

**Ontario Agency for Health Protection and Promotion Laboratory Pandemic H1N1 Surveillance Report
Information current as of: Monday December 7, 2009**

This report summarizes patient specimens (1 specimen/patient) collected and received at OAHP 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 7, 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. 2nd, 2009 subtyping is being increased as resources allow. Subtyping continues to be performed on all intensive care samples, outbreak samples and a minimum of 20% of all additional influenza A positive tests, as per the modification of the testing algorithm during the week of Oct 25-31st, 2009. 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 OAHP laboratories.

Starting the week of November 9-12th, 2009, a minimum of 20% of ambulatory (community) viral culture requests are being processed.

For additional details on changes to the laboratory testing algorithm, please see the November Labstract at www.oahpp.ca

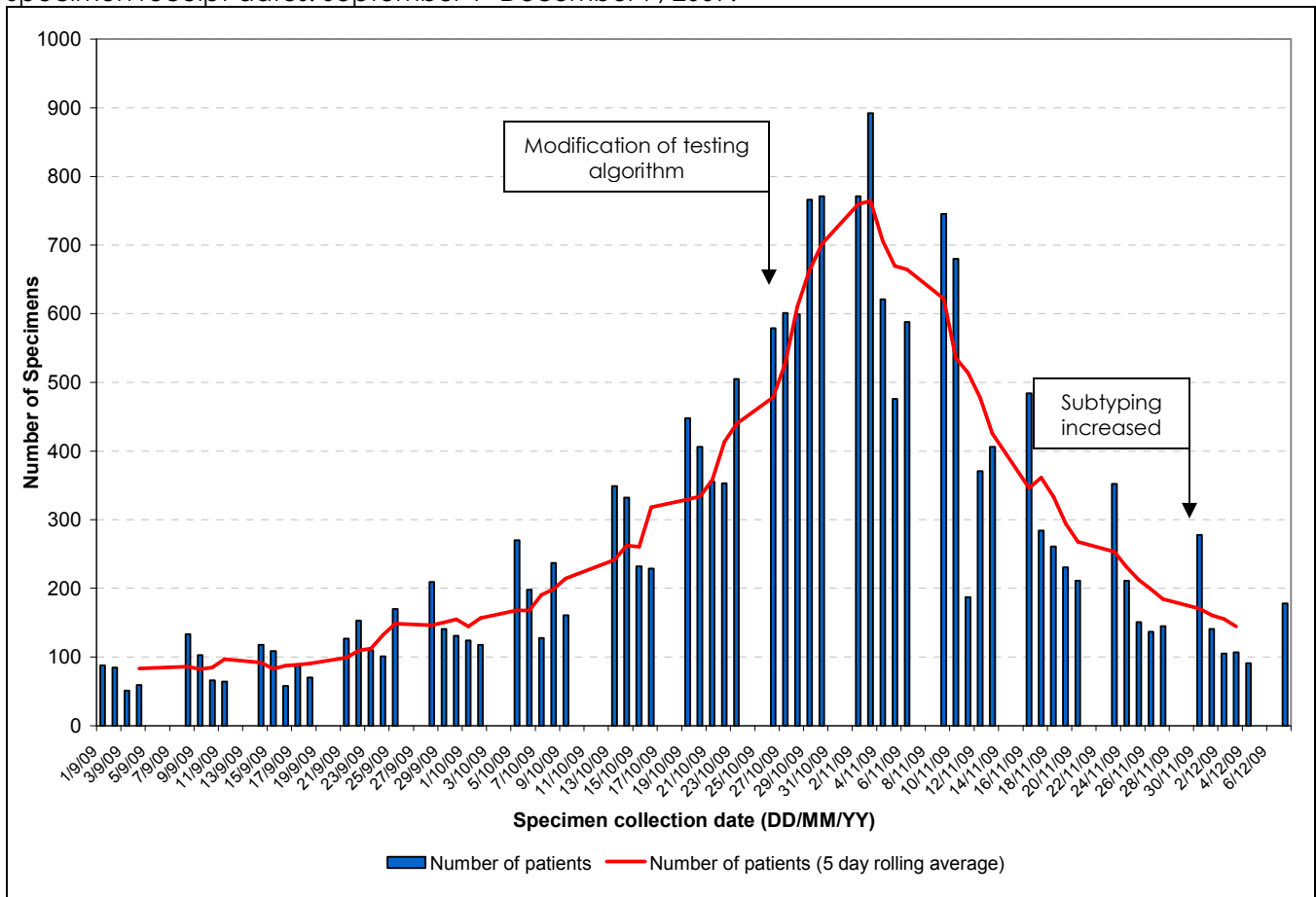
Week 48 Summary Snapshot

- There were 15 laboratory confirmed cases of influenza A so far this week, which is a drop from 54 laboratory confirmed influenza A cases last week.
- The RT-PCT % positivity continues to fall, down from 7.0% last week to 5.0% this week.

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 7, 2009 is 19,310. 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 908 specimens received for pH1N1 testing during the 7 day period between December 1 – December 7, 2009; 4.7% of the total received since September 1. Within the past four weeks submissions have declined.

Figure 1. The number of specimens received (1/patient) at PHL/OAHP for pH1N1 testing by date. Specimen receipt dates: September 1- December 7, 2009.



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

Case Statistics

Between September 1 and December 7, 2009, a total of 15,925 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. 15,310 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 54.4% on October 27, 2009. At the height of the Spring/Summer pH1N1 outbreak, percent positive pH1N1 reached approximately 54% (Source: OAHP 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, 15,060 specimens and isolates have been tested for influenza A at the PHL. Influenza A virus has been identified in 4,543 (30.2%) of the patients tested at PHL; an additional 615 patient specimens that tested positive for influenza A at hospital laboratories were forwarded to the PHL to be subtyped for pH1N1. There are 1,922 that have been confirmed positive for influenza A but have not been subtyped. Of all specimens and isolates subtyped for pH1N1, 3147 cases of pH1N1 have been detected. Two cases of seasonal influenza (H3) have been detected. One-hundred 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 277 for tyrosine (H275Y) in the neuraminidase gene. Since September 1, 2009, of the 697 isolates that have been tested, 3 (0.43%) have been identified as resistant to oseltamivir.

