

Please see our notice to readers on page 2

Ontario Respiratory Pathogen Bulletin | 2015-2016

SURVEILLANCE WEEK 12 (March 20, 2016 – March 26, 2016)

This issue of the Ontario Respiratory Pathogen Bulletin provides information on the surveillance period from March 20 to March 26, 2016 (Week 12). Unless otherwise specified, **data presented in this issue of the bulletin are for Week 12** and data extraction occurred on Wednesday, March 30, 2016.

Assessment of Influenza Activity in Ontario

Measure of activity	Assessment of measure compared to the previous week (Lower, Similar, Higher)	Reasoning behind assessment
Laboratory-confirmed influenza cases ¹	Lower	There were 783 influenza cases (516 influenza A, 267 influenza B) reported in Week 12, which was lower than the 1080 influenza cases reported in Week 11 (766 influenza A, 310 influenza B, 4 influenza A and B).
Percent positivity for influenza ²	Lower	Percent positivity of laboratory tests for all influenza types in Week 12 was 29.1%, which was lower than the percent positivity in Week 11 (32.9%). In Week 12, percent positivity was 19.8% for influenza A and 9.3% for influenza B.
Institutional influenza outbreaks ³	Similar	There were 12 new influenza outbreaks reported in Week 12, which was similar to the number of influenza outbreaks reported in Week 11 (14).
Influenza activity levels reported by public health units	Lower	In Week 12 , 21 public health units reported 'localized' activity, 10 reported 'sporadic' activity, and 5 public health units did not report.
OVERALL ASSESSMENT	Lower	Overall, the indicators show that influenza activity for Week 12 was lower compared to Week 11.
Measures of severity for influenza		
Hospitalizations among laboratory-confirmed cases of influenza ⁴	There were 210 hospitalized cases reported in Week 12; the number of hospitalized cases reported in Week 11 was 230.	
Deaths among laboratory-confirmed cases of influenza ⁴	There were 7 deaths reported in Week 12; there were 11 deaths reported in Week 11.	

Notes:

¹ Based on the date the case was reported to the public health unit.

² Positivity among specimens tested by Ontario laboratories that submit results to the Centre for Immunization and Respiratory Infectious Diseases (CIRID). Due to rounding, percentages presented here may not add up to the overall influenza percent positivity.

³ The number of new outbreaks reported for the current week is based on the date the outbreak was reported to the public health unit; when reported date is unavailable, the date the outbreak was created in iPHIS is used.

⁴ Hospitalization / death data are based on the date reported to the public health unit. These data are likely under-reported and may not be comparable to prior years. Please see note on page 12.

Summary of respiratory pathogen activity for Surveillance Week 12, 2016

1. Circulating respiratory viruses in Ontario

Provincial percent positivity is moderate for influenza A and low for influenza B, at 19.8% and 9.3% respectively in Week 12 (Figures [1](#) and [3](#)). Of the 232 influenza A positive specimens for which subtyping was available, 92.7% (215/232) were (H1N1)pdm09 in week 12; for the season to date, 89.5% (2,887/3,224) were (H1N1)pdm09. Coronavirus was the most common circulating non-influenza respiratory virus, with provincial positivity at 8.6% (Figure [2](#)). Influenza A(H1N1)pdm09 positivity has declined for the second week in a row, suggesting we may be past the peak of influenza A activity, however influenza B positivity continues to increase.

2. Comparison to previous influenza seasons

For the 2015-2016 surveillance season to date, 8,657 laboratory-confirmed influenza cases have been reported. Among these cases, 79.0% (6,835/8,657) were influenza A ([Table 6](#)). Of the 1,892 reported influenza A cases with subtype information available, 9.7% (183/1,892) were H3N2 and 90.3% (1,709/1,892) were (H1N1)pdm09. Influenza A (H1N1)pdm09 has been the dominant influenza type/subtype circulating in the 2015-2016 season to date. Influenza A activity in week 12 continued to decline, but was higher than previous seasons for the same surveillance week.

3. Institutional respiratory outbreaks

Twelve influenza outbreaks were reported in Week 12 ([Figure 6](#)). Three influenza A outbreaks in week 12 had subtype information available, all of which were subtype (H1N1)pdm09. Of 61 influenza A outbreaks with subtyping information available for the season to date, 46 (75.4%) were (H1N1)pdm09 and 15 (24.6%) were H3N2. Influenza was detected in 22.3% (162/727) of institutional respiratory infection outbreaks reported to date in the 2015-2016 season. 26.1% (190/727) of the outbreaks were reported as entero/rhinovirus. Most respiratory infection outbreaks were reported from long-term care homes (455/727 or 62.6% of all reported outbreaks).

4. Severity - Influenza hospitalizations and deaths, and respiratory viruses by setting

In the season to date, 1611 hospitalizations and 51 deaths have been reported among laboratory-confirmed influenza cases. The majority (1373/1611 or 85.2%) of hospitalizations have occurred in influenza A cases. 235 of 1611 hospitalizations (14.6%) occurred in patients with influenza B; three cases with influenza A and B were hospitalized (0.2%). 32.1% (517/1611) of the hospitalizations were in individuals 65 years of age and older. In week 12, 71.8% of hospitalized cases with influenza A were under the age of 65, reflective of the currently circulating H1N1 subtype. The highest hospitalization rate was seen in infants under one year of age followed by children aged 1-4. The highest case fatality rate was seen in adults aged 65 and over.

For week 12 based on PHOL data, influenza A positivity decreased to 16.4% with positive specimens predominantly from individuals in ambulatory, emergency department and hospital ward (i.e., not intensive care unit) settings. Influenza B positivity decreased to 8.6% and positive specimens were predominantly detected from individuals in ambulatory and emergency department settings. Overall, coronavirus and respiratory syncytial virus (RSV) were the most common non-influenza respiratory viruses detected at PHOL. Coronavirus was primarily detected from individuals in institutions and RSV was mostly detected from individuals in hospital and ambulatory settings.

5. By Jurisdiction – Influenza activity

Influenza activity is high across the province, with 21 public health units reporting ‘localized’ activity, and 10 reporting ‘sporadic’ activity. Five public health units did not report for week 12.

6. By Age – Respiratory viruses

For week 12, both influenza A and B were detected predominantly among patients in the 20-64 age group. Overall, coronavirus and respiratory syncytial virus were the most common non-influenza respiratory viruses detected at PHOL. Coronavirus was mostly detected among adults 65 and older and respiratory syncytial virus was most commonly detected among infants <1 year of age. Information on influenza hospitalizations and deaths by age can be found in [Section 4: Severity - Influenza hospitalizations and deaths, and respiratory viruses by setting](#).

7. Strain comparisons – circulating influenza strains and vaccine strains

Through genetic characterization performed at the National Microbiology Laboratory (NML), sequence analysis showed that the 775 influenza A(H1N1) viruses tested nationally were antigenically similar to A/California/7/2009, which is the influenza A/H1N1 component [recommended by the World Health Organization](#) for the 2015-2016 Northern Hemisphere influenza vaccine.

Only 35 influenza A(H3N2) viruses from Canada grew to sufficient titre for antigenic characterization by haemagglutination inhibition assay and were characterized as antigenically similar to the cell-passaged A/Switzerland/9715293/2013, the World Health Organization recommended influenza A(H3N2) component of the 2015-2016 Northern Hemisphere vaccine.

Of the 388 influenza B viruses characterized in Canada, NML reported that 104 were antigenically similar to the recommended influenza B component for the Northern Hemisphere 2015-2016 vaccine, B/Phuket/3073/2013. 284 influenza B viruses were characterized as B/Brisbane/60/2008-like, which is included as an influenza B component of the 2015-2016 quadrivalent vaccine.

8. Antiviral resistance / sensitivity in influenza isolates

All influenza viruses in Canada tested by the National Microbiology Laboratory (NML) for antiviral resistance in the 2015-2016 season were sensitive to zanamivir. Seven influenza A (H1N1)pdm09 viruses tested nationally were resistant to oseltamivir; four of these were from Ontario. Only one of the influenza A viruses tested was sensitive to amantadine. All influenza B viruses in Canada were sensitive to both oseltamivir and zanamivir.

9. Bacterial pathogens

No specimen was positive for *Bordetella pertussis* or *Mycoplasma pneumoniae* during week 12. No specimen tested positive for *Bordetella parapertussis*, *Bordetella holmesii* or *Chlamydia pneumoniae* during this week.

