



# TUBERCULOSIS (TB)

## WHAT IS TB?

Tuberculosis (TB) is an infection caused by bacteria. TB usually affects the lungs, but sometimes can affect other organs, especially for people with HIV and a CD4 cell count under 200.

TB is a very serious disease worldwide. Almost one-third of the world's population, and one third of people with HIV, are infected with TB, but a healthy immune system can usually prevent active disease. However, TB kills as many as half of people with HIV worldwide, according to the World Health Organization.

The name tuberculosis comes from tubercles. These are small, hard lumps that form when the immune system builds a wall around the TB bacteria in the lungs.

There are two kinds of active TB. **Primary** TB occurs soon after a person is first exposed to TB. **Reactivation** TB occurs in people who were previously exposed to TB. If their immune system is weakened, TB can break out of the tubercles and cause active disease. Most of the cases of TB in people with HIV are due to reactivation of a previous TB infection.

Active TB can cause the following symptoms: coughing for more than 3 weeks, weight loss, constant fatigue, night sweats, and fevers, especially in the evening. These are very much like the symptoms caused by Pneumocystis pneumonia (PCP, see fact sheet 515), but active TB can occur at any CD4 level.

TB is transmitted through the air, when someone with active TB coughs or sneezes. You can develop TB easily if you have advanced HIV disease. You can become infected with TB at any CD4 level.

## TB AND HIV: A BAD PAIR

Many viruses and bacteria live in our bodies. A healthy immune system will control these germs so they won't make us sick. If HIV weakens our immune system, they can cause opportunistic infections.

The rate of TB for people with HIV in the United States is 40 times the rate for people who aren't HIV-infected. TB rates all over the world are increasing because of HIV disease. TB can make HIV multiply faster, and make HIV disease worse. This makes it important for people with HIV to prevent and treat TB.

## HOW IS TB DIAGNOSED?

There is a simple skin test for TB. A protein found in TB bacteria is injected into the skin of your arm. If your skin reacts with swelling more than a certain size, you have probably been infected with the TB bacteria. People with HIV should get a TB skin test to find out if they were exposed to TB in the past.

If HIV or another disease has damaged your immune system, you might not show any reaction to the skin test, even if you're infected. This condition is called "anergy". If you have anergy, the best way to test for TB is a sputum culture (see next paragraph.)

A positive skin test usually doesn't mean you have active TB. Your doctor will check x-rays of your lungs, ask you about other symptoms, examine samples of your sputum (fluid produced in the airways and lungs) and try to grow TB bacteria from those samples. This can take four weeks. It is difficult to diagnose active TB, especially in people with HIV, because it can look like pneumonia, other lung problems, or other infections. However, newer, faster tests are being developed.

## HOW IS TB TREATED?

If you are infected with TB, but don't have the active disease, you should be treated with an antibiotic called isoniazid (INH) for at least 6 months, or with INH plus one or two other drugs for 3 months. A study published in 2001 showed that the multi-drug treatments are more effective than INH alone. INH can cause liver problems, especially for black or Hispanic women.

If you have active TB disease, you will be treated with antibiotics. Because the TB bacteria can develop resistance to individual drugs, you will be given a combination of antibiotics. TB is hard to cure, and the drugs must be taken for at least 6 months. If you don't take all the drugs, then the TB in your body might become resistant and the anti-TB drugs will stop working.

There are types of TB that are resistant to some antibiotics. These are called multi-drug resistant TB (MDR-TB) or extensively drug resistant TB (XDR-TB). However, the majority of cases of TB can be cured with existing antibiotics.

## MEDICATION PROBLEMS

Some of the antibiotics used to treat TB can damage your liver or kidneys; so can some ARVs. It can be difficult to take drugs for both TB and HIV at the same time. INH can cause peripheral neuropathy (see Fact Sheet 555), as can several ARVs, so there can be problems if these drugs are taken together. TB treatment can cause "immune restoration syndrome." (see fact sheet 483.)

Also, many ARVs interact with some drugs used to fight TB. Rifampin or rifabutin are commonly used to fight TB. They can drop the levels of ARVs in your blood too low to control HIV. ARVs can raise the levels of these TB drugs high enough to cause serious side effects.

Rifampin should not be used with most protease inhibitors. Rifabutin can be used in some cases, but drug doses might have to be changed. There are special guidelines for your doctor to use if you take drugs to fight TB and HIV at the same time. They are available on the Internet at <http://www.cdc.gov/tb/publications/factsheets/treatment/treatmentHIVpositive.htm>

Also, people with a CD4 cell count below 100 should take rifabutin at least 3 times a week. This reduces the risk of their TB becoming resistant to rifabutin.

For these reasons, TB should usually be cured first before ART is started. However, this may not be possible if CD4 cell counts are low.

## THE BOTTOM LINE

TB is a very serious disease worldwide and kills more people with HIV than any other disease. TB and HIV both make each other worse.

There are effective treatments for TB infection, and for active TB disease. If you are exposed to TB, or have signs of TB, get tested and treated.

The treatments for TB take a long time, and can be difficult to take at the same time as ARVs, but they can cure TB. Some TB drugs interact with ARVs, so treatment has to be carefully planned if you have both HIV and TB.

Revised August 9 2009