

# Ontario Pandemic Preparedness

**Vivek Goel**

Ontario Hospital Association

October 5, 2009

Please visit our website at [www.oahpp.ca](http://www.oahpp.ca)

## What we do:

1. Better information for better public health decisions and actions

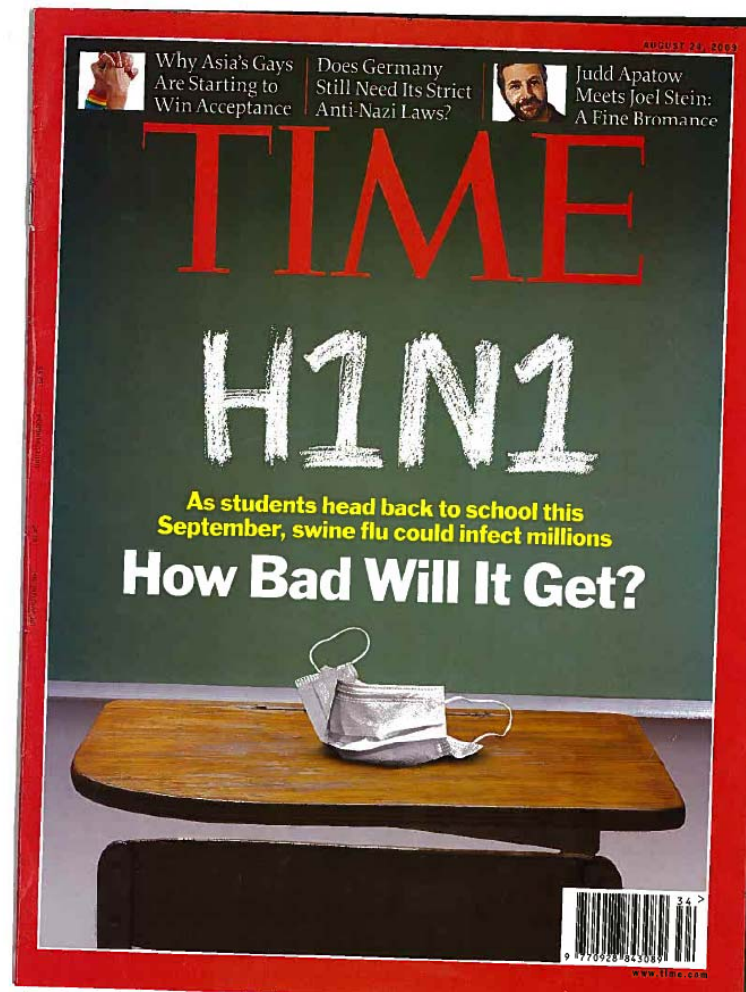
## GOALS

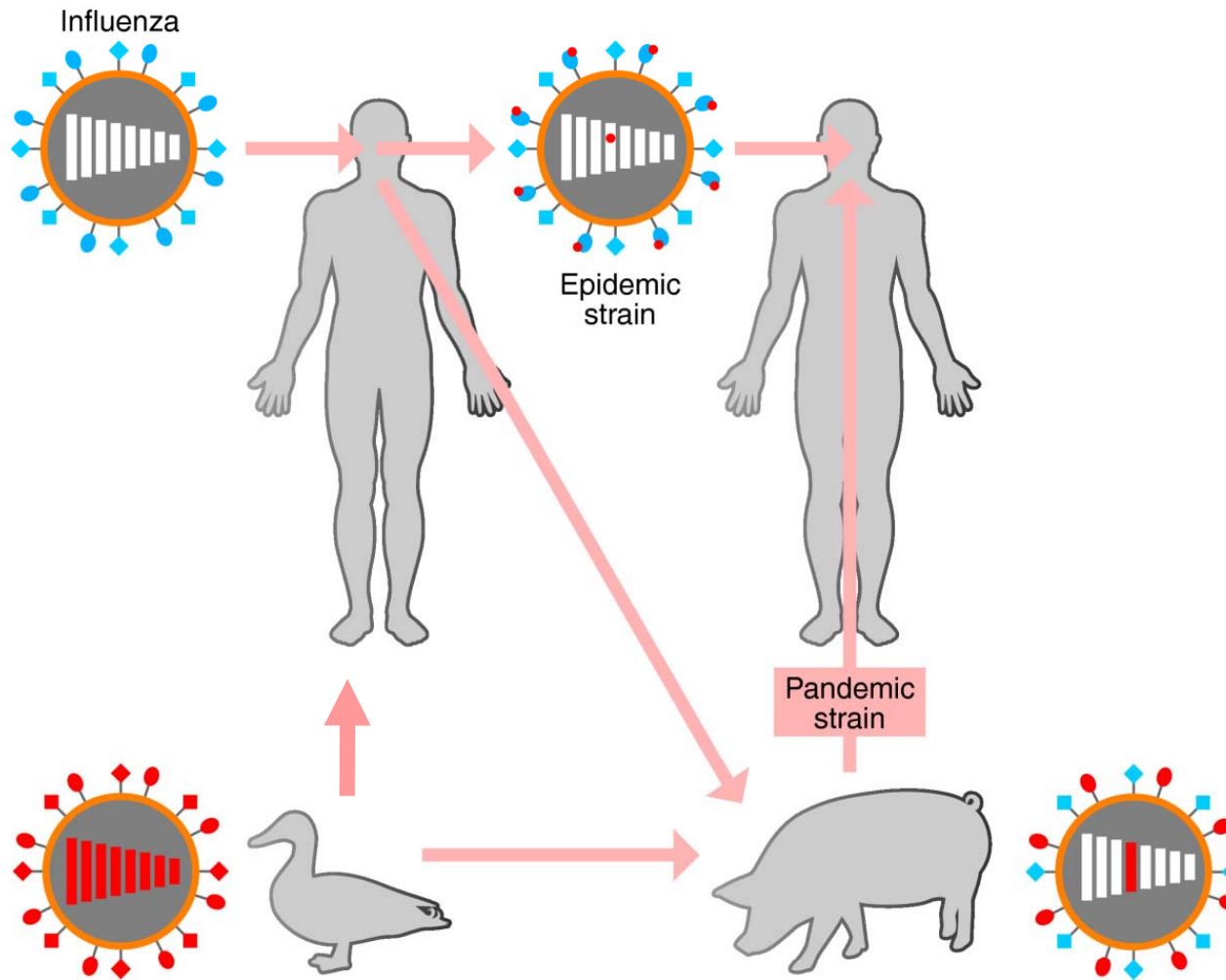


2. Generate and accelerate application of knowledge for better public health decisions and actions
3. Support the Ontario public health system in its daily business and enhance capacity in emergencies

## Outline

- Where did we start and what did we learn?
- Where are we now?
- Lessons learned

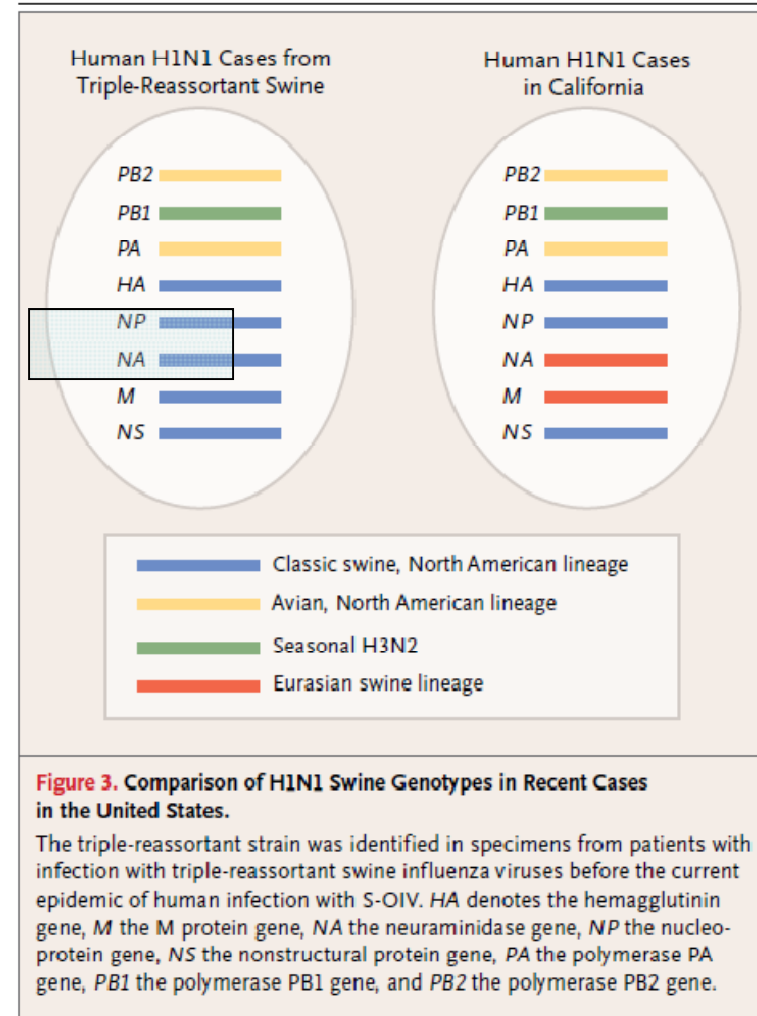




DeFranco AD, et al. *Immunity* Oxford University Press; 2007<sub>4</sub>

### Emergence of a Novel Swine-Origin Influenza A (H1N1) Virus in Humans

Novel Swine-Origin Influenza A (H1N1) Virus Investigation Team\*



*N Engl J Med* 2009;361.

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### Influenza-like illness in the United States and Mexico

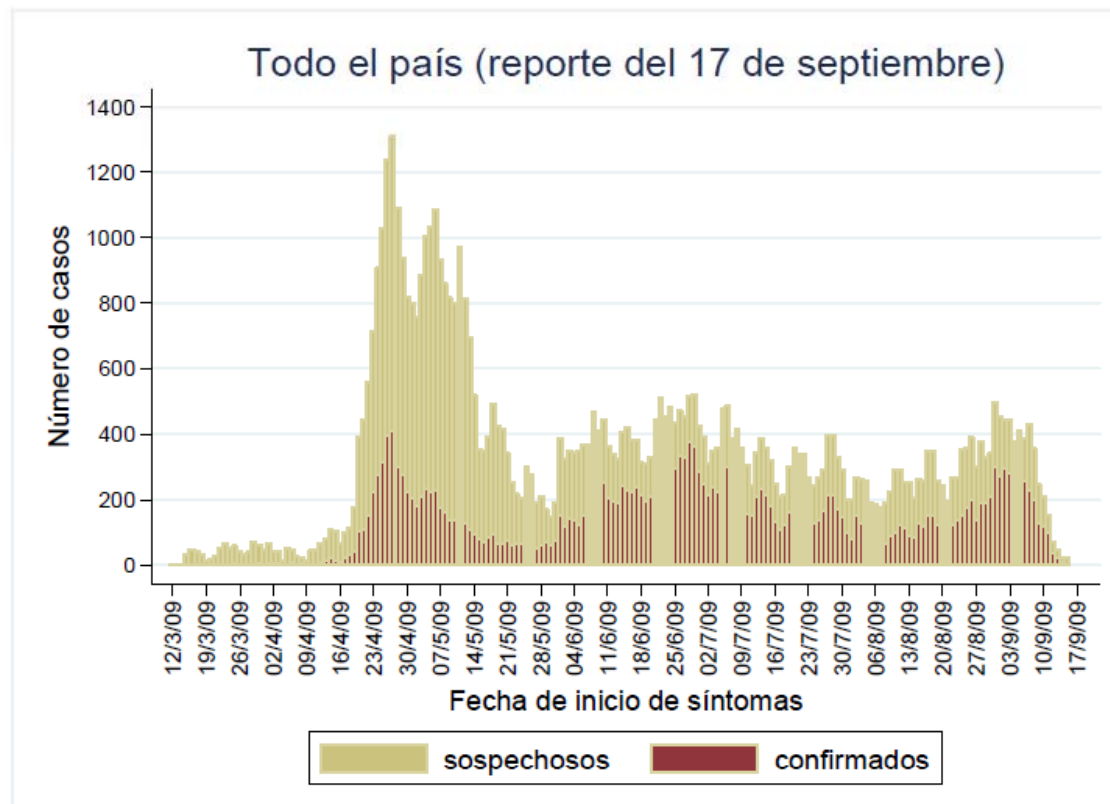
24 April 2009 -- The United States Government has reported seven confirmed human cases of Swine Influenza A/H1N1 in the USA (five in California and two in Texas) and nine suspect cases. All seven confirmed cases had mild Influenza-Like Illness (ILI), with only one requiring brief hospitalization. No deaths have been reported.

