

Tuberculosis

Tuberculosis (TB) is an infectious disease caused by a germ (bacterium) called Mycobacterium tuberculosis. This germ primarily affects the lungs and may infect anyone at any age.

In the United States, the number of TB cases steadily decreased until 1986 when an increase was noted; TB has continued to rise since. Today, ten million individuals are infected in the U.S., as evidenced by positive skin tests, with approximately 26,000 new cases of active disease each year. The increase in TB cases is related to HIV/AIDS, homelessness, drug abuse and immigration of persons with active infections.

How is TB Contracted?

TB is a contagious or infectious disease that is spread from person-to-person. A person is usually infected by inhaling the germs which have been sprayed into the air by someone with the active disease who coughs.

However, inhaling the germ does not usually mean you will develop active disease. A person's natural body defenses are usually able to control the infection so that it does not cause disease. In this case, the person would be infected, but not have active disease. Only about 10% of those infected will actually develop TB in their lifetimes.

Active disease can occur in an infected person when the body's resistance is low or if there is a large or prolonged exposure to the germs that overcome the body's natural defenses. The body's response to active TB infection produces inflammation which can eventually damage the lungs. The amount of damage may be quite extensive, yet the symptoms may be minimal. The usual symptoms of disease due to TB are:

- Fever
- Night sweats
- Cough
- Loss of appetite
- Weight Loss
- Blood in the sputum (phlegm)
- Loss of energy

Diagnosing TB

To diagnose TB, your clinician will gather five important pieces of information:

- Symptoms
- History of possible exposure and onset of symptoms
- Tuberculin skin test or PPD
- Chest X-ray
- Sputum test

Tuberculin Skin Test

The tuberculin skin test (or PPD) is performed with an extract of killed tuberculosis germs that is injected into the skin. If a person has been infected

with tuberculosis, a lump will form at the site of the injection--this is a positive test. This generally means that TB germs have infected the body. It does not usually mean the person has active disease. People with positive skin tests but without active disease cannot transmit the infection to others.

Chest X-Ray

If a person has been infected with TB, but active disease has not developed, the chest X-ray usually will be normal. Most people with a positive PPD have normal chest X-rays and continue to be healthy. For such persons, preventive drug therapy may be recommended.

However, if the germ has attacked and caused inflammation in the lungs, an abnormal shadow is usually visible on the chest X-rays. For these persons, aggressive diagnostic studies (sputum tests) and treatment usually are appropriate.

Sputum Test

Samples of sputum coughed up from the lungs can be tested to see if TB germs are present. The sputum is examined under a microscope (a "sputum smear") to look for evidence of the presence of TB organisms. The organisms are then grown in the laboratory to identify them as TB germs and to determine what medications are effective in treating them. These studies are referred to as culture and susceptibility testing. State health department laboratories and reference laboratories can perform such testing.

Treatment of TB

Individuals with a positive tuberculin skin test may or may not receive preventive drug therapy depending on the exposure history, the timing of the skin test conversion (when the test changes from negative to positive) and other factors in the individual's medical history. When it is known that a person has recently been in close contact with an individual with active tuberculosis and has developed a positive tuberculin skin test, preventive treatment is advisable due to a relatively high risk of developing active disease. Isoniazid (INH) may be prescribed for six to nine months as preventive treatment and for twelve months in persons who are HIV positive.

Since the advent of anti-tuberculosis drugs in the 1940s, the treatment of drug susceptible tuberculosis has become highly effective if administered and taken properly. Treatment no longer requires prolonged hospital stays. In many cases, a patient with a new case of TB can be treated at home. Others will enter the hospital to be placed on a medication program and to be isolated until the disease is controlled. When the person is no longer infectious, he or she can leave the hospital and continue on medication at home. Hospitalization in such cases may be a few weeks to several months depending on the severity of the disease and the effectiveness of the treatment program.

In most cases, a treatment program for drug-susceptible TB involves taking two or four drugs for a period of time ranging from six to nine months. Medications may include isoniazid, rifampin, pyrazinamide, ethambutol or streptomycin. It is necessary to take multiple drugs and to take all of the doses prescribed, because all of the TB germs cannot be destroyed by one drug.

It is important to realize that hospitalization for a TB patient, when necessary, represents only the beginning of treatment. Since active TB is slow to respond completely to therapy, medications prescribed by a clinician must be taken faithfully for a long period of time (at least 6 months, in some cases for a year or more). If the TB medications are not taken regularly, serious complications may develop:

- the organisms may become resistant to one or more of the drugs,
- there may be an increased risk of toxic reactions from the drugs and
- there is a high risk of disease relapse or recurrence.

Given the many effective medications available today, the chances are excellent that tuberculosis in an individual can be cured. It is important, however, for the patient to understand the disease and to cooperate fully in the therapy program.

Drug-Resistant TB

In a small percentage of cases, the initial treatment does not go as planned. It may be that the patient is not taking the medications regularly, the medication program is not sufficient for a particular infection or the medications are not absorbed properly. In these patients, there is a tendency for the germs to become resistant to some or all of the drugs. Sometimes a person has initial drug-resistant disease. In other words, the TB germs they contracted were from a person with drug-resistant TB.

Drug-resistant TB is very difficult to treat and requires more and different medications for a longer period of treatment. Sometimes, surgery is needed to remove areas of destroyed lung that contain many millions of germs that are inaccessible to antibiotics. A person with drug-resistant TB should be treated by a specialist with considerable experience in managing the disease and this treatment should be initiated in a hospital setting.

TB and National Jewish

Since 1899, the National Jewish Center for Immunology and Respiratory Medicine in Denver has treated tuberculosis patients. The hospital was established to care for the thousands of persons who flocked to Colorado's high altitude and dry climate, seeking the elusive cure for their tuberculosis.

In 1919, a research department was established at the hospital. When anti-TB drugs became available in the late 1940s, National Jewish was one of the first institutions to base its TB treatment program on the new chemotherapy, contributing refinements and developing combinations of drugs to overcome the problems of drug toxicity and resistance.

Today, National Jewish is one of the world's leading centers for the diagnosis and treatment of tuberculosis. Research continues at the Center to define new approaches to treat difficult TB infections. Our world renowned doctors are backed by state-of-the-art laboratories that help them select the most effective drug combinations and dosages. For drug-resistant TB, the New York Times recently wrote

that National Jewish provides "the most sophisticated and aggressive treatment the world has to offer." National Jewish offers a comprehensive evaluation for TB and drug-resistant TB. It is important to have a referral from the doctor along with previous medical records, chest X-rays and recent TB drug susceptibility testing before scheduling a TB evaluation at the Center. In most cases doctors refer a patient for our highly specialized in-patient program. To refer a patient for a TB evaluation, a doctor can call 303-398-1279. In addition, doctors and other health-care professionals can use this number to obtain consultations regarding current diagnosis and treatment information. Consultation is available for health-care professionals only.