# *INFLUENZA IN MANITOBA – 2010/2011*

End of Season Report and Recommendations

***October 31, 2011***

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## INTRODUCTION

The following report details influenza activity in Manitoba for the 2010/2011 flu season (July 1, 2010 to June 30, 2011). The Public Health Surveillance Unit of Manitoba Health received its first laboratory-confirmed positive case of influenza for the season during the week of Sept. 26 – Oct. 2, 2010. This flu season in Manitoba, there were **486** lab-confirmed cases of influenza reported, of which **474** were influenza A and **12** were influenza B.

Due to the clinical severity of cases observed during the 2009/2010 pandemic H1N1 influenza season, Manitoba Health opted to collected additional clinical information on lab-confirmed influenza cases who were admitted to an ICU. In addition, the Public Health Agency of Canada also asked each province and territory to collect aggregate data on severe influenza outcomes (hospitalizations, ICU admissions, and deaths).

The purpose of this report is to both summarize this season's influenza activity and to provide directions and recommendations for future influenza seasons.

## METHODOLOGY/DATA SOURCES

### A. Syndromic Surveillance

#### *National FluWatch Program*

*FluWatch* is Canada's national surveillance system that monitors the spread of flu and flu-like illnesses on an on-going basis. The *FluWatch* program consists of a network of labs, hospitals, doctor's offices and provincial and territorial ministries of health.

Manitoba Health participates in the National *FluWatch* Program co-ordinated by the Public Health Agency of Canada (PHAC). In addition to lab-confirmation of influenza, this program relies on weekly reports of influenza-like illness (ILI) as reported by 23 sentinel physicians reflecting 8 health authorities (as of March 15, 2011): Winnipeg (10), Brandon (1), North Eastman (2), South Eastman (2), Interlake (2), Central (3), Parkland (1), and Burntwood (2). The coverage goal is to have one sentinel per 250,000 population, based on Canadian census divisions.

Sentinels can also opt in to the voluntary swabbing component of the program, which consists of the submission of either two posterior pharyngeal swabs or two nasopharyngeal swabs within 48 hours of symptom onset from patients presenting with ILI. Requisitions, swabs, and antiviral transport media are available from Cadham. Requisitions submitted as part of this program should be clearly labeled "FLUWATCH". As of March 15, 2011, 10 of Manitoba's 23 sentinels were participating in the swabbing component of the FluWatch program.

The Public Health Epidemiology Unit receives weekly reports from the Public Health Agency of Canada presenting the provincial ILI rate and the specific data for each of the participating sentinel physicians. The provincial epidemiologist then assigns an activity level code to each of Manitoba's three influenza surveillance regions based on the following definitions and submits the completed report to *FluWatch*:

1 = No activity: No laboratory-confirmed influenza detections in the reporting week; however, sporadically occurring ILI may be reported.

2 = Sporadic: Sporadically occurring ILI and lab confirmed influenza detection(s) with NO outbreaks detected within the influenza surveillance region.

3 = Localized:
(1) Evidence of increased ILI* and
(2) Lab confirmed influenza detection(s) together with
(3) Outbreaks in schools, hospitals, residential institutions and/or other types of facilities occurring in less than 50% of the influenza surveillance region†.

4 = Widespread:
(1) Evidence of increased ILI* and
(2) Lab confirmed influenza detection(s) together with
(3) Outbreaks in schools, hospitals, residential institutions and/or other types of facilities occurring in greater than or equal to 50% of the influenza surveillance region†.

Note: ILI data may be reported through sentinel physicians, emergency room visits or health line telephone calls.
* More than just sporadic as determined by the provincial/territorial epidemiologist.
† Influenza surveillance regions within the province or territory as defined by the provincial/territorial epidemiologist.

Manitoba is divided into three influenza surveillance regions (see map below):

1) North Rural (grey): *Nor-Man, North Eastman, Burntwood, Churchill*
2) South Rural (white): *Brandon, Assiniboine, Parkland, Central, South Eastman, Interlake*
3) Winnipeg (blue): *Winnipeg*


For the 2010/2011 season, ILI in the general population is defined as:
*Acute onset of respiratory illness with fever and cough and with one or more of the following - sore throat, arthralgia, myalgia, or prostration which is likely due to influenza. In children under 5, gastrointestinal symptoms may also be present. In patients under 5 or 65 and older, fever may not be prominent.*

Definitions of ILI/influenza outbreaks for the 2010/2011 season:

*Schools:* Greater than 10% absenteeism (or absenteeism that is higher (e.g. >5-10%) than expected level as determined by school or public health authority) which is likely due to ILI. Note: it is recommended that ILI school outbreaks be laboratory confirmed at the beginning of influenza season as it may be the first indication of community transmission in an area.

*Hospitals and residential institutions:* Two or more cases of ILI within a seven-day period, including at least one laboratory confirmed case. Institutional outbreaks should be reported within 24 hours of identification. Residential institutions include but not limited to long-term care facilities (LTCF) and prisons.

*Other settings:* Two or more cases of ILI within a seven-day period, including at least one laboratory confirmed case; i.e. workplace, closed communities.

### *Health Links – Info Santé*

Health Links - Info Santé (HL-IS) is one of 30 inbound and outbound calling programs offered by the Provincial Health Contact Centre (PHCC) operated by Misericordia Health Centre in partnership with Manitoba Health and the Winnipeg Health Region.

Implemented in 1994, the bilingual program was the first telephone, nurse-based triage system in Canada. A staff of 80 full- and part-time registered nurses answer calls 24 hours a day, seven days a week, 365 days a year. Interpreters are available for more than 110 different languages.

Nurses obtain information about symptoms and follow clinical protocols on their computer screens to offer advice on whether to treat the symptoms at home, see a family doctor, or visit an emergency room. Calls range from concerns about abdominal pain to flu virus symptoms.[1]

When a caller phones HL-IS and selects the Influenza Service, they are given an option to select information on (1) the groups of individuals who are at an increased risk of serious illness, (2) how to arrange a flu shot, (3) the annual influenza immunization campaign, or (4) the management of flu and its potential complications.

Aggregate data from HL-IS Influenza Service is emailed to the Public Health Division at Manitoba Health on a weekly basis.

## B. Laboratory-Confirmed Influenza

Reports of culture isolations and enzyme immunoassay (EIA) detections from Cadham Provincial Laboratory (CPL) are forwarded to the Public Health Surveillance (PHS) Unit weekly. While EIA detections and culture isolations comprise the largest number of reports from CPL, seroconversions are similarly forwarded to the PHS Unit weekly. Information contained within this update is based on positive lab reports received at the PHS Unit as of July 13, 2011. This includes specimen dates from July 1, 2010 to June 30, 2011. Out of province reports are excluded.

[1] Source: http://www.misericordia.mb.ca/files/phccfactsheet.pdf.

The specimen date is used to:

(a) extract cases; and,
(b) assign cases to the appropriate week/month

One of the general features by which cases are compared is status of federal referral. This indicator does not determine how many cases were First Nations or non-First Nations; however, it provides a proxy measurement of which cases live on and off reserve, based on their current address of residence

## C. Clinically Severe Cases

### *Aggregate Reporting of Influenza-Related Hospitalizations, ICU Admissions and Deaths*

The Public Health Agency of Canada (PHAC) requested weekly collection of aggregate numbers of hospitalized cases (as well as ICU admissions and deaths). These data were collected in order to continue with the surveillance system implemented during the 2009 H1N1 pandemic to help monitor the severity/burden of illness during the influenza season.

Aggregate data were therefore reported by regions on a weekly basis using a reporting form developed by the Public Health Agency of Canada (PHAC). The regions were asked to complete a chart that included the total number of hospitalized cases, of those, the number admitted to ICUs (where applicable), and deaths. The chart also included a breakdown by age group and aboriginal identity.

Hospitalized cases were defined as follows:

Manitoba residents with laboratory confirmed influenza admitted to a hospital located within the reporting region. The positive specimen must have been obtained between October 1, 2010 and March 31, 2011.

Deaths were reported if influenza was considered to be a contributing factor.

### *Additional Data Sources for Influenza-Related Deaths*

Reporting of influenza-related deaths is likely incomplete. Reports are based on notification by:

(a) Chief Medical Examiner;
(b) Medical Officers of Health in the Regional Health Authorities
(c) Infection Control Practitioners in long term care facilities

### *Enhanced Surveillance for Laboratory-confirmed Influenza Cases Admitted to an ICU*

Winnipeg and Brandon were asked to complete a detailed investigation form within 72 hours of receiving a positive influenza lab result for all influenza cases admitted to an ICU.

Cases were defined as Manitoba and non-Manitoba residents with laboratory confirmed influenza who were admitted to an ICU. The positive specimen must have been obtained between October 1, 2010 and March 31, 2011.

Reported underlying conditions included the following: chronic heart disease, diabetes, tuberculosis, asthma, other underlying chronic lung disease, hemoglobinopathy/anemia, neuromuscular disorder, neurodevelopmental condition, cancer, on immunosuppressing medications, immunodeficiency disease/condition, clinically obese (BMI >30).

Overall aggregate reporting for hospitalizations, ICU admissions and deaths during the influenza season was not mutually exclusive. In other words, individuals may have been reported as initially hospitalized in one week and admitted to an ICU in the following week and then as a death in yet a different week.

## D. Suspected/Confirmed Reports of Influenza Outbreaks

As outlined in Manitoba's Communicable Disease Management Protocol Manual on Epidemiological Investigation of Outbreaks[2], the common definition of an outbreak is:

> The occurrence in a community or region of cases of an illness with a frequency clearly in excess of normal expectancy. The number of cases indicating presence of an outbreak will vary according to the infectious agent, size and type of population exposed, previous experience or lack of exposure to the disease, and time and place of occurrence. Therefore, the status of an outbreak is relative to the usual frequency of the disease in the same area, among the same population, at the same season of the year.[3]

Reports of suspected/confirmed influenza outbreaks are directed to the PHS Unit by:

(a) a phone call/email from public health staff within a RHA; or
(b) a phone call/email from CPL advising of the assignment of an outbreak code; or
(c) completion and submission of an outbreak form

Only laboratory confirmed reports of influenza outbreaks are included in this report.

## E. Vaccination Data

### *Uptake*

Influenza vaccination data originates from Manitoba's immunization registry, the Manitoba Immunization Monitoring System (MIMS). Immunization events are captured in MIMS in two ways: publicly-funded immunizations administered by physicians are entered into the system via the physician billing system; all other immunizations, such as those provided by public health nurses, are recorded by data entry staff in the regions. MIMS captures information related to an immunization event, including type of vaccine administered, date of administration and service provider. This report uses a snapshot of the MIMS database capturing all influenza immunization events between September, 2010 and March, 2011 as of April 2, 2011.

This influenza season, Manitoba Health offered a targeted universal program for the influenza vaccine. While all Manitobans were eligible to receive the vaccine, those at increased risk of serious illness from the flu, their caregivers, and close contacts were particularly encouraged to get the flu shot. This included:

- Seniors age 65 or older
- Residents of personal care homes or long-term care facilities
- Children age six months to four years

[2] http://www.gov.mb.ca/health/publichealth/cdc/protocol/investigation.pdf.
[3] Chin, James (Editor). *Control of Communicable Disease Manual*. American Public Health Association, Washington DC, 2000.