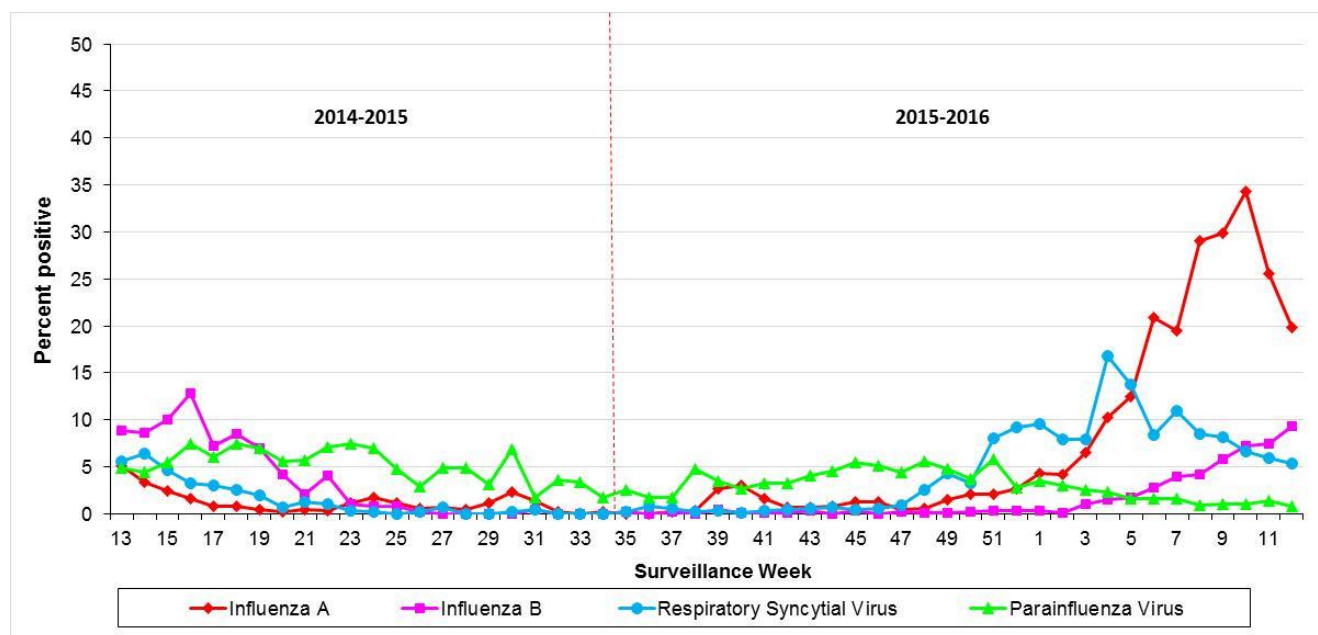
10. Data sources for this report

Provides a list and description of data sources used to prepare this report.

1. Circulating respiratory viruses in Ontario

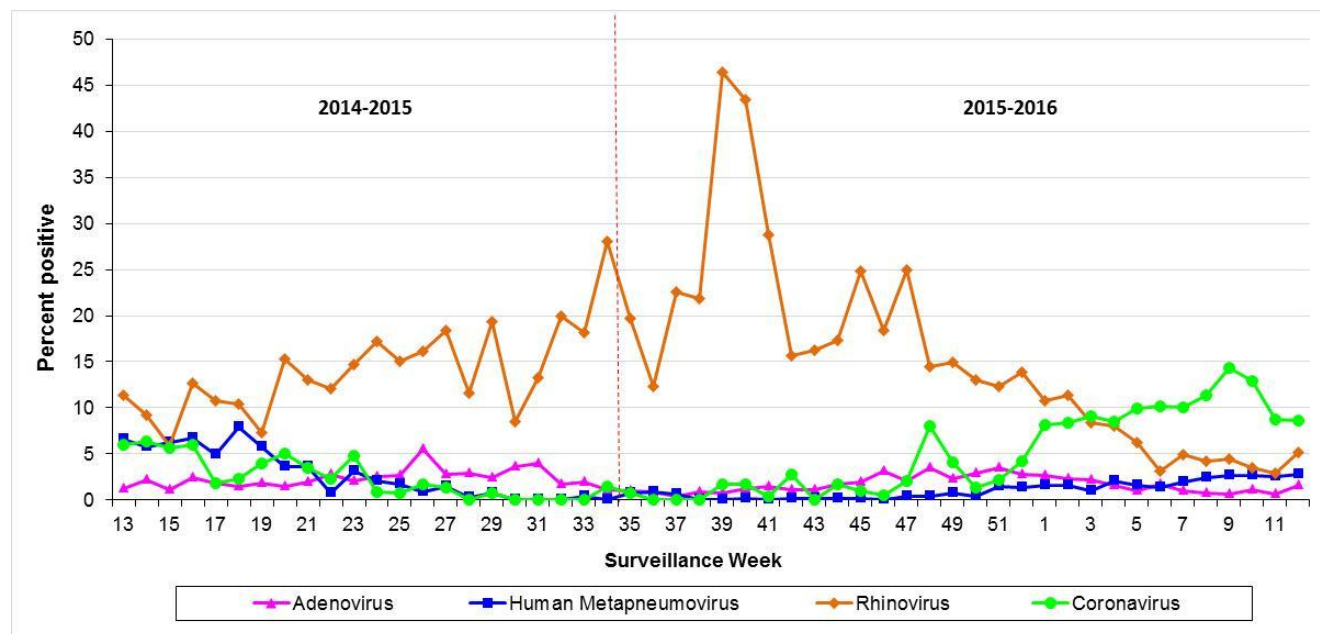
Provincial percent positivity is moderate for influenza A and low for influenza B, at 19.8% and 9.3% respectively in Week 12 (Figures 1 and 3). Of the 232 influenza A positive specimens for which subtyping was available, 92.7% (215/232) were (H1N1)pdm09 in week 12; for the season to date, 89.5% (2,887/3,224) were (H1N1)pdm09. Coronavirus was the most common circulating non-influenza respiratory virus, with provincial positivity at 8.6% (Figure 2). Influenza A(H1N1)pdm09 positivity has declined for the second week in a row, suggesting we may be past the peak of influenza A activity, however influenza B positivity continues to increase.

Figure 1: Percentage of respiratory viral pathogens (influenza A, influenza B, respiratory syncytial virus, and parainfluenza virus) detected among specimens tested by all methods: Ontario, March 29, 2015 to March 26, 2016



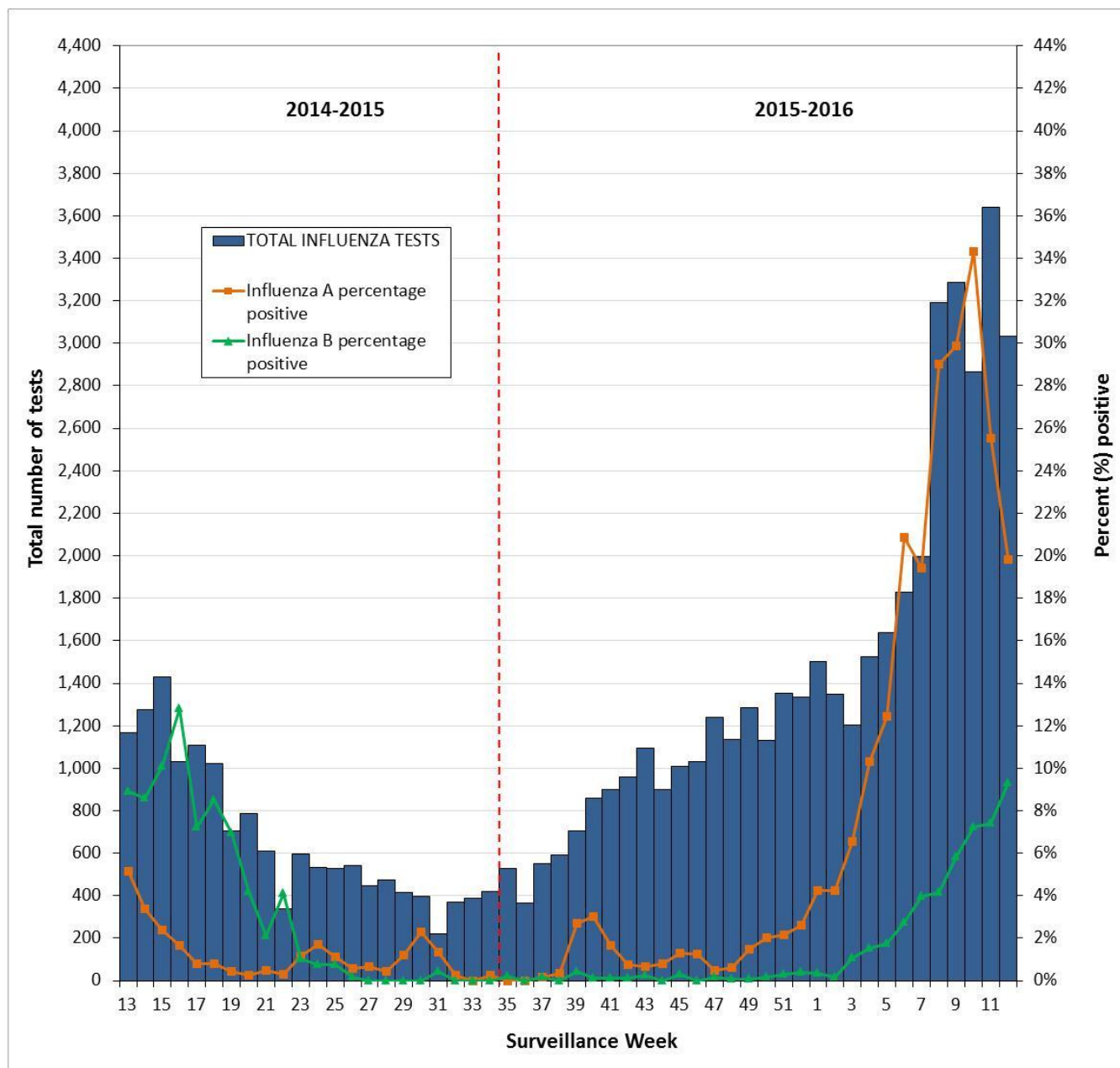
Source: [Centre for Immunization and Respiratory Infectious Diseases \(CIRID\)](#)

