

ONTARIO RESPIRATORY PATHOGEN BULLETIN

Surveillance Week 1: (December 30, 2018 - January 5, 2019)

This issue of the Ontario Respiratory Pathogen Bulletin provides information on the surveillance period from December 30, 2018 to January 5, 2019 (Week 1). It also provides information on the current influenza season to date, from a start date of September 1, 2018. Unless otherwise specified, data presented in this issue of the bulletin are for Week 1 and data extraction occurred on Wednesday, January 9, 2019.

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 991 influenza cases (985 influenza A, 0 influenza A & B, and 6 influenza B) reported in Week 1, which was higher than the 511 influenza cases reported in Week 52 (505 influenza A, 2 influenza A & B, and 4 influenza B).
Percent positivity for influenza ²	Similar	Percent positivity of laboratory tests for all influenza types in Week 1 was 17.6%, which was similar to the percent positivity in Week 52 (16.3%). In Week 1, percent positivity was 17.5% for influenza A and 0.1% for influenza B.
Institutional influenza outbreaks ³	Higher	There were 20 new influenza outbreaks reported in Week 1, which was higher than the number of influenza outbreaks reported in Week 52 (6).
Influenza activity levels reported by public health units	Higher	In Week 1 , 1 public health unit reported 'widespread activity,' 16 public health units reported 'localized' activity, 16 reported 'sporadic' activity, 2 reported no activity and 0 public health units did not report. In Week 52, 0 public health units reported 'widespread activity,' 7 public health units reported 'localized' activity, 17 reported 'sporadic' activity, 4 reported no activity and 7 public health units did not report.
OVERALL ASSESSMENT	Higher	Overall, the indicators show that influenza activity for Week 1 was higher when compared to Week 52.

Notes:

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

² Positivity among viral respiratory 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.

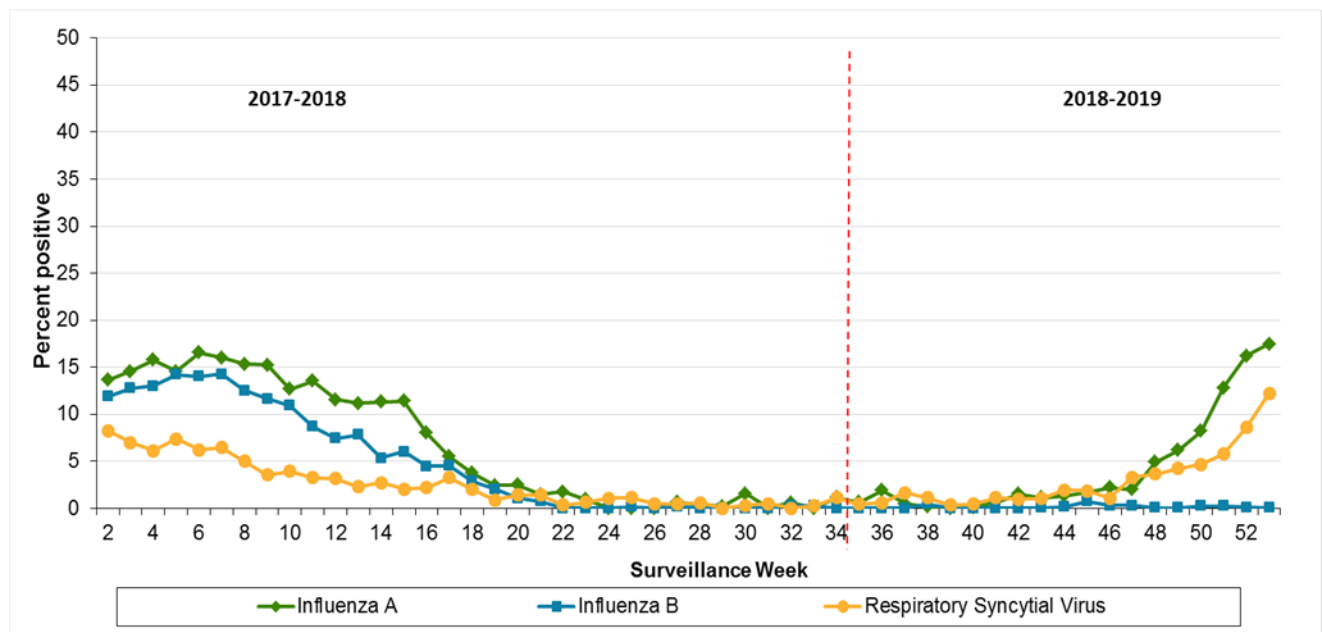
³ The number of new outbreaks reported for the current week is based on the date the outbreak was reported to the public health unit; when reported date is unavailable, the date the outbreak was created in iPHIS is used.

1. Circulating respiratory viruses in Ontario

Provincial percent positivity was moderate for influenza A and low for influenza B, at 17.5% (445/2546) and 0.1% (2/2546) respectively in Week 1 (Figure 1 and Figure 3). Of the 278 influenza A positive tests for which subtyping was available, 87.1% (242/278) were (H1N1)pdm09 in week 1; for the season to date, 80.7% (752/932) were (H1N1)pdm09. Influenza activity based on percent positivity in week 1 was moderate.

Respiratory syncytial virus was the most common circulating non-influenza respiratory virus, with provincial percent positivity at 12.3% (304/2481) (Figure 2).

Figure 1. Percentage of respiratory viral pathogens (influenza A, influenza B, and respiratory syncytial virus) detected among specimens tested for that pathogen by all testing methods: Ontario, January 7, 2018 to January 5, 2019

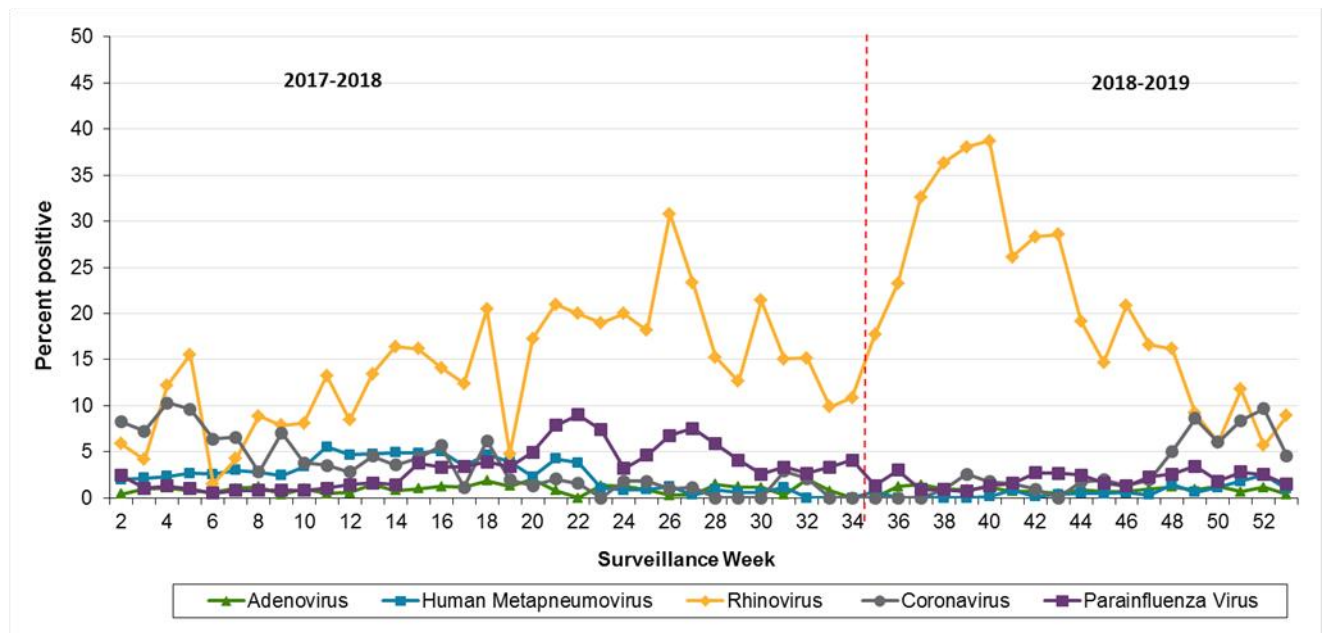


Source: [Centre for Immunization and Respiratory Infectious Diseases \(CIRID\)](#)

