

SURVEILLANCE WEEK 49 (December 6, 2009– December 12, 2009)

This issue of the Ontario Influenza Bulletin provides information on the surveillance period from December 6, 2009-December 12, 2009, (Week 49). **All data are for week 49 unless otherwise specified. Death and hospitalization information among pandemic (H1N1) 2009 (abbreviated as pH1N1) confirmed cases is current as of December 16, 2009.** Data extraction and analysis for this issue of the Bulletin occurred on December 16, 2009.

In order to enable our readers to better assess influenza activity in Ontario, we have combined various sources of information in the following table.

Assessment of Influenza Activity in Ontario

Measure	Assessment of measure compared to previous week (Lower, Similar, Higher)	Reasoning behind assessment
Laboratory Confirmed Cases	Lower	45 total influenza cases (30 pH1N1) in week 49 compared to 100 reported in week 48 (92 pH1N1)*. The percent positivity of laboratory tests for influenza A was 3.0%, which is lower than in week 48 (5.4%).
Influenza A Outbreaks	No change	No new institutional influenza outbreaks were reported for the current reporting week.
Influenza Activity Levels Reported by Health Units	Lower	One health unit reported 'localized' activity and fifteen reported 'sporadic' activity for the current reporting week.
ILI Consultation Rate reported by Sentinel Physicians	Slightly higher	The overall ILI consultation rate increased slightly from 22.27/1,000 patient visits to 25.71/1,000 patient visits.
Hospitalizations Among Lab Confirmed Cases of pandemic (H1N1) 2009 virus	Lower	Fewer hospitalized cases were reported from December 10 to December 16 as compared to December 3 to December 9 (38 compared to 69).
Deaths Among Lab Confirmed Cases of pandemic (H1N1) 2009 virus	Lower	Five new deaths were reported from December 10 to December 16 compared to 9 new deaths reported from December 3 to December 9.
OVERALL ASSESSMENT	Influenza activity in Ontario is <i>lower</i> compared to the previous week.	Overall the indicators show that influenza activity was lower in week 49 compared to week 48. Starting in week 45 (November 8-14), influenza activity in Ontario has declined each week.

*Counts from previous weeks may be updated and therefore may not match reports in earlier Bulletins

Overall, influenza activity in Ontario during week 49, 2009, was **lower** when compared to week 48, 2009. Ontario health units reported 45 new confirmed cases of influenza through the integrated Public Health Information System (iPHIS). This count includes 30 laboratory confirmed cases of pH1N1. During week 49, new laboratory confirmed cases of pH1N1 continued to be seen in the Eastern, Central East, Toronto, and Central West regions. No new institutional influenza outbreaks were reported. For week 49, one health unit reported localized influenza activity, fifteen health units reported sporadic activity, and the remaining health units reported no influenza activity or did not report. The rate of influenza-like illness (ILI) in patients seen by sentinel physicians has now decreased to what is expected for this time of the year based on the average ILI rate reported in week 48 from previous years.

Updates to the Bulletin

The Ontario Influenza Bulletin will be on vacation next week. The next bulletin covering week 50 (December 13 -19) data will be published on December 29. A bulletin covering weeks 51 and 52 (December 20 – January 2) will be published on January 8, 2010. Health units are advised to report data for Weeks 51 & 52 on January 5, 2010 (refer to page 25). Happy holidays and best wishes for a happy and healthy 2010!

For a definition of ILI activity levels and links to websites providing current influenza information from other sources, please refer to the attached Appendix- I. If you would like to provide feedback on the Bulletin, please contact Christine D'Souza (christine.dsouza1@ontario.ca, 416-212-5323) or Michael Whelan (michael.whelan@ontario.ca, 416-327-9174).

Table 1: Summary of confirmed influenza cases and institutional influenza outbreaks by health region (Week 49, 2009-2010)

Confirmed influenza cases*†	HEALTH REGION							TOTAL
	North West	North East	Eastern	Central East	Toronto	South West	Central West	
Pandemic (H1N1) 2009	0	0	1	19	5	0	5	30
Influenza A (Not Subtyped)	0	0	1	1	3	5	4	14
Influenza A (Seasonal H1/H3)	0	0	0	0	0	0	0	0
Influenza A (Indeterminate pH1N1/ unsubtypeable)	0	0	0	0	1	0	0	1
Influenza B	0	0	0	0	0	0	0	0
Influenza A & B	0	0	0	0	0	0	0	0
Total new cases	0	0	2	20	9	5	9	45
Institutional outbreaks of pandemic (H1N1) 2009 ‡	0	0	0	0	0	0	0	0
Institutional outbreaks of Influenza (Other Subtypes/Not Subtyped)‡	0	0	0	0	0	0	0	0

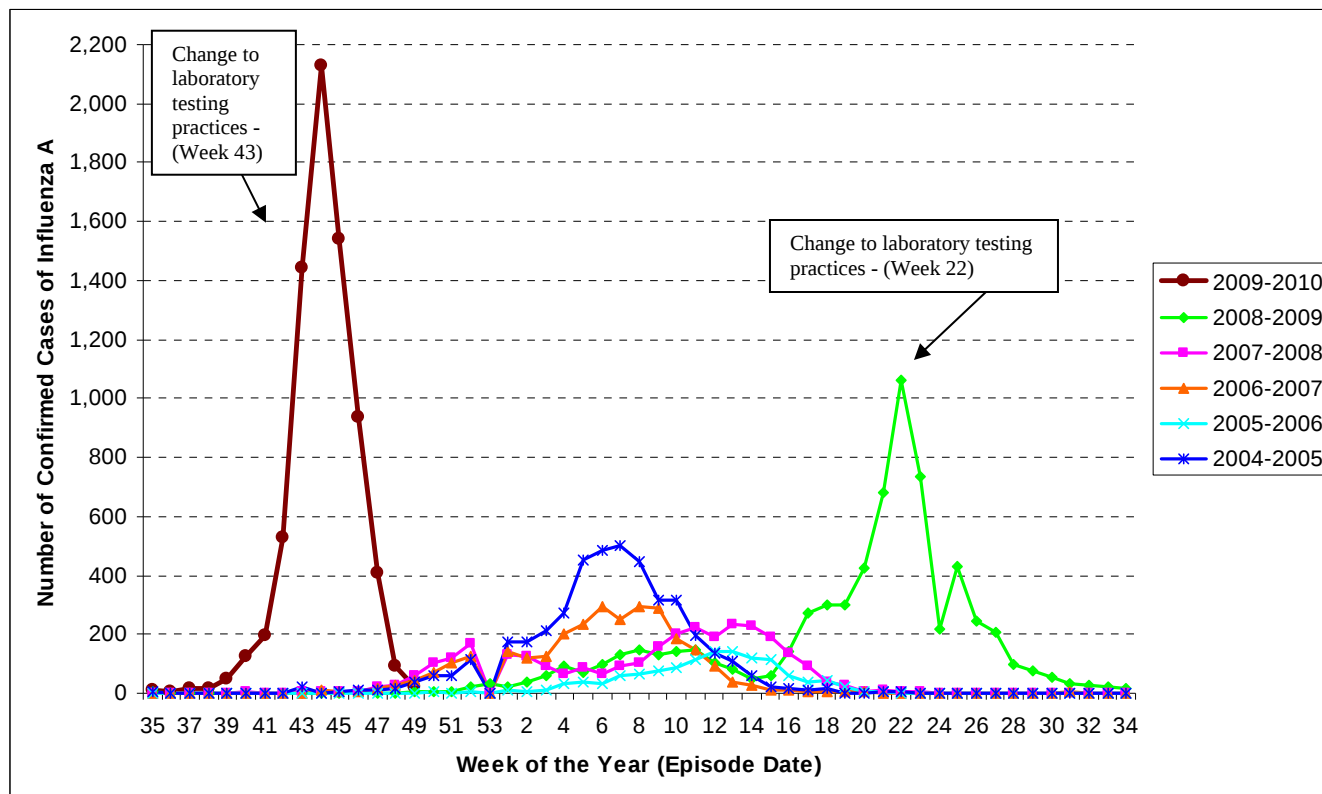
SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [16/12/2009].

* Includes reports of confirmed influenza through iPHIS, as well as cases in institutional outbreaks, with dates of onset for the first case in the surveillance period.

‡ Confirmed outbreaks in institutions with onset date of symptoms during the surveillance period.

The number of laboratory confirmed cases of influenza A reported to date in the 2009-2010 season is much higher than in the previous five seasons at this time (Figure 1). The number of influenza A cases reported during the second wave began to increase in early September, with a maximum number of cases reported in week 44 (November 1 -7). The number of cases reported in each of weeks 43-45 in the second wave of the pandemic was higher than the maximum for any week observed in the first wave. The maximum case volume observed to date in the 2009-2010 season has exceeded the maximum case volume in all of the past five influenza seasons.

Figure 1: All confirmed cases of Influenza A in Ontario by week, 2004-2010^{†*}



SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [16/12/2009].

[†] Episode Date for a case corresponds to the earliest date on record for the case according to the iPHIS hierarchy (Symptom Date > Clinical Diagnosis Date > Specimen Collection Date > Lab Test Date > Reported Date)

Table 2: Laboratory confirmed cases of pandemic (H1N1) 2009 virus by health unit & health region, reported during Week 49[†], 2009-10, wave two, wave one, and cumulative* confirmed cases between April 1, 2009 – December 12, 2009

Region	Health Unit	Confirmed pH1N1			
		Current week (WK 49)	Wave 2 (WK 35-current)	Wave 1 (WK 15-WK 34)	Total cumulative
North West	Northwestern	0	73	74	147
	Thunder Bay District	0	87	10	97
	TOTAL NORTH WEST	0	160	84	244
North East	Algoma	0	61	6	67
	North Bay Parry Sound District	0	48	7	55
	Porcupine	0	106	4	110
	Sudbury & District	0	44	24	68
	Timiskaming	0	53	0	53
	TOTAL NORTH EAST	0	312	41	353
Eastern	City of Ottawa	1	414	359	773
	Eastern Ontario	0	171	25	196
	Hastings & Prince Edward Counties	0	76	4	80
	Kingston, Frontenac, Lennox & Addington	0	146	15	161
	Leeds, Grenville And Lanark District	0	93	10	103
	Renfrew County And District	0	37	12	49
	TOTAL EASTERN	1	937	425	1,362
Central East	Durham Region	1	163	118	281
	Haliburton, Kawartha, Pine Ridge	0	43	13	56
	Peel Region	9	370	704	1,074
	Peterborough County-City	1	45	4	49
	Simcoe Muskoka District	2	134	64	198
	York Region	6	206	494	700
	TOTAL CENTRAL EAST	19	961	1,397	2,358
Toronto	Toronto	5	832	1,587	2,419
	TOTAL TORONTO	5	832	1,587	2,419
South West	Chatham-Kent	0	32	6	38
	Elgin-St. Thomas	0	21	0	21
	Grey Bruce	0	35	12	47
	Huron County	0	25	2	27
	Lambton County	0	54	1	55
	Middlesex-London	0	201	28	229
	Oxford County	0	61	3	64
	Perth District	0	33	3	36
	Windsor-Essex County	0	136	49	185
	TOTAL SOUTHWEST	0	598	104	702
Central West	Brant County	0	22	8	30
	City Of Hamilton	1	210	124	334
	Haldimand-Norfolk	0	0	6	6
	Halton Region	0	167	219	386
	Niagara Region	2	230	20	250
	Waterloo Region	1	118	38	156
	Wellington-Dufferin-Guelph	1	54	26	80
	TOTAL CENTRAL WEST	5	801	441	1,242
	Out of Province	0	0	6	6
	TOTAL ONTARIO	30	4,601	4,085	8,686

