Annex N

Pandemic Influenza Surveillance Guidelines

Date of Latest Version: October 2006

Note:
▶ This is a new annex being released with the 2006 version of the Canadian Pandemic Influenza Plan.
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Since 2004, Canadian public health surveillance stakeholders, through national working groups, have been defining the roles, responsibilities as well as the minimum standards for national surveillance data to be collected during interpandemic and pandemic periods.

The ability to adapt to rapidly evolving situations must be included in all surveillance guidelines. As such, the following annex is part of an ongoing and evolving preparedness plan. It is recognised that while the current published version outlines high level surveillance guidelines, further detail is required in order to provide comprehensive national guidelines, in particular, a more detailed description of streamlined surveillance activities for phase 6.

Therefore, the annex should be considered with the following list of next steps:

- Review of the sustainability of routine surveillance activities and consideration of options for streamlined surveillance which may include either greater focus on more reliable indicators or modification/simplification of routine activities during a pandemic
- Prioritize surveillance activities by phase
- Explore options and feasibility for development of new surveillance activities as part of preparedness, e.g. real-time mortality surveillance.
Introduction

The overall goals of influenza pandemic preparedness and response are:

*First, to minimize serious illness and overall deaths, and second to minimize societal disruption among Canadians as a result of an influenza pandemic.*

The strategies used to achieve these goals will depend on a number of factors including the epidemiology of the pandemic. Determination of epidemiological parameters and indicators are critical for informing the public health response. As the pandemic progresses through each phase, the surveillance activities needed to guide public health actions will change from enhanced activities in the pandemic alert phases to streamlined activities at the height of the pandemic.

In this document, influenza surveillance guidelines, including data collection, collation, analysis and dissemination/communication issues for both disease and virologic surveillance are outlined for each phase of the pandemic. In addition, detailed protocols for virologic surveillance and other laboratory procedures can be found in the laboratory annex of the Canadian Pandemic Influenza Plan (Annex C).

This document has been prepared for pandemic planning purposes as well as to facilitate a standardised approach to national influenza surveillance during the interpandemic period. While the characteristics of a novel influenza virus are not known, the experiences learned from both SARS and outbreaks of human infection with influenza A (H5N1), have underscored the importance of preparatory planning and establishing a surveillance infrastructure capacity for the detection and monitoring of emerging respiratory infections. The following framework addresses planning for surveillance in general terms; however, it should be understood that while some of the recommended actions can be prepared for in advance, other situation-specific recommendations and alerts will need to be developed based on information that will only be available as the situation evolves.

Guidelines are necessary to ensure data are collected in a standardized manner across jurisdictions to enable national level analysis and cross-jurisdictional comparison. The guidelines represent the minimum recommended activities required for national monitoring of the evolving pandemic. Provincial and territorial jurisdictions may choose, based on their own risk assessment and experience, to increase the sensitivity of surveillance activities (e.g. increased timeliness of data collection and reporting or use of more sensitive case definitions for monitoring) while respecting national health reporting standards. Further, as additional information becomes available during the course of the pandemic, monitoring and reporting activities may be refined as necessary.

The objectives of these guidelines are to assist federal, provincial and territorial (FPT) partners in the development or enhancement of surveillance activities that will facilitate:

- ongoing risk assessment for pandemic influenza based on national and international sources
- rapid detection and monitoring of the arrival of a novel/pandemic influenza virus anywhere in Canada,
- timely description of the epidemiologic and virologic characteristics of the pandemic
- detection and characterization of unusual/unexpected disease patterns or manifestations
- real-time monitoring of disease severity indicators i.e. through real-time surveillance of hospitalizations or deaths
- implementation and discontinuation of public health measures\(^1\)
- ongoing evaluation of disease and virologic surveillance activities for each pandemic phase (e.g. timeliness, appropriate sensitivity and specificity, effectiveness in guiding public health measures)
- comparing novel influenza strains to match pandemic vaccine composition
- identification of areas of need for special studies and further research

Assumptions

- The Respiratory Illness Outbreak Response Protocol (RIORP)\(^2\) will be approved and implemented in order to facilitate data sharing and communication within Canada during the pandemic. This document outlines local, PT and federal reporting processes.
- Information on the current risk assessment, epidemiologic, virologic, and clinical descriptions (based on the global situation) will be available and shared in a timely manner via our international partners (e.g., WHO).
- The majority of, if not the entire population, will be susceptible to the pandemic strain.
- During the pandemic alert period (the early phases of the arrival of a novel virus with pandemic potential in Canada) detailed reporting of epidemiological data and contact tracing for initial cases by public health will be possible.
- As the efficiency of human-to-human transmission increases, resulting in widespread activity of the novel virus in Canada, surveillance resources are expected to be strained. This may impact participation and reporting rates for routine surveillance activities such as sentinel influenza-like illness (ILI) reporting. While in some areas participation may be maintained at sufficient levels for accurate monitoring population-based trends on a local or even provincial/territorial level, participation rates may fall off elsewhere thus limiting the representativeness of the data in certain areas or nationally. At the height of the pandemic, if population-based ILI rates become unreliable for monitoring disease spread/ population impact, particularly at the regional or national level, surveillance may be limited to tallying outbreaks in residential institutions and/or assessment of regional influenza activity levels (i.e. streamlined surveillance).
- The novel virus strain (pandemic strain) will supplant other circulating influenza strains.
- The pandemic will last 12 to 18 months and more than one wave may occur within a 12 month period and could have a similar or more severe impact than the initial wave.
- PHAC will follow guidelines as per the International Health Regulations.

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\(^1\) Refer to the Public Health Measures, Annex M of the Canadian Pandemic Influenza Plan.

\(^2\) RIORP is an agreement between Federal/Provincial/Territorial governments to guide the operating procedures to assist in coordinating the investigation and control of severe respiratory outbreaks in Canada.
Special Studies

Protocols for special studies which may be conducted during the pandemic should be developed and pre-tested in the interpandemic/pandemic alert periods, recognizing that refinements may be necessary at the time of a pandemic. It is recognised that these studies will most likely be conducted in parallel to other surveillance activities.

Special studies may include, but are not limited to, serological surveys\(^3\) of early cases/clusters of human infection with a novel influenza virus, vaccine effectiveness studies, role of bacterial pathogens in the development of secondary complications and serious outcomes, investigation of reported adverse events following immunization (AEFI), antiviral resistance monitoring, and modes of transmission studies (e.g. in community or hospital-based settings).

In addition, targeted studies may be useful in supplementing routine surveillance data to assess the impact of the pandemic on the health care system as well as in terms of social and economic impact. Even if conducted at the end of the pandemic wave, special studies may serve as a means of evaluating and refining various attempted interventions to lessen the impact of successive waves of the pandemic.

Surveillance Activities by Canadian Pandemic Phases

Surveillance for pandemic influenza is expected to be founded on timely, representative and comprehensive surveillance activities that are the cornerstones of ongoing routine annual influenza surveillance, including:

- Disease/epidemiologic surveillance
- Laboratory/virologic surveillance, including antiviral resistance monitoring
- Ongoing information sharing through established communication networks (e.g. CIOSC, FluWatch, provincial and territorial networks)

Several additional activities are recommended for pandemic influenza surveillance both for enhanced detection of early warning signals and for monitoring during a pandemic, including:

- Animal health surveillance (early detection of animal outbreaks and/or animal-to-human transmission in interpandemic and pandemic alert periods)
- Monitoring vaccine and antiviral uptake
- Monitoring of adverse events following immunization

The following tables describe the surveillance objectives, roles and responsibilities for public health stakeholders at each level of government (federal, provincial/territorial and local). The tables are organized by successive phases of a pandemic based on the Canadian Pandemic Phases which reflects both the global situation (phases 1.0, 2.0, 3.0, etc.) as well as the highest level of novel virus activity in Canada (sub-phases 3.1, 4.1, 5.1, etc.). See the Background Section of the Canadian Pandemic Influenza Plan for more details.

Note: In the description of the phases the term “animal” is used to cover both avian and mammalian species.

\(^3\) For a generic serosurvey protocol, refer to the following document: “Generic Serosurvey Protocol of People Exposed to Influenza”, Appendix 1.
Interpandemic Period

Table 1: Interpandemic Period

<table>
<thead>
<tr>
<th>Canadian Pandemic Phase</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0 No new virus subtypes have been detected in humans. An influenza virus subtype that has caused human infection may be present in animals located outside of Canada. If present in animals, the risk of human infection/disease is considered to be low.</td>
<td></td>
</tr>
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<td></td>
</tr>
<tr>
<td>2.0 No new virus subtypes have been detected in humans. However, an animal influenza virus subtype that poses substantial risk to humans is circulating in animals located outside of Canada.</td>
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</tr>
</tbody>
</table>

Surveillance Objectives/Roles and Responsibilities

Objectives:

- to assess the seasonal burden of influenza and to detect and describe unusual events including emergence of new strains and unexpected outcomes such as changes in distribution or increases in severity
- to establish baseline influenza activity levels

Federal:

- Provide ongoing leadership through organisation of teleconferences/meetings, providing guidance and surveillance recommendations as needed
- Align national pandemic surveillance plans with WHO global pandemic influenza surveillance plans
- Participate in the WHO Global Influenza Surveillance Network
- Conduct regular information scanning and seek verification of international disease activity of potential public health significance i.e. International Ministries of Health and/or other international surveillance networks
- Coordinate national level routine annual influenza surveillance activities via FluWatch, including hosting national influenza surveillance meetings and leading the development of recommendations for ongoing improvements of the FluWatch system
- Develop national recommendations/surveillance protocols for enhanced surveillance of severe emerging respiratory infections (SRI) for early detection and response to emerging respiratory infections
- Provide regular dissemination of surveillance information and analysis (weekly FluWatch, annual influenza reports)
- Provide information, risk assessment and surveillance recommendations on an as needed basis in relation to identified events with pandemic potential (e.g. avian influenza) specific alerts/signals to F/P/T public health surveillance stakeholders
- Lead the development of national standards for case definitions, minimum datasets and mechanisms for data collection and reporting during the pandemic phases

