

**Ontario Agency for Health Protection and Promotion Laboratory Pandemic H1N1 Surveillance Report
Information current as of: Monday December 28, 2009**

This report summarizes patient specimens (1 specimen/patient) collected and received at OAHPP Public Health Laboratories (PHL) in Ontario for pandemic H1N1 influenza virus (pH1N1) testing since September 1, 2009. This information is current as of Monday December 28, 2009 and is updated weekly.

Specimen collection date is used in this weekly report to classify the specimens submitted and tested by time. A daily summary is also prepared which uses the date the specimen was logged into the PHL electronic system. Because of these differences, numbers may not always match accordingly.

The PHL performs the majority of testing for pH1N1; however, several hospital laboratories also perform pH1N1 testing. The numbers reported here may not reconcile precisely with those reported through the integrated Public Health Information System (iPHIS) since results from hospital laboratories may be entered into iPHIS without being entered into the PHL database.

RECENT CHANGE IN LAB TESTING ALGORITHM:

Starting on Dec. 17th, 2009, viral culture testing will increase to all ambulatory samples and a minimum of 20% of influenza A negative RT-PCR tests. Viral culture testing and subtyping will continue to be increased as resources allow. Please see Appendix 1 for all prior changes to the testing algorithm. As the pre-test probability for an influenza A positive sample testing positive for pH1N1 is currently 99%, the percent positive for influenza A will be reported instead of the percent positive for pH1N1. Note that influenza A positivity rates are only reported for influenza A tests performed at the OAHPP laboratories. For additional details on changes to the laboratory testing algorithm, please see the November Labstract at www.oahpp.ca

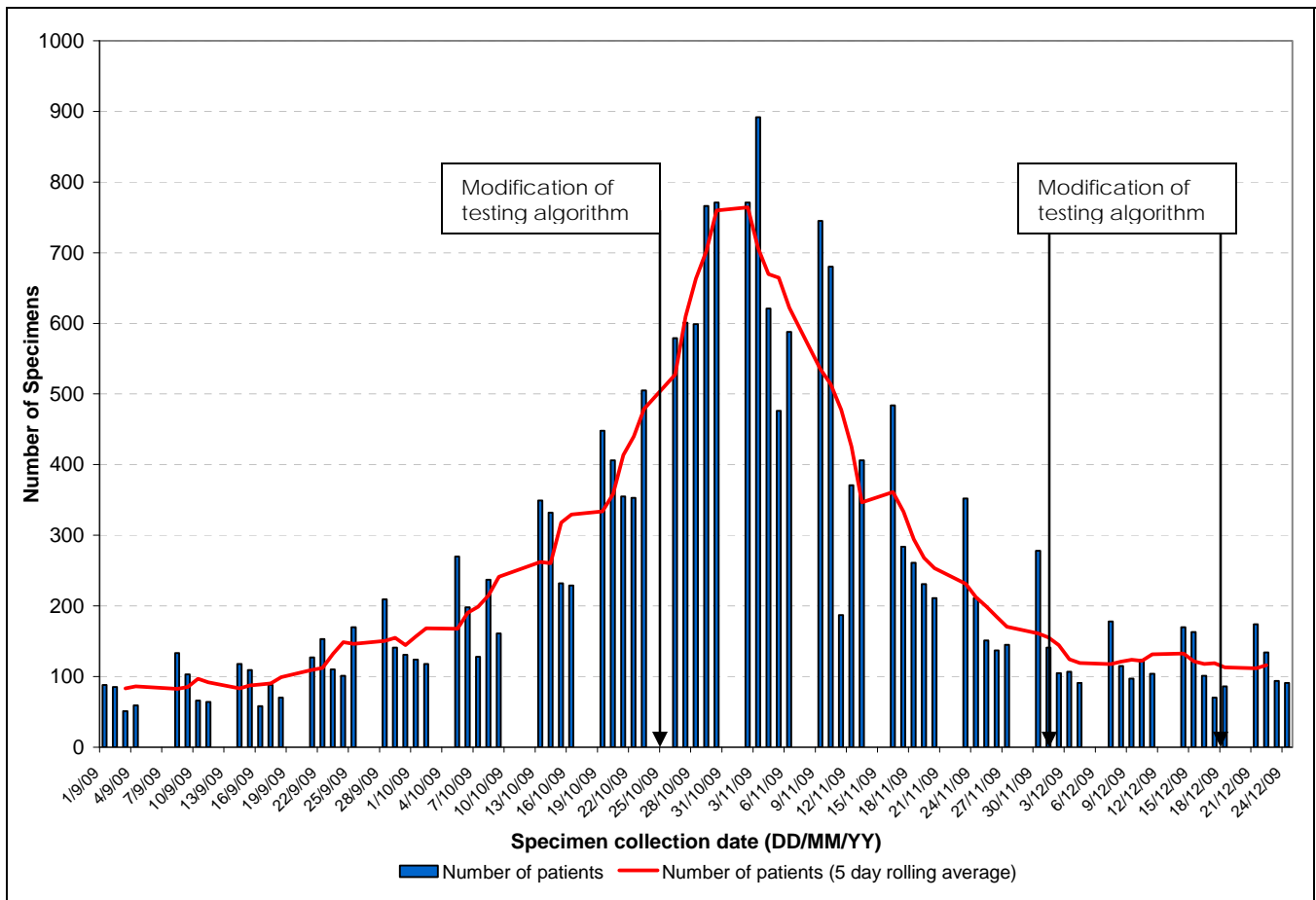
Week 51 Summary Snapshot

- There were 2 laboratory confirmed cases of influenza A so far for Week 51, which is a drop from 4 laboratory confirmed influenza A cases in Week 50.
- The RT-PCT % positivity continues to fall, down from 1.3% in Week 50 to 1.0% in Week 51.

Lab Submissions

Figure 1 displays the daily number of patient specimens (1 specimen/patient) received at PHL for pH1N1 testing since September 1, 2009, as well as a five-day rolling average. Rolling averages offer a method of smoothing time series data to reduce the effects of random variation and reveal underlying trends. The total number of patients with specimens received as of December 28, 2009 is 20,340. This number includes all specimens received, irrespective of testing status and also includes rejected specimens. The number of specimen submissions remained relatively constant in the first three weeks of September. However, the number of specimens received steadily increased until the end of October. There were 493 specimens received for pH1N1 testing during the 7 day period between December 21 – December 28, 2009; 2.42% of the total received since September 1. Within the past three weeks submissions have remained constant.

Figure 1. The number of specimens received (1/patient) at PHL/OAHPP for pH1N1 testing by date. Specimen receipt dates: September 1- December 28, 2009.



Source: PHL, Ontario Agency for Health Protection and Promotion (OAHPP).

Case Statistics

Between September 1 and December 28, 2009, a total of 17,040 patient specimens and isolates (1/patient) have been submitted for pH1N1 testing at the PHL and entered into the PHL electronic system. This number does not include rejected samples or samples for which testing has been cancelled. 16,411 of the samples were submitted to PHL directly for influenza A testing and subsequent pH1N1 subtyping. The additional samples, tested for influenza A at hospitals, were forwarded to the PHL to be subtyped for pH1N1. Please refer to Appendix 1 for further information on testing protocols. The number of patient specimens and isolates submitted for pH1N1 testing by test result (or status) by collection date is displayed in **Figure 2**. The percentage of all patient specimens tested by RT-PCR and viral culture that have detected influenza A (percent positive Influenza A for RT-PCR and viral culture) in addition to the percentage of all subtyped specimens that have detected pH1N1 (percent positive pH1N1 for subtyped cases) across specimen collection weeks are displayed in **Table 1**. The highest influenza A percent positive since September 1st, 2009 reached 54.2% on October 27, 2009. At the height of the Spring/Summer pH1N1 outbreak, percent positive pH1N1 reached approximately 54% (Source: OAHPP Laboratory Pandemic H1N1 Surveillance Report: Tuesday September 22, 2009).

