

Ontario Agency for Health Protection and Promotion (OAHP): Laboratory Pandemic Influenza Surveillance Report

Information current as of: Monday May 10, 2010

This report summarizes patient specimens (1 specimen/patient) collected and received at the Ontario Agency for Health Protection and Promotion (OAHP) public health laboratories (PHL) in Ontario for influenza virus testing since September 1, 2009. This information is current as of Monday May 10, 2010 and is updated weekly. Note that influenza A positivity rates are only reported for influenza A tests performed at the OAHP Public Health Laboratories.

This report uses the specimen collection date to classify the specimens submitted. The PHL performs the majority of subtype testing; however, several hospital laboratories also perform subtyping. Therefore, 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.

SUREVILLANCE SUMMARY

Pandemic influenza (pH1N1) is virtually absent in Ontario with the most recent Flu A (pH1N1) positive sample collected on April 27, 2010. The most recent influenza B sample was collected on March 24, 2010. Low levels of parainfluenza viruses (PIV), human metapneumovirus (hMPV) and respiratory syncytial virus (RSV), are circulating in Ontario.

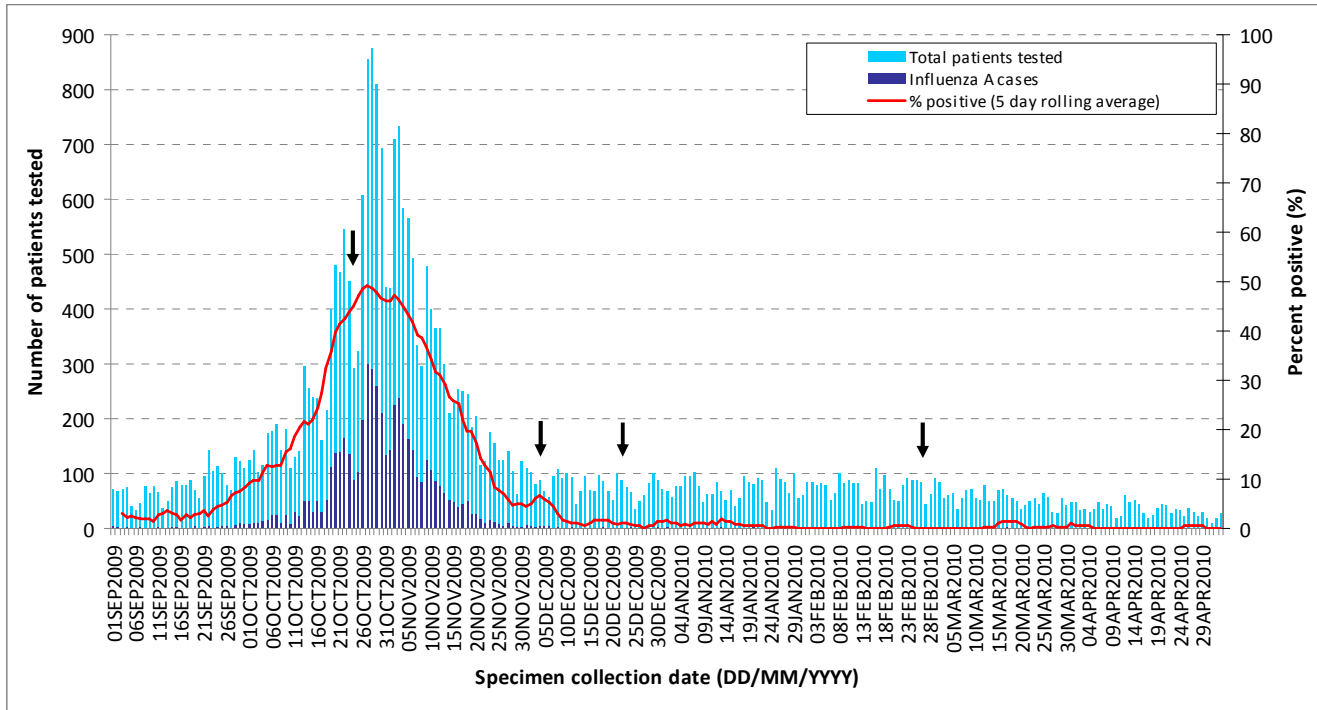
Case statistics:

