



## Active infectious TB disease

### What is active, infectious TB disease?

Active, infectious tuberculosis (TB) disease is caused by germs (bacteria) that are spread through the air from person to person. If someone has active TB disease of the lungs or airways, the TB germs may spread to others by coughing, sneezing, singing, playing a wind instrument or sometimes even just talking. Active TB is most infectious when the TB germs are found in the person's sputum (phlegm).

### What happens if I have active, infectious TB disease?

If you have active, infectious TB disease of the lungs or airways you will usually feel sick. You may have symptoms, like a bad cough lasting longer than three weeks, pain in the chest, coughing up blood or sputum, weakness or feeling very tired, weight loss, lack of appetite, chills, fever and night sweats. By the time you see a doctor, you may need to be hospitalized. In the hospital, you may be kept in a special isolation room to protect other patients and health-care workers from becoming infected with TB. You will be asked to wear a mask if you have to leave this room. Health-care workers will wear masks to protect themselves while caring for you.

You will be given antibiotic drugs to kill the TB germs. When you are no longer infectious to others, you can usually go back to your normal routine as soon as you feel up to it. It is *very important* to keep taking TB drugs to complete your treatment and be cured. If you stop taking your drugs too early, you may develop drug-resistant TB, which is harder to treat.

### What happens to my friends and family if I have active, infectious TB disease?

Because you may have spread TB germs to others without even knowing it, health-care workers will talk to you to find out who you spend time with every day. This is called contact tracing. Your family, friends and coworkers will be contacted and then tested to find out if they have been infected. Contact tracing helps stop the spread of TB.



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### Tuberculosis Prevention and Control

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## Active TB disease outside the lungs

Active tuberculosis (TB) disease usually affects your lungs. Sometimes TB germs (bacteria) can spread through your blood to