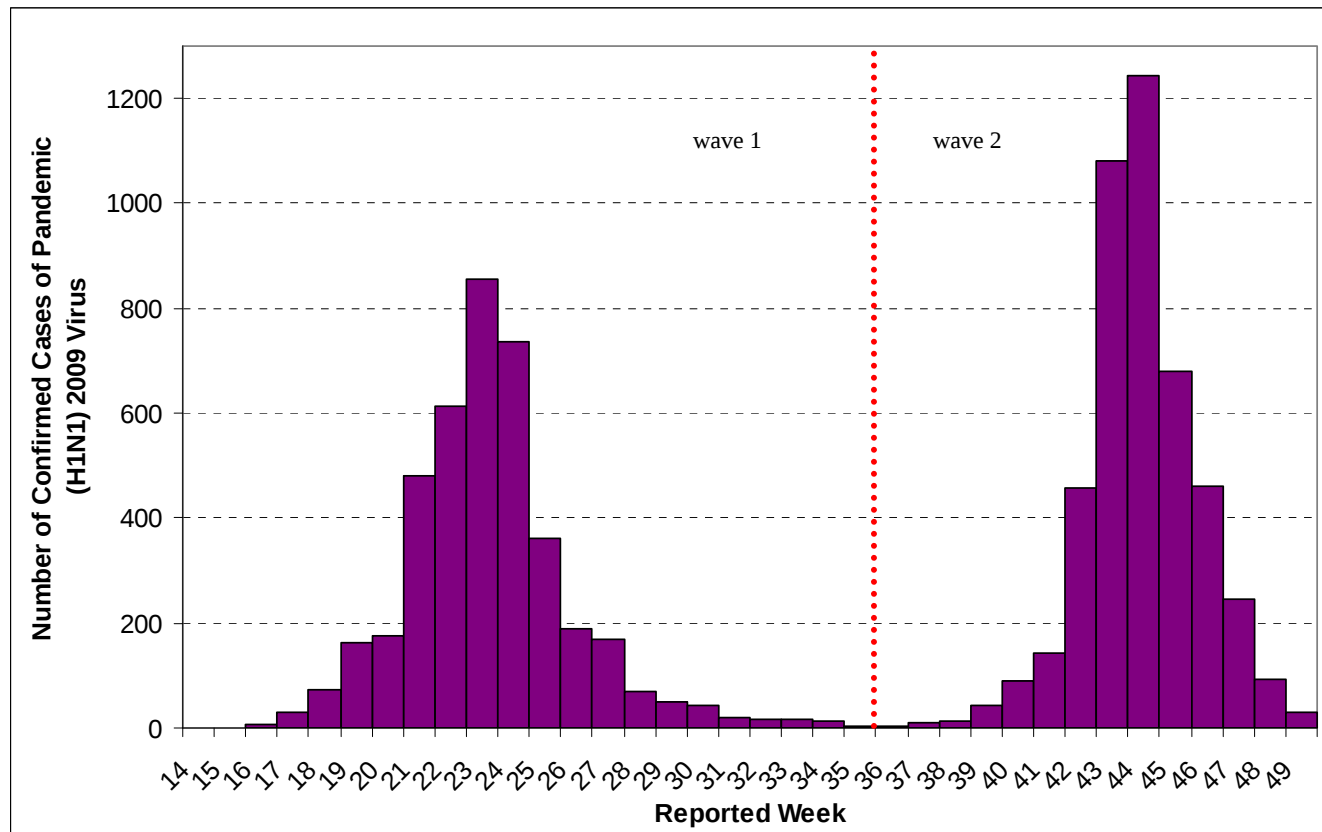
SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [16/12/2009].

[†] Reported date corresponds to the date pandemic (H1N1) 2009 was reported to the health unit

* Cumulative case counts include late reports and records that are otherwise reconciled. Therefore, cumulative counts may not equal new cases plus previous cumulative value.

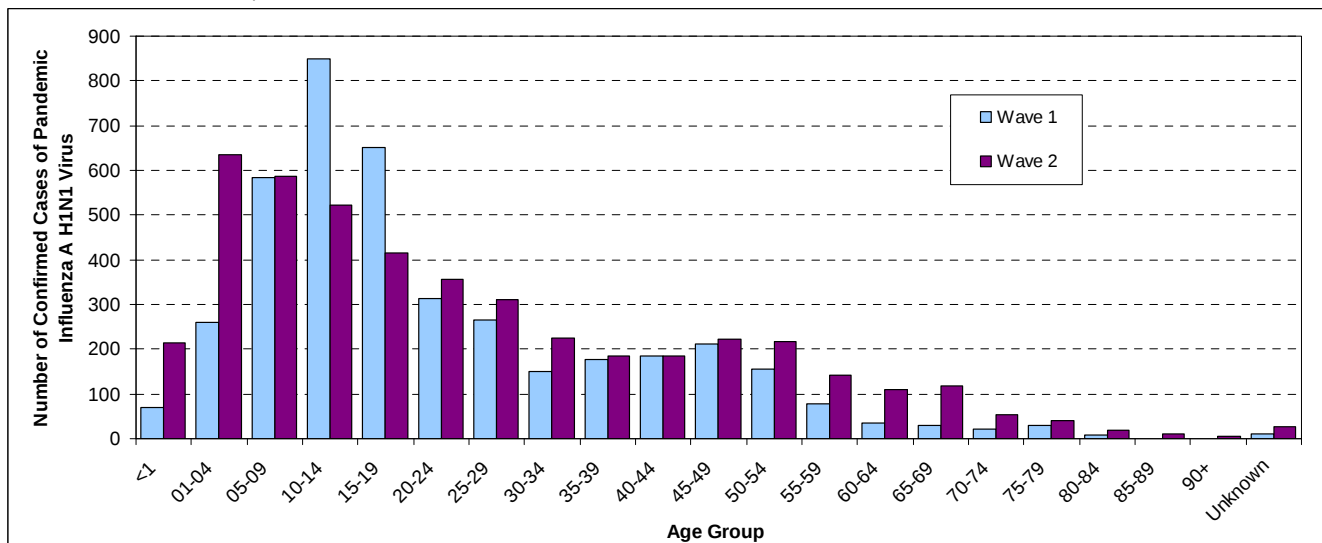
Note: Wave 1 corresponds to April 12, 2009 to August 29, 2009; Wave 2 corresponds to August 30, 2009 to the last date of the current week.

Figure 2: Laboratory confirmed cases of pandemic (H1N1) 2009 in Ontario by week between April 13 and December 12, 2009



SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [16/12/2009].

Figure 3: Laboratory confirmed cases of pandemic (H1N1) 2009 in Ontario by age group and wave between April 13 and December 12, 2009



SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [16/12/2009].

Table 3: Confirmed cases of influenza by health unit & health region, excluding laboratory confirmed pandemic (H1N1) 2009, with an episode date[†] during Week 49, 2009-10

Region	Health Unit	Confirmed Influenza					
		Influenza A (no subtype /not subtyped)	Influenza A (Other)*	Influenza A (seasonal) [‡]	Influenza A & B	Influenza B	TOTAL
North West	Northwestern	0	0	0	0	0	0
	Thunder Bay District	0	0	0	0	0	0
	TOTAL NORTH WEST	0	0	0	0	0	0
North East	Algoma	0	0	0	0	0	0
	North Bay Parry Sound District	0	0	0	0	0	0
	Porcupine	0	0	0	0	0	0
	Sudbury & District	0	0	0	0	0	0
	Timiskaming	0	0	0	0	0	0
	TOTAL NORTH EAST	0	0	0	0	0	0
Eastern	City of Ottawa	0	0	0	0	0	0
	Eastern Ontario	0	0	0	0	0	0
	Hastings & Prince Edward Counties	0	0	0	0	0	0
	Kingston, Frontenac, Lennox & Addington	0	0	0	0	0	0
	Leeds, Grenville And Lanark District	1	0	0	0	0	1
	Renfrew County And District	0	0	0	0	0	0
	TOTAL EASTERN	1	0	0	0	0	1
Central East	Durham Region	0	0	0	0	0	0
	Haliburton, Kawartha, Pine Ridge	0	0	0	0	0	0
	Peel Region	0	0	0	0	0	0
	Peterborough County-City	0	0	0	0	0	0
	Simcoe Muskoka District	0	0	0	0	0	0
	York Region	1	0	0	0	0	1
	TOTAL CENTRAL EAST	1	0	0	0	0	1
Toronto	Toronto	3	1	0	0	0	4
	TOTAL TORONTO	3	1	0	0	0	4
South West	Chatham-Kent	0	0	0	0	0	0
	Elgin-St. Thomas	0	0	0	0	0	0
	Grey Bruce	0	0	0	0	0	0
	Huron County	0	0	0	0	0	0
	Lambton County	0	0	0	0	0	0
	Middlesex-London	5	0	0	0	0	5
	Oxford County	0	0	0	0	0	0
	Perth District	0	0	0	0	0	0
	Windsor-Essex County	0	0	0	0	0	0
	TOTAL SOUTHWEST	5	0	0	0	0	5
Central West	Brant County	0	0	0	0	0	0
	City Of Hamilton	0	0	0	0	0	0
	Haldimand-Norfolk	0	0	0	0	0	0
	Halton Region	1	0	0	0	0	1
	Niagara Region	3	0	0	0	0	3
	Waterloo Region	0	0	0	0	0	0
	Wellington-Dufferin-Guelph	0	0	0	0	0	0
	TOTAL CENTRAL WEST	4	0	0	0	0	4
	TOTAL ONTARIO	14	1	0	0	0	15

SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [16/12/2009].

[†] Episode Date for a case corresponds to the earliest date on record for the case according to the iPHIS hierarchy (Symptom Date > Clinical Diagnosis Date > Specimen Collection Date > Lab Test Date > Reported Date)

[‡]includes seasonal H1/H3

*includes indeterminate, untypeable and other subtypes

Table 4: Cumulative* confirmed cases of influenza by health unit & health region, excluding laboratory confirmed pandemic (H1N1) 2009, with an episode date[†] between September 1, 2009 – December 12, 2009

Region	Health Unit	Confirmed Influenza					
		Influenza A (no subtype /not subtyped)	Influenza A (Other)*	Influenza A (seasonal) [‡]	Influenza A & B	Influenza B	TOTAL Cumulative
North West	Northwestern	1	1	0	0	0	2
	Thunder Bay District	71	2	0	0	0	74
	TOTAL NORTH WEST	72	3	0	0	0	76
North East	Algoma	50	1	0	0	0	52
	North Bay Parry Sound District	59	3	0	0	0	62
	Porcupine	48	4	0	0	0	52
	Sudbury & District	74	2	0	0	0	76
	Timiskaming	9	1	0	0	0	10
	TOTAL NORTH EAST	240	11	0	0	0	252
Eastern	City of Ottawa	8	0	0	0	0	8
	Eastern Ontario	21	0	0	0	0	19
	Hastings & Prince Edward Counties	36	0	0	0	0	36
	Kingston, Frontenac, Lennox & Addington	35	0	0	0	0	35
	Leeds, Grenville And Lanark District	20	0	0	0	0	19
	Renfrew County And District	14	0	0	0	0	14
	TOTAL EASTERN	134	0	0	0	0	131
Central East	Durham Region	91	5	0	0	0	96
	Haliburton, Kawartha, Pine Ridge	37	2	0	0	0	39
	Peel Region	277	7	0	0	2	286
	Peterborough County-City	34	3	0	0	0	37
	Simcoe Muskoka District	150	4	0	0	0	154
	York Region	168	0	0	0	0	166
	TOTAL CENTRAL EAST	757	21	0	0	2	778
Toronto	Toronto	376	12	0	0	1	386
	TOTAL TORONTO	376	12	0	0	1	386
South West	Chatham-Kent	30	0	0	0	0	30
	Elgin-St. Thomas	24	0	0	0	0	24
	Grey Bruce	85	0	0	0	0	85
	Huron County	29	0	0	0	0	29
	Lambton County	23	0	0	0	0	23
	Middlesex-London	137	2	1	0	0	134
	Oxford County	24	5	0	0	0	29
	Perth District	16	0	0	0	2	19
	Windsor-Essex County	238	0	0	0	0	238
	TOTAL SOUTHWEST	606	7	1	0	2	611
Central West	Brant County	29	0	0	0	0	29
	City Of Hamilton	212	0	0	0	1	214
	Haldimand-Norfolk	25	0	0	0	0	26
	Halton Region	130	2	0	0	0	131
	Niagara Region	123	7	0	0	1	126
	Waterloo Region	123	0	1	0	0	124
	Wellington-Dufferin-Guelph	56	0	0	0	1	55
	TOTAL CENTRAL WEST	698	9	1	0	3	705
	TOTAL ONTARIO	2,883	63	2	0	8	2939

SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [16/12/2009].

