Update on epidemiology of Pandemic Influenza H1N1 2009

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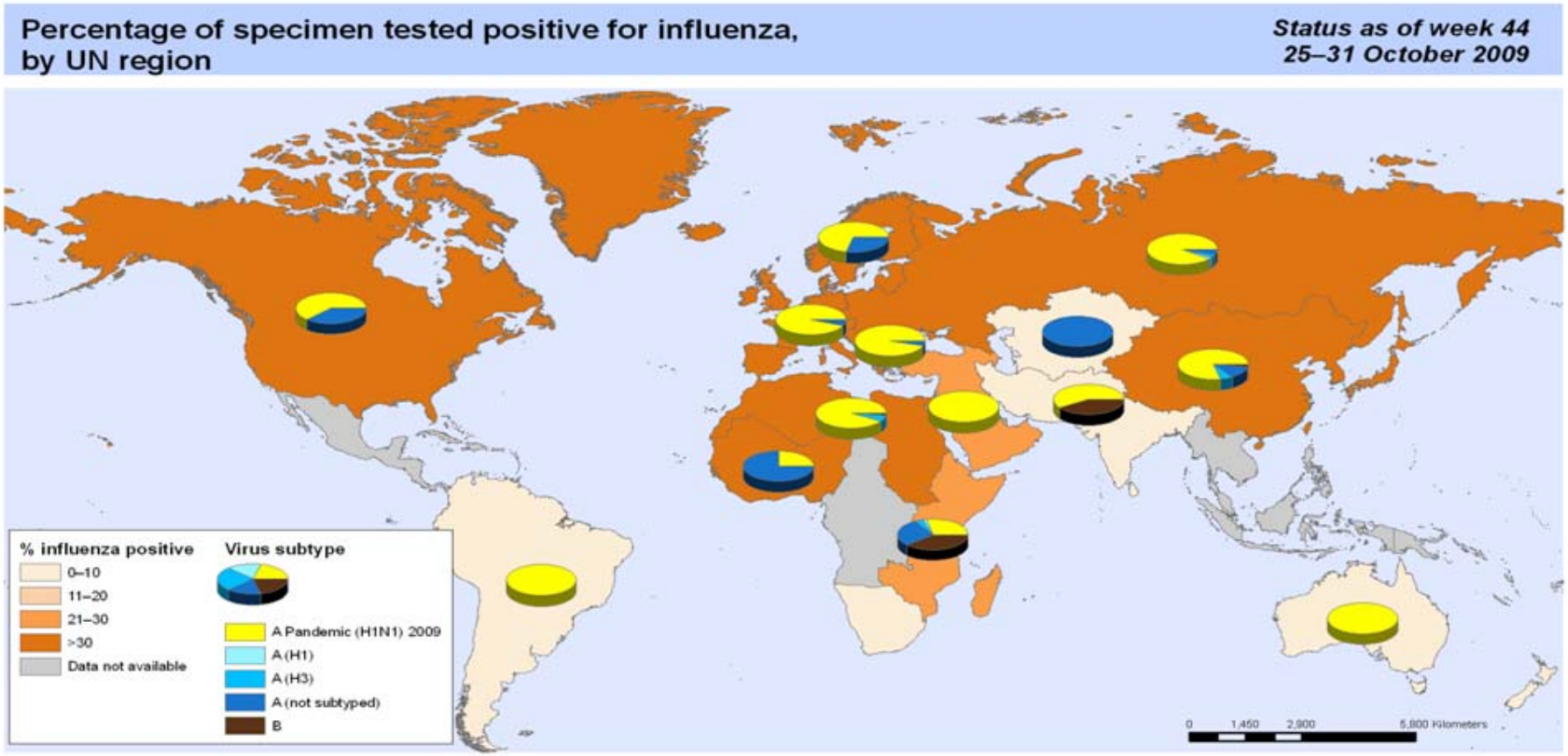
World Health Organization

Pandemic Overview
(November 2009)

- It is likely that every country of the world is now infected and that cases number in the millions.
- As nearly all countries have stopped counting individual cases the official case count is ***significantly*** lower than the actually number of cases.
- Northern Hemisphere
  - Very early season well established; starting to peak in parts of U.S.
  - Europe now showing definite signs of early season as well, some weeks behind N. America but still quite early
  - Intensity spreading eastward across Europe. E. Europe much in the news lately.
- Southern Hemisphere
  - No active circulation in the temperate regions since the season passed but recent report of a cluster in Buenos Aires.
- Tropics
  - Variable - Widespread infections but respiratory disease decreasing

Global Spread of Pandemic (H1N1) 2009



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Data Source: World Health Organization
Map Production: Public Health Information and Geographic Information Systems (GIS)
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Summary of WHO international consultation on clinical aspects of pandemic H1N1,
Washington DC, October 2009

- The pandemic virus has similar features with seasonal influenza, but differs in several aspects.
- Burden is highest in children and younger adults.
- The virus cause very severe pneumonia, requiring special ventilator support. Virological and pathological findings support this nature.
- Three groups at increased risk of severe illness and deaths: pregnant women, children younger than 2 years of age, and people with chronic lung disease including asthma. Indigenous/disadvantaged populations and obesity have been reported with higher incidence of severe complications.
- Bacterial co-infection (namely, pneumococcus and S. *aureus*) are more frequently reported than initially recognized.
- Timely antiviral treatment has gained evidence in reducing severe illness and death.

