

Ontario Respiratory Pathogen Bulletin | 2016-2017

SURVEILLANCE WEEK 47 (November 20, 2016 – November 26, 2016)

This issue of the Ontario Respiratory Pathogen Bulletin provides information on the surveillance period from November 20 to November 26, 2016 (Week 47). Unless otherwise specified, **data presented in this issue of the bulletin are for Week 47** and data extraction occurred on Wednesday, November 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	Higher	There were 46 influenza cases (45 influenza A, 0 influenza A&B, 1 influenza B) reported in Week 47, which was higher than the 36 influenza cases reported in Week 46 (32 influenza A, 1 influenza A&B, 3 influenza B).
Percent positivity for influenza ²	Similar	Percent positivity of laboratory tests for all influenza types in Week 47 was 3.3%, which was similar to the percent positivity in Week 46 (2.4%). In Week 47, percent positivity was 3.2% for influenza A and 0.1% for influenza B.
Institutional influenza outbreaks ³	Similar	There were 2 new influenza outbreaks reported in Week 47, which was similar to the number of influenza outbreaks reported in Week 46 (2).
Influenza activity levels reported by public health units	Higher	In Week 47 , 5 public health units reported 'localized' activity, 16 reported 'sporadic' activity, 15 reported no activity and 0 public health units did not report.
OVERALL ASSESSMENT	Higher	Overall, the indicators show that influenza activity for Week 47 was higher compared to Week 46.
Measures of severity for influenza		
Hospitalizations among laboratory-confirmed cases of influenza ⁴	There were 13 hospitalized cases reported in Week 47; the number of hospitalized cases reported in Week 46 was 10.	
Deaths among laboratory-confirmed cases of influenza ⁴	There was 1 death reported in Week 47; there were 0 deaths reported in Week 46.	

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 47, 2016

1. Circulating respiratory viruses in Ontario

Provincial percent positivity is low for influenza A and influenza B, at 3.2% and 0.1% respectively in Week 47 (Figures [1](#) and [3](#)). Of the 37 influenza A positive specimens for which subtyping was available, all (37/37) were H3N2 in week 47; for the season to date, 95.3% (162/170) were H3N2. Rhinovirus was the most common circulating non-influenza respiratory virus, with provincial positivity at 17.6% (Figure [2](#)).

2. Comparison to previous influenza seasons

For the 2016-2017 surveillance season to date, 212 laboratory-confirmed influenza cases have been reported. Among these cases, 90.6% (192/212) were influenza A ([Table 6](#)). Of the 116 reported influenza A cases with subtype information available, 98.3% (114/116) were H3N2 and 1.7% (2/116) were (H1N1)pdm09. Influenza activity in week 47 was low, and within expected levels for this time of year.

3. Institutional respiratory outbreaks

Two influenza outbreaks were reported in Week 47 ([Figure 6](#)). Of seven influenza A outbreaks with subtyping information reported for the season to date, all were H3N2. Influenza was detected in 3.9% (11/283) of institutional respiratory infection outbreaks reported to date in the 2016-2017 season. 63.6% (180/283) of the outbreaks were reported as entero/rhinovirus. Most respiratory infection outbreaks were reported from long-term care homes (173/283 or 61.1% of all reported outbreaks).

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

In the season to date, 50 hospitalizations and 1 death have been reported among laboratory-confirmed influenza cases. The majority (44/50 or 88.0%) of hospitalizations have occurred in influenza A cases. Six of 50 hospitalizations (12.0%) occurred in patients with influenza B. 60.0% (30/50) of the hospitalizations were in individuals 65 years of age and older. In week 47, 7 of the hospitalized cases with influenza A were 65 years of age and older. The highest hospitalization rate was seen in adults aged 65 years and older.

For week 47 based on PHOL data, influenza A positivity was 3.3% and no influenza B was identified among respiratory specimens tested. The highest number of influenza A detections occurred among individuals who presented for care at hospital and emergency departments. Overall, entero/rhinovirus was the predominant respiratory virus and was more commonly detected from individuals in hospital and emergency departments.

5. By Jurisdiction – Influenza activity

Influenza activity continues to be reported across the province, with 5 public health units reporting 'localized' activity, 16 reporting 'sporadic' activity and 15 reporting no activity.

6. By Age – Respiratory viruses

Very few influenza A(H3N2) viruses were detected in respiratory specimens during week 47. The highest number was detected among the 65+ age group. Overall, enterovirus was the most common respiratory virus detected at PHOL, primarily among children aged 1-4 years and adults 65 and older. 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

40 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.

49 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 49 H3N2 viruses belonged to the same genetic group as A/Hong Kong/4801/2014-like virus which is the influenza A(H3N2) component of the 2016-17 Northern Hemisphere influenza vaccine.

NML reported that the 6 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 10 influenza B viruses characterized in Canada, NML reported that 7 were antigenically similar to B/Brisbane/60/2008, which is the recommended influenza B strain for the Northern Hemisphere 2016-2017 trivalent vaccine, and 3 influenza B viruses were characterized as B/Phuket/3073/2013-like, which is included as an influenza B component of the 2016-2017 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 oseltamivir and zanamivir, and resistant to amantadine. All influenza B viruses in Canada were sensitive to both oseltamivir and zanamivir.

9. Bacterial pathogens

Four specimens were positive for *Bordetella pertussis* and no specimen was positive for *Bordetella parapertussis* or *Bordetella holmesii* during week 47. Two specimens were positive for *Mycoplasma pneumoniae* and no specimen tested positive for *Chlamydia pneumoniae* during this week.

