

Chapter 8: Surveillance

Communicable disease surveillance is the collection, analysis, and dissemination of information about infectious diseases like influenza. Surveillance data can be used to determine when, where, and which infectious agent is circulating, and the patterns and severity of illness. Surveillance data is used to guide interventions and determine an effective response.

This section will describe the role of Peel Public Health in performing influenza surveillance and the contribution of other partners (e.g. hospitals, physicians, and schools) to the surveillance process. It will also identify how surveillance will be modified as the pandemic progresses.

Objectives of Surveillance Strategy

Surveillance activities will vary depending on the stage of the pandemic, but at all stages surveillance is designed to provide the information required to make informed decisions about how best to manage the pandemic. The surveillance objectives of the Inter-Pandemic Period include detecting and characterizing seasonal influenza activity. The surveillance objective in Pandemic Alert Period is the monitoring for novel virus activity in the Region of Peel. During the Pandemic Period, surveillance objectives include tracking the virus as it moves through the Region of Peel and measuring the capacity of the health care sector to cope with the outbreak. Specific surveillance objectives for each pandemic phase are shown in Table 8.1.

Table 8. 1: Surveillance Objectives by Pandemic Phase

Pandemic Phase (Alert Period)	Objectives
Phases 1 and 2 (Inter-Pandemic Period)	<ul style="list-style-type: none"> • To assess the seasonal burden of influenza; • To establish baseline influenza severity levels; and • To detect and describe unusual events, including emergence of new strains and unexpected outcomes such as unusual age distribution or increased severity.
Phase 3 (Pandemic Alert Period)	<ul style="list-style-type: none"> • To detect and describe the initial appearance of a novel virus in the Region of Peel; • To heighten awareness about the novel virus and communicate surveillance expectations to the health sector and other stakeholders; and • To ensure that surveillance systems meet provincial standards.
Phases 4 and 5 (Pandemic Alert Period)	<ul style="list-style-type: none"> • To detect and describe the introduction of a novel virus in the Region of Peel; • To identify and capture epidemiological characteristics on the initial cases and clusters of the novel virus in the Region of Peel; • To provide data to monitor, manage, and contain the outbreak, if applicable; and • To provide information to the health sector to heighten awareness and increase vigilance while ensuring system capacity and resource availability.
Phase 6 (Pandemic Period)	<ul style="list-style-type: none"> • To detect and describe the initial pandemic cases in the Region of Peel; • To inform the response by tracking occurrence and progression of the pandemic waves through the population; • To identify and describe the affected population in the Region of Peel and the impact on capacity of the health care system in order to guide public health actions; and • To determine triggers in preparation for subsequent waves of infection.

Description of Surveillance Activities

SARS taught the health sector that it is very difficult to develop new surveillance systems in the middle of an outbreak. Pandemic surveillance will be built on the strong influenza surveillance systems that are already in place for seasonal flu. Due to limitations of individual components, it is best to have a network of surveillance systems, covering both laboratory and influenza activity-based measures.

Surveillance programs for seasonal influenza are well established. Local results feed into the federal FluWatch⁹ program via the Ontario Ministry of Health and Long-Term Care (MOHLTC).

The key components of seasonal influenza surveillance in the Region of Peel are:

1. Laboratory surveillance – reports of lab-confirmed cases;
2. Institutional outbreak reporting;
3. Sentinel physician reporting – weekly data on influenza-like-illness (ILI) from a sample of Peel physicians;
4. Febrile respiratory illness (FRI) surveillance in health care settings – to identify potential cases or clusters of novel virus infection;
5. Absenteeism Reporting – currently conducted in 11 Region of Peel childcare centres and across all Region of Peel departments;
6. Weekly reporting of influenza activity level to MOHLTC; and
7. Global activity monitoring – to stay on top of developments around the world.

Peel Public Health is currently working with the school boards to introduce a process of school absenteeism surveillance.