- Those with chronic illness such as:
  - kidney, heart or lung conditions
  - an immune system weakened by disease or medical treatment
  - a condition that makes it difficult to breathe
  - children on long-term aspirin therapy
  - other chronic medical conditions (ex. diabetes, mental disabilities)
- Pregnant women
- Health care workers and first responders
- Individuals of Aboriginal ancestry
- People who are severely overweight or obese

***Adverse Events Following Immunization (AEFI)***

Vaccine manufacturers are required by law (Food and Drugs Act and Regulations) to report to PHAC all serious AEFI reports with vaccines (active immunizing agents) for which they are the Market Authorization Holder within 15 days of knowledge of their occurrence. No other legal requirement for reporting AEFI exists nationally. Health care professionals who become aware of reportable adverse events are to report them within 7 days by completing and faxing the AEFI form (http://www.gov.mb.ca/health/publichealth/cdc/docs/aefi_form.pdf) to their regional Medical Officer of Health.

An adverse event following immunization (AEFI) is reportable under the Public Health Act of Manitoba as prescribed in the Immunization Regulation (C.C.S.M. c.P210) if it is temporally associated with an immunizing agent, cannot be attributed to a co-existing condition, and if meets at least one of the following criteria:

(a) the event is life-threatening, could result in permanent disability, requires hospitalization or urgent medical attention, or for any other reason is considered to be of a serious nature;
(b) the event is unusual or unexpected, including, without limitation,
  (i) an event that has not been previously identified, or
  (ii) an event that has been previously identified but is being reported at an increased frequency;
(c) at the time of the report there is nothing in the patient's medical history — such as a recent disease or illness, or the taking of medication — that could explain the event.

## F. Strain Characterization and Antiviral Resistance

The Influenza and Respiratory Viruses section of the National Microbiology Laboratory (NML) undertakes enhanced surveillance, investigations, and research on influenza and other respiratory pathogens, as well as develops, evaluates, and improves new molecular techniques and reagents for early detection and identification of potential epidemic and pandemic influenza strains and other new emerging respiratory viruses.

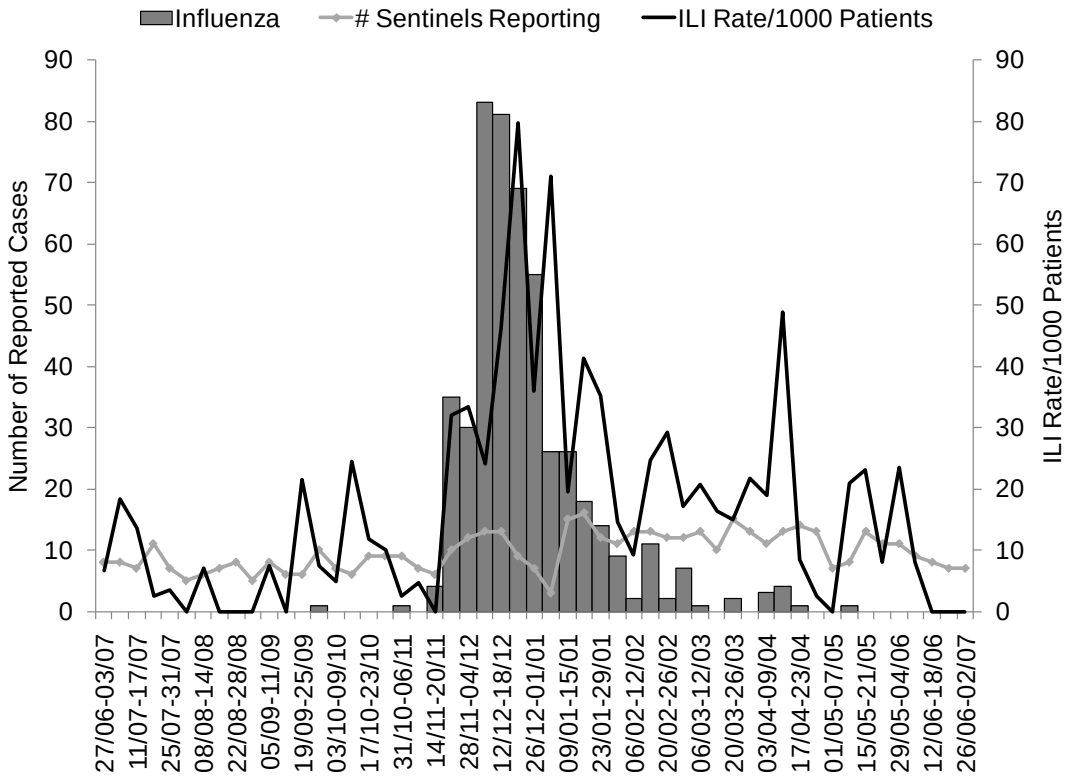
NML routinely antigenically characterizes influenza viruses received from Canadian laboratories. A random sample of positive influenza specimens isolated by culture was referred from Cadham Provincial Laboratory to the NML for strain characterization. Routine testing for antiviral resistance is also performed. This aggregate level information is shared with provinces and territories on a weekly basis during the influenza season.

## RESULTS

### A. Syndromic Surveillance

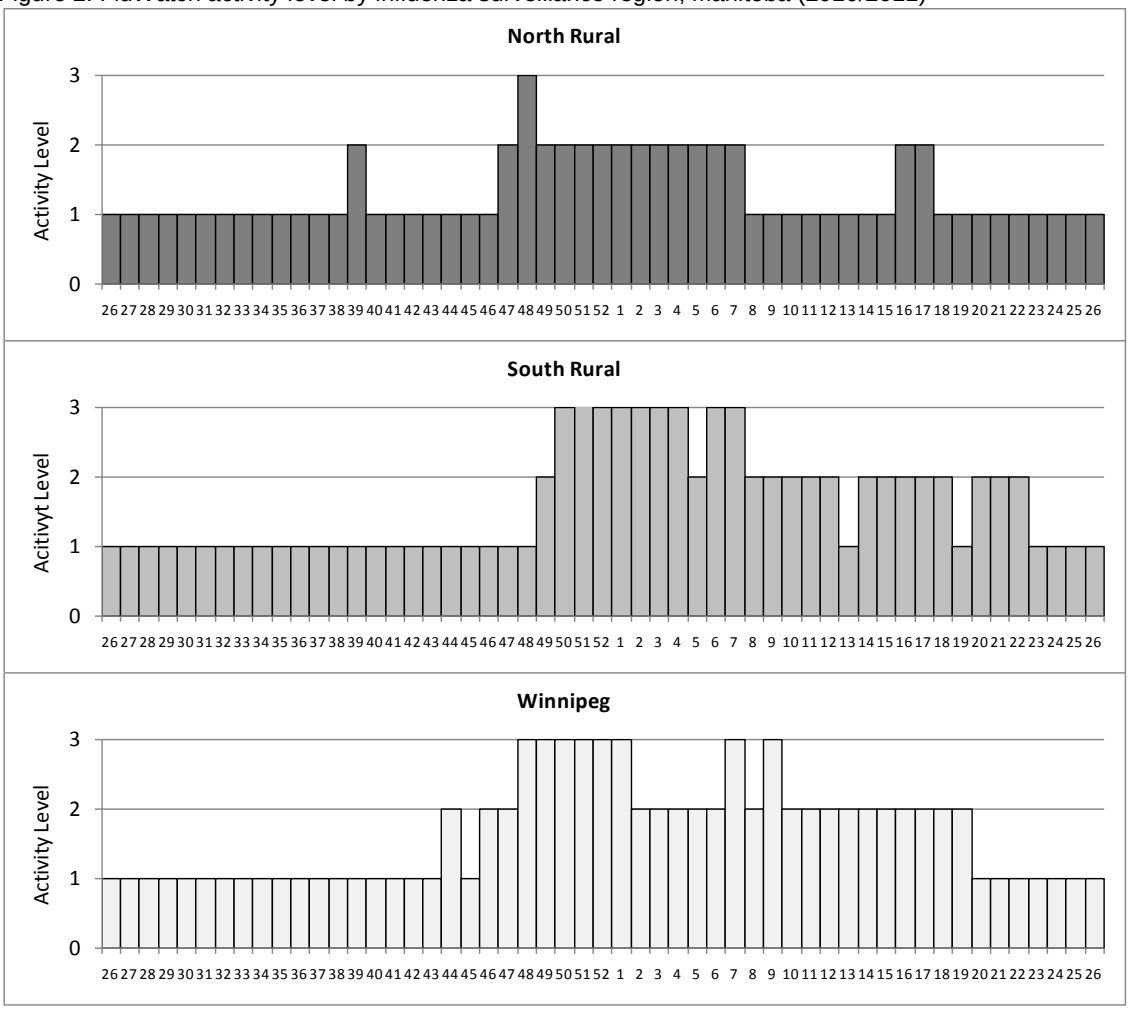
#### *FluWatch*

Figure 1. Number of influenza cases and sentinels reporting by influenza-like-illness rate, Manitoba (2010/2011)




The peak in ILI rate occurred during week 51 (Dec. 19-25, 2010), which was two weeks after the peak in reported cases of lab-confirmed influenza (Dec. 5-11, 2010) (Figure 1). The mean and median number of sentinels reporting during the flu season was 9.6 and 9, respectively, with a range of 3 to 16.

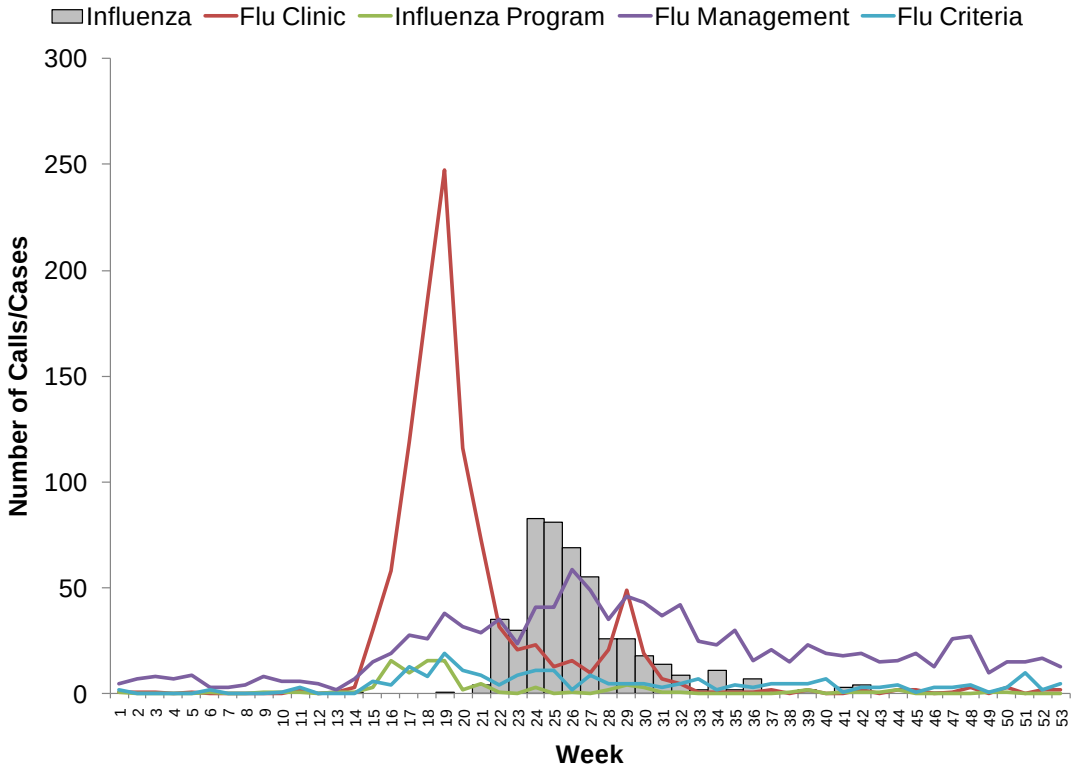
Figure 2. FluWatch activity level by influenza surveillance region, Manitoba (2010/2011)




The activity levels increased first in the North Rural (NR) influenza surveillance region in week 39 (Sept. 26 – Oct. 2, 2010) (Figure 2). It later increased in Winnipeg Region in week 44 (Oct. 31 – Nov. 6, 2010) and remained at level 3 for six consecutive weeks. The activity level increased later in South Rural (SR) in week 49 (Dec. 5-11, 2010) and was reported at level 3 for the greatest number of weeks (nine weeks between week 50 (Dec. 12-18, 2010) and week 7 (Feb. 13-19, 2011).