Cumulative case counts include late reports and records that are otherwise reconciled. Therefore, cumulative counts may not equal new cases plus previous cumulative value.

[†] Episode Date for a case corresponds to the earliest date on record for the case according to the iPHIS hierarchy (Symptom Date > Clinical Diagnosis Date > Specimen Collection Date > Lab Test Date > Reported Date)

[‡]includes seasonal H1/H3

*includes indeterminate, untypeable and other subtypes

Deaths among pandemic (H1N1) 2009 virus cases, April 13 – December 16, 2009

A total of 118 deaths have been reported since April, with 21% (25) reported in wave 1 and 79% (93) in wave 2. Of the reported deaths, 77% (91) were hospitalized prior to death. Overall, cases that died ranged in age from 0 to 95 years and had a mean and median age of 52 and 55 years, respectively. Women accounted for slightly less than half of all cases that have died, with 45% of deaths occurring among women.

Mortality due to pH1N1 increased with increasing age, with people in the 45-64 and in the 65 and older age groups accounting for the highest mortality rates. These rates were significantly higher than the overall provincial rate. A similar trend was observed for both waves one and two.

The mean and median days from symptom onset to death were 20.6 and 14 days, respectively, in Wave 1. The mean and median days from symptom onset to death were 11.0 and 10 days, respectively, in Wave 2. The statistics for Wave 2 must be interpreted with caution as they will continue to change as more information becomes available. Among the 118 confirmed cases that have died, 100 (85%) had underlying chronic medical conditions reported, compared to 92% (23) of wave 1 cases and 83% (77) of wave 2 cases. Reporting of underlying chronic medical conditions may be incomplete for wave 2 cases due to delays in data entry.

Hospitalizations among pandemic (H1N1) 2009 virus cases, April 13 – December 16, 2009

A total of 1,763 hospitalizations have been reported, with 22% (388) reported in wave 1 and 78% (1,375) reported in wave 2. The cumulative hospitalization rate of pH1N1 related hospitalizations is 13.65 hospitalizations per 100,000 population. In general, the hospitalization rate of pH1N1 cases decreased with increasing age, with persons in the three youngest age ranges (under 15 years) accounting for the highest hospitalization rates. Persons aged 15 years and older had lower hospitalization rates which were all below the overall provincial hospitalization rate for pH1N1. A similar trend was observed for wave one and wave two cases. Hospitalized cases under the age of 20 years account for 47% of hospitalized cases in wave 1 and 44% of hospitalized cases in wave 2.

Admission to ICU and/or use of a ventilator was reported for 21% (80) of wave one cases and 18% (248) of wave 2 cases; Overall, 19% (328) of hospitalizations have been admitted to ICU and/or placed on a ventilator. Fever, cough, shortness of breath, vomiting, malaise, myalgia and sore throat/difficulty swallowing have been the most commonly reported symptoms among hospitalized cases. The mean and median days from symptom onset to hospitalization were 2.7 and 2 days, respectively, in Wave 1. The mean and median days from symptom onset to hospitalization were 2.0 and 2 days, respectively, in Wave 2.

Table 5. Overview of key surveillance indicators among fatal and hospitalized cases in Ontario*

Surveillance Indicators	Wave 2 (Sep 1 – Dec 16, 2009)	Wave 1 (Apr - Aug 31, 2009)	Total (Apr - Dec 16, 2009)
Number of deaths	93 (79%)	25 (21%)	118 (100%)
Number of hospitalizations	1375 (78%)	388 (22%)	1,763 (100%)
Hospitalization status			
Discharged	89% (1219)	98% (381)	91% (1,600)
Currently hospitalized	11% (156)	2% (7)	9% (163)
Length of hospital stay (days)**			
Mean	4	7	5
Median	3	4	3
Range	0-106	0-127	0-127

Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted at 8:30 am [16/12/2009]

Note: Cases that were hospitalized or that have died are not mutually exclusive.

* 26 fatal cases were not hospitalized before death;

**Mean and Median LOS excludes those outside of the 95th percentile.

Table 6. Hospitalizations among confirmed cases of pandemic (H1N1) 2009 in Ontario, April 13 – December 16, 2009

Hospitalization Status	Ventilator and/or ICU	Not in ICU and not on ventilator	Number of cases hospitalized to date
Number Currently Hospitalized	58 (36%)	105 (64%)	163 (100%)
Number Hospitalized and Discharged	270 (17%)	1330 (83%)	1600 (100%)
Total Hospitalized to date	328 (19%)	1435 (81%)	1763 (100%)

Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted at 8:30 am [16/12/2009]

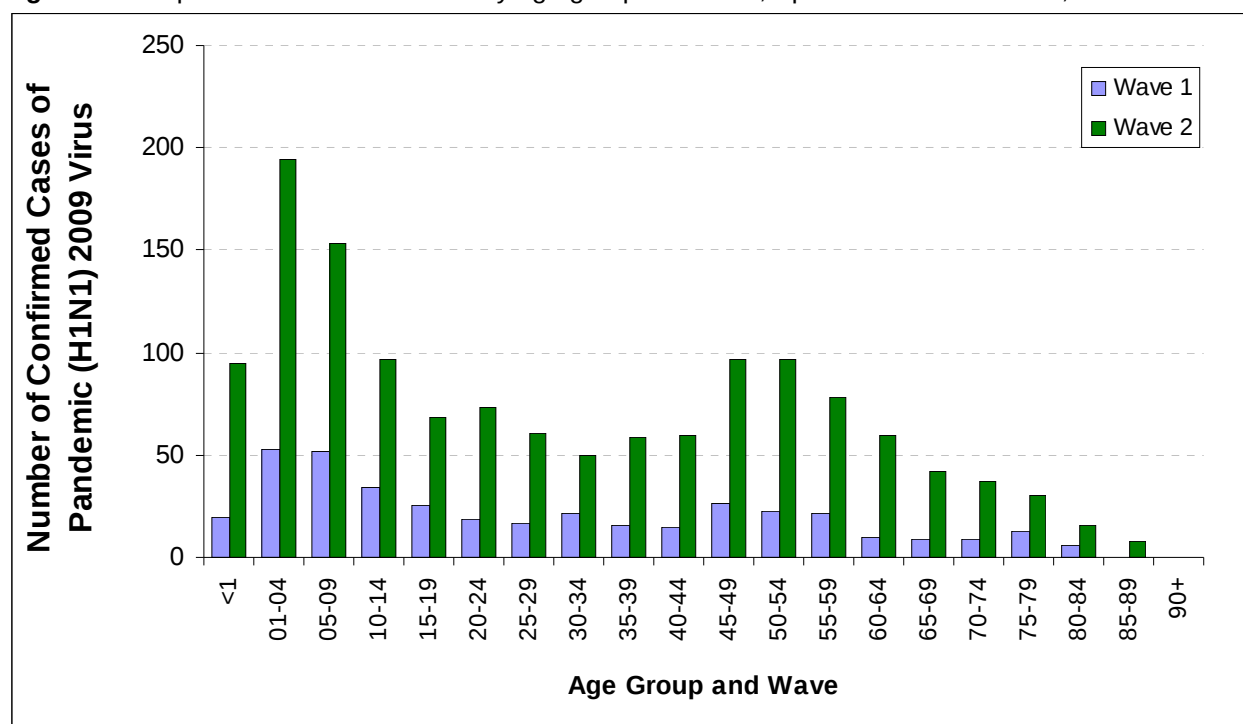
Table 7. Incidence of hospitalization and death due to pandemic H1N1 2009 in Ontario, April 13 – December 16, 2009

Age Group	Hospitalizations	Rate/100,000	Deaths	Rate/100,000
<1	115	85.83	1	0.75
1-4	247	45.22	1	0.18
5-14	336	21.77	5	0.32
15-24	185	10.58	10	0.57
25-44	299	7.98	18	0.48
45-64	411	11.83	52	1.50
65+	170	9.84	31	1.79
TOTAL	1763	13.65	118	0.91

Source (incidence): Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted at 8:30 am [16/12/2009]

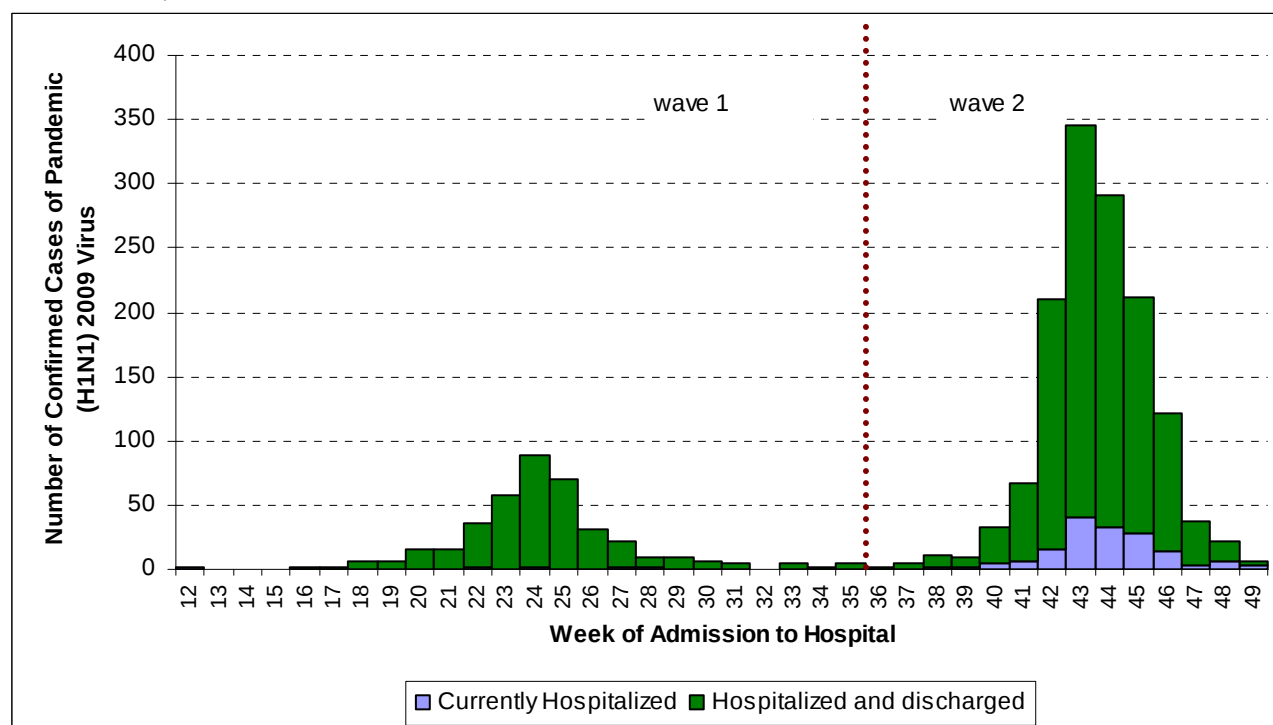
Source (incidence): Ontario population projections for 2008: Ontario Ministry of Health and Long-Term Care, Public Health Planning Database (PHPDB), extracted [12/02/2009]

Figure 4: Hospitalized cases in Ontario by age group and wave, April 13 to December 16, 2009



Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted at 8:30 am [16/12/2009]

Figure 5: Hospitalized cases of pandemic (H1N1) 2009 by hospital admission week in Ontario, April 13 – December 16, 2009*



Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted at 8:30 am [16/12/2009]

Note: Interpret with caution due to reporting lags, changes in lab testing, case identification and data entry.