4 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)). Provinces and territories receive regular summaries of the international situation through the Canadian Integrated Outbreak Surveillance Centre (CIOSC).
### Surveillance Objectives/Roles and Responsibilities (continued)

#### Federal:
- Enhance linkages between federal departments including linkages between human and animal health surveillance partners (e.g., Canadian Food Inspection Agency, National Centre for Foreign Animal Diseases, Canadian Cooperative Wildlife Health Centre, etc.)
- Develop business continuity plans and increase capacity and training and/or set priorities to meet surveillance requirements during each phase of a pandemic. This includes identifying which routine activities can be suspended or reduced during a pandemic.
- Develop a human resources plan to ensure sustainability of surveillance activities during a pandemic.
- Work with F/P/T and Local partners to agree on phase-specific minimum surveillance activities for monitoring at each phase of the pandemic. In particular, work to establish priorities for critical common surveillance activities that can be maintained as streamlined surveillance during the height of a pandemic when resources are strained.
- Coordinate the establishment of surveillance systems to estimate severity.

#### P/T/local:
- Determine key surveillance stakeholders within P/T jurisdiction.
- Ensure P/T pandemic plan is in place and align P/T/Local surveillance plans with national surveillance plans.
- Participate in routine annual influenza surveillance activities (e.g., FluWatch).
- Participate in national influenza surveillance meetings.
- Maintain intra-P/T surveillance networks to enable early detection of influenza activity.
- Ensure capacity (surveillance infrastructure, technical/human resources) to meet national minimum standards for case detection, minimum datasets and mechanisms for data collection and reporting during the pandemic period.
- Establish and maintain mechanisms for the timely sharing of surveillance data from the local to the P/T and on to the federal jurisdictions.
- Provide regular dissemination of surveillance information and specific alerts/recommendations to national and jurisdictional stakeholders.
- Develop business continuity plans and increase capacity and training and/or set priorities to meet surveillance requirements during each phase of a pandemic. This includes identifying which routine activities can be suspended or reduced during a pandemic.
- Develop a human resources plan to ensure sustainability of surveillance activities during a pandemic.
- Identify potential sentinel surveillance sites (regions, settings) that may be used to assist in focusing limited resources or answer specific questions (i.e. special studies) during a pandemic.
- Work with F/P/T and Local partners to agree on phase-specific minimum surveillance activities for monitoring at each phase of the pandemic. In particular, work to establish priorities for critical common surveillance activities that can be maintained as streamlined surveillance during the height of a pandemic when resources are strained.
- Confirm that public health laboratories within the province/territory have the capacity and materials needed to isolate and subtype influenza viruses. If they do not, linkages to those laboratories having this capacity should be established and coordination agreements put in place.
Table 1.1: National Surveillance Data during the Interpandemic Period

<table>
<thead>
<tr>
<th>Canadian Pandemic Phase</th>
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<tbody>
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<td>1.0 No new virus subtypes have been detected in humans. An influenza virus subtype that has caused human infection may be present in animals located outside of Canada. If present in animals, the risk of human infection/disease is considered to be low.</td>
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</table>

<table>
<thead>
<tr>
<th>National Surveillance Data</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Disease surveillance</td>
<td></td>
</tr>
<tr>
<td>(a) influenza activity level by P/T region (based on FluWatch definitions)</td>
<td></td>
</tr>
<tr>
<td>(b) influenza-like illness (ILI) consultation rate (number of ILI sentinel physician visits/1000 consults)</td>
<td></td>
</tr>
<tr>
<td>(c) number of laboratory-confirmed outbreaks in long-term care facilities</td>
<td></td>
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<tr>
<td>(d) number of influenza-associated hospitalizations and influenza-associated deaths in children 0-18 years through sentinel paediatric hospitals (IMPACT)</td>
<td></td>
</tr>
<tr>
<td>Laboratory surveillance</td>
<td></td>
</tr>
<tr>
<td>(e) percent positive influenza tests (total number of laboratory tests for influenza and number of positive results, by virus type (A or B))</td>
<td></td>
</tr>
<tr>
<td>(f) strain characterisation, number identified for each strain and subtype, and percentage of total for approximately 10% of isolates from the sentinel laboratory respiratory virus detection system</td>
<td></td>
</tr>
<tr>
<td>(g) increased targeted strain characterisation based on risk assessment in areas where animal strains are circulating</td>
<td></td>
</tr>
<tr>
<td>(h) antiviral resistance testing for influenza isolates</td>
<td></td>
</tr>
<tr>
<td>Risk assessment</td>
<td></td>
</tr>
<tr>
<td>(i) summary of national/international areas where animal virus activity has been confirmed</td>
<td></td>
</tr>
</tbody>
</table>

*Appendix 2 provides a pictorial representation of the national FluWatch influenza surveillance system.

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5 During the interpandemic phases, these data (FluWatch) will be reported on a weekly (during the influenza season) and bi-weekly (during the summer months) basis.

6 The Immunization Monitoring Program ACTive (IMPACT) is a paediatric hospital-based national active surveillance network for adverse events following immunization, vaccine failures and selected infectious diseases in children that are, or are soon to be, vaccine preventable.
Pandemic Alert Period

Table 2, below, describes the surveillance objectives for the pandemic alert period. The objectives are general, given the unknown epidemiology of a novel influenza virus infection and uncertainties as to how it might behave in terms of efficiency of human-to-human transmission, impact on the population/population sub-groups and capacity to spread rapidly. Recommended surveillance tools and protocols, including surveillance case definitions, will need to be developed and revised based on information received as the situation evolves. The triggers that will signal the move to a new phase are generally based on relative ability to infect humans and spread efficiently among humans, as determined by observed activity and a comprehensive risk assessment. This risk assessment will include analyzing the interplay of these and other factors (e.g. infectiousness, rate of transmission, incubation period and period of communicability, severity of illness, impact of initial control measures, etc.). These factors should be viewed as general parameters which are useful for describing the critical points in the evolution and escalation of a pandemic and can only be assumed prior to strain identification and circulation of the novel virus. Furthermore, initial predictions are subject to change as the novel virus becomes adapted to human populations and flexibility will be important to respond to rapid adjustment of surveillance and related activities. As such, the following tables provide a basic framework for establishing and maintaining the recommended surveillance infrastructure and for clarifying basic roles and responsibilities to managing these activities at the various levels of government.

Supplementary Surveillance Recommendations – Ongoing Risk Assessment and Emerging Respiratory Illness Updates (Alerts/FYIs):

The ongoing maintenance and adjustment of routine surveillance activities and the timely sharing of surveillance and risk assessment information is an important supplement to the basic surveillance framework laid out in this annex. Based on ongoing risk assessment derived from the interpretation of local, regional, national and international influenza/emerging respiratory illness activity, recommendations may be made on an as-needed basis. These will guide increased vigilance and direct surveillance and investigation of severe and/or unexpected respiratory illnesses in relation to exposures of concern (high risk travel locations, exposure settings or types of contact). Furthermore, monitoring and investigation activities may be adjusted in terms of sensitivity and specificity as dictated by the evolving situation. Factors that may influence the opportunity for initial containment of cases/isolated clusters, such as the length of the incubation period and efficiency of transmission, will contribute to the decision of whether or not to continue case and cluster investigation with a view to controlling spread, if only temporarily, to buy additional time at the outset of a pandemic.\(^7\) The following framework should be considered with these factors in mind, underscoring the need for flexible, simple and proven activities/systems founded on good routine surveillance practices, clarified roles and responsibilities and efficient use of resources.

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\(^7\) Refer to the Public Health Measures, Annex M, of the Canadian Pandemic Influenza Plan.
### Table 2: Pandemic Alert Period

<table>
<thead>
<tr>
<th>Canadian Pandemic Phase</th>
<th>3.0</th>
<th>Outside Canada human infection(s) with a new subtype are occurring, but no human-to-human spread, or at most rare instances of spread to a close contact has been observed. No cases identified in Canada.</th>
</tr>
</thead>
</table>

#### Surveillance Objectives/Roles and Responsibilities

**Objective:**
- to detect and describe the first introduction of the novel virus in Canada
- to create awareness and ensure surveillance systems meet standards and pandemic plans are updated, tested and ready for possible implementation

**Federal:**
- Provide ongoing leadership through organisation of teleconferences/meetings, providing guidance and surveillance recommendations as needed
- Conduct regular information scanning and seek verification of international disease activity of potential public health significance i.e. International Ministries of Health and/or other international surveillance networks

**Additional roles/responsibilities for phase 3:**
- Confirm with WHO any reports of novel virus detection
- Establish current risk assessment with international surveillance partners
- Assess and convey current risk assessment to national surveillance partners
- Inform PIC/CCMOH/CPHLN/FluWatch reps of situation and advise all to remain on alert for further updates (e.g. for updates of current avian influenza H5N1 affected areas refer to [http://www.phac-aspc.gc.ca/h5n1/index.html](http://www.phac-aspc.gc.ca/h5n1/index.html))
- Review surveillance annex of pandemic plans and ensure systems and resources are ready/tested/available for rapid ramp up
- Review and confirm that all pandemic alert period surveillance activities via FluWatch and SRI surveillance are operating optimally
- Coordinate with P/T partners the review and modification of national case definitions. Ensure process is in place to document changes in the case definition and the definitions for reporting purposes are consistent with the international definitions
- Review/revise standard reports and pandemic reporting tools for dissemination of epidemiological and virologic information within Canada (*FluWatch* weekly reports for the public and CIOSC weekly situation updates for public health professionals)
- Define reporting parameters (process, frequency)
- Coordinate the implementation of surveillance systems to estimate severity of a novel virus outbreak (e.g. hospitalisations, mortality surveillance)

