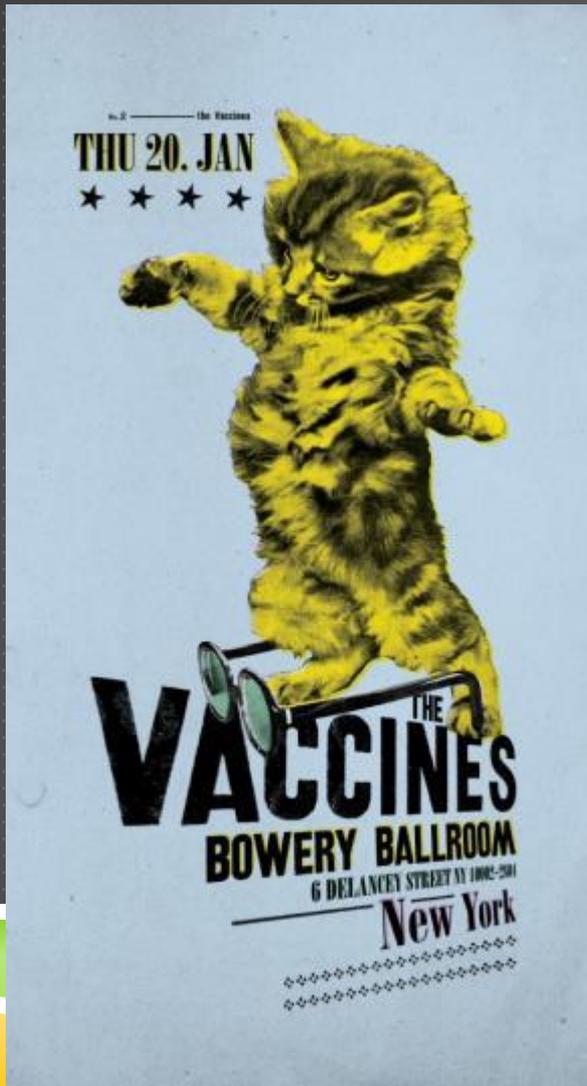


# PNEUMOCOCCAL VACCINATION

Matt Shoemaker, D.O.

11.19.2015



# PNEUMOCOCCAL VACCINATION

Matt Shoemaker, D.O.