Figure 3 displays the number of influenza A cases detected, the total number of patients tested, as well as the 5 day rolling averages for total number of patients tested and the number of influenza A cases confirmed by laboratory results (average of the current date, 2 preceding and 2 following dates), by specimen collection date.

Since September 1, 2009, 16,342 specimens and isolates have been tested for influenza A at the PHL. Influenza A virus has been identified in 4,562(27.9%) of the patients tested at PHL; an additional 629 patient specimens that tested positive for influenza A at hospital laboratories were forwarded to the PHL to be subtyped for pH1N1. There are 1,913 that have been confirmed positive for influenza A but have not been subtyped. Of all specimens and isolates subtyped for pH1N1, 3183 cases of pH1N1 have been detected. Two cases of seasonal influenza (H3) have been detected. 102 samples tested positive for influenza A but were indeterminate for pH1N1 (**Table 1**). Please refer to Appendix 1 for further information on interpreting subtyping results.

Resistance testing

A proportion of isolates undergo oseltamivir susceptibility testing, specifically looking for a nucleotide mutation at position 275 for tyrosine (H275Y) in the neuraminidase gene. Since September 1, 2009, of the 741 isolates that have been tested, 14 from 5 patient cases (1.9%) have been identified as containing the H275Y mutation that confers resistance.

Of the 5 cases, 1 was identified in Week 40, 2 in Week 46, and 2 in Week 49.

Table 1. Patient test results for specimens collected between September 1 and December 26, 2009, tested at the PHL in Ontario.

Specimen collection date*	pH1N1 positive	Positive influenza A, not subtyped	Seasonal H1 influenza	Seasonal H3 influenza	Positive influenza A – indeterminate pH1N1	Indeterminate & negative influenza A	Total cases tested**	Percent positive (%) influenza A RT-PCR	Percent Positive (%) influenza A Viral culture‡	Percent Positive (%) pH1N1 for influenza A subtyped cases	Positive influenza B†
Sep. 1 – Sep. 5	2	9	0	0	0	242	253	4.0	2.4	100.0	0
Week 36 (Sep. 6 – 12)	2	3	0	1	0	336	342	1.6	7.3	66.7	0
Week 37 (Sep. 13 – 19)	12	4	0	1	1	432	450	5.2	3.2	85.7	0
Week 38 (Sep. 20 – 26)	27	1	0	0	1	555	584	5.8	0.8	96.4	0
Week 39 (Sep. 27 – Oct. 3)	59	6	0	0	0	595	660	11.5	0.0	100.0	0
Week 40 (Oct. 4 – 10)	126	3	0	0	4	741	874	13.9	4.3	96.9	1
Week 41 (Oct. 11 – 17)	293	12	0	0	4	808	1117	21.0	15.5	98.7	0
Week 42 (Oct. 18 – 24)	915	54	0	0	15	1083	2067	38.4	33.8	98.4	0
Week 43 (Oct. 25 – 31)	882	552	0	0	35	1444	2913	48.0	49.9	96.2	0
Week 44 (Nov. 1 – 7)	388	745	0	0	25	1333	2492	45.4	60.6	93.9	1
Week 45 (Nov. 8 – 14)	259	346	0	0	7	1088	1700	34.2	31.4	97.4	1
Week 46 (Nov. 15 – 21)	127	141	0	0	8	872	1149	22.2	23.9	94.1	0
Week 47 (Nov. 22 – 28)	36	34	0	0	0	687	757	7.2	11.8	100.0	0

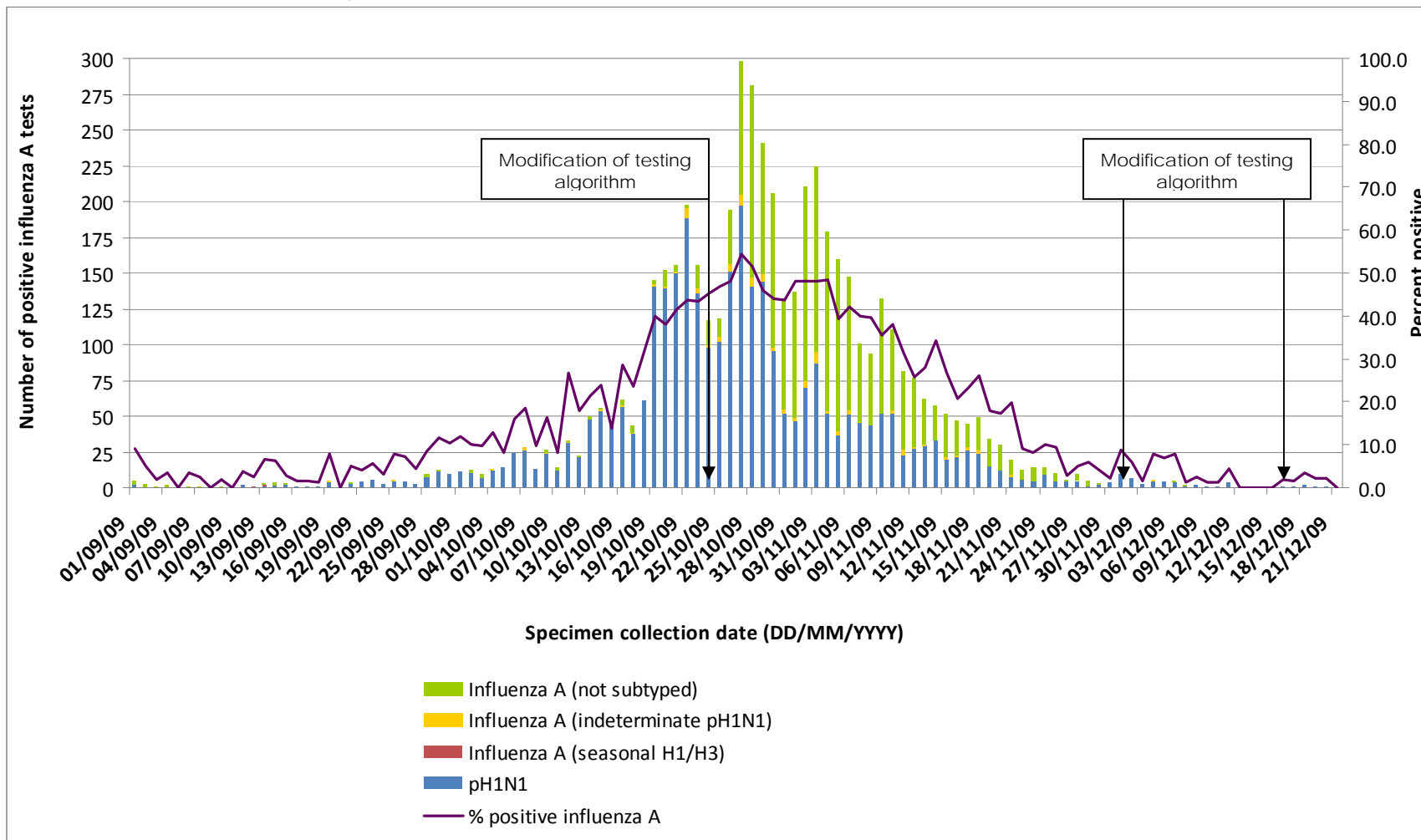
Table 1 – Continued

Specimen collection date*	pH1N1 positive	Positive influenza A, not subtyped	Seasonal H1 influenza	Seasonal H3 influenza	Positive influenza A – indeterminate pH1N1	Indeterminate & negative influenza A	Total cases tested**	Percent positive (%) influenza A RT-PCR	Percent Positive (%) influenza A Viral culture‡	Percent Positive (%) pH1N1 for influenza A subtyped cases	Positive influenza B†
Week 48 (Nov. 29 – Dec. 5)	35	1	0	0	1	491	528	5.6	6.9	97.2	0
Week 49 (Dec 6-12)	13	2	0	0	0	462	482	2.7	6.9	100.0	0
Week 50 (Dec 13-19)	6	0	0	0	0	402	429	1.3	0.0	100.0	0
Week 51*** (Dec 20-26)	1	0	0	0	1	200	239	1.0	0.0	50.0	0
Total	3183	1913	0	2	102	11771	17036	27.4	29.1	96.8	3

Source: PHL, Ontario Agency for Health Protection and Promotion (OAHPP).

