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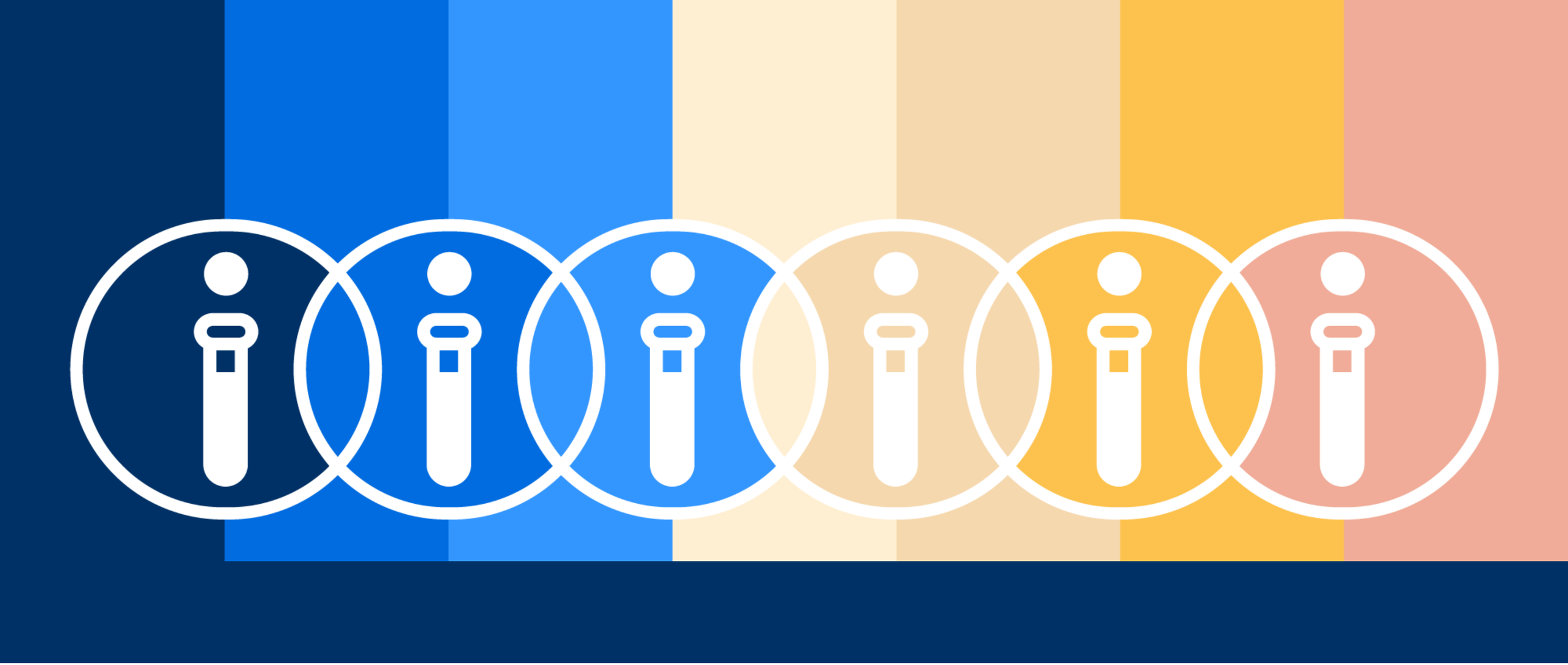
Nursing Home Leadership Roundtable: Pneumococcal Vaccines, Pneumonia and Resident Care

Visit Health

June 14, 2023



Pneumococcal Vaccines, Pneumonia and Resident Care

v1.1 Last updated 5.24.23

Objectives

- To understand and be able to define the difference between pneumonia and pneumococcal disease.
- Understand the difference between community acquired and hospital acquired pneumonia.
- Understand the new options available for diagnosing and treating pneumonia.
- Understand Streptococcus Pneumoniae, the diseases it causes and their impact.
- Understand the different historical types of pneumococcal vaccinations.
- Understand and utilize the current vaccination guidelines from the CDC, and use the state registries and select the proper vaccination for residents/patients.

Image source: Visit Health

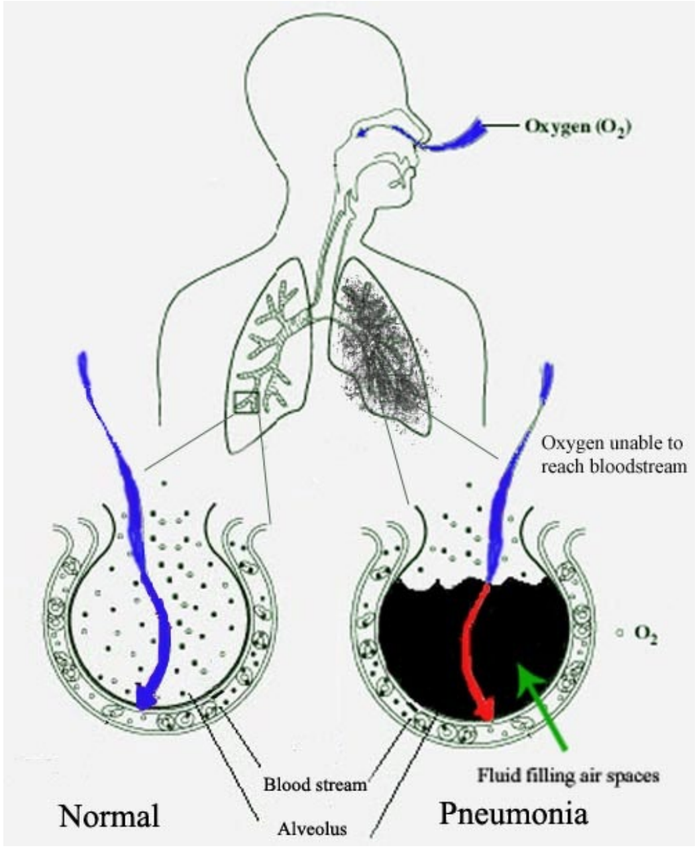
Who Am I?

- Daniel Mercer, Pharm.D
- Currently: National Clinical Director, Visit Health
  - Direct vaccination efforts for the company.
  - Responsible for LTC and community sales, marketing, education and clinical activities.
  - Manage lab activities at Visit Health in conjunction with our internal and external lab partners.
- At various points in my career:
  - A pharmacist with a concentration in infectious disease
  - Experiential adjunct faculty for Ferris State School of Pharmacy
  - Clinical Pharmacy manager and vaccination trainer for pharmacists
- Administered thousands of vaccinations, both before and during Covid.