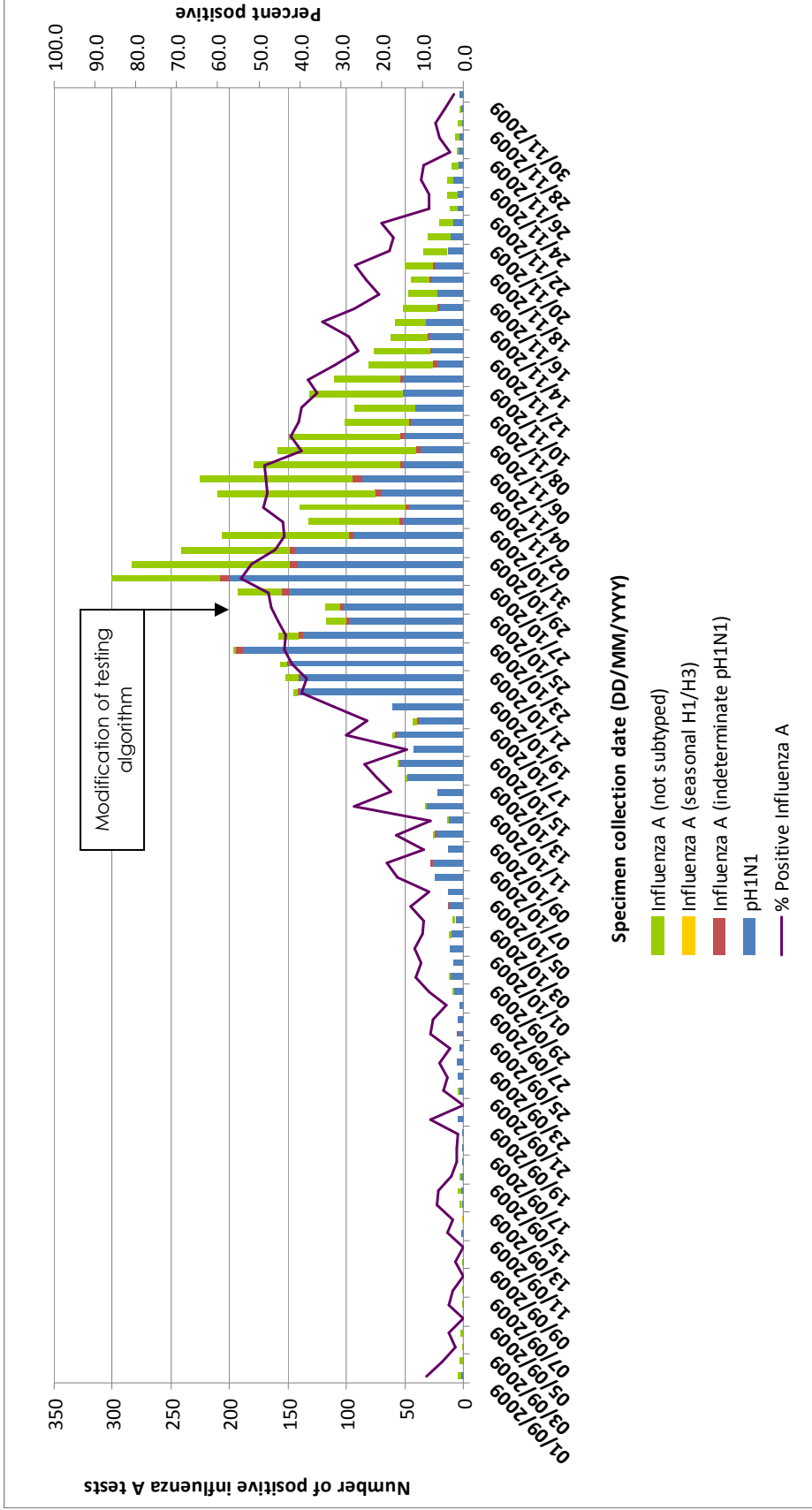
Table 1. Patient test results for specimens collected between September 1 and December 5, 2009, tested at the PHL in Ontario.

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			Percent Positive (% pH1N1 for influenza A subtyped cases)	Positive influenza B†
								RT-PCR	Positive influenza A Viral culture‡	Positive influenza A		
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	335	341	1.6	7.2	66.7	0	
Week 37 (Sep. 13 – 19)	12	4	0	1	1	432	450	5.2	3.1	85.7	0	
Week 38 (Sep. 20 – 26)	27	1	0	0	1	557	586	5.8	0.8	96.4	0	
Week 39 (Sep. 27 – Oct. 3)	59	6	0	0	0	597	662	11.4	0.0	100.0	0	
Week 40 (Oct. 4 – 10)	126	3	0	0	4	740	873	13.9	4.2	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)	916	54	0	0	15	1086	2071	38.4	33.8	98.4	0	
Week 43 (Oct. 25 – 31)	884	556	0	0	35	1451	2926	47.9	49.8	96.2	0	
Week 44 (Nov. 1 – 7)	389	748	0	0	25	1333	2495	45.5	60.9	94.0	1	
Week 45 (Nov. 8 – 14)	258	347	0	0	7	1088	1700	34.2	31.3	97.4	1	
Week 46 (Nov. 15 – 21)	126	143	0	0	8	874	1151	22.2	23.9	94.0	0	
Week 47 (Nov. 22 – 28)	33	34	0	0	0	646	713	7.0	12.1	100.0	0	
Week 48 *** (Nov. 29 – Dec. 5)	20	2	0	0	0	321	343	5.0	8.1	100.0	0	
Total	3147	1922	0	2	100	10510	15681	29.8	31.2	96.8	3	

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

* For 783 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=615) *** 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, unsubtypeable & indeterminate pH1N1 or pending subtype), for specimen collection dates* September 1 – November 30, 2009, 2009**.