Notes:

- Changes in the testing algorithm used by the Public Health Ontario Laboratory will impact the interpretation of respiratory virus reports over time. Please see the [data sources](#) section with regard to the changes to the Public Health Ontario Laboratory testing algorithm.

Figure 2. Percentage of respiratory viral pathogens (parainfluenza virus, adenovirus, human metapneumovirus, rhinovirus and coronavirus) detected among specimens tested for that pathogen by all testing methods: Ontario, January 7, 2018 to January 5, 2019

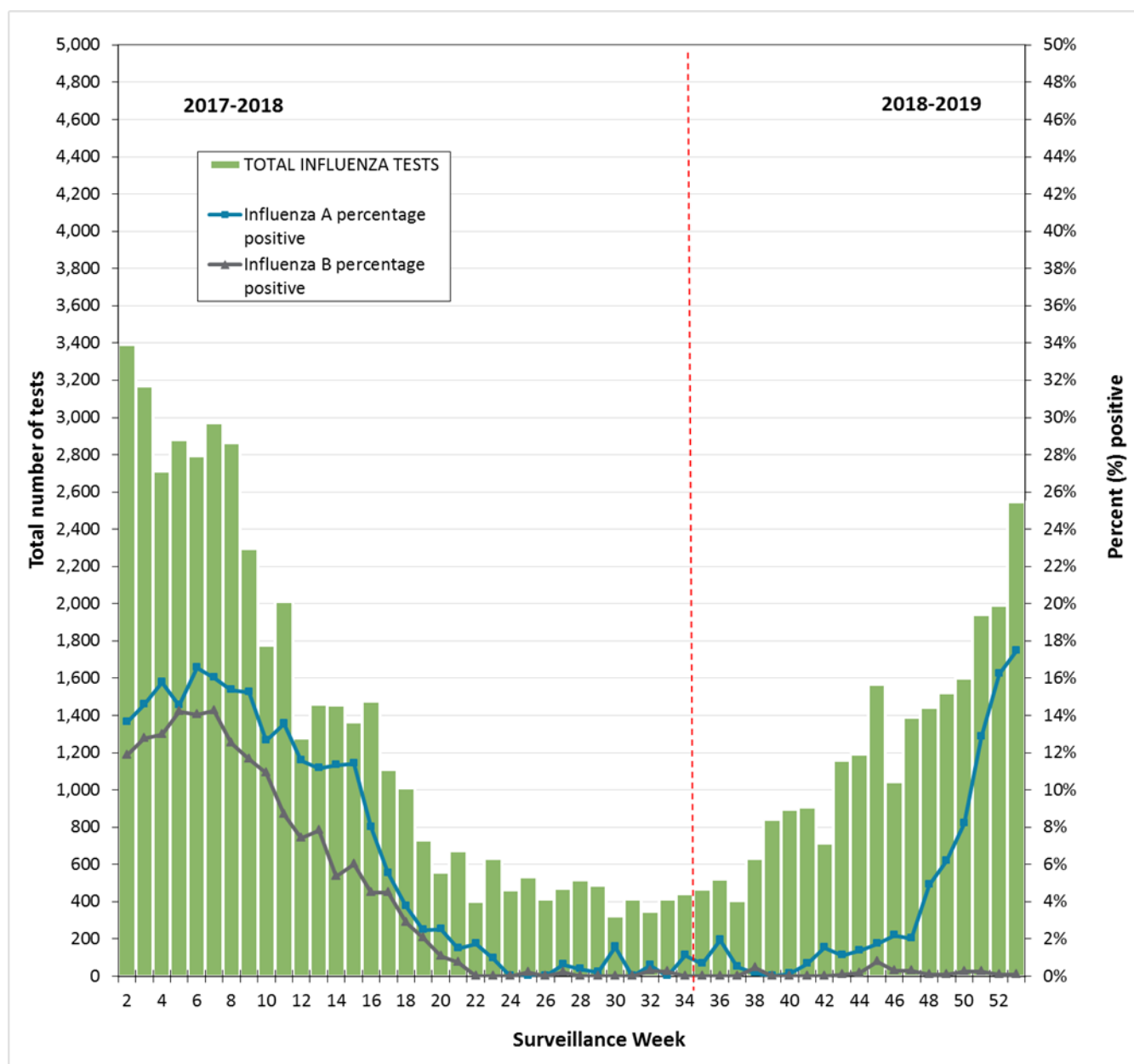


Source: [Centre for Immunization and Respiratory Infectious Diseases \(CIRID\)](#)

Notes:

- Changes in the testing algorithm used by the Public Health Ontario Laboratory will impact the interpretation of respiratory virus reports over time. Please see the [data sources](#) section with regard to the changes to the Public Health Ontario Laboratory testing algorithm.

Figure 3. Total number of influenza tests performed and percent of tests positive for influenza A and B by surveillance week: Ontario, January 7, 2018 to January 5, 2019



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

Notes:

- Changes in the testing algorithm used by the Public Health Ontario Laboratory will impact the interpretation of respiratory virus reports over time. Please see the [data sources](#) section with regard to the changes to the Public Health Ontario Laboratory testing algorithm.