* For 865 specimens, no specimen collection date was available; the date the specimen was received at the lab has been used as a proxy. ** This number includes specimens for which the primary detection was not completed at the PHL (N=629) *** Because of the lag in time from the date the specimen was collected to the date the final test result is confirmed, not all cases with specimens collected during the most recent week are included in this summary. ‡ Viral culture % positive is based on resulted tests from September 1st 2009 onwards. †Influenza B positives are counted in the week in which testing was resulted and released.

Figure 2. The number of positive test results and the percent positive for influenza A, by subtype (pH1N1, seasonal H1/H3, indeterminate pH1N1 & not subtyped), for specimen collection dates* September 1 - December 21, 2009, 2009**.

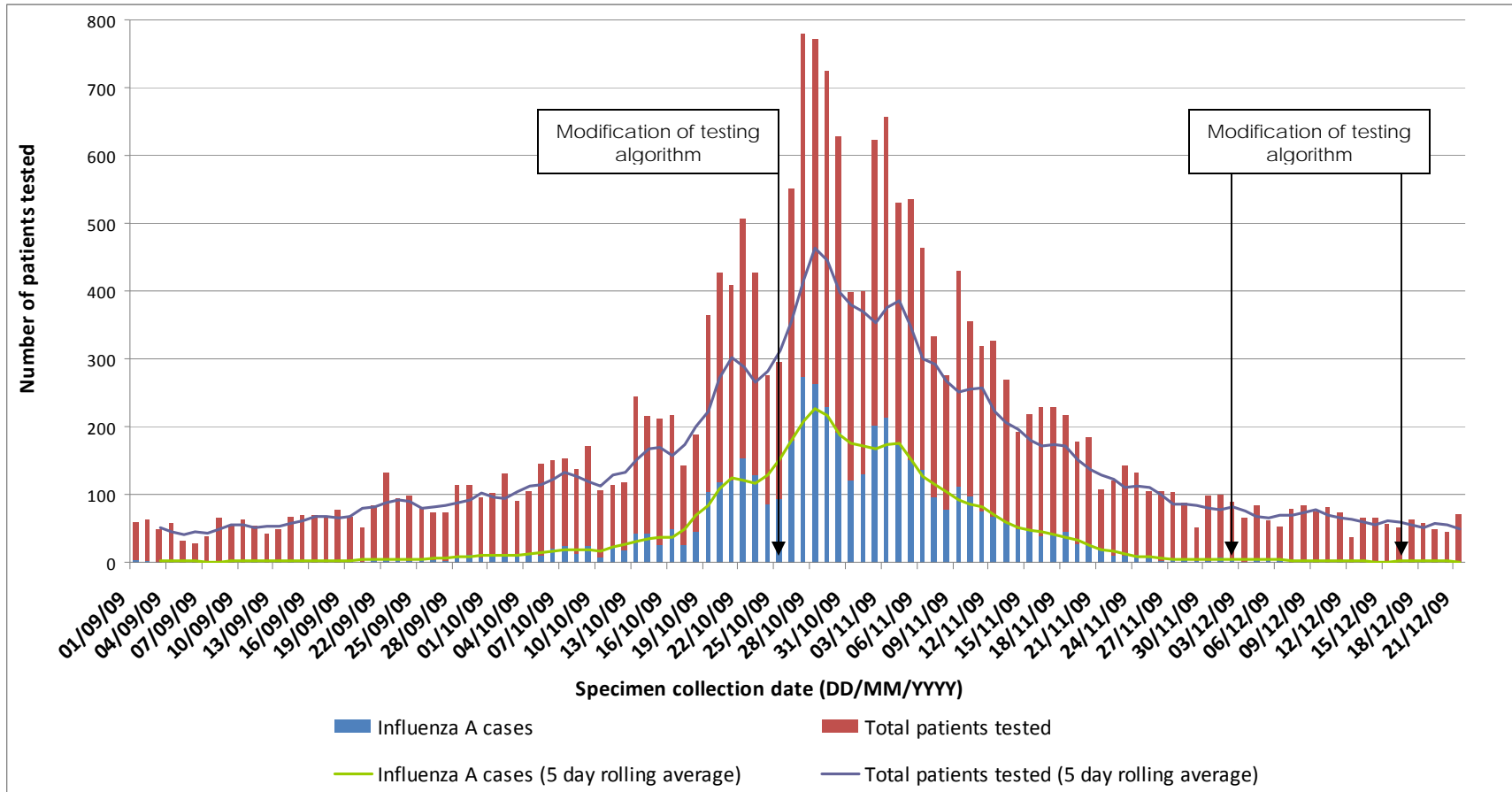


Source: PHL, Ontario Agency for Health Protection and Promotion (OAHP).

* For 865 specimens, no specimen collection date was available; the date the specimen was received at the lab has been used as a proxy.

**Data collected since December 21st, 2009 has been excluded from Figures 3. Since not all specimens collected on those dates have test results available, the data from those days may not reflect the current situation.

Figure 3. Total counts and 5 Day rolling averages of the number of influenza A cases and number of patients tested, by specimen collection dates* September 1 – December 21, 2009**.



Source: PHL, Ontario Agency for Health Protection and Promotion (OAHPP).

* For 865 specimens, no specimen collection date was available; the date the specimen was received at the lab has been used as a proxy.