The Government of Mexico has reported three separate events. In the Federal District of Mexico, surveillance began picking up cases of ILI starting 18 March. The number of cases has risen steadily through April and as of 23 April there are now more than 854 cases of pneumonia from the capital. Of those, 59 have died. In San Luis Potosi, in central Mexico, 24 cases of ILI, with three deaths, have been reported. And from Mexicali, near the border with the United States, four cases of ILI, with no deaths, have been reported.

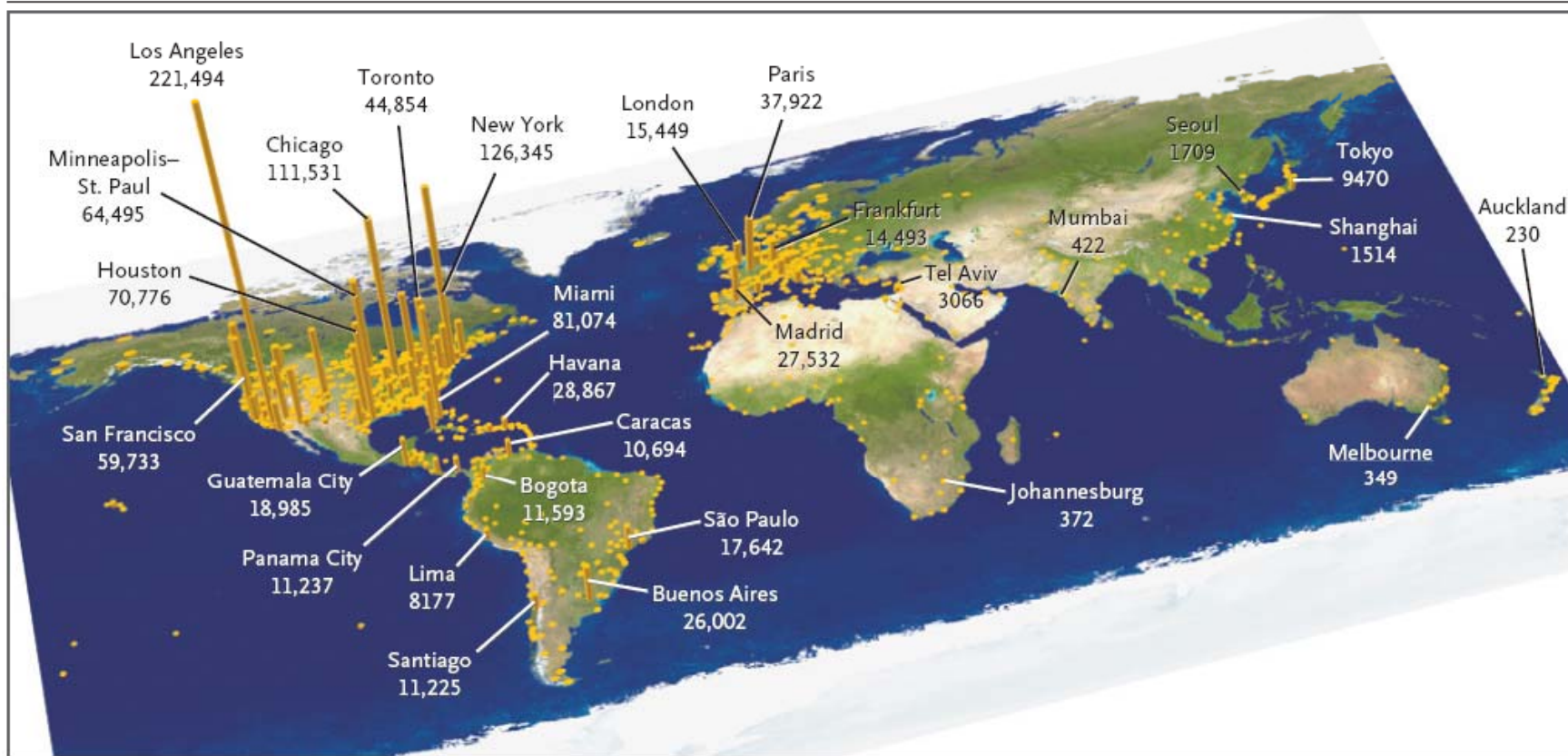
Of the Mexican cases, 18 have been laboratory confirmed in Canada as Swine Influenza A/H1N1, while 12 of those are genetically identical to the Swine Influenza A/H1N1 viruses from California.

Fecha de inicio de síntomas en  
casos sospechosos y confirmados

**SALUD**



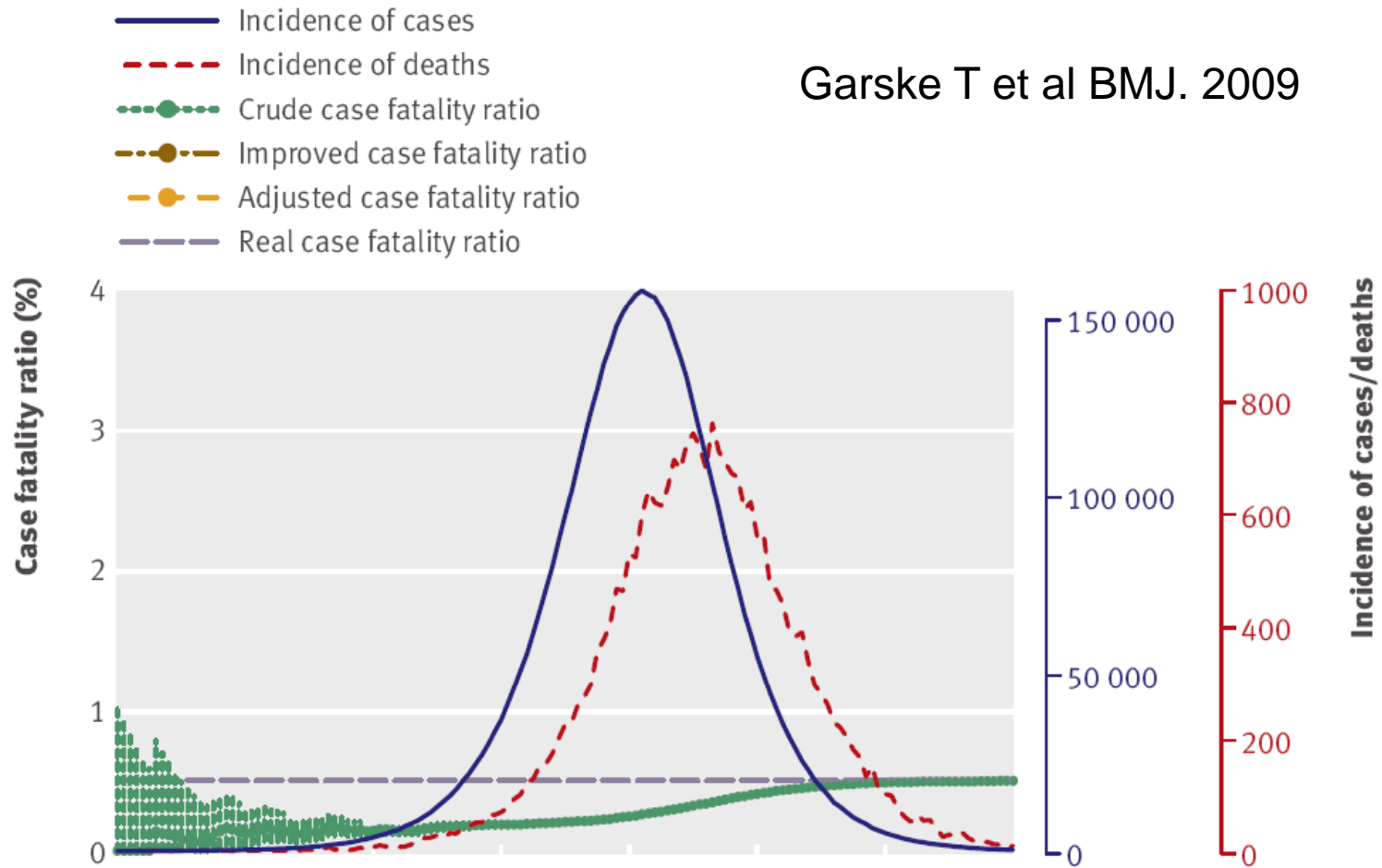
[http://portal.salud.gob.mx/descargas/pdf/influenza/situacion\\_actual\\_epidemia\\_180909.pdf](http://portal.salud.gob.mx/descargas/pdf/influenza/situacion_actual_epidemia_180909.pdf)



**Figure 1.** Destination Cities and Corresponding Volumes of International Passengers Arriving from Mexico between March 1 and April 30, 2008.

*Khan K et al NEJM 2009*

Garske T et al BMJ. 2009



## News

### Ontario has first swine flu cases

By ANTONELLA ARTUSO, QUEEN'S PARK BUREAU CHIEF

Last Updated: 28th April 2009, 3:36pm

Email Story | Print | Size **A A A** | Report Typo

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Dr. David Williams, Ontario's Associate chief medical officer of health, says Ontario has been hit by four cases of swine flu.

Ontario has four confirmed cases of swine flu.

Three cases are in Durham and one is in York Region.

"These are mild cases," said Dr. David Williams, Ontario's Associate chief medical officer of health.

In all four cases, travel to Mexico was involved.

The individuals, who were not immediately identified, are recovering at home.

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## Post-SARS Ontario better prepared for new flu outbreak

Reuters

Published: Friday, April 24, 2009

OTTAWA -- An outbreak of swine flu in Ontario, Canada's most populous province, would not be as serious as the 2003 SARS epidemic, in part because authorities have been preparing for decades to fight widespread influenza, a senior provincial medical official said Friday.