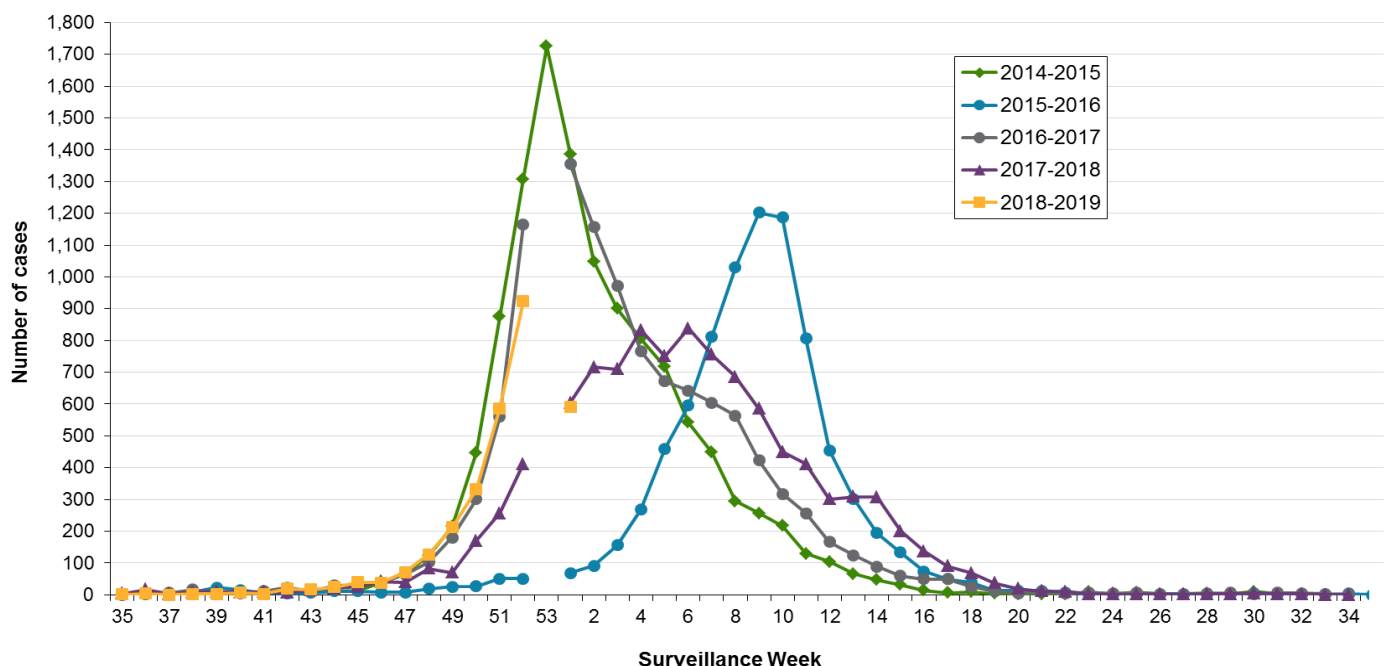
2. Laboratory-confirmed influenza cases

For the 2018-2019 surveillance season to date, 3069 laboratory-confirmed influenza cases have been reported in Ontario. Among these cases, 97.7% (2998/3069) were influenza A ([Table 6](#)). Of the 597 reported influenza A cases with subtype information available, 21.9% (131/597) were H3N2 and 78.1% (466/597) were (H1N1)pdm09.

Dominant A Subtype and B Lineage by Season

- 2014-2015: A(H3N2), B Yamagata
- 2015-2016: A(H1N1)pdm09, B Victoria
- 2016-2017: A(H3N2), B Yamagata
- 2017-2018: A(H3N2), B Yamagata
- 2018-2019: A(H1N1)pdm09, dominant B lineage to be determined

Figure 4. Number of reported confirmed cases of influenza A by surveillance week and season: Ontario, September 1, 2014 to January 5, 2019

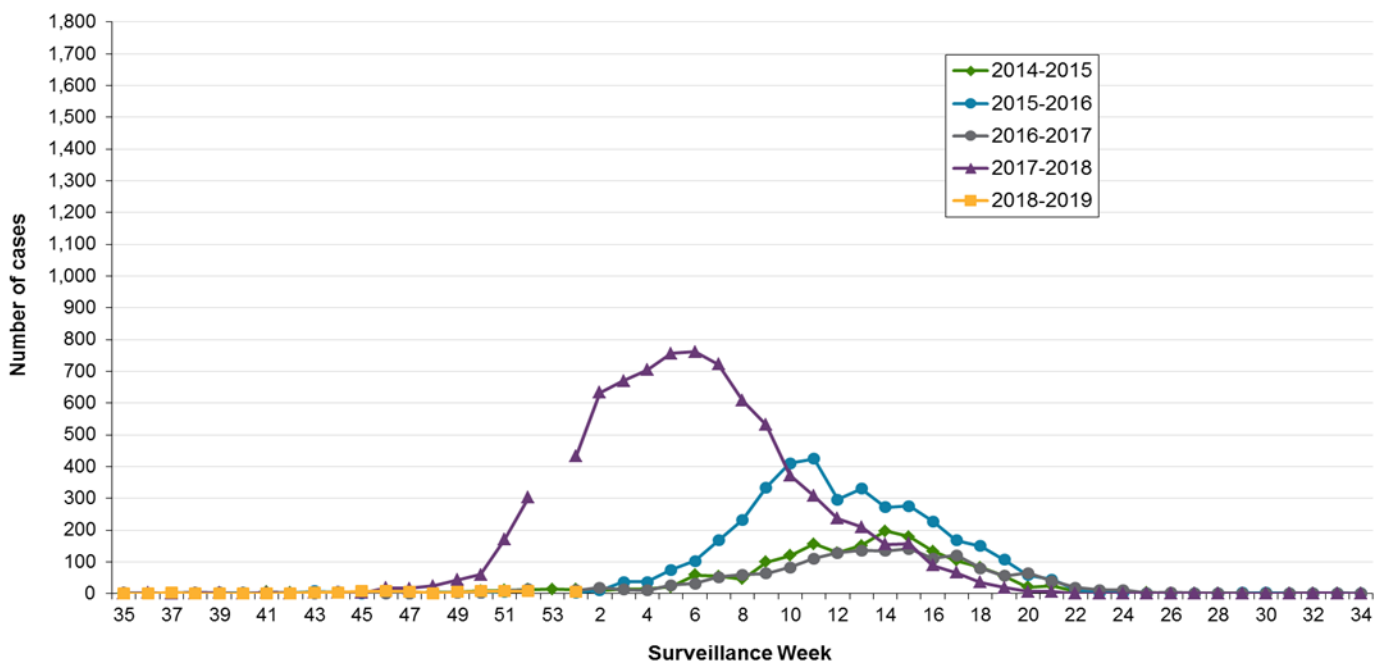


Source: [integrated Public Health Information System \(iPHIS\)](#)

Notes:

- Case counts are assigned to surveillance weeks based on the episode date entered in iPHIS to better reflect influenza activity. See the [data sources](#) section for details.
- 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.
- Changes in the testing algorithm used by the Public Health Ontario Laboratory will impact the interpretation of respiratory virus reports over time. Please see the [data sources](#) section with regard to the changes to the Public Health Ontario Laboratory testing algorithm.

Figure 5. Number of reported confirmed cases of influenza B by surveillance week and season: Ontario, September 1, 2014 to January 5, 2019



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

Notes:

- Case counts are assigned to surveillance weeks based on the episode date entered in iPHIS to better reflect influenza activity. See the [data sources](#) section for details.
- 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.
- Changes in the testing algorithm used by the Public Health Ontario Laboratory will impact the interpretation of respiratory virus reports over time. Please see the [data sources](#) section with regard to the changes to the Public Health Ontario Laboratory testing algorithm.

3. Institutional respiratory infection outbreaks

Twenty influenza A, zero influenza A and B, and zero influenza B outbreaks were reported in Week 1 ([Table 1](#)). Influenza was detected in 11.4% (51/449) of institutional respiratory infection outbreaks reported to date in the 2018-2019 season; 11.1% (50/449) were reported as respiratory syncytial virus (RSV). Most institutional respiratory infection outbreaks were reported from long-term care homes (275/449 or 61.2% of all reported outbreaks) ([Table 2](#)).

