical data are available regarding drug interactions and careful observation is recommended when administered concurrently with drugs that affect the nervous system, antihistamines, or drugs that may interfere with the excretion by the kidneys (i.e., probenecid). **Package inserts should be consulted**.

### New developments

New drugs are being developed for the prevention and treatment of influenza infections, and such developments may change the existing guidelines. Particularly, a single dose dimerized zanamivir[177] is presently in early trials, and may be a good candidate in case of a pandemic.

## Pandemic use of antivirals

Limited data are available about the potential of antivirals to prevent infection and/or treat disease in pandemic situations. Amantadine was observed to be efficacious and safe for prevention and treatment of infection due to influenza A/Hong Kong/68 in the year after its appearance in 1968.

During a pandemic, the antiviral strategy should utilize all anti-influenza drugs available to Canadians. Either M2 ion channel inhibitors (e.g., amantadeine) or neurominidase inhibitors (e.g., oseltamivir) can be used for prophylaxis but only neuraminidase inhibitors should be used for treatment.

**Rationale for the roles of amantadine and neuraminidase inhibitors** (Annex E):

1. Rapid emergence of resistance has been observed during amantadine treatment but resistance has been uncommonly observed during therapy with neuraminidase inhibitors.
2. Neuraminidase inhibitors are currently approved for treatment. Oseltamivir is now licensed for prophylaxis in adults and adolescents over 13 years of age .
3. Although neuraminidase inhibitors are associated with fewer side effects and viral resistance may be less likely to develop as compared to amantadine, evidence that they have a greater efficacy than amantadine for prophylaxis is still required. The cost of these drugs is substantially greater than that of amantadine.

Chemoprophylaxis is not a substitute for vaccination; however, it is expected that vaccines are not going to be available (or will be available only in limited amounts), during the first months of a pandemic. In addition, not all patients can be vaccinated and some individuals may need supplementary protection until their antibodies reach a protective level or because their immune system is defective. Since the pandemic strain will be new for the population, a second dose of the vaccine may be required before protective immunity is developed; therefore, protective prophylaxis may be needed for up to 6 weeks: 4 weeks after the first dose and 2 after the second dose[1].

It is expected that there will be a limited supply of anti-influenza drugs available during a pandemic; therefore, priorities for the use of these agents have been established. Epidemiological surveillance during the pandemic will confirm these priorities or identify new priority groups.

### (Preliminary) priority groups (Annex E)

The following groups in descending order of priority, are offered as planning guidance but will need to be re-examined at the time of a pandemic alert when epidemiologic data about the pandemic virus is available.

1. Treatment of persons hospitalized for influenza
2. Treatment of ill health care and emergency services workers
3. Treatment of ill high-risk persons* in the community
4. Prophylaxis of health care workers
5. Control outbreaks in high-risk residents of institutions (nursing homes and other chronic care facilities)
6. Prophylaxis of essential service workers
7. Prophylaxis of high-risk persons* hospitalized for illnesses other than influenza
8. Prophylaxis of high-risk persons* in the community

***Note**: during a pandemic the definition of high risk persons may change based on epidemiologic evidence.

The mass prophylaxis of children to control a pandemic is currently not recommended.

Antimicrobial therapy will be indicated for treatment of patients with secondary bacterial pneumonia[130,140,63]. Acute bacterial sinusitis is another secondary bacterial infection, but antimicrobials are not indicated for this complication unless symptoms are severe. Otitis media, another potential bacterial superinfection, is uncommon in adults but very common in children. Diagnosis of secondary bacterial pneumonia should be considered with:

1. Clinical deterioration after a period of clinical improvement following the initial onset of influenza; especially if there is a new onset of purulent sputum or dyspnea.
2. Radiographic consolidation.

Purulent sputum without radiographic consolidation is not an indication for antimicrobial therapy, unless the patient has pre-existing chronic obstructive pulmonary disease. Expectoration of purulent sputum with a normal chest radiograph, concomitant or shortly after the onset of influenza (up to 14 days), however, suggests bacterial bronchitis. If it is severe, or occurs in individuals vulnerable to superinfection, the use of antibiotics should be considered[171].

In any upper respiratory tract infection, runny nose and sinus inflammation (Rhinosinusitis) are common. In some cases, when severe symptoms are present or persist for more than 10-14 days, a bacterial sinusitis may be present. Acute sinusitis presents clinically with purulent nasal discharge, maxillary tooth or facial pain (especially unilateral), unilateral sinus tenderness, and worsening of these symptoms after initial improvement of influenza. In children, suspected sinusitis at 10 days to 2 weeks of symptoms would likely be treated, although it may not be in adults. Acute bacterial sinusitis does not require antibiotic treatment if symptoms are mild or moderate. Most patients with a clinical diagnosis of rhinosinusitis improve without antibiotic treatment and, therefore, only appropriate doses of analgesics, antipyretics and decongestants should be offered. Only patients with severe or persistent symptoms and clinical findings specific for bacterial sinusitis should be treated with antimicrobials. Narrow spectrum antibiotics are reasonable first line agents for these patients.

Issues to be considered in providing antimicrobial therapy in the pandemic influenza setting include:

- The availability of antimicrobials during a pandemic may be limited because of increased demand. Provincial and federal governments should have antibiotics stockpiled for such a contingency. However, the potential limited supply means antimicrobials should be prescribed judiciously. Influenza infection, by itself, without secondary bacterial complications, should not be treated with antimicrobials.
- A wide variety of antimicrobial agents will be effective for the treatment of secondary bacterial pneumonia. As a general rule, it is not desirable to treat all individuals with the same antibiotic, as this may promote resistance to that antimicrobial and limit efficacy. A variety of antimicrobials that are effective are listed in Table 1. **Antimicrobials for empiric treatment should be reviewed and updated regularly, considering the availability of new antimicrobials and the evolution of bacterial resistance among respiratory pathogens**.
- *Staphylococcus aureus* is a pathogen isolated frequently in secondary bacterial pneumonia and initial antimicrobial therapy should include coverage for methicillin

susceptible *Staphylococcus aureus*. Other common bacteria include *Streptococcus pneumoniae*, *Haemophilus influenzae*, *Moraxella catarrhalis*, and group A streptococcus. Antimicrobials which provide a broader coverage for resistant organisms should be considered in selected circumstances: patients known to previously have had infection with a resistant organism; patients who have failed or recurred following initial antimicrobial therapy; and patients who have severe clinical presentations including respiratory failure or hemodynamic instability.

- Antimicrobial resistance is a consideration in antimicrobial selection. Current levels of resistance are low but increasing, and the clinical impact of antimicrobial resistance in respiratory infections remains controversial. The prevalence of antimicrobial resistance in common respiratory pathogens should be monitored in the pre-pandemic period and during the pandemic in patients with bacterial pneumonia. This information must be provided to practicing physicians in a timely manner.
- For adult patients hospitalized with a diagnosis of bacterial pneumonia, a sputum specimen for culture and susceptibility testing should be obtained, whenever possible. Once culture results are available, usually in 48-72 hours, antimicrobial therapy should be reassessed and modified based on these results. Sputum specimens from ambulatory patients would not be routinely recommended, but should be obtained if patients have recently received antimicrobial therapy, or if the clinical response to initial antimicrobial therapy is sub optimal.
    - Patients not admitted to hospital may be treated with oral therapy. Patients admitted to hospital will usually require parenteral therapy, but oral therapy may be considered for selected cases. Parenteral therapy should be modified to oral therapy once the patient has stabilized. The selection of an antimicrobial agent will be based on sputum and blood culture and sensitivity results, patient tolerance, local prevalence of antimicrobial resistance, and availability.

### Table 5.6. Suggested empiric antimicrobial therapy for the treatment of acute secondary bacterial pneumonia (adults ≥ 18 years)

Please refer to the current product monograph for the most up to date recommendations on antibiotic dosage, precautions and side effects.

| Oral: First line |
|---|
| › Second generation cephalosporin (e.g., cefuroxime, cefaclor)<br>› clarithromycin*<br>› azithromycin*<br>› erythromycin*<br>› doxycycline<br>› trimethoprim/sulfamethoxazole (TMP/SMX) |
| **Increased likelihood of high level resistance** |
| › Amoxicillin/clavulanic acid<br>› levofloxacin<br>› moxifloxacin<br>› gatifloxacin |
| **Parenteral** |
| › Second generation cephalosporin (e.g., cefuroxime)<br>› Third generation cephalosporin if septic (e.g., ceftriaxone, cefotaxime)<br>› piperacillin/tazobactam<br>› levofloxacin<br>› gatifloxacin<br>› imipenem (if septic)<br>› meropenem (if septic) |

* Macrolides should only be used as a first line agent when bacteremia is unlikely.

Table 5.7. Antimicrobials for the treatment of secondary bacterial pneumonia in patients with influenza where the infecting organism and susceptibility are known from sputum or blood culture (adults ≥ 18 years)

Please refer to the current product monograph for the most up to date recommendations on antibiotic dosage, precautions and side effects.

| Organism | Antimicrobial |
|---|---|
| *Streptococcus pneumonia* | |
| › penicillin susceptible | penicillin G, amoxicillin, erythromycin*, clarithromycin*, azithromycin*, doxycycline |
| › penicillin high level resistance | amoxicillin (high dose), levofloxacin, gatifloxacin, moxifloxacin, third generation cephalosporin (e.g., ceftriaxone, cefotaxime) |
| *Haemophilus influenzae* | |
| › beta lactamase negative | amoxicillin, ampicillin (IV), cefuroxime , clarithromycin, azithromycin |
| › beta lactamase positive | TMP/SMX, second generation cephalosporin (e.g., cefuroxime) , third generation cephalosporin (e.g., cefotaxime, ceftriaxone), clarithromycin*, azithromycin*, amoxicillin/clavulanic acid, ciprofloxacin, levofloxacin, gatifloxacin, moxifloxacin |
| *Staphylococcus aureus* | |
| › methicillin susceptible | cloxacillin, TMP/SMX, first generation cephalosporin (e.g., cephalexin, cefazolin), clarithromycin*, azithromycin* |
| › methicillin resistant | vancomycin, linezolid (use clindamycin or TMP/SMX if sensitive) |

Note: when organisms are isolated from cultures, definitive antibiotic therapy will be guided by susceptibility testing (if done) and availablility of specific antibiotics.

* Macrolides should only be used if bacteremia is absent.

## Management of Bacterial Pneumonia in children

Once bacterial pneumonia is diagnosed (or strongly suspected), therapy with antibiotics should be initiated without delay. When possible, the Gram stain of sputum or tracheal aspirate should be obtained. If not, an empiric treatment should be started (based on the frequency of pathogens for the different age groups and on the most common agents identified in the community)[121,157,143]. Children with mild disease can be treated at home; however, hospitalization (or alternative centre of care) will be indicated for very young children (first year of life), those children with severe disease, those who look toxic and/or have severe pulmonary dysfunction, and also for those children who may not receive appropriate care at home.

### Table 5.8. Suggested empiric antimicrobial therapy for the treatment of acute secondary bacterial pneumonia in children[143]

| Age | Outpatient (oral) | Inpatient | Inpatient with signs of sepsis, and/or alveolar infiltrate or pleural effusion |
|---|---|---|---|
| 3w- 3m | Afebrile: Erythromycin or Azithromycin<br>Admit if fever or hypoxia | Afebrile: Erythromycin* IV<br>Febrile: Add Cefotaxime | Cefotaxime IV |
| 4m- 4y | Amoxicillin | Ampicillin IV | Cefotaxime IV, or<br>Cefuroxime IV, or<br>Ampicillin IV |
| 5-15y | Erythromycin, or<br>Clarithromycin, or<br>Azithromycin, or<br>Doxycycline (>8 years) | Erythromycin* IV, or<br>Azithromycin* IV, or<br>Doxycycline IV (>8 years) | Cefotaxime IV, or<br>Cefuroxime IV<br>consider adding Azithromycin IV |

* Macrolides should only be used as a first line agent when bacteremia is unlikely.

### Table 5.9. Antimicrobials for the treatment of secondary bacterial pneumonia in children with influenza, where the infecting organism and susceptibility are known from sputum or blood culture (≤ 18 years)[121]

| Organism | Antimicrobial |
|---|---|
| *Streptococcus pneumonia* | |
| › penicillin susceptible | Penicillin G (IV, IM), Penicillin V (oral), azithromycin*, clarithromycin* TMP/SMX |
| › penicillin high level resistance | third generation cephalosporin (e.g.cefotaxime or ceftriaxone), Vancomycin |
| *Haemophilus influenzae* | |
| › beta lactamase negative | Amoxicillin, ampicillin, azithromycin*, clarithromycin* |
| › beta lactamase positive | second generation cephalosporin (e.g., cefuroxime,) third generation cephalosporin (e.g., cefotaxime, ceftriaxone), amoxicillin/clavulanic acid, azithromycin*, clarithromycin* and TMP/SMX |
| *Staphylococcus aureus* | |
| › methicillin susceptible | Cloxacillin, first generation cephalosporin (e.g.cephazolin), cephalexin |
| › methicillin resistant | Vancomycin, linezolid (use clindamycin* or TMP/ SMX if sensitive) |

Note: when organisms are isolated from cultures, definitive antibiotic therapy will be guided by susceptibility testing (if done) and availablility of specific antibiotics.

* **Macrolides should only be used if bacteremia is absent**.

The drug of choice for pneumonia due to *S. pneumoniae* is penicillin G. Cefotaxime or ceftriaxone should be used if the isolate is resistant to penicillin, and vancomycin if it is resistant to both[1].

## 6.1 Remote Rural areas and Aboriginal Communities

The last Census of Population, in 2001, revealed that 79.4% of Canadians live in urban areas with a population of 10,000 people or more[202]. This also means that about 6.2 millions of Canadians live in communities with a population of less than 10,000 individuals, including several communities of less than 1,000 individuals. Although some of these groups live in semi-urban settings adjacent to metropolitan areas in the south of Canada, about 6% of the total Canadian population (i.e., about 1.8 million persons, 30% of them aboriginal people) live in remote areas in the north, "shaped by distances, weather, limited resources, and little backup from urban centres"[139].

Registered Nurses are the predominant primary healthcare providers for remote and isolated communities in the north, and for southern rural areas. They work in community health clinics, outpost nursing stations, small rural hospitals and other facilities. In small towns of less than 5,000 inhabitants, the hospital (if there is one) is usually the only health-care facility available, and nurses (less than three in any shift) manage patients in collaboration with on-call physicians (frequently living 100 km or more away). Patients who cannot be managed in their communities are transported by air or road to secondary or tertiary centres, sometimes located at considerable distances (200 or more kilometres)[139,111].

In some northern First Nations' and Inuit communities, low density of human population has led to regional, instead of community-centred services. While resident nurses and paraprofessionals provide primary health care for larger populations, smaller communities have only a community health representative who works alone, with the support of a nurse visiting once a week and of long distance telephone consultations. In the event of a crisis, patients have to be taken out to larger urban centres. In some areas four out of five communities are accessible only by airplane[20,111].

### *Co-morbidities*

Past epidemics of respiratory illness in remote communities in the north were characterized by high morbidity and mortality. Particularly influenza A has been associated with high attack rates (86-100%) and high case fatality (5-10%, sometimes higher). Improvements in health care decreased the burden of disease, but it remains higher than in the rest of the country[217]. The reasons for that include co-morbidity factors like high prevalence of underlying lung disease, environmental factors like smoking and living under crowded conditions in houses with poor ventilation, and low antibody levels to common pathogens[217,6].

Inuit infants suffer from a high rate of low respiratory tract infections (LRTI) and often require mechanical ventilation. Their rate of admission to hospital for LRTI is one of the highest of the world, and infant mortality in the north is at least twice the Canadian average[6].

First Nations' communities in the north have a high prevalence of coronary disease and type-2 diabetes and the incidence of myocardial infarction is increasing[111].

After the pandemic is declared in Canada, most influenza patients living in remote areas will have to be managed within their communities, without transferring them to larger cities. This requires that each community elaborate guidelines in advance, to direct the appropriate management of patients, medical personnel, and volunteers. The inter-pandemic epidemics suffered almost every year in Canada are an opportunity to develop such strategies and test their efficacy.

Each community will need:

a) A policy for the management of an outbreak, with timely diagnosis and appropriate management of influenza infection in patients.

b) Guidelines for the immunization of citizens, medical personnel, and volunteers once a vaccine is available (in agreement with the national influenza pandemic plan).

c) Guidelines for the use of antivirals if they are available (in agreement with the national influenza pandemic plan). During the early stages of the pandemic, each community should ascertain access to antivirals and antibiotics.

d) Plans to establish an area for triaging patients with respiratory illnesses, with resources and personnel to carry out primary and secondary assessment.

e) To assign a place for the management of more acutely ill patients, where acute care (parenteral therapy and oxygen therapy) and closer monitoring and more intensive nursing care, may be performed.

Emergency preparedness plans for isolated communities are critical, and the influenza pandemic guidelines should be part of these strategies.

### 6.1.1 Management of an influenza outbreak in isolated communities

The timely detection of an outbreak in a community is essential to implement control measures and to stop the diffusion of the disease. In a pandemic situation, the first case of confirmed influenza would likely lead to outbreak management for pandemic influenza (see Appendix 6.I).

Every community should have in place surveillance for the early detection and control of an outbreak. This includes:

1. Preparation of a written plan for the management of an influenza outbreak, avoiding unnecessary delays. It will include the identification of diagnostic tests, responsibilities of medical and non-medical personnel, and use of antiviral medication.

2. Identification of a person responsible for the surveillance and for the transmission of information in the community. This will usually be the individual with responsibility for infection control; he/she will be also in charge to report to the pertinent authorities when an outbreak has been detected in the area. In an isolated community, the person responsible for surveillance and transmission of information in an outbreak is the Nurse in Charge, the most senior health professional working at the community health centre.

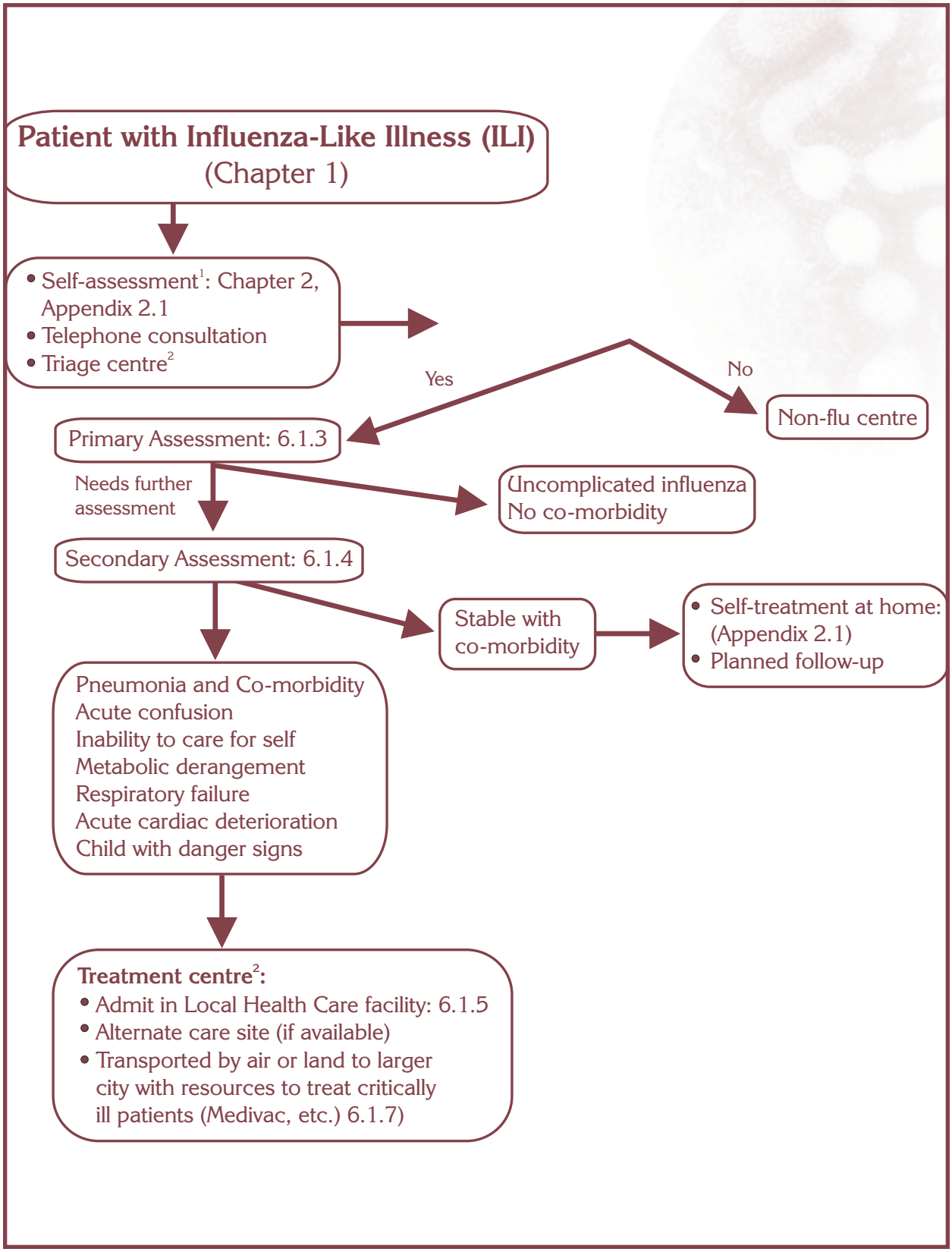
3. Education of all medical and non-medical volunteers of the importance of early identification and notification if a case is suspected.
4. A response capacity maintained 7 days per week.
5. Specific reporting mechanisms and standardized data collection (see appendices in Chapters 2 and 4).

Once the outbreak has been confirmed in the area, the authorities responsible should take all the measures required to control the propagation of the virus within the locality and to neighbour towns (see Infection control document). Studies and treatment of patients will be done in the area assigned for this purpose, and prophylactic treatment of high-risk contacts may be initiated (following the existing framework for antiviral prioritization during the pandemic).

People in rural areas and remote communities usually face unique geographic and resource challenges in the delivery of health care. For these reasons, a pandemic plan that is suitable for urban centres may not be adaptable to rural or remote jurisdictions. The interpandemic period is the best time to plan for health care delivery in an emergency. Each Province and Territory should identify needs, capacity to respond to a pandemic threat, and alternative options in both, large urban centres and in small or remote communities.

The Health Protection Unit, Health and Social Services, in the North West Territories developed a protocol for the management of outbreaks, which is included in their Communicable Disease Manual (February 2000). Appendix 6.I. has a summary of this protocol, adapted to be used in an influenza pandemic.