Age group affected

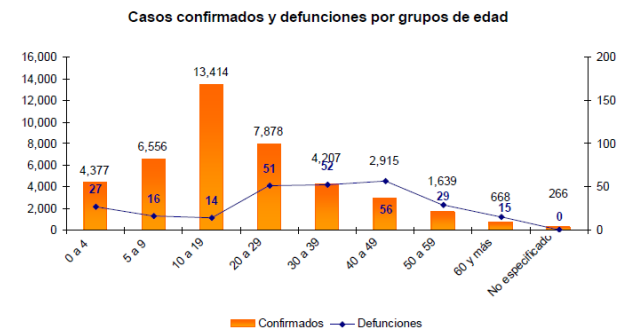
Younger age groups most affected

- Older teens and young adults have highest attack rates for *all* illness
  - median age 12-28 yrs
- Less than 5 y.o. have highest *rates* of hospitalization
  - At least twice that of other age groups
  - But absolute numbers smaller than in slightly older age group because of population distribution
  - median 20-36 yrs
- Mortality highest in 50 – 60 y.o.
  - median 35-51 yrs

Distribution of confirmed cases by age group (number of cases)

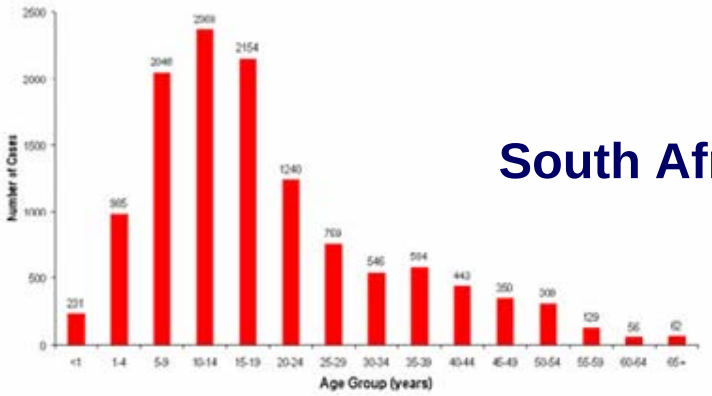
Casos confirmados y defunciones por grupos de edad

(41,920 casos confirmados y 260 defunciones)



FUENTE: Casos confirmados: Base de datos InDRE; Defunciones: CONAMED.

Mexico



South Africa

Figure 2: Number of laboratory confirmed pandemic influenza A(H1N1) 2009 cases by age-group, South Africa, updated 19 October 2009 (n=12 378, 116 unknown age)

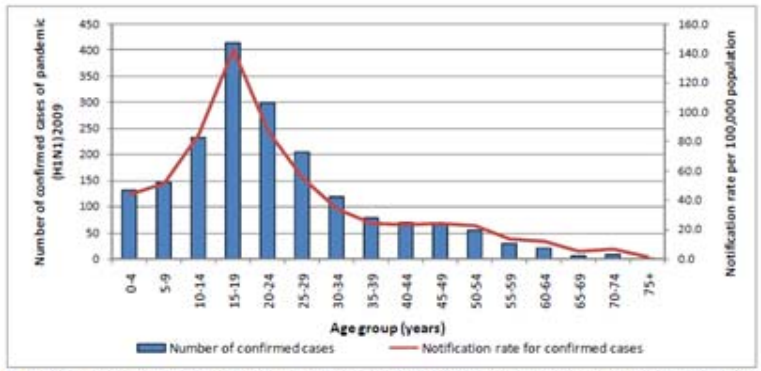
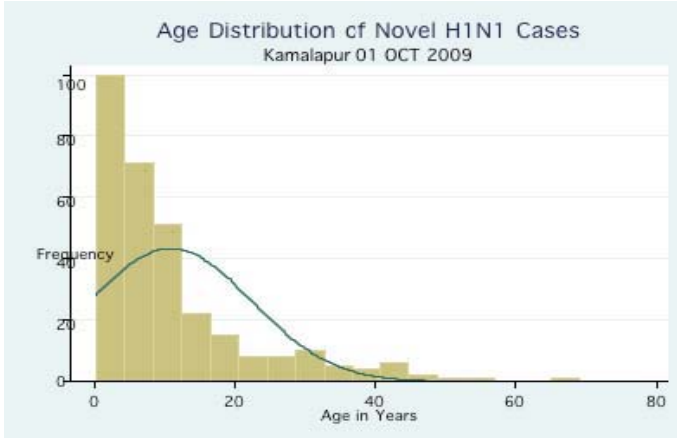


Figure 8: Cumulative number of confirmed cases of pandemic (H1N1) 2009 and notification rate per 100,000 population by age group (years)

Source: CIDR

Ireland



Bangladesh

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Age-Specific (population based) hospitalization rates (Australia, Chile, Argentina, New Zealand)

FIGURE 8

Rates of notified and hospitalised influenza A(H1N1)v cases by age group, New Zealand, cumulative rates for 2009

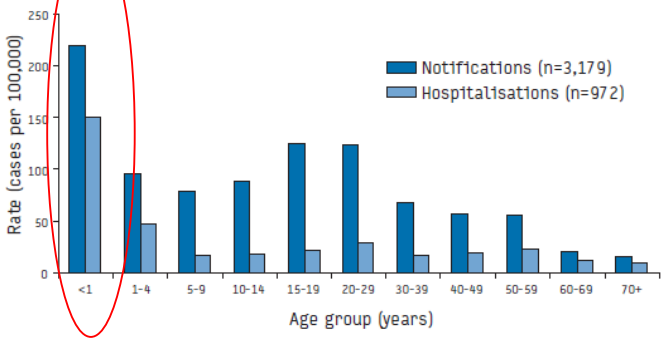
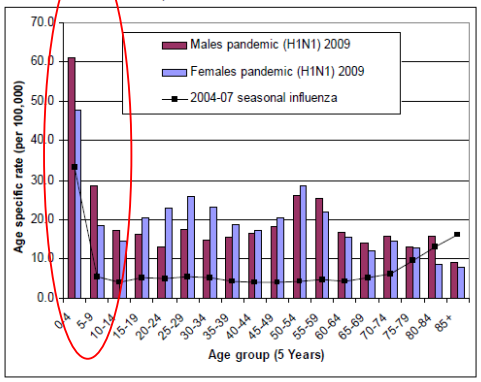


