

# THE H1N1 PANDEMIC FLU:

A report on the experience in the  
Porcupine Health Unit area

# 2010



Porcupine

Health Unit • Bureau de santé

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FOYEZ HAQUE

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## Introduction

The 2009 influenza season was notable for the circulation of a novel pH1N1 influenza virus. Appearing first in Mexico in the early spring, the H1N1 virus spread around the world quickly. By May 2009, the pattern of spread of pH1N1 influenza was such that the WHO (World Health Organization) elevated the pandemic influenza alert to Phase 6.<sup>1</sup>

Typical of any influenza infection, the common symptoms of pH1N1 influenza included sudden onset of cough and fever, fatigue, headache, muscle aches, decreased appetite, sore throat and runny nose. In some cases, it also caused nausea, vomiting and diarrhea. Infection rates for this novel influenza virus were quickly noted to be higher in younger age groups (born after 1957), and especially those 15 years of age and under.<sup>2</sup>

Symptoms of complications (pneumonia, sepsis, respiratory and multi organ failure) included shortness of breath, chest pain, cyanosis, severe or persistent vomiting, high fever and low blood pressure.<sup>3</sup> Also typical for influenza, mortality due to pH1N1 increased in older age groups, but those at higher risk for complications also included children under 5 years of age (especially those less than 2 years old), women who were pregnant and people with chronic medical condition.

In the Province of Ontario, cases of pH1N1 influenza started to appear in April of 2009 followed by 2 distinct waves: one in June (weeks 16–34) that rapidly declined until the end of August, and a second larger wave in late October and November 2009.<sup>4</sup>

The Porcupine Health Unit area population was also affected by the pandemic. To date, of 8,746 laboratory confirmed cases of pH1N1 in Ontario,<sup>5</sup> 111 cases occurred among residents of the Porcupine Health Unit area (excluding reserve populations).<sup>6</sup> Across Ontario, pH1N1 infection was associated with 1,803 hospitalizations and 121 deaths. Here in the Porcupine Health Unit area, pH1N1 infection was associated with 56 hospitalizations and 3 deaths.

Local public health units are charged with the task of both monitoring for influenza activity as a part of the provincial and national surveillance systems and with managing and coordinating many elements of the response to any influenza outbreak or pandemic. Much planning has been completed in recent years for such an event.

The purpose of this report is twofold: to document and examine the results of our local surveillance and several key aspects of our outbreak response.

## **Epidemiology - A picture of the 2009 pH1N1 outbreak in the Porcupine Health unit area**

This report is based on data that was received from the first week of April to the last week of December, 2009, in both Ontario and the Porcupine Health Unit area.

### **School Absenteeism Data**

During the 2009 influenza pandemic, schools in the Porcupine Health Unit area were requested to call the Porcupine Health Unit if the absenteeism rate in their facility exceeded 10%. Thirty-one out of thirty-four schools (91%) from Timmins and forty-three schools (100%) from branch office areas reported school absenteeism to the Porcupine Health Unit from mid-October until the end of December 2009.

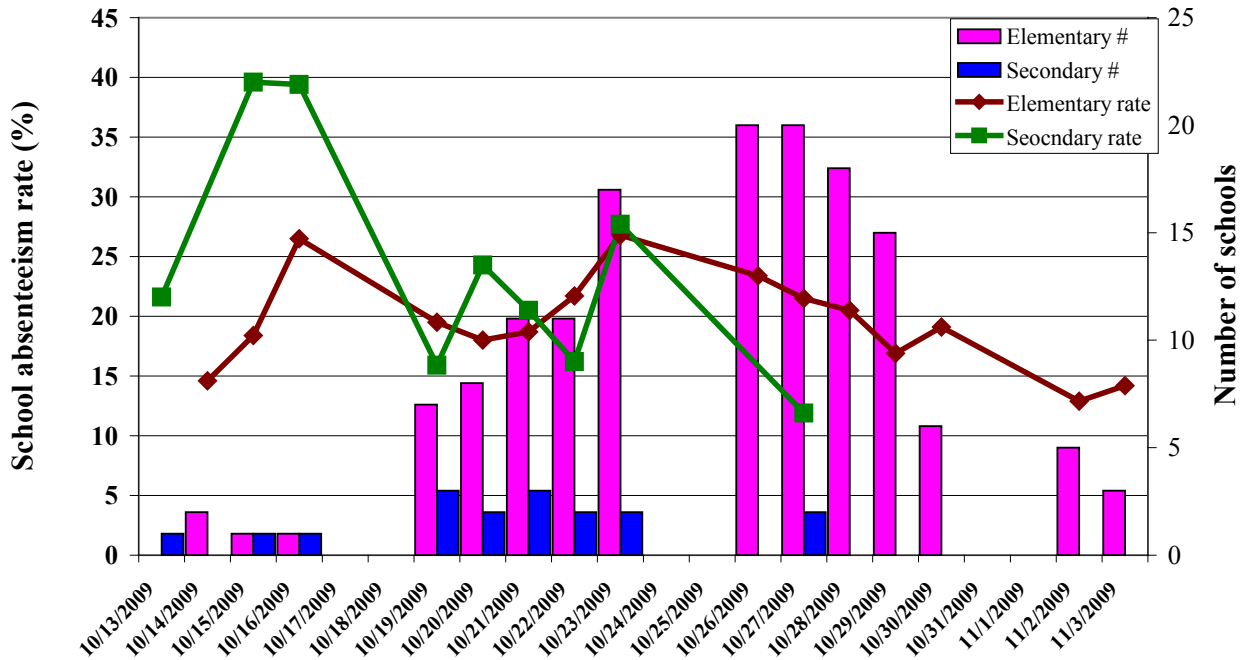
Figures 1 and 2 show the average daily absenteeism rate for schools experiencing absenteeism over 10% and the number of schools reporting absenteeism over 10% on a given day. The figures below illustrate the patterns of reports of school absenteeism for the time period of mid-October to mid-November 2009, during the “second wave” of H1N1 influenza activity in our area. The first day where school absenteeism was greater than 10% was reported in Timmins schools on October 13, and the last report was December 10, 2009.