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WHO confirms 60 dead, 800 sick with flu-like illness

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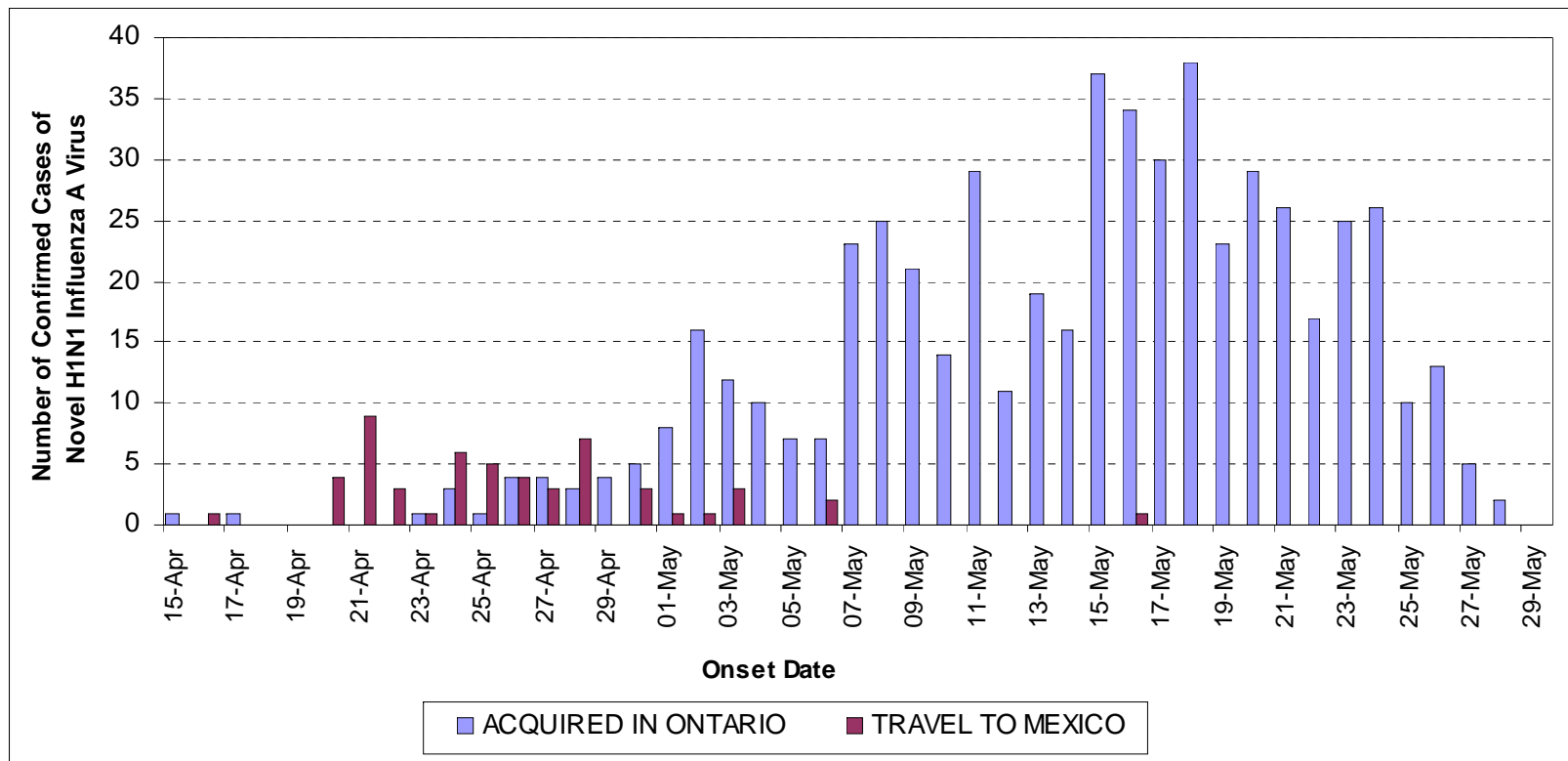
### Toronto on strike: June 22

A massive strikes raises a stink in Canada's largest city. Will this be Toronto's summer from hell? Mike Drolet reports.

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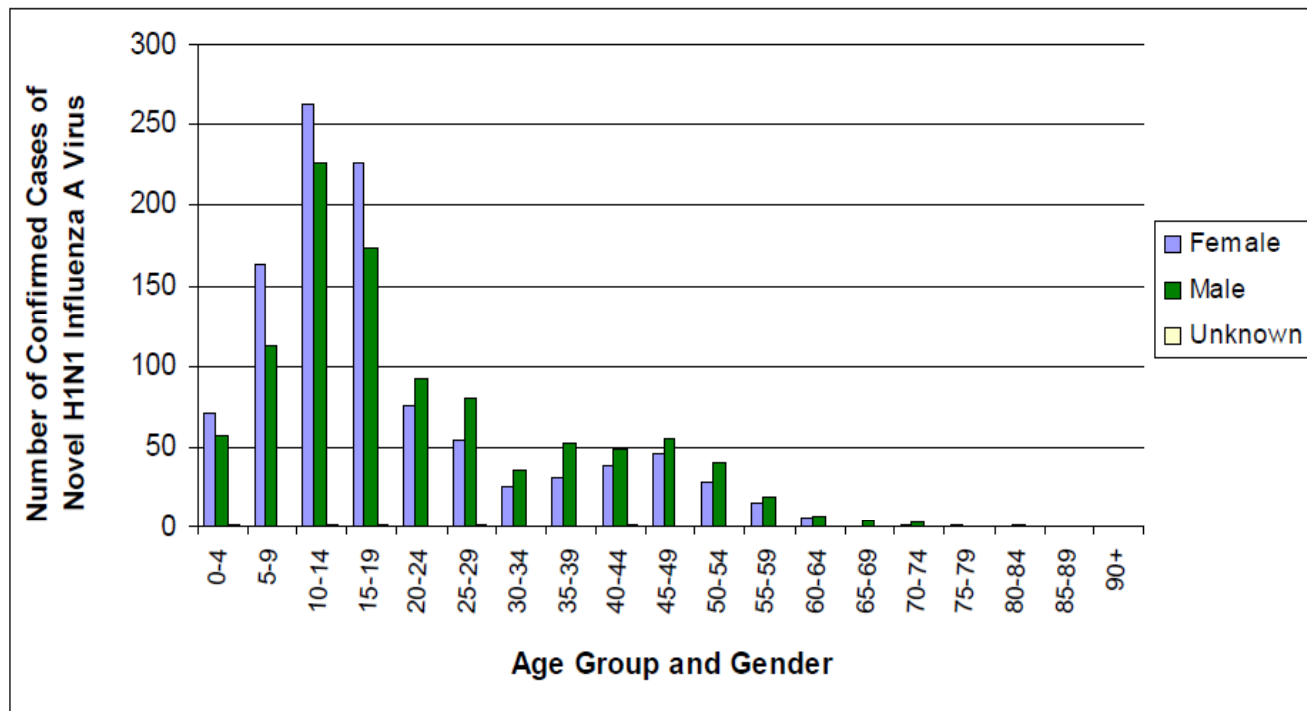
# Travel to Mexico



## Different approach to control in Europe

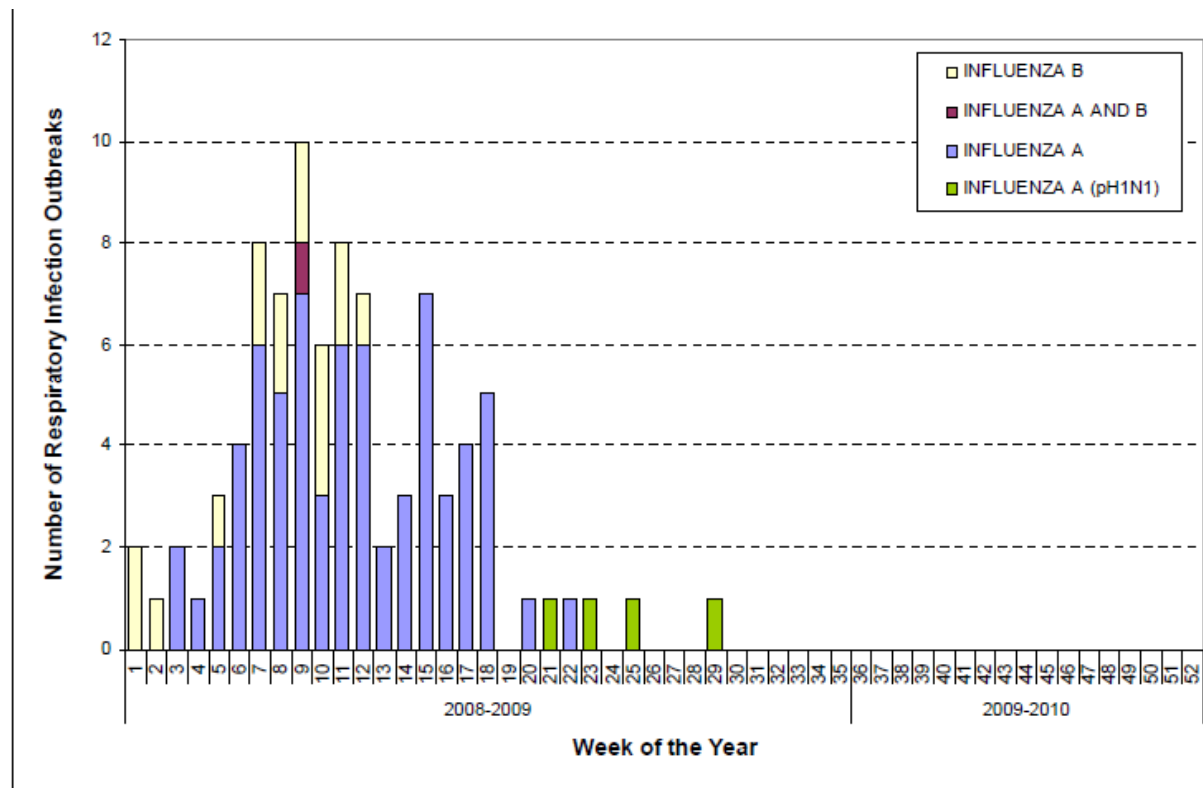
- Containment considered feasible
- Widespread prophylaxis – households and in schools
- School closures

## Confirmed pandemic H1N1 virus cases in Ontario by age group and gender, April 13<sup>th</sup> to June 15<sup>th</sup>



Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted at 8:30 am [15/06/2009]