## 6.1.2 Triage of patients in small communities[1]



### Legend for Table 6.1.2

1) This algorithm would apply to isolated cities or towns with a population of less than 10.000 habitants, where only emergency and sub-acute care services are available. Most rural towns as well as some First Nation and Inuit communities may be included in this group. Individuals living in these communities are usually sent to larger cities/towns when they need acute or chronic hospital services.

   It is advisable that influenza patients, or their relatives, learn to evaluate the seriousness of the disease, and to determine if they can care for themselves at home or need further assessment. Appendix 2.I. contains some helpful self-evaluation criteria and instructions for self-treatment. Basic instruction can be given to the general public by TV (an explanatory video), radio, newspapers, pamphlets, and the Internet. Telephone consultation (or consultation through Internet) with competent personnel or volunteers trained for this purpose, may be provided.

   Triage centres may be located at community health clinics, outpost nursing stations, small rural hospitals and other places like pharmacies, schools, churches, community centres, military field hospitals, etc. A special "emergency" area for the triage, secondary assessment and treatment of influenza patients, should be assigned. This should be different from the area regularly used for the triage and treatment of other emergencies. The Health-Care-Centre may be the only recognized centre of treatment in some areas; to alleviate the burden at these centres, alternative places of triage and care and **appropriate staffing and resources should be planned in advance**. At the triage centre, all patients will be evaluated following the primary assessment algorithms described in section 6.1.2 (see also Chapter 2). Some patients more seriously ill may need further evaluation (secondary assessment, section 6.1.3). Treatment and advice may be given. Some health care sites will be able to handle patients more critically ill as well as providing sub-acute care.

2) For some small communities (some have less than 1000 individuals) it may not be possible to operate an alternate centre of care. In these situations, the triage site may be a designated area close to, or in the health care centre. Additional staff must be trained and dedicated to these designated areas in advance of the pandemic, because one or two nurses constitute all the health-care personnel available in these communities. In some small communities, the only health centre available is designed to house patients for up to four hours, until evacuation to hospital is possible. Those patients requiring attention, who cannot be cared for by family, friends or home support workers, may have to be evacuated to a larger centre in other community.

### 6.1.3 Initial assessment

The initial assessment and evaluation of respiratory patients should be consistent with advance directives, and may include the following (see Chapter 2):

a) History: age, co-morbid illnesses, respiratory and extra-respiratory symptoms, time of onset.

b) Physical assessment: temperature, skin colour, pulse, blood pressure, respiratory rate, chest auscultation, chest pain on inspiration, peripheral oedema, mental status, function (ability to function independently, continuous vomiting, etc.).

c) For patients who are clinically stable and not judged to be severely ill this may be sufficient.

### 6.1.4 Secondary assessment

When there are concerns about metabolic status, or the degree of illness of an individual, additional tests may be considered. These may include (see Chapter 2):

- CBC with white cell count,
- Electrolytes,
- Blood glucose,
- CPK,
- BUN and creatinine,
- EKG if there is a history of cardiovascular disease and/or evidence of significant deterioration in cardiac status.

Diagnostic testing should include $0_2$ saturation, and a chest x-ray should be considered for patients with an oxygen saturation of $\leq$90% on room air, with new purulent sputum, or respiratory rate $\geq$30 per minute.

A sputum culture may be helpful for patients producing purulent sputum (depending on the availability of resources, see Chapter 2).

Laboratory and radiology testing will be very limited. For most health centres in small communities, routine testing is WBC and blood glucose. Chest X-rays and O2 saturation may be done to those who are suspected to have pneumonia, to confirm diagnosis and to decide if they have to be transferred to a larger centre for treatment. Trained support staff will be needed to help the nurses with the testing and for the care of patients remaining in the community. Other testing will have to be referred.

Portable chest x-rays may be needed in some nursing stations.

### 6.1.5 Management of influenza patients in local health care establishments

A written plan for the timely management of influenza patients who are more seriously ill, but will be treated in the community, should be prepared in advance. It will include diagnostic and follow-up tests, responsibilities of medical and non-medical personnel, and the use of medications. **Resources and support (by medical personnel and volunteers) should be planned in advance.**

a) **Diagnostic and follow-up tests** (in selected patients, see Chapter 2):

- Chest X-Rays
- Blood tests, urine analysis, etc.
- Viral/Bacterial studies: sputum, nasopharyngeal aspirate.

b) **General management**: The goals of general management are to maintain comfort, to preserve functional status, and to limit complications. Specific aspects of management for influenza and its complications include:

1. **Oxygenation**. Patients with an oxygen saturation of <90% on room air should have oxygen supplementation. This may usually be given by portable oxygen with nasal prongs. Where this is insufficient, patients may require more aggressive efforts of oxygenation including non-intubation methods of respiratory therapy.
2. **Maintenance of hydration**. This may be achieved through oral fluids or if necessary through parenteral fluids. Where parenteral fluids are necessary hypodermoclysis is an option rather than intravenous therapy and may be more practical.
3. **Antipyretics and analgesics** may be required to limit discomfort associated with myalgia and arthralgia. Usually acetaminophen will be sufficient.
4. **Other therapies** such as antitussives may occasionally be indicated depending on the clinical features of the given patient.

c) **Specific therapy**: Specific therapy is directed at the influenza infection itself and influenza complications, including secondary pneumonia and/or aggravation of pre-existing disease. When antivirals/antibiotics are not available, symptom control and oxygenation may be the only management approaches.

1. **Antiviral agents** including amantadine (for prevention), zanamivir, and oseltamivir (for treatment) may be given for the prevention and/or treatment of influenza. Treatment with these drugs is, usually, only indicated if symptoms have been present for less than 48 hours. They may not be available, depending on supplies and on the priorities for the pandemic situation. When amantadine is used, dosage adjustment for renal function is necessary. (See Appendix 5.III)
2. **Antibiotics** should be given for the management of presumed or diagnosed secondary bacterial pneumonia (see Chapter 2 and Appendix 5.IV). It has been reported that First Nations' and Inuit children have more severe low respiratory infections than other children hospitalized for pneumonia; the frequency and severity of upper respiratory infections and otitis media is much higher than in other children[209,6].
3. **Management of preexisting disease**: Cardiovascular, respiratory, metabolic, etc.

### 6.1.6 Discharge Criteria

Once the patients are clinically stable for at least 24 hours, symptoms and signs have improved, oral therapy is being given, and they are functionally independent, discharge from the local hospital (or designated health care establishment), with follow up, may be considered. The use of an alternative centre of care (domiciliary care) should be contemplated if more prolonged observation is necessary for patients with pneumonia, co-morbidities, or for individuals who are not functionally independent. Domiciliary care may also be used to alleviate local hospitals and care centres; less ill patients that for personal or social reasons are not able to self-care at home will be directed to these places. **Training and support should be planned in advance.**

If the patient is discharged, provide a copy of:

a) Assessment sheet

b) Instructions for self-management

c) Contact names/numbers to notify if they deteriorate clinically

d) Arrangements for home care/follow-up as required: usually 48 hours later for adults and 24 hours for children.

e) Arrangements for alternate care if this is required.

### 6.1.7 Transfer to and from Acute Care facilities

Severely ill patients may need to be evacuated to larger cities with appropriate services to provided complex or critical care. **Territorial plans need to be established during the interpandemic period to determine evacuation criteria and to designate which hospitals will receive patients from each community.**

## 6.2 Correctional and penal institutions

### 6.2.1 Federal Correctional Institutions

Federal correctional institutions accommodate inmates who are serving 2 years plus one day or more and provincial institutions house individuals sentenced 2 years minus one day or less. Federal institutions can be classified as: maximum, medium, or minimum-security institutions, and establishments with multiple levels of security. Maximum-security institutions can generally accommodate up to 400 inmates while medium security institutions can house up to 525 offenders and minimum-security institutions accommodate from 80 and up to 200 individuals. The rated capacity for women's institutions is much lower.

#### *Health resources*

Health services in federal correctional institutions are provided by health care professionals who are registered or licensed in Canada. Access by inmates to health services is available on a 24-hour basis. It can be provided through on-site coverage (nursing care coverage fluctuate from eight to twenty-four hours, depending on the institution security level and location), on an on-call basis, or through other CSC institutions or community services. Contracted medical care is provided in every federal correctional facility, either on-site or off-site.

Most inmates residing in high and medium security institutions live in individual cells, where they may be treated in case of influenza infection. The majority of minimum-security institutions, on the other hand, offer either residential style unit accommodation or regular cell units. Most institutions also have a special area, with some "medical beds", for patients who need special attention and may be treated in the same establishment. However, these beds are not used regularly, because of the lack of nursing supervision after regular operational hours. In case of a pandemic, and provided that they receive night care, such beds may be useful to treat more seriously ill influenza patients within the same institutions[39].

### 6.2.2 Provincial Correctional Institutions

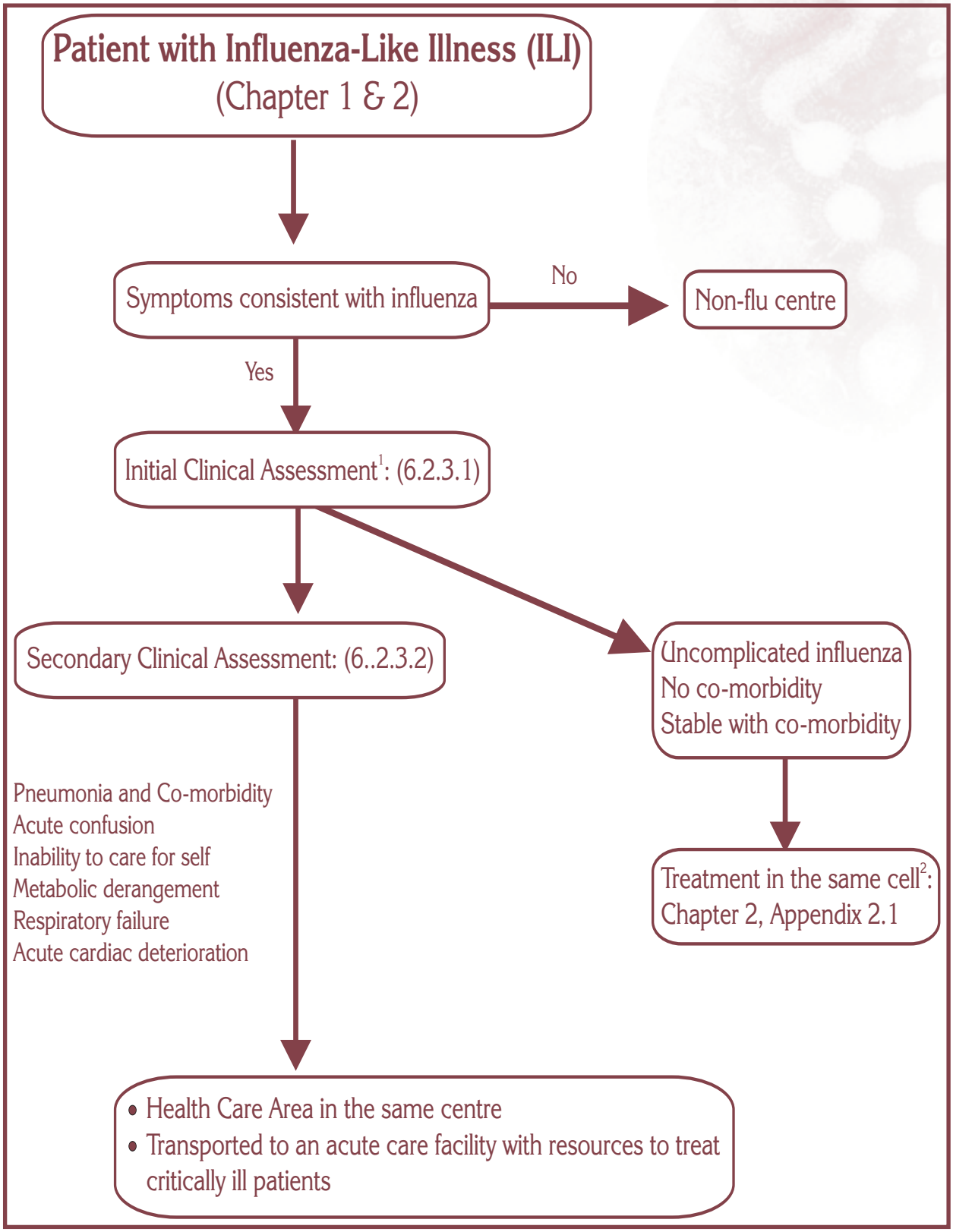
Provincial institutions can also be classified as maximum, medium, or minimum-security institutions; they provide lodging to individuals sentenced 2 years minus one day or less (about 87,000 per year, roughly 8.000 in a given day).

#### *Health resources (this applies only to Ontario)*

Provincial correctional institutions receive the regular support of registered nurses (380 nurses in Ontario, about 3 nurses per shift per institution). The number of hours of available on-site nursing care coverage varied from sixteen to twenty-four hours per day, depending on the size and location of the institution. Contracted medical care is provided in an "on call" manner.

Inmates live in cells (2 or 3 individuals per cell) or share dormitories (about 12 individuals each). It would be possible to segregate them to private/semi-private areas where they may be treated in case of influenza infection. Most institutions also have a special "health-care" area, with some beds for patients who need special attention and may be treated in the same establishment. In case of a pandemic, and provided that they receive nursing care, these beds may be useful to treat influenza patients within the same institutions. Emergencies that cannot be treated in the same institution may be referred for treatment to close community hospitals. Provincial institutions count with the same facilities available to neighbour communities.

### 6.2.3 Triage of patients in correctional institutions*: Federal and provincial correctional institutions



### Legend for Table 6.2.3

1. A special "emergency" area should be assigned for the triage, assessment and treatment of influenza patients. All patients will be evaluated following the primary assessment algorithms described in Chapter 2, and some patients more seriously ill may need further evaluation (secondary assessment, Chapter 2).
2. Some influenza patients will be able to care for themselves in their cells; Appendix 2.I. (Chapter 2) contains some helpful self-evaluation criteria and instructions for self-treatment. Other patients, however, may need more intensive care in a special area assigned for this purpose. Only critically ill patients may be transported to an acute care centre.

A goal, in the pandemic situation, will be to manage patients within the same institution without transferring them to an acute care facility. This will require that each institution designate an area for the acute care of inmates, with some monitoring and nursing care. Most large federal institutions, and some provincial institutions, already have an area for sub-acute care that can be used for this purpose in case of a pandemic.

Prior to any pandemic, correctional institutions should develop policies that will support appropriate management of inmates and personnel. The inter-pandemic epidemics suffered almost every year are excellent opportunities to develop such policies and test their efficacy. Non-compulsive vaccination of inmates in federal correction centres is performed every year, before the beginning of the "flu-season".

Pandemic preparedness should include:

a) An institutional policy for the management of influenza outbreaks.

b) Implement immunization of inmates and personnel when/if vaccine is available.

c) Plans for the establishment of an area within the facility for management of more acutely ill patients. These plans should also include 24 hours of nursing care for influenza patients who require close observation or care.

#### 6.2.3.1 Initial assessment of patients with an influenza like illness: The initial assessment and evaluation of the inmates will include (see also Chapter 2, Table 2.1.1)

d) History: age, length of residence in the detention centre, co-morbid illnesses, documentation of previous influenza vaccinations, time of onset of symptoms.

e) Physical assessment: temperature, skin color, pulse, blood pressure, respiratory rate, peripheral edema, chest auscultation, chest pain on inspiration, mental status, function (vomiting, etc.).

f) For individuals who are clinically stable and not judged to be severely ill this may be sufficient.

### 6.2.3.2. Secondary assessment (Chapter 2, Table 2.1.3)

If there are concerns about metabolic status, or the degree of illness of an inmate, additional tests may be done, as required by the clinical presentation (ideally CBC with white cell count, electrolytes, blood glucose, CPK, BUN, creatinine, an EKG if there is a history of cardiovascular disease and/or evidence of significant deterioration in cardiac status). Some correctional institutions have the facilities to do blood work regularly - in some institutions it can be done daily or biweekly (depending mostly of the size and location of the institution).

Depending on the availability of resources, the determination of 02 saturation in patients severely ill will be desirable. Individuals with an oxygen saturation of (90% on room air, with new purulent sputum, or respiratory rate (30 per minute should have a chest X-Ray performed. A sputum culture may be obtained from patients who are producing sputum and appear to be severely toxic or who have pneumonia (see Chapter 2 for further guidelines).

Most federal maximum and medium institutions have X-Ray equipment and technician in place (the number of clinics per week depends of the size of the institution). Minimum-security institutions are affiliated with larger institutions with which they share the ground and some health care services such as radiography and laboratory services. Some provincial institutions also count with X-Ray equipment.

Correctional centres should have in place arrangements by which timely chest X-Rays and laboratory results may be obtained (conditional upon availability and pandemic guidelines, see Chapter 2), and should also consider a phone reporting system to ensure that results are returned promptly and in a standardized fashion.

### 6.2.3.3 Co-morbidities

Some inmates may suffer from diseases that will increase their risk for complicated influenza, like diabetes, COPD, asthma, etc. (see Chapter 1). In addition, the percentage of offenders who smoke is very high and high rates of infectious diseases such as hepatitis C (up to 22% in some federal jails), HIV/AIDS ( 1.6% in some federal jails), tuberculosis, etc. are frequently observed in this population. The presence of one or more of these co-morbidities should be considered when treating or preventing influenza infections in inmates.

### 6.2.3.4 Instructions for the management of subjects remaining in correctional establishments

A written plan for the management of more seriously ill influenza patients who stay in the establishment should be in place in each institution. This will include diagnostic and follow-up tests, responsibilities of medical and non-medical personnel, and use of medication (consistent with the national pandemic plan).

a) **Diagnostic and follow-up tests**: as required (conditional on availability and the national pandemic guideline, see Chapter 2):
   - Chest X-Rays
   - Blood tests, urine analysis, etc.
   - Viral/Bacterial studies: sputum, nasopharyngeal aspirate.

b) **General management**: Specific aspects of management of influenza and its complications may include:

1. **Oxygenation**. Patients with an oxygen saturation of <90% on room air should have oxygen supplementation. This may usually be given by portable oxygen with nasal prongs. Where this is insufficient, patients may require more aggressive efforts of oxygenation including non-intubation methods of respiratory therapy.
2. **Antipyretics and analgesics** may be required to limit discomfort associated with myalgia and arthralgia. Usually acetaminophen will be sufficient.
3. **Maintenance of hydration**. This may be achieved through oral fluids or if necessary through parenteral fluids.
4. **Other therapies** such as antitussives may occasionally be indicated depending on the clinical features of the given patient.

c) **Specific therapy**: Specific therapy is directed at the influenza infection itself and influenza complications including secondary pneumonia and/or aggravation of pre-existing disease. When antivirals/antibiotics are not available, symptom control and oxygenation may be the only resources.

1. Antiviral agents including amantadine (for prevention), zanamivir, and oseltamivir (for treatment) may be given for the prevention and treatment of influenza. Treatment with these drugs is, usually, only indicated if symptoms have been present for less than 48 hours. They may not be available, depending on supplies and on the priorities for the pandemic situation. When amantadine is used attention to renal function must be assured (See Appendix 5.III).
2. Antibiotics should be given only for the management of secondary bacterial pneumonia (abide by availability and pandemic guideline, see Appendix 5.IV).
3. Management of preexisting disease: Cardiovascular, respiratory, metabolic, AIDS/hepatitis C, etc.

#### 6.2.3.5 Transfer to and from Acute Care facilities

A goal, in the pandemic situation, will be to manage patients within the same correctional institution; however, some patients may need to be moved to an acute care facility for more intensive treatment. The regulation of these transfers should be planned in the interpandemic period.

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During influenza epidemics and pandemics when the overall attack rate is relatively high, even a low frequency of complications will result in marked increases in rates of hospitalizations. Pandemic influenza usually occurs in waves lasting 6 to 8 weeks in any one location. Therefore the demand on health care services provided at health care facilities can be expected to increase, peak and decline during the weeks in which any one location is affected.

It is estimated that between 34 thousand and 138 thousand people will need to be hospitalised in Canada during the next pandemic if the attack rate is between 15% and 35%. This will put enormous stresses on all aspects of the medical system and medical resources will be stretched beyond capacity.

This document is divided into a background section and two main guidelines sections - guidelines regarding the management of resources in health care facilities, and guidelines on the need for and identification of additional human resources as part of pandemic planning activities involving health care facilities. These guidelines identify activities for the interpandemic, pandemic and post-pandemic periods.

Although these guidelines focus on resource management in health care facilities, health services are delivered in many other settings, including: triage centres; telephone health support; physician clinics; ambulance/paramedical services; patient transport services; home care; long term care facilities, and public health. In addition, "non-traditional" health care sites may be set up for the pandemic response (e.g., mobile health units, acute /subhealth care facilities). Regional and local planners will need to address resource management issues for all health services settings. Guidelines for resource management in non-traditional sites are considered in another annex of the Canadian Influenza Pandemic Plan Annex J - Guidelines for Non-Traditional Sites and Workers.

## 1.1 Planning Assumptions

Current disaster plans primarily address multi-casualty, short-term, localised emergency situations. In a pandemic the impact is virtually world-wide and the duration of the "emergency" will be longer. Since multiple jurisdictions will be affected simultaneously, the sharing and exchange of resources may not be possible between jurisdictions.

For the purposes of resource planning for pandemic influenza the following assumptions have been made.

a) **It is unlikely that there will be a "Declaration of Emergency".**

Regional Pandemic Plans should not assume that a National or Provincial Emergency will be "declared", as this is unlikely to occur in the event of a pandemic.

b) **The health care system may be overwhelmed.**

There will be an increase in physician visits, hospitalizations and deaths putting the health care system under extreme stress.

- Canadian institutions are presently running at or close to maximal bed capacity and budget cutbacks and staff shortages have meant that many jurisdictions have already reduced elective admissions.
- Increasing or even maintaining existing bed capacity requires committed human resources. During a pandemic, shortages of personnel, supplies and equipment can be expected to limit the ability of institutions to respond to a significant increase in patient volume.

c) **The best use of resources will be achieved through system-wide prioritization.**

A pandemic will require a regional prioritization of needs and resources, across the health care system, not just a review of resources at a single institution. For example, in terms of human resources, health care professionals may need to be moved from vaccination clinics to hospitals or from one hospital to another. Beds, ventilators and other equipment may need to be moved to non-traditional sites. This will require a review of logistical, ethical and practical issues throughout the region.

d) **There will be limited transfer of resources.**

The global nature of the crisis will mean that resources from other jurisdictions cannot be depended upon for meeting additional requirements during a pandemic.

e) **The usual supply lines will be disrupted.**

The demand for medications, medical/surgical and other supplies will increase substantially around the world and across the country. Suppliers may experience difficulties responding to increased demand, due to staff shortages, raw material shortages and transportation disruptions. Additionally, because most medications, equipment and supplies are produced outside of Canada, there will be barriers to obtaining supplies which include embargoes of medications, cross border issues and transportation issues due to staff shortages.

f) **A pandemic vaccine may be unavailable.**

There will likely be no vaccine available until well into the first wave of a pandemic or later, depending on the time necessary to find a suitable vaccine seed strain, and for development, testing and production. When a vaccine does become available, immunization clinics targeting health care workers may need to be established inside health care facilities.

g) **Anti-influenza drugs will be in short supply.**

Currently no raw materials for anti-influenza drugs are produced in Canada. Existing supplies are very limited and insufficient to form the basis for an effective antiviral response strategy. Stockpiling of these medications is being considered.

