

Please see our notice to readers on page 2

Ontario Respiratory Pathogen Bulletin | 2016-2017

SURVEILLANCE WEEK 9 (February 26, 2017 – March 4, 2017)

This issue of the Ontario Respiratory Pathogen Bulletin provides information on the surveillance period from February 26 to March 4, 2017 (Week 9). Unless otherwise specified, **data presented in this issue of the bulletin are for Week 9** and data extraction occurred on Wednesday, March 8, 2017.

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	Similar	There were 533 influenza cases (467 influenza A, 0 influenza A&B, 66 influenza B) reported in Week 9, which was similar to the 570 influenza cases reported in Week 8 (523 influenza A, 1 influenza A&B, 46 influenza B).
Percent positivity for influenza ²	Lower	Percent positivity of laboratory tests for all influenza types in Week 9 was 18.2%, which was lower than the percent positivity in Week 8 (22.4%). In Week 9, percent positivity was 16.7% for influenza A and 1.5% for influenza B.
Institutional influenza outbreaks ³	Lower	There were 14 new influenza outbreaks reported in Week 9, which was lower than the number of influenza outbreaks reported in Week 8 (23).
Influenza activity levels reported by public health units	Similar	In Week 9 , 1 public health unit reported 'widespread' activity, 31 public health units reported 'localized' activity, 3 reported 'sporadic' activity, 1 reported no activity and 0 public health units did not report.
OVERALL ASSESSMENT	Lower	Overall, the indicators show that influenza activity for Week 9 was Lower compared to Week 8.
Measures of severity for influenza		
Hospitalizations among laboratory-confirmed cases of influenza ⁴	There were 161 hospitalized cases reported in Week 9; the number of hospitalized cases reported in Week 8 was 179.	
Deaths among laboratory-confirmed cases of influenza ⁴	There were 11 deaths reported in Week 9; there were 18 deaths reported in Week 8.	

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.

Notice to readers:

Based on the PHO alert system, seasonal activity for influenza B started as of Week 8. Public Health Ontario uses results from respiratory specimens tested by the Public Health Ontario Laboratories to detect the start of the influenza season for both influenza A and B. Using the cumulative sum method (CUSUM), current testing results are compared to baseline activity. Baseline activity was determined using historical influenza testing data from September 1, 2010 to August 31, 2016.

Summary of respiratory pathogen activity for Surveillance Week 9, 2017

1. Circulating respiratory viruses in Ontario

Provincial percent positivity is moderate for influenza A at 16.7% and low for influenza B at 1.5% respectively in Week 9 (Figures [1](#) and [3](#)). Influenza A positivity has decreased since the provincial peak at week 2. All of the 330 influenza A positive specimens for which subtyping was available were H3N2 in week 9; for the season to date, 99.4% (6942/6987) were H3N2. Respiratory Syncytial Virus was the most common circulating non-influenza respiratory virus, with provincial positivity at 12.7% (Figure [1](#)).

2. Comparison to previous influenza seasons

For the 2016-2017 surveillance season to date, 9692 laboratory-confirmed influenza cases have been reported. Among these cases, 97.0% (9400/9692) were influenza A ([Table 6](#)). Of the 5108 reported influenza A cases with subtype information available, 99.4% (5076/5108) were H3N2 and 0.6% (32/5108) were (H1N1)pdm09.

3. Institutional respiratory outbreaks

14 influenza outbreaks were reported in Week 9 ([Table 1](#)). Of the 310 influenza A outbreaks with subtyping information reported for the season to date, all were H3N2. Influenza was detected in 42.6% (510/1198) of institutional respiratory infection outbreaks reported to date in the 2016-2017 season. 18.3% (219/1198) of the outbreaks were reported as enterovirus/rhinovirus. Most respiratory infection outbreaks were reported from long-term care homes (650/1198 or 54.3% of all reported outbreaks). 13.7% (164/1198) of respiratory infection outbreaks were reported with an unknown setting type.

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

In the season to date, 2711 hospitalizations and 137 deaths have been reported among laboratory-confirmed influenza cases. The majority (2655/2711 or 97.9%) of hospitalizations have occurred in influenza A cases. Fifty-six of 2711 hospitalizations (2.1%) occurred in patients with influenza B. 70.5% (1911/2711) of the hospitalizations were in individuals 65 years of age and older. In week 9, 113 of the hospitalized cases with influenza were 65 years of age and older. The highest hospitalization rate was seen in adults 65 years of age and older.

For week 9 based on PHOL data, influenza A positivity was 16.1% and influenza B positivity was 2.5%. The majority of influenza A detections occurred among patients presenting for care in emergency departments. Overall, respiratory syncytial virus (RSV) and coronavirus were the predominant non-influenza respiratory viruses detected. RSV was more commonly detected from patients presenting for care to emergency departments and from hospital (non-ICU) in-patients and coronavirus was predominantly detected among institutional settings and from individuals presenting for care in ambulatory settings.

5. By Jurisdiction – Influenza activity

Influenza activity continues to be reported across the province. In week 9, 1 public health unit reported 'widespread' activity, 31 public health units reported 'localized' activity, 3 reported 'sporadic' activity, 1 reported no activity.

6. By Age – Respiratory viruses

The influenza A(H3N2) virus was detected in 190 respiratory specimens during week 9 at PHOL and was the dominant circulating respiratory virus. The highest number of H3N2 positive results were from the 65 and over age group. Overall, respiratory syncytial virus (predominantly detected among infants under 1 year of age and adults 65 years of age and over), and coronavirus (primarily detected among adults 65 and older) were the most common non-influenza viruses. 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

285 influenza A(H3N2) viruses from Canada were characterized as antigenically similar to A/Hong Kong/4801/2014(H3N2), the World Health Organization recommended influenza A(H3N2) component of the 2016-2017 Northern Hemisphere vaccine.

683 influenza A(H3N2) viruses did not grow to sufficient hemagglutination titers for antigenic characterization by hemagglutination inhibition (HI) assays. Sequence analysis of the HA (hemagglutinin) gene of these viruses showed that 683 H3N2 viruses belonged to the same genetic group as the A/Hong Kong/4801/2014-like virus which is the influenza A/H3N2 component of the 2016-2017 Northern Hemisphere influenza vaccine.

NML reported that the 25 influenza A(H1N1) viruses characterized were antigenically similar to A/California/7/2009, which is the influenza A/H1N1 component of the 2016-2017 Northern Hemisphere influenza vaccine.

Of the 81 influenza B viruses characterized in Canada, NML reported that 32 were antigenically similar to B/Brisbane/60/2008, which is the recommended influenza B strain for the Northern Hemisphere 2016-2017 trivalent vaccine, and 49 influenza B viruses were characterized as B/Phuket/3073/2013-like, which is included as an influenza B component of the 2016-2017 Northern Hemisphere 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 2016-2017 season were sensitive to zanamivir, and resistant to amantadine. One influenza A (H3N2) positive isolate from Ontario tested by NML was resistant to oseltamivir. All influenza B viruses in Canada were sensitive to both oseltamivir and zanamivir.

9. Bacterial pathogens

Four respiratory specimens were positive for *Bordetella pertussis* and one specimen was positive for *Bordetella parapertussis* during week 9. No specimen was positive for *Bordetella holmesii* during this week. Additionally, two specimens were positive for *Mycoplasma pneumoniae* and no specimen was positive for *Chlamydia pneumoniae* during week 9.