Some tenets of infectious disease

- The only good bug is a dead bug.
- Dead bugs don’t create resistance.
- The only thing better than killing bugs is vaccinating against them.
- The only thing better than vaccinating against bugs is preventing their spread in the first place.
- That’s a nice goal.
- That’s not possible.

Image source:
Canva



Well, what IS pneumonia?

Pneumonia is an infection of the lung tissue. When a person has pneumonia the air sacs in their lungs become filled with microorganisms, fluid and inflammatory cells and their lungs are not able to work properly.

- “Trunks and branches” vs. “leaves”

Pneumonia in adults: diagnosis and management - NCBI Bookshelf (nih.gov)

Image source: Wikipedia

Diagnostic Criteria

3 of the following:

- Respiratory rate ≥30 breaths/min
- PaO2/FIO2 ratio ≤ 250
- Multilobar infiltrates
- Confusion/disorientation
- Uremia (BUN ≥20mg/dl)
- Leukopenia (WBC <4000 cells/µl)
- Thromocytopenia (platelet count <100,000/µl)
- Hypothermia (core temperature <36° C
- Hypotension requiring aggressice fluid resuscitation

Or ONE of the following:

- Septic shock with need for vasopressors
- Respiratory failure requiring mechanical ventilation

Diagnosis and Treatment of Adults with Community-acquired Pneumonia. An Official Clinical Practice Guideline of the American Thoracic Society and Infectious Diseases Society of America | American Journal of Respiratory and Critical Care Medicine (atsjournals.org)

Pneumonia is a problem.

Per a study from 2015, it was a leading cause of death for adults 18 years of age and older.

Community-Acquired Pneumonia Requiring Hospitalization among U.S. Adults | NEJM

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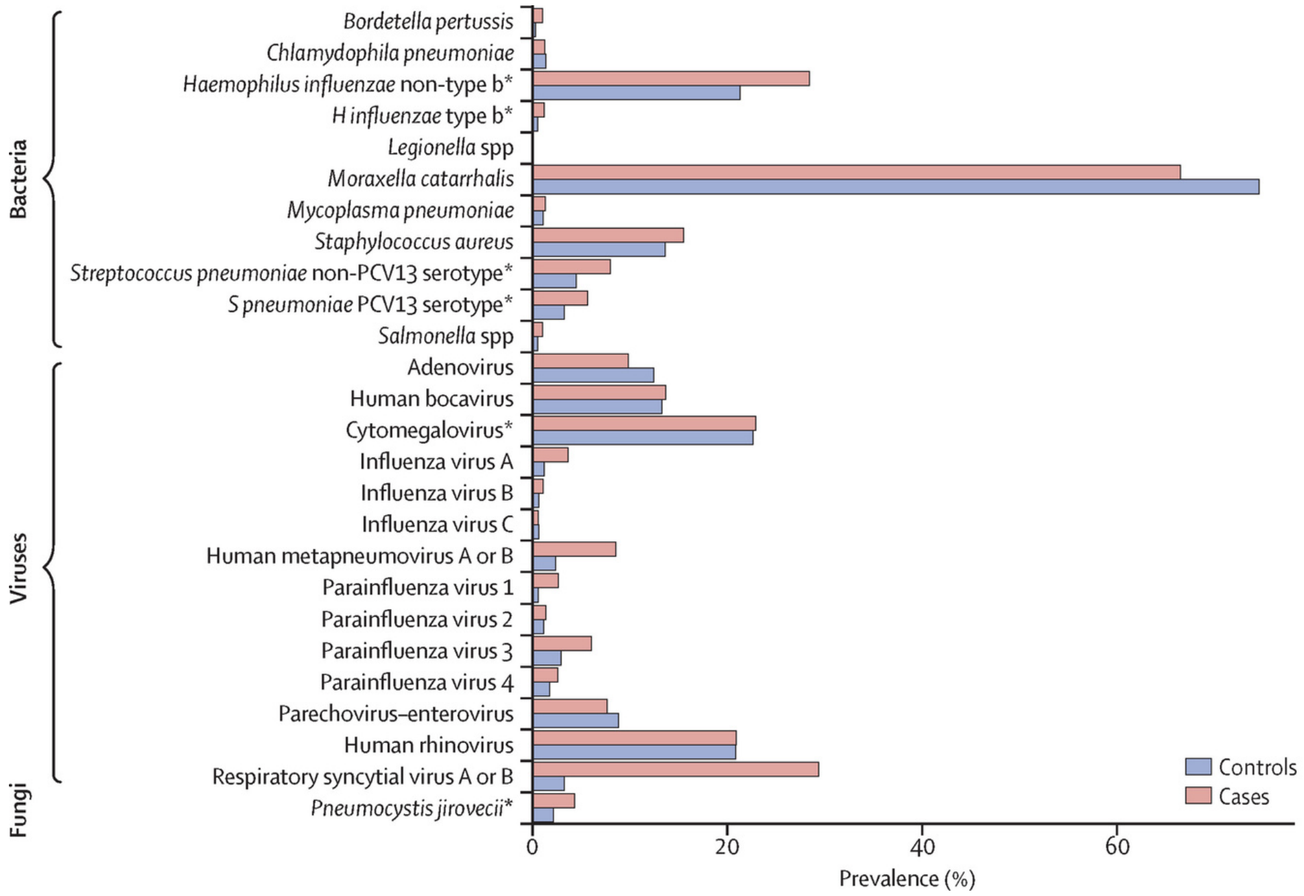


Image source: The Lancet

Because of the similarity of the name to the disease state and to a couple of the pathogens, it gets confusing. The most significant pathogen is Streptococcus Pneumoniae – the one we are specifically addressing in this presentation.

- S. Pneumoniae is not the only pathogen.
- Gram +, Gram -, atypical, fungi, viruses
- Pneumococcal vaccination vs. pneumonia
- One is a directly targeted vaccination for a specific bacteria.
- The other is the name of a disease state sometimes caused by that bacteria… and often not.