When and if antivirals drugs are made available, treatment and prophylaxis for people seeking health care services at health care facilities will need to be prioritised according to national recommendations.

h) **The number of essential service workers will be reduced.**

The availability of health care workers, and service providers essential to limiting societal disruption during a pandemic, may be reduced due to illness in themselves or family members.

i) **The pandemic will occur in waves.**

The pandemic will likely occur in successive waves of approximately six to eight weeks duration in any one community followed by a recovery period of unknown duration. Between the waves substantial resources will be required to "catch up" with elective procedures, delayed treatments for cancer or cardiac care and other treatments. Maintenance on equipment, restocking of supplies, and other activities necessary to recover and prepare for another pandemic wave will need to occur during this time frame.

## 1.2 Projecting the Impact

No one can predict how serious the impact of the next influenza pandemic may be. Current Canadian estimates have been calculated based on attack rates for symptomatic illness of 15% and 35%, however, higher attack rates are possible. Local estimates of the potential impact of a pandemic (the number of ill persons, the number of hospitalisations, number of deaths, etc.) can be projected using software programs, e.g., the "FluAid" software developed by the Centers for Disease Control and Prevention in the U.S. (http://www2.cfdc.gov/bd/fluai Hlt13977776d Hlt13977776/default.htm).

This software presents some challenges and has some limitations based on the fact that it is geared to the U.S. health care system and health seeking behaviours, which may be quite different from Canada. Currently there are no reliable tools for estimating rates of intubation, which would assist in planning for equipment such as ventilators. An example of how one province, Alberta, has used FluAid is provided as Annex A in the Preparedness Section of the Plan.

# 2 Resource Management in Health Care Facilities

## 2.1 Resource Management During the Interpandemic Period

The following activities should take place during the interpandemic period. Further detail is provided below this list.

- Review emergency preparedness legislation
- Identify triggers for intervention
- Planning for increased bed capacity
- Plan for patient prioritisation
- Plan for critical equipment and supplies

### 2.1.1 Review Emergency Preparedness Legislation

Emergency Preparedness Legislation makes many provisions for the management of a crisis, obtaining and accessing materials, and other resources, implementation of crisis plans and also provides for a crisis management structure. This includes the recruitment of professional and other paid staff as well as volunteers, managing human resources and protection of people who volunteer. Pandemic planning should be integrated with the emergency legislation as well as emergency plans of the jurisdictions in order to make best use of existing plans and resources.

**Important Note: Regional Pandemic Plans should not assume that a National or Provincial Emergency will be "Declared", as it is highly unlikely to occur in a pandemic. Provincial and territorial planners should assess issues such as workers compensation and liability insurance, maintaining and supporting workers and other aspects of the plan that may arise without such a declaration.**

The national support framework is not contingent upon a declaration of a national emergency. It is recommended that all provincial and territorial planners review both the Federal and the Provincial/Territorial Emergency legislation to determine how to integrate plans within the framework of emergency legislation.

For example it is important to identify what provisions of legislation are particularly applicable to obtaining use of property and materials in a crisis. These provisions would include but likely not be limited to:

- the ability and responsibility of authorities to requisition property for use as Non-Traditional Sites,
- access to transportation, materials, administrative staff and other resources, and
- compensation for requisitioned property.

### 2.1.2 Identify Triggers for Implementation

Existing legislation and emergency plans at the government and institutional level already identify criteria that would trigger the implementation of specific plans. The Canadian Pandemic Influenza Plan will also describe general points of action.

In co-ordination with existing legislation and plans, Provincial/Territorial, Regional and Local authorities and institutions should identify key criteria and methodologies that would trigger the phased implementation of plans regarding resource management activities in their jurisdiction. The local medical officer of health, together with the local pandemic response team, will decide when to initiate the pandemic influenza plan for their jurisdiction.

Since it is unlikely that the pandemic will start in Canada, the first trigger may be reports of the severity and epidemiology of the pandemic from other countries. This will likely be the first indicator of what to expect when the pandemic reaches Canada in terms of demand for health care services.

Local health care resources and local disease epidemiology, for example, the number of confirmed influenza cases in the community, or data on the impact of pandemic influenza on other Canadian jurisdictions, will determine the triggers for health services emergency plans. These triggers may include:

- The proportion of emergency room visits attributable to influenza.
- The proportion of influenza cases requiring hospitalisation.
- The capacity of the hospital to accommodate influenza cases.

Other triggers may include reports from sentinel physician or walk-in clinics that they cannot accommodate all of the patients requesting appointments for influenza-like-illness. Ambulance re-routing to other acute care setting due to full emergency rooms may serve as another trigger for reallocation or acquisition of resources. The trigger points and surveillance protocols should be defined during the interpandemic period.

Federal, Provincial/Territorial, Regional and Local authorities and institutions may designate points at which the following specific actions are taken.

- Changing staffing ratios, job duties
- Reducing surgical slates, admissions
- Consolidating services
- Procuring additional supplies
- Calling on alternative staff
- Re-routing of ambulances

### 2.1.3 Planning for Increased Bed Capacity

In any institution a “bed” includes infrastructure support, including staffing, which is required to care for the patient in that “bed”. Therefore the requirements for a “bed” in an intensive care unit, for example, include all the support required for a patient to be cared for at that level.

Planning to increase bed capacity during a crisis includes:

- identifying the strategies in advance,
- planning for the consequences of these strategies, and
- identifying trigger points at which the options will be implemented.

Various options to increase bed capacity have been identified, including:

- reducing elective admissions and surgeries to maximise medical bed capacity, and to maximise critical care beds,
- changing protocols or requirements for early discharge,
- increase home care staffing,
- increase the number of residential beds, long-term care and hospice beds,
- re-opening capacity currently closed,
- using reserved critical care capacity,
- using emergency ventilation facilities in recovery and operating rooms,
- assessing associated sites such as clinics, extended care facilities and psychiatric facilities for use by non-influenza patients, and
- creating "flex" beds during the influenza season.

Programs that track and manage Bed Capacity such as the Ontario Critical Program and Ontario Resource Registry, British Columbia's "Bedline" and Alberta's Call Centre System play a key role in the transfer/placement of critical care patients across the province, thus ensuring that staffed beds are used to maximum advantage. The Resource Management subgroup has recommended that each Province/Territory create a centralized bed registry, call centre and centralized ambulance dispatch.

Appendix A of this document includes checklists to assist in evaluating bed capacity in health care facilities.

### 2.1.4 Plan for Patient Prioritization

During a pandemic it will be a challenge to manage high ward and intensive care unit censuses, and high emergency department volumes in the face of reduced availability of health care workers and limited respiratory support equipment.

The pandemic may have a first wave of approximately 6 to 8 weeks and there may be one or more subsequent waves. Cancellation of elective admissions and surgeries, as a way of managing limited resources, could have serious consequences for some patients, including cancer and cardiac patients. Since elective surgeries are not all equivalent in terms of necessity and risks of delay, health authorities must consider within their Province/Territory, region, municipality and/or facility how patients scheduled for elective admissions/surgeries will be prioritized if beds are limited.

Prioritization of health resources at times of critical shortages will also need to be considered. Local community-based centres and hospitals need to take a multi-disciplinary approach and include ethical and legal considerations when developing any prioritization processes. The Clinical Care Guidelines (Annex G in the Canadian Influenza Pandemic Plan) provide recommendations on the assessment and management of influenza and non-influenza patients during a pandemic, including algorithms on the triage of adults and children based on their clinical presentation and risk factors or co-morbidities. However, if supplies, equipment, and access to intensive care must be rationed, a fair and equitable prioritization process will need to be established.

A general approach to ethical considerations will be developed by the national pandemic planning working groups. This will require further discussions including ethics and public consultations. With the ethical considerations and goal of the pandemic response in mind, each community will need to make their own decisions on prioritization, depending on the

availability of resources, stage of the pandemic in the community and management decisions made up until the point that rationing/prioritization becomes necessary. Since there are so many variables and contingencies, it is highly unlikely that a nationally developed guideline would be detailed enough to meet the needs of those involved in these types of decisions at the local level.

### 2.1.5 Plan for Critical Equipment and Supplies

A pandemic will likely result in shortages of medications, medical supplies, and potentially, operational supplies. Since multiple jurisdictions including other countries will potentially be affected by these shortages, the response plan should not rely heavily on outside assistance in terms of the provision of supplies and equipment. Some of the issues directly affecting Canadian supplies will be:

- *Interrupted transportation lines* — Canadian supplies travel long distances by truck train and aircraft. Supplies are often obtained from the U.S. and other nations. Difficulties at border crossings may substantially affect supply lines. In addition, a loss of up to 30% of workers, drivers, and other transportation staff may affect the production and delivery of supplies.
- *Lack of inventory* — In an effort to reduce costs, most health regions have moved to "just-in-time" inventory systems that keep minimal supplies on hand.
- *Embargoes* — The majority of medical supplies are not produced in Canada. Health Canada has made major efforts to establish a domestic infrastructure for the manufacturing of influenza vaccine and has encouraged in-Canada manufacture of some antibiotics. However in many cases supplies are provided by only one or two manufacturers worldwide, or the essential ingredients or components come from a single source. In past pandemics and health crises other nations have banned the export of critical vaccines, medications and supplies.

Recommendations for the use of vaccine and antivirals during a limited supply situation are provided in other annexes. Other resources such as the Infectious Diseases Society of America (IDSA) Guidelines lists medications considered to be critical in the treatment of influenza and pneumonia. These guidelines should be distributed to and reviewed by health care facilities during the interpandemic period since these issues will affect the management patients and resources, including medications, within the facility.

#### *Stockpiling*

Provinces/Territories and local health authorities may wish to review the possibility of rotating stockpiles of critical supplies for health care facilities within their own jurisdictions. Jurisdictions may specifically wish to keep some older equipment such as beds, which need little maintenance and have no specific "shelf life". Appropriate assessment should be made of the maintenance and training required to ensure the safety and effectiveness of older equipment, training needed by staff to use unfamiliar equipment, etc. (See Appendix B for supply management checklist )

After such a critical assessment, institutions and health authorities may consider maintaining certain critical pieces of older equipment such as ventilators.

The stockpiling of antiviral drugs will be discussed at the national level, however, the need to and feasibility of stockpiling critical medications for the management of patients with influenza and secondary pneumonia, should be address at the P/T and local levels. In

addition, provinces and territories will have to discuss with local pandemic planners the need to stock larger quantities of medications and equipment to manage persons with co-morbidities, e.g., chronic cardiac and respiratory disease, diabetes, renal failure, that may be exacerbated by influenza infection. The Clinical Care Guidelines (Annex G) provide guidance on antibiotics for the treatment of secondary pneumonia. The antibiotics currently stockpiled at the national level will be reviewed to determine whether these can be utilized in a pandemic, in addition to, further discussions on the need for additional national stockpiles.

### *Local Production*

During a crisis some items, which are usually ordered from centralized sources, may be produced locally. Procurement specialists may wish to review which supplies could be obtained or produced locally if prior arrangements are made. Possible suppliers and suppliers of alternative products should be contacted to explore this possibility.

## 2.2 Resource Management During the Pandemic Period

Prior to the onset of the pandemic it not known which populations will be most affected by the novel virus, and what the prominent symptoms of the disease, and the most common complications will be. Once the WHO has identified a "Novel Virus" and confirmed "Human to Human Transmission", this information will gradually become available. Planners should review the epidemiology of the disease in light of the demographics of their own population and in terms of their existing resources and revise plans for the allocation of resources based on this information.

The following activities, with respect to health care facilities, should occur during this phase of the pandemic when the triggers indicate the need for action.

- Implementation of emergency plans.
- Increase bed capacity.
- Review critical equipment and supplies.

### 2.2.1 Implementation of Emergency Plans

Based on the previously identified triggers for action and existing legislation and plans, the phased implementation of pandemic response plans will be initiated at this time.

### 2.2.2 Increase Bed Capacity

To increase bed capacity, based on the plans made during the interpandemic period, the following activities may occur during the pandemic:

- re-open closed wards and hospitals,
- cancel elective surgeries and admissions based on the prioritization process determined earlier,
- centralize the tracking of bed capacity,
- use of reserved critical care capacity,
- preparation and use of emergency ventilation facilities in recovery and operating rooms,

- cohorting infectious and non-infectious patients in alternative sites such as clinics or extended care facilities, and
- discharge as many patients as possible based on revised criteria for discharge.

Provinces and territories should review and consider any existing legislation that may put restrictions on patient and staff movement.

### 2.2.3 Review Critical Equipment and Supplies

Review and revise supply needs and plans based on WHO and Health Canada epidemiologic projections.

- Order additional supplies.
- Establish alternate transportation/distribution arrangements if required.
- Establish domestic production of supplies where possible.

Health Canada or other authorities will notify jurisdictions of the status of stockpiles, embargoes, and emergency production facilities. Vaccine and antiviral supplies and recommendations on their use in times of shortages will be co-ordinated at the national level.

## 2.3 Resource Management During the Post-Pandemic Period

Activities at health care facilities during this pandemic phase will focus on the implementation of recovery plans to return the facility to its normal, interpandemic, operating state. Beds may be closed and additional supplies acquired during the pandemic may be return or put into storage. The pandemic response should be reviewed and evaluated so that plans may be revised as necessary during this or the interpandemic period.

# 3 Guidelines for Human Resource Management in Acute Care Settings

## 3.1 Introduction

During an influenza pandemic there will be an increased need for people with health care training to deal with the increased demands on the health care system. This may involve the re-locating of health care workers to different settings within an acute care facility or expansion of the services usually provided at these facilities (e.g., to include immunization clinics for health care workers). In addition, non-health care workers or retired health care workers may need to be hired/contracted to provide supplementary services essential to meet the demand for services at health care facilities. Volunteers will also be a potentially vital source of human resources to facilitate the management of health care services during a pandemic.

During an influenza pandemic the shortage of trained medical staff will be one of many barriers to the provision of adequate care. A significant proportion of the workforce may be unable to attend work for a period of time due to illness in themselves or family members. Communities and health care organizations will need to have specific guidelines in place to address what will be done if the health care system is overwhelmed and non-traditional sites must be established or current service sites expanded. Human resource management at non-traditional sites during a pandemic is addressed in the Guidelines for Non-Traditional Sites and Workers, Annex J of the Plan. This section of the document will therefore focus on human resource issues in acute care settings.

## 3.2 Human Resource Management During the Interpandemic Period

Health authorities may make preliminary estimates of staffing needs based on estimates of the impact of a pandemic and the demographics of the region (see Section 2.1).

The following list of activities is provided to assist with planning for the optimal use of human resources, including health care workers, trainees, retirees and volunteers, at health care facilities. Further details are provided in the following sections.

- Plan for optimal use of health care workers and volunteers
- Review emergency legislation pertaining to health care workers and volunteers
- Provide training
- Consider insurance and licensing issues
- Immunization of Health Care Workers, including volunteers
- Plan for support for Health Care Workers, including volunteers

### 3.2.1 Plan for Optimal Use of Health Care Workers

The work involved in identifying current health care workers who could be re-located within an institution and recruiting additional health care professionals, other health care workers and volunteers that could offset some of the increased demands on health care workers that will occur during a pandemic, should be initiated during the interpandemic period.

a) **Appoint a human resource management team**

Identifying current health care workers; recruiting additional professionals, non-professionals and volunteers; and managing the training, assignment and support of health care workers to various locations and tasks will be some of the most important pandemic preparedness tasks. Establishment of a team or subcommittee that could take on these responsibilities in each jurisdiction is an important first step. A combination of professionals with expertise in human resource issues, pandemic planning, health care administration, infection control, occupational health and safety, and volunteer organizations would be desirable for this planning team/subcommittee.

b) **Placement of personnel**

During a pandemic health care workers may need to be reallocated from their usual roles and settings. For example, trained, health care professionals, may be required to expand their role to include the supervision of volunteers and other staff in the acute care settings, affiliated clinics and non-traditional sites.

While it is likely that all health care workers will be needed at their usual acute care facility, consideration should be given as to the source of staff for other sites including:

- Triage Sites – community triage sites: at clinics, non-traditional sites, attached to an existing hospital.
- Non-Traditional Sites – including emergency care centres, emergency hospitals, support hotels, nursing stations, etc.
- Vaccination Clinics –clinics in acute care sites, etc.

The Guidelines for Non-Traditional Sites and Workers (Annex J) address many of the human resource issues involving these sites. However, it is important to recognize that the expertise needed for the clinical management of influenza patients predominantly resides within the health care facilities. Positioning some staff at these sites may offset the demands on the health care facilities and ultimately lead to the optimal use of human resources.

Health authorities must review the needs of their own communities to determine whether more emphasis should be placed on supporting community care options and which staff will be needed where.

c) **Review scopes of practice**

Even in acute care settings, delegation of tasks and authority will, by necessity, change during a pandemic. A shortage of staff and increase in the number of patients may necessitate cancellations of surgery, tests and other procedures. Staff may be reassigned from their usual roles to make best use of their skills. Retired and foreign-trained personnel may be asked to step in.

Negotiations and planning must take place within each province and territory, with existing colleges, associations and insurers in order that the process of reassignment and delegation may take place quickly and as smoothly as possible. (See the section on Emergency Preparedness Legislation.) Prior negotiation with licensing bodies and bargaining units to facilitate changing of job descriptions and the use of alternative workers during a pandemic will ease the transition and make the process more efficient. In the interpandemic period we recommend the jurisdictions take the following actions:

- Establish a process, in conjunction with existing emergency plans, to assess the work needed and skills required for each task. Jurisdictions need to look at the

process of intake, reception, triage, clinical care, clean up, etc. and assess additional workers or sources of workers who already have the skills to be slotted into these jobs.

- Review the recommendations on patient assessment and management in the Clinical Care Guidelines which will indicate the needs for various skills at various points in patient care, and determine who may provide those during a pandemic.
- Communicate with health care professionals about pandemic needs.

d) **Recruit professional staff for the pandemic response**

Within facilities, consideration should be given to reassigning medical and nursing personnel with administrative, research and educational assignments to clinical duties.

Alternate sources of HCW would include, but are not limited to:

- retired physicians/nurses (need to be assurance that work during a pandemic would not affect their pension plans)
- physicians/nurses currently not working in clinical health care (i.e., working in education, administration, research, private industry)
- trainees (i.e., medical students and nursing students)
- registered nursing assistants
- patient care assistants
- emergency medical technicians
- veterinarians
- pharmacists
- therapists (respiratory/occupational/physio)
- technicians (laboratory, radiography)
- health care aides

Consider how best to recruit persons with health care qualifications but not currently working in the health services. Work with professional associations to determine how to communicate with their members prior to the pandemic about pandemic issues, and how they might communicate during the pandemic.

Provinces/Territories may work with professional associations to ensure that persons with health care qualifications but not currently working in the health services maintain their qualifications and competencies. It is also important to establish a method for assessing professional qualifications and competence during the pandemic when people are being hastily recruited.

Developing and maintaining databases of staff is a time consuming and expensive task. Databases are only useful if kept up to date with licensing, skill set and contact information.

Most health care facilities will already have some type of database of their staff. Local facilities or authorities may wish to develop databases of workers with specific training (through licensing bodies and associations) or establish a co-operative arrangement with licensing bodies, associations or volunteer agencies that already maintain these lists.

Provinces/Territories are encouraged to review professional and privacy legislation to determine how best to maintain such lists. It may be most appropriate both legally and effectively to ask professionals to volunteer their names as pandemic workers. It may also

be appropriate to provide some form of incentive in the form of free training, subsidized license fees etc. to encourage professionals to volunteer their names.

Develop methods to ensure:

- Qualified workers can be contacted quickly and easily,
- Workers are placed where they are needed most, and
- Workers' training and qualifications are on record to ensure people have appropriate qualifications.

### 3.2.2 Review Emergency Legislation Pertaining to Health Care Workers

Emergency Preparedness Legislation makes many provisions for the management of workers during a crisis. This includes the recruitment of professional and other paid staff as well as volunteers, managing human resources and protection of people who volunteer. Pandemic planning should be integrated with the emergency plans of the jurisdictions as much as possible, in order to make best use of existing plans and resources. There is no assurance that a national emergency will be declared; jurisdictions should be prepared to operate under either condition. Therefore human resource planning should be based on existing plans without a declaration.

The following provisions of legislation are particularly applicable to human resource issues including:

- authority regarding licensing and scope of practice issues, and the ability of government to make unilateral changes during a crisis;
- safety and protection of workers, (one of the primary responsibilities);
- fair compensation;
- insurance, both site insurance, workers compensation and other forms of insurance;
- training;
- provision of clothing and equipment;
- protection of the jobs of workers who take leave to assist during the crisis.

#### *Compelling Workers*

Under Emergency Legislation provinces/territories may have the authority to designate "Essential Services" and workers and have the ability to compel people's time or property with due compensation *as a last resort*.

This issue has been raised both because of the existing shortage of health care workers and concerns that health care workers and others may refuse to work during a pandemic due to changed job responsibilities, fear of infection, family responsibilities or other reasons. However, the Subgroup notes the extreme difficulty of enacting or enforcing such legislation and would strongly encourage the jurisdictions to review all other methods of obtaining health care workers, in advance of a pandemic.

### 3.2.3 Provide Training

Health Care professionals, both those currently working in their fields and those working elsewhere or retired, as well as volunteers may benefit from training and communication regarding pandemic plans. As well as looking at specific skills, training and communication may focus on preparedness, changing roles and responsibilities, supervising volunteers, crisis management and emergency planning.

a) **Start training and awareness building now**

There will be very little time for effective training, once a pandemic is underway. Therefore, training should be incorporated into existing programs provided during the interpandemic period. By incorporating the skills needed during a pandemic into existing training, we reduce costs, improve efficiency and enhance readiness.

