

SURVEILLANCE WEEK 9 (February 28, 2010– March 6, 2010)

This issue of the Ontario Influenza Bulletin provides information on the surveillance period from February 28, 2010-March 6, 2010, (Week 9). **All data are for week 9 unless otherwise specified. Death and hospitalization information among pandemic (H1N1) 2009 (abbreviated as pH1N1) confirmed cases is current as of March 10, 2010.** Data extraction and analysis for this issue of the Bulletin occurred on March 10, 2010.

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	Similar	3 influenza cases (1 pH1N1) in week 9 compared to 3 reported in week 8 (3 pH1N1)*. The percent positivity of laboratory tests for influenza A at the Toronto Public Health Laboratory was 0% for week 9. This is the same as week 8 (0%). No H3 influenza cases were identified (Table 3). The percent positivity for RSV was the highest among all isolates tested, at 26.92% (Table 8).
Influenza A Outbreaks	No change	No new institutional influenza outbreaks were reported for the current reporting week.
Influenza Activity Levels Reported by Health Units	Similar	No health units reported 'localized' activity and one reported 'sporadic' activity for the current reporting week.
ILI Consultation Rate reported by Sentinel Physicians	Higher	The overall ILI consultation rate has increased from 13.00/1,000 patient visits in Week 8 to 24.36/1,000 patient visits in Week 9. The ILI rate is lower than the average rate for week 8 from previous years. Much of the ILI activity may be attributable to RSV as evidenced by the high percent positivity noted above.
Hospitalizations Among Lab Confirmed Cases of pandemic (H1N1) 2009 virus	Higher	One new hospitalized case was reported from March 4 to March 10, and no new hospitalizations were reported for the previous week (February 25 to March 3).
Deaths Among Lab Confirmed Cases of pandemic (H1N1) 2009 virus	No change	No new deaths were reported from March 4 to March 10, and no new deaths were reported for the previous week (February 25 to March 3).
OVERALL ASSESSMENT	Influenza activity in Ontario is <i>similar</i> compared to the previous week.	Overall the indicators show that influenza activity was similar in week 9 compared to week 8.

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

Ontario Influenza Bulletin, 2009-2010

Surveillance Week 9 (February 28, 2010 – March 6, 2010)

Overall, influenza activity in Ontario during week 9, 2010, was **similar** when compared to week 8, 2010. Ontario health units reported three new confirmed case of influenza for the current week through the integrated Public Health Information System (iPHIS). During week 9, one new laboratory confirmed case of pH1N1 was seen in the Eastern health region. No new institutional influenza outbreaks were reported. For week 9, no health units reported localized influenza activity, one health unit 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 is lower than what is expected for this time of the year based on the average ILI rate reported in week 9 from previous years.

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 9, 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	0	0	0	0	1
Influenza A (Not Subtyped/No Subtype)	0	0	0	1	0	0	0	1
Influenza A (Seasonal H1)	0	0	0	0	0	0	0	0
Influenza A (Seasonal H3)	0	0	0	0	0	0	0	0
Influenza A** (Other)	0	0	0	0	0	0	0	0
Influenza B	0	0	0	1	0	0	0	1
Influenza A & B	0	0	0	0	0	0	0	0
Total new cases	0	0	1	2	0	0	0	3
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 [10/03/2010].

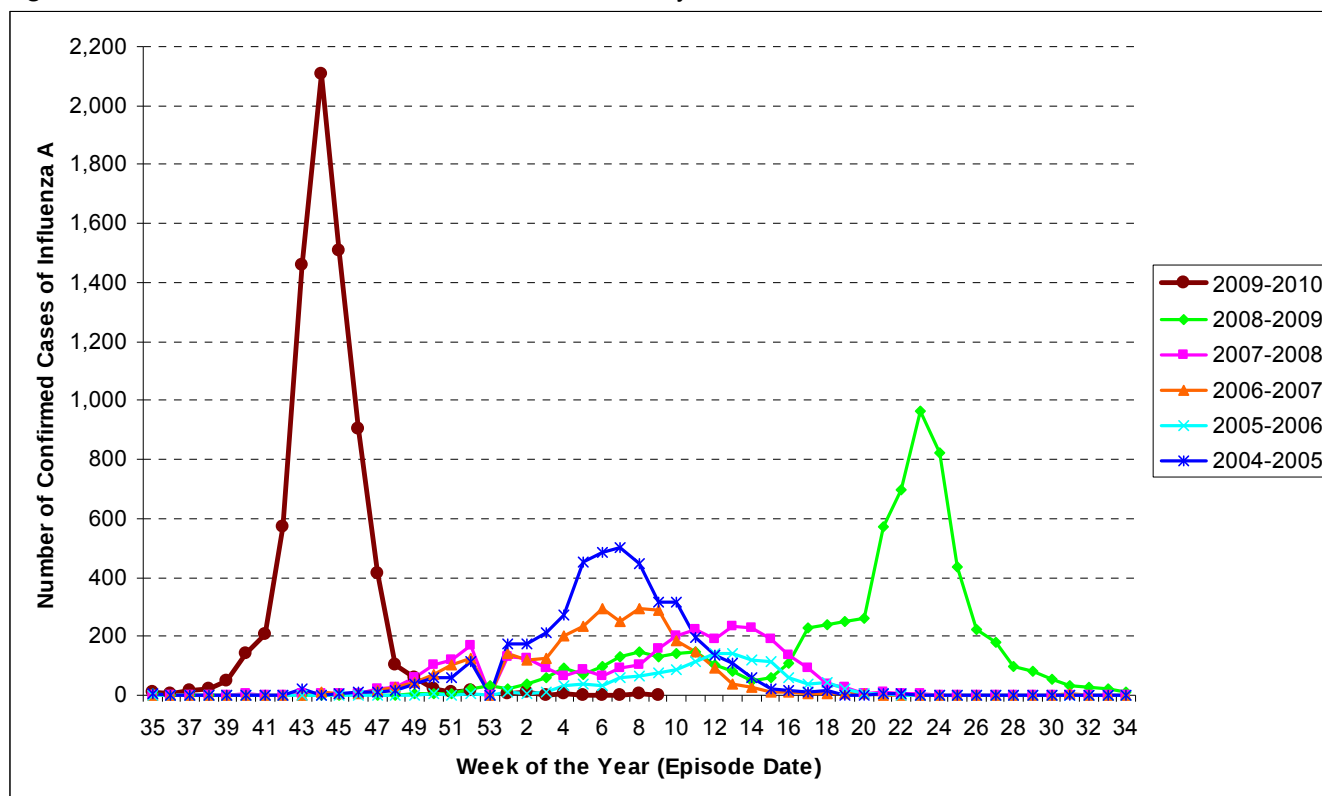
* Includes reports of confirmed influenza through iPHIS, as well as cases in institutional outbreaks, with dates of onset for the first case in the surveillance period.

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

**includes indeterminate, untypeable and other subtypes

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 during the same time period (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 (however in other flu seasons, there has been less extensive testing). However, the number of cases of influenza A reported in week 9 of the 2009-2010 season is below that reported from previous seasons in the same week.

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 [10/03/2010].
[†] 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 9[†], 2009-10, wave two, wave one, and cumulative* confirmed cases between April 12, 2009 – March 6, 2010

Region	Health Unit	Confirmed pH1N1			
		Current week (WK 9)	Wave 2 (WK 35-current)	Wave 1 (WK 15-WK 34)	Total cumulative
North West	Northwestern	0	73	74	147
	Thunder Bay District	0	88	10	98
	TOTAL NORTH WEST	0	161	84	245
North East	Algoma	0	61	7	68
	North Bay Parry Sound District	0	48	7	55
	Porcupine	0	107	4	111
	Sudbury & District	0	44	24	68
	Timiskaming	0	53	0	53
	TOTAL NORTH EAST	0	313	42	355
Eastern	City of Ottawa	0	415	359	774
	Eastern Ontario	0	175	26	201
	Hastings & Prince Edward Counties	0	76	4	80
	Kingston, Frontenac, Lennox & Addington	1	149	20	169
	Leeds, Grenville And Lanark District	0	95	10	105
	Renfrew County And District	0	40	12	52
	TOTAL EASTERN	1	950	431	1,381
Central East	Durham Region	0	170	120	290
	Haliburton, Kawartha, Pine Ridge	0	51	14	65
	Peel Region	0	354	705	1,059
	Peterborough County-City	0	47	4	51
	Simcoe Muskoka District	0	166	64	230
	York Region	0	206	498	704
	TOTAL CENTRAL EAST	0	994	1,405	2,399
Toronto	Toronto	0	844	1,535	2,379
	TOTAL TORONTO	0	844	1,535	2,379
South West	Chatham-Kent	0	33	6	39
	Elgin-St. Thomas	0	21	0	21
	Grey Bruce	0	37	12	49
	Huron County	0	25	2	27
	Lambton County	0	54	1	55
	Middlesex-London	0	204	28	232
	Oxford County	0	62	3	65
	Perth District	0	33	3	36
	Windsor-Essex County	0	145	49	194
	TOTAL SOUTHWEST	0	614	104	718
Central West	Brant County	0	22	8	30
	City Of Hamilton	0	212	124	336
	Haldimand-Norfolk	0	25	6	31
	Halton Region	0	174	211	385
	Niagara Region	0	233	20	253
	Waterloo Region	0	122	38	160
	Wellington-Dufferin-Guelph	0	55	26	81
	TOTAL CENTRAL WEST	0	843	433	1,276
	Out of Province	0	0	6	6
	TOTAL ONTARIO	1	4,719	4,040	8,759

