pneumoADIP

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

Q&A: Pneumonia

1. What is pneumonia?

Pneumonia is a severe acute lower respiratory infection that specifically affects the lungs. Pus and fluid fill the alveoli, the smallest air spaces in the lungs, and make it difficult to absorb oxygen.[1]

2. What are the clinical symptoms of pneumonia?

Cough, fast breathing and/or fever are often the presenting symptoms of pneumonia. Severe pneumonia causes difficulty breathing which may manifest in children under 5 years as chest indrawing, grunting or nasal flaring (in young infants). A child with very severe pneumonia may also appear lethargic, unconscious or have central cyanosis and be unable to eat or drink.[2]

3. What causes pneumonia?

Pneumonia is caused by some kinds of bacteria, viruses and fungi. Bacteria are more likely to result in severe pneumonia, with *Streptococcus pneumoniae* (pneumococcus) being the leading cause of severe pneumonia among children in the developing world. *Haemophilus influenzae* type b (Hib) is also another common bacterial cause of pneumonia. Viruses such as respiratory synctial virus (RSV) and influenzae are also important causes of pneumonia. The fungus *Pneumocystis jiroveci* (PCP) is important in persons with AIDS.[3]

4. How are bacterial pneumonias different from viral pneumonias?

There is no easy way of distinguishing bacterial and viral causes of pneumonia because there is large overlap in common presenting clinical symptoms. Bacterial pneumonias usually result in children becoming severely ill with high fever and rapid breathing; while viral pneumonias generally start more gradually and worsen over time. An X-ray that shows a lobar consolidation is usually attributed to a bacterial cause of pneumonia.[4]

5. Who is most at risk for acquiring pneumonia?

Children with compromised immune systems are at greater risk for acquiring pneumonia. For example, undernourished children, low birthweight infants, infants who are not breastfed and children suffering from other illnesses such as AIDS are more likely to develop pneumonia. Environmental factors also increase the risk for pneumonia: overcrowding in homes and exposure to tobacco smoke or indoor air pollution can make children more susceptible to pneumonia.[5] [6] [7]

6. How is pneumonia diagnosed?

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[1] UNICEF. Pneumonia: the Forgotten Killer of Children 2006.
[2] WHO. Management of the Child with a Serious Infection of Severe Malnutrition 2000. Accessed at http://www.who.int/child-adolescent-health/publications/referral_care/Referral_Care_en.pdf
[3] UNICEF. Pneumonia: the Forgotten Killer of Children 2006.
[4] UNICEF. Pneumonia: the Forgotten Killer of Children 2006.
[5] UNICEF. Pneumonia: the Forgotten Killer of Children 2006.
[6] WHO. Indoor air pollution and lower respiratory tract infections in children 2007.
[7] Victora CG, Kirkwood BR, et al. Am J Clin Nutr 1999; 70: 309-20.

Pneumonia is diagnosed most often by the combination of presenting clinical symptoms. A chest X-ray can help confirm the diagnosis since a chest X-ray should be abnormal in the case of a pneumonia. A lobar consolidation is the classical presentation of a bacterial pneumonia, however, sometimes viral pneumonias can also result in lobar consolidation. A blood culture may help determine the exact cause of a bacterial pneumonia but is only positive in less than 10% of patients with a clinical diagnosis of pneumonia.[8] [9]

7. How is pneumonia treated?

Pneumonia is treated with a prompt, appropriate course of antibiotics. The type of antibiotic, route of administration and duration of therapy depend on the age of the patient, the severity of the pneumonia and local patterns of antimicrobial resistance. Cotrimoxazole and amoxicillin are usually effective drugs against the common bacteria causing pneumonia and are used often to treat children in developing countries. Infants under two months are at risk of severe illness and death, and so they should be referred to a hospital for treatment with intravenous antibiotics. Where antibiotic resistance rates are high, the first-line drugs may be less effective against pneumonia and alternative drugs may be needed. In some settings, where there are large numbers of high-risk persons who are undernourished or HIV-positive, treatment strategies need to be adapted to use drugs that are effective against PCP.[10]

8. How common is pneumococcal pneumonia?

Pneumococcus is the most common bacterial cause of pneumonia. Vaccine studies using the pneumococcal conjugate vaccine indicate that up to 37-39% of pneumonia cases in children are caused by pneumococcus. [11] [12]

9. How serious is pneumococcal pneumonia?

About 1 in 5 child deaths under 5 years of age worldwide is due to pneumonia. Pneumonia is the most common killer of children: it kills more children then AIDS, malaria and measles combined.[13] Of the deaths due to pneumonia, 25-45% are attributed to pneumococcus, making pneumococcus the most common bacterial cause of pneumonia deaths.[14] The WHO estimates that more than 1.6 million people die of pneumococcal pneumonia each year, and about half of these deaths— up to 1 million deaths--are in children under the age of five years.[15]

10. How can pneumonia be prevented?

Preventing undernutrition in children can reduce their risk of acquiring pneumonia or dying from pneumonia. Breastfeeding infants and providing zinc supplementation for children have been proven to reduce the risk of pneumonia and death.[16] [17] There are also well-tolerated, effective vaccines against the common bacterial causes of pneumonia: the pneumococcal conjugate vaccine and the Hib vaccine. The routine use of these vaccines can significantly reduce the burden of illness and death due to pneumonia.[18] [19]

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[8] Shah SS, Alpern ER, et al. Arch Pediatr Adolesc Med 2003; 157(4): 389-92.
[9] Vuori-Holopainen E and Peltola H. CID 2001; 32: 715-26.
[10] UNICEF. Pneumonia: the Forgotten Killer of Children 2006.
[11] Cutts FT, Zaman SMA, et al. Lancet 2005; 365: 1139-46.
[12] Grijalva CG, Nuorti JP, et al. Lancet 2007; 369: 1179-86.
[13] WHO. World Health Report 2004.
[14] WHO. Global Burden of Disease Estimates (data unpublished).
[15] WHO Position Paper. Weekly Epidemiological Record, No. 12, 2007; 82:93-104.
[16] Victora CG, Kirkwood BR, et al. Am J Clin Nutr 1999; 70: 309-20.
[17] Black RE. J Nutrition 2003; 1485S-1489S.
[18] Madhi SA, Kuwanda L, et al. CID 2005; 40: 1511-8.
[19] WHO. The WHO position paper on *Haemophilus influenzae* type b conjugate vaccines. WER 1998; 73: 64-71.