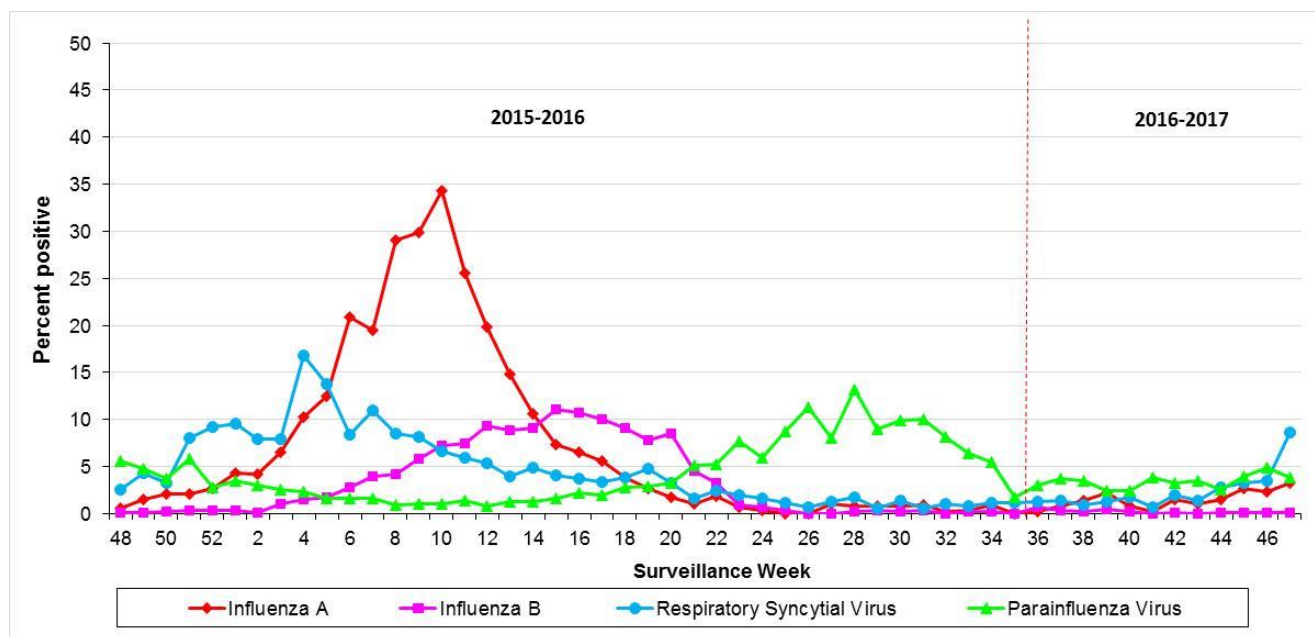
10. Data sources for this report

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

1. Circulating respiratory viruses in Ontario

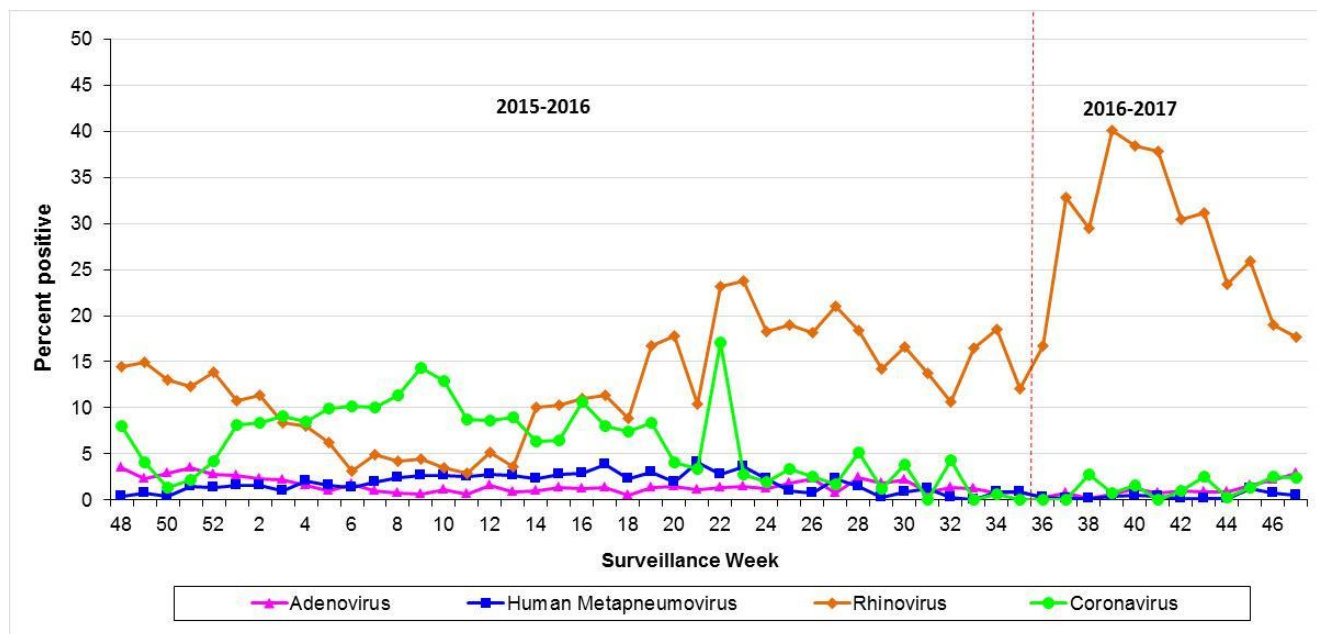
Provincial percent positivity is low for influenza A and influenza B, at 3.2% and 0.1% respectively in Week 47 (Figures 1 and 3). Of the 37 influenza A positive specimens for which subtyping was available, all (37/37) were H3N2 in week 47; for the season to date, 95.3% (162/170) were H3N2. Rhinovirus was the most common circulating non-influenza respiratory virus, with provincial positivity at 17.6% (Figure 2).

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, November 29, 2015 to November 26, 2016