Table 1. Institutional respiratory infection outbreaks: Ontario, Week 1 and total for the 2018-2019 season to date¹

Virus reported in outbreak	Current week: Number of new outbreaks ²	Percentage of total for current week	Cumulative: Number of outbreaks	Percentage of cumulative total
Influenza A ³	20	35.7%	51	11.4%
Influenza B ³	0	0.0%	0	0.0%
Both influenza A and B ³	0	0.0%	0	0.0%
Enterovirus/rhinovirus	0	0.0%	5	1.1%
Parainfluenza (all types)	0	0.0%	12	2.7%
Respiratory syncytial virus (RSV)	14	25.0%	50	11.1%
Human metapneumovirus, adenovirus, coronavirus or other viruses	0	0.0%	6	1.3%
Two or more non-influenza viruses	0	0.0%	1	0.2%
No organism reported	22	39.3%	324	72.2%
TOTAL	56	100.0%	449	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, 2018 (Week 35, 2018) 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. December 30, 2018 – January 5, 2019 (Week 1), 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 2018-2019 season to date¹

Setting type reported	Number of influenza outbreaks (% of total)	Number of other respiratory virus outbreaks (% of total)
Long-Term Care Home	21 (41.2%)	254 (63.8%)
Hospital	13 (25.5%)	17 (4.3%)
Retirement Home	13 (25.5%)	62 (15.6%)
Other ²	1 (2.0%)	4 (1.0%)
Unknown	3 (5.9%)	61 (15.3%)
TOTAL	51 (100.0%)	398 (100.0%)

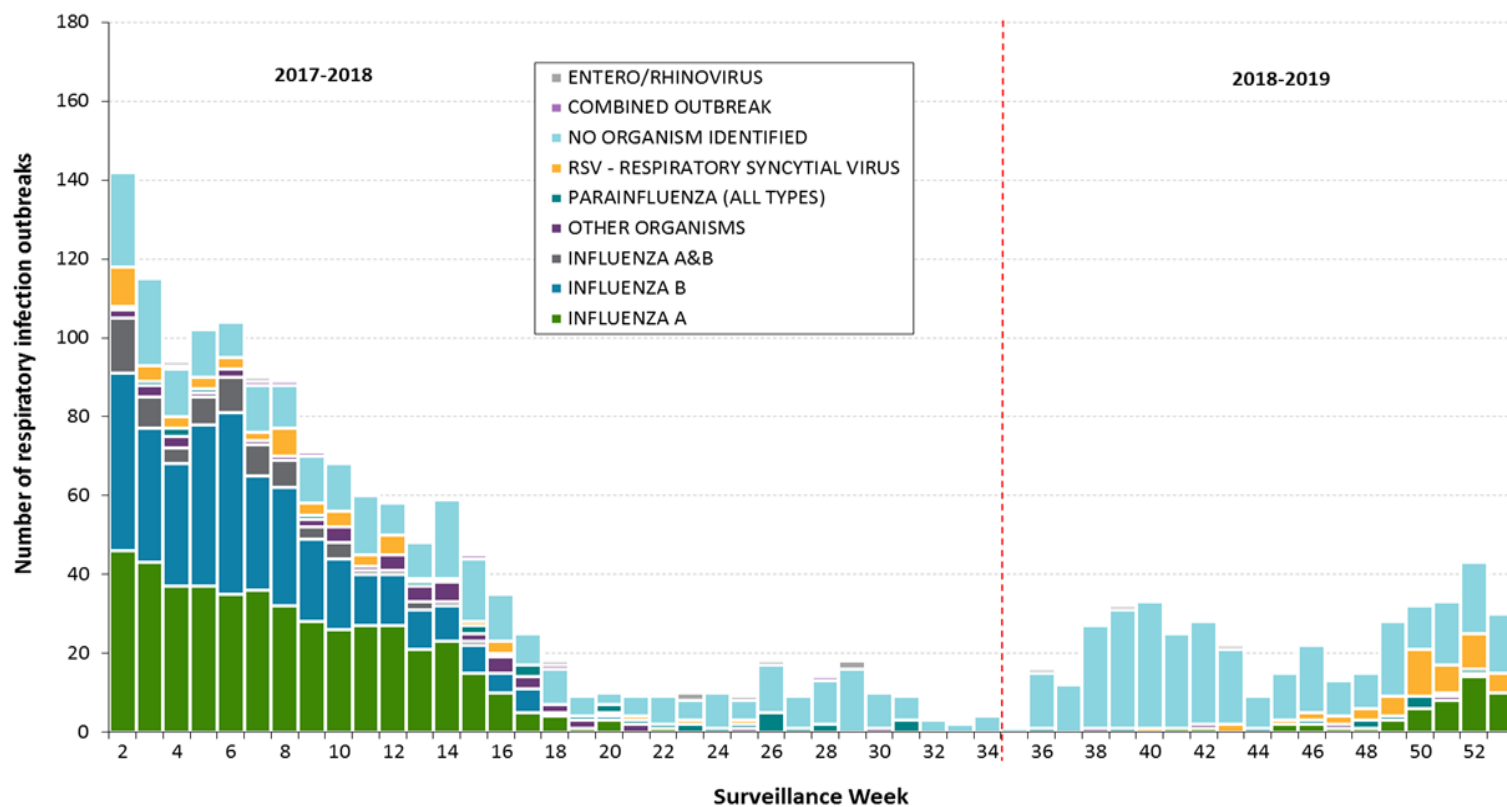
Source: [Integrated Public Health Information System \(iPHIS\)](#)

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, 2018 (Week 35, 2018) 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 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: January 7, 2018 to January 5, 2019



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.
- Changes in the testing algorithm used by the Public Health Ontario Laboratory will impact the interpretation of respiratory virus reports over time. Please see the [data sources](#) section with regard to the changes to the Public Health Ontario Laboratory testing algorithm.

4. Respiratory viruses by setting and age

Based on Public Health Ontario Laboratory (PHOL) data, week 1 influenza A positivity was 18.9% (245/1,299) compared to 18.3% (145/791) for week 52. Influenza B positivity was 0.2% (2/1,299) for week 1 compared to 0.1% (1/791) for the previous week ([Table 3](#)). Of the influenza A specimens that had subtyping completed for the 2018-2019 season (n=736), the most predominant subtype was influenza A(H1N1)pdm09 (n=589), with the remainder being comprised of Influenza A(H3N2) subtype (n=147). Most influenza A detections for this season occurred in the 20-64 and 65+ years age groups.

