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Pneumococcal Vaccine Health & Safety Alert

Pneumococcal Disease Introduction

Pneumococcal disease is a leading cause of serious illness globally. Pneumococcal disease is the name for any infection caused by bacteria called *Streptococcus pneumoniae*, or pneumococcus. Pneumococcal infections can range from ear and sinus infections to pneumonia and bloodstream infections.

The best way to lower the risk of pneumococcal disease is through vaccination, which can also help to reduce the severity of illness and death when someone is diagnosed with pneumococcal infection (CDC, 2019a, b, c).

Types of Pneumococcal Infections

Pneumococcal disease is a term used for a wide range of infections caused by bacteria called *Streptococcus pneumoniae* (pneumococcus):

- Pneumonia (lung infection).
- Ear infections.
- Sinus infections.
- Meningitis (infection of the covering of the brain and spinal cord).
- Bacteremia (bloodstream infection).
- Sepsis (the body's extreme response to a systemic infection).

What Are The Symptoms Of Pneumococcal Disease?

Symptoms depend on the part of the body the *Streptococcus pneumoniae* bacteria are affecting.

Pneumococcal Pneumonia

Pneumococcal pneumonia is the most common clinical presentation of pneumococcal disease among adults (Hamborsky & Kroger, 2015). Pneumococcal bacteria account for up to 30% of adult community-acquired pneumonia cases. Complications of pneumococcal pneumonia include empyema, pericarditis, respiratory failure, bacteremia and sepsis, among others (CDC, 2017). Bacteremia occurs in up to 25–30% of patients with pneumococcal pneumonia.

Community-acquired pneumococcal pneumonia is a significant cause of morbidity and mortality among adults worldwide (CDC, 2017). *Streptococcus pneumoniae* is still thought to be the most common etiologic agent of CAP (File, 2003; Lim et al., 2009; Mandell et al., 2007; Said et al., 2013). There are an estimated 400,000 hospitalizations per year in the United States due to pneumococcal pneumonia and it is a common bacterial complication of influenza (Hamborsky & Kroger, 2015).

The fatality rate for pneumococcal pneumonia is 5–7% and may be much higher among elderly persons. However, due to common use of broad-spectrum antibiotics and their effectiveness on such a wide range of bacteria, it is difficult to prove, as physicians are less likely to do cultures now. However, there is agreement among researchers that if cultures were completed, it would likely prove the existence of *Streptococcus pneumoniae* continuing to be one of the main causes of CAP according to researchers (File, 2003; Lim et al., 2009; Mandell et al., 2007; Said et al., 2013). Other pathogens causing CAP are Influenza A, *Mycoplasma pneumoniae* and *Chlamydia pneumoniae* (Brown, 2012). Pneumonia can also be caused by aspiration of any substance into the lungs. (For more information on all types of pneumonia, please see the OIH Health & Safety Alert on Pneumonia).

Symptoms of pneumococcal pneumonia may begin with an abrupt onset of fever and chills or rigors (exaggerated shaking that can occur with a rapid rise of fever). Other common symptoms include chest pain, coughing (with or without) sputum, dyspnea (shortness of breath), tachypnea (rapid breathing), hypoxia (poor oxygenation), tachycardia (rapid heart rate), poor appetite, listlessness, and weakness. Nausea, vomiting, and headaches can occur as well (Hamborsky & Kroger, 2015).

Pneumococcal Ear Infections (Otitis Media)

Streptococcus pneumoniae is one the most commonly reported bacterial causes of acute otitis media (Rowe et al., 2019) accounting for 28 to 55 percent of cases (Eskola et al., 2001). Ear infections often accompany mucous-producing illness such as the common cold, flu or upper respiratory infection. Ear infections can also cause acute ear pain, lack of energy, fussiness, insomnia, irritability, fever and a lack of appetite. Hearing loss and delayed speech are the most frequent long-term effects of otitis media in children (Eskola, et al., 2001; Graydon, et al., 2019). Acute ear infection (otitis media) is the most common reason for antibiotic use in children (Rowe et al., 2019).

If an Individual has Pneumococcal Sinusitis, Meningitis, or Bacteremia, Sepsis, they may have the following symptoms:

- Fever or chills.
- Cough.
- Rapid or difficult breathing.
- Chest pain.
- Headache.
- Stiff neck.
- Increased pain when looking at bright lights.
- Confusion or low alertness.

