Influenza
Monica Mehta, PharmD, Long Island University
A Webber Training Teleclass

Presentation Objectives

- Briefly review influenza
  - History and epidemiology
  - Structure and classification
  - Pathogenesis
  - Diagnosis of influenza
- Discuss management of influenza with antiviral agents
- Describe influenza vaccination
  - Including influenza survey-based study at a hospital in Bronx, New York

Seasonal Influenza Overview

- Infection caused by influenza type A or B
- Acute, usually self-limited, febrile illness
- Outbreaks generally occur annually in winter
- Rates 10-40% over 5-6 week period
- Mortality ~35,000 per year in US due to pulmonary complications
- Clinical manifestations include fever, malaise, and cough
- Anti-viral agents may reduce severity and duration
- Vaccination is the best way to prevent influenza

History of Influenza

- Cause of recurrent epidemics/pandemics every 1-3 years over last 400 years
- Greatest known pandemic in 1819
  - Three waves of influenza
  - 21 million deaths worldwide (most deaths d/t secondary bacterial PNA)
  - At present, influenza vaccination, antibiotics, and antiviral agents have decreased mortality rates

History of Influenza Epidemics & Pandemics

<table>
<thead>
<tr>
<th>Year</th>
<th>Population</th>
<th>~Deaths per 1,000</th>
<th>Influenza A subtype</th>
</tr>
</thead>
<tbody>
<tr>
<td>1875, 1878, 1887, 1847</td>
<td>London</td>
<td>1 – 10</td>
<td>Unknown</td>
</tr>
<tr>
<td>1900</td>
<td>UK</td>
<td>1-2.5</td>
<td></td>
</tr>
<tr>
<td>1918-1919</td>
<td>Worldwide</td>
<td>2.25</td>
<td>H1N1</td>
</tr>
<tr>
<td>India</td>
<td>70</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Samoa</td>
<td>200</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Alaska</td>
<td>up to 600</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Zealand whites</td>
<td>5.5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>New Zealand Maori</td>
<td>42</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1957</td>
<td>Worldwide</td>
<td>0.7</td>
<td>H2N2</td>
</tr>
<tr>
<td>1958-1969</td>
<td>Worldwide</td>
<td>0.3</td>
<td>H3N2</td>
</tr>
<tr>
<td>Seasonal influenza</td>
<td>Developed countries</td>
<td>0.03-0.3</td>
<td>H3N2, H1N1</td>
</tr>
</tbody>
</table>

Epidemiology

- Worldwide influenza deaths 250K-500K annually
- US deaths average ~36K annually (1990-1999)
  - 90% deaths occur in > 65 year olds
  - Deaths in oldest elderly (> 85 year olds) are 16x higher compared to persons aged 65 - 69 years
- US hospitalizations ~226K annually
  - Rates of infection highest among children
- Overall rates have been increasing (due to growing predominance of influenza A and aging population)
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Morbidity & Mortality
- Gateway to more serious ailments
  - Pneumonia, COPD exacerbation
- Causes of death
  - Complications of pneumonia and superimposed bacterial infections
  - Exacerbations of respiratory, cardiac, and renal conditions

Influenza Cell Structure

Influenza Classification
- Three types: Influenza A, B, & C
- Influenza A and B are the two types of influenza viruses that cause epidemic human disease
  - Influenza type C infections cause a mild illness

Antigenic Drift
- Antigenic variants develop due to point mutations during replication
- Frequent emergence of variants through antigenic drift is the virological basis for seasonal epidemics
- Antigenic drift: Influenza A > B
- Reason for the usual incorporation of one or more new strains in each year’s vaccine

Influenza Classification
- Influenza A viruses are categorized into subtypes on the basis of two surface antigens
  - Hemagglutinin (H) – mediates entry of virus into the cell
  - Neuraminidase (N) – cleaves and releases newly formed viral particles
- Influenza A has 16 H subtypes and 9 N subtypes
  - Significant diversity among different viruses types
  - Genetic, structure, host range, epidemiology, clinical manifestations