Between September 1, 2009 and May 10, 2010, a total 27,045 patient specimens and isolates (1/patient) have been submitted for influenza testing and subtyping at the PHL and entered into the PHL electronic system. Of those, 26,320 specimens and isolates have been tested for influenza A at the PHL, of which 5,040 (19.1%) were positive for Influenza A; an additional 487 patient specimens that tested positive for influenza A at hospital laboratories were forwarded to the PHL for subtyping.

Four cases of seasonal influenza (H3) have been detected in Weeks 36, 37, 52, 2009, and Week 2, 2010. No seasonal influenza A H1 has been detected. Eight cases of influenza B have been detected: one each in Week 40 of 2009 and Weeks 2, 8, 9, 10 and 12 of 2010, and two in Week 43 of 2010.

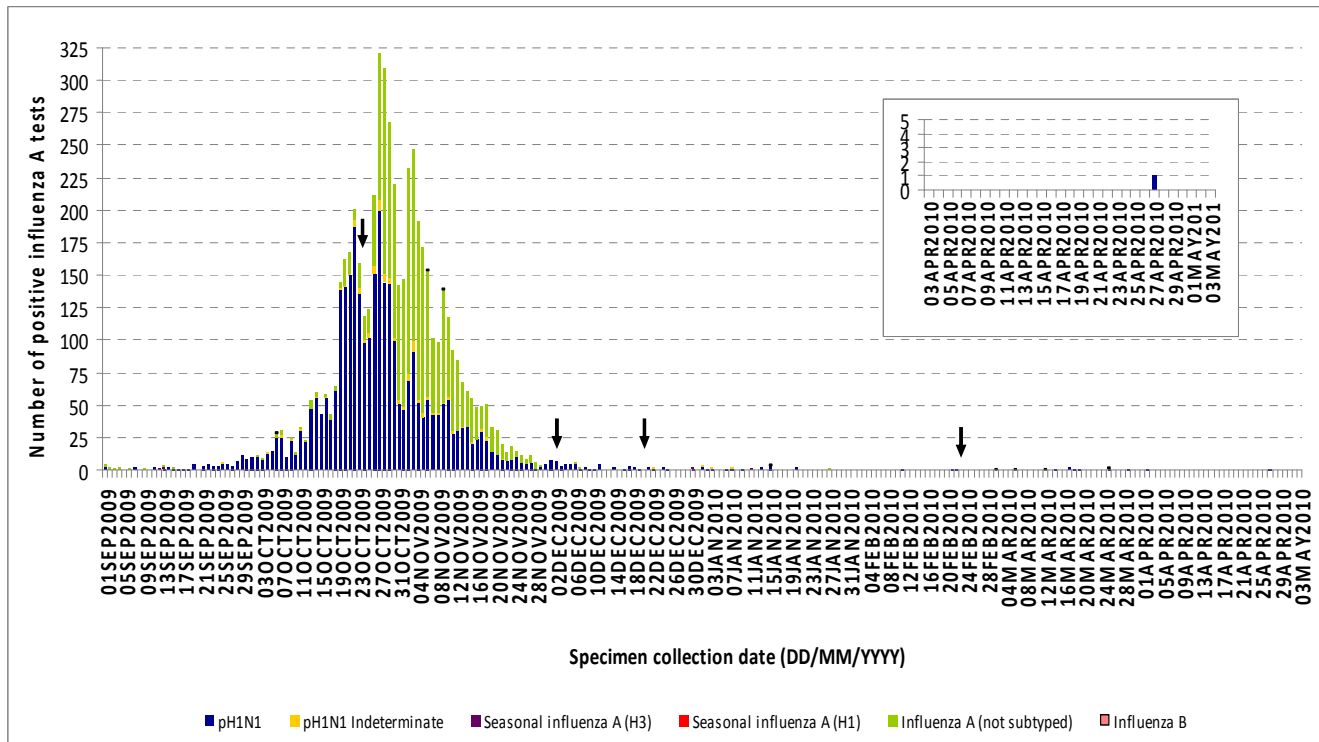
Please refer to **Appendix 1** for further information on lab testing algorithms and interpreting subtyping results.

