



# Leeds, Grenville & Lanark District HEALTH UNIT

Your Partner in Health

## LGLDHU pH1N1 Statistical & Surveillance Report (2009)

### Highlights:

- 90 pH1N1-related syndromic surveillance alerts were issued during wave II of the pandemic
- 34,905 vaccinations administered by LGLDHU and other agencies
- 121 lab confirmed cases of pH1N1 identified for LGLDHU during wave II of the pandemic
- 66.9 school absences per 1000 students occurred during the week of October 30, 2009

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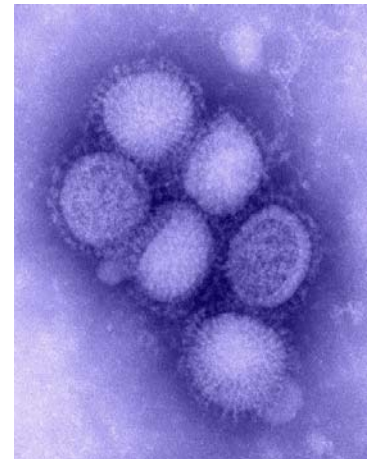
### Pandemic H1N1 (pH1N1)

Pandemic H1N1 2009 (pH1N1) is a new influenza virus that was first detected in April 2009 during an outbreak of respiratory disease in Mexico.

After a rapid spread throughout the world, the sustained transmission among humans reached the level of pandemic (i.e., global dissemination of

the disease with widespread human infection) in June 2009.

The objective of this report is to present pH1N1 Wave II specific data beginning at the end of August 2009 and ending on Dec 31, 2009. Data from various sources applicable to the Leeds, Grenville & Lanark District Health Unit will be presented.



### Viral Characteristics of pH1N1

The pH1N1 influenza virus had never been identified as a cause of infections in human populations prior to the 2009 pandemic. Genetic analyses of the virus have demonstrated that it originated from other animal influenza viruses unrelated to the human seasonal H1N1 viruses that have been circulating among humans since 1977.<sup>1</sup>

Antigenic analyses have shown that antibodies to the seasonal H1N1 virus do not protect against pH1N1. However, other studies have shown that a significant percentage of people age 65 and older do have some immunity against the pandemic virus. This suggests that some people in the older age cohort may have some cross protection from exposure to viruses that have circulated in the past.

Unlike typical seasonal flu patterns, the new virus caused high levels of summer infections in the northern hemisphere, and even higher levels of activity during cooler months.<sup>2</sup>

The new virus has also led to patterns of death and illness not normally seen in influenza infections. Most of the deaths attributed to pH1N1 occurred among otherwise healthy younger people. Pregnant women, younger children and people of any age with certain chronic lung or other medical conditions were at higher risk of more complicated or severe illness. Many of the severe cases observed have been due to viral pneumonia. This was also atypical as bacterial pneumonia is more often associated with seasonal influenza. Many of these patients have required intensive care.<sup>3</sup>

## Surveillance Indicators

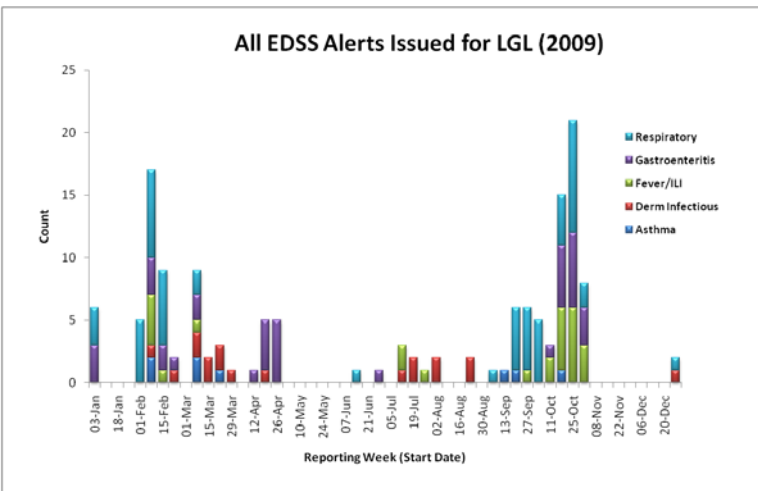
### Emergency Department (ED) Visits

The Leeds, Grenville & Lanark District Health Unit (LGLDHU) is a participant in the Emergency Department Syndromic Surveillance System (EDSS) that collects and categorizes, in near real-time, the reasons why residents of Leeds, Grenville and Lanark Counties visit hospital emergency departments.

The EDSS monitors 7 different syndromes (respiratory, gastrointestinal, fever/ILI, asthma, dermatological infectious, neurological infectious, and severe infectious). The system uses two algorithms that compare real-time data to historical data to generate alerts when the number of cases presenting to hospital EDs exceeds what is expected for that time of year. During pH1N1 the respiratory, fever/ILI and asthma syndromic alerts were of particular interest.

Figure 1 shows the number and type of alerts that were generated for LGLDHU in 2009. Increases in alert frequency can be clearly seen for both wave I and wave II of the pH1N1 pandemic.

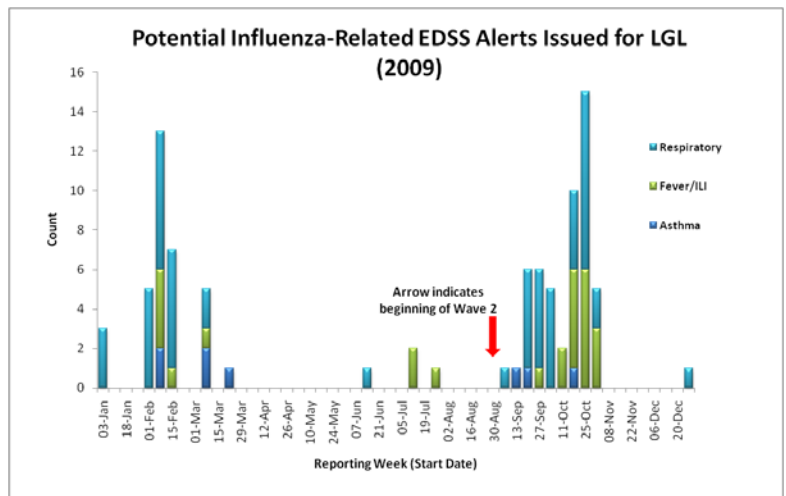
Figure 1: Number and type of ED alerts in 2009 for LGLDHU



Source: LGLDHU EDSS data, 2009

Overall, in 2009 145 alerts were issued for LGLDHU. Of these 90 (62.1%) were potentially related to pH1N1 (respiratory, fever/ILI and asthma). During wave II of pH1N1 a total of 68 alerts were issued. Of these 52 (76.5%) were potentially related to pH1N1. When separated out from all alerts issued in 2009, a pattern of alert issuance that coincides with both waves of pH1N1 is evident (figure 2). This pattern of alert issuance underscores that value of EDSS as an early warning tool for potential outbreak surveillance.