Influenza Subtype(s):

During week 49, a total of 4486 results of isolate testing were received by the Public Health Agency of Canada, with 298 testing positive for influenza A and one positive for influenza B. 108 of the reported influenza A isolates were from Quebec (36.2%), 49 were from Ontario (16.4%), 33 were from Manitoba (11.1%), and 32 were from Saskatchewan (10.7%). The influenza B isolate was from Quebec. Quebec also reported 1 seasonal H3 isolate for week 48. **Ontario reported 1 seasonal H1 isolate***

(Antigenic Characterization and Antiviral Resistance data are current as of December 16, 2009)

Antigenic Characterization (National):

Since September 1, 2009, National Microbiology Laboratory (NML) has antigenically characterized 518 pandemic H1N1 viruses and eight seasonal influenza viruses (two A/H1N1, five H3N2 and one B virus) that were received from Canadian laboratories.

Pandemic Influenza A (H1N1):

Among the 518 pandemic influenza A (H1N1) viruses characterized, 515 (99.4%) were antigenically related to A/California/7/2009, which is the pandemic reference virus selected by WHO as a potential candidate for 2009 influenza A (H1N1) vaccine. Three viruses (0.6%) tested showed reduced titer with antisera produced against A/California/7/2009. Sequence analysis showed that the two viruses with reduced titer did not have the mutation at amino acid position 222 as reported by Norway.

Seasonal Influenza A (H1N1):

Two seasonal influenza A/H1N1 viruses characterized were related to A/Brisbane/59/2007, which is the influenza A/H1N1 component for the 2009-2010 influenza vaccine.

Seasonal Influenza A (H3N2):

Of the five H3N2 viruses, one seasonal influenza A (H3N2) virus characterized was related to A/Brisbane/10/2007, which is the influenza A/H3N2 component recommended for the 2009-10 influenza vaccine. Four viruses were antigenically related to A/Perth/16/2009, which is the WHO recommended influenza A (H3N2) component for the 2010 Southern Hemisphere vaccine formulation.

Influenza B:

The one influenza B virus characterized was antigenically related to B/Brisbane/60/2008, which is the recommended influenza B component for the 2009-2010 influenza vaccine.

Antigenic Characterization (Provincial):

The National Microbiology Laboratory (NML) has antigenically characterized the following strains from Ontario: 237 influenza A/California/07/2009-like and 1 influenza B/Brisbane/60/2008-like.

Antiviral Resistance and Sensitivity (National):

a) Amantadine

Eighteen seasonal influenza A viruses (three H1N1 and 15 H3N2) and 580 pandemic H1N1 viruses were tested for resistance to amantadine and found that one H1N1 virus, all 15 H3N2 viruses and all 580 pandemic H1N1 viruses were resistant. One seasonal H1N1 virus was sensitive to amantadine.

b) Oseltamivir:

Five seasonal influenza viruses (two H1N1, seven H3N2 and one B) and 566 pandemic H1N1 viruses were tested for resistance to oseltamivir. Two seasonal H1N1 isolates were resistant to oseltamivir. Of the 566 pandemic H1N1 viruses tested, 561 were sensitive to oseltamivir and five pH1N1 isolates were resistant to oseltamivir with the H275Y mutation. The resistance was associated with oseltamivir treatment. The seven H3N2 viruses and one B virus were sensitive to oseltamivir.

c) Zanamivir:

Ten seasonal influenza viruses (two H1N1, seven H3N2 and one B) and 554 pandemic H1N1 viruses were tested for resistance to zanamivir. All ten seasonal influenza viruses and all 554 pandemic H1N1 viruses were sensitive to zanamivir.

Antiviral Resistance and Sensitivity (Provincial):

a) Amantadine:

Of the 252 isolates tested, none were sensitive to amantadine. The two H3N2 isolates were resistant to amantadine.[†]

b) Oseltamivir

Of the 249 influenza pH1N1 isolates tested, 245 were sensitive to oseltamivir.

c) Zanamivir

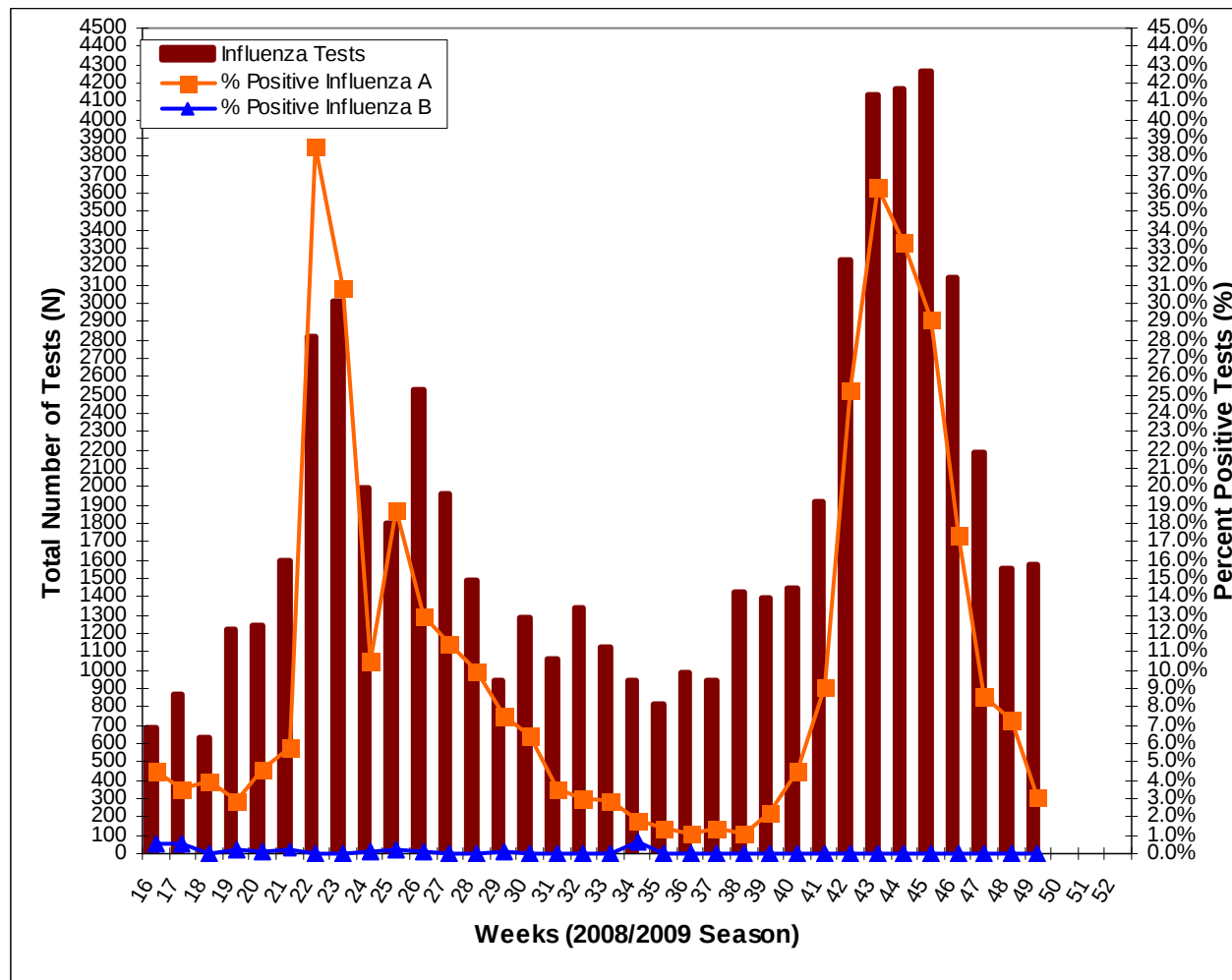
, All 243 isolates tested were sensitive to zanamivir.

The influenza B isolate was sensitive to oseltamivir and zanamivir.

* These data have been obtained from the Respiratory Virus Detection tables of Public Health Agency of Canada and do not include data from late reports to PHAC: Week 49, 2009. Please note that the last version received from PHAC as of 4:00PM on December 17, 2009 was used.

[†] These data have been obtained from the National Microbiology Laboratory of the Public Health Agency of Canada for Week 49, 2009.

Figure 6: Total number of influenza tests performed and percent of positive tests in Ontario reported to the Centre for Immunization and Respiratory Infectious Diseases (CIRID), by report week*.

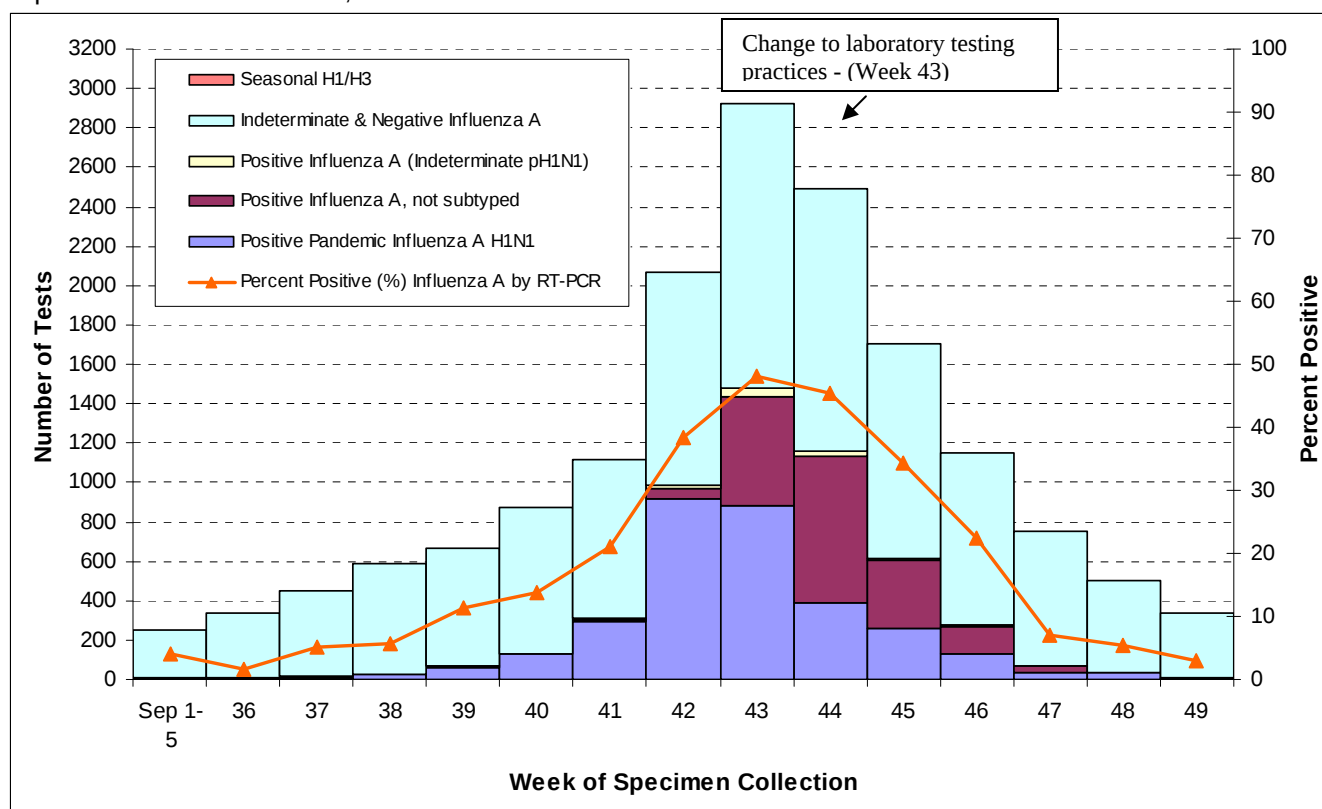


Source: Public Health Agency of Canada. These data have been obtained from the Respiratory Virus Detection tables of Public Health Agency of Canada from 17 labs in Ontario and do not include data from late reports to PHAC for the current season: Week 49, 2009. Please note that the last version received from PHAC as of 4:00PM on December 17, 2009 was used.

