UNIVERSITY OF SOUTH FLORIDA
GERIATRIC WORKFORCE
ENHANCEMENT PROGRAM
(GWEP)
FACULTY
DEVELOPMENT
MASTERWORKS
SERIES

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To Shoot or Not to Shoot: Immunization Rates & Disparities in the Elderly

Given by Dr. Asa Oxner
Ppt by: Lucy Guerra, MD, MPH, FACP FHM
Associate Professor
Division Director, Internal Medicine
University of South Florida
Disclosures

- I have no financial, personal, or familial associations to disclose
Vaccine History

First, a little background...
What is a Vaccine?

- Agent stimulates the body's immune system to recognize the agent as foreign, destroy it, and "recognize" it, so that the immune system can more easily recognize and destroy at a later time.

- *UpToDate, 2014*
1796- The term vaccine was derived from Edward Jenner's use of cowpox.

When administered it provided protection against smallpox.
Introduction of New Vaccines, Jenner to the Present Day

Cumulative Total

1800 1850 1900 1950 2000

Birth of Immunology
Germ theory of disease accepted

Detoxification techniques

Tissue culture

New Biotechnology MAb, rDNA

1796
Smallpox

1880-1920
- Rabies
- Typhoid
- Cholera
- Plague
- Diphtheria toxoid

1920-1960
- Diphtheria toxoid
- BCG (Tuberculosis)
- Pertussis
- Tetanus toxoid
- Yellow fever
- Influenza
- Polio

1960-1990
- Measles
- Mumps
- Rubella
- Adenovirus
- Pneumococcal
- Meningococcal C, A
- Hepatitis B
- Rabies, HDCV
- Hib
- Typhoid, oral

1990-2000
- Hepatitis A
- Acellular pertussis
- Varicella
- DTap/Hib
- Japanese encephalitis
- Vi typhoid
- Lyme disease
- Pneumococcal conjugate
Presentation Objectives

- Address why vaccines are an important public health measure
- Briefly review guidelines for flu and pneumonia vaccines in older adults
- Examine disparities in vaccination rates in the geriatric population
- Understand vaccine myths
- Identify barriers to vaccinations in geriatric patients
Important Public Health Measure: Vaccines Prevent Disease

Pictures Speak Louder than Words ---
Polio, Smallpox, Cervical Cancer
Diphtheria, Tetanus & Pertussis

Diphtheria

Tetanus

Pertussis = Whooping Cough
Influenza, Pneumonia & Meningitis

Pneumonia

Meningitis

Influenza Pandemic of 1918
## Comparison of 20th Century Annual Morbidity and Current Morbidity: Vaccine-Preventable Diseases

<table>
<thead>
<tr>
<th>Disease</th>
<th>20th Century Annual Morbidity†</th>
<th>2011 Reported Cases † †</th>
<th>Percent Decrease</th>
</tr>
</thead>
<tbody>
<tr>
<td>Smallpox</td>
<td>29,005</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Diphtheria</td>
<td>21,053</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Measles</td>
<td>530,217</td>
<td>212</td>
<td>&gt; 99%</td>
</tr>
<tr>
<td>Mumps</td>
<td>162,344</td>
<td>370</td>
<td>&gt; 99%</td>
</tr>
<tr>
<td>Pertussis</td>
<td>200,752</td>
<td>15,216</td>
<td>92%</td>
</tr>
<tr>
<td>Polio (paralytic)</td>
<td>16,316</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Rubella</td>
<td>47,745</td>
<td>4</td>
<td>&gt; 99%</td>
</tr>
<tr>
<td>Congenital Rubella Syndrome</td>
<td>152</td>
<td>0</td>
<td>100%</td>
</tr>
<tr>
<td>Tetanus</td>
<td>580</td>
<td>9</td>
<td>98%</td>
</tr>
<tr>
<td><em>Haemophilus influenzae</em></td>
<td>20,000</td>
<td>8*</td>
<td>&gt; 99%</td>
</tr>
</tbody>
</table>

† Source: JAMA. 2007;298(18):2155-2163

† † Source: CDC. MMWR January 6, 2012;60(51):1762-1775. (provisional 2011 data)

* Haemophilus influenzae type b (Hib) < 5 years of age. An additional 14 cases of Hib are estimated to have occurred among the 237 reports of Hib (< 5 years of age) with unknown serotype.
Vaccination is one of the greatest public health achievements in the United States in the 20th Century. Immunizations have eradicated smallpox, eliminated polio in the Americas, and controlled measles, rubella, tetanus, diphtheria and others.