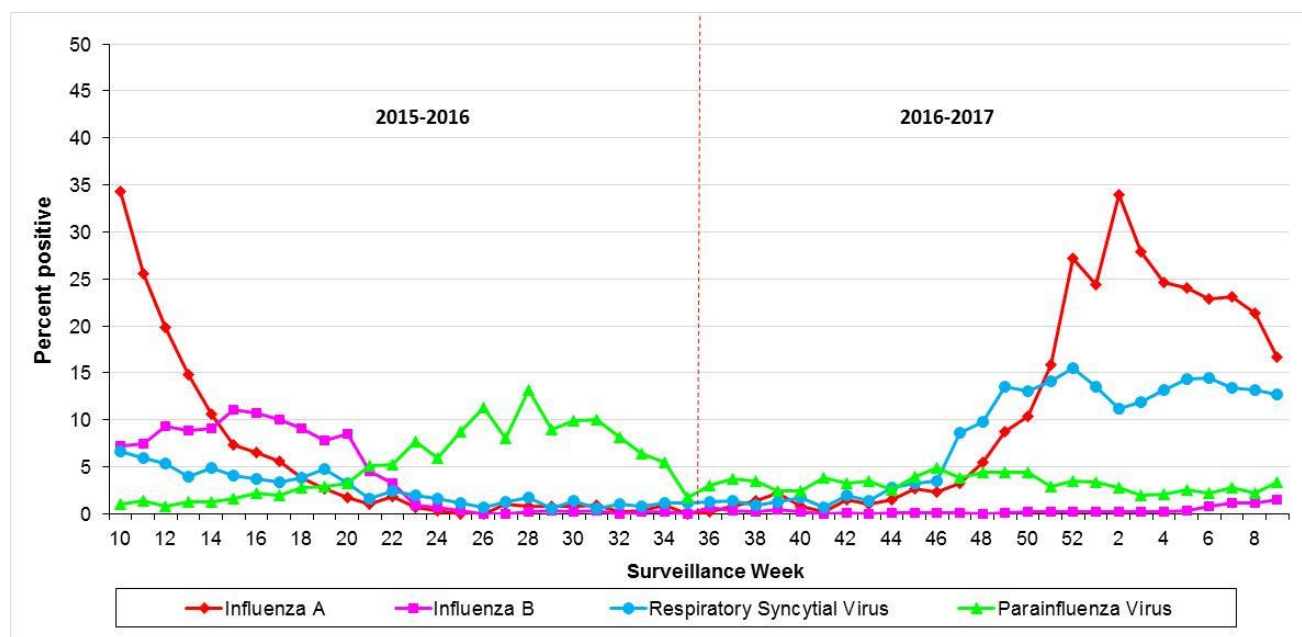
10. Data sources for this report

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

1. Circulating respiratory viruses in Ontario

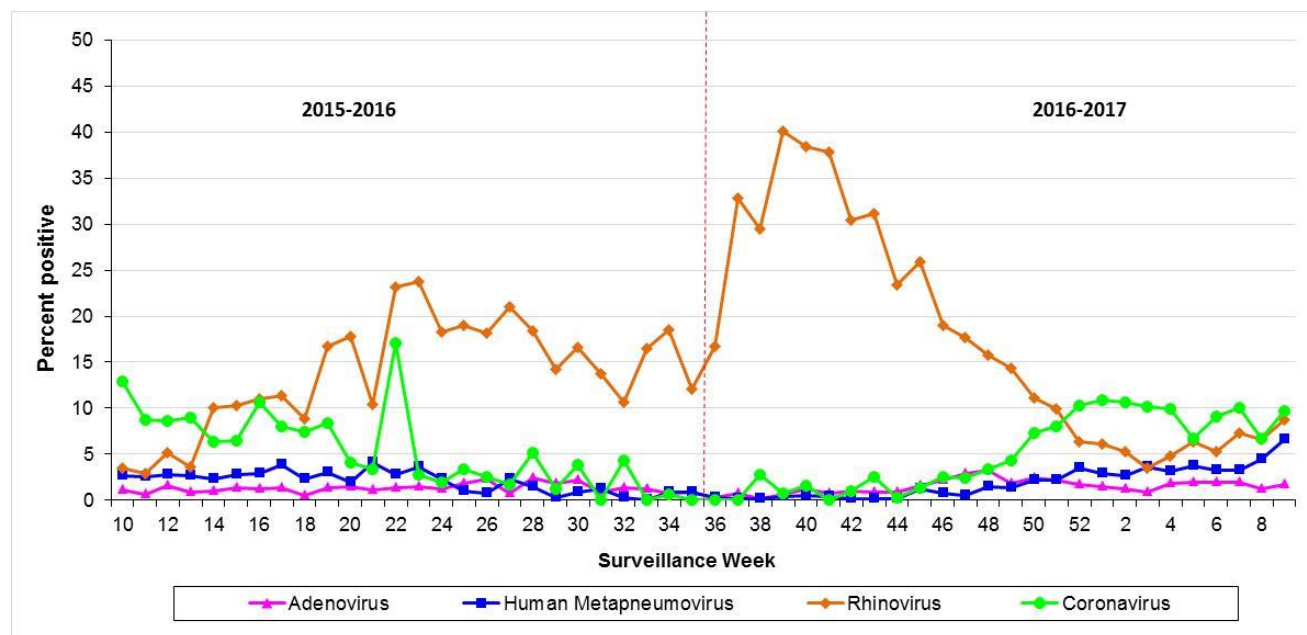
Provincial percent positivity is moderate for influenza A at 16.7% and low for influenza B at 1.5% respectively in Week 9 (Figures [1](#) and [3](#)). Influenza A positivity has decreased since the provincial peak at week 2. All of the 330 influenza A positive specimens for which subtyping was available were H3N2 in week 9; for the season to date, 99.4% (6942/6987) were H3N2. Respiratory Syncytial Virus was the most common circulating non-influenza respiratory virus, with provincial positivity at 12.7% (Figure [1](#)).