* Total numbers reported include late reports from previous seasons; therefore totals may not be equal to the sum of the weekly numbers.

Note: Cumulative numbers for season to date are available through FluWatch: <http://www.phac-aspc.gc.ca/fluwatch/>

Figure 6a: Total number of influenza tests performed and percent of positive tests in Ontario conducted by the Ontario Agency for Health Protection and Promotion Laboratory – Toronto, by specimen collection week September 1 – December 12, 2009



Source: Adapted from Table 1 in the "OAHPP Laboratory Pandemic H1N1 Surveillance Report"; Monday, December 14, 2009

Note: Not all cases with specimens collected during week 49 are included in this summary due to the lag in time from the date of specimen collection to the date the final test result is confirmed.

Note: Beginning on Week 43, subtyping will be only performed on 20% of influenza A positive tests, in addition to all intensive care patients and outbreak samples.

Table 8: Summary of Other Respiratory Virus Detections/Isolations in Ontario in Week 49

Organism Name	Number of Positive Tests	Number of Tests	% Positive
Respiratory Syncytial Virus	40	982	4.07
Parainfluenza (all types)	26	982	2.65
Adenovirus	8	982	0.81
Human Metapneumovirus	1	332	0.30

SOURCE: These data have been obtained from the Respiratory Virus Detection tables of Public Health Agency of Canada from 17 labs in Ontario and do not include data from late reports to PHAC: Week 48, 2009. Please note that the last version received from PHAC as of 4:00PM on December 10, 2009 was used.

Table 9: Institutional respiratory infection outbreaks in Ontario: new outbreaks* in Week 49 and total outbreaks for the season**

Institutional Respiratory Infection Outbreaks		
New Outbreaks*	N	% (of outbreaks)
Influenza A (All subtypes)	0	0.0
Influenza B	0	0.0
Influenza A and B	0	0.0
Parainfluenza (All types)	0	0.0
RSV	0	0.0
Other organisms	0	0.0
No organism identified	1	100.0
TOTAL	1	100.0
Total Respiratory Infection Outbreaks of the Season to date**	N	% (of outbreaks)
Influenza A	55	26.3
Influenza B	0	0.0
Influenza A and B	0	0.0
Parainfluenza (All types)	2	1.0
RSV	2	1.0
Combined Outbreaks [†]	20	9.6
Other organisms	62	29.7
No organism identified	68	32.5
TOTAL	209	100.0
Types of Institutions – All Outbreaks **	N	% (of outbreaks)
Long-Term Care Homes	119	56.9
Hospitals	18	8.6
Retirement Homes	13	6.2
Other	10	4.8
Unknown	49	23.4
TOTAL	209	100.0
	N	% (of outbreaks)
New Outbreaks – Pandemic (H1N1) 2009*	0	0.0
Total pH1N1 2009 Infection Outbreaks of the Season to date**	44	100.0
	N	% (of outbreaks)
Types of Institutions (pH1N1 Outbreaks)		
Long-Term Care Homes	8	18.2
Hospitals	14	31.8
Retirement Homes	3	6.8
Other	4	9.1
Unknown	15	34.1
TOTAL	44	100.0

SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [16/12/2009]

* New outbreaks are those in which the date of onset of illness in the first case occurred and recorded through iPHIS in the current surveillance period; i.e. December 6, 2009 – December 12, 2009

** Season to date includes all outbreaks in which the date of onset of illness in the first case occurred up to Week 45. For pH1N1 note that there have been 4 outbreaks between April 13, 2009 and August 31, 2009 - 2 in LTCHs and 2 in Hospitals.

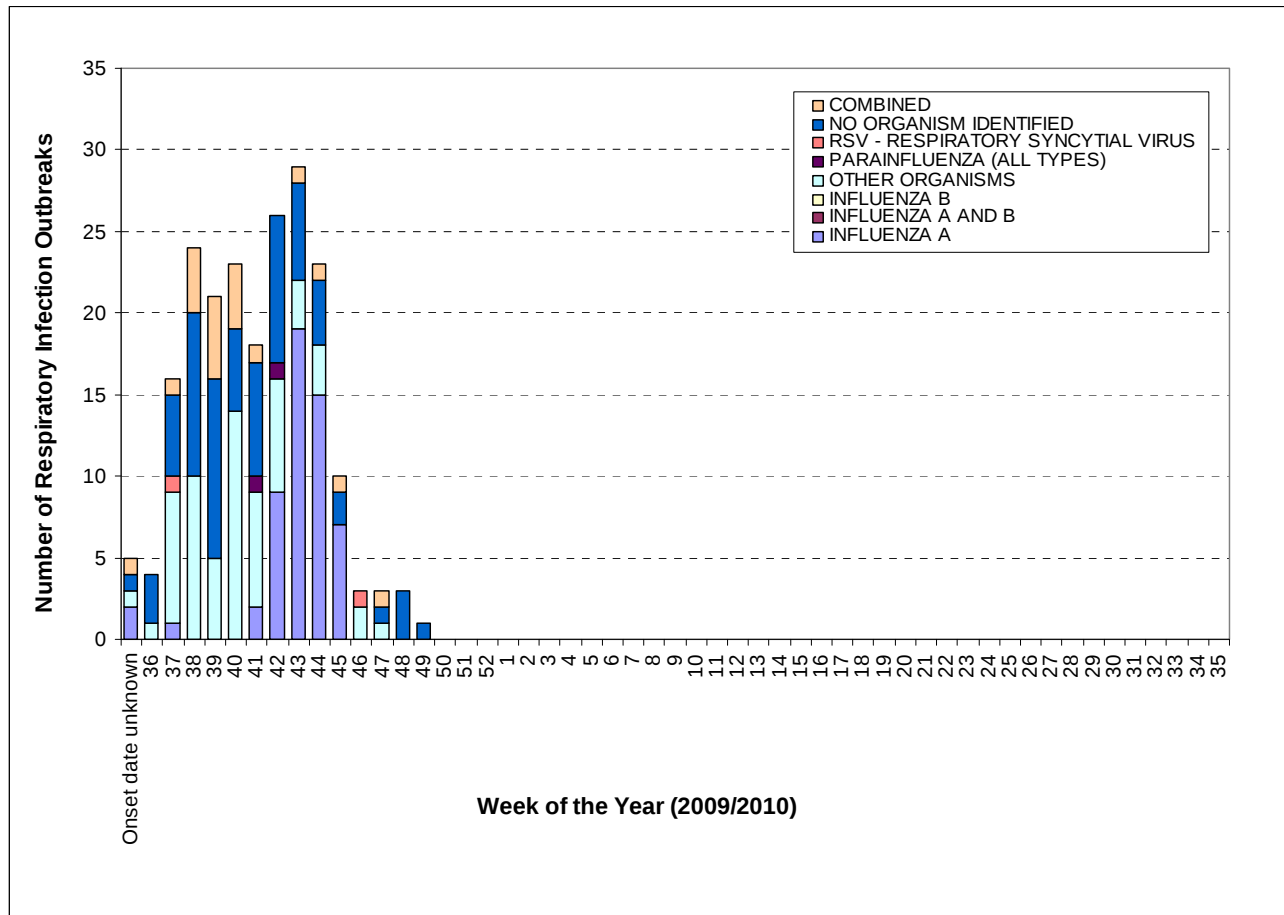
[†] Combined outbreaks include outbreaks in which more than one non-influenza organism has been identified (e.g. RSV, parainfluenza, rhinovirus, etc.)

Table 10: Outbreak Related Complications in institutional respiratory infection outbreaks in Ontario during the Surveillance Season*

Outbreak Related Cases – All Outbreaks	N	% (of total cases)
Residents	2019	65.2
Patients	151	4.9
Staff	925	29.9
Total Cases	3095	100.0
Deaths		% (of cases per role)
Residents	59	2.9
Patients	2	1.3
Staff	0	0.0
Pneumonia (Chest x-ray confirmed)		% (of cases per role)
Residents	53	2.6
Patients	8	5.3
Staff	0	0.0
Hospitalizations		% (of cases per role)
Residents	92	4.6
Staff	0	0.0
Outbreak Related Cases – All Influenza Outbreaks	N	% (of total cases)
Residents	268	53.3
Patients	68	13.5
Staff	167	33.2
Total Cases	503	100.0
Deaths		% (of cases per role)
Residents	19	7.1
Patients	1	0.4
Staff	0	0.0
Pneumonia (Chest x-ray confirmed)		% (of cases per role)
Residents	5	1.9
Patients	4	1.5
Staff	0	0.0
Hospitalizations		% (of cases per role)
Residents	29	10.8
Staff	0	0.0
Outbreak Related Cases – Pandemic (H1N1) 2009 Outbreaks	N	% (of total cases)
Residents	178	46.2
Patients	58	15.1
Staff	149	38.7
Total Cases	385	100.0
Deaths		% (of cases per role)
Residents	19	10.7
Patients	1	1.7
Staff	0	0.0
Pneumonia (Chest x-ray confirmed)		% (of cases per role)
Residents	4	2.2
Patients	4	6.9
Staff	0	0.0
Hospitalizations		% (of cases per role)
Residents	27	15.2
Staff	0	0.0