[Causes of severe pneumonia requiring hospital admission in children without HIV infection from Africa and Asia: the PERCH multi-country case-control study - The Lancet]

Image source: Canva

The causative agent for pneumonia shifts with age from pathogens like RSV to S. Pneumoniae.

- NiH gives a range of 36-49% of pneumonia cases in the elderly being caused by S. Pneumoniae

Management of community-acquired pneumonia in older adults - PMC (nih.gov)

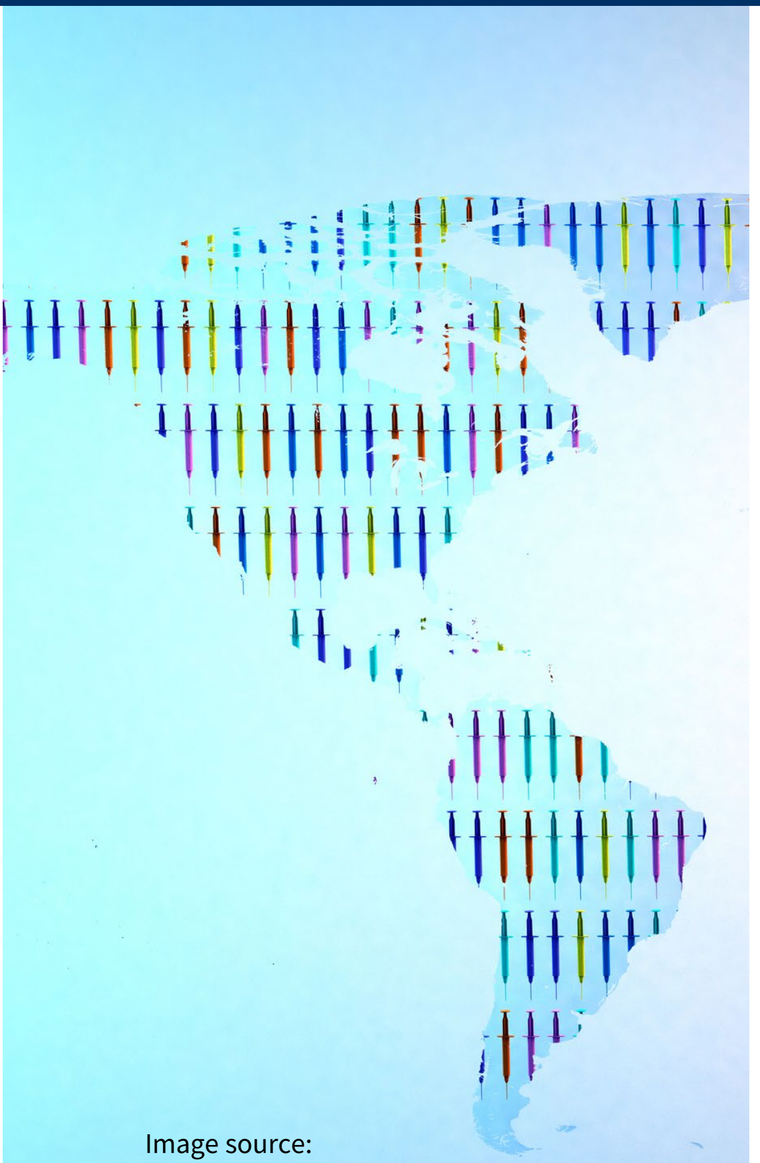


Image source:
Canva

Here's the REAL problem:

- Culture and sensitivity can be unreliable.
- In areas with poor vaccine penetration, S. Pneumoniae will be detected by PCR (thresholds removed) **70%** of the time.
- The PCR evidence being so overwhelming, it points to the following: **You're colonized. I'm colonized. Everybody is colonized.**
- If you're not vaccinated, you're sort of a hotel for S. Pneumoniae:

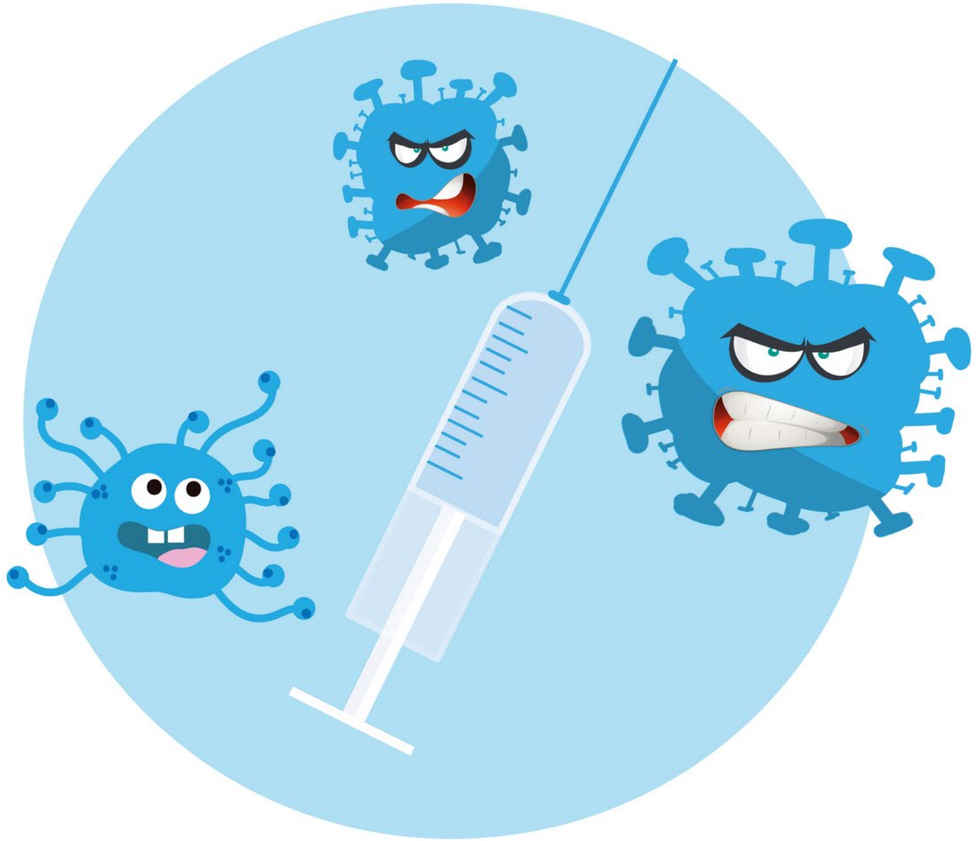
"Pneumococci are common inhabitants of the respiratory tract and may be isolated from the nasopharynx of 5% to 90% of healthy persons."