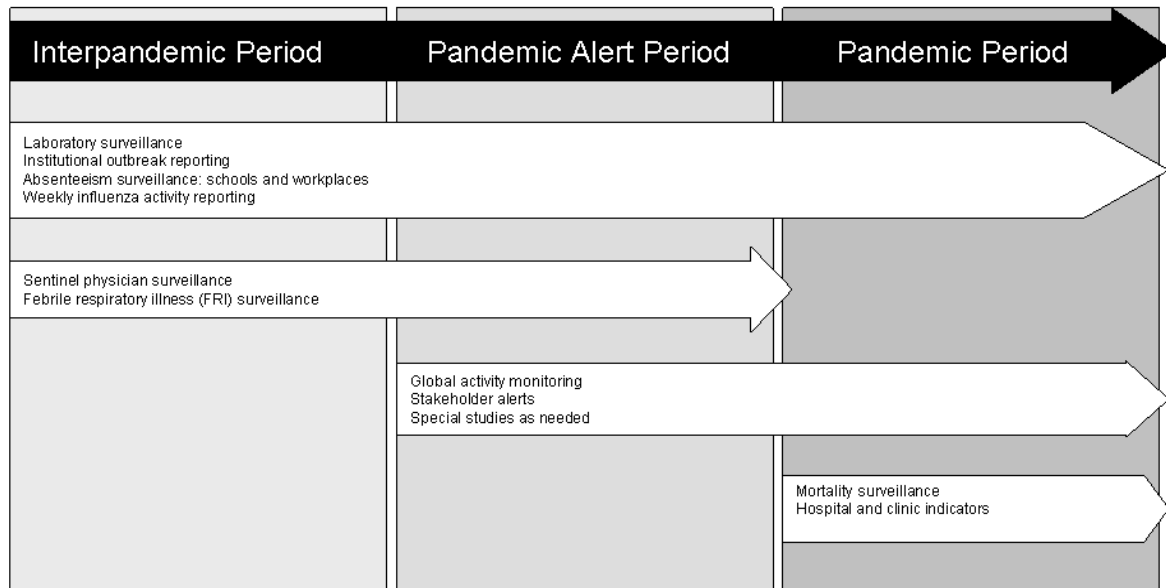
Two major surveillance components to be added during the pandemic are:

8. Mortality surveillance – to provide a real-time indication of pandemic severity; and
9. Hospital and clinic indicators – to measure influenza activity and monitor health system capacity to meet health care needs.

⁹ Public Health Agency of Canada. (2006). *Flu Watch Reports*. Retrieved November 29, 2006, from <http://www.phac-aspc.gc.ca/fluwatch/index.html>

The following sections describe the surveillance components in more detail. They also describe the planned modifications to Peel surveillance activities throughout the pandemic alert and pandemic periods. Figure 8.1 provides an overview of the surveillance activities for these periods.

Figure 8 1: Timing of Surveillance Activities by Pandemic Phase



1. Laboratory Surveillance

Influenza is a reportable disease under the Ontario *Health Protection and Promotion Act* (HPPA), and must be reported to the Peel Medical Officer of Health (MOH) by laboratories, physicians, health care facilities, and other institutions. In practice, however, it is primarily lab-confirmed cases (e.g. rapid test or culture positive) that are reported to the MOH.

Laboratory surveillance for influenza occurs year-round. Many of the positive influenza results reported to public health come from clinical specimens ordered by physicians who have seen a patient with influenza-like illness. Other specimens are collected during outbreaks in long term care facilities or when public health organizes testing specifically for surveillance purposes (e.g. if it is suspected that a different strain has started to circulate). Surveillance of lab-confirmed influenza in the Region of Peel contributes to a worldwide system of influenza surveillance that guides vaccine development through the potential identification of new virus strains and monitors resistance to antiviral drugs. Laboratory surveillance also helps identify cases and outbreaks for timely investigation and control.

