

PNEUMOCOCCAL BACKGROUNDER

What is pneumococcal disease?

Pneumococcal disease is a leading source of serious illness in children and adults worldwide. It is caused by a common bacterium, the pneumococcus (*Streptococcus pneumoniae*), that can attack different parts of the body.

When these bacteria invade the lungs, they cause bacterial pneumonia; when they invade the bloodstream, they can cause an infection called bacteremia; and when they invade the covering of the brain, they cause meningitis. Pneumococci may also cause middle ear infection (otitis media) and sinusitis.

There are more than 90 known subtypes of the pneumococcus, but not all cause serious, invasive disease. The strains included in vaccines are those known to cause invasive disease.

Who is at risk?

Anyone can get pneumococcal disease, but some groups are at greater risk for pneumococcal infection, including:

- Persons 65 years of age and older;
- Very young children;
- Individuals with weak immune systems due to cancer, leukemia, Hodgkin's disease or human immunodeficiency virus (HIV);
- Persons with sickle cell disease or without a functioning spleen;
- Persons who have certain chronic illnesses, such as lung, heart and kidney disease, diabetes or alcoholism;
- Persons living in special communities or environments, such as Alaskan Natives and certain American Indian populations; and
- Residents of chronic or long-term care facilities.

How significant is pneumococcal disease?

According to the Centers for Disease Control and Prevention (CDC), there were more than 40,000 U.S. cases of invasive pneumococcal disease in 2005, causing 4,850 deaths. Although anyone can contract the disease, some groups are at particularly high risk, including children younger than 2 years old and persons 65 years of age and older. The elderly are more likely to die from invasive disease, usually bacteremia or meningitis.

How is pneumococcal disease treated?

Pneumococcal disease has traditionally been treated with penicillin. In recent years, however, pneumococcal strains have emerged that are resistant to penicillin and other commonly used

antibiotics. This resistance makes treatment difficult and may result in longer hospitalizations, the need to use more expensive alternative antibiotics, and increased morbidity and mortality. The treatment complications that result from the emergence of resistant strains places further emphasis on the need for preventing pneumococcal disease through vaccination.

Can pneumococcal disease be prevented?

The best way to protect against pneumococcal disease is through vaccination. There are two types of pneumococcal vaccine currently available: a polysaccharide vaccine (used in adults and certain children 2 years of age and older) and a conjugate vaccine (used in children up to 5 years of age). The polysaccharide vaccine has been available in the U.S. for more than 20 years and the conjugate vaccine has been available for seven years. In addition to reducing the risk of pneumococcal infection, pneumococcal vaccination is also associated with improved survival, a reduced chance of respiratory failure or other complications, and shorter in-patient stays for adults hospitalized with pneumonia.

Who should be vaccinated?

Vaccination with the **polysaccharide** pneumococcal vaccine protects against 23 of the most common *Streptococcus pneumoniae* strains and is recommended for:

- Persons who are 65 years of age and older;
- Everyone 2 years of age and older with chronic medical conditions, such as diabetes, chronic lung (except asthma), heart, kidney or liver disease, or alcoholism (see recommendations of the Advisory Committee on Immunization Practices [ACIP] for children 24 to 59 months of age);
- Those whose immune systems have been weakened by such conditions as cancer or HIV infection;
- People without a functioning spleen and those with sickle cell disease; and
- Residents of chronic care or long-term care facilities.

Experts have concluded that improving immunization rates among those at risk can help prevent potentially life-threatening pneumonia. However, more than one third of Americans 65 years of age and older have not been vaccinated.

The pneumococcal **conjugate** vaccine is recommended as part of the routine childhood immunization series for all children at 2, 4, 6 and 12 to 15 months of age. The pneumococcal conjugate vaccine protects against seven strains of the *Streptococcus pneumoniae* bacterium. The polysaccharide vaccine is not recommended for infants and toddlers under 2 years of age, as this age group does not respond to polysaccharide vaccines. Children at increased risk, including those with sickle cell disease, HIV infection, other immunocompromising conditions or chronic medical disease should receive pneumococcal conjugate vaccine and, after 2 years of age, pneumococcal polysaccharide vaccine. For additional information about pneumococcal vaccination in infants and young children, visit the CDC Web site, www.cdc.gov/vaccines.

When is the best time to get vaccinated?

The polysaccharide vaccine can be administered to adults at any time of year. It can be given in the other arm at the same time as the influenza vaccine. Annual influenza vaccination season is a good time for consumers to discuss the need for pneumococcal disease vaccination with their health care providers.