The onset of increased absenteeism in schools during the week of October 13 coincided with the death of a Timmins teenager from complications of H1N1 infection. A similar pattern was seen in schools across the district. No reports were received during the first wave as it occurred during the school summer vacation. Figures 1 and 2 show that the rate and number of schools reporting absenteeism greater than 10% decreased substantially from October 28.

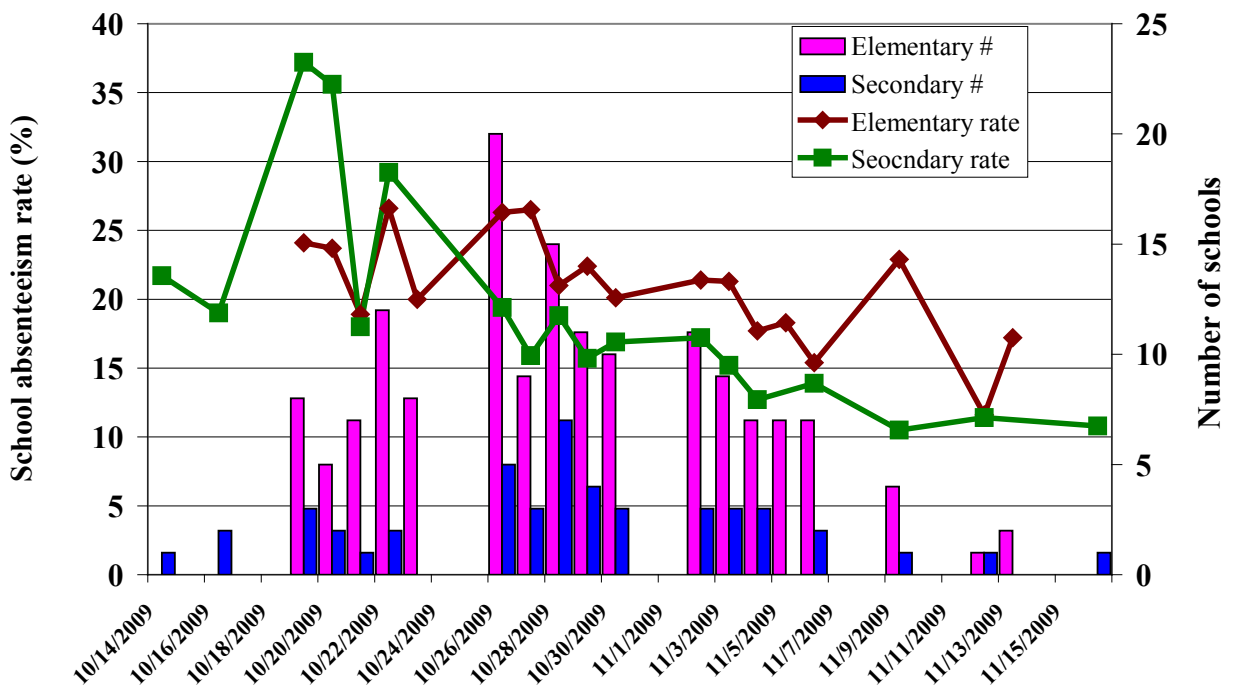
School absenteeism reporting in the Porcupine Health Unit area has been a passive, manual system where school personnel are requested to report daily absenteeism as per “Section 1: Reporting and Exclusion Guidelines” for communicable diseases in the *School Services Guide*.<sup>7</sup> It is possible that participation in and implementation of this system could vary across schools, leading to inconsistencies. The threshold for reporting is 10%, which is somewhat arbitrary and not adjusted for baseline levels of absenteeism.

Although this program has been in use for many years, no data analysis has been done to establish the baseline patterns.

**Figure 1: Daily average of school absenteeism (>10%) and number of schools reporting such absenteeism in Timmins area from October to November, 2009**



**Figure 2: Daily average of school absenteeism (>10%) and number of schools reporting such absenteeism in branch office areas from October to November, 2009**



## **Hospital Emergency Room Visit Reports**

Starting in the spring of 2009, all hospitals were requested to send a daily report on the number of emergency department visits due to Febrile Respiratory Illness and of Severe Respiratory Illness or influenza-like illness to the Porcupine Health Unit, including gender, age and symptoms.

The hospitals were also asked to report the number of hospital admissions due to influenza or influenza-like illnesses. After receiving the data, the epidemiologist of the Porcupine Health Unit determined which of the cases should be included in the plotted epicurve as a Febrile Respiratory Illness (FRI) case. When any patient had fever with or without any other symptoms, the case was counted as an FRI case.