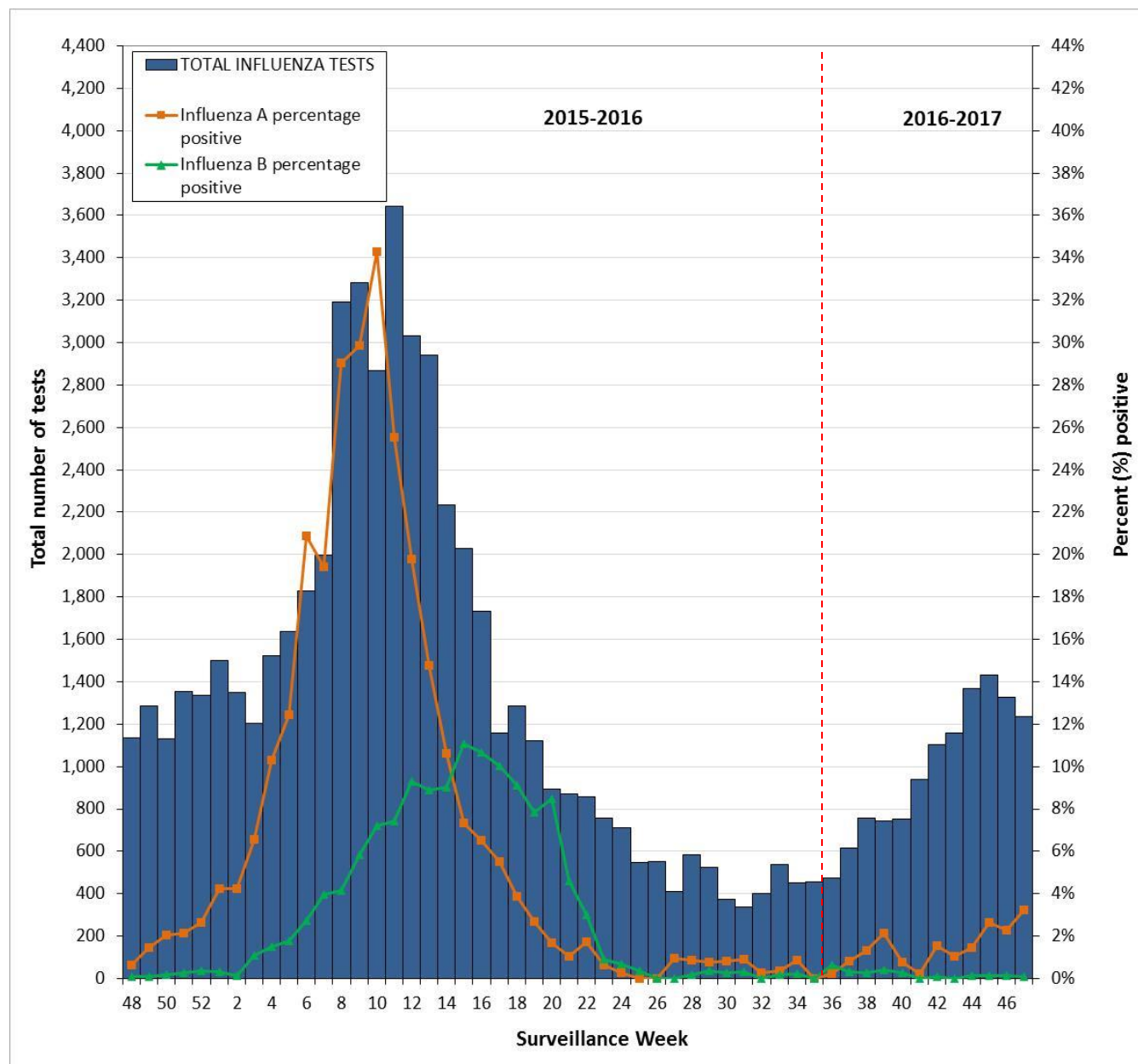
Source: [Centre for Immunization and Respiratory Infectious Diseases \(CIRID\)](#)

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



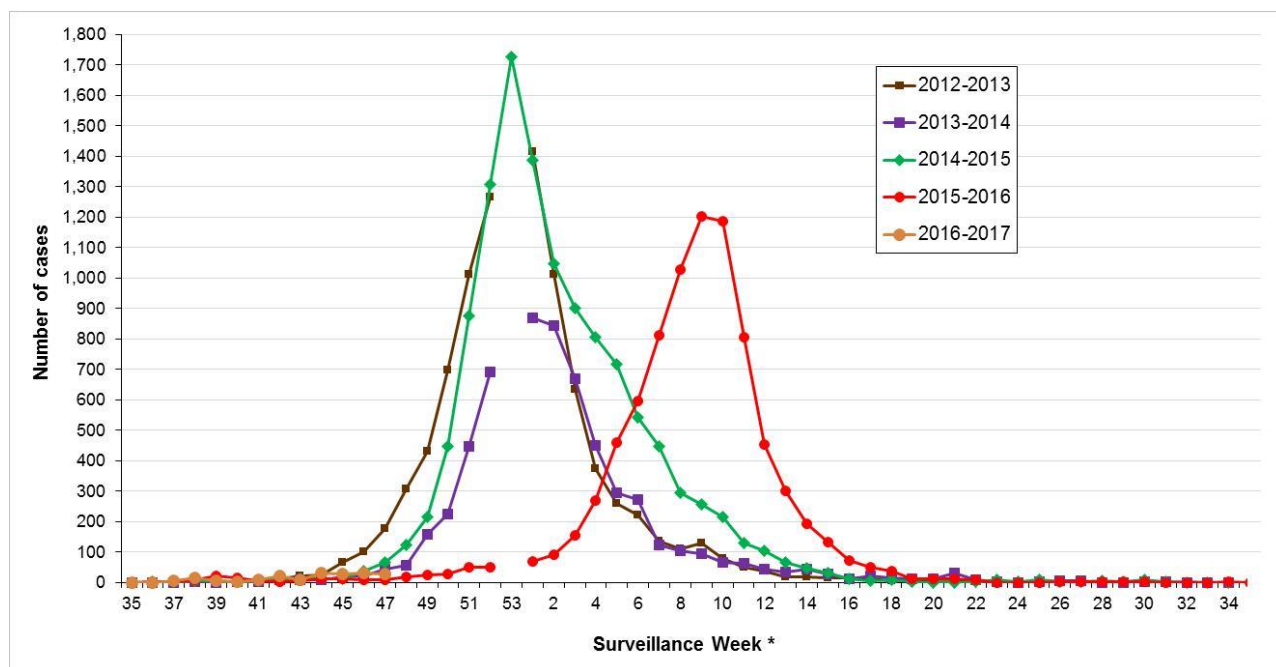
Source: [Centre for Immunization and Respiratory Infectious Diseases \(CIRID\)](#)

2. Comparison to previous influenza seasons

For the 2016-2017 surveillance season to date, 212 laboratory-confirmed influenza cases have been reported. Among these cases, 90.6% (192/212) were influenza A ([Table 6](#)). Of the 116 reported influenza A cases with subtype information available, 98.3% (114/116) were H3N2 and 1.7% (2/116) were (H1N1)pdm09. Influenza activity in week 47 was low, and within expected levels for this time of year.

