PNEUMOCOCCAL VACCINATION
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DISCLOSURES

- Sanofi Pasteur
  - Speaker’s bureau
  - Honoraria
PNEUMOCOCCAL VACCINATION

- Immunization is one of the most beneficial and cost-effective disease prevention measures
- Marked improvements in immunization rates in adults 65 years and older
- Per CDC, vaccinations in elderly adults in 1989 and 2003:
  - Pneumococcal vaccine coverage increased from 15 to 64%
PNEUMOCOCCAL VACCINATION

- WHO global vaccination rates 2014

![Diagram showing world immunization coverage for various vaccines, including Diphtheria-tet., Polio, Measles, Hepatitis B, Pneumococcal, and Rotaviruses.](image-url)
PNEUMOCOCCAL VACCINATION

- WHO global vaccination rates 2014
PNEUMOCOCCUS

- *Streptococcus pneumoniae*
  - First identified 1881
  - Aerobic
  - Gram positive
  - Cocci
  - α-hemolytic
  - Pairs and chains
  - >90 serotypes identified
  - Serotypes 6, 14, 18, 19, & 23
    - Account for 60-80% of infections

http://www.atsu.edu/faculty/chamberlain/website/gallery.htm
PNEUMOCOCCUS

- Invasive Pneumococcal Disease (IPD)
  - Isolation of *S. pneumoniae* from a normally sterile site
    - Blood
    - CSF
    - NOT SPUTUM
Invasive Pneumococcal Disease (IPD)

- When bacteremia is present, metastatic seeding and secondary complications can occur
  - Arthritis
  - Osteomyelitis
    - Discitis
  - Meningitis
  - Brain abscess
  - Epidural abscess
    - Cranial
    - Spinal
  - Endocarditis
  - Purulent Pericarditis
  - Pleural Empyema
  - Peritonitis/ileitis
    - Particularly in setting of nephrotic syndrome

http://circ.ahajournals.org/content/107/20/e185.figures-only
PNEUMOCOCCUS

- Invasive Pneumococcal Disease (IPD)
  - Endocarditis
    - <3% native valve endocarditis
    - Predilection for aortic valve
    - Clinical triad – Austrian’s triad
      - Endocarditis, meningitis, and pneumonia
      - First described by Osler 1881

http://library.med.utah.edu/WebPath/CVHTML/CV038.html
PNEUMOCOCCUS

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PNEUMOCOCCUS

- Incidence IPD
  - United States Active Bacterial Core surveillance (ABCs)
    - 18 to 34 years of age: 3.8 cases per 100,000 population
    - Infants <1 year: 34.2 cases per 100,000 population
    - ≥65 years of age: 36.4 cases per 100,000 population
    - HIV infection: 173 per 100,000 population
    - 18 to 64 years of age w/ hematologic malignancy: 186 per 100,000 population
Incidence IPD

- Highest incidence
  - Children <2 years of age
  - Adults ≥65 years of age
  - High risk conditions
    - Immuno-compromising conditions
      - HIV, leukemia, lymphoma, MM, malignancy, on immuno-suppressive medications
    - SOT/BMT
    - Cochlear implant
    - CSF leak
    - Asplenia
      - Functional or anatomic
      - Sickle cell disease
    - CKD or nephrotic syndrome
    - Cigarette smoker
    - Crack cocaine use
PNEUMOCOCCAL VACCINATION

- Immunization rates for younger adults at risk for pneumococcus remain unacceptably low.
  - Only 18.5% of adults aged 18 to 64 years at risk of pneumococcal disease have received the vaccine.
ADULT VACCINATIONS

- Pneumococcus and Influenza
  - Approximately 50,000 to 70,000 adults die annually of these two vaccine-preventable diseases alone

- Population
  - Jefferson City 43,330
  - Cole County 76,699
MORAL OBLIGATION

- “First do no harm”
- I will prevent disease whenever I can, for prevention is preferable to cure
  - Modern Hippocratic Oath (1964)
PNEUMOCOCCAL VACCINATION

- 2 vaccines
  - 23 valent polysaccharide (ppv23)
    - aka Pneumovax
    - Serotypes 1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19A, 19F, 20, 22F, 23F, & 33F
  - 13 valent conjugate (pcv13)
    - aka Prevnar
    - Serotypes 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, 23F
23 valent polysaccharide (ppv23)
- Prevents invasive pneumococcal disease (IPD)
- Does NOT
  - Prevent Pneumococcal pneumonia
  - Decrease all cause mortality
PNEUMOCOCCAL VACCINATION

- 23 valent polysaccharide (ppv23)
  - ALL patients >65 years
  - <65 years
    - Gets complicated
    - Based presence of high risk conditions
PNEUMOCOCCAL VACCINATION

23 valent polysaccharide (ppv23)

- <65 years w/ high risk conditions
  - Cigarette smokers
  - Chronic cardiovascular disease
    - CHF, cardiomyopathies
    - **NOT HTN**
  - COPD/asthma
  - Diabetes mellitus
  - Alcoholism
  - Chronic liver disease/cirrhosis

- Cochlear implant
- CSF leak
- Asplenia
  - Functional or anatomic
  - **Sickle cell disease**
- Immuno-compromising conditions
  - HIV, leukemia, lymphoma, MM, malignancy, on immuno-suppressive medications
- SOT/BMT
- CKD or nephrotic syndrome
PNEUMOCOCCAL VACCINATION