Both pneumococcal polysaccharide and influenza vaccines are fully reimbursable (no co-pay, no deductible) by Medicare Part B. For infants 2 to 23 months of age, the conjugate pneumococcal vaccine has been incorporated into the routine childhood immunization schedule.

What has been the experience with pneumococcal vaccines?

Pneumococcal vaccines are considered clinically effective and safe. Pneumococcal vaccination of adults with the polysaccharide vaccine is effective in the prevention of invasive pneumococcal disease, offering protection against 23 of the most common pneumococcal types. The pneumococcal subtypes in the vaccine account for nearly 90 percent of pneumococcal disease.

In infants and children, the conjugate vaccine reduces the incidence of invasive pneumococcal disease, pneumonia and middle ear infections. The conjugate vaccine also provides longer-term immune response (immune memory) and reduces disease carriage rates, potentially offering herd immunity benefits (i.e., protection for non-vaccinated individuals) within communities.

Either vaccine may cause some local reaction or soreness around the site of the injection; however, these reactions are usually minor and subside within a few days. In children, the conjugate vaccine may cause mild fever, fussiness and decreased appetite.

How often is vaccination needed?

For most adults who are vaccinated at age 65 or older, vaccination is needed only once in a lifetime. However, for adults who are vaccinated before age 65, or for those at highest risk for serious disease, one-time revaccination may be necessary.

In infants younger than 12 months of age, three or four doses of conjugate vaccine are required, depending upon the age the first dose is given. Children 12 to 23 months of age require two doses. Healthy children 24 to 59 months of age require one dose of conjugate vaccine, and those with certain chronic diseases require two doses.

Who should not be vaccinated?

Individuals who have had a previous allergic reaction (e.g., hives, difficulty breathing) to the pneumococcal vaccine should avoid vaccination. The vaccine should also be avoided during radiation therapy or chemotherapy.

Health care providers can choose to delay vaccination of a child with moderate to severe illness until he or she has recovered. However, vaccination can proceed during minor illness, with or without fever, particularly among children with mild upper respiratory tract infections or hay fever.

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References

Centers for Disease Control and Prevention. 2005. Active Bacterial Core Surveillance Report, Emerging Infections Program Network, *Streptococcus pneumoniae*, 2005. Available via the Internet:

<http://www.cdc.gov/ncidod/dbmd/abcs/survreports/spneu05.pdf>

Centers for Disease Control and Prevention. 2006. National Center for Chronic Disease Prevention & Health Promotion, Behavioral Risk Factor Surveillance System, Prevalence Data, 2006. Available via the Internet:

<http://apps.nccd.cdc.gov/brfss/display.asp?yr=2006&state=US&qkey=4408&grp=0&SUBMIT3=Go>

Centers for Disease Control and Prevention. 2000. Preventing Pneumococcal Disease Among Infants and Young Children Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR*, October 6, 2000 / 49(RR09);1-38. Available via the Internet:

<http://www.cdc.gov/mmwr/preview/mmwrhtml/rr4909a1.htm>.

Centers for Disease Control and Prevention. 1997. Prevention of Pneumococcal Disease: Recommendations of the Advisory Committee on Immunization Practices (ACIP). *MMWR*, April 4, 1997/ 46(RR08);1-25. Available via the Internet:

<http://www.cdc.gov/mmwr/preview/mmwrhtml/00047135.htm>

Fisman DN, Abrutyn E, Spaude KA, Kim A, Kirchner C, Daley J. Prior pneumococcal vaccination is associated with reduced death, complications, and length of stay among hospitalized adults with community-acquired pneumonia. *Clin Infect Dis* 2006;42:1093-1101.

Jackson ML, Neuzil KM, Thompson WW, et al. The burden of community-acquired pneumonia in seniors: results of a population-based study. *Clin Infect Dis* 2004;39:1642-1650.

Lexau CA, Lynfield R, Danila R, et al for the Active Bacterial Core Surveillance Team. Changing epidemiology of invasive pneumococcal disease among older adults in the era of pediatric pneumococcal conjugate vaccine. *JAMA* 2005;294(16):2043-2051.

Poehling KA, Talbot TR, Griffin MR, et al. Invasive pneumococcal disease among infants before and after introduction of pneumococcal conjugate vaccine. *JAMA* 2006;295(14):1668-1674.