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 6, 2016 to March 4, 2017



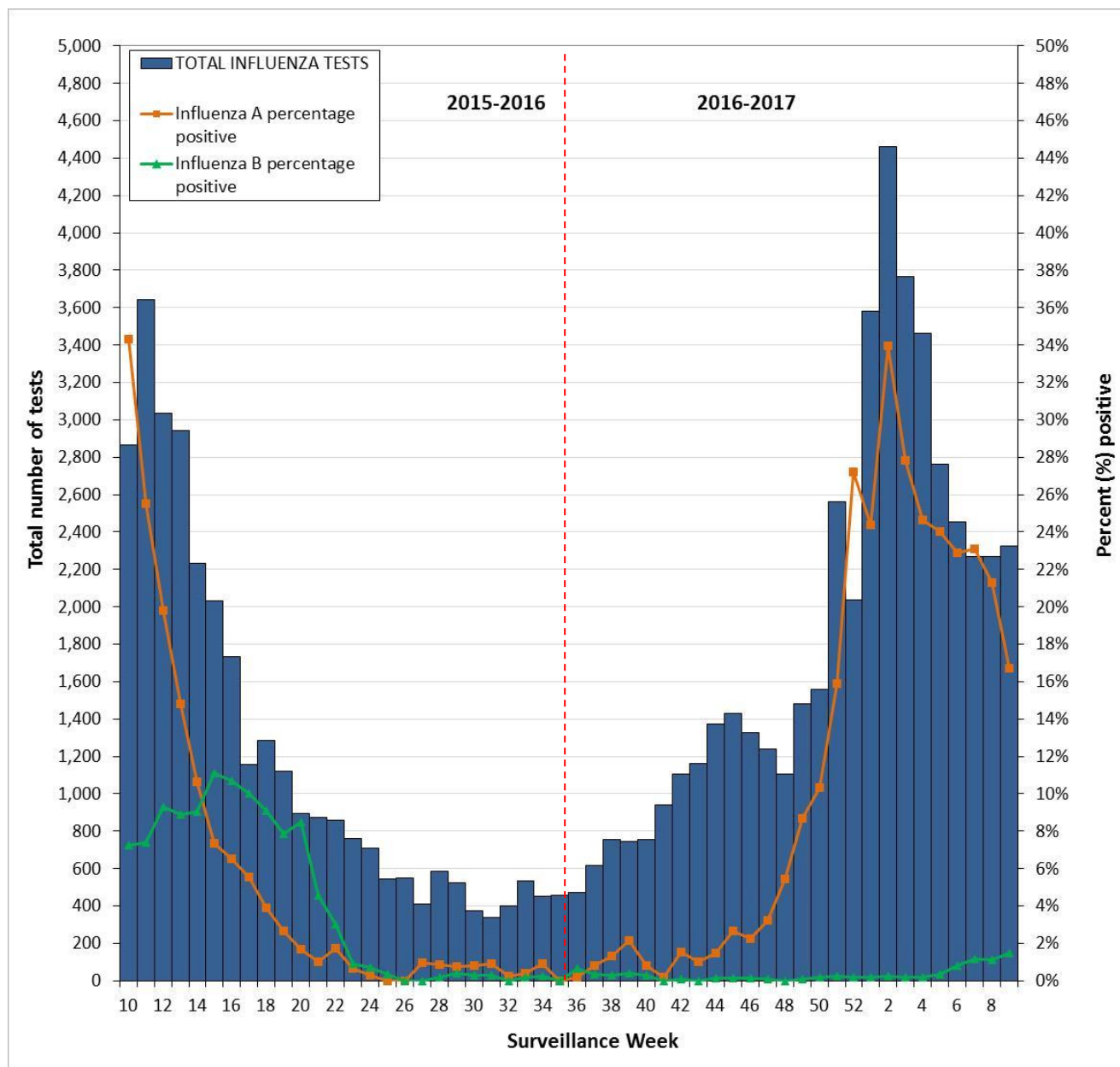
Source: [Centre for Immunization and Respiratory Infectious Diseases \(CIRID\)](#)

Figure 2: Percentage of respiratory viral pathogens (adenovirus, human metapneumovirus, rhinovirus and coronavirus) detected among specimens tested by all methods: Ontario, March 6, 2016 to March 4, 2017



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 6, 2016 to March 4, 2017



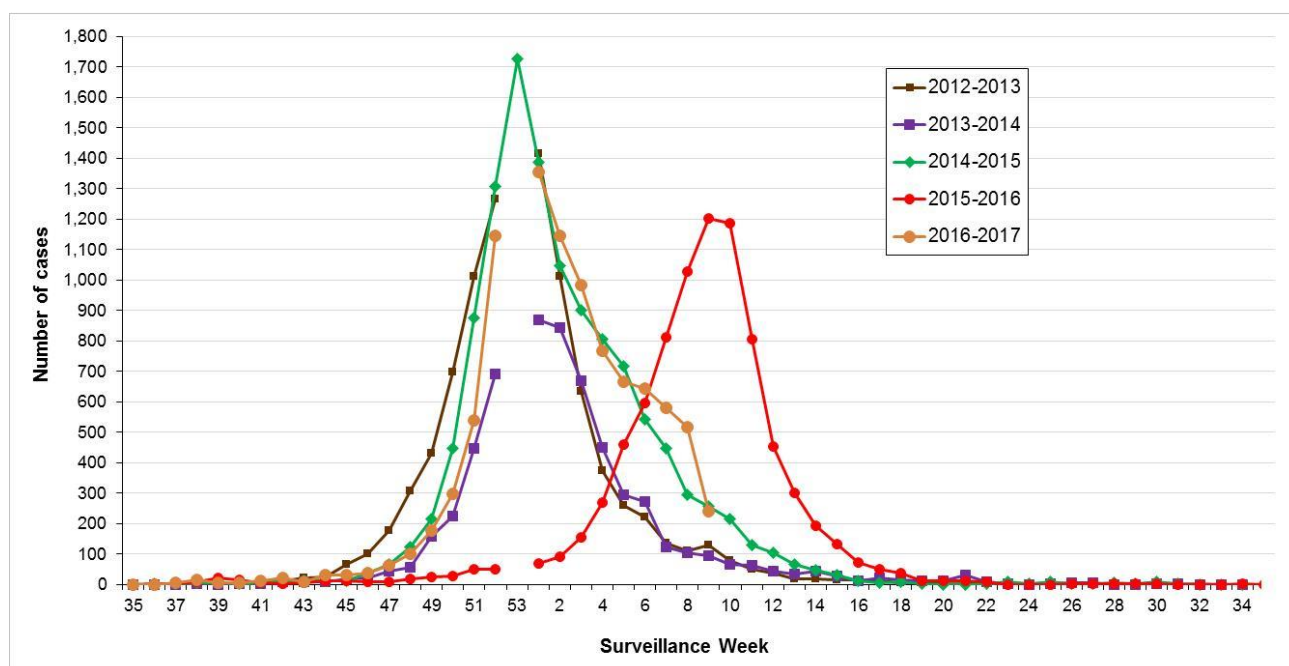
Source: [Centre for Immunization and Respiratory Infectious Diseases \(CIRID\)](#)

2. Comparison to previous influenza seasons

For the 2016-2017 surveillance season to date, 9692 laboratory-confirmed influenza cases have been reported. Among these cases, 97.0% (9400/9692) were influenza A ([Table 6](#)). Of the 5108 reported influenza A cases with subtype information available, 99.4% (5076/5108) were H3N2 and 0.6% (32/5108) were (H1N1)pdm09.

Dominant Type/Subtype by Season	
2012-2013:	A(H3N2)
2013-2014:	A(H1N1)pdm09
2014-2015:	A(H3N2)
2015-2016:	A(H1N1)pdm09
2016-2017:	A (H3N2)

Figure 4: Number of reported confirmed cases of influenza A by surveillance week: Ontario, September 1, 2012 to March 4, 2017