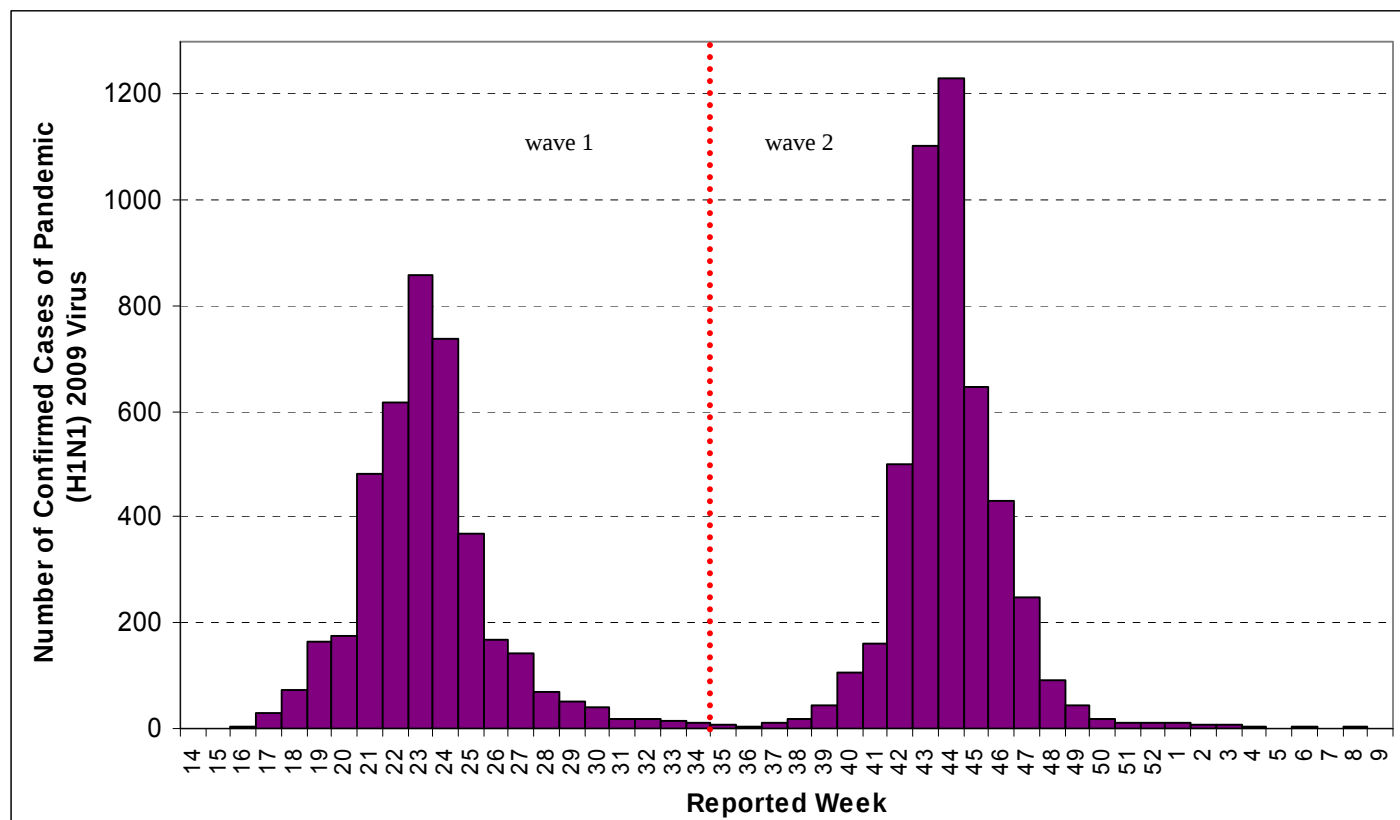
SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [11/03/2010].

[†] 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.

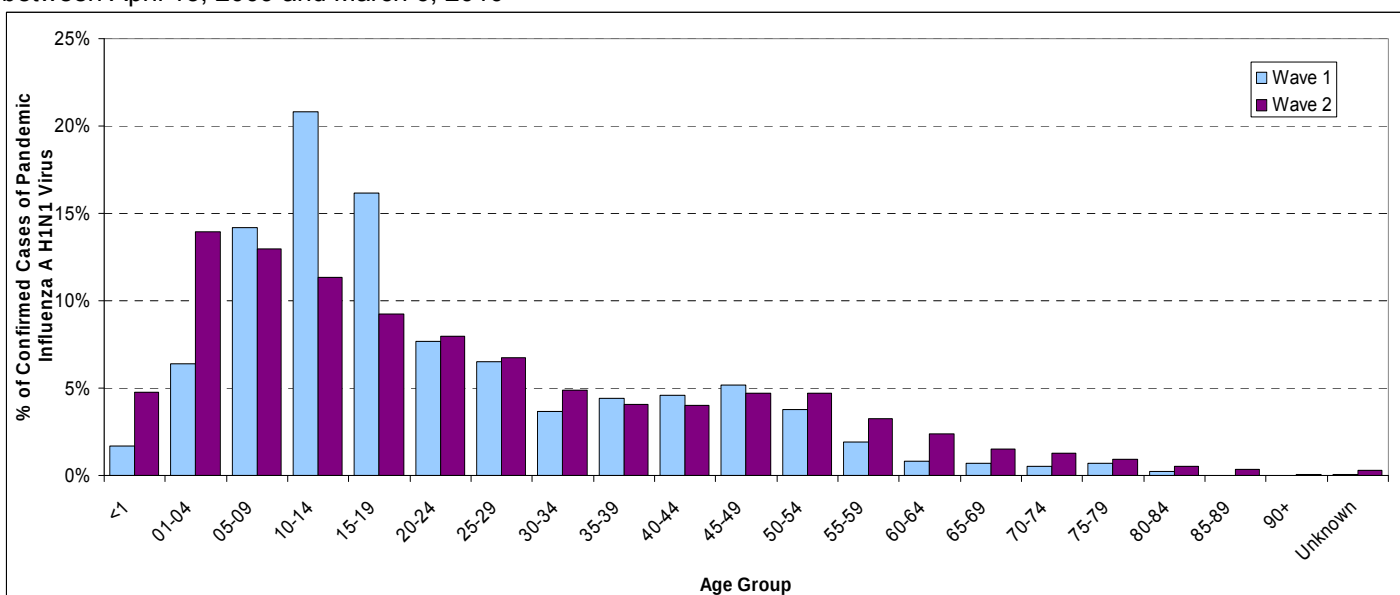
Note: Wave 1 corresponds to April 12, 2009 to August 29, 2009; Wave 2 corresponds to August 30, 2009 to the last date of the current week.

Figure 2: Laboratory confirmed cases of pandemic (H1N1) 2009 in Ontario by week between April 13, 2009 and March 6, 2010



SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [10/03/2010].

Figure 3: Proportion of laboratory confirmed cases of pandemic (H1N1) 2009 in Ontario by age group and wave between April 13, 2009 and March 6, 2010



SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [10/03/2010].

Table 3: Confirmed cases of influenza by health unit & health region, excluding laboratory confirmed pandemic (H1N1) 2009, with an episode date[†] during Week 9, 2009-10

Region	Health Unit	Influenza A				Influenza A & B	Influenza B	TOTAL Cumulative
		No Subtype / Not Subtyped	Other*	H1	H3			
North West	Northwestern	0	0	0	0	0	0	0
	Thunder Bay District	0	0	0	0	0	0	0
	TOTAL NORTH WEST	0	0	0	0	0	0	0
North East	Algoma	0	0	0	0	0	0	0
	North Bay Parry Sound District	0	0	0	0	0	0	0
	Porcupine	0	0	0	0	0	0	0
	Sudbury & District	0	0	0	0	0	0	0
	Timiskaming	0	0	0	0	0	0	0
	TOTAL NORTH EAST	0	0	0	0	0	0	0
Eastern	City of Ottawa	0	0	0	0	0	0	0
	Eastern Ontario	0	0	0	0	0	0	0
	Hastings & Prince Edward Counties	0	0	0	0	0	0	0
	Kingston, Frontenac, Lennox & Addington	0	0	0	0	0	0	0
	Leeds, Grenville And Lanark District	0	0	0	0	0	0	0
	Renfrew County And District	0	0	0	0	0	0	0
	TOTAL EASTERN	0	0	0	0	0	0	0
Central East	Durham Region	0	0	0	0	0	0	0
	Haliburton, Kawartha, Pine Ridge	0	0	0	0	0	0	0
	Peel Region	1	0	0	0	0	1	2
	Peterborough County-City	0	0	0	0	0	0	0
	Simcoe Muskoka District	0	0	0	0	0	0	0
	York Region	0	0	0	0	0	0	0
	TOTAL CENTRAL EAST	1	0	0	0	0	1	2
Toronto	Toronto	0	0	0	0	0	0	0
	TOTAL TORONTO	0	0	0	0	0	0	0
South West	Chatham-Kent	0	0	0	0	0	0	0
	Elgin-St. Thomas	0	0	0	0	0	0	0
	Grey Bruce	0	0	0	0	0	0	0
	Huron County	0	0	0	0	0	0	0
	Lambton County	0	0	0	0	0	0	0
	Middlesex-London	0	0	0	0	0	0	0
	Oxford County	0	0	0	0	0	0	0
	Perth District	0	0	0	0	0	0	0
	Windsor-Essex County	0	0	0	0	0	0	0
	TOTAL SOUTHWEST	0	0	0	0	0	0	0
Central West	Brant County	0	0	0	0	0	0	0
	City Of Hamilton	0	0	0	0	0	0	0
	Haldimand-Norfolk	0	0	0	0	0	0	0
	Halton Region	0	0	0	0	0	0	0
	Niagara Region	0	0	0	0	0	0	0
	Waterloo Region	0	0	0	0	0	0	0
	Wellington-Dufferin-Guelph	0	0	0	0	0	0	0
	TOTAL CENTRAL WEST	0	0	0	0	0	0	0
	TOTAL ONTARIO	1	0	0	0	0	1	2

SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [11/03/2010].