Influenza Classification
- Standard nomenclature = influenza type + place of initial isolation + strain designation + year of isolation
  - E.g. A/Puerto Rico/8/34 = Influenza A virus isolated from a patient in Puerto Rico in 1934

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Antigenic Characterization of Influenza
Positive Tests

Clinical Manifestations

- Symptoms are abrupt in onset and vary considerably from person to person
- Systemic symptoms (predominate early)
  - Fever, chills, HA, malaise, anorexia
  - Myalgias = back, calf, possibly eye muscles
  - Fever ~100-104°F typically
  - Severe related to fever
  - Systemic symptoms persist ~3 days
- Respiratory symptoms
  - Dry cough, severe pharyngeal pain, nasal obstruction & discharge, hoarseness, cough

People at High Risk for Complications From Influenza

- > 65 years old or residents of LTCF
- People w/ long-term health problems (asthma, renal disease, DM, anemia, CVD)
- People w/ certain muscle or nerve disorders (seizures, severe cerebral palsy)
- People w/ weakened immune system (HIV, long-term steroids, chemotherapy)
- People 6 months - 18 years of age on long-term ASA (they can develop Reye Syndrome if they got influenza)
- Women who will be pregnant during influenza season
- All children 6-59 months of age

Diagnosing Influenza - Tests

- Diagnostic tests should be combined with clinical suspicion
- Three main testing modalities:
  1. RT-PCR
     - Highest sensitivity, used as a confirmatory test
  2. Immunofluorescence (fluorescent antibody staining)
     - Performance depends on laboratory expertise
  3. Rapid Diagnosis
     - Based on immunologic detection of viral antigen in respiratory secretions
     - Results in 30 minutes
     - Sensitivity 40-80%

Antiviral Agents

- Neuraminidase Inhibitors
  - Oseltamivir (Tamiflu)
  - Oral
  - Zanamivir (Relenza)
  - Inhaler

- Amantadines
  - Amantadine
  - Rimantadine

Who should be considered for Antiviral Therapy?

- Unvaccinated infants (12-24 months)
- Asthma or other chronic pulmonary diseases (e.g. CF)
- Significant cardiac disease
- Immunosuppressed
- HIV-infected
- Requiring long-term ASA (e.g. rheumatoid arthritis)
- Sickle cell anemia
- Chronic renal disease
- Cancer
- Chronic metabolic disease (e.g. DM)
- Neuromuscular disorders, seizure disorders, or cognitive dysfunction
- Adults > 65 years old
- Residents of long-term care institutions or nursing homes

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Antiviral Usage

- Neuraminidase Inhibitors = primary agents
- Initiate within 2 days of illness onset
- Benefits of treatment
  - Shown to decrease the duration of influenza by one day compared with placebo
  - May prevent complications (pneumonia) or exacerbation of chronic disease
  - May decrease mortality
  - Data on viral shedding is mixed
  - Chemoprophylaxis may be used in patients exposed to influenza
    - Especially in high risk patients
  - Resistance rapidly emerging

Neuraminidase Inhibitors: Mechanism

Neuraminidase Inhibitors: Indications

- Active against Influenza A and B
- Approved for use in adults and children
  - Zanamivir approved for treatment of persons age 7 years and older; prophylaxis in age 5 and older
  - Oseltamivir approved for treatment and prophylaxis of persons age 1 and older

Neuraminidase Inhibitors: PK

- Zanamivir
  - Dry powder for inhalation; not orally bioavailable
  - 10-20% of the active compound reaches the lungs and the rest is deposited in the oropharynx
  - 5-10% is absorbed and excreted in the urine
- Oseltamivir
  - Capsule or powder for liquid; Readily absorbed from GI
  - Converted by hepatic esterases to active form
  - Widely distributed in body
  - T1/2 = 6-10 hours; excreted primarily via kidneys (dose adjust in renal failure)