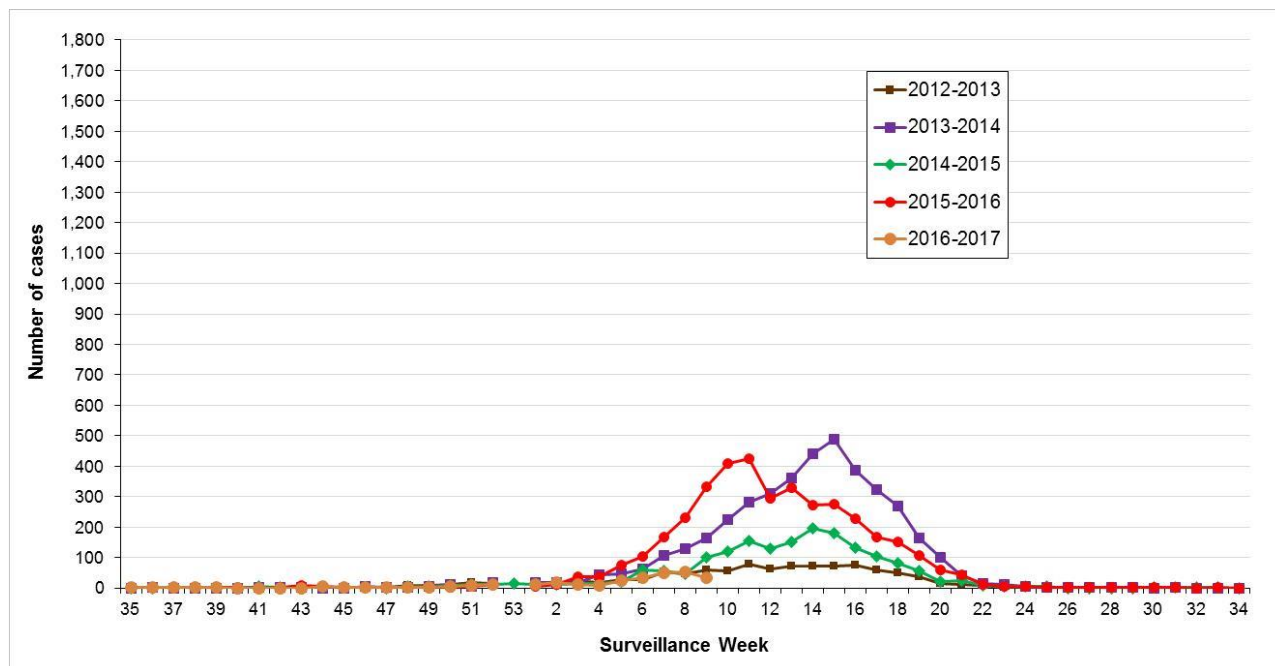


Source: [Integrated Public Health Information System \(iPHIS\)](#)

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, 2012 to March 4, 2017



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

14 influenza outbreaks were reported in Week 9 ([Table 1](#)). Of the 310 influenza A outbreaks with subtyping information reported for the season to date, all were H3N2. Influenza was detected in 42.6% (510/1198) of institutional respiratory infection outbreaks reported to date in the 2016-2017 season. 18.3% (219/1198) of the outbreaks were reported as entero/rhinovirus. Most respiratory infection outbreaks were reported from long-term care homes (650/1198 or 54.3% of all reported outbreaks). 13.7% (164/1198) of respiratory infection outbreaks were reported with an unknown setting type.

Table 1: Institutional respiratory infection outbreaks: Ontario, Week 9 and total for the 2016-2017 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	14	36.8%	501	41.8%
Influenza B ³	0	0.0%	5	0.4%
Both influenza A and B ³	0	0.0%	4	0.3%
Enterovirus	0	0.0%	219	18.3%
Parainfluenza (all types)	1	2.6%	32	2.7%
Respiratory syncytial virus (RSV)	4	10.5%	79	6.6%
Human metapneumovirus, adenovirus, coronavirus or other viruses	13	34.2%	151	12.6%
Two or more non-influenza viruses ³	2	5.3%	82	6.8%
No organism reported	4	10.5%	125	10.4%
TOTAL	38	100.0%	1198	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, 2016 (Week 35, 2016) 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. February 26, 2017 – March 4, 2017 (Week 9), 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 2016-2017 season to Week 9

Setting type reported	Number of influenza outbreaks (% of total)	Number of other respiratory viruses (% of total)
Long-Term Care Home	253 (49.6%)	397 (57.7%)
Hospital	74 (14.5%)	35 (5.1%)
Retirement Home	136 (26.7%)	135 (19.6%)
Other ²	1 (0.2%)	3 (0.4%)
Unknown	46 (9.0%)	118 (17.2%)
TOTAL	510 (100.0%)	688 (100.0%)

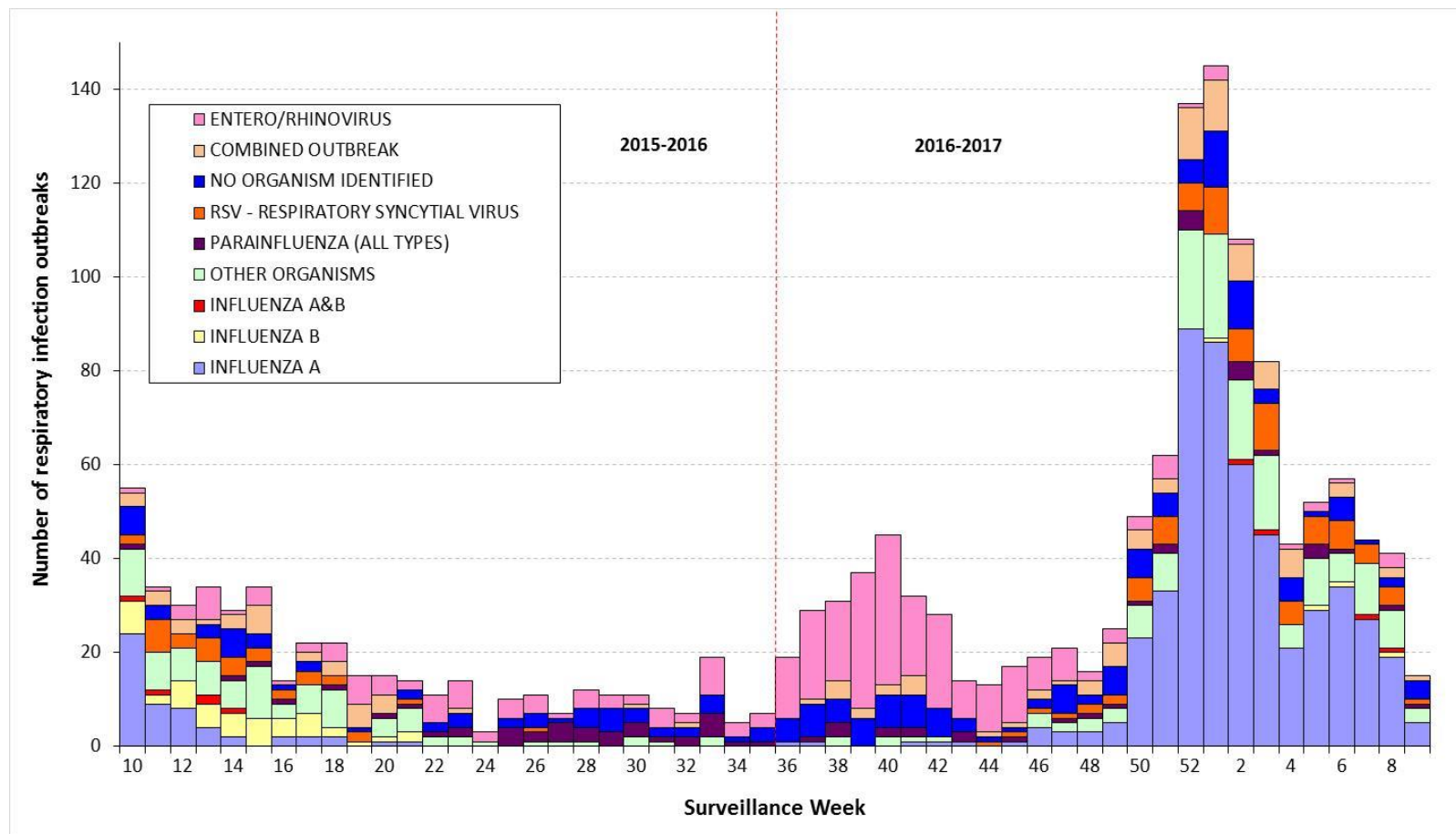
Source: [Integrated Public Health Information System \(iPHIS\)](#)

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, 2016 (Week 35, 2016) 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 6, 2016 to March 4, 2017



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.