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:	To be determined

Figure 4: Number of reported confirmed cases of influenza A by surveillance week: Ontario, September 1, 2012 to November 26, 2016

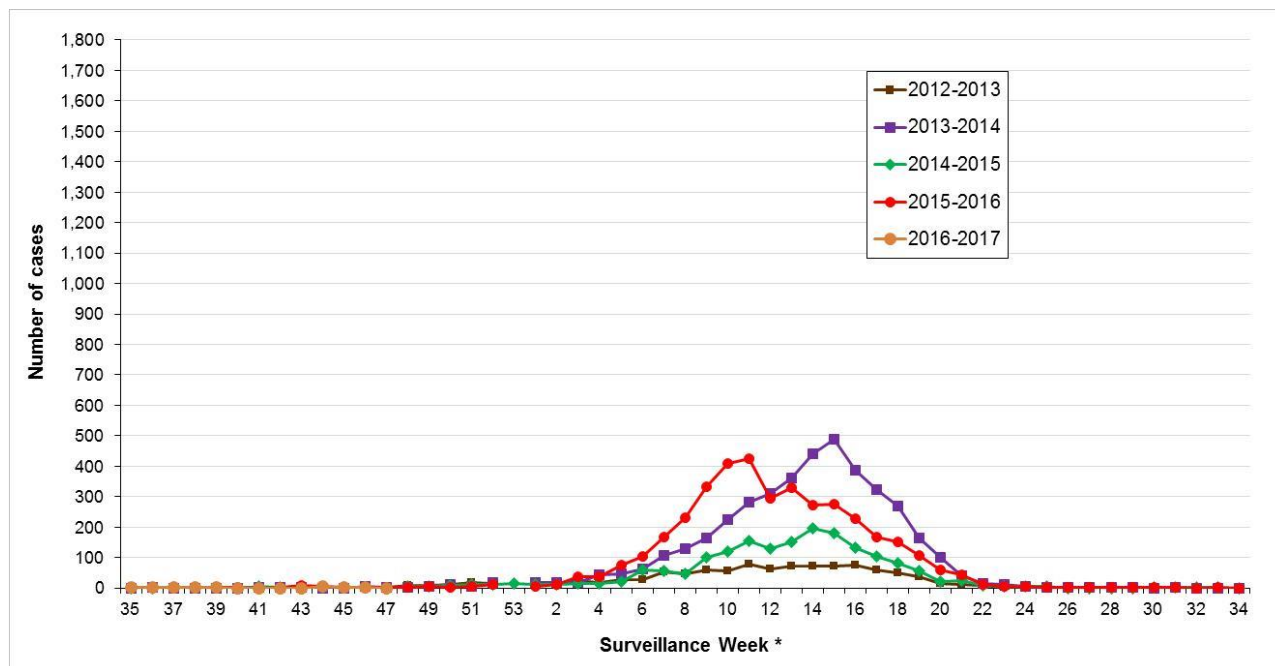


Source: [Integrated Public Health Information System \(iPHIS\)](#)

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, 2012 to November 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

Two influenza outbreaks were reported in Week 47 ([Figure 6](#)). Of seven influenza A outbreaks with subtyping information reported for the season to date, all were H3N2. Influenza was detected in 3.9% (11/283) of institutional respiratory infection outbreaks reported to date in the 2016-2017 season. 63.6% (180/283) of the outbreaks were reported as entero/rhinovirus. Most respiratory infection outbreaks were reported from long-term care homes (173/283 or 61.1% of all reported outbreaks).

Table 1: Institutional respiratory infection outbreaks: Ontario, Week 47 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	2	14.3%	11	3.9%
Influenza B ³	0	0.0%	0	0.0%
Both influenza A and B ³	0	0.0%	0	0.0%
Enterovirus	5	35.7%	180	63.6%
Parainfluenza (all types)	0	0.0%	9	3.2%
Respiratory syncytial virus (RSV)	0	0.0%	1	0.4%
Human metapneumovirus, adenovirus, coronavirus or other viruses	0	0.0%	10	3.5%
Two or more non-influenza viruses ³	1	7.1%	15	5.3%
No organism reported	6	42.9%	57	20.1%
TOTAL	14	100.0%	283	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. November 20, 2016 – November 26, 2016 (Week 47), 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 date¹

Setting type reported	Number of influenza outbreaks (% of total)	Number of other respiratory viruses (% of total)
Long-Term Care Home	6 (54.5%)	167 (61.4%)
Hospital	2 (18.2%)	13 (4.8%)
Retirement Home	1 (9.1%)	31 (11.4%)
Other ²	0 (0.0%)	3 (1.1%)
Unknown	2 (18.2%)	58 (21.3%)
TOTAL	11 (100.0%)	272 (100.0%)

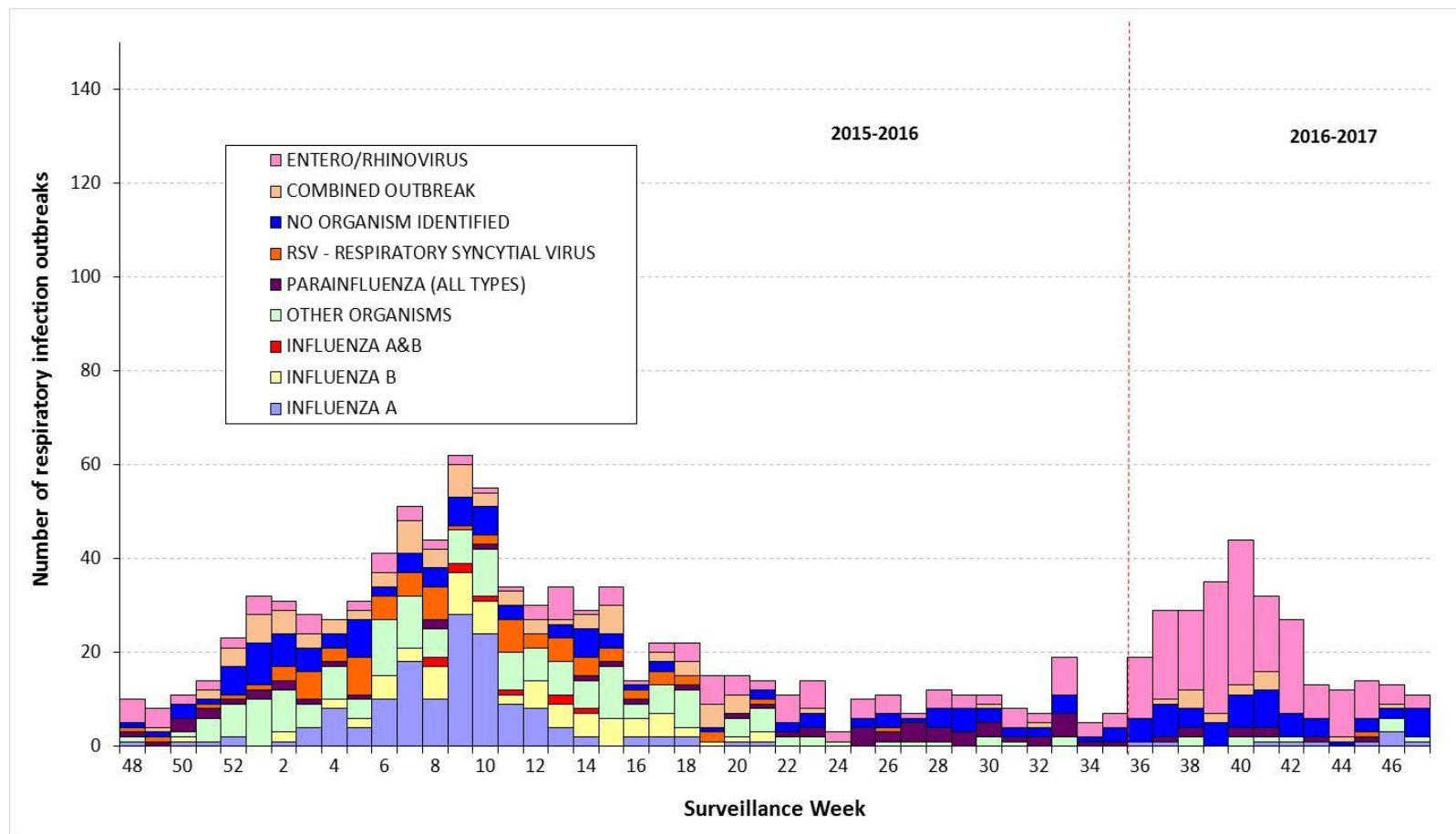
Source: [Integrated Public Health Information System \(iPHIS\)](#)

