

Seasonal Influenza in Alberta

2011/2012 Summary Report

August 2012



For more information contact:

Surveillance and Assessment Branch
Family and Population Health Division
Alberta Health
PO Box 1360 Station Main
Edmonton, Alberta T5J 2N3

Email: Health.Surveillance@gov.ab.ca
Website: www.health.alberta.ca

Executive Summary

The 2011/2012 influenza season in Alberta started later, was shorter in duration, and was milder than the previous season. The overall rate of influenza infections in Alberta confirmed by the provincial laboratory was 37 per 100,000 people. Infants had the highest rate of influenza infection as well as the highest rate of hospitalization due to influenza. Rates in every age group for infection and hospitalization were lower than the previous season, except in seniors 65 years of age and older. The number of influenza outbreaks increased this season, and the two most common sites were long-term care facilities (LTCF) and supportive living sites. Sentinel physicians participating in the The Alberta Recording and ReseArch NeTwork (TARRANT) program saw a lower proportion of patient visits due to influenza like illness (ILI) than during the 2010/2011 season.

There were four strains of influenza detected in Alberta this season: influenza A H3N2 (A/Perth/16/2009) and H1N1 (A/California/7/2009), and two influenza B strains (B/Brisbane/60/2008 and B/Wisconsin/01/2010). Three strains (all but the B/Wisconsin/01/2010 strain) were included in the seasonal vaccine. Influenza A accounted for 80 per cent of lab confirmed cases in Alberta. It is estimated that the B/Wisconsin/01/2010 strain was responsible for 52 per cent of the influenza B infections across Canada.

Of the 428 cases admitted to hospital, 48 were admitted to the ICU and 15 cases died. Eighty five per cent of seniors admitted to hospital had known underlying health conditions, the most common of which was heart disease. Twenty-two per cent of infants were admitted with a known underlying condition, and asthma was the most common underlying condition in infants and children. There were 129 hospitalized cases (30 per cent) who had previously received the current year's influenza vaccine and 172 cases (40 per cent) received antivirals. Across Canada, all influenza isolates were sensitive to zanamivir and oseltamivir (antivirals), whereas all but one isolate were resistant to amantadine (antiviral).

Background

Influenza is caused by a virus that invades the respiratory tract of humans and other animals. It can be spread from person to person in the form of droplets from a cough or a sneeze, and the virus can survive for days on inanimate objects waiting to be picked up by the next susceptible host. Symptoms of the illness can include fever, aching muscles, headache, malaise, sore throat, rhinitis, a non-productive cough, and sometimes diarrhea and nausea. Two different types of influenza, A and B, are typically found in North America. The highest rate of morbidity attributed to these viruses typically occurs during the winter months.

The most serious form of the illness is often seen in infants and seniors, particularly those with underlying conditions such as asthma or chronic obstructive pulmonary disease (COPD). Such cases are usually more susceptible to infection and more likely to develop complications like pneumonia, with the most severe outcome being death. Healthy adults may become sick enough to miss days of work and school, and it can take one to two weeks to recover.

The greatest danger attributed to the influenza virus is its potential to cause a worldwide pandemic. Mutations in the virus may result in a novel strain of the virus that we may have no immunity to. However, the wave of seasonal influenza beginning each fall is usually the result of minor genetic variations. In 2011/2012, most of North America saw a delayed start to the influenza season with a shorter duration and lower peaks in activity than is typical of seasonal influenza.

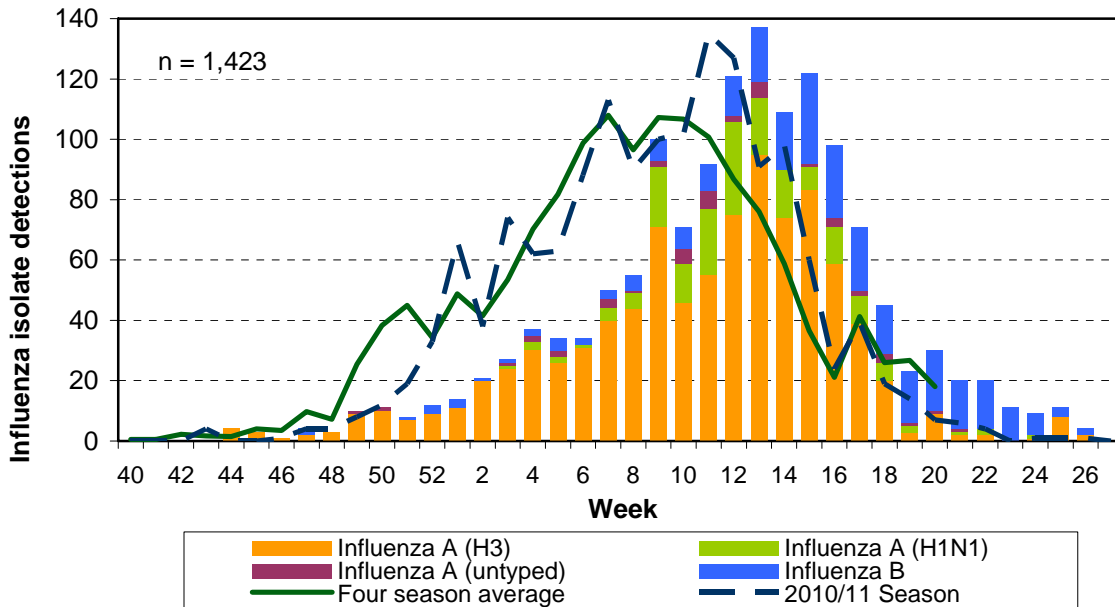
While influenza surveillance in Alberta continues year round, this report includes surveillance of influenza activity from October 2, 2011 (Week 40) to June 30, 2012 (Week 26) (See Appendix for weeks and date ranges for the 2011/12 season). For this season, data was included later into the season than usual due to the delayed peak in influenza activity.

The information used in this report includes data from confirmed influenza cases from the Provincial Laboratory of Alberta (ProvLab), influenza like illness (ILI) activity from the Alberta sentinel physician system (TARRANT), Alberta outbreak reports, physician claims data, and hospitalized case report forms. There were four strains of influenza detected in Alberta this season: influenza A H3N2 (A/Perth/16/2009) and H1N1 (A/California/7/2009), and two influenza B strains (B/Brisbane/60/2008 and B/Wisconsin/01/2010).