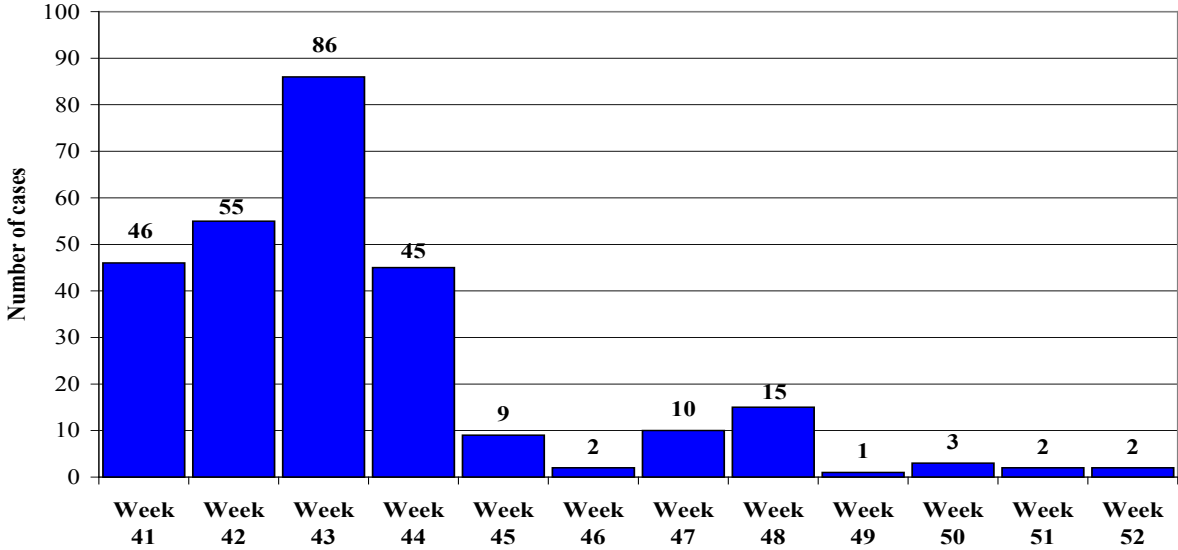
At times during the pandemic, the reporting emergency departments were overloaded with an increased number of patients seeking care, and as a result we cannot be sure all cases were reported on all days. Certainly, it is of note that cases were not reported on some days.

In Timmins, available data indicates that, of the patients who came to the emergency room for febrile respiratory illnesses during the time period of interest, 55% were between the ages of 0 and 19, about 40% were aged 20 to 64 and 5% of the patients were aged 65 and above. Male patients accounted for 52% of the cases, female 48%.

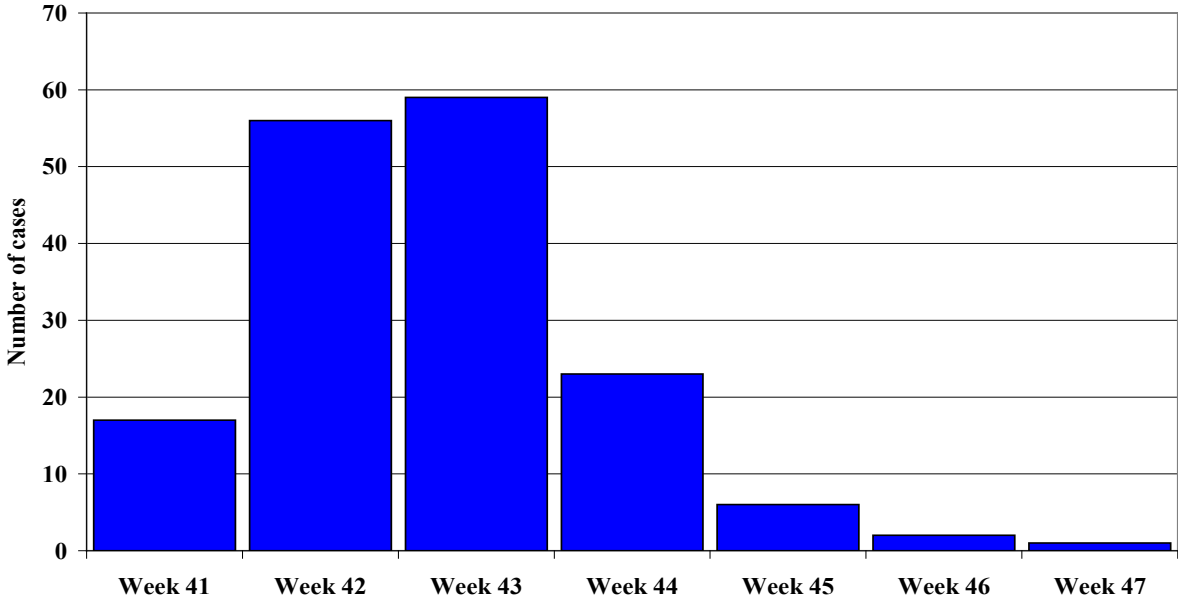
In Kapuskasing, 47% of the patients who came to the emergency room for febrile respiratory illnesses were between ages of 0 and 19, 51% were from the age group of 20 to 64, and 2% of the patients were from the age group of 65 and above. Fifty-one percent of the patients were male whereas 49% of the patients were female.

Only Kapuskasing data was utilized for surveillance of the hospital emergency room visits in branch office areas, as Kapuskasing is the second biggest community (population-wise) after Timmins. Besides, the Kapuskasing hospital had more comprehensive data than any other branch office area hospital during the recent influenza outbreak.

**Figure 3: Weekly count of ER FRI visits in Timmins, Week 41-52, 2009**



**Figure 4: Weekly count of ER FRI visits in Kapuskasing, Week 41-47, 2009**



## Sentinel Physician Data

The role of a sentinel physician is to conduct surveillance for influenza or influenza-like illness in the Porcupine Health Unit area. Data provided by the sentinel physicians can contribute to local pictures of influenza virus and influenza-like illness activity.

Sentinel physicians are asked to report by fax the total number of patient visits per week and the number of patient visits for influenza-like illness by different age groups. Six physicians, 4 clinics and hospitals and 3 nurse practitioners agreed to participate in this surveillance, but little or no data was received by the health unit. The reasons for non-participation are unknown at this time.