Figure 9. Age specific rates of hospitalised confirmed cases of pandemic (H1N1) 2009 to 18 September 2009, compared with average annual age specific rates of hospitalisations from seasonal influenza 2004-05 to 2006-07*, Australia



*The rates for pandemic (H1N1) 2009 are from 15 June to 21 August 2009 whereas the rates for seasonal influenza are averaged annual rates (i.e. for a full influenza season).

Source: NETEPI database

Gráfico 2: Distribución de IRAG según grupos de edad. Tasas por cien mil hab. Argentina 2009. n= 8.872

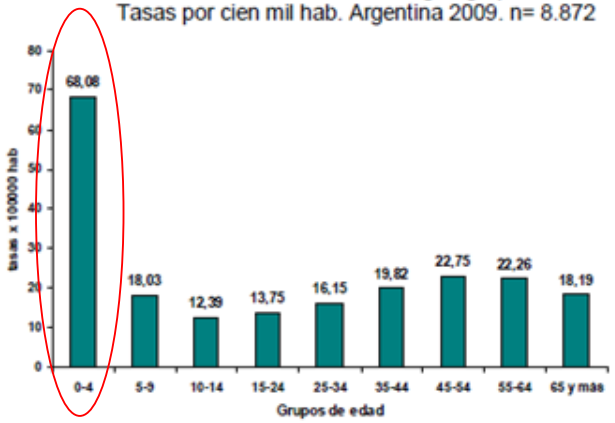
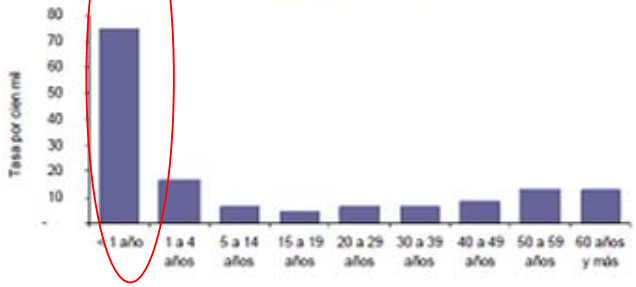


Gráfico 5: Distribución de las tasa de IRAG confirmadas de influenza pandémica (H1N1) 2009, según grupos de edad. Chile, 2009. n= 1562



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Pregnancy and Influenza: Outcomes in Pregnant Women

- 5 -10% of hospitalized (including ICU) being pregnant women
  - 5 times higher proportions in hospital compared to general population (or in child bearing age group)
- Up to 10 times higher ICU hospitalization compared to general population
  - Not a consistent observation everywhere

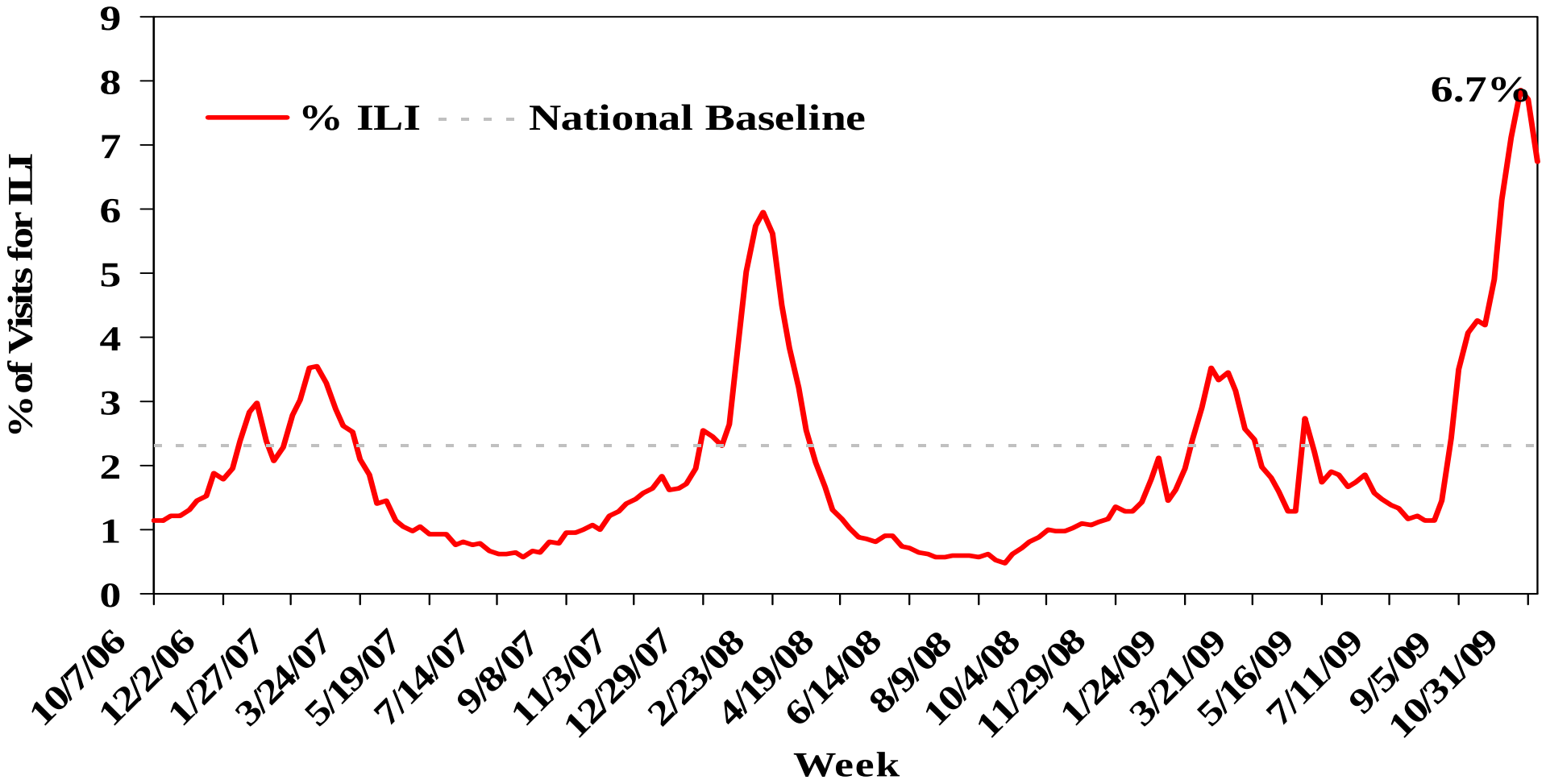
Neuzil et al. Amer J Epidmiol 148:1094, 1998; Dodds et al. Can Med Assoc J 176:463, 2007; Rasmussen et al. Emerg Infect Dis 14:95, 2008; ANZIC NEJM 361, 2009, JAMA Oct 2009