Figure 2: Percentage of respiratory viral pathogens (adenovirus, human metapneumovirus, rhinovirus and coronavirus) detected among specimens tested by all methods: Ontario, March 29, 2015 to March 26, 2016



Source: [Centre for Immunization and Respiratory Infectious Diseases \(CIRID\)](#)

Figure 3: Total number of influenza tests performed and percent of positive tests by surveillance week: Ontario, March 29, 2015 to March 26, 2016



Source: [Centre for Immunization and Respiratory Infectious Diseases \(CIRID\)](#)

2. Comparison to previous influenza seasons

For the 2015-2016 surveillance season to date, 8,657 laboratory-confirmed influenza cases have been reported. Among these cases, 79.0% (6,835/8,657) were influenza A ([Table 6](#)). Of the 1,892 reported influenza A cases with subtype information available, 9.7% (183/1,892) were H3N2 and 90.3% (1,709/1,892) were (H1N1)pdm09. Influenza A (H1N1)pdm09 has been the dominant influenza type/subtype circulating in the 2015-2016 season to date. Influenza A activity in week 12 continued to decline, but was higher than previous seasons for the same surveillance week.

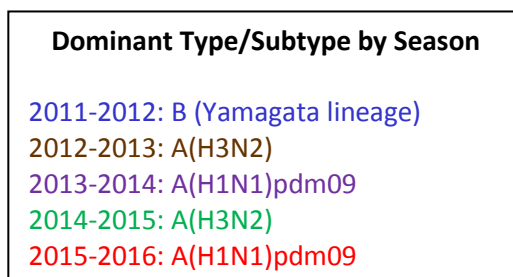
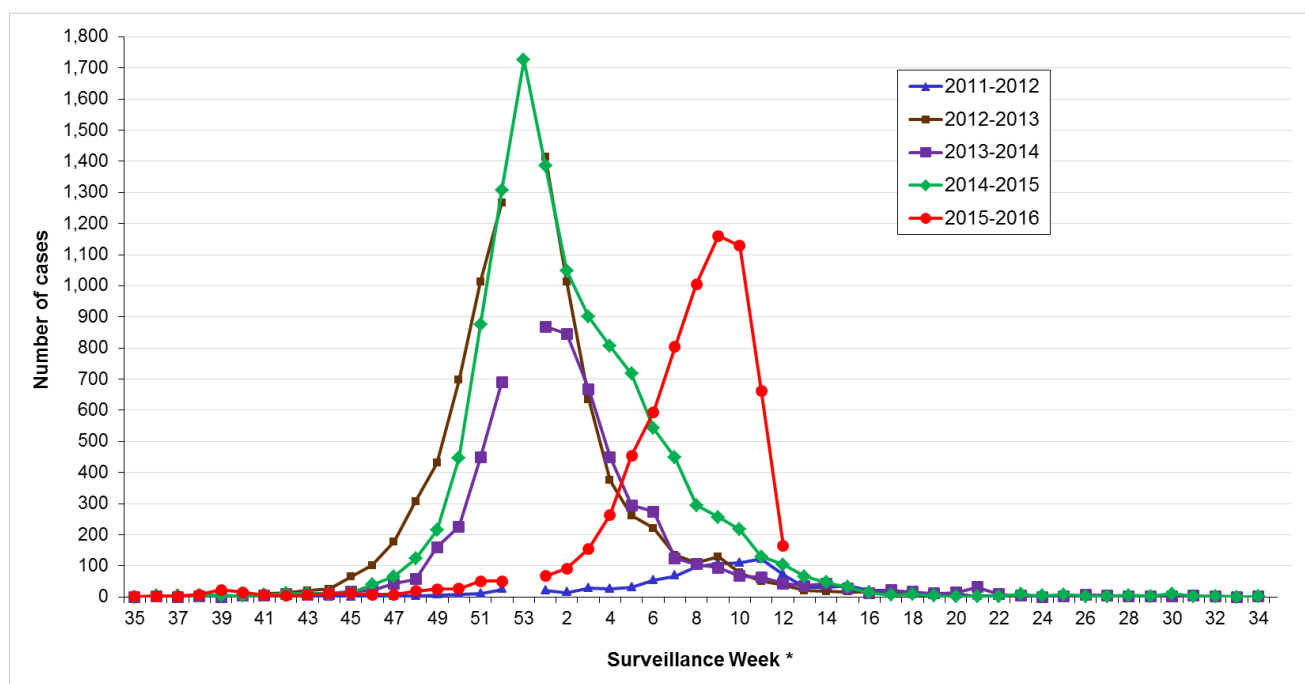


Figure 4: Number of reported confirmed cases of influenza A by surveillance week: Ontario, September 1, 2011 to March 26, 2016

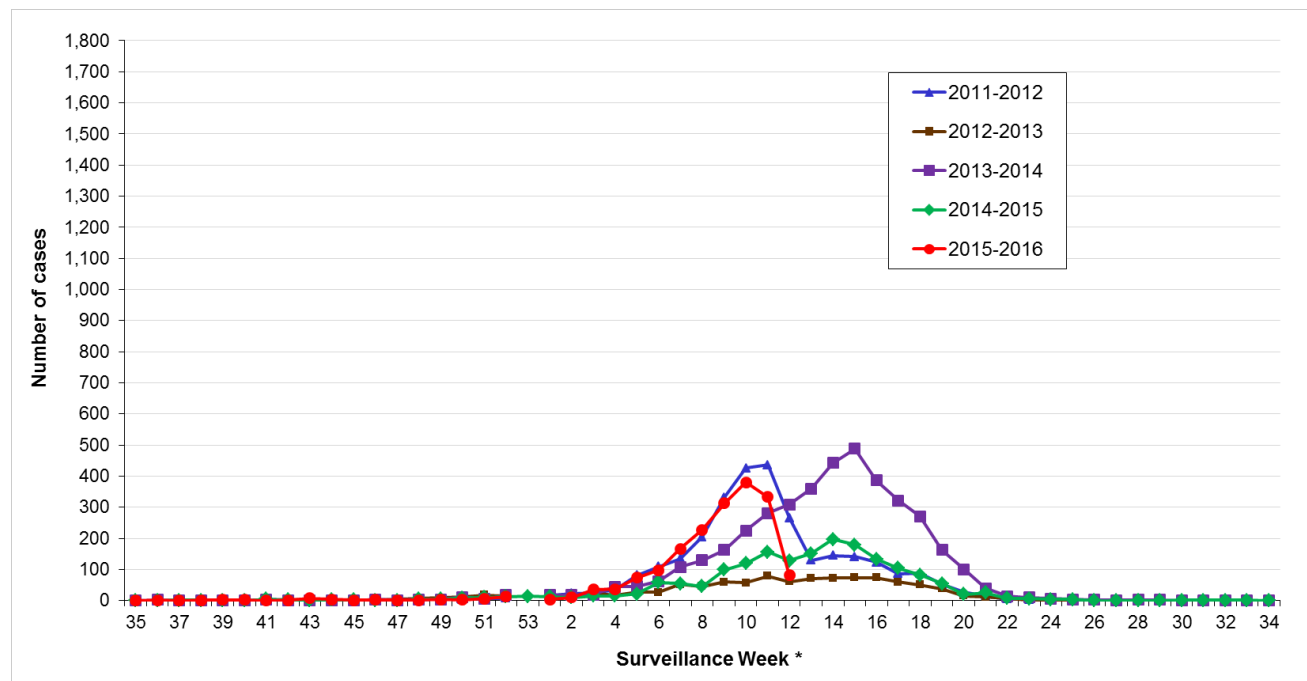


Source: [Integrated Public Health Information System \(iPHIS\)](#)

Notes:

- Interpret most recent case counts for the current season with caution due to reporting lags.
- Unlike the other seasons presented, the 2014-2015 season included a week 53; a week 53 occurs once every five to six years. Week 53 in 2014-2015 corresponded to December 28, 2014 to January 3, 2015.