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

In the season to date, 2711 hospitalizations and 137 deaths have been reported among laboratory-confirmed influenza cases. The majority (2655/2711 or 97.9%) of hospitalizations have occurred in influenza A cases. Fifty-six of 2711 hospitalizations (2.1%) occurred in patients with influenza B. 70.5% (1911/2711) of the hospitalizations were in individuals 65 years of age and older. In week 9, 113 of the hospitalized cases with influenza were 65 years of age and older. The highest hospitalization rate was seen in adults 65 years of age and older.

For week 9 based on PHOL data, influenza A positivity was 16.1% and influenza B positivity was 2.5%. The majority of influenza A detections occurred among patients presenting for care in emergency departments. Overall, respiratory syncytial virus (RSV) and coronavirus were the predominant non-influenza respiratory viruses detected. RSV was more commonly detected from patients presenting for care to emergency departments and from hospital (non-ICU) in-patients and coronavirus was predominantly detected among institutional settings and from individuals presenting for care in ambulatory settings.

Table 3: Hospitalizations and deaths among confirmed influenza cases by age group: Ontario, Week 9 and cumulative for the 2016-2017 influenza season

Age Group	HOSPITALIZATIONS		DEATHS	
	Weekly Count	Cumulative count (rate per 100,000)	Weekly count	Cumulative count (rate per 100,000)
<1	7	106 (73.7)	0	0 (0.0)
1 – 4	4	124 (21.7)	0	1 (0.2)
5 – 14	8	99 (6.7)	0	1 (0.1)
15 – 24	5	43 (2.4)	0	1 (0.1)
25 – 44	7	112 (3.0)	1	1 (0.0)
45 – 64	17	316 (8.1)	0	14 (0.4)
65+	113	1911 (86.4)	10	119 (5.4)
Total	161	2711 (19.7)	11	137 (1.0)

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, August 2015 and September 2016 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 2014-2015, 2015-2016 and 2016-2017 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 9 and cumulative for the 2016-2017 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	8 (12.9)	125 (7.1)	43 (14.1)	864 (10.2)	73 (22.3)	1,713 (19.1)	44 (11.6)	1,092 (12.6)	23 (20.0)	731 (26.0)
Influenza A (H3N2) ⁴	7	123	43	855	73	1,701	44	1,069	23	728
Influenza A (H1N1)pdm09 ⁴	0	0	0	4	0	8	0	10	0	0
Influenza B	0 (0.0)	5 (0.3)	7 (2.3)	27 (0.3)	15 (4.6)	76 (0.8)	7 (1.8)	39 (0.4)	1 (0.9)	7 (0.2)
Adenovirus	0 (0.0)	5 (0.3)	5 (1.6)	105 (1.2)	9 (2.8)	200 (2.2)	5 (1.3)	156 (1.8)	1 (0.9)	12 (0.4)
Coronavirus	5 (8.2)	73 (4.3)	19 (6.2)	441 (6.3)	18 (5.5)	531 (7.0)	41 (10.9)	619 (8.8)	37 (32.2)	439 (16.6)
Enterovirus/rhinovirus ⁶	2 (3.2)	141 (8.0)	33 (10.8)	652 (9.2)	26 (8.0)	750 (9.8)	40 (10.5)	724 (9.8)	4 (3.5)	413 (15.6)
Human metapneumovirus	2 (3.3)	25 (1.4)	16 (5.2)	197 (2.4)	21 (6.4)	239 (2.7)	21 (5.6)	209 (2.5)	19 (16.5)	81 (2.9)
Parainfluenza(all types)	3 (4.8)	37 (2.1)	11 (3.6)	233 (2.8)	11 (3.4)	302 (3.4)	8 (2.1)	272 (3.1)	2 (1.7)	109 (3.9)
Respiratory syncytial virus	6 (9.7)	94 (5.3)	42 (13.8)	1,019 (12.0)	46 (14.1)	1,163 (13.0)	31 (8.2)	805 (9.3)	8 (7.0)	259 (9.2)
Total positives^{5,7}	26 (41.9)	482 (27.4)	161 (52.8)	3,224 (38.1)	201 (61.5)	4,493 (50.2)	184 (48.4)	3,569 (41.1)	92 (80.0)	1,983 (70.4)

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.

⁶ Commencing November 7, 2016 the number of enterovirus and coronavirus-positive specimens may be higher due to the change to a more sensitive test method and a new testing algorithm for respiratory viruses at PHOL

5. By Jurisdiction – Influenza activity

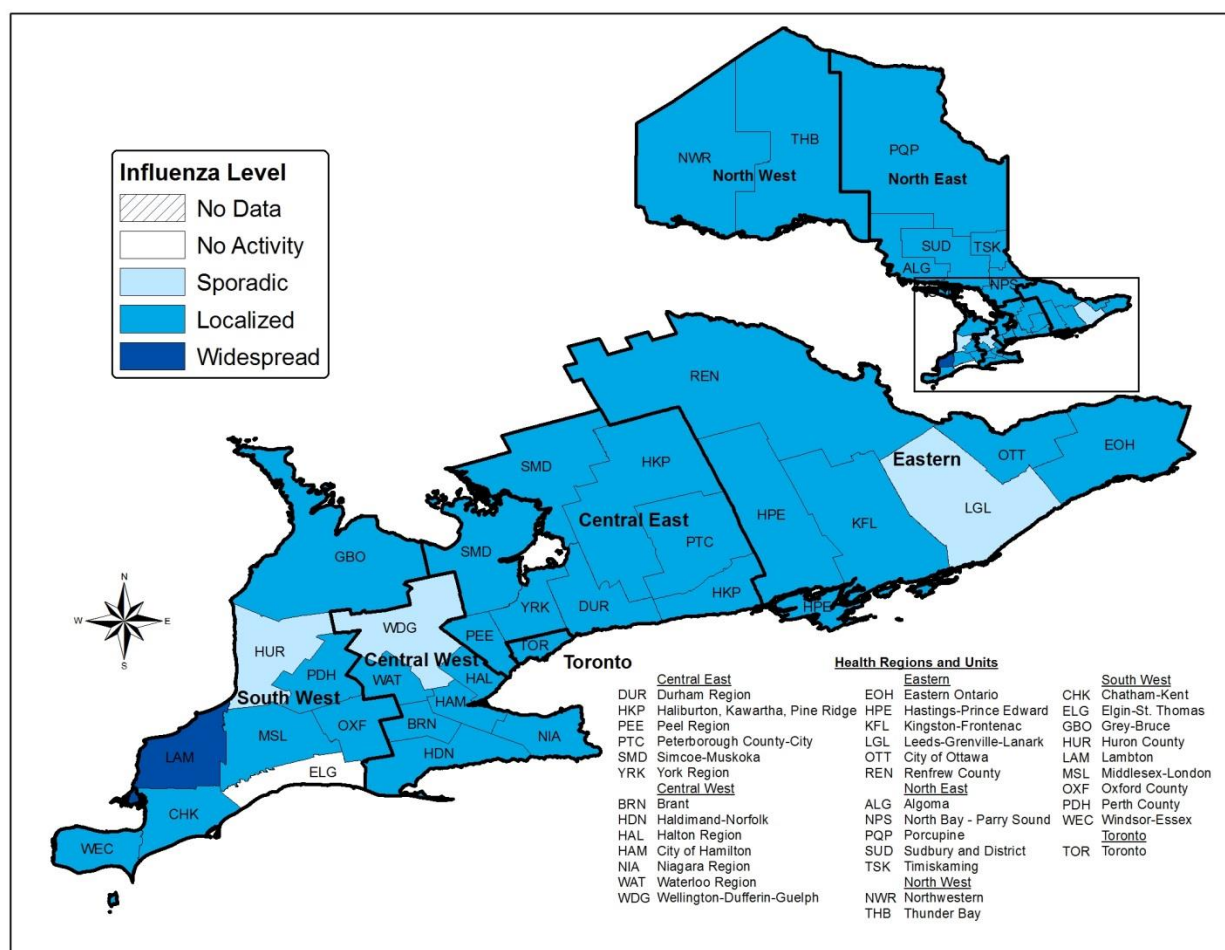
Influenza activity continues to be reported across the province. In week 9, 1 public health unit reported 'widespread' activity, 31 public health units reported 'localized' activity, 3 reported 'sporadic' activity, 1 reported no activity.