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, November 29, 2015 to November 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.

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

In the season to date, 50 hospitalizations and 1 death have been reported among laboratory-confirmed influenza cases. The majority (44/50 or 88.0%) of hospitalizations have occurred in influenza A cases. Six of 50 hospitalizations (12.0%) occurred in patients with influenza B. 60.0% (30/50) of the hospitalizations were in individuals 65 years of age and older. In week 47, 7 of the hospitalized cases with influenza A were 65 years of age and older. The highest hospitalization rate was seen in adults aged 65 years and older.

For week 47 based on PHOL data, influenza A positivity was 3.3% and no influenza B was identified among respiratory specimens tested. The highest number of influenza A detections occurred among individuals who presented for care at hospital and emergency departments. Overall, enterovirus was the predominant respiratory virus and was more commonly detected from individuals in hospital and emergency departments.

Table 3: Hospitalizations and deaths among confirmed influenza cases by age group: Ontario, Week 47 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	0	1 (0.7)	0	0 (0.0)
1 – 4	0	2 (0.3)	0	0 (0.0)
5 – 14	0	3 (0.2)	0	0 (0.0)
15 – 24	0	0 (0.0)	0	0 (0.0)
25 – 44	2	3 (0.1)	0	0 (0.0)
45 – 64	4	11 (0.3)	0	0 (0.0)
65+	7	30 (1.4)	1	1 (0.0)
Total	13	50 (0.4)	1	1 (0.0)

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 the 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 47 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	1 (1.1)	5 (0.9)	11 (3.7)	40 (1.6)	11 (4.5)	51 (2.4)	4 (2.2)	38 (1.5)	1 (2.6)	15 (2.2)
Influenza A (H3N2) ⁴	1	5	11	40	11	50	4	30	1	14
Influenza A (H1N1)pdm09 ⁴	0	0	0	0	0	1	0	2	0	0
Influenza B	0 (0.0)	1 (0.2)	0 (0.0)	1 (0.0)	0 (0.0)	1 (0.0)	0 (0.0)	4 (0.2)	0 (0.0)	0 (0.0)
Adenovirus	0 (0.0)	2 (0.4)	7 (2.4)	20 (0.8)	11 (4.5)	45 (2.1)	6 (3.3)	33 (1.3)	0 (0.0)	1 (0.1)
Coronavirus	0 (0.0)	2 (0.4)	4 (1.4)	22 (2.1)	7 (2.9)	15 (1.8)	8 (4.5)	27 (2.6)	1 (2.6)	9 (1.8)
Entero/rhinovirus ⁵	11 (12.1)	91 (17.0)	45 (15.3)	201 (17.6)	44 (18.2)	174 (19.3)	39 (21.7)	266 (22.0)	10 (26.3)	294 (58.3)
Human metapneumovirus	0 (0.0)	1 (0.2)	2 (0.7)	7 (0.3)	3 (1.2)	13 (0.6)	1 (0.6)	15 (0.6)	0 (0.0)	3 (0.4)
Parainfluenza(all types)	0 (0.0)	7 (1.3)	11 (3.7)	84 (3.3)	12 (5.0)	101 (4.7)	7 (3.9)	80 (3.2)	1 (2.6)	35 (5.2)
Respiratory syncytial virus	5 (5.5)	14 (2.6)	38 (12.9)	91 (3.6)	18 (7.4)	75 (3.5)	12 (6.7)	63 (2.5)	8 (21.1)	19 (2.8)
Total positives⁵	17 (18.7)	123 (22.5)	118 (40.0)	466 (18.4)	106 (43.8)	475 (21.9)	77 (42.8)	526 (20.7)	21 (55.3)	376 (56.1)

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 The numbers of enterovirus/rhinovirus and coronavirus may be higher this week due to the change to more a sensitive test method and new testing algorithm for respiratory viruses at PHOL that became effective as of November 7, 2016

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5. By Jurisdiction – Influenza activity