Causes of severe pneumonia requiring hospital admission in children without HIV infection from Africa and Asia: the PERCH multi-country case-control study - The Lancet

Pinkbook: Pneumococcal Disease | CDC

We're not just vaccinating for pneumonia ...but that gets the most press!

- Major clinical syndromes are pneumonia, bacteremia, and meningitis.
- The vaccines will cover **all three** disease states.



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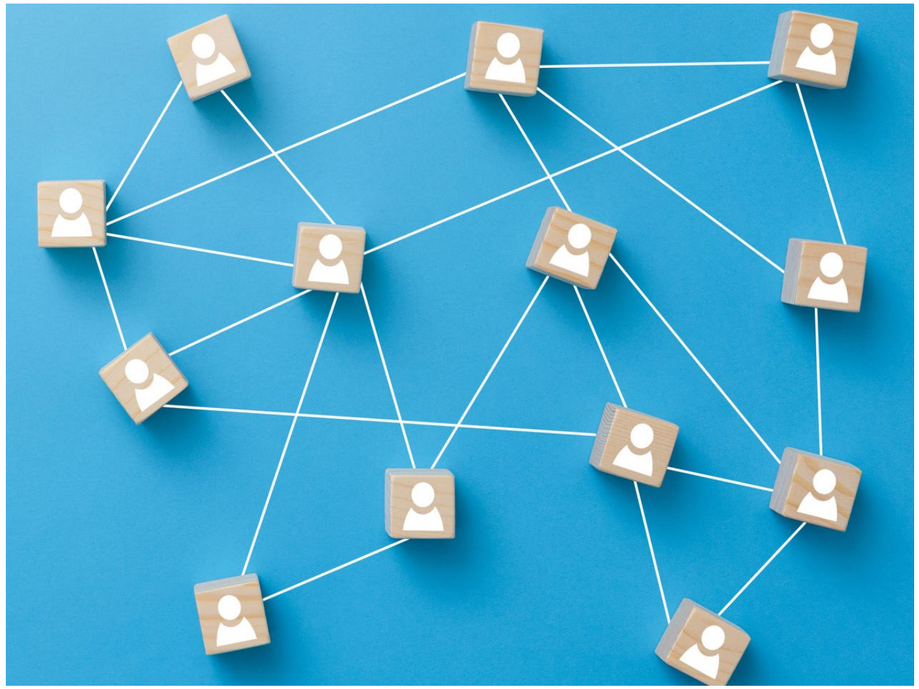
HAP - IDSA

Management of Adults With Hospital-acquired and Ventilator-associated Pneumonia: 2016 Clinical Practice Guidelines by the Infectious Diseases Society of America and the American Thoracic Society (silverchair.com)

Image source: Canva



CAP – American Thoracic Society

Diagnosis and Treatment of Adults with Community-acquired Pneumonia. An Official Clinical Practice Guideline of the American Thoracic Society and Infectious Diseases Society of America | American Journal of Respiratory and Critical Care Medicine (atsjournals.org)

Image source: Canva

So, what's the real difference between HAP and CAP?

- In HAP, resistance is assumed.
- Broad spectrum antibiotics are the first choice of treatment with what might be termed "The Nuclear Option" for vulnerable patients with assumed bacterial pneumonia:
  - **Kill everything Gram –** (levofloxacin, piperacillin/tazobactam)
  - **Kill Everything Gram +** (vancomycin, linezolid)
  - **Kill Everything atypical** (levofloxacin, ciprofloxacin)
- These are not nice drugs in some cases… vancomycin is rough…
  - Kidney damage
  - Hearing damage
  - Narrow therapeutic index drug

Management of Adults With Hospital-acquired and Ventilator-associated Pneumonia: 2016 Clinical Practice Guidelines by the Infectious Diseases Society of America and the American Thoracic Society (silverchair.com)

Image source: Canva

Everyone in a Long-Term Care is assumed to have HAP if they are diagnosed with pneumonia.

- “HCAP includes any patient who was hospitalized in an acute care hospital for two or more days within 90 days of the infection; resided in a nursing home or long-term care facility; received recent intravenous antibiotic therapy, chemotherapy, or wound care within the past 30 days of the current infection; or attended a hospital or hemodialysis clinic.”

- The categories of HAP and HCAP were merged in 2016 by ATS (American Thoracic Society) and IDSA (Infectious Disease Society of America)

Guidelines for the Management of Adults with Hospital-acquired, Ventilator-associated, and Healthcare-associated Pneumonia | American Journal of Respiratory and Critical Care Medicine (atsjournals.org)

Image source: Canva

So, back to the previous concept of taking care of pneumonia patients…

- Prevent the spread in the first place.
- Since you can't always prevent the spread, vaccinate.
- If a resident/patient still ends up with pneumonia:
  - Begin treatment quickly. Empirics are OK when the need arises.
    - Start with local resistance patterns.
    - We can help.

- Identify the pathogen and what it is resistant to **ASAP**
  - C&S takes 3 days.
  - We can get you this information in 24 hours.

- Pick the right antibiotic
  - Broad spectrum -> narrow spectrum
  - We can help.

