

# The Epidemiology of H1N1 Pandemic Influenza: Unanswered Questions

Dr. Carole Beaudoin

Epidemiologist, National Microbiology Laboratory

Public Health Agency of Canada

Severe H1N1 Disease:

Preventing Cases, Reducing Mortality

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# The Epidemiology of H1N1 Pandemic Influenza: Unanswered Questions

Basic epidemiologic questions for any infectious disease focus on:

- **person** – identification of population-specific infection rates; identification of population-specific vulnerabilities
- **place** – identification of spread patterns and opportunities for spread beyond identified geographic or social boundaries
- **time** – characterisation and trending of the infection / disease spread as it is introduced to and circulates within a population

with particular emphasis on the synergistic effect of host characteristics, the environmental or social factors that may exacerbate risk (e.g., access to health care), and organism characteristics (e.g., genetic shifts, viral shedding).

# The Epidemiology of H1N1 Pandemic Influenza: Unanswered Questions - Person

## What we know

- ◆ Majority of cases are among children and young or middle-aged adults.
- ◆ Indigenous Canadians seem to be more affected.

## What we don't know

- ◆ Why are middle aged and younger people more at risk compared to older adults?
- ◆ This ethnic disparity is not generally seen with seasonal influenza; why the difference?

What are the estimated population-specific attack rates, and what risks are associated with infection and severity?

# The Epidemiology of H1N1 Pandemic Influenza: Unanswered Questions - Person

## What we know

- ◆ There may be some host vulnerabilities among those severely ill.
- ◆ Pregnant woman appear to be more at risk particularly for severe illness.

## What we don't know

- ◆ What is the contribution that these potential host vulnerabilities play?
- ◆ Do these recognised vulnerabilities just reflect the Canadian population or do they represent true risk?
- ◆ What role does pregnancy play in infection or severity risk?

Once population-specific vulnerabilities are identified, how can we mitigate their risk for future waves?

# The Epidemiology of H1N1 Pandemic Influenza: Unanswered Questions - Place

## What we know

- ◆ H1N1 appears to have affected all parts of Canada, and globally.
- ◆ Access to health services vary greatly across Canada.

## What we don't know

- ◆ Are there places, geographic or social, where infection risk is greater?
- ◆ Does housing and access to basic sanitation matter?
- ◆ Do schools or workplaces represent specific risky places?
- ◆ Does access to health care and specifically antiviral medications impact severity?

# The Epidemiology of H1N1 Pandemic Influenza: Unanswered Questions - Place

## What we know

- ◆ Outbreaks within “closed” settings have been identified.
- ◆ Farm workers in the swine industry are thought to represent a particular risk group for infection and/or transmission.

## What we don't know

- ◆ What is the spread pattern associated with these closed settings outbreaks?
- ◆ If some within the transmission or exposure network resolve infections and others do not, why?
- ◆ Are pig farms and their workers at particular risk for infection or transmission, and if so, how can this risk be mitigated?

# The Epidemiology of H1N1 Pandemic Influenza: Unanswered Questions - Time

## What we know

- ◆ H1N1 infections appear to have tapered off, and a second wave is expected to follow a seasonal influenza pattern.
- ◆ Incubation period and length of shedding both impact the success of the virus in circulating (and continuing to circulate) throughout a population.

## What we don't know

- ◆ Can we anticipate zoonotic influenza viruses to diversify once established in a human population?
- ◆ Do we expect any antigenic shifts during subsequent waves?
- ◆ For how long do people shed the H1N1 virus?
- ◆ What is the incubation period for the H1N1 virus?
- ◆ What is the basic reproductive rate for the novel virus?

# The Epidemiology of H1N1 Pandemic Influenza: Unanswered Questions – Organism Characteristics

## What we know

- ◆ There appears to be very few strain variations that can explain infection vulnerability and/or disease severity.
- ◆ Recommendations have/will be made for vaccination against seasonal influenza during the upcoming fall/winter.

## What we don't know

- ◆ Can we combine the epidemiologic and laboratory science to identify significant sequence variations that may correlate with and predict disease severity?
- ◆ What is the impact of seasonal influenza immunization on H1N1 infection risk?
- ◆ Is any cross protection offered?
- ◆ Does it exacerbate infection risk?

# The Epidemiology of H1N1 Pandemic Influenza: Moving Forward

- Provinces, territories, and the Public Health Agency have been working feverishly to better understand the descriptive, clinical, and social epidemiology of this novel H1N1 virus
- More questions than answers re: circulation, risk, determinants of severe disease, and anticipated changes in the virus
- Some things to consider as we continue to move forward:
  - need better laboratory and epidemiologic linkages
  - research into risk and determinants of severity need to consider how to mitigate those risks
  - strong linkages required between researchers and clinical care providers