Influenza Activity in Alberta

The 2011/2012 influenza season had a delayed start and was shorter in duration than previous seasons (Figure 1). Dr. Bresee at the United States Center for Disease Control provided two explanations for this phenomenon¹. One corresponds to the mild winter this season. The influenza virus may be more stable at lower levels of humidity and temperature seen in regular winter seasons, resulting in increased viral shedding and increased potential for transmission². The other explanation is that there was very little antigenic drift from the previous season influenza viruses, which means that most of the population had some level of immunity to the previous and current season influenza viruses, either by infection or immunization. According to the national guidelines established by FluWatch, the season is considered to have started when 10 per cent of respiratory virus samples test positive for influenza. The 2011/2012 influenza season started in Week 7 (February 12, 2012) and continued until Week 18 (May 5, 2012). A consistent decline in positive samples began in Week 17 (April 22, 2012). In comparison, the 2010/2011 influenza season reached the 10 per cent positive for influenza mark in Week 1 (January) and continued until Week 15 (March) until the seasonal decline in May.

Figure 1: Number of lab-confirmed isolates detected by week, compared to previous seasons.



Source: Provincial Laboratory for Public Health (Microbiology) (ProvLab)

Note: 2009/2010 season data excluded due to the pandemic

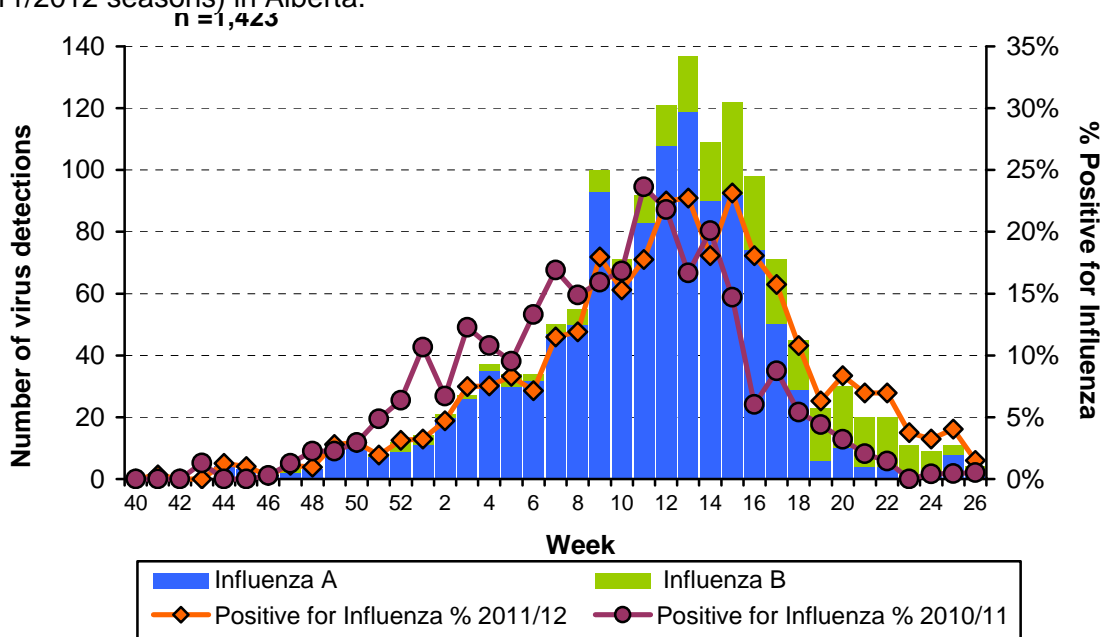
¹ Dr. Joseph Bresee, Chief of Epidemiology, Center for Disease Control. (2012). 2011-2012 Flu Season Draws to a Close. Accessed online July 13, 2012, from <http://www.cdc.gov/flu/spotlights/2011-2012-flu-season-wrapup.htm>.

² Anice C. Lowen, Samira Mubareka, John Steel, and Peter Palese. (2007). Influenza virus transmission is dependent on relative humidity and temperature. *Public Library of Science: Pathogens*. 3: 1470-1476.

Laboratory

Every year samples from patients suspected of having an illness due to a respiratory virus are sent to the ProvLab for testing. From October 2, 2011 until June 30, 2012 1,423 samples tested positive for influenza (Figure 2). Unlike the previous season where nearly 50 per cent of samples tested positive for influenza A and 50 per cent for influenza B, approximately 80 per cent of samples tested positive for influenza A and 20 per cent tested positive for influenza B during the 2011/12 season. The majority (80.5 per cent) of influenza A specimens were identified as the H3 subtype, and 15.6 per cent were found to be H1N1. The remaining 3.9 per cent were identified as influenza A, but had such low levels of viral load that they were unable to be typed as either H3 or H1N1. The peak in influenza activity occurred during Week 13 (March 25-31, 2012) when 22.7 per cent of samples tested were positive for influenza. This peak was slightly lower and was later compared to the 2010/11 season, where 23.6 per cent of samples were positive for influenza during Week 11 (March 13 – 19, 2011).

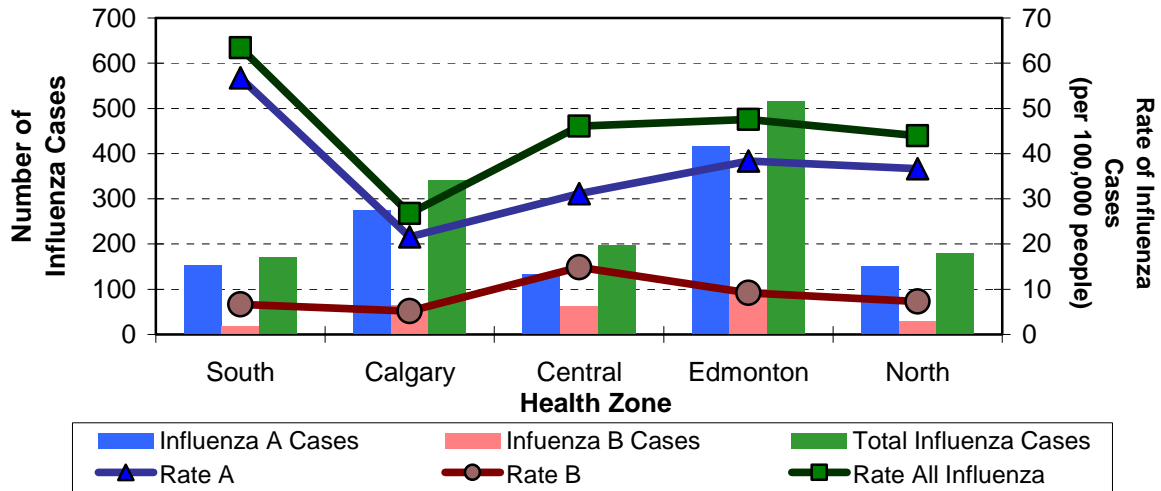
Figure 2: Number of influenza detections among respiratory specimens submitted to ProvLab and per cent of samples positive for influenza, by week (2010/2011 and 2011/2012 seasons) in Alberta.