11.19.2015

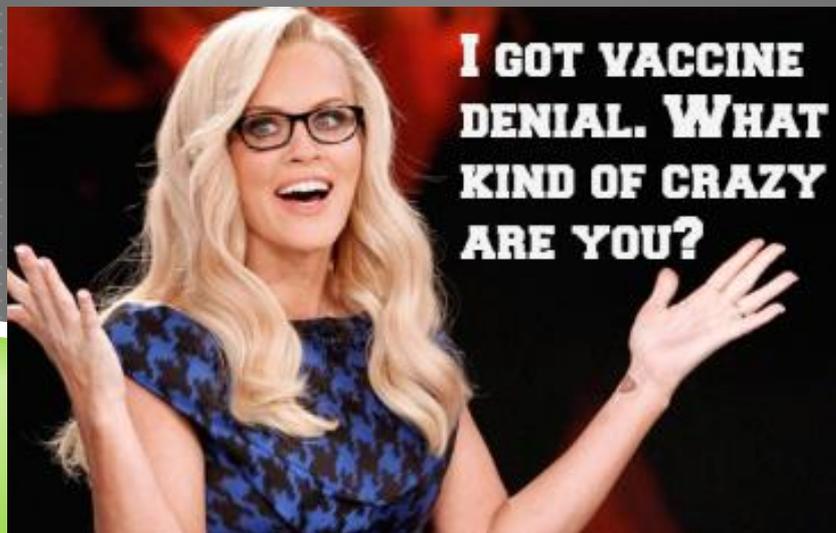
# DISCLOSURES

- ▶ Sanofi Pasteur
  - ▶ Speaker's bureau
  - ▶ Honoraria



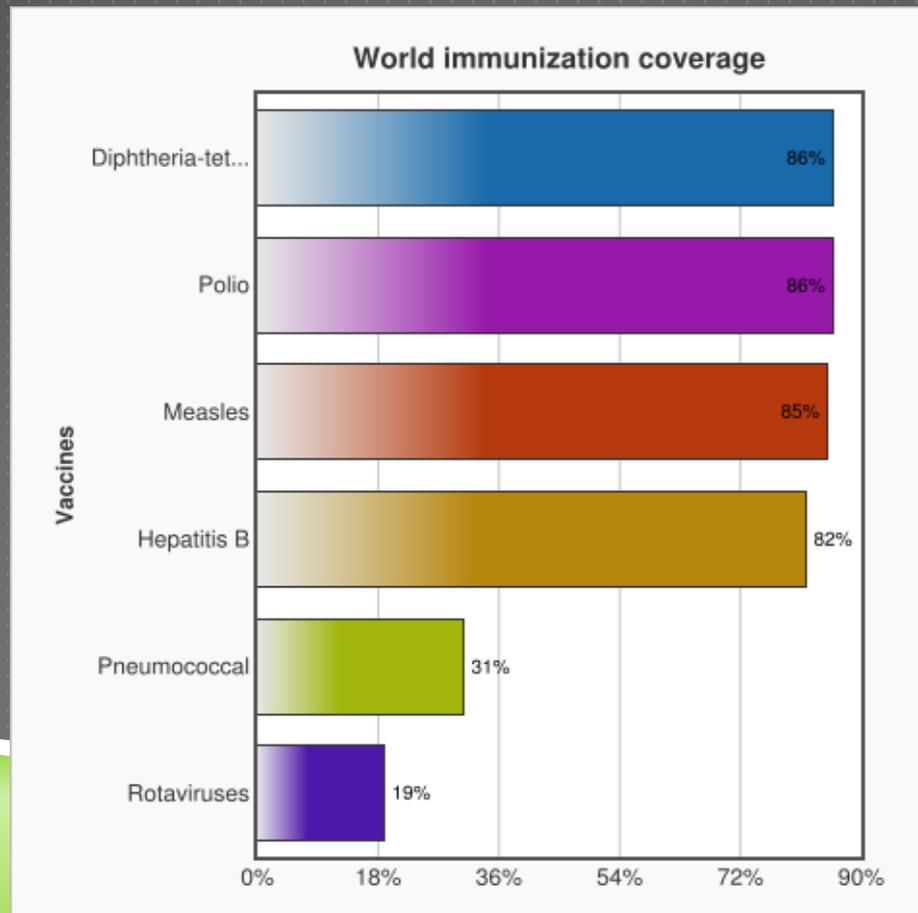
# PNEUMOCOCCAL VACCINATION

- ▶ 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 %



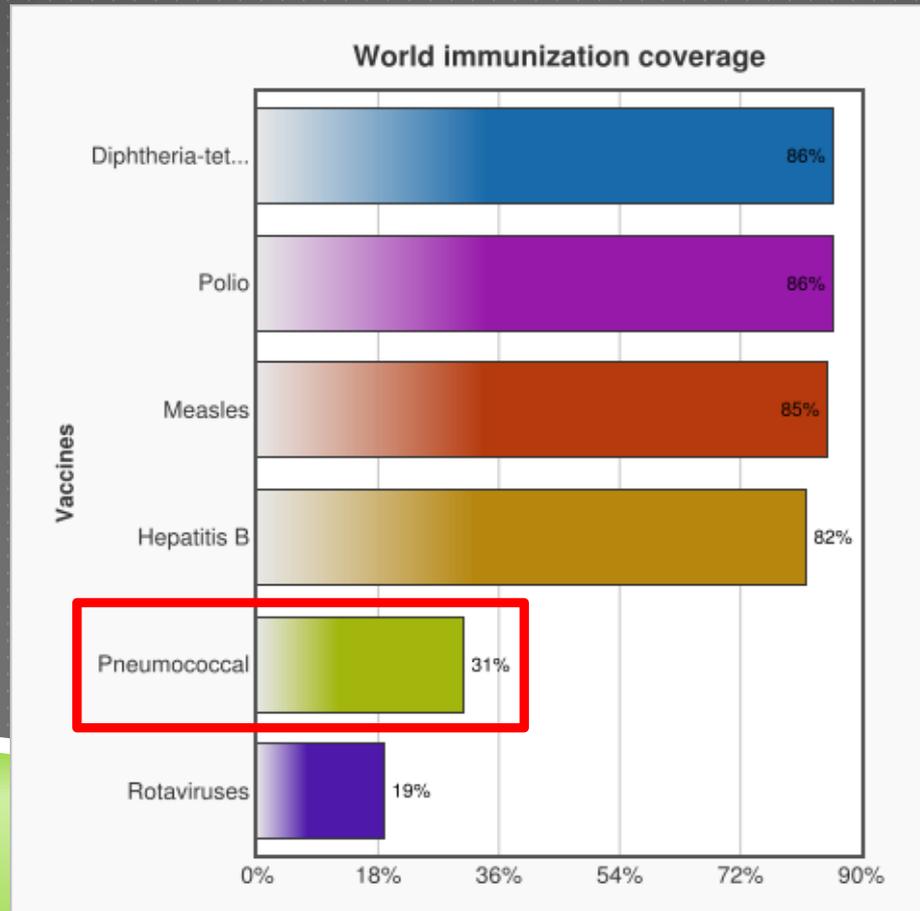
# PNEUMOCOCCAL VACCINATION

- ▶ WHO global vaccination rates 2014