Table 3. Number (percentage) of specimens with respiratory pathogens detected by patient setting, Public Health Ontario Laboratory, week 1 and cumulative for the 2018-2019 season to date

Respiratory Pathogen Detected	ICU Current	ICU Cumulative	Hospitalized non-ICU Current	Hospitalized non-ICU Cumulative	Emergency Department Current	Emergency Department Cumulative	Ambulatory/ No Setting Current	Ambulatory/ No Setting Cumulative	Institution Current	Institution Cumulative
Influenza A (all)	26 (24.3)	65 (5.7)	139 (16.8)	460 (6.6)	8 (42.1)	27 (9.7)	49 (26.3)	247 (10.2)	23 (14.5)	53 (4.7)
Influenza A (H3N2)	1	3	18	77	0	9	6	31	7	27
Influenza A (H1N1)pdm09	16	50	73	308	7	18	29	192	14	21
Influenza B	0 (0.0)	1 (0.1)	2 (0.2)	21 (0.3)	0 (0.0)	1 (0.4)	0 (0.0)	4 (0.2)	0 (0.0)	0 (0.0)
Adenovirus	0 (0.0)	3 (0.3)	0 (0.0)	40 (0.7)	0 (0.0)	2 (0.8)	1 (1.6)	5 (0.3)	0 (0.0)	0 (0.0)
Enterovirus/rhinovirus	0 (NA)	0 (0.0)	0 (NA)	0 (0.0)	0 (NA)	0 (0.0)	0 (0.0)	2 (0.6)	0 (NA)	0 (0.0)
Human metapneumovirus	0 (0.0)	0 (0.0)	5 (1.2)	32 (0.5)	0 (0.0)	0 (0.0)	2 (3.2)	8 (0.5)	1 (1.5)	8 (0.9)
Parainfluenza (all types)	0 (0.0)	7 (0.7)	3 (0.7)	106 (1.8)	0 (0.0)	9 (3.8)	0 (0.0)	18 (1.1)	1 (1.5)	22 (2.4)
Respiratory syncytial virus	10 (9.8)	23 (2.1)	70 (8.6)	426 (6.1)	3 (18.8)	9 (3.4)	21 (11.9)	117 (4.9)	38 (24.5)	101 (9.0)
Total positives	35 (32.7)	98 (8.6)	216 (26.1)	1,076 (15.4)	11 (57.9)	48 (17.2)	73 (39.2)	394 (16.2)	63 (39.6)	183 (16.2)

Source: [Public Health Ontario Laboratory](#)
Please see below [Table 4](#) for additional notes.

Table 4. Number (percentage) of specimens with respiratory pathogens detected by age group (years), Public Health Ontario Laboratory, week 1 and cumulative for the 2018-2019 season to date

Respiratory Pathogen Detected	<1 Current	<1 Cumulative	1-4 Current	1-4 Cumulative	5-19 Current	5-19 Cumulative	20-64 Current	20-64 Cumulative	65+ Current	65+ Cumulative
Influenza A (all)	7 (12.3)	25 (3.4)	23 (40.4)	108 (13.8)	14 (42.4)	82 (18.0)	88 (25.4)	316 (9.2)	113 (14.1)	318 (4.9)
Influenza A (H3N2)	0	1	0	6	2	4	5	39	25	97
Influenza A (H1N1)pdm09	6	22	18	94	6	71	55	235	54	164
Influenza B	0 (0.0)	1 (0.1)	0 (0.0)	2 (0.3)	0 (0.0)	3 (0.7)	1 (0.3)	11 (0.3)	1 (0.1)	10 (0.2)
Adenovirus	0 (0.0)	13 (2.3)	0 (0.0)	21 (4.1)	0 (0.0)	5 (1.7)	1 (0.7)	7 (0.3)	0 (0.0)	4 (0.1)
Enterovirus/rhinovirus	0 (NA)	0 (0.0)	0 (NA)	0 (0.0)	0 (0.0)	0 (0.0)	0 (NA)	2 (0.9)	0 (NA)	0 (0.0)
Human metapneumovirus	1 (4.8)	6 (1.1)	0 (0.0)	2 (0.4)	0 (0.0)	0 (0.0)	2 (1.3)	8 (0.3)	5 (1.2)	32 (0.6)
Parainfluenza (all types)	1 (4.8)	28 (4.9)	0 (0.0)	30 (5.9)	0 (0.0)	7 (2.3)	2 (1.3)	23 (0.8)	1 (0.2)	74 (1.3)
Respiratory syncytial virus	26 (47.3)	166 (22.9)	17 (31.5)	159 (20.5)	4 (13.3)	23 (5.1)	23 (6.8)	77 (2.3)	72 (9.2)	249 (3.8)
Total positives	35 (61.4)	237 (32.5)	37 (64.9)	314 (40.2)	18 (54.5)	116 (25.4)	116 (33.4)	442 (12.8)	192 (23.9)	685 (10.5)

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

Notes for Table 3 and Table 4:

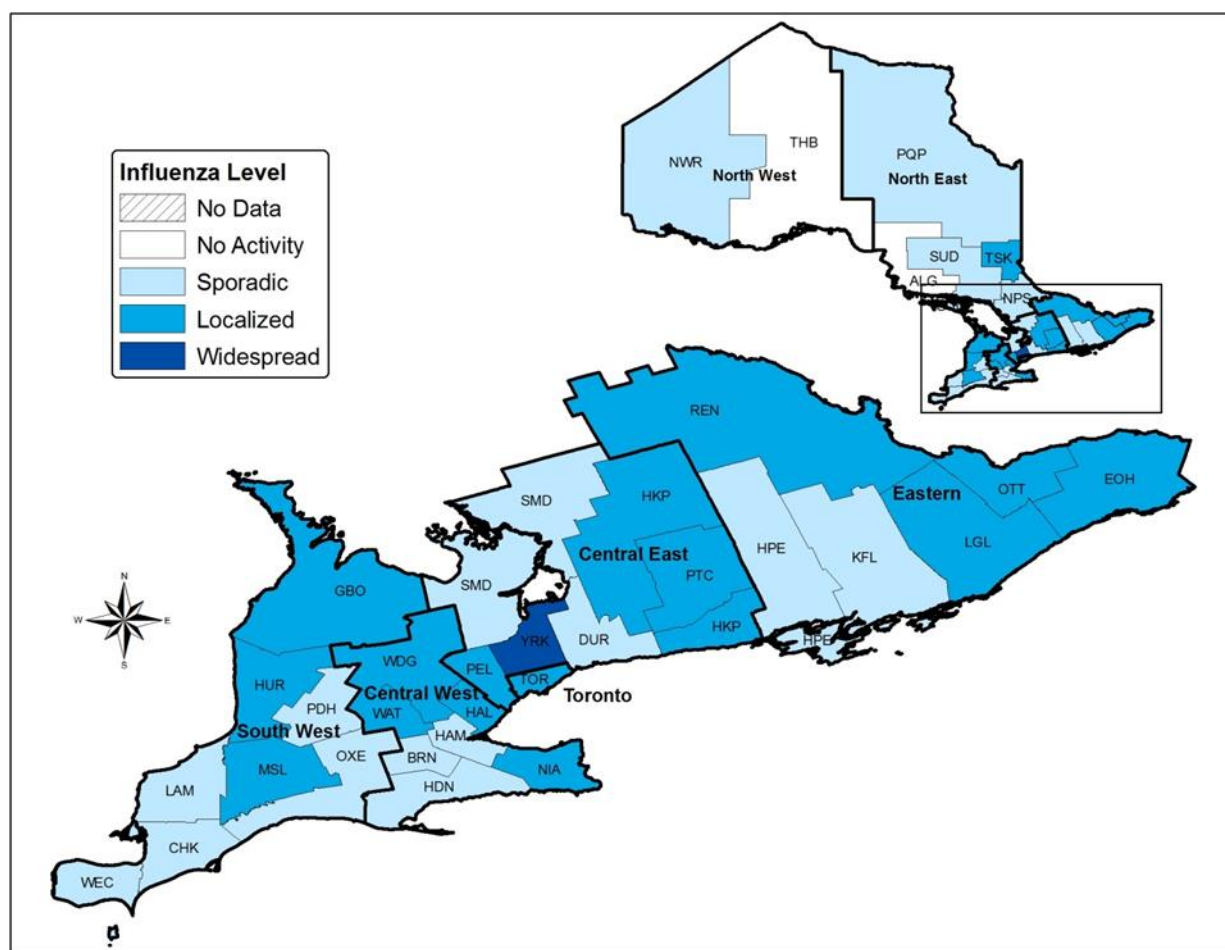
- The percentages in [Table 3](#) and [Table 4](#) are calculated as number of specimens with the respiratory pathogen detected divided by total number of specimens tested for that particular pathogen within the patient setting/same age category. Following the implementation of the new respiratory virus testing algorithm on September 20, 2017, no routine respiratory virus testing is offered to ambulatory and emergency department patients.
- Institution includes retirement homes, long term care facilities, correctional facilities, and undefined institutions. Excludes hospitals.
- Ambulatory/No Setting includes specimens where setting was missing, as well as specimens from sentinels in the Sentinel Practitioner Surveillance Network or specimens with special approval.
- Current respiratory testing does not test for coronavirus and parainfluenza virus 4.
- 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.
- 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.