**P/T/local:**

**Additional roles/responsibilities for phase 3:**
- Ensure awareness and appropriate actions are carried out by key stakeholders and confirm that enhanced surveillance is implemented
- Review and confirm all normal interpandemic influenza surveillance activities via FluWatch and SRI surveillance are operating optimally
- Review the surveillance annex of pandemic plans and ensure systems and resources are ready/available for rapid ramp up if this becomes necessary
- Participate in regular information sharing with F/P/T/local stakeholders partners through teleconferences and electronic reporting
- Define reporting parameters (process, frequency, content)
## Surveillance Objectives/Roles and Responsibilities (continued)

**P/T/local:**

**Additional roles/responsibilities for phase 3:**

- Review/revise standard reporting forms, data collection tools and surveillance reports
- Regular information sharing nationally as well as from local to provincial jurisdictions
- Implement surveillance systems to estimate severity of the pandemic (e.g. mortality surveillance) if not already established during the interpandemic period

## Canadian Pandemic Phase

### 3.1

Single human case(s) with a new subtype detected in Canada. Virus is not known to be spreading from human-to-human, or at most rare instances of spread to a close contact have been observed.

## Surveillance Objectives/Roles and Responsibilities

**Objective:**

- to capture epidemiological data on the first case(s) of the novel virus infection in Canada
- to further heighten awareness and ensure surveillance systems meet standards and pandemic plans are updated, tested and ready for implementation

In addition to phase 3.0 roles and responsibilities:

**Federal:**

- Convene a meeting of PIC and the national surveillance working group to develop recommendations to review risk and implement enhanced surveillance e.g. awareness/heightened vigilance, surveillance/advisory at points of entry, increasing proportion of isolates subtypes and isolate referral
- Send Public Health Alert using CIOSC which includes an analysis of the epidemiologic information on the first case(s) detected in Canada (Alert to be approved by PIC)
- Follow up of potential imported/exported cases (e.g. linking with relevant international counterparts to share/obtain exposure/contact history)
- Report non-nominal case information to the WHO (for list of data elements refer to appendix 2) to be added once report form is revised
- Coordinating the enhancement of antiviral resistance monitoring

**P/T/local:**

- The PHLs and other viral diagnostic laboratories will be on high alert and will focus on: enhanced laboratory-based surveillance for the emerging new subtype; viral isolation by culture if appropriately equipped; implementation or augmentation of Real Time-PCR assays or other Nucleic Acid Tests (NATs) for identification and subtyping of influenza viruses. Case by case risk assessments will be used at this phase to determine the extent of enhanced surveillance

- Immediately report and refer to the NML any positive influenza laboratory findings or situations in which the strain type cannot be identified at the PT laboratory level from a case with ILI symptoms and epidemiological links with the novel influenza strain need to be reported and shipped to the NML immediately to ensure rapid confirmation characterization. Refer to the laboratory annex of the CPIP for details
- Convene a meeting of P/T surveillance groups to review national recommendations, review P/T/Local recommendations and implement enhanced surveillance
- Investigation of sporadic cases, including contact tracing, public health monitoring, and collection of detailed epidemiologic data using the SRI or other available report form (http://www.phac-aspc.gc.ca)

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8 The level of enhanced surveillance will depend on the location of the first case(s) in Canada as well as the risk assessment and whether the cases arise in Canada or are imported cases and novel viruses arising in Canada.
## Canadian Pandemic Phase

### 4.0
Outside Canada small cluster(s) with limited human-to-human transmission are occurring but spread is highly localized, suggesting that the virus is not well adapted to humans. No cases identified with these cluster(s) have been detected in Canada.

## Surveillance Objectives/Roles and Responsibilities

**Objective:**
- to detect and describe the first introduction of the novel virus in Canada
- to provide the information to heighten awareness and increase vigilance while ensuring system capacity and resource availability

**Federal:**
- Provide ongoing leadership through organisation of teleconferences/meetings, providing guidance and advice as needed
- Conduct regular scanning and verification of national and international surveillance information e.g. Ministries of Health and other international surveillance networks
- Assess and convey current risk assessment to national surveillance partners
- Convene a meeting of PIC and the national surveillance working group to develop recommendations to review risk and implement enhanced surveillance e.g. awareness/heightened vigilance, surveillance/advisory at points of entry, increasing proportion of isolates subtypes and isolate referral
- Review surveillance annex of pandemic plans and ensure systems and resources are ready/available for rapid ramp up if this becomes necessary
- Review and confirm that all normal inter-pandemic surveillance activities via FluWatch and SRI surveillance are operating optimally
- Coordinate with P/T partners the review and modification of national case definitions. Ensure process is in place to document changes in the case definition and the definitions are consistent with the international definitions
- Review/revise standard reports for dissemination of epidemiological information within Canada
- Review/revise reporting parameters (process, frequency)

**Additional roles/responsibilities for phase 4:**
- Confirm with the WHO report of clusters of 2 or more cases
- Confirm case definitions with the WHO
- Review/revise Public Health Alert to increase awareness for informed public health and clinical decision making as necessary\(^9\) (revisions to Alert to be approved by PIC)

**P/T/local:**
- Ensure regular contact with key pandemic decision makers and stakeholders within P/T jurisdiction
- Ensure awareness and appropriate action is carried out by key stakeholders and confirm that enhanced surveillance is implemented
- Review surveillance annex of pandemic plans and ensure systems and resources are ready/available for rapid ramp up if this becomes necessary

**Additional roles/responsibilities for phase 4:**
- Review and confirm all normal inter-pandemic influenza surveillance activities via FluWatch and SRI surveillance are operating optimally
- Disseminate change in pandemic phase to health care providers

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\(^9\) Although it is considered unlikely that a pandemic strain will first emerge in Canada, the public health system needs to be prepared to deal with this possibility. Public Health Alerts need to address the situation for both impor
Canadian Pandemic Phase

4.1 Single human case(s) with virus that has demonstrated limited human-to-human transmission detected in Canada. No cluster(s) identified in Canada.

4.2 Small localized clusters with limited human-to-human transmission are occurring in Canada but spread is highly localized, suggesting that the virus is not well adapted to humans.

Surveillance Objectives/Roles and Responsibilities

Objective:
- to identify, capture epidemiological data and describe the epidemiological characteristics on the first cases and clusters of the novel virus infection in Canada
- to provide data to monitor the containment of the outbreak
- to provide the information to heighten awareness and increase vigilance while ensuring system capacity and resource availability

Federal:
- Provide ongoing leadership through organisation of teleconferences/meetings, providing guidance and advice as needed
- Conduct regular scanning and verification of national and international surveillance information e.g. Ministries of Health and other international surveillance networks
- Assess and convey current risk assessment to national surveillance partners
- Convene a meeting of PIC and the national surveillance working group to develop recommendations to review risk and implement enhanced surveillance e.g. awareness/heightened vigilance, surveillance/advisory at points of entry, increasing proportion of isolates subtyped and isolate referral
- Review surveillance annex of pandemic plans and ensure systems and resources are ready/available for rapid ramp up if this becomes necessary
- Review and confirm that all routine inter-pandemic surveillance activities via FluWatch and SRI surveillance are operating optimally
- Coordinate with P/T partners the review and modification of national case definitions. Ensure process is in place to document changes in the case definition and the definitions are consistent with the international definitions
- Review/revise standard reports for dissemination of epidemiological information within Canada
- Provide alert to increase awareness for informed public health and clinical decision making as necessary

Additional roles/responsibilities for phase 4.1, 4.2:
- Implement international border-based surveillance (depending on origin of cases) coordinated by the Centre for Emergency Preparedness and Response (PHAC)\(^\text{10}\)
- Collect/compile/distribute epidemiological data for cases reported in Canada
- Establish current level of risk to guide public health actions (e.g. transmission characteristics associated with secondary cases)
- Review protocols for special studies\(^\text{11}\) and prepare dedicated teams as necessary to ensure prompt activation of the studies when appropriate
- Revise case definitions based on observed clinical presentation of cases
- Report non-nominal case/cluster information to the WHO (for list of data elements refer to appendix 3

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\(^{10}\) Refer to the Public Health Measures, Annex M, of the Canadian Pandemic Influenza Plan.

\(^{11}\) Implementation of serologic surveys can be considered at this time. Guidelines developed as a framework to be revised as needed at the time of implementation are found in appendix I. Plans for vaccine effectiveness studies should be reviewed and prepared for implementation.
### Surveillance Objectives/Roles and Responsibilities (continued)

**P/T/local:**
- Ensure awareness and appropriate action is carried out by key stakeholders and confirm that enhanced surveillance is implemented immediately in affected area in order to identify any human to human transmission in Canada
- Review surveillance annex of pandemic plans and ensure systems and resources are ready/available for rapid ramp up if this becomes necessary

**Additional roles/responsibilities for phase 4.1, 4.2:**
- Review and confirm all normal inter-pandemic influenza surveillance activities via FluWatch and SRI surveillance are operating optimally
- Conduct case/cluster investigation and report to PHAC (for list of data elements refer to appendix 3)

### Canadian Pandemic Phase

**5.0** Outside Canada larger cluster(s) are occurring but human-to-human spread still localized, suggesting that virus is becoming increasingly better adapted to humans but may not yet be fully transmissible (substantial pandemic risk). No cases identified with these clusters have been detected in Canada.