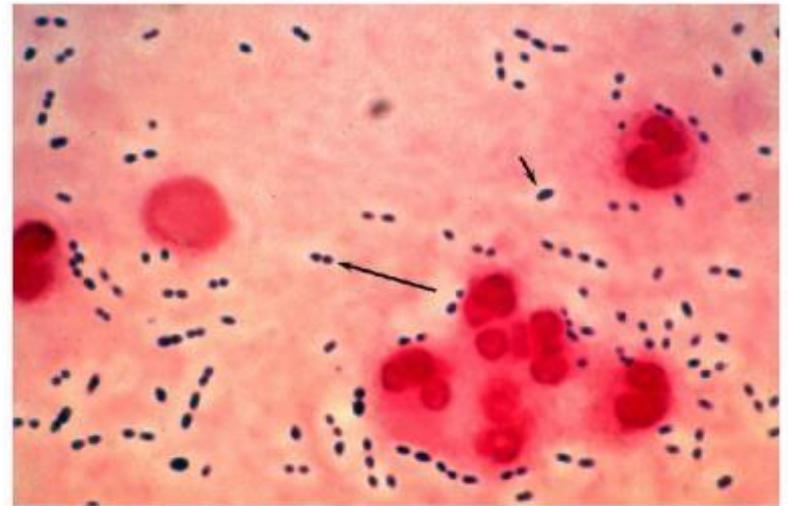
# PNEUMOCOCCAL VACCINATION

- ▶ WHO global vaccination rates 2014



# PNEUMOCOCCUS

- ▶ *Streptococcus pneumoniae*
  - ▶ First identified 1881
  - ▶ Aerobic
  - ▶ Gram positive
  - ▶ Cocci
  - ▶  $\alpha$ -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>