[†] 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 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 – March 6, 2010

Region	Health Unit	Influenza A				Influenza A & B	Influenza B	TOTAL Cumulative
		No Subtype / Not Subtyped	Other*	H1	H3			
North West	Northwestern	56	3	0	0	0	0	59
	Thunder Bay District	64	2	0	0	0	0	66
	TOTAL NORTH WEST	120	5	0	0	0	0	125
North East	Algoma	46	1	0	0	0	0	47
	North Bay Parry Sound District	59	2	0	0	0	0	61
	Porcupine	39	7	0	0	0	0	46
	Sudbury & District	63	2	0	0	0	0	65
	Timiskaming	9	1	0	0	0	0	10
	TOTAL NORTH EAST	216	13	0	0	0	0	229
Eastern	City of Ottawa	9	0	0	0	0	0	9
	Eastern Ontario	26	0	0	0	0	0	26
	Hastings & Prince Edward Counties	29	0	0	0	0	0	29
	Kingston, Frontenac, Lennox & Addington	31	0	0	0	0	0	31
	Leeds, Grenville And Lanark District	21	0	0	0	0	0	21
	Renfrew County And District	7	0	1	0	0	0	8
	TOTAL EASTERN	123	0	1	0	0	0	124
Central East	Durham Region	88	5	0	0	0	0	93
	Haliburton, Kawartha, Pine Ridge	34	2	0	0	0	0	36
	Peel Region	270	6	0	1	0	3	280
	Peterborough County-City	33	3	0	0	0	0	36
	Simcoe Muskoka District	144	4	0	0	0	0	148
	York Region	154	3	0	0	0	1	158
	TOTAL CENTRAL EAST	723	23	0	1	0	4	751
Toronto	Toronto	386	19	0	0	0	3	408
	TOTAL TORONTO	386	19	0	0	0	3	408
South West	Chatham-Kent	27	0	0	0	0	0	27
	Elgin-St. Thomas	22	1	0	0	0	0	23
	Grey Bruce	72	0	0	0	0	0	72
	Huron County	28	0	0	0	0	0	28
	Lambton County	25	0	0	0	0	0	25
	Middlesex-London	136	2	0	1	0	0	139
	Oxford County	25	5	0	0	0	0	30
	Perth District	16	0	0	0	0	2	18
	Windsor-Essex County	199	3	1	0	0	0	203
	TOTAL SOUTHWEST	550	11	1	1	0	2	565
Central West	Brant County	28	0	0	0	0	0	28
	City Of Hamilton	215	1	0	0	0	1	217
	Haldimand-Norfolk	28	0	1	0	0	0	29
	Halton Region	121	2	0	1	0	1	125
	Niagara Region	111	7	0	0	0	1	119
	Waterloo Region	112	0	0	1	0	0	113
	Wellington-Dufferin-Guelph	53	0	0	0	1	1	55
	TOTAL CENTRAL WEST	668	10	1	2	1	4	686
	TOTAL ONTARIO	2,786	81	3	4	1	13	2,888

SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [11/03/2010].

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 indeterminate, untypeable and other subtypes

Deaths among pandemic (H1N1) 2009 virus cases, April 13, 2009 – March 11, 2010

A total of 128 deaths have been reported since April, with 20% (25) reported in wave 1 and 80% (103) in wave 2. Of the reported deaths, 80% (102) were hospitalized prior to death. Overall, cases that died ranged in age from less than 1 to 95 years of age and had a mean and median age of 51 and 54 years, respectively. Women accounted for less than half of all cases that have died, with 42% 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 18.6 and 14 days, respectively, in Wave 1. The mean and median days from symptom onset to death were 10.6 and 9 days, respectively, in Wave 2. Among the 128 confirmed cases that have died, 112 (88%) had underlying chronic medical conditions reported, compared to 96% (24) of wave 1 cases and 85% (88) of wave 2 cases.

Hospitalizations among pandemic (H1N1) 2009 virus cases, April 13, 2009 – March 11 2010

A total of 1,845 hospitalizations have been reported, with 22% (403) reported in wave 1 and 78% (1,442) reported in wave 2. The cumulative hospitalization rate of pH1N1 related hospitalizations is 14.3 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 49% 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 20% (81) of wave one cases and 19% (273) of wave two cases. Overall, 19% (354) 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 2.3 and 2 days, respectively, in Wave 2.

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

Surveillance Indicators	Wave 2 (Sep 1, 2009 – Mar 11, 2010)	Wave 1 (Apr, 2009 - Aug 31, 2009)	Total (Apr, 2009 - Mar 11, 2010)
Number of deaths	103 (80%)	25 (20%)	128 (100%)
Number of hospitalizations	1,442 (78%)	403 (22%)	1,845 (100%)
Hospitalization status			
Discharged	92% (1,334)	98% (396)	94% (1,730)
Currently hospitalized	8% (108)	2% (7)	6% (115)
Length of hospital stay (days)**			
Mean	4	7	5
Median	3	4	3
Range	0-130	0-127	0-130

Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted at 8:30 am [11/03/2010]

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.

^a For individuals in hospital prior to their pH1N1 infection, onset of illness and end of treatment relating to pH1N1 were used to determine LOS.

Table 6. Hospitalizations among confirmed cases of pandemic (H1N1) 2009 in Ontario, April 13, 2009 – March 11, 2010

Hospitalization Status	Ventilator and/or ICU	Not in ICU and not on ventilator	Number of cases hospitalized to date
Number Currently Hospitalized	35 (30%)	80 (70%)	115 (100%)
Number Hospitalized and Discharged	319 (18%)	1411 (82%)	1730 (100%)
Total Hospitalized to date	354 (19%)	1491 (81%)	1845 (100%)

Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted at 8:30 am [11/03/2010]

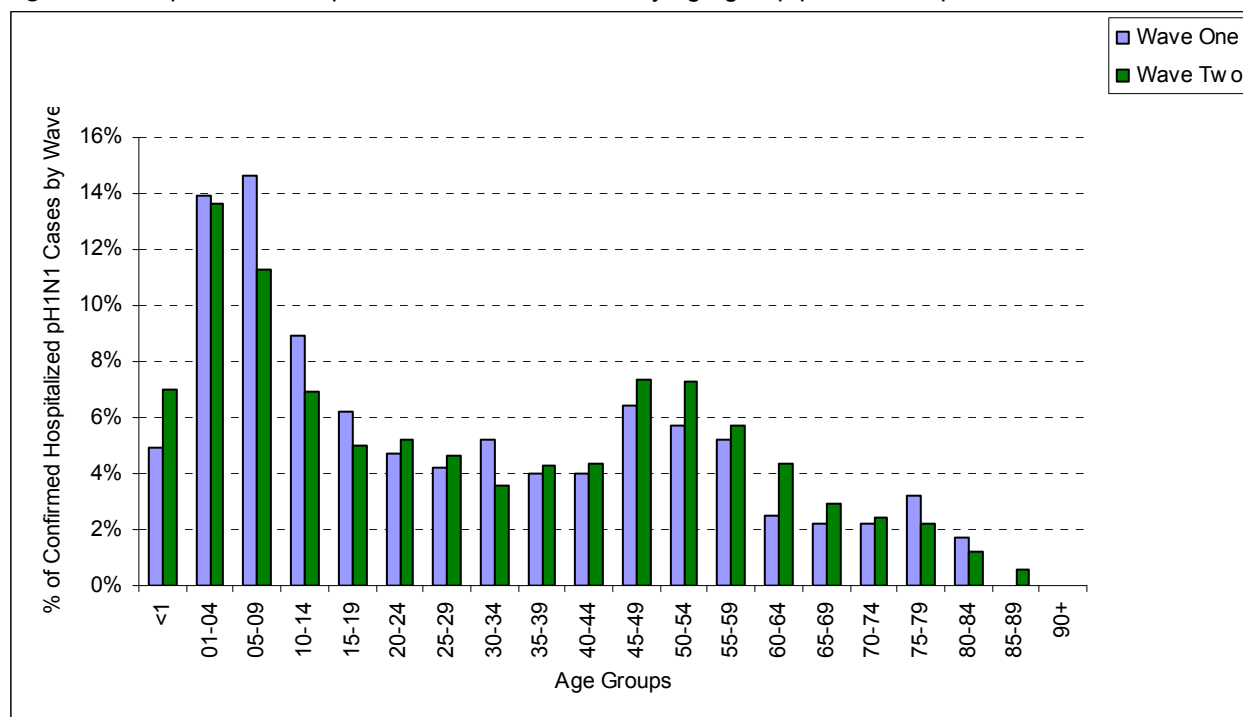
Table 7. Incidence of hospitalization and death due to pandemic (H1N1) 2009 in Ontario, April 13, 2009 – March 11, 2010

Age Group	Hospitalizations	Rate/100,000	Deaths	Rate/100,000
<1	121	90.31	1	0.75
1-4	253	46.32	1	0.18
5-14	358	23.19	5	0.32
15-24	191	10.92	10	0.57
25-44	314	8.38	18	0.48
45-64	436	12.55	62	1.78
65+	172	9.96	31	1.79
TOTAL	1845	14.28	128	0.99

Source (incidence): Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted at 8:30 am [11/03/2010]