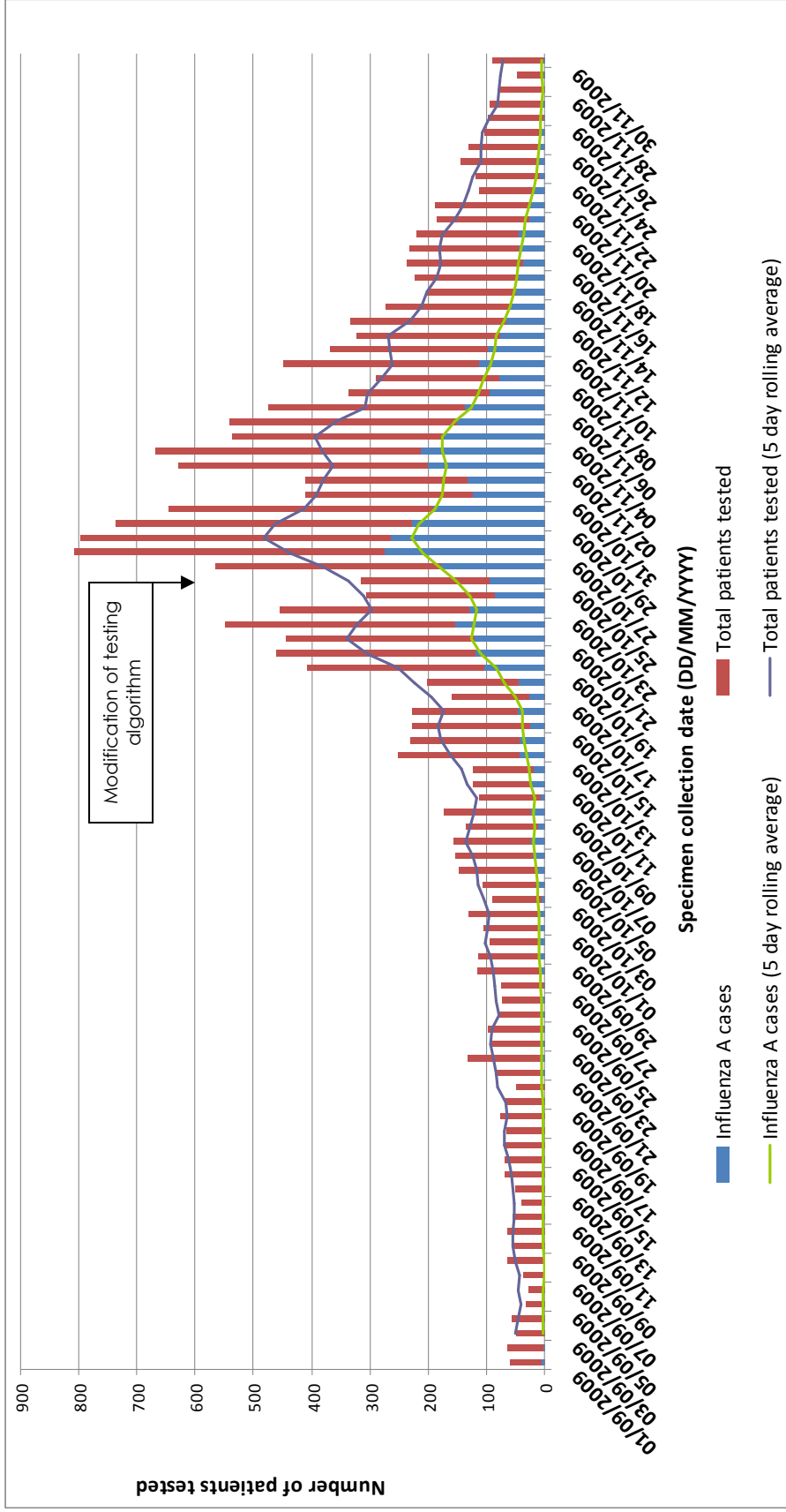


Source: PHL, Ontario Agency for Health Protection and Promotion (OAHP).

* For 783 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 November 30th, 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 – November 30, 2009**.



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

* For 783 specimens, no specimen collection date was available; the date the specimen was received at the lab has been used as a proxy.