- Total number of positives represents unique specimens that have at least one virus detected. Therefore, it may not correspond to the sum of viruses detected per each setting as some specimens may have more than one organism detected. 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.
- Changes in the testing algorithm used by the Public Health Ontario Laboratory will impact the interpretation of respiratory virus reports over time. Please see the [data sources](#) section with regard to the changes to the Public Health Ontario Laboratory testing algorithm.
- NA-Not applicable- Indicates no specimens were tested in that setting; therefore percent positivity was not calculated.

5. By Jurisdiction – Influenza activity

In Week 1, 1 public health unit reported ‘widespread activity,’ 16 public health units reported ‘localized’ activity, 16 reported ‘sporadic’ activity, 2 reported no activity and 0 public health units did not report.

Figure 7: Influenza activity levels reported by public health units: Ontario, December 30, 2018 to January 5, 2019 (Week 1)



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

Table 5. Specimens submitted to Public Health Ontario Laboratory for influenza testing and positive results by public health unit; number for week 52 and (cumulative total) for the 2018-2019 season to date

Public Health Unit and Region	Number of specimens submitted	Number of specimens tested	Number of influenza A positive specimens	% positivity influenza A	Influenza A(H1N1)pdm09	Influenza A H3N2	Number of influenza B positive specimens	% positivity influenza B
Northwestern	19 (98)	15 (87)	4 (16)	26.7 (18.4)	1 (12)	0 (0)	0 (0)	0.0 (0.0)
Thunder Bay District	4 (73)	4 (57)	2 (5)	50.0 (8.8)	0 (2)	0 (0)	0 (0)	0.0 (0.0)
TOTAL NORTH WEST	23 (171)	19 (144)	6 (21)	31.6 (14.6)	1 (14)	0 (0)	0 (0)	0.0 (0.0)
Algoma	15 (156)	15 (153)	2 (4)	13.3 (2.6)	0 (2)	1 (1)	0 (0)	0.0 (0.0)
North Bay Parry Sound District	42 (253)	36 (250)	1 (4)	2.8 (1.6)	0 (3)	0 (0)	0 (0)	0.0 (0.0)
Porcupine	8 (114)	5 (93)	0 (9)	0.0 (9.7)	0 (9)	0 (0)	0 (0)	0.0 (0.0)
Sudbury & District	7 (82)	6 (73)	0 (1)	0.0 (1.4)	0 (1)	0 (0)	0 (0)	0.0 (0.0)
Timiskaming	12 (90)	13 (85)	4 (9)	30.8 (10.6)	4 (9)	0 (0)	0 (0)	0.0 (0.0)
TOTAL NORTH EAST	84 (695)	75 (654)	7 (27)	9.3 (4.1)	4 (24)	1 (1)	0 (0)	0.0 (0.0)
City of Ottawa	19 (149)	17 (137)	1 (9)	5.9 (6.6)	1 (4)	0 (4)	0 (0)	0.0 (0.0)
Eastern Ontario	20 (131)	22 (124)	7 (12)	31.8 (9.7)	5 (8)	0 (1)	0 (0)	0.0 (0.0)
Hastings & Prince Edward Counties	28 (200)	21 (189)	3 (16)	14.3 (8.5)	3 (7)	0 (9)	0 (0)	0.0 (0.0)
Kingston, Frontenac, Lennox & Addington	5 (178)	4 (159)	0 (1)	0.0 (0.6)	0 (1)	0 (0)	0 (0)	0.0 (0.0)
Leeds, Grenville And Lanark District	16 (90)	13 (83)	5 (16)	38.5 (19.3)	5 (14)	0 (2)	0 (0)	0.0 (0.0)
Renfrew County And District	21 (72)	22 (68)	9 (9)	40.9 (13.2)	5 (5)	1 (1)	0 (0)	0.0 (0.0)
TOTAL EASTERN	109 (820)	99 (760)	25 (63)	25.3 (8.3)	19 (39)	1 (17)	0 (0)	0.0 (0.0)
Durham Region	52 (510)	42 (459)	15 (34)	35.7 (7.4)	9 (20)	1 (6)	0 (1)	0.0 (0.2)
Haliburton, Kawartha, Pine Ridge	37 (219)	37 (197)	9 (17)	24.3 (8.6)	6 (12)	0 (2)	0 (0)	0.0 (0.0)
Peel Region	215 (1,631)	210 (1,616)	16 (70)	7.6 (4.3)	9 (47)	1 (10)	0 (14)	0.0 (0.9)
Peterborough County-City	5 (74)	5 (70)	2 (3)	40.0 (4.3)	1 (1)	0 (0)	0 (0)	0.0 (0.0)
Simcoe Muskoka District	70 (590)	54 (540)	12 (25)	22.2 (4.6)	10 (20)	0 (2)	0 (0)	0.0 (0.0)
York Region	154 (1,372)	141 (1,321)	37 (117)	26.2 (8.9)	22 (81)	8 (28)	0 (3)	0.0 (0.2)
TOTAL CENTRAL EAST	533 (4,396)	489 (4,203)	91 (266)	18.6 (6.3)	57 (181)	10 (48)	0 (18)	0.0 (0.4)
Toronto	249 (3,109)	226 (2,842)	46 (175)	20.4 (6.2)	18 (102)	13 (51)	1 (4)	0.4 (0.1)
TOTAL TORONTO	249 (3,109)	226 (2,842)	46 (175)	20.4 (6.2)	18 (102)	13 (51)	1 (4)	0.4 (0.1)
Chatham-Kent	11 (120)	14 (114)	1 (11)	7.1 (9.6)	0 (9)	1 (1)	0 (0)	0.0 (0.0)
Grey Bruce	18 (113)	14 (89)	1 (6)	7.1 (6.7)	1 (5)	0 (0)	0 (0)	0.0 (0.0)