New risks for severe outcome?

- Many reports of obesity as risk factor
  - Appear excessive numbers in intensive care units
  - Some report that the % of obese patients in hospitalised cases reflects the % of obesity in the general population.
  - % with obesity seems to increase with severity but inconsistent data
  - Obese patients admitted in ICU not at more risk to die than non-obese patients admitted in ICU (JAMA 12 Oct, Kumar et al)
  - Difficult to tease out as an independent risk factor due to associated comorbidities like diabetes
- Many countries with large indigenous populations report higher risk in those communities
  - Also difficult to tease out effect from comorbid conditions
  - Whatever the mechanism, observation is consistent

Experience in the North America
In the current season
Regarding severity and impact

Epidemiology/Surveillance
Percentage of Visits for Influenza-like Illness (ILI) Reported by the *U.S. Outpatient Influenza-like Illness Surveillance Network (ILINet)*, National Summary October 1, 2006 – November 7, 2009 (source: US CDC)



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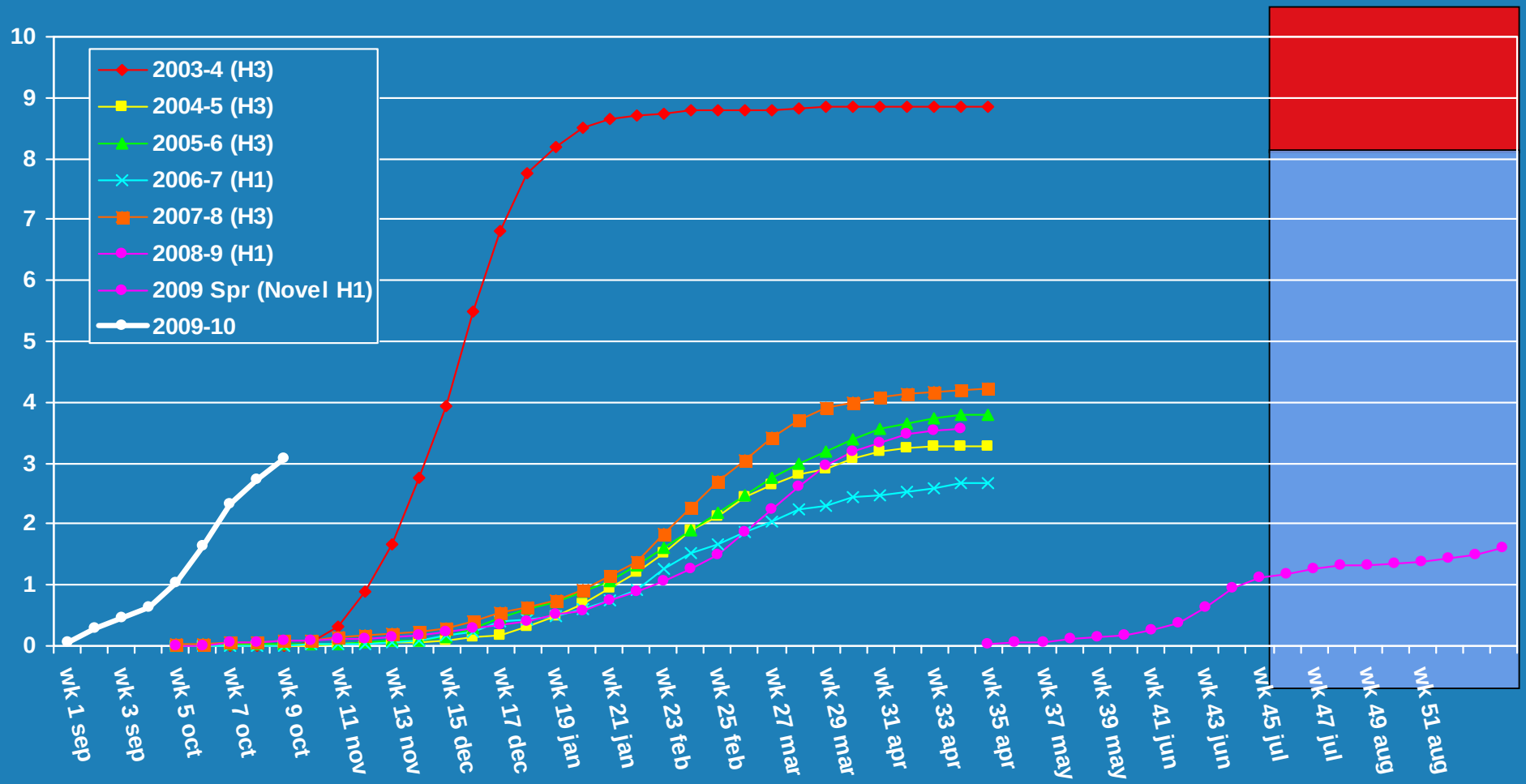
Epidemiology/Surveillance