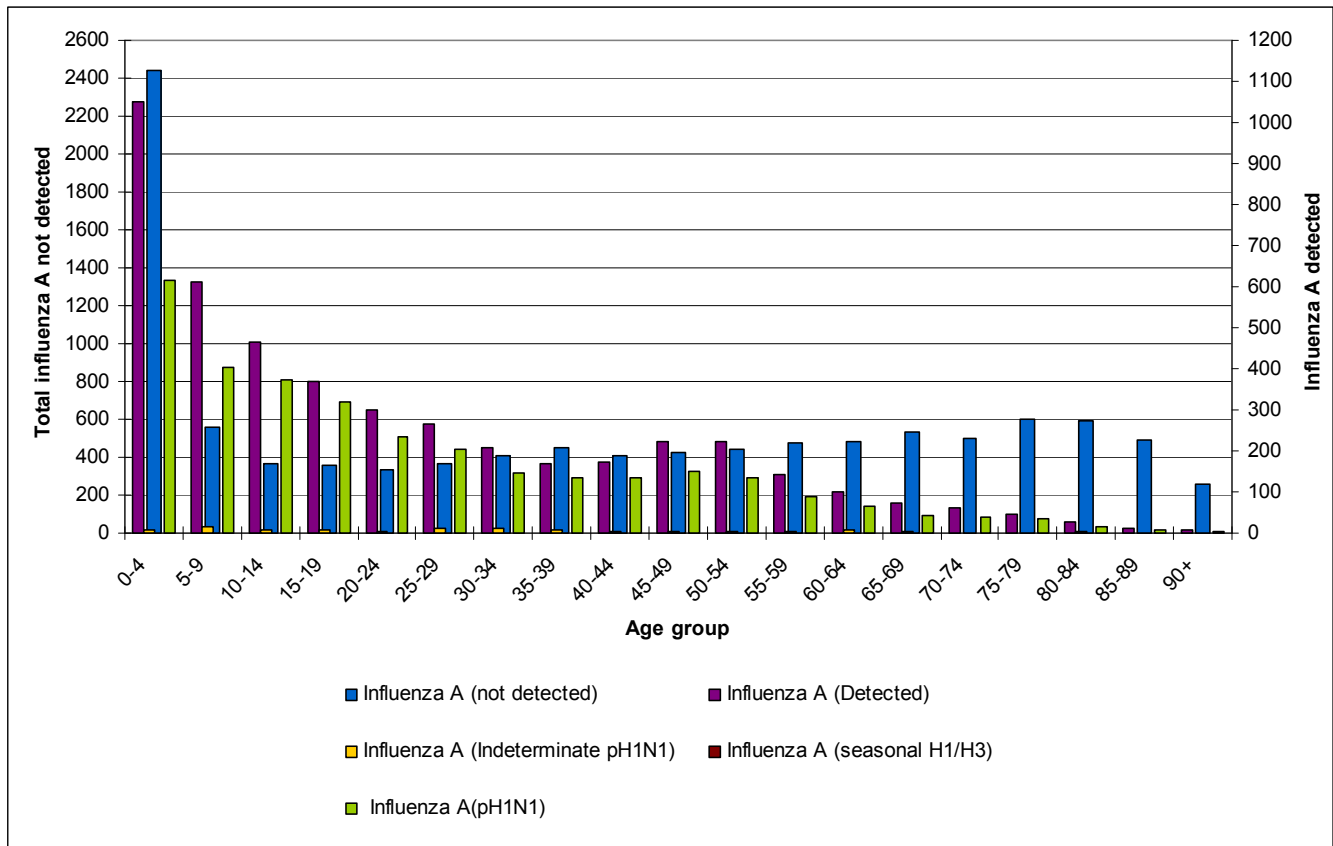
** Data collected since November 30th, 2009 has been excluded from Figures 3. Since not all specimens collected on those dates have test results available, the data from those days may not reflect the current situation.

Sex and Age Distribution

Over half (52.2%; n=8,169) of all patient specimens submitted for testing for pH1N1 were from female patients. Males made up 47.8% (n=7,467) of patients and sex was not reported for 291 of patients. Females make up 51.6% (n=1,591) of all lab confirmed cases of pH1N1 detected. Males made up 48.4% (n=1,495) 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 1049 cases (23.1%). Children aged 0-19 represent over half of the cases (54.9%; n=2494). There were 565 cases of pH1N1 among adults aged 20-29 (12.4%). Adults aged 30-59 make up 25.1% of pH1N1 cases (n=1141). 330 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 7, 2009*.



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

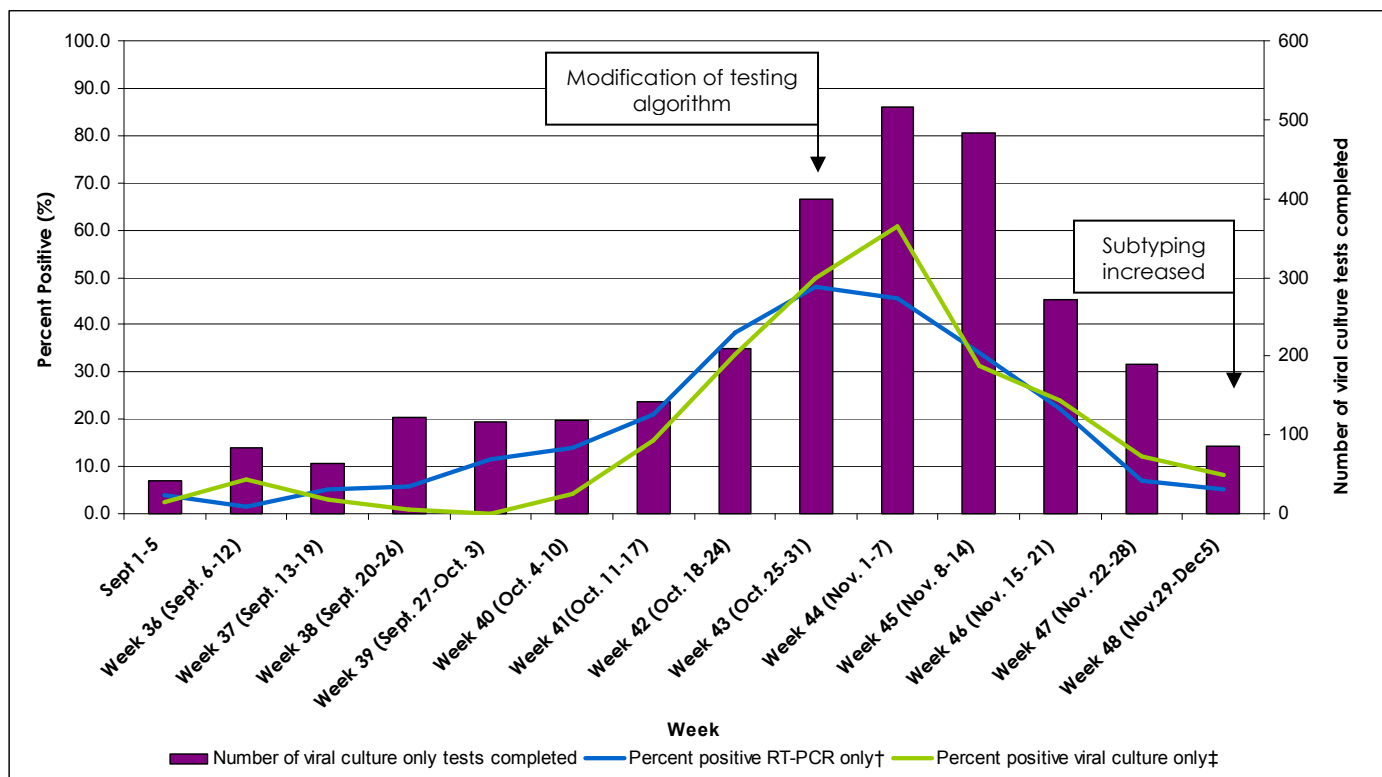
*Note: Age was not available for 37 patients.