Source: ProvLab

The highest rates of influenza this year were seen in South Zone, whereas last season North Zone had the highest rate (Figure 3). Similar to the previous season, the 2011/2012 season saw a higher number of cases and a larger rate of influenza overall in Edmonton Zone compared to Calgary Zone. This data is limited by how many people in each health zone are tested for influenza. Edmonton Zone had the highest rate of testing (5 per 1000 people), followed by North Zone (4 per 1000 people), and Central, Calgary and South Zones (3 per 1000 people).

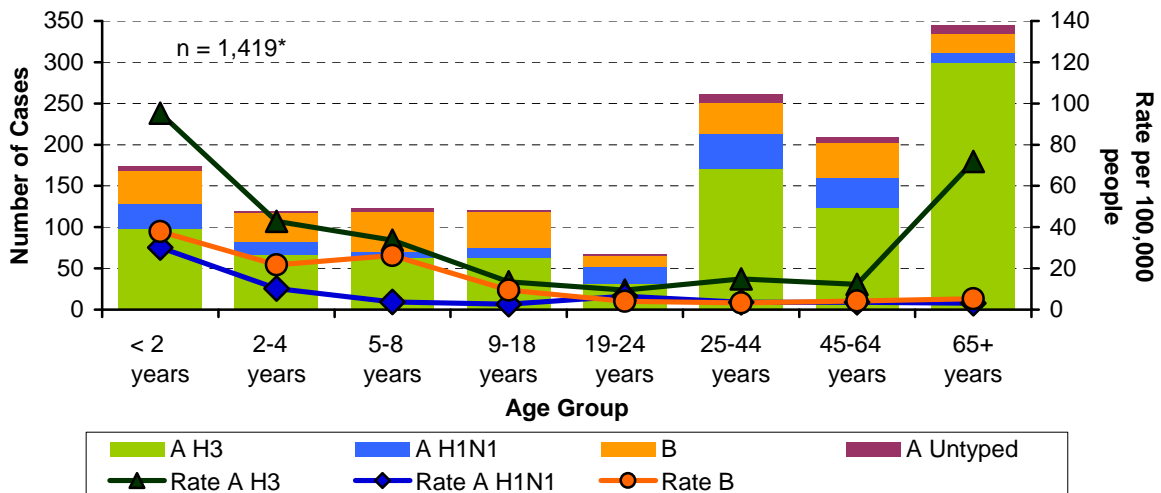
Figure 3: Number and rate of confirmed influenza cases by zone and type in Alberta during the 2011/2012 influenza season.



Source: ProvLab. Population numbers obtained from the Interactive Health Data Application.

The overall rate of influenza infections as confirmed by ProvLab was 37 per 100,000 people in 2011/2012, compared to the 2010/2011 season (41 cases per 100,000 people). Similar to the previous season, 2011/2012 saw the highest rate of influenza in infants (169 cases per 100,000 people compared to 195 per 100,000 in 2010/2011). Seniors had the second highest rate (80 cases per 100,000 people), however last year this age group had the 4th highest rate with less than 50 cases per 100,000 people. Similar to 2010/11, people aged 45 to 64 years had the lowest rate of influenza this season, with 20 cases per 100,000 people, versus 17 cases per 100,000 people in 2010/11. The majority of infections in all age groups were caused by influenza A, unlike the 2010/2011 season where school aged children were more often infected with influenza B (Figure 4).

Figure 4: Cumulative Alberta laboratory confirmed cases and rates of influenza by age group and influenza strain from Week 40, 2011 to Week 26, 2012.



Source: ProvLab, population numbers obtained from IHDA

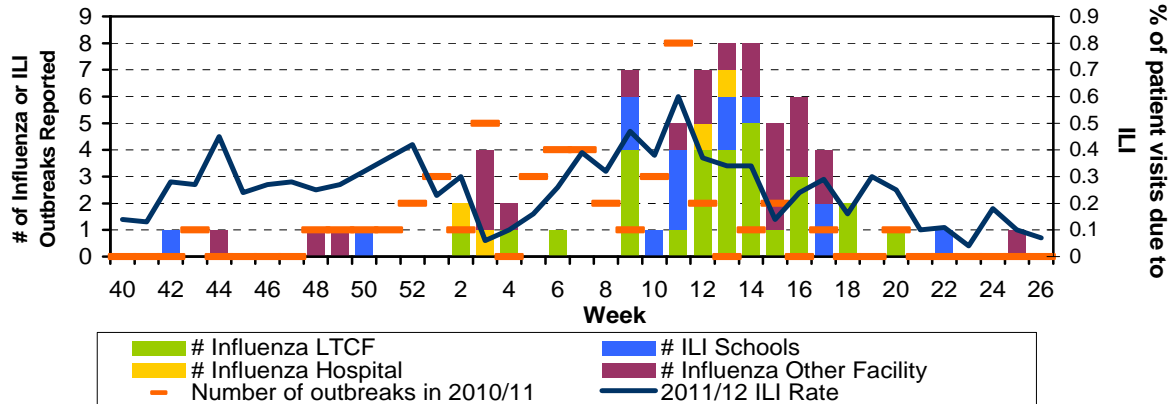
*Total 1,423 confirmed cases. Four cases excluded due to unknown age.

Outbreaks

Alberta Health receives reports of outbreaks caused by respiratory viruses on a weekly basis. While an attempt is made to confirm the viral source of every outbreak, however it is not possible for every situation, especially for outbreaks that occur in schools. A respiratory outbreak is declared if there are two or more cases of ILI within a week in a hospital, long-term care facility (LTCF), or assisted living facility, or if there is more than 10 per cent absenteeism in a school. The numbers reported below are the laboratory confirmed influenza outbreaks in hospitals, LTCF, and other facilities, while the numbers reported for school outbreaks are those where the probable cause is influenza.