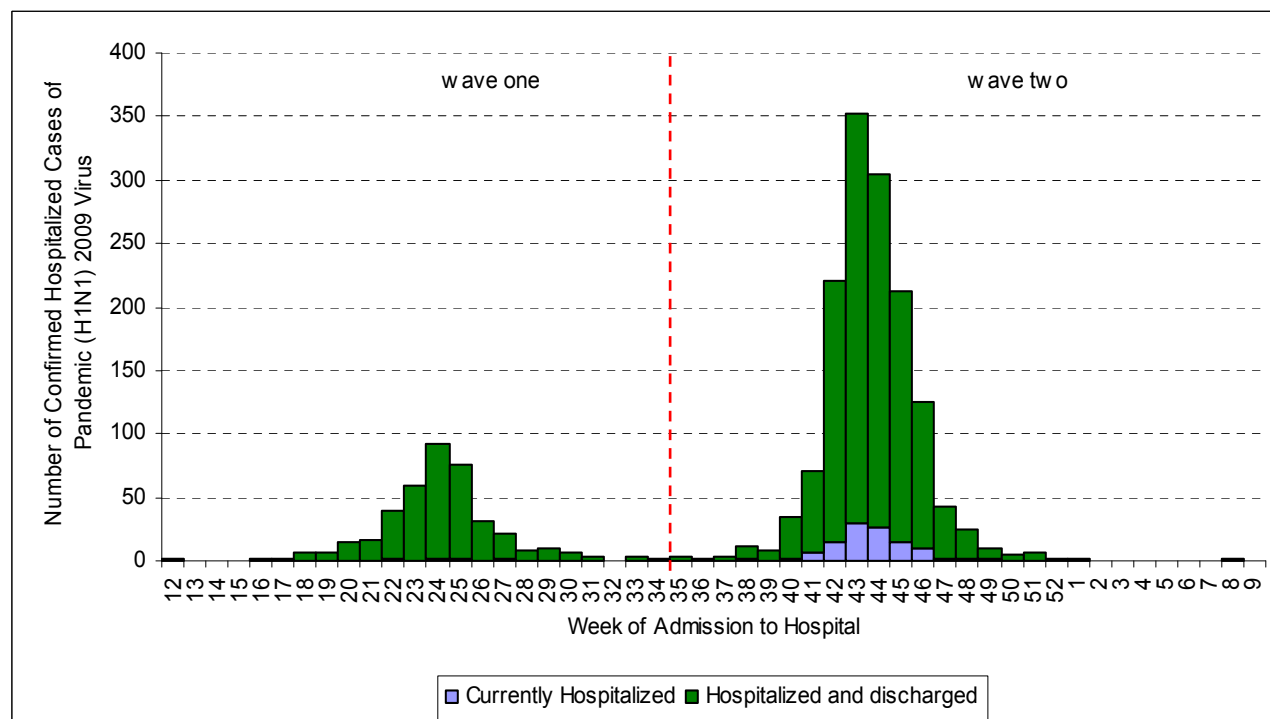
Source (incidence): Ontario population projections for 2008: Ontario Ministry of Health and Long-Term Care, Public Health Planning Database (PHPDB), extracted [12/02/2009]

Figure 4: Proportion of hospitalized cases in Ontario by age group per wave, April 13, 2009 – March 11, 2010



Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted at 8:30 am [11/03/2010]

Figure 5: Hospitalized cases of pandemic (H1N1) 2009 by hospital admission week in Ontario, April 13, 2009 – March 11, 2010*



Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted at 8:30 am [11/03/2010]

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

Influenza Subtype(s):

During week 9, a total of 2574 results of isolate testing were received by the Public Health Agency of Canada, with 1 testing positive for influenza A and two positive for influenza B. The one reported influenza A isolate was from British Columbia (100.0%). The two influenza B isolates were from Ontario (100.0%).

(Antigenic Characterization and Antiviral Resistance data are current as of March 11, 2010)

Antigenic Characterization (National):

Since September 1, 2009, National Microbiology Laboratory (NML) has antigenically characterized 836 pandemic H1N1 viruses and 16 seasonal influenza viruses (three A/H1N1, ten A/H3N2 and three B virus) that were received from Canadian laboratories.

Pandemic Influenza A (H1N1):

Among the 836 pandemic influenza A (H1N1) viruses characterized, 832 (99.5%) 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. Four viruses (0.5%) tested showed reduced titer with antisera produced against A/California/7/2009.

Seasonal Influenza A (H1N1):

Three 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 ten H3N2 viruses, two 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. Eight viruses were antigenically related to A/Perth/16/2009, which is the WHO recommended influenza A (H3N2) component for the 2010 -11 Northern Hemisphere vaccine formulation.

Influenza B:

Among the three influenza B viruses characterized, two were antigenically related to B/Brisbane/60/2008, which is the recommended influenza B component for the 2009-2010 influenza vaccine. One B virus was related to the previous vaccine virus B/Florida/4/2006 (Yamagata lineage).

Antigenic Characterization (Provincial):

Since September 1, 2009, The National Microbiology Laboratory (NML) has antigenically characterized the following strains from Ontario: 292 influenza A/California/07/2009-like and 2 influenza B/Brisbane/60/2008-like.

Antiviral Resistance and Sensitivity (National):

a) Amantadine

Twenty-nine seasonal influenza A viruses (five H1N1 and 24 H3N2) and 1121 pandemic H1N1 viruses were tested for resistance to amantadine and found that one H1N1 virus, all 24 H3N2 viruses and all 1121 pandemic H1N1 viruses were resistant. Four seasonal H1N1 viruses were sensitive to amantadine.

b) Oseltamivir:

Twenty-two seasonal influenza viruses (six H1N1, thirteen H3N2 and three B) and 1065 pandemic H1N1 viruses were tested for resistance to oseltamivir. Six seasonal H1N1 isolates were resistant to oseltamivir. Of the 1065 pandemic H1N1 viruses tested, 1053 were sensitive to oseltamivir and 12 pH1N1 isolates were resistant to oseltamivir with the H275Y mutation. Twelve of the resistant cases were associated with oseltamivir treatment

c) Zanamivir:

Eighteen seasonal influenza viruses (two H1N1, thirteen H3N2 and three B) and 1043 pandemic H1N1 viruses were tested for resistance to zanamivir. All 18 seasonal influenza viruses and all 1043 pandemic H1N1 viruses were sensitive to zanamivir.

Antiviral Resistance and Sensitivity (Provincial):

a) Amantadine

Of the 311 pH1N1 isolates tested, all were resistant to amantadine. Two H3N2 isolates were also resistant to amantadine.[†]

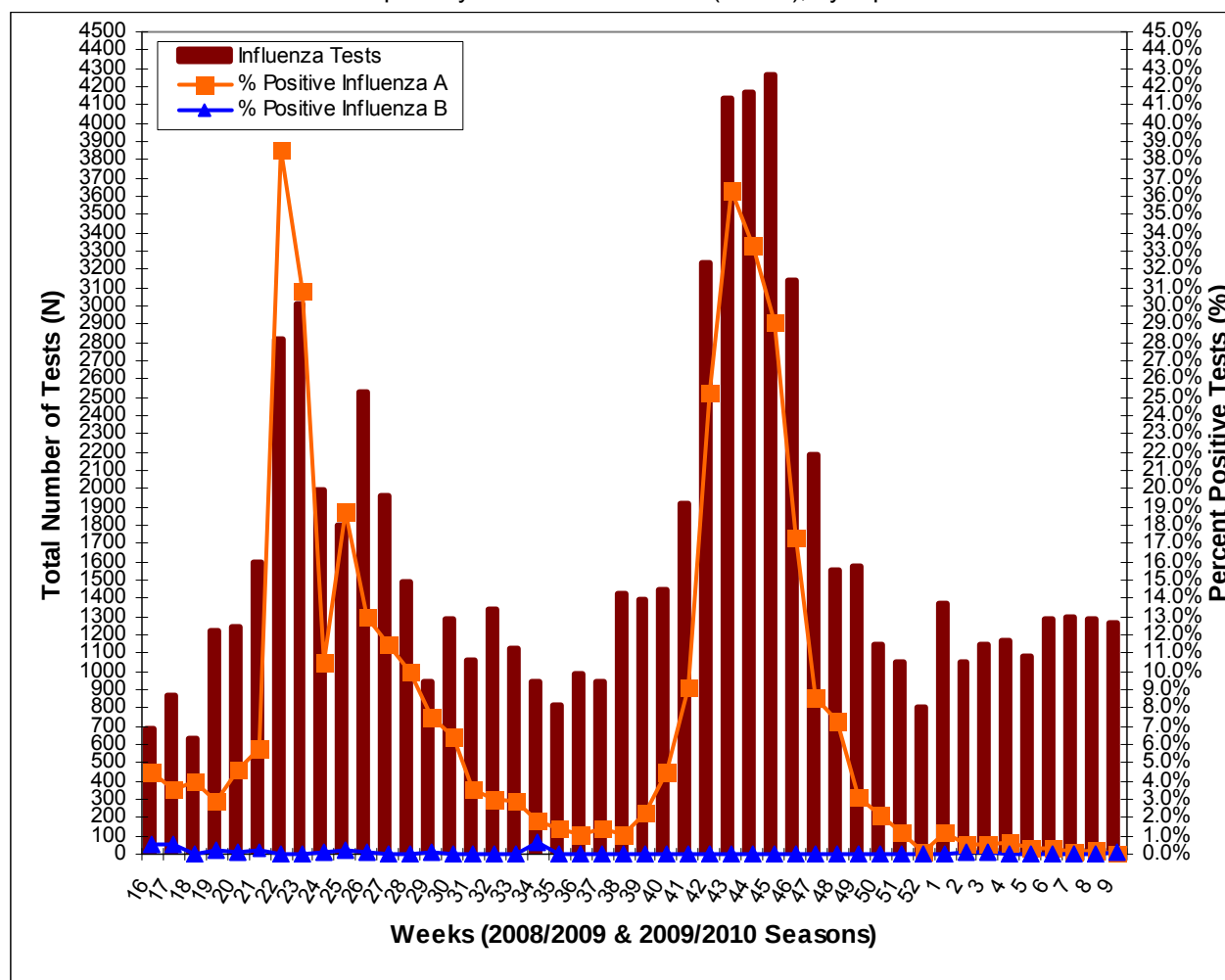
b) Oseltamivir

Of the 310 influenza pH1N1 isolates from Ontario tested at NML, 4 were resistant to oseltamivir. One seasonal influenza A/H1N1 virus was also resistant. Of 760 Ontario isolates tested provincially by the OAHPP 15, representing 5 patients, were resistant to oseltamivir.[‡] Both influenza B isolates were sensitive to oseltamivir.

c) Zanamivir

All 303 pH1N1 isolates tested were sensitive to zanamivir. Both influenza B isolates were sensitive to 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 9, 2010. Please note that the last version received from PHAC as of 4:00PM on March 11, 2010 was used.[†]
These data have been obtained from the National Microbiology Laboratory of the Public Health Agency of Canada as of March 11, 2010.