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 three weeks, with sharp declines in the most recent two weeks. For viral culture approximately 8.1% 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 5th, 2009



Source: PHL, Ontario Agency for Health Protection and Promotion (OAHP).
 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 47 and 48, 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 7

Since, September 1, the highest submission rates for specimens being tested for pH1N1 observed were from the Porcupine (589.4 submissions/100,000 persons) and Northwestern (381.22 submissions/100,000 persons) PHUs. The Toronto area had the highest number of influenza A cases in the province (n=633) during this time period, followed by Peel Regional (n=411) and York Regional (n=259) (**Table 2**). Percent positive for influenza A was greatest in Middlesex-London, with 48.1% of samples tested yielding positive results.

Week 47: November 22 – November 28

In the recent full week, Porcupine (14.3 submissions/100,000 persons) and Peel Regional (12.9 submissions/100,000 persons) PHUs had the highest submission rates for specimens to be tested for pH1N1. In Week 47, 54 new influenza A cases have been identified (33 confirmed new cases of pH1N1) to date. The greatest number of influenza A cases was identified in Toronto (n=15). This was followed by Peel (n=13) and York Regional (n=4) (**Table 3**).

Most recent full week: November 29 – December 5 (Week 48)

In the most recent full week, Porcupine (9.5 submissions/100,000 persons) and Timiskiming (5.8 submissions/100,000 persons) PHUs had the highest submission rates for specimens to be tested for pH1N1. In Week 48, 18 new influenza A cases have been identified (20 confirmed new cases of pH1N1) to date. The greatest number of cases was identified in Toronto and Peel Region (n=4), and Leeds-Grenville and Lanark County, Waterloo and York Regional with 2 cases each (**Table 4**).

Table 2. Number of pH1N1 specimens submitted for testing, pH1N1 cases, percent positive and submission rate (/100,000) by PHU. Specimen collection dates: September 1- December 7, 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	331	284.7	51	100	30.6
Brant County	172	137.5	28	49	29.9
Chatham-Kent	143	131.7	32	50	36.0
City of Hamilton	435	86.2	261	117	45.0
City of Ottawa	90	11.1	18	27	30.0
City of Toronto	3003	120.0	350	633	21.7
Durham Regional	493	87.8	118	149	32.7
Eastern Ontario	295	154.8	98	117	40.3
Elgin-St. Thomas	108	126.5	19	40	38.5
Grey Bruce	347	220.0	34	110	32.4
Haldimand-Norfolk	121	112.3	35	49	43.0
Haliburton-Kawartha-Pine Ridge District	220	128.2	43	54	26.0
Halton Regional	563	128.2	134	142	27.8
Hastings & Prince Edward Counties	297	190.4	90	77	29.3
Huron County	123	207.3	23	49	40.8
Kingston-Frontenac and Lennox & Addington	411	222.9	132	129	33.6
Lambton	155	120.9	35	53	34.6
Leeds-Grenville and Lanark District	186	114.1	50	63	35.0
Middlesex-London	277	65.6	143	104	48.1
Niagara Regional Area	561	131.3	124	195	36.9
North Bay Parry Sound District	246	200.2	43	74	30.8
Northwestern	307	381.2	69	123	40.9
Oxford County	132	128.5	29	47	35.6
Peel Regional	1939	167.2	235	411	22.0
Perth District	153	205.8	30	43	28.5
Peterborough County-City	191	143.5	43	72	38.1
Porcupine	496	589.4	179	233	47.3
Renfrew County & District	75	75.5	15	26	36.1
Simcoe Muskoka District	1098	228.9	146	242	24.2
Sudbury & District	332	172.6	56	122	37.0
Thunder Bay District	403	261.6	83	149	37.4
Timiskaming	93	271.8	32	41	44.6
Waterloo	336	70.3	74	123	38.6
Wellington-Dufferin-Guelph	318	124.8	41	82	26.8
Windsor-Essex County	445	113.1	111	166	41.3
York Regional	966	108.2	126	259	27.7
Out of Province/Not Available	64	N/A	17	23	36.5
Grand Total	15925	131.0	3147	4543	30.2

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, percent positive and submission rate (/100,000) by PHU. Specimen collection dates: Nov. 22–Nov.28, 2009 (**Week 47**).

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	14	12.0	0	0	0.0
Brant County	7	5.6	0	0	0.0
Chatham-Kent	5	4.6	0	0	0.0
City of Hamilton	6	1.2	1	2	40.0
City of Ottawa	2	0.2	0	0	0.0
City of Toronto	167	6.7	7	15	10.1
Durham Regional	12	2.1	0	1	8.3
Eastern Ontario	8	4.2	0	0	0.0
Elgin-St. Thomas	8	9.4	0	0	0.0
Grey Bruce	12	7.6	0	0	0.0
Haldimand-Norfolk	10	9.3	0	1	10.0
Haliburton-Kawartha-Pine Ridge District	14	8.2	1	1	7.1
Halton Regional	25	5.7	2	3	12.0
Hastings & Prince Edward Counties	9	5.8	0	0	0.0
Huron County	1	1.7	0	0	0.0
Kingston-Frontenac and Lennox & Addington	18	9.8	0	0	0.0
Lambton	8	6.2	0	0	0.0
Leeds-Grenville and Lanark District	8	4.9	1	0	0.0
Middlesex-London	7	1.7	0	1	20.0
Niagara Regional Area	27	6.3	0	0	0.0
North Bay Parry Sound District	10	8.1	1	1	10.0
Northwestern	2	2.5	0	0	0.0
Oxford County	5	4.9	1	1	20.0
Peel Regional	150	12.9	9	13	8.9
Perth District	2	2.7	0	0	0.0
Peterborough County-City	14	10.5	0	0	0.0
Porcupine	12	14.3	1	2	16.7
Renfrew County & District	4	4.0	0	0	0.0
Simcoe Muskoka District	57	11.9	3	3	6.5
Sudbury & District	16	8.3	0	0	0.0
Thunder Bay District	12	7.8	0	0	0.0
Timiskaming	3	8.8	0	0	0.0
Waterloo	17	3.6	0	1	7.1
Wellington-Dufferin-Guelph	8	3.1	0	1	12.5
Windsor-Essex County	25	6.4	1	3	12.0
York Regional	45	5.0	4	4	9.5
Out of Province/Not Available	5	N/A	1	1	25.0
Grand Total	755	6.2	33	54	7.7