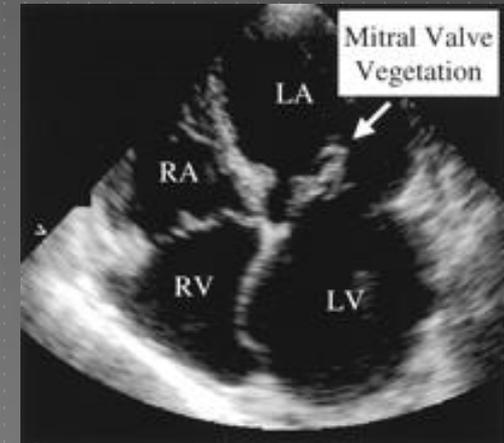
# PNEUMOCOCCUS

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



# PNEUMOCOCCUS

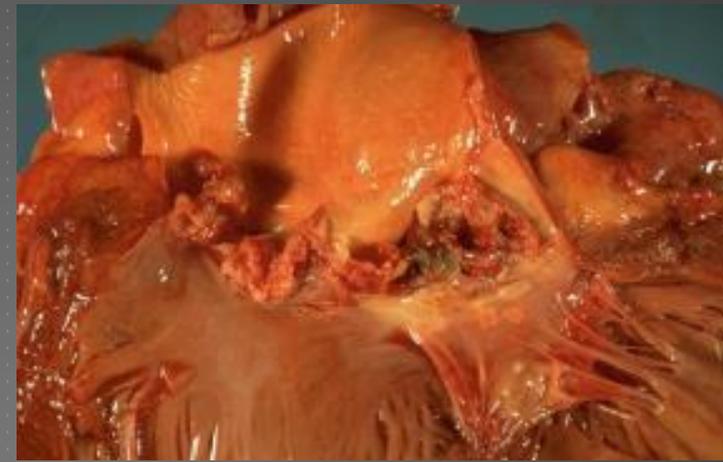
- ▶ Invasive Pneumococcal Disease (IPD)
  - ▶ When bacteremia is present, metastatic seeding and secondary complications can occur
    - ▶ Arthritis
    - ▶ Osteomyelitis
      - ▶ Discitis
    - ▶ Meningitis
    - ▶ Brain abscess
    - ▶ Epidural abscess
      - ▶ Cranial
      - ▶ Spinal
    - ▶ Endocarditis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



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

# PNEUMOCOCCUS

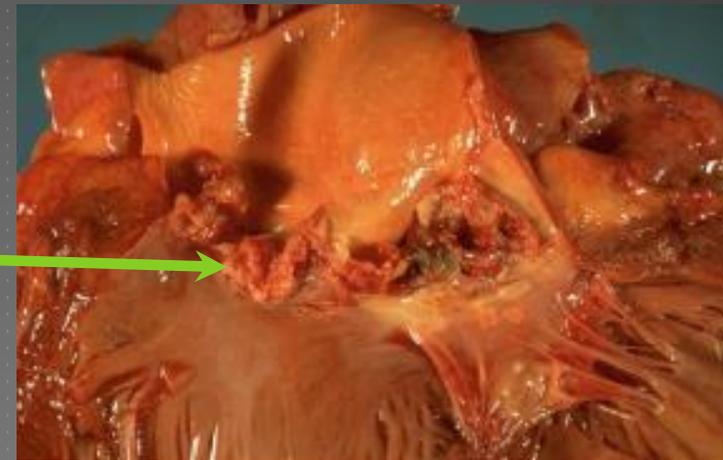
- ▶ Invasive Pneumococcal Disease (IPD)
  - ▶ Endocarditis
    - ▶ <3% native valve endocarditis
    - ▶ Predilection for aortic valve
    - ▶ Clinical triad – Austrian's triad
      - ▶ Endocarditis, meningitis, and pneumonia
      - ▶ First described by Osler 1881



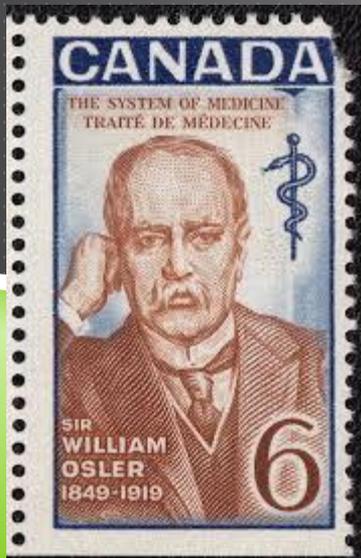
<http://library.med.utah.edu/WebPath/CVHTML/CV038.html>

# PNEUMOCOCCUS

- ▶ 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

## ▶ 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

# PNEUMOCOCCUS

## ▶ 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

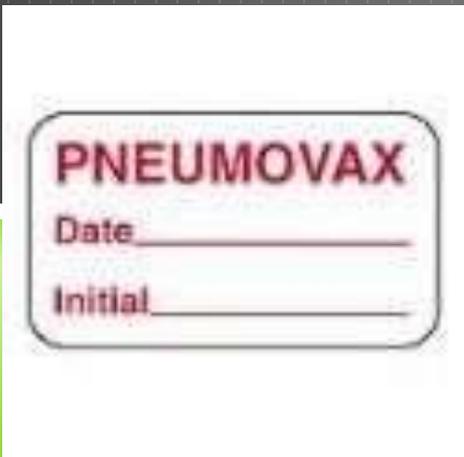
**Vaccine-preventable diseases  
are just a plane ride away.**