Figure 5: Number of reported confirmed cases of influenza B by surveillance week: Ontario, September 1, 2011 to March 26, 2016



Source: [Integrated Public Health Information System \(iPHIS\)](#)

Notes:

- Interpret most recent case counts for the current season with caution due to reporting lags.
- Unlike the other seasons presented, the 2014-2015 season included a week 53; a week 53 occurs once every five to six years. Week 53 in 2014-2015 corresponded to December 28, 2014 to January 3, 2015.

3. Institutional respiratory infection outbreaks

Twelve influenza outbreaks were reported in Week 12 ([Figure 6](#)). Three influenza A outbreaks in week 12 had subtype information available, all of which were subtype (H1N1)pdm09. Of 61 influenza A outbreaks with subtyping information available for the season to date, 46 (75.4%) were (H1N1)pdm09 and 15 (24.6%) were H3N2. Influenza was detected in 22.3% (162/727) of institutional respiratory infection outbreaks reported to date in the 2015-2016 season. 26.1% (190/727) of the outbreaks were reported as entero/rhinovirus. Most respiratory infection outbreaks were reported from long-term care homes (455/727 or 62.6% of all reported outbreaks).

Table 1: Institutional respiratory infection outbreaks: Ontario, Week 12 and total for the 2015-2016 season to date¹

Virus reported in outbreak	CURRENT WEEK		CUMULATIVE	
	Number of new outbreaks ²	Percentage of total for current week	Number of cumulative outbreaks	Percentage of cumulative total
Influenza A ³	8	32.0%	118	16.2%
Influenza B ³	4	16.0%	39	5.4%
Both influenza A and B ³	0	0.0%	5	0.7%
Enterovirus/rhinovirus	0	0.0%	190	26.1%
Parainfluenza (all types)	0	0.0%	35	4.8%
Respiratory syncytial virus (RSV)	3	12.0%	49	6.7%
Human metapneumovirus, adenovirus, coronavirus or other viruses	2	8.0%	98	13.5%
Two or more non-influenza viruses ³	0	0.0%	60	8.3%
No organism reported	8	32.0%	133	18.3%
TOTAL	25	100.0%	727	100.0%

Source: [Integrated Public Health Information System \(iPHIS\)](#)

Notes:

¹ Season to date includes all outbreaks in which the date the outbreak was reported to the public health unit (or if unavailable, the date the outbreak was created in iPHIS) occurred between September 1, 2015 (Week 35, 2015) and the current reporting week, as well as outbreaks in which the reported date is missing but the outbreaks were entered into iPHIS during the current season.

² New outbreaks are defined as those in which the date the outbreak was reported to the public health unit was in the current surveillance period, i.e. March 20, 2016 – March 26, 2016 (Week 12), and was recorded in iPHIS.

³ Any outbreak where influenza was identified is reported under the appropriate influenza category ("Influenza A", "Influenza B", or "Both influenza A and B") regardless of what other virus was also identified in the outbreak.

Table 2: Institutional respiratory infection outbreaks by setting type: Ontario, total for the 2015-2016 season to date¹

Setting type reported	Number of influenza outbreaks (% of total)	Number of other respiratory viruses (% of total)
Long-Term Care Home	91 (56.2%)	364 (64.4%)
Hospital	30 (18.5%)	19 (3.4%)
Retirement Home	19 (11.7%)	90 (15.9%)
Other ²	7 (4.3%)	1 (0.2%)
Unknown	15 (9.3%)	91 (16.1%)
TOTAL	162 (100.0%)	565 (100.0%)

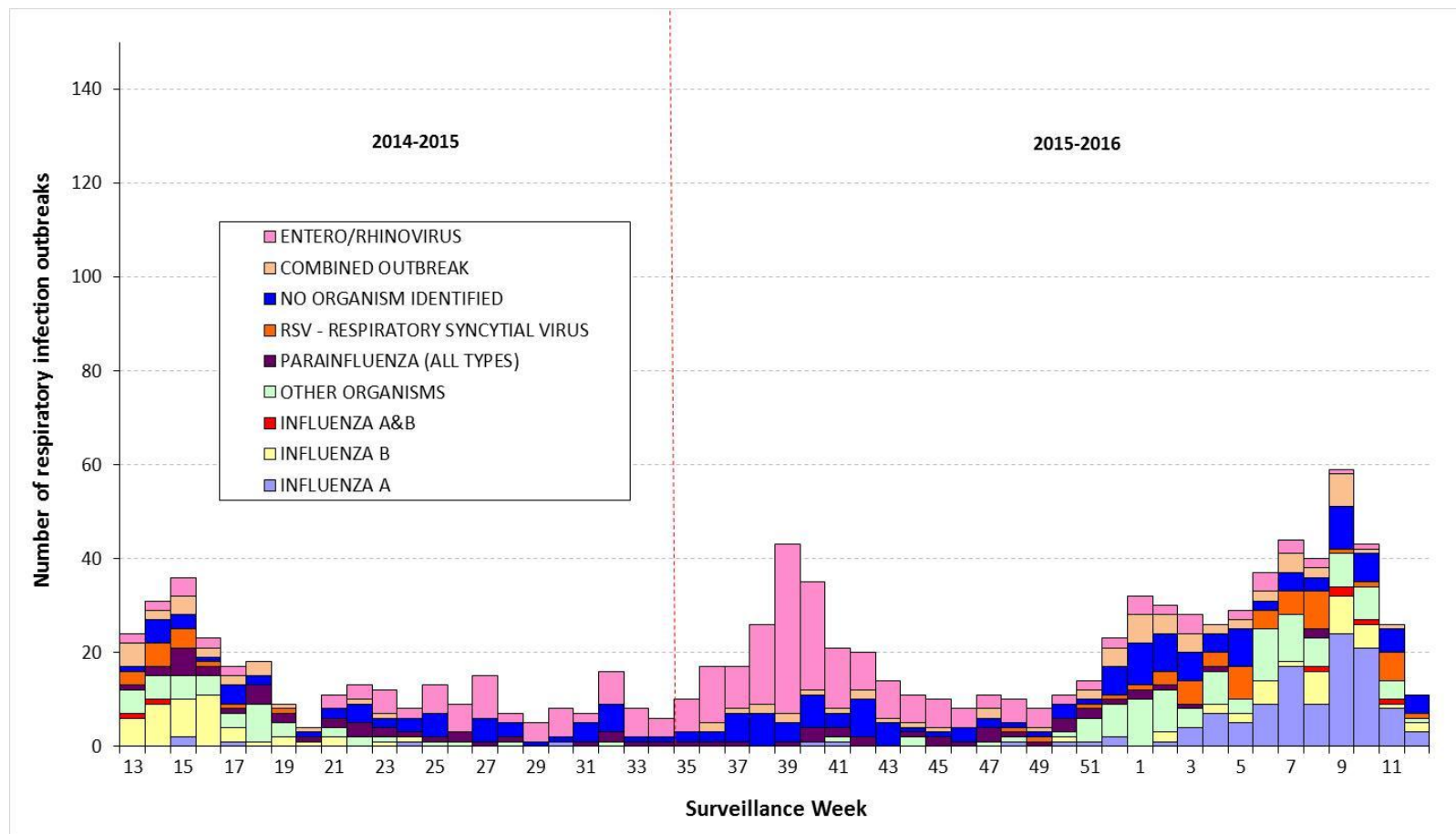
Source: [Integrated Public Health Information System \(iPHIS\)](#)

Notes:

¹ Season to date includes all outbreaks in which the date the outbreak was reported to the public health unit (or if unavailable, the date the outbreak was created in iPHIS) occurred between September 1, 2015 (Week 35, 2015) and the current reporting week, as well as outbreaks in which the reported date is missing but the outbreaks were entered into iPHIS during the current season.

² Other types of institutions include: correctional facilities, group homes, shelters, and facilities operating under the *Developmental Services Act*. Note that school-based and child care centre respiratory outbreaks are not captured in this table.

Figure 6: Institutional respiratory infection outbreaks by week of illness onset in the first case: Ontario, March 29, 2015 to March 26, 2016



Source: [Integrated Public Health Information System \(iPHIS\)](#)

Notes:

- Interpret most recent outbreak counts for the current season with caution due to reporting lags.
- Institutional respiratory infection outbreaks for which the date of onset of illness for the first case is missing are excluded in this figure. However, these outbreaks are counted in the cumulative outbreaks section of Table 1.
- Any outbreak where influenza was identified is reported under the appropriate influenza category ("Influenza A", "Influenza B", or "Both influenza A & B") regardless of what other virus is also identified in the outbreak.

