

PATIENT EDUCATION | INFORMATION SERIES

Who Gets Tuberculosis (TB) Infection and TB Disease?

Tuberculosis (TB) is an infection from a type of bacteria called *Mycobacterium tuberculosis*. It is different than many common bacteria as it is very slow growing and may not cause symptoms for a long time after a person gets infected. Anyone can get TB, but those who are more exposed and/or who have an immune system that is less able to fight it are at higher risk.



Greater exposure can occur when people are exposed to others who are coming from areas where many people are infected with TB. This would include persons from countries with high rates of TB (often poor countries), those living with an infected person in close quarters either in a home or prisons, and healthcare workers who may have been exposed to someone with TB.

People who have less ability to fight the disease would include those with immune-related disorders, such as HIV infection, those taking immunosuppressive medicine, such as chemotherapy or medicines for auto-immune conditions, and even people who have conditions such as diabetes or kidney disease are at higher risk of developing active TB disease.

Progression from an asymptomatic infection (latent or "sleeping" TB) to active disease occurs in only about 10% of people, but treating it generally prevents active disease from occurring. This fact sheet talks about TB infection and disease.

What is the difference between TB infection (i.e., latent or "sleeping" TB) and TB disease (i.e., active TB)?

TB infection is when the TB mycobacteria infect a person but don't initially cause that person to feel sick. The immune system in 90% of people will control, and sometimes even eliminate the infection. However, the TB infection can persist for many years or even decades. Then when a person's immune system becomes weaker (i.e., they start a new medicine, they develop diabetes, or other conditions), the immune system is no longer able to control the infection and the person develops TB disease. When a person develops TB disease, they feel sick and develops symptoms of TB. We can diagnose and cure both TB infection and TB disease. However, it is safer to treat and cure the TB infection before a person gets sick with TB disease. TB infection is very common – 1/3 of people in the world likely has TB infection, but only a small proportion will progress to TB disease.

What are the signs and symptoms of TB disease?

Symptoms are usually mild and tend to present over a period

of weeks, months, or sometimes years. Symptoms are often initially mistaken for a smoker's cough, allergies, or chronic bronchitis from a lingering cold or flu infection. Classic symptoms of TB in the lungs include:

- Cough lasting more than three weeks
- Unexplained weight loss
- Low-grade fever
- Night sweats

If you have these symptoms, especially if you think you may have been exposed to someone with TB or have an immune system that is less able to fight disease, you should check with your healthcare provider. Although these symptoms are initially mild, without out treatment they usually get much worse.

How is TB diagnosed?

Given that people with latent TB infection have no symptoms, infection must be diagnosed using a screening test. This can be either a tuberculin skin test (TST) or a blood test called an interferon gamma release assay (IGRA). The TB skin test is also called a Mantoux test or a PPD skin test because the material used in the skin test is called purified protein derivative (PPD). The TST/PPD is a small amount of fluid injected under the skin of the arm. It is interpreted by a medical provider 2-3 days later. A positive test will be red and raised. The IGRA blood test done on a tube of blood. These tests detect the immune response our body mounts to components of *Mycobacterium tuberculosis*, the bacteria that causes TB. A positive result indicates that a person has been infected, i.e., they have latent TB infection, with the tuberculosis bacteria at some point in his or her life.

TB disease is suspected clinically when a person presents with the symptoms mentioned above usually together with abnormal findings on a chest x-ray. If TB disease is suspected, the person should be isolated from the public until the diagnosis is made and treatment is started as he or she can be contagious and spread *Mycobacterium tuberculosis* to others.

TB disease is often diagnosed by microscopic examination of three separate samples of coughed-up sputum (phlegm) often collected on different days. The sputum is first looked at under a

microscope using a special dye (acid fast bacillus (AFB) stain) to see if any tuberculosis bacteria can be found. It can be difficult to see the TB organisms so this test is not always positive as there may be only a small number of bacteria. Therefore, a culture is always needed in addition to the AFB test. Sputum cultures are done to grow the bacteria to confirm the diagnosis and determine the best combination of drugs for treatment. TB grows very slowly so they may take up to 2 months to grow. Newer tests use sputum to detect the DNA of the TB organism. If TB DNA is present, this means a person has TB disease. Flexible bronchoscopy, putting a small tube with a camera into the lungs, is sometimes needed to obtain lung sputum samples if a patient is unable to produce sputum. (To learn more about flexible bronchoscopy, see the ATS Patient Information Series “Flexible bronchoscopy” at www.thoracic.org/patients/.)