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, February 26, 2017 to March 4, 2017 (Week 9)



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 9 and cumulative total for the 2016-2017 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	% positivity influenza A	A(H1N1) pdm09	H3N2	Number of influenza B positive specimens	% positivity influenza B
Northwestern	37 (316)	21 (293)	12 (38)	57.1 (13.0)	0 (0)	12 (38)	0 (3)	0.0 (1.0)
Thunder Bay District	35 (585)	27 (552)	4 (63)	14.8 (11.4)	0 (0)	4 (63)	0 (2)	0.0 (0.4)
TOTAL NORTH WEST	72 (901)	48 (845)	16 (101)	33.3 (12.0)	0 (0)	16 (101)	0 (5)	0.0 (0.6)
Algoma	31 (386)	25 (362)	8 (57)	32.0 (15.7)	0 (0)	8 (56)	1 (1)	4.0 (0.3)
North Bay Parry Sound District	42 (682)	34 (669)	5 (97)	14.7 (14.5)	0 (0)	5 (97)	0 (1)	0.0 (0.1)
Porcupine	31 (318)	27 (293)	6 (39)	22.2 (13.3)	0 (0)	6 (39)	2 (5)	7.4 (1.7)
Sudbury & District	29 (446)	23 (408)	10 (43)	43.5 (10.5)	0 (0)	9 (41)	0 (1)	0.0 (0.2)
Timiskaming	10 (146)	5 (139)	0 (17)	0.0 (12.2)	0 (0)	0 (17)	0 (0)	0.0 (0.0)
TOTAL NORTH EAST	143 (1,978)	114 (1,871)	29 (253)	25.4 (13.5)	0 (0)	28 (250)	3 (8)	2.6 (0.4)
City of Ottawa	14 (391)	12 (364)	1 (68)	8.3 (18.7)	0 (0)	1 (68)	0 (1)	0.0 (0.3)
Eastern Ontario	15 (351)	13 (342)	3 (62)	23.1 (18.1)	0 (0)	3 (62)	0 (1)	0.0 (0.3)
Hastings & Prince Edward Counties	17 (429)	15 (413)	3 (77)	20.0 (18.6)	0 (0)	3 (77)	0 (1)	0.0 (0.2)
Kingston, Frontenac, Lennox & Addington	19 (537)	13 (514)	1 (64)	7.7 (12.5)	0 (0)	1 (63)	1 (3)	7.7 (0.6)
Leeds, Grenville And Lanark District	7 (175)	5 (164)	0 (22)	0.0 (13.4)	0 (0)	0 (22)	0 (0)	0.0 (0.0)
Renfrew County And District	6 (145)	8 (133)	2 (27)	25.0 (20.3)	0 (0)	2 (27)	0 (0)	0.0 (0.0)
TOTAL EASTERN	78 (2,028)	66 (1,930)	10 (320)	15.2 (16.6)	0 (0)	10 (319)	1 (6)	1.5 (0.3)
Durham Region	50 (1,330)	46 (1,260)	6 (175)	13.0 (13.9)	0 (0)	6 (175)	0 (2)	0.0 (0.2)
Haliburton, Kawartha, Pine Ridge	24 (685)	19 (663)	2 (99)	10.5 (14.9)	0 (0)	2 (99)	3 (8)	15.8 (1.2)
Peel Region	102 (2,701)	89 (2,599)	3 (320)	3.4 (12.3)	0 (4)	3 (317)	5 (29)	5.6 (1.1)
Peterborough County-City	39 (646)	37 (639)	5 (90)	13.5 (14.1)	0 (0)	5 (90)	1 (6)	2.7 (0.9)
Simcoe Muskoka District	171 (2,865)	111 (2,773)	24 (440)	21.6 (15.9)	0 (0)	24 (439)	5 (18)	4.5 (0.6)
York Region	93 (2,874)	89 (2,772)	12 (445)	13.5 (16.1)	0 (1)	12 (442)	2 (13)	2.2 (0.5)
TOTAL CENTRAL EAST	479 (11,101)	391 (10,706)	52 (1,569)	13.3 (14.7)	0 (5)	52 (1,562)	16 (76)	4.1 (0.7)
Toronto	252 (7,939)	228 (7,618)	15 (802)	6.6 (10.5)	0 (5)	15 (790)	1 (9)	0.4 (0.1)
TOTAL TORONTO	252 (7,939)	228 (7,618)	15 (802)	6.6 (10.5)	0 (5)	15 (790)	1 (9)	0.4 (0.1)
Chatham-Kent	10 (335)	11 (319)	1 (54)	9.1 (16.9)	0 (0)	1 (53)	0 (5)	0.0 (1.6)
Elgin-St. Thomas	5 (217)	5 (216)	0 (35)	0.0 (16.2)	0 (0)	0 (34)	0 (0)	0.0 (0.0)
Grey Bruce	81 (778)	63 (740)	18 (179)	28.6 (24.2)	0 (0)	18 (178)	3 (8)	4.8 (1.1)
Huron County	6 (200)	5 (197)	2 (34)	40.0 (17.3)	0 (0)	2 (34)	0 (0)	0.0 (0.0)
Lambton County	31 (362)	29 (355)	6 (71)	20.7 (20.0)	0 (0)	6 (70)	0 (3)	0.0 (0.8)
Middlesex-London	10 (511)	11 (469)	2 (109)	18.2 (23.2)	0 (0)	2 (109)	0 (4)	0.0 (0.9)
Oxford County	12 (282)	13 (273)	2 (59)	15.4 (21.6)	0 (1)	2 (58)	0 (0)	0.0 (0.0)
Perth District	13 (305)	12 (295)	3 (50)	25.0 (16.9)	0 (0)	3 (50)	0 (0)	0.0 (0.0)
Windsor-Essex County	30 (650)	24 (593)	6 (110)	25.0 (18.5)	0 (3)	6 (106)	0 (2)	0.0 (0.3)