Figure 2: Number of respiratory/fever/ILI/asthma alerts in 2009



Source: LGLDHU EDSS data, 2009

It must be noted that as an indicator of pH1N1 activity, the EDSS tends to underreport the true number of people with respiratory, fever/ILI and asthma symptoms as it did not account for residents of LGLDHU who presented to their family doctor with potential influenza symptoms or those who did not seek medical attention. As well, the EDSS only reports on 3 out of the 6 hospitals located in LGLDHU.

LGLDHU began detecting increased frequencies of ED visits due to respiratory and Influenza-like illness (ILI) complaints at the end of August 2009. The frequency of visits increased exponentially until peaking on October 29th at 124 visits per day (figure 3, next page).

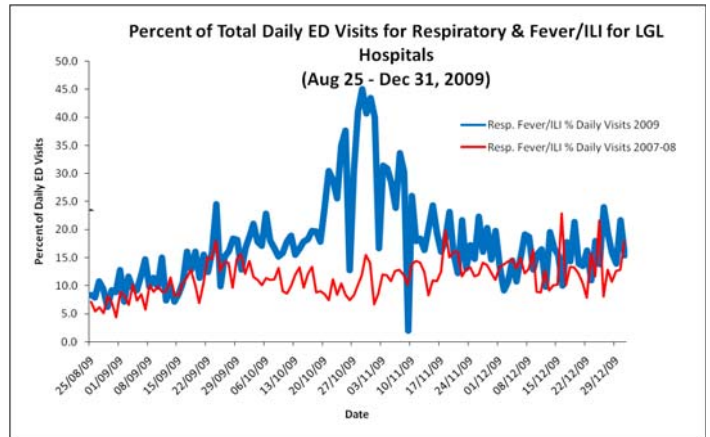
## Surveillance Indicators

### Emergency Department (ED) Visits (cont.)

This number translates into 45.1% of all hospital emergency department visits on that day. In comparison, average historical respiratory and fever/ILI visits were about 12% of daily visits to reporting emergency departments in LGLDHU during 2007 and 2008 (figure 4).

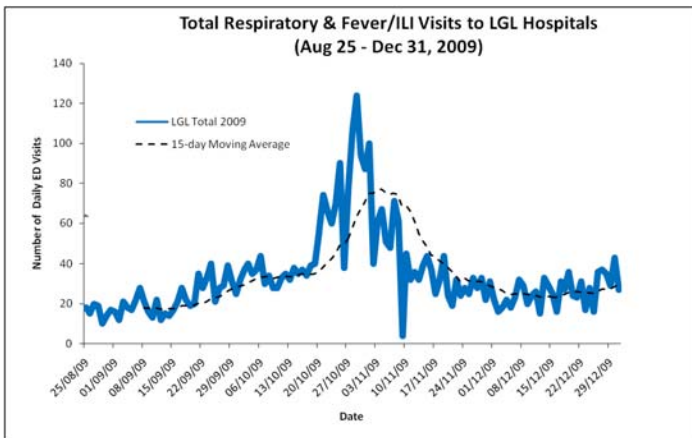
When these hospital visits are broken down by syndrome, the majority of complaints were coded as respiratory in nature (90.8%). Fever/ILI complaints were coded much less often (figure 5).

Figure 4: Comparative historical EDSS visits for LGLDHU



Source: LGLDHU EDSS data, 2009

Figure 3: EDSS visits for LGLDHU



Source: LGLDHU EDSS data, 2009

As the rates in hospital emergency department visits began to increase during wave II of the pandemic, assessment and treatment centres were implemented to help alleviate the volume of hospital visits and provide influenza assessment, treatment and referral services. Two centres were opened in LGLDHU; one in North Lanark County and one in Smiths Falls/Merrickville.

Unfortunately, data from the clinics was sporadic but does reflect similar increases in flu-related volume coincident with hospitals (Figure 6).

Figure 5: Respiratory vs. fever/ILI EDSS visits for LGLDHU

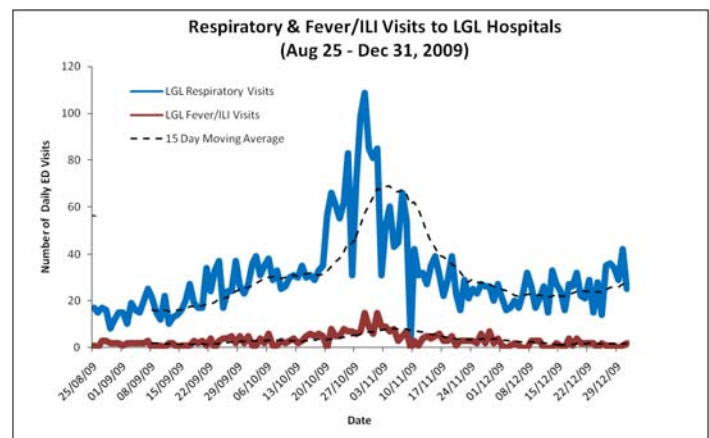
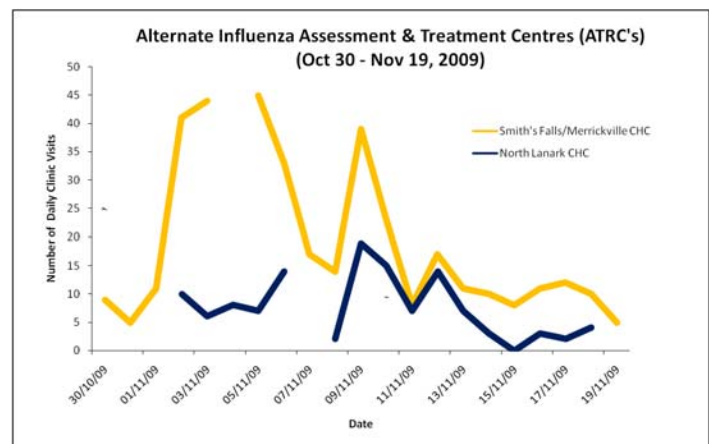


Figure 6: ATRC visits for LGLDHU



Source: Smiths Falls/Merrickville, North Lanark CHCs, 2009

## Surveillance Indicators

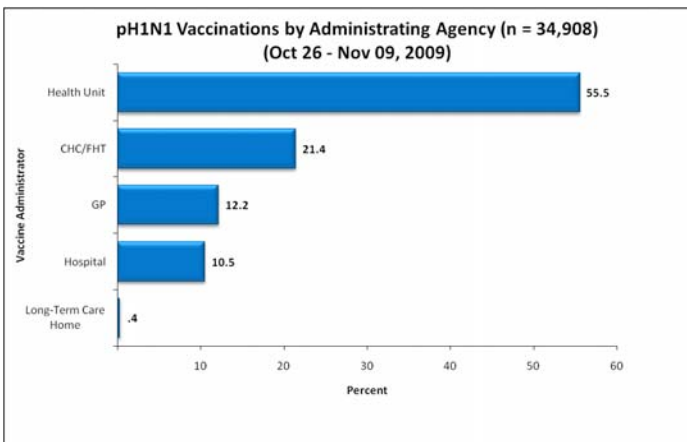
### pH1N1 Vaccine Administration

The health unit began receiving vaccine from the MOHLTC on October 20th 2009. Distribution of our vaccine supplies from LGLDHU to hospitals began on October 26th 2009 and to other administering agencies (e.g. MDs, CPHCs) began on November 3rd 2009.