Figure 1. Total number of influenza A tests conducted, the number of influenza A positive cases and the percent positive (5 day rolling average), September 1, 2009 – May 3, 2010**.



Source: The Ontario Agency for Health Protection and Promotion (OAHPP) public health laboratories.

Figure 2. The number of positive influenza A test results by subtype (pH1N1, seasonal H1/H3, indeterminate pH1N1 Influenza A - not subtyped & influenza B), September 1, 2009 – May 3, 2010**.



Source: The Ontario Agency for Health Protection and Promotion (OAHPP) public health laboratories.

For 1,470 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 May 4, 2010 has been excluded from Figures 1 and 2. Since not all specimens collected on those dates have test results available, the data from those days may not reflect the current situation. ↓ **Modification to testing algorithm**

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, which confers resistance.

Table 1: PHL oseltamivir susceptibility testing results since September 1, 2009.

Isolate tested	Total tested	Total Positive (%)	Total number of patients	Collection date of first resistant isolate
Pandemic Influenza A (H1N1)	769	15 (19.5)	5	1 Week 17 1 Week 30 1 Week 36 2 Week 45 1 Week 49

Source: The Ontario Agency for Health Protection and Promotion (OHPP) public health laboratories.

Nationally oseltamivir, amantadine and zanamivir susceptibility testing is conducted at the National Microbiology Laboratory (NML).

Table 2: NML susceptibility assay results for influenza isolates in Canada from September 1, 2009 – May 6, 2010.

Isolates tested	Isolates tested for Oseltamivir susceptibility	Isolates resistant to Oseltamivir (%)	Isolates tested for Amantadine susceptibility	Isolates resistant to Amantadine (%)	Isolates tested for Zanamivir susceptibility	Isolates resistant to Zanamivir (%)
Seasonal Influenza A (H1N1)	6	6(100)	5	1(20)	2	0(0)
Influenza A (H3N2)	13	0 (0)	24	24(100)	13	0(0)
Influenza B	4	0 (0)	n/a	n/a	4	0(0)
Pandemic Influenza A (H1N1)	1079	12 (1.11)	1136	1136(100)	1057	0(0)

Source: Influenza and Respiratory Viruses Section, National Microbial Laboratory, Public Health Agency of Canada.

Table 3: NML strain characterization of isolates from Ontario and Canada from September 1, 2009 to May 6, 2010.

Strain	Positive isolates, Ontario	Positive isolates, Canada
Seasonal Influenza A (H1N1)		
A/Brisbane/59/2007-like	0	3
Seasonal Influenza A (H3N2)		
A/Brisbane/10/2007 – like	0	2
A/Perth/16/2009 – like	0	8
Seasonal Influenza B		
B/Brisbane/60/2008 – like	2	2
B/Florida/04/2006 –like	0	1
B/Malaysia/2506/2004 – like	1	1
Pandemic Influenza A (H1N1)		
A/California/07/2009 – like	295	851

Source: Influenza and Respiratory Viruses Section, National Microbial Laboratory, Public Health Agency of Canada.

Note:

Pandemic (2009) H1N1 vaccine component: A/California/07/2009

Seasonal influenza vaccine for 2009/2010: A/Brisbane/59/07-like (H1N1 component),

A/Brisbane/10/2007-like (H3N2 component), B/Brisbane/60/2008-like (influenza B component)

For the season to date, the vast majority of circulating influenza was the pH1N1 strain. However, of the seasonal influenza strains that circulated in Canada, most of the H3N2 subtype has drifted from the 2009/10 H3N2 vaccine component.

