

## Seasonal Influenza

- **Background<sup>1</sup>**
  - Influenza types A and B cause epidemic human disease
  - Virus variants result from frequent antigenic change resulting from point mutations that occur during viral replication
  - Influenza B viruses undergo antigenic drift less rapidly than influenza A viruses
  - Frequent development of antigenic variants through antigenic drift is the virologic basis for seasonal epidemics and is the reason for the incorporation of one or more new strains in each year's influenza vaccine
  - Each influenza vaccine contains three influenza viruses – one A (H3N2) virus, one A (H1N1) virus, and one B virus
- **Types of Vaccines<sup>2</sup>**
  - “Flu Shot” – inactivated vaccine approved for use in people older than six months, including healthy people and those with chronic medical conditions
  - FluMist<sup>®</sup> - a vaccine made with live, weakened flu viruses that's administered intranasally and is approved for use in healthy people aged 5 to 49 who are not pregnant
- **Who Should Get Vaccinated?<sup>2</sup>**
  - **People at high risk for complications from the flu**
    - People 65 years of age and older
    - People who live in nursing homes or other long-term care facilities that house those with long-term illnesses
    - Adults and children 6 months and older with chronic lung or heart conditions
    - Adults and children 6 months and older who needed regular medical care or who were in a hospital during the previous year because of a metabolic disease, chronic kidney disease or weakened immune system (including medication-induced immune system problems)
    - Children 6 months to 18 years of age who are on long-term aspirin therapy
    - Women who will be pregnant during the influenza season
    - All children 6 to 23 months of age
    - People with any condition that can compromise respiratory function or the handling of respiratory secretions
  - **People 50 to 64 years of age**
    - Nearly one-third of people in this age bracket have one or more medical conditions that place them at increased risk for serious flu complications

- **People who can transmit the flu to others who are at high risk for complications**
  - Includes health-care workers, employees of long-term care and assisted living facilities, and caregivers of children aged 0-23 months
- **Who Should Not Be Vaccinated?<sup>2</sup>**
  - People with a severe allergy to chicken eggs
  - People who have had a severe reaction to the influenza vaccine in the past
  - People who developed Guillain-Barre syndrome within six weeks of receiving an influenza vaccine previously
  - Children less than six months of age
  - People who have a moderate or severe illness with a fever should wait until their symptoms lessen
- ***Haemophilus influenzae* type b (Hib) Vaccination<sup>3</sup>**
  - High risk populations include those with leukemia, asplenia or HIV
  - Licensed for children aged 6-71 months
  - No efficacy data available to base a recommendation concerning use for older children or adults with the chronic conditions associated with an increased risk of Hib disease
  - However, studies do suggest good immunogenicity in patients with sickle cell disease, leukemia, HIV infection, or those who have had splenectomies – vaccine administration is not contraindicated in these patients
- **Weekly Report: Influenza Summary Update<sup>4</sup>**
  - **Week ending December 31, 2005 – Week 52**
    - Influenza activity continued to increase in the United States
    - The proportion of patient visits to sentinel providers for influenza-like illnesses was above the national baseline
    - The proportion of deaths attributed to pneumonia and influenza was below the baseline level
    - No influenza-associated pediatric deaths reported
    - Since 10/2/05, WHO and NREVSS laboratories have tested a total of 35,006 specimens for influenza viruses and 1203 (3.4%) were positive
    - 1153 (95.8%) were influenza A viruses and 50 (4.2%) were influenza B viruses
    - 608 (52.7%) of the influenza A viruses have been subtyped and 602 (99%) were influenza A (H3N2) viruses and 6 (1%) were influenza A (H1N1) viruses
    - 43 states from all surveillance regions have reported laboratory-confirmed influenza this season

## Pandemic Influenza<sup>5</sup>

- **Definition**
  - Seasonal outbreak or epidemic – contagious respiratory illness caused by influenza viruses that already circulate among people
  - Pandemic – global outbreak of disease that occurs when a new strain of influenza A virus appears in the human population, causes serious illness and spreads easily from person to person
    - New influenza viruses emerge as a result of antigenic shift, which causes a sudden and major change in influenza A viruses. These changes occur when proteins on the surface of the virus combine in new ways as a result of mutation or exchange of genetic material between multiple influenza viruses.
- **Previous influenza pandemics**
  - “Spanish flu” – 1918-1919 – 500,000 deaths in the USA and 50 million worldwide
  - “Asian flu” – originated in China; 70,000 deaths in the USA
  - “Hong Kong flu” – virus still circulates today; 34,000 deaths in the USA
- **Treatment**
  - Vaccination
    - Would not be available in early stages of pandemic
    - Can take up to 6 months to develop
    - Takes several months to become widely available
  - Antivirals
    - Should not be used as a substitute for the vaccine
    - 4 available (amantadine (Symmetrel), rimantadine (Flumadine), oseltamivir (Tamiflu), and zanamivir (Relenza))
    - Usually work against influenza A, however, influenza virus strains can become resistant
- **Future pandemics**
  - Many believe it is only a matter of time before the next pandemic
    - Severity cannot be predicted
  - Estimates of impact of a medium level pandemic:
    - 89-207 thousand deaths
    - 314-734 thousand hospitalizations
    - 18-42 million outpatient visits
    - 15-35% of the US population affected
    - Economic impact of 71.3-166.5 billion dollars

