

# Pandemic potential of the 1918 H1N1 Virus - Is it the same in 2008?

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The underlying assumption of this meeting is that the H1N1-1918 virus would be as virulent in 2008 as it was in 1918\*

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Is that assumption reasonable?

What are the significant differences between the human populations of 1918 and 2008 and the medical resources available to the two groups?

# Major epidemiological differences between 1918 and 2008 human populations

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Condition present in humans in:

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1918

2008

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Immunity to H1

No

Yes

Immunity to N1

No

Yes

Co-circulation of  
H1N1 and H3N2

No

Yes

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All humans > 2-3 years of age have immunity to both H1N1 and H3N2 viruses.

# Immunity induced by current influenza viruses or vaccines will restrict the replication of a 1918 H1N1 virus in current human populations

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- 1 - Current vaccines can boost antibody to 1918 virus (Tumpey et al. PNAS 2004).
- 2- Immunization of mice with 1999 H1N1 vaccine reduced replication of 1918 virus 50-fold (Tumpey et al. PNAS 2004).
- 3- Reduction would be expected to be greater if these mice, like current 2008 humans, had been repeatedly infected with wild type H1N1 viruses

# Additional factors that would decrease the severity of a 1918 H1N1 infection of humans in 2008

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- 1- Excess mortality in 1918 linked to secondary bacterial infection (pre-antibiotic era). Antibiotics are available in 2008 (Kuiken et al. Vaccine 2007).
- 2- Medical support services have improved dramatically in the last 90 years.

# Conclusions

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- 1- Clinical impact of 1918 virus in 2008 would be much less than in 1918 -- even less than the H2N2 epidemic of 1957.
- 2- The 1918 H1N1 virus should not be treated differently than other human influenza A viruses with pandemic potential.
- 3- A series of incorrect assumptions led to the existing recommendation of mandatory antiviral prophylaxis for work with 1918 H1N1 virus.
- 4- New data on restricted replication of 1918 virus in H1N1 immune mice makes continuation of this policy unnecessary and unwise.

# Challenges

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What risk/benefit analyses have been performed to propose the use of pre-exposure antiviral prophylaxis versus post-exposure prophylaxis for the 1918 H1N1 in an enhanced BSL3 facility with appropriate biosafety practices?

# Challenges

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- 1- What are the data to support the safety and efficacy of the long term use of antiviral prophylaxis?
- 2- If data are not available or insufficient for licensure for this indication, do we have the authority to mandate its use?
  - If so, should this be studied under an IND?
- 3- If safety data are not available for pregnant women, will they be mandated to use antiviral prophylaxis? Or, will they be removed from their positions?
- 4- What is the liability for the institution and the prescribing physicians for mandating use of an antiviral drug off-label?