Amantadines

- Mechanism:
  - Inhibition of M2 ion channel activity of susceptible viruses (M2 channels play a role in replication)
  - Interfere with viral uncoating inside the cell
  - Inhibitory for most influenza A, but not for influenza B
  - Widespread high levels of resistance among influenza A (H3N2)
  - Rimantadine is preferred over amantadine because of a more favorable adverse effect profile

Antiviral: Dosing in Influenza A & B

- **Zanamivir**
  - Treatment: 10mg (2 inhalations) BID
  - Prophylaxis: 10mg (2 inhalations) daily
- **Oseltamivir**
  - Treatment: 75mg PO BID
  - Prophylaxis: 75mg PO daily
- **Amantadine & Rimantadine**
  - Treatment: 100mg PO BID (100mg daily in elderly over 65 years)
  - Prophylaxis: 100mg PO BID (100mg daily in elderly over 65 years)
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Antivirals – Treatment Duration

- Treatment: 5 days
- Prophylaxis: 5 – 10 days after last known exposure
  - May be longer in hospitals and long-term care facilities; minimum of 14 days

Adverse Effects

<table>
<thead>
<tr>
<th>Amantadine</th>
<th>Oseltamivir</th>
<th>Zanamivir</th>
</tr>
</thead>
<tbody>
<tr>
<td>CNS side effects (higher in amantadine)*</td>
<td>Nausea &amp; Vomiting</td>
<td>Bronchospasm**</td>
</tr>
<tr>
<td>Nausea, Anorexia</td>
<td>Transient neuropsychiatric events (e.g. delirium)</td>
<td>Nausea &amp; Diarrhea</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Nasal symptoms</td>
</tr>
</tbody>
</table>

* CNS side effects include nervousness, anxiety, insomnia, difficulty concentrating, and lightheadedness
** Zanamivir is contraindicated in patients with underlying respiratory disease

Management of Influenza: Antiviral Resistance

<table>
<thead>
<tr>
<th>Isolates tested (n)</th>
<th>Isolates tested (n), Resistant Viruses, Number (%)</th>
<th>Isolates tested (n)</th>
<th>Resistant Viruses, Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Oseltamivir</td>
<td>Zanamivir</td>
<td>Adamantanes</td>
</tr>
<tr>
<td>Seasonal Influenza A (H1N1)</td>
<td>1,009</td>
<td>0 (0.5% )</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Influenza A (H3N2)</td>
<td>216</td>
<td>216</td>
<td>216 (100%)</td>
</tr>
<tr>
<td>Influenza B</td>
<td>620</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Novel Influenza A (H1N1)</td>
<td>216</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>

FluView, 2009-2010 Influenza Season Week 28 ending July 18, 2009 CDC.

Influenza Vaccination

- Most effective means to prevent flu
- 70-90% effective in healthy adults <65 years old when vaccine and virus are antigenically similar
- 50-77% when antigenically dissimilar
- 90% effective in preventing influenza-related hospitalization

Influenza Vaccination Indications

- Persons aged 50 years and older
- Adults and children who have any condition that can compromise respiratory function or the handling of respiratory secretions or that can increase the risk for aspiration
- Residents of nursing homes and other chronic-care facilities
- Health-care workers
- Healthy household contacts (including children) and caregivers of persons with medical conditions that put them at higher risk for severe complications from influenza

Other Means of Prevention

- Isolation precautions, negative pressure rooms, & good hand/respiratory hygiene
  - Offers modest benefit
  - Not been studied adequately to determine if they reduce transmission

Not a complete list (see www.cdc.gov for all indications)
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### CDC/ACIP Recommendations

- 1981: All HCW should be vaccinated  
  - Who are HCW?  
- Vaccination goals: reduce transmission, staff illness & absenteeism, morbidity & mortality among high risk persons  
- JCAHO: must offer  
  - But cannot enforce (violation of employee rights)

