Influenza: Disease and Vaccine in 2015

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Disclosures

• I have no relevant financial relationships with the manufacturers of any commercial products or commercial services discussed in this CME activity
• I may discuss unapproved uses of drugs and vaccines

Objectives

• Describe how influenza is transmitted
• Be aware of the symptoms of influenza
• Discuss influenza vaccines
“I had a little bird.
His name was Enza.
I opened the window.
And in flew Enza.”

A chant popular during the influenza pandemic of 1918

Influenza Viruses
Orthomyxovirus
Types A, B and C
Yearly winter outbreaks of A and B
Hemagglutinin (H)
Neuraminidase (N)

www.cdc.gov/flu
**Antigenic Changes**

**Shift:** Major change in surface
- Pandemics
- To date with A only

**Drift:** Minor change in surface
- Yearly outbreaks

**Influenza Pandemics**

- 1918: H1
- 1957: H2
- 1968: H3
- 1977: H1
- 2009: H1N1

**Animal strains**

- Birds: virus in the gut
- Pigs: respiratory
- 2009 H1N1: pig, avian and human influenza genes - novel
- H5N1, H7N9: avian strains
Influenza Transmission

- Large and small droplets
- Large fall in 3-6 ft; small go further
- Hands: major route for most pathogens
- Air: often over-rated
- Fomites: often forgotten
- Contact, fomites and air matter

Influenza: The Illness

- Symptoms: fever, chills, aches, malaise, myalgia, gastrointestinal in younger
- Signs: fever, pharyngitis, rhinitis, cough
- Signs and symptoms are similar to a multitude of other illnesses
Epidemiology

- Usually winter outbreaks
- Cruise ship outbreaks - Alaska in summer
- Children - major role as transmitters
- Droplet and contact spread
- Contagious 1 day before to 7 days after
- Incubation 1 to 3 days

Children and Influenza

- Highest attack rates: 15-42% yearly
- Highest hospitalization rates
- Major transmitters: shed higher titers for longer times, poor hygiene and less control of nasal excretions
- Immunizing children protects their communities

Influenza Viruses Circulating Since October 2014

- 95.6% A: 99.6% H3, 35% match vaccine
- 4.4% B: 67% in TIV, 88% of the other B viruses are in quadrivalent vaccines
- All strains tested are susceptible to oseltamivir, zanamivir and peramivir
Complications of Influenza

- Bacterial superinfection
- Reye syndrome
- Triggers asthma
- Myositis
- Encephalitis

Influenza Diagnosis

- Clinical: generally sufficient but may over or under-diagnose infection
- Culture: throat gargle or nasal wash
- Antigen detection: rapid but lack sensitivity (40-70%)
- Serology not clinically useful

Management of Influenza

- Symptomatic:
  - Antipyretics may prolong viral shedding
  - Aspirin contraindicated
  - Complementary therapies abound
- Antivirals: two available and useful
Antivirals for Influenza

- Shorten the course and decrease virus shed but may not decrease transmission
- Start early for maximal effect
- Opinions vary as to who should receive antiviral therapy
- My opinion: yes for most

Children at Risk

- Underlying diseases: the usual suspects
- Neuromuscular and developmental
- Obese
- Age under 5 but especially under 2 years

Oseltamivir (Tamiflu)

- Neuraminidase inhibitor
- Prevents viral entry into cells
- Effective for influenza A and B
- Dose varies by age and weight
- Side effects mild, gastrointestinal
Zanamivir (Relenza)

- Neuraminidase inhibitor,
- Prevents viral entry
- Effective for influenza A and B
- Dose: 10 mg bid, inhaled
- Precaution in patients with bronchospasm

Prevention of Influenza

- Infection control
- Hand washing and hand hygiene
- Isolation
- Limit visitors
- Respiratory hygiene: tissues and sleeves

2014-2015 Vaccine Strains

- A/California/7/2009 (H1N1)-like virus
- A/Texas/50/2012 (H3N2)-like virus
- B/Massachusetts/2/2012-like (Yamagata lineage) virus
- B/Brisbane/60/2008-like (Victoria lineage) virus
Inactivated Influenza Vaccines
- Vaccine strains: 2 A, 1 or 2 B
- No adjuvants in US vaccines
- IIV4: Fluzrix, FluLaval, Fluzone
- IIV3: Afluria, Fluarix, FluLaval, Fluvirin, Fluzone (IM, ID, high dose)
- ccIIV3: Flucelvax
- RIV3: FluBlok

Live Attenuated Vaccine
- Cold adapted viruses: LAIV4
- Won’t survive body temperature
- Immunogenic, safe, rarely transmitted
- Healthy people 2 to 50 years of age
- Nasal spray, quadrivalent
- 2015 ACIP: preferred age 2-8 yr

Indications
- Everyone 6 months and older
- High risk, especially important
- Healthcare providers: mandates suggested
- Immunize pregnant women to protect them and their infants
**Vaccine Schedule**

Yearly, as soon as you get it
Child 8 and under: two doses, first season
    Age 9 and above: one dose
Contraindicated in persons with anaphylaxis to chicken or eggs*

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**Vaccine Efficacy**

- Depends on the match of vaccine strains to circulating strains
- Age related
- Less in young and elderly
- Generally 30 to 60%
- End points: ILI, influenza, visits, otitis

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**2013-15 Vaccine Efficacy**

- LAIV4 efficacy in 2013-14 season: none against H1N1
- Early estimates of vaccine efficacy in 2014-2015: 23% (medically attended acute respiratory illness)
- Repeated immunizations: 8 yr study – best efficacy if vaccinated this season, not prior
Chemoprophylaxis
• Oseltamivir approved for age 1 + yr
• Zanamivir approved for age 5 + yr
• When: unable to vaccinate or unlikely to respond to vaccine or while waiting
• High risk when vaccine mismatch
• Outbreak in long term care facility
• Consider for close contacts

Smiling is a contagious condition!

Resources
www.cdc.gov/flu/
www.aap.org/immunization
www.cdc.gov/vaccinesafety/
www.aapnj.org
www.state.nj.us/health/flu/
www.healthychildren.org