## Avian Influenza “Bird Flu”

- **Background<sup>6</sup>**
  - This virus is believed to be related to our yearly strains of influenza A
  - All influenza A viruses are believed to be derived from birds
  - Occurs naturally among birds (including chickens, ducks and turkeys)
  - Virus is shed through saliva, nasal secretions and feces
  - Domesticated birds are infected through direct contact with other infected birds, or by contact with surfaces/materials (ie cages, water or feed)
  - Infection of domesticated birds results in two types of infection: “low pathogenic” and “high pathogenic” types
  - “Low pathogenic” type causes only mild symptoms including ruffled feathers and low egg count
  - “High pathogenic” type can spread rapidly among flocks of poultry. It affects multiple internal organs and carries with it a mortality rate that can reach 90-100% within 48 hours
- **Human Infection<sup>6</sup>**
  - Influenza A virus that originates in birds
  - Most human cases resulted from contact with infected poultry (domesticated chicken, turkeys and ducks) or through contact with contaminated surfaces
  - The spread of avian influenza virus from one ill person to another has only rarely been reported
  - Transmission beyond one person has not been reported
- **Symptoms of Avian Flu**
  - Typical flu symptoms including: fever, cough, sore throat, eye infections and muscle aches<sup>6</sup>
  - More severe symptoms include: pneumonia, severe respiratory diseases and other severe and life threatening complications (ie liver necrosis, encephalitis and sepsis)<sup>8</sup>
- **Current Avian Flu (H5N1)**
  - As of January 7<sup>th</sup>, 2006, **human cases** of influenza A virus (H5N1) have been reported in Cambodia, China, Indonesia, Thailand, Vietnam and Turkey<sup>6</sup>
  - As reported from WHO as of January 10<sup>th</sup>, reported number of human cases is 147 with 78 deaths (53%)<sup>7</sup>
  - Most cases have occurred in previously healthy children and young adults
  - Because these particular viruses do not commonly affect humans, we have very little immune protection against them<sup>6</sup>
- **Risk and Treatment**
  - Persons exposed to domestic fowl, wild birds, or domestic ducks within a 1 meter radius or within speaking radius of an infected individual (confirmed or suspected) should be treated<sup>8</sup>
  - Other high risk persons include those who work with domestic fowl-food processing or sales, healthcare workers and laboratory workers<sup>8</sup>

- Amantadine and Rimantadine are believed to be ineffective due to resistance being identified in a prior 2004 H5N1 outbreak<sup>8</sup>
- Currently, Oseltamivir (Tamiflu<sup>®</sup>) is the only medication for both treatment and prophylaxis<sup>8</sup>
- Prophylaxis: Oseltamivir 75mg twice a day for 7-14 days<sup>8</sup>
- Treatment: Oseltamivir 150mg twice a day for 7-10 days<sup>8</sup>
- Medications under investigation include zanamivir (Relenza<sup>®</sup>), peramivir, ribavirin and interferon alpha<sup>8</sup>
- An investigational vaccine (RD-3) is being studied currently in Europe<sup>6</sup>
- An investigation vaccine is also under investigation in the United States<sup>6</sup>
- **Healthcare Facilities/Household Contacts/Travelers<sup>8</sup>**
  - Universal precautions are necessary
  - Gowns, gloves and masks should be worn by any person caring for these patients
  - Patients should be placed in negative pressure rooms
  - Health care providers with high contact should consider prophylaxis with Oseltamivir
  - Household contacts should use proper hand washing techniques and avoid close contact and sharing utensils
  - Travelers should receive the trivalent flu vaccine 2 weeks prior to any overseas traveling
  - Travelers should avoid direct contact with animals, use proper hand washing techniques, and monitor themselves for any flu-like signs/symptoms
  - If flu-like signs/symptoms occur, seek medical attention immediately

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#### References

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4. Weekly Report: Influenza Summary Update. [www.cdc.gov/flu/weekly](http://www.cdc.gov/flu/weekly)
5. <http://www.cdc.gov/flu/pandemic/>
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