Cumulative rate of hospitalization/10,000 population ages 0-4, EIP, 2003-2009



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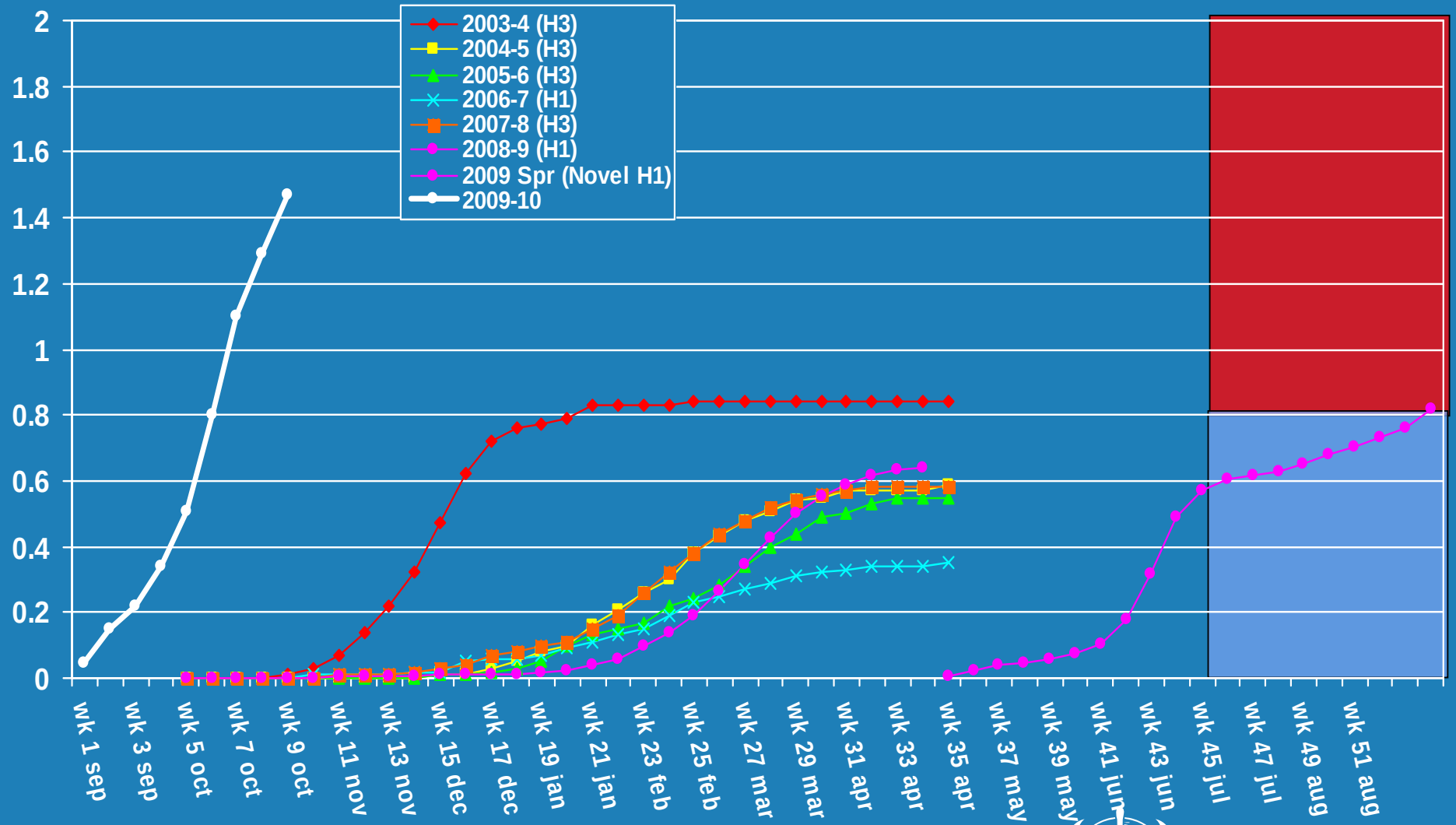
Epidemiology/Surveillance