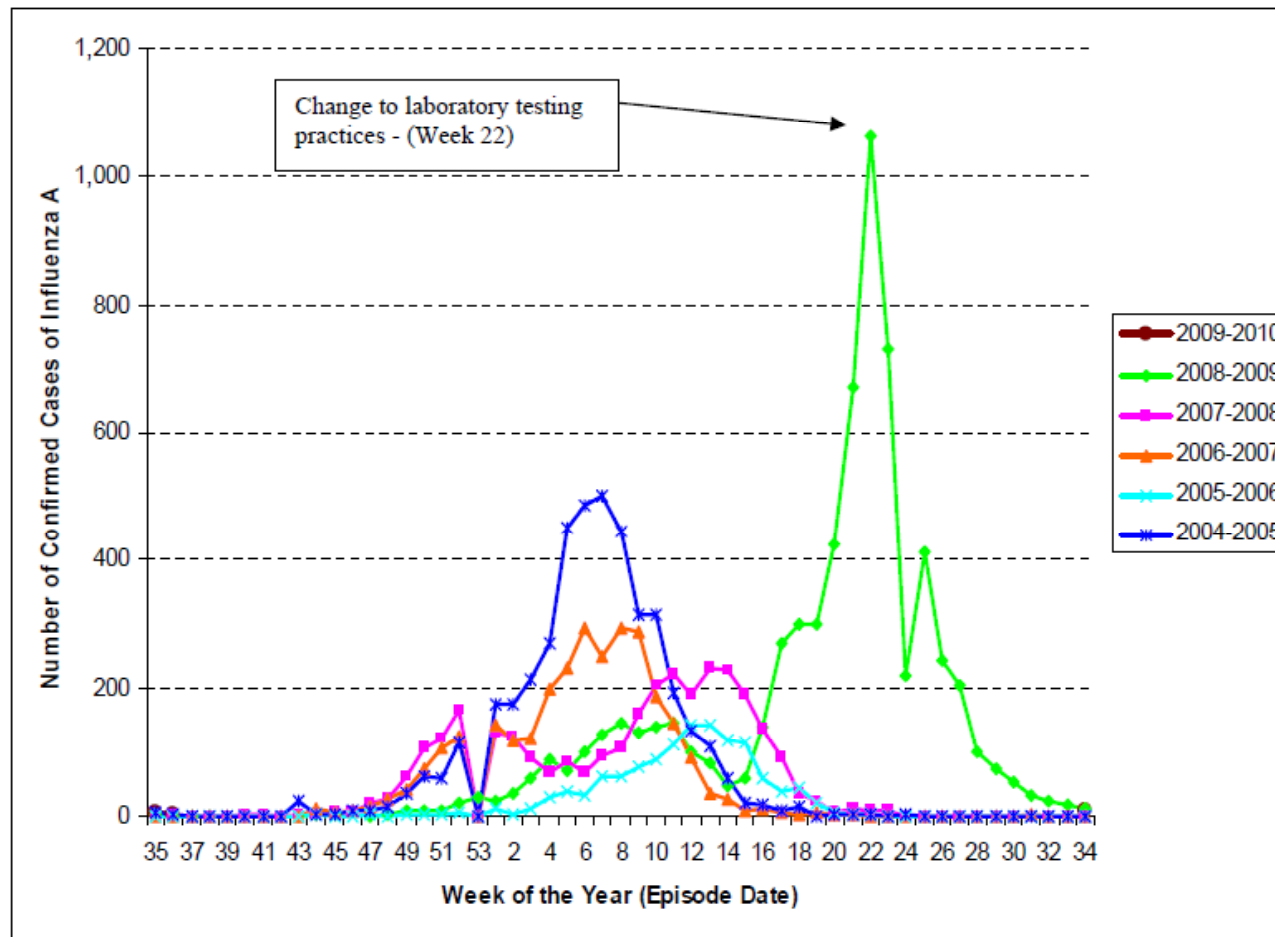
## Institutional influenza outbreaks in Ontario by onset of illness in the first case: Total Outbreaks up to and including Week 36 by subtype



Source: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [16/09/2009]

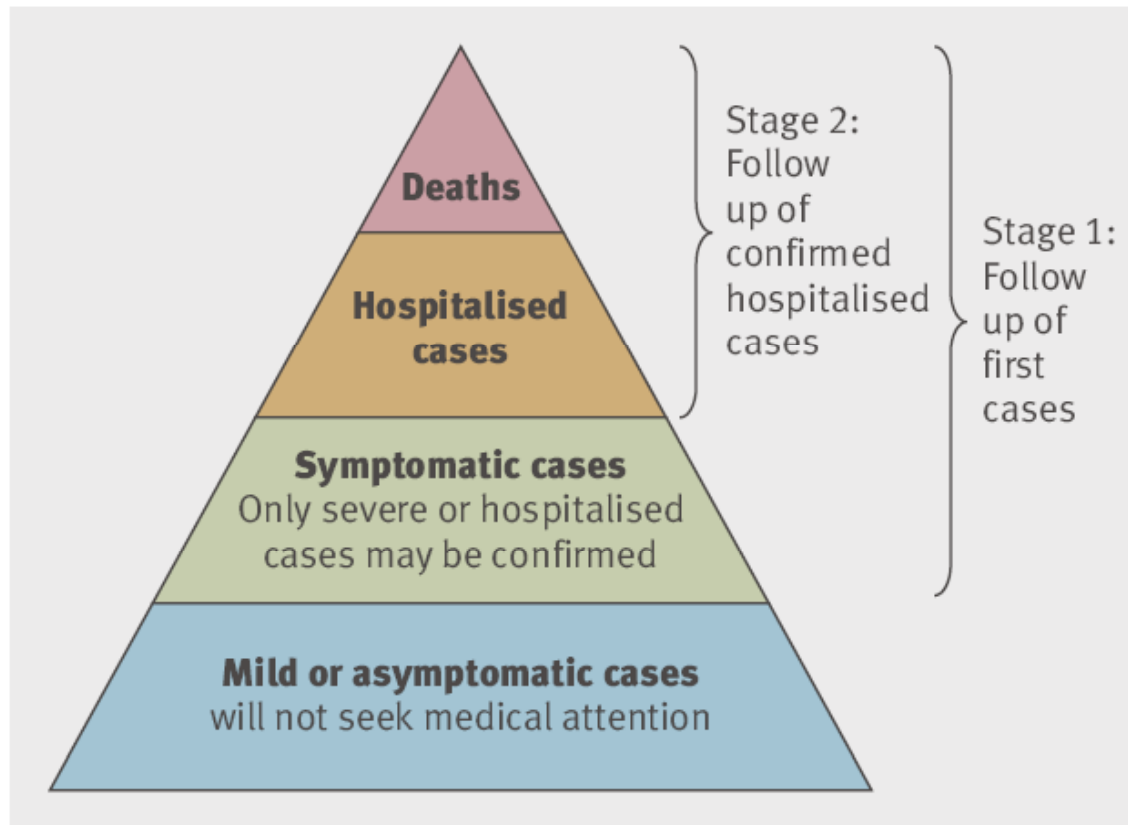
## IHN 11<sup>th</sup> June

- Testing for novel H1N1 Influenza A is not recommended for patients with mild illness. Specimens should only be submitted for testing where lab results are required for clinical management of hospitalized cases of ILI or where patients are at high risk for complications from influenza.

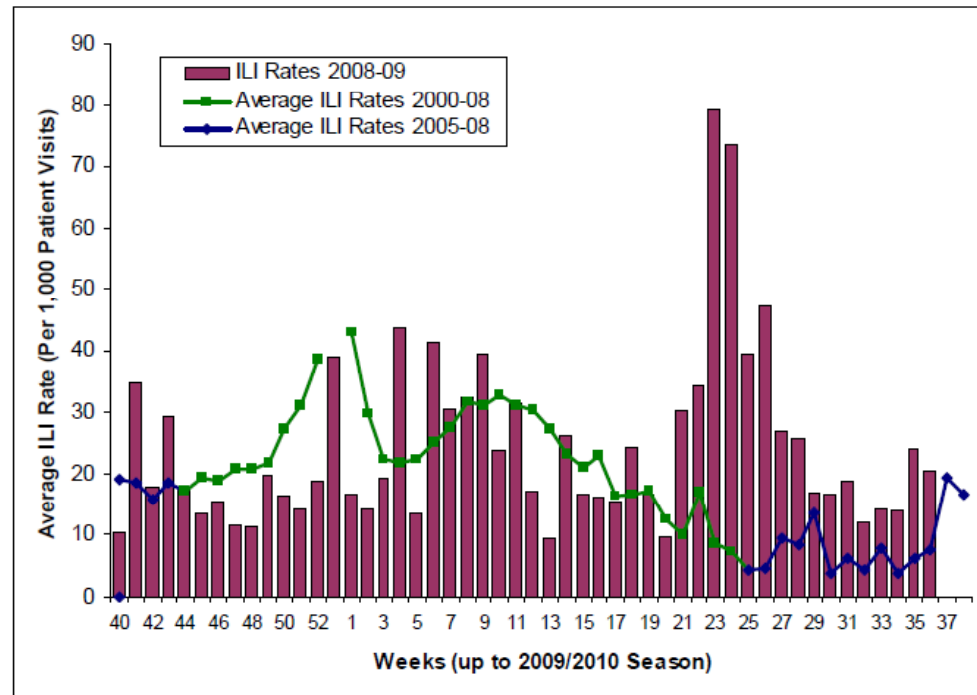


SOURCE: Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (iPHIS) database, extracted [16/09/2009].  
 † Episode Date for a case corresponds to the earliest date on record for the case according to the iPHIS hierarchy (Symptom Date > Clinical Diagnosis Date > Specimen Collection Date > Lab Test Date > Reported Date)

## Influenza and the iceberg of disease



**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, 104 sentinels reported this week.  
 † No data available for mean rate in previous years for weeks 21 to 39 (1999-2000 through 2004-2005 seasons). During weeks 20-39, 2002-2003/2004-2005 seasons, ILI is reported once every two weeks, on even weeks only.  
 Since Week 23, 2009, the number of sentinel physicians has increased, which might affect ILI rate starting from week 23.

## Incidence of hospitalization and death due to pandemic H1N1 2009 in Ontario, April 13 – September 23, 2009

Age Group	Hospitalizations	Rate/100,000	Deaths	Rate/100,000
<1	20	14.93	0	0.00
1-4	51	9.34	0	0.00
5-19	108	4.47	3	0.12
20-49	109	1.91	4	0.07
50-64	51	2.12	10	0.42
65+	34	1.97	7	0.41
<b>TOTAL</b>	<b>373</b>	<b>2.89</b>	<b>24</b>	<b>0.19</b>

**Source (incidence):** Ontario Ministry of Health and Long-Term Care, integrated Public Health Information System (IPHIS) database, extracted at 8:30 am [23/09/2009]