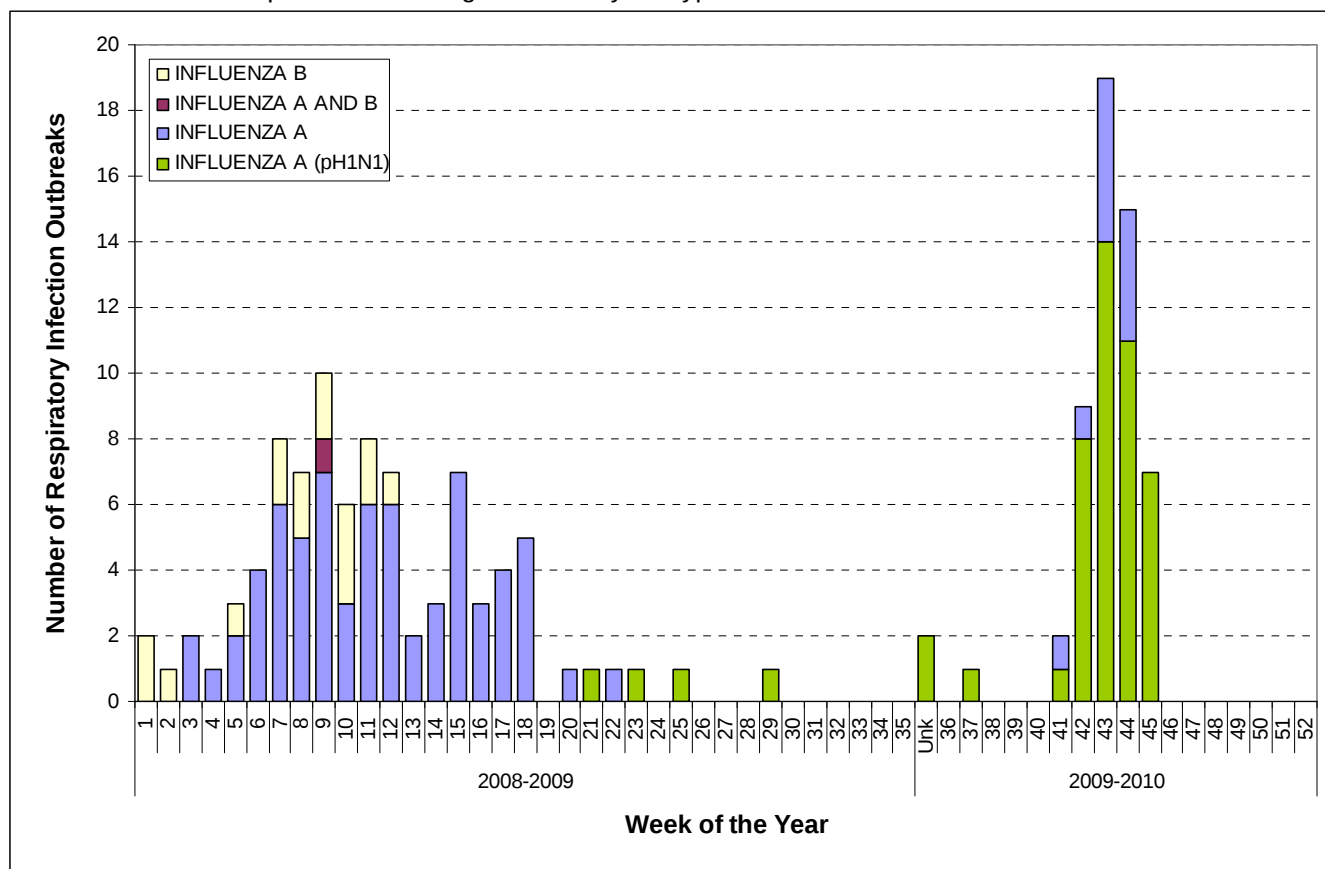
SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [16/12/2009]

Figure 8: Institutional respiratory infection outbreaks in Ontario by onset of illness in the first case: Total Outbreaks up to and including Week 49 by causative organism



Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [16/12/2009]

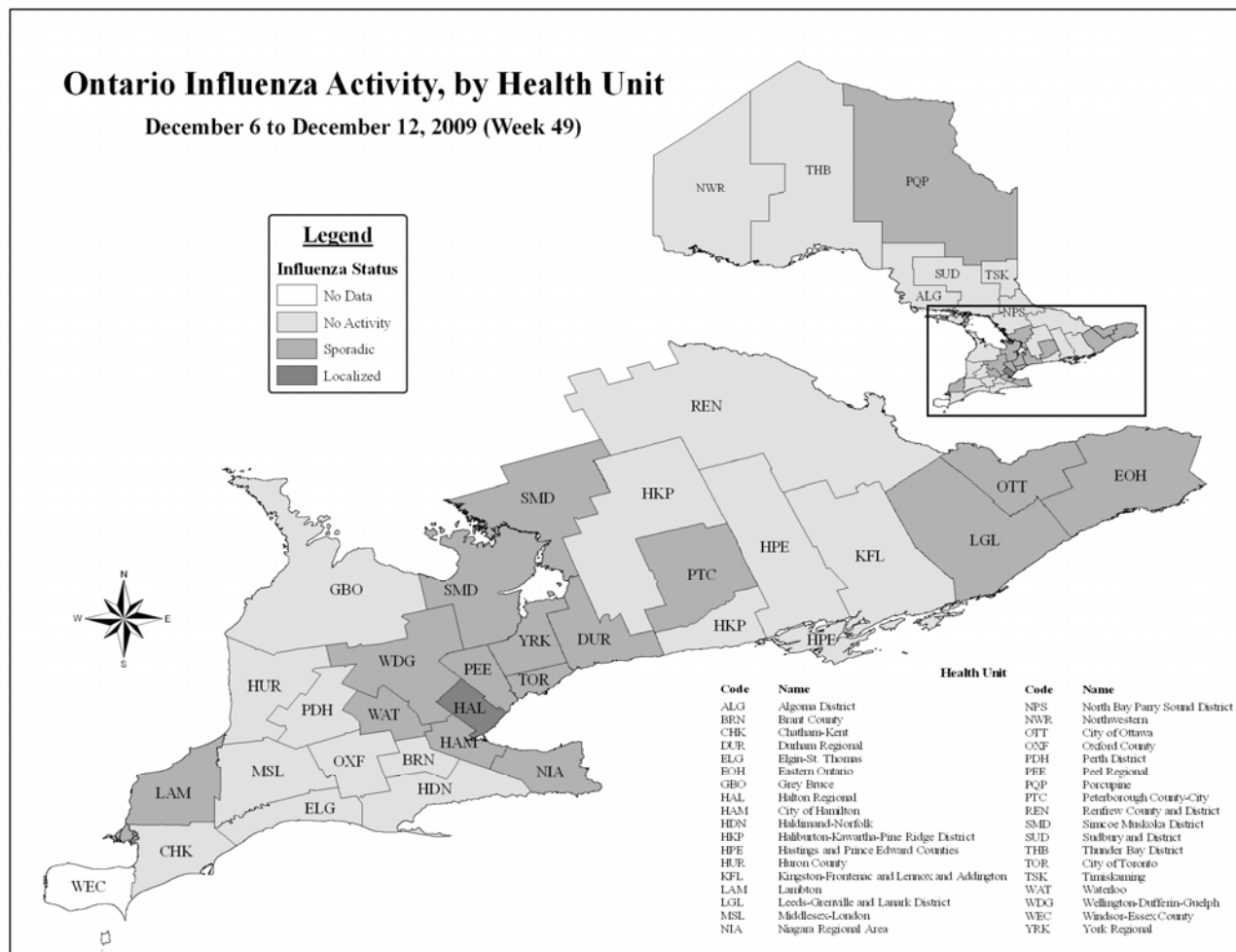
Figure 9: Institutional influenza outbreaks in Ontario by onset of illness in the first case: Total Outbreaks up to and including Week 49 by subtype*



Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [16/12/2009]

*School outbreaks are not included in this chart.

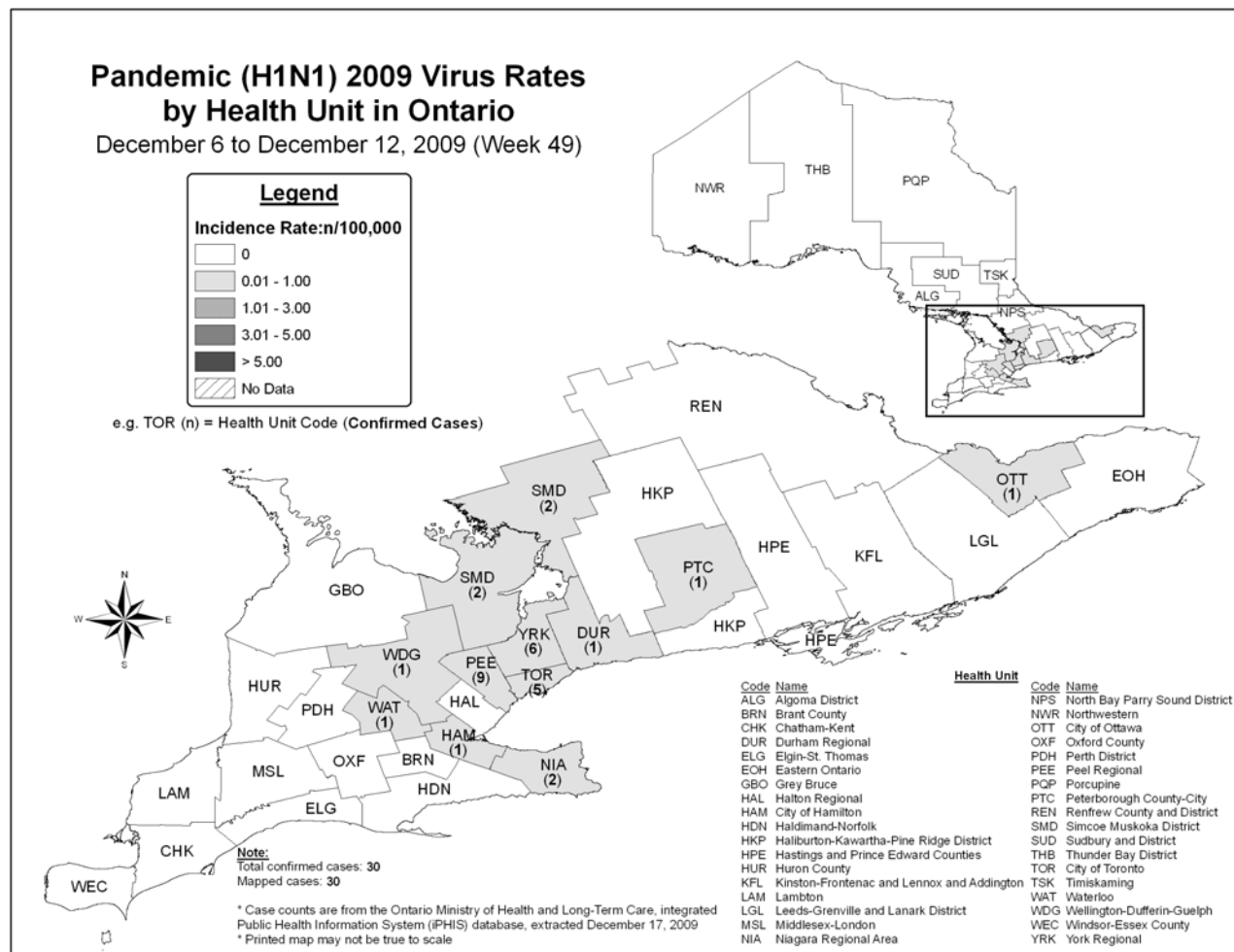
Figure 10: Influenza Activity* levels in Ontario by health unit for Week 49, 2009



SOURCE: MOHLTC [Provincial Influenza Activity Report (Appendix C) Database]