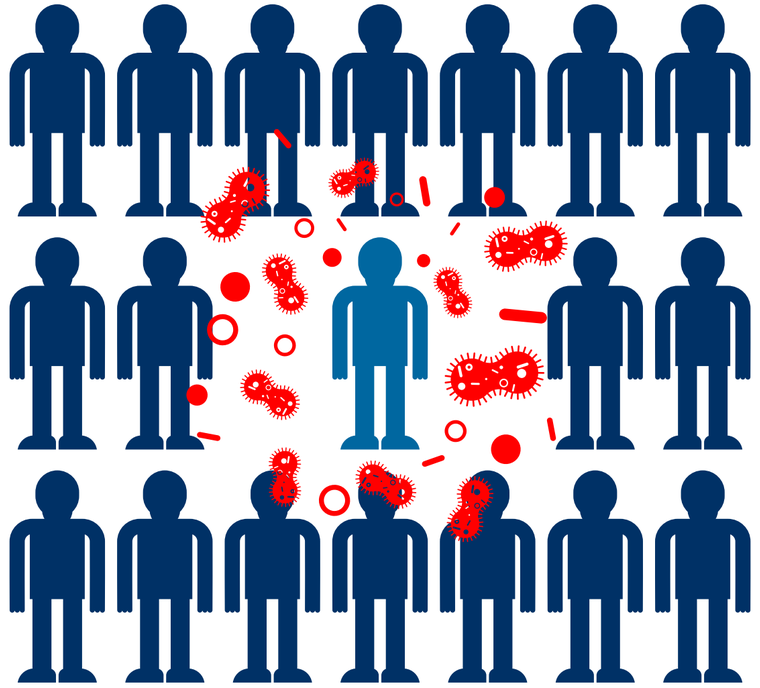


Image source: Canva

Streptococcus pneumoniae

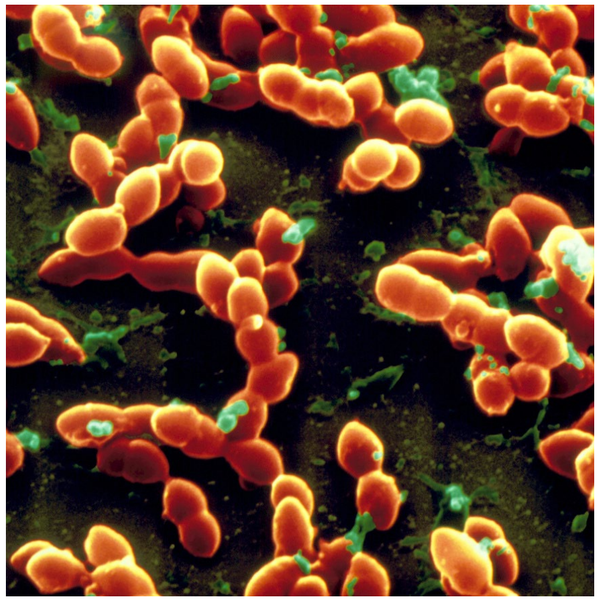


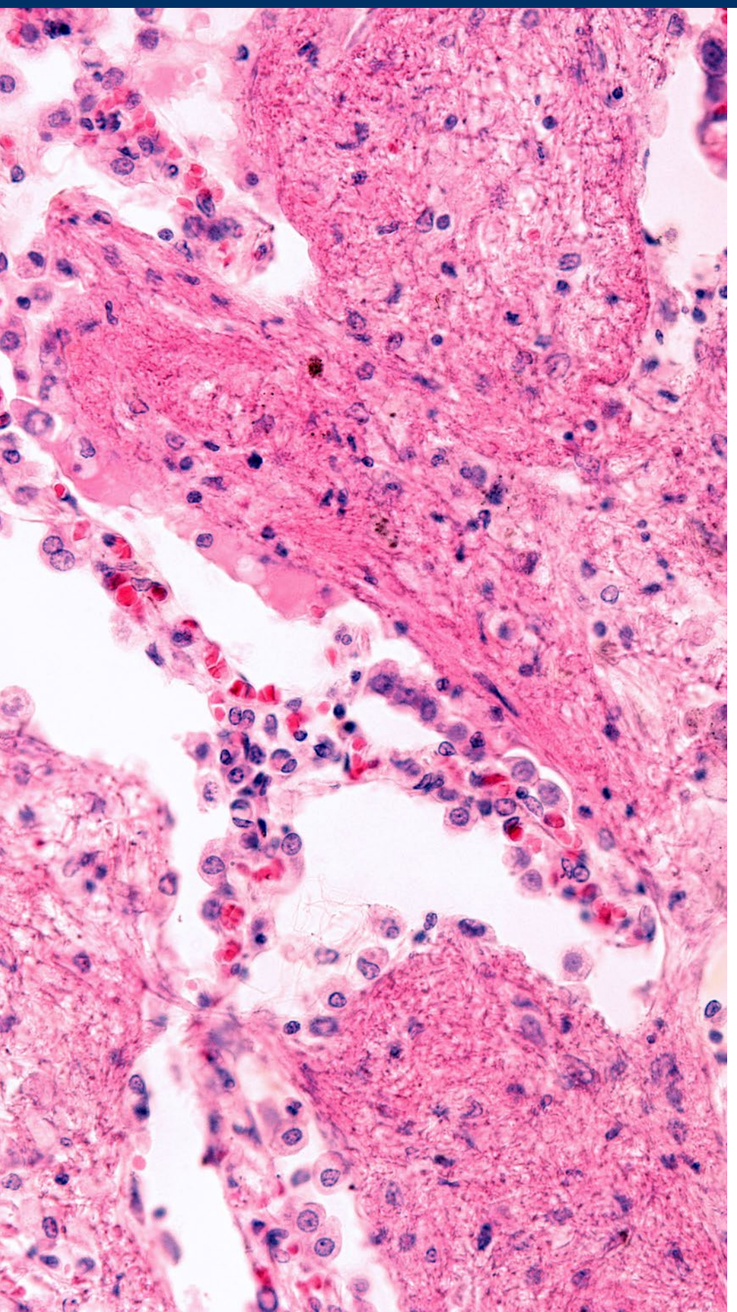
Image source: Oxford University Innovation

Lancet-shaped, gram-positive, facultative anaerobic organisms that typically appear in pairs.

- Gram +… that's good… lots of effective antibiotics.
- Pneumococci cause more than 50% of all cases of bacterial meningitis in the United States with approximately 2,000 cases of pneumococcal meningitis occurring each year.
- Over 150,000 hospitalizations from pneumococcal pneumonia are estimated to occur annually in the United States and it has been demonstrated to complicate influenza infection.
- In adults, pneumococci account for 10% to 30% of adult community-acquired pneumonia.
- As we age, this percentage goes UP.

100 different serotypes. These are identified by surface features.

Pinkbook: Pneumococcal Disease | CDC d. Picture source: Streptococcus pneumoniae bacteria - Oxford University Innovation



In the beginning...

Well, not really. The really early ones are irrelevant... sort of the beginning...

Pneumococcal Conjugate Vaccine (PCV7)

- Contains serotypes of S. pneumoniae conjugated to a nontoxic variant of diphtheria toxin known as CRM197.
- Covers only 7 serotypes.
- If a patient received this, according to the current guideline, they are to be considered unvaccinated. In other words, pretend like that vaccination never happened.. In other words, pretend like that vaccination never happened.