Severity – Influenza hospitalizations and deaths, and respiratory viruses by setting

In the season to date, 1611 hospitalizations and 51 deaths have been reported among laboratory-confirmed influenza cases. The majority (1373/1611 or 85.2%) of hospitalizations have occurred in influenza A cases. 235 of 1611 hospitalizations (14.6%) occurred in patients with influenza B; three cases with influenza A and B were hospitalized (0.2%). 32.1% (517/1611) of the hospitalizations were in individuals 65 years of age and older. In week 12, 71.8% of hospitalized cases with influenza A were under the age of 65, reflective of the currently circulating H1N1 subtype. The highest hospitalization rate was seen in infants under one year of age followed by children aged 1-4. The highest case fatality rate was seen in adults aged 65 and over.

For week 12 based on PHOL data, influenza A positivity decreased to 16.4% with positive specimens predominantly from individuals in ambulatory, emergency department and hospital ward (i.e., not intensive care unit) settings. Influenza B positivity decreased to 8.6% and positive specimens were predominantly detected from individuals in ambulatory and emergency department settings. Overall, coronavirus and respiratory syncytial virus (RSV) were the most common non-influenza respiratory viruses detected at PHOL. Coronavirus was primarily detected from individuals in institutions and RSV was mostly detected from individuals in hospital and ambulatory settings.

Table 3: Hospitalizations and deaths among confirmed influenza cases by age group: Ontario, Week 12 and cumulative for the 2015-2016 influenza season

Age Group	HOSPITALIZATIONS		DEATHS	
	Weekly Count	Cumulative count (rate per 100,000)	Weekly count	Cumulative count (rate per 100,000)
<1	13	111 (78.2)	0	1 (0.7)
1 – 4	39	281 (49.2)	0	0 (0.0)
5 – 14	21	152 (10.3)	1	1 (0.1)
15 – 24	4	37 (2.0)	0	4 (0.2)
25 – 44	24	157 (4.3)	0	0 (0.0)
45 – 64	48	356 (9.2)	2	12 (0.3)
65+	61	517 (24.2)	4	33 (1.5)
Total	210	1611 (11.8)	7	51 (0.4)

Source: [Integrated Public Health Information System \(iPHIS\)](#) and [IntelliHEALTH Ontario](#)

Notes:

- Reported deaths in any laboratory-confirmed influenza case are included; the contribution of influenza to the death is not able to be determined.
- The numbers of hospitalizations and deaths provided in iPHIS need to be interpreted with caution due to delays between the onset of illness, hospital admission or death, and when this information is reported to public health. During periods of increased influenza activity, there may be additional delays in the reporting of hospitalizations and deaths beyond the expected reporting time lag.
- The numbers of hospitalizations and deaths reported in iPHIS are likely an underestimation of the true experience in the Ontario population for many reasons, including underreporting because influenza is not suspected as the source of infection so testing is not done. In addition, public health units were advised in December 2014 and August 2015 that only 20% of laboratory confirmed cases require follow-up, as opposed to all cases. As a result, there will likely be more under-reporting of hospitalizations and deaths in the 2014-2015 and 2015-2016 seasons than in previous seasons so comparisons to prior years should be done with caution.

Table 4: Number and percentage of specimens (in brackets)¹ with respiratory pathogens detected by patient setting, week 12 and cumulative for the 2015-2016 season to date

Respiratory Pathogen Detected	Patient setting when tested									
	Intensive Care Unit (ICU) Number (% positive) ¹		Hospital (Non-ICU) Number (% positive) ¹		Emergency Number (% positive) ¹		Ambulatory/No setting Number (% positive) ¹		Institution ² Number (% positive) ¹	
	Current	Cumulative	Current	Cumulative	Current	Cumulative	Current	Cumulative	Current	Cumulative
Influenza A (all) ³	11 (17)	174 (10)	51 (18)	688 (9)	53 (18)	1236 (15)	55 (15)	1444 (14)	9 (11)	130 (7)
Influenza A (H3N2) ⁴	0	3	4	34	3	57	2	79	0	12
Influenza A (H1N1)pdm09 ⁴	5	137	13	284	1	361	14	639	5	70
Influenza B	2 (3)	15 (1)	9 (3)	161 (2)	30 (10)	351 (4)	45 (12)	521 (5)	8 (10)	62 (3)
Adenovirus	0 (0)	20 (1)	0 (0)	77 (1)	5 (2)	152 (2)	7 (2)	183 (2)	0 (0)	3 (0)
Coronavirus	1 (3)	48 (3)	0 (0)	20 (5)	0 (0)	12 (7)	3 (9)	76 (5)	6 (24)	164 (16)
Enterovirus/rhinovirus	0 (0)	164 (10)	0 (0)	50 (7)	0 (0)	33 (6)	0 (0)	246 (11)	2 (8)	311 (30)
Human metapneumovirus	2 (5)	34 (2)	4 (2)	72 (1)	7 (2)	77 (1)	8 (3)	132 (1)	5 (13)	70 (5)
Parainfluenza(all types)	0 (0)	70 (4)	0 (0)	130 (2)	2 (1)	187 (2)	3 (1)	235 (2)	0 (0)	84 (6)
Respiratory syncytial virus	3 (8)	70 (4)	17 (10)	424 (6)	10 (3)	476 (6)	14 (4)	462 (5)	10 (26)	94 (7)
Total positives⁵	19 (29)	595 (33)	81 (28)	1,622 (21)	107 (36)	2,524 (31)	135 (37)	3,299 (31)	40 (51)	918 (52)

Source: [Public Health Ontario Laboratory \(PHOL\)](#)

Notes:

¹ The percentages in this table are calculated as number of specimens with the respiratory pathogen detected divided by total number of specimens tested for that particular pathogen within the patient setting. For example, if 40 respiratory specimens were tested for influenza B from patients in intensive care unit (ICU) settings and 4 tested positive, the cell for influenza B in the ICU setting would indicate “4 (10%)”.

² Institution includes retirement homes, correctional facilities, and undefined institutions.

³ The “Influenza A (all)” row includes the numbers in the “Influenza A(H3N2)” and “Influenza A (H1N1)pdm09” rows as well as Influenza A positives that were not subtyped.

⁴ Percent positivity is not calculated for Influenza A(H3N2) and Influenza A(H1N1)pdm09 because subtyping is only done on select influenza A samples, precluding an accurate calculation.

⁵ When calculating the “Total Positives”, the “Influenza A(H3N2)” and “Influenza A(H1N1)pdm09” rows are not counted as these numbers are already included in the “Influenza A (all)” row.

4. By Jurisdiction – Influenza activity

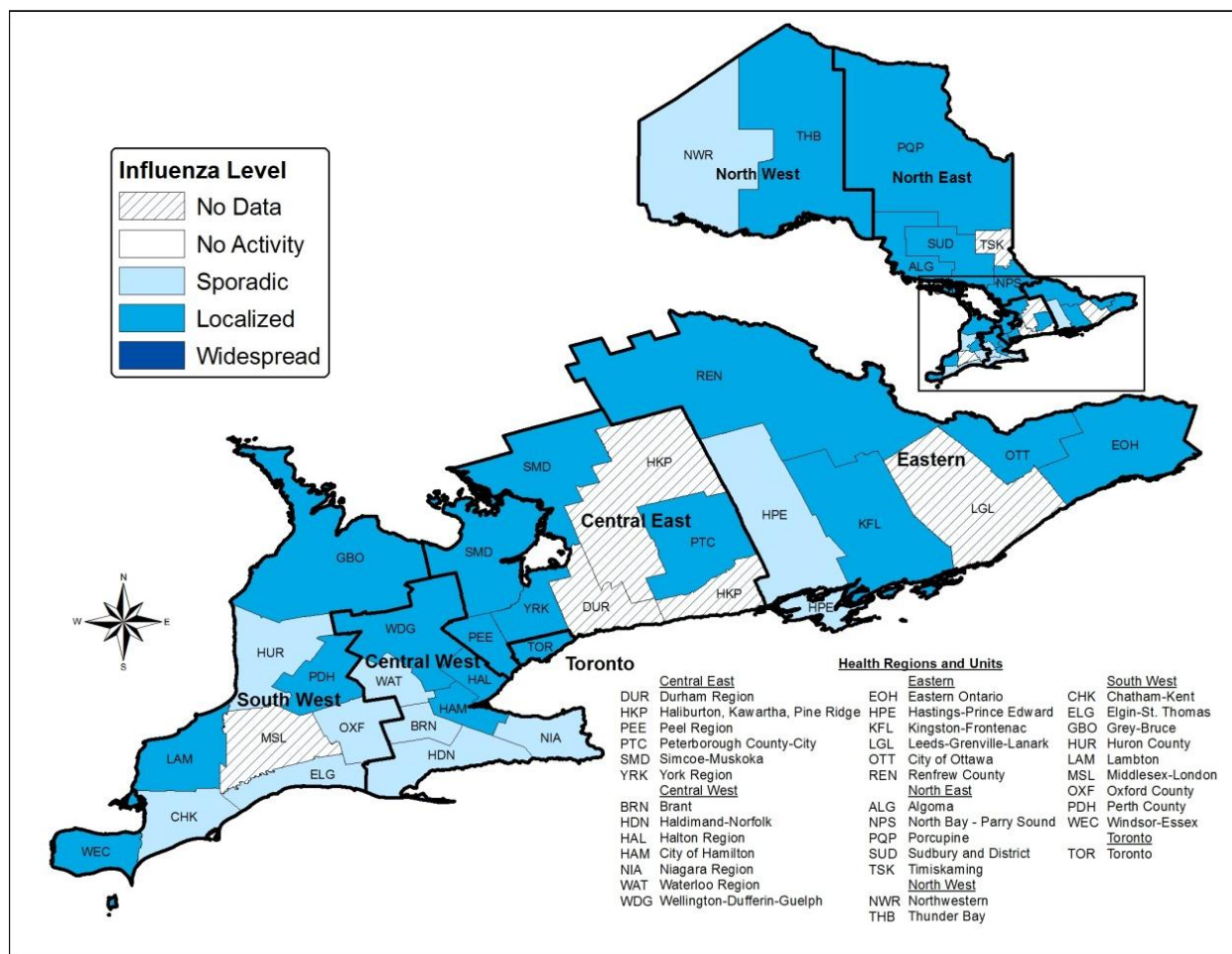
Influenza activity is high across the province, with 21 public health units reporting ‘localized’ activity, and 10 reporting ‘sporadic’ activity. Five public health units did not report for week 12.