Pneumococcal Sinus Infections (Acute Sinusitis)

Sinusitis is defined as symptomatic inflammation of the paranasal sinuses and nasal cavity. It occurs in nearly 30 million adults annually in the United States (Rosenfeld, 2016). The sinuses are air-filled spaces in the bone of the face. *Streptococcus pneumoniae* is the most common bacterial cause of sinusitis (Brook, 2011). Acute sinusitis can cause facial pain (pain and tenderness over the sinuses or around the eyes), fever, chills, light sensitivity, low alertness, confusion, and headache (Rosenfeld, 2016).

Pneumococcal Meningitis

Pneumococcal meningitis and bacteremia resulted in approximately 3,600 fatalities in the United States in 2017 (CDC, 2017). Pneumococcal meningitis can cause serious complications such as hearing loss, seizures, hydrocephalus, arterial and venous cerebrovascular complications, cerebrovascular hemorrhaging, acute spinal cord dysfunction (due to myelitis), blindness, brain damage and paralysis (CDC, 2019a, b, c; Kastenbauer & Pfister, 2003). In a retrospective analysis of cases spanning from 1984 to 2007, there was a 24% in-hospital fatality rate (Kastenbauer & Pfister, 2003).

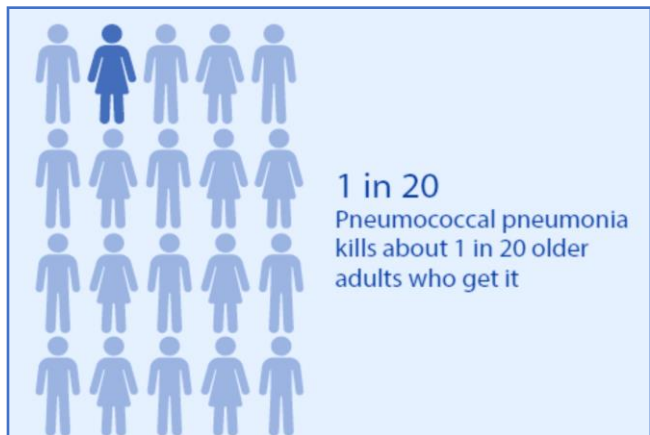
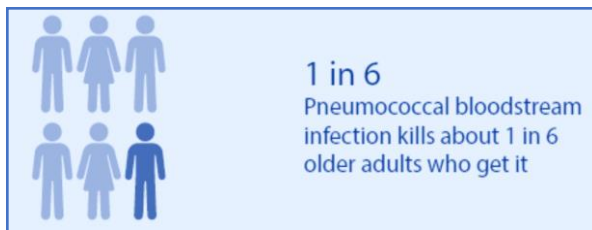
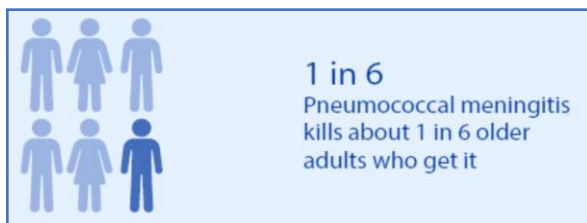
Pneumococcal Bacteremia

Bacteremia is a type of pneumococcal disease that infects the blood. About 1 out of 100 children younger than 5 years old who are diagnosed with pneumococcal bacteremia will die. The chance of death from pneumococcal bacteremia is even higher among elderly patients (CDC, 2019a, b, c). Many people use bacteremia and septicemia interchangeably. However, bacteremia is the simple presence of bacteria in the blood, while sepsis or septicemia is the presence and multiplication of bacteria in the blood (Maggio, 2020).

Pneumococcal Sepsis

Sepsis is a life-threatening condition caused by the body's response to an overwhelming infection that is systemic (body-wide). There is no specific test for sepsis. A diagnosis of sepsis is considered to be a "differential diagnosis" or one made after consideration of an array of symptoms. Low blood pressure and high levels of lactic acid in the blood (i.e. serum lactate), even after IV fluid replacement, would indicate sepsis as a possible diagnosis. In cases of rapidly progressing septic shock, pneumococcal infection should always be considered (Mayo Clinic, 2018).