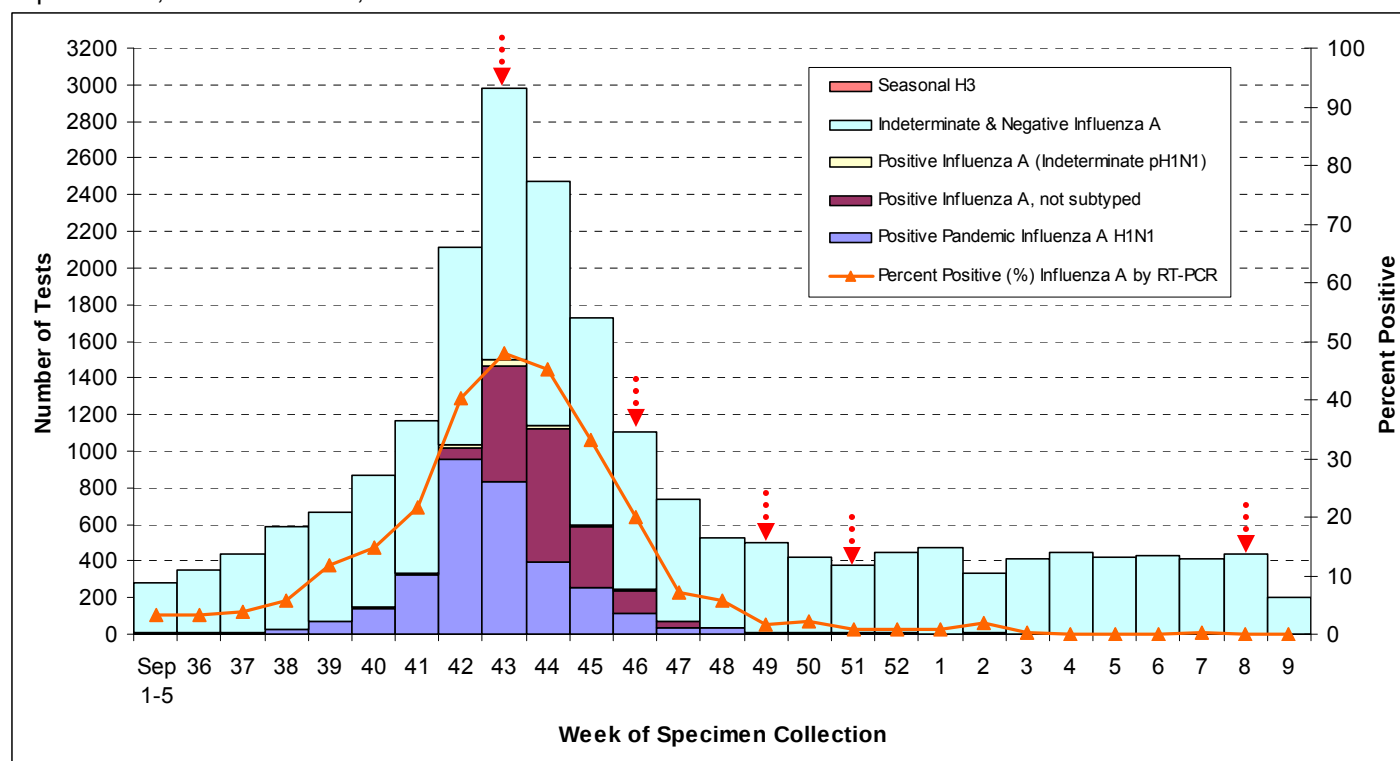
Figure 6: Total number of influenza tests performed and percent of positive tests in Ontario reported to the Centre for Immunization and Respiratory Infectious Diseases (CIRID), by report week.

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 9, 2010. Please note that the last version received from PHAC as of 4:00PM on March 11, 2010 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, 2009 – March 6, 2010



Source: These data have been obtained from the PHL, Ontario Agency for Health Protection and Promotion (OAHPP).

Note: Not all cases with specimens collected during week 9 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: The downward arrows indicate changes in the testing algorithm. For details on the changes, please refer to Appendix 1 of the OAHPP: Laboratory Pandemic Influenza Surveillance Report

Table 8: Summary of Other Respiratory Virus Detections/Isolations in Ontario in Week 9

Organism Name	Number of Positive Tests	Number of Tests	% Positive
Respiratory Syncytial Virus	249	925	26.92
Parainfluenza (all types)	22	838	2.63
Adenovirus	8	868	0.92
Human Metapneumovirus	14	219	6.39

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 9, 2010. Please note that the last version received from PHAC as of 4:00PM on March 11, 2010 was used.

Table 9: Institutional respiratory infection outbreaks in Ontario: new outbreaks* in Week 9 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	2	22.2
Other organisms	0	0.0
No organism identified	7	77.8
TOTAL	9	100.0
Total Respiratory Infection Outbreaks of the Season to date**	N	% (of outbreaks)
Influenza A	57	15.5
Influenza B	0	0.0
Influenza A and B	0	0.0
Parainfluenza (All types)	12	3.3
RSV	37	10.1
Combined Outbreaks [†]	14	3.8
Other organisms	99	26.9
No organism identified	149	40.5
TOTAL	368	100.0
Types of Institutions – All Outbreaks **	N	% (of outbreaks)
Long-Term Care Homes	211	57.3
Hospitals	29	7.9
Retirement Homes	29	7.9
Other	11	3.0
Unknown	88	23.9
TOTAL	368	100.0
	N	% (of outbreaks)
New Outbreaks – Pandemic (H1N1) 2009*	0	0.0
Total pH1N1 2009 Infection Outbreaks of the Season to date**	45	100.0
Types of Institutions (pH1N1 Outbreaks)	N	% (of outbreaks)
Long-Term Care Homes	10	22.2
Hospitals	14	31.1
Retirement Homes	3	6.7
Other	3	6.7
Unknown	15	33.3
TOTAL	45	100.0

SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [10/03/2010]

* 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. February 28, 2010 – March 6, 2010

** Season to date includes all outbreaks in which the date of onset of illness in the first case occurred up to Week 9. 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.)

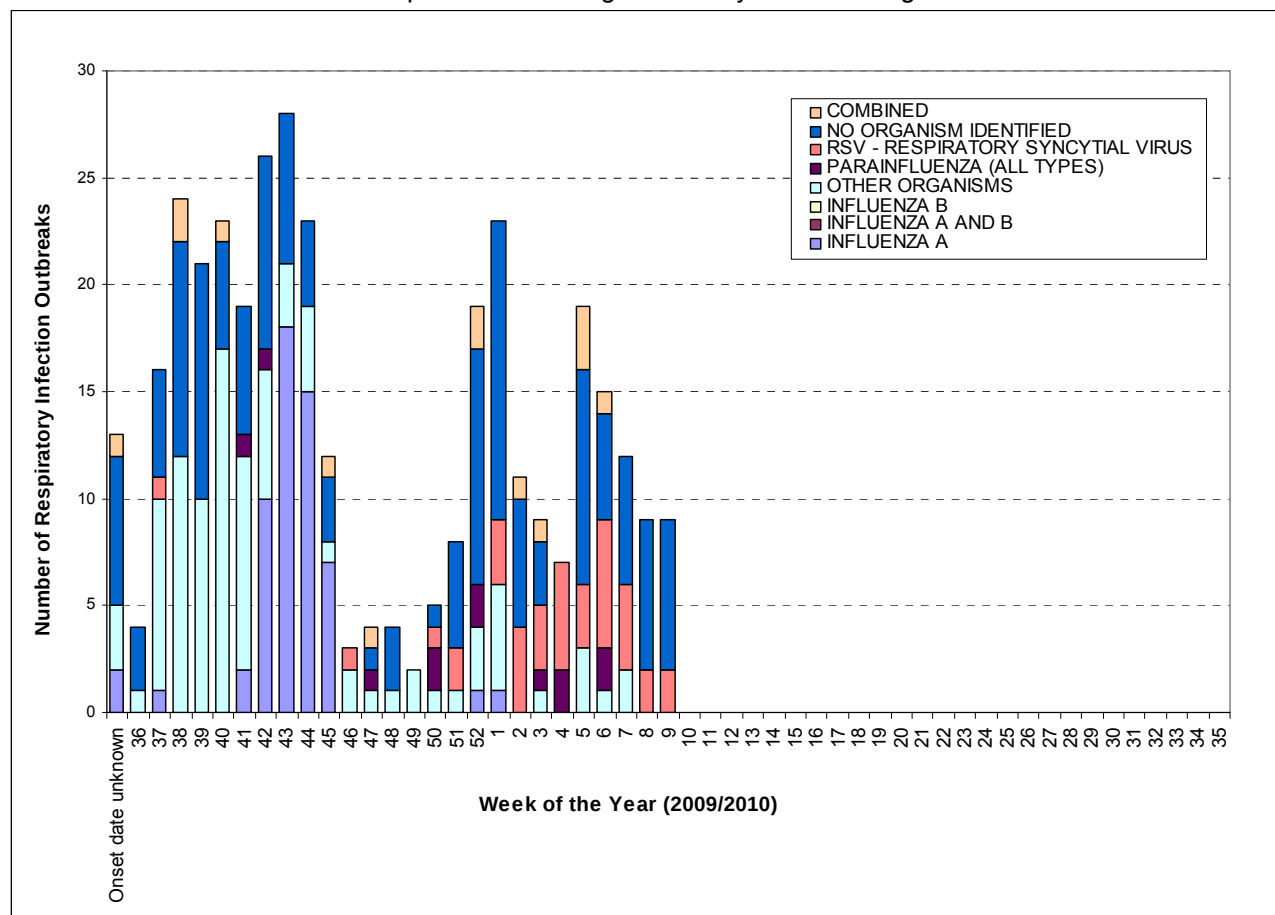
Table 10: Outbreak Related Complications in institutional respiratory infection outbreaks in Ontario during the Surveillance Season*