The median age of pH1N1 vaccine recipients was 47 years (min = 0, max = 110) (mean = 42.0 years SD = 24.5). Females accounted for 57.5% of vaccine recipients (males = 42.5%).

A total of 34,905 vaccinations were administered via LGLDHU and other administering agencies (e.g. GP's, community health teams, hospitals, etc) between October 26 and November 28, 2009, with the health unit accounting for 19,369 (55.5%) vaccine administrations (figure 7).

Figure 7: Vaccine administration by agency type



Day-to-day counts in vaccine administration varied over time (figure 8). Health unit counts in vaccine administration were bimodal, with the majority of vaccinations done in late October and again in late November (figure 9).

The age distribution of vaccine recipients was also bimodal, with low counts of vaccinations received by residents between the ages of 15-29 years and 75+ years (figure 10).

Figure 8: Vaccine administration by date

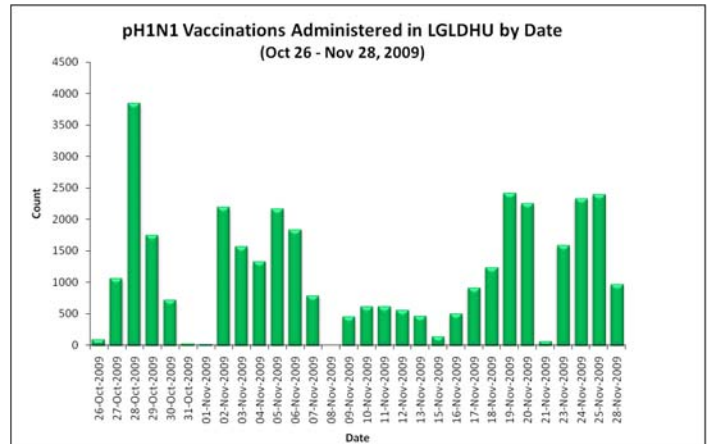


Figure 9: Vaccine Administration by agency type and date

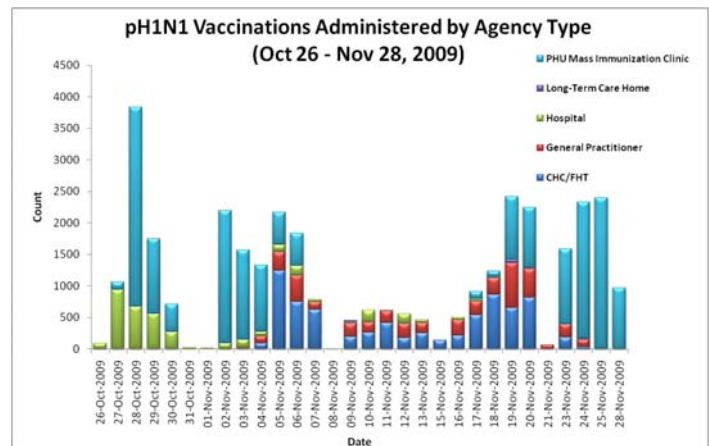
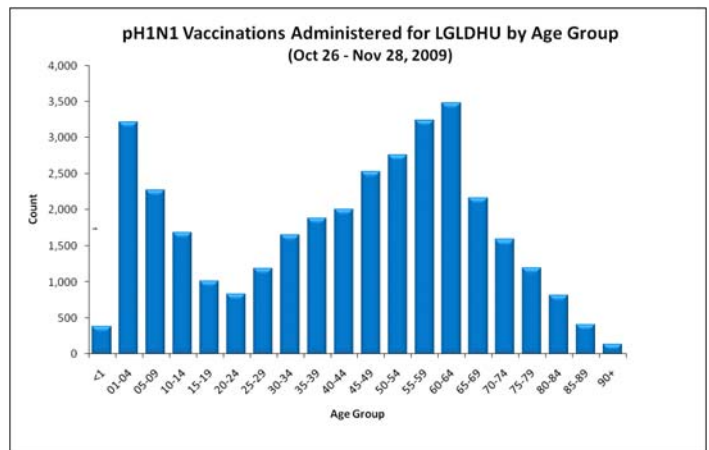


Figure 10: Vaccine administration by age group



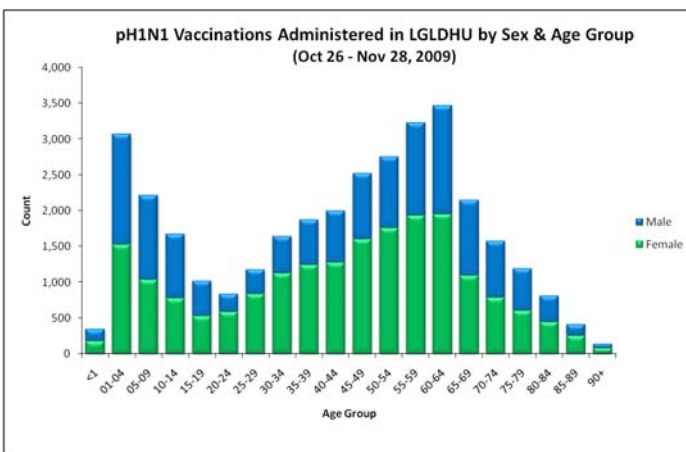
Source for all data on this page: iPHIS, Ontario MOHLTC

## Surveillance Indicators

### pH1N1 Vaccine Administration (cont.)

Almost equal numbers of males and females received vaccinations in the 19 years and under and 65+ year age groups. In all other age groups more females than males received a vaccination (figure 11).