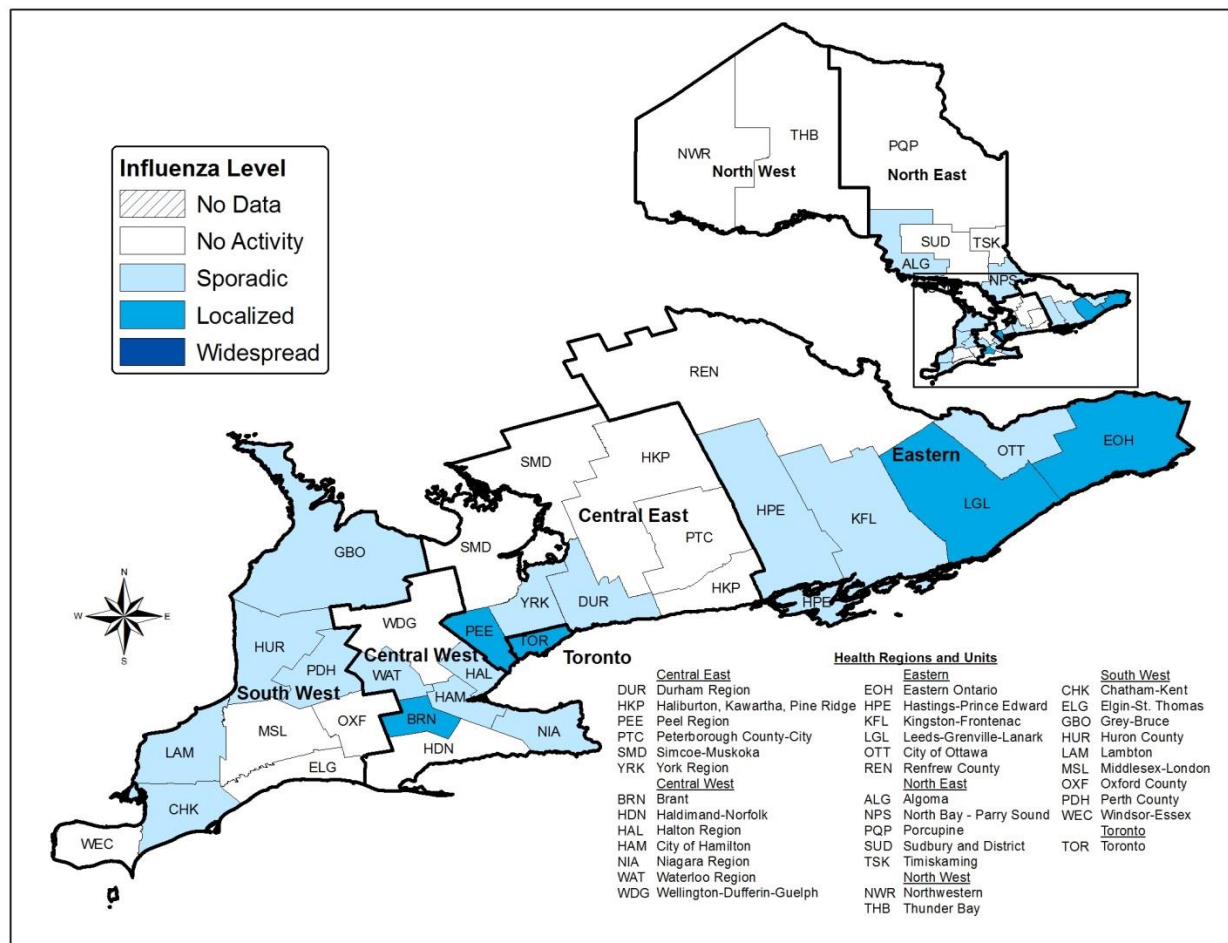
Influenza activity continues to be reported across the province, with 5 public health units reporting 'localized' activity, 16 reporting 'sporadic' activity and 15 reporting no activity.

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, November 20, 2016 to November 26, 2016 (Week 47)



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 47 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	22 (96)	12 (94)	0 (0)	0.0 (0.0)	0 (0)	0 (0)	0 (0)	0.0 (0.0)
Thunder Bay District	15 (151)	11 (140)	0 (0)	0.0 (0.0)	0 (0)	0 (0)	0 (0)	0.0 (0.0)
TOTAL NORTH WEST	37 (247)	23 (234)	0 (0)	0.0 (0.0)	0 (0)	0 (0)	0 (0)	0.0 (0.0)
Algoma	17 (112)	11 (96)	2 (6)	18.2 (6.3)	0 (0)	2 (6)	0 (0)	0.0 (0.0)
North Bay Parry Sound District	33 (148)	29 (143)	3 (3)	10.3 (2.1)	0 (0)	3 (3)	0 (0)	0.0 (0.0)
Porcupine	13 (84)	16 (79)	0 (0)	0.0 (0.0)	0 (0)	0 (0)	0 (0)	0.0 (0.0)
Sudbury & District	13 (120)	18 (118)	0 (0)	0.0 (0.0)	0 (0)	0 (0)	0 (0)	0.0 (0.0)
Timiskaming	2 (29)	2 (28)	0 (0)	0.0 (0.0)	0 (0)	0 (0)	0 (0)	0.0 (0.0)
TOTAL NORTH EAST	78 (493)	76 (464)	5 (9)	6.6 (1.9)	0 (0)	5 (9)	0 (0)	0.0 (0.0)
City of Ottawa	1 (91)	1 (83)	0 (1)	0.0 (1.2)	0 (0)	0 (1)	0 (0)	0.0 (0.0)
Eastern Ontario	9 (85)	13 (89)	2 (2)	15.4 (2.2)	0 (0)	2 (2)	0 (0)	0.0 (0.0)
Hastings & Prince Edward Counties	9 (88)	11 (82)	1 (2)	9.1 (2.4)	0 (0)	1 (2)	0 (0)	0.0 (0.0)
Kingston, Frontenac, Lennox & Addington	36 (233)	25 (225)	1 (6)	4.0 (2.7)	0 (0)	1 (5)	0 (1)	0.0 (0.4)
Leeds, Grenville And Lanark District	7 (41)	5 (42)	3 (3)	60.0 (7.1)	0 (0)	3 (3)	0 (0)	0.0 (0.0)
Renfrew County And District	3 (35)	3 (29)	0 (0)	0.0 (0.0)	0 (0)	0 (0)	0 (0)	0.0 (0.0)
TOTAL EASTERN	65 (573)	58 (550)	7 (14)	12.1 (2.5)	0 (0)	7 (13)	0 (1)	0.0 (0.2)
Durham Region	50 (459)	42 (441)	1 (7)	2.4 (1.6)	0 (0)	1 (7)	0 (0)	0.0 (0.0)
Haliburton, Kawartha, Pine Ridge	36 (179)	31 (175)	1 (2)	3.2 (1.1)	0 (0)	1 (2)	0 (0)	0.0 (0.0)
Peel Region	81 (1,083)	58 (1,049)	2 (28)	3.4 (2.7)	0 (0)	2 (28)	0 (0)	0.0 (0.0)
Peterborough County-City	11 (119)	9 (118)	0 (0)	0.0 (0.0)	0 (0)	0 (0)	0 (0)	0.0 (0.0)
Simcoe Muskoka District	65 (502)	60 (494)	0 (1)	0.0 (0.2)	0 (0)	0 (1)	0 (0)	0.0 (0.0)
York Region	101 (792)	91 (765)	3 (18)	3.3 (2.4)	0 (0)	3 (18)	0 (0)	0.0 (0.0)
TOTAL CENTRAL EAST	344 (3,134)	291 (3,042)	7 (56)	2.4 (1.8)	0 (0)	7 (56)	0 (0)	0.0 (0.0)
Toronto	197 (2,171)	184 (2,102)	1 (21)	0.5 (1.0)	0 (2)	1 (19)	0 (1)	0.0 (0.0)
TOTAL TORONTO	197 (2,171)	184 (2,102)	1 (21)	0.5 (1.0)	0 (2)	1 (19)	0 (1)	0.0 (0.0)
Chatham-Kent	18 (51)	20 (55)	0 (1)	0.0 (1.8)	0 (0)	0 (1)	0 (0)	0.0 (0.0)
Elgin-St. Thomas	10 (44)	8 (44)	0 (1)	0.0 (2.3)	0 (0)	0 (0)	0 (0)	0.0 (0.0)
Grey Bruce	19 (143)	15 (138)	0 (2)	0.0 (1.4)	0 (0)	0 (2)	0 (0)	0.0 (0.0)
Huron County	7 (51)	7 (52)	1 (2)	14.3 (3.8)	0 (0)	1 (2)	0 (0)	0.0 (0.0)
Lambton County	13 (76)	12 (76)	0 (2)	0.0 (2.6)	0 (0)	0 (2)	0 (1)	0.0 (1.3)
Middlesex-London	10 (126)	6 (118)	0 (2)	0.0 (1.7)	0 (0)	0 (2)	0 (0)	0.0 (0.0)
Oxford County	3 (54)	2 (51)	0 (0)	0.0 (0.0)	0 (0)	0 (0)	0 (0)	0.0 (0.0)
Perth District	10 (97)	9 (97)	1 (9)	11.1 (9.3)	0 (0)	1 (9)	0 (0)	0.0 (0.0)
Windsor-Essex County	14 (137)	11 (131)	0 (4)	0.0 (3.1)	0 (0)	0 (4)	0 (0)	0.0 (0.0)