Public Health Unit and Region	Number of specimens submitted	Number of specimens tested	Number of influenza A positive specimens	% positivity influenza A	Influenza A(H1N1)pdm09	Influenza A H3N2	Number of influenza B positive specimens	% positivity influenza B
Huron County	7 (62)	5 (60)	1 (2)	20.0 (3.3)	1 (2)	0 (0)	0 (0)	0.0 (0.0)
Lambton County	14 (116)	14 (115)	1 (15)	7.1 (13.0)	1 (12)	0 (0)	0 (0)	0.0 (0.0)
Middlesex-London	21 (210)	17 (184)	4 (11)	23.5 (6.0)	1 (7)	0 (0)	0 (0)	0.0 (0.0)
Perth District	21 (113)	17 (104)	1 (3)	5.9 (2.9)	0 (2)	1 (1)	0 (0)	0.0 (0.0)
Southwestern Public Health	31 (215)	30 (210)	4 (12)	13.3 (5.7)	2 (7)	1 (4)	0 (2)	0.0 (1.0)
Windsor-Essex County	79 (573)	66 (535)	9 (90)	13.6 (16.8)	7 (82)	0 (0)	0 (0)	0.0 (0.0)
TOTAL SOUTH WEST	202 (1,522)	177 (1,411)	22 (150)	12.4 (10.6)	13 (126)	3 (6)	0 (2)	0.0 (0.1)
Brant County	6 (198)	4 (190)	0 (8)	0.0 (4.2)	0 (3)	0 (4)	0 (0)	0.0 (0.0)
City Of Hamilton	22 (136)	22 (129)	5 (14)	22.7 (10.9)	3 (10)	0 (2)	0 (0)	0.0 (0.0)
Haldimand-Norfolk	8 (114)	12 (110)	3 (6)	25.0 (5.5)	0 (3)	0 (0)	0 (0)	0.0 (0.0)
Halton Region	62 (640)	60 (634)	7 (33)	11.7 (5.2)	2 (22)	0 (4)	0 (0)	0.0 (0.0)
Niagara Region	27 (265)	28 (237)	13 (46)	46.4 (19.4)	10 (35)	2 (9)	0 (1)	0.0 (0.4)
Waterloo Region	15 (222)	14 (200)	4 (8)	28.6 (4.0)	1 (3)	0 (0)	0 (1)	0.0 (0.5)
Wellington-Dufferin-Guelph	69 (470)	74 (460)	16 (35)	21.6 (7.6)	11 (27)	2 (5)	1 (1)	1.4 (0.2)
TOTAL CENTRAL WEST	209 (2,045)	214 (1,960)	48 (150)	22.4 (7.7)	27 (103)	4 (24)	1 (3)	0.5 (0.2)
OUT OF PROVINCE	0 (0)	0 (0)	0 (0)	NA (NA)	0 (0)	0 (0)	0 (0)	NA (NA)
TOTAL ONTARIO	1,409 (12,758)	1,299 (11,974)	245 (852)	18.9 (7.1)	139 (589)	32 (147)	2 (27)	0.2 (0.2)

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

Notes:

- Cumulative numbers are from September 1, 2018 to the current week and are displayed in brackets.
- The difference between submissions and testing is due to lags in testing time. In addition, number of specimens submitted is determined based on the date specimens were received at lab for testing, while number of specimens tested is determined based on the date specimens were collected from the patient.
- “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.
- The calculation of percent positivity is possible because PHOL tests the samples and knows the numbers of positive and negative results. 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.
- Public Health Ontario Laboratory performs testing for influenza and other respiratory viruses, but other microbiology laboratories also perform these tests. Therefore, it is important to note that the numbers reported here do not represent the total number of influenza viruses identified in Ontario.
- The public health units Elgin-St. Thomas and Oxford County have merged into Southwestern Public Health Unit.

Table 6. Number of reported confirmed influenza cases by public health unit and geographic region for week 1 and (cumulative total) for the 2018-2019 influenza season

Public Health Unit and Region	Influenza A (H1N1)pdm09	Influenza A H3	Influenza A All subtypes ¹	Influenza A & B	Influenza B	TOTAL
Northwestern	4 (11)	0 (0)	7 (17)	0 (0)	0 (0)	7 (17)
Thunder Bay District	5 (33)	1 (1)	7 (56)	0 (0)	1 (1)	8 (57)
TOTAL NORTH WEST	9 (44)	1 (1)	14 (73)	0 (0)	1 (1)	15 (74)
Algoma	0 (1)	0 (0)	0 (1)	0 (0)	0 (0)	0 (1)
North Bay Parry Sound District	2 (3)	0 (1)	6 (16)	0 (0)	0 (1)	6 (17)
Porcupine	3 (9)	0 (0)	4 (10)	0 (0)	0 (0)	4 (10)
Sudbury & District	1 (1)	0 (0)	2 (3)	0 (0)	1 (1)	3 (4)
Timiskaming	4 (8)	0 (0)	4 (8)	0 (0)	0 (0)	4 (8)
TOTAL NORTH EAST	10 (22)	0 (1)	16 (38)	0 (0)	1 (2)	17 (40)
City of Ottawa	1 (4)	0 (8)	20 (91)	0 (1)	0 (5)	20 (97)
Eastern Ontario	1 (4)	0 (1)	9 (21)	0 (0)	0 (1)	9 (22)
Hastings & Prince Edward Counties	3 (6)	0 (9)	6 (20)	0 (0)	0 (0)	6 (20)
Kingston, Frontenac, Lennox & Addington	0 (1)	0 (0)	2 (9)	0 (0)	0 (0)	2 (9)
Leeds, Grenville And Lanark District	4 (10)	0 (2)	15 (36)	0 (0)	0 (0)	15 (36)
Renfrew County And District	0 (0)	1 (1)	6 (6)	0 (0)	0 (0)	6 (6)
TOTAL EASTERN	9 (25)	1 (21)	58 (183)	0 (1)	0 (6)	58 (190)
Durham Region	11 (15)	0 (3)	46 (97)	0 (1)	1 (5)	47 (103)
Haliburton, Kawartha, Pine Ridge	5 (10)	1 (2)	16 (23)	0 (0)	0 (0)	16 (23)
Peel Region	13 (43)	1 (9)	163 (466)	0 (0)	0 (18)	163 (484)
Peterborough County-City	1 (1)	0 (0)	11 (20)	0 (0)	0 (0)	11 (20)
Simcoe Muskoka District	6 (14)	0 (2)	52 (111)	0 (0)	2 (3)	54 (114)
York Region	34 (68)	6 (28)	88 (215)	0 (0)	0 (6)	88 (221)
TOTAL CENTRAL EAST	70 (151)	8 (44)	376 (932)	0 (1)	3 (32)	379 (965)
Toronto	13 (59)	7 (43)	190 (692)	0 (1)	1 (15)	191 (708)
TOTAL TORONTO	13 (59)	7 (43)	190 (692)	0 (1)	1 (15)	191 (708)
Chatham-Kent	3 (5)	0 (0)	4 (9)	0 (0)	0 (0)	4 (9)
Elgin-St. Thomas	0 (3)	1 (2)	1 (5)	0 (0)	0 (0)	1 (5)
Grey Bruce	1 (3)	0 (0)	14 (78)	0 (0)	0 (0)	14 (78)
Huron County	0 (1)	0 (0)	9 (12)	0 (0)	0 (0)	9 (12)
Lambton County	3 (11)	0 (0)	4 (16)	0 (0)	0 (0)	4 (16)
Middlesex-London	0 (4)	0 (2)	23 (55)	0 (0)	0 (0)	23 (55)
Oxford County	0 (1)	0 (0)	3 (4)	0 (2)	0 (0)	3 (6)
Perth District	1 (2)	0 (0)	5 (11)	0 (0)	0 (0)	5 (11)
Windsor-Essex County	13 (72)	0 (0)	16 (83)	0 (0)	0 (0)	16 (83)
TOTAL SOUTH WEST	21 (102)	1 (4)	79 (273)	0 (2)	0 (0)	79 (275)
Brant County	0 (1)	0 (1)	16 (39)	0 (0)	0 (0)	16 (39)
City Of Hamilton	3 (6)	1 (2)	64 (249)	0 (0)	0 (5)	64 (254)
Haldimand-Norfolk	0 (0)	0 (0)	3 (8)	0 (0)	0 (0)	3 (8)
Halton Region	0 (8)	0 (2)	40 (151)	0 (0)	0 (1)	40 (152)
Niagara Region	8 (26)	3 (8)	84 (265)	0 (1)	0 (2)	84 (268)
Waterloo Region	0 (2)	0 (0)	22 (49)	0 (0)	0 (1)	22 (50)
Wellington-Dufferin-Guelph	7 (20)	2 (4)	23 (46)	0 (0)	0 (0)	23 (46)
TOTAL CENTRAL WEST	18 (63)	6 (17)	252 (807)	0 (1)	0 (9)	252 (817)
TOTAL ONTARIO	150 (466)	24 (131)	985 (2998)	0 (6)	6 (65)	991 (3069)