### Surveillance Objectives/Roles and Responsibilities

**Objective:**
- to detect and describe the first introduction of the novel virus in Canada
- to heighten awareness and increase vigilance while ensuring system capacity and resource availability

**Federal:**
- Provide ongoing leadership
- Confirm with the WHO sustained person-to-person transmission and determine if there are outbreaks in one or more countries
- Conduct regular scanning and verification of national and international surveillance information e.g. Ministries of Health and other international surveillance networks
- Assess and convey current risk assessment to national surveillance partners
- Convene PIC and the national surveillance working group to determine situation-specific information needs and appropriate enhanced surveillance activities (increased lab testing and referral, collection of epidemiologically relevant information, e.g. travel history, immunization status, other information needed to guide the control measures based on global experience)
- Notify PIC/CCMOH/CPHLN/FluWatch reps of situation and recommended action, including situation-specific enhanced surveillance activities
- Initiate ramp up of enhanced surveillance if determined necessary (based on efficiency of human-to-human spread and assessment of pandemic potential)
- Ensure any additional systems and resources are ready/available for rapid ramp up if this becomes necessary

**P/T/local:**
- Ensure heightened awareness and appropriate action is carried out by key pandemic stakeholders including enhanced surveillance activities
- Ramp up to enhanced surveillance as required
- Ensure additional systems and resources are ready/available for rapid ramp up if this becomes necessary
- Information sharing with F/P/T/local partners
### Canadian Pandemic Phase

**5.1** Single human case(s) with virus that is better adapted to humans detected in Canada. No cluster(s) identified in Canada.

### Surveillance Objectives/Roles and Responsibilities

**Objective:**
- to identify, capture epidemiological data and describe the epidemiological characteristics on the first cases and clusters of the novel virus infection in Canada
- to provide data to monitor the containment of the outbreak
- to provide the information to heighten awareness and increase vigilance while ensuring system capacity and resource availability

In addition to phase 5.0 roles and responsibilities:

**Federal:**
- Report non-nominal case/cluster information to the WHO (for list of data elements refer to appendix 3)

**P/T/local:**
- Conduct case investigation and report to the PHAC (for list of data elements refer to appendix 3)

---

### Canadian Pandemic Phase

**5.2** Larger localized cluster(s) with limited human-to-human transmission are occurring in Canada but human-to-human spread still localized, suggesting that virus is becoming increasingly better adapted to humans but may not yet be fully transmissible (substantial pandemic risk).

### Surveillance Objectives/Roles and Responsibilities

**Objective:**
- to identify, capture epidemiological data and describe the epidemiological characteristics on the first cases and clusters of the novel virus infection in Canada
- to provide data to monitor the containment of the outbreak
- to provide the information to heighten awareness and increase vigilance while ensuring system capacity and resource availability

In addition to phase 5.1 roles and responsibilities:

**Federal:**
- *Cluster within one P/T:* assist with the coordination and implementation of the outbreak investigation as led by the P/T, act as the liaison with international organisations
- *Clusters in more than one P/T:* coordinate outbreak investigation and act as the liaison between provinces/territories as well as international organisations
- Revise case definitions based on observed clinical presentation of cases

**P/T/local:**
- *Cluster within one P/T:* lead the outbreak investigation and report to the PHAC (for list of data elements refer to appendix 3)
Table 2.1: National Surveillance Data for the Pandemic Alert Period

<table>
<thead>
<tr>
<th>Canadian Pandemic Phase</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>National Surveillance Data</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Disease surveillance</strong></td>
</tr>
<tr>
<td>(a) influenza activity level by P/T region (based on FluWatch definitions)</td>
</tr>
<tr>
<td>(b) influenza-like illness (ILI) consultation rate (number of ILI sentinel physician visits/ 1000 consults)</td>
</tr>
<tr>
<td>(c) number of laboratory-confirmed outbreaks in long-term care facilities</td>
</tr>
<tr>
<td>(d) number of influenza-associated hospitalizations and influenza-associated deaths in children 0-18 years through sentinel paediatric hospitals (IMPACT12)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Laboratory surveillance</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>(e) percent positive influenza tests (total number of laboratory tests for influenza and number of positive results, by virus type (A or B))</td>
</tr>
<tr>
<td>(f) strain characterisation, number identified for each strain and subtype, and percentage of total for approximately 10% of isolates from the sentinel laboratory respiratory virus detection system</td>
</tr>
<tr>
<td>(g) increased targeted strain characterisation based on risk assessment in areas where animal strains are circulating</td>
</tr>
<tr>
<td>(h) antiviral resistance testing for influenza isolates</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Risk assessment</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>(i) summary of national/international areas where animal virus activity has been confirmed</td>
</tr>
<tr>
<td>(j) summary of international activity in humans</td>
</tr>
</tbody>
</table>

---

12 The Immunization Monitoring Program ACTive (IMPACT) is a paediatric hospital-based national active surveillance network for adverse events following immunization, vaccine failures and selected infectious diseases in children that are, or are soon to be, vaccine preventable.
### Canadian Pandemic Phase

3.1 Single human case(s) with a new subtype detected in Canada. Virus is not known to be spreading from human-to-human, or at most rare instances of spread to a close contact have been observed.

### National Surveillance Data

#### Disease surveillance

- (a) influenza activity level by P/T region (based on FluWatch definitions)
- (b) influenza-like illness (ILI) consultation rate (number ILI sentinel physician visits/1000 consults)
- (c) number of laboratory-confirmed outbreaks in long-term care facilities
- (d) number of influenza-associated hospitalizations and influenza-associated deaths in children 0-18 years through sentinel paediatric hospitals (IMPACT)

#### Laboratory surveillance

- (e) percent positive influenza tests (total number of laboratory tests for influenza and number of positive results, by virus type (A or B))
- (f) Strain characterisation, number identified for each strain and subtype, and percentage of total for approximately 10% of isolates from the sentinel laboratory respiratory virus detection system
- (g) increased targeted strain characterisation based on risk assessment in areas where animal strains are circulating
- (h) antiviral resistance testing for influenza isolates

#### Risk assessment

- (i) summary of national/international areas where animal virus activity has been confirmed
- (j) summary of international activity in humans

#### In addition to indicators for 3.0:

- (k) detailed epidemiological description and estimation of incubation and communicability periods (e.g. number of secondary cases)
- (l) *if antivirals are used for prophylaxis* - antivirals: # patients with ILI after prophylaxis, length of time given prophylaxis, severe adverse events
- (m) enhanced laboratory surveillance (increased strain characterisations) targeted to areas where the first case(s) are identified. Includes subtyping samples from contacts with known exposure who report ILI symptoms (based on case by case risk assessment)
- (n) monitoring for unusual outbreaks and cluster activity

---

13 The Immunization Monitoring Program ACTive (IMPACT) is a paediatric hospital-based national active surveillance network for adverse events following immunization, vaccine failures and selected infectious diseases in children that are, or are soon to be, vaccinable preventable.
### Canadian Pandemic Phase

**4.0** Outside Canada small cluster(s) with limited human-to-human transmission are occurring but spread is highly localized, suggesting that the virus is not well adapted to humans. No cases identified with these cluster(s) have been detected in Canada.

**5.0** Outside Canada larger cluster(s) are occurring but human-to-human spread still localized, suggesting that virus is becoming increasingly better adapted to humans but may not yet be fully transmissible (substantial pandemic risk). No cases identified with these clusters have been detected in Canada.

### National Surveillance Data

**Same data as 3.0:**

**Disease surveillance**

(a) influenza activity level by P/T region (based on *FluWatch* definitions)

(b) influenza-like illness (ILI) consultation rate (number ILI sentinel physician visits/ 1000 consults)

(c) number of laboratory-confirmed outbreaks in long-term care facilities

(d) number of influenza-associated hospitalizations and influenza-associated deaths in children 0-18 years through sentinel paediatric hospitals (IMPACT)

**Laboratory surveillance**

(e) percent positive influenza tests (total number of laboratory tests for influenza and number of positive results, by virus type (A or B))

(f) strain characterisation, number identified for each strain and subtype, and percentage of total for approximately 10% of isolates from the sentinel laboratory respiratory virus detection system

(g) Increased targeted strain characterisation based on risk assessment in areas where animal strains are circulating

(h) antiviral resistance testing for influenza isolates

**Risk assessment**

(i) summary of national/international areas where animal virus activity has been confirmed

(j) summary of international activity in humans
### Canadian Pandemic Phase

4.1 Single human case(s) with virus that has demonstrated limited human-to-human transmission detected in Canada. No cluster(s) identified in Canada.

4.2 Small localized clusters with limited human-to-human transmission are occurring in Canada but spread is highly localized, suggesting that the virus is not well adapted to humans.

5.1 Single human case(s) with virus that is better adapted to humans detected in Canada. No cluster(s) identified in Canada.

5.2 Larger localized cluster(s) with limited human-to-human transmission are occurring in Canada but human-to-human spread still localized, suggesting that virus is becoming increasingly better adapted to humans but may not yet be fully transmissible (substantial pandemic risk).