In addition to these tests, chest X-ray and CT chest imaging are performed to evaluate for any lung abnormalities. While TB usually occurs in the lungs it can infect any organ in the body. If TB is suspected in a different part of the body, a different sample or a tissue biopsy may be needed.

How is TB treated?

Latent TB infection is usually treated with 1 or 2 oral medications (rifampin, rifapentine, and isoniazid). It greatly reduces the risk of developing active TB later in life. Preventing the development of active disease stops TB transmission to other people. Current treatment options include daily isoniazid (shortened to INH) for six to nine months, daily rifampin (shortened to RIF) for 3 to 4 months, or weekly isoniazid and rifapentine for 12 doses. Researchers are currently doing studies to find safer and shorter treatment plans so these medication combinations may change in the future.

Currently active TB is treated with at least 4 anti-TB medications for 2 months followed by 2 drugs for 4 months for total of at least six months. If it involves certain organs or is more advanced, the treatment is usually longer. This can mean taking 6-12 pills every day! TB disease can be quite difficult to treat so healthcare workers must monitor patients closely with repeat chest x-rays, sputum tests, and exams to make sure they are getting better. Many people with TB disease find this difficult without the support of workers trained in providing directly observed treatment (DOT). DOT is the standard for treating TB worldwide and is when a healthcare worker or trained person watches a person take their anti-TB medicines every day. DOT helps detect side effects early and prevents missed doses and breaks in treatment that reduce the benefit of treatment and can lead to drug-resistant strains of bacteria. New, shorter, treatments for active disease may also be coming in the near future. Your healthcare provider or infectious disease specialist will help decide what the best treatment plan is for you. Sometimes a treatment needs to be adjusted based on how sensitive the bacteria is to various antibiotics.

How can I prevent getting or spreading TB?

TB is spread by tiny airborne droplets created by coughing. It is not spread by sharing food, utensils, drinks, touching,

or having sex. Covering the mouth and nose when coughing is an important way to stop the spread of TB and other airborne diseases. If you have TB disease and are coughing, it is important to wear a mask and limit contact with others until your healthcare provider tells you that you are no longer contagious while on treatment. Seeking care right away and finding out you have TB is the best way to stop its spread since treatment of disease helps you not be contagious, decreasing transmission. Treatment of latent TB prevents the spread of TB by stopping it before contagious disease develops.

Authors: Monica Campo, MD, MPH, L. Masae Kawamura MD
Reviewers: Christopher Berger MD, Dean Schraufnagel MD, Marianna Sockrider MD, DrPH
 Previous reviewers: Charles Dela Cruz, MD, PhD, Hrishkesh Kulkarni, MD, Jeffrey Starke, MD

Rx Action Plan

- ✓ Symptoms of TB should prompt you to see your healthcare provider without delay.
- ✓ You should ask about the possibility of TB because the diagnosis may not be on your healthcare provider’s mind.
- ✓ Contact your healthcare provider if you have had exposure to a person with TB. You should also contact your provider if you have symptoms of TB and if you have lived, worked, or had prolonged travel in a country or area where TB is common. For example, Asia, Africa, Eastern Europe, Central and South America are endemic for TB, as are some inner cities where the poor and homeless congregate.
- ✓ TB disease is often preventable! Knowing your “TB status” is important because, if needed, treatment of TB infection will kill the few TB bacteria in your body before it progresses into active TB disease.

Healthcare Provider’s Contact Number:

Resources:

American Thoracic Society

- www.thoracic.org/patients/
– Flexible bronchoscopy

World Health Organization

- <http://www.who.int/tb/en/>

U.S. Centers for Disease Control

- <https://www.cdc.gov/tb/>

U.S. National Library of Medicine—Medline Plus

- <https://medlineplus.gov/tuberculosis.html>

This information is a public service of the American Thoracic Society. The content is for educational purposes only. It should not be used as a substitute for the medical advice of one’s health care provider.