Today, the greatest vaccine-preventable disease burden for the U.S. population is among older adults.

- Surgeon General David Satcher, MD, PhD
  Remarks to Congress, August 1999
Guidelines for Vaccinations in older adults
Guidelines for Vaccinations in older adults

- **Influenza, pneumococcal, tetanus/diphtheria, and herpes-zoster vaccinations** are recommended by the Advisory Committee on Immunization Practices (ACIP) for elders.
**2016 Recommended Immunizations for Adults: By Age**

<table>
<thead>
<tr>
<th>Age Range</th>
<th>Flu/Influenza</th>
<th>Tetanus, diphtheria, pertussis</th>
<th>Shingles/Zoster</th>
<th>Pneumococcal</th>
<th>Meningococcal</th>
<th>MMR</th>
<th>HPV</th>
<th>Chickenpox</th>
<th>Hepatitis A</th>
<th>Hepatitis B</th>
<th>Hib</th>
</tr>
</thead>
<tbody>
<tr>
<td>19 - 21 years</td>
<td>Fluent</td>
<td>Tetanus, diphtheria, pertussis</td>
<td>Flu</td>
<td>PCV13</td>
<td>MenACWY or MPSV4</td>
<td>MenB</td>
<td>HPV</td>
<td>Chickenpox</td>
<td>Hepatitis A</td>
<td>Hepatitis B</td>
<td>Hib</td>
</tr>
<tr>
<td>22 - 26 years</td>
<td></td>
<td></td>
<td></td>
<td>PPSV23</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27 - 49 years</td>
<td></td>
<td></td>
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<td></td>
<td></td>
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<td></td>
<td></td>
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<tr>
<td>50 - 59 years</td>
<td></td>
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<td></td>
<td></td>
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</tr>
<tr>
<td>60 - 64 years</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
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<td></td>
</tr>
<tr>
<td>65+ years</td>
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</tbody>
</table>

**More Information:**
- You should get influenza vaccine every year.
- You should get a Td booster every 10 years. You also need 1 dose of Tdap. Women should get a Tdap vaccine during every pregnancy to protect the baby.
- You should get shingles vaccine even if you have had shingles before.
- You should get 1 dose of PCV13 and at least 1 dose of PPSV23 depending on your age and health condition.

**For more information, call 1-800-CDC-INFO (1-800-232-4636) or visit [www.cdc.gov/vaccines](http://www.cdc.gov/vaccines)**

**Recommended For You:** This vaccine is recommended for you unless your healthcare professional tells you that you cannot safely receive it or that you do not need it.

**May Be Recommended For You:** This vaccine is recommended for you if you have certain risk factors due to your health, job, or lifestyle that are not listed here. Talk to your healthcare professional to see if you need this vaccine.

If you are traveling outside the United States, you may need additional vaccines. Ask your healthcare professional about which vaccines you may need at least 6 weeks before you travel.
Disparities in Vaccination Rates...
Focus on Aging in America

- Adults aged 65+ is a fast growing population
  - 55 million in 2010
  - 80 million by 2040
## Vaccination Gaps in Older Adults

### Healthy People 2020 Vaccination Gaps

<table>
<thead>
<tr>
<th>Objectives</th>
<th>Baseline Data 2008 and *2006</th>
<th>Healthy People 2020 Goals</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INFLUENZA VACCINE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adults 18 to 64 years</td>
<td>25%</td>
<td>80%</td>
</tr>
<tr>
<td>High-risk adults 18 to 64 years</td>
<td>39%</td>
<td>90%</td>
</tr>
<tr>
<td>High-risk adults 65 years +</td>
<td>67%</td>
<td>90%</td>
</tr>
<tr>
<td>*Institutionalized adults 18 years +</td>
<td>62%</td>
<td>90%</td>
</tr>
<tr>
<td>Health care personnel</td>
<td>45%</td>
<td>90%</td>
</tr>
<tr>
<td><strong>PNEUMOCOCCAL VACCINE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adults 65 years +</td>
<td>60%</td>
<td>90%</td>
</tr>
<tr>
<td>High-risk adults 18 to 64 years</td>
<td>17%</td>
<td>60%</td>
</tr>
<tr>
<td>*Institutionalized adults</td>
<td>66%</td>
<td>90%</td>
</tr>
<tr>
<td><strong>HERPES ZOSTER VACCINE</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adults 60 years +</td>
<td>7%</td>
<td>30%</td>
</tr>
</tbody>
</table>