## Laboratory Confirmed pH1N1 Cases

The first laboratory confirmed case of pH1N1 influenza infection in the Porcupine Health Unit area was reported during the first wave of the pandemic on June 30, 2009. Subsequently, only 4 confirmed cases were reported during the first wave (weeks of 26–28). Laboratory-confirmed case reports began again in the second wave, starting on the 13 of October. Case reports peaked around late October 2009 and thereafter subsided.

The Porcupine Health Unit used the following definition of pandemic influenza case as determined by the Ontario Ministry of Health and Long-Term Care of Ontario.<sup>8</sup> The definition was as follows:

Confirmed cases:

*Person with or without influenza-like illness and laboratory confirmation of pH1N1 virus infection by one or more of the following test:*

- RT-PCR with genotyping of H1 and/or N1 swine influenza virus
- Viral culture with strain typing
- Four-fold rise in pH1N1 virus specific antibodies by serology testing.

Probable:

*Person with influenza-like illness with laboratory test positive for influenza A, untypable.*

Suspect:

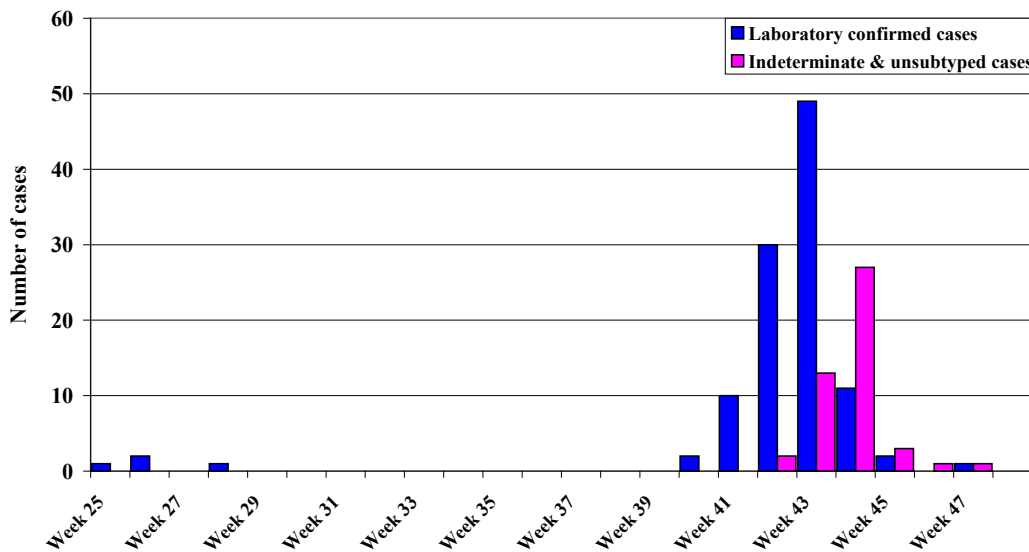
*Person with influenza-like illness with laboratory test positive for influenza A, not subtyped.*

In some instances, the Public Health Laboratory reported the result of the swab testing as “influenza A indeterminate and not subtyped”. The graph below shows both the laboratory confirmed cases and influenza A indeterminate and not subtyped.

Of note, the November 13, 2009, Important Health Notice stated that the Public Health Laboratories (PHL) of the Ontario Agency for Health Protection and Promotion had changed the testing recommendations, noting that “a pretest probability for an influenza A positive sample to be pH1N1 at that time was 99%, thus rendered subtyping of all influenza A positive samples no longer necessary”. After November 13, 2009, the PHL only subtyped the following influenza A samples:

- All intensive care and outbreak samples.
- Twenty percent (20%) of influenza A positive samples from other settings. This means that many swabs taken after that date were not subtyped for H1N1.

**Figure 5: Laboratory confirmed and Influenza A indeterminate and untyped cases in the Porcupine Health Unit area based on swab collection date between weeks 24 and 47, 2009 (inclusive)**

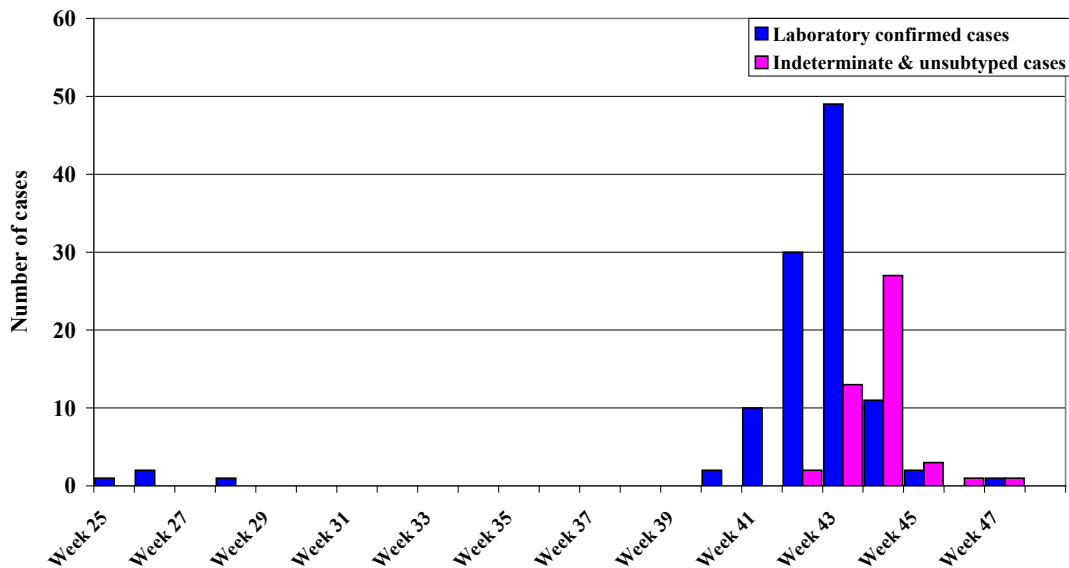


From June 30 to November 30, 2009, the health unit received reports on a total of 110 laboratory confirmed cases of pH1N1 and 46 cases of influenza A (indeterminate or not subtyped).