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	104 (779)	90 (762)	2 (23)	2.2 (3.0)	0 (0)	2 (22)	0 (1)	0.0 (0.1)
Brant County	26 (189)	23 (190)	1 (6)	4.3 (3.2)	0 (0)	1 (6)	0 (0)	0.0 (0.0)
City Of Hamilton	12 (113)	11 (102)	0 (0)	0.0 (0.0)	0 (0)	0 (0)	0 (0)	0.0 (0.0)
Haldimand-Norfolk	7 (83)	6 (76)	0 (2)	0.0 (2.6)	0 (0)	0 (2)	0 (0)	0.0 (0.0)
Halton Region	35 (309)	26 (293)	1 (5)	3.8 (1.7)	0 (0)	1 (5)	0 (0)	0.0 (0.0)
Niagara Region	19 (191)	9 (160)	0 (0)	0.0 (0.0)	0 (0)	0 (0)	0 (0)	0.0 (0.0)
Waterloo Region	22 (244)	21 (239)	3 (5)	14.3 (2.1)	0 (1)	3 (4)	0 (2)	0.0 (0.8)
Wellington-Dufferin-Guelph	29 (216)	28 (210)	1 (3)	3.6 (1.4)	0 (0)	1 (3)	0 (0)	0.0 (0.0)
TOTAL CENTRAL WEST	150 (1,345)	124 (1,270)	6 (21)	4.8 (1.7)	0 (1)	6 (20)	0 (2)	0.0 (0.2)
OUT OF PROVINCE	3 (98)	0 (21)	0 (5)	NA (23.8)	0 (0)	0 (0)	0 (2)	NA (10.0)
TOTAL ONTARIO	978 (8,840)	846 (8,445)	28 (149)	3.3 (1.8)	0 (3)	28 (139)	0 (7)	0.0 (0.1)

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 47 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)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Thunder Bay District	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)	1 (1)
TOTAL NORTH WEST	0 (0)	0 (0)	1 (1)	0 (0)	0 (0)	1 (1)
Algoma	0 (0)	1 (5)	1 (5)	0 (0)	0 (0)	1 (5)
North Bay Parry Sound District	0 (0)	1 (1)	1 (1)	0 (0)	0 (1)	1 (2)
Porcupine	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Sudbury & District	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Timiskaming	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
TOTAL NORTH EAST	0 (0)	2 (6)	2 (6)	0 (0)	0 (1)	2 (7)
City of Ottawa	0 (0)	0 (1)	1 (6)	0 (0)	0 (2)	1 (8)
Eastern Ontario	0 (0)	2 (2)	2 (4)	0 (0)	0 (0)	2 (4)
Hastings & Prince Edward Counties	0 (0)	1 (1)	1 (1)	0 (0)	0 (0)	1 (1)
Kingston, Frontenac, Lennox & Addington	0 (0)	2 (3)	2 (6)	0 (0)	0 (1)	2 (7)
Leeds, Grenville And Lanark District	0 (0)	2 (2)	2 (3)	0 (0)	0 (0)	2 (3)
Renfrew County And District	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
TOTAL EASTERN	0 (0)	7 (9)	8 (20)	0 (0)	0 (3)	8 (23)
Durham Region	0 (0)	1 (6)	5 (10)	0 (0)	0 (0)	5 (10)
Haliburton, Kawartha, Pine Ridge ²	0 (0)	0 (1)	0 (1)	0 (0)	0 (0)	0 (1)
Peel Region	0 (0)	3 (20)	5 (29)	0 (0)	0 (0)	5 (29)
Peterborough County-City	0 (0)	0 (1)	0 (1)	0 (0)	0 (0)	0 (1)
Simcoe Muskoka District	0 (0)	0 (1)	0 (1)	0 (0)	0 (0)	0 (1)
York Region	0 (0)	2 (15)	2 (17)	0 (0)	0 (1)	2 (18)
TOTAL CENTRAL EAST	0 (0)	6 (44)	12 (59)	0 (0)	0 (1)	12 (60)
Toronto	0 (1)	3 (16)	12 (44)	0 (1)	0 (7)	12 (52)
TOTAL TORONTO	0 (1)	3 (16)	12 (44)	0 (1)	0 (7)	12 (52)
Chatham-Kent	0 (0)	1 (1)	1 (1)	0 (0)	0 (0)	1 (1)
Elgin-St. Thomas	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Grey Bruce	0 (0)	0 (1)	1 (2)	0 (0)	0 (0)	1 (2)
Huron County	0 (0)	1 (2)	1 (2)	0 (0)	0 (0)	1 (2)
Lambton County	0 (0)	1 (2)	1 (2)	0 (0)	0 (1)	1 (3)
Middlesex-London	0 (0)	0 (6)	0 (8)	0 (0)	0 (0)	0 (8)
Oxford County	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)
Perth District	0 (0)	1 (9)	1 (11)	0 (0)	0 (0)	1 (11)
Windsor-Essex County	0 (0)	0 (4)	0 (4)	0 (0)	0 (0)	0 (4)
TOTAL SOUTH WEST	0 (0)	4 (25)	5 (30)	0 (0)	0 (1)	5 (31)
Brant County	0 (0)	0 (4)	0 (5)	0 (0)	0 (0)	0 (5)
City Of Hamilton	0 (0)	0 (0)	1 (7)	0 (0)	0 (2)	1 (9)
Haldimand-Norfolk	0 (0)	0 (2)	0 (2)	0 (0)	0 (0)	0 (2)
Halton Region	0 (0)	1 (4)	2 (7)	0 (0)	0 (0)	2 (7)
Niagara Region	0 (0)	0 (0)	1 (6)	0 (0)	0 (1)	1 (7)
Waterloo Region	0 (1)	1 (2)	1 (3)	0 (0)	1 (3)	2 (6)
Wellington-Dufferin-Guelph	0 (0)	0 (2)	0 (2)	0 (0)	0 (0)	0 (2)
TOTAL CENTRAL WEST	0 (1)	2 (14)	5 (32)	0 (0)	1 (6)	6 (38)
TOTAL ONTARIO	0 (2)	24 (114)	45 (192)	0 (1)	1 (19)	46 (212)