Pandemic Modifications to Lab Surveillance

The Lab Services chapter of the *Ontario Health Plan for an Influenza Pandemic* (Chapter 14) describes how testing for influenza will change as the pandemic progresses, although this refers primarily to clinical or diagnostic testing. In the first one to two weeks of pandemic activity (Phase 6), all suspect cases might be tested to confirm the entry of pandemic activity into the Region of Peel. During the peak of the pandemic, most clinical management will be based on clinical criteria and testing will be confined to cases with unusual presentations. As the pandemic subsides, the level of clinical testing will increase again to mark the departure of the pandemic virus. Public health has a role in advising practitioners on appropriate testing, while ensuring that sufficient specimens are being collected for surveillance purposes, as directed by the provincial laboratory.

Peel Public Health uses the integrated Public Health Information System (iPHIS) to report lab-confirmed cases of influenza to MOHLTC. It will not be practical for Peel Public Health to keep up with timely iPHIS reporting of individual lab-confirmed cases to the MOHLTC during the peak of the pandemic. It is anticipated that MOHLTC will develop a pandemic module for streamlined electronic reporting by public health units.

2. Institutional Outbreak Reporting

Under the HPPA, outbreaks of respiratory disease, including influenza, in long term care homes and other health care institutions are to be reported immediately to the MOH. The purpose of this outbreak reporting is to facilitate the following:

- Timely outbreak investigation and control;
- Monitoring of epidemiological trends;
- Evaluation of prevention and control activities; and
- Dissemination of local information to stakeholders in a timely fashion.

Peel Public Health conducts an investigation following a report of a suspected or confirmed outbreak in an institution. During an investigation, epidemiological information is collected by case investigators, who work with the institution staff to implement infection control measures, obtain laboratory specimens from those with respiratory symptoms, and isolate ill individuals. Once influenza is confirmed, antiviral prophylaxis and treatment are administered, as appropriate. Preliminary and final outbreak reports are reported by Peel Public Health to MOHLTC using iPHIS. Peel Public Health also issues a weekly institutional outbreak report for stakeholders, which identifies the active outbreaks in the Region of Peel.

Pandemic Modifications to Institutional Outbreak Reporting

Reporting of institutional outbreaks to Peel Public Health during the Pandemic Period (Phase 6) is expected to continue, though it is anticipated that the usual level of public health assistance to the facilities may not be available. Detailed final outbreak reports may not be processed until the pandemic wave is over.

3. Sentinel Physician Reporting

The federal Flu Watch program includes a national sentinel physician surveillance system. The purpose of this system, which is administered by the Public Health Agency of Canada (PHAC), is to detect the occurrence of influenza-like illnesses by family physicians and track their movement through the community. Sentinel physicians may also collect nasopharyngeal specimens from symptomatic patients, and submit the specimens for analysis.

Sentinel physicians are recruited for this program by the College of Family Physicians of Canada, and the goal of the program is to have one sentinel per 250,000 persons. The current program includes two physicians in the Region of Peel. Data from this program go directly to PHAC and are not accessible to Peel Public Health; however, they form part of the national reports on the FluWatch website.

Pandemic Enhancements to Sentinel Physician Surveillance

It is recommended that Peel Public Health enroll additional sentinel physicians to supplement the current sentinels and report directly to Peel Public Health. It is best to do this during the pandemic alert phase, as this will allow the system can be piloted in advance. Sentinel physician reporting should be of value through pandemic Phase 5 and early Phase 6 (when the pandemic is declared), but would be discontinued if patients are directed away from family doctor offices during the pandemic

4. Febrile Respiratory Illness (FRI) Surveillance

Following the 2003 SARS outbreak, surveillance for febrile respiratory illness (FRI) was initiated in health care settings to detect any unusual occurrences of severe respiratory infections and to facilitate the rapid implementation of infection control and public health measures. The recommended process is well set out in the MOHLTC document *Preventing Febrile Respiratory Illnesses*.¹⁰