A total of 70 influenza outbreaks were reported to Alberta Health this season (Figure 5; Table 1). This is higher than the 48 outbreaks reported in 2010/2011, and slightly higher than the five-year average from 2005 to 2011 of 64 reported outbreaks, excluding the pandemic influenza H1N1 season in 2009/10. The majority of outbreaks (n=23) occurred in LTCFs, which is nearly double the number of LTCF outbreaks 2010/2011 (n=14). However, in this situation it is not unusual given the five-year average number of outbreaks in LTCFs from 2005 to 2011 (excluding 2009/10) was 21.

Figure 5: Number of lab-confirmed influenza outbreaks and school ILI outbreaks reported during the 2011/2012 season compared to the 2010/2011 season, and ILI rate for 2011/2012 in Alberta.



Source: AH outbreak database

Table 1: Number of ILI and influenza outbreaks reported to Alberta Health, by facility type and influenza season.

Season	LTCF	Hospital	School	Other*	Total
2003/04	25	2	29	5	61
2004/05	58	7	13	10	88
2005/06	28	5	46	17	96
2006/07	15	1	52	9	77
2007/08	32	2	16	14	64
2008/09	16	0	11	6	33
2009/10	6	3	983	5	997
2010/11	14	3	20	11	48
2011/12	28	4	14	24	70

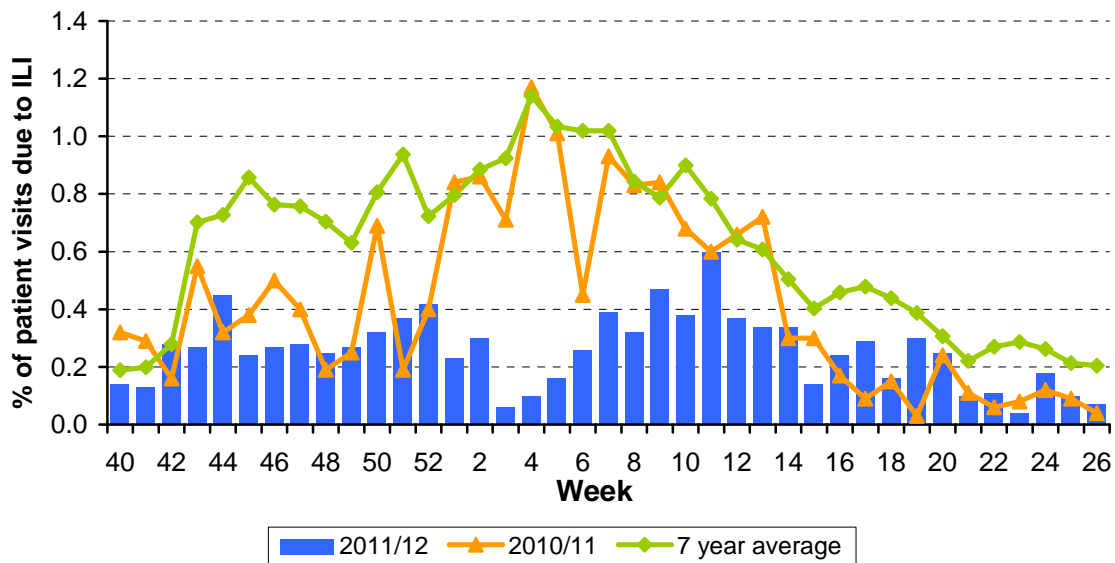
*Other includes supportive living sites, child care facilities, post-secondary institutions, and other facilities not listed above.

Sentinel Surveillance System

The TARRANT system enlists physicians to participate in sentinel influenza surveillance. The number of patients seen with ILI is recorded and swabs are sent for testing. TARRANT defines ILI as a respiratory illness that has an acute onset and symptoms must include a fever, cough, and at least one the following: sore throat, body aches and pains, and/or exhaustion and weakness³. This system is usually the way in which the first influenza infections of the season are detected.

Sentinel physicians had lower percentages of patient visits attributed to ILI in almost every week of the 2011/2012 influenza season compared to the 2010/2011 season (Figure 6). The percentage was also lower than what was calculated as the seven-year average (excluding the pandemic influenza H1N1 season in 2009/2010).

Figure 6: Percentage of sentinel physician patient visits due to ILI per Week compared to the percentage of ILI visitors for past seasons in Alberta.



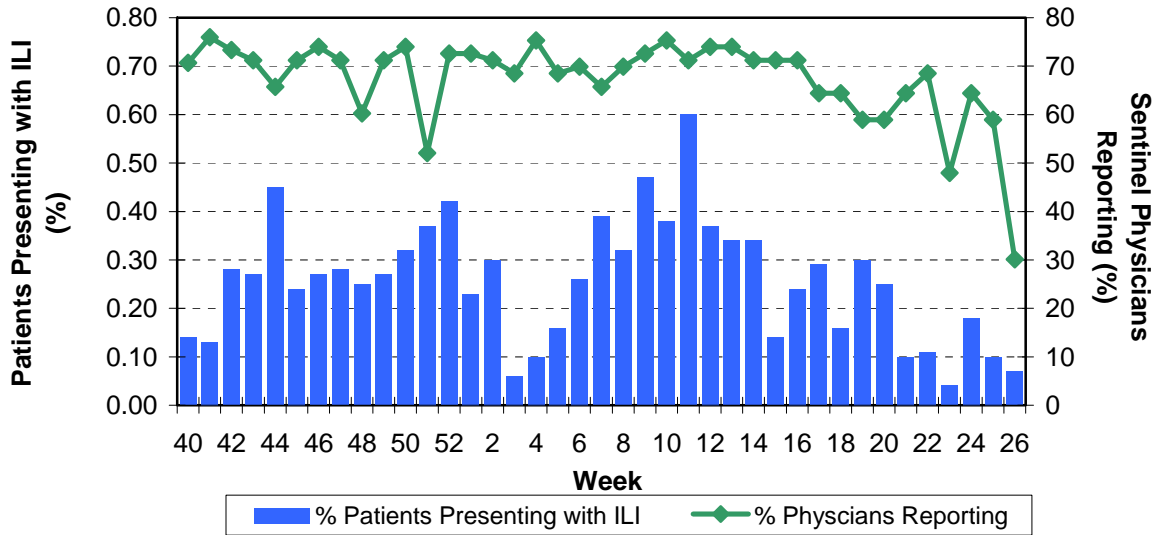
Source: TARRANT

Note: 2007/2008 season excluded due to incomplete data for season; 2009/2010 season excluded due to the pandemic

The percentage of reporting physicians participating in the TARRANT sentinel influenza surveillance was fairly consistent throughout the season, with some reduction in reporting during Weeks 48 and 51, and then again towards the end of the season (Figure 7). However these drops do not appear to greatly impact the rate of ILI detection in the community.