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 4. Number of pH1N1 specimens submitted for testing, pH1N1 cases, percent positive and submission rate (/100,000) by PHU. Specimen collection dates: Nov. 29– Dec. 5, 2009 (**Week 48*****).

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	0	0.0	0	0	N/A
Brant County	2	1.6	0	0	0.0
Chatham-Kent	4	3.7	0	0	0.0
City of Hamilton	10	2.0	1	0	0.0
City of Ottawa	0	0.0	0	0	N/A
City of Toronto	65	2.6	4	4	6.3
Durham Regional	11	2.0	1	1	9.1
Eastern Ontario	10	5.2	0	0	0.0
Elgin-St. Thomas	0	0.0	0	0	N/A
Grey Bruce	8	5.1	0	0	0.0
Haldimand-Norfolk	4	3.7	1	1	25.0
Haliburton-Kawartha-Pine Ridge District	4	2.3	0	0	0.0
Halton Regional	15	3.4	0	0	0.0
Hastings & Prince Edward Counties	8	5.1	0	0	0.0
Huron County	0	0.0	0	0	N/A
Kingston-Frontenac and Lennox & Addington	1	0.5	0	0	0.0
Lambton	2	1.6	0	0	0.0
Leeds-Grenville and Lanark District	8	4.9	2	2	25.0
Middlesex-London	1	0.2	0	0	0.0
Niagara Regional Area	11	2.6	0	0	0.0
North Bay Parry Sound District	3	2.4	0	0	0.0
Northwestern	0	0.0	0	0	N/A
Oxford County	5	4.9	0	0	0.0
Peel Regional	65	5.6	4	4	6.2
Perth District	1	1.3	0	0	0.0
Peterborough County-City	5	3.8	1	1	20.0
Porcupine	8	9.5	0	0	0.0
Renfrew County & District	1	1.0	0	0	0.0
Simcoe Muskoka District	24	5.0	2	1	4.3
Sudbury & District	6	3.1	0	0	0.0
Thunder Bay District	6	3.9	0	0	0.0
Timiskaming	2	5.8	0	0	0.0
Waterloo	11	2.3	1	2	18.2
Wellington-Dufferin-Guelph	5	2.0	0	0	0.0
Windsor-Essex County	10	2.5	0	0	0.0
York Regional	25	2.8	3	2	8.3
Out of Province/Not Available	2	N/A	0	0	0.0
Grand Total	343	2.8	20	18	8.4

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

*** 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 45	Number of lab confirmed Influenza A cases WEEK 46	Number of lab confirmed Influenza A cases WEEK 47	Number of lab confirmed Influenza A cases WEEK 48	Total confirmed Influenza A cases (Sept 1 st , 2009)	Rate of influenza A cases per 100,000 (Sept. 1 st , 2009)
Algoma District	8	3	0	0	100	86.0
Brant County	5	1	0	0	49	39.2
Chatham-Kent	7	2	0	0	50	46.0
City of Hamilton	3	2	2	0	117	23.2
City of Ottawa	3	2	0	0	27	3.3
City of Toronto	105	52	15	4	633	25.3
Durham Regional	13	5	1	1	149	26.5
Eastern Ontario	11	2	0	0	117	61.4
Elgin-St. Thomas	2	1	0	0	40	46.9
Grey Bruce	16	6	0	0	110	69.7
Haldimand-Norfolk	6	3	1	1	49	45.5
Haliburton-Kawartha-Pine Ridge District	10	2	1	0	54	31.5
Halton Regional	12	5	3	0	142	32.3
Hastings & Prince Edward Counties	1	3	0	0	77	49.4
Huron County	4	0	0	0	49	82.6
Kingston-Frontenac and Lennox & Addington	8	3	0	0	129	70.0
Lambton	3	3	0	0	53	41.3
Leeds-Grenville and Lanark District	3	3	0	2	63	38.7
Middlesex-London	4	3	1	0	104	24.6
Niagara Regional Area	25	10	0	0	195	45.6
North Bay Parry Sound District	10	2	1	0	74	60.2
Northwestern	23	12	0	0	123	152.7
Oxford County	1	2	1	0	47	45.7
Peel Regional	57	33	13	4	411	35.4
Perth District	1	0	0	0	43	57.8
Peterborough County-City	10	4	0	1	72	54.1
Porcupine	11	2	2	0	233	276.9
Renfrew County & District	9	1	0	0	26	26.2
Simcoe Muskoka District	38	20	3	1	242	50.4
Sudbury & District	20	12	0	0	122	63.4
Thunder Bay District	12	6	0	0	149	96.7
Timiskaming	1	2	0	0	41	119.8
Waterloo	13	0	1	2	123	25.7
Wellington-Dufferin-Guelph	10	5	1	0	82	32.2
Windsor-Essex County	32	10	3	0	166	42.2
York Regional	37	22	4	2	259	29.0
Out of Province/Not Available	6	2	1	0	23	N/A
Grand Total	540	246	54	18	4543	37.4

*** The ring map will be attached in the subsequent report***

Ontario Influenza Vaccine Effectiveness Program: Weekly Report.