¹⁰ Ministry of Health and Long-Term Care. (2006). *Ontario Best Practice Manual: Preventing Febrile Respiratory Illnesses*. Retrieved November 29, 2006, from <http://www.health.gov.on.ca/english/providers/program/infectious/syndromes/fri.html>

This document states that health care setting administrators, labs, and physicians:

- *Should report* to the local MOH when a patient has a new cough, fever AND a travel history to a country with a health alert OR contact with someone with such a travel history; and
- *Must report* to the local MOH when the etiology of the febrile respiratory illness is a reportable disease (like influenza) or there is a cluster of FRI in any health care facility.

Peel Public Health has provided standardized forms for this reporting to all health care facilities and the Greater Toronto Airports Authority, and will keep these partners informed about countries with a health alert. Clusters of FRI are investigated by Peel Public Health together with the affected facility.

Pandemic Modifications to FRI Surveillance

FRI surveillance will play an important role in the pandemic alert period. However, in the pandemic itself (Phase 6), this measure will no longer be practical or useful.

5. Absenteeism Reporting

There is evidence that school-aged children are usually the first in the community to become infected with influenza. Tracking school absenteeism serves as a potential early warning system for influenza activity at the community level. Increased school absenteeism (10% or higher) can trigger the following:

- The collection of nasopharyngeal swabs to confirm influenza and identify circulating strains;
- The implementation of prevention and control measures; and
- The timely dissemination of advice to stakeholders and the general public.

Workplace absenteeism surveillance provides similar information on illness activity in the community, though usually not as early as school absenteeism. Both systems facilitate the tracking of virus spread across the Region of Peel. Preschool children also have high rates of influenza, but absenteeism rates from childcare centres are not as reliable or predictive as from schools.

Currently, both the Region of Peel (as an employer), and the 11 childcare centres operated by the Region of Peel, provide weekly absenteeism data to Peel Public Health. Absenteeism rates of 10% or higher are reported to communicable disease investigators for further investigation. The absenteeism data are used to inform the weekly reporting of influenza activity to MOHLTC.

Enhancements to Absenteeism Reporting

Peel Public Health plans to expand absenteeism surveillance to area schools and several large workplaces. School absenteeism reporting will be continued as far into the pandemic as possible. However, if the pandemic arrives in the summer (i.e. when schools are closed), or if schools are closed as the result of the pandemic, surveillance would shift to large workplaces.

6. Weekly Influenza Activity Reporting

Influenza activity is reported by Peel Public Health to the MOHLTC on a weekly basis. Influenza activity is the level of influenza-like illness in the community and is categorized as:

- No activity;
- Sporadic activity;
- Localized outbreaks; or
- Widespread outbreaks.

The assigned activity level is based on the data sources that are used to track influenza and respiratory infection activity in the Region of Peel, and include laboratory-confirmed cases of influenza, reported outbreaks in institutions, and absenteeism data from childcare centres and workplaces. Provincial data are analyzed and published weekly in the *Ontario Influenza Bulletin*.¹¹

7. Global Activity Monitoring

Peel Public Health conducts ongoing monitoring of global activity levels of infectious disease, in particular avian and pandemic influenza. This assists Peel Public Health to identify emerging health threats in other areas of the world that have the potential to spread to the Region of Peel; and to take preventative and preparatory action, including communication to stakeholders and residents.

Peel Public Health receives regular updates and alerts from MOHLTC, which provide information about global influenza and novel virus activity. In addition, the Peel Surveillance Unit (PSU) routinely scans web resources and publications, and participates in external working groups to increase awareness of emerging infectious diseases. Relevant global activity data is collated and disseminated in an internal weekly *Avian Influenza Report*, and in monthly communicable disease reports. Relevant information is included in the *Health Professionals Update*, which is sent to external stakeholders.

