

## **Chapter 2: Pandemic Influenza**

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## Chapter 2: Pandemic Influenza

### 1.0 Introduction

Influenza is a common virus that is present in our community primarily on a seasonal basis. A pandemic is a worldwide epidemic, which constitutes a global health emergency. Influenza pandemics have the capacity to cause serious mortality and morbidity as the population has little or no immunity to the circulating strains of influenza. Historically, influenza pandemics have occurred approximately every 35 – 40 years. Although there is no way to predict when the next influenza pandemic will occur, many health experts believe that it is overdue and planning should take place to deal with such an emergency.

Chapter 2 provides an overview of information about influenza, pandemics and the current concern re Avian Influenza in other parts of the world. The World Health Organization pandemic phases are reviewed, as well as the scope and impact of illness that is expected to occur in Renfrew County & District.

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### 2.0 What is influenza?

Influenza, commonly known as “the flu,” is a highly contagious and common respiratory illness caused by a virus. There are three known types of influenza virus – A, B, and C. Types A and B cause seasonal influenza. Only type A is associated with pandemics.

Influenza is usually transmitted from person to person by droplet spread or direct contact.

- Droplet spread refers to spray with relatively large, short range droplets produced by sneezing, coughing, talking or singing. These droplets may spray up to one meter (about three feet) and can land directly in the eye or be breathed in through the nose or mouth.
- Direct contact occurs when there is immediate transfer of the virus through skin to skin contact or kissing. For example, this can occur by shaking hands with someone who has infectious mouth or nose secretions on their hands. Chapter 9 – Infection Control presents more information on how influenza is transmitted.

The incubation period (the time between being exposed to the virus and the point at which one starts to experience symptoms) is 1 to 3 days. Most people recover in 7 to 10 days. Most adults are infectious to others between 24 hours before and up to 5 days after they develop symptoms. Children and some adults may be infectious for 7 or more days after they develop symptoms. Humans are usually infected by other humans. However, in some rare cases, humans may be infected by close contact with infected birds or mammals such as pigs.

About 30% to 50% of those who are infected by the influenza virus experience no symptoms at all. The remainder will experience symptoms ranging from mild to severe.

- The first symptoms are usually fever, headache, chills, muscle aches, physical exhaustion, and a dry cough.
- Later, the infected person may have a sore throat, a stuffy or runny nose, and a worsening cough.
- Children may feel sick to their stomach, and may vomit or have diarrhea.
- Elderly people and those whose immune system is weak may not develop a fever.

These symptoms may be caused by other viruses or bacteria, not just the influenza virus. Diagnosing influenza depends on laboratory testing and epidemiological characteristics.

The influenza season is usually October to April. The virus is constantly changing or mutating, resulting in minor changes known as “antigenic drift.” A new vaccine must be developed every year based on current and emerging viral strains identified through worldwide disease surveillance.

For most people, this type of seasonal flu is not life-threatening. The most seriously affected are the elderly, people with chronic medical conditions, and children less than 2 years old. For these people, the flu may lead to complications such as pneumonia, which can be fatal.

### 3.0 What is an influenza pandemic?

An influenza pandemic occurs when there is an abrupt and major change in the structure of the influenza A virus (known as an “antigenic shift”). This change may occur in two ways:

1. When two different influenza viruses infect the same cell, their genetic material may mix (reassortment), resulting in a completely new strain of virus. For example, this may occur when a bird virus and a human virus both infect a pig. Such mixing most often occurs where domestic pigs, birds, and humans live in close proximity to one another.
2. A virus may undergo random mutation. This second type of change may occur during the sequential infection of humans and other mammals and lead to a virus more efficiently transmitted amongst humans.

Since people have little or no immunity to the completely new strain, the virus can spread very quickly. When outbreaks occur in one or more countries or worldwide, the event is called a pandemic. The exact nature of the pandemic virus (such as how severely it affects people, how long the incubation period is, and how easily the virus is transmitted from one person to another) cannot be known until the new strain emerges.

### 4.0 What is the difference between seasonal influenza and an influenza pandemic?

The following chart summarizes the main differences between seasonal influenza and an influenza pandemic.

**Table 2.1: Differences between seasonal a pandemic influenza**

Seasonal influenza	Pandemic Influenza
Occurs every year (October to April).	Occurred 3 times in the 20 <sup>th</sup> century.
Occurs during the winter.	Occurs at any time of the year.
For most people, it is an unpleasant but not life-threatening infection.	It is typically a more serious infection for everyone.
Most people recover within one or two weeks without requiring medical treatment.	Some people will not recover, even with medical treatment. Because the illness is more severe, there is greater risk that an infected person may die.
The very young, the very old and people with chronic illness are most at risk of serious illness.	People of every age may be at risk of serious illness.
Vaccine is available in advance.	Vaccines will not be available in advance.
Annual vaccination is recommended, especially for those at risk of serious illness.	The whole population may be vaccinated when the specific vaccine required becomes available.
Antiviral drugs are available to treat those at special risk.	Antiviral drugs are likely to be in limited supply and will be used according to how the disease develops.

Adopted from:  
 Department of Health (England) “Pandemic Flu: Frequently Asked Questions” October 19 2005 <http://www.dh.gov.uk>  
 Ministry of Health and Long-term Care “Differences between seasonal or annual influenza and the influenza pandemic” Fact Sheet

## 5.0 How often do influenza pandemics occur?

From historical records, we know that a pandemic strain of influenza tends to emerge 3 or 4 times each century. In the last century, influenza pandemics occurred in 1918 (Spanish flu), 1957 (Asian flu) and 1968 (Hong Kong flu). The pandemic of 1918-1919 caused between 20 and 40 million deaths worldwide, while the pandemics of 1957 and 1968 caused much less mortality and morbidity. It is generally believed that another influenza pandemic will occur but there is no way of predicting when that might be, nor precisely the level of illness that might result.