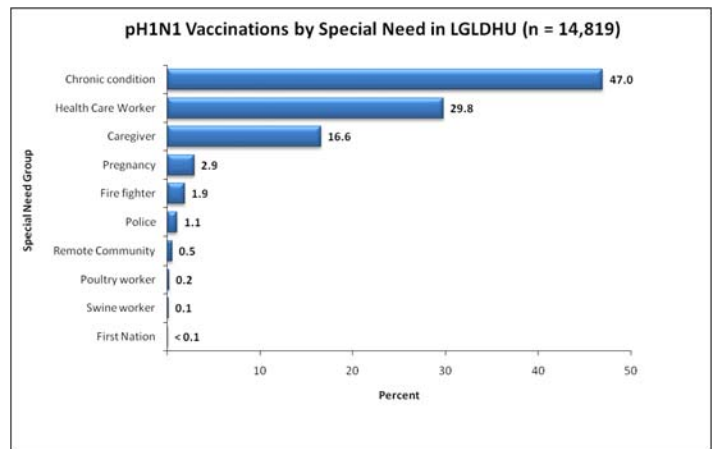
Figure 11: Vaccine administration by age group and sex



A total of 14,819 persons received their pH1N1 vaccination due to special needs. Of these, 6,958 (47.0%) were due to co-morbid chronic conditions, 4,410 (29.8%) were health care workers and 2,453 (16.6%) identified themselves as care-givers (figure 12).

**Note: Figure 13 and description associated with it have been temporarily removed.**

Figure 12: Vaccine administration by special need



People line up outside the Brockville Memorial Centre for a pH1N1 vaccination in late October 2009



Source: Photo courtesy of Mark Lysko

Source for all data on this page: iPHIS, Ontario MOHLTC

## Surveillance Indicators

### pH1N1 Vaccine Administration (cont.)

A forward sortation area (FSA) is the first 3 characters of a Canadian postal code. These characters provide direction as to where mail is to go. The first character is specific to a province, while the second and third identify an exact geographic region to which mail is delivered. The Clinic Event Management System (CEMS) used during the pH1N1 pandemic automatically gathered client information, including postal code of residence. However, only the first 3 characters of the 6 character postal code were released with the data. This has resulted in difficulties in mapping the specific geographic areas of residence of people who received a pH1N1 vaccination during wave II of the pandemic.

Both table 1 and figure 14 demonstrate that individuals from outside of LGLDHU (Ottawa in particular) got their pH1N1 vaccinations from an agency within LGLDHU during wave II of the pandemic.

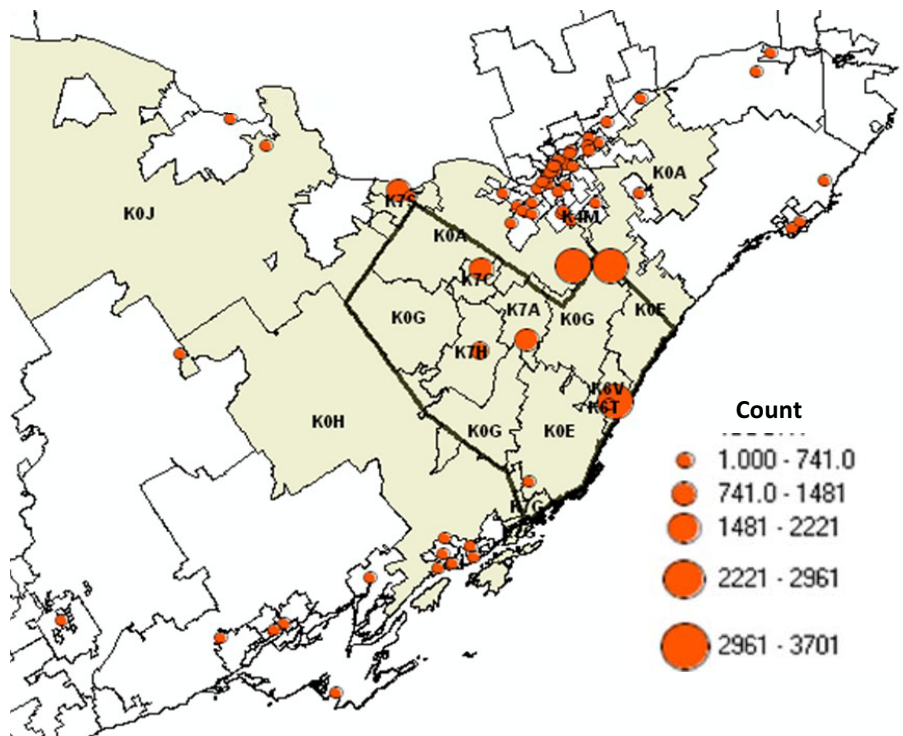
The statistics presented for vaccinations also include a large number of individuals who's FSAs were not collected (45.1%). This situation may suggest that under-reporting of non-LGLDHU residents who obtained pH1N1 vaccinations in LGLDHU could exist.

Residents from a total of 116 FSAs external to LGLDHU received vaccinations from an agency within LGLDHU. As well, many of our FSAs transcend the borders of LGLDHU which makes it difficult to know if a resident from the KOH FSA, for example, was from the LGLDHU or KFLA jurisdiction.

Table 1:

FSA	Location	Count	Percent
K0G	Kemptville	3616	10.4
K6V/K6T	Brockville	3678	10.6
K7A	Smiths Falls	2217	6.4
K0E	Athens	3704	10.6
K7H	Perth	1390	4.0
K7C	Carleton PI	1655	4.7
K0A	Almonte	2006	5.7
K7G	Gananoque	372	1.1
K0H	Maberly	92	0.3
Other FSA's		440	1.3
Missing FSA		15735	45.1
<b>Total</b>		<b>34905</b>	<b>100.0</b>

Figure 14: Count by FSA of people obtaining a pH1N1 vaccination in LGLDHU



Source for all data on this page: CEMS, Ontario MOHLTC

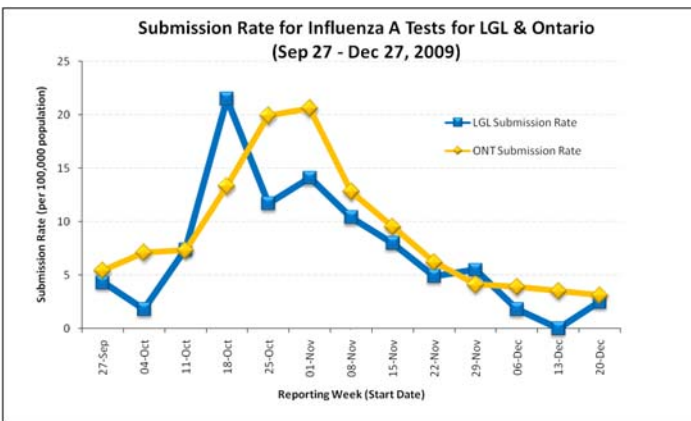
## Surveillance Indicators

### Lab Submissions & Case Sub-typing

In LGLDHU there were a total of 121 confirmed cases of Influenza A/pH1N1 in Wave II of the pandemic. The median case age was 26-years (min = 0, max = 94) (mean = 33.0 years SD = 27.7).