Training and awareness building will be needed in order to:

- motivate development of a response capacity, including identification of responsibilities and preparation activities, in acute care settings,
- facilitate an understanding of pandemic consequences, vaccination and ethical issues, among health care providers, prior to the pandemic,
- recruit workers willing to take on new responsibilities during the pandemic
- encourage health care workers to maintain skills and licensing while working elsewhere, and
- to develop specific skills related to pandemic influenza.

b) **Identify skill/knowledge requirements**

Health care workers will need to be skilled and knowledgeable in the fields of infection control, crisis management, worker supervision and working with grieving families, which may not be a significant part of their current responsibilities. In addition, it would be useful to expand and maintain the number of health care professionals and others with training in oxygen therapy and the use of ventilators and care of patients on ventilators.

Clerical skills in terms of patient tracking procedures will also be needed in overwhelmed health care facilities, as will people who can train patients and families in "self-care" thereby facilitating early discharge of patients. Ideally all health care workers should be trained in the principles of self-care, since they will be the primary conduit of information to their patients, families and communities. (See Clinical Care Guidelines and Tools Annex in the Plan for more information on self-care).

However, it is recognized that because of the difficulty of maintaining many of these skills without constant use, training programs targeting these skills should be developed for quick and efficient implementation once a pandemic is declared.

It is also advisable to develop a plan specifically for training or re-training of health care workers who are not currently working in health care, for example retirees.

c) **Train the trainer**

Health authorities and existing volunteer agencies, may establish programs to "train the trainers". Through this process a pool of trained individuals can be maintained, during the interpandemic period, that would be available to implement training programs as quickly as possible at the onset of a pandemic.

To facilitate this process it would be essential to:

- identify and train those with knowledge of the tasks and adequate communication skills to act as trainers during the pandemic,
- identify training resources of use to on-the-job trainers,
- ensure there are adequate, easy to use procedures/instruction manuals for tasks such as admissions, patient tracking, etc., and
- use and share existing training programs and materials which can be adapted for pandemic influenza.

d) **Plan now for training during the pandemic period**

A great deal of training will have to be done once a Pandemic is declared. Staff not currently working in health care and volunteers may only come forward once a pandemic is declared. In addition, it may be necessary to update training closer to the pandemic period. In order to ensure that this is done swiftly and efficiently during the pandemic, the following preparations should be made in advance:

- identify training which will take place following the declaration of pandemic,
- identify and obtain training resources which can be tested and used during the pandemic period,
- train the trainers -(see above), and
- plan for where and how training will be delivered during the pandemic.

### 3.2.4 Consider Insurance and Licensing Issues

Insurance and liability coverage should be provided for trainees, volunteers, retirees and any other workers that are recruited to provide health care services during a pandemic. A more in-depth treatment of insurance and liability issues may be found in the annex on Non-Traditional Sites and Workers (Annex J). While these issues will be investigated at the national level, each province/territory will need to review existing legislation and policies to determine how this might be accomplished in their respective jurisdictions.

a) **Liability/insurance for workers and volunteers**

The need to expand scopes of practice may have implications for liability protection/malpractice insurance.

b) **Workers' compensation**

A Memorandum of Understanding (MOU) between the Office of Critical Infrastructure Protection and Emergency Preparedness (formerly Emergency Preparedness Canada), and the Provinces/Territories asserts that registered volunteers or persons compelled/conscripted for emergency service work are protected by workers' compensation during emergency response, as long as they are registered. Some volunteer agencies, have a liability policy for their volunteers.

In some circumstances, volunteers who register with designated agencies may be covered by workers' compensation under emergency legislation. However, there are a number of issues to be resolved with workers compensation boards at the provincial level:

- Does the policy require a declaration of Emergency and, at what level of government, or would the insurance come into effect once Minister of Health declares a pandemic?

- Definition of health care workers for this purpose.
- Definition of volunteers for this purpose.
- Compensation is usually based on loss of income, however, in some cases volunteers may be retired, homemakers, or self-employed. Would compensation cover costs of the person's other responsibilities, such as family care?
- Would compensation be available if volunteers became ill rather than injured?
- Does this include Death and Dismemberment insurance?

**Ensure such insurance is available independent of the need for a "Declaration of Emergency."**

c) **Transfer of licensing between jurisdictions**

*(This section is under review pending discussion with provincial and territorial licensing organizations.)*

Each province/territory needs to liase with professional licensing bodies in their jurisdiction during the interpandemic period regarding licensing issues. In addition, professional licensing bodies may be asked to liase and extend privileges to out of province professionals, based on their standing in another jurisdiction.

### 3.2.5 Immunization of Health Care Workers

While it is unlikely that a vaccine for the pandemic strain of influenza will be available in advance of the arrival of the pandemic in Canada, health care workers should be up-to-date with the other routinely recommended immunizations. Because immunizations require varying amounts of time and some require more than one dose for a person to develop immunity, it will likely be impossible to provide all of these once a pandemic is declared, or to provide them within an appropriate time frame given the lack of supplies and human resources.

Once a pandemic vaccine becomes available the vaccine will be distributed according to nationally agreed upon recommendations for prioritisation of vaccine recipients. A preliminary list of priority groups has been developed by the Vaccines Sub-group and is provided in Annex D of the Plan. The priority and composition of these groups may change based on the epidemiology of the pandemic. However it is widely recognized that health care workers are critical to the pandemic response and should be considered high priority for immunization during a pandemic.

### 3.2.6 Supporting Health Care Workers

During a pandemic, health care workers will need considerable personal support in order to keep working. During the interpandemic period, it is important to plan for how these services may be provided. Some strategies may require changes in policy, or even in legislation to ensure the availability of health care workers during the pandemic. Support provided to health care workers may include:

- Basic Personal support – ensure food and services are available to health care workers on the job.
- Emotional support/Grief Counselling (aimed at permitting workers to continue to work and reduce loss of staff due to grief or traumatic stress).

- Family Care (for children, seniors, sick family members who do not require hospitalization). This poses significant infection control concerns if gathering children or the elderly together for group care.
- Job protection for HCWs who move from other jobs during pandemic.
- Job protection for spouses who do family care to allow HCWs to work in health care.

In order to develop crisis programs, health authorities may build on existing employee support programs. This may involve:

- contacting existing support services,
- working with Chaplains, counsellors and grief counsellors to develop crisis support programs including grief support and traumatic stress counselling,
- determining whether child, or family care, programs would be appropriate for the site(s) and where and how they would be set up (eg. Contract with YM/YWCA), and
- reviewing legislation to determine if there is protection for spouses who take on child care responsibilities to permit health care workers to continue to work.

## 3.3 Human Resource Management During the Pandemic Period

If the pandemic arrives in other countries prior to arriving in Canada, information on the epidemiology of the pandemic strain will be circulated internationally as it becomes available. Planners will need to consider each piece of new information in terms of how this might impact their own population and potentially revise plans for the allocation of human resources based on this information.

The following steps/actions will need to occur during the pandemic period to optimise the human resource dependent response:

- organize the deployment of health care workers
- work with emergency management personnel and use emergency preparedness legislation as required
- implement training and communication plans
- manage insurance and licensing issues
- address immunization needs
- support health care workers

### 3.3.1 Organize the Deployment of Health Care Workers

At this point it will be necessary to activate the Human Resource Planning Team and recruit new members that may be vital to the implementation of previously developed plans. This will facilitate the coordinated management of human resource issues. Next steps are listed below.

- Identify key and supervisory positions and the people to fill them.
- Based on current staffing levels, and assuming a similar attack rate for staff as for the rest of the population, estimate additional staff needs for each region.
- Reassign staff where necessary.
- The Team, in conjunction with the local health authority, should update the inventory of current staff, number of beds, and acute care settings.
- Review worker and volunteer databases established in the interpandemic period.

- Call for staff - Communicate with the public and with health care workers that are not currently working, regarding the possible need for additional staff.
- Screen additional staff.
- Train - existing staff in special tasks and train additional staff.
- Deploy staff.

### 3.3.2 Coordinate Response with Emergency Management Personnel

During a Pandemic the relationship between Emergency Measures Organizations and personnel, and medical authorities and personnel will determine the overall response to the crisis. The best deployment of health care workers and other essential workers will result from well established, coherent communication between Emergency Preparedness Personnel and Health Authorities.

Advance planning should focus on establishing communication strategies and protocols which will permit on-going direct, daily integrated communication during the period of the pandemic. Knowledge and implementation of existing legislation, strategies and resources and a transparent means of communicating with health care workers and other essential workers, as well as the public will permit authorities to efficiently implement adequate human resource management strategies during the crisis.

### 3.3.3 Implement Training and Communication Plans

During the pandemic period staff and volunteers will be identified who need additional training. This will include training such as: working with ventilated patients, and basic support skills such as sterilization procedures, management of admissions etc. to permit licensed trained health care workers to take on additional tasks. It is vital that the training be quickly and easily available in formats that are short, manageable and preferably "on-the-job" where possible.

- Identify experienced people, those with knowledge of the tasks and adequate communication skills and provide them with resources to permit them to train others. (See Train the trainers above.) Ensure trainers and experienced people remain available for consultation and training on an on-going basis.
- Review training programs and emphasize skill sets based on the epidemiology of the disease.
- Use the time between the WHO/Health Canada declaration of pandemic, and the arrival of the first wave in the jurisdiction to train as many staff and volunteers as possible in general and specific tasks.
- Call on existing agencies such as St. John Ambulance and the Red Cross to ramp up existing training programs with an emphasis on tasks required to treat influenza patients.
- Maintain records of trained individuals to ensure best deployment of those individuals.

### 3.3.4 Manage Insurance and Licensing Issues

It will be important to communicate any necessary changes to licensing and insurance provisions to all stakeholders. This will require a thorough review of provisions for insurance in the provincial/territorial emergency plan, a review of licensing issues and communication with licensing bodies, associations, colleges, etc. regarding this issue.

If insurance and/or licensing arrangements require activation of some form of legislation, bylaw or declaration, inform the Minister of Health and other appropriate authorities.

Inform Chiefs of Staff, Managers, Supervisors and Human Resource professionals in health care settings, of changes in licensing and insurance and what that will mean for flexibility in staff deployment, additional staffing, requirements for deployment, or any other provisions of legislation, licensing or insurance with which the institution must comply.

### 3.3.5 Address Immunization Needs

Health care facilities may have to provide qualified personnel capable of administering immunizations, under the guidance of public health authorities, to staff clinics targeting staff and volunteers at their site.

### 3.3.6 Support Health Care Workers

Review plans made during the interpandemic period to provide support to all health care workers including volunteers and retired persons, to enable them to continue working. During the pandemic authorities may:

- Establish personal support services providing on-site food delivery, nap rooms, etc.
- Set up counselling services (find an office, determine a schedule).
- Call in additional counsellors, grief counsellors, chaplains, clergy, clerical support.
- Set up child/family care services.
- Notify staff of how to access these services.
- Notify staff of legislated protections such as protection for job of spouse while caring for children.

## 3.4 Human Resource Management During the Post-Pandemic Period

Activities during this period will focus on the demobilization of staff and volunteers. The pandemic response, in terms of human resources, should be reviewed and evaluated so that plans may be revised as necessary during this or the interpandemic period.

Consideration should be given to methods to formally recognize the efforts of all workers involved in the pandemic response.

These worksheets have been designed to assist facilities in planning for an influenza pandemic. It can be used to complement centralized bed management systems, or used on their own to evaluate bed capacity and how to achieve maximum bed utilization. Facilities should determine the maximum number of beds available and the numbers of hours of care needed to staff the beds. During an influenza pandemic there would most likely be a change in acuity of beds.

Who has responsibility for collecting this information? (Check your facility's emergency plan.)
Position Title

Who will have authority and responsibility to apply this information during a Pandemic?
Position Title

1. What is the total number of non-ventilated beds, **without** oxygen supply, which are:

| | | |
|---|---|---|
| a) Currently open and staffed? | | |
| b) Which could be available during an emergency if extra resources were available in the short term? | **In 72 hours** | **In 7 days** |

What are the limiting factors (staffing, equipment, physical space, other)?

2. What is the total number of non-ventilated beds, **with** oxygen supply, which are:

| | | |
|---|---|---|
| a) Currently open and staffed? | | |
| b) Which could be available during an emergency if extra resources were available in the short term? | **In 72 hours** | **In 7 days** |

What are the limiting factors (staffing, equipment, physical space, other)?

| 3. What is the total number of ventilated beds which are: | | |
|---|---|---|
| a) Currently open and staffed? | | |
| b) Which could be available during an emergency if extra resources were available in the short term? | In 72 hours | In 7 days |
| What are the limiting factors (staffing, equipment, physical space, other)? | | |

| 4. If a directive came to stop all elective surgery/admission: | In 72 hours | In 7 days |
|---|---|---|
| a) How many beds would become available? | | |
| b) How many beds, with oxygen supply, would become available? | | |
| c) How many ventilated beds would become available? | | |

| 5. How many extra emergency ventilatory beds could your hospital create? [NB. Consider use of all ventilator capacity, including time-cycled ventilators, anaesthetic machines, CPAP, BiPAP, and the availability of oxygen/suction and air-supply, recovery and operating rooms and neuroscience beds.] | In 72 hours | In 7 days |
|---|---|---|
| a) Assuming current staffing levels (redeployment of staff permitted) | | |
| b) Assuming additional resources for staffing: | | |
| What are the limiting factors (staffing, equipment, physical space, other)? | | |

6. Does your hospital have any excess capacity to assist other health care facilities or the community, such as provisions of meals, sterilization capacity?

7. Does your hospital have an affiliation with a Health Care Facility, which may have extra bed capacity?

| Affiliation | Number of Beds |
|---|---|
| › Number of Beds | |
| › Long-Term Care Facility | |
| › Acute Detoxification Unit | |
| › Rehabilitation Facility | |
| › Crisis Unit | |
| › Other Type | |

## Inventory of Beds (Work Sheet)

| Type of Bed | Total number of physical beds in facility | Number of physical beds with oxygen supply | Number of currently operating beds (opened and staffed) | Number of currently operating beds with oxygen supply | Estimate current proportion of elective vs emergency cases/beds | Number of beds able to be staffed using current resources | Space for beds available, with oxygen outlet, no physical bed available | Space for beds available, no oxygen outlet no physical bed available | Comments (e.g., unique equipment, special purpose) |
|---|---|---|---|---|---|---|---|---|---|
| Medical | | | | | | | | | |
| Special medical/Step Down | | | | | | | | | |
| Surgical | | | | | | | | | |
| Special surgical | | | | | | | | | |
| Coronary care* | | | | | | | | | |
| Intensive care* | | | | | | | | | |
| Paediatric | | | | | | | | | |
| Obstetric | | | | | | | | | |
| Special Care Nursery | | | | | | | | | |
| NICU | | | | | | | | | |
| Day ward | | | | | | | | | |
| Recovery room* | | | | | | | | | |
| Sleep laboratory | | | | | | | | | |
| Closed wards | | | | | | | | | |
| Other | | | | | | | | | |
| TOTAL | | | | | | | | | |

* denotes areas currently used for ventilation which could be used for emergency ventilation

## Inventory of Ventilators (Work Sheet)

| Types of ventilators | Intensive Care | Coronary Care | Special medical/ stepdown | Recovery room | Operating room | Emergency department | Storage | In repair | Sleep study laboratory | Physio-therapy | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Oxylog | | | | | | | | | | | |
| Bird | | | | | | | | | | | |
| CPAP spont. breathing | | | | | | | | | | | |
| BiPAP spont. breathing | | | | | | | | | | | |
| TOTAL | | | | | | | | | | | |

## Emergency ventilatory capacity considerations (Work Sheet)

| Property | Intensive Care | Coronary Care | High dependency | Recovery room | Operating room | Emergency department | Neuro-science | Sleep study laboratory | Other |
|---|---|---|---|---|---|---|---|---|---|
| Suction | | | | | | | | | |
| Oxygen outlet | | | | | | | | | |
| Medical air outlet | | | | | | | | | |
| Airflow (negative pressure) | | | | | | | | | |
| Airflow (positive pressure) | | | | | | | | | |
| Room monitoring | | | | | | | | | |
| Physical bed | | | | | | | | | |
| Space, but no physical bed | | | | | | | | | |

**Operational Period** _____ **Date Prepared** _____ **Prepared By** _____

| Location Required | Facility | Item and Unit Size | Shelf life | Have | Need | Stockpile/ Location | Supplier Name/ Location | Issues Affecting Supply* & Alternate Arrangements |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |
| | | | | | | | | |

***Issues Affecting Supply**

- Interrupted transportation lines — Canadian supplies travel long distances by truck train and aircraft. Supplies are often obtained from the U.S. and other nations. Difficulties at border crossings may substantially affect supply lines. In addition, a loss of up to 30% of workers, drivers, and other transportation staff may affect supplies.
- Special storage or transportation requirements (e.g., Cold Chain).
- Just-In-Time Inventory — Supplies can be obtained but may take some time.
- Embargo — If the item is not produced in Canada is it an item which is likely to be embargoed.

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During a pandemic, local authorities will have to be prepared to manage additional deaths due to influenza, over and above the number of fatalities from all causes currently expected during the inter-pandemic period. Within any locality, the total number of fatalities (including influenza and all other causes) occurring during a 6- to 8-week pandemic wave is estimated to be similar to that which typically occurs over six months in the inter-pandemic period. This guideline aims to assist local planners and funeral directors in preparing to cope with large-scale fatalities due to an influenza pandemic. A number of issues have been identified, which should be reviewed with coroners/medical examiners, local authorities, funeral directors, and religious groups/authorities.

## 1.0 Planning for Mass Fatalities

In order to identify planning needs for the management of mass fatalities during a pandemic, it is important to examine each step in the management of a corpse under normal circumstances and then to identify what the limiting factors will be when the number of corpses increase over a short period of time. The following table identifies the usual steps. Possible solutions or planning requirements are discussed in further detail in the sections that follow this table.

Table 1: Usual Process for Corpse Management

| Steps | Requirements | Limiting Factors | Planning for Possible Solutions/Expediting Steps |
|---|---|---|---|
| Death pronounced | › person legally authorized to perform this task | › if death occurs in the home then one of these people will need to be contacted<br>› availability of people able to do this task | › provide public education re. how to access an authorized person<br>› consider planning an on call system 24/7 specifically for this task |
| Death certified | › person legally authorized to perform this task | › legally, may not necessarily be the same person that pronounced the death | › consider "collecting" corpses and having one authorized person perform this task en masse to improve efficiency |
| Body wrapped | › person(s) trained to perform this task<br>› body bags | › supply of human and physical (body bags) resources<br>› if death occurs in the home: the availability of these requirements | › consider developing a rotating 6 month inventory of body bags, given their shelf life<br>› consider training or expanding the role of current staff to include this task<br>› provide this service in the home in conjunction with pronouncement and transportation to morgue |

| Steps | Requirements | Limiting Factors | Planning for Possible Solutions/Expediting Steps |
|---|---|---|---|
| Transportation to the morgue | › in hospital: trained staff (orderly?) and stretcher<br>› outside hospital: informed person(s), stretcher and vehicle suitable for this purpose | › availability of human and physical resources | › in hospital: consider training additional staff working within the facility<br>› consider keeping old stretchers in storage instead of discarding<br>› look for alternate suppliers of equipment that could be used as stretchers in an emergency e.g., trolley manufacturers<br>› outside hospital: provide public education or specific instructions through a toll-free phone service re. where to take corpses if the family must transport |
| Morgue storage | › a suitable facility that can be maintained at 4 to 8 degrees Celsius | › capacity of such facilities | › identify and plan for possible temporary morgue sites |
| Autopsy if required/ requested | › person qualified to perform autopsy and suitable facility with equipment | › availability of human and physical resources<br>› may be required in some circumstances | › ensure that physicians and families are aware that an autopsy is not required for confirmation of influenza as cause of death |
| 1) Cremation* | › suitable vehicle of transportation from morgue to crematorium<br>› availability of cremation service<br>› a cremation certificate | › capacity of crematorium/speed of process<br>› availability of coroner or equivalent official to issue certificate | › identify alternate vehicles that could be used for mass transport<br>› examine the capacity and surge capacity of crematoriums within the jurisdiction<br>› discuss and plan appropriate storage options if the crematoriums become backlogged<br>› discuss and plan expedited cremation certificate completion processes |
| 2) Embalming** | › suitable vehicle for transportation from morgue<br>› trained person<br>› embalming equipment<br>› suitable location | › availability of human and physical resources<br>› capacity of facility and speed of process | › consult with service provided regarding the availability of supplies and potential need to stockpile or develop a rotating 6 month inventory of essential equipment/supplies<br>› discuss capacity and potential alternate sources of human resources to perform this task e.g. Retired workers or students in training programs<br>› consider "recruiting" workers that would be willing to provide this service in an emergency |

| Steps | Requirements | Limiting Factors | Planning for Possible Solutions/Expediting Steps |
|---|---|---|---|
| Funeral service | › appropriate location (s), casket (if not cremated), funeral director | › availability of caskets<br>› availability of location for service and visitation | › contact suppliers to determine lead time for casket manufacturing and discuss possibilities for rotating 6 month inventory<br>› consult with the FSAC to determine surge capacity and possibly the need for additional sites (e.g., use of churches etc. for visitation) |
| 2a) Transportation to temporary vault or burial site | › suitable vehicle and driver | › availability of human and physical resources | › identify alternate vehicles that could be used for this purpose<br>› consider use of volunteer drivers |
| 2b) Temporary vault storage | › access to and space in a temporary vault | › temporary vault capacity and accessibility | › expand capacity by increasing temporary vault sites |
| 2c) Burial | › grave digger, space at cemetery | › availability of grave diggers and cemetery space<br>› extreme cold and heavy snowfall | › identify sources of supplementary workers |

* cremated bodies are not usually embalmed; families may choose to have a funeral service followed by cremation or to have the body cremated first and a memorial service later.

** bodies to be buried may be embalmed and may need to be stored in a temporary vault prior to burial.

## 1.1 General Planning Considerations

In order to develop guidelines or adjust existing plans to suit the pandemic situation, local pandemic planners should ensure that the following persons are involved in mass fatality planning:

- the Coroner Office/Branch,
- the Medical Officer of Health,
- the Emergency Response Team,
- representatives of the Funeral Services Association of Canada (FSAC) and/or the local funeral director,
- representatives from local health care facilities, and
- representatives of local religious and ethnic groups.

Existing disaster plans may include provisions for mass fatalities but should be reviewed and tested regularly, to determine if these plans are appropriate for the relatively long period of increased demand which may occur in a pandemic, as compared to the shorter response period required for most disaster plans. There are currently no plans to recommend mass burials or mass cremations. This would only be considered in the most extreme circumstances.

Since it is expected that most fatal influenza cases will seek medical services prior to death, hospitals, nursing homes and other institutions (including non-traditional sites) must plan for more rapid processing of corpses. These institutions should work with the pandemic planners and the FSAC and coroner office to ensure that they have access to the additional supplies (e.g., body bags) and can expedite the steps, including the completion of required documents, necessary for efficient corpse management during a pandemic.

