

Tuberculosis

Tuberculosis (TB) is a disease caused by germs that are spread from person to person through the air, (TB) is an infectious disease caused by bacteria whose scientific name is *Mycobacterium tuberculosis*. It was first isolated in 1882 by a German physician named Robert Koch who received the Nobel Prize for this discovery. TB most commonly affects the lungs but also can involve almost any organ of the body. Many years ago, this disease was referred to as "consumption" because without effective treatment, these patients often would waste away. Today, of course, tuberculosis usually can be treated successfully with antibiotics.

Transmission of disease

A person can become infected with tuberculosis bacteria when he or she inhales minute particles of infected sputum from the air. The bacteria get into the air when someone who has a tuberculosis lung infection coughs, sneezes, shouts, or spits (which is common in some cultures). People who are nearby can then possibly breathe the bacteria into their lungs. You don't get TB by just touching the clothes or shaking the hands of someone who is infected. Tuberculosis is spread (transmitted) primarily from person to person by breathing infected air during close contact.

Development of disease

When the inhaled tuberculosis bacteria enter the lungs, they can multiply and cause a local lung infection (pneumonia). The local lymph nodes associated with the lungs may also become involved with the infection and usually become enlarged. The hilar lymph nodes (the lymph nodes adjacent to the heart in the central part of the chest) are often involved. In addition, TB can spread to other parts of the body. The body's immune (defense) system, however, can fight off the infection and stop the bacteria from spreading. The immune system does so ultimately by forming scar tissue around the TB bacteria and isolating it from the rest of the body. Sometimes, however, the body's immune system becomes weakened, and the TB bacteria break through the scar tissue and can cause active disease, For example, the immune system can be weakened by old

age, the development of another infection or a cancer, or certain medications such as cortisone, anticancer drugs, or certain medications used to treat arthritis, inflammatory bowel disease, or organ transplantation. The breakthrough of bacteria can result in a recurrence of the pneumonia and a spread of TB to other locations in the body. The kidneys, bone, and lining of the brain and spinal cord are the most common sites affected by the spread of TB beyond the lungs.

People are at higher risk, including :

- people who live with individuals who have an active TB infection,
- poor or homeless people,
- foreign-born people from countries that have a high prevalence of TB,
- nursing-home residents and prison inmates,
- alcoholics and intravenous drug users,
- people with diabetes, certain cancers, and HIV infection (the AIDS virus),
- health-care workers.

signs and symptoms of tuberculosis

As previously mentioned, TB infection usually occurs initially in the upper part (lobe) of the lungs. The body's immune system, however, can stop the bacteria from continuing to reproduce. Thus, the immune system can make the lung infection inactive (dormant). On the other hand, if the body's immune system cannot contain the TB bacteria, the bacteria will reproduce (become active or reactivate) in the lungs and spread elsewhere in the body. It may take many months from the time the infection initially gets into the lungs until symptoms develop. The usual symptoms that occur with an active TB infection are a generalized tiredness or weakness, weight loss, fever, and night sweats. If the infection in the lung worsens, then further symptoms can include coughing, chest pain, coughing up of sputum (material from the lungs) and/or blood (hemoptysis), and shortness of breath. If the infection spreads beyond the lungs, the symptoms will depend upon the organs involved.

Diagnosis of tuberculosis

TB can be diagnosed in several different ways, including chest X-rays, analysis of sputum, and skin tests. Sometimes, the chest X-rays can reveal evidence of active tuberculosis pneumonia. Other times, the X-rays may show scarring (fibrosis) or hardening (calcification) in the lungs, suggesting that the TB is contained and inactive. Examination of the sputum on a slide (smear) under the microscope can show the presence of the tuberculosis-like bacteria.

A new technology, light emitting-diode fluorescence microscopy (LED-FM), a type of smear microscopy, is more sensitive than the standard Ziehl-Neelsen AFB stain to identify the bacteria. This test is faster to perform and again may help identify patients in need of therapy quicker.

vaccine against tuberculosis

Bacille Calmette Guérin, also known as BCG, is a vaccine given throughout many parts of the world. It is derived from an atypical Mycobacterium but offers some protection from developing active tuberculosis, especially in infants and children.

What is the treatment for tuberculosis

A person with a positive skin test, a normal chest X-ray, and no symptoms most likely has only a few TB germs in an inactive state and is not contagious. Nevertheless, treatment with an antibiotic may be recommended for this person to prevent the TB from turning into an active infection. The antibiotic used for this purpose is called isoniazid (INH). If taken for six to 12 months, it will prevent the TB from becoming active in the future. Active TB is treated with a combination of medications along with isoniazid. Rifampin (Rifadin, rifampicin), ethambutol (Myambutol), and pyrazinamide are the drugs commonly used to treat active TB in conjunction with isoniazid (INH). Four drugs are often taken for the first two months of therapy to help kill any potentially resistant strains of bacteria. Then the number is usually reduced to two drugs for the remainder of the treatment based on drug-sensitivity testing that is usually available by this time in the course of the illness.

Drug-resistant TB & Multidrug-Resistant TB (MDR TB)

Drug-resistant TB (TB that does not respond to drug treatment) has become a very serious problem in recent years in certain populations. For example, isoniazid INH-resistant TB is seen among patients from Southeast Asia. The presence of INH-like substances in the cough syrups in that part of the world may play a role in causing the isoniazid INH resistance. Drug-resistant cases are also often seen in prison populations. However, the major reason for the development of resistance is poorly managed TB care. This can result from poor patient compliance, inappropriate dosing or prescribing of medication, poorly formulated medications, and/or an inadequate supply of medication.

Multidrug-resistant TB (MDR TB) is caused by an organism that is resistant to at least isoniazid and rifampin, the two most potent TB drugs. These drugs are used to treat all persons with TB disease.

Sometimes TB bacteria become resistant to the drugs used to treat TB. which means that the drug can no longer kill the bacteria.

Drug-resistant TB can occur when the drugs used to treat TB are misused or mismanaged. Examples include:

- When people do not complete the full course of treatment;
- When health care providers prescribe the wrong treatment, the wrong dose, or wrong length of time for taking the drugs;
- When the supply of drugs is not always available; or
- When the drugs are of poor quality.

Drug-resistant TB is more common in people who:

- Do not take their TB drugs regularly
- Do not take all of their TB drugs
- Develop TB disease again, after being treated for TB disease in the past
- Come from areas of the world where drug-resistant TB is common

- Have spent time with someone known to have drug-resistant TB disease

Preventing Drug-Resistant TB

The most important way to prevent the spread of drug-resistant TB is to take all TB drugs exactly as prescribed by the health care provider. No doses should be missed and treatment should not be stopped early. People receiving treatment for TB disease should tell their health care provider if they are having trouble taking the drugs.

Health care providers can help prevent drug-resistant TB by quickly diagnosing cases, following recommended treatment guidelines, monitoring patients' response to treatment, and making sure therapy is completed.

TB Prevention

Preventing Exposure to TB Disease While Traveling Abroad

Travelers should avoid close contact or prolonged time with known TB patients in crowded, enclosed environments (for example, clinics, hospitals, prisons, or homeless shelters).

Travelers who will be working in clinics, hospitals, or other health care settings where TB patients are likely to be encountered should consult infection control or occupational health experts. They should ask about administrative and environmental procedures for preventing exposure to TB. Once those procedures are implemented, additional measures could include using personal respiratory protective devices.