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

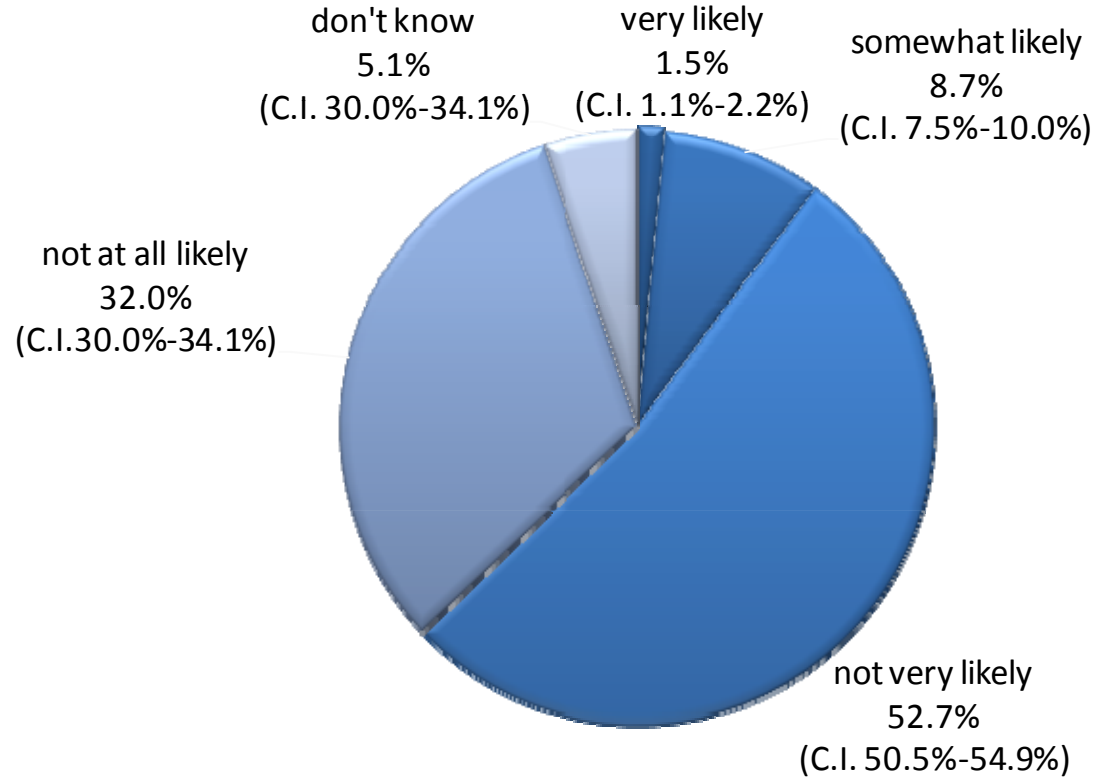
<http://www.health.gov.on.ca/>

## Global mortality

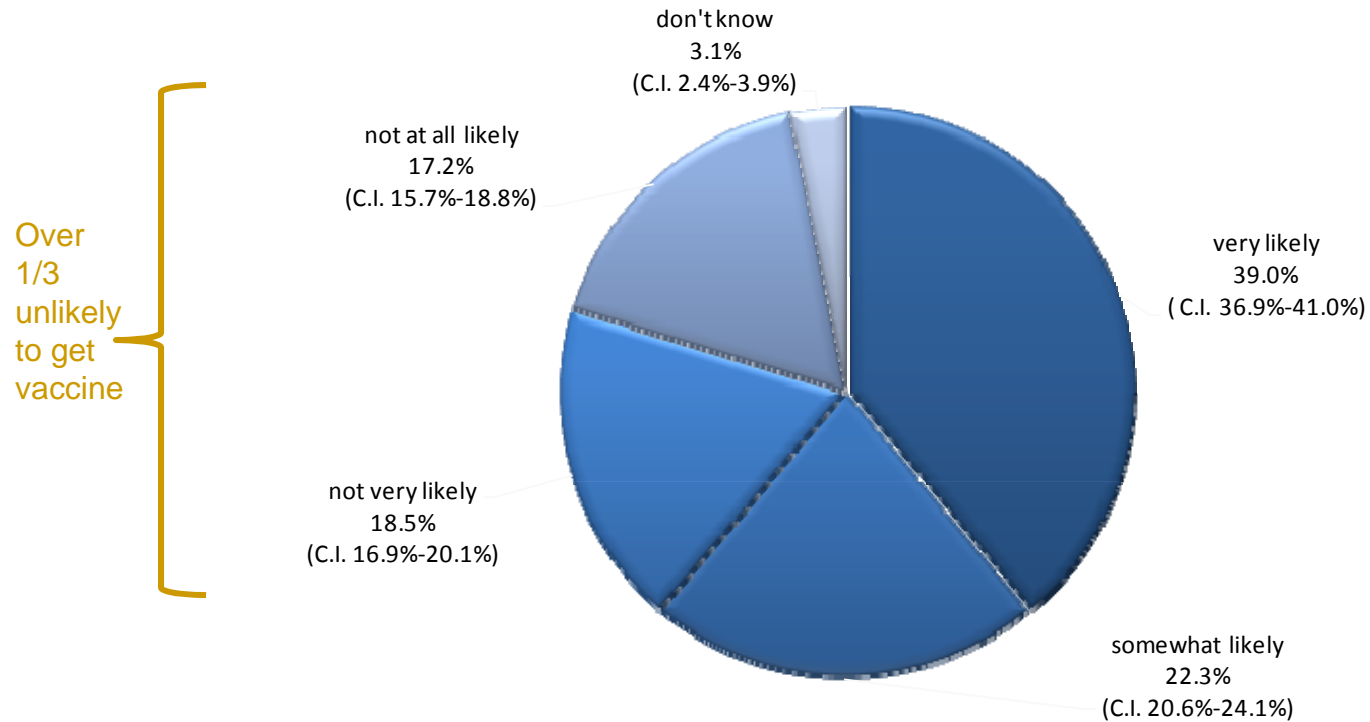
Region	Cumulative total as of 13 September 2009	
	Cases*	Deaths
WHO Regional Office for Africa (AFRO)	8125	40
WHO Regional Office for the Americas (AMRO)	124126	2625
WHO Regional Office for the Eastern Mediterranean (EMRO)	10533	61
WHO Regional Office for Europe (EURO)	over 52000	at least 140
WHO Regional Office for South-East Asia (SEARO)	25339	283
WHO Regional Office for the Western Pacific (WPRO)	76348	337
Total	over 296471	at least 3486

**Estimated excess deaths from 1918 pandemic: 1.1% of European population (2.64 million deaths) *Ansart S et al 2009***

## RRFSS - Perceived risk of becoming infected with Novel H1N1 among adults aware of nH1N1 outbreak in May 2009



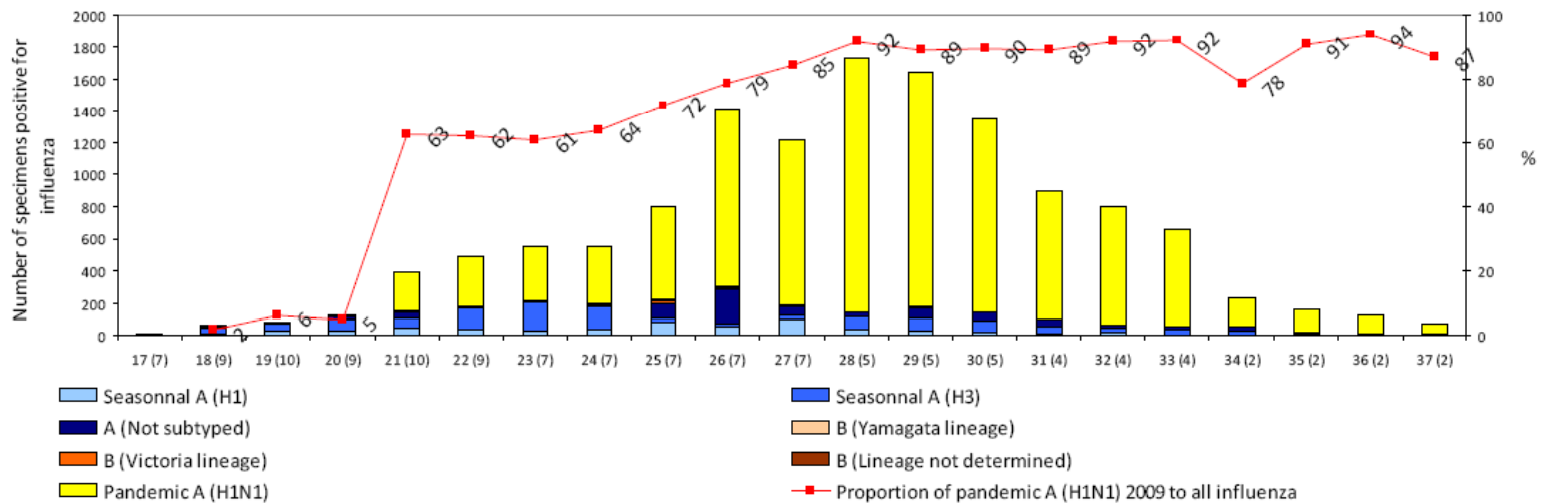
## RRFSS – Novel H1N1 Vaccination Likelihood among adults aware of pandemic H1N1 outbreak in May 2009



# Where are we now?

## Southern hemisphere (week 17-37)

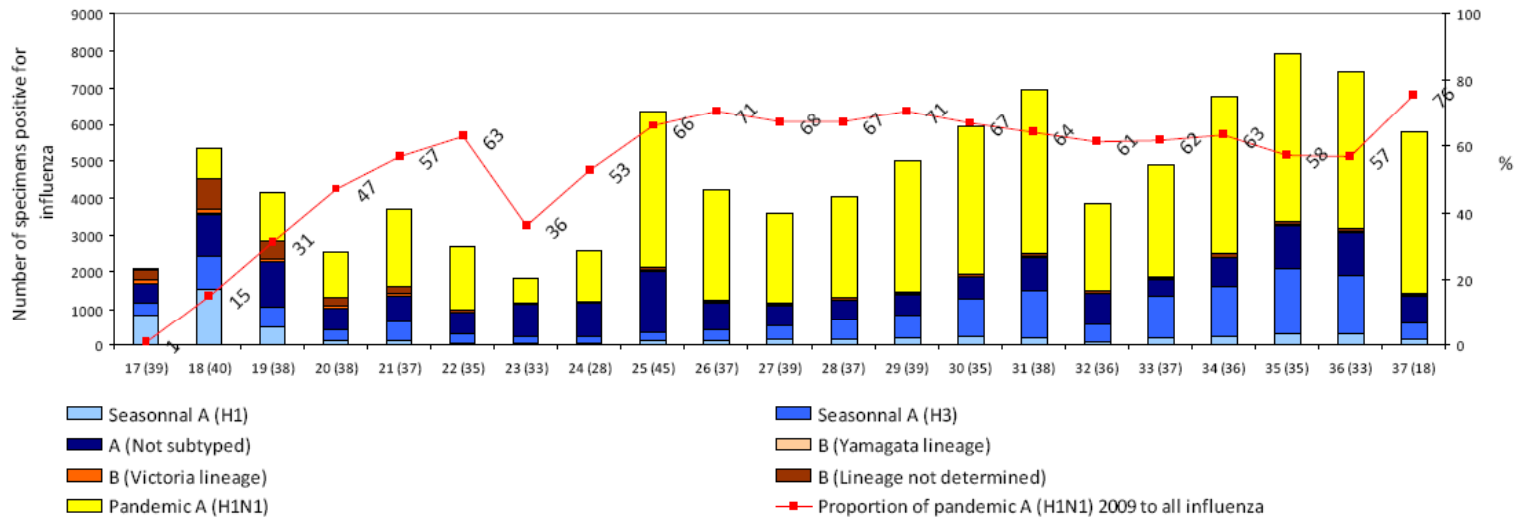
Number of specimens positive for influenza by subtypes (from 19 April to 12 September)



Virological data reported to FluNet by GISN NICs from countries in the southern hemisphere (week 17-37). Bars represent the number of specimens reported positive for influenza viruses during the reporting week represented in the X-axis. The X-axis also shows the number of countries that reported to FluNet during the respective week. Example: 17 (7) means that in week 17, 7 countries reported. The right side Y-axis shows the proportion (%) and the left Y-axis shows the absolute number of specimens reported positive for influenza viruses (influenza A subtypes, pandemic H1N1 and influenza B).