Other vaccines: Tdap, HPV, hepatitis, MMR, meningococcal

<table>
<thead>
<tr>
<th>Disease</th>
<th>United States/Annual Rates</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>INFLUENZA</strong></td>
<td>• 200,000 hospitalizations&lt;br&gt;• 36,000 deaths (&gt;85% elderly)</td>
</tr>
<tr>
<td><strong>INVASIVE PNEUMOCOCCAL DISEASE</strong></td>
<td>• 44,000 cases&lt;br&gt;• 4500 deaths&lt;br&gt;• Higher rates in elderly, AA, persons with comorbidities</td>
</tr>
<tr>
<td><strong>HEPATITIS B</strong></td>
<td>• 51,000 infections (&gt;95% adults)&lt;br&gt;• 2000-3000 deaths&lt;br&gt;• 1.25 (m) chronic HBV infection</td>
</tr>
</tbody>
</table>
Vaccination Gaps in Older Adults

- Influenza is the most important vaccine preventable contagious infectious disease for older adults
Complications of Flu

– Bacterial pneumonia, ear infections, sinus infections, dehydration, and worsening of chronic medical conditions, such as congestive heart failure, asthma, or diabetes.
Distribution by age group of persons hospitalized with laboratory-confirmed influenza* – U.S.

Winter Influenza Season 2007 – 2008 (N=3930)  April 15 - August 11, 2009 (N=1148)

<table>
<thead>
<tr>
<th>Age Group</th>
<th>2007–2008</th>
<th>2009</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;6 mo</td>
<td>6</td>
<td>5</td>
</tr>
<tr>
<td>6 mo-4 yr</td>
<td>10</td>
<td>12</td>
</tr>
<tr>
<td>5-9 yr</td>
<td>12</td>
<td></td>
</tr>
<tr>
<td>10-17 yr</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>18-29 yr</td>
<td>9</td>
<td></td>
</tr>
<tr>
<td>30-49 yr</td>
<td>6</td>
<td>16</td>
</tr>
<tr>
<td>50-64 yr</td>
<td>13</td>
<td>16</td>
</tr>
<tr>
<td>65+ yr</td>
<td>15</td>
<td>16</td>
</tr>
</tbody>
</table>

*Evidence of a positive influenza test result by viral culture, DFA/IFA, RT.
Vaccination Gaps in Older Adults

**Older Adults Own the Bulk of Influenza’s Morbidity and Mortality**

- Adults ≥65 years of age represent:
  - 13% of the US population
  - 63% of influenza-related hospitalizations
  - 90% of influenza-related deaths
  - 64% of the total economic burden of influenza

*Increase in the older adult population globally represents a substantial challenge for influenza vaccination programs*

References:
Flu Vaccine Prevents other Diseases in Geriatric Patients

Influenza Vaccine Reduces PNA, MI, and CVA in Older Patients

Influenza severity associates with loss of ADL in nursing homes

2013: Estimated 13,500 cases of invasive pneumococcal disease (IPD) in adults 65 and older

- In adults 65 and older:
  - PCV 13 serotypes were to blame for
    - 20-25% of IPD
    - 10% of community-acquired pneumonia (CAP)
    - Potentially preventable with PCV 13 vaccine
## Older Adult Vaccination Rates Too Low in Minority Populations

| INFLUENZA  |  
| ≥65        | 66%  
| 50-64      | 40%  
| 19-49      | 33%  
| HCW        | 65%  
|            |  
| PNEUMOCOCCAL  |  
| ≥65        | 62%  
| AA         | 48%  
| Hispanic   | 43%  
| 19-64 (high risk) | 20%  
| TDAP  |  
| 19-64 | 13%  

HCW, health care worker; TDAP, tetanus, diphtheria, and pertussis.