This results in a laboratory confirmed pH1N1 attack rate of 130.7/100,000 for the Porcupine Health Unit area, compared with an Ontario-wide attack rate of 71.9 /100,000 population for the same period.<sup>5</sup>

Interestingly, the Porcupine Health Unit area also saw the highest rate in the province of specimen submission for pH1N1 testing, with a rate of 545.5 specimens/100,000 population compared to a provincial rate of 110.8/100,000 population.<sup>9</sup>

**Figure 5: Laboratory confirmed and Influenza A indeterminate and unsubtyped cases in the Porcupine Health Unit area based on swab collection date between weeks 24 and 47, 2009 (inclusive)**



## Hospitalized Cases and Deaths

In the Porcupine Health Unit area, there were a total of 56 hospital admissions for pH1N1 and 24 for influenza A (indeterminate/not subtyped) during the outbreak period.

Interestingly, according to the *Porcupine Health Unit Pandemic Plan* (June 2006), the expected number of hospital admissions due to an influenza pandemic in the health unit area could be 180–360.<sup>10</sup>

Figure 7 shows the hospitalization rates during the first and second wave in 2009 for pH1N1 confirmed cases and influenza A cases. Notably, there were very few cases reported in the first wave, whereas most of the hospitalizations were reported in the second wave. For influenza A cases, there were no cases reported in the first wave, whereas in the second wave, 24 cases (29/100,000 population) were reported.

**Figure 7: Hospitalization rates for pH1N1 confirmed and Influenza A cases in the Porcupine Health Unit, Apr to Dec 2009**

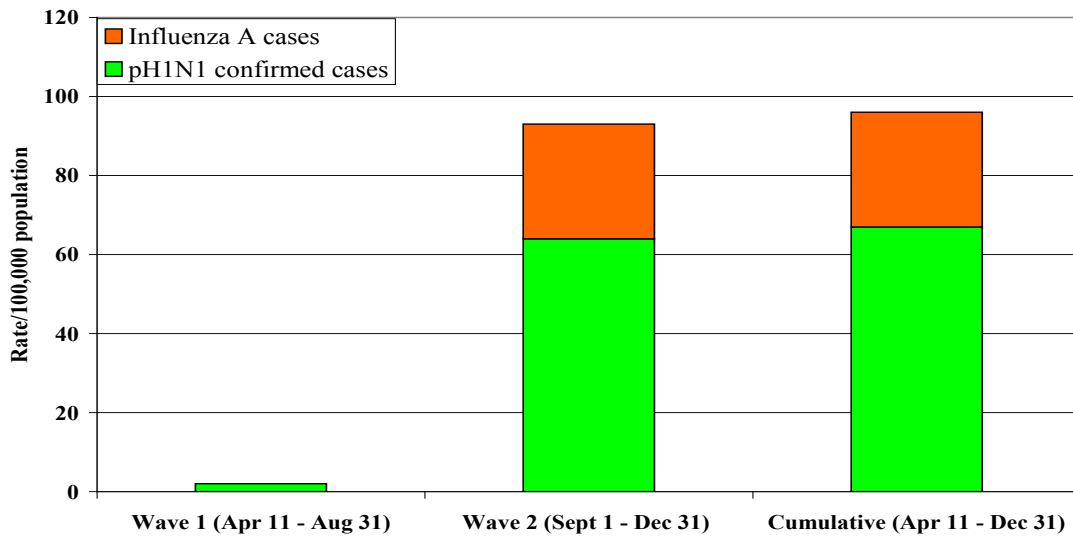
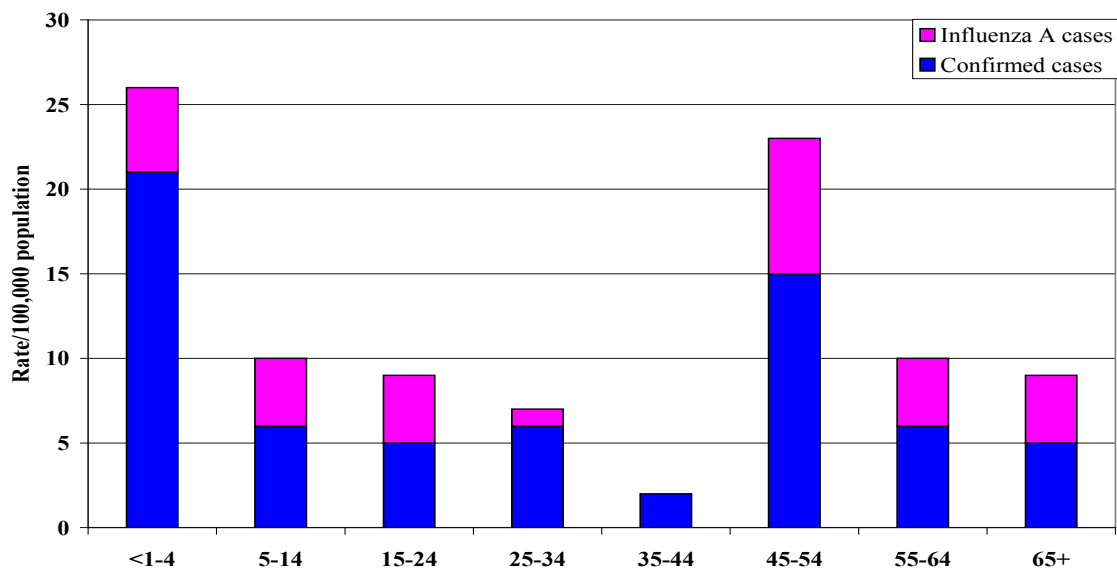


