PANDEMIC INFLUENZA

Ralph D. Feigin, M.D.
Chairman, Department of Pediatrics
Baylor College of Medicine
and
Physician-in-Chief
Texas Children's Hospital
Houston, Texas

BCM
Baylor College of Medicine

Texas Children's Hospital

Influenza

Severe Respiratory Illness

Complications Seen in Children

- Otitis media
- Sinusitis
- Croup
- Bronchiolitis
- Pneumonia
  (influenza and bacterial)
- Pericarditis
- Myocarditis
- Rhabdomyositis and Rhabdomyolysis
  (sometimes leads to myoglobinemia, myoglobinuria and renal failure)
- Encephalitis
- Reye syndrome
- Guillain-Barré syndrome
- Toxic shock
- Sudden death

Risk of Complications and Death Higher in Children with Co-Morbidities

- Cystic fibrosis
- Asthma
- Bronchiectasis
- Congenital heart disease
- Diabetes
- Cancer and/or receiving immunosuppressive drugs
- AIDS
- Inherited immune deficiency diseases

- Highest attack rates for influenza are in children, and children are the major disseminators of the virus.
- Children 6-12 months of age have highest attack rate in seasonal influenza due to waning maternal antibodies.
- Young children usually develop higher temperatures than adolescents and adults and often have febrile convulsions.

- In neonates and infants, unexplained fever may be only indication of influenza.
- 40% of children with influenza also have and may present with gastrointestinal manifestations.
- 20% of children present with neurologic manifestations (seizures, meningitis, encephalitis).
- A dedicated outpatient area for assessment of children with influenza symptoms may limit spread of disease related to children sitting in emergency centers.

- In influenza epidemics, we have good estimates that 25-50% of children who are unimmunized will develop disease. Hospitalization rates are 2.5-3.5% of those with illness and deaths occur in 0.37-2.0% of those who are hospitalized.

- According to the CDC, a “medium level pandemic” in the U.S. would cause 15-35% of the population to become ill (higher rates of 25-50% in children); 314,000 to 734,000 hospitalizations; 18-42 million outpatient visits; and 89,000 to 207,000 deaths.

Special Considerations for Children in Pandemics

- Children hospitalized at higher rates than adults.
- Less surge capacity and specialized expertise. Requires specialized respirators. More caregivers per patient. More space as parents or other adults are almost always present at bedside.
- Who cares for children if parents or caretakers are too ill to provide oversight?

Special Considerations for Children in Pandemics (cont'd.)

- Need for more vaccine studies in children. Only one vaccine available for children less than four years of age.
- No antivirals approved for children less than one year of age.
- Need to stockpile liquid antiviral medication which has shorter half life than capsules.
- Need to consider care for children if decision made to close schools during pandemic and both parents work during normal school hours.

- Based on the projected severity of the pandemic, government and health officials may recommend different actions communities can take in order to try to limit the spread of disease. The actions are designed primarily to reduce contact between people and would affect employers. The actions may include:
  - Asking ill persons to stay at home or not go to work until they are no longer contagious (7-10 days). Ill persons will be treated with antiviral medication if drugs are available and effective against the pandemic strain.
  - Asking household members of ill persons to stay at home for seven days.

- Dismissing students from schools and closing child care programs for up to three months for the most severe pandemics, and reducing contact among kids and teens in the community.
- Recommending social distancing of adults in the community and at work, which may include closing large public gatherings, changing workplace environments and shifting work schedules without disrupting essential services.
- Encourage employees who have children in their household to make plans to care for their children if officials recommend dismissal of students from schools, colleges, universities, and childcare programs. Advise employees to plan for an extended period (up to 12 weeks) in case the pandemic is severe.

- In a severe pandemic, parents would be advised to protect their children by reducing out-of-school social contacts and mixing with other children. Although limiting all outside contacts may not be feasible, parents may be able to develop support systems with co-workers, friends, families, or neighbors if they continue to need childcare. For example, they could prepare a plan in which two-to-three families work together to supervise and provide care for a small group of infants and young children while their parents are at work (studies suggest that a childcare group size of less than six children may be associated with fewer respiratory infections).

Plan for Dismissal of Students and Childcare Closure

- Identify employees who may need to stay home if schools dismiss students and childcare programs close during a severe pandemic.