Outbreak Related Cases – All Outbreaks	N	% (of total cases)
Residents	3557	69.4
Patients	266	5.2
Staff	1305	25.4
Total Cases	4851	100.0
Deaths		% (of cases per role)
Residents	88	2.5
Patients	3	1.1
Staff	0	0.0
Pneumonia (Chest x-ray confirmed)		% (of cases per role)
Residents	94	2.6
Patients	9	3.4
Staff	2	0.2
Hospitalizations		% (of cases per role)
Residents	166	4.7
Staff	0	0.0
Outbreak Related Cases – All Influenza Outbreaks	N	% (of total cases)
Residents	291	54.2
Patients	77	14.3
Staff	169	31.5
Total Cases	537	100.0
Deaths		% (of cases per role)
Residents	20	6.9
Patients	1	1.3
Staff	0	0.0
Pneumonia (Chest x-ray confirmed)		% (of cases per role)
Residents	7	2.4
Patients	4	5.2
Staff	0	0.0
Hospitalizations		% (of cases per role)
Residents	32	11.0
Staff	0	0.0
Outbreak Related Cases – Pandemic (H1N1) 2009 Outbreaks	N	% (of total cases)
Residents	189	46.4
Patients	67	16.5
Staff	151	37.1
Total Cases	407	100.0
Deaths		% (of cases per role)
Residents	20	10.6
Patients	1	1.5
Staff	0	0.0
Pneumonia (Chest x-ray confirmed)		% (of cases per role)
Residents	5	2.6
Patients	4	6.0
Staff	0	0.0
Hospitalizations		% (of cases per role)
Residents	30	15.9
Staff	0	0.0

SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [10/03/2010]

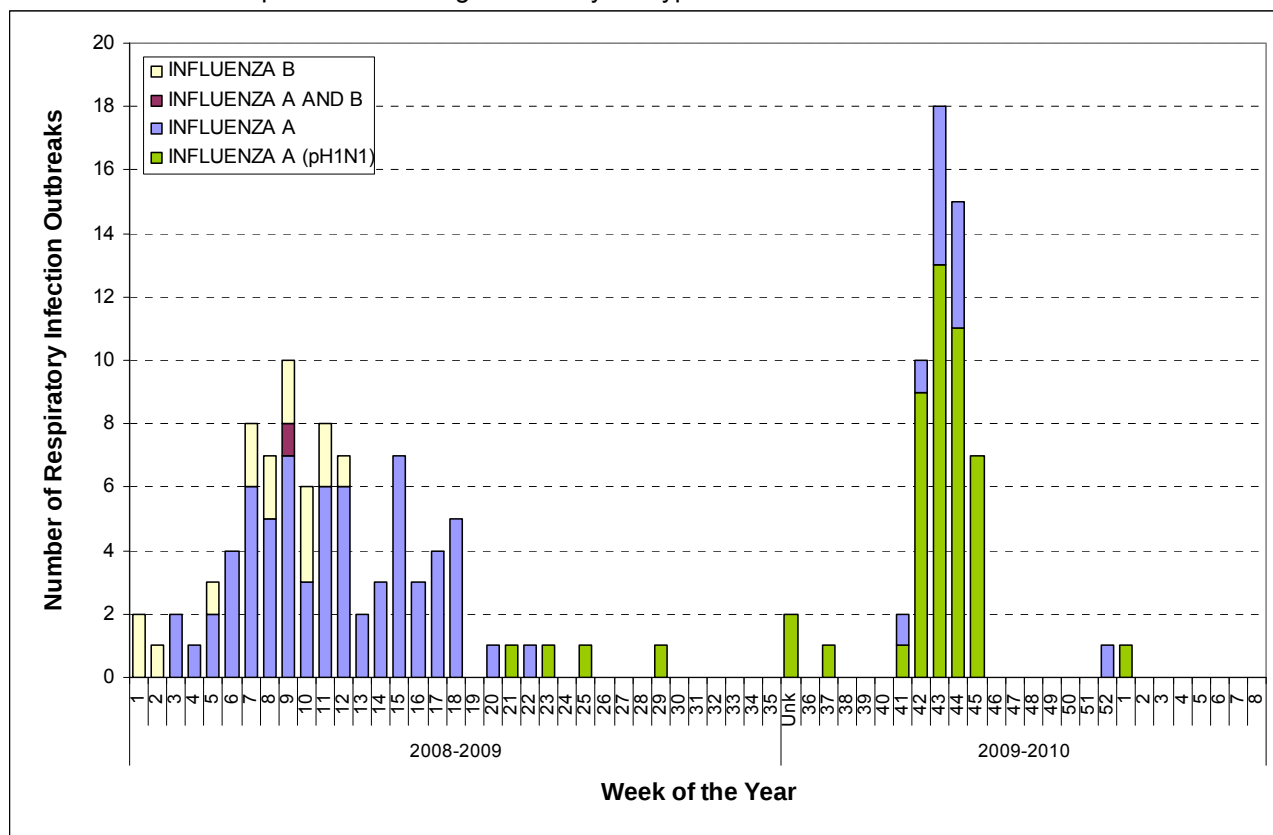
* Season to date includes all outbreaks in which the date of onset of illness in the first case occurred from September 1, 2009 – March 6, 2010

Figure 8: Institutional respiratory infection outbreaks in Ontario by onset of illness in the first case: Total Outbreaks up to and including Week 9 by causative organism



Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [10/03/2010]

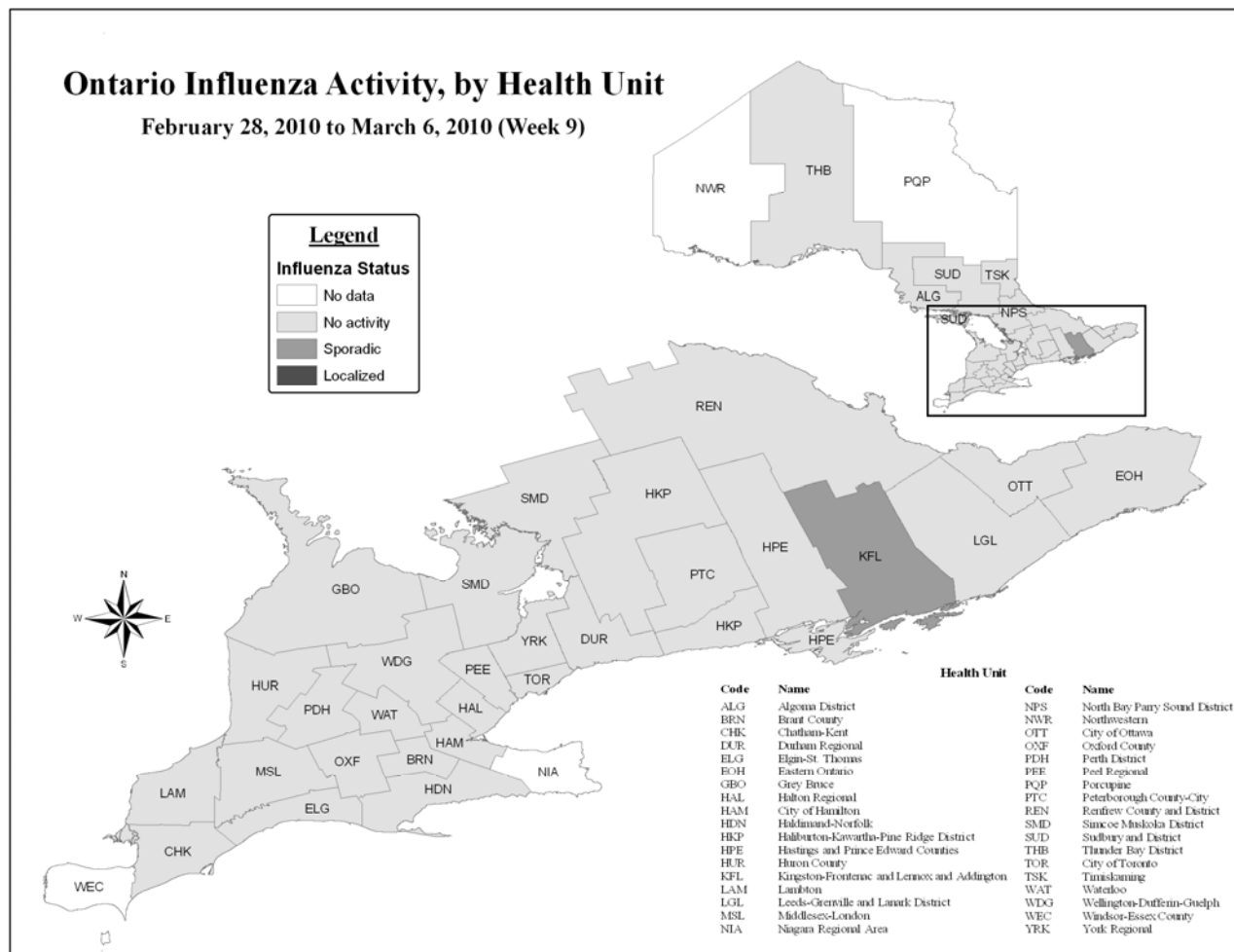
Figure 9: Institutional influenza outbreaks in Ontario by onset of illness in the first case: Total outbreaks up to and including Week 9 by subtype*



Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [10/03/2010]

*School outbreaks are not included in this chart.