Figure 8 shows the age-specific hospitalization rate due to pH1N1 and influenza A cases in the Porcupine Health Unit area. The highest rate of hospitalization occurred in <1–4 year group, followed by 45–54 year age group, whereas the lowest hospitalization rate was reported in the 35–44 year age group for pH1N1 confirmed cases. For influenza A cases, the highest rate of hospitalization was in the 45–54 year age group and the lowest was in 25–34 year age group.

Complications from influenza usually are more severe in the very young and very old. This particular influenza outbreak in the Porcupine Health Unit area spared the senior group but not the younger age group.

**Figure 8: Age-specific pH1N1 hospitalization rates of pH1N1 confirmed and Influenza A cases, Porcupine Health Unit, 2009**



For pH1N1 confirmed cases who were hospitalized, 11 required Intensive Care Unit (ICU) support. Among these, 6 were on ventilation and 2 cases were on bypap. Of the 56 pH1N1 hospitalized patients, 34 had pre-existing conditions including: kidney diseases, chronic pulmonary diseases, cancers, diabetes and chronic musculoskeletal disorders. For influenza A cases, 1 case was in the ICU and on ventilators and 15 cases had pre-existing conditions.

**(Table 1 : Age distribution of hospitalized cases)**

| Hospitalized cases                 | Minimum age | Maximum age (Years) | Average age (Years) |
|------------------------------------|-------------|---------------------|---------------------|
| Indeterminate and unsubtyped cases | 6 days      | 84                  | 36.4                |
| Laboratory confirmed cases         | 2 months    | 86                  | 28.9                |

A total of 121 deaths due to pH1N1 infection were reported in 2009 in Ontario, whereas 3 persons died in the Porcupine Health Unit area due to pH1N1 and influenza A over the same time. The individuals who died in Ontario ranged in age from 0 to over 90 years, with a mean age of 52 years. In the Porcupine Health Unit area, ages ranged from 10 to 60. In cases where death occurred, the individuals had pre-existing medical conditions.

## **pH1N1 Flu in Long-Term Care Facilities**

During the period when H1N1 influenza was circulating in our communities, 5 long term care facilities experienced small outbreaks of respiratory illness.

The first such outbreak occurred at the beginning of H1N1 activity in our area on October 15. A respiratory outbreak was declared. Outbreak measures included: respiratory isolation, treatment of some cases with antivirals and commencement of H1N1 immunizations for staff and residents on affected units. However, the nasopharyngeal swabs eventually came back showing only rhinovirus.

Four other long term care facilities did experience small outbreaks of H1N1 influenza in the first two weeks of November. Symptomatic residents were placed in respiratory isolation and treated in some instances with antivirals. Symptoms included: fever, cough, and malaise.

In some institutions, prophylactic antiviral medication was given to close contacts. One resident required hospitalization and subsequently passed away from complications of pneumonia.

Of note the timing of delivery of the H1N1 vaccine to our area was such that the institutions in our area were only able to immunize their staff as part of Priority Group, at the end of October and into November, which was after the virus started to circulate in our area. General institution wide immunization of residents was commenced some 3 weeks later in phase 3 of the Priority Groups.

## Flu Assessment Centres

After the pH1N1 influenza (flu) virus was identified in the spring of 2009, Porcupine Health Unit staff took the lead in the development of a community-based plan for an alternate assessment, treatment and referral service centre (Flu Assessment Centres).

A Flu Assessment Centre is a temporary, free-standing site intended to provide primary care. It is established in order to assist with the provision of assessment, treatment and referral services during a flu pandemic. The main goal is to provide antiviral treatment to individuals ill with influenza within 12 to 24 hours of the onset of symptoms. Antiviral medications have been shown to reduce the length, severity and complications associated with seasonal influenza-related illness. Individuals who require further assessment (e.g., chest x-ray, blood work) are referred to the hospital.

A collaborative and community-based approach was followed to develop a plan for alternate assessment, treatment and referral services, the objectives being:

- To provide contingency measures should the existing primary care system become overwhelmed,
- To ensure equitable access to influenza assessment, treatment and referral services in a timely manner, including those without access to existing primary care services, and
- To protect the acute care system from being overwhelmed by individuals seeking primary care services, so as to ensure acute care resources can be focused on those with serious illness.

In Timmins, Kapuskasing and Moosonee, several community organizations were invited to sit on the flu assessment centre planning committee. In all communities, separate committees were formed to plan for a Flu Assessment Centre in the event that the existing primary care system became overwhelmed due to the severity of the H1N1 influenza pandemic.

While the physicians' offices and emergency services in Timmins did experience a rapid increase in the number of clients requiring assessment and treatment at the end of October and into November 2009, an assessment centre was not opened. At the peak of ER visit volumes, it was realized that the size of centre actually required was much smaller than originally planned. A smaller site was located over the next 2 days, but by that time, emergency visit volumes were decreasing and Family Health Team and walk-in clinic members reported they were coping with visit volumes.