[www.VaccinateYourBaby.org](http://www.VaccinateYourBaby.org)

# 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



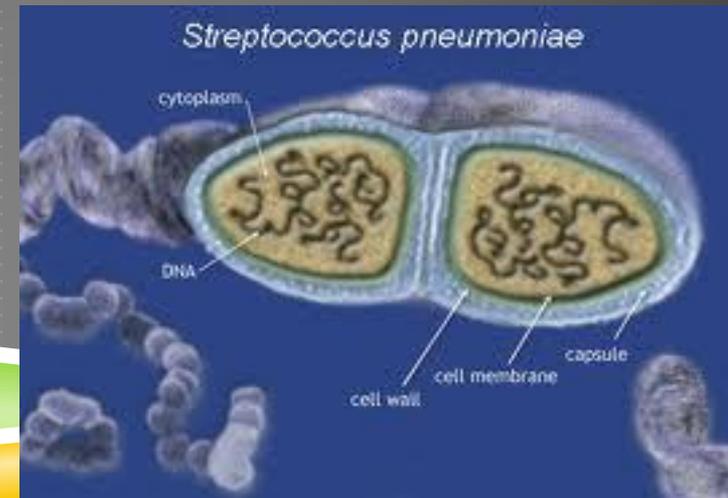
# MORAL OBLIGATION

- ▶ “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



# PNEUMOCOCCAL VACCINATION

- ▶ 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



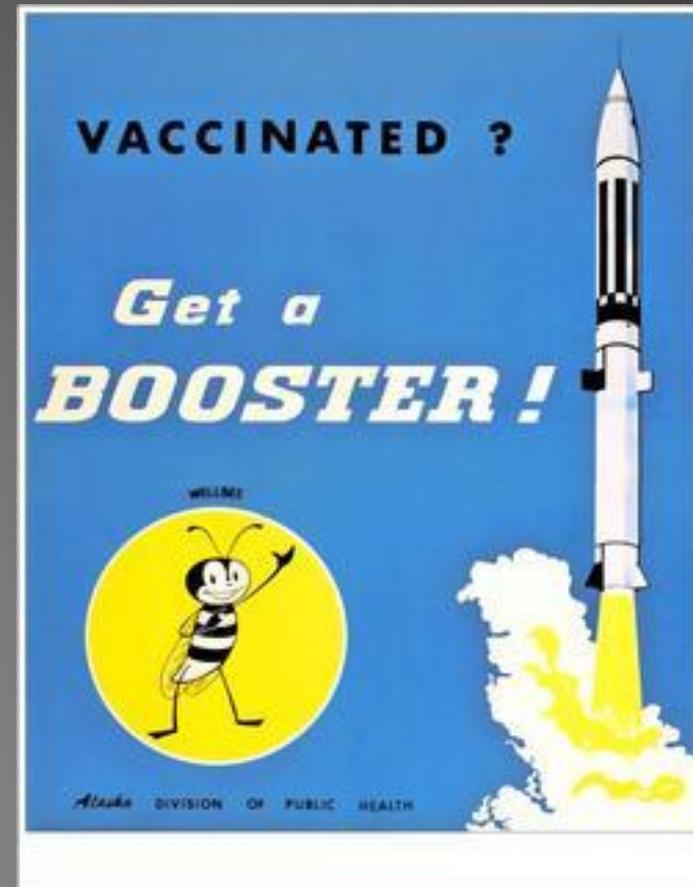
# PNEUMOCOCCAL VACCINATION

## 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!?!?!?!?



# PNEUMOCOCCAL VACCINATION

- ▶ 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...



Make a Note of This!

