pneumoADIP

Accelerating access to pneumococcal vaccines for the world's children.

Fact Sheet: Pneumococcal Disease

Pneumococcal disease is the number one vaccine preventable cause of death in children under 5 years.[1] Pneumococcal disease kills up to one percent of all children born in high mortality areas of the world, making it the leading infectious cause of death in young children worldwide.[2] The WHO estimates that up to 1 million children under the age of five years worldwide die each year from pneumococcal disease.[3]

Pneumococcal disease is common. *Streptococcus pneumoniae*, or pneumococcus, is a bacteria that comes in 90 varieties or serotypes. Each serotype has a slightly different polysaccharide capsule that initially protects the bacteria from a person's immune system. Pneumococcus is commonly found in the nasopharynx, the lining of the nose and throat, of healthy children and, to a lesser extent, healthy adults. Across the world, at any given time, over 50% of children under 3 years carry pneumococcus in their nasopharynx.[4]

Many times pneumococcus can be found in a person's nasopharynx without any signs of disease. These persons are called carriers. However, sometimes, with certain, more invasive pneumococcal serotypes, the bacteria invades the body via the respiratory tract to cause infections such as otitis media, sinusitis or pneumonia. Other times pneumococcus can spread by entering the bloodstream (bacteremia) and may cause sepsis or a more distal infection such as pneumonia, meningitis, bone or joint infections.

Pneumococcus is spread person to person by contact with respiratory droplets containing the bacteria, such as through coughing or sneezing. Any person carrying the pneumococcus in their nasopharynx and some persons with disease can spread the bacteria. Not everyone exposed to contaminated respiratory droplets will develop disease. Some exposed persons will become carriers of the pneumococcus, and some will progress to develop pneumococcal disease.

While persons of any age can acquire a pneumococcal disease, young children--particularly infants--and persons over the age of 65 years are the most vulnerable in a population.[5] In children this is due to their immature immune response to the pneumococcal polysaccharide capsule. The elderly may suffer from multiple illnesses that compromise their immune response to pneumococcus as well. Other persons also at greater risk for pneumococcal disease are those who have a weakened immune system as a result of such conditions as undernutrition, AIDS or sickle cell anemia. For

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[1] 1CDC. MMWR 2006; 55(18): 511-15.
[2] PneumoADIP. GAVI's PneumoADIP Surveillance and Research Report.
[3] WHO Position Paper. Weekly Epidemiological Record, No. 12, 2007; 82:93-104.
[4] Bogaert D, de Groot R and Hermans PWM. Lancet Inf Dis 2004; 4: 144-154.
[5] US Data 1999: CDC. ABCs Report Emerging Infections Program Network, Streptococcus pneumoniae, 1999 accessed at http://www.cdc.gov/ncidod/dbmd/abcs/survreports/spneu99.pdf.

example, persons with HIV infection have a 20 to 40-fold higher risk of acquiring pneumococcal disease than HIV negative persons.[6]

Serious diseases caused by pneumococcus are pneumonia, meningitis and sepsis. Pneumonia is the most common serious type of pneumococcal disease, and pneumococcus is the leading cause of severe pneumonia among children in the developing world. Pneumonia causes one in every five child deaths in the world.[7]

Pneumococcus is also a major cause of bacterial meningitis and the leading cause of non-epidemic meningitis in Africa.[8] Sepsis is a severe illness caused by infection of the bloodstream and the body's resulting inflammatory response.[9] Pneumococcus has been found to be an important bacterial cause of sepsis particularly in young children. In a WHO study among sick infants under 3 months of age, 33% of those with pneumococcal infection died.[10]

The under-diagnosis of pneumococcal disease is common. In most developing countries, pneumococcal disease is diagnosed only based on clinical symptoms. X-rays can help diagnose a pneumonia but may be too expensive or unavailable in many resource-poor areas. Even growth of the bacteria in culture media can be very limited based on the site of the infection, the laboratory equipment available and training of staff in the proper handling of specimens. Other, more sensitive diagnostic tests are available, but the cost and special training needed to run such tests limit their regular use in developing countries.

Treatment of pneumococcal disease is complicated by the increase in antibiotic-resistant pneumococcus. The treatment for pneumococcal disease is prompt, appropriate antibiotic therapy. The type of antibiotic, the route of administration (for example oral or intravenous) and the duration of treatment depend on the age of the child, the site of pneumococcal disease and the local patterns of antimicrobial resistance. Pneumococcal bacteria are increasingly becoming more resistant to common antibiotics, such as penicillin, thus making it harder and more costly to treat these infections.[11]

Pneumococcal disease is preventable: vaccines have the potential to save millions of children worldwide. There are safe, effective vaccines against pneumococcal disease. In 2000 a pneumococcal conjugate vaccine was licensed and has been used safely in over 60 countries to prevent a significant proportion of pneumococcal disease in children under five years of age.[12] The conjugate vaccine prevents about 88% of invasive pneumococcal disease in children.[13] Routine use of pneumococcal conjugate vaccines in developing countries could help save 5.4 million children's lives by 2030.[14] The pneumococcal polysaccharide vaccine protects against 23 serotypes and is important in preventing disease in the elderly who are at higher risk of dying from pneumococcal disease.

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[6] Mofenson LM, Oleske J, Serchuck L et al. *MMWR Recomm Rep.* 2004; 53(RR-14): 1-92.
[7] UNICEF. Pneumonia: the Forgotten Killer of Children 2006.
[8] Peltola H. Clin Inf Dis 2001; 32: 64-75.
[9] Medline Plus. Sepsis. Accessed at http://www.nlm.nih.gov/medlineplus/ency/article/000666.htm on 2/22/08.
[10] WHO Young Infants Study Group. Ped Inf Dis J 1999; 18(10): S17-S22.
[11] Hoban DJ, Doern GV, et al. CID 2001; 32 (Supple 2): S81-93
[12] Pneumococcal Awareness Council of Experts. Pneumococcal Disease Fact Sheet. Accessed at http://sabin.org/programs/pace/disease.html on 2/15/08.
[13] Lucero MG, Dulalia VE, et al. *Cochrane Database of Systematic Reviews* 2004, Issue 4. Art. No.: CD004977. DOI: 10.1002/14651858.CD004977.
[14] PneumoADIP. Accessed at http://www.preventpneumo.org/ on 3/3/08.