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

Very few influenza A(H3N2) viruses were detected in respiratory specimens during week 47. The highest number was detected among the 65+ age group. Overall, entero/rhinovirus was the most common respiratory virus detected at PHOL, primarily among children aged 1-4 years and adults 65 and older. 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 47 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	1 (1.4)	4 (0.6)	2 (2.0)	6 (0.8)	3 (7.1)	10 (1.9)	5 (1.9)	45 (1.6)	17 (4.7)	79 (2.2)
Influenza A(H3N2) ³	1	4	2	6	3	10	5	41	17	78
Influenza A(H1N1)pdm09 ³	0	0	0	0	0	0	0	3	0	0
Influenza B	0 (0.0)	2 (0.3)	0 (0.0)	1 (0.1)	0 (0.0)	0 (0.0)	0 (0.0)	1 (0.0)	0 (0.0)	1 (0.0)
Adenovirus	1 (1.4)	10 (1.5)	12 (11.9)	42 (5.6)	5 (11.9)	17 (3.3)	5 (1.9)	26 (0.9)	1 (0.3)	6 (0.2)
Coronavirus	2 (2.7)	5 (1.9)	2 (2.0)	7 (2.7)	1 (2.4)	1 (0.6)	9 (3.4)	24 (1.8)	6 (1.7)	38 (2.0)
Enterovirus	23 (31.1)	103 (34.8)	44 (43.6)	112 (37.0)	5 (11.9)	36 (17.4)	31 (11.5)	237 (15.9)	46 (12.8)	536 (27.0)
Human metapneumovirus	2 (2.7)	4 (0.6)	1 (1.0)	6 (0.8)	1 (2.4)	7 (1.5)	2 (0.7)	11 (0.4)	0 (0.0)	11 (0.3)
Parainfluenza	3 (4.1)	57 (8.4)	8 (7.9)	64 (8.6)	0 (0.0)	18 (3.5)	8 (3.0)	63 (2.2)	12 (3.3)	101 (2.8)
Respiratory syncytial virus	33 (44.6)	94 (13.9)	29 (28.7)	96 (12.9)	0 (0.0)	7 (1.4)	9 (3.3)	23 (0.8)	10 (2.8)	40 (1.1)
Total positives⁴	65 (87.8)	279 (41.3)	98 (97.0)	334 (44.8)	15 (35.7)	96 (18.6)	69 (25.7)	430 (15.1)	92 (25.6)	812 (22.4)

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.

7. Strain comparisons – circulating influenza strains and vaccine strains

40 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.

49 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 49 H3N2 viruses belonged to the same genetic group as A/Hong Kong/4801/2014-like virus which is the influenza A/H3N2 component of the 2016-17 Northern Hemisphere influenza vaccine.

NML reported that the 6 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 10 influenza B viruses characterized in Canada, NML reported that 7 were antigenically similar to B/Brisbane/60/2008, which is the recommended influenza B strain for the Northern Hemisphere 2016-2017 trivalent vaccine, and 3 influenza B viruses were characterized as B/Phuket/3073/2013-like, which is included as an influenza B component of the 2016-2017 quadrivalent vaccine.

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

Influenza strains	Ontario	Canada
Influenza A (H3N2) A/Hong Kong/4801/2014-like	26	40
Influenza A (H1N1) A/California/07/09-like	3	6
Influenza B B/Brisbane/60/08-like	0	7
B/Phuket/3073/13-like	1	3

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 oseltamivir and zanamivir, and resistant 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, 2016 to December 1, 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)	15	0	39	0	0	44	0	88	0	44	0	88
Influenza A (H1N1)pdm09	2	0	4	0	0	2	0	5	0	2	0	5
Influenza B	NA	NA	NA	NA	0	1	0	9	0	1	0	9

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

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

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9. Bacterial pathogens

Four specimens were positive for *Bordetella pertussis* and no specimen was positive for *Bordetella parapertussis* or *Bordetella holmesii* during week 47. Two specimens were positive for *Mycoplasma pneumoniae* and no specimen tested positive for *Chlamydomphila pneumoniae* during this week.

Table 10: Number and percent positivity of respiratory specimens tested for any *Bordetella* species, *Mycoplasma pneumoniae*, or *Chlamydomphila pneumoniae*, Public Health Ontario Laboratories, week 47.

Pathogens	Tested	Positives	% positivity
	Current (Cumulative)	Current (Cumulative)	Current (Cumulative)
<i>Bordetella pertussis</i>	104 (4231)	4 (268)	4 (6)
<i>Bordetella parapertussis</i>	104 (4231)	0 (6)	0 (0)
<i>Bordetella holmesii</i>	104 (4231)	0 (3)	0 (0)
<i>Mycoplasma pneumoniae</i>	47 (487)	2 (22)	4 (5)
<i>Chlamydomphila pneumoniae</i>	47 (487)	0 (2)	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 *Chlamydomphila* 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 November 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 December 1, 2016. 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.