**EXCEPTIONS!!**

# PNEUMOCOCCAL VACCINATION

- ▶ 23 valent polysaccharide (ppv23)
  - ▶ Boosters
    - ▶ Exceptions...
      - ▶ 2<sup>nd</sup> dose 5 years after the 1<sup>st</sup> 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,
        - ▶ 2<sup>nd</sup> dose ppv23 5 years after the 1<sup>st</sup> dose
      - ▶ Children w/ high risk conditions who are immuno-compotent
        - ▶ 2<sup>nd</sup> dose ppv23 **NOT** recommended

# PNEUMOCOCCAL VACCINATION

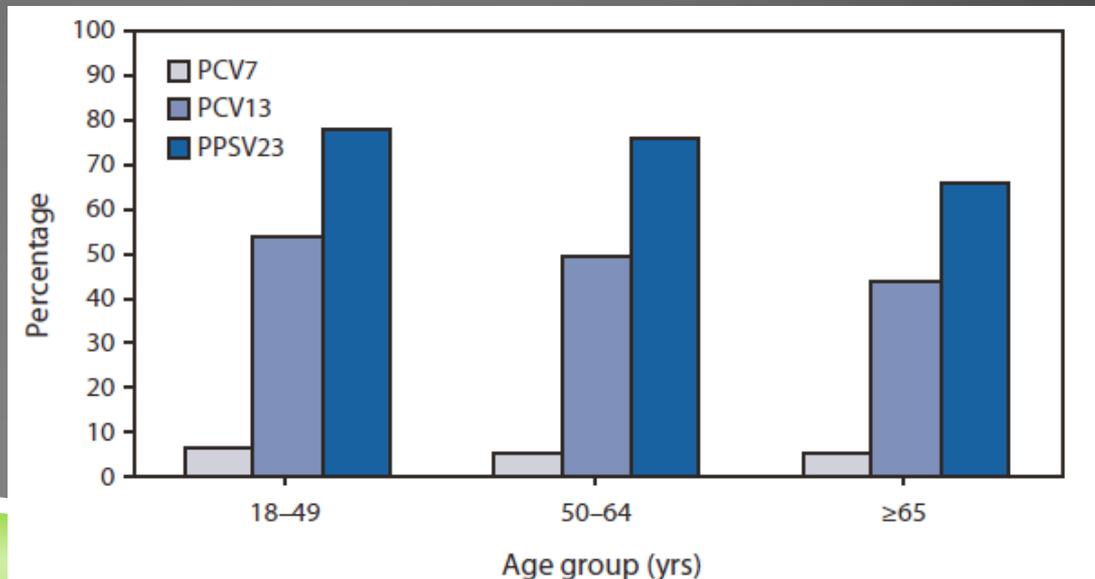
- ▶ 13 valent conjugate (pcv13)
  - ▶ Decrease incidence Pneumococcal pneumonia
  - ▶ IPD
  - ▶ Otitis media (children)