## Northern hemisphere (week 17-37)

Number of specimens positive for influenza by subtypes (from 19 April to 12 September)



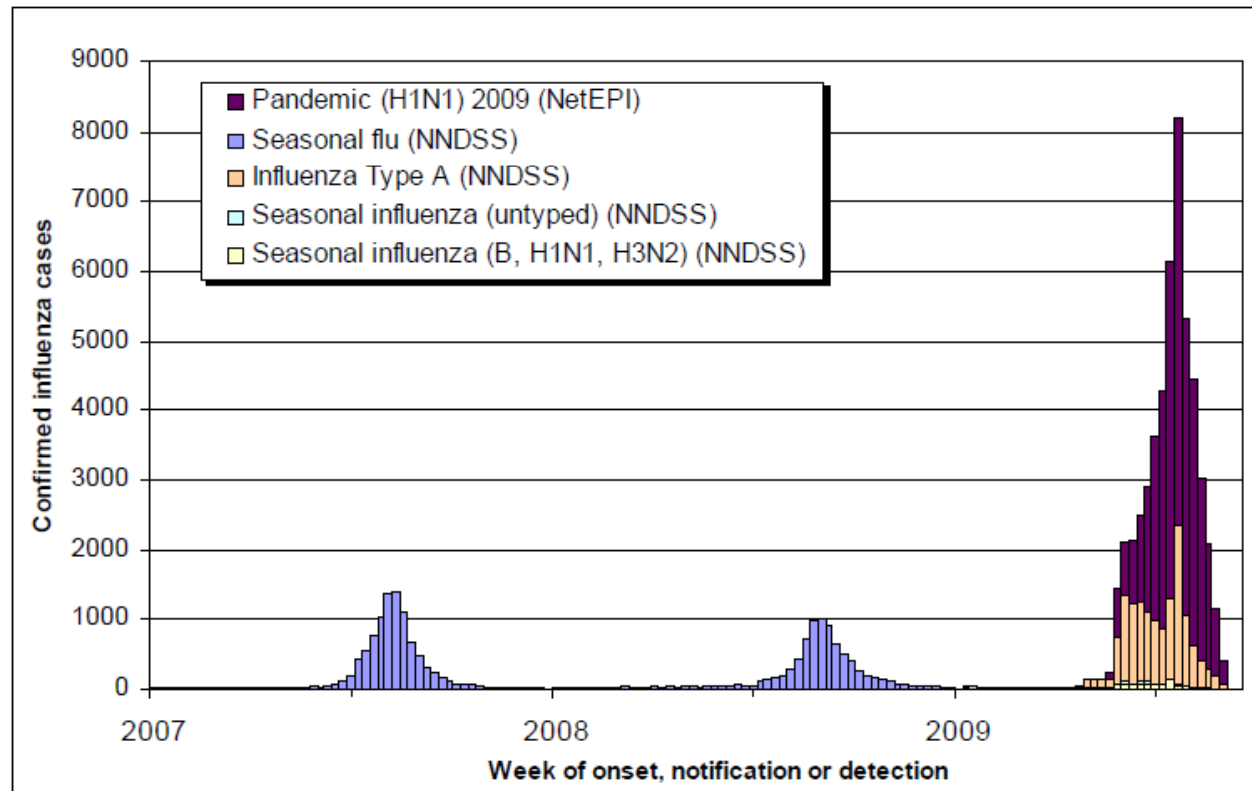
Virological data reported to FluNet by GISN NICs from countries in the northern hemisphere (week 17-37). Bars represent the number of specimens reported positive for influenza viruses during the reporting week represented in the X-axis. The X-axis also shows the number of countries that reported to FluNet during the respective week. Example: 17 (38) means that in week 17, 38 countries reported. The right side Y-axis shows the proportion (%) and the left Y-axis shows the absolute number of specimens reported positive for influenza viruses (influenza A subtypes, pandemic H1N1 and influenza B).

## Australia

- Data for September 18<sup>th</sup> bulletin
- Most cases mild
  - 36,237 confirmed cases of pandemic (H1N1) 2009
  - 4,698 Hospitalized
  - 56 /303 (18%) currently hospitalized are in ICU
  - 172 Deaths (8 per million)
- Aboriginal population at 8 fold increased risk

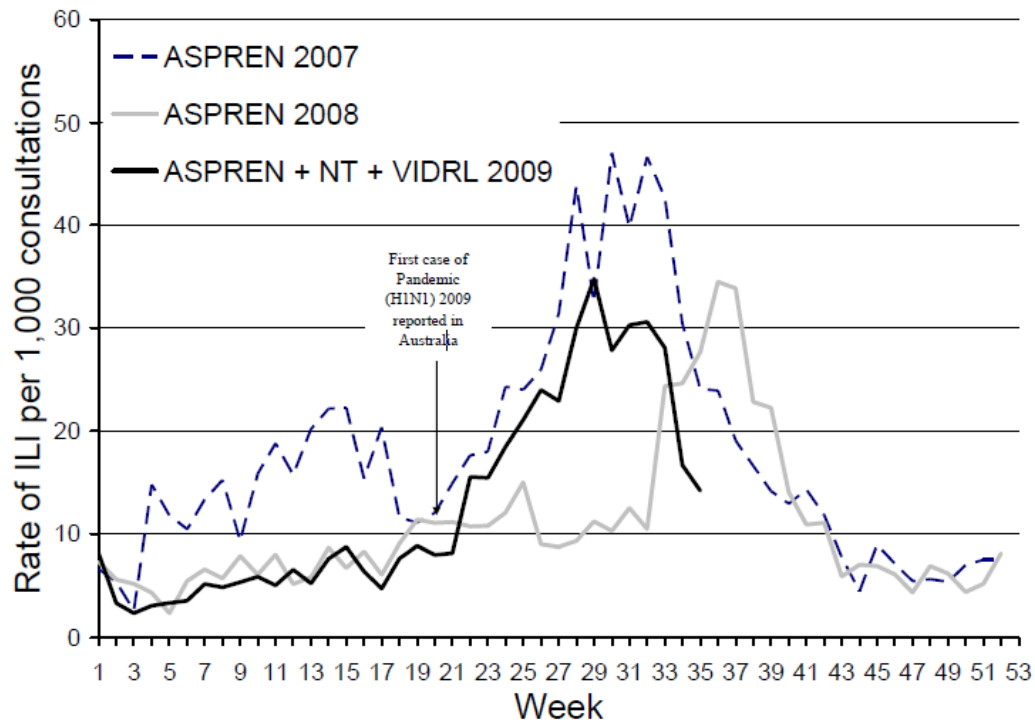
<http://www.healthemergency.gov.au/internet/healthemergency/publishing.nsf/Content/bulletins-14-20Sep>

## Influenza activity in Australia, by reporting week, years 2007, 2008 and 2009\*



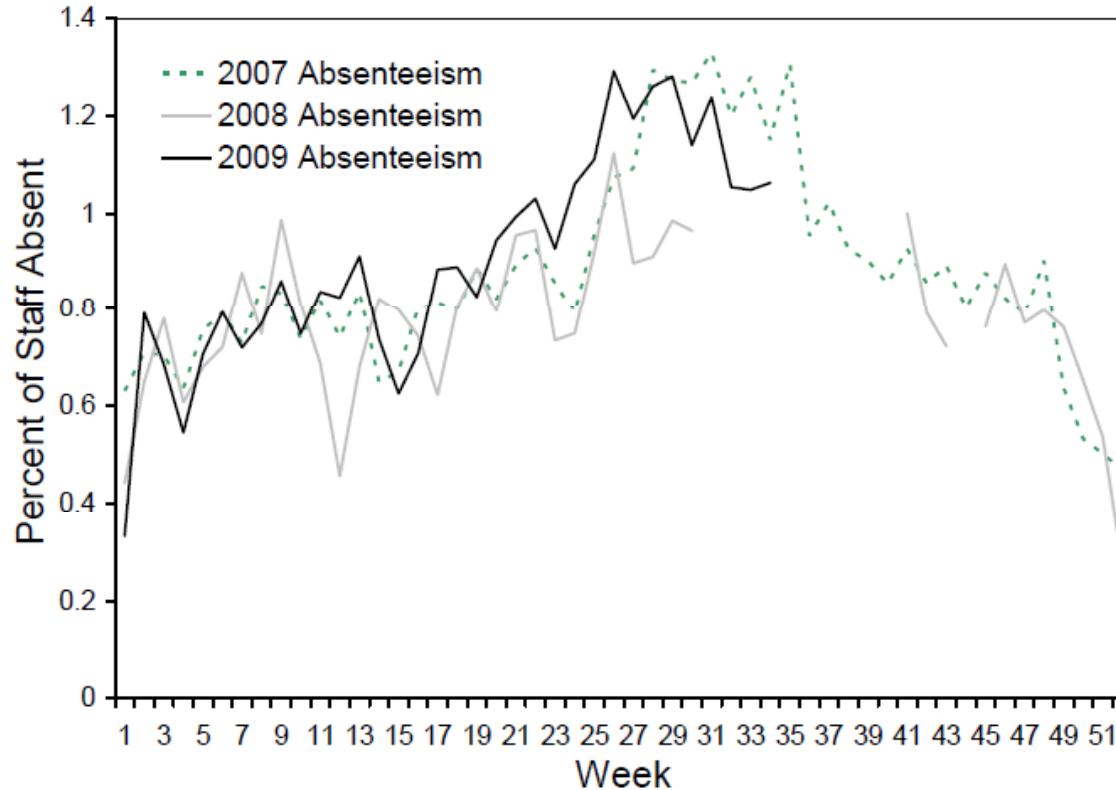
\* Data on pandemic (H1N1) 2009 cases is extracted from NetEPI; data on seasonal influenza is extracted from the NNDSS. Sources: NNDSS and NetEPI databases

## Rate of ILI reported from GP ILI surveillance systems from 2007 to 30 August 2009 by week

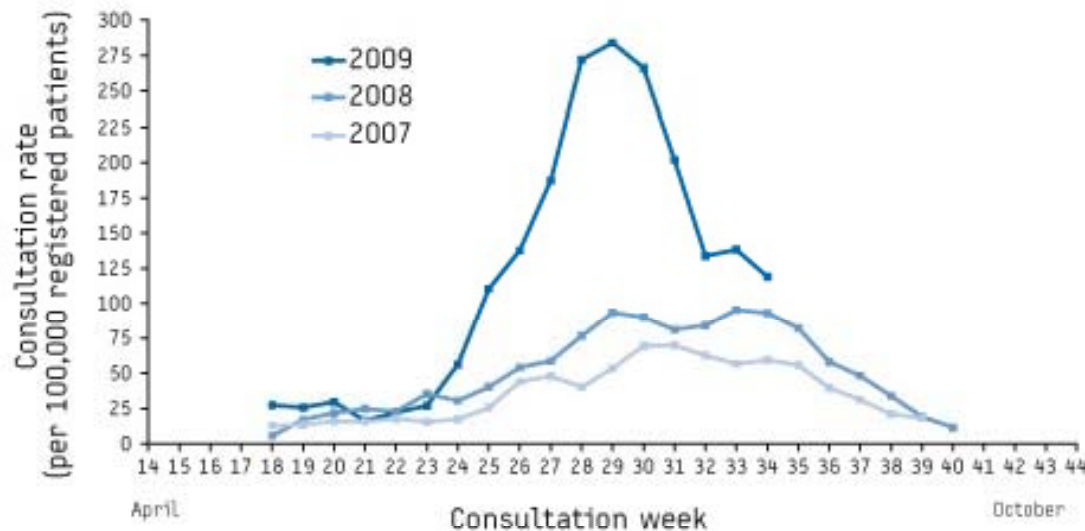


\* Delays in the reporting of data may cause data to change retrospectively. As data from the NT and the VIDRL surveillance systems are combined with ASPREN data, rates may not be directly comparable across 2007, 2008 and 2009.