Cumulative rate of hospitalization/ 10,000 population ages 5-17, EIP, 2003-2009



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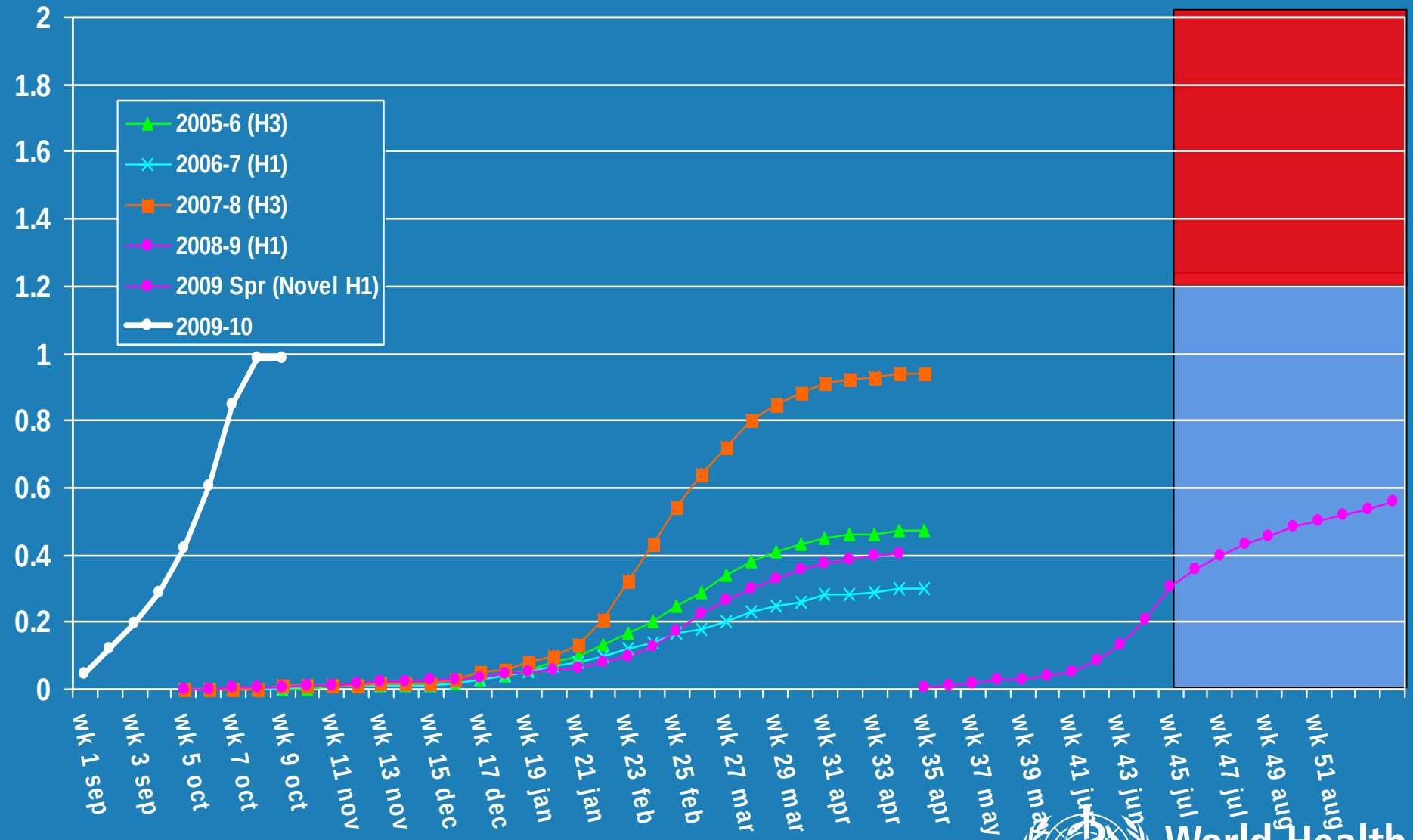
Epidemiology/Surveillance

Cumulative rate of hospitalization/ 10,000 population ages 18-64, EIP, 2005-2009



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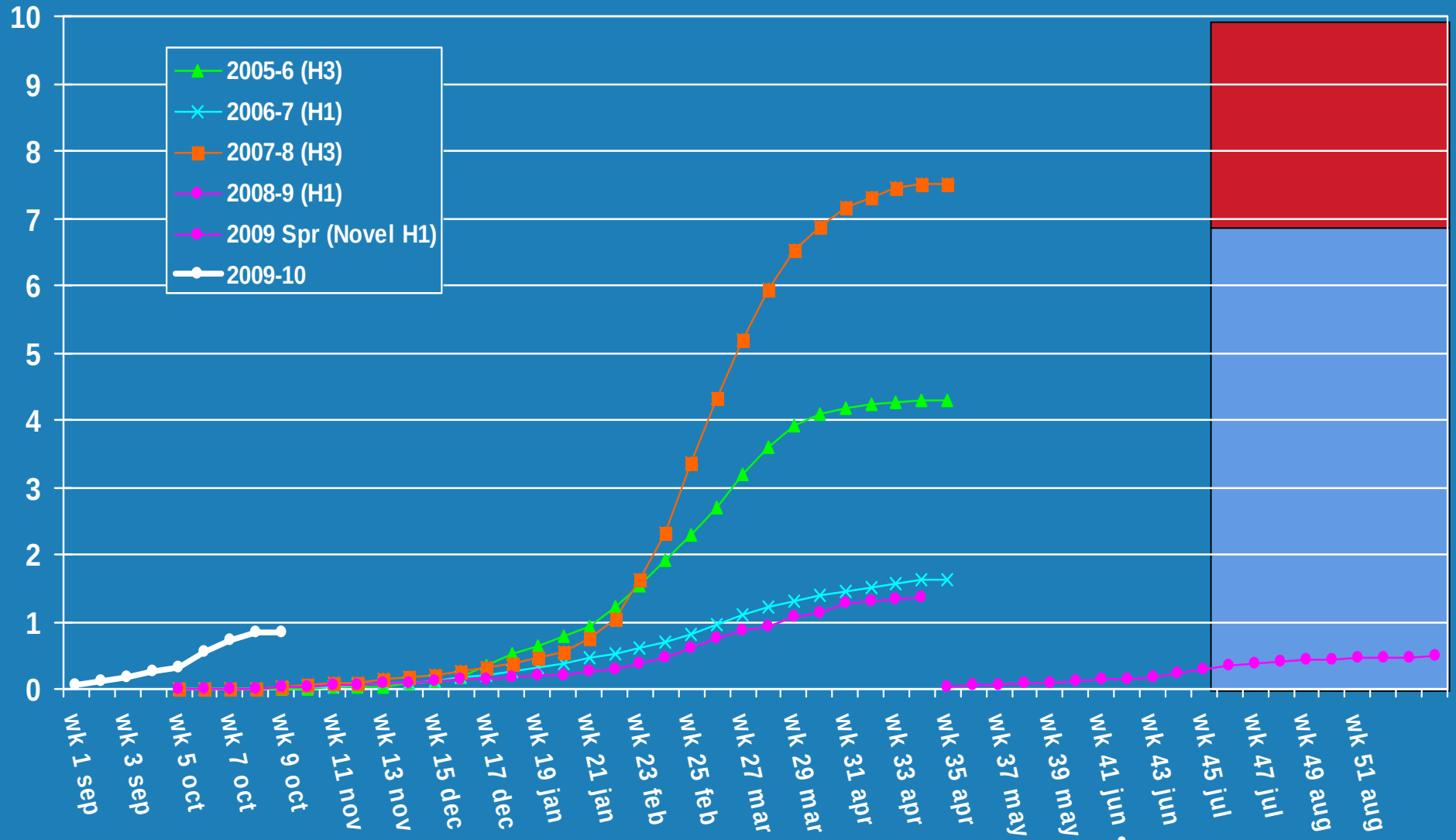
Epidemiology/Surveillance