***Health Links – Info Santé***

Figure 3. Number of calls received at Health Links - Info Santé Influenza Service and the number of lab-confirmed cases of influenza by week (2010/2011), Manitoba

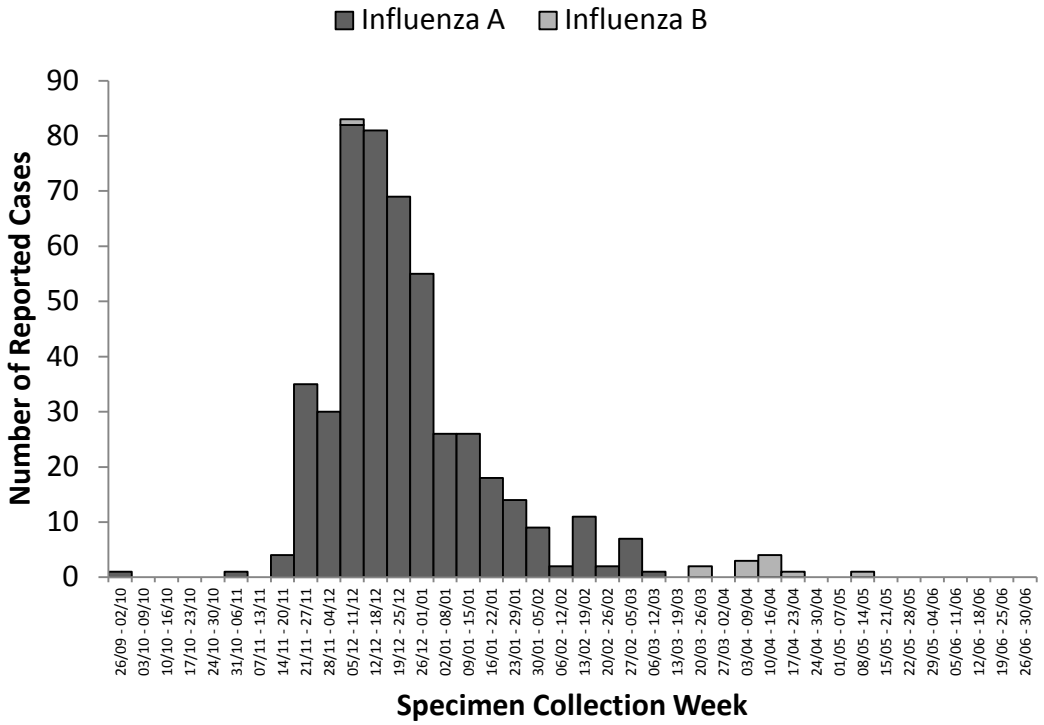



The number of callers who selected to hear information about how to get a flu shot peaked five weeks prior to the peak in the number of lab-confirmed cases of influenza reported to Manitoba Health (Figure 3). The number of callers who selected to hear information about the management of flu symptoms peaked two weeks after the peak in the number of lab-confirmed cases of influenza. Additional calls were received for information about the influenza immunization campaign (influenza program) and the groups of individuals at increased risk of serious illness (flu criteria); however, there were considerably fewer calls received than for the other two categories.

## B. Laboratory-Confirmed Influenza

### *General*

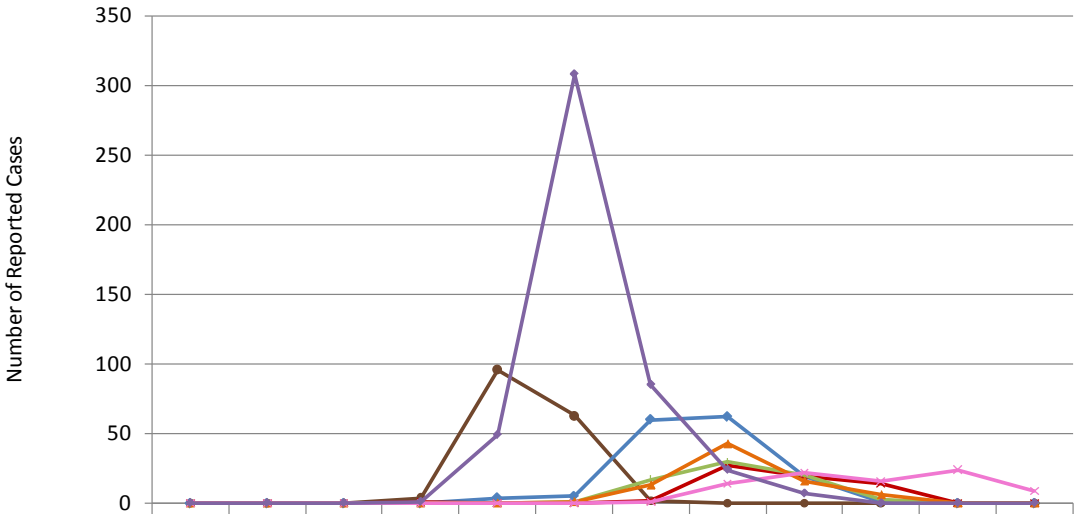
Figure 4. Seasonal influenza cases by specimen collection date (n=486), Manitoba, 2010/2011




The first lab-confirmed case of influenza A was reported during the week of Sept. 26 – Oct. 2, 2010. The number of reported cases peaked during the week of Dec. 5-11, 2010 (n=82 cases) (Figure 4). The last reported lab-confirmed case of influenza A was reported during the week of Mar. 6-12, 2011. The first lab-confirmed case of influenza B was reported during the week of Dec 5-11, 2010 and the last was reported during the week of May 8-14, 2011.

There were a total of 12 cases of influenza B and 474 cases of influenza A during the 2010/2011 season. Of the influenza A cases, 416 were influenza A/unsubtyped. Of the 58 cases that were subtyped, there were 57 cases of influenza A/H3 and 1 case of influenza A/H1. The majority remained unsubtyped because subtyping was conducted primarily at the beginning of the season until A/H3 was identified as the dominant circulating strain.

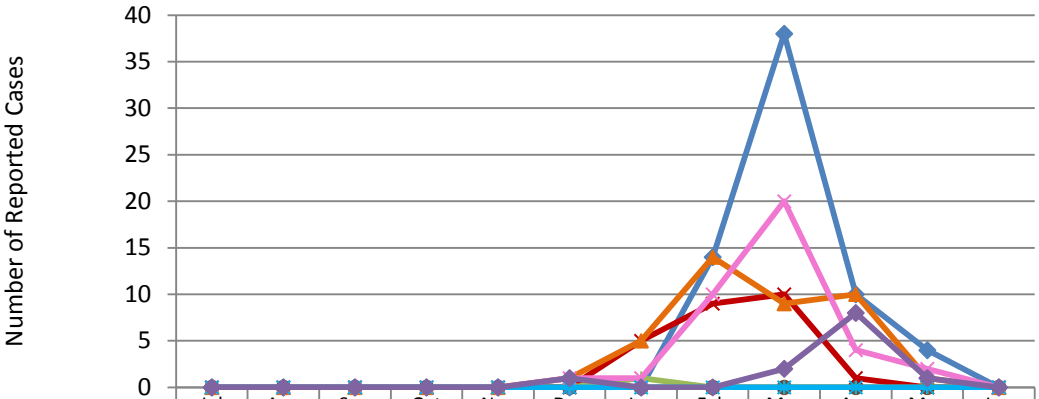
Figure 5. Seasonal influenza A 2010/2011 compared to the last six influenza seasons excluding the 2009/2010 pandemic H1N1 influenza season




| | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2003/2004 | 0 | 0 | 0 | 4 | 96 | 63 | 2 | 0 | 0 | 0 | 0 | 0 |
| 2004/2005 | 0 | 0 | 0 | 0 | 4 | 5 | 60 | 62 | 19 | 1 | 0 | 0 |
| 2005/2006 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 27 | 19 | 14 | 0 | 0 |
| 2006/2007 | 0 | 0 | 0 | 0 | 0 | 1 | 17 | 30 | 20 | 3 | 0 | 0 |
| 2007/2008 | 0 | 0 | 0 | 0 | 0 | 1 | 13 | 43 | 16 | 6 | 0 | 0 |
| 2008/2009 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 14 | 22 | 16 | 24 | 9 |
| 2010/2011 | 0 | 0 | 0 | 1 | 49 | 308 | 85 | 24 | 7 | 0 | 0 | 0 |

The overall total number of reported lab-confirmed cases of influenza A was greater this season (n=474) than in any other season since 2003/2004, excluding the pandemic H1N1 season (not shown) (Figure 5). This season's peak occurred in December. This is earlier than in previous seasons where the peak usually occurred in February, with the exception of 2003/2004, where the peak occurred in November.

Figure 6. Seasonal influenza B 2010/2011 compared to the last 7 influenza seasons




| | Jul | Aug | Sep | Oct | Nov | Dec | Jan | Feb | Mar | Apr | May | Jun |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2003/2004 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2004/2005 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 14 | 38 | 10 | 4 | 0 |
| 2005/2006 | 0 | 0 | 0 | 0 | 0 | 0 | 5 | 9 | 10 | 1 | 0 | 0 |
| 2006/2007 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 |
| 2007/2008 | 0 | 0 | 0 | 0 | 0 | 1 | 5 | 14 | 9 | 10 | 1 | 0 |
| 2008/2009 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 10 | 20 | 4 | 2 | 0 |
| 2009/2010 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 2010/2011 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 2 | 8 | 1 | 0 |

There were 12 positive lab-confirmed cases of influenza B reported to Manitoba Health this season. The season peaked in April this year, which is later than in previous seasons where it usually peaked in March (Figure 6).

***Features***

Table 1. Number of influenza cases and crude incidence rate[a] per 100,000 by age group and type in Manitoba (2010/2011)

| | **Influenza A** | | **Influenza B** | |
|---|---|---|---|---|
| Age Group | N | Inc. Rate[b] | N | Inc. Rate[c] |
| <1 | 31 | 194.7 | 4 | - |
| 1-4 | 45 | 71.6 | 2 | - |
| 5-9 | 27 | 35.9 | 1 | - |
| 10-14 | 32 | 39.7 | 1 | - |
| 15-19 | 13 | 14.7 | 0 | - |
| 20-24 | 18 | 20.9 | 1 | - |
| 25-29 | 23 | 28.1 | 1 | - |
| 30-39 | 52 | 32.9 | 0 | - |
| 40-49 | 42 | 23.9 | 2 | - |
| 50-59 | 40 | 23.8 | 0 | - |
| 60-69 | 18 | 15.6 | 0 | - |
| 70-79 | 33 | 47.9 | 0 | - |
| >79 | 100 | 189.9 | 0 | - |
| **Total** | **474** | **38.5** | **12** | **1.0** |

a. 2010 Population file used to calculate crude incidence rates.

b. per 100,000 population

c. Numbers are too small to calculate reliable incidence rates.