¹¹ Ministry of Health and Long-Term Care. (2006). *Ontario Influenza Bulletins: 2005-2006 Season*. Retrieved November 29, 2006, from http://www.health.gov.on.ca/english/providers/program/pubhealth/flu/flu_05/flubul_mn.html

Pandemic Enhancements to Global Activity Monitoring

As part of the daily review of data sources, Peel Public Health will continue to monitor national and international surveillance activity via bulletins from PHAC, the Centers for Disease Control and Prevention, WHO, World Organization for Animal Health (OIE), ProMed and other pertinent websites and list serves. The frequency of both internal and external summaries and alerts will be increased (or decreased), as appropriate.

8. Mortality Surveillance

Influenza deaths are reportable to the MOH. However, reports of influenza deaths are often late arriving, if at all, except when there is a recognized outbreak (such as in long term care homes). Moreover, not all related deaths are recognized, or attributed, to influenza, as influenza can lead to complications like myocardial infarction, stroke, or exacerbation of diabetes.

It is anticipated that timely death data will be useful and sought after in a pandemic as a measure of severity, though currently there are no practical methods for real-time mortality surveillance. The Chief Coroner has indicated that most pandemic deaths will not be investigated by the coroner, so reporting through coroners will not be comprehensive. PHAC is exploring options regarding the timely collection and analysis of mortality rates.

9. Hospital and Clinic Indicators

Over the past five years, chief complaint data from hospital emergency department records have been used in the United States as a part of syndromic surveillance systems to detect significant increases in illness. At present, MOHLTC is working to pilot and evaluate the use of emergency department data for the detection of enteric and respiratory illnesses. This could serve as an early alert for novel virus activity. Peel Public Health is currently developing a strategy to approach hospitals in the Region of Peel to determine the interest and feasibility of initiating this type of syndromic surveillance for respiratory illness in the inter-pandemic period.

Pandemic Enhancements to Hospital and Clinic Indicators

During a pandemic, hospitals and large medical clinics can provide simple information that assists to measure influenza activity and monitor health system capacity. Daily reports are proposed for the following:

- Emergency room visits;
- New admissions to hospital;
- Admissions to Intensive Care Unit;
- Patients on ventilators; and
- Patients seen at Flu Centres.

Peel Public Health will collect and collate this information and make it available to the MOH and others responsible for overall management of the pandemic response. The pandemic alert period provides an opportunity for Peel Public Health to work with the hospitals to organize and pilot this surveillance initiative so as to streamline data collection and transfer.

Surveillance Reports for Stakeholders

It is important for public health to disseminate local information to stakeholders in a timely fashion so that they can initiate appropriate prevention and control measures. Current Peel Public Health publications that provide reports on influenza are:

- *Health Professionals Update*, which is sent periodically to physicians;
- *A Weekly Institutional Outbreak Report*, which identifies the active institutional outbreaks (including influenza) in the Region of Peel and their start dates. This information allows appropriate infection control measures to be implemented for patients being transferred between institutions. This report is shared with internal and external stakeholders (e.g. hospital infection control practitioners, long-term care home administrators, CCACs, and first responders);
- *A Weekly Influenza Report* during flu season that provides current influenza status and advice. This is sent by email and fax to hospital infection control practitioners and infectious disease specialists; and
- *An annual communicable disease report* produced by the Peel Public Health Epidemiology Unit which is posted on the Region of Peel website.

Pandemic Modifications to External Reporting

Peel Public Health will keep stakeholders apprised of new developments and surveillance data as the World Health Organization announces moves to higher pandemic phases. During the pandemic itself, Peel Public Health will provide more frequent reports.

Next Steps

Peel Public Health will seek to:

- Introduce school and expanded workplace absenteeism surveillance;
- Work with hospital partners to develop and pilot basic hospital indicator reporting for use during the pandemic;
- Enhance the sentinel physician surveillance system in the Region of Peel;
- Work with regional and provincial partners to develop data collection techniques and forms; and
- Improve the dissemination of surveillance data to stakeholders.