Notes:

Tables 5 and 6 below present information by public health unit.

- [Table 5](#) is information from Public Health Ontario Laboratories (PHOL). It allows for the calculation of percent positivity because PHOL tests the samples and knows the numbers of positive and negative results. Percent positivity for public health units that had less than 40 respiratory specimens tested may not be reliable due to small numbers.
- [Table 6](#) is information the Integrated Public Health Information System (iPHIS) based on positive influenza cases reported to the public health unit. These tests are done by multiple laboratories and because negative results are not reported to the public health unit, the percent positivity cannot be calculated.

Figure 7: Influenza activity levels reported by public health units: Ontario, March 20, 2016 to March 26, 2016 (Week 12)



Source: [Public Health Ontario from public health units](#)

Table 5: Specimens submitted to Public Health Ontario Laboratories for influenza testing and positive results by public health unit; number for week 12 and cumulative total for the 2015-2016 season to date (in brackets)

Public Health Unit and Region	Number of specimens submitted	Number of specimens tested	Influenza A				Influenza B	
			Number of influenza A positive specimens	H3N2	A(H1N1) pdm09	% positivity influenza A	Number of influenza B positive specimens	% positivity influenza B
Northwestern	22 (419)	8 (395)	3 (46)	0 (0)	1 (10)	38 (12)	0 (3)	0 (1)
Thunder Bay District	54 (544)	19 (492)	7 (78)	1 (1)	2 (27)	37 (16)	1 (6)	5 (1)
TOTAL NORTH WEST	76 (963)	27 (887)	10 (124)	1 (1)	3 (37)	37 (14)	1 (9)	4 (1)
Algoma	12 (410)	6 (400)	3 (56)	0 (0)	2 (26)	50 (14)	0 (29)	0 (7)
North Bay Parry Sound District	44 (698)	32 (682)	6 (63)	0 (1)	0 (26)	19 (9)	1 (8)	3 (1)
Porcupine	27 (340)	17 (320)	6 (44)	0 (0)	1 (16)	35 (14)	2 (2)	12 (1)
Sudbury & District	51 (563)	40 (548)	10 (83)	0 (1)	1 (31)	25 (15)	6 (31)	15 (6)
Timiskaming	7 (108)	4 (105)	0 (20)	0 (1)	0 (3)	0 (19)	0 (1)	0 (1)
TOTAL NORTH EAST	141 (2,119)	99 (2,055)	25 (266)	0 (3)	4 (102)	25 (13)	9 (71)	9 (3)
City of Ottawa	17 (340)	13 (321)	2 (51)	2 (6)	0 (27)	15 (16)	1 (8)	8 (2)
Eastern Ontario	25 (382)	20 (374)	3 (63)	0 (2)	0 (18)	15 (17)	1 (3)	5 (1)
Hastings & Prince Edward Counties	14 (362)	13 (352)	0 (39)	0 (0)	0 (22)	0 (11)	0 (6)	0 (2)
Kingston, Frontenac, Lennox & Addington	49 (833)	34 (809)	6 (106)	0 (2)	0 (22)	18 (13)	1 (9)	3 (1)
Leeds, Grenville And Lanark District	11 (162)	6 (154)	2 (26)	0 (2)	1 (16)	33 (17)	0 (0)	0 (0)
Renfrew County And District	7 (105)	6 (99)	0 (11)	0 (2)	0 (3)	0 (11)	0 (2)	0 (2)
TOTAL EASTERN	123 (2,184)	92 (2,109)	13 (296)	2 (14)	1 (108)	14 (14)	3 (28)	3 (1)
Durham Region	82 (1,754)	59 (1,675)	9 (200)	0 (14)	3 (69)	15 (12)	4 (79)	7 (5)
Haliburton, Kawartha, Pine Ridge	25 (697)	17 (674)	4 (78)	0 (2)	0 (37)	24 (12)	2 (16)	12 (2)
Peel Region	48 (2,333)	43 (2,283)	12 (282)	1 (25)	1 (107)	28 (12)	5 (119)	12 (5)
Peterborough County-City	36 (450)	17 (427)	2 (49)	0 (1)	1 (16)	12 (11)	1 (17)	6 (4)
Simcoe Muskoka District	166 (3,138)	142 (3,077)	22 (420)	0 (23)	4 (105)	15 (14)	7 (77)	5 (3)
York Region	89 (2,257)	77 (2,208)	10 (276)	0 (16)	5 (114)	13 (13)	7 (90)	9 (4)
TOTAL CENTRAL EAST	446 (10,629)	355 (10,344)	59 (1305)	1 (81)	14 (448)	17 (0)	26 (398)	7 (4)
Toronto	197 (6,365)	166 (6,186)	15 (488)	0 (42)	7 (219)	9 (8)	12 (163)	7 (3)
TOTAL TORONTO	197 (6,365)	166 (6,186)	15 (488)	0 (42)	7 (219)	9 (8)	12 (163)	7 (3)
Chatham-Kent	11 (222)	11 (218)	3 (21)	0 (0)	1 (9)	27 (10)	1 (8)	9 (4)
Elgin-St. Thomas	10 (218)	6 (213)	0 (35)	0 (3)	0 (19)	0 (16)	1 (9)	17 (4)
Grey Bruce	46 (727)	36 (710)	4 (118)	0 (2)	0 (58)	11 (17)	1 (43)	3 (6)
Huron County	15 (117)	13 (115)	3 (14)	0 (1)	0 (4)	0 (12)	2 (4)	0 (3)
Lambton County	15 (294)	10 (289)	2 (39)	0 (0)	0 (19)	20 (13)	0 (11)	0 (4)
Middlesex-London	12 (454)	10 (446)	0 (103)	0 (4)	0 (70)	0 (23)	2 (42)	20 (10)
Oxford County	7 (208)	6 (205)	0 (40)	0 (0)	0 (16)	0 (20)	1 (15)	0 (7)
Perth District	21 (258)	17 (252)	3 (28)	0 (1)	1 (9)	18 (11)	2 (10)	12 (4)
Windsor-Essex County	46 (755)	37 (739)	6 (66)	1 (4)	1 (31)	16 (9)	10 (73)	27 (10)

Public Health Unit and Region	Number of specimens submitted	Number of specimens tested	Influenza A				Influenza B	
			Number of influenza A positive specimens	H3N2	A(H1N1) pdm09	% positivity influenza A	Number of influenza B positive specimens	% positivity influenza B
TOTAL SOUTH WEST	183 (3,253)	146 (3,187)	21 (464)	1 (15)	3 (235)	14 (15)	20 (215)	14 (7)
Brant County	33 (636)	23 (616)	5 (90)	0 (1)	1 (43)	22 (15)	1 (17)	4 (3)
City Of Hamilton	35 (492)	27 (468)	5 (62)	1 (1)	0 (19)	19 (13)	6 (36)	22 (8)
Haldimand-Norfolk	28 (313)	16 (292)	1 (44)	0 (1)	0 (23)	6 (15)	0 (9)	0 (3)
Halton Region	79 (1,135)	53 (1,082)	10 (163)	2 (8)	3 (68)	19 (15)	11 (62)	21 (6)
Niagara Region	23 (866)	21 (832)	2 (77)	0 (2)	0 (47)	10 (9)	2 (25)	10 (3)
Waterloo Region	40 (939)	28 (910)	8 (157)	1 (13)	2 (75)	29 (17)	0 (48)	0 (5)
Wellington-Dufferin-Guelph	41 (874)	33 (855)	3 (119)	0 (3)	0 (63)	9 (14)	3 (27)	9 (3)
TOTAL CENTRAL WEST	279 (5,255)	201 (5,055)	34 (712)	4 (29)	6 (338)	17 (14)	23 (224)	11 (4)
OUT OF PROVINCE	8 (146)	6 (141)	2 (17)	0 (0)	0 (4)	33 (12)	0 (2)	0 (1)
TOTAL ONTARIO	1,453 (30,914)	1,092 (29,964)	179 (3,672)	9 (185)	38 (1,491)	16 (12)	94 (1,110)	9 (4)