In order to deal with the increase in fatalities, some municipalities will find it necessary to establish temporary morgues. Plans should be based on the capacity of existing facilities compared to the projected demand, for each municipality. Local planners should make note of all facilities available, including those owned by religious organizations. Some religious groups maintain facilities including small morgues, crematoria and other facilities that are generally operated by volunteers. Access to these resources should be discussed with these groups as part of the planning process during the interpandemic period.

In the event that local funeral directors are unable to handle the increased numbers of corpses and funerals, it will be the responsibility of municipalities to make appropriate arrangements. Individual municipalities should work with local funeral directors to plan for alternate arrangements.

Planning should also include a review of death documentation requirements and regulatory requirements that may affect the timely management of corpses.

## 1.2 Role of the Funeral Service Association of Canada (FSAC)

It is recommended that all funeral directors contact their Medical Officer of Health to become involved in their disaster and pandemic planning activities with respect to the management of mass fatalities at the local level. The national Mass Fatalities sub-group for pandemic influenza planning has recommended that funeral directors consider it a part of their professional standards to make contingency plans for what would happen if they were incapacitated or overwhelmed. This recommendation is being taken forward to the association, which has an established disaster planning committee. It is expected that this committee will put forward a recommendation to the Provincial/Territorial associations to set up disaster plans.

Currently, FSAC is planning to set up three containers to be placed at three military bases across Canada (probably Edmonton, Toronto area and Halifax). Each container would be a fully organized temporary morgue with all necessary equipment. These are intended for use in such disaster scenarios as major fire, flood or aircraft crash but might be useful as adjuncts to large auxiliary hospitals in a pandemic. FSAC and funerary supplies companies are setting up these containers; any materials used would be re-supplied by the user.

Members of the FSAC board are on the Funeral Supply Coalition Council of Canada. FSAC is likely to take a role in supply (e.g., fluids, body bags and caskets) management for mass fatalities related to a pandemic.

The FSAC is currently updating information regarding health concerns and funeral service issues, which will be available through a publicly accessible web site.

## 1.3 Autopsies

Many deaths in a pandemic would not require autopsies since autopsies are not indicated for the confirmation of influenza as the cause of death. However, for the purpose of public health surveillance (e.g., confirmation of the first cases at the start of the pandemic), respiratory tract specimens or lung tissue for culture or direct antigen testing could be collected post-mortem. Serological testing is not optimal but could be performed if 8-10 mL of blood can be collected from a subclavian puncture post-mortem Permission will be required from next-of-kin for this purpose.

Any changes to regular practices pertaining to the management of corpses and autopsy requirements during pandemic situations, would require the authorization of the Chief Medical Examiner or Coroner.

If a physician requires that an autopsy be performed, normal protocols will be followed, including permission from the next-of-kin. In cases where the death is reportable to a Medical Examiner or Coroner, the usual protocols prevail based on provincial legislation.

### 1.4 Preparations for Funeral Homes and Crematoria

In a pandemic, each individual funeral home could expect to have to handle about six months work within a 6- to 8-week period. That may not be a problem in some communities, but funeral homes in larger cities may not be able to cope with the increased demand.

Individual funeral homes should be encouraged to make specific plans during the interpandemic period regarding the need for additional human resources during a pandemic situation. For example, volunteers from local service clubs or churches may be able to take on tasks such as digging graves, under the direction of current staff.

Crematoriums will also need to look at the surge capacity within their facilities. Most crematoriums can handle about one body every four hours and could probably run 24 hours to cope with increased demand. Cremations have fewer resource requirements than burials and, where acceptable, this may be an expedient and efficient way of managing large numbers of corpses during a pandemic.

### 1.5 Planning for Temporary Morgues

Additional temporary cold storage facilities may be required during a pandemic, for the storage of corpses prior to their transfer to funeral homes. A emporary morgue must be maintained at 4-8° C. However, corpses will begin to decompose in a few days when stored at this temperature. If the body is not going to be cremated, plans to expedite the embalming process should be developed since in the case of a pandemic, bodies may have to be stored for an extended period of time. In jurisdictions where a timely burial is not possible due to frozen ground or lack of facilities, corpses may need to be stored for the duration of the pandemic wave (6 to 8 weeks).

Each municipality should make pre-arrangements for temporary morgues based on local availability and requirements. The resource needs (e.g. body bags) and supply management for temporary morgues should also be addressed. The types of temporary cold storage to be considered may include refrigerated trucks, cold storage lockers or arenas.

Refrigerated trucks can generally hold 25-30 bodies without additional shelving. To increase storage capacity, temporary wooden shelves can be constructed of sufficient strength to hold the bodies. Shelves should be constructed in such a way that allows for safe movement and removal of bodies (i.e., storage of bodies above waist height is not recommended). To reduce any liability for business losses, municipalities should avoid using trucks with markings of a supermarket chain or other companies, as the use of such trucks for the storage of corpses may result in negative implications for business.

Arenas and curling rinks, where the required temperature of 4-8° C can be maintained, are other options for temporary morgues. Using local businesses for the storage of human remains is not recommended and should only be considered as a last resort. The post-pandemic implications of storing human remains at these sites can be very serious, and may result in negative impacts on business with ensuing liabilities.

### 1.6 Capacity of and Access to Vaults

A vault is a non-insulated storage facility for remains that have already been embalmed, put into caskets and are awaiting burial. In most places in Canada extra corpse storage facilities already exist, as they are often needed from January to April when the ground is frozen and burials are difficult to perform. Although larger cities may be able to open burial plots in winter, smaller communities do not have the equipment or permanent staff to do this.

The accessibility of vaults during the winter should be assessed. A vault may be situated in the back of cemeteries, with entrances that are partially below ground level or in close proximity to headstones, so that a snow blower or plough would have difficulty creating a path of access without damaging some headstones.

In preparation for a pandemic each community should identify the capacity of existing vaults and address access issues for temporary storage. In addition, the need for the creation of new temporary vaults, to meet the increased demand during a pandemic should be addressed. This temporary vault should be non-insulated, have some security features such as covered windows and locks on doors.

## 2.0 Other Technical Considerations

### 2.1 Death Registration

Death registration is a provincial/territorial (P/T) responsibility and each P/T has its own laws, regulations, and administrative practices to register a death. Moreover, there is a distinction between the practices of pronouncing and certifying a death. For example, in Ontario physicians, nurses, and in some circumstances police and ambulance attendants may pronounce a person dead. Only physicians, and a small group of designated nurses in narrowly defined circumstances may certify death.

In the pandemic situation, with the increased number of deaths, each jurisdiction must have a body collection plan in place to ensure that there is no unnecessary delay in moving a body to the (temporary) morgue. If the person's death does not meet any of the criteria for needing to be reported to a coroner, then the person could be moved to a holding area soon after being pronounced dead. Then, presumably on a daily basis, a physician could be designated to complete the death certificate.

Funeral directors generally have standing administrative policies that prohibit them from collecting a body from the community or an institution until there is a completed certificate of death. In the event of a pandemic with many bodies, it seems likely that funeral directors could work out a more flexible practice if directed to do so by some central authority (e.g. provincial attorney general, registrar of vital statistics). These special arrangements must be planned in advance of the pandemic and should include consideration of the regional differences in resources, geography, and population.

### 2.2 Infection Control

The Infection Control and Occupational Health Guidelines (Annex F of the Canadian Influenza Pandemic Plan) provide general recommendations on infection control for health care facilities and non-traditional sites during a pandemic. However, special infection control measures are not required for the handling of persons who died from influenza, as the body is not "contagious" after death. Funeral homes should take special precautions with deaths from influenza. Training in the routine infection control practice and additional precautions is available through the FSAC. <http://www.fsac.ca/>.

Visitations could be a concern in terms of influenza transmission amongst attendees, particularly in smaller communities. For example, in P.E.I., the average attendance at a visitation is 1,000 to 1,400 people; visitations in larger centres are typically a fraction of that size. The Guidelines to Infection Prevention and Control and Occupational Health (Annex F of the Pandemic Plan), lists several recommendations regarding public gatherings. It is the responsibility of the Medical Officers of Health to place restrictions on the type and size of public gatherings if this seems necessary to reduce the spread of disease. This may apply to funerals and religious services. Medical Officers of Health should plan in advance for how such restrictions would be enacted, and enforced, and for consistency and equitability of the application of any bans.

Families requesting cremation of their deceased relative are much less likely to request a visitation, thus reducing the risk of spreading influenza through public gatherings.

### 2.3 Transportation

No special vehicle or driver licence is needed for transportation of a corpse. Therefore, there are no restrictions on families transporting bodies of family members if they have a death certificate.

Transportation of bodies from their place of death to their place of burial in northern and isolated communities may become an issue, especially if this requires air transport. Local pandemic planners should consult existing plans for these communities and determine what changes can be made to meet the increased demand during a pandemic.

### 2.4 Supply Management

FSAC is recommending to funeral directors that they not order excessive amounts of supplies such as embalming fluids, body bags, etc., but that they have enough on hand in a rotating inventory to handle the first wave of the pandemic (that is enough for six months of normal operation). Fluids can be stored for years, but body bags and other supplies have a limited shelf life. A supply list for temporary morgues will be accessible through FSAC. Cremations generally require fewer supplies since embalming is not required.

A list of current suppliers is provided in Appendix 1.

Families having multiple deaths are unlikely to be able to afford multiple higher-end products or arrangements. Funeral homes could quickly run out of lower-cost items (e.g. inexpensive caskets such as cloth and some wooden caskets) and should be prepared to provide alternatives.

## 3.0 Social/Religious Considerations

### 3.1 Special Populations

A number of religious and ethnic groups have specific directives about how bodies are managed after death, and such needs must be considered as a part of pandemic planning. First Nations, Inuit, Jews, Hindus, Muslims, all have specific directives for the treatment of bodies and for funerals. The wishes of the family will provide guidance, however, if no family is available local religious or ethnic communities can be contacted for information. For example, in the case of First Nations peoples, mechanisms currently exist to communicate with band councils for this purpose (established to deal with archeological issues) and medical examiners should contact the band council of the individual where this is possible.

As a result of these special requirements, some religious groups maintain facilities such as small morgues, crematoria, and other facilities, which are generally operated by volunteers. Religious groups should be contacted to ensure these facilities and volunteers are prepared to deal with pandemic issues.

Religious leaders should be involved in planning for funeral management, bereavement counselling, and communications, particularly in ethnic communities with large numbers of people who do not speak the official languages.

## 3.2 Northern and Isolated Communities

Northern and isolated communities face particular issues in dealing with large numbers of fatalities. The following issues make the preparation, storage and burial/disposal of large numbers of corpses very challenging in such communities.

- The lack of funeral service personnel and other resources.
- The extreme cold weather and heavy snowfalls in winter result in difficulties with burials, and in difficulties with the transportation of corpses.
- In remote areas where families live vast distances apart, corpses may have to be transported a long way for burial/disposal. This may be challenging for areas with few plane flights and no road access or poor road surface conditions. The large distances also pose a challenge for the transportation of funeral directors and funeral supplies.
- Permafrost, boggy land and other geographical features also pose a challenge to transportation and burial.

Planners responsible for these jurisdictions should ensure that local pandemic plans address these issues.

## Embalming fluids and suppliers:

- H.S. Eckels and Company, Guelph, Ontario
- Esco of Rexdale, Ontario
- Les Fournitures, J.C.R. Inc., Vanier, Québec
- Dodge Chemical, Mississauga, Ontario

## Casket suppliers:

- Alton Caskets
- J.I. Astley & Associates
- Batesville Canada
- Bernier Caskets Inc./Cercueils Bernier Inc.
- Classic Casket Distributors, Limited.
- Colonial Caskets Limited
- Cercueils Concept Inc/Concept Caskets Inc.
- Cormier & Gaudet
- Exquisite Enterprises, Inc.
- Imperial Evergreen Casket Corporation
- Imperial Casket (Calgary) Limited
- Imperial Casket (Saskatchewan) Limited
- Imperial Casket (Manitoba) Limited
- Imperial Legacy Caskets Limited
- Industries Maximel Inc.
- Cercueils Magog Caskets
- Northern Casket (1976) Limited
- Cercueils South Durham Caskets
- St. Lawrence Casket Co. Inc.
- Trans-Global Casket
- Victoriaville Funeral Supplies, Inc.
- Winkler Caskets Co. Limited

# J Guidelines for Non-Traditional Sites and Workers

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In influenza pandemics over 50% of persons may be infected and the majority of illnesses and deaths will tend to occur over a period of six to eight weeks in any one location. Epidemiologic data from influenza epidemics and past pandemics show that 15% to 35% of the population could become clinically ill. Consequently, even a low frequency of complications result in marked increases in rates of hospitalizations. An estimate of the health and economic impact of a pandemic in Canada has been performed using a model developed by Meltzer and colleagues, CDC, Atlanta (<http://www.cdc.gov/ncidod/eid/vol5no5/meltzer.htm>). Based on this model it is estimated that between 2.1 and 5.0 million people would require outpatient care, between 34 thousand and 138 thousand people would require hospitalization and between 11 thousand and 58 thousand people would die in Canada during an influenza pandemic.

Due to the large number of patients who would require medical services during an influenza pandemic, communities and health care organizations must have guidelines in place that will address what will be done if health care organizations are overwhelmed. The use of non-traditional sites (NT sites) for the provision of medical care and the need for additional human resources, including volunteers and other health care or non-health care workers, must be considered as a strong possibility and planned for accordingly. Legislative, management and professional authorities will have to be clearly defined at the local level.

This document is divided into two main sections. The first section provides guidelines regarding the utilization and administration of NT sites, and the preparedness and operational activities that should take place with respect to NT sites during the interpandemic, pandemic and post-pandemic periods. The second section focuses on the need for and identification of additional human resources as part of pandemic planning, and also identifies activities by each pandemic period.

## 1.1 Definition of a Non-Traditional Site

The following is a definition of a non-traditional site (NT site) for the purposes of planning for an influenza pandemic.

A non-traditional site is a site that is:

a) currently not an established health care site, or

b) is an established health care site that usually offers a different type or level of care.

***The functions of a non-traditional site will vary depending on the needs of the community but will focus on monitoring, care and support of influenza patients during an influenza pandemic.***

## 1.2 Potential Roles of Non-Traditional Sites

The role of any NT site will depend on the needs of the community and the resources available. It is expected that NT sites will be used during a pandemic for three main purposes:

- the care of patients who are not critically ill when hospitals are overloaded,
- as domiciliary care for individuals unable to care for themselves at home, and
- as a "step-down" unit for the care of stable patients that have been transferred from acute care hospitals.

Where possible care at non-traditional sites should be limited to supportive care or palliation for influenza patients. Critical care would likely not be possible within these sites and should remain in the acute care setting. Persons with immunosuppressive illness or communicable diseases other than influenza (e.g. tuberculosis) should not be admitted to these sites.

In communities with a high proportion of elderly or high risk persons, the role of the NT site may need to be expanded to include the provision of health care services specifically related to dealing with the exacerbation of co-morbidities (e.g. chronic heart or lung disease, diabetes) in these groups.

Depending on the impact of the pandemic and the health care resources available in the community, NT sites may serve several functions. They may be set-up as triage centres, mobile health units, acute care or sub-acute care providers, clinics, or emergency residential facilities for those that cannot care for themselves at home or for cases that usually live with a high-risk individual.

## 1.3 Administrative Options for Non-Traditional Sites

NT sites may be established as a "satellite site" of an acute care facility or other health care facility, or as a "free-standing site". The "satellite site" model is advantageous since it does not require establishment of a separate administrative structure. Specifically, linkage with an existing acute care facility or other health care facility would facilitate the following:

- prompt implementation of an administrative structure,
- ordering, tracking and maintenance of equipment and supplies,
- implementation of record keeping and patient tracking systems,
- implementation/establishment of nursing protocols and patient care guidelines,
- sharing of expertise and human resources between sites,
- access to services such as sterilization, laboratory services, pharmacy services, laundry, food services,
- referrals between the site and the affiliated health care facility, and
- extension of liability, workers compensation and other insurance programs to the satellite site.

The satellite site is the recommended administrative option, however, where it is not possible to set-up a "satellite site" the establishment of "free-standing sites" will be necessary. Planning for the administration of "free-standing sites", including how the issues listed above will be dealt with at the site, will need to be completed during the inter-pandemic period. It is recommended that pandemic planning be incorporated into the existing emergency response plan.

Triage, transfer and transport agreements between the NT site and the affiliated health care facility or referral hospital need to be established.

Regardless of the administrative structure of the site, an individual or team needs to be designated to oversee the care provided in each NT site. This person/team should monitor patient flow, maintain a log of patient activity including patient outcome, and monitor availability of supplies. Delegation of these responsibilities to ensure ongoing and consistent administration of the site needs to be planned for in advance.

## 1.4 Insurance Issues

In planning for the establishment of NT sites during a pandemic it is important that insurance needs are considered and that provisions for appropriate insurance are made. Do not assume that the insurance covering the site for its usual use will extend to cover its use as an emergency medical site. Specifically, fire/damage/theft insurance and site liability insurance will be required for NT sites.

## 1.5 National Emergency Stockpile System

The National Emergency Stockpile System (NESS) was primarily developed for use in crises such as natural disasters, earthquakes, or other emergencies in which there is a sudden need for supplies and equipment to deal with a large number of people with varying medical needs. The program involves the purchase, packaging, shipping and storing of supplies and equipment organized into "kits" designed to meet specific emergency medical needs. The components of the "kits" are packaged and stored in warehouses across Canada to facilitate

timely distribution. The NESS should not be confused with provincial emergency stockpiles that may exist within each province or territory.

In the event of a pandemic, specific kits or units from the stockpile could potentially be used to facilitate reception, intake, triage and provision of medical and social services at a NT site. The following is a brief description of the types of kits/units available through the NESS.

*Emergency Hospital* - capable of providing support to the existing health care system by the provision of acute and short term medical care for up to 200 patients. Also has the adaptability to support social services functions (i.e., evacuation centres, reception areas, shelters, etc).

*Advanced Treatment Centre* - capable of providing early medical and limited surgical procedures in a 'field' or operational environment; also used to support the movement of patients to other health care facilities. Can also support the movement of evacuees and the operations of shelters, evacuation centres, reception areas, etc.

*Casualty Collecting Unit* - capable of providing immediate first aid care and movement of patients to other health care facilities. Also can support the movement of evacuees and the operations of evacuation centres, shelters, reception areas, etc.

*Reception Centre Kit* - provides supplies, and registration and inquiry materials for the set-up and operation of reception functions for evacuation centres/shelters.

*Mobile Feeding Unit* - provides an emergency feeding capability in a 'field' environment, or where normal food services are not available (equipment and supplies, not food).

*Trauma Kit* - consists of first aid, intubation equipment, IV solutions and medical components to support first line response, patient triage and stabilization. Is useful in a patient staging facility (mini clinics, advanced treatment centres, etc).

*Mini Clinic* - intended to supplement existing medical care facilities in a disaster situation that overwhelms their system (e.g. a hospital emergency room). It would be located adjacent to these facilities to triage and treat the less seriously injured, so that the main facility remains clear to accept and treat the seriously injured.

The equipment supplied is older but well maintained. New equipment is being added to certain units and others are being reconfigured to be more effective. Transportation of these materials is dependent upon commercial or military vehicles and requires access by road or, for some items, an airport that will accept a Hercules aircraft.

In the event of a local emergency that overwhelms available municipal resources, the protocol for accessing the NESS program is that the municipality contacts the provincial/territorial emergency management authorities. Release of equipment or supplies must then be coordinated through the Provincial/Territorial Health, or Social Services Director. In certain cases the distribution of drugs is handled directly by provincial Chief Medical Officers of Health.

The NESS equipment and supplies are owned by the Office of Emergency Services, Health Canada and are made available to the provinces/territories on a loan basis. The Province/ Territory administers this Federal program under guidelines established by the Office of Emergency Services and through 'Memoranda of Agreement' between the Minister of Health, Health Canada and the Provincial/Territorial Health and Social Services Minister(s). In a national emergency or large-scale disaster, the authority for the release and use of the stockpile equipment remains with the Director of Emergency Services, Health Canada. To

obtain an Emergency Hospital or other unit, a Provincial Emergency Services Director must apply to the Director, Centre for Emergency Preparedness and Response, Health Canada.

For more information on the National Emergency Stockpile System contact your provincial/ territorial Emergency Services Directors

## 1.6 NT Site Planning During the Interpandemic Period

The following activities should take place during the interpandemic period. Further detail is provided below the list.

- Review emergency preparedness legislation
- Identify triggers for implementation
- Plan for the triage process
- Assess locations for potential NT sites
- Planning for critical equipment and supplies

### 1.6.1 Review Emergency Preparedness Legislation

Emergency preparedness legislation makes many provisions for management of a crisis including: obtaining and accessing materials and other resources, implementation of crisis plans and a crisis management structure. Pandemic planning should be integrated with the emergency plans of the jurisdictions in order to make best use of existing plans and resources.

**Important note: Regional pandemic plans should not assume that a national or provincial emergency will be "declared", as this is unlikely to occur during a pandemic. Provincial and Territorial planners should assess issues such as workers compensation and liability insurance, maintaining and supporting workers and other aspects of the plan without, such a declaration.**

The national support framework is not contingent upon declaration of a national emergency. The resource management and non-traditional sites working groups recommend all provincial and territorial planners review both federal and provincial/territorial emergency legislation to determine how to integrate plans within the framework of emergency legislation.

For example it is important to identify what provisions of legislation are particularly applicable to obtaining use of property and materials in a crisis. These provisions would include but likely not be limited to:

- the ability and responsibility of authorities to requisition property for use as NT sites,
- access to transportation, materials, administrative staff and other resources, and
- compensation for requisitioned property.

### 1.6.2 Identify Triggers for Implementation

Existing legislation and emergency plans at the government and institutional level already identify criteria that would trigger the implementation of specific plans. The Canadian Pandemic Influenza Plan and the pandemic phases will also describe general points of action.

In co-ordination with existing legislation and plans, provincial/territorial, regional and local authorities and institutions should identify key criteria and methodologies that would trigger the phased implementation of plans regarding NT sites in their jurisdiction. Local authorities,

most likely the local medical officer of health, together with the local pandemic response team, will decide when to initiate the pandemic influenza plan for their jurisdiction, including recommendations regarding the establishment of NT sites.

Since it is likely that the pandemic will not start in Canada, the first trigger for the consideration of establishment of NT sites may be reports of the severity and epidemiology of the pandemic from other countries. This will likely be the first indicator of what to expect when the pandemic reaches Canada in terms of demand on traditional health care services.