*Age Group*

The incidence rate (per 100,000) of influenza A was greatest among the very young (195 cases per 100,000 among those <1 year) and the very old (190 cases per 100,000 among those >79 years) (Table 1).

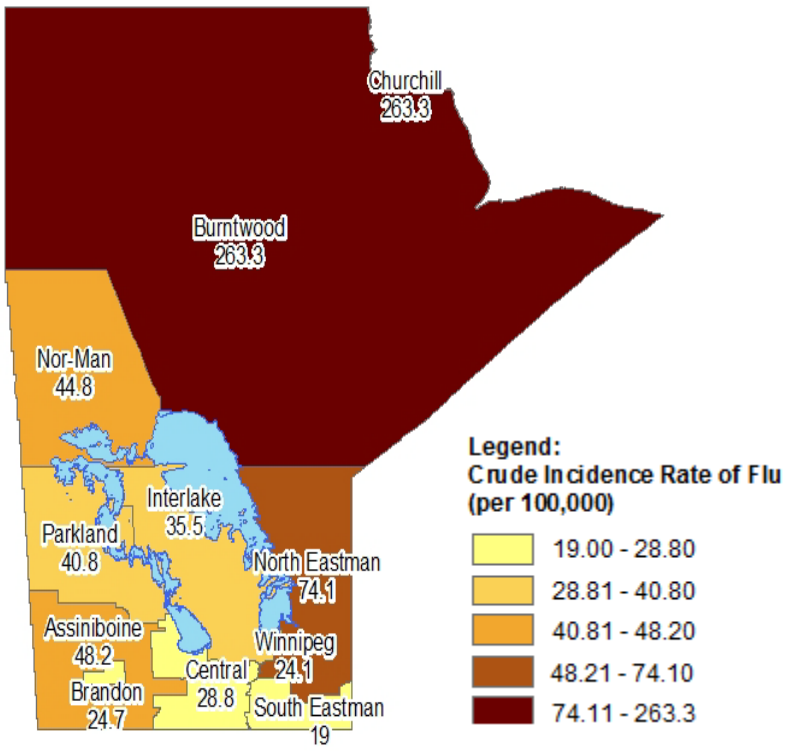
The number of cases of influenza B was too small to calculate reliable incidence rates; however, the majority of cases of influenza B occurred among children <15 years (n=8, 67%).

*Sex*

Fifty seven percent (272/474) of influenza A cases were male. Ninety two percent (11/12) of influenza B cases were male (Table 1).

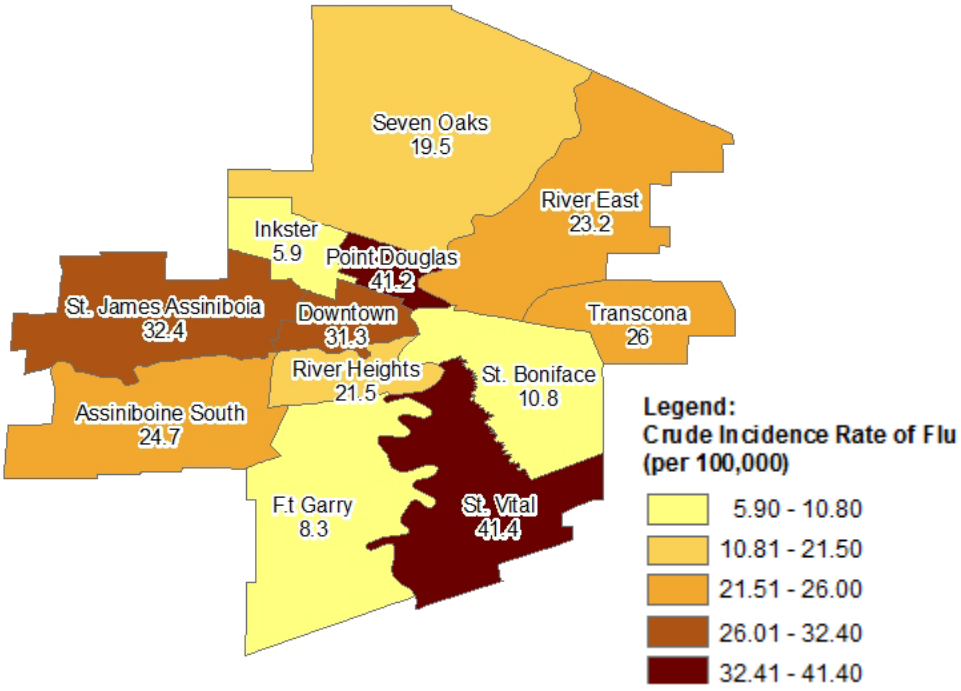
*Regional Health Authority*

Figure 7. Crude incidence rate (per 100,000) of influenza A by RHA, 2010/2011 season, Manitoba




The crude incidence rate of influenza A was highest in Burntwood and Churchill RHA (combined, 263.3 cases per 100,000 population) while the lowest was observed in Winnipeg (24.1 cases per 100,000 population) (Figure 7). While these rates are not age or sex standardized, it can be stated that the greatest burden of illness was observed in the northern regions of Manitoba, while the least burden of illness was observed in the south/south eastern regions of Manitoba.

Figure 8. Crude incidence rate (per 100,000) of influenza A by Winnipeg community area, 2010/2011 season, Manitoba




The crude incidence rate of influenza A was highest in the St. Vital community area (41.4 cases per 100,000 population) while the lowest was in Inkster (5.9 cases per 100,000 population) (Figure 8).

*Referred Federally*

The incidence rate of influenza A among cases referred federally was 156.4 per 100,000. The incidence rate among cases not referred federally was 29.4 per 100,000. No cases of influenza B were referred federally.

## C. Clinical Severity: Influenza-Related Hospitalizations, ICU Admissions and Deaths

### *Aggregate Reporting of Hospitalized, ICU and Deaths*

There were 98 Manitoba residents hospitalized in Manitoba. Fifteen of these individuals were admitted to a Manitoba ICU. Two additional out of province residents were also admitted to Manitoba ICUs.

There were 7 deaths that occurred in Manitoba where influenza was considered to be a contributing factor.

Figure 9. Number of hospitalizations (n=96) reported by week in Manitoba (2010-2011)

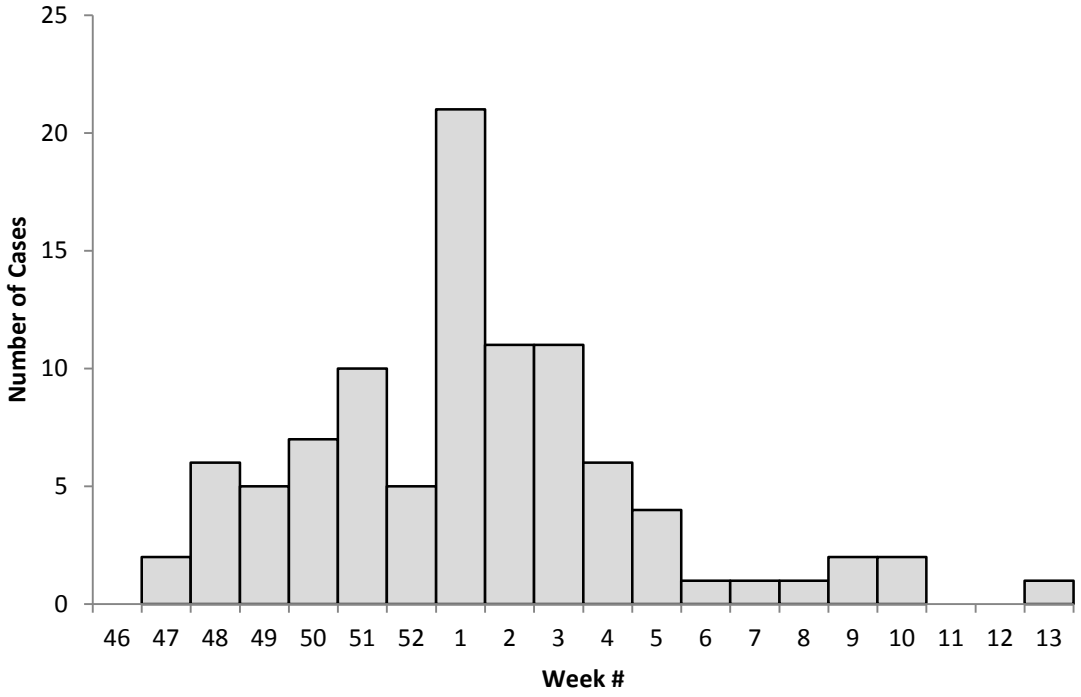



Figure 9 shows the number of Manitoba residents with laboratory confirmed influenza admitted to a Manitoba hospital (including both ICU and non-ICU admissions). The majority of hospitalizations occurred in week 1 (Jan. 2-8, 2011).

Between week 46 and week 13 there were 7 deaths reported in Manitoba residents where influenza was considered to be a contributing factor. Three of the deaths were reported within week 51 (Dec. 19-25, 2010).

Table 2. Age Breakdown of Hospitalized Cases in Manitoba

| Age Group | Hospitalizations n (%) |
|---|---|
| < 1 | 18 (18%) |
| 1-4 | 12 (12%) |
| 5-19 | 11 (11%) |
| 20-44 | 13 (13%) |
| 45-64 | 18 (18%) |
| 65+ | 24 (25%) |
| Unknown | 2 (2%) |
| Total | 98 |

### *Additional Data Sources for Influenza-Related Deaths*

Five of the seven deaths occurred in individuals over the age of 75. Two of seven were admitted to an ICU prior to death. Four of the remaining five resided in a personal care home with the remaining individual's type of residence unknown.

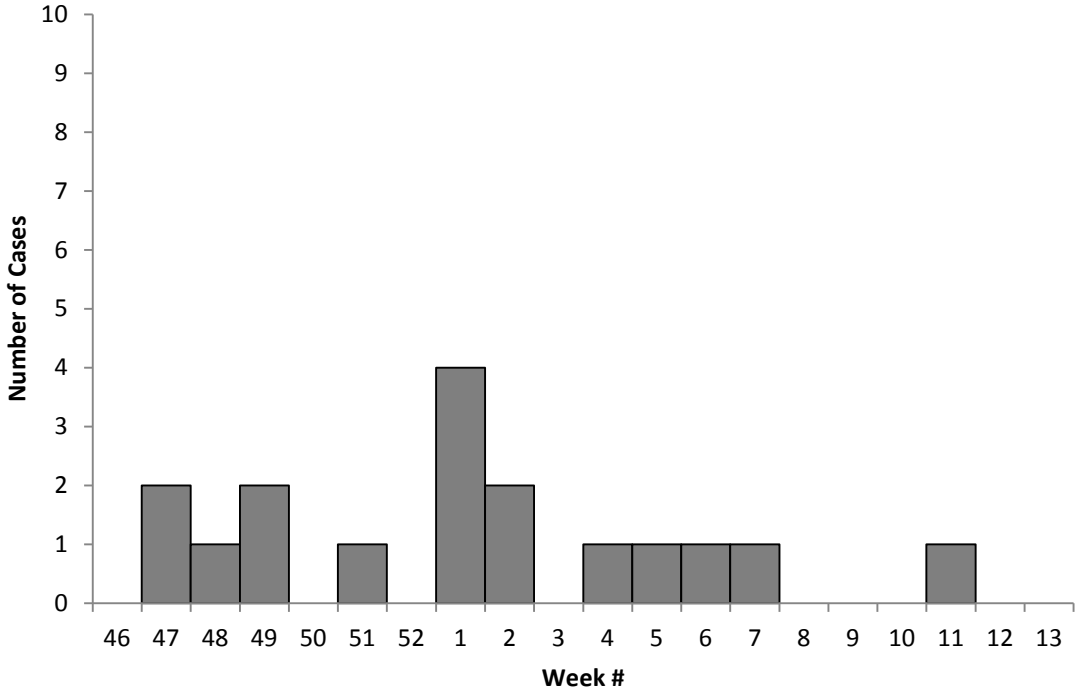
Subtyping was performed for two of the seven deaths, which were determined to be influenza A/H3. The five remaining viral isolates were not typed.