PCV13

- 13 serotypes of S. pneumoniae: 1, 3, 4, 5, 6A, 6B, 7F, 9V, 14, 18C, 19A, 19F, and 23F.
- Same tech as PCV7
- Here comes the confusion... this is considered in the vaccination history of the patient. PCV13 vaccine history will effect vaccination choices considered in the vaccination history of the patient. PCV13 vaccine history will effect vaccination choices.

Pinkbook: Pneumococcal Disease | CDC
Adult Immunization Schedule – Healthcare Providers | CDC

Image source:
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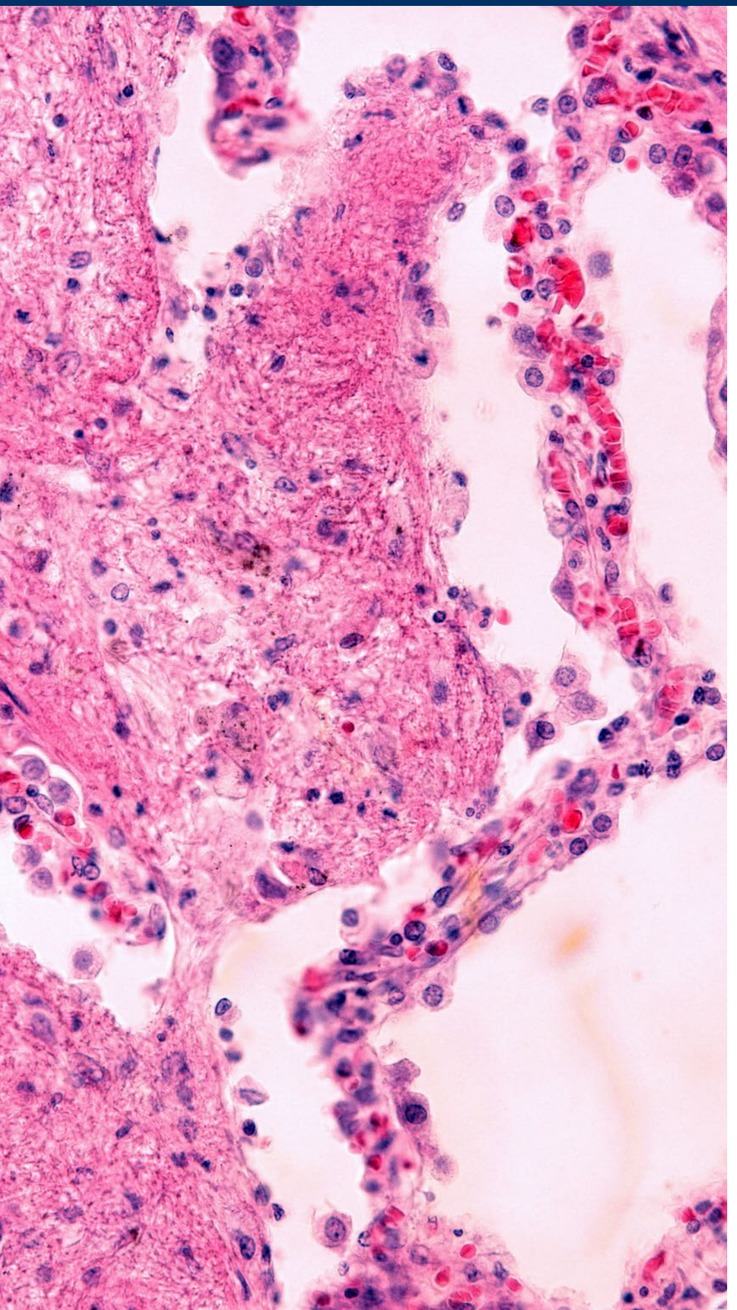


PPSV23

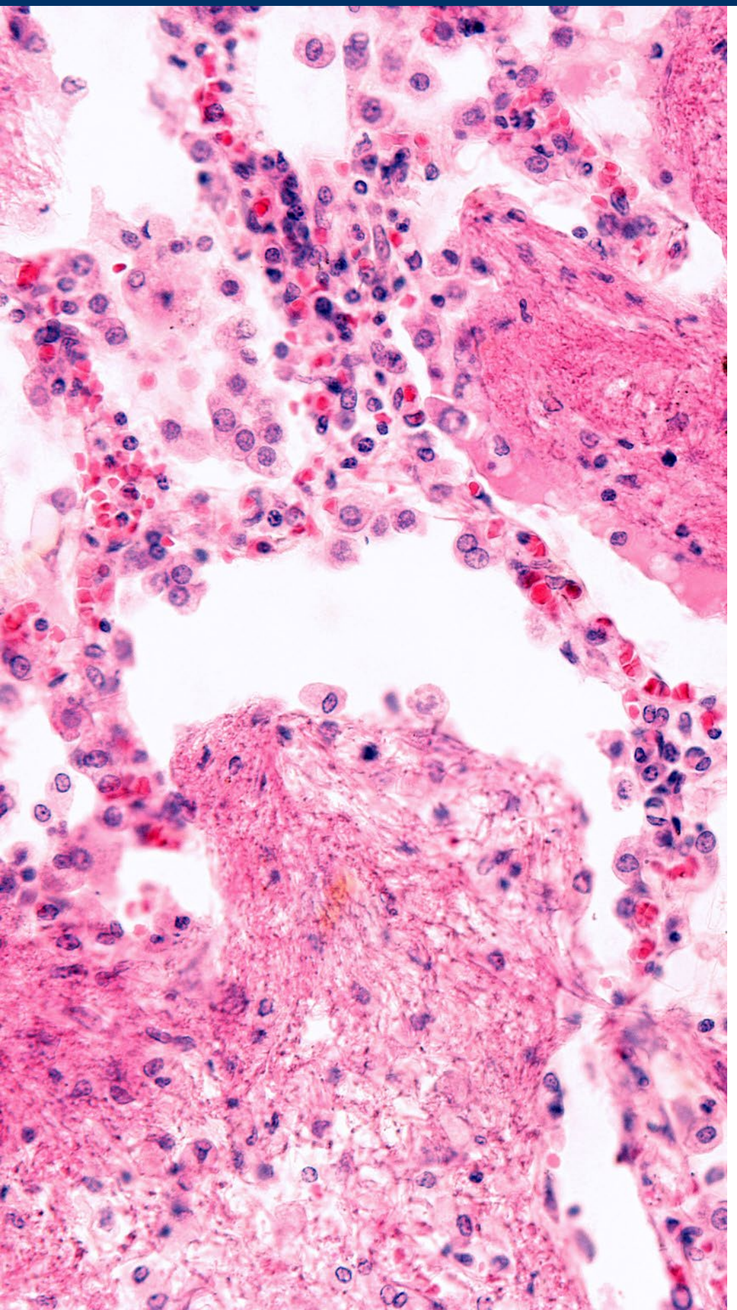
- Mimics the surface antigenic features we described earlier that define the serotypes.
- Antibodies react to the antigens presented… immunogenicity is reduced in the immune compromised (i.e. the elderly).
- 1983
- 23 serotypes: 1, 2, 3, 4, 5, 6B, 7F, 8, 9N, 9V, 10A, 11A, 12F, 14, 15B, 17F, 18C, 19A, 19F, 20, 22F, 23F, and 33F
- Note the overlap… PCV13 and PPSV23 share: 1, 3, 4, 5, 6B, 7F, 9V, 14, 18C, 19A, 19F and 23F (12 serotypes)
- Here comes some more confusion… is sometimes considered in a person's vaccination history.