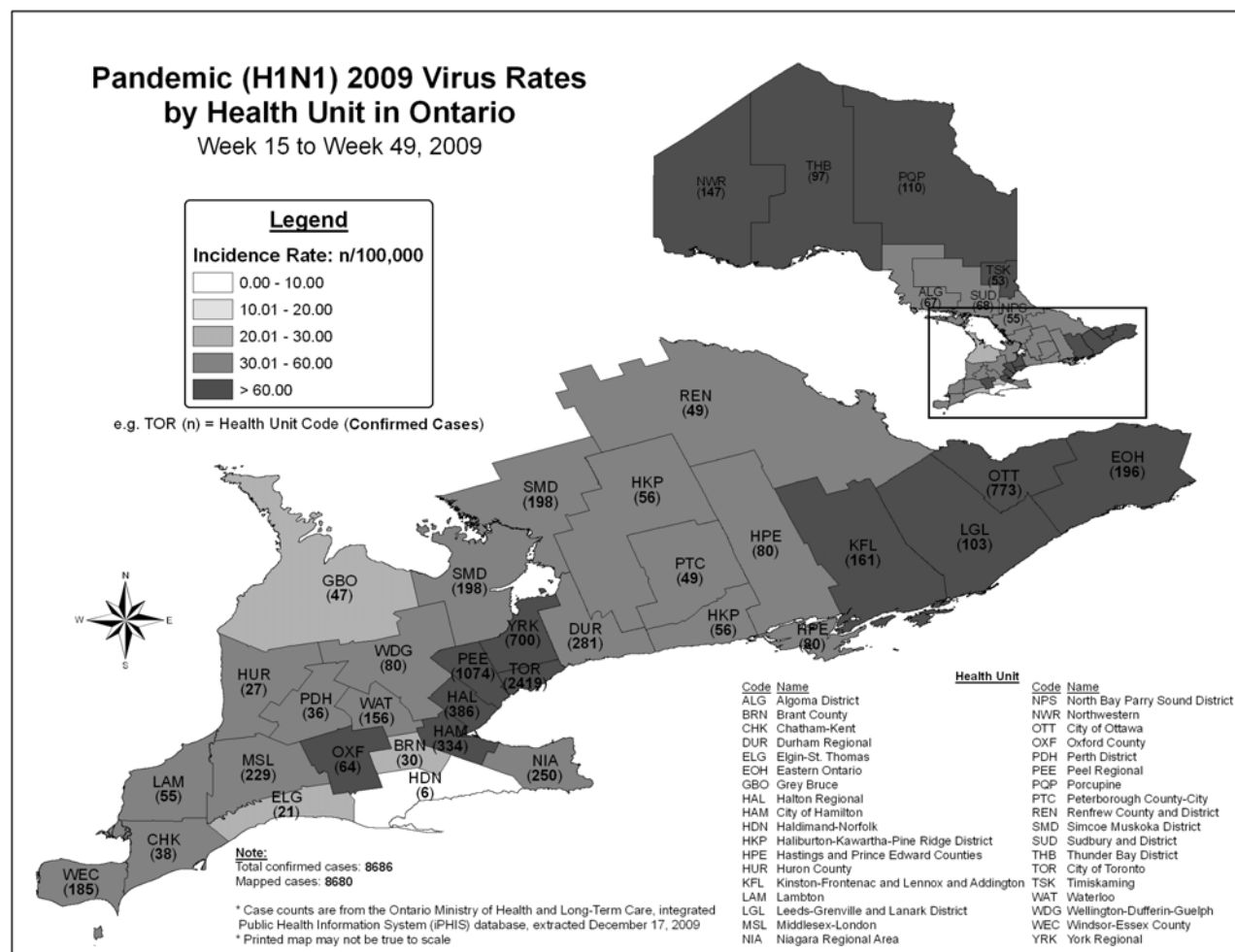
* Influenza activity levels are assigned by local public health units and reported to the MOHLTC by the Tuesday following the end of the surveillance week at 4 pm. Activity levels are assigned based on laboratory confirmations, ILI reports from various sources, and laboratory confirmed institutional outbreaks. Please refer to detailed definitions for the 2009-2010 season included in the Appendix-1]

Figure 11: Pandemic (H1N1) 2009 Virus incidence rates and counts in Ontario by health unit for Week 49, 2009



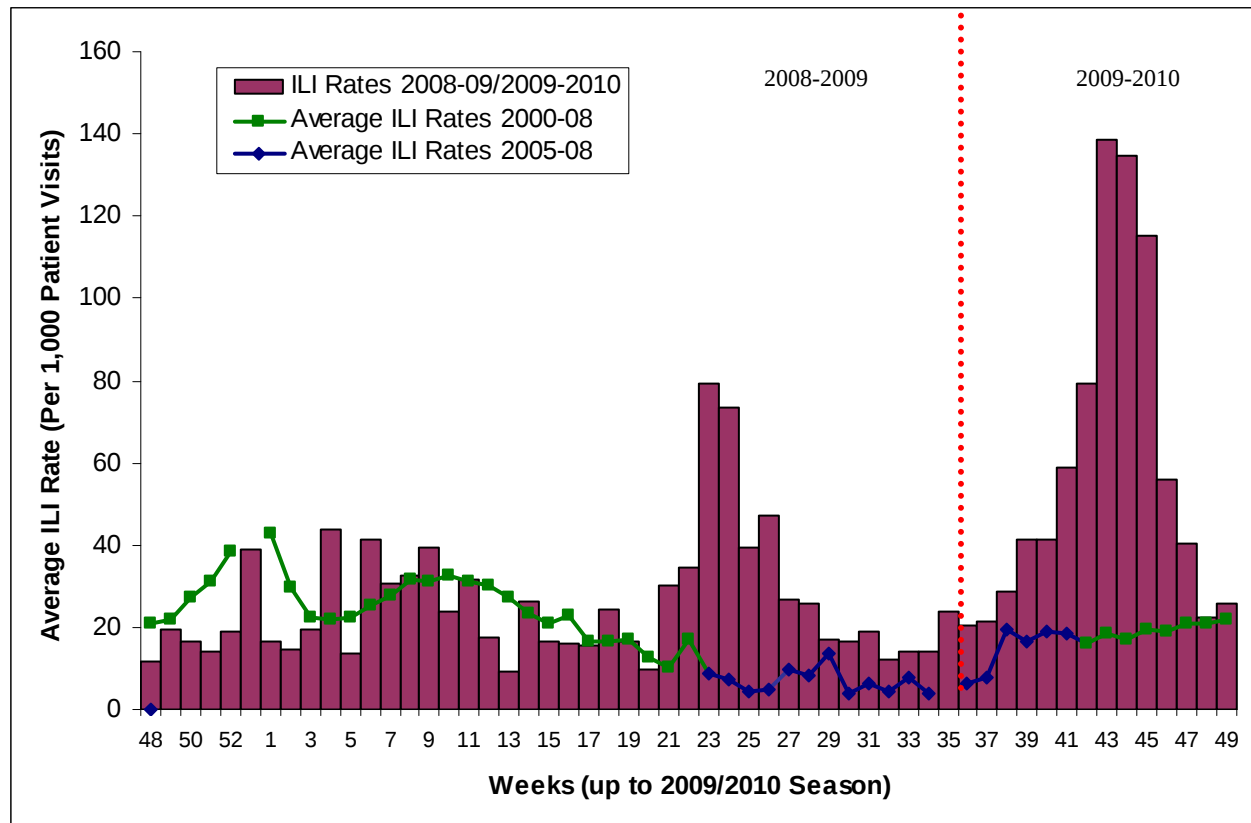
Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [16/12/2009]

Figure 12: Pandemic (H1N1) 2009 Virus cumulative incidence rates and counts in Ontario by health unit, Week 15 – 49 (April 12 – December 12, 2009)



Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (IPHIS) database, extracted [16/12/2009]

Figure 13: Average influenza-like illness (ILI) consultation rate (per 1,000 patient visits) reported by sentinel physicians* in Ontario up to the 2009-10 surveillance season, by report week, compared to Ontario average† (1999/2000 to 2007/08 seasons).



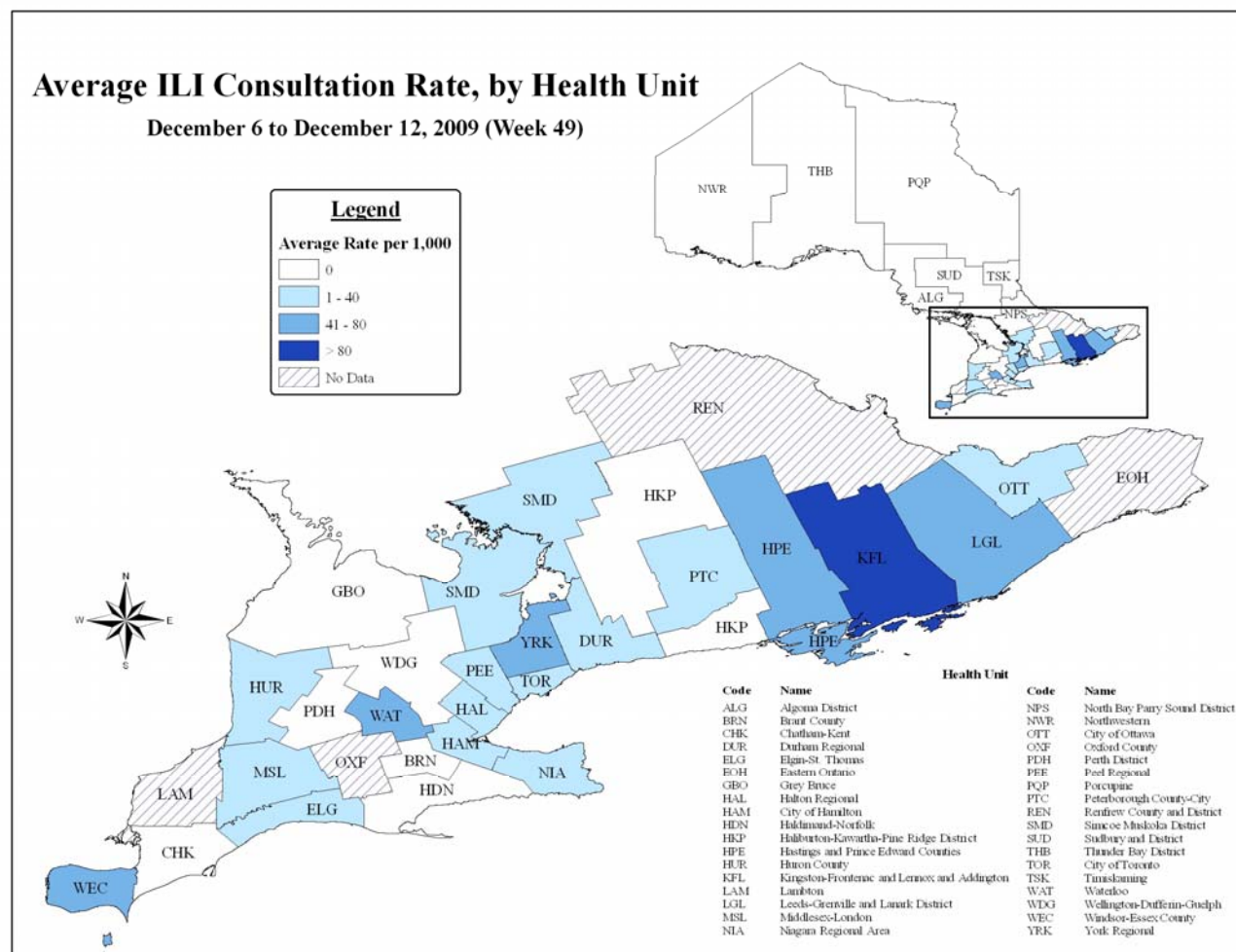
Source: Public Health Agency of Canada

* Sentinel physician information is reported to Public Health Agency of Canada, 100 sentinels reported this week.

† No data available for mean rate in previous years for weeks 21 to 39 (1999-2000 through 2004-2005 seasons). During weeks 20-39, 2002-2003/2004-2005 seasons, ILI is reported once every two weeks, on even weeks only.

Since Week 23, 2009, the number of sentinel physicians has increased, which might affect ILI rate starting from week 23.

Figure 14: Average influenza-like illness consultation rate (per 1,000 patient visits) by health unit as reported by sentinel physicians* in Ontario, for Week 49.



Source: Public Health Agency of Canada

* Sentinel physicians report ILI and patient data to the Public Health Agency of Canada; 107 sentinels reported this week of which all were matched to a health unit and represented in the above map.

Note: The small numbers of sentinel physicians reporting at the local level can make the ILI rates unstable. Please interpret these data correspondingly.

Table 11: Average influenza-like illness consultation rate (per 1,000 patient visits) by age group as reported by sentinel physicians* in Ontario, for Week 49.