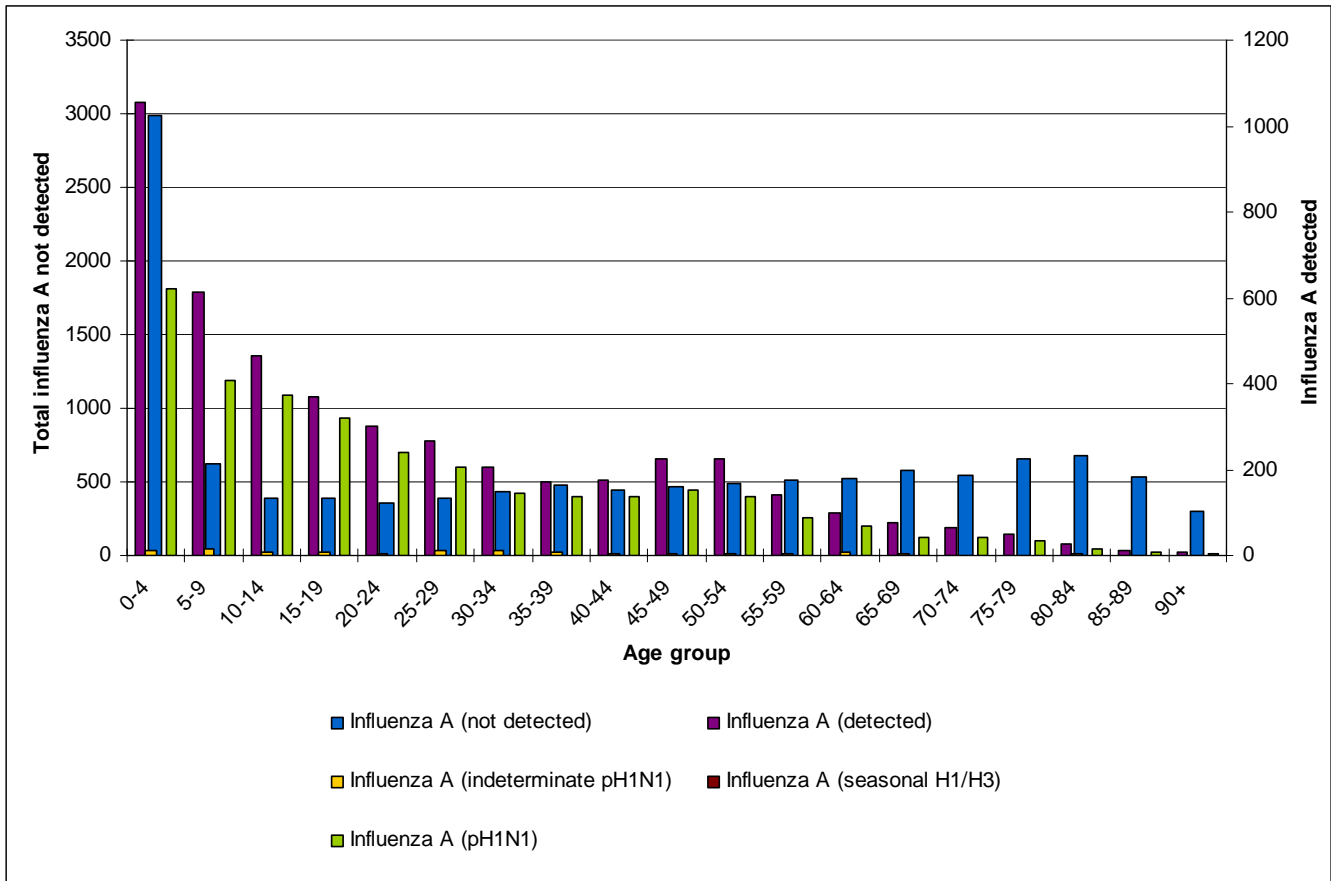
**Data collected since December 21st, 2009 has been excluded from Figures 3. Since not all specimens collected on those dates have test results available, the data from those days may not reflect the current situation.

Sex and Age Distribution

Over half (51.8%; n=8,673) of all patient specimens submitted for testing for pH1N1 were from female patients. Males made up 48.2% (n=8,056) of patients and sex was not reported for 311 of patients. Females make up 51.6% (n=1,610) of all lab confirmed cases of pH1N1 detected. Males made up 48.4% (n=1,512) of confirmed pH1N1 cases. Sex was not reported for 61 cases.

The age distribution of patients by influenza A test result since September 1, 2009 is shown in **Figure 4**. The largest amount of influenza A cases occurred in children under the age of five, with 1054 cases (23.2%). Children aged 0-19 represent over half of the cases (54.9%; n=2500). There were 568 cases of pH1N1 among adults aged 20-29 (12.5%). Adults aged 30-59 make up 25.2% of pH1N1 cases (n=1147). 335 influenza A cases occurred among adults 60 years of age and older.

Figure 4. Age distribution of patients tested at PHL for influenza A by test result, for specimens collected between September 1- December 28, 2009*.



Source: PHL, Ontario Agency for Health Protection and Promotion (OAHPP).

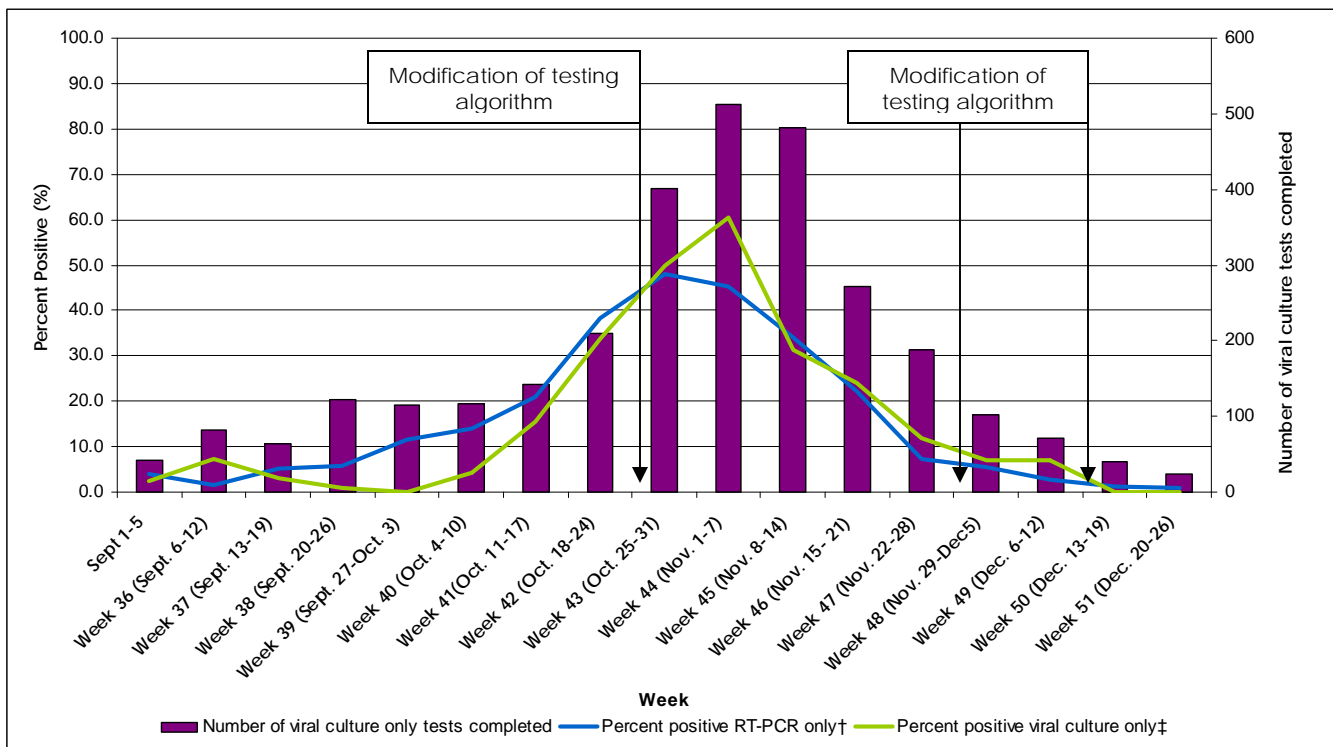
*Note: Age was not available for 42 patients.

Second wave peak

To date various indicators (specimen submission, percent positive, activity at local health unit level) reveal that Ontario has passed the second wave peak activity in terms of infections. It should be noted that the peak in hospitalizations and/or deaths would be anticipated to follow the peak in infections due to the lag between the onset of infection and hospitalization or death.

The percent positive for influenza A separated by testing method (PCR† and viral culture‡) is shown in **Figure 5**. The percentage of specimens positive for influenza by RT-PCR has declined in the past month. For viral culture approximately 0% of these specimens tested positive in the most recent reporting week. Percent positivity by RT-PCR provides a better indicator of the overall trend given that this test is performed on the majority of patient specimens and provides a more timely result compared to viral culture due to the inherent lag time of growing cultures. Since ambulatory samples are primarily tested with only viral culture, the percent positive of viral culture tests provides an indicator for ambulatory activity.