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

Note:¹ Includes influenza A positive cases for whom no subtype was reported. This table presents laboratory-confirmed influenza cases reported to the public health units from multiple laboratories. Percent positivity cannot be calculated because negative tests are not reported

6. Strain comparison – circulating influenza strains and vaccine strains

Since September 1, 2018, the National Microbiology Laboratory (NML) has characterized 481 influenza viruses (45 H3N2, 420 H1N1 and 16 B) that were received from Canadian laboratories.

Genetic Characterization of Influenza A (H3N2):

33 influenza A(H3N2) viruses did not grow to sufficient hemagglutination titer for antigenic characterization by hemagglutination inhibition (HI) assay. Therefore, NML has performed genetic characterization to determine the genetic group identity of these viruses.

Sequence analysis of the HA gene of the viruses showed that five viruses belonged to genetic group 3C.2a and 27 viruses belonged to subclade 3C.2a1. One isolate could not be sequenced.

A/Singapore/INFIMH-16-0019/2016-like virus belongs to genetic group 3C.2a1 and is the influenza A/H3N2 component of the 2018-19 Northern Hemisphere influenza vaccine.

Antigenic Characterization:

Influenza A (H3N2):

Twelve influenza A (H3N2) viruses were antigenically characterized as A/Singapore/INFIMH-16-0019/2016-like by HI testing using antiserum raised against egg-propagated A/Singapore/INFIMH-16-0019/2016. A/Singapore/INFIMH-16-0019/2016 is the influenza A/H3N2 component of the 2018-19 Northern Hemisphere influenza vaccine. Four influenza A (H3N2) viruses characterized belonged to genetic group 3C.2a1. One virus belonged to genetic group 3C.2a and one to 3C.3a. Sequencing is pending for the remaining six viruses.

Influenza A (H1N1):

415 H1N1 viruses characterized were antigenically similar to A/Michigan/45/2015, which is the influenza A/H1N1 component of the 2018-19 Northern Hemisphere influenza vaccine. Five viruses showed reduced titer with ferret antisera raised against cell culture-propagated A/Michigan/45/2015.

Influenza B:

Influenza B viruses can be divided into two antigenically distinct lineages represented by B/Yamagata/16/88 and B/Victoria/2/87 viruses. The recommended influenza B components for the 2018-19 Northern Hemisphere influenza vaccine are B/Colorado/06/2017 (Victoria lineage) and B/Phuket/3073/2013 (Yamagata lineage).

Two influenza B viruses were characterized as B/Colorado/06/2017, which belongs to the Victoria lineage and is included as an influenza B component of the 2018-19 Northern Hemisphere influenza vaccine.

Fourteen influenza B viruses were characterized as B/Phuket/3073/2013-like, which belongs to the Yamagata lineage and is included as an influenza B component of the 2018-19 Northern Hemisphere quadrivalent influenza vaccine.

Table 7. Strain characterization completed on influenza isolates at the National Microbiology Laboratory: Ontario and Canada, September 1, 2018 to January 10, 2019

Influenza strains	Ontario	Canada
Influenza A (H3N2)		
A/Singapore/INFIMH-16-0019/2016-like	5	12
Influenza A (H1N1)		
A/Michigan/45/2015-like	60	420
Influenza B		
B/Colorado/06/2017-like	0	2
Influenza B		
B/Phuket/3073/13-like	11	14

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

7. Antiviral resistance/ sensitivity for influenza

All influenza A viruses in Canada tested by NML for antiviral resistance in the 2018-2019 season were resistant to amantadine, but sensitive to zanamivir and oseltamivir. All influenza B viruses in Canada tested by NML for antiviral resistance were sensitive to both oseltamivir and zanamivir.

Table 8. Amantadine susceptibility assays completed on influenza isolates at the National Microbiology Laboratory: Ontario and Canada, September 1, 2018 to January 10, 2019

Influenza strains	Ontario: Resistant	Ontario: Susceptible	Canada: Resistant	Canada: Susceptible
Influenza A (H3N2)	24	0	37	0
Influenza A (H1N1)pdm09	48	0	241	0
Influenza B	NA	NA	NA	NA

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

NA = Not Applicable

Table 9. Oseltamivir susceptibility assays completed on influenza isolates at the National Microbiology Laboratory: Ontario and Canada, September 1, 2018 to January 10, 2019

Influenza strains	Ontario: Resistant	Ontario: Susceptible	Canada: Resistant	Canada: Susceptible
Influenza A (H3N2)	0	20	0	40
Influenza A (H1N1)pdm09	0	60	0	348
Influenza B	0	11	0	15

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

NA = Not Applicable

Table 10. Zanamavir susceptibility assays completed on influenza isolates at the National Microbiology Laboratory: Ontario and Canada, September 1, 2018 to January 10, 2019

Influenza strains	Ontario: Resistant	Ontario: Susceptible	Canada: Resistant	Canada: Susceptible
Influenza A (H3N2)	0	20	0	40
Influenza A (H1N1)pdm09	0	60	0	348
Influenza B	0	11	0	15

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

NA = Not Applicable

8. 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 January 9, 2019.

Cases of influenza A and B are included in the report based on the 'Reported Date', which was the date the public health unit was notified of the case. For [Figure 4](#) and [Figure 5](#), cases are assigned to a particular surveillance week based on the episode date entered in iPHIS to better reflect influenza activity. Episode date for a case corresponds to the earliest date on record for the case according to the iPHIS hierarchy (Symptom Onset 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's laboratory:** provides specimen level information from the 11 PHO laboratory sites located in Ontario; data for this issue was extracted from the Laboratory Information Management System by PHO on January 10, 2019. A detailed summary of PHO laboratory data is available on the PHO website [here](#). More details about the new testing algorithm can be found [here](#).
- **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 2018-2019 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 1](#) because ongoing outbreaks from previous weeks, as well as laboratory confirmed outbreaks in schools, may be included in the assessment of the activity level.

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