The lab submission rate for LGLDHU during Wave II was 117.2 submissions per 100,000 population compared to 140.1 for Ontario overall. Although peaking 2 weeks earlier, the trend for lab submissions of potential influenza cases for LGLDHU was similar to that of Ontario overall (figure 15).

Figure 15: Lab submission trend for LGLDHU and Ontario

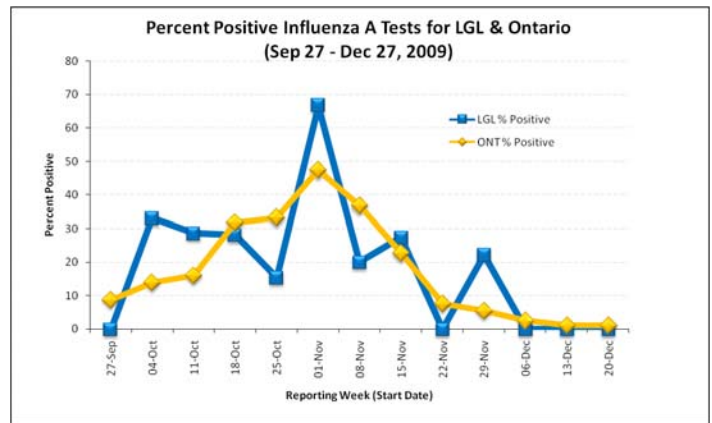


Source: Ontario Influenza Bulletins 2009-2010, Ontario MOHLTC

The percent of positive cases for lab submissions for LGLDHU during Wave II was 34.1% compared to 27.9% for Ontario overall. Although the week-over-week trend for LGLDHU was more variable, the pattern was similar to that of Ontario overall (figure 16).

The percent of positive pH1N1 cases in LGLDHU and Ontario overall peaked in the first week of November which is consistent with data presented in other sections of this report.

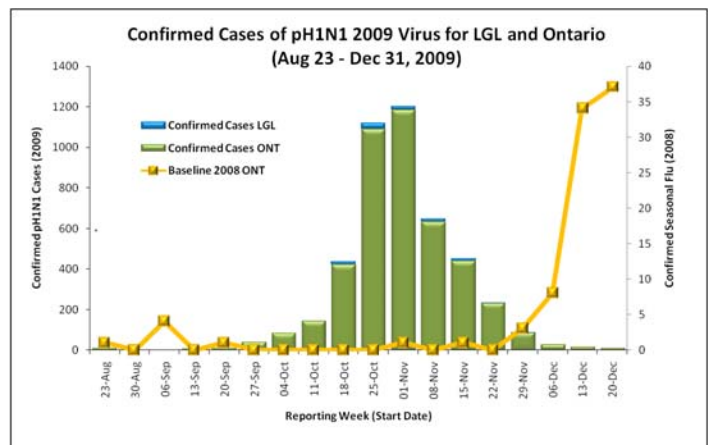
Figure 16: Case positive trend for LGLDHU and Ontario



Source: Ontario Influenza Bulletins 2009-2010, Ontario MOHLTC

When comparing the seasonal flu in 2008 (during the same time-frame) to Wave II of pH1N1 in 2009 a clear difference can be seen. The onset of confirmed cases for seasonal flu in 2008 was much later than that of pH1N1 in 2009 (figure 17). Although much lower in LGLDHU, the number of lab-confirmed cases for the pH1N1 virus identified was similar in terms of reporting week with Ontario overall in 2009. The number of confirmed cases of pH1N1 peaked in the first week of November.

Figure 17: Trend differences in positive cases for pH1N1 2009 and seasonal influenza in 2008



Source: Adapted from Ontario Influenza Bulletins 2008-2010, Ontario MOHLTC

## Surveillance Indicators

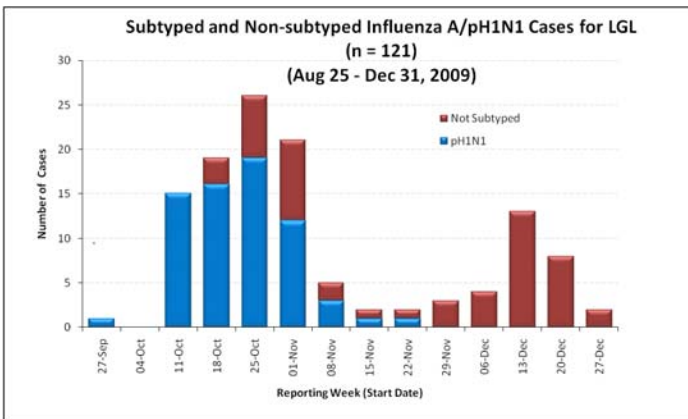
### Lab Submissions & Case Sub-typing (cont.)

Of the 121 confirmed cases of pH1N1/Influenza A in LGLDHU during wave II 68 (55.7%) were sub-typed as pH1N1 and 53 (43.4%) were not. The overall distribution of lab-confirmed cases was bimodal in terms of time of submission, with late October and mid-December accounting for the bulk of lab-confirmed cases (figure 18).

The majority of cases (66.9%) were identified during the reporting weeks of October 11 to November 01, 2009 inclusive.

The number of sub-typed cases declined over time as a decision was made to end laboratory viral case typing due to limits in laboratory capacity.

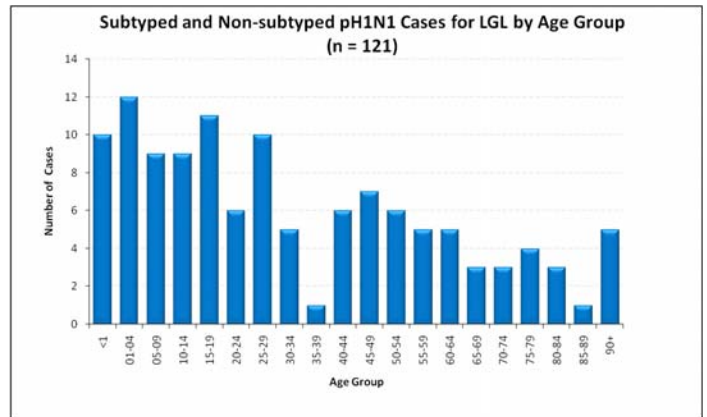
Figure 18: Lab confirmed cases by reporting week



Source: iPHIS, Ontario MOHLTC

A full quarter (25.4%) of lab confirmed cases were under the age of 10 years, with almost 50% being under the age of 26 years (figure 19). Only 15.6% of lab-confirmed cases were from the 65+ year age groups.

Figure 19: Lab confirmed cases by age group



Source: iPHIS, Ontario MOHLTC

When considering the geographic distribution of lab confirmed cases by forward sortation area (FSA), table 2 demonstrates that the KOG FSA had the largest proportion of cases (29.2%), followed by Brockville (15.0%) and Smiths Falls (14.2%). Note that 8 cases are missing due to not having a postal code associated with them.