In each locality it will be important for the local pandemic response team to be monitoring the availability of resources in their local acute care facilities and projections regarding when capacity may be exceeded (especially if there will be "free-standing sites"). Therefore potential triggers include:

- The proportion of emergency room visits attributable to influenza.
- The proportion of influenza cases requiring hospitalisation.
- The capacity of the hospital to accommodate influenza cases.
- The proportion of cases who normally live with high-risk individuals or who have no support at home and cannot care for themselves.

Other triggers may include reports from sentinel physician or walk-in clinics that they cannot accommodate all of the patients requesting appointments for influenza-like-illness. Ambulance re-routing to other acute care setting due to full emergency rooms may serve as another trigger for further implementation of plans for NT sites. These triggers should be established during the interpandemic period.

### 1.6.3 Plan for the Triage Process

***Definition of Triage***:

A process whereby a group of casualties or patients is sorted according to the seriousness of their illness or injuries, so that treatment priorities can be allocated between them. In emergency situations it is designed to maximize the number of survivors.

In order to reduce demand on hospital emergency departments and potentially on family physicians and walk-in clinics, it may be necessary to perform triage at NT sites during the pandemic. The use of such a system will require a significant public awareness campaign since ill people will tend to seek services at their usual health care providers.

The Clinical Care Guidelines and Tools (Annex G in the Canadian Influenza Pandemic Plan) provide recommendations on the assessment and management of influenza and non-influenza patients during a pandemic, including algorithms on the triage of adults and children based on their clinical presentation and risk factors or co-morbidities. The guidelines on initial assessment and management assist healthcare staff, as well as volunteers with minimal expertise, to rapidly evaluate the needs of each individual and to sort patients efficiently in a crisis situation (i.e., to decide when patients can be treated as outpatients, or if they need to be redirected or admitted to a hospital). In larger communities, patients who required further assessment by a physician, X-rays and laboratory tests (secondary assessment) would likely be transferred to an acute care facility. Some NT triage centres,

however, may have the facilities to perform secondary assessment and treatment without moving the patients.

Designation of NT sites as triage centres specifically for influenza-like-illness has the added advantage of potentially reducing the exposure of other patients to influenza, consistent application of current recommendations through the use of patient care protocols and control over the number and type of other services, such as laboratory testing and chest x-rays, that are being ordered.

Non-traditional triage sites may be established at public health clinics/units, specifically identified walk-in clinics or triage centres adjacent to or associated with acute care institutions.

Triage sites will need to be organized to provide streamlined and efficient service. The following table is provided for planning purposes and suggest how a site might be organized.

| Zone | Service | Training Required |
|---|---|---|
| Registration Zone | Register in-coming patients | Trained non-medical workers |
| Waiting Zone | Awaiting Primary Assessment | Medical professionals with trained non-medical workers |
| Primary Assessment Zone | Vital signs<br><br>Chest auscultation & assessment | Trained non-medical<br><br>Medical Professional (Physician or Nurse) |
| Secondary Assessment Zone | On-Site Lab Tests<br><br>Secondary assessment | Trained non-medical workers<br><br>Physician |
| Advanced First Aid & Transfer Zone | Service to patients who arrive in distress includes oxygen, suction, etc. while they await transfer to emergency department | Advanced First Aid |
| Education Zone | Education resources and advice | Trained non-medical workers |
| Discharge Zone | Follow up or transfer | |

The Infection Control and Occupational Health Guidelines (Annex F in the Plan) lists some guidelines for the set up of triage and preliminary treatment sites including:

- If possible, separate those with influenza like illness (ILI) and those without ILI by: minimizing time spent in waiting rooms; providing separate entrance/waiting areas for patients with lLI; placing patients with ILI directly into a single room; separate patients as quickly as possible by placing ILI patients in an area of the waiting room separated from non ILI patients by at least one metre.
- Remove magazines and toys from the waiting rooms.
- Clean equipment and environmental surfaces in examination/treatment rooms potentially contaminated by coughing patients as frequently as possible, preferably after each patient.

### 1.6.4 Assess Locations for Potential NT Sites

It is recommended that a multidisciplinary team approach be used to assess potential NT sites in a jurisdiction, to ensure suitability of a potential site. Ideally the assessment team should include:

- emergency personnel/police/fire,
- health care personnel, and,
- engineering/maintenance/public works staff.

This team should conduct a community-wide space and site inventory to determine the location and availability of potential sites for NT hospitals and vacant land for possible mobile hospital installations. This assessment should be repeated at regular intervals during the interpandemic period to ensure that identified sites remain suitable. Potential locations for NT sites include, but are not limited to:

- schools
- hotels
- community halls
- banquet facilities
- arenas
- churches
- closed hospitals or hospital wards
- day care centres

For each location the feasibility of its use as a NT site should be determined based on the information below and the intended use of the facility.

Since a site at which inpatient care will be provided will have the most stringent and demanding requirements, it might be reasonable to assess each location for this type of service provision. Locations that are not found to be suitable for provision of inpatient care may be considered for another purpose such as triage or provision of education/counselling services.

#### *Characteristics and Services Required for an Inpatient Care Setting*

Each building under consideration should meet the National Building Code standards for its currently designated building type.

Once the building code standards have been assessed, the following issues need to be considered:

- Adequacy of external facilities:
  - public accessibility (including public transport, parking, directions) off-loading, traffic control, assistants for elderly, etc.
- Adequacy of internal space:
  - washrooms and sinks: number m/f; amenities, function
  - kitchen: refrigeration, dishes, dishwashing capability, food preparation areas etc.
  - secure space for administration/patient records

- space for reception, waiting, patient care, patient/family education, counselling/support, and any other services defined by the planning process
- secure storage capacity for pharmacy and other supplies
- mortuary space

- Adequacy of critical support systems required for the site to provide patient care:
  - ventilation system (adequate air flow, air conditioning)
  - physical plant/ building engineering
  - electricity - power for lighting, sterilizers, refrigeration, food services.
  - natural gas supply – e.g., for heating or electricity or cooking
  - water supply
  - sanitation (including number of toilets, showers or washing facilities)
- Arrangements to provide essential support services required for the provision of in-patient care:
  - security
  - communications capability
  - maintenance
  - laundry
  - environmental/cleaning services
  - sterilization services – Sterilization of equipment should be provided by trained and experienced personnel using certified equipment. Appropriate arrangements for sterilization services, e.g., with a hospital, may be required
  - pharmaceutical services
  - medical waste disposal/storage
  - mortuary/funeral services
  - food services
  - facilities for staff lodging and feeding

### *Infection Control*

When planning for a NT site it is important to establish whether the site will focus only on the care of influenza patients or whether other types of patients will be receiving services at these sites. Infection control issues will be greater if transmission of influenza to other patients is a possibility.

All patient beds should be separated by at least one metre; as is the norm for patients with any medical condition. If non-influenza patients will be seen at these sites separate waiting areas should be considered for potential influenza patients. For NT sites focussed on influenza, there appears to be no infection control basis for segregating people at various stages of illness. In either situation health care workers and visitors to the site will need to be educated regarding appropriate infection control practices.

Infection prevention and control issues are addressed in detail in Annex F of the Plan.

### *Security and Safety*

The safety of buildings will be based on National Building Code and CSA standards. "Security" includes security of access, security of medications, and the security of patients. Security issues must be considered in choosing sites as well as when planning for staffing needs.

### *Upgrade Facilities*

Some facilities may need to be upgraded, in order to be used as a medical site. Local authorities may wish to upgrade designated facilities in order to ensure they are adequate. Upgrades such as improving power supplies and upgrading washing facilities may be considered as an investment in emergency preparedness and part of overall emergency planning for the community.

As it is much less expensive to build in facilities at the time of construction then to add them later, emergency planners and pandemic co-coordinators may work with local authorities, school boards, etc. to add facilities to buildings that are under construction. .

## 1.6.5 Planning for Critical Equipment and Supplies

During the interpandemic period planners should identify critical equipment and supplies necessary for the establishment and operation of NT sites. Sources of supplies need to be identified; expected needs during an influenza pandemic and ability to meet those needs should be discussed with all possible suppliers. Potential access to the NESS should also be addressed.

A pandemic will likely result in shortages of medications, medical supplies and potentially operational supplies. Since multiple jurisdictions including other countries will potentially be affected by these shortages, the response plan should not rely heavily on outside assistance in terms of the provision of supplies and equipment. Some of the issues directly affecting Canadian supplies will be:

*Interrupted transportation lines* — Canadian supplies travel long distances by truck train and aircraft. Supplies are often obtained from the U.S. and other nations. Difficulties at border crossings may substantially affect supply lines. In addition, a loss of up to 30% of workers, drivers, and other transportation staff may affect the production and delivery of supplies.

*Lack of inventory* — In an effort to reduce costs, most health regions have moved to "just-in-time" inventory systems that keep minimal supplies on hand. Consideration should be given to the purchase of products made in Canada to avoid potential supply problems due to border crossing restrictions implemented at the time of the pandemic.

*Embargoes* — The majority of medical supplies are not produced in Canada. Health Canada has made major efforts to establish a domestic infrastructure for the manufacturing of influenza vaccine and has encouraged in-Canada manufacture of some antibiotics. However in many cases supplies are provided by only one or two manufacturers worldwide or the essential ingredients or components come from a single source. In past pandemics and health crises other nations have banned the export of critical vaccines, medications and supplies.

Recommendations for the use of vaccine and antivirals during a limited supply situation are provided in other annexes.

### *Transportation and Supply Logistics*

Transportation planning for NT sites should include consideration of the types of supplies and products (e.g., dangerous goods such as oxygen, biomedical waste, equipment for sterilization) that will need to be transported to and from NT sites, who will provide these services (i.e., will volunteers need to be trained) and whether the site has appropriate delivery access. The size and types of vehicles and other mechanisms of transport have been identified for each "kit" that is available through the NESS.

### *Stockpiling*

Provinces/territories and local health authorities may wish to review the possibility of rotating stockpiles of critical supplies for NT sites within their own jurisdictions. Jurisdictions may specifically wish to keep some older equipment such beds, which need little maintenance and have no specific "shelf life". Appropriate assessment should be made of the maintenance and training required to ensure the safety and effectiveness of older equipment, training needed by staff to use unfamiliar equipment, etc.

After such a critical assessment, institutions and health authorities may consider maintaining certain critical pieces of older equipment such as ventilators.

The stockpiling of antiviral drugs will be discussed at the national level, however, the need to and feasibility of stockpiling critical medications for the management of patients with influenza and secondary pneumonia, should be address at the P/T and local levels. In addition, provinces and territories will have to discuss with local pandemic planners the need to stock larger quantities of medications and equipment to manage persons with co-morbidities, e.g. chronic cardiac and respiratory disease, diabetes, renal failure, that may be exacerbated by influenza infection. The Clinical Care Guidelines (Annex G) provide guidance on antibiotics for the treatment of secondary pneumonia. The antibiotics currently stockpiled at the national level will be reviewed to determine whether these can be utilized in a pandemic, in addition to, further discussions on the need for additional national stockpiles.

### *Equipment and Supplies*

The issue of equipment and supplies has been addressed in other annexes. The Resource Management annex provides information on supplies and equipment issues for acute care facilities that can be extrapolated to identify needs for NT sites. In addition, the treatment protocols in the Clinical Care Guidelines (Annex G) can be used to plan for medical supply and equipment needs. The Infection Control annex will address the use of masks and gowns and other supplies in various settings.

The services offered by each NT site will obviously dictate equipment and supply needs. For example, it is unlikely that NT Sites will be able to provide the expertise and resources required to support intubated patients, however, equipment may be needed to support patients requiring ventilation while they are transported to another facility. Isolated communities may wish to review the possibilities for hand ventilators (Ambubags) for short-term assistance and other equipment that does not require the same expertise or support as for ventilated patients.

The following is a preliminary list of medical equipment and supplies needed to provide medical care in each site.

- beds, bedding
- lights

- intravenous equipment (e.g., needles, intravenous catheters, fluid and tubing, syringes, tape, tourniquet)
- sterilizers
- sphygmomanometer, stethoscopes, thermometers
- miscellaneous supplies (e.g., antiseptics, dressings, bandages, steristrips, gloves, alcohol based hand sanitizers, alcohol sponges, gauze sponges, arm boards, pulse oximeter, extra batteries for equipment needs, flashlights, scissors, tongue blades, portable lamps)
- emergency drugs (e.g., epinephrine, diazepam, salbutamol)
- airway supplies (e.g., bag-valve-mask, oxygen masks, oxygen tubing, oxygen tank, spacer device for aerosolized medication, motor-driven nebulizers, oral airways, suction machines and catheters)
- patient identification tools
- privacy screens
- communications (telephone, fax, cell, radio or alternatives for isolated communities)
- computers and Internet access

Supplies will need to be carefully managed. An example of a supply management form is provided in Appendix A.

### *Local Production*

During a crisis some items, which are usually ordered from centralized sources, may be produced locally. Procurement specialists may wish to review which supplies could be obtained or produced locally if prior arrangements are made. Possible suppliers and suppliers of alternative products should be contacted to explore this possibility.

## 1.7 NT Site Planning During the Pandemic Period

The following activities, with respect to NT sites, should occur during the pandemic, when there are indications that NT sites will be needed, based on local resource availability and utilization, and projections of disease impact:

- Re-evaluate plans based on WHO and Health Canada epidemiological projections.
- Appoint site administrators/managers or teams
- Implement plans to prepare the site(s)
- Co-ordinate procurement of supplies

### 1.7.1 Re-evaluate Plans Based on WHO and Health Canada Epidemiological Projections

Based on expected attack rates and the demographic of the groups most affected, local planners may re-evaluate what sites and services may be required. For example, if it appears pregnant women will be seriously affected by influenza as they were in 1918, moving deliveries to birthing centres may not be appropriate.

### 1.7.2 Appoint Site Administrators/Managers or Teams

Each NT site will require a site administrator/manager or a team of managers to locate the site, set up, manage adaptations, schedule staff, oversee movement of supplies, maintenance etc. and continue to operate the site. Depending on the size of the NT site, what services are offered and the community, this may require on-site management 24 hours a day 7 days a week for the duration of the epidemic wave. The nature of the task and the fact that any one may fall ill or be incapacitated requires that all such managers should have alternative people to whom to delegate authority.

### 1.7.3 Implement Plans to Prepare the Site(s)

The Centre for Emergency Response and Preparedness (CEPR), Health Canada, has developed outlines for the planning and operation of Emergency Reception Centres and Shelters available through CEPR or the Provincial/Territorial Emergency Services Directors.

- Contact those currently responsible for the site (school board, civic authorities for community centres, etc.)
- Conduct a "walk through" of the site to determine any problems or needed emergency upgrades.
- Ensure heat/light/power/water/telephone is operational.
- Ensure adequate furniture and position.
- Remove any obstructions, tripping hazards, impediments to flow, etc.
- Affix or erect any necessary directional signs, including route to washrooms if unclear.
- Identify various rooms/areas for specific functions (e.g., rest, food service, etc.)
- Ensure adequate hand hygiene stations are available.
- Document and report any:
  - deficiencies in facilities;
  - failure of heat/light/power/water/telephones.
- Arrange to move out and store any equipment that will not be needed (e.g. desks, chairs).
- Clean and disinfect the site.
- Contact any required transportation providers.
- Notify pre-determined media for public direction.
- Determine staff support - electrician/plumber/public health inspector/public health nurse/Occupational Health and Safety personnel.
- Determine municipal support.
- Address financial implications to municipality. Ideally, using previously established accounts.
- Notify garbage removal contractor if required.
- Notify recycling removal contractor if size or duration indicates.
- Notify staff, volunteer agencies, and specialty personnel (see Human Resource Section).

### 1.7.4 Coordinate Procurement of Supplies

- Contact stationery, office, and support equipment providers; arrange transportation if required.
- Contact identified food suppliers (may be a pre-alert to provide lead time).
- Notify any required food transporters (vehicles).
- Arrange for dishes/eating utensils if not present at identified food serving locations.
- Order additional medical supplies.
- Establish alternate transportation/distribution arrangements if required.
- Establish local production of supplies where possible.
- Evaluate the need to access supplies from the NESS and request if necessary.

## 1.8 NT Site Planning During the Post-Pandemic Period

The possibility of subsequent waves of the pandemic, and the resources that would be required during those waves, should be considered before decommissioning NT sites.

Activities at NT sites during the post-pandemic period will focus on the discharging or re-locating of patients, storage of medical records and the decommissioning of the NT site(s). Each site should be assessed for damage or necessary alterations to return it to its previous use. Supplies should be redistributed, stored or returned to stockpiles. Insurers will also need to be notified of the date the site was decommissioned in order to discontinue the coverage.

## 2.1 Introduction

During an influenza pandemic there will be an increased need for people with health care training to deal with the increased demands on the health care system. This may involve the re-locating of health care workers to different settings, including NT sites or to different locations within the same traditional site to provide services that differ from their usual responsibilities. In addition, non-health care workers may need to be hired/contracted to provide supplementary services essential to the establishment and operation of NT sites or the expanded role of current health care sites. Volunteers will also be a potentially vital source of human resources to facilitate the management of health care services during a pandemic.

During an influenza pandemic the shortage of trained medical staff will be one of many barriers to the provision of adequate care. A significant proportion of the workforce may be unable to attend work for a period of time due to illness in themselves or family members. Communities and health care organizations will need to have specific guidelines in place to address what will be done if the health care system is overwhelmed and NT sites must be established or current service sites expanded. Human resource management in the acute care setting during a pandemic is addressed in the Resource Management Guidelines for Health Care Facilities During an Influenza Pandemic, Annex H of the Plan. This section of the document will, therefore, focus on human resource issues outside of the traditional acute care settings.

## 2.2 Human Resource Planning During the Interpandemic Period

Planning during the interpandemic period for the optimal use of human resources at NT sites and other health care sites involves several steps. The following list of steps/activities is provided to assist with this part of the planning process, details are provided in the following sections.

- Appoint a human resource management team.
- Identification of human resource needs and a database to be used for staff and scheduling.
- Review emergency preparedness legislation.
- Recruitment of health care professionals.
- Plan for salaries or payments to staff not currently employed by the health care system.
- Identify and recruit volunteers.
- Provide training.
- Establish immunization recommendations.
- Supporting health care workers in NT sites.
- Insurance/licensing.

### 2.2.1 Appoint a Human Resource Management Team

The work involved in identifying current health care workers who could be re-located to NT sites; recruiting additional health care workers, non-medical workers and volunteers; and managing the training, assignment and support of these workers, should be initiated during the interpandemic period.

Establishment of a team or subcommittee that could take on these responsibilities in each jurisdiction is an important first step. A combination of professionals with expertise in human resource issues, pandemic planning, health care administration, and volunteer organizations would be desirable for this planning team/subcommittee.

### 2.2.2 Identify Human Resource Needs

One approach to identifying the human resource needs for NT and other health care sites is to consider each potential type of site and the services that would be provided at each. From this exercise the number and type of health care workers and non-health care workers that would be required per site could be estimated.

The following is a list of where additional or new human resources will be needed during a pandemic (excluding acute care facilities).

- Triage Sites – community triage sites: at clinics, non-traditional sites, attached to an existing hospital
- Non-Traditional Sites – including emergency care centres, emergency hospitals, support hotels, nursing stations, etc.
- Vaccination Clinics – mobile clinics, clinics in acute care sites, etc.
- Home Care/Community Care – to reduce the pressure on other health care programs
- Long Term Care Facilities
- Telephone Information Services, 24-hour health lines
- Other – doctors' offices, specialty health services (cancer or cardiac treatment centres), etc.

In order to make best use of the skills of various health care workers a pandemic will likely require that health care workers be reallocated from their usual roles and settings. For example, trained, health care professionals, will be required to supervise volunteers and other staff in clinics and non-traditional sites.

Shortages of physicians and nurses will require extensive use of other health care professionals, trained non-medical workers and trained volunteers. Each jurisdictions needs to conduct an inventory of health care personnel and potential volunteers and determine sources from which additional staff could be acquired, assuming that hospitals are using much, if not all, available staff for their own needs. The following list is for reference, and may be adapted and altered to meet various needs.

### *Health Care Workers (HCW)*

Within facilities, consideration should be given to reassigning medical and nursing personnel with administrative, research and educational assignments to clinical duties.

Alternate sources of HCW would include, but are not limited to:

- retired physicians/nurses (need to be assurance that work during a pandemic would not affect their pension plans)
- physicians/nurses currently not working in clinical health care (i.e., working in education, administration, research, private industry)
- medical and nursing students
- registered nursing assistants
- patient care assistants
- emergency medical technicians
- veterinarians
- pharmacists
- therapists (respiratory/occupational/physio)
- technicians (laboratory, radiography)
- pharmacists, therapists, technicians in training
- health care aides

### *Personal Care Services*

Personal care services involve those people that provide health care and support services in the home. It is recognized that these organizations already function near capacity and may have limited ability to expand during a pandemic. These services include, but are not limited to:

- VON
- Home Health Agencies

### *Categories of Workers*

In a pandemic, in addition to current health care workers, health care tasks may have to be undertaken by personnel who would not normally perform these tasks. For the purposes of assigning tasks, training, support, insurance and other issues human resource planners and managers must be aware of the following types of workers:

- Paid health care professionals
- Paid health care workers who are not licensed professionals
- Paid non-health care/non-medical staff (support, maintenance, etc.)
- Volunteer health care professionals
- Volunteers trained in medical tasks, but who are not licensed professionals.
- Volunteers not trained in medical tasks, but can provide other essential services to health care sites– e.g. electricians, who help set up the NT site.

For each site the essential functions and the skills required to complete each task should be identified and documented. It will be necessary to establish medical and nursing directives for each NT site (triage, influenza hospital, nursing station, community clinic or support hotel) and to access existing directives for sites that may need to be expanded during a pandemic.

The next step is to list the type of workers/volunteers who already have the skills to carry out these tasks. (In existing institutions these roles are already defined, however they will need to be developed and adapted for use in the Non-Traditional Sites.) Any gaps in required skill sets should be addressed during this planning exercise. It may be necessary to investigate the local availability and access to other types of service providers in this type of emergency situation (e.g., mortuary services).