### National Surveillance Data

**Same data as 3.1:**

**Disease surveillance**

(a) influenza activity level by P/T region (based on *FluWatch* definitions)

(b) influenza-like illness (ILI) consultation rate (number ILI sentinel physician visits/ 1000 consults)

(c) number of laboratory-confirmed outbreaks in long-term care facilities

(d) number of influenza-associated hospitalizations and influenza-associated deaths in children 0-18 years through sentinel paediatric hospitals (IMPACT)

**Laboratory surveillance**

(e) percent positive influenza tests (total number of laboratory tests for influenza and number of positive results, by virus type (A or B))

(f) strain characterisation, number identified for each strain and subtype, and percentage of total for approximately 10% of isolates from the sentinel laboratory respiratory virus detection system

(g) increased targeted strain characterisation based on risk assessment in areas where animal strains are circulating

(h) antiviral resistance testing for influenza isolates

**Risk assessment**

(i) summary of national/international areas where animal virus activity has been confirmed

(j) summary of international activity in humans

(k) detailed epidemiological description and estimation of incubation and communicability periods (e.g. number of secondary cases)

(l) *If antivirals are used for prophylaxis* - antivirals: # patients with ILI after prophylaxis, length of time given prophylaxis, severe adverse events

(m) enhanced laboratory surveillance (increased strain characterisations) targeted to areas where the first case(s) are identified. Includes subtyping samples from contacts with known exposure who report ILI symptoms (based on case by case risk assessment)

(n) monitoring for unusual outbreaks and cluster activity

**In addition to data for 3.1:**

(o) # and epidemiological description of settings involved
### Table 3: Pandemic Period

#### Canadian Pandemic Phase

<table>
<thead>
<tr>
<th>Phase</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.0</td>
<td>Outside Canada increased and sustained transmission in general population has been observed. No cases have been detected in Canada.</td>
</tr>
</tbody>
</table>

#### Surveillance Objectives/Roles and Responsibilities

**Objective:**
- to describe the first cases in Canada
- to inform the response by tracking occurrence and progression of the pandemic through the population

**Federal:**
- Provide ongoing leadership
- Confirm with the WHO reports of multiple widespread outbreaks with high rates of morbidity/mortality in multiples countries
- Conduct regular scanning and verification of national and international surveillance information e.g. Ministries of Health and other international surveillance networks
- Evaluate current epidemiology to facilitate prioritisation (if necessary) of scarce resources to high risk groups
- Convene meeting with PIC and the national surveillance working group to evaluate situation and determine information needs and frequency of reporting, e.g. geographic regions/specific urban centres or selected population groups/health case settings for ramping up of surveillance activities (e.g. sentinel/non-sentinel surveillance ramp up to increase coverage, specimen collection, collection of mortality data)
- Scale up surveillance activities as required (frequency of data collection, additional information needs, dissemination to partners)
- Coordinate with P/T’s the review and revision of case definition based on current evidence of the clinical spectrum of the disease
- Distribute revised data collection forms and database transmission instructions/protocols if not done previously
- Prepare to implement the human resources plan developed during phase 1

**P/T/local:**
- Have regular contact with key stakeholders within jurisdictions
- Ensure surveillance activities are scaled up, resources are in place as necessary, and appropriate action is carried out
- Prepare to implement the human resources plan developed during phase 1
## Canadian Pandemic Phase

### 6.1 Single human case(s) with the pandemic virus detected in Canada. No cluster(s) identified in Canada.

*Note: It is likely that this phase will have a very short duration and may not occur at all in Canada (i.e., novel virus activity may not be detected prior to the occurrence of a cluster of cases).*

### Surveillance Objectives/Roles and Responsibilities

**Objective:**
- to describe the first cases in Canada
- to inform the response by tracking occurrence and progression of the pandemic through the population

In addition to phase 6.0 roles and responsibilities:

**Federal:**
- Collect, collate and analyse national impact and trends and provide epidemiological summaries to characterize outbreaks and impact using mortality and enhanced surveillance data (age-specific mortality rates, high risk groups)
- Provide epidemiological summaries to characterise outbreaks and impact (mortality, high risk groups, clinical presentation)
- Implement the human resources plan developed during phase 1

**P/T/local:**
- Collect, collate and analyse P/T impact and trends and provide epidemiological summaries to PHAC to characterize outbreaks and impact using mortality and enhanced surveillance data (age-specific mortality rates, high risk groups, clinical spectrum of the disease)
- Report antiviral use, antiviral-related adverse events to Health Canada, and adverse events following immunization (AEFI) data to PHAC
- Implement the human resources plan developed during phase 1

## Canadian Pandemic Phase

### 6.2 Localized or widespread pandemic activity observed in Canadian population.

### Surveillance Objectives/Roles and Responsibilities

**Objective:**
- to identify and describe the affected population thereby facilitating identification of high risk groups and comparisons between other populations or other influenza season in order to guide public health actions
- to inform the response by tracking occurrence and progression of the pandemic through the population
- to determine triggers bases on decreasing activity levels for implementation of post-pandemic activities in preparations for second and later waves

In addition to phase 6.0 roles and responsibilities:

**Federal:**
- Scale back to streamlined surveillance (to be further defined)
- Coordinate activities for evaluation and resource planning for subsequent waves

**P/T/local:**
- Scale back to streamlined surveillance (to be further defined)
- Evaluate performance and plan resources for subsequent waves
### Table 3.1: National Surveillance Data for the Pandemic Period

<table>
<thead>
<tr>
<th>Canadian Pandemic Phase</th>
<th>6.0 Outside Canada increased and sustained transmission in general population has been observed. No cases have been detected in Canada.</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>National Surveillance Data</th>
<th></th>
</tr>
</thead>
</table>
| **Disease surveillance**  | (a) influenza activity level by P/T region (based on FluWatch definitions)  
(b) influenza-like illness (ILI) consultation rate (number of ILI sentinel physician visits/ 1000 consults)  
(c) number of laboratory-confirmed outbreaks in long-term care facilities  
(d) number of influenza-associated hospitalizations and influenza-associated deaths in children 0-18 years through sentinel paediatric hospitals (IMPACT14) |
| **Laboratory surveillance** | (e) percent positive influenza tests (total number of laboratory tests for influenza and number of positive results, by virus type (A or B))  
(f) strain characterisation, number identified for each strain and subtype, and percentage of total for approximately 10% of isolates from the sentinel laboratory respiratory virus detection system  
(g) increased targeted strain characterisation based on risk assessment  
(h) antiviral resistance testing for influenza isolates |
| **Risk assessment**        | (i) summary of international activity in humans  |

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14 The Immunization Monitoring Program ACTive (IMPACT) is a paediatric hospital-based national active surveillance network for adverse events following immunization, vaccine failures and selected infectious diseases in children that are, or are soon to be, buccine preventable.
### Canadian Pandemic Phase

**6.1** Single human case(s) with the pandemic virus detected in Canada. No cluster(s) identified in Canada.  
*Note: It is likely that this phase will have a very short duration and may not occur at all in Canada (i.e., novel virus activity may not be detected prior to the occurrence of a cluster of cases).*

### National Surveillance Data

**Same data as 5.1, 5.2:**

**Disease surveillance**
- (a) influenza activity level by P/T region (based on FluWatch definitions)
- (b) influenza-like illness (ILI) consultation rate (number of ILI sentinel physician visits/ 1000 consults)
- (c) number of laboratory-confirmed outbreaks in long-term care facilities
- (d) number of influenza-associated hospitalizations and influenza-associated deaths in children 0-18 years through sentinel paediatric hospitals (IMPACT)

**Laboratory surveillance**
- (e) percent positive influenza tests (total number of laboratory tests for influenza and number of positive results, by virus type (A or B))
- (f) strain characterisation, number identified for each strain and subtype, and percentage of total for approximately 10% of isolates from the sentinel laboratory respiratory virus detection system
- (g) increased targeted strain characterisation based on risk assessment
- (h) antiviral resistance testing for influenza isolates

**Risk assessment**
- (i) summary of international activity in humans
- (j) detailed epidemiological description and estimation of incubation and communicability periods (e.g. number of secondary cases)
- (k) *If antivirals are used for prophylaxis* - antivirals: # patients with ILI after prophylaxis, length of time given prophylaxis
- (l) enhanced laboratory surveillance (increased strain characterisations) targeted to areas where the first case(s) are identified. Includes subtyping samples from contacts with known exposure who report ILI symptoms (based on case by case risk assessment)
- (m) monitoring for unusual outbreaks and cluster activity
- (n) # and epidemiological description of settings involved

**In addition to data for 5.1, 5.2:**
- (o) # surveillance regions with widespread activity, based on FluWatch definitions

**NOTE:** Presently, there is no mechanism for collecting mortality data on a real-time basis. This is a recognized gap in information for monitoring of severity of the pandemic. While required during inter-pandemic phases to monitor severity of annual influenza epidemics, establish baseline expected seasonal mortality trends and detect potential signals, real-time mortality surveillance is recommended at the height of a pandemic to describe the severity of the pandemic, identify high risk age groups and provide crude indications of intervention effectiveness. As well, during this heightened phase of the pandemic, resources are expected to be scarce and due to low participation/reporting rates, existing surveillance activities may no longer provide accurate or complete data. While routine surveillance activities are not expected to stop entirely, participation rates may be very low and therefore data quality and representativeness may be poor. As such, simple and flexible systems for surveillance are key. In addition to routine activities that are established and maintained, new and recommended activities, such as real-time mortality surveillance, should be simple and flexible.
Canadian Pandemic Phase

6.2 Localized or widespread pandemic activity observed in Canadian population.

National Surveillance Data

Streamlined surveillance for activity and severity: influenza activity levels (using modified indicators for assessment). Other severity indicators under consideration, as above.

