Bacterial Pneumonia

Bacterial pneumonia is a common problem for many people living with HIV, even for those who have high CD4 cell counts or are responding well to HIV treatment. In one large study, Adults with HIV were almost eight times more likely to experience bacterial pneumonia than adults who are negative—though the incidence of bacterial pneumonia has declined since the introduction of more potent combination antiretroviral (ARV) therapy in recent years.

Bacterial pneumonia and less severe airway (respiratory tract) infections can be caused by one of several bacteria. *Streptococcus pneumoniae* is the most common, followed by *Haemophilus influenzae*, *Pseudomonas aeruginosa*, and *Staphylococcus aureus*. Rarely, bacterial pneumonia can be caused by *Legionella pneumophila*, *Mycoplasma pneumoniae*, and *Chlamydia pneumoniae*.

Not only are people living with HIV more likely to develop bacterial pneumonia as a result of one of these infections, they are also more likely to experience recurrent pneumonia. People with CD4 counts below 100, and those whose bacterial infection has spread beyond the lungs, are at increased risk of death from bacterial pneumonia.

People living with HIV who smoke tobacco, use crack cocaine, are intravenous drug users, or suffer from alcoholism or liver disease, are likely at a higher risk of developing bacterial pneumonia than people living with HIV who don’t have any of these cofactors.

What are the symptoms, and how is it diagnosed?

Symptoms of bacterial pneumonia include chills, shivering, and chest pain. Fever, rapid breathing, rapid heart rate, and wheezing are other signs of bacterial pneumonia.

A diagnosis of bacterial pneumonia depends mostly on the results of chest x-rays, blood tests (especially those looking for the bacteria and measuring white blood cell counts), and examination of sputum (phlegm) samples.

Because *Pneumocystis pneumonia* (PCP) is another common form of pneumonia, especially in people living with HIV with suppressed immune systems, more advanced testing of sputum samples may be necessary. This is because bacterial pneumonia and pneumocystis pneumonia are treated very differently. In turn, it is important to rule out PCP in some HIV-positive people. Testing for PCP is recommended if the person has fewer than 250 CD4 cells, other signs of immune deficiency (such as thrush), a history of PCP, or a history of another AIDS-related condition. Testing for tuberculosis, such as tuberculin skin testing (TST), may also be required. Because of the
increased risk of the infection spreading beyond the lungs in people with lower CD4 counts, and because drug-resistant Staphylococcus aureus requires different treatment, your provider may conduct a blood test to look for these conditions.

How is it treated?

Bacterial pneumonia is treated using drugs called antibiotics. There are typically three classes, or groups, of antibiotics healthcare providers will use when treating bacterial pneumonia:

- **Beta-lactams**: Recommended drugs in this class include high-dose amoxicillin (Amoxil), amoxicillin-clavulanate (Augmentin), cefpodoxime (Vantin) and cefuroxime (Ceftin).
- **Macrolides**: The two preferred macrolides are clarithromycin (Biaxin) and azithromycin (Zithromax). Macrolides are believed to effectively treat a large number of bacteria known to cause respiratory infections and pneumonia.
- **Tetracyclines**: The recommended drug in this class is doxycycline (Oracea, Monodox).
- **Fluoroquinolones**: Recommended drugs in this class include levofloxacin (Levaquin), moxifloxacin (Avelox) or gemifloxacin (Factive).

Combining antibiotics is recommended, preferably a beta-lactam combined with a macrolide. Doxycycline may be used in place of a macrolide. For people who are allergic to penicillin or who have received a beta-lactam within the prior three months, a fluoroquinolone may be used.

In rarer cases, pneumonia may sometimes be caused by less common strains of bacteria. For people who are suspected to have infection with Pseudomona aeruginosa, a different combination of drugs is preferred. For the beta lactam, the drugs peracillin-tazobactam (Zosyn), cefepime, imipenem or meropenem are recommended, in combination with either ciprofloxacin (Cipro) or levofloxacin (Levaquin).

When methicillin-resistant Staphylococcus aureus (MRSA)—a potentially dangerous drug-resistant infection—is suspected as the cause of the pneumonia, experts recommend that vancomycin, possibly combined with clindamycin (Cleocin) or linezolid (Zyvox), be added to regular antibiotic therapy.

Pneumonia sometimes requires treatment in a hospital, where oxygen and other medications can be administered to ensure effectiveness and to make the patient more comfortable.

Patients usually start feeling better within two to three days after treatment is started. However, completing the full course of treatment is necessary, to ensure that the infection is controlled and to prevent the infection from becoming resistant to the medications being used.
A syndrome—called immune reconstitution inflammatory syndrome (IRIS)—where antiretroviral treatment can actually exacerbate the symptoms of an opportunistic infection due to a strengthened immune response, has not been reported with bacterial pneumonia.

How is it prevented?

According to the U.S. Department of Health and Human Services, maintaining the health of the immune system, using ARV therapy, is one of the best ways to reduce the risk of developing bacterial pneumonia.

People living with HIV who have CD4 cell counts above 200 should talk with their doctors about receiving the 23-valent polysaccharide pneumococcal vaccine (PPV) if they do not recall receiving one during the past five years. While the effectiveness of this vaccine has not been established in clinical trials involving HIV-positive people, it is believed to offer some benefit to people with HIV with relatively healthy immune systems. People living with HIV should consider being revaccinated every five years. PPV may also be offered to people with CD4 counts below 200, however, there is no evidence of benefit in this group unless they also initiate ARV therapy.

Receiving a flu shot (influenza vaccination) every year may also be a good idea for people living with HIV. Many people who experience the flu, a viral infection, can also develop bacterial infections that can lead to pneumonia. Reducing the risk of the flu may also reduce the risk of bacterial pneumonia.

For people living with HIV who experience frequent recurrences of bacterial respiratory infections, including pneumonia, the regular use of antibiotics may be necessary. However, treatment guidelines recommend against taking antibiotics regularly unless they are also being used to prevent either PCP pneumonia or Mycobacterium avium complex (MAC). This is because there is an increased risk of side effects or bacterial drug resistance if these drugs are used on a regular basis.

Are there any experimental treatments?

If you would like to find out if you are eligible for any clinical trials that include new therapies for the treatment or prevention of bacterial pneumonia, visit ClinicalTrials.gov, a site run by the U.S. National Institutes of Health. The site has information about all HIV-related clinical studies in the United States. For more info, you can call their toll-free number at 1-800-HIV-0440 (1-800-448-0440) or email contactus@aidsinfo.nih.gov.

Last Reviewed: January 24, 2019