### Inactivated Influenza Vaccine

- Sterile suspension prepared from influenza viruses propagated in embryonated chicken eggs  
- Standardized for particular season  
- The 2009-2010 trivalent influenza vaccines will contain:  
  - A/Brisbane/59/2007 (H1N1)-like antigen  
  - A/Brisbane/10/2007 (H3N2)-like antigen  
  - B/Brisbane/60/2008-like antigen  
- Dose = 0.5ml in prefilled syringe given IM (preferably in deltoid)

### Pharmacology

- Effectiveness depends on age, immunocompetence, and degree of similarity between the vaccine and infecting virus  
- Majority develop high post-vaccination hemagglutination-inhibition antibody titers  
- These antibody titers are protective against illness caused by strains similar to those in the vaccine

### Contraindications

- Contraindications: known hypersensitivity, reaction to egg/chicken proteins  
- Delay in active neurologic d/o (ok when stable)  
- Delay in febrile or acute disease (ok when stable)  
- Warnings: Guillain-Barre syndrome within 6 weeks of prior vaccine, bleeding disorders (hemophilia, thrombocytopenia, on anticoagulant) - monitor for hematoma, latex allergy  
- Pregnancy category C (but risk of influenza complications is increased during pregnancy)

### Guillain-Barre Syndrome

- 1976 swine influenza vaccine was associated with increased frequency of GBS (1 case in 100,000)  
- GBS has an annual incidence of 10-20 cases in 1 million adults  
- No evidence indicates an increase fatality from GBS among people vaccinated  
- Potential benefits outweigh estimated risk of vaccine-associated GBS

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Fluarix Adverse Events

<table>
<thead>
<tr>
<th>Adverse Event</th>
<th>Fluvarix (n=760)</th>
<th>Placebo (n=192)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Local pain</td>
<td>54.7</td>
<td>12</td>
</tr>
<tr>
<td>Local redness</td>
<td>17.5</td>
<td>10.4</td>
</tr>
<tr>
<td>Local swelling</td>
<td>9.3</td>
<td>5.7</td>
</tr>
<tr>
<td>Muscle aches</td>
<td>23</td>
<td>12</td>
</tr>
<tr>
<td>Fatigue</td>
<td>19.7</td>
<td>17.7</td>
</tr>
<tr>
<td>Headache</td>
<td>19.3</td>
<td>21.4</td>
</tr>
<tr>
<td>Arthralgia</td>
<td>6.4</td>
<td>6.3</td>
</tr>
<tr>
<td>Shivering</td>
<td>3.3</td>
<td>2.6</td>
</tr>
<tr>
<td>Fever (&gt;100.4-degrees F)</td>
<td>1.7</td>
<td>1.6</td>
</tr>
</tbody>
</table>

Other Adverse Events

- Unsolicited adverse events (AE) from Study Fluvarix-US-001
  - AE ≥ 1% of recipients - Fluvarix (placebo):
    - RTI 3.9% (2.6%), nasopharyngitis 2.5% (1.6%), nasal congestion 2.2% (2.1%), diarrhea 1.6% (0%), influenza-like illness 1.6% (0.5%), vomiting 1.4% (0%), dysmenorrhea 1.3% (1%)

Timing of Vaccination

- Influenza seasons vary in timing and duration
- >80% US outbreaks occurred in January or later
- Vaccination should begin soon after vaccine becomes available and continue throughout the season
- Vaccination campaigns for HCW should ideally begin mid-October and continued through December

Key in Education to HCW

- CDC: “Inactivated influenza vaccine contains killed viruses, and thus cannot produce signs or symptoms of influenza virus infection.”