*****Due to low submissions, results from the Vaccine Effectiveness (VE) Study will be in a future laboratory report*****

Additional information on the VE study can be found at <http://www.oahpp.ca/vestudy/index.php>

Spotlight on Current Research at the OAHPP Public Health Laboratories:

A study looking at circulating respiratory viruses and co-infection during the H1N1 pandemic was presented at the Clinical Virology Symposium and Annual Meeting of the Pan American Society for Clinical Virology in Florida this week.

The study describes and quantifies the profile of respiratory viruses, in addition to pandemic H1N1 (pH1N1), detected during the period April, 2009 to February, 2010 among patients presenting with influenza-like illness (ILI) to community-based sentinel physicians in Ontario.

Infection with a single virus was detected in 531 (52%) of 1018 specimens tested between April, 2009 and February, 2010, of which 270 (51%) were pH1N1 and 242 (49%) were other viruses. Co-infection was detected in 143 (14%) of specimens. Influenza A (Flu A) and Respirator Syncytial Virus (RSV) or Flu A and Entero/Rhinovirus (ERV) co-infections were the most common, detected in 64% and 20 % of all co-infections, respectively. Co-infection was more commonly detected in younger patients who are at higher risk of infections with respiratory viruses. Co-infection was more commonly detected in patients under 4 years of age compared to patients 5 and older (OR 1.79; 95% CI 1.07 to 2.98); co-infection was less common in patients 55 years and older compared to patients less than 54 (OR 0.5; 95% CI 0.26 to 0.95). The presence of an underlying chronic condition also increased the likelihood of co-infection (OR 1.51; 95% CI 1.01 to 2.26).

Respiratory co-infections were common during the 2009 pandemic, were more frequent in younger persons, and were associated with chronic health conditions.

Ontario Public Health Units

At the PHL, a patient is sorted into a public health unit (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.

Table 4. Number of influenza specimens submitted for testing, pH1N1 and influenza A cases, percent positive and submission rate and cumulative influenza A cases (/100,000) by PHU. Cumulative numbers from September 1, 2009- May 10, 2010 (Specimens collected: April May 2 – May 8, 2010 (**Week 18*****)) are in displayed in brackets; **if no bracket value is 0**

Public Health Unit	Total number of specimens submitted	Submission rate (/100,000)	Number of lab confirmed cases of pH1N1	Number of confirmed Influenza A cases	Number of laboratory Influenza A tests completed	Percent positive (%) influenza A**	Cumulative influenza A cases rate (/100,000)
Algoma District	449(2)	386.2(1.7)	50	103	445(1)	23.1	88.6
Brant County	319(3)	254.9(2.4)	28	50	317(2)	15.8	40.0
Chatham-Kent	257(3)	236.7(2.8)	33	62	257(3)	24.1	57.1
City of Hamilton	693(3)	137.3(0.6)	266	137	525	26.1	27.2
City of Ottawa	128(3)	15.8(0.4)	18	27	126(1)	21.4	3.3
City of Toronto	5,379(72)	214.9(2.9)	371	673	5,274(30)	12.8	26.9
Durham Regional	919(5)	163.7(0.9)	122	208	908	22.9	37.1
Eastern Ontario	409(1)	214.6(0.5)	99	118	404(1)	29.2	61.9
Elgin-St. Thomas	166	194.5	19	40	165	24.2	46.9
Grey Bruce	540(1)	342.3(0.6)	37	113	536	21.1	71.6
Haldimand-Norfolk	190(2)	176.3(1.9)	36	50	180	27.8	46.4
Haliburton-Kawartha-Pine Ridge District	398(4)	231.8(2.3)	43	70	392(1)	17.9	40.8
Halton Regional	1,224(13)	278.7(3.0)	138	197	1,172(4)	16.8	44.8
Hastings & Prince Edward Counties	440(1)	282.1(0.6)	91	81	408	19.9	51.9
Huron County	173(1)	291.6(1.7)	24	48	172(1)	27.9	80.9
Kingston-Frontenac and Lennox & Addington	578(1)	313.4(0.5)	133	133	561(1)	23.7	72.1
Lambton	280(2)	218.4(1.6)	35	53	277	19.1	41.3
Leeds-Grenville and Lanark District	229	140.5	49	63	224	28.1	38.7
Middlesex-London	344	81.5	141	104	288	36.1	24.6
Niagara Regional Area	1,023(10)	239.3(2.3)	128	213	997(4)	21.4	49.8
North Bay Parry Sound District	390(3)	317.5(2.4)	44	75	384(2)	19.5	61.1
Northwestern	442(1)	548.9(1.2)	70	127	441(1)	28.8	157.7
Oxford County	172(3)	167.4(2.9)	29	48	169(1)	28.4	46.7
Peel Regional	3,536(24)	305.0(2.1)	251	435	3,482(13)	12.5	37.5
Perth District	286(2)	384.7(2.7)	30	43	285(2)	15.1	57.8
Peterborough County-City	336(6)	252.5(4.5)	45	84	334(4)	25.1	63.1
Porcupine	649(6)	771.2(7.1)	179	237	644(2)	36.8	281.6
Renfrew County & District	94(1)	94.6(1.0)	15	27	92	29.3	27.2
Simcoe Muskoka District	1,850(9)	385.6(1.9)	150	253	1,774(6)	14.3	52.7