Table 2: Lab confirmed cases of influenza A/pH1N1 by FSA

FSA	Location	Count	Percent
K0G	Kemptville <sup>1</sup>	33	29.2
K6V	Brockville	17	15.0
K7A	Smiths Falls	16	14.2
K0E	Athens <sup>2</sup>	15	13.3
K7H	Perth	12	10.6
K7C	Carleton Place	9	8.0
K0A	Almonte	5	4.4
K7G	Gananoque	4	3.5
Other		2	1.8
<b>Total</b>		<b>113</b>	<b>100</b>

Source: iPHIS, Ontario MOHLTC

**Notes:**

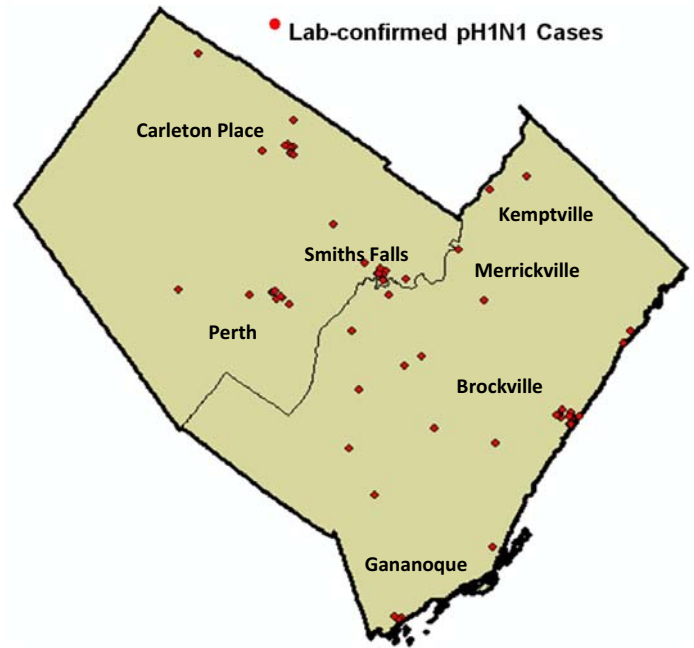
- Also includes: Jasper, Lombardy, Merrickville, Portland, and Balderson.
- Also includes: Lansdowne, Mallorytown, Lyndhurst, and Prescott.

## Surveillance Indicators

### Lab Submissions & Case Sub-typing (cont.)

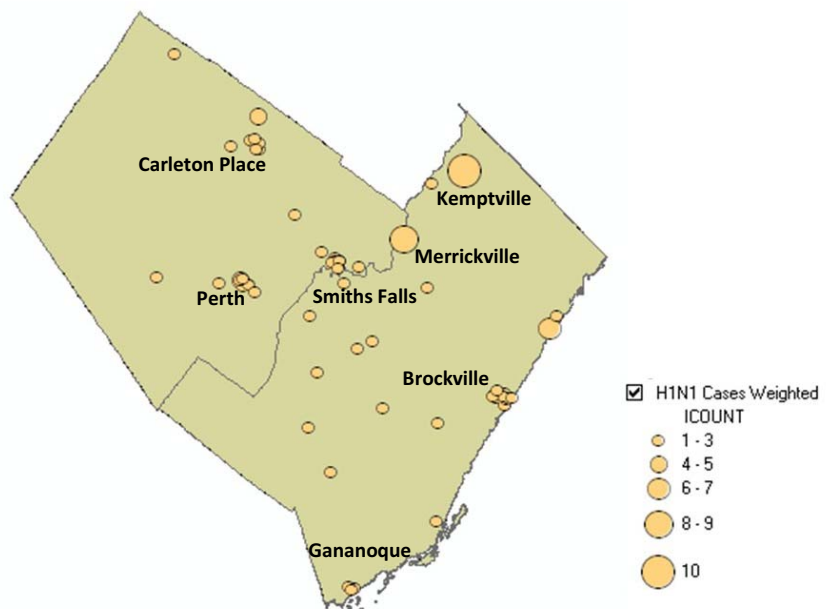
Plotting the geographic distribution of lab confirmed cases allows for a better understanding of their spatial characteristics. Plotting the data by case postal code details how the cases were clustered around urban areas as would be expected. However, in contrast to urban postal codes that may represent a couple of addresses, a single rural postal code often encompasses a large geographic area and therefore does not really detail how many cases are associated with that point (e.g. Kemptville) (figure 20). To account for this, the lab confirmed case data was weighted to detail the count associated with each postal code (figure 21 Below).

Figure 20: Geographic distribution of lab confirmed influenza A/pH1N1 cases



Source: iPHIS, Ontario MOHLTC

Figure 21: Weighted geographic distribution of lab confirmed influenza A/pH1N1 cases



Source: iPHIS, Ontario MOHLTC

## Surveillance Indicators

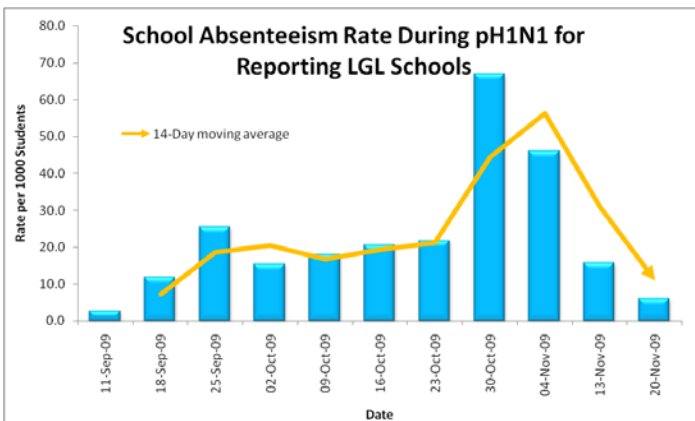
### School Absenteeism

LGLDHU monitored school absenteeism rates during Wave II of the pandemic using the protocol developed by the Public Health Protection and Prevention branch of the MOHLTC (otherwise known as *Appendix C*). It should be noted that the reporting done was for ILI-specific absenteeism only and was not necessarily reflective of all-cause specific absenteeism. As well, absenteeism reporting was sporadic with some schools thereby not allowing for a continual flow of week-over-week data.

Absenteeism rates per 1000 primary and secondary students were calculated beginning in the week of September 11 and ending on the week of November 20, 2009. Increasing rates of school absenteeism were evident during the week of October 18 but then remained elevated and flat until increasing dramatically during the week of October 30. After the week of November 04 absenteeism rates then dropped off completely.

Unfortunately there is no baseline data for comparison purposes for school absenteeism. However, this indicator was closely correlated to hospital ED visits (figure 3) and lab confirmed cases (figure 17).