The first two deaths occurred in weeks 47 (Nov. 21-27, 2010) and 48 (Nov. 28 – Dec. 4). The following three deaths occurred in week 51 (Dec. 19-25, 2010). The last two occurred in weeks 6 (Feb. 6-12, 2011) and 7 (Feb. 13-19, 2011).

### *Enhanced Surveillance for Laboratory-confirmed Influenza Cases Admitted to an ICU*

There were 17 individuals with lab confirmed influenza who were admitted to Manitoba ICUs. Fifteen of these individuals were Manitoba residents and two were out of province.

Figure 10. Epi curve of all ICU cases in Manitoba hospitals (residents and non-residents), (n=17)




Cases admitted to Manitoba ICUs were reported between weeks 47 and 11 with the majority (n=4) observed in Week 1 (Figure 10).

The following data are based on the 15 Manitoba residents:

*Gender*

Sixty percent of the cases were female (n=9) and 40% (n=6) were male.

*Age*

Table 3. Age breakdown of laboratory confirmed influenza cases admitted to an ICU in Manitoba

| Age Group | ICU Admitted Cases n (%) |
|---|---|
| < 1 | 2 (13%) |
| 1-4 | 0 |
| 5-19 | 1 (7%) |
| 20-44 | 3 (20%) |
| 45-64 | 4 (27%) |
| 65+ | 5 (33%) |
| Unknown | 0 |
| Total | 15 |

*Ethnicity*

Ethnicity was known for 14 of the 15 individuals. Of the 14 for whom ethnicity was known 7 (50%) were Caucasian, 6 (43%) Aboriginal (5 First Nations and 1 Aboriginal unspecified) and 1 (7%) individual was identified as "Other".

*Location of Residence*

Table 4. Location of residence for laboratory confirmed influenza cases admitted to an ICU in Manitoba

| Region of Residence | ICU Admitted Cases n (%) |
|---|---|
| WRHA | 5 (33%) |
| N. Eastman | 1 (7%) |
| Interlake | 2 (13%) |
| Assiniboine | 3 (20%) |
| Parkland | 1 (7%) |
| Nor-Man | 1 (7%) |
| Churchill | 2 (13%) |
| Total | 15 |

*Underlying Conditions/Pregnancy:*

Nine of the 15 individuals were female, and 4 of these females were of childbearing age (15-44)[4], 2 of whom were pregnant.

Twelve (80%) of the 15 individuals had at least one of the above listed underlying conditions.

If pregnancy is included as an underlying condition, this number increases to 13 (87%) with the only two individuals not having underlying conditions being infants under one year of age.

Excluding the two infants under the age of one:

Nine (69%) of the 13 individuals had at least one of the following underlying conditions: asthma, tuberculosis or another chronic lung disease. Five of the 13 adults were clinically obese (BMI >30), 1 listed as do not know, and the remaining 7 as not obese.

*Treatment:*

Nine (60%) of the 15 individuals were treated with antivirals following symptom onset, whereas 6 were not.

[4] World Health Organization: http://www.wpro.who.int/internet/resources.ashx/HIN/childbearing_age.pdf.

*Vaccination:*

Based on the information from the case based investigation forms, 9 (60%) of the 15 individuals did not receive the 2010-2011 seasonal influenza vaccine, 3 were listed as do not know, and 3 individuals were listed as having received the vaccine. One of the infants was eligible to have received the vaccine at the time of symptom onset; however, the other infant was not old enough to vaccinate at the time of symptom onset.

*Condition at Time of Reporting:*

At the time of reporting, 2 individuals were listed as discharged, 5 individuals were categorized as stable, 5 as recovering, 1 deteriorating, and 2 dead.

## D. Outbreaks

Between November 2010 and March 2011, there were 38 laboratory confirmed outbreaks of influenza A (Table 5). The majority of outbreaks were reported from Winnipeg (64%) followed by Assiniboine (13%) and Central (8%) (Figure 11). The number of reported outbreaks peaked in December (n=21, 55%) (Table 6). The majority (n=34, 90%) occurred in long term care facilities with 22 of the 34 (65%) occurring in Winnipeg. The remaining occurred in a hospital (n=2), a community (n=1), and a workplace (n=1). There were no reported lab-confirmed outbreaks of influenza B.

Table 5. Number of lab-confirmed influenza A outbreaks by RHA and type of facility in Manitoba (2010/2011)

| RHA: | LTCF* | Hospital | Community | Workplace | **Total** |
|---|---|---|---|---|---|
| Winnipeg | 22 | 1 | 0 | 1 | **24** |
| Brandon | 2 | 0 | 0 | 0 | **2** |
| North Eastman | 0 | 0 | 0 | 0 | **0** |
| South Eastman | 0 | 0 | 0 | 0 | **0** |
| Interlake | 2 | 0 | 0 | 0 | **2** |
| Central | 2 | 1 | 0 | 0 | **3** |
| Assiniboine | 5 | 0 | 0 | 0 | **5** |
| Parkland | 1 | 0 | 0 | 0 | **1** |
| Nor-Man | 0 | 0 | 0 | 0 | **0** |
| Burntwood | 0 | 0 | 1 | 0 | **1** |
| Churchill | 0 | 0 | 0 | 0 | **0** |
| **Total** | **34** | **2** | **1** | **1** | **38** |

* LTCF = Long term care facility

Table 6. Number of lab-confirmed influenza A outbreaks by month in Manitoba (2010/2011)

| Month | Reported Outbreaks |
|---|---|
| November | 3 |
| December | 21 |
| January | 10 |
| February | 3 |
| March | 1 |
| **Total** | **38** |

Figure 11. Distribution of laboratory-confirmed outbreaks and crude incidence rate of influenza A by southern RHA, Manitoba (2010/2011)

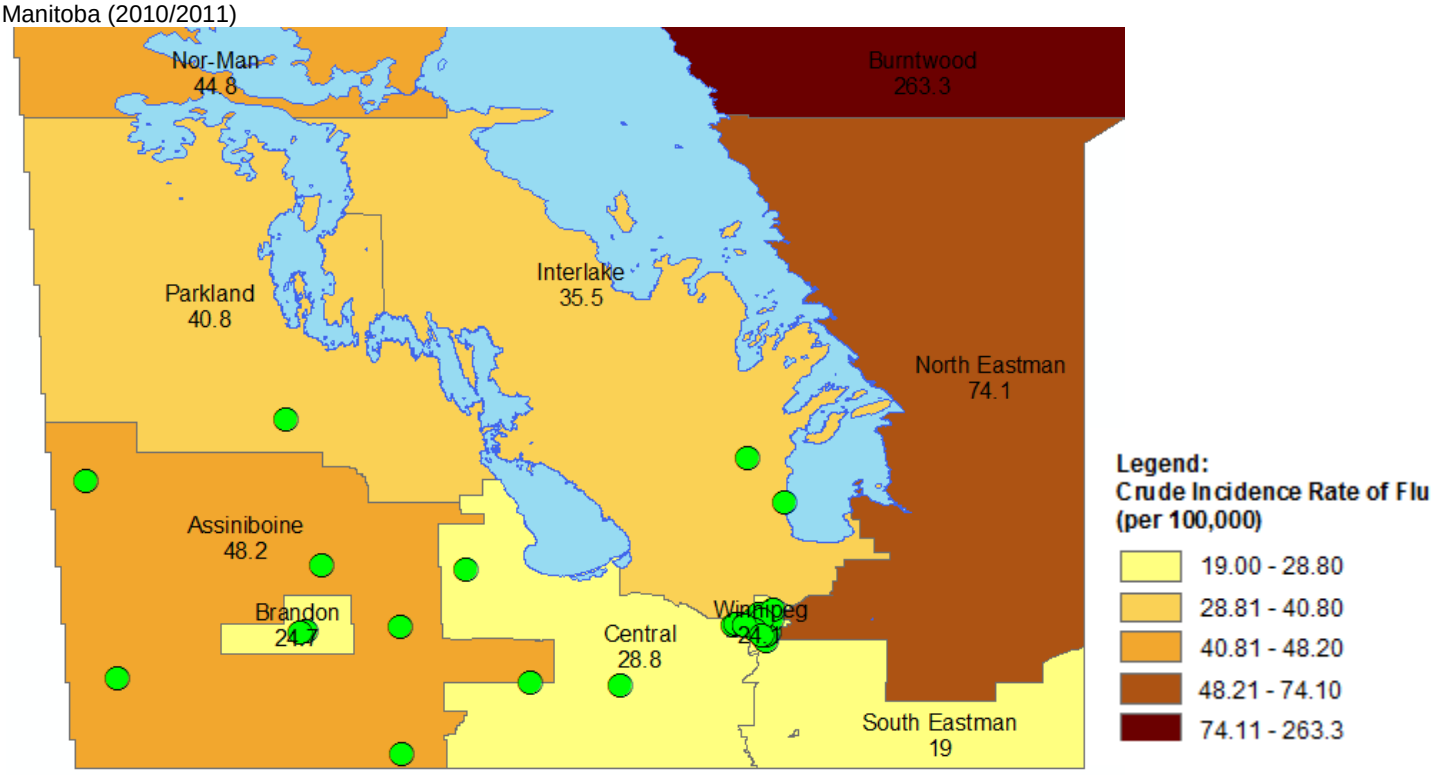
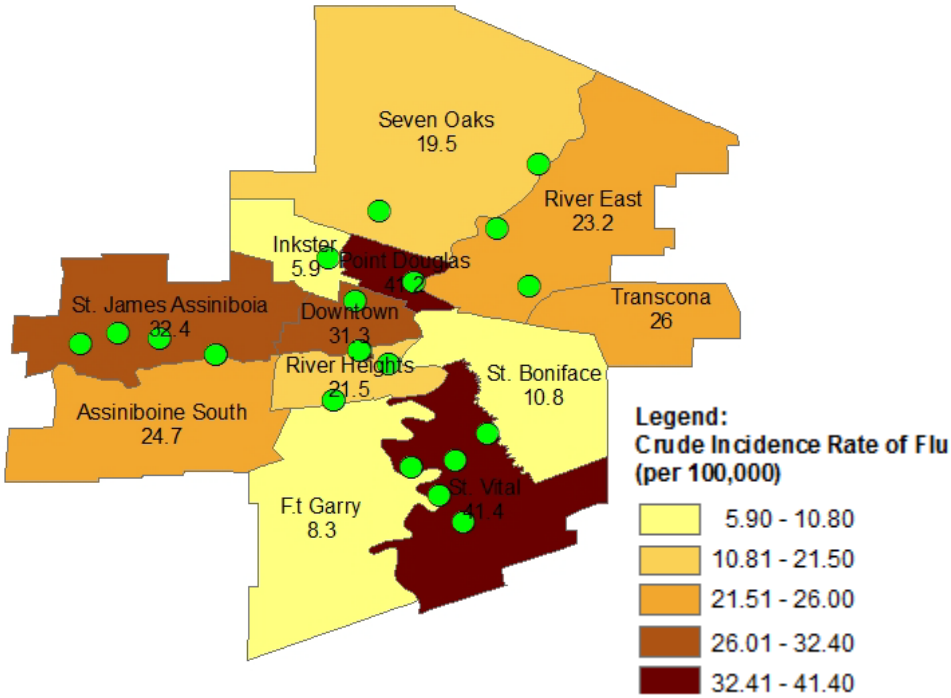



Figure 12. Distribution of laboratory-confirmed outbreaks and crude incidence rate of influenza A by Winnipeg Community Area, Winnipeg Region (2010/2011)



## E. Vaccination Data

### *Uptake*

The overall provincial influenza vaccine uptake was 21% in the 2010/2011 season. By age group, the highest uptake was among Manitobans aged 65 years and over (58%), followed by those 2 years and younger (22%), those 19-64 years (16%), and individuals aged 3-18 years (9%) (Figure 13). By RHA, the lowest uptake was observed in South Eastman RHA (13%) and the highest in Churchill RHA (30%). The remaining RHAs varied between 15% (Central RHA) to 23% (Burntwood RHA) (Figure 14).