Deaths Due to Pneumococcal Disease (CDC, 2019)



How do Pneumococcal Infections Spread?

- Pneumococcus spread from the nose and throat through coughing and sneezing. It can also spread through saliva by kissing or sharing things like food, cups, water bottles, straws, toothbrushes, or a musical instrument with a mouthpiece.
- Children in daycare settings are at greater risk of infection, because they are more likely to share items.



Make a difference! Ensure that immunizations are kept current. If you are unsure, ask the individual's PCP. Make sure face sheets and other documentation that accompanies individuals to Primary Care, Urgent Care and Emergency Room visits contains the date of the last pneumococcal and influenza vaccines for the individual.

Refer to the Immunization schedule for adults and children from the CDC.

Adults: <https://www.cdc.gov/vaccines/schedules/hcp/imz/adult.html>

Children: <https://www.cdc.gov/vaccines/schedules/hcp/imz/child-adolescent.html>

Children at Highest Risk for Pneumococcal Disease

- Children at increased risk for pneumococcal disease include those who:
 - Participate in daycare.
 - Are younger than 2 years old.
 - Those who have certain illnesses (sickle cell disease, HIV infection, diabetes, immune compromising conditions, nephrotic syndrome, or chronic heart, lung, kidney, or liver disease).
 - Those with cochlear implants or cerebrospinal fluid (CSF) leaks (escape of the fluid that surrounds the brain and spinal cord).

Adults at Highest Risk for Pneumococcal Disease

- Adults who are at increased risk for pneumococcal disease are those who:
 - Are 65 years of age or older.
 - Have chronic illnesses (chronic heart, liver, kidney, or lung [including chronic obstructive lung disease, emphysema, and asthma] disease; diabetes; or alcoholism).
 - Have conditions that weaken the immune system (HIV/AIDS, cancer, or damaged/absent spleen).
 - Have cochlear implants or cerebrospinal fluid (CSF) leaks (escape of the fluid that surrounds the brain and spinal cord).
 - Smoke cigarettes.

Types of Pneumococcal Vaccines

Two vaccines used in the United States help protect against pneumococcal disease are:

- Pneumococcal conjugate vaccine (PCV13).
- Pneumococcal polysaccharide vaccine (PPSV23).

The CDC (2019a) recommends PCV13 for:

- Children younger than 2 years old.
- Individuals 2 years or older with certain medical conditions.
- Adults 65 years or older per physician's recommendations.

The CDC (2019b) recommends PPSV23 for:

- All adults 65 years or older.
- Individuals 2 through 64 years old with certain medical conditions.
- Adults 19 through 64 years old who smoke cigarettes.

These vaccines are very effective at preventing severe pneumococcal disease, which can require treatment in the hospital and can be fatal. However, these vaccines will not prevent all infections. The PCV13 vaccine protects against 13 serotypes while the PPSV23 protects against 23. It is imperative to follow the physician recommendations for receiving pneumococcal as well as other immunizations (2019a, b, c).

Side Effects of Pneumococcal Vaccine

The side effects of both vaccines are minimal. Most people receiving the vaccines report mild tenderness and pain at the injection site, fever, local redness, swelling, loss of appetite, irritability, feeling tired, headache, chills, and muscle aches (CDC, 2019a, b, c).

Any severe reaction will occur within a few minutes to a few hours after receiving the injection. The facility or physician administering the vaccine should be notified of the reaction immediately. The CDC reports that severe reactions are very rare, approximately 1 in 1 million injections (CDC, 2019a, b). **In the case of a severe reaction, seek medical attention immediately or call 911.**



Who should **NOT** receive the Pneumococcal Vaccine?

There are circumstances, which prevent someone from receiving one of the pneumococcal vaccines:

- Health conditions.
- Not feeling well.
- Recently sick with an infection.
- Pregnant.
- Has had a severe reaction to the first dose.
- Has had a severe reaction to a previous pneumococcal vaccine (PCV7).
- Has had a severe reaction to a component of either vaccine.
- Has had a severe reaction to any vaccine containing diphtheria toxoid (CDC, 2019).