Vaccination Rates

- Per CDC, average national vaccination rate of HCW was 40.1% (2003) & 42% (2006)
- Individual institutions 2% to 60% in 2004
- Of those surveyed at Bronx-Lebanon Hospital Center (BLHC), 56.5% were vaccinated during 2006-2007 influenza season

Vaccination Goals

- National Health Objective has a goal of 60% immunization rate by 2010 to provide protective immunity
- Vaccination rate of 80% desired to confer herd immunity
  - 98% measles vaccination rate would potentially eradicate the measles virus

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Factors Influencing Vaccination Rate

- Prior Vaccination
  - Kimura study: statistically significant correlation b/w getting vaccinated and being vaccinated previously (p<0.001)
- Motivation
- Knowledge & Attitude
  - Belief that vaccine is “safe, valuable, and wise” correlated with accepting vaccine

Steps To Increase Vaccination Rates

- Educational campaign + formalized “vaccine day”
- Strongly developed leadership role
- Mobile vaccine carts
- Providing vaccination % to directors/chiefs halfway through season
- Declination forms

Influenza Vaccination Survey-Based Study


Purpose of Survey

- During employee health screenings, many HCW declined influenza vaccine
  - “Do not believe in vaccines”
  - “Vaccines have made my friends very sick”
  - “The vaccine may decrease spermatogenesis”
- How pervasive are these beliefs?

What We Hoped to Learn...

- Which groups of HCW refused the influenza vaccine?
- Why did they refuse?
- Is refusal linked to other factors?
  - Job position, frequency of pt contact
  - Perceived reason for vaccination
  - Knowledge of influenza & CDC recommendations

Bronx-Lebanon Hospital Center

- BLHC is a 858-bed, non-profit, community teaching medical center located in south central Bronx
- Two major divisions + ambulatory sites
  - Major focus of survey = Grand Concourse division
- Total of ~3,500 healthcare workers (HCW)

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Hypotheses

- Influenza vaccine acceptance linked with two parameters in particular
  - Knowledge of influenza
  - Motivation for getting vaccinated

First Wave: The Survey

- Eight questions
- Three categories of questions
  - General information of employee
  - Influenza vaccination
  - Knowledge
- IRB approved

Methods

- Cross-sectional design
- Survey team distributed and collected surveys by hand over ~2-weeks
- Distribution of survey
  - Attended grand rounds (IM, Peds, FM)
  - Attended meetings (housekeeping, pharmacy)
  - Floor to floor (nurses, PCTs)
  - Departmental managers (respiratory therapy, dietary)

Methods

- Survey was purely optional and anonymous
- Employees were offered a survey with no or minimal explanation
- Raffle w/ prizes served two functions (increased overall participation, decreased participation bias)
- Data entered into SPSS (statistical package for the social sciences)

Results

- 570 surveys collected
- Overall vaccination rate (2006-2007 flu season) 56.5%
- Top two reasons for not receiving vaccine
  - "I feel I do not need" (31.8%)
  - "I am afraid of getting sick from vaccine" (23%)

Respondent Demographics: Job Position

<table>
<thead>
<tr>
<th>Position</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician</td>
<td>166</td>
<td>29.2%</td>
</tr>
<tr>
<td>Nurse, PA, NP</td>
<td>114</td>
<td>20%</td>
</tr>
<tr>
<td>Technician</td>
<td>83</td>
<td>14.6%</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>12</td>
<td>2.1%</td>
</tr>
<tr>
<td>Housekeeper/Maintenance</td>
<td>41</td>
<td>7.2%</td>
</tr>
<tr>
<td>PT/RT/Nutritional</td>
<td>24</td>
<td>4.2%</td>
</tr>
<tr>
<td>Dietary</td>
<td>23</td>
<td>4%</td>
</tr>
<tr>
<td>Office/Administrator</td>
<td>70</td>
<td>12.3%</td>
</tr>
<tr>
<td>Other</td>
<td>36</td>
<td>6.2%</td>
</tr>
<tr>
<td>Total</td>
<td>569</td>
<td>100%</td>
</tr>
</tbody>
</table>
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Percent Vaccination by Job Position

<table>
<thead>
<tr>
<th>Job Position</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physician</td>
<td>90%</td>
</tr>
<tr>
<td>Pharmacist</td>
<td>67%</td>
</tr>
<tr>
<td>Dentistry</td>
<td>75%</td>
</tr>
<tr>
<td>Housekeeping</td>
<td>40%</td>
</tr>
<tr>
<td>Nurse</td>
<td>67%</td>
</tr>
<tr>
<td>Office</td>
<td>50%</td>
</tr>
<tr>
<td>Technician</td>
<td>90%</td>
</tr>
<tr>
<td>PT/RT/Nutritionists</td>
<td>50%</td>
</tr>
</tbody>
</table>