Figure 13. Influenza vaccine uptake by age group in Manitoba (2010/2011)

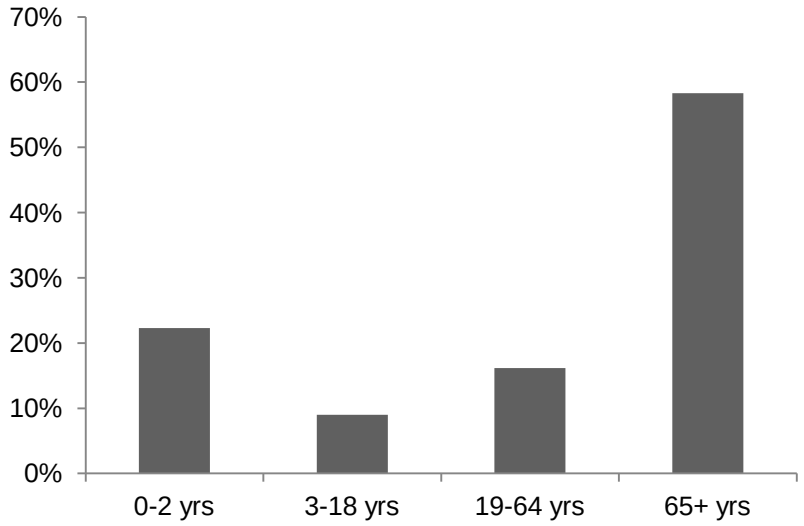
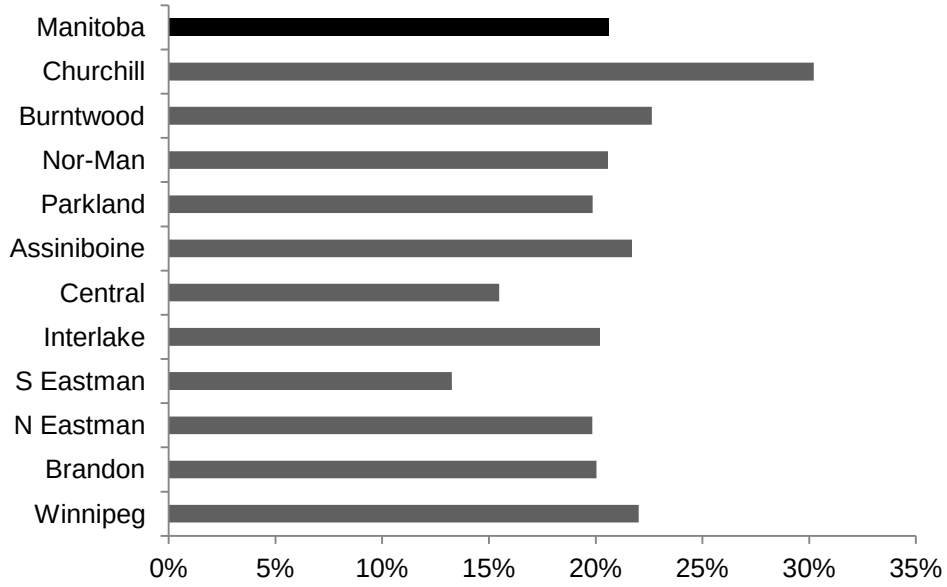



Figure 14. Influenza vaccine uptake by RHA in Manitoba (2010/2011)




Notes:
All proportions based on immunization events found in the April 2, 2011 snapshot of MIMS.
Includes all immunization events with TARIFF code 8791.

### *Adverse Events Following Immunization (AEFI)*

A total of 62 AEFI reports were received this season related to the influenza vaccine. Overall, the incidence rate of AEFI was 24.3 per 100,000. By age group, the highest incidence rate was among those less than three years-old. In general, the incidence rate decreased as age group increased (Table 7).

The majority of AEFI reports (n=33) noted other allergic event as the type of reaction, followed by local reaction (n=28), and other defined event of interest (n=25) (Table 8). There were nine neurologic events reports and 1 report of anaphylaxis. Some people experienced more than one reaction in a single episode, which means there were a greater number of reactions reported (n=96) than reports submitted (n=62).

The majority (26%) of AEFI reports noted that no care was obtained by the person experiencing the adverse event (Table 9). The next most frequent level of care obtained was a non-urgent visit to a health care professional (24%) followed by telephone advice from a health professional (15%). There were eight reported emergency visits and four reported hospitalizations.

The most frequently reported outcome following the AEFI was a full recovery (39%) followed by not yet recovered at the time of form completion (27%) (Table 10). There were no permanent disabilities or deaths reported.

The most frequently reported recommendation following review of the adverse event by the regional Medical Officer of Health (MOH) was no change to the immunization schedule (n=28) followed by expert referral (n=14; e.g. to an allergist), controlled setting for next immunization (n=10), active follow-up for AEFI recurrence (n=8), no further immunization with the influenza vaccine (n=6), and determine protective antibody level (n=1) (Table 11). There were 10 reports received with no recommendation by an MOH.

Table 7. Number and incidence rate (per 100,000)* of adverse events following immunization with the influenza vaccine by age group, 2010/2011 season, Manitoba

| Age Group | N | Inc. Rate |
|---|---|---|
| 0-2 | 13 | 121.6 |
| 3-18 | 11 | 47.5 |
| 19-64 | 29 | 23.8 |
| 65+ | 9 | 9.1 |
| **Total** | **62** | **24.3** |

* Number of doses administered used as denominator.

Table 8. Type of adverse event following immunization with the influenza vaccine, 2010/2012 season, Manitoba

| Type of adverse event: | N | %* |
|---|---|---|
| Local reaction | 28 | 45.2 |
| Anaphylaxis | 1 | 1.6 |
| Other allergic event | 33 | 53.2 |
| Neurologic events | 9 | 14.5 |
| Other defined event of interest | 25 | 40.3 |
| **Total number of reports**** | **62** | |

* Percentage based on total number of reports received.
** Total number of types of reactions is greater than total number of reports received as some people experienced more than one reaction in a single episode.

Table 9. Level of care obtained reported in influenza AEFI, 2010/2011 season, Manitoba

| Level of Care: | N | % |
|---|---|---|
| None | 16 | 25.8 |
| Telephone advice from health professional | 9 | 14.5 |
| Non-urgent visit | 15 | 24.2 |
| Emergency visit | 8 | 12.9 |
| Hospitalization | 4 | 6.5 |
| Prolongation of existing hospitalization | 0 | 0.0 |
| Missing | 10 | 16.1 |
| **Total** | **62** | **100.0** |

Table 10. Outcome of episode reported in influenza AEFI, 2010/2011 season, Manitoba

| Outcome: | N | % |
|---|---|---|
| Fully recovered | 24 | 38.7 |
| Not yet recovered | 17 | 27.4 |
| Permanent disability | 0 | 0.0 |
| Death | 0 | 0.0 |
| Unknown | 3 | 4.8 |
| Missing | 18 | 29.0 |
| **Total** | **62** | **100.0** |

Table 11. MOH recommendation reported in influenza AEFI, 2010/2011 season, Manitoba

| Recommendation: | N | %** |
|---|---|---|
| No change to immunization schedule | 28 | 45.2 |
| Expert referral | 14 | 22.6 |
| Determine protective antibody level | 1 | 1.6 |
| Controlled setting for next immunization | 10 | 16.1 |
| No further immunization with flu vaccine | 6 | 9.7 |
| Active follow-up for AEFI recurrence | 8 | 12.9 |
| Other* | 2 | 3.2 |
| None | 10 | 16.1 |
| **Total*** ** | **62** | |

*One did not have enough information to make recommendation; one recommend injection in opposite arm.
** Percentage based on total number of reports received.
*** Total number of recommendations (n=79) is greater than the number of reports received as more than one recommendation was made for some single episodes of an adverse event.

## F. Strain Characterization and Antiviral Resistance

### *Strain Characterization*

Since September 1st, 2010, National Microbiology Laboratory (NML) reports that it has antigenically characterized **10** influenza viruses that were received from CPL. A total of 14 positive specimens were forwarded to NML from CPL. Nine influenza A/H3N2 viruses characterized were antigenically related to A/Perth/16/2009-like, and one influenza B virus was antigenically related to B/Brisbane/60/2008-like.

Nationally, from September 1, 2010 to July 14, 2011, NML has antigenically characterized 1021 influenza viruses received from Canadian laboratories. Of these, 284 A/H3N2 viruses were antigenically related to

A/Perth/16/2009-like, 151 A/H1N1 viruses were antigenically related to A/California/07/09-like, 557 B viruses were antigenically related to B/Brisbane/60/2008-like, and 29 B viruses were antigenically related to B/Wisconsin/01/2010-like.

### *Antiviral Resistance*

Since September 1st, 2010, NML has tested for antiviral resistance on Manitoba isolates with the following results:

Table 12. Antiviral resistance summary of Manitoba influenza isolates, 2010/2011

| | Influenza A/H3N2 | | Influenza B | |
|---|---|---|---|---|
| Antiviral: | Resistant | Sensitive | Resistant | Sensitive |
| Amantadine | 16 | 0 | 0 | 0 |
| Oseltamivir | 0 | 8 | 0 | 1 |
| Zanamivir | 0 | 8 | 0 | 1 |

Nationally, from September 1, 2010 to July 14, 2011, NML has tested for antiviral resistance on Canadian isolates with the following results:

Table 13. Antiviral resistance summary of Canadian influenza isolates, 2010/2011

| | Influenza A/H3N2 | | 2009 Influenza A/H1N1 | | Influenza B | |
|---|---|---|---|---|---|---|
| Antiviral: | Resistant | Sensitive | Resistant | Sensitive | Resistant | Sensitive |
| Amantadine | 496 | 1 | 170 | 0 | | |
| Oseltamivir | 1 | 258 | 1 | 153 | 1 | 579 |
| Zanamivir | 0 | 255 | 0 | 151 | 1 | 578 |

## DISCUSSION AND RECOMMENDATIONS

### *General Limitation*

There is no true denominator for all individuals infected as not all individuals infected with influenza will present to health care and/or be tested. The information available will serve to characterize severe cases and to monitor trends; however, since we cannot compare characteristics of severe to mild cases we will not be able to identify true risk factors for severe clinical outcome for this influenza season. Comparison of severe clinical cases from last year's pandemic to the severe cases seen this season will be limited by the fact that different data collection forms were used.

## A. Syndromic Surveillance

### *FluWatch*

Surveillance of influenza-like illness (ILI) approximates the true burden of influenza in the population. While it may also capture the burden of other circulating respiratory viruses, it can provide a good estimate of disease when combined with other reliable data sources such as laboratory testing.