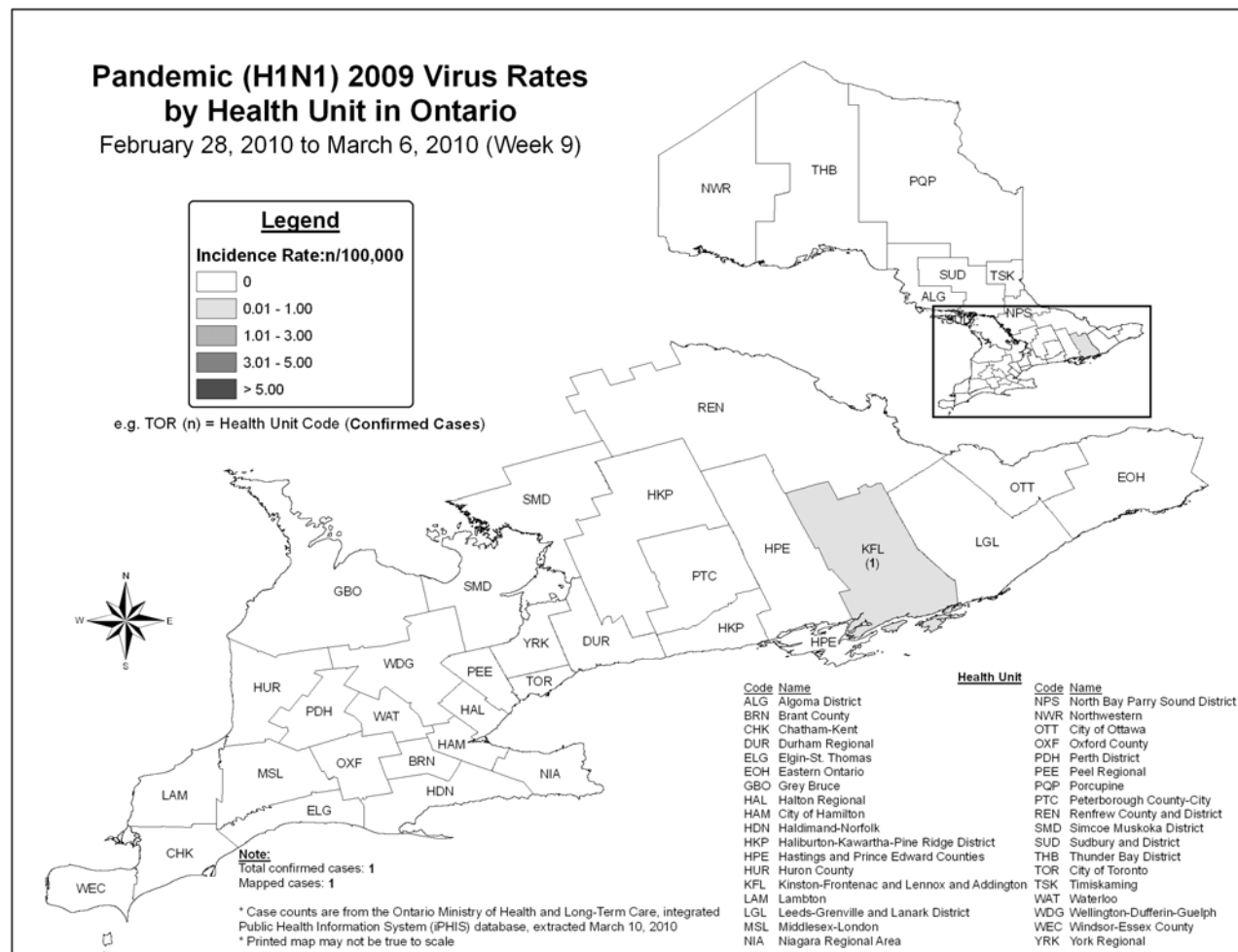
Figure 10: Influenza Activity* levels in Ontario by health unit for Week 9, 2010



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

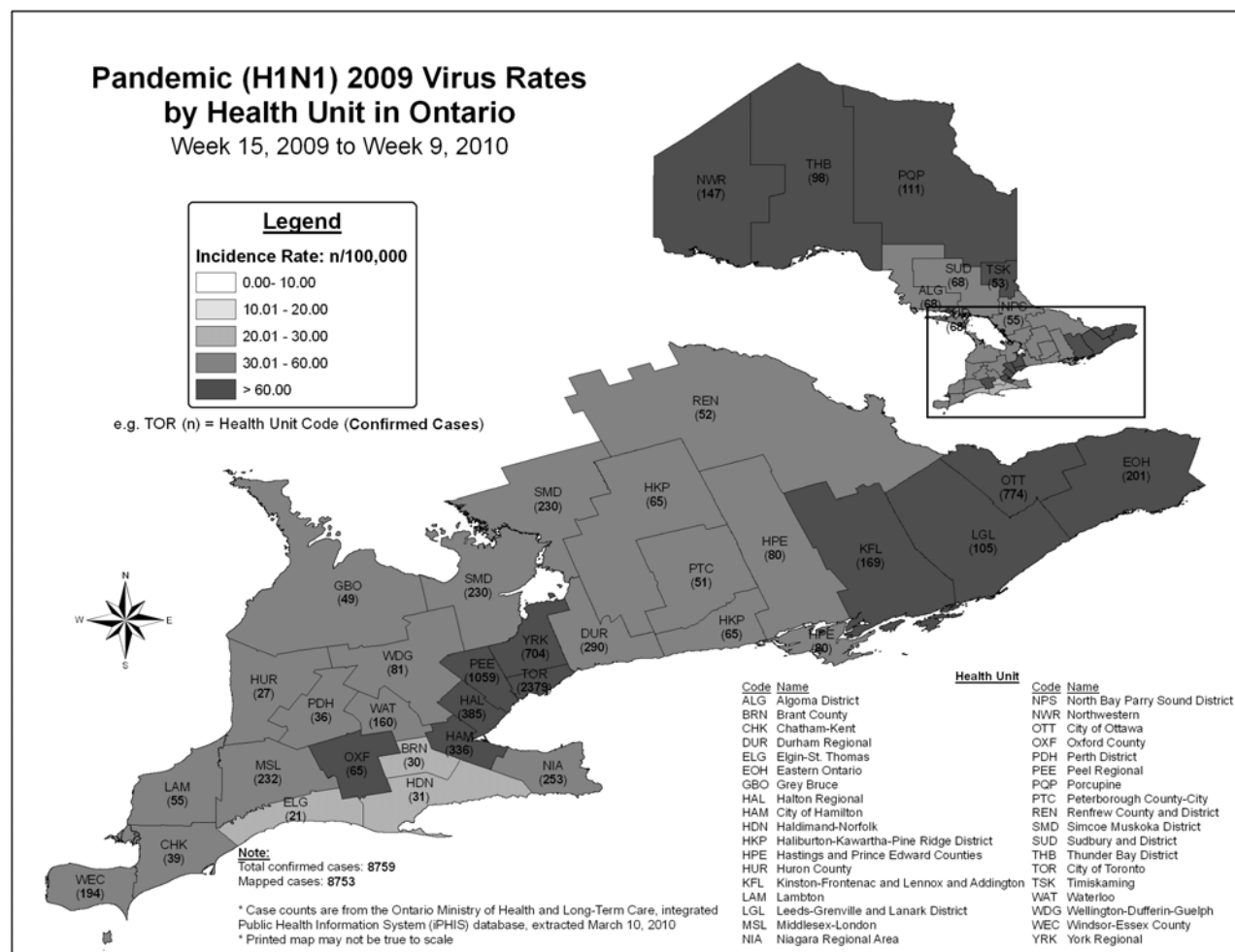
* Influenza activity levels are assigned by local public health units and reported to the MOHLTC by the Tuesday following the end of the surveillance week at 4 pm. Activity levels are assigned based on laboratory confirmations, ILI reports from various sources, and laboratory confirmed institutional 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 9, 2010



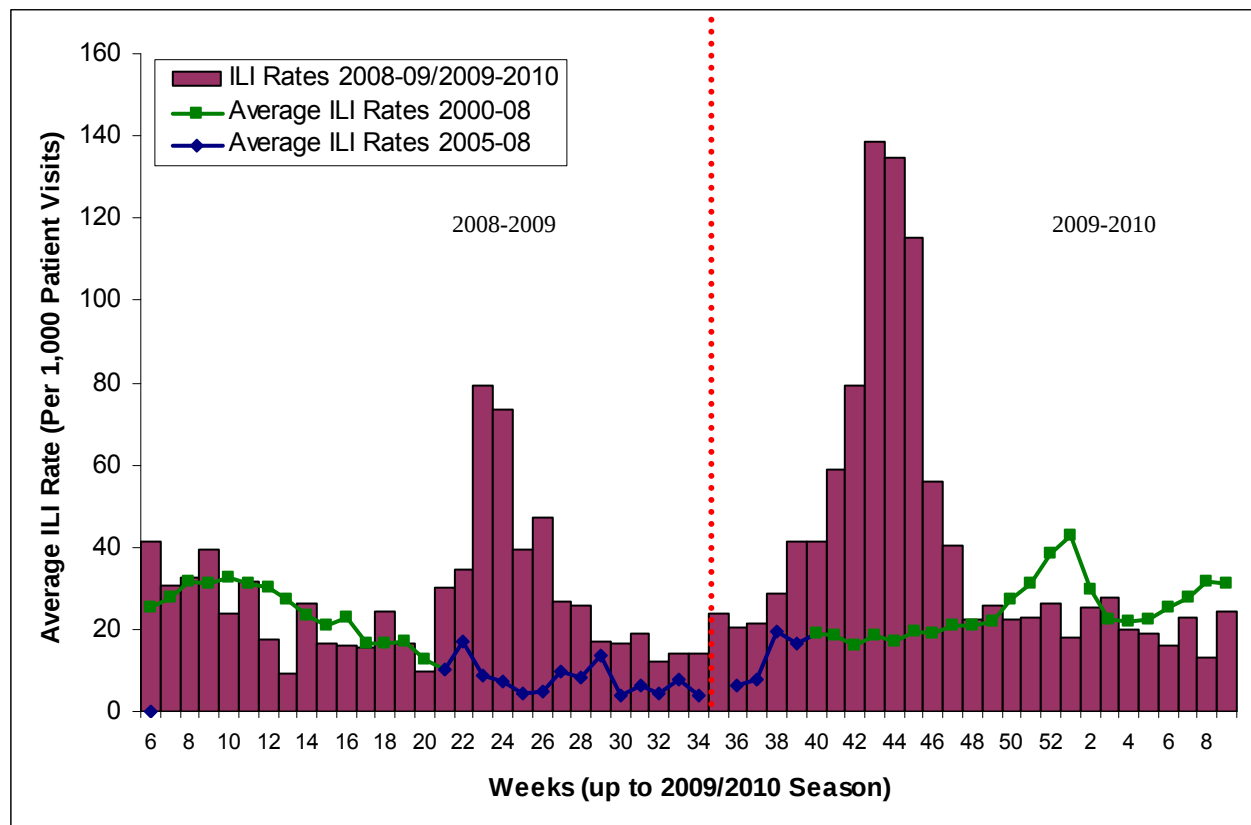
Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [10/03/2010]

Figure 12: Pandemic (H1N1) 2009 Virus cumulative incidence rates and counts in Ontario by health unit, Week 15, 2009 – Week 9, 2010 (April 12, 2009 – March 6, 2010)



Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [10/03/2010]

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).