Post-Pandemic Period

While the post-pandemic period suggests that the pandemic waves have ended and that the virus is no longer causing significant outbreaks in the population, it is acknowledged that the virus will continue to circulate. The following outlines activities to evaluate the surveillance activities during the pandemic, however, surveillance and laboratory activities during this time should continue to monitor changes in the pandemic virus.
## Table 4: Post-Pandemic Period

<table>
<thead>
<tr>
<th><strong>Canadian Pandemic Phase</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Post-Pandemic</strong></td>
</tr>
<tr>
<td>Reports of case counts and other broad indicators of pandemic activity in Canada suggest that the pandemic virus is no longer causing significant illness in the population.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Surveillance Objectives/Roles and Responsibilities</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Objective:</strong></td>
</tr>
<tr>
<td>➢ to assess the seasonal burden of influenza and to detect unusual events including unusual or new strains, unusual outcomes/syndromes, or unusual distribution or severity of influenza within the population</td>
</tr>
<tr>
<td>➢ to evaluate and assess system’s ability to provide information useful for reducing morbidity and mortality during a pandemic</td>
</tr>
<tr>
<td>➢ to summarise the epidemiological characteristics of the pandemic waves in Canada</td>
</tr>
<tr>
<td>➢ to continue to monitor changes in the pandemic virus</td>
</tr>
<tr>
<td><strong>Federal:</strong></td>
</tr>
<tr>
<td>➢ Provide ongoing leadership</td>
</tr>
<tr>
<td>➢ Confirm with WHO end of global widespread novel virus activity</td>
</tr>
<tr>
<td>➢ Resume regular scanning and verification of national and international surveillance information e.g. Ministries of Health and other international surveillance networks</td>
</tr>
<tr>
<td>➢ Evaluate current epidemiology and end of pandemic activity</td>
</tr>
<tr>
<td>➢ Convene meeting with PIC and the national surveillance working group to determine any special information needs for the evaluation of surveillance system performance during the pandemic waves</td>
</tr>
<tr>
<td>➢ Provide epidemiological summaries to characterise the impact of the pandemic waves in Canada (spread, age-specific morbidity and mortality rates, high risk groups)</td>
</tr>
<tr>
<td>➢ Coordinate activities for evaluation and resource planning, including special studies for surveillance of delayed effects of the pandemic virus (e.g. neurological)</td>
</tr>
<tr>
<td>➢ Resume interpandemic influenza surveillance via FluWatch (except in case of additional information needs for evaluation)</td>
</tr>
<tr>
<td>➢ Scale back frequency and change focus of regular updates via e-mail, fax, teleconferencing and web postings to meet the needs of evaluation and planning activities</td>
</tr>
<tr>
<td>➢ Evaluate surveillance system performance and plan improvements as required</td>
</tr>
<tr>
<td><strong>P/T/local:</strong></td>
</tr>
<tr>
<td>➢ Resume interpandemic FluWatch and jurisdiction-specific activities</td>
</tr>
<tr>
<td>➢ Evaluate surveillance system performance and plan improvements as required and share the information with F/P/T/local stakeholders</td>
</tr>
</tbody>
</table>
Appendix 1: Generic Serosurvey Protocol of People Exposed to Influenza

Drafted by: The Vaccine Preventable and Respiratory Infections Surveillance (VPRIS) working group, April 2006.

Background

To understand the risk of new influenza strains to humans, it is important to know their capability to infect people and cause disease. During the recent years, several avian influenza strains caused outbreaks in animals with limited secondary transmission to humans. These human cases may potentially transmit their influenza to their various types of contacts: household, healthcare workers or social contacts. In the multiple possible scenarios regarding pandemic influenza, one expects strains that will become pandemic to initially be acquired from animals, cause limited transmission and progressively hone their capacity to infect humans through adaptative mutations or reassortment.

To identify potential pandemic strains, it is important to be able to define the transmissibility of these strains to humans as well as their virulence which is their capacity to cause serious disease. When an influenza strain infects a person, it will trigger an antibody immune response specific to this strain. The presence of these antibodies is an accurate marker of infection even in absence of symptoms. Serosurveys of persons who have been in contact with infected animals or humans are therefore helpful to estimate the transmissibility of new strains and their virulence when coupled with clinical symptoms.

This generic protocol describes a methodology to conduct serosurveys in people who have been in contact with infected animals or humans. This methodology has to be adapted to the specific context of the outbreak. While the influenza strains to investigate may be of swine origin or from another type of animal, the most likely hosts of strains that will raise concerns are birds. For simplicity, the protocol will refer to avian strain when speaking of the implicated animal strain.

This protocol is a synthesis of several serosurvey protocols used elsewhere in the world after or during outbreaks of avian influenza. It describes a method that can be used with the three most frequent types of contacts investigated: workers and people in contact with infected animals, household contacts of human cases and healthcare workers in contact with patients. The study design and variables to collect will vary for each situation but laboratory assessment is common to all studies. The proposed questionnaire presents a series of questions and variables that may or may not apply to a specific situation. It is not meant to be exhaustive but can serve as a basis to construct the questionnaire adapted to the specific outbreak. Investigators should choose the items most relevant to their situation and should consider adding other questions that have not been presented but may be important in their context.

Objective

To estimate the prevalence of avian influenza-specific antibodies in persons exposed to avian influenza infected animals or patients, to describe the spectrum of illness, and assess epidemiologically associated risk factors for having antibodies to avian influenza.
Study design
Two types of surveys can be conducted. Prospective studies estimate the incidence of infections whereas retrospective studies estimate prevalence of past exposures to avian influenza without confirming the time when the infection occurred.

Description and source of study population and catchment areas
The target populations for the study should be defined with inclusion criteria describing the demographic characteristics of participants (age, gender, occupation, residence, etc...) and the type and timing of exposure to infected animals or patients.

Exposed and non exposed participants
Seroprevalence studies that include only a group of exposed persons are useful but may not be adequate to identify risk factors outside the direct exposure to an infected animal or patient that contributed to infection. The inclusion of a group of participants who have not been exposed to infected animals or patients will generally provide a different perspective on other factors or behaviours that contributed to infection. Therefore the enrolment of a group of non-exposed participants is generally recommendable.

Enrolment and data collection
The site of enrolment, the method to contact participants, to obtain their informed consent, to collect information and blood specimen should be described. It may be useful to plan to ask participants who have positive test results for antibody to avian influenza if they would agree to participate in follow-up studies. The follow-up could include 1) clinical information on an influenza-like illness if not yet available; 2) testing of banked sera if available for comparison of antibody titers to assist with the interpretation of test results; and/or 3) testing of an additional blood sample to assist with the interpretation of test results. The participant may choose to participate in any of the three components of the study that are applicable and may refuse to participate in any of them.

Variables
Variables to collect will vary according to the specific event. However the set of common characteristics that are interesting include: Age, sex, area of residence, primary occupation, medical history and underlying conditions, smoking habits, prior influenza vaccination, number of persons in the household, contacts with pet animals, travel, activities where contacts with animal may have occurred, household and non household contacts with a sick person, types of contacts, presence of symptoms of respiratory infection, duration of disease, medical consultation, hospitalization, outcome.
For occupational exposure, specific questions related to each activity and the protective measures used should be collected.
The sample questionnaire includes several variables collected during previous serosurveys and can serve as a starting point to develop the final questionnaire to use during a specific event. The questions have been grouped into sections that address specific issues. Some or all of these sections may be relevant during an outbreak and selection should be made accordingly. This questionnaire is not meant to be exhaustive and should be adapted to individual situation.
Laboratory methods

As the antibody response requires time to become detectable, specimens collected early after a contact may still be negative despite the presence of an ongoing infection whereas negative specimens collected ≥ 21 days after the last possible time of exposure rule out an infection. This concept is important for prospective studies because they will require the collection of two blood specimens: one at time of enrolment and a second one collected ≥ 21 days after the last possible time of exposure. Retrospective studies will collect only one specimen taken ≥ 21 days after the last possible time of exposure. As antibodies persist for months, a retrospective study has little risks of false negative results if conducted within six months of exposure.

The blood should be centrifuged, and serum separated, aliquoted into multiple cryovials and, labelled. If tested within a week, the serum can be kept in the refrigerator. If not tested immediately sera should be frozen at minus 20 °C. For long term conservation, sera should be frozen at minus 70 °C. Determination of antibodies to avian influenza can be done through a variety of assays including haemagglutination inhibition, neutralization assays including micro-neutralization and western blot (Ref: Rowe T, Abernathy RA, Hu-Primmer J, Thompson WW, Lu X, Lim W, Fukuda K, Cox NJ, Katz JM. Detection of antibody to avian influenza A (H5N1) virus in human serum by using a combination of serologic assays. Journal of Clinical Microbiology 1999;37:937-43).

Sample size and statistical power

The precision of the estimate will vary with the expected prevalence of infection. The precision of prevalence in studies with only one group of exposed people is presented Table 1. Table 2 presents the number of participants per group required for different expected prevalence to obtain an 80% power.