"Despite the vaccine's reduced effectiveness among immunocompromised persons, PPSV23 is still recommended for such persons because they are at increased risk of developing severe disease."

"There is no consensus regarding the ability of PPSV23 to prevent non-bacteremic pneumococcal pneumonia. For this reason, providers should avoid referring to PPSV23 as a 'pneumonia vaccine.'"

Image source: Canva

Pinkbook: Pneumococcal Disease | CDC



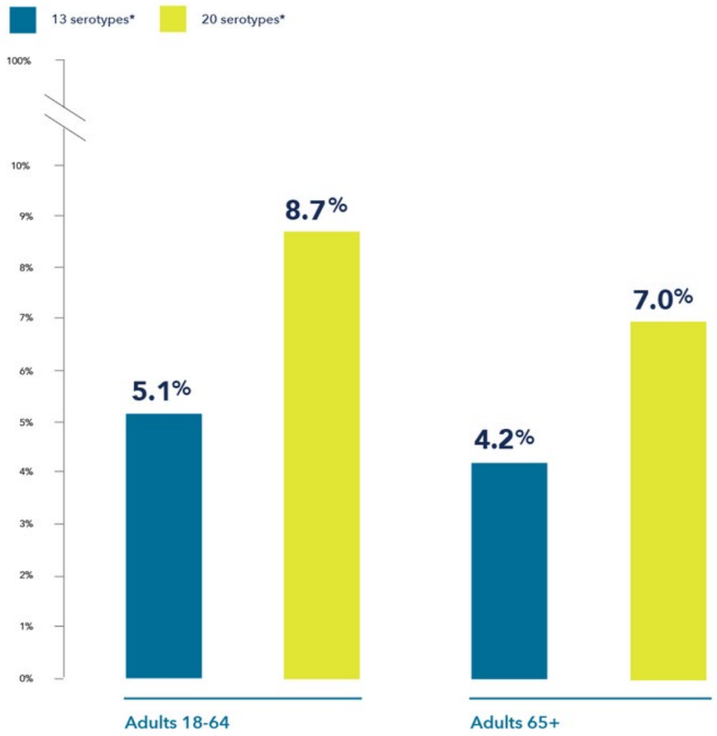
The New Vaccines

PCV15

- This falls into the “That’s neat… why would we do that?” category.
- Provides 2 more serotypes, but no clinical advantage whatsoever compared to what was recently released.
- If it is used, the vaccine schedule then requires the use of PPSV23.

Adult Immunization Schedule – Healthcare Providers | CDC

Image source:
Canva



Prevnar 20 and Prevnar 13® (Pneumococcal 13-valent Conjugate Vaccine [Diphtheria CRM197 Protein]) are the only conjugate vaccines approved to help prevent pneumococcal pneumonia[2,3]

The Newest Vaccine: PCV20 (Prevnar 20)

- Same general type as PCV 13
- Covers 7 more serotypes than PCV13: serotypes 8, 10A, 11A, 12F, 15B, 22F, and 33F
- Makes PCV15 irrelevant.
- Per Pfizer, these additional strains cover 40% more of the total pneumonia cases caused by Streptococcus Pneumoniae in the community:

PREVNAR20™ (Pneumococcal 20-valent Conjugate Vaccine) (pfizerpro.com)

Image source: Pfizer Pro

So where's the confusion?

New shot, works better, everybody gets it, right?

- Well… no
- PCV20 changes the considerations significantly.

Image source:
Canva

Age 65 years or older who have:

Not previously received a dose of PCV13, PCV15, or PCV20 or whose previous vaccination history is unknown:

1 dose PCV15 OR 1 dose PCV20. If PCV15 is used, this should be followed by a dose of PPSV23 given at least 1 year after the PCV15 dose. A minimum interval of 8 weeks between PCV15 and PPSV23 can be considered for adults with an immunocompromising condition,* cochlear implant, or cerebrospinal fluid leak to minimize the risk of invasive pneumococcal disease caused by serotypes unique to PPSV23 in these vulnerable groups.

Previously received only PCV7:

Follow the recommendation above.

Image source:
Canva

Previously received only PCV13:

1 dose PCV20 at least 1 year after the PCV13 dose OR complete the recommended PPSV23 series as described here:

www.cdc.gov/vaccines/vpd/pneumo/downloads/pneumo-vaccine-timing.pdf

Previously received only PPSV23:

1 dose PCV15 OR 1 dose PCV20 at least 1 year after the PPSV23 dose. If PCV15 is used, it need not be followed by another dose of PPSV23.

Image source:
Canva

Previously received both PCV13 and PPSV23,
but NO PPSV23 was received at age 65 years or older:
1 dose PCV20 at least 5 years after their last pneumococcal vaccine dose OR complete the recommended PPSV23 series as described here:

www.cdc.gov/vaccines/vpd/pneumo/downloads/pneumo-vaccine-timing.pdf

Previously received both PCV13 and PPSV23,
AND PPSV23 was received at age 65 years or older:
Based on shared clinical decision-making, 1 dose of PCV20 at least 5 years after the last pneumococcal vaccine dose.