Information current as of December 4, 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 4, 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 4. During Week 48 (November 30 – December 4) the total number of specimens received was 28, which is 14% lower than during the previous week (33). Of the total number of specimens received, only 1 specimen (3.6 %) was Flu A positive, which represents a 5.1 times lower positivity rate compared to the previous week. The strain of the positive specimens was Influenza A/ (pH1N1).

Figure 1. Weekly epidemic curve of influenza for VE specimens, September 1- December 4, 2009

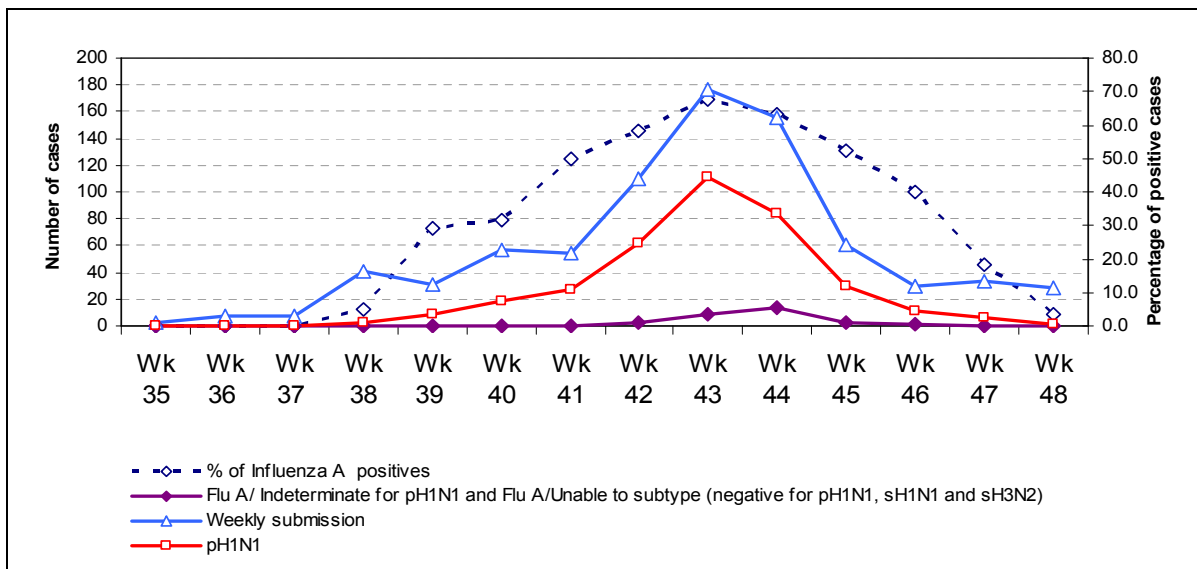


Figure 2 shows the distribution of age of influenza A positive patients (cases) and influenza A negative patients (controls). During Week 48, Influenza A remains more commonly detected in younger age groups, with the most cases detected in the interval age of 10 -14 years. Seventy per cent of cumulative 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 8/57 which is 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 4, 2009

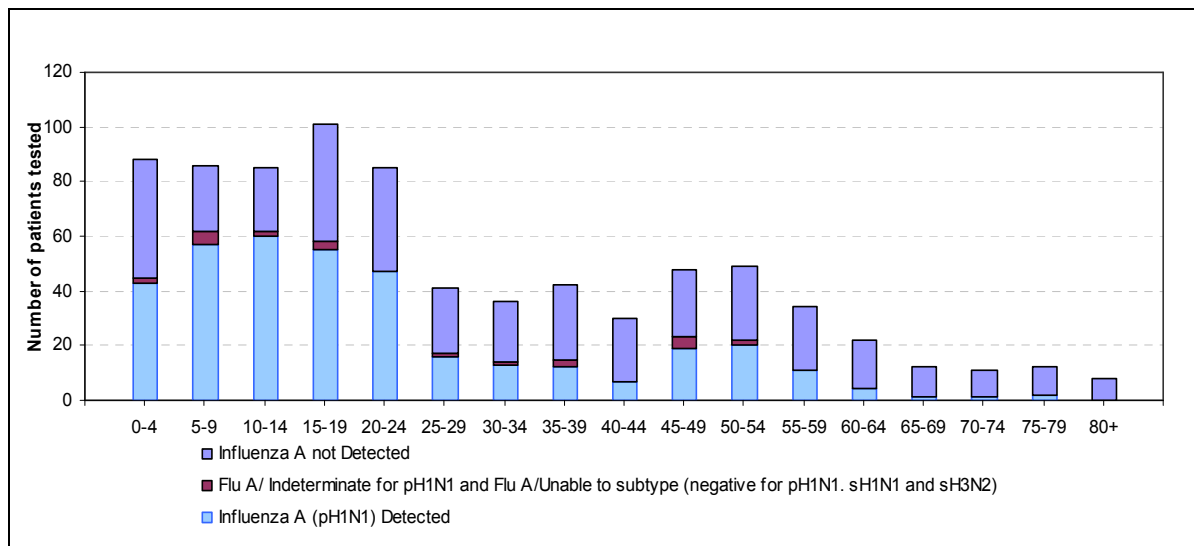


Table 1 shows the distribution of all detected circulating respiratory viruses in VE specimens during the Week 48, using RT_PCR and Multiplex as testing methods. At least one respiratory virus was detected in 5 (17.9 %) of specimens tested. The only detected case of Influenza A was coinfecting with Parainfluenza 3 virus. Parainfluenza 1 and Rhinovirus were detected in 1 and two specimens, respectively. During the specified week a case of Corona virus was detected for which Multiplex method wasn't able to identify properly between Corona 229E and Corona NL63 subtypes.