<table>
<thead>
<tr>
<th>Prevalence</th>
<th>±1%</th>
<th>±2%</th>
<th>±5%</th>
<th>±10%</th>
</tr>
</thead>
<tbody>
<tr>
<td>1%</td>
<td>380</td>
<td>95</td>
<td>15</td>
<td>4</td>
</tr>
<tr>
<td>5%</td>
<td>1,825</td>
<td>456</td>
<td>73</td>
<td>18</td>
</tr>
<tr>
<td>10%</td>
<td>3,457</td>
<td>864</td>
<td>138</td>
<td>35</td>
</tr>
<tr>
<td>15%</td>
<td>4,898</td>
<td>1,225</td>
<td>196</td>
<td>49</td>
</tr>
</tbody>
</table>
Table 2 Sample size of each group (exposed and non-exposed) by expected level of prevalence in the exposed and non exposed group assuming an alpha threshold of 5% and a power of 80%

<table>
<thead>
<tr>
<th>Prevalence in the exposed group</th>
<th>Prevalence in the control group</th>
</tr>
</thead>
<tbody>
<tr>
<td>5%</td>
<td>1%</td>
</tr>
<tr>
<td>332</td>
<td>653</td>
</tr>
<tr>
<td>10%</td>
<td>121</td>
</tr>
<tr>
<td>15%</td>
<td>71</td>
</tr>
<tr>
<td>20%</td>
<td>50</td>
</tr>
<tr>
<td>25%</td>
<td>37</td>
</tr>
</tbody>
</table>

While in many circumstances the number of people exposed will not be sufficient to obtain precise estimates, studies will still be valuable to demonstrate if transmission appears to be efficient or small.

**Statistical Analysis**

The primary outcome is the seroprevalence of antibody in the exposed and non exposed groups. Risk factors should be sought comparing the characteristics of positive and negative exposed patients and comparing the exposed and unexposed participants.

**Ethics**

Seroprevalence studies must respect the highest ethical standards for protection of the research subject and be approved by a recognized Research Ethics Board. Signed informed consent should be obtained from each subject. In respect of the individual’s privacy, a study code number must be assigned to all research participants. This will allow for confidentiality of information to be maintained to the extent legally possible. A record linking the participant’s name and study code number should be kept secure and confidential by the investigator. Personal information should never be divulged to a third party and only aggregate results presented at conferences and in publications. Patients should be informed that testing will only be done for the presence of antibody to influenza and other respiratory viruses, but that under no circumstance will their sample be screened for unrelated viruses such as HIV.

The benefit of these studies is to increase knowledge concerning the risk for infection from avian influenza viruses. There may be no direct benefit to the research subject who is donating blood for these studies. If antibody is detected among participants, the study may also help determine which types of exposures are associated with an increased risk of infection. The potential discomforts and hazards of seroprevalence studies are minimal. These include risks associated with venipuncture, which may cause temporary discomfort at the procedure site. Participants should have access to contact phone numbers in the consent form in the event of adverse reactions to blood draws or general concerns during the course of the study. The participant should be free to withdraw his/her sample from the serum bank and/or participation in the study at any time after the blood is drawn.
### Annex 1
Sample Questionnaire for Avian influenza serosurvey

**Study ID #____________**

<table>
<thead>
<tr>
<th>Interview Date (dd/mm/yyyy):</th>
<th>Interviewer:</th>
</tr>
</thead>
</table>

#### Nominal data: *(Can be put on a separate form)*

<table>
<thead>
<tr>
<th>Family Name (Last Name):</th>
<th>Given Name (First Name):</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date of Birth (dd/mm/yyyy):</td>
<td>Home Telephone Number:</td>
</tr>
<tr>
<td>Address:</td>
<td>Work Telephone Number:</td>
</tr>
<tr>
<td>City:</td>
<td>Postal code:</td>
</tr>
</tbody>
</table>

#### Non nominal data

<table>
<thead>
<tr>
<th>First three digit of the postal code:</th>
<th>Sex: Male ☐ Female ☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years):</td>
<td>What is your primary occupation?</td>
</tr>
</tbody>
</table>

#### Medical History

**Have you ever been diagnosed by a doctor with any of the following chronic medical conditions?**

<table>
<thead>
<tr>
<th>Condition</th>
<th>No ☐ Yes ☐ Unknown ☐</th>
</tr>
</thead>
<tbody>
<tr>
<td>Asthma</td>
<td></td>
</tr>
<tr>
<td>Emphysema or chronic bronchitis</td>
<td></td>
</tr>
<tr>
<td>Other chronic lung disease</td>
<td></td>
</tr>
<tr>
<td>Chronic heart disease</td>
<td></td>
</tr>
<tr>
<td>Diabetes mellitus</td>
<td></td>
</tr>
<tr>
<td>Kidney failure</td>
<td></td>
</tr>
<tr>
<td>Immunodeficiency</td>
<td></td>
</tr>
<tr>
<td>Cancer</td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td></td>
</tr>
</tbody>
</table>

**Are you taking oral steroids daily?**

| No ☐ Yes ☐ Unknown ☐ |

**In the past year, have you smoked a total of 5 or more packs of cigarettes or other tobacco products?**

| No ☐ Yes ☐ Unknown ☐ |

**If yes:**

**On average, how many packs of cigarettes or other tobacco products do you smoke per day?**

| (packs per day) |

**How many years have you smoked?**

| ________ (years) |

**Did you receive a flu shot during the past fall or winter?**

| No ☐ Yes ☐ |

---

28 – The Canadian Pandemic Influenza Plan *for the Health Sector*
Household data

How many total individuals (including you) live in your household? ________

How many individuals are there in each of the following age categories

<table>
<thead>
<tr>
<th>Age Categories:</th>
<th>0 - 5 years</th>
<th>6 - 17 year</th>
<th>18 - 64 years</th>
<th>65 + years</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>Yes</td>
<td>Unknown</td>
<td></td>
</tr>
</tbody>
</table>

In your residence, is there a pet animal?

If yes, is it a:
- Bird: No  Yes  Unknown
- Cat: No  Yes  Unknown
- Dog: No  Yes  Unknown
- Another animal (specify): __________________

Travel outside region of residence

Did you travel outside your area of residence in the month before (put the exposure period) No  Yes  Unknown

If yes, Where did you go? _______________________________________
What date did you leave? _____/______/______
At what date did you come back? _____/______/______

Symptoms of respiratory infection DURING (period of interest to define), did you newly develop any of the following symptoms?

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Feverishness</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Measured temperature ≥ 38°C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Cough</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sore throat</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Runny nose</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body aches</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Headache</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Red or watery eyes</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

If you were sick:

How many days did your illness last? ________________ (days)

Were you so ill that you could not come to work? No  Yes
Did you seek medical attention? No  No  Yes
Were you hospitalized? No  No  Yes
During the exposure period (to define), did you do the following activities?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Play outdoors?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Visit bird parks or aviaries?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Visit any place where there were wild birds (sparrows, robins, etc.)?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Visit any place where there were pet birds (song birds, parrots, etc.)?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Visit any place where there were wild pigeons (i.e. in a park)?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Visit a poultry farm?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Visit another type of farm?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Clean up an area where wild bird feces were visible?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Clean up pet bird feces?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Clean up an area where poultry feces were visible?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Visit any place where there were other types of animals than birds?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

Household contacts with a sick person

<table>
<thead>
<tr>
<th>Activity</th>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Did you talk with ill person?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Did you eat meal with ill person?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Did you share utensils or cups with ill person?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Did you hug ill person?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Did you kiss ill person?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Did you take care of this ill person?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Did you share the same sleeping room as ill person(s)?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Did you share bed with ill person(s)?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
</tbody>
</table>

Non household contacts with a sick person

<table>
<thead>
<tr>
<th>Activity</th>
<th>Yes</th>
<th>No</th>
<th>Unknown</th>
</tr>
</thead>
<tbody>
<tr>
<td>Have you been in contact with anyone ill with fever, cough, or sore throat?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>If yes,</td>
<td></td>
<td>Yes</td>
<td>Unknown</td>
</tr>
<tr>
<td>Were you ever in an enclosed area (e.g. room or vehicle/bus/car) with this ill person?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Were you ever within 3 meters of this ill person?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Did you talk with ill person?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Did you eat meal with ill person?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Did you share utensils or cups with ill person?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Did you hug ill person?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Did you kiss ill person?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Did you take care of this ill person?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Did you share the same sleeping room as ill person(s)?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
<tr>
<td>Did you share bed with ill person(s)?</td>
<td></td>
<td>No</td>
<td>Unknown</td>
</tr>
</tbody>
</table>
Poultry and Other Animal Exposures

Did you ever:

- Live or work on a poultry farm? No ○ Yes ○ Unknown ○
- Live or work on a pig farm? No ○ Yes ○ Unknown ○
- Work as a butcher? No ○ Yes ○ Unknown ○
- Work in a restaurant preparing poultry or pork? No ○ Yes ○ Unknown ○
- Work in any other aspect of poultry or pig industry? No ○ Yes ○ Unknown ○
  If yes Specify: ___________________________________________

If yes to any of the above, during what time period? ______/_______ (mo/yr) through _______/_______ (mo/yr)

Have you ever hunted birds or waterfowl? No ○ Yes ○
  If yes, what types: ___________________________________________________

Occupational exposure to poultry

During the period (period of interest to define), have you worked in any of the following settings?

- Poultry hatchery No ○ Yes ○
- Poultry farm No ○ Yes ○
- Poultry slaughter No ○ Yes ○
- Poultry depopulation operations No ○ Yes ○
- Poultry necropsy No ○ Yes ○
- Laboratory processing of poultry pathogens (e.g. avian viruses) No ○ Yes ○
- Other, please specify _____________________________________________

If yes to any of the above
  how many years have you worked with poultry? _______ (years)
  how often did you work with poultry on average? _______ (day/week) _______ (weeks/year)

During the period (period of interest to define), have you worked with any of the following types of live poultry or waterfowl?

- Chicken No ○ Yes ○
- Turkey No ○ Yes ○
- Duck No ○ Yes ○
- Quail No ○ Yes ○
- Goose No ○ Yes ○
- Other type of poultry, please specify ___________________________________________

During the period (period of interest to define), in which of the following activities did you engage?

