


Centers for Disease Control and Prevention
National Center for Immunization and Respiratory Diseases



Pneumococcal Disease and Pneumococcal Vaccines

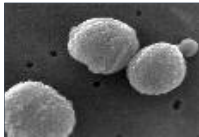
Adult Track

Chapter 17

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Streptococcus pneumoniae

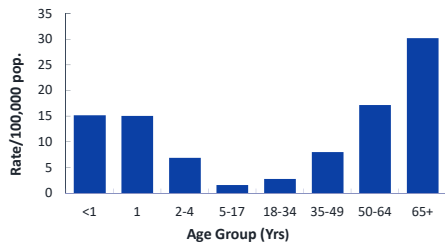
- Gram-positive bacteria
- 92 known serotypes
- Polysaccharide capsule important virulence factor
- Type-specific antibody is protective
- Limited cross-reactivity



Pneumococcal Disease

- Second most common cause of vaccine-preventable death in the U.S.
- Major clinical syndromes
 - Pneumonia
 - Bacteremia
 - Meningitis

Invasive Pneumococcal Disease Incidence by Age Group—2013*

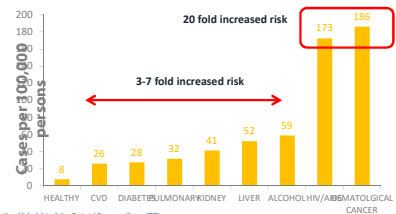


*CDC Active Bacterial Core surveillance 2009 report.
<http://www.cdc.gov/sbsc/reports-findings/docs-reports/npnac13.html>

Risk Factors for Invasive Pneumococcal Disease

- Functional or anatomic asplenia, including sickle-cell disease
- Altered immunocompetence
- Underlying medical conditions, including chronic renal disease, nephrotic syndrome, and CSF leak
- Cochlear implant

Incidence of IPD in Adults Aged 18-64 Years with Selected Underlying Conditions, United States, 2009



Unpublished data, Active Bacterial Core surveillance, 2009

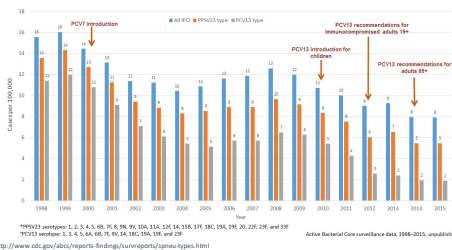
Pneumococcal Disease Epidemiology

- **Reservoir** Human carriers
- **Transmission** Respiratory and autoinoculation
- **Temporal pattern** Winter and early spring
- **Communicability** Unknown; probably as long as organism in respiratory secretions

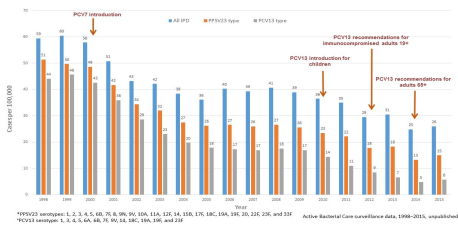
Pneumococcal Vaccines

- **1977** ▪ 14-valent polysaccharide vaccine licensed
- **1983** ▪ 23-valent polysaccharide vaccine licensed (PPSV23)
- **2000** ▪ 7-valent polysaccharide conjugate vaccine licensed (PCV7)
- **2010** ▪ 13-valent polysaccharide conjugate vaccine licensed (PCV13)

Trends in Invasive Pneumococcal Disease Among Adults 19–64 Years of Age, 1998–2015



Trends in Invasive Pneumococcal Disease Among Adults 65 Years of Age and Older, 1998–2015



Pneumococcal Disease in Adults

- In 2013, 20%-25% of invasive pneumococcal disease cases among adults 65 years old and older were attributable to PCV13 serotypes
- 10 percent of community-acquired pneumonia in adults due to PCV13 serotypes

Pneumococcal Polysaccharide Vaccine (PPSV23) Immunogenicity/Effectiveness

- Most estimates range between 60%-70% effective against invasive disease among immunocompetent older persons and adults with underlying illnesses
- Effectiveness among immunocompromised or very old persons not demonstrated

PCV13 for Adults

- Licensed for use among adults >50 years old on 12/30/11
- Based on noninferior immunogenicity compared to PPSV23
- Post approval condition of licensure:
 - Randomized controlled trial of PCV13 against pneumococcal pneumonia among adults >65 years old in the Netherlands

New Evidence Supporting PCV13 Use among Adults, CAPITA Results

Study/Population	Endpoint	Vaccine Efficacy (95% CI)
CAPITA ~85,000 Adults 65+ Netherlands	PCV13-serotype IPD	75% (41%, 91%)
	PCV13-serotype nonbacteremic pneumonia	45% (14%, 65%)