Figure 22: School absenteeism



Source: Internal LGLDHU databases

### Health Unit Resources

Health unit staff recorded 18,856 working hours devoted to pH1N1 activities in 2009 (17,074 for wave II only). The median number of hours worked during wave II overall reported by all participating staff was 25.2 hours.

When broken down by month, November had the highest median hours worked on pH1N1 activities (30.0) overall by health unit staff (figure 23).

The number of staff devoted to pH1N1 activities from each department/program varied, ranging from 36 in Family Health to 9 in Quality Improvement (figure 24).

Figure 23: Overall hours worked on pH1N1 activities

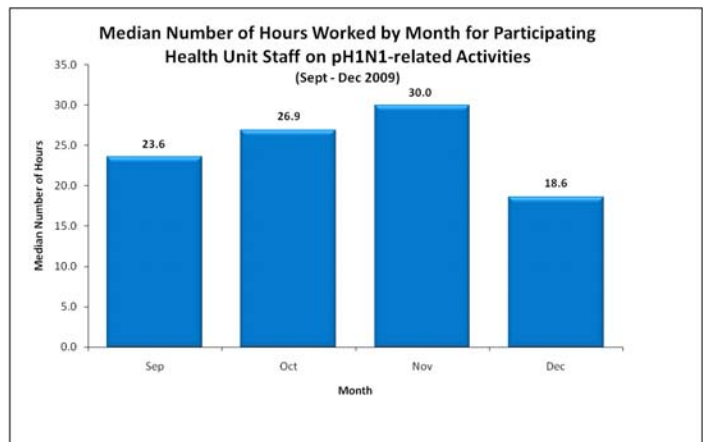
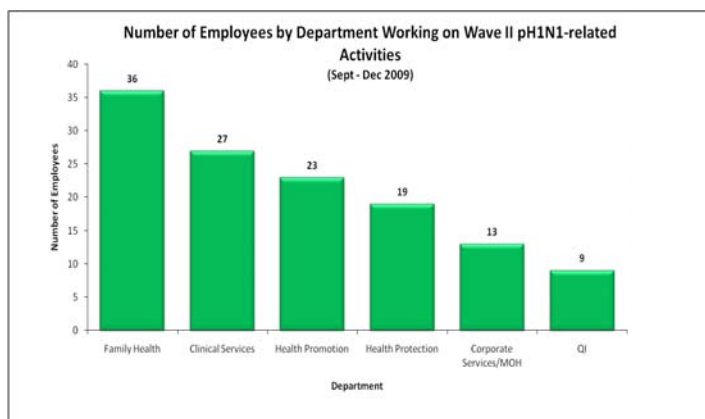


Figure 24: Employees devoted to pH1N1 activities



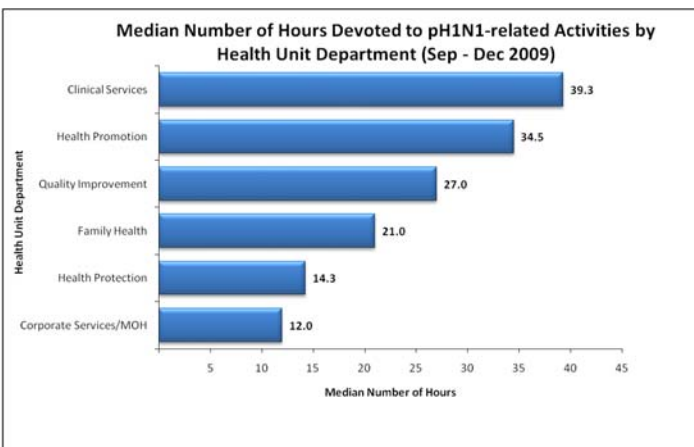
Source for both figures: Internal LGLDHU databases

## Surveillance Indicators

### Health Unit Resources (cont.)

In terms of overall median hours worked by department, Clinical Services recorded the highest values (figure 24). However, it must be kept in mind that the number of employees devoted from each department is not represented by these figures.

Figure 25: hours devoted to pH1N1 activities by department



Source: Internal LGLDHU databases

### Health Unit Call Volumes

LGLDHU instituted an H1N1 call line to respond to public H1N1-related queries early in October of 2009. Over 3400 calls were logged to the line in a 10-week period.

The mean time required to answer and close a call was 3.6 minutes (SD ± 2.4 mins) (median = 3.0 mins) according to our client call database. Women accounted for 66.4% of callers (male = 17.3%, unknown = 16.3%). The majority of calls were received in the morning (57.0%). However, due to call volumes, 73.3% of calls went to voicemail before being responded to (23.8% answered, 2.3% email). Over 90% of voicemail calls were answered on the day received. A further 8.5% were answered within 24-hours. Call volumes peaked on Oct 26, 2009 at 1279 recorded calls (figure 26).

The main reason cited for calling was to determine clinic dates/times/locations (47.3%) (figure 27).