Figure 5: Percent positive of influenza A tests conducted by RT-PCR and viral culture at the public health labs from September 1st, 2009 to December 26th, 2009



Source: PHL, Ontario Agency for Health Protection and Promotion (OAHPP).
Note: †RT-PCR percent positive is calculated based on date of specimen collection.
 ‡Viral culture percent positive is calculated based on date of entry of results.

Public Health Unit

The cumulative number of specimens submitted for pH1N1 testing, submission rates, number of lab-confirmed cases and percent positives by PHU, since September 1, 2009, are displayed in **Table 2**. The number of pH1N1 cases and influenza A cases detected in Weeks 50 and 51, as well as the total number of specimens submitted, by public health unit (PHU), is displayed in **Tables 3 and 4**. Rates of the submission of specimens for pH1N1 testing and percent positive by PHU are also displayed. **Table 5** displays influenza A cases by PHU per week, a cumulative total since September 1, 2009 and a cumulative population rate per 100,000. At the PHL, a patient is sorted into a PHU based on their place of residence. If this information is not available, the address of the physician who submitted the sample is used to classify patients into PHUs. As a result, influenza A cases may not necessarily be residents of the PHU in which they have been classified.

Cumulative: September 1 – December 28

Since, September 1, the highest submission rates for specimens being tested for pH1N1 observed were from the Porcupine (604.8 submissions/100,000 persons) and Northwestern (397.4 submissions/100,000 persons) PHUs. The Toronto area had the highest number of influenza A cases in the province (n=640) during this time period, followed by Peel Regional (n=418) and York Regional (n=260) (**Table 2**). Percent positive for influenza A was greatest in Middlesex-London, with 46.6% of samples tested yielding positive results.

Week 50: December 13 – December 19

In the recent full week, Hastings & Prince Edward County (9.6 submissions/100,000 persons) and Peel Regional (8.2 submissions/100,000 persons) PHUs had the highest submission rates for specimens to be tested for pH1N1. In Week 50, 5 new influenza A cases have been identified (6 confirmed new cases of pH1N1) to date. The greatest number of cases was identified in Toronto (n=2), followed by Durham Regional, Peel and Windsor-Essex County with 1 case each (**Table 3**).

Most recent full week: December 20– December 26 (Week 51)

In the most recent full week, Timiskaming (8.8 submissions/100,000 persons) and Northwestern (5.0 submissions/100,000 persons) PHUs had the highest submission rates for specimens to be tested for pH1N1. In Week 51, 2 new influenza A cases have been identified (1 confirmed new cases of pH1N1) to date. The greatest number of cases was identified in Toronto (n=1) and Windsor-Essex County (n=1) (**Table 4**).

Table 2. Number of pH1N1 specimens submitted for testing, pH1N1 cases, influenza A cases, percent positive and submission rate (/100,000) by PHU. Specimen collection dates: Sept. 1- Dec. 28, 2009.

Public Health Unit	Total number of specimens submitted	Submission rate (/100,000)	Number of lab confirmed cases of pH1N1	Number of lab confirmed Influenza A cases	Percent positive (%) influenza A**
Algoma District	347	298.5	51	100	28.9
Brant County	187	149.4	28	50	27.0
Chatham-Kent	153	140.9	33	51	34.0
City of Hamilton	455	90.2	263	117	41.5
City of Ottawa	93	11.5	18	27	29.0
City of Toronto	3228	129.0	359	640	20.1
Durham Regional	518	92.3	119	150	31.1
Eastern Ontario	314	164.8	99	118	38.2
Elgin-St. Thomas	114	133.6	19	40	35.7
Grey Bruce	369	233.9	34	110	30.1
Haldimand-Norfolk	129	119.7	35	49	39.8
Haliburton-Kawartha-Pine Ridge District	231	134.6	43	54	24.4
Halton Regional	606	138.0	135	142	25.4
Hastings & Prince Edward Counties	326	209.0	90	77	26.5
Huron County	128	215.8	24	49	38.9
Kingston-Frontenac and Lennox & Addington	439	238.1	132	129	31.2
Lambton	162	126.4	35	53	33.1
Leeds-Grenville and Lanark District	191	117.2	50	63	34.1
Middlesex-London	280	66.3	142	104	46.6
Niagara Regional Area	604	141.3	127	198	33.9
North Bay Parry Sound District	261	212.5	43	74	28.8
Northwestern	320	397.4	69	123	38.9
Oxford County	139	135.3	29	47	33.8
Peel Regional	2173	187.4	245	418	19.6
Perth District	162	217.9	30	43	26.7
Peterborough County-City	204	153.3	44	73	36.1
Porcupine	509	604.8	179	233	45.8
Renfrew County & District	75	75.5	15	26	35.6
Simcoe Muskoka District	1176	245.1	144	234	21.5
Sudbury & District	343	178.3	56	122	35.7
Thunder Bay District	421	273.3	83	149	35.6
Timiskaming	100	292.3	32	41	41.4
Waterloo	366	76.5	75	123	34.7
Wellington-Dufferin-Guelph	337	132.2	43	84	25.4
Windsor-Essex County	469	119.2	114	168	39.1
York Regional	1044	116.9	129	260	25.2
Out of Province/Not Available	67	N/A	17	23	34.3
Grand Total	17040	140.1	3183	4562	27.9

Source: PHL, Ontario Agency for Health Protection and Promotion (OAHPP).

**Percent positive influenza A is calculated based on the number of specimens where testing has been completed. This may not equal the number of specimens submitted for testing.

Table 3. Number of pH1N1 specimens submitted for testing, pH1N1 cases, influenza A cases, percent positive and submission rate (/100,000) by PHU. Specimen collection dates: Dec.13 – Dec. 19, 2009 (Week 50).

Public Health Unit	Total number of specimens submitted	Submission rate (/100,000)	Number of lab confirmed cases of pH1N1	Number of lab confirmed Influenza A cases	Percent positive (%) influenza A**
Algoma District	5	4.3	0	0	0.0
Brant County	8	6.4	0	0	0.0
Chatham-Kent	1	0.9	0	0	0.0
City of Hamilton	11	2.2	1	0	0.0
City of Ottawa	2	0.2	0	0	0.0
City of Toronto	78	3.1	2	2	2.6
Durham Regional	9	1.6	1	1	11.1
Eastern Ontario	8	4.2	0	0	0.0
Elgin-St. Thomas	3	3.5	0	0	0.0
Grey Bruce	11	7.0	0	0	0.0
Haldimand-Norfolk	3	2.8	0	0	0.0
Haliburton-Kawartha-Pine Ridge District	3	1.7	0	0	0.0
Halton Regional	19	4.3	0	0	0.0
Hastings & Prince Edward Counties	15	9.6	0	0	0.0
Huron County	3	5.1	0	0	0.0
Kingston-Frontenac and Lennox & Addington	12	6.5	0	0	0.0
Lambton	3	2.3	0	0	0.0
Leeds-Grenville and Lanark District	0	0.0	0	0	N/A
Middlesex-London	1	0.2	0	0	0.0
Niagara Regional Area	18	4.2	0	0	0.0
North Bay Parry Sound District	7	5.7	0	0	0.0
Northwestern	6	7.5	0	0	0.0
Oxford County	5	4.9	0	0	0.0
Peel Regional	95	8.2	1	1	1.1
Perth District	6	8.1	0	0	0.0
Peterborough County-City	1	0.8	0	0	0.0
Porcupine	3	3.6	0	0	0.0
Renfrew County & District	0	0.0	0	0	N/A
Simcoe Muskoka District	31	6.5	0	0	0.0
Sudbury & District	4	2.1	0	0	0.0
Thunder Bay District	4	2.6	0	0	0.0
Timiskaming	2	5.8	0	0	0.0
Waterloo	7	1.5	0	0	0.0
Wellington-Dufferin-Guelph	8	3.1	0	0	0.0
Windsor-Essex County	9	2.3	1	1	11.1
York Regional	28	3.1	0	0	0.0
Out of Province/Not Available	0	N/A	0	0	N/A
Grand Total	429	3.5	6	5	1.2

Source: PHL, Ontario Agency for Health Protection and Promotion (OAHP).