³ Tarrant Viral Watch. (2012). About Us – A Brief History. Accessed online July 18, 2012, from <http://www.tarrantviralwatch.ca/index.php/page/about+us>.

Figure 7: Per cent of sentinel physician patient visits due to ILI compared to per cent of sentinel physicians reporting per week.

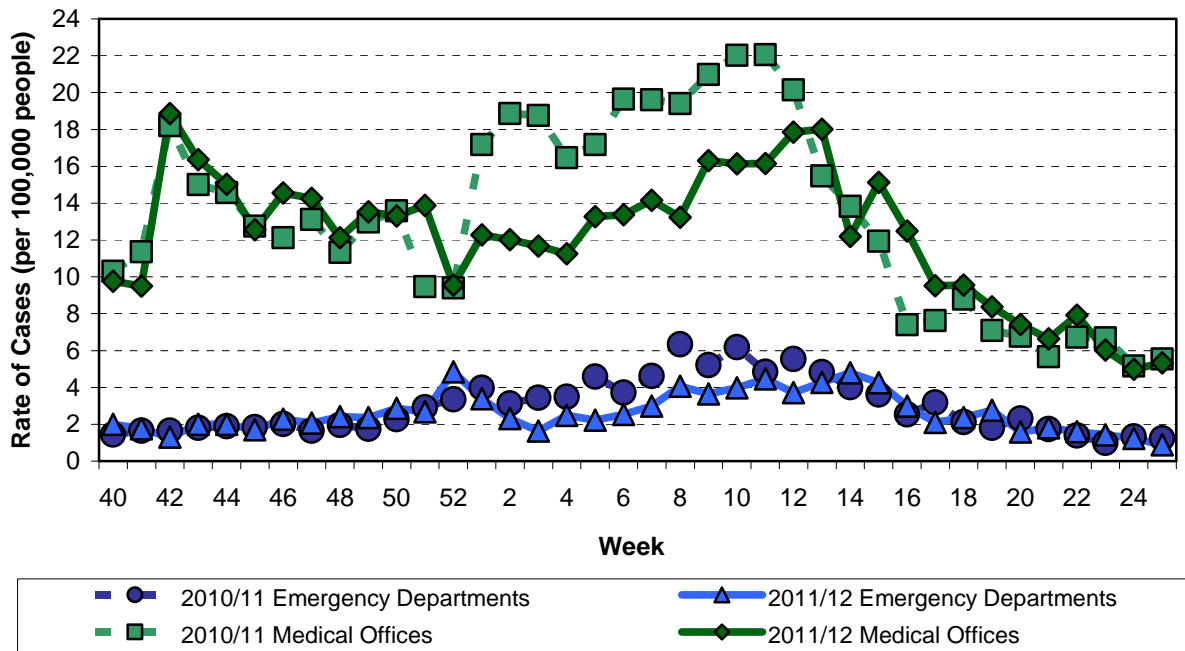


Source: TARRANT

Emergency Department and Physician Office Clinical Influenza

Data from physician claims and ambulatory care were used to identify the number of patients who were clinically diagnosed with influenza at either medical offices or in emergency departments at hospitals. Overall, the rate of people diagnosed with influenza was lower this season compared to 2010/2011. On a weekly basis, the seasons are similar with respect to the rate of diagnosed influenza cases, however the 2011/2012 season shows a lower rate between Weeks 2 and 12 than the 2010/2011 season (Figure 8). From Week 40 to Week 25 (October 2, 2011 to June 23, 2012), there were 3,804 cases diagnosed in emergency departments, compared to 4,287 in 2010/2011. There were 17,713 cases diagnosed in medical offices in 2011/2012, compared to 19,261 in 2010/2011.

Figure 8: Number of visits to emergency departments and medical offices with a diagnosis code for influenza, by influenza season.

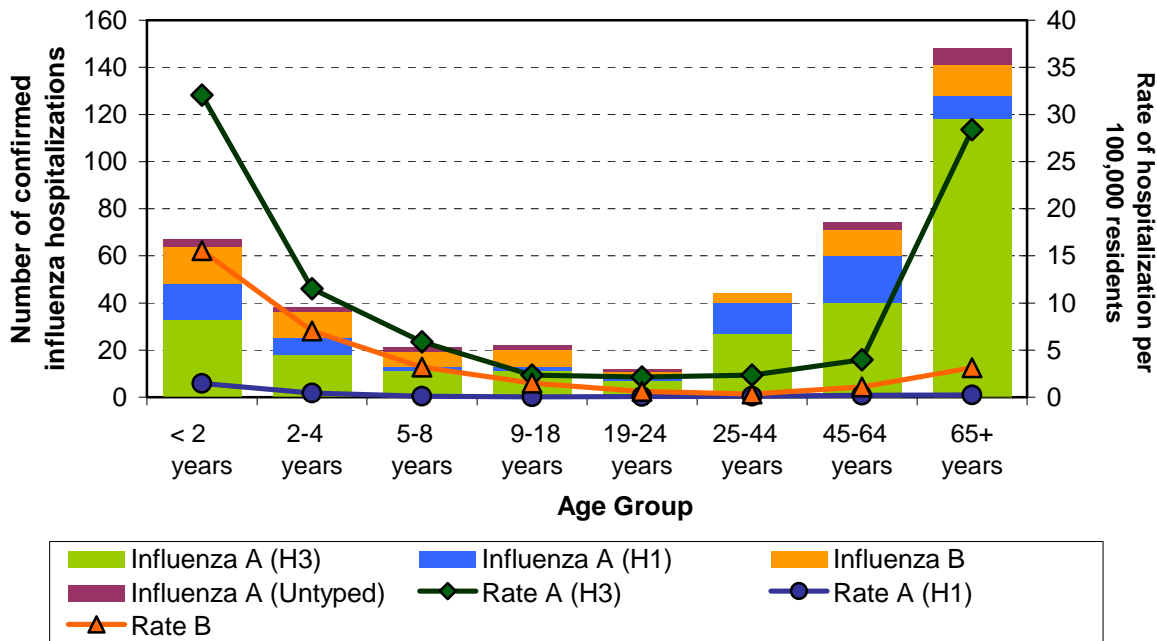


Source: Morbidity and Ambulatory Care Reporting (MCAR) system, Supplemental Enhanced Service Event (SESE) database. Population numbers obtained from IHDA.