Table 1 Circulating respiratory viruses detected by RT_PCR and Multiplex in VE specimens, November 30 to December 4, 2009

THE DETECTED VIRUSES	NUMBER OF SPECIMENS	PERCENTAGE OF SPECIMENS
FLU A/pH1N1-PARAINFLUENZA 3	1	3.6
FLU B	0	0.0
PARAINFLUENZA 1	1	3.6
RHINOVIRUS	2	7.1
CORONA 229E/NL63	1	3.6
TOTAL POSITIVE SPECIMENS	5	17.9
TOTAL SPECIMENS TESTED	28	100.0

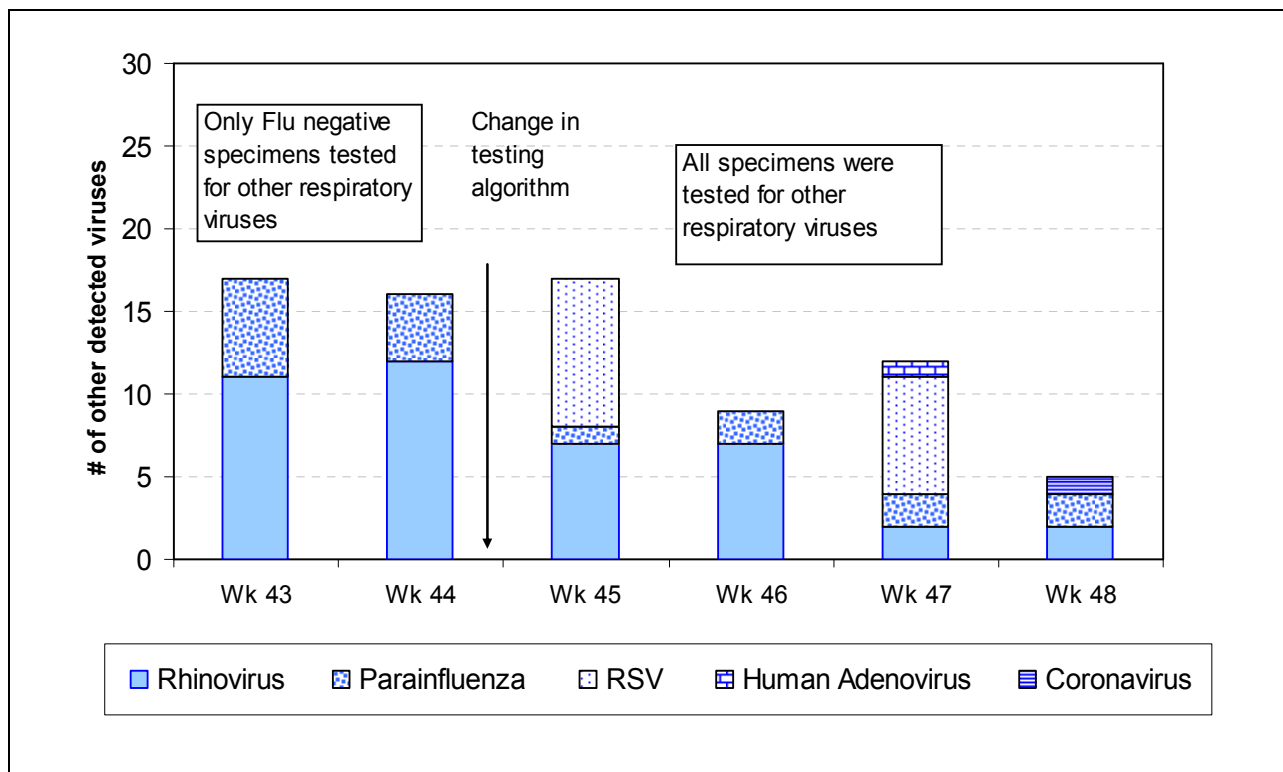
Table 2 shows the geographical and age distribution of patients tested positive by RT_PCR and Multiplex methods during Week 48. Due to small sample size it is hard to observe any age or geographical trend. Coinfections of Flu A by Parainfluenza 3 were detected in Ottawa Health Unit. Two cases of Rhinovirus were detected in Ottawa and Waterloo Health Units. Coronavirus and Parainfluenza 1 were detected in Ottawa and Windsor Health Units, respectively. All viruses were detected in patients 0-24 years old with the exception of Parainfluenza 1, which was detected in a patient of 50-54 years old.

Table 2 Geographical and age distribution of positive tested patients by RT_PCR and Multiplex methods, November 23 - November 27, 2009.

THE DETECTED VIRUSES	PATIENT PHU	AGE CATEGORY
FLU A/pH1N1-PARAINFLUENZA 3		5-9
RHINOVIRUS		20-24
CORONA 229E/NL63	OTTAWA	20-24
RHINOVIRUS	WATERLOO	0-4
PARAINFLUENZA 1	WINDSOR	50-54

Figure 3 represents other circulating viruses detected in VE specimens from October 26 to December 4. During the peak of the second wave of Influenza A outbreak (Week 43 to Week 44) only Influenza A negative specimens were tested by Multiplex for the presence of other respiratory viruses. From week 45 and currently there was a change in testing algorithm and all specimens were tested by Multiplex. The number of viruses identified do not necessary represent the number of specimens tested as in 27/204 specimens tested coinfections of two viruses (25/27) or three viruses (2/27) were present. Rhinovirus and Parainfluneza viruses have been consistently present during the entire period. Rhinovirus reached the peak in Week 44 at 12/50 specimens and continuously dropped at 2/28 specimens during Week 48. Similarly, Painfluenza viruses reached the peak in Week 43 at 6/42 specimens and slightly dropped at 2/28 specimens in Week 48. Respiratory Syncytial Viruses were detected during Week 45 and 47 in 9/60 and 7/33 specimens, respectively. Other detected respiratory specimens are Human Adenovirus 1/33 during Week 47 and Coronavirus 1/28 specimens during Week 48.

Figure 3. Weekly epidemic curve of other circulating respiratory viruses detected in VE specimens, October 26- December 4, 2009



Appendix 1

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. Currently an indeterminate pH1N1 result should be clinically interpreted as a pH1N1 case given that over 99% of influenza samples are of this subtype. An influenza isolate is considered **unsubtypeable** 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 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 OAHP 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>