**Percent positive influenza A is calculated based on the number of specimens where testing has been completed. This may not equal the number of specimens submitted for testing

Table 4. Number of pH1N1 specimens submitted for testing, pH1N1 cases, influenza A cases, percent positive and submission rate (/100,000) by PHU. Specimen collection dates: Dec. 20 - Dec. 26, 2009 (Week 51***).

Public Health Unit	Total number of specimens submitted	Submission rate (/100,000)	Number of lab confirmed cases of pH1N1	Number of lab confirmed Influenza A cases	Percent positive (%) influenza A**
Algoma District	5	4.3	0	0	0.0
Brant County	2	1.6	0	0	0.0
Chatham-Kent	2	1.8	0	0	0.0
City of Hamilton	3	0.6	0	0	0.0
City of Ottawa	0	0.0	0	0	N/A
City of Toronto	42	1.7	0	1	2.6
Durham Regional	6	1.1	0	0	0.0
Eastern Ontario	2	1.0	0	0	0.0
Elgin-St. Thomas	2	2.3	0	0	0.0
Grey Bruce	2	1.3	0	0	0.0
Haldimand-Norfolk	1	0.9	0	0	0.0
Haliburton-Kawartha-Pine Ridge District	1	0.6	0	0	0.0
Halton Regional	7	1.6	0	0	0.0
Hastings & Prince Edward Counties	4	2.6	0	0	0.0
Huron County	1	1.7	0	0	0.0
Kingston-Frontenac and Lennox & Addington	2	1.1	0	0	0.0
Lambton	2	1.6	0	0	N/A
Leeds-Grenville and Lanark District	2	1.2	0	0	0.0
Middlesex-London	0	0.0	0	0	N/A
Niagara Regional Area	5	1.2	0	0	0.0
North Bay Parry Sound District	4	3.3	0	0	0.0
Northwestern	4	5.0	0	0	0.0
Oxford County	1	1.0	0	0	0.0
Peel Regional	55	4.7	0	0	0.0
Perth District	1	1.3	0	0	0.0
Peterborough County-City	2	1.5	0	0	0.0
Porcupine	2	2.4	0	0	0.0
Renfrew County & District	0	0.0	0	0	N/A
Simcoe Muskoka District	23	4.8	0	0	0.0
Sudbury & District	2	1.0	0	0	0.0
Thunder Bay District	5	3.2	0	0	0.0
Timiskaming	3	8.8	0	0	0.0
Waterloo	13	2.7	0	0	0.0
Wellington-Dufferin-Guelph	5	2.0	0	0	0.0
Windsor-Essex County	11	2.8	0	1	10.0
York Regional	17	1.9	1	0	0.0
Out of Province/Not Available	3	N/A	0	0	0.0
Grand Total	242	2.0	1	2	1.0

Source: PHL, Ontario Agency for Health Protection and Promotion (OAHP).

**Percent positive influenza A is calculated based on the number of specimens where testing has been completed. This may not equal the number of specimens submitted for testing

*** Because of the lag in time from the date the specimen was collected to the date the final test result is confirmed, not all cases with specimens collected during the most recent week are included in this summary.

Table 5. Table of the laboratory confirmed influenza A cases by PHU. (PHU was not available for 23 influenza A cases)

Public Health Unit	Number of lab confirmed Influenza A cases WEEK 48	Number of lab confirmed Influenza A cases WEEK 49	Number of lab confirmed Influenza A cases WEEK 50	Number of lab confirmed Influenza A cases WEEK 51	Total confirmed Influenza A cases (Sept 1 st , 2009)	Rate of influenza A cases per 100,000 (Sept. 1 st , 2009)
Algoma District	0	0	0	0	100	86.0
Brant County	1	0	0	0	50	40.0
Chatham-Kent	1	0	0	0	51	47.0
City of Hamilton	0	0	0	0	117	23.2
City of Ottawa	0	0	0	0	27	3.3
City of Toronto	6	2	2	1	640	25.6
Durham Regional	1	0	1	0	150	26.7
Eastern Ontario	1	0	0	0	118	61.9
Elgin-St. Thomas	0	0	0	0	40	46.9
Grey Bruce	0	0	0	0	110	69.7
Haldimand-Norfolk	1	0	0	0	49	45.5
Haliburton-Kawartha-Pine Ridge District	0	0	0	0	54	31.5
Halton Regional	0	0	0	0	142	32.3
Hastings & Prince Edward Counties	0	0	0	0	77	49.4
Huron County	0	0	0	0	49	82.6
Kingston-Frontenac and Lennox & Addington	0	0	0	0	129	70.0
Lambton	0	0	0	0	53	41.3
Leeds-Grenville and Lanark District	2	0	0	0	63	38.7
Middlesex-London	0	0	0	0	104	24.6
Niagara Regional Area	1	2	0	0	198	46.3
North Bay Parry Sound District	0	0	0	0	74	60.2
Northwestern	0	0	0	0	123	152.7
Oxford County	0	0	0	0	47	45.7
Peel Regional	6	4	1	0	418	36.1
Perth District	0	0	0	0	43	57.8
Peterborough County-City	1	0	0	0	73	54.9
Porcupine	0	0	0	0	233	276.9
Renfrew County & District	0	0	0	0	26	26.2
Simcoe Muskoka District	2	0	0	0	234	48.8
Sudbury & District	0	0	0	0	122	63.4
Thunder Bay District	0	0	0	0	149	96.7
Timiskaming	0	0	0	0	41	119.8
Waterloo	2	0	0	0	123	25.7
Wellington-Dufferin-Guelph	0	2	0	0	84	33.0
Windsor-Essex County	0	2	1	1	168	42.7
York Regional	3	0	0	0	260	29.1
Out of Province/Not Available	0	0	0	0	23	N/A
Grand Total	28	12	5	2	4562	37.5

Ontario Influenza Vaccine Effectiveness Program: Weekly Report.

Information current as of December 25, 2009

The Ontario Influenza Vaccine Effectiveness (VE) Program is part of a national surveillance system that monitors circulating Influenza viruses. Data in this report represents VE specimens (1specimen/1patient) tested at TPHL since the beginning of September up to December 25, 2009. Rejected specimens are not included in the analyses. For more information related to this study please see Appendix 1.

Figure 1 represents the total number of VE specimens submitted to be tested for Influenza from September 1 up to December 25. During last week (Wk 51) the total number of specimens received was 9, which was slightly lower than during the previous week (13). Of the total number of specimens received, Flu A was detected in only one specimen (11.1%), which represents a slightly increased rate compared to the previous week (0%). The strain of Flu A positive specimen was Influenza A / (pH1N1).