Image source:
Canva

Pneumococcal Vaccine Timing for Adults

Make sure your patients are up to date with pneumococcal vaccination.

Adults ≥65 years old
Complete pneumococcal vaccine schedules

Prior vaccines	Option A	Option B
None*	PCV20	PCV15 → ≥1 year† → PPSV23
PPSV23 only at any age	≥1 year → PCV20	≥1 year → PCV15
PCV13 only at any age	≥1 year → PCV20	≥1 year† → PPSV23
PCV13 at any age & **PPSV23** at <65 yrs	≥5 years → PCV20	≥5 years§ → PPSV23

* Also applies to people who received PCV7 at any age and no other pneumococcal vaccines
† Consider minimum interval (8 weeks) for adults with an immunocompromising condition, cochlear implant, or cerebrospinal fluid leak (CSF) leak
§ For adults with an immunocompromising condition, cochlear implant, or CSF leak, the minimum interval for PPSV23 is ≥8 weeks since last PCV13 dose and ≥5 years since last PPSV23 dose; for others, the minimum interval for PPSV23 is ≥1 year since last PCV13 dose and ≥5 years since last PPSV23 dose

Shared clinical decision-making for those who already completed the series with PCV13 and PPSV23

Prior vaccines	Shared clinical decision-making option
Complete series: PCV13 at any age & **PPSV23** at ≥65 yrs	≥5 years → PCV20 Together, with the patient, vaccine providers **may choose** to administer PCV20 to adults ≥65 years old who have already received PCV13 (but not PCV15 or PCV20) at any age and PPSV23 at or after the age of 65 years old.

www.cdc.gov/pneumococcal/vaccination.html

U.S. Department of Health and Human Services
Centers for Disease Control and Prevention

Adults 19–64 years old with specified immunocompromising conditions
Complete pneumococcal vaccine schedules

Prior vaccines	Option A	Option B
None*	PCV20	PCV15 → ≥8 weeks → PPSV23
PPSV23 only	≥1 year → PCV20	≥1 year → PCV15
PCV13 only	≥1 year → PCV20	≥8 weeks → PPSV23 → ≥5 years → PPSV23 Review pneumococcal vaccine recommendations again when your patient turns 65 years old.
PCV13 and **1 dose of PPSV23**	≥5 years → PCV20	≥5 years† → PPSV23 Review pneumococcal vaccine recommendations again when your patient turns 65 years old.
PCV13 and **2 doses of PPSV23**	≥5 years → PCV20	**No vaccines** recommended at this time. Review pneumococcal vaccine recommendations again when your patient turns 65 years old.
Immunocompromising conditions	◗ Chronic renal failure ◗ Congenital or acquired asplenia ◗ Congenital or acquired immunodeficiency§ ◗ Generalized malignancy ◗ HIV infection ◗ Hodgkin disease ◗ Iatrogenic immunosuppression¶ ◗ Leukemia ◗ Lymphoma ◗ Multiple myeloma ◗ Nephrotic syndrome ◗ Sickle cell disease/other hemoglobinopathies ◗ Solid organ transplant	

* Also applies to people who received PCV7 at any age and no other pneumococcal vaccines
† The minimum interval for PPSV23 is ≥8 weeks since last PCV13 dose and ≥5 years since last PPSV23 dose
§ Includes B- (humoral) or T-lymphocyte deficiency, complement deficiencies (particularly C1, C2, C3, and C4 deficiencies), and phagocytic disorders (excluding chronic granulomatous disease)
¶ Includes diseases requiring treatment with immunosuppressive drugs, including long-term systemic corticosteroids and radiation therapy

Image source: CDC

www.cdc.gov/pneumoccoccal/vaccination.html

Adults 19–64 years old with a cochlear implant or cerebrospinal fluid leak
Complete pneumococcal vaccine schedules

Prior vaccines	Option A	Option B
None*	PCV20	PCV15 → ≥8 weeks → PPSV23
PPSV23 only	≥1 year → PCV20	≥1 year → PCV15
PCV13 only	≥1 year → PCV20	≥8 weeks → PPSV23 Review pneumococcal vaccine recommendations again when your patient turns 65 years old.
PCV13 and 1 dose of PPSV23	≥5 years → PCV20	**No vaccines** recommended at this time. Review pneumococcal vaccine recommendations again when your patient turns 65 years old.

* Also applies to people who received PCV7 at any age and no other pneumococcal vaccines

Adults 19–64 years old with chronic health conditions
Complete pneumococcal vaccine schedules

Prior vaccines	Option A	Option B
None*	PCV20	PCV15 → ≥1 year → PPSV23
PPSV23 only	≥1 year → PCV20	≥1 year → PCV15
PCV13† only	≥1 year → PCV20	≥1 year → PPSV23 Review pneumococcal vaccine recommendations again when your patient turns 65 years old.
PCV13† and PPSV23	**No vaccines** are recommended at this time. Review pneumococcal vaccine recommendations again when your patient turns 65 years old.	
Chronic health conditions	❩ Alcoholism ❩ Chronic heart disease, including congestive heart failure and cardiomyopathies ❩ Chronic liver disease	❩ Chronic lung disease, including chronic obstructive pulmonary disease, emphysema, and asthma ❩ Cigarette smoking ❩ Diabetes mellitus

* Also applies to people who received PCV7 at any age and no other pneumococcal vaccines
† Adults with chronic medical conditions were previously not recommended to receive PCV13

Image source: CDC

www.cdc.gov/pneumoccoccal/vaccination.html

Image source:
Canva

What does “Shared Clinical Decision-making” mean?

Shared clinical decision-making vaccinations are not recommended for everyone in a particular age group or everyone in an identifiable risk group. Rather, shared clinical decision-making recommendations are individually based and informed by a decision process between the health care provider and the patient or parent/guardian. The decision about whether or not to vaccinate may be informed by the best available evidence of who may benefit from vaccination; the individual’s characteristics, values, and preferences; the health care provider’s clinical discretion; and the characteristics of the vaccine being considered. There is not a prescribed set of considerations or decision points in the decision-making process.

ACIP Shared Clinical Decision-Making Recommendations | CDC

For guidance on determining which pneumococcal vaccines a patient needs and when, please refer to the mobile app which can be downloaded here:

www.cdc.gov/vaccines/vpd/pneumo/hcp/pneumoapp.html

Thank you!

Contact Us:
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