Hospitalized Cases

Every year the most severe cases of influenza are seen throughout the province in hospitals. During the 2011/2012 influenza season, there were 428 hospitalized influenza cases reported to Alberta Health, an increase from the 414 cases in 2010/11. Similar to all lab-confirmed cases, infants had the highest rate of hospitalization (65 per 100,000 in 2011/12 versus 86 per 100,000 in 2010/11), followed by seniors aged 65 years and older (36 per 100,000 in 2011/2012 versus 22 per 100,000 people in 2010/11). The rate of hospitalization was lower in all age groups compared to the previous season, except for in those aged 65 years and older. Influenza A contributed to 84 per cent of influenza-related hospitalizations during the 2011/2012 influenza season (Figure 9). During the previous season, however, influenza B was detected more often in hospitalized cases, with 59 per cent of all influenza related hospitalizations diagnosed with influenza A and 41 per cent diagnosed with influenza B.

Figure 9: Influenza hospitalization counts and rates by age group and influenza type, 2011/2012.



Source: Alberta Provincial Hospitalized Influenza and SRI Report form, population numbers obtained from IHD/A

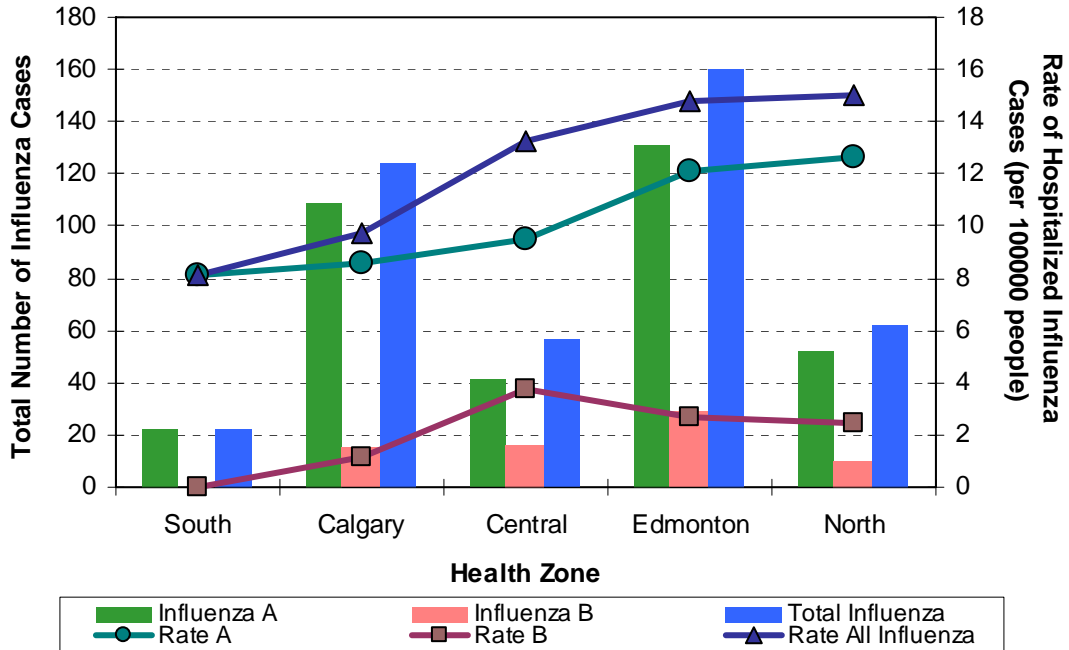
Of the 428 hospitalized influenza cases during the 2011/12 season,

- 11 per cent (48) were admitted to the Intensive Care Unit
- 4 per cent (15) died after being admitted for influenza
- 10 per cent (43) were First Nations
- 40 per cent (172) were treated with antivirals
- 30 per cent (129) had previously been given the seasonal influenza vaccine

Influenza A accounted for the majority of influenza-related hospitalizations in all Health Zones. During the previous season, the majority of hospitalized influenza cases in South Zone were diagnosed with influenza B. During the 2011/12 season South Zone attributed

100 per cent of its hospitalized cases to influenza A. The highest proportion of influenza B hospitalizations occurred in the Central Zone (28 per cent). South Zone had the lowest overall rate of influenza related hospitalizations (8 cases per 100,000 people) while and North Zone had the highest (15 per 100,000 people) (Figure 10).

Figure 10: Influenza hospitalization cases and rates by influenza type and Health Zone.