Figure 1. Weekly epidemic curve of Influenza for VE specimens, September 1- December 25, 2009

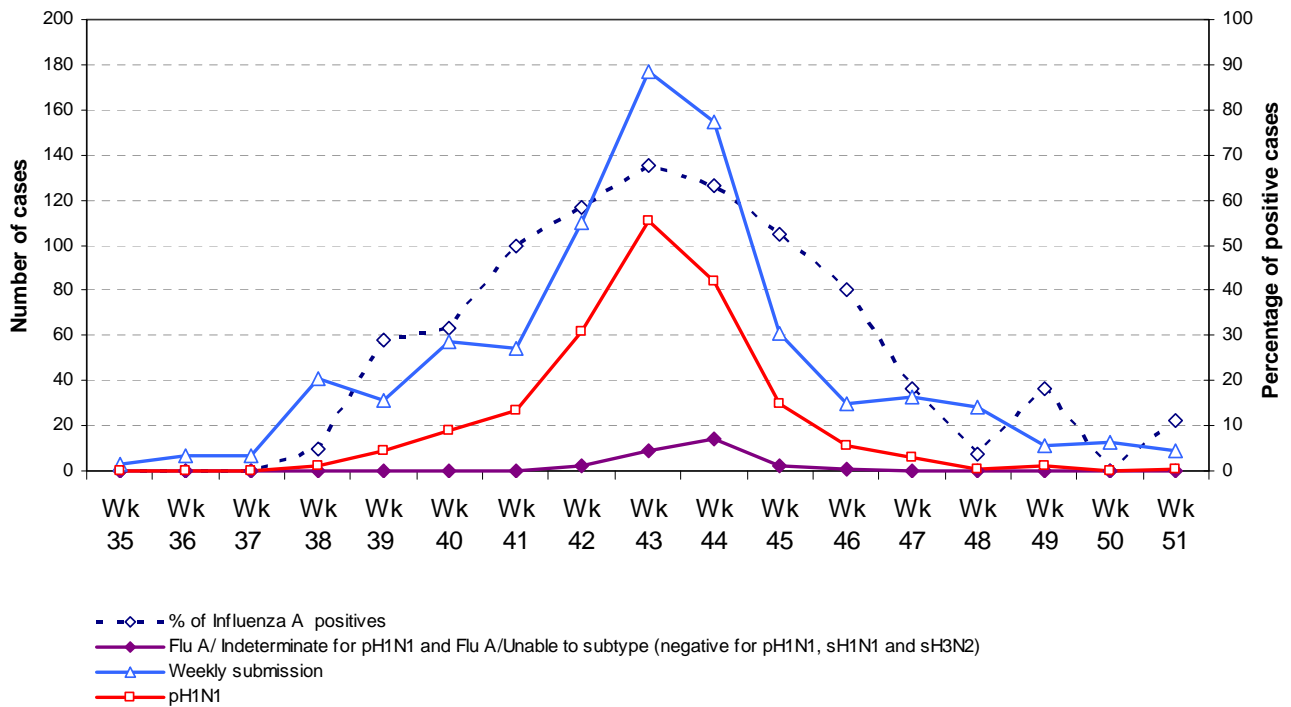


Figure 2 shows the distribution of age of Influenza A positive patients (cases) and Influenza A negative patients (controls). Influenza A remains more commonly detected in younger age groups, with the most cases detected in the interval age of 10 -14 years. Almost 70% of cumulative cases were between the ages 0-24, which is the same as the previous week. Influenza remains less commonly detected in older age groups. In samples tested from individuals 60 and over, the cumulative percentage of positive for Influenza A was 8/73, which is more than 2% lower than during the previous week. This is because Influenza was not detected in any of specimens tested from patients in this age interval.

Figure 2. Age distribution of VE patients tested for Influenza by Influenza subtype, September 1 – December 25, 2009

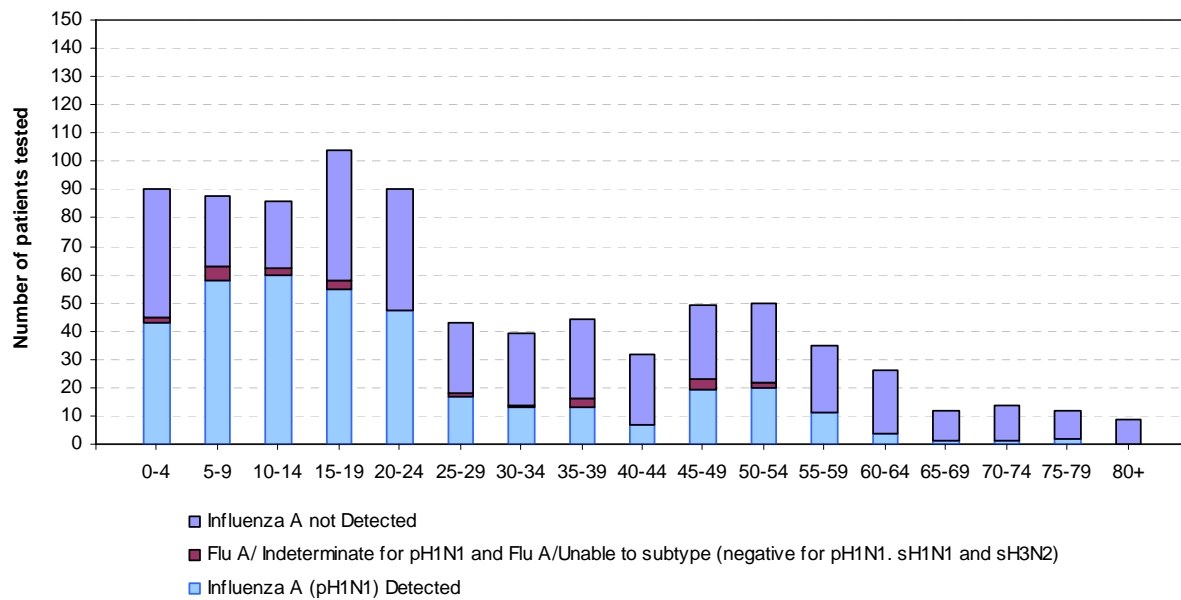


Table 1 shows the distribution of all detected circulating respiratory viruses in VE specimens during last week (Wk 51), using RT_PCR and Multiplex as testing methods. At least one virus was detected in 4/9 specimens. Specifically coinfection of Flu A/pH1N1 and Rhinovirus was detected in one specimen (11.1%), Rhinovirus alone was detected in another specimen (11.1%) and Parainfluenza 1 was detected in two separate specimens.

Table 1 Circulating respiratory viruses detected by RT_PCR and Multiplex in VE specimens, December 21 to December 25, 2009

THE DETECTED VIRUSES	NUMBER OF SPECIMENS	PERCENTAGE OF SPECIMENS
FLU A(pH1N1)-RHINOVIRUS	1	11.1
FLU B	0	0.0
RHINOVIRUS	1	11.1
PARAINFLUENZA	2	22.2
TOTAL POSITIVE SPECIMENS	4	44.4
TOTAL SPECIMENS TESTED	9	100.0