The data would suggest that routine monitoring of the ILI rate does not provide any early indication of the peak in the flu season. A recommendation is to begin comparing the current ILI rate to a calculated expected ILI rate based on the mean observation rate for the previous ten seasons. This would be similar to the model currently used by the national *FluWatch* program.

The same could be said for the activity level codes assigned to Manitoba`s influenza surveillance regions. A similar algorithm could be applied to compare current activity level codes with a historical comparison based on a calculated expected activity level.

It is difficult to determine if Manitoba's sentinels provide adequate provincial representation, as on average, less than 50% of sentinels are reporting each week. Moving forward into subsequent flu seasons, it will be important to consider innovative methods of sentinel retention and recruitment in order to maximize the effectiveness of this ILI surveillance program. This will be especially essential for next season, when provinces and territories will be solely responsible for retention and recruitment following the College of Family Physicians of Canada's decision to discontinue their coordinating role in the program.

### *Health Links – Info Santé*

It is a positive outcome that the peak in the number of calls related to obtaining a flu shot is occurring prior to the beginning of the influenza season. This would suggest that Manitoba Health's influenza immunization campaign is positively creating awareness about the importance of getting a flu shot.

It would also be expected to observe a peak in the number of calls related to flu management prior to the peak in lab-confirmed cases due to the delay in receiving lab results after being tested. However, there are limitations of the data that restrict their interpretation. Demographic and other information is not collected from the callers; therefore, it is not known if the people at greatest risk of severe outcomes are receiving the information about the flu vaccine. The geographic distribution of callers is also unknown; it is unknown if all Manitobans are utilizing this service or if utilization is concentrated within a specific geographic area.

It is also unknown why fewer people are calling to obtain information about the groups of individuals who are at an increased risk of serious illness and the annual influenza immunization campaign. It is possible that this information is received elsewhere or that there is a lack of awareness about priority groups and the campaign. An evaluation of Manitoba's 2011/2012 influenza immunization campaign is being developed, which will provide a comprehensive and systematic method of responding to some of these questions.

## B. Laboratory-Confirmed Influenza

### *General*

It is unclear why there were more cases of influenza A reported than in previous flu seasons, excluding the H1N1 pandemic. This may have been the result of increased vigilance to seek care and be tested precipitated by outcomes of the H1N1 pandemic. It would be worthwhile to explore percent positivity and compare to previous non-pandemic seasons to determine if increased testing contributed to the higher number of lab-confirmed cases.

As anticipated from past influenza B seasons, there were few lab-confirmed cases reported compared to influenza A. As expected, the majority of influenza B cases were reported following the peak of influenza A.

***Features***

In general, the age group most affected were those typically seen in past non-pandemic flu seasons (the very young and very old age groups). Excluding the pandemic H1N1 season, this age trend has been observed repeatedly in previous flu seasons. The highest incidence rates have consistently been observed among these two age groups (see Appendix A on p.34 for extended tables):

Table 14. Incidence rate (per 100,000) of influenza A by youngest and oldest age group in Manitoba

| | Age Group | |
|---|---|---|
| Season: | <1 year | >79 years |
| 2003/2004 | 135.6 | 100.1 |
| 2004/2005 | 57.3 | 155.7 |
| 2005/2006 | 34.9 | 58.2 |
| 2006/2007 | 67.0 | 33.7 |
| 2007/2008 | 90.3 | 21.5 |
| 2008/2009 | 44.2 | 51.9 |

This differs than what was observed during the H1N1 pandemic, where overall those aged <1 year had the highest incidence rate (613 cases per 100,000), followed by those aged 5-9 years (473 cases per 100,000) and those aged 10-14 years (410 cases per 100,000). The incidence rate decreased as age group increased (44 cases per 100,000 among 65-69 year-olds, 38 cases per 100,000 among 70-74 year-olds, and 14 cases per 100,000 among those aged 75 and over) [5].

The crude incidence rate of influenza A was highest in Burntwood and Churchill RHAs combined (263.3 cases per 100,000), which is the same trend observed during the pandemic season (482.7 cases per 100,000 in Burntwood and 535.3 cases per 100,000 in Churchill).

It is difficult to validate the reasons why northern RHAs have a greater burden without age-standardized rates or data on risk factors; however, age standardized rates calculated for Manitoba's H1N1 Technical Report (unreleased) were comparable to the crude rates, which suggest that other risk factors may be driving the higher rates in the north. A more comprehensive exploration of risk factors may be warranted to better understand these RHA disparities.

Similar conclusions can be drawn in terms of burden within Winnipeg community areas. While these rates are not age or sex standardized, it can be stated that the greatest burden of illness was observed in the areas with the highest rates (St. Vital and Point Douglas followed by St. James Assiniboia and Downtown), while the least burden of illness was observed in the areas with the lowest rates (Inkster, Fort Garry, and St. Boniface).

It is difficult to draw any conclusions from cases that were referred federally, as this is not a reliable indicator for First Nations status. It can be stated that those who live on reserve have a greater burden of illness compared to those who live off reserve.

## C. Clinical Severity: Influenza-Related Hospitalizations, ICU Admissions and Deaths

Historically, there is no record of these data being collected in previous non-pandemic flu seasons; therefore, it is not possible to compare clinical severity with previous non-pandemic seasons.

[5] Manitoba Pandemic H1N1 Influenza A Technical Report, June 2010, unreleased.

During the pandemic season, there were 383 hospitalized cases, of which 71 were admitted to an ICU. The peak in the number of hospitalizations occurred in May and November during the pandemic whereas it occurred in December this past season.

There were 11 reported deaths during the H1N1 pandemic compared to 7 this past season. Five of the 7 deaths that occurred this season occurred among cases aged over 75 years. In contrast, the majority of deaths (73%) occurred among cases aged between 20-59 years.

The greatest proportion of hospitalizations this past season was among cases aged 65 and over (25%) compared to 22% among 45-65 year-olds during the pandemic, with only 4% occurring among those aged over 65 years.

This season, the greatest proportion of ICU admissions was observed among cases aged 65 and over (33%). In contrast, during the pandemic, 4% of ICU admissions occurred among cases aged over 65 years with the majority occurring among cases aged 46-65 years (28%), followed by 20% among 26-35 year-olds and 20% among 36-45 year-olds.

This season, 36% of ICU-admitted cases occurred among those self-identifying as First Nations. This same proportion was 37% during the pandemic. These were the highest proportions observed within both the pandemic and this flu season.

In terms of underlying conditions, risk factors for severe outcomes observed during the H1N1 pandemic in Manitoba included having at least one underlying condition.[6] This was similar to what was observed this past season; however, it should be noted that the definition for underlying condition differed slightly.[7] Also, all ages were included in the H1N1 pandemic data whereas infants were removed from the summary of this season.

While the age groups with the greatest burden of illness differed between this season and the pandemic H1N1 season, the same trends were observed among cases most severely affected: presence of chronic/underlying condition(s), First Nations ethnicity, and unvaccinated cases in populations included in priority groups to receive the vaccine.

In terms of antiviral treatment, it is unclear why 40% of ICU-admitted cases did not receive antivirals. While antiviral treatment given after 48 hours of illness onset is most beneficial to shorten symptom duration and reduce the risk of complications from influenza, evidence suggests that antivirals given after 48 hours of symptom onset may still benefit hospitalized patients and people with severe illness.[8] Should these data be collected in future seasons, it is recommended that the reason(s) why antivirals were not administered be collected in order to assess the apparent lack of treatment.

It is important to reiterate that the majority of ICU-admitted cases (60%) had not been immunized with the influenza vaccine, especially given that 13 of the 15 cases had at least one underlying condition. Of the remaining two cases (both infants), one was under 6 months old and thus was not eligible to receive the

[6] Definition included: asthma; chronic heart disease; diabetes; tuberculosis; kidney disease; immune suppressed; lung disease; neuromuscular disorder; cancer; clinical obesity; cognitive disorder; injection drug use; no access to running water; resident in a nursing home or long term care facility; alcohol abuse; substance abuse; smoking; exposure to second hand smoke; pregnancy.

[7] Definition included: chronic heart disease, diabetes, tuberculosis, asthma, other underlying chronic lung disease, hemoglobinopathy/anemia, neuromuscular disorder, neurodevelopmental condition, cancer, on immunosuppressing medications, immunodeficiency disease/condition, clinically obese (BMI >30)

[8] 2011-2012 Influenza Antiviral Medications: A Summary for Clinicians. Department of Health and Human Services. Centers for Disease Control and Prevention. August 30, 2011. Accessed online, September 29, 2011 from: http://www.cdc.gov/flu/pdf/professionals/antivirals/clinician-antivirals-2011.pdf.

vaccine. However, the other infant was over 6 months-old and eligible to receive the vaccine prior to symptom onset.

Limited conclusions can be drawn from these enhanced surveillance data due to small numbers. However, it is valuable to highlight the importance of ensuring that messaging is reaching target populations to ensure that the most vulnerable people are getting vaccinated. A recommendation is to conduct an evaluation of Manitoba Health's immunization campaign to consider the effectiveness of the influenza vaccine campaign and to investigate the reasons why people choose not to be vaccinated. Such a project is currently under development following the 2011/2012 influenza vaccine campaign. Results will be used to direct future campaigns.

The following are recommendations for enhanced surveillance of influenza cases for the 2011/2012 season resulting from the analysis of the 2010/2011 enhanced data on clinical severity:

1) **Aggregate reporting of severe influenza outcomes**: Program will be resumed by PHAC for 2011/2012 season. Manitoba Health will be collecting these data from RHAs on a weekly basis.

2) **Enhanced ICU investigation form**: Program will be terminated; however, should a significant change in activity level warrant surveillance of severe cases, the investigation form and accompanying database are ready for re-implementation.

### D. Outbreaks

The number of laboratory confirmed outbreaks was higher than the last four non-pandemic seasons. During the 2004/2005 season, the same number of lab-confirmed outbreaks were reported as this past season (n=38). Also of note is the proportion of outbreaks reported by long-term care facilities (LTCF). In all previous non-pandemic seasons since 2004/2005, the majority of outbreaks were reported by LTCF (95% in 2004/2005, 85% in 2005/2006, 56% in 2006/2007, 83% in 2007/2008, and 55% in 2008/2009). The same trend was observed this past season where 90% of outbreaks were reported by LTCF.

The reasons for this increase are not known due to the limited amount of summary level data collected on outbreaks; however, potential contributing factors to explore might include increased reporting and testing this season, or unvaccinated populations visiting high risk residents within LTCF. A comprehensive investigation of contributing factors of this trend may be warranted to determine strategies to reduce its occurrence in future seasons.