### *Checklist of Functions and Personnel at Non-Traditional Sites*

This is a checklist of functions that may be required at a non-traditional site. It is an example of how the exercise described above might be documented. Depending on size, number of patients and function of the site, many tasks may be carried out by the same individual. Consider that these functions may be required 24 /7. Some services may be provided by a central hospital or community.

| | FUNCTIONS | SKILL SETS/PERSONNEL |
|---|---|---|
| A | Administration | |
| | Site Administration/Management | Management/administration |
| | Co-ordination of Patient Care – staff scheduling and support, assessing service demands and supply | Medical training/knowledge (e.g. in-charge nurse), leadership and coordination skills |
| | Medical Management | Physician or nurse with physician backup |
| | On-site training and orientation of staff, volunteer and family members | Knowledge of basic patient care, patient triage, infection control, occupational health and safety |
| | Spokesperson | Medical management. If no medical spokesperson refer to hospital or site administrator |
| | Receptionist | Communication/language skills, public relations |
| | Health Records Management | Clerical skills (including computer skills), confidentiality agreement |
| | Information Technology Resource | Knowledge of IT systems and problem solving skills |

| | FUNCTIONS | SKILL SETS/PERSONNEL |
|---|---|---|
| B | **Patient Care** | |
| | Medical triage | Medical training/nurse, ideally with ER training |
| | Admissions/Discharge | Medical training/nurse, ideally with experience in discharge planning |
| | Patient Care - medical | Instructed in nursing care: rehydration, feeding, ambulation, bathing, vital signs monitor, give meds |
| | Physiotherapy | Trained in chest phyiotherapy and mobilization |
| | Respiratory care | Trained in oxygen delivery, patient monitoring, equipment monitoring (oximeters) and inventory |
| | Pharmacy Services | Pharmacist at hospital or in community |
| | Discharge planning | (Refer to community care, self care) |
| C | **Infection Control** | |
| | Sterilization of Equipment | Trained in sterilization and infection control |
| | Housekeeping | Basic infection control knowledge |
| D | **Food Services** | **Hospital or community based?** |
| | Patient nutrition/therapeutic diets | Dietician at hospital or in community (home care, meals on wheels) |
| | Food preparation - workers' meals | Basic food safety training |
| E | **Social Services** | |
| | Social service/community care | Counselling, accessing community resources/Liaison Social Worker |
| | Psychology/Pastoral Care/Grief Counselling | Social workers, religious leaders, psychologists, local service clubs/support groups |
| | Care for children/family members of workers | Training or experience in child care, care for elderly, home care/criminal records check |

| | FUNCTIONS | SKILL SETS/PERSONNEL |
|---|---|---|
| F | **Morgue** | |
| | Transportation of corpses | Driver's license |
| | Preparation and storage of corpses (see Annex on Mass Fatalities) | Body bagging, shelving corpses |
| G | **Transportation** | |
| | Patients, Staff | Class 4 license |
| | Dangerous goods (e.g. oxygen), medical waste | Appropriate licenses and liability insurance |
| | Supplies, Lab tests | Drivers license, criminal records check |
| H | **Services** | |
| | Laboratory testing | Laboratory services at hospital or in community |
| | Maintenance | plumbing, electrical, etc. |
| | Laundry | local laundry business |
| | Communication services and equipment support - phone, cells, cable, computer support | Local businesses |
| I | **Security (Staff ID will be necessary)** | |
| | Public order and personal safety | Crowd control, traffic control |
| | Protection of site – fire safety, theft | Trained in building safety and security |

*Training for health care workers, volunteers, family members may be carried out at the time of a pandemic.*

### 2.2.3 Review Emergency Legislation

Emergency legislation makes many provisions for the management of workers during a crisis. This includes the recruitment of professional and other paid staff as well as volunteers, managing human resources and protection of people who volunteer. Pandemic planning should be integrated with the emergency plans of the jurisdictions as much as possible, in order to make best use of existing plans and resources. Remember, it is unlikely that an Emergency will be "declared". Therefore human resource planning should be based on existing plans without a declaration.

The following provisions of legislation are particularly applicable to human resource issues including:

- authority regarding licensing and scope of practice issues, and the ability of government to make unilateral changes during a crisis;

- safety and protection of workers, (one of the primary responsibilities);
- fair compensation;
- insurance, both site insurance, workers compensation and other forms of insurance;
- training;
- provision of clothing and equipment;
- protection of the jobs of workers who take leave to assist during the crisis.

### *Compelling Workers*

Under emergency legislation Provinces/Territories may have the authority to designate "Essential Services" and workers and have the ability to compel people's time or property with due compensation *as a last resort*.

This issue has been raised both because of the existing shortage of health care workers and concerns that health care workers and others may refuse to work during a pandemic due to changed job responsibilities, fear of infection, family responsibilities or other reasons. However, the extreme difficulty of enacting or enforcing such legislation and would strongly encourage the jurisdictions to review all other methods of obtaining essential human resources, in advance of a pandemic.

### 2.2.4 Recruitment of Health Care Professionals

While actual recruitment of health care professionals for the purpose of service provision will not be necessary until the pandemic arrives, it is important to establish an ongoing dialogue with these professionals in the interpandemic period. Communication must take place to inform health care professionals about influenza, influenza pandemic plans and their roles within those plans. It will be important to convey the potential impact of the pandemic on health care service provision and specifically the need for additional human resource and NT sites. Issues regarding licensing and scope of practice expansion during a crisis should be discussed with the goal of addressing any concerns during the interpandemic period rather that at the time of the pandemic. In addition, any potential impediments for recruited/volunteer health worker being able to return to their own workplace following the provision of services in the NT site, will need to be addressed in advance. Education regarding the identification and treatment of influenza and immunization programs should also be ongoing during the interpandemic period.

In order to be able to call on health care professionals, for the purpose of pandemic training or the implementation of the pandemic response, planners should review the logistical and legal issues around developing databases of HCWs who have the training and skills needed during a pandemic. This may be achieved by arranging with the appropriate licensing bodies or associations for the establishment and maintenance of databases of members for use during a crisis. There may be legal requirements that individuals agree to keep their names on a list of professionals available for work in a crisis.

### 2.2.5 Plan for Salaries or Payments to Staff Not Currently Employed by the Health Care System

Decisions around payment and expenditures will be based on current arrangements and labour agreements in each province, territory or local jurisdictions. Planning must be based on these contractual arrangements or assessment of current local salaries for similar work.

### 2.2.6 Identify and Recruit Volunteers

#### *Definition of Pandemic Volunteer*

The following is a definition of a volunteer for the purposes of pandemic planning and response.

> ***A volunteer is a person registered with a government agency or government designated agency, who carries out unpaid activities, occasionally or regularly, to help support Canada to prepare for and respond to an influenza pandemic. A volunteer is one who offers his/her service of his/her own free will, without promise of financial gain, and without economic or political pressure or coercion.***

A volunteer may be a health care or other professional, or any other person who offers their services freely. Notwithstanding that while a volunteer may not expect financial gain, or remuneration for their time, the agency or government may provide supports such as: insurance protection, family support and job security to facilitate the recruitment of needed volunteers.

#### *Interpandemic Tasks in Volunteer Management*

There are several tasks/activities that should take place during the interpandemic period to optimise the use of volunteers in the pandemic response. These include:

a. Communicate with the public and with volunteer organizations.

b. Develop and maintain databases of volunteer organizations.

c. Develop Job descriptions and skill lists for volunteer positions in conjunction with volunteer agencies. (See Checklist of Functions and Personnel)

d. Develop recruitment, screening procedures.

e. Develop training procedures.

f. Monitor and track qualifications.

g. Prepare to manage volunteers.

The time between the WHO declaration of an influenza pandemic, the first wave and analysis of the severity of the pandemic will be very short. There will be a need to recruit, screen, train and deploy volunteers as quickly as possible. Therefore procedures need to be in place in order to best place volunteers in as short a time as possible.

a. **Communicate with volunteer agencies**

Existing volunteer agencies will be the primary source of trained, screened volunteers in most jurisdictions. Developing ongoing communications and planning procedures with these agencies will be essential to the planning effort.

Potential sources of volunteers include, but are not limited to:

- Red Cross
- St. John Ambulance
- Salvation Army
- Volunteer Fire Departments
- Mennonite Disaster Services
- Adventist Disaster Relief Association (ADRA)
- Scouts, Sea/Army/Air Cadets, Guides
- Big Brothers
- Big Sisters
- Community Service Agencies
- Christian Reformed World Relief Committee - Disaster Response Services

Each jurisdiction needs to liaise with non-governmental organizations within their district to determine the approximate number of volunteers who would be available during a pandemic.

During the interpandemic period, recruitment of volunteers, both those with health care skills and those without should take place primarily through existing agencies. These agencies already have recruitment, screening, training programs and management programs in place. It is important that health authorities and emergency planners establish communication with existing agencies to communicate community needs during a pandemic, in order that agencies may recruit and maintain a core group of volunteers with appropriate training. They may wish to add certain types of training to standard training programs in order to address issues regarding pandemic influenza. Specifically, volunteers should be aware that unlike other emergencies such as earthquakes or floods, the duration of the "emergency" will be longer for an influenza pandemic and more than one pandemic wave will likely occur. Since people view the risk of disease differently than the risk of injury, and will be concerned about bringing this disease home to their families, it is important that these issues are addressed during training sessions.

b. **Develop and maintain databases of volunteers**

Because maintaining up-to-date databases of volunteers is time consuming, difficult and expensive, health authorities will likely have to depend on existing volunteer agencies. Such agencies should be encouraged, where possible, to track trained and screened (those that had interviews, reference checks and criminal records checks) volunteers and track records of certificates or diplomas and maintain methods of communication. Health authorities may wish to encourage these agencies to keep their databases current, and to expand the information on their volunteers' skill sets or experiences, to include skill sets that would be required in a pandemic.

c. **Develop job descriptions and skill lists for volunteers**

Develop a list of jobs, job descriptions and skills based on the needs of the region or community and working in conjunction with volunteer agencies. (See Checklist of Functions and Personnel). This list can be used to determine which training programs are necessary and how best to recruit, train and assign volunteers in the interpandemic and pandemic periods.

d. **Develop volunteer recruitment, and screening procedures.**

Develop procedures that can be implemented quickly once a pandemic is declared. (See Pandemic Period – Recruitment, Screening and Deployment.)

e. **Monitor and track qualifications and certification**

Plan for methods to ensure health care workers, including volunteers are trained and certified for the tasks they are undertaking.

- Review the logistical and legal issues around developing databases of HCW's who have the training and skills to be deployed during a pandemic.
- Arrange with appropriate agencies to maintain databases of members for use during a crisis. There may be legal requirements that individuals agree to keep their names on a list of those available for work in a crisis.
- Plan for a "Quick Check" method of confirming certification or qualification.
- If a volunteer is trained at an NT site during a pandemic, plan for ways to test and record the level of skills.

f. **Prepare to manage volunteers**

During a major crisis many people come forward who wish to volunteer. In some cases managing the numbers of people who come forward to volunteer is a major logistical effort in itself.

***During the interpandemic period***:

- Review emergency plans for managing an influx of volunteers.
- Plan for a volunteer co-ordinator or team – identify agencies, positions or individuals – to take responsibility for directing the process of accepting, screening, training and placing volunteers.
- Ensure resource information is available to the volunteer co-coordinator/team.
- Plan for a location for volunteer recruitment/management that is separate from existing hospitals or clinics to reduce congestion and security issues.

### 2.2.7 Provide Training

Both health care professionals and other workers will need training for dealing with pandemic influenza. Professionals may need training or refresher courses in tasks they don't normally perform, including supervision and management. Due to the limited number of health care professionals that will be available in the community, volunteers and other non-medically trained staff will likely be needed to perform direct patient care.

i) **Train the Trainer**

Health authorities and existing volunteer agencies, may establish programs to "train the trainers," to maintain resources to call on during a pandemic. Plan for where and how

training programs will be delivered, ideally during the interpandemic period, but also during the pandemic.

ii) **Train for Self-Care**

All health care workers should be trained in self-care as it pertains to pandemic influenza treatment and symptom control and the ability to communicate the principles of self-care to others. As professionals will likely be required for the provision of medical services, teaching self-care skills may become part of the volunteers' role.

A number of jurisdictions are currently developing "Self-Care" modules designed to improve the quality of home care. (See the Clinical Care annex for more information). Jurisdictions are encouraged to share such resources and to develop other health information services for the public, e.g. 24-hour telephone health information services. Ensure that all those training in self-care are using consistent, accurate and up-to-date information.

Plan for methods to educate health care workers and the public in Self-Care. While some education will be done in advance, much of the education of patients and their families will take place in clinics, NT Sites, vaccination clinics during a pandemic.

iii) **Train Health Care Professionals**

A number of training programs exist which can be adapted for pandemic influenza. Health care professionals may need training for reassignment and training for supervision.

The time for training once a pandemic is underway will be extremely short; therefore training should be incorporated into existing programs now. By incorporating the skills needed during a pandemic into existing training, we reduce costs, improve efficiency and enhance readiness.

Training may include medical training essential to working in a pandemic situation including:

- Infection control procedures
- Use of respirators and care of patients on respirators
- Worker and volunteer supervision
- Working with grieving families

Develop a plan for training/retraining health care workers who have not been working in health care (retirees, etc.) at the time of a pandemic. (See Resource Management Guidelines in Acute Care Settings (Annex H) for lists of Health Care Professionals.)

iv) **Train Volunteers**

During the interpandemic period, volunteer training may be left as much as possible to existing agencies. In areas without well-developed volunteer systems and agencies, planners may wish to review the need for developing, maintaining and funding core groups of volunteers trained for medical emergencies such as pandemic, and trained trainers.

All volunteers should be trained for

- Self-care and
- Infection prevention and control (routine or universal precautions).

Based on the Checklist of Functions for your jurisdiction, volunteers working in direct patient care may also be trained in:

- Basic personal care (Bed baths, bed pans)
- Observation of condition (temp, pulse, resp, etc.)
- Case definition, identify the illness
- Giving medications (pills, eye and ear drops, liquids)
- Oxygen administration
- Pressure ulcer prevention – skin care
- Ambulation, mobilization

Volunteers will also be needed who are trained in the following:

- Cleaning in health care facilities
- Records management
- Food preparation (Food Safety Courses)
- Workplace Hazardous Materials Information Systems (WHMIS) protocols
- Security staff trained in working with grief stricken people.

Review the Checklist of Functions for the training required in your jurisdiction. As far as possible, existing agencies should be encouraged to maintain skills in these tasks during the inter-pandemic period.

v) **Training Resources and Programs**

Curricula for the above listed skills are available through existing agencies.

Training programs include, but are not limited to:

- on-line courses, including an Infection Prevention on-line course for infection control issues at www.igc.org/avsc/ip/index.html
- Association for Practitioners in Infection Control and Epidemiology training manual "*Influenza Prevention: A Community and Healthcare Worker Education Program*" < http://www.apic.org/resc/>
- St. John Ambulance Brigade. Brigade Training System. 1997
- St. John Ambulance Brigade. Handbook on the Administration of Oxygen. 1993. ISBN 0-919434-77-0
- The Canadian Red Cross Society. *Yes You Can prevent disease transmission*. 1998
- Nursing colleges training programs (i.e. the basic care programs for health care aides)
- CHICA, APIC and the Infection Control Association in the UK have a "tool kit" with detailed forms and templates that could be used at the NT site, 2002. [reference: "Infection Control Toolkit" - Strategies for Pandemics and Disasters, can be ordered through the Community and Hospital Infection Control Association (CHICA-Canada), Phone: 204-897-5990 or toll free 866-999-7111; Email : chicacda@mb.sympatico.ca]

### 2.2.8 Establish Immunization Recommendations

While no vaccine for the pandemic strain of influenza will likely be available in advance of the arrival of the pandemic in Canada, health care workers should be up-to-date with the other recommended immunizations. Because immunizations require varying amounts of time and some require more than one dose for a person to develop immunity, it will likely be impossible to provide all of these once a pandemic is declared, or to provide them within an appropriate time frame given the lack of supplies and human resources.

Where possible volunteers already working with existing agencies or recruited in the interpandemic period should be encouraged or required to be up-to-date with respect to the recommended immunization schedule. In addition, depending on type of work they will be doing during the pandemic, it may be appropriate to recommend that volunteers receive the same immunizations that are recommended for health care workers (e.g., hepatitis B vaccine). Volunteer recruiters should also ask for immunization records, where possible, to facilitate identification of individuals who are not up-to-date with respect to the current recommended schedule.

### 2.2.9 Supporting Workers in NT Sites

Plans to extend support programs for health care workers (including trainees, volunteers and retirees) to all workers at NT sites should also be included in overall plan for the management of human resources. Support should include: provision of food and drink, grief counseling, support for families and job protection.

### 2.2.10 Insurance/Licensing

In addition to addressing any liability / insurance issues in relation to health care professionals and other non-professional health care workers, these issues must also be addressed for retired/trainee health care professionals and volunteers performing patient care and other non-medical tasks.

There are a number of insurance issues which present major concerns, especially the insurance required for workers at NT sites including volunteers. The Non-Traditional Sites and Workers subgroup has noted that issues around personal liability and workers compensation (including compensation for acquired illness) may present a powerful barrier and disincentive to the recruitment of health care workers, especially volunteers, during a crisis. A recommendation has been put forth, that these issues be addressed on a national basis, and be reviewed by provincial/territorial planners to determine the legislative, administrative, licensing and other options within each province and territory.

The scale of a pandemic may require significant changes to scopes of practice of professionals, and delegation of tasks to non-professional staff and volunteers. These raises many issues regarding insurance and licensing which must be reviewed with respect to existing insurance, licensing practices, cross jurisdictional licensing, labour agreements and Emergency Legislation. The types of insurance which must be reviewed include:

- Malpractice and personal liability
- Transfer of licensing between jurisdictions
- Workers compensation
- Accidental death and dismemberment.
- Directors and officers liability (depending on the administrative authority)

### *Malpractice/Liability Insurance of Workers and Volunteers*

Review liability protection/malpractice insurance coverage to see how it will extend to cover workers in Non-Traditional Sites, professionals, those taking on tasks not usually part of their scope of practice and volunteers.

### *Transfer of Licensing Between Jurisdictions*

Each province/territory must review with its professional licensing bodies (medical colleges, nurses associations) how pandemic workers with varying qualifications, or licensed in other jurisdictions, may deliver some services. Professional licensing bodies may be asked to liaise and extend privileges to out of province professionals, or foreign trained professionals based on their standing in another jurisdiction.

### *Workers' Compensation*

Each province/territory must make appropriate arrangements with their workers' compensation board if pandemic volunteers are to be covered by workers' compensation. A Memorandum of Understanding (MOU) between the Office of Critical Infrastructure Protection and Emergency Preparedness (OCIPEP) Canada and the provinces/territories asserts that registered volunteers or persons compelled for emergency service work are protected by workers' compensation during emergency response, as long as they are registered. Some volunteer agencies have a liability policy for their volunteers. In some circumstances, volunteers who register with designated agencies may be covered by workers' compensation under Emergency Preparedness Legislation. However, there are a number of issues to be resolved with workers' compensation Boards at the provincial level:

- Definition of Health Care Workers for this purpose
- Definition of volunteers for this purpose
- Does the policy require a declaration of Emergency and at what level of government or would the insurance come into effect once the Minister of Health declares a Pandemic?
- Compensation is usually based on loss of income, however, in some cases volunteers may be retired, homemakers, or self-employed. Would compensation cover costs of the person's other responsibilities, such as family care?
- Would compensation be available if volunteers became ill rather than injured?

### *Accidental Death and Dismemberment*

Usually a subset of workers' compensation. Ensure that this insurance is available.

### *Directors and Officers liability*

If the health care site or service is a part of an existing institution, hospital, or health authority, determine whether existing insurance can be extended to those managing sites or services elsewhere or obtain this insurance elsewhere.

## 2.3 Human Resource Planning During the Pandemic Period

Once a pandemic is declared there will be a massive effort required to implement the programs and activities developed during the interpandemic period to manage the human resource issues. Activities will include:

- Activation of the Human Resource Management Team
- Implement Volunteer Management Team
- Provide Human Resource Management Team with lists and job descriptions of personnel required.
- Contact supporting organizations to request additional personnel with special skills, e.g. Translation Services, Churches/Counselling Services.

### 2.3.1 Contact Health Care Professionals

By the time Pandemic is declared most existing health care institutions and agencies will be aware that the WHO and Health Canada have been monitoring a growing situation. Communications with professionals is vital at this stage as professionals will be required to take on additional or changed responsibilities and may be reassigned to other sites or activities.

### 2.3.2 Volunteer Recruiting, Screening, Training, Deployment

a. **Communicate with volunteer agencies**

Communicating with the Volunteer Agencies to co-ordinate the activities of voluntary efforts will be one of the first tasks of the Volunteer Management Team.

b. **Call for volunteers**

In emergencies often volunteers come forward. This potentially large and commendable response needs to be channelled so that those with needed skills can be placed where they are needed most and their skills can be optimized. However, not all volunteers will have the skills, ability or stability required for the jobs they want to do. Therefore, any calls for volunteers should identify the needed skill sets to streamline the recruitment process.

Volunteer recruitment and screening needs to be considered, including:

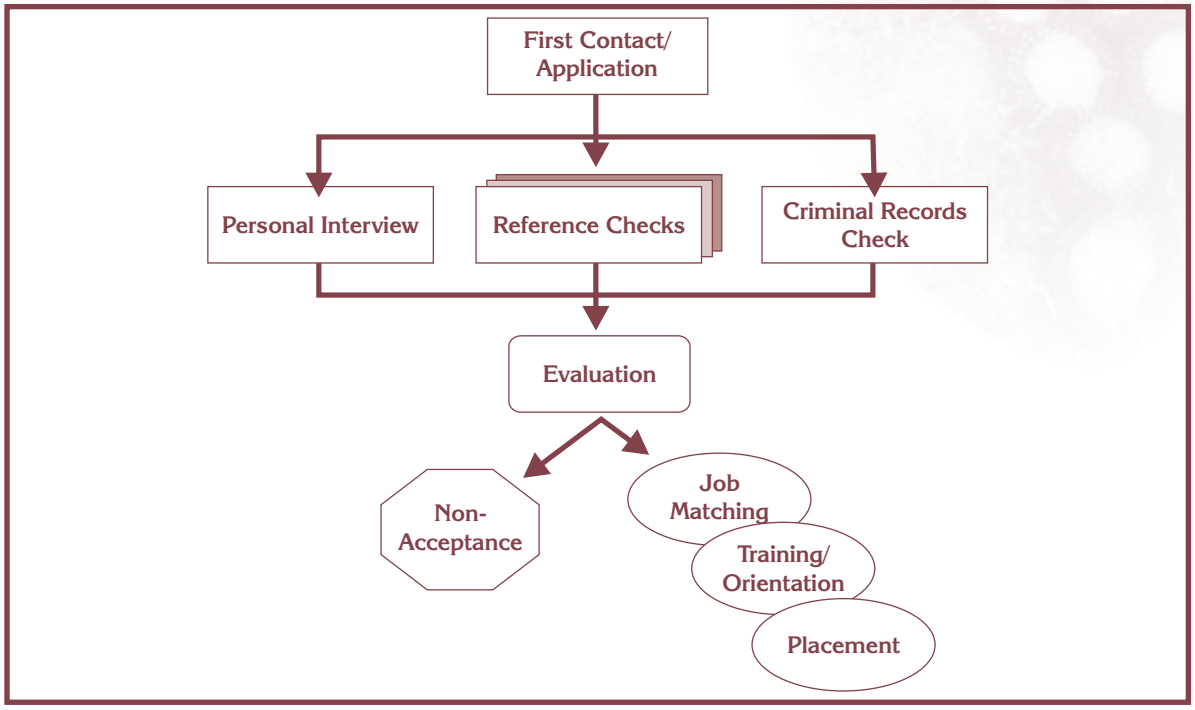
- position descriptions
- advertising the need for volunteers
- screening criteria
- volunteer application forms
- interview
- reference checks
- criminal record check.