CAPITA, ACIP, June 2014

ACIP Adult Pneumococcal Vaccination Recommendations

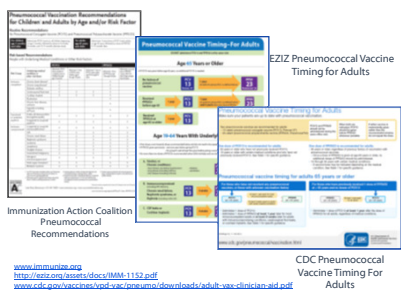
- **PPSV23 recommendations**
 - PPSV23 is recommended for persons 19 through 64 years of age at increased risk
 - PPSV23 is routinely recommended for persons 65 years of age and older
- **PCV13 recommendations**
 - PCV13 is recommended for persons 6 years and older at increased risk (2012, 2013)
 - PCV13 for routinely for adults 65 years or older (2014)

Administering PCV13 and PPSV23 Vaccines General Rules

- Administer PCV13 before PPSV23 whenever possible
- PCV13 and PPSV23 should not be administered during the same clinic visit
 - Either vaccine may be administered simultaneously with influenza vaccine
- Prior doses count and do not need to be repeated

Pneumococcal Vaccination Schedule

- **PCV13 schedule:**
 - Administer 1 dose to eligible adults who have no history of PCV13 vaccine
 - If PCV13 was administered before age 65, no additional doses are indicated at 65 years of age and older
- **PPSV23 schedule:**
 - No more than 2 doses of PPSV23 are recommended before age 65 and 1 dose after
 - Separate doses of PPSV23 by at least 5 years



Higher Risk for IPD

- Administer PCV13 and PPSV23 to adults 19 through 64 years of age at higher risk for IPD, including those with:
 - CSF leak
 - Cochlear implant
- Administer PCV13 followed by PPSV23 vaccine



MMWR 2015;64(36):944-47

Highest Risk for IPD

- Adults 19 through 64 years of age at highest risk for IPD, including those who:
 - Are immunocompromised (including HIV infection)
 - Have chronic renal failure or nephrotic syndrome
 - Are asplenic
- Administer PCV13 and 2 doses of PPSV23



MMWR 2015;64(36):944-47

Persons Age 65 Years and Older

- No history of pneumococcal vaccine



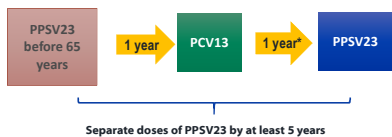
- Immunization history of PPSV23 at age 65 or older



*8 weeks if at higher or highest risk
MMWR 2015;64(36):944-47

Persons Age 65 Years and Older

- Received PPSV23 before age 65 years



*8 weeks if at higher or highest risk
MMWR 2012;61(16):344-7

**Pneumococcal Vaccines
Contraindications and Precautions**

- Severe allergic reaction to vaccine component or following prior dose of vaccine
- Moderate or severe acute illness

**Vaccine Administration
Pneumococcal Vaccines**

- Route: IM injection PCV13 and PPSV23**
 - Needle gauge: 22 – 25 gauge
 - Needle length*: 1 – 1.5 inch depending on the patient’s age and/or weight
- IM injection site*:**
 - 6 weeks – 11 months: Vastus lateralis muscle is recommended
 - 1 – 3 years: Vastus lateralis muscle is preferred; deltoid muscle may be used if the muscle mass is adequate
 - 3 years and older: Deltoid muscle is preferred; vastus lateralis muscle may be used
- Note: PPSV23 may also be administered by Subcut injection in the upper outer triceps area**
 - Needle gauge/length: 23 – 25 gauge; 5/8th inch needle
- Vaccine administration error:**
 - Wrong vaccine: PPSV23 to an infant
 - Schedule error: More than 1 PPSV23 revaccination dose to at-risk persons 19 – 64 years of age

*Professional judgement should be used to determine the proper needle length and site. Influencing factors include injection technique, local reaction, number of vaccines to be administered, patient age, size and muscle mass.

Pneumococcal Vaccines Adverse Reactions

	PPSV23	PCV
Local reactions	30%-50%	5%-49%
Fever, myalgia	<1%	24-35%
Febrile seizures	---	Rare: 1-14/100,000; with IIV 4 -45/ 100,000
Severe adverse reactions	rare	8% (local)

Vaccine Storage and Handling

- Store PCV13 and PPSV23 vaccines in a refrigerator between 2°C - 8°C (36°F - 46°F)
- Store:
 - In the original packaging with the lids closed
 - In a clearly labeled bin and/or area of the storage unit – not next to each other
- Do not freeze the vaccine

PCV13 (Prevnar 13)
 Ages: All children 6 weeks through 5 years
Increased risk children 6 years through 18 years
Increased risk adults 19 years and older
 Adults 65 years and older who have never received PCV13
Route: Intramuscular (IM) injection

PPSV23 (Pneumovax 23)
 Ages: Healthy adults 65 years and older
Increased risk persons 2 years through 64 years
Route: Intramuscular (IM) injection OR Subcutaneous (subcut) injection
No more than two doses of PPSV23 recommended before 60th birthday and one dose after 65.

Vaccine storage label example
 Available at www.cdc.gov/vaccines/imz/admin/storage/guides/vaccine-storage-labels.pdf

What Do You Think?

A 70-year-old patient is immunosuppressed. Her immunization history includes PCV13 and PPSV23 at 65 years of age. Should PPSV23 be administered today?

- Yes
- No