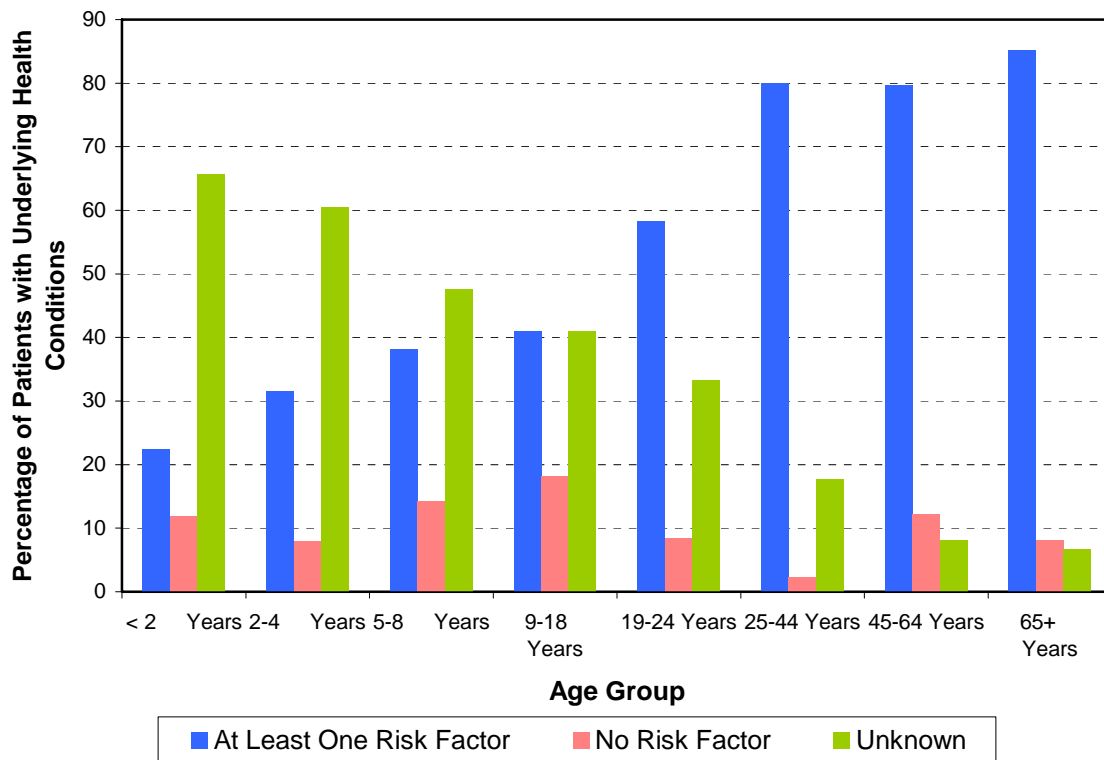


Source: Alberta Provincial Hospitalized Influenza and SRI Report form, population numbers obtained from IHDA

Risk Factors

Influenza patients admitted to hospitals were assessed for underlying conditions. These conditions have the potential to make patients more susceptible to complications and more serious illness resulting from the influenza infection. Of those patients aged 65 years and older, 85 per cent were admitted with at least one known risk factor (Figure 11). Infants were admitted with the lowest proportion of known underlying health conditions (22 per cent). The most prevalent underlying condition in the 65 years and older group was chronic heart disease (Table 2). Diabetes and Chronic obstructive pulmonary disease (COPD) were the second most common underlying conditions. The most prevalent known underlying condition in infants and children was asthma.

Figure 11: Per cent of patients admitted to hospital with underlying health conditions.



Source: Alberta Provincial Hospitalized Influenza and SRI Report form

Table 2: Number of hospitalized influenza cases with known underlying health conditions, by age group.

Age Group	Asthma	Chronic Heart Disease	Chronic Hepatic Disease	Chronic Lung Disease	Chronic Renal Disease	COPD	Anemia	Diabetes	Immune Suppressed	Pregnant	Smoker
< 2 years	6	1	1	2	0	0	5	0	0	0	0
2 – 4 years	9	1	0	1	0	0	2	0	1	0	0
5 – 8 years	5	1	0	0	1	0	2	1	2	0	0
9 – 18 years	4	0	0	1	1	0	2	1	5	0	0
19 – 24 years	2	0	0	1	0	0	1	1	0	1	3
25 – 44 years	4	1	2	4	2	2	4	6	7	14	10
45 – 64 years	12	12	6	5	7	19	2	18	16	0	19
65+ years	20	77	2	13	21	51	15	45	17	0	15

Source: Alberta Provincial Hospitalized Influenza and SRI Report form

Immunization

The 2011/12 seasonal influenza vaccine offered protection against H3N2 (A/Perth/16/2009) and H1N1 (A/California/7/2009) influenza A strains, and influenza B (B/Brisbane/60/08). All of the influenza A isolates (H3N2 and H1N1) from across Canada that were characterized by the National Microbiology Laboratory (NML) were compatible with the 2011/12 vaccine in Alberta. However, over half (52.1 per cent) of the influenza B isolates characterized by NML were influenza B (B/Wisconsin/01/2010) and were not covered by the 2011/12 seasonal vaccine. Overall, the 2011/12 influenza vaccine protected against approximately 65.3 per cent of the isolates detected in Canada this influenza season (Table 3).

Table 3: Number and proportion of influenza isolates from across Canada characterized by the National Microbiology Laboratory (NML), by influenza strain.

Influenza Strain	Isolates characterized	Per cent of isolates
Influenza A H3N2 (A/Perth/16/2009)	252	17.7
Influenza A H1N1 (A/California/7/2009)	221	15.5
Influenza B (B/Brisbane/60/2008)	455	32.0
Influenza B (B/Wisconsin/01/2010) (Not in the 2011/12 influenza vaccine)	494	34.7
Total	1,422	

Source: NML.

In Alberta, seasonal influenza immunization became a universal program in the fall of 2009. In 2011/12, the influenza immunization campaign ran from October to April. The majority of 2011/12 influenza immunizations were administered by AHS (75.5 per cent), followed by pharmacists (13.6 per cent) and physicians (10.9 per cent) (Table 4).

Table 4: Number of people immunized with the 2011/12 seasonal influenza vaccine, by provider.

Provider	Influenza Immunizations	Per cent of total
AHS	502,397	75.5
Pharmacists	90,358	13.6
Physicians	72,487	10.9
Total	665,242	

Source: AHS immunizations from Alberta Health electronic influenza immunization records; Pharmacist immunizations from Alberta Blue Cross claims; Physician immunizations from physician claims.

Note: These numbers do not take into consideration the two doses of vaccine that children aged 6 months to <9 years must receive during their first time being immunized for influenza.

For the second season, influenza immunization data provided by AHS was electronic. The majority of influenza immunization recipients fell under the following reason codes for their immunization: healthy (45.3 per cent), 65 years and older (27.8 per cent), people less than 65 years with an eligible chronic condition (11.0 per cent), or children aged 6-23 months (5.13 per cent) (Table 5).

Table 5. Number of per cent of doses administered by AHS Public Health during the 2011/12 seasonal influenza immunization campaign, by reason code.

Reason Immunized	Number of people immunized	Proportion of people immunized
Healthy Less than 65 Years Old	227,453	45.3%
Greater Than or Equal to 65 Years	139,768	27.8%
Less Than 65 Years With an Eligible Chronic Condition	55,220	11.0%
Children 6-23 months	25,754	5.1%
Children 24-59 months	23,885	4.8%
Health Care Workers	19,945	4.0%
Eligible Pregnant Women	3,657	0.7%
Resident in Long Term Care Facility	3,652	0.7%
Long-Term Care Staff	3,040	0.6%
Non-Provincially Funded	21	0.0%
Household/Close Contact of Immunocompromised/High Risk	2	0.0%
Total	502,397	

Source: Alberta Health Imm/ARI database.