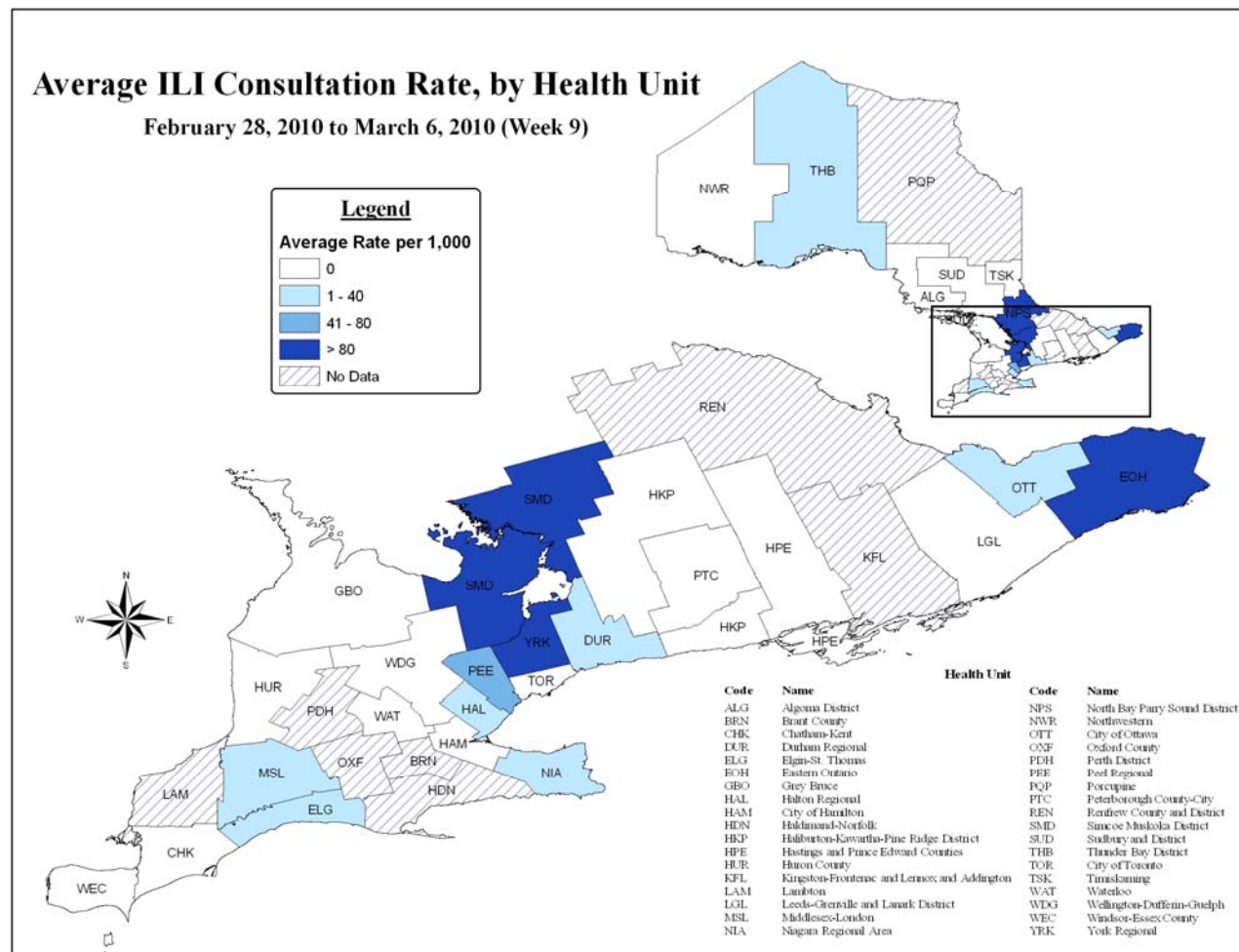
Source: Public Health Agency of Canada

* Sentinel physician information is reported to Public Health Agency of Canada, 87 sentinels reported in week 9.

† 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 9.



Source: Public Health Agency of Canada

* Sentinel physicians report ILI and patient data to the Public Health Agency of Canada; 87 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 9.

Age Category	0 – 4	5 – 19	20 – 64	65 +	Unknown	TOTAL
ILI Sum	8	13	33	5	0	59
ILI Consultation Rate (per 1,000 patient visits)	49.69	44.98	23.74	10.12	0.00	24.36

Source: Public Health Agency of Canada

Sentinel physician information is reported to the Public Health Agency of Canada; 87 sentinels reported this week.

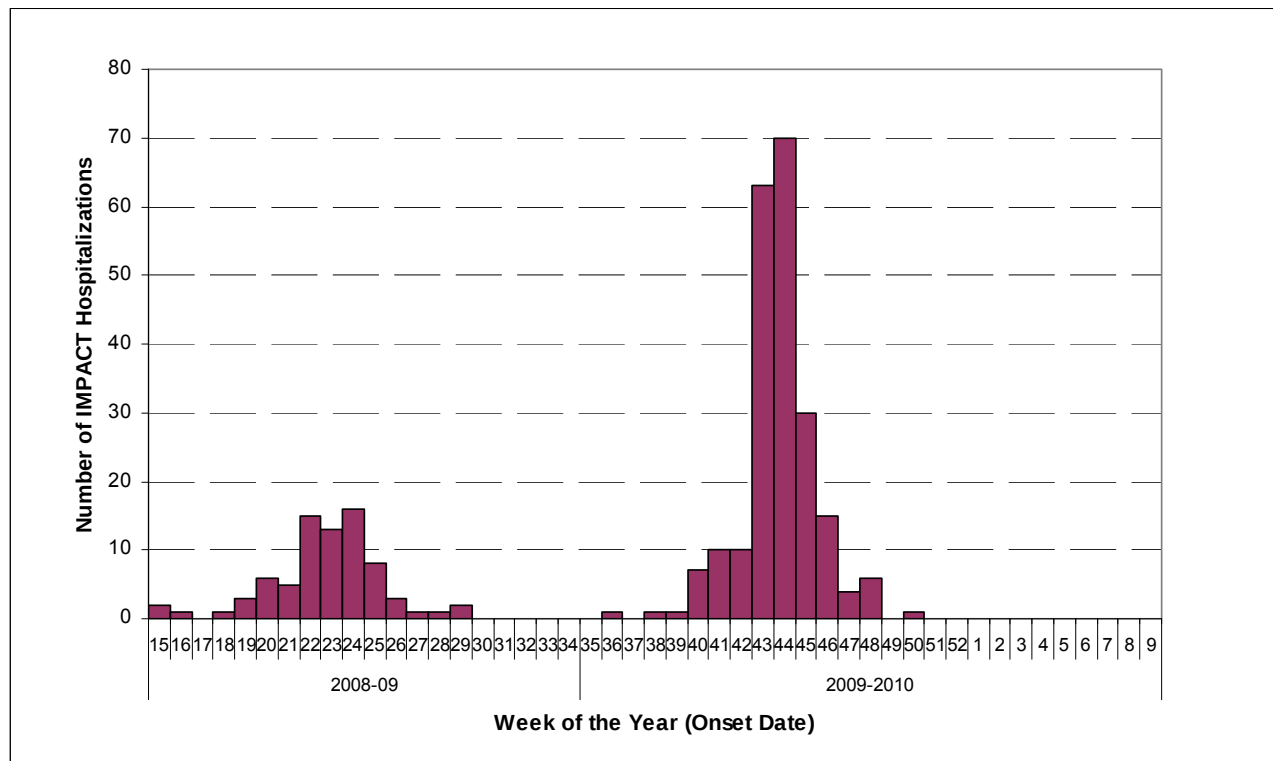
Ontario Influenza Bulletin, 2009-2010

Surveillance Week 9 (February 28, 2010 – March 6, 2010)

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 A related hospitalizations in Ontario reported through IMPACT up to Week 9, 2010, 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 February 15, 2010 to February 26, 2010*

Health Unit	Results	Total Specimens Testing Positive
NOT APPLICABLE	FLU A	0
NOT APPLICABLE	FLU B	0
LONDON	RSV A	2
ELGIN	METAPNEUMOVIRUS	1

Source: Ontario Agency for Health Protection and Promotion, March 4, 2010

* A total of 7 specimens were tested

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_09/flubul_mn.html

When referencing material from the Ontario Influenza Bulletin please use the following format:
Ontario Ministry of Health and Long-Term Care, Ontario Influenza Bulletin 2009-2010 Season, Surveillance Week ##. <URL>
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
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.