Although the Flu Assessment Centre Committees did not activate any flu centres in our district, the engagement of the community stakeholders has resulted in a comprehensive *Operational and Administrative Flu Assessment Centre Plan* for the three communities. This plan is now fully realized and capable of managing any future pandemic.

Despite some challenges, many positive outcomes arose from this outbreak. Communication and networking has improved between partners, resulting in a clearer understanding of the impact of an influenza pandemic on our health system and business structures within the region. The assistance of planners from organizations already familiar with working in the Incident Management System and emergency management has provided knowledge and direction to those new to the system. The collaborative planning process has enabled the Flu Assessment Centre Committee to develop innovative ways of providing assessment, treatment and referral services, and access to antivirals on a smaller scale to be supported over a period of four to six weeks, and provided impetus to further refine business continuity planning within organizations represented.

## Mass Vaccination Strategy

The Porcupine Health Unit began to receive pH1N1 vaccine from the Ministry of Health and Long Term Care in late October. The vaccine arrived in boxes of 1,000 doses. In order to facilitate the administration of the vaccine, a local pharmacist was hired by the health unit to repackage the vaccine into smaller quantities. Once this was completed, the vaccine was distributed to all participating vaccine delivery agents in our jurisdiction, including eight First Nations communities.

Figure 9 shows the amount of vaccine distributed to the vaccine delivery agents. It was estimated by the province that, on average, 40% of the population would choose to get vaccinated. Thus, each community was allocated enough vaccine to immunize 40% of their residents. However, First Nations received enough vaccine to immunize their entire population, due to the isolated locations of their communities.

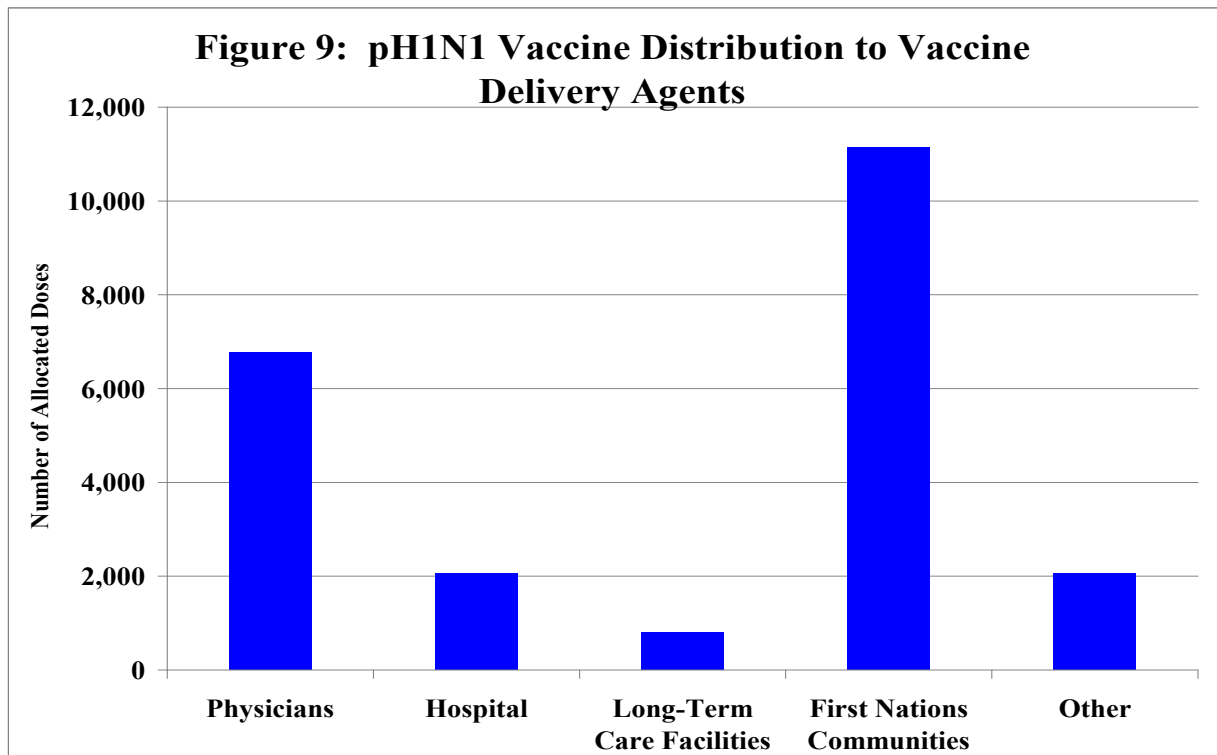
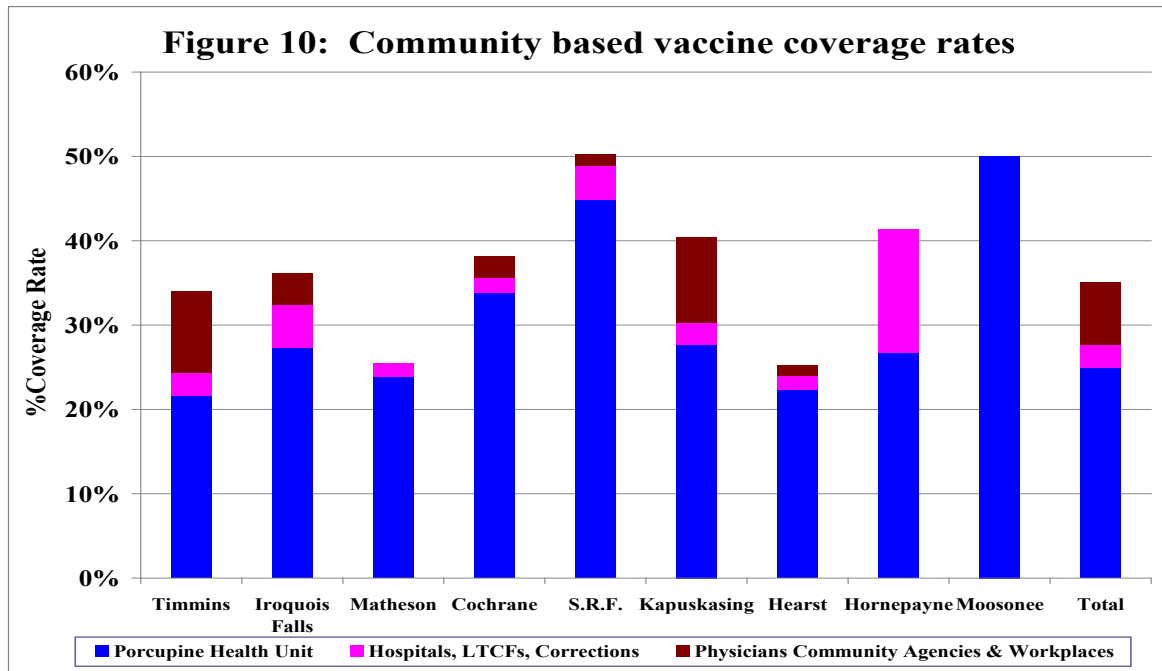
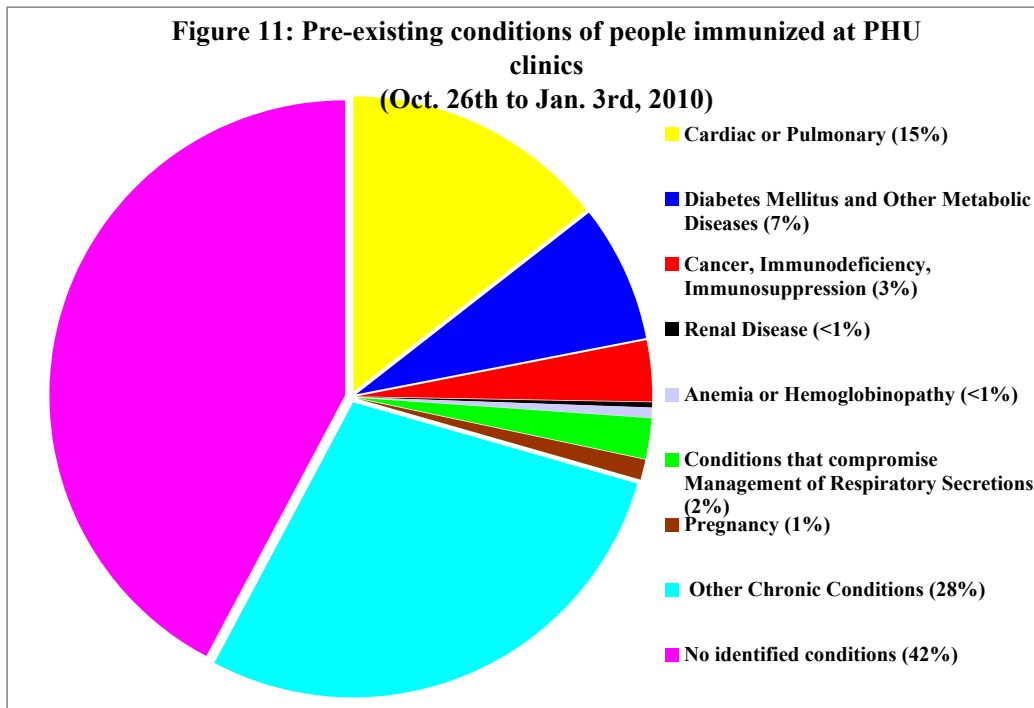