- 23 valent polysaccharide (ppv23)
  - Boosters
    - Lots of confusion
      - One prior to 65 years and one at 65 years
      - Every 3 years
      - Every 5 years
      - Every 7 years
      - Every 10 years
      - WTF!?!?!?!
23 valent polysaccharide (ppv23)

- Boosters
  - Healthy adults do not require booster, just a single dose at 65 years
  - Most adults who received initial dose <65 years should receive a single booster at 65 years
  - Exceptions…
PNEUMOCOCCAL VACCINATION

- 23 valent polysaccharide (ppv23)
  - Boosters
    - Exceptions…
      - 2nd dose 5 years after the 1st dose < 65 years
        - Asplenia
          - Functional or anatomic
            - Sickle cell disease
        - Immuno-compromising conditions
          - HIV, leukemia, lymphoma, MM, malignancy, on immuno-suppressive medications
        - SOT/BMT
        - CKD or nephrotic syndrome
      - Additional booster at 65 years for this sub-group of patients
PNEUMOCOCCAL VACCINATION

- 23 valent polysaccharide (ppv23)
  - Children
    - High risk conditions
      - 2 years AND at least 8 weeks AFTER last pcv13
PNEUMOCOCCAL VACCINATION

- 23 valent polysaccharide (ppv23)
  - Children
    - BOOSTERS
      - Children w/ immuno-compromising conditions or asplenia,
        - 2nd dose ppv23 5 years after the 1st dose
      - Children w/ high risk conditions who are immuno-compotent
        - 2nd dose ppv23 NOT recommended
PNEUMOCOCCAL VACCINATION

- 13 valent conjugate (pcv13)
  - Decrease incidence Pneumococcal pneumonia
  - IPD
  - Otitis media (children)
PNEUMOCOCCAL VACCINATION

- 13 valent conjugate (pcv13)
  - Adult usage...Why?
    - 2013 13.5K cases invasive pneumococcal disease (IPD) >65 years
      - 25% IPD pcv13 serotypes
      - 10% CAP pcv13 serotypes

% IPD by serotypes covered in pneumococcal vaccines (PCV7, PCV13, and PCV23) adults aged ≥18 years, by age group --- Active Bacterial Core surveillance, United States, 2008 MMWR 59(34); 1102-1106
PNEUMOCOCCAL VACCINATION

- 13 valent conjugate (pcv13)
  - How to use in adults?
    - Pneumococcal vaccine naïve
      - pcv13 first
      - ppv23 6-12 months later
    - Previous vaccination w/ ppv23
      - pcv13 at least 1 year after ppv23
PNEUMOCOCCAL VACCINATION

- 13 valent conjugate (pcv13)
  - How to use in adults?

Abbreviations: PCV13 = 13-valent pneumococcal conjugate vaccine; PPSV23 = 23-valent pneumococcal polysaccharide vaccine.

* Minimum interval between sequential administration of PCV13 and PPSV23 is 8 weeks; PPSV23 can be given later than 6–12 months after PCV13 if this window is missed.
PNEUMOCOCCAL VACCINATION

- 13 valent conjugate (pcv13)
  - How to use in adults?
    - What if you do not know and can not determine their pcv13 status?
      - Just give it
**PNEUMOCOCCAL VACCINATION**

- 13 valent conjugate (pcv13)
  - Children
    - Healthy <24 months – part of routine childhood vaccination series
      - 2, 4, 6, and 12-15 months
    - High risk <24 months
      - Same as healthy children PLUS ppv23 at least 8 weeks after last dose pcv13
  - 6-18 years of age high risk pneumococcal vaccine naïve
    - pcv13, then ppv23 at least 8 weeks later
  - 6-18 years of age high risk pcv13 naïve (already received ppv23 only,)
    - pcv13 at least 8 weeks after ppv23
PNEUMOCOCCAL VACCINATION

- 13 valent conjugate (pcv13)
  - Children
    - Transition from pcv7 to pcv13
    - If started on pcv7, then pcv13 should be used to complete series
      - Next slide
# Pneumococcus

## TABLE 10. Recommended transition from 7-valent pneumococcal polysaccharide-protein conjugate vaccine (PCV7) to 13-valent pneumococcal conjugate vaccine (PCV13) in the routine immunization schedule among infants and children, according to number of previous PCV7 doses received

<table>
<thead>
<tr>
<th>Infant series</th>
<th>Booster dose</th>
<th>Supplemental PCV13 dose</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 mos 4 mos 6 mos</td>
<td>≥12 mos*</td>
<td>14–59 mos†</td>
</tr>
<tr>
<td>PCV7 PCV13 PCV13</td>
<td>PCV13</td>
<td>NA</td>
</tr>
<tr>
<td>PCV7 PCV7 PCV13</td>
<td>PCV13</td>
<td>NA</td>
</tr>
<tr>
<td>PCV7 PCV7 PCV7</td>
<td>PCV13</td>
<td>NA</td>
</tr>
<tr>
<td>PCV7 PCV7 PCV7</td>
<td>PCV7</td>
<td>PCV13</td>
</tr>
</tbody>
</table>

*No additional PCV13 doses are indicated for children aged 12–23 months who have received 2 or 3 doses of PCV7 before age 12 months and at least 1 dose of PCV13 at age ≥12 months.

† For children with underlying medical conditions (see Table 2), a supplemental PCV13 dose is recommended through age 71 months.
I am being proven right about massive vaccinations—the doctors lied. Save our children & their future.

6:30am - 3 Sep 14
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