Vaccination Myths…
In 1915, Johnny Gruelle's daughter, Marcella died at age 13 after being vaccinated for smallpox without consent. Authorities blamed a heart defect, but her parents blamed the vaccine. Gruelle became an opponent of vaccination, and the Raggedy Ann doll was used as a symbol by the anti-vaccination movement.

-Raggedy Ann Museum, 2001
Vaccination Myths: Why are We Still Talking About Vaccines & Autism?

- Science clearly shows no link
- Media Loves Controversy
- Anti-vaccine Movement Has a Celebrity Spokesperson
Vaccinations & Autism Myth

THE LANCET

FRAUD

FRIGHTENS PARENTS AWAY FROM LIFE-SAVING VACCINES FOR THEIR KIDS

SELLS ADDICTIVE NICOTINE TO THEIR TEENAGERS

UNIVERSITY OF SOUTH FLORIDA
MYTH: Thimerosal Causes Harm

• Form of mercury found in thimerosal is ethylmercury (EM), not methylmercury (MM). MM is the form that has been shown to damage the nervous system.

• Although no evidence of harm has ever been demonstrated, thimerosal was taken out of vaccines as a precaution.

• Since 2001, with the exception of a few influenza vaccine products, thimerosal has not been used as a preservative in any routinely recommended childhood or adult vaccines.
MYTH: Other Ingredients in Vaccines are Harmful

• Antibiotics are present in some vaccines to prevent bacterial contamination.

• Aluminum is used in some vaccines as an adjuvant—improves the immune response.

• Aluminum is the most common metal found in nature. It is in the air and in food and drink. Infants get more aluminum through breast milk or formula than vaccines.

• Trying to make vaccines without additives, and preservatives is difficult—they keep vaccines safe and effective.
Myth: I never get sick with flu.

I never get the flu...

If you think the flu can’t affect you, your family, or your friends—THINK AGAIN.
Geriatric Immunosenescence

- Decline in immune function that occurs with aging
- Multiple parts of the adaptive immune system become deregulated
- Has effects on vaccine responses
- May be driven by chronic infections
MOST COMMON Vaccine Side Effects

- Any vaccine can cause side effects
  - Mild Problems
    - Reactions on the arm where the shot was given:
    - Tenderness (about 1 person out of 2)
    - Redness & Itching
    - Lump or bruise
  - Muscle aches & Fatigue
- Severe Problems
  - Serious allergic reaction (very rare – less than once in 100,000 doses).

-CDC Vaccine Update, 2016
Overcoming Vaccination Barriers in Geriatric Patients

- Facts vs. Myth
- Affordable Vaccines
- Databases

- Better Communication: Poor Health Literacy
- Transitioning Care: Immunization Records
Are Vaccines Affordable?

**Flu-**
- Inactivated shot ($12-19)
  - Egg-free FluBlok ($32)
- Nasal vaccine (live) ($24)
- Intradermal* ($17.50)
- High dose* ($30)
- Hep A ($63-65)- need 2
- Hep B ($52-59)- need 3
- HPV- Series 3 doses
  - HPV2, HPV4, HPV9*
  - $128 / $147 / $163
- Hib* haemophilus influenza type b ($27)

**Meningococcal**
- ACWY ($71-75)
- B*: Bexsero $160 (need 2)
  - Trumenba $135 (need 3)
- MMR (live) ($59)- need 2

**Pneumococcal**
- PPSV 23- ($72)
- PCV 13-($152)
- Shingles ($187)
- Td/ Tdap ($24 / $37)
- Varicella ($100) need 2
Most physicians say, “I talk to all of my patients about vaccines”

But few patients agree

87%

Physicians

18%

“Yes, I regularly discuss vaccines with my health care provider”

31%

“I occasionally discuss vaccines with my health care provider”

21%

“I don't recall ever discussing vaccines”

Patients

Results are based on surveys by the National Foundation for Infectious Diseases. November 2010.
BE AN ADVOCATE FOR VACCINATING YOUR GERIATRIC PATIENTS!

THANK YOU!
Selected References

– www.cdc.gov/pneumococcal/vaccination.html

– https://www.acponline.org/clinical-information/clinical-resources-products/adult-immunization/i-raise-the-rates