Public Health Unit and Region	Number of specimens submitted	Number of specimens tested	Influenza A				Influenza B	
			Number of influenza A positive specimens	% positivity influenza A	A(H1N1) pdm09	H3N2	Number of influenza B positive specimens	% positivity influenza B
TOTAL SOUTH WEST	198 (3,640)	173 (3,457)	40 (701)	23.1 (20.3)	0 (4)	40 (692)	3 (22)	1.7 (0.6)
Brant County	25 (556)	28 (549)	9 (73)	32.1 (13.3)	0 (1)	9 (71)	1 (1)	3.6 (0.2)
City Of Hamilton	26 (442)	23 (401)	2 (77)	8.7 (19.2)	0 (0)	2 (76)	0 (1)	0.0 (0.2)
Haldimand-Norfolk	9 (301)	8 (285)	2 (72)	25.0 (25.3)	0 (0)	2 (72)	0 (2)	0.0 (0.7)
Halton Region	33 (932)	29 (868)	4 (144)	13.8 (16.6)	0 (0)	4 (143)	2 (4)	6.9 (0.5)
Niagara Region	14 (576)	12 (490)	1 (89)	8.3 (18.2)	0 (0)	1 (89)	1 (6)	8.3 (1.2)
Waterloo Region	36 (832)	39 (799)	7 (158)	17.9 (19.8)	0 (4)	7 (154)	2 (7)	5.1 (0.9)
Wellington-Dufferin-Guelph	31 (865)	30 (823)	4 (158)	13.3 (19.2)	0 (3)	4 (155)	0 (5)	0.0 (0.6)
TOTAL CENTRAL WEST	174 (4,504)	169 (4,215)	29 (771)	17.2 (18.3)	0 (8)	29 (760)	6 (26)	3.6 (0.6)
OUT OF PROVINCE	0 (146)	0 (31)	0 (8)	NA (25.8)	0 (0)	0 (2)	0 (2)	NA (6.9)
TOTAL ONTARIO	1,396 (32,237)	1,189 (30,673)	191 (4,525)	16.1 (14.8)	0 (22)	190 (4,476)	30 (154)	2.5 (0.5)

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

Notes:

- Cumulative numbers are from September 1, 2016 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 9 and cumulative total for the 2016-2017 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	0 (0)	11 (28)	12 (29)	0 (0)	3 (3)	15 (32)
Thunder Bay District	0 (0)	2 (58)	2 (58)	0 (0)	0 (2)	2 (60)
TOTAL NORTH WEST	0 (0)	13 (86)	14 (87)	0 (0)	3 (5)	17 (92)
Algoma	0 (0)	8 (56)	8 (59)	0 (0)	1 (1)	9 (60)
North Bay Parry Sound District	0 (0)	2 (103)	5 (121)	0 (0)	2 (6)	7 (127)
Porcupine	0 (0)	6 (35)	6 (39)	0 (0)	1 (3)	7 (42)
Sudbury & District	0 (0)	4 (28)	7 (90)	0 (0)	0 (1)	7 (91)
Timiskaming	0 (0)	0 (15)	0 (16)	0 (0)	0 (0)	0 (16)
TOTAL NORTH EAST	0 (0)	20 (237)	26 (325)	0 (0)	4 (11)	30 (336)
City of Ottawa	0 (0)	1 (61)	24 (459)	0 (0)	0 (8)	24 (467)
Eastern Ontario	0 (0)	0 (51)	6 (96)	0 (0)	0 (0)	6 (96)
Hastings & Prince Edward Counties	0 (0)	5 (69)	6 (73)	0 (0)	0 (1)	6 (74)
Kingston, Frontenac, Lennox & Addington	0 (0)	0 (36)	2 (98)	0 (0)	0 (3)	2 (101)
Leeds, Grenville And Lanark District	0 (0)	0 (22)	2 (35)	0 (0)	0 (0)	2 (35)
Renfrew County And District	0 (0)	2 (14)	4 (30)	0 (0)	0 (0)	4 (30)
TOTAL EASTERN	0 (0)	8 (253)	44 (791)	0 (0)	0 (12)	44 (803)
Durham Region	0 (0)	6 (177)	12 (343)	0 (0)	2 (8)	14 (351)
Haliburton, Kawartha, Pine Ridge ²	0 (0)	3 (94)	4 (103)	0 (0)	3 (7)	7 (110)
Peel Region	0 (12)	18 (667)	33 (1101)	0 (0)	10 (53)	43 (1154)
Peterborough County-City	0 (0)	2 (72)	2 (75)	0 (0)	2 (6)	4 (81)
Simcoe Muskoka District	0 (0)	50 (397)	69 (494)	0 (0)	4 (16)	73 (510)
York Region	0 (1)	8 (534)	11 (551)	0 (1)	4 (16)	15 (568)
TOTAL CENTRAL EAST	0 (13)	87 (1941)	131 (2667)	0 (1)	25 (106)	156 (2774)
Toronto	0 (7)	30 (1290)	73 (2513)	0 (2)	8 (48)	81 (2563)
TOTAL TORONTO	0 (7)	30 (1290)	73 (2513)	0 (2)	8 (48)	81 (2563)
Chatham-Kent	0 (0)	0 (40)	1 (53)	0 (0)	0 (5)	1 (58)
Elgin-St. Thomas	0 (0)	0 (31)	0 (39)	0 (0)	0 (0)	0 (39)
Grey Bruce	0 (0)	20 (147)	23 (206)	0 (0)	4 (9)	27 (215)
Huron County	0 (0)	4 (31)	5 (37)	0 (0)	0 (0)	5 (37)
Lambton County	0 (0)	8 (61)	8 (71)	0 (0)	0 (4)	8 (75)
Middlesex-London	0 (0)	2 (108)	12 (395)	0 (0)	1 (6)	13 (401)
Oxford County	0 (1)	1 (49)	1 (64)	0 (1)	0 (0)	1 (65)
Perth District	0 (0)	5 (51)	7 (68)	0 (0)	0 (0)	7 (68)
Windsor-Essex County	0 (2)	1 (77)	1 (89)	0 (0)	1 (2)	2 (91)
TOTAL SOUTH WEST	0 (3)	41 (595)	58 (1022)	0 (1)	6 (26)	64 (1049)
Brant County	0 (1)	12 (55)	12 (91)	0 (0)	0 (0)	12 (91)
City Of Hamilton	0 (0)	3 (65)	29 (576)	0 (0)	6 (14)	35 (590)
Haldimand-Norfolk	0 (0)	6 (57)	7 (76)	0 (0)	0 (3)	7 (79)
Halton Region	0 (0)	4 (123)	16 (364)	0 (0)	3 (13)	19 (377)
Niagara Region	0 (0)	3 (75)	21 (405)	0 (0)	9 (35)	30 (440)
Waterloo Region	0 (4)	11 (138)	26 (303)	0 (0)	2 (9)	28 (312)
Wellington-Dufferin-Guelph	0 (4)	9 (161)	10 (180)	0 (0)	0 (6)	10 (186)
TOTAL CENTRAL WEST	0 (9)	48 (674)	121 (1995)	0 (0)	20 (80)	141 (2075)
TOTAL ONTARIO	0 (32)	247(5076)	467 (9400)	0 (4)	66 (288)	533 (9692)