Source: [Public Health Ontario Laboratory \(PHOL\)](#)

Notes:

- Cumulative numbers are from September 1, 2015 to the current week and are displayed in brackets.
- The difference between submissions and testing is due to lags in testing time.
- “Public Health Unit” reflects the jurisdiction where the patient resides. In the event this is not available, the public health unit of the specimen submitter is used.
- NA-Not applicable- Indicates public health units with no specimens tested; therefore percent positivity was not calculated.
- Percent positivity for health units that had less than 40 respiratory specimens tested for the current week may not be reliable due to small numbers.

Table 6. Number of reported confirmed influenza cases by public health unit and health region; number for week 12 and cumulative total for the 2015-2016 influenza season (in brackets)

Public Health Unit and Region	Number of influenza A positive cases			Influenza A & B	Influenza B	TOTAL
	(H1N1) pdm09	H3	Influenza A All subtypes ¹			
Northwestern	2 (9)	0 (1)	11 (45)	0 (0)	1 (3)	12 (48)
Thunder Bay District	3 (25)	1 (1)	20 (73)	0 (0)	2 (6)	22 (79)
TOTAL NORTH WEST	5 (34)	1 (2)	31 (118)	0 (0)	3 (9)	34 (127)
Algoma	4 (25)	0 (0)	5 (55)	0 (0)	2 (29)	7 (84)
North Bay Parry Sound District	0 (25)	0 (1)	14 (119)	0 (2)	4 (17)	18 (138)
Porcupine	1 (17)	0 (0)	6 (39)	0 (0)	2 (2)	8 (41)
Sudbury & District	4 (26)	0 (1)	20 (104)	0 (0)	8 (30)	28 (134)
Timiskaming	0 (3)	0 (1)	2 (20)	0 (0)	0 (0)	2 (20)
TOTAL NORTH EAST	9 (96)	0 (3)	47 (337)	0 (2)	16 (78)	63 (417)
City of Ottawa	1 (26)	1 (5)	22 (353)	0 (0)	5 (30)	27 (383)
Eastern Ontario	1 (18)	0 (2)	16 (108)	0 (0)	2 (7)	18 (115)
Hastings & Prince Edward Counties	0 (22)	0 (0)	1 (39)	0 (1)	1 (6)	2 (46)
Kingston, Frontenac, Lennox & Addington	1 (23)	0 (2)	12 (159)	0 (0)	2 (11)	14 (170)
Leeds, Grenville And Lanark District	4 (17)	0 (0)	7 (50)	0 (0)	0 (2)	7 (52)
Renfrew County And District	0 (2)	0 (2)	5 (23)	0 (0)	0 (3)	5 (26)
TOTAL EASTERN	7 (108)	1 (11)	63 (732)	0 (1)	10 (59)	73 (792)
Durham Region	0 (88)	0 (9)	18 (224)	0 (0)	15 (95)	33 (319)
Haliburton, Kawartha, Pine Ridge ²	0 (33)	0 (2)	8 (69)	0 (0)	2 (15)	10 (84)
Peel Region	7 (167)	1 (24)	47 (784)	0 (2)	44 (341)	91 (1127)
Peterborough County-City	0 (14)	0 (1)	9 (58)	0 (0)	1 (20)	10 (78)
Simcoe Muskoka District	9 (145)	0 (23)	17 (361)	0 (2)	3 (54)	20 (417)
York Region	9 (183)	1 (23)	36 (398)	0 (0)	20 (110)	56 (508)
TOTAL CENTRAL EAST	25 (630)	2 (82)	135 (1894)	0 (4)	85 (635)	220 (2533)
Toronto	9 (352)	0 (47)	67 (1532)	0 (0)	49 (407)	116 (1939)
TOTAL TORONTO	9 (352)	0 (47)	67 (1532)	0 (0)	49 (407)	116 (1939)
Chatham-Kent	0 (5)	0 (0)	3 (15)	0 (0)	2 (6)	5 (21)
Elgin-St. Thomas	2 (15)	0 (3)	3 (35)	0 (0)	0 (9)	3 (44)
Grey Bruce	3 (37)	1 (1)	12 (113)	0 (0)	6 (37)	18 (150)
Huron County	0 (5)	0 (0)	2 (11)	0 (0)	1 (4)	3 (15)
Lambton County	5 (17)	0 (0)	5 (47)	0 (0)	4 (11)	9 (58)
Middlesex-London	5 (67)	0 (4)	26 (286)	0 (1)	14 (78)	40 (365)
Oxford County	1 (16)	0 (0)	2 (47)	0 (0)	3 (19)	5 (66)
Perth District	1 (16)	0 (1)	3 (29)	0 (1)	1 (8)	4 (38)
Windsor-Essex County	3 (27)	1 (3)	9 (56)	0 (0)	18 (61)	27 (117)
TOTAL SOUTH WEST	20 (205)	2 (12)	65 (639)	0 (2)	49 (233)	114 (874)
Brant County	0 (38)	0 (2)	4 (103)	0 (3)	1 (17)	5 (123)
City Of Hamilton	0 (19)	1 (1)	17 (396)	0 (1)	10 (108)	27 (505)
Haldimand-Norfolk	0 (16)	0 (0)	3 (52)	0 (0)	1 (13)	4 (65)
Halton Region	4 (48)	1 (5)	35 (305)	0 (0)	22 (77)	57 (382)
Niagara Region	1 (40)	0 (2)	18 (344)	0 (1)	8 (79)	26 (424)
Waterloo Region	4 (66)	0 (12)	25 (270)	0 (0)	6 (68)	31 (338)
Wellington-Dufferin-Guelph	1 (57)	0 (4)	6 (113)	0 (0)	7 (25)	13 (138)
TOTAL CENTRAL WEST	10 (284)	2 (26)	108 (1583)	0 (5)	55 (387)	163 (1975)
TOTAL ONTARIO	85 (1709)	8 (183)	516 (6835)	0 (14)	267 (1808)	783 (8657)

Source: [Integrated Public Health Information System \(iPHIS\)](#)

Note:

¹ Includes influenza A positive cases for whom no subtype was reported

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5. By Age – Respiratory viruses

For week 12, both influenza A and B were detected predominantly among patients in the 20-64 age group. Overall, coronavirus and respiratory syncytial virus were the most common non-influenza respiratory viruses detected at PHOL. Coronavirus was mostly detected among adults 65 and older and respiratory syncytial virus was most commonly detected among infants <1 year of age. Information on influenza hospitalizations and deaths by age can be found in [Section 4: Severity - Influenza hospitalizations and deaths, and respiratory viruses by setting](#).

Table 7: Number and percentage of specimens (in brackets)¹ with respiratory pathogens detected by age group by Public Health Ontario Laboratories, week 12 and cumulative for the 2015-2016 season to date

Respiratory Pathogen Detected	Age groups									
	<1 Number (% positive) ¹		1-4 Number (% positive) ¹		5-19 Number (% positive) ¹		20-64 Number (% positive) ¹		65+ Number (% positive) ¹	
	Current	Cumulative	Current	Cumulative	Current	Cumulative	Current	Cumulative	Current	Cumulative
Influenza A (all) ²	17 (16)	401 (9)	17 (28)	318 (18)	8 (11)	364 (17)	96 (22)	1924 (17)	41 (10)	665 (6)
Influenza A(H3N2) ³	2	9	0	6	0	18	3	76	4	76
Influenza A(H1N1)pdm09 ³	1	146	1	136	1	137	22	807	13	265
Influenza B	6 (6)	78 (2)	10 (16)	112 (6)	18 (26)	350 (16)	36 (8)	362 (3)	24 (6)	208 (2)
Adenovirus	6 (6)	122 (3)	2 (4)	93 (6)	0 (0)	104 (5)	4 (1)	90 (1)	0 (0)	26 (0)
Coronavirus	0 (0)	7 (4)	0 (0)	5 (11)	0 (0)	3 (4)	1 (2)	67 (4)	9 (13)	238 (9)
Entero/rhinovirus	0 (0)	35 (8)	0 (0)	11 (7)	0 (0)	16 (7)	0 (0)	201 (8)	2 (3)	541 (18)
Human metapneumovirus	1 (1)	71 (2)	2 (4)	37 (2)	1 (2)	19 (1)	10 (3)	84 (1)	12 (4)	175 (2)
Parainfluenza	3 (3)	207 (5)	0 (0)	82 (5)	0 (0)	33 (2)	2 (1)	130 (1)	0 (0)	254 (3)
Respiratory syncytial virus	18 (18)	917 (21)	2 (4)	185 (11)	0 (0)	34 (2)	12 (3)	108 (1)	22 (8)	282 (3)
Total positives⁴	51 (48)	1,838 (41)	33 (54)	843 (48)	27 (39)	923 (43)	161 (36)	2,966 (27)	110 (27)	2,389 (23)

Source: [Public Health Ontario Laboratory \(PHOL\)](#)

Notes:

¹The percent positivity in this table is calculated as number of specimens with the respiratory pathogen detected divided by total number of specimens tested for that particular pathogen within the age group. For example, if 50 respiratory specimens were tested for influenza B from patients in the 5-19 year age group and 10 tested positive, the cell for influenza B in 5-19 years olds would indicate "10 (20)".