Useful resources include, but are not limited to:

- The Canadian Red Cross Society. National Volunteer Policy Manual
- The Canadian Red Cross Society. The 30-Minute Quick-Response Guide. 1995.
- The Canadian Red Cross Society. Disaster Response Team: Participant Attachments. 1996.
- St. John Ambulance Brigade. Screening Brigade Volunteers. 2000.

c. **Volunteer screening**

Volunteers in a pandemic may be placed in positions of significant trust and authority, with vulnerable people. Volunteer positions will vary in nature, in the type of training, skills and abilities required, in the setting and in the level of risk to the volunteer. Volunteer screening must take all of these issues into consideration and provide for interviews, review of qualifications and appropriate assignment. In addition, it is important to ensure that volunteers do not have a personal history, which indicates they are incompatible with the safety and well being of vulnerable people.




Screening processes must review the stability of the individuals and may include criminal record checks. Information on procedures used by the Red Cross, and St. John Ambulance is available through their offices.

The most important part of volunteer recruitment and assignment is the interview process. Reference checks are also a good screening tool. A criminal records check is usually required by law for volunteers who work with vulnerable people. However, during the pandemic, police services may not have the resources due to illness and/or have other high priority duties to provide this service. Therefore more emphasis may need to be placed on conducting a good interview and reference check process. It will be important use trained volunteer recruiters, preferably identified and trained during the interpandemic period.

- Check existing emergency plans, regional or municipal plans for information on recruiting and screening volunteers
- Partner with existing agencies, where possible.
- Review Red Cross, St. John Ambulance and other resource documents

**Due Diligence**: The volunteer recruitment process should include a briefing meeting on risks and infection control (routine or universal precautions), and should require the individual to sign an agreement acknowledging they have been informed of the risks and protections, prior to being assigned to a placement.

### 2.3.3 Training During the Pandemic

Training programs developed or planned during the interpandemic period should be "geared up". These will include those programs listed in the interpandemic section of this document.

#### *Training for Families/Caregivers*

Family members of patients may stay at the site to help care for a patient or may be asked to take a patient home. In either case, the family member will need some training, especially in the areas of re-hydration, infection control, observation and assessment, and self-care. In addition, families may require counselling to help them support those who are ill or to cope with fear and grief.

#### *Training for Support Tasks*

In addition to training for patient care there are needs for training for intake, housekeeping, maintenance and other tasks. There are standards set for training of all workers related to health care, including housekeeping and maintenance staff. In many cases Staff Associations set these standards.

It is important to note that during a crisis it will not be possible to demand the same level of training for volunteers, which would normally be required of staff. Thus, it will be important to consider what are the minimum standards and basic information that must be communicated on certain issues.

### 2.3.4 Supporting Workers in NT Sites

Support provided to Workers at Non-Traditional Sites may include:

- Emotional support/grief counselling (aimed at permitting workers to continue to work and reduce loss of staff due to grief or traumatic stress).
- Family care (for children, seniors, sick family members who do not require hospitalization). This poses some questions around infection control if gathering children or others together for group care.
- Job protection for workers who move from other jobs during pandemic.
- Job protection for spouses who do family care to allow workers to work in health care.

### 2.3.5 Communicate Changes to Licensing and Insurance Provisions

Inform site managers and coordinators, as well as health care professionals in all sites and health care programs of changes in licensing and insurance and what it will mean for flexibility in staff deployment and additional staffing.

## 2.4 Human Resource Planning During the Post-Pandemic Period

Activities during this period will focus on the demobilization of staff and volunteers. Assessment of insurance claims or claims for assistance will also occur during this period.

# K Canadian Pandemic Influenza Plan: Communications Annex

## Introduction

The objective of this annex is to ensure that Canada's health partners are prepared to respond to the enormous public communications challenges associated with an influenza pandemic. Specific activities designed to promote consistent, coordinated and effective public communications of federal, provincial, territorial governments and other health partners are set out. As well, emergency communications options are described to ensure that the public communications demands of various scenarios are met.

Operational plans for public communications will reside within the specific organisations involved in the response. For example, Health Canada will use its Crisis/Emergency Communications Guidelines (September 2003), just as specific provincial and territorial ministries will rely on their own plans and systems.

## Strategic Considerations

1. Provincial, territorial health ministries and/or local authorities assumes lead responsibility for public communications within their jurisdiction.

   Health Canada is the lead organisations for public communications if the pandemic has moved beyond a single province or if a national emergency has been declared. Specific responsibilities include disease surveillance and national guidelines for infection control.

   Canadians are unlikely to distinguish between levels of government in the event of a health emergency. Public communications among all involved organisations must be coordinated and consistent.

2. Public Communications around an influenza pandemic will occur in the international context. Key audiences, especially the media, will access various information sources from around the globe including the World Health Organisation. Communications channels must be opened with the WHO, HHS and the CDC to ensure an ongoing exchange of information, key messages and information products.

3. Canadians will turn to various sources to obtain the information they need and want during a pandemic scenario. Professional groups such as the Canadian Medical Association, Nurses Union, Canadian Pharmacists Association will be key partners in disseminating information, as will NGOs such as the Red Cross, Salvation Army, and others. Strong communications networks must be established with these organisations to ensure an ongoing exchange of information, key messages and information products.

4. The public communications demands of an influenza pandemic will likely exist at the top end of anything organisations have experienced in the past. In addition to the full weight of the individual organisation's communications capacity being brought to the table, organisations must find ways to work together to ensure as efficient a national effort as possible.

5. Public communications strategies must consider the information needs of:
   - communities directly affected
   - health professionals and health facility staff
   - regional, national and international media
   - other federal, provincial, territorial and international government organisations
   - key non-governmental organisations (e.g., Canadian Medical Association, Canadian Nurses Association, Red Cross, etc.)
   - industry representatives (e.g., pharmaceutical sector, medical supply sector)
   - specific ethnic communities that may require translated information packages into languages other than English or French
   - internal, non-implicated staff
   - international partners and stakeholders (WHO, HHS, CDC)
   - infectious disease experts
   - Members of Parliament and legislatures
   - Aboriginal communities

   **Note**: See Section 11 for additional information on audiences
6. Risk communications principles must be applied in developing both content and strategy for public communications activities in response to an influenza pandemic.

## Notification Process

1. **Integration of communications staff into main notification procedures**

   Communications staff will be integrated into the notification processes within the Canadian Pandemic Influenza Plan. It is the responsibility of emergency managers in the implicated organisations to ensure that their own organisation's communications staff are alerted to a developing problem.
2. **Notifying communications staff of other governments and health partners**

   Although the lead province or territory will likely notify other organisations, Health Canada will be responsible to ensure communications staff from the provinces and territories have been notified. This will be done through the Health Emergency Communications Network.

   Similarly, Health Canada will be responsible for alerting communications staff of key non-governmental organisations. This will be done through a network currently in development.

## Public Communications Coordination

1. **Health Emergency Communications Network(HECN)**

   Teleconferences of the HECN will be organised to ensure coordinated public communications messages and activities among F/P/T organisations.

   Health Canada will be responsible for organising these teleconferences, frequency will depend on the need identified by HECN members.

2. **Intergovernmental Coordination**

   Health Canada and involved health ministries will lead teleconferences of other implicated departments to ensure coordinated public communications activities across respective governments. For example, Health Canada may convene teleconferences with communications representatives of Department of Foreign Affairs and International Trade, Office of Critical Infrastructure Protection and Emergency Preparedness, the Privy Council Office and others. Provincial and territorial health ministries will convene similar intra-governmental meetings.

3. **International Coordination**

   Contact – either through email or by teleconference – must be made with key international health organisations including the World Health Organisation, the department of Health and Human Services (US) and the Centers for Disease Control and Prevention (US) to share public communications messages, and coordinate public communications activities.

   Health Canada will engage international contacts and report back to the HECN.

## Establishment and Coordination of Toll-Free Lines

1. Involved organisations will likely set up toll-free information lines for both the health professionals and the general public. Background material used by operators on such lines should be shared to ensure that consistent information is being disseminated.

## Website Management

1. Websites of all involved organisations should include links to central information sources (such the World Health Organisation and Health Canada), as well as other involved organisations and information sources.
2. If the emergency escalates, a central, emergency specific website should be established. The address of such a central website would be included as part of the public communications activities of all involved organisations. Health Canada is currently developing options for such a central, emergency specific website.

## Recommended Public Communications Activities

| | |
|---|---|
| **Phase 0, Level 1:**<br>Novel virus identification in a human | › Notification of the Health Emergency Communications Network(HECN), as well as communications staff with international and non-governmental organizations<br>› Review existing communication systems (e.g., emergency contact lists, toll free capacity, dedicated Internet site capacity, information sharing systems )<br>› Work with partners to improve the local, provincial/territorial and federal informatics infrastructure to support the potential information campaign<br>› Ensure names/numbers/e-mails are up-to-date and document sharing is possible |
| **Phase 0, Level 2:**<br>Human infection confirmed | › Activate inter- and intra- governmental response through national teleconferences (including the HECN, and the NGO health emergency communications group)<br>› Refine/modify F/P/T communication plans as needed and ensure consistency with the emergency preparedness and response framework to be established by the Special Task Force to the Conference of F/P/T Ministers of Health<br>› Ensure that rapid 24 hour translation capacity is in place and that all responders know how to access this resource<br>› Ensure that web-site production staff are alerted to the potential need for development of sites and linkages<br>› Identify gaps in the existing systems that will require additional resources (e.g., funding for toll free lines, dedicated press conference facilities and HR support for comm. staff)<br>› Stage background technical briefings for media, external experts and other stakeholders |
| **Phase 0, Level 3:**<br>Human-to-human transmission confirmed | › Increased engagement with international partners<br>› Establish ongoing communications with media, partners and public<br>› Activate Emergency Communications processes (as set out in the Emergency Communications Plans within each implicated organizations)<br>› Establish 1) communications lead 2) strategic considerations 3) draft initial response<br>› Recruit/supply additional resources to fulfill previously identified gaps in the existing systems<br>› Implement plans and mechanisms for communications with all relevant audiences, including media, key opinion leaders, stakeholders, employees |

| | |
|---|---|
| **Phase 1:**<br>Pandemic confirmed | › Institute daily conference calls of the HECN, ensure it is integrated with PIC meetings<br>› Ongoing communication with global partners<br>› Ongoing communications with media, partners and public<br>› Establishment of joint website/linkages<br>› Launch multi-media campaign targeting specific target groups including the general public, health care workers and local community support network<br>› Stage joint media and stakeholder briefings with representatives of Health Canada, relevant P/T officials, CMOH rep, etc. |
| **Phase 2:**<br>Outbreaks in multiple geographic areas (within Canada) | › Ongoing communication with HECN, international organizations and other health partners including NGOs<br>› Ongoing communications with media, partners and public<br>› Training of additional communication leads to allow for staff rotation<br>› Evaluation of implemented communication strategy<br>› Updating of public resources<br>› Ensure that all audiences, including media, key opinion leaders, stakeholders, employees are satisfied with the level of communication<br>› Daily joint briefings of media involving representatives of the implicated organizations |
| **Phase 3:**<br>End of first wave | › Evaluate communication strategy<br>› Update public education materials and scripts for phone line staff<br>› Scale back staffing as need diminishes |
| **Phase 4:**<br>Second or later waves | › As per previous phases |
| **Phase 5:**<br>Post-pandemic/ recovery | › Review performance measurement criteria and evaluate response |

## Health Emergency Communications Network - Contacts

| Name | Office | Cell |
|---|---|---|
| Sheila Watkins, Health Canada<br>Élaine Chatigny, Health Canada | (613) 957-2979<br>(613) 957-2987 | |
| John Rainford, Health Canada | (613) 946-7245 | |
| Andrew Swift, Health Canada | (613) 957-2988 | |
| Carol Chawrun, Alberta Health and Wellness | (780) 427-7164 | |
| Michelle Stewart, British Columbia Ministry of Health Planning & Health Services | (250) 952-1423 | |
| Joe Czech, Manitoba Health | (204) 945-0750 | |
| Carole Payne, Health and Wellness, Province of New Brunswick | (506) 453-2536 | |
| Carolyn Chaplain, Government of Newfoundland and Labrador | (709) 729-1377 | |
| Laura Seddon, Department of Health and Social Services Government of the NWT | (867) 920-8927 | |
| Kim Silver, Nova Scotia Department of Health | (902) 424-7942 | |
| Department of Health and Social Services Government of Nunavut | (867) 975-5700 | |
| John Bozzo, Ontario Ministry of Health & Long-Term Care | (416) 327-4352 | |
| Connie McNeill, PEI Department of Health and Social Services | (902) 368-6172 | |
| Debra Dollard, Ministère de la Santé et des Services sociaux | (418) 266-8905 | |
| Marg Moran McQuinn, Saskatchewan Health | (306) 787-8433 | |
| Patricia Living, Department of Health and Social Services, Government of Yukon | (867) 667-3673 | |

## International Communications Contacts

| International | | |
|---|---|---|
| U.S. Centers for Disease Control and Prevention | Jana Telfer, Manager, Media Relations | 404-639-7290 |
| Health & Human Services (USA) | Marc Wolfson, Public Affairs<br>Bill Hall, Public Affairs | 202-205-1300<br>202-690-7264 |
| World Health Organization | Dick Thompson | +41 22 791 2684 |
| Department of Health (UK) | Lis Birrane, Chief Media Officer | 20 7210 5225 |

## NGO Communications Contacts

| Organisation | Name | Contact |
|---|---|---|
| Canadian Association of Emergency Physicians | Sue Norrington | 613-523-3343 ext. 15 |
| Canadian Healthcare Association | Rhona Lahey | 613-241-8005 ext. 210 |
| Canadian Infectious Disease Society | Matthew Perry | 613-260-3233 |
| Canadian Medical Association | Jill Skinner<br>Carole Lavigne | 613-731-8610 ext. 2329<br>613-731-8610 ext. 1266 |
| Canadian Nurses Association | Karen McCarthy<br>Joanna Filion | 613-237-2133 ext. 252<br>613-237-2133 ext. 312 |
| Canadian Pediatric Society | Elizabeth Moreau | 613-526-9397 ext. 231 |
| Canadian Pharmacists Association | Janet Becigneul | 613-523-7877 ext. 267 |
| Canadian Public Health Association | Judy Redpath<br>Louise Cécire | 819-827-3648<br>613-725-3769 ext. 127 |
| Canadian Red Cross | Suzanne Charest<br>Cheryl Smith | 613-740-1928<br>613-740-1989 |
| College of Family Physicians of Canada | Leslie Stafford | 905-629-0900 ext. 303 |
| Royal College of Physicians and Surgeons of Canada | Pierrette Leonard<br>Genevieve Lacroix | 613-730-6201<br>613-730-6286 |
| St. John Ambulance | Julie Desjardins | 613-236-1283 ext. 228 |
| Salvation Army of Canada | Jim Ferguson | 613-234-3372 |

## Audiences to Consider

| Audience | ✔ |
|---|---|
| Public within the circle of the emergency.<br>*Concerns*: Personal safety, family safety, stigmatization, property protection. | |
| Public immediately outside circle of the emergency.<br>*Concerns*: Personal safety, family safety, interruption of normal life activities. | |
| Public health and medical professionals involved in the emergency.<br>*Concerns*: Resources adequate to respond, personal safety, family safety. | |
| Public health and medical professionals not involved in the emergency.<br>*Concerns*: Ability to respond to patients with appropriate information, access to treatment supplies if needed/wanted. | |
| Emergency response and recovery workers.<br>*Concerns*: Resources to accomplish response and recovery, personal safety, family safety. | |
| Media<br>*Concerns*: Personal safety, access to information and spokespersons, deadlines. | |
| Stakeholders and partners specific to the emergency.<br>*Concerns*: Inclusion in decision-making, access to information, and other resources | |
| Trade and industry.<br>*Concerns*: Business issues (loss of revenue, liability, business interruption) and protection of employees. | |
| Members of Parliaments/Legislatures<br>*Concerns*: Informing constituents, review of statutes and laws for adequacy and adjustment needs, opportunities for expressions of concern. | |
| Civic leaders, local, provincial, and national.<br>*Concerns*: Response and recovery resources, liability, leadership, and quality of response and recovery planning and implementation; opportunities for expressions of concern; trade and international diplomatic relations. | |
| Infections disease specialists, likely providing comment to media<br>*Concerns*: Access to accurate information, updates on specific steps being taken | |

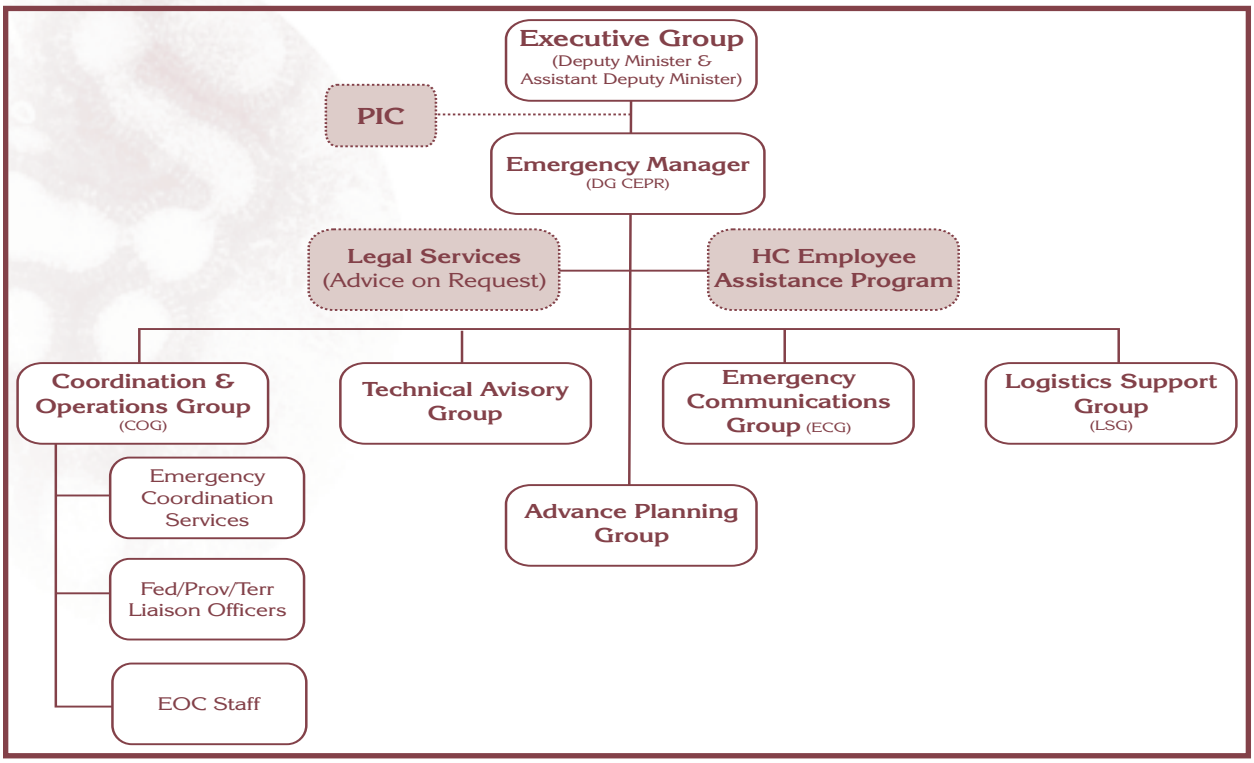
# L Federal Emergency Planning Documents

This annex includes documents provided by the Centre for Emergency Preparedness and Response (CEPR), Health Canada. The documents provided at this time include:

- Generic checklist of roles and responsibilities of the various groups in the emergency management structure during Public Health emergencies.
- Departmental Emergency Response Structure: Pandemic Influenza

## Generic checklist of roles and responsibilities of the various groups in the emergency management structure during Public Health emergencies

| | Roles and Responsibilities |
|---|---|
| Executive Group (EG) | › advises Minister (s)<br>› activates/deactivates the Emergency Response Plan<br>› provides direction to manage the response<br>› authorises and directs the commitment of Departmental resources and release of public communications<br>› provides overall guidance and oversight functions |
| Emergency Manager (EM) | › advises the EG on activation and deactivation of the plan<br>› initiates operations and manages operational response<br>› advises EG on the conduct of response<br>› approves liaison to federal co-ordinating agency and external response partners<br>› reviews Public Communication Material<br>› approves SITREPS and reports<br>› advises EG regarding resource availability and recommends deployment of departmental resources |
| Co-ordination and Operations Group (COG) | › respond to requests for assistance from response partners<br>› coordinates the advice and assistance for the emergency, including the activities of other groups in the EOC<br>› co-ordinates activities of liaison officers<br>› creates task teams to deal with response issues<br>› directs required HC and seconded staff<br>› advises and recommends to Emergency Manager (EM)<br>› makes routine decisions on behalf of EM, Maintains logs of all activities<br>› manages details of the operation |

| | Roles and Responsibilities |
|---|---|
| Technical Advisory Group (TAG) | › disease epidemiology, surveillance and medical response as required<br>› impacts on food, water supply, air quality & health matters<br>› radiation and related matters<br>› environmental and clinical sampling<br>› social impact of the activation & other relevant issues |
| Emergency Communication Group (ECG) | › advise Emergency Manager on communication strategies & media messages<br>› monitors and analysis, media reports and comments<br>› liaison with F/P/T communications coordinating groups<br>› develops communications plans<br>› prepares communications materials for review |
| Logistics and Support Group (LSG) | › support to Emergency Manger, COG,TG and ECG<br>› co-ordinates provision of support to external partners<br>› provides security, logistics of supplies and equipment |
| Advance Planning Group(APG) | Provides risk assessment and management concerning:<br>› medium and long term policy, planning, development and direction concerning the response<br>› considers the policy and socio-economic ramifications of the emergency<br>› assists in the transition from the Response to Recovery Phases of the emergency<br>› anticipates the next stage in an operation to overcome the inevitable time lag in the implementation of measures and the application of resources<br>***Remarks***<br>The need for this group was emphasized during SARS crisis. Its roles & responsibilities are yet to be discussed at DEPC and other levels. |

## Departmental Emergency Response Structure: Pandemic Influenza