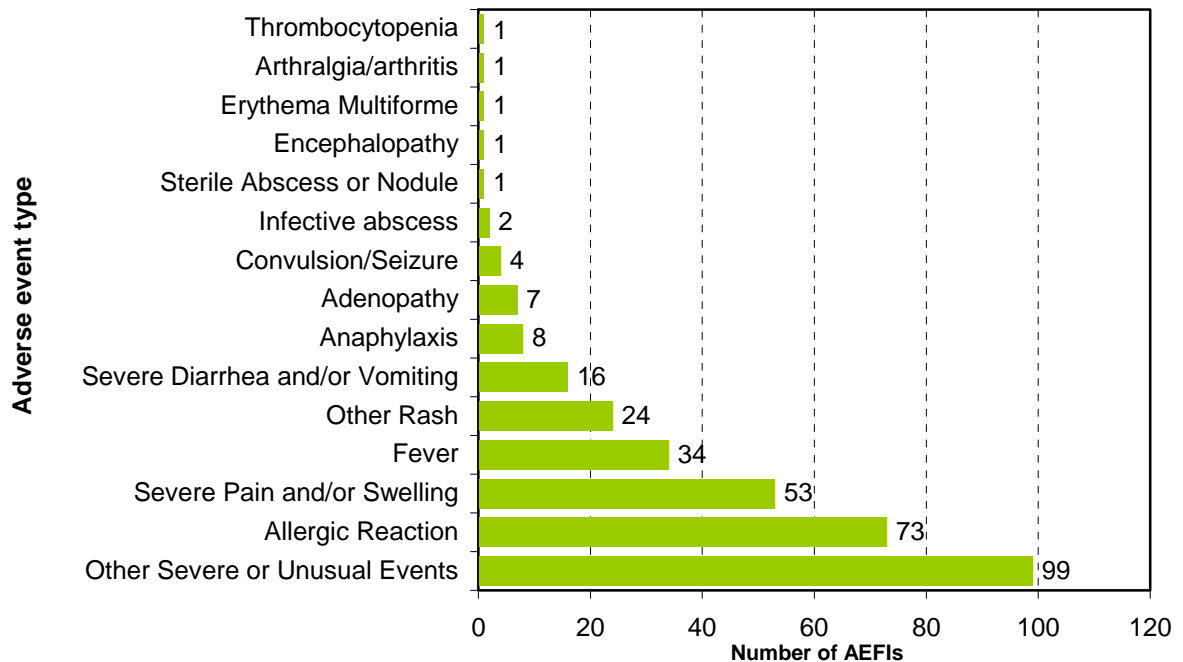
Adverse Events Following Immunization

A key part of immunization surveillance is monitoring the safety of influenza immunizations administered. Reporting and monitoring of adverse events following immunization (AEFIs) are critical to safety surveillance, confirming or refuting results of pre-licensure clinical trials, and providing a process to identify any unusual events. This monitoring is done through tracking AEFIs. An AEFI is defined as a serious or unexpected event temporally associated with immunization.

Common or expected side effects of an immunization are usually mild, predictable and self-limiting; therefore, these events are not reported. It is important to note that while reported events are temporally related to an immunization, they are not necessarily causally linked and this should be considered when interpreting the following information.

During the 2011/12 influenza season, there were 269 people with at least one adverse event following immunization. The most frequently reported types of AEFIs were allergic reactions (73 events), severe pain and/or swelling (53 events), and other severe or unusual events (99 events) (Figure 12). Approximately half of the adverse events categorized as “Other Severe or Unusual Events” had symptoms indicative of Oculorespiratory Syndrome. There were 10 serious adverse events reported - anaphylaxis (8), encephalopathy (1) and thrombocytopenia (1); however, this equated to 0.0015 per cent of people being immunized experiencing a serious adverse event. For every 100,000 people immunized with seasonal influenza vaccine this season, there were approximately 40 AEFIs reported. There were no fatal cases.

Figure 12: Frequency and type of adverse reaction following 2011/12 seasonal influenza immunizations (269 reports with n=325 reactions).



Source: Imm/ARI database

Antiviral Resistance

Results from tests studying viral resistance to existing antiviral drug therapies was very similar to what was found in the previous season. Nearly all (99.9 per cent) influenza strains are resistant to amantadine, whereas all (100 per cent) were susceptible to the neuraminidase inhibitors (zanamivir and oseltamivir) (Table 6).

Table 6: Number of influenza isolates, by strain, exhibiting resistance or susceptibility to antivirals Amantadine, Zanamivir, and Oseltamivir (Canada).

		Amantadine	Zanamivir	Oseltamivir
H1N1	Sensitive	0	256	256
	Resistant	352	0	0
H3N2	Sensitive	1	246	248
	Resistant	425	0	0
B	Sensitive	n/a	929	929
	Resistant	n/a	0	0
All	Sensitive	1	1,431	1,433
	Resistant	777	0	0

Source: National Microbiology Laboratory

Appendix: 2011/2012 Influenza Season Reporting Weeks

Week	Date (Sunday to Saturday)	Week	Date (Sunday to Saturday)
40	October 2 - 8, 2011	14	April 1 - 7, 2012
41	October 9 - 15, 2011	15	April 8 - 14, 2012
42	October 16 - 22, 2011	16	April 15 - 21, 2012
43	October 23 - 29, 2011	17	April 22 - 28, 2012
44	October 30 - November 5, 2011	18	April 29 - May 5, 2012
45	November 6 - 12, 2011	19	May 6 - 12, 2012
46	November 13 - 19, 2011	20	May 13 - 19, 2012
47	November 20 - 26, 2011	21	May 20 - 26, 2012
48	November 27 - December 3, 2011	22	May 27 - June 2, 2012
49	December 4 - 10, 2011	23	June 3 - 9, 2012
50	December 11 - 17, 2011	24	June 10 - 16, 2012
51	December 18 - 24, 2011	25	June 17 - 23, 2012
52	December 25 - 31, 2011	26	June 24 - 30, 2012
1	January 1 - 7, 2012	27	July 1 - 7, 2012
2	January 8 - 14, 2012	28	July 8 - 14, 2012
3	January 15 - 21, 2012	29	July 15 - 21, 2012
4	January 22 - 28, 2012	30	July 22 - 28, 2012
5	January 29 - February 4, 2012	31	July 29 - August 4, 2012
6	February 5 - 11, 2012	32	August 5 - 11, 2012
7	February 12 - 18, 2012	33	August 12 - 18, 2012
8	February 19 - 25, 2012	34	August 19 - 25, 2012
9	February 26 - March 3, 2012	35	August 26 - September 1, 2012
10	March 4 - 10, 2012	36	September 2 - 8, 2012
11	March 11 - 17, 2012	37	September 9 - 15, 2012
12	March 18 - 24, 2012	38	September 16 - 22, 2012
13	March 25 - 31, 2012	39	September 23 - 29, 2012