## Rates of absenteeism of greater than 3 days absent, National employer, 1 January 2007 to 26 August 2009, by week



Weekly rate of ILI per 100,000 registered population, all ages, New Zealand, 2007-2009

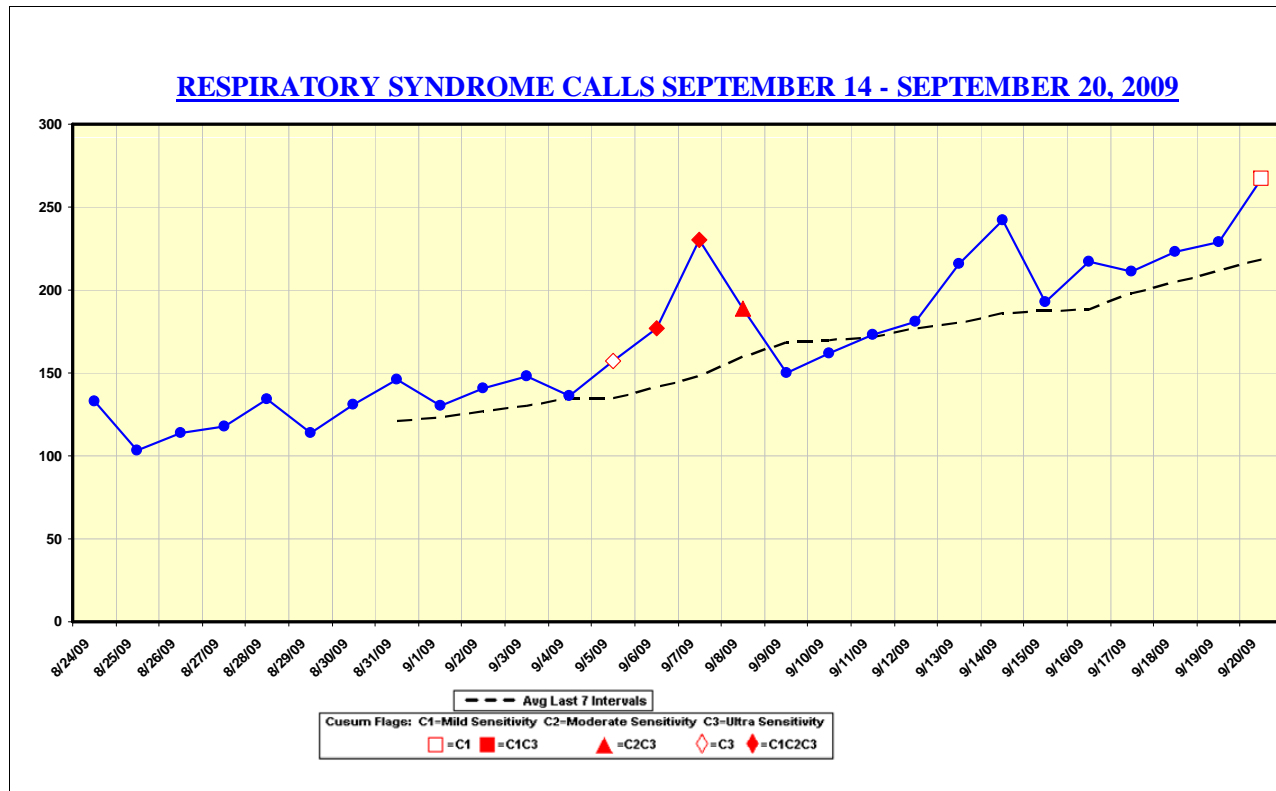


“The apparent decline cannot be fully explained. New Zealand remains in the middle of its traditional influenza season... we estimate that only about 11% of the population have been infected....”

Source: Sentinel General Practice Surveillance System

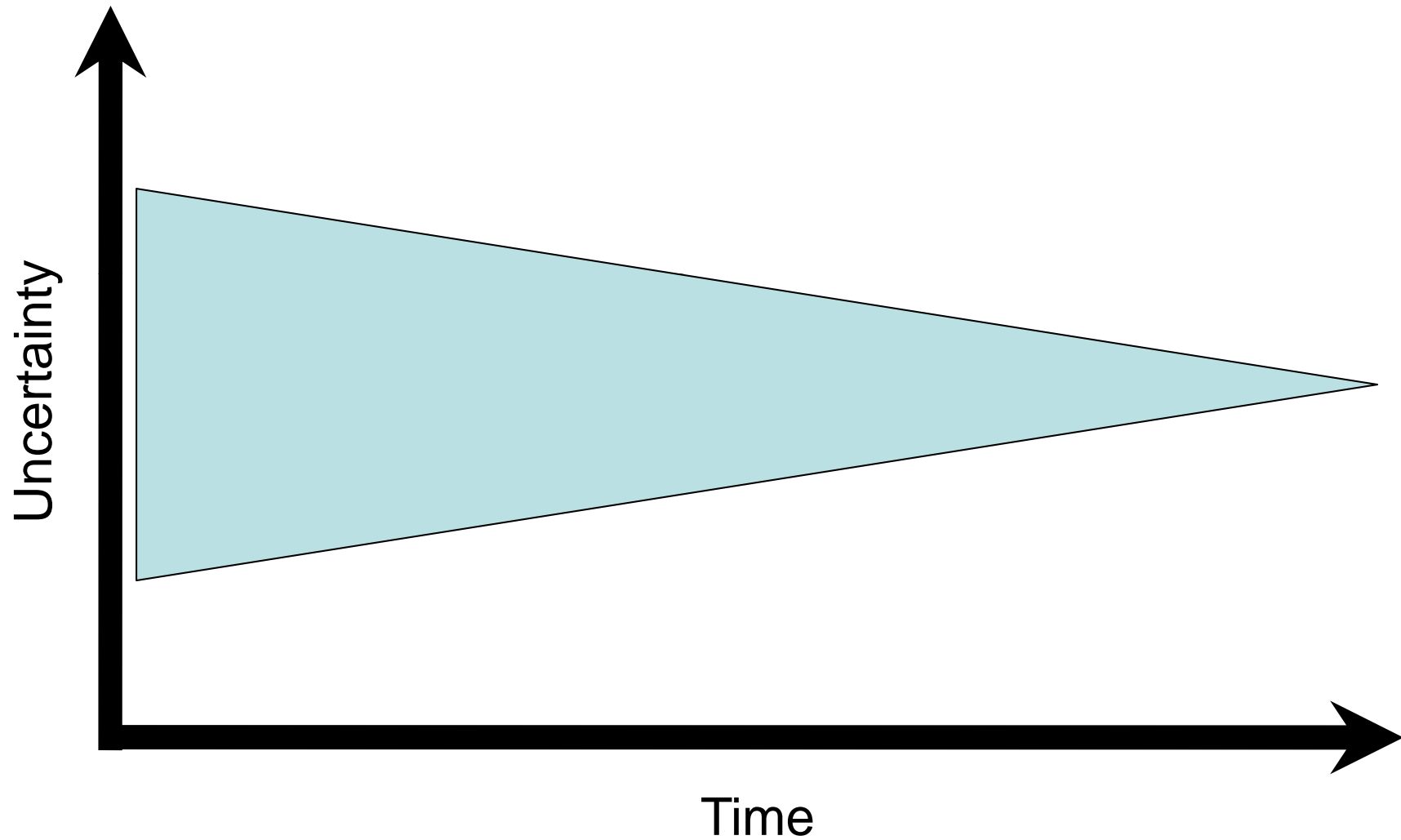
<http://www.eurosurveillance.org/ViewArticle.aspx?ArticleId=19319>

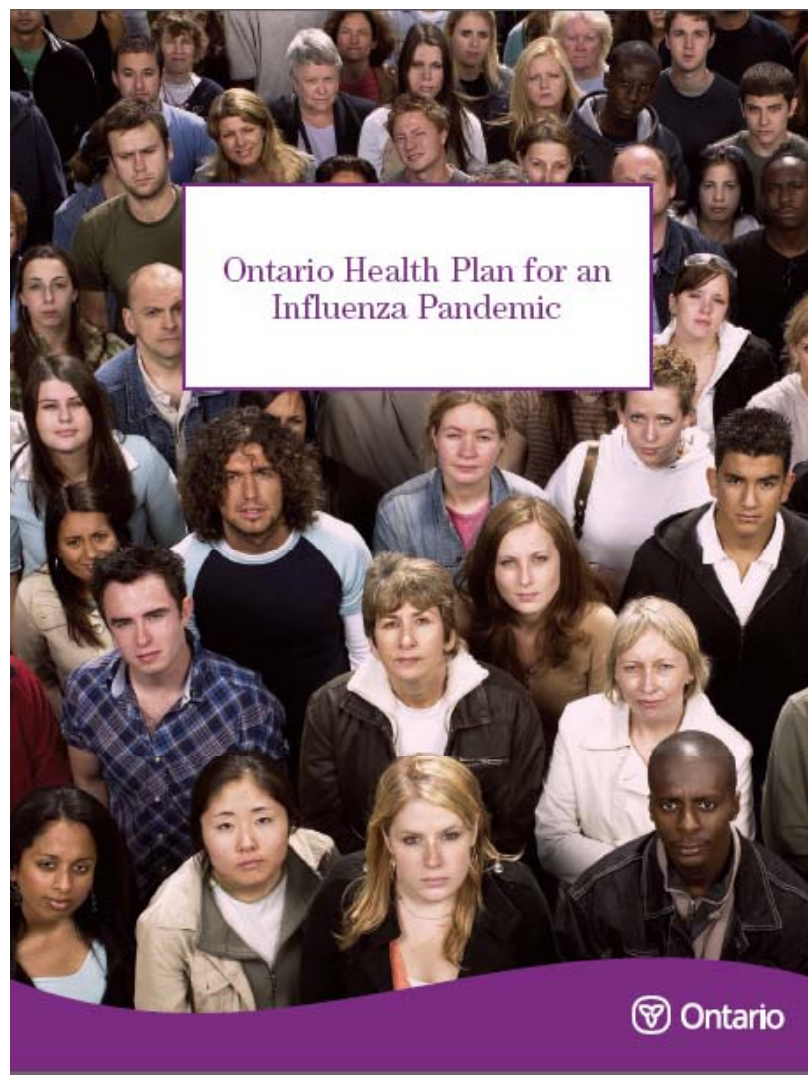
## MOHLTC Telehealth Syndromic Surveillance Report Monday September 14, 2009 – Sunday September 20, 2009