Job Position

- Significant differences between groups when data was collapsed
  - Physicians* vs. Non-physicians (p=0.001)
  - Technicians vs. Non-technicians* (p=0.02)
  - Therapists (PT/RT/nutritionists) vs. Non-therapists* (p=0.001)

* Group with higher vaccination rate

Rationale for not Receiving Vaccine

- I feel I do not need
- I am afraid of getting sick from the flu vaccine
- Other
- I do not believe in vaccinations
- I am afraid of getting the flu from vaccine
- I was not offered the vaccine
- I am afraid of needles

Significant Findings: Knowledge

- Survey "knowledge" questions:
  - What is your best estimate regarding the number of deaths that occur each year due to the flu in the US?
  - Do you believe that the CDC recommends that health care workers receive the flu shot?
  - How often do you think the flu vaccine should be administered?

Significant Findings: Knowledge

- Knowledge score correlated with getting vaccinated
  - 3 "knowledge" questions
  - Participants vaccinated = 2.35/3 correct
  - Participants not vaccinated = 2.17/3 correct
  - Statistically significant (p = 0.003)

Significant Findings: Knowledge

- However, no relationship between getting all 3 knowledge questions correct and being vaccinated.
- Why might this be?
  - Other reasons...
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Significant Findings: Motivation

- Survey "motivation" question:
  - Why are flu vaccines for health care workers encouraged? (choose one):
    - To minimize sick days and loss of productivity
    - Because healthcare workers can get exposed to the flu by sick patients
    - Because sick patients are exposed to the flu by healthcare workers
    - To set an example to other workers

- HCW who received the vaccine were 3x more likely than those who did not receive the vaccine to indicate that:
  - "Influenza vaccines are encouraged because sick patients are exposed to influenza by healthcare workers.
  - Statistically significant (p = 0.001)

Second Wave: Additional Players

- Managers were interviewed using a structured tool
- To assess:
  - Involvement of Management
  - Positive or Negative Reinforcement
  - Distribution of literature
  - Access: Mobile cart

Additional Players

<table>
<thead>
<tr>
<th></th>
<th>Vaccination Rate</th>
<th>Mobile Cart</th>
<th>Management involvement</th>
<th>Formal medical education</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physicians</td>
<td>74.7%</td>
<td>Y</td>
<td>Y</td>
<td>Y</td>
</tr>
<tr>
<td>Pharmacists</td>
<td>66.7%</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Dietaries</td>
<td>65.2%</td>
<td>Y</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Housekeeping</td>
<td>58.5%</td>
<td>N</td>
<td>Y</td>
<td>N</td>
</tr>
<tr>
<td>Nursing</td>
<td>54.6%</td>
<td>Y</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>PT</td>
<td>16%</td>
<td>N</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>RT</td>
<td></td>
<td>N</td>
<td>N</td>
<td>Y</td>
</tr>
<tr>
<td>Laboratory (as part of technician group)</td>
<td>44.6%</td>
<td>N</td>
<td>N</td>
<td>N</td>
</tr>
</tbody>
</table>

Study Limitations

- Skewed representation: largest % of participants = physicians (29.2%); second largest = nurses (20%); third largest = technicians (14.6%)
- No to little data collected from night shifts and outpatient clinics
- Only two questions to test internal validity
- Possibility of > 1 survey/person
- Assumption that surveys reflect truth
- Other unknown factors (e.g. declination form)

Live Attenuated Influenza Vaccine

- Flumist™
- Contains live, attenuated virus and can cause mild symptoms related to influenza
- Intranasal administration
- Approved ONLY for use among healthy, non-pregnant, persons age 2 - 49 years
- Including HCW (per CDC)
- Advantages: broad mucosal & systemic response in children, ease of use, & increased acceptability