- Come within 1 meter of live poultry No ○ Yes ○
- Touch live poultry No ○ Yes ○
- Touch ill or diseased poultry No ○ Yes ○
- Slaughter poultry No ○ Yes ○
- Clean poultry stalls, cages or trucks No ○ Yes ○
- Process poultry specimens in a lab No ○ Yes ○
- Other types of work with poultry ___________________________________________
If exposed to infected poultry

Please indicate if you engaged in any of the following tasks and, if so, how many days per week on average did you engage in the specified activity for at least part of the day. For each activity, please specify if you wore protective gear while engaging in the specific task.

<table>
<thead>
<tr>
<th>Activity</th>
<th>No</th>
<th>Yes</th>
<th>If yes: _________(days/wk)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Came within 1 meter of healthy birds?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wore gloves?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Wore mask?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Wore eye protection?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Came within 1 meter of ill birds?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wore gloves?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Wore mask?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Wore eye protection?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Came within 1 meter of birds that tested positive for avian influenza?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wore gloves?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Wore mask?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Wore eye protection?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Touched healthy birds?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wore gloves?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Wore mask?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Wore eye protection?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Touched live birds that were ill?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wore gloves?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Wore mask?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Wore eye protection?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Touched dead birds?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wore gloves?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Wore mask?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Wore eye protection?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Touched live or dead birds that tested positive for avian influenza?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wore gloves?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Wore mask?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Wore eye protection?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Collected cloacal or endotracheal swabs?</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wore gloves?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Wore mask?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
<tr>
<td>Wore eye protection?</td>
<td>Never</td>
<td>Sometimes</td>
<td>Most of the time</td>
</tr>
</tbody>
</table>

The Canadian Pandemic Influenza Plan for the Health Sector
Collected environmental swabs from chicken or turkey houses?  
No ☐  Yes ☐  If yes: __________ (days/wk)  
  Wore gloves?  
   Never ☐  Sometimes ☐  Most of the time ☐  Always ☐  
  Wore mask?  
   Never ☐  Sometimes ☐  Most of the time ☐  Always ☐  
  Wore eye protection?  
   Never ☐  Sometimes ☐  Most of the time ☐  Always ☐  
Have you been present for onloading or offloading of dead birds?  
No ☐  Yes ☐  If yes: __________ (days/wk)  
  Wore gloves?  
   Never ☐  Sometimes ☐  Most of the time ☐  Always ☐  
  Wore mask?  
   Never ☐  Sometimes ☐  Most of the time ☐  Always ☐  
  Wore eye protection?  
   Never ☐  Sometimes ☐  Most of the time ☐  Always ☐  
Have you been present for incineration of birds?  
No ☐  Yes ☐  If yes: __________ (days/wk)  
  Wore gloves?  
   Never ☐  Sometimes ☐  Most of the time ☐  Always ☐  
  Wore mask?  
   Never ☐  Sometimes ☐  Most of the time ☐  Always ☐  
  Wore eye protection?  
   Never ☐  Sometimes ☐  Most of the time ☐  Always ☐  
If you wore a mask for any of the activities described above, what type of mask did you wear?  
______________________________________________________________________________________________________  
Please describe any other activities that brought you near to or in contact with poultry during (period of exposure)_____________________________________________________________________________________

Hospital Work and exposure to patients

What is your occupation in the hospital?  
Nurse ☐  Nurses aid ☐  Doctor ☐  Laboratory worker ☐  Cleaner ☐  Other ________________________________  
What department(s) do you work at? ________________________________  
What floor(s) do you work on? ______________________________________ (list all floors)  
How many hours per week do you work in the hospital? ___________________________ (hours per week)  
Do you work at any other hospital?  
No ☐  Yes ☐  
If "yes", what other hospitals do you work at? ________________________________  
Have you been in the same room as one of the avian flu patients?  
No ☐  Yes ☐  Unknown ☐  
If yes,  
How many hours in total have you been in the same room with all the avian flu patients? ________ (hours)  
What was the last date that you have been in the same room with a patient? _____/_____/_______ (dd-mm-yyyy)  
Were the avian flu patients wearing masks?  
No ☐  Yes ☐  Unknown ☐  
Did you touch any of the avian flu patients?  
No ☐  Yes ☐  Unknown ☐  
When you were in the same room as an avian flu patient, did you wear a mask?  
No ☐  Yes ☐  Unknown ☐  
If "yes", indicate what type of mask: N95 ☐  Surgical mask ☐  Other mask: ________________________________  
Did you always wear a mask when you provided care?  
No ☐  Yes ☐  Unknown ☐  
When you were in the same room as an avian flu patient, did you wear any eye protection?  
No ☐  Yes ☐  Unknown ☐
If “yes” indicate what type of eye protection: **Goggles** [ ]  **Glasses** [ ]  **Face shield** [ ]  Other: ___________________

Did you always wear eye protection when you provided care?  No [ ]  Yes [ ]  Unknown [ ]
When you were in the same room as an avian flu patient, did you wear gloves?  No [ ]  Yes [ ]  Unknown [ ]

If “yes”
Did you always wear gloves when you provided care?  No [ ]  Yes [ ]  Unknown [ ]

Have you been involved in performing or assisting to any of the following high risk procedures with avian flu patients:

<table>
<thead>
<tr>
<th>Procedure</th>
<th>No [ ]</th>
<th>Yes [ ]</th>
<th>Unknown [ ]</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nebulized therapies</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Aerosol humidification</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-invasive ventilation (CPAP, BiPAP)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Use of bag-valve mask to ventilate a patient</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Endotracheal intubation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Airway suctioning</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sputum induction</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Tube or needle thoracotomy</td>
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<tr>
<td>Bronchoscopy or other upper airway endoscopy</td>
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<tr>
<td>Tracheostomy</td>
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<tr>
<td>Open Thoracotomy</td>
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</tbody>
</table>

When you did these procedures, did you wear a mask?  No [ ]  Yes [ ]

If “yes”, indicate what type of mask:  **N95** [ ]  **Surgical mask** [ ]  Other mask: ___________________

When you did these procedures, did you wear eye protection?  No [ ]  Yes [ ]

If “yes” indicate what type of eye protection: **Goggles** [ ]  **Glasses** [ ]  **Face shield** [ ]  Other: ___________________

Did you take the antiviral drug “Tamiflu” (oseltamivir) since (period of interest)?  No [ ]  Yes [ ]  Unknown [ ]

If “yes”, why did you take it because

- You had flu symptoms [ ]
- You had direct contact with an avian flu patient [ ]
- No direct contact with an avian flu patient but there were cases in the hospital [ ]
Appendix 2: National FluWatch Influenza Surveillance System

1. Influenza-like Illness (ILI)
   - Provincial Sentinel Practitioners
     - FluWatch Sentinel Practitioners (recruited by PHAC through the National Research System of the College of Family Physicians of Canada)
     - # ILI consultations

2. Activity Levels
   - Provincial/Territorial Ministries of Health
     - activity levels

3. Lab Detections
   - Provincial/Territorial Ministries of Health
     - ~10% positive isolates
     - National Microbiology Laboratory
     - strain characterizations
     - case-by-case data for influenza, aggregate data for respiratory virus detections/isolations (influenza, RSV, parainfluenza, adenovirus)

4. Paediatric Hospitalizations/Deaths
   - Immunization Monitoring Program ACTive (IMPACT)***
     - number of hospitalizations and deaths, flu type

5. International Surveillance
   - United States (CDC); Europe (EISS); Global (WHO)
     - Flu activity and intensity, ILI, lab detections, strain characterizations, avian influenza

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* FluWatch case definitions available at http://www.phac-aspc.gc.ca/fluwatch
** Centre for Infectious Disease Prevention and Control, PHAC
*** IMPACT is sponsored by PHAC and implemented by the Canadian Paediatric Society
Appendix 3: National SRI Investigation Report Form Data Elements
(please refer to form for definitions: www.phac-aspc.gc.ca)

Reporting Information
✓ Name/affiliation of person making report
✓ Reporting contact phone number
✓ Date of Report

Patient Information
✓ Gender
✓ Date of Birth
✓ Age at outset
✓ Forward Sorting Locator
✓ City of residence
✓ Health unit of residence
✓ Occupation

Surveillance definition algorithm
✓ Hospitalized patients: symptoms
✓ Epi-link/Risk factors
✓ Post-mortem
✓ Case classification
✓ Isolation date

Clinical Information
✓ Clinical presentation
✓ Symptoms onset date
✓ Was patient hospitalized (date of admission/date of discharge)
✓ Course of illness
✓ Disposition at time of report

Underlying Illness
✓ Chronic heart disease
✓ Lung disease
✓ Diabetes
✓ Immune suppressed
✓ Kidney disease
✓ Other

Travel Related
✓ Travel to Zone of Re-emergency/ Emergency (ZRE) or H5N1 affected area
✓ Country/Hotel (residence)
✓ Date of arrival/date of departure
✓ Part of a tour
✓ Ill during flight
✓ Flight number
✓ Carrier
✓ Seat
✓ City of origin
✓ Date of flight

Exposure history
✓ Contact of previously identified SRI case
✓ Contact case status
✓ Type of contact
✓ Date of first contact
✓ Date of last contact
✓ Contact with HCW
✓ Contact with traveller to ZRE of H5N1 affected area
✓ Contact with laboratory worker who works directly with emerging or re-emerging pathogens

Laboratory Testing
✓ SRI Lab tracking code
✓ Date specimen collected
✓ Specimen source
✓ Test method
✓ Test result
✓ Date test performed
✓ Comments

36 – Canadian Pandemic Influenza Plan