Public Health Unit												
Sudbury & District	473(3)	245.9(1.6)	57	124	471(2)	26.3	64.5					
Thunder Bay District	575(4)	373.2(2.6)	87	157	570(1)	27.5	101.9					
Timiskaming	122(2)	356.5(5.8)	34	44	121(2)	36.4	128.6					
Waterloo	661(5)	138.2(1.0)	78	127	648(2)	19.6	26.6					
Wellington-Dufferin-Guelph	580(7)	227.6(2.7)	43	85	570(3)	14.9	33.4					
Windsor-Essex County	912(2)	231.8(0.5)	118	325	911(1)	35.7	82.6					
York Regional	1,721(12)	192.8(1.3)	134	281	1,688(4)	16.6	31.5					
Out of Province/Not Available	108	N/A	17	25	108	23.1	N/A					
Grand Total	27,045(217)	222.4(1.8)	3,242	5,040	26,320(95)	19.1	41.4					

Source: The Ontario Agency for Health Protection and Promotion (OAHPP) public health laboratories.

*** 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.

**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.

Appendix 1

Changes to Testing Algorithm:

Date	Change
March 12, 2010	Due to technical changes made to the data extraction process, results, may differ slightly from those presented in the previous reports.
February 22, 2010	All limitations on ambulatory (community) viral culture requests and influenza A subtyping have been removed.
December 17, 2009	Viral culture testing was increased to all ambulatory samples and a minimum of 20% of influenza A negative RT-PCR tests. Viral culture testing increases as resources allowed.
December 2, 2009	Subtyping was increased as resources allow.
November 9-12, 2009	Only 20% of ambulatory (community) viral culture requests were being processed.
October 25-31, 2009	Subtyping was performed on all intensive care samples, outbreak samples and on 20% of all additional influenza A positive tests.

For additional details on modifications to the testing algorithm, please view the November Lababstract at www.oahpp.ca/resources/lababstracts.html

Interpretation of subtyping results:

- **Indeterminate:** a RT-PCR test 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 it is not known if this is a true positive result, or nonspecific activity giving a false positive response.
- **Untypeable:** occurs when an influenza A is detected, but the sample does not match any of the subtypes that can be tested for (e.g. pH1N1, seasonal H3N2, H1N1).
- **Unable to subtype:** occurs when influenza A positive sample has a very low amount of virus and the subtype cannot be detected.

A reference calendar of epidemiological weeks can be found at <http://www.phac-aspc.gc.ca/fluwatch/09-10/09-10cal-eng.php>

This report and past versions are available on our website and can be viewed at anytime at <http://oahpp.ca/h1n1>