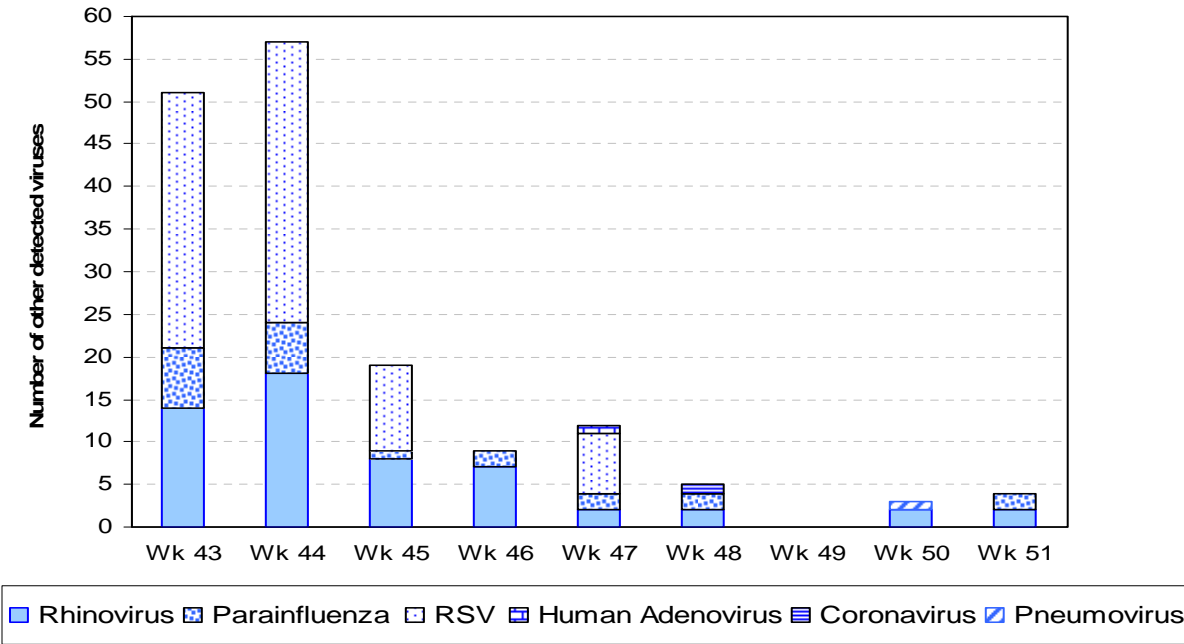
Table 2 shows the geographical and age distribution of patients tested positive by Multiplex method during last week (Wk 51). Due to small sample size it is hard to observe any age or geographical trend. Coinfection of Flu A/pH1N1 and Rhinovirus was detected in a patient from Toronto Health Unit and Rhinovirus alone was detected in a patient from Waterloo Health Unit. Cases of Parainfluenza 1 were detected in patients from Timiskaming and Haliburton Health Units. Coinfection of FluA/pH1N1 and Rhinovirus, and Rhinovirus alone, were detected in adults ranging from 35 to 44 years of age. Cases of Parainfluenza 1 were detected in seniors ranging from 70 to 94 years of age.

Table 2 Geographical and age distribution of positive tested patients by RT_PCR and Multiplex methods, December 21 – December 25, 2009.

THE DETECTED VIRUSES	PATIENT_PHU	AGE_CATEGORY
FLUA/p(H1N1)-RHINOVIRUS	TORONTO	35-39
RHINOVIRUS	WATERLOO	40-44
PARAINFLUENZA	TIMISKAMING	70-74
PARAINFLUENZA	HALIBURTON	90-94

Figure 3 represents cumulative cases of other circulating respiratory viruses detected in VE specimens from October 26 to December 25. The number of viruses detected do not necessary represents the number of specimens tested as coinfections of two or more respiratory viruses were detected in 102/504 specimens. Specifically, coinfections of Flu A and Rhinovirus or Parainfluenza or Respiratory Syncytial Viruses (RSV), and coinfection of Rhinovirus and Parainfluenza, were detected in 98/102 specimens. Coinfections of multiple viruses such as Flu A and Rhinovirus and RSV B, and Flu A and Parainfluenza 1 and Rhinovirus were detected in 3/102 and 1/102 specimens, respectively. RSVs have been detected from Week 43 to Week 47 reaching the peak during Week 44 at 33/155 specimens. Rhinovirus has been continuously detected during the entire period with the exception of Week 49. Rhinovirus reached the peak during Week 44 at 18/155 specimens and during last two weeks (Wk 50 & Wk 51) dropped down at 2/13 and 2/9 specimens, respectively. Parainfluenza viruses have been detected almost during the entire period with the exception of Week 49 and 50, reaching the peak during Week 43 at 7/104 specimens. Other respiratory specimens detected sporadically in VE specimens are: Human Adenovirus in 1/33 specimens during Week 47; Coronavirus in 1/28 specimens during Week 48; and Metapneumovirus in 1/13 specimens during Week 50.

Figure 3. Weekly epidemic curve of other circulating respiratory viruses detected in VE specimens, October 26 - December 25, 2009



Appendix 1

Changes to Testing Algorithm:

<u>Date</u>	<u>Change</u>
December 17, 2009	Viral culture testing will increase to all ambulatory samples and a minimum of 20% of influenza A negative RT-PCR tests. Viral culture testing will be increased as resources allow.
December 2, 2009	Subtyping is being increased as resources allow.
November 9-12, 2009	Only 20% of ambulatory (community) viral culture requests are being processed.
October 25-31, 2009	Subtyping performed on all intensive care samples, outbreak samples and on 20% of all additional influenza A positive tests.

Additional information on Testing Protocol for Influenza A:

The majority of specimens received at PHL, which have been approved for testing, are first tested for influenza A by real-time reverse transcriptase (RT) polymerase chain reaction (PCR). A subset of samples is tested by viral culture. Subtyping of positive influenza A tests is done to determine if samples are pH1N1 or seasonal H1/H3. For Influenza A real-time RT-PCR negative samples, 20% are followed up with viral culture to look for other viral pathogens. Viral culture analyses take considerably longer to process (up to 10 days) than analyses by real-time RT-PCR.

Interpretation of subtyping results:

An **indeterminate** result occurs in a RT-PCR test when a result is obtained that reflects a very low level of the target (e.g. influenza, or influenza subtype). Due to the level of target being near the threshold of detection of the RT-PCR test, it is not known if this is a true positive result, or nonspecific activity giving a false positive response. The clinical interpretation of an indeterminate result depends on the prevalence of the target of interest in the population being tested at that point in time. An indeterminate pH1N1 result is more predictive of true pH1N1 infection when obtained at a time of high prevalence of the virus. An influenza isolate is considered **untypeable** when influenza A is detected, but this sample does not match any of the subtypes that can be tested for (e.g. pH1N1, seasonal H3N2, H1N1). These samples are investigated further for the possibility of new strains or subtypes (due to genetic drift or shift). On occasion an influenza A positive sample that has a very low amount of virus in it does not match any subtype. This occurs because the subtyping PCR tests are less sensitive than the influenza A RT-PCR tests available. When this occurs a result of "**unable to subtype**" is released.

Ontario Influenza Vaccine Effectiveness Program Additional Information

The Ontario Influenza Vaccine Effectiveness (VE) Program aims to monitor circulating influenza viruses and measure the effectiveness of yearly influenza vaccine. Through a case-control design, VE links laboratory testing results with patient's epidemiological information to measure influenza vaccine effectiveness. Ontario joined the VE study in the 2006/07 influenza season along with British Columbia, Alberta and Quebec. The Ontario VE program represent a collaboration between OAHPP Public Health Laboratories and Surveillance and Epidemiology teams, the Ontario Ministry of Health and Long Term Care (MOHLTC), the Ontario College of Family Physicians and a network of 115 sentinel physicians across the province. Sentinel physicians who volunteer to join the VE study submit respiratory specimens (nasal or nasopharyngeal) for influenza testing along with vaccine history and other epidemiologic information collected from eligible consenting participants from community presenting within 7 days of onset of influenza like illness (ILI). ILI is defined as acute onset of respiratory illness with fever and cough and with one or more of the following: sore throat, arthralgia, myalgia or prostration. Sentinel physicians

are exempted from any restrictions placed on other clinicians who submit respiratory specimens. They are permitted to collect specimens without restrictions as they contribute to national and provincial influenza surveillance systems. At the Toronto Public Health Laboratory (TPHL) specimens are tested for influenza A/B and subtypes (seasonal H1N1 and H3N2, and pH1N1). They are also screened for a panel of common respiratory viruses and cultured for antigenic strain characterization (performed at the National Microbiology Laboratory (NML)). Lab results are merged with epidemiological data to calculate VE from cases and controls with adjustments for covariates such as age and chronic conditions. For more details, please look at the study website available at: <http://www.oahpp.ca/vestudy/index.php>