Figure 10 details the immunization coverage rates for the different communities in the PHU catchment area. The average rate was 35%, while individual community rates varied from a high of 50% for Moosonee and Smooth Rock Falls to a low of 25% for Matheson and Hearst. Overall, 28,095 doses of vaccine were administered, with 71% given by the health unit, 21% by physicians and community agencies and the remaining 8% by hospitals and LTCFs.



Fifty-eight percent of those immunized at the Porcupine Health Unit's H1N1 immunization clinics had specific pre-existing conditions. The most common condition was cardiac and pulmonary disease with 15%, followed by diabetes and other metabolic diseases at 7%.



## **Conclusion**

The 2009 H1N1 outbreak was eventually found to be a mild to moderate influenza outbreak, based on the case numbers and outcomes in our area.

This was very similar to experiences across Ontario and Canada, except for our higher hospitalization rates, which created moderate bed surge capacity pressure, particularly for our larger district hospital, despite the fact that some of our hospitalized and ICU cases were cared for in other hospitals, including hospitals outside of our area. Future planning for outbreak impacts at the hospital level will need to be examined and learned from, in order to better plan for strategies in the event of a more severe influenza outbreak.

Our mass immunization strategy performed well in terms of establishing mass clinics across the district as soon as the vaccine became available. The overall immunization coverage rate eventually reached 35%, comparable to the overall provincial rate, but less than the originally stated provincial goal and less than levels achieved in other provinces, such as Newfoundland and Quebec.

Factors in this shortfall included the late arrival of the vaccine after the peak of outbreak activity in our area, and also a provincial requirement to adhere to priority group sequencing. The directive to adhere to priority group sequencing in the second and third week of our clinics significantly reduced attendance. It must also be noted that the late arrival of the vaccine, after the peak of case activity in our area, almost certainly reduced the impact of the vaccine on the outbreak in our area.

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