Age Category	0 – 4	5 – 19	20 – 64	65 +	Unknown	TOTAL
ILI Sum	20	11	32	8	1	72
ILI Consultation Rate (per 1,000 patient visits)	97.56	34.59	20.78	12.40	10.75	25.71

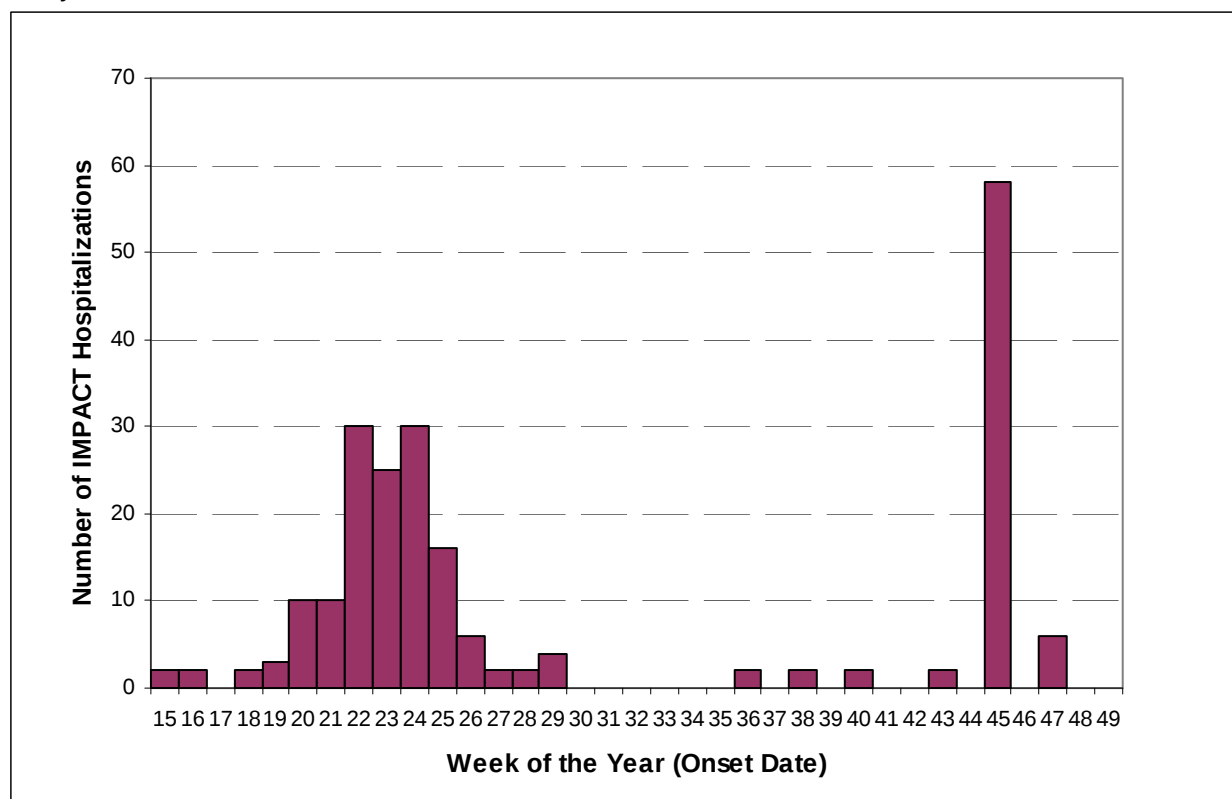
Source: Public Health Agency of Canada

* Sentinel physician information is reported to the Public Health Agency of Canada; 107 sentinels reported this week.

Immunization Monitoring Program ACTive (IMPACT) is a paediatric hospital-based national active surveillance network for adverse events following immunization and selected infectious diseases in children, including influenza-associated pediatric hospitalizations and complements the [Canadian Adverse Event Following Immunization Surveillance System](#) (CAEFISS). It involves 12 Canadian centres, two of which are in Ontario (Children's Hospital of Eastern Ontario in Ottawa and the Hospital for Sick Children, Toronto).

Reports of adverse events following immunization are reported to the Vaccine Safety Unit at the Immunization Division of the Public Health Agency of Canada. Note that the number of IMPACT hospitalizations presented in this week's bulletin has been updated with the latest data received from PHAC.

Figure 15: Number of influenza related hospitalizations in Ontario reported through IMPACT up to Week 49, by onset date.



Source: Public Health Agency of Canada

***Note:** The number of IMPACT hospitalizations presented reflect the latest data received at the time of publication, thus lower numbers of cases reported in recent weeks may be attributed in part to reporting delays.

Table 12: Number of RT-PCR & Multiplex test results by health unit and agent in Ontario by the Ontario Agency for Health Protection and Promotion Laboratory, for the period November 30, 2009 to December 4, 2009*

Health Unit	Results	Total Specimens Testing Positive
OTTAWA	FLU A/pH1N1-PARAINFLUENZA 3	1
	RHINOVIRUS	1
	CORONA 229E/NL63	1
WATERLOO	RHINOVIRUS	1
WINDSOR	PARAINFLUENZA 1	1

*There are no new updates for Week 49. The latest data available is provided in the table above.

Source: Ontario Agency for Health Protection and Promotion, December 10, 2009

FURTHER INFORMATION

1. Ontario Ministry of Health and Long-Term Care
Previous issues of the *Ontario Influenza Bulletin* can be accessed at:
http://www.health.gov.on.ca/english/providers/program/pubhealth/flu/flu_08/flubul_mn.html
2. Ontario Agency for Health Protection and Promotion
OAHPP Weekly Laboratory Surveillance Update
<http://www.oahpp.ca/SRI%20Bulletin.php>
3. Public Health Agency of Canada
Issues of FluWatch can be accessed at:
www.phac-aspc.gc.ca/fluwatch/
4. United States Centers for Disease Control and Prevention
<http://www.cdc.gov/flu/weekly/fluactivity.htm>
5. European Influenza Surveillance Scheme
http://www.eiss.org/cgi-files/bulletin_v2.cgi

INFORMATION ABOUT H1N1 INFLUENZA (HUMAN SWINE INFLUENZA)

1. CDC (Human swine flu investigation)
<http://www.cdc.gov/swineflu/investigation.htm>
2. PHAC (Human swine flu investigation)
http://www.phac-aspc.gc.ca/alert-alerte/swine_200904-eng.php
3. WHO Swine Flu general info
<http://www.who.int/csr/disease/swineflu/en/index.html>
4. Ontario Ministry of Health (Important Health Notices)
<http://www.health.gov.on.ca/english/providers/program/emu/ihn.html>

INFORMATION ABOUT AVIAN INFLUENZA

For latest information on the status of avian influenza worldwide please use the following link:
Public Health Agency of Canada
<http://www.phac-aspc.gc.ca/h5n1/index.html>

Influenza Surveillance Weeks 2009-2010 and date of submission of Appendix C

WEEKS	START	END	Appendix C Submission to MOHLTC
WK50	13-Dec-09	19-Dec-09	22-Dec-09
WK51	20-Dec-09	26-Dec-09	5-Jan-10
WK52	27-Dec-09	2-Jan-10	5-Jan-10
WK1	3-Jan-10	9-Jan-10	12-Jan-10
WK2	10-Jan-10	16-Jan-10	19-Jan-10
WK3	17-Jan-10	23-Jan-10	26-Jan-10
WK4	24-Jan-10	30-Jan-10	2-Feb-10
WK5	31-Jan-10	6-Feb-10	9-Feb-10
WK6	7-Feb-10	13-Feb-10	16-Feb-10
WK7	14-Feb-10	20-Feb-10	23-Feb-10
WK8	21-Feb-10	27-Feb-10	2-Mar-10
WK9	28-Feb-10	6-Mar-10	9-Mar-10
WK10	7-Mar-10	13-Mar-10	16-Mar-10
WK11	14-Mar-10	20-Mar-10	23-Mar-10
WK12	21-Mar-10	27-Mar-10	30-Mar-10
WK13	28-Mar-10	3-Apr-10	6-Apr-10
WK14	4-Apr-10	10-Apr-10	13-Apr-10
WK15	11-Apr-10	17-Apr-10	20-Apr-10
WK16	18-Apr-10	24-Apr-10	27-Apr-10
WK17	25-Apr-10	1-May-10	4-May-10
WK18	2-May-10	8-May-10	11-May-10
WK19	9-May-10	15-May-10	18-May-10
WK20	16-May-10	22-May-10	25-May-10
WK21	23-May-10	29-May-10	1-Jun-10
WK22	30-May-10	5-Jun-10	8-Jun-10
WK23	6-Jun-10	12-Jun-10	15-Jun-10
WK24	13-Jun-10	19-Jun-10	22-Jun-10
WK25	20-Jun-10	26-Jun-10	29-Jun-10
WK26	27-Jun-10	3-Jul-10	6-Jul-10
WK27	4-Jul-10	10-Jul-10	13-Jul-10
WK28	11-Jul-10	17-Jul-10	20-Jul-10
WK29	18-Jul-10	24-Jul-10	27-Jul-10
WK30	25-Jul-10	31-Jul-10	3-Aug-10
WK31	1-Aug-10	7-Aug-10	10-Aug-10
WK32	8-Aug-10	14-Aug-10	17-Aug-10
WK33	15-Aug-10	21-Aug-10	24-Aug-10
WK34	22-Aug-10	28-Aug-10	31-Aug-10
WK35	29-Aug-10	4-Sep-10	7-Sep-10

APPENDIX - I

Definitions for influenza activity levels:

No Data: No activity report corresponding to the surveillance week was received at the Ministry of Health and Long-Term Care Call Centre by the Tuesday (at 4 p.m.) following the end of the surveillance period.

No Activity: **No laboratory-confirmed* influenza and NO outbreaks detected** within the health unit/ influenza surveillance area, within the prior week, although sporadically occurring ILI may or may not be present.†

Sporadic: Sporadically (infrequently) occurring **ILI and at least one lab-confirmed influenza* case with NO outbreaks** detected within the health unit area.†

Localized: sporadically occurring **ILI and lab-confirmed influenza* together with outbreaks of ILI** in schools§ and work sites, or laboratory-confirmed influenza in residential institutions occurring in < 50% of the health unit. Outbreaks affect a single and/or adjacent geographic area within the health unit jurisdiction, e.g. outbreaks in a nursing home and a school in close proximity to each other.†

Widespread: sporadically occurring **ILI and lab-confirmed influenza* together with outbreaks of ILI** in schools and work sites, or laboratory-confirmed influenza in residential institutions occurring in > 50% of the health unit. Outbreaks affect multiple and non-adjacent geographic areas within the health unit jurisdiction, such as two or more regions of the health unit, two or more municipalities, two or more electoral wards, etc.†

* Confirmation of influenza within the surveillance region at any time within the prior week

† Sub-regions within the province or territory as defined by the provincial/territorial epidemiologist

§Health units have been requested to consider laboratory confirmed pH1N1 outbreaks in camps in their region when evaluating ILI activity levels

Influenza-Like Illness (ILI) Definitions:

A) ILI in the general population:

Acute onset of respiratory illness with fever and cough and with one or more of the following - sore throat, arthralgia, myalgia, or prostration which could be due to influenza virus. In children under 5, gastrointestinal symptoms may also be present. In patients under 5 or 65 and older, fever may not be prominent.

B) ILI/Influenza outbreaks:

Schools and work sites: greater than 10% absenteeism on any day, most likely due to ILI.

Residential institutions: two or more cases of ILI within a seven-day period, **including at least one laboratory confirmed case.**

Current Provincial Surveillance Case Definition for pH1N1 (as of May 5, 2009):

Confirmed

Person with or without Influenza-like illness¹ and

Laboratory confirmation of swine influenza A (H1N1) virus infection by one or more of the following tests:

- RT-PCR with genotyping of H1 and/or N1 swine influenza virus
- Viral culture with strain typing
- Four-fold rise in swine influenza A(H1N1) virus specific antibodies by serology testing

¹Influenza-like illness: Acute onset of respiratory illness with fever AND one or more of the following - cough, sore throat, arthralgia, myalgia, prostration, or malaise. In cases under 5 or 65 and older fever may not be prominent.