Cumulative rate of hospitalization/ 10,000 population ages 65+, EIP, 2005-2009



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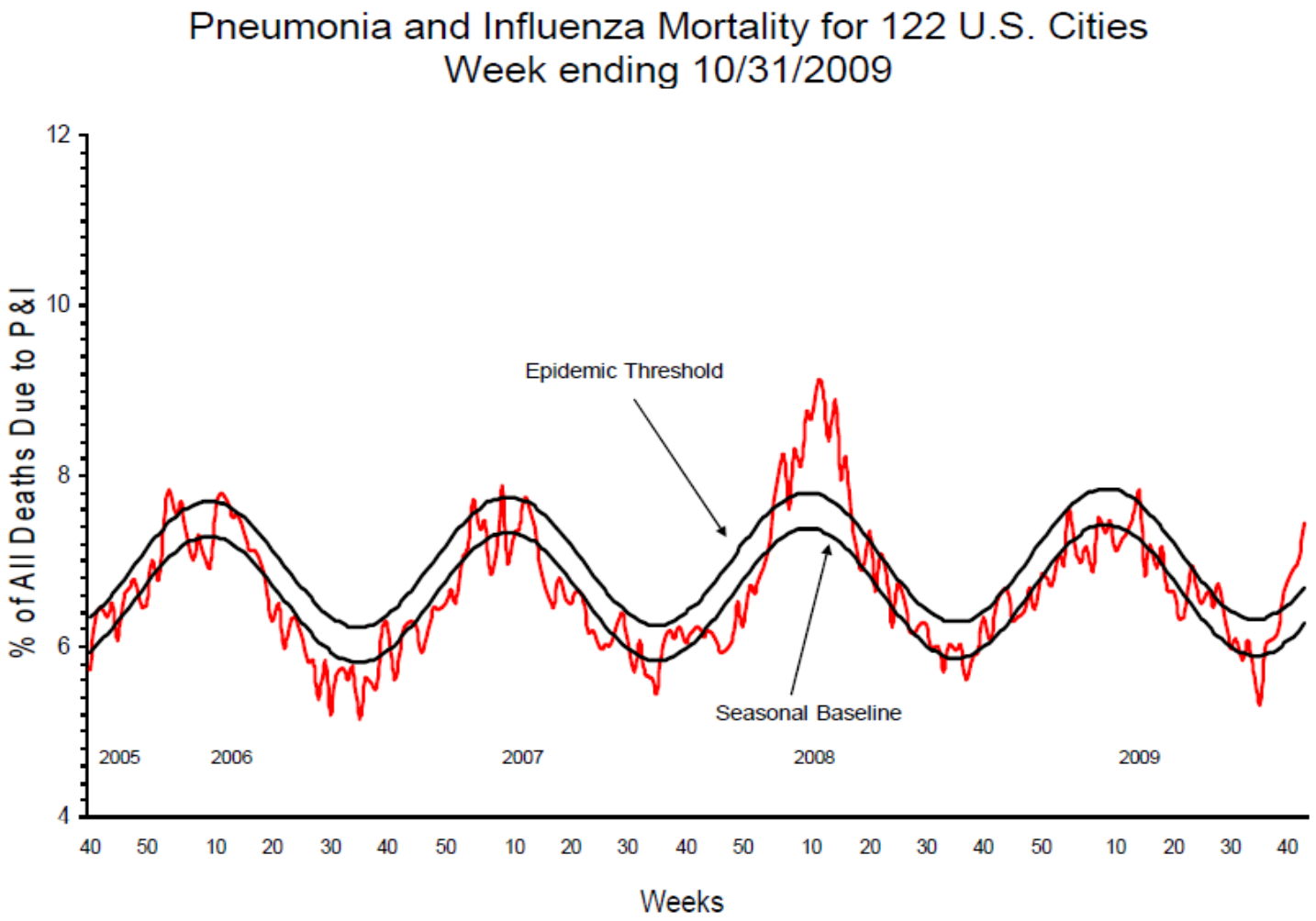
Mortality data from USA