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Vaccine Comparison

<table>
<thead>
<tr>
<th>Trivalent inactivated influenza vaccine</th>
<th>Live attenuated influenza vaccine (FluMist®)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inactivated virus (therefore, cannot produce s/sx of influenza)</td>
<td>Live, attenuated virus (has potential to produce s/sx of influenza, e.g. runny nose, sore throat and congestion)</td>
</tr>
<tr>
<td>Intramuscular administration</td>
<td>Intranasal administration</td>
</tr>
<tr>
<td>Less expensive</td>
<td>More expensive</td>
</tr>
<tr>
<td>Approved for use among persons &gt; 6 months, including those who are healthy and with chronic medical problems.</td>
<td>Approved only for use among healthy persons age 2 to 49 years.</td>
</tr>
<tr>
<td>Efficacy: conflicting and limiting data (some studies showing greater efficacy with LAIV compared to TIV and others showing no significant difference)</td>
<td></td>
</tr>
</tbody>
</table>

Mandatory Vaccination for HCW in New York State 2009-2010
- On 8/13/09, an emergency regulation went into effect, requiring all personnel of healthcare settings receive seasonal annual influenza vaccine
  - Purposes: 1) protect health and safety of vulnerable patients, 2) maintain a healthy workforce
  - Must be vaccinated by 11/30/09 of each year
  - Unless medical contraindication or NY State determines that there is a shortage

Mandatory Regulation Applies to...
- Hospitals, diagnostic/treatment centers, home health care agencies, long-term care, hospice
- Personnel who have direct contact with patients or whose activities are such that they pose a risk of transmission of influenza to patients
  - Including students & volunteers

2009 Novel H1N1 Influenza
- Previously called “swine flu”
  - Was initially believed many of the genes were similar to an influenza virus that normally occurs in pigs
  - Most cases have occurred in people between the ages of 5 - 24-years-old
  - Treatment: neuraminidase inhibitors (zanamivir, oseltamivir) only
  - Novel H1N1 is resistant to amantadines
  - Infection control and prevention practices are critical

2009 Novel H1N1 Influenza Vaccine
- The seasonal flu vaccine is unlikely to provide protection against novel H1N1 influenza
- A novel H1N1 vaccine
  - Currently in production
  - May be ready in the fall
  - Should be given in addition to seasonal vaccine

Recommendations on Recipients of Novel H1N1 Vaccine
- Pregnant women
- Household contacts and caregivers for children < 6 months
- Healthcare and EMS personnel
- All people 6 months to 24 years of age
- People aged 25 - 64 years who have health conditions associated are high risk
  - Current studies indicate that the risk for infection among persons age > 65 is less vs. younger age groups

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Monica Mehta, PharmD, Long Island University
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References


References

- Improving influenza vaccination rates in health care workers: strategies to increase protection for workers and patients. National Foundation for Infectious Diseases 2004. (How to reference?)

References


References


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References


THE NEXT FEW TELECLASSES

21 Sep 09 (Free British Teleclass) Live Broadcast from the Infection Prevention Society Conference
Fifty Years of Resistance
Speaker: Prof. Gary French, Guy’s & St. Thomas Hospital, England

22 Sep 09 (Free British Teleclass) Live Broadcast from the Infection Prevention Society Conference
The Pursuit of Excellence During a Global Pandemic
Speaker: Prof. Robert Pratt, Thames Valley University

23 Sep 09 (Free British Teleclass) Live Broadcast from the Infection Prevention Society Conference
Hit Off the Press - A Review of the Evidence
Speaker: Dr. William Janie, President, Jason and Janie Associates

23 Sep 09 (Free British Teleclass) Live Broadcast from the Infection Prevention Society Conference
Moving on from Audit - Quality Improvement Tools for Infection Prevention
Speaker: Dr. Neil Wiggetsorth, Salford Royal NHS Trust

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