**Pus** on brain



# 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



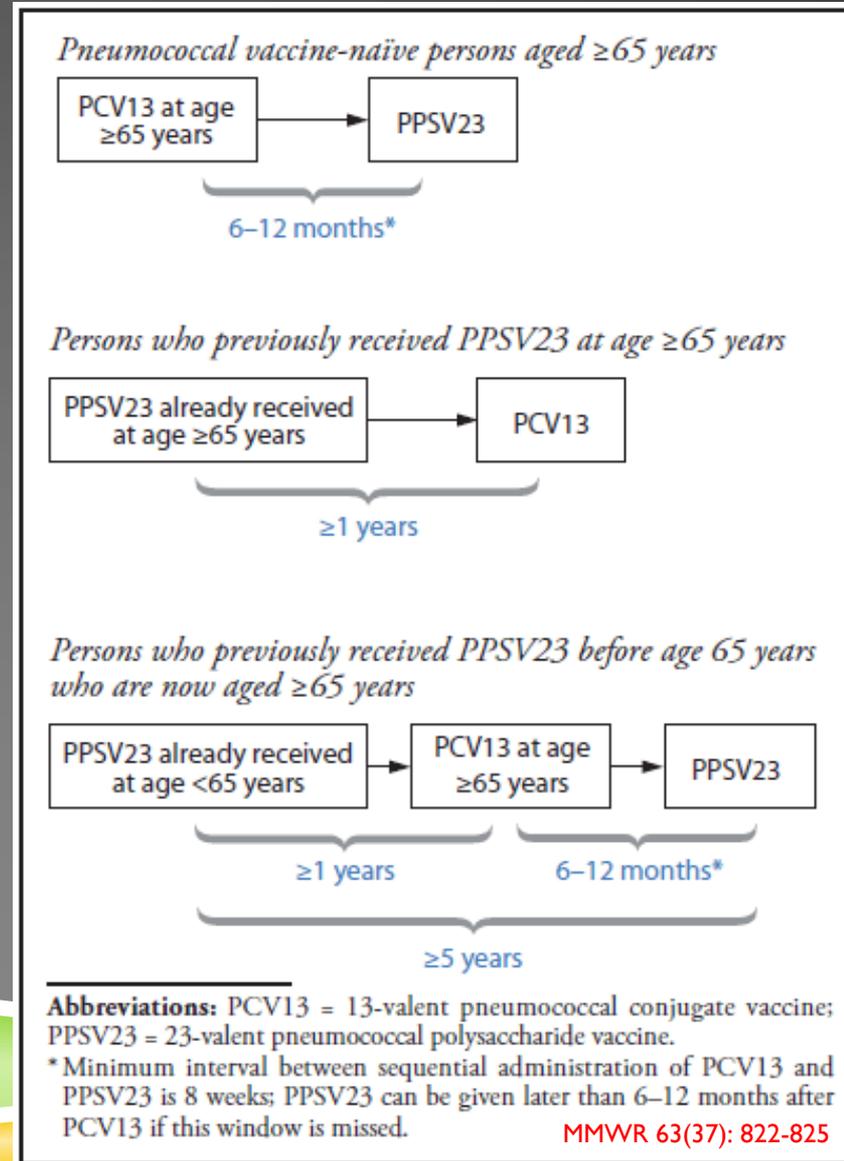
**% IPD by serotypes covered in pneumococcal vaccines (PCV7, PCV13, and PCV23) adults aged ≥18 years, by age group --- Active Bacterial Core surveillance, United States, 2008  
MMWR 59(34); 1102-1106**

# 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?



# 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**

| Infant series |       |       | Booster dose | Supplemental PCV13 dose |
|---------------|-------|-------|--------------|-------------------------|
| 2 mos         | 4 mos | 6 mos | ≥12 mos*     | 14–59 mos <sup>†</sup>  |
| PCV7          | PCV13 | PCV13 | PCV13        | NA                      |
| PCV7          | PCV7  | PCV13 | PCV13        | NA                      |
| PCV7          | PCV7  | PCV7  | PCV13        | NA                      |
| PCV7          | PCV7  | PCV7  | PCV7         | PCV13                   |

MMWR 59 (RR11): 1-19

\* 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.

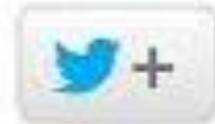
<sup>†</sup> For children with underlying medical conditions (see Table 2), a supplemental PCV13 dose is recommended through age 71 months.

# QUESTIONS



**Donald J. Trump**

@realDonaldTrump



I am being proven right about massive vaccinations—the doctors lied. Save our children & their future.

6:30am - 3 Sep 14

# REFERENCES

- ▶ UpToDate Online
- ▶ CDC.gov
- ▶ Immunize.org
- ▶ WHO.org
- ▶ atsu.edu
- ▶ Clin Infect Dis March 15, 2008 vol. 46 no. 6 926-932
- ▶ NEJM 345; 21: 1543-1547
- ▶ MMWR 63(37): 822-825
- ▶ MMWR 61(21): 394-395
- ▶ MMWR 60(2): 1-60
- ▶ MMWR 59(34): 1102-1106
- ▶ MMWR 59 (RR11): 1-19
- ▶ The Pink Book: Course Textbook - 13th Edition (2015)
- ▶ CID 49: 817-840