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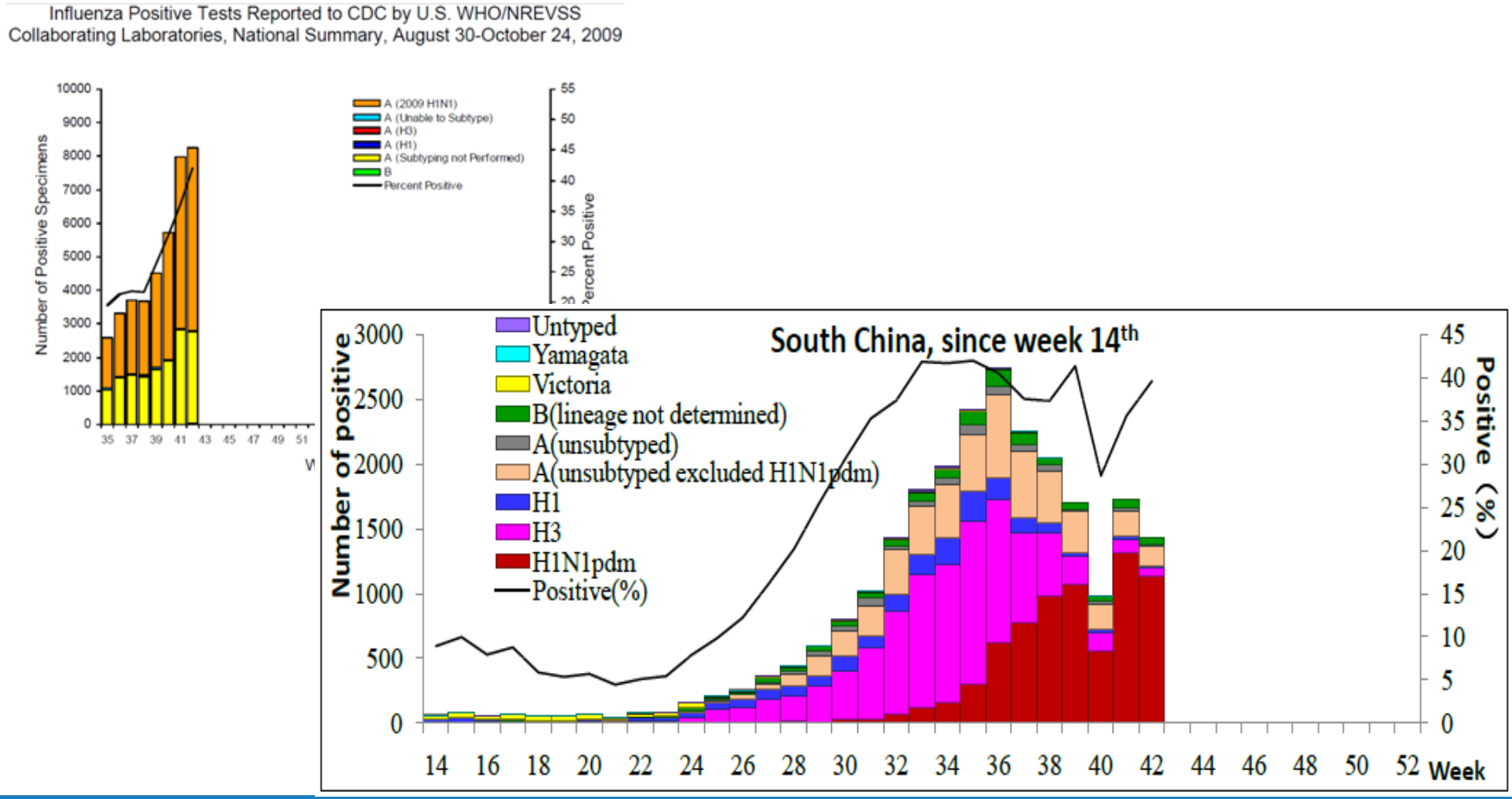
Pandemic (H1N1) 09 virus characteristics

- All viruses analyzed to date are
  - Antigenically and genetically similar to A/California/7/2009, WHO recommended pandemic vaccine virus
  - Viruses isolated from severe cases do not show sequence differences
- **Sensitive to neuraminidase inhibitors** (oseltamivir, zanamivir)
  - Resistant to amantadine and rimantadine
  - Sporadic resistant virus to oseltamivir reported, >50 cases by 18 Nov 2009
  - All resistant viruses showed H275Y mutation
  - An animal study showed same pathogenicity in mice of oseltamivir resistant or sensitive pandemic 2009 viruses

Pandemic (H1N1) 2009 and seasonal influenza viruses co-circulation, and H5N1

- Pandemic (H1N1) 2009 and seasonal viruses have co-circulated at varying levels over time in multiple countries but very little currently
- Patterns in upcoming northern hemisphere season are uncertain
  - H3N2 quickly disappearing when H1N1 transmission reaches significant levels e.g. China
  - Disappearance of seasonal virus related to intensity of circulation of pandemic H1N1?
  - Implications of early season – lots of winter left in the northern hemisphere
- H3N2 circulating in swine herds

Co-circulation of 2009 H1N1 and Seasonal Influenza



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Summary

Experience to date indicates:

- Youngest age group, pregnant women, those with chronic medical illnesses, and indigenous groups at high risk
  - Question about obesity not yet answered but worth concern
  - Significant portion of severe cases without identifiable risk factors
- Season is well under way in Northern Hemisphere, many weeks early
  - Implications for remainder of winter is unknown
- Impact significant in terms of demands on health care system
- H3N2 and seasonal H1N1 rapidly disappearing

Acknowledgements

(by alphabetic order)

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