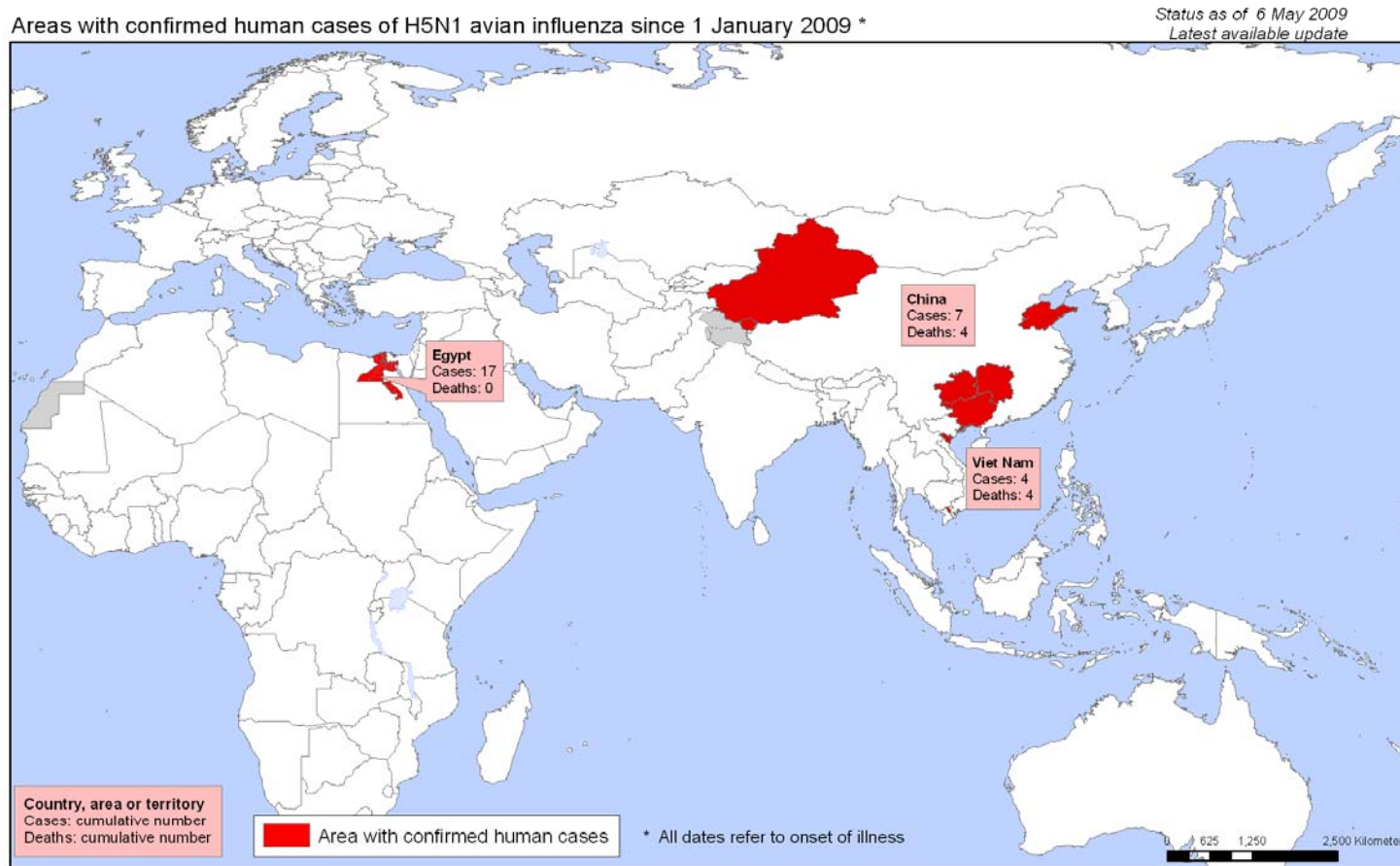
## Global summary – what do we know?

- 2009 Pandemic H1N1 has established itself as the dominant influenza strain globally
- Strains have remained identical, and resistance is also rare
- Most cases of infection are mild
- Large numbers of people remain susceptible
- Age distribution is much younger than seasonal influenza
- Risk groups globally include those with obesity, asthma, diabetes, pregnant women and indigenous peoples,
- Severe respiratory disease (direct lung infection) including in young healthy people requires highly specialized and prolonged intensive care
  - Impact on ICU in the coming season is likely to be significant





## How did it start? – Not where we expected!



The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted lines on maps represent approximate border lines for which there may not yet be full agreement. © WHO 2009. All rights reserved

Data Source: WHO  
Map Production: Public Health Information and Geographic Information System (GIS)  
World Health Organization

## What we expected

- Started in Southeast Asia
- Time to prepare
- High morbidity & mortality
- Predilection for risk groups (including elderly and young)
- High societal disruption

## What we got

- Started in North America
- No time to prepare
- Low morbidity and mortality (so far)
- Predilection for young risk groups (including pregnant women)
- High media profile

**Table 3.2: Number of People Affected as a Percentage of the Population (based on a 35% attack rate)**

	No. of People	% of People who are Clinically Ill (#2 in Table 3.1)	% of Total Population (#1 in Table 3.1)
People who can be managed through self care	2,043,345	45.2%	15.8%
People who will require an outpatient visit	2,411,308	53.3%	18.7%
People who will be hospitalized and recover	54,572	1.2%	0.4%
Fatal cases (70% in hospital)	12,635	0.3%	0.1%
Hospitalizations (recoveries + 70% of fatal cases)	63,417	1.4%	0.5%

OHPIP 2008

## Canadian Assumptions

- Assumed 165 thousand hospitalizations
  - We have seen 0.6% so far
- Assumed 33 thousand deaths
  - We have seen 0.2% so far
- Assumed 1 in 5 of hospitalized would die
  - We have seen 1 in 21 of hospitalized die

## So why are we concerned?

**Some populations are harder hit than others:**

- **Children < 5 (especially <2)**
- **Co-morbid illness**
- **Aboriginal**
- **Pregnancy**

## Severe outcomes

**“Children under 2 years of age, pregnant women, persons under 65 years of age with underlying medical conditions and Aboriginal populations have higher rates of hospitalizations and greater risk of severe outcomes (ICU admissions and deaths). Aboriginal communities have more pregnant women, young children, and underlying chronic disease than the general Canadian population, which may explain the disproportionate number of severe cases in this population.”**

Flu Watch

## Severe outcomes

- Children < 5 years of age have the highest ICU admission rate
- Mortality rate highest in > 65 years (0.42 per 100,000), followed by the cases between 45 and 64 years (0.27 per 100,000)
- Some cases required prolonged ventilation
- What happens if the virus mutates or becomes resistant to antivirals?

# Health System Issues

- a) Primary care
- b) Alternative assessment, treatment and referral
- c) Acute care
- d) Critical care

## Primary Care

- **On the frontlines – need rapid access to changing information**
- **OHPIP primary care chapter useful in guidance re maintaining primary care services**
- **Variable response**

# Primary Care strategies

- Self assessment algorithms
- Telehealth
- IPC and Clinical guidance for ambulatory care settings
- Provider education and support
- Maintaining services: cohorting patients, group coverage, phone assessments

# Alternative Assessment, Treatment and Referral Strategies (e.g. flu centres)

- Local contingency plans should address circumstance where local primary care system is unable to meet demand for assessment, treatment and referral
- Local plan to be flexible and address strengths and constraints of local health care delivery system
- Health care providers to work with local public health unit to put plan in place

## Alternative Assessment, Treatment and Referral Strategies: examples:

- “Flu Centre” – ad hoc health facilities performing assessment, treatment and referral services
- Augmented hours of primary care operation, staff resources of existing primary care centres
- Out-patient hospital clinic
- Mixed approach including some or all of the above

## Acute Care

- 20-25% of hospitalizations have been ICU admissions
- Due to “polarity” of illness, non-ICU care may not be as stressed as Critical Care
- Exception may be in children <5: asthma, croup, bronchiolitis

## Critical Care Surge Planning

- pH1N1 critical care surge strategy currently in development by Emergency Management Branch and the Critical Care Secretariat
- Goal is to optimize existing critical care surge resources through the LHIN-based Surge Capacity Management Program and to provide for contingencies should existing resources become overwhelmed

## Critical Care Surge Planning

- On-going monitoring and analysis of critical care resource utilization
- Application of principles and approaches of the provincial Surge Capacity Management Program: hospital-based and LHIN-based
- Encourage local planning, using strategies outlined in OHPIP
- Clinical guidance for critical care (in development)
- Provincial support for additional ventilator capacity

## Summary: Clinical lessons

- Mild in many, severe in some
- Early treatment important: Access to antiviral medication
- Recommending antivirals for children, elderly, pregnant women, morbid obesity, underlying illness
- Watch out for those who get sick

## General work place guidance

- General education
- Provision of appropriate PPE if healthcare workers
- Hand hygiene
- Cough etiquette
- Loosening of sick time management programs
- Explore ability to work from home
- Provision of influenza vaccine when available

## **Pregnant/immunocompromised staff**

- Assumed similar risk of infection as general public
- At modest increased risk of more severe disease
- Possible work reassignment but not exclusion
- Advise on risks, preparedness
  - Vaccination
  - antivirals

## Infection Control Guidance

- Ontario is different from other provinces
- Requirement for fit-tested respirators within 2 metres
- Physical barriers
- Stockpiling for facilities, physician's offices

## Seasonal versus pH1N1 Vaccine

- pH1N1 seen as primary influenza strain this fall
- However older people less vulnerable to pH1N1 (residual immunity) but still vulnerable to seasonal strains
- Extent of seasonal 'flu penetration not clear
- Seasonal vaccine available now, pH1N1 in about a month
- Ontario's Plan:
  1. Seasonal program to  $\geq 65$  and LTCH residents
  2. pH1N1 immunization campaign (1<sup>st</sup> & 2<sup>nd</sup> tiers)
  3. Seasonal catch-up if indicated

## pH1N1 Vaccine Sequencing

### Tier 1

- <65 with chronic health conditions
- Pregnant women
- Children 6 months – 5 years
- Residents of remote/isolated communities
- Health care workers
- Household contacts of infants < 6 months and immunocompromised

### Tier 2 (everyone else)

- Children 5-18
- First responders
- Poultry and swine workers
- Adults 19-64
- Adults  $\geq 65$

## Antivirals

- Resistance has not yet been an issue
- Stockpiled enough drug to treat 25% of Ontario's population
- Unlikely to see widespread use
  - OHPIP plan versus current plan
  - All patients versus those at high risk for complications
- No plan for prophylaxis
- Reliance on existing distribution networks (pharmacies)

## Epidemiological uncertainties and risk communication – what don't we know?

- Many uncertainties, little time, and difficult messages to balance
- Benefits of seasonal vaccination uncertain this year
  - How much seasonal influenza will circulate, how much additional benefit from vaccine?
- Risk of pH1N1 for healthy people is low and safety of pH1N1 vaccine unknown – e.g. Guillain-Barré syndrome
  - *Safranek et al Am J Epidemiol. 1991*
    - 1976 swine influenza vaccine: Relative risk during the 6 weeks following vaccination 7.10 ; 9-10 per million vaccinees
  - *Stowe J et al. Am J Epidemiol. 2009*
    - Relative risk within 90 days of seasonal **vaccination** 0.76 (0.41, 1.40)
    - Relative risk within 90 days of **an influenza-like illness** 7.35 (4.36, 12.38)

**We're waiting for  
a different flu  
season.....**



Ian McKellen and Patrick Stewart in  
Samuel Becket's *Waiting for Godot*