## 6.0 Annual influenza immunization

The best way to protect yourself from seasonal influenza is to get vaccinated every fall. The influenza vaccine (or “flu shot”) is made from particles of influenza viruses that have been killed and contains three different types of influenza viruses (two types of influenza A and one type of influenza B). Every year, doctors and scientists around the world identify the strains of influenza virus that are circulating, and the vaccine is prepared to protect against the types that are most likely to occur that year. The body needs about two weeks after being vaccinated to build up protection against the virus, and this protection lasts about four to six months. The influenza virus changes each year, so a different vaccine has to be created and used each year.

All Renfrew County & District residents should be vaccinated every year. Vaccination protects individuals against the seasonal strains of influenza. Seasonal immunization may also reduce the chances of a new influenza virus emerging through genetic mixing.

The influenza vaccine is offered free of charge to everyone who lives, works, or attends school in Ontario, through family physicians, workplaces, and public health clinics.

## 7.0 What is avian influenza?

Avian influenza or “bird flu” is a contagious disease that affects animals, caused by viruses that normally infect only birds and sometimes pigs. Avian influenza viruses have on rare occasions mutated in a way that makes it possible for them to infect humans.

Infection with avian influenza causes two main forms of disease in domestic poultry. One is a mild form that causes hens to have ruffled feathers and produce fewer eggs, and the other is very severe, spreading rapidly and killing most infected poultry.

The H5N1 sub-type that is currently circulating in Asia and parts of Europe is the severe form. The subtype has infected humans who have been in close contact with infected birds and over half of the humans who have been infected have died. There is a possibility that the virus may change to a highly infectious form that spreads very easily from person to person. Such a change could mark the start of a pandemic.

However, current strains of avian influenza will not necessarily become a pandemic strain. The next pandemic could arise from a different influenza virus altogether.

For information on human cases of avian influenza, check the World Health Organization website: [http://www.who.int/csr/disease/avian\\_influenza/country/cases/](http://www.who.int/csr/disease/avian_influenza/country/cases/). For more information on avian influenza, see the Public Health Agency of Canada website: [http://www.phac-aspc.gc.ca/influenza/avian\\_e.html](http://www.phac-aspc.gc.ca/influenza/avian_e.html)

## 8.0 World Health Organization alert phases

Pandemic planning begins with the World Health Organization (WHO) classification system, developed in 1999 and revised in April 2005. The WHO phases are intended to guide planning in individual countries and regions and are incorporated into the Canadian, Ontario, and Renfrew County & District plans. The WHO will identify which phase is occurring internationally and will declare when a pandemic has begun. The Public Health Agency of Canada (PHAC) and the Ministry of Health and Long-Term Care (MOHLTC) will declare when a pandemic period has begun in Canada and Ontario, respectively.

The following table outlines the WHO Pandemic Phase Model:

**Table 2.2: World Health Organization Pandemic Phases**

<b>Interpandemic Period*</b>	<b>Phase 1</b> No new influenza virus subtypes have been detected in humans. An influenza virus subtype that has caused human infection may be present in animals. If present in animals, the risk of human infection or disease is considered to be low.
	<b>Phase 2</b> No new influenza virus subtypes have been detected in humans. However, a circulating animal influenza virus sub-type poses a substantial risk of human disease.
<b>Pandemic Alert Period**</b>	<b>Phase 3</b> Human infection(s) with a new subtype, but no human to human spread, or at most rare instances of spread to a close contact.
	<b>Phase 4</b> Small cluster(s) with limited human-to-human transmission but spread is highly localized, suggesting that the virus is not well adapted to humans.
	<b>Phase 5</b> Larger cluster(s) but human-to-human spread is still localized, suggesting that the virus is becoming increasingly better adapted to humans, but may not yet be fully transmissible (substantial pandemic risk).
<b>Pandemic Period</b>	<b>Phase 6</b> Pandemic phase: increased and sustained transmission in the general population.
<b>Postpandemic Period</b>	Return to interpandemic period.

\*The distinction between phase 1 and phase 2 is based on the risk of infection or disease from circulating strains in animals.

\*\* The distinction between phase 3, phase 4 and phase 5 is based on the risk of a pandemic. As of early February 2006, the world is in Pandemic Alert Phase 3.

## 9.0 Potential health impact of pandemic influenza on Renfrew County & District

Unlike the Severe Acute Respiratory Syndrome (SARS) epidemic of 2003, which spread primarily among people within a hospital or within a household, an influenza pandemic will likely spread quickly throughout the general community.

According to the Canadian Pandemic Influenza Plan, during an influenza pandemic, between 15 to 35% of the population might become ill, compared to an average of 5 to 20% of the public who are affected by “normal” seasonal influenza outbreaks. Previous influenza pandemics have occurred in multiple waves. Each wave is likely to last six to eight weeks.

Planning for a pandemic is based on this estimate of 15 to 35% of the population being affected. However, when an actual pandemic begins, the specific impact on Renfrew County & District may be different from the estimate.

**Table 2.3: Estimated Direct Health Impact of an Influenza Pandemic on Renfrew County & District**

Description	Based on 15% attack rate	Based on 35% attack rate
Clinically ill	15,000	35,000
Require outpatient care	6,300	26,949
Require hospitalization	70	558
Deaths	28	172

Based on FLUAID 2.0 – A CDC software designed to provide a range of estimates of the impact of pandemic influenza available at [www.cdc.gov/flu/tools/fluaid/](http://www.cdc.gov/flu/tools/fluaid/) and Renfrew County & District population estimate of 100,545 in 2005.