²The "Influenza A (all)" row includes the numbers in the "Influenza A(H3N2)" and "Influenza A(H1N1)pdm09" rows as well as Influenza A positives that were not subtyped.

³Percent positivity is not calculated for Influenza A(H3N2) and Influenza A(H1N1)pdm09 because subtyping is only done on select influenza A samples, precluding an accurate calculation.

⁴When calculating the "Total Positives", the "Influenza A(H3N2)" and "Influenza A(H1N1)pdm09" rows are not counted as these numbers are already included in the "Influenza A (all)" row.

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6. Strain comparisons – circulating influenza strains and vaccine strains

Through genetic characterization performed at the National Microbiology Laboratory (NML), sequence analysis showed that the 775 influenza A(H1N1) viruses tested nationally were antigenically similar to A/California/7/2009, which is the influenza A/H1N1 component [recommended by the World Health Organization](#) for the 2015-2016 Northern Hemisphere influenza vaccine.

Only 35 influenza A(H3N2) viruses from Canada grew to sufficient titre for antigenic characterization by haemagglutination inhibition assay and were characterized as antigenically similar to the cell-passaged A/Switzerland/9715293/2013, the World Health Organization recommended influenza A(H3N2) component of the 2015-2016 Northern Hemisphere vaccine.

Of the 388 influenza B viruses characterized in Canada, NML reported that 104 were antigenically similar to the recommended influenza B component for the Northern Hemisphere 2015-2016 vaccine, B/Phuket/3073/2013. 284 influenza B viruses were characterized as B/Brisbane/60/2008-like, which is included as an influenza B component of the 2015-2016 quadrivalent vaccine.

Table 8: Strain characterization completed on influenza isolates at the National Microbiology Laboratory: Ontario and Canada, September 1, 2015 to March 31, 2016

Influenza strains	Ontario	Canada
Influenza A (H3N2) A/Switzerland/9715293/13-like	30	35
Influenza A (H1N1) A/California/07/09-like	268	775
Influenza B B/Brisbane/60/08-like	57	284
B/Phuket/3073/13-like	49	104

Source: [National Microbiology Laboratory \(NML\)](#)

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7. Antiviral resistance / sensitivity for influenza

All influenza viruses in Canada tested by the National Microbiology Laboratory (NML) for antiviral resistance in the 2015-2016 season were sensitive to zanamivir. Seven influenza A (H1N1)pdm09 viruses tested nationally were resistant to oseltamivir; four of these were from Ontario. Only one of the influenza A viruses tested was sensitive to amantadine. All influenza B viruses in Canada were sensitive to both oseltamivir and zanamivir.

Table 9: Amantadine, oseltamivir and zanamivir susceptibility assays completed on influenza isolates at the National Microbiology Laboratory: Ontario and Canada, September 1, 2015 to March 31, 2016

	Amantadine				Oseltamivir				Zanamivir			
Influenza strains	ONTARIO		CANADA		ONTARIO		CANADA		ONTARIO		CANADA	
	R	S	R	S	R	S	R	S	R	S	R	S
Influenza A (H3N2)	86	0	159	1	0	73	0	137	0	72	0	134
Influenza A (H1N1)pdm09	270	0	780	0	4	221	7	538	0	193	0	479
Influenza B	NA	NA	NA	NA	0	60	0	222	0	53	0	213

Source: [National Microbiology Laboratory \(NML\)](#)

R = Resistant, S = Susceptible, NA = Not Applicable

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8. Bacterial pathogens

No specimen was positive for *Bordetella pertussis* or *Mycoplasma pneumoniae* during week 12. No specimen tested positive for *Bordetella parapertussis*, *Bordetella holmesii* or *Chlamydophila pneumoniae* during this week.

Table 10: Number and percent positivity of respiratory specimens tested for any *Bordetella* species, *Mycoplasma pneumoniae*, or *Chlamydophila pneumoniae*, Public Health Ontario Laboratories, week 12

Pathogens	Tested	Positives	% positivity
	Current (Cumulative)	Current (Cumulative)	Current (Cumulative)
<i>Bordetella pertussis</i>	47 (1446)	0 (64)	0 (4)
<i>Bordetella parapertussis</i>	47 (1446)	0 (0)	0 (0)
<i>Bordetella holmesii</i>	47 (1446)	0 (0)	0 (0)
<i>Mycoplasma pneumoniae</i>	18 (1593)	0 (89)	0 (6)
<i>Chlamydophila pneumoniae</i>	18 (1593)	0 (6)	0 (0)

Source: [Public Health Ontario Laboratory \(PHOL\)](#)

Notes:

- Cumulative numbers (in brackets) for *Bordetella* are from January 1, 2016.
- Cumulative numbers (in brackets) for *Mycoplasma* and *Chlamydophila* are from September 1, 2015.
- Note that not all laboratory-confirmed *Bordetella pertussis* patients meet the Ontario case definition for pertussis.

9. Data sources for this report

- **Integrated Public Health Information System (iPHIS):** provides information on laboratory-confirmed cases of influenza reported to local public health units, and institutional outbreaks of influenza and other respiratory pathogens reported to local public health units. iPHIS is administered by the Ontario Ministry of Health and Long-Term Care; data for this issue was extracted by Public Health Ontario on March 30, 2016.

Case counts for influenza A and B cases are based on the 'Reported Date', which was the date the public health unit was notified of the case; however, cases are assigned to a particular surveillance week based on the episode date entered in iPHIS for the case. Episode date for a case corresponds to the earliest date on record for the case according to the iPHIS hierarchy (Symptom Date > Clinical Diagnosis Date > Specimen Collection Date > Lab Test Date > Reported Date). Cases are excluded from these counts if the episode date is based on reported date, and the reported date occurs after the latest surveillance week.

- **Centre for Immunization and Respiratory Infectious Diseases (CIRID) of the Public Health Agency of Canada (PHAC):** provides information on the number of influenza tests and number that are positive based on submissions from 16 participating laboratories in Ontario including 11 Public Health Ontario Laboratories (PHOLs) and five hospital-based laboratories. The results are assigned to a particular surveillance week based on when test results are reported to PHAC; these data are not updated when results are submitted late for previous surveillance weeks. These data represent the number of specimens tested, which may not necessarily correspond with the number of patients as more than one specimen may have been submitted per patient. Cumulative numbers for the season to date are also available through [FluWatch](#).
- **Public Health Ontario Laboratory (PHOL):** provides specimen level information from the 11 Public Health Ontario Laboratory sites located in Ontario; data for the issue was extracted from the Laboratory Information Management System by Public Health Ontario on March 29, 2016.
- **National Microbiology Laboratory (NML), Influenza and Respiratory Viruses Section:** provides testing results for influenza strain identification and influenza antiviral resistance / susceptibility.
- **Public Health Ontario from public health units:** Public health units provide Public Health Ontario with weekly reports of influenza activity levels in their areas [Provincial Influenza Activity Report (Appendix C) Database]. Influenza activity levels are assigned by local public health units and reported to Public Health Ontario by 4:00 pm on the Tuesday following the end of each surveillance week. Activity levels are assigned based on laboratory confirmations, ILI reports from various sources, and laboratory-confirmed institutional respiratory infection outbreaks. Please refer to the [detailed definitions for the 2015-2016 season](#) for more information. Activity levels reported for a particular surveillance week may not necessarily correspond to the number of new outbreaks reported in the same week in Table 3 because ongoing outbreaks from previous weeks, as well as laboratory confirmed outbreaks in schools, may be included in the assessment of the activity level.

- **IntelliHEALTH Ontario:** provides information on population counts based on 2014 estimates. The information was obtained from the Ontario Ministry of Health and Long-Term Care, and received by Public Health Ontario on November 18, 2015.