Discuss with the Individual's PCP

Covering the Cost of Vaccines

Most insurance plans cover the cost of vaccines. Medicare Part B covers at 100% as long as the injections (PVC13 and PPSV23) are spaced one year apart. Most private insurance plans cover vaccines, even before the out-of-pocket costs are met. However, check with the insurance company for a list of in-network approved vaccine providers before receiving a vaccine. For children needing vaccines check with the local health department. Vaccines for Children is a federally funded program that covers the cost of vaccines for those who cannot afford (CDC, 2016).

Vaccines Save Lives!

The PVC13 and PPSV23 have been successful in decreasing the number of cases and severity of pneumococcal infections. However, they do not prevent every case. Some infections are more severe or may not be included in the serotypes covered by the vaccine. According to the CDC, since starting children's pneumococcal vaccinations (PCV13), 8-10 babies are protected against serious pneumococcal infection (CDC, 2019a, b, c). For adults receiving the PCV13 vaccine, protection rates average out to about 75 out of 100 adults, who are protected against serious pneumococcal infection (CDC, 2019a, b, c).

Does the Pneumococcal Vaccine Protect Against COVID-19?

No. However, people who test positive for COVID-19, which is a respiratory virus, may develop pneumonia. Especially those with risk factors such as COPD, asthma, cystic fibrosis, immune compromised, heart conditions, diabetes, pulmonary fibrosis, smoking, kidney and liver disease, and obesity (CDC, 2020). Following physician advice to decrease the risk of developing pneumonia after testing positive for COVID-19. Currently, pharmaceutical companies are working to develop a vaccine for COVID-19. Be proactive and discuss vaccines with the individual's primary care physician, and see if the individual is a candidate for the pneumococcal vaccine. Respiratory illness is more prevalent in the fall and winter months. Having individuals vaccinated for Pneumococcal disease will provide at least some protection from one type of respiratory illness (Pneumococcal pneumonia). The Flu vaccine will provide some protection from pneumococcal disease as well (by default), due to the fact that pneumococcal pneumonia is a common complication of the flu. (Hamborsky & Kroger, 2015).

Preventing Respiratory Infections (in general)

As with any respiratory infection, the risk of community-acquired pneumonia may be lowered, by practicing these common sense suggestions.

- Attend regularly scheduled appointments with physicians.
- Take medications as prescribed.
- Stop smoking.
- Get vaccines as suggested by your physician.
- Practice good hand hygiene frequently.
- Stay away from others who are sick.
- Avoid crowds of people during cold and flu season.
- Practice good health habits such diet, rest, and exercise (American Lung Association, 2020).

Resources and Printable Handouts

Pneumococcal Disease in Adults and the Vaccines to Prevent It

(Describes pneumococcal disease, including signs and symptoms to look for and vaccines that help prevent this serious disease).

<https://www.cdc.gov/pneumococcal/resources/prevent-pneumococcal-factsheet.pdf>

Pneumococcal Disease for Parents: The Basics

Describes symptoms of infection as well as benefits and risks of vaccination.

<https://www.cdc.gov/vaccines/parents/diseases/pneumo-basics-color.pdf>

Pneumococcal Vaccines (PCV13 and PPSV23)

Addresses common questions about pneumococcal vaccination for adults.

<https://www.cdc.gov/vaccines/hcp/adults/downloads/fs-pneumo-hcp.pdf>

Pneumococcal Conjugate Vaccine (PCV13): What You Need to Know

<https://www.cdc.gov/vaccines/hcp/vis/vis-statements/pcv13.pdf>

Pneumococcal Polysaccharide Vaccine (PPSV23): What You Need to Know

<https://www.cdc.gov/vaccines/hcp/vis/vis-statements/ppv.pdf>

Pneumococcal Disease in Adults and the Vaccines to Prevent It

<https://www.cdc.gov/pneumococcal/resources/prevent-pneumococcal-factsheet.pdf>

Spreading germs is OUT. Handwashing is IN!

<https://www.cdc.gov/handwashing/pdf/handwashing-is-in-8x11.pdf>

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If you have any questions about the information contained in this Health & Safety Alert, please email your question to the Office of Integrated Health's nursing team at: communitynursing@dbhds.virginia.gov