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

Note:

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

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6. By Age – Respiratory viruses

The influenza A(H3N2) virus was detected in 190 respiratory specimens during week 9 at PHOL and was the dominant circulating respiratory virus. The highest number of H3N2 positive results were from the 65 and over age group. Overall, respiratory syncytial virus (predominantly detected among infants under 1 year of age and adults 65 years of age and over), and coronavirus (primarily detected among adults 65 and older) were the most common non-influenza viruses. 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 9 and cumulative for the 2016-2017 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	6 (5.9)	125 (4.7)	11 (9.9)	288 (10.7)	23 (28.8)	385 (23.2)	50 (15.2)	1,297 (14.3)	101 (17.9)	2,414 (16.6)
Influenza A(H3N2) ³	6	125	11	284	23	378	50	1,277	100	2,402
Influenza A(H1N1)pdm09 ³	0	0	0	4	0	4	0	13	0	1
Influenza B	1 (1.0)	6 (0.2)	2 (1.8)	15 (0.6)	8 (10.0)	24 (1.4)	11 (3.3)	60 (0.7)	8 (1.4)	47 (0.3)
Adenovirus	2 (2.0)	82 (3.1)	13 (11.7)	228 (8.5)	2 (2.5)	53 (3.2)	0 (0.0)	82 (0.9)	3 (0.5)	32 (0.2)
Coronavirus	12 (11.8)	198 (8.9)	7 (6.3)	188 (8.6)	3 (3.8)	55 (4.3)	26 (8.0)	495 (6.7)	72 (12.8)	1,162 (9.1)
Enterovirus/rhinovirus	20 (19.6)	451 (19.8)	31 (27.9)	492 (22.0)	9 (11.3)	148 (11.0)	24 (7.3)	567 (7.4)	21 (3.7)	1,019 (7.9)
Human metapneumovirus	12 (11.8)	109 (4.1)	10 (9.0)	122 (4.6)	3 (3.8)	37 (2.3)	9 (2.8)	142 (1.6)	45 (8.0)	339 (2.3)
Parainfluenza	6 (5.9)	175 (6.6)	7 (6.3)	179 (6.7)	2 (2.5)	43 (2.6)	5 (1.5)	176 (2.0)	15 (2.7)	375 (2.6)
Respiratory syncytial virus	42 (41.2)	1,093 (41.1)	29 (26.1)	865 (32.3)	2 (2.5)	91 (5.5)	9 (2.7)	319 (3.5)	51 (9.0)	962 (6.6)
Total positives^{4,5}	90 (88.2)	1,890 (71.1)	91 (82.0)	1,937 (72.2)	50 (62.5)	765 (46.1)	128 (38.8)	2,998 (33.2)	305 (54.0)	6,120 (42.0)

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

Notes: ¹ The 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%)”.

² 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.

³ 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.

⁴ 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.

⁵ Total number of positives do not necessary represent unique specimens as some specimens may have more than one organism detected, as a result percent positivity may be over 100.

7. Strain comparisons – circulating influenza strains and vaccine strains

285 influenza A(H3N2) viruses from Canada were characterized as antigenically similar to A/Hong Kong/4801/2014(H3N2), the World Health Organization recommended influenza A(H3N2) component of the 2016-2017 Northern Hemisphere vaccine.

683 influenza A(H3N2) viruses did not grow to sufficient hemagglutination titers for antigenic characterization by hemagglutination inhibition (HI) assays. Sequence analysis of the HA (hemagglutinin) gene of these viruses showed that 683 H3N2 viruses belonged to the same genetic group as the A/Hong Kong/4801/2014-like virus which is the influenza A/H3N2 component of the 2016-2017 Northern Hemisphere influenza vaccine.

NML reported that the 25 influenza A(H1N1) viruses characterized were antigenically similar to A/California/7/2009, which is the influenza A/H1N1 component of the 2016-2017 Northern Hemisphere influenza vaccine.

Of the 81 influenza B viruses characterized in Canada, NML reported that 32 were antigenically similar to B/Brisbane/60/2008, which is the recommended influenza B strain for the Northern Hemisphere 2016-2017 trivalent vaccine, and 49 influenza B viruses were characterized as B/Phuket/3073/2013-like, which is included as an influenza B component of the 2016-2017 Northern Hemisphere quadrivalent vaccine.

WHO has issued their recommendation for the 2017/2018 Northern Hemisphere seasonal influenza vaccine available at:

http://www.who.int/influenza/vaccines/virus/recommendations/2017_18_north/en/

Table 8: Strain characterization completed on influenza isolates at the National Microbiology Laboratory: Ontario and Canada, September 1, 2016 to March 9, 2017

Influenza strains	Ontario	Canada
Influenza A (H3N2) A/Hong Kong/4801/2014-like	179	285
Influenza A (H1N1) A/California/07/09-like	21	25
Influenza B B/Brisbane/60/08-like B/Phuket/3073/13-like	17 23	32 49

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

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8. Antiviral resistance / sensitivity for influenza

All influenza viruses in Canada tested by the National Microbiology Laboratory (NML) for antiviral resistance in the 2016-2017 season were sensitive to zanamivir, and resistant to amantadine. One influenza A (H3N2) positive isolate from Ontario tested by NML was resistant to oseltamivir. 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, 2016 to March 9, 2017

Influenza strains	Amantadine				Oseltamivir				Zanamivir			
	ONTARIO		CANADA		ONTARIO		CANADA		ONTARIO		CANADA	
	R	S	R	S	R	S	R	S	R	S	R	S
Influenza A (H3N2)	33	0	148	0	1	289	1	547	0	290	0	548
Influenza A (H1N1)pdm09	17	0	20	0	0	18	0	22	0	17	0	21
Influenza B	NA	NA	NA	NA	0	35	0	68	0	35	0	69

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

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

9. Bacterial pathogens

Four respiratory specimens were positive for *Bordetella pertussis* and one specimen was positive for *Bordetella parapertussis* during week 9. No specimen was positive for *Bordetella holmesii* during this week. Additionally, two specimens were positive for *Mycoplasma pneumoniae* and no specimen was positive for *Chlamydophila pneumoniae* during week 9.

Table 10: Number and percent positivity of respiratory specimens tested for any *Bordetella* species, *Mycoplasma pneumoniae*, or *Chlamydophila pneumoniae*, Public Health Ontario Laboratories, week 9.

Pathogens	Tested	Positives	% positivity
	Current (Cumulative)	Current (Cumulative)	Current (Cumulative)
<i>Bordetella pertussis</i>	77 (926)	4 (54)	5 (6)
<i>Bordetella parapertussis</i>	77 (926)	1 (3)	1 (0)
<i>Bordetella holmesii</i>	77 (926)	0 (1)	0 (0)
<i>Mycoplasma pneumoniae</i>	34 (1142)	2 (41)	6 (4)
<i>Chlamydophila pneumoniae</i>	34 (1142)	0 (3)	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, 2016.
- Note that not all laboratory-confirmed *Bordetella pertussis* patients meet the Ontario case definition for pertussis.

10. 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 8, 2017.

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 9, 2017. A detailed summary of PHOL lab data is [available](#).
- **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 2016-2017 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 2015 estimates. The information was obtained from the Ontario Ministry of Health and Long-Term Care, and extracted on September 2, 2016.