- Advise employees not to bring their children to the workplace if childcare cannot be arranged.

Targeted Social Distancing Design for Pandemic Infections

Robert J. Glass, et. al., *Emerging Infect. Dis.,* 12:11: 2006

- Children and teenagers compose only 29% of the population, yet they are responsible for 59% (SD 4.5%) of infectious contacts, adults for 38% (SD 7.9%) and older adults for 3% (SD 0.6%). Approximately half of infectious contacts of either children or teenagers are within the same age class (19%, SD 0.8%, and 9%, SD 0.7%, respectively). Adults get influenza from children or teenagers at approximately the same frequency (24%, SD 1.6%) as from other adults (26%, SD 5.9%). Older adults are equally likely to get influenza from children or teenagers as from adults or older adults (2%, SD 0.3%).

Glass, et al., 2006 (cont'd.)

- Transmission to children or teenagers from adults is 10% (SD 1.8%) and nearly none by older adults. These transmission results are supported by recent field studies that show children who go to preschool or school are more likely to contact influenza and their family members are also more likely to become ill as well. A person is also more likely to be infected when they are exposed to children or teenagers than when they are exposed to adults.

Glass, et al., 2006 (cont'd.)

- Studied effects of school closure. Class contacts are removed but since children and teenagers spend more time at home and in public spaces, other contact domains increase. Estimated attack rates reduced to 22% if 90% compliance with school closure achieved.

Glass, et al., 2006 (cont'd.)

- If you close schools and quarantine children and teenagers to stay at home for duration of pandemic but permit adults to go about their day-to-day routines, attack rates reduced by 93%; at 50% compliance rate, attack rates reduced by 68%.

- Response to the demand for services may require non-standard approaches, including:
  - Discharge of all but critically ill hospital patients.
  - Expansion of hospital “capacity” by using all available space and “less than code compliant beds”
  - Increase of patient ratio to hospital staff.
  - Recruitment of volunteers who can provide custodial services under the general supervision of health and medical workers.
  - Relaxation of practitioner licensure requirements as deemed appropriate.

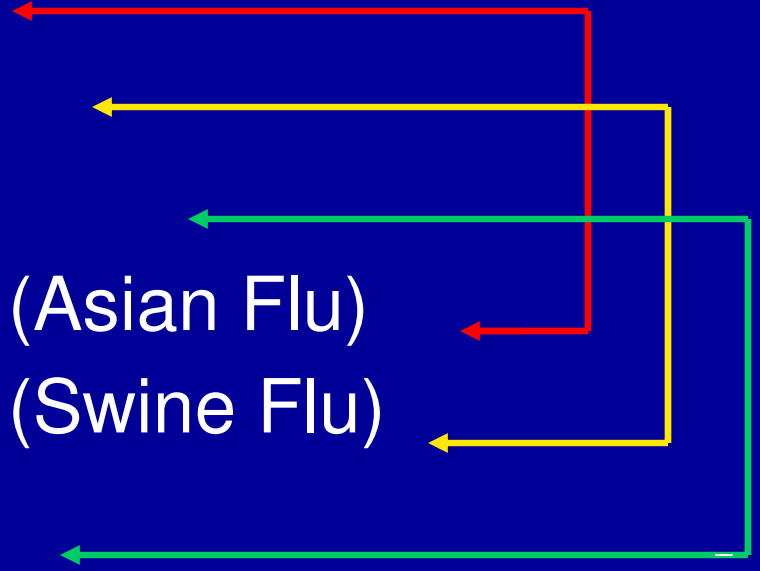
United States Food and Drug Administration Statement

- "Tamiflu (oseltamivir phosphate) approved in capsules of 30 mg and 45 mg doses to provide convenient alternative for treatment and prevention of influenza types A and B in patients one year of age and older."

- *Question*: How many children less than 6 or 7 years of age will swallow capsules?

Pandemic Influenza
1889 - 2007

- 1889 – H2
- 1900 – H3
- 1918 – H1
- 1957 – H2 (Asian Flu)
- 1968 – H3 (Swine Flu)
- 1986 – H1



Exactly 68 years between pandemic of same type

Next H2 might be predicted in 2025
Bird flu H5