Table 15. Number of reported lab-confirmed influenza outbreaks by season (excluding pandemic H1N1 season), Manitoba

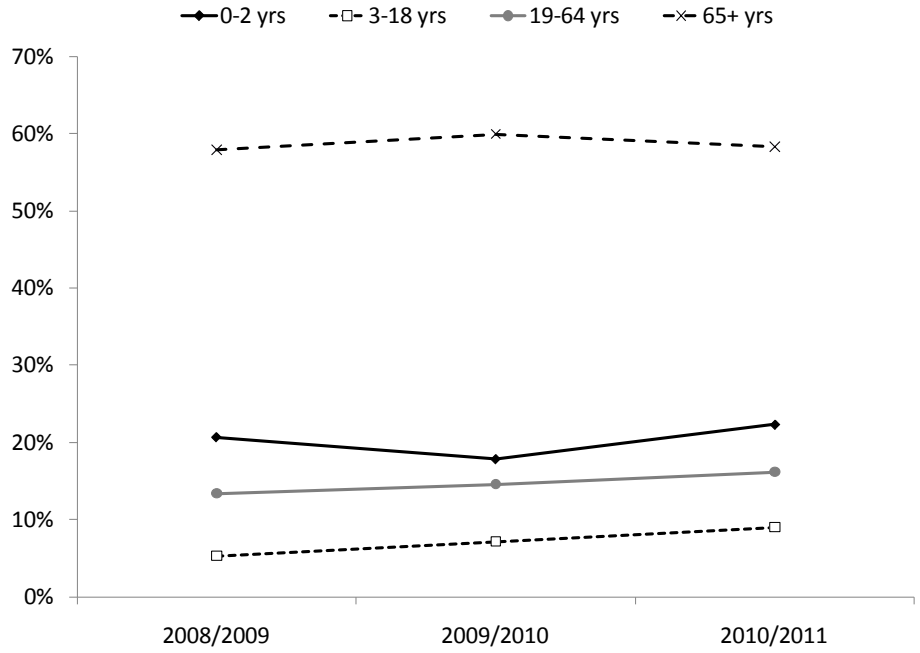
| Season: | Influenza A | Influenza B | Total |
|---|---|---|---|
| 2004/2005 | 27 | 11 | 38 |
| 2005/2006 | 12 | 1 | 13 |
| 2006/2007 | 9 | 0 | 9 |
| 2007/2008 | 6 | 6 | 12 |
| 2008/2009 | 19 | 1 | 20 |
| 2010/2011 | 38 | 0 | 38 |

## E. Vaccination Data

### *Uptake*

The overall provincial influenza vaccine uptake for the 2010/2011 season was 21%, which is similar to the seasonal influenza vaccine uptake reported for the 2009/2010 season (19%) and for the 2008/2009 season (18%). These proportions only include the seasonal influenza vaccine and not the Pandemic 2009/2010 H1N1 influenza vaccine (Arepanrix™). The same age group trends were observed for all three of these seasons, with the lowest uptake observed among 3-18 year-olds and the highest among those aged 65 years and over (Figure 15). The uptake among 3-18 year-olds and 19-64 year-olds has increased slightly since 2008/2009; however, the uptake among 0-2 year-olds and those 65 and over has remained fairly stable.

Figure 15. Influenza vaccine uptake by age group and season, Manitoba




The highest uptake was observed in Churchill RHA this season (30%), which was also the case last season (30%). The same was true for South Eastman RHA having the lowest uptake both seasons (12% in 2009/2010 and 13% in 2010/2011). However, during the 2008/2009 season, there was much less variability in uptake between RHAs, which ranged from 11.6% in Burntwood RHA to 19.5 in Parkland and Assiniboine RHAs. Between 2009/2010 and this season, uptake increased in all RHAs except for Brandon and Nor-Man RHAs, where uptake decreased. The increases in uptake may be due to an improved awareness of the importance of receiving the influenza vaccine following the H1N1 pandemic.

Information on uptake among priority groups was not obtained apart from during the H1N1 pandemic and therefore cannot be commented on. However, given the vaccine history of the ICU-admitted cases from this season, a future qualitative study exploring the reasons why priority groups may not be receiving the influenza vaccine is recommended.

### *Adverse Events Following Immunization (AEFI)*

The incidence rate of AEFI reports related to the seasonal influenza vaccine is lower (24.3 per 100,000 doses administered) than the incidence rate of AEFI reports related to the pandemic H1N1 vaccine observed during the 2009/2010 immunization campaign (144.6 per 100,000 doses administered).[9] It should be noted that this comparison involves two different vaccines, the seasonal flu vaccine and the 2009/2010 pandemic H1N1 vaccine, both of which are now combined into one trivalent vaccine.

The highest incidence rate was observed among the youngest age group (6 months to 2 years) both during the 2009/2010 H1N1 immunization campaign (258.6 per 100,000) and this past season's campaign (121.6 per 100,000). The same was true for the lowest incidence rate, which was observed among the oldest age group, those aged 65 and over (64.5 per 100,000 in 2009/2010 and 9.1 per 100,000 during 2010/2011).

The proportion of people who sought no care following the adverse event was higher this season (25.8%) than during the H1N1 pandemic (10.9%). The incidence rate of AEFI resulting in hospitalization was slightly lower following vaccination with the H1N1 vaccine (1.33 per 100,000 doses administered) than with this season's seasonal influenza vaccine (1.57 per 100,000 doses administered). The incidence rate of anaphylaxis was lower this season (0.39 per 100,000 doses administered) compared to the pandemic H1N1 immunization campaign (2.44 per 100,000 doses administered). This is likely due to an identified higher than normal rate of anaphylaxis linked to a particular lot of the adjuvanted H1N1 influenza vaccine.[10]

Further to this, there were more reports received with the level of care missing (23.9%) or unknown (8.7%) at time of form completion during the H1N1 pandemic than this season (16% missing and 0% unknown). The higher frequency of missing or unknown information is likely due to the higher volume of reports submitted during the H1N1 pandemic (n=599 AEFI reports related to the H1N1 vaccine) compared to a more typical influenza season (vs. n=62 this season).

Similar trends were observed such that the proportion of reports with MOH recommending no change to the immunization schedule was highest both during the H1N1 pandemic (50.9%) and this season (45.2%), followed by expert referral to a specialist (19.6% and 22.6, respectively).

Limitations with AEFI data include the inability to determine a direct cause and effect relationship between the immunizing agent and the adverse event due to a multitude of other competing factors. For example, in this summary, people may have received other vaccines at the same time as receiving the seasonal influenza vaccine. Further, frequently missing information impedes the ability to identify patterns or issues with a specific lot number, for example. Finally, the reporting system is paper-based in Manitoba, which decreases efficiency and reliability of the data, as it is being filled out by hand and then submitted to Manitoba Health where it is later entered into an electronic database. A web-based paperless system would simplify the review process, increase data reliability, and facilitate data submissions to PHAC.

Manitoba is currently developing an AEFI pilot project that will address some of the limitations mentioned above, which will work to improve standard operating procedures, improve data quality and reliability, and enhance reporting capacity.

[9] Manitoba Pandemic H1N1 Influenza A Technical Report, June 2010, unreleased.
[10] http://www.phac-aspc.gc.ca/alert-alerte/h1n1/surveillance-archive/addeve20091204-eng.php.

## F. Strain Characterization and Antiviral Resistance

### *Strain Characterization*

The World Health Organization recommended that the trivalent influenza vaccine contain A/California/7/2009(H1N1)-like, A/Perth/16/2009(H3N2)-like, and B/Brisbane/60/2008(Victoria lineage)-like antigens for the 2010/2011 season in the Northern Hemisphere.[11] These recommendations correspond to Manitoba's characterized influenza viruses submitted by our Provincial Public Health Laboratory. This provides evidence that the seasonal trivalent influenza vaccine provided protection against the circulating strains of the influenza virus.

### *Antiviral Resistance*

All of the ICU-admitted cases who were treated with antivirals (n=9) received Oseltamivir, which along with Zanamivir, are the recommended antiviral treatments in Canada. Zanamivir is not recommended for use in people with underlying respiratory disease such as asthma or chronic obstructive pulmonary disease or in children under the age of seven.[12] All nine ICU-admitted cases treated with Oseltamivir had either an underlying respiratory condition, smoked, or were under the age of seven.

Antiviral susceptibility testing by NML on Manitoba isolates indicated that Oseltamivir-resistance was not observed for any of the A/H3N2 isolates tested.

[11] http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/10pdf/36-acs-6.pdf.
[12] http://www.phac-aspc.gc.ca/cpip-pclcpi/ann-e-eng.php#a3_1_2.

## APPENDIX A: Incidence rate of influenza A by age group

**Incidence rate (per 100,000) of influenza A (excluding pandemic H1N1) by age group and season (July 1 – June 30)**

| | 1999-2000 | | 2000-2001 | | 2001-2002 | | 2002-2003 | | 2003-2004 | | 2004-2005 | | 2005-2006 | | 2006-2007 | | 2007-2008 | | 2008-2009 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Age Group:** | **N** | **Inc.** | **N** | **Inc.** | **N** | **Inc.** | **N** | **Inc.** | **N** | **Inc.** | **N** | **Inc.** | **N** | **Inc.** | **N** | **Inc.** | **N** | **Inc.** | **N** | **Inc.** |
| <1 | 27 | 187.15 | 20 | 142.78 | 16 | 114.93 | 6 | 43.56 | 19 | 135.63 | 8 | 57.29 | 5 | 34.89 | 10 | 67.04 | 14 | 90.31 | 7 | 44.24 |
| 1-4 | 11 | 18.20 | 10 | 16.86 | 18 | 30.86 | 3 | 5.19 | 14 | 24.29 | 14 | 24.51 | 1 | 1.76 | 13 | 22.64 | 8 | 13.56 | 9 | 14.82 |
| 5-9 | 1 | 1.19 | 2 | 2.42 | 1 | 1.23 | 1 | 1.26 | 10 | 12.75 | 2 | 2.60 | 3 | 3.98 | 1 | 1.33 | 9 | 12.03 | 2 | 2.67 |
| 10-14 | 2 | 2.39 | 1 | 1.19 | 7 | 8.25 | 2 | 2.35 | 6 | 6.99 | 3 | 3.51 | 3 | 3.55 | 4 | 4.81 | 1 | 1.21 | 3 | 3.69 |
| 15-19 | 3 | 3.70 | 7 | 8.55 | 6 | 7.26 | 2 | 2.42 | 4 | 4.77 | 1 | 1.18 | | | 3 | 3.47 | 3 | 3.44 | 3 | 3.40 |
| 20-24 | 7 | 9.15 | 3 | 3.92 | | | 1 | 1.28 | 9 | 11.38 | 4 | 5.00 | 1 | 1.24 | 1 | 1.23 | 6 | 7.33 | 4 | 4.81 |
| 25-29 | 7 | 9.21 | | | 5 | 6.72 | 1 | 1.34 | 7 | 9.29 | 6 | 7.98 | | | 1 | 1.31 | 3 | 3.85 | 2 | 2.50 |
| 30-39 | 13 | 7.55 | 2 | 1.19 | 8 | 4.87 | 1 | 0.62 | 8 | 5.07 | 6 | 3.87 | 4 | 2.61 | 4 | 2.61 | 7 | 4.52 | 9 | 5.75 |
| 40-49 | 9 | 5.18 | 5 | 2.82 | 8 | 4.45 | 1 | 0.55 | 4 | 2.18 | 7 | 3.81 | 6 | 3.28 | 4 | 2.21 | 7 | 3.92 | 5 | 2.81 |
| 50-59 | 22 | 17.37 | | | 2 | 1.47 | 4 | 2.85 | 4 | 2.75 | 9 | 5.98 | 2 | 1.29 | 7 | 4.44 | 5 | 3.11 | 6 | 3.65 |
| 60-69 | 18 | 20.97 | | | 3 | 3.45 | 2 | 2.26 | 4 | 4.40 | 7 | 7.52 | 4 | 4.18 | 2 | 1.98 | 2 | 1.89 | 3 | 2.71 |
| 70-79 | 25 | 34.67 | | | 7 | 9.82 | 5 | 7.07 | 14 | 20.03 | 10 | 14.46 | 7 | 10.16 | 4 | 5.84 | 3 | 4.37 | 6 | 8.72 |
| >79 | 102 | 235.09 | 1 | 2.25 | 20 | 43.72 | 11 | 23.39 | 48 | 100.11 | 76 | 155.71 | 29 | 58.22 | 17 | 33.72 | 11 | 21.45 | 27 | 51.91 |