Figure 26: pH1N1 call volumes to Health Unit

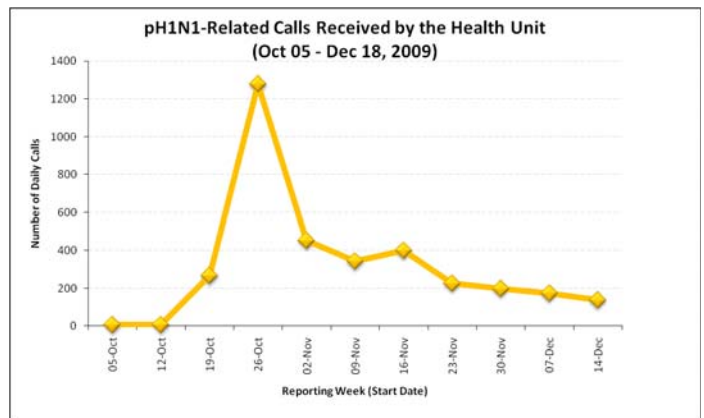


Figure 27: Main reasons for pH1N1 calls to Health Unit

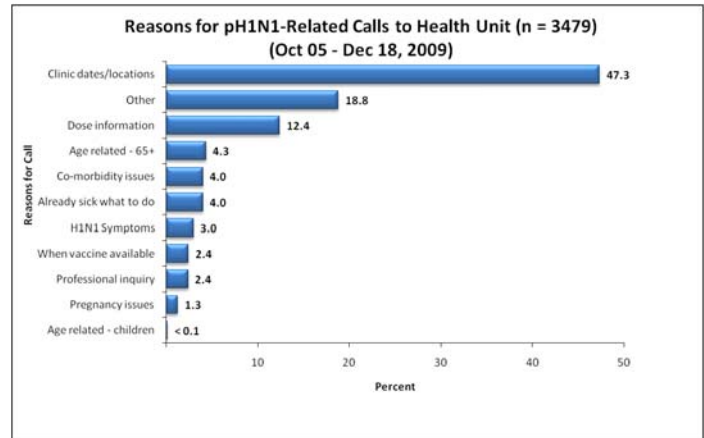
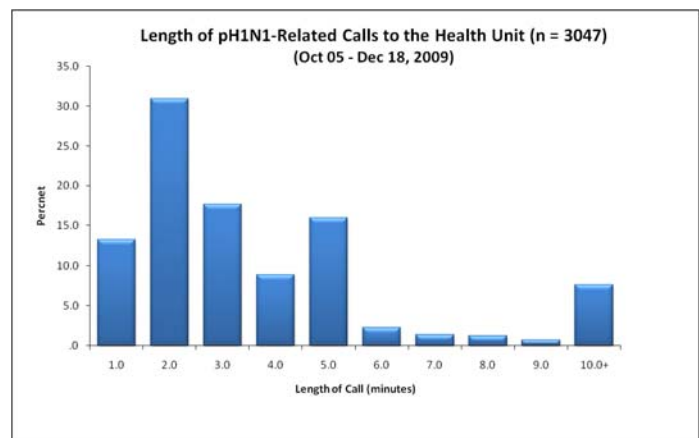


Figure 28: Time required to complete pH1N1 calls to Health Unit



Source: Internal LGLDHU databases

## Conclusions, Recommendations & Limitations

### Health Unit Surveillance Experience

From April 1st 2009 to January 30th 2010 there was a total of 128 pH1N1 related deaths in Ontario (0.98/100,000 population).<sup>4</sup> In LGLDHU there were 2 pH1N1 related deaths (1.2/100,000 population) during the same time-frame. The effects of pH1N1 on the population of LGLDHU was mild in terms of disease severity, but had a major impact in terms of how people perceived of, and responded to, the pandemic and how Public Health resources were deployed to provide information and care to our population. The data presented in this report indicates that our experience was similar to that of Ontario overall in many ways (e.g. peak in percent positive influenza lab tests (Figure 16), and that the pH1N1 virus behaved atypically when compared to seasonal influenza (Figures 4 and 17).

In terms of surveillance, the EDSS syndromic surveillance system, in which LGLDHU is a party, provided an excellent indicator of increased respiratory/fever/ILI/asthma activity in our jurisdiction during wave II of pH1N1. If these ED complaints are used as an analogue for increased influenza activity, our EDSS alerts concerning respiratory/fever/ILI/asthma complaints above the normal threshold correlated perfectly with the beginning of wave II of the pandemic in late August/early September (week 35 of the 2009 surveillance year). In fact, there is an almost perfect correlation between many of our surveillance indicators and the temporal peak in wave II of the pH1N1 pandemic in Ontario. Potential influenza-related emergency department visits peaked during the last week of October and first week of November 2009 in LGLDHU. Lab submissions, percent positive lab-confirmed cases and school absenteeism rates also peaked during this time period.

Inconsistency in pH1N1 vaccine supply and capacity messaging at the provincial level may have lead to

confusion and helped to affirm panic in some of the population of Ontario. Messaging seemed to vary by health unit. This may have resulted in a number of people residing in other health unit areas seeking to get vaccinated against pH1N1 in LGL. Although the actual numbers are unknown, the extent of individuals coming to LGL clinics to receive their pH1N1 vaccinations was considerable (see figure 14 on page 6).

### Recommendations

In terms of the surveillance contained in this report, the following recommendations are made:

1. Make a concerted effort to expand the geographic coverage of our EDSS system to include all hospitals within the jurisdiction of LGLDHU. To accomplish this recommendation we need to add Carleton Place & District Memorial, Almonte General and Kemptville District hospitals to the EDSS system. This action would considerably increase our ability to timely monitor the epidemiology of a future infectious disease outbreak.
2. Make efforts to obtain positive case and vaccination data with a full postal code for use in geo-coding and GIS. Use of FSAs only are severely limiting to any serious effort at GIS-based spatial or cluster analysis.
3. Our health unit client call data collection would benefit from a purpose-built database to aid in the electronic recording and analysis of incoming calls to the health unit from our stakeholders. During the time of our Health Action Line our on-call staff recorded thousands of calls manually on paper. This process needs to be refined to allow for automated data entry and more efficient and timely analysis.

## Data Limitations

The indicators presented in this report are subject to the limitations imposed upon them by the data quality and quantity. Because of this, several cautions must be considered when interpreting these results.

First, it must be acknowledged that ED visit data only reflects those individuals who visited an ED and were documented by the triage nurse. Data from 3 area hospitals are missing. This could lead to either an over or under estimation of the actual percentage of hospital visits that were potentially influenza-related.

Data presented for vaccine administration originated in iPHIS. This data only reflects administration between October 26—Nov 28, 2009. In reality, many more vaccinations were administered within the LGLDHU area

(approx 54,000 from all administering agencies) from October until the end of December 2009.

Lab testing policies changed during wave II of the outbreak. Only hospital cases were tested. Initially tests were done to determine the presence of the pH1N1 strain. This gave way over time due to lab capacity constraints to test for influenza A only.

School absenteeism data was affected by changes in data collection methodology during the pandemic. As well, differences in school board policy, sporadic reporting and the frequency of reporting made producing rates of student absenteeism challenging.

Health Unit call volumes likely represent an under-reporting of actual calls received as 800 line calls are not included in the analysis presented in this document.

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## References:

1. [http://hldemo.ebscohost.com/Influenza/nrc/influenza\\_pandemic\\_h1n1\\_2009.htm](http://hldemo.ebscohost.com/Influenza/nrc/influenza_pandemic_h1n1_2009.htm)
2. <http://www.who.int/csr/disease/swineflu/en/>
3. [http://www.healthunit.org/press\\_rel/2010\\_pressrelease/pr\\_feb1\\_H1N1wrapup.pdf](http://www.healthunit.org/press_rel/2010_pressrelease/pr_feb1_H1N1wrapup.pdf)
4. [http://www.health.gov.on.ca/en/ccom/flu/h1n1/pro/docs/oh9100\\_report.pdf](http://www.health.gov.on.ca/en/ccom/flu/h1n1/pro/docs/oh9100_report.pdf)

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*The Leeds, Grenville & Lanark District Health Unit offers a wide range of services to promote healthy living, healthy growth and development, prevent illness and injury and control communicable diseases in the community. Services are available to individuals and groups of all ages in a variety of places. A referral is not needed for any service. We publish and update health-related information on our website on a continual basis.*

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*For more information about this report please contact the Epidemiologist at The Leeds, Grenville and Lanark District Health Unit, at 345-5685 or 1-800-660-5853. For more information on pH1N1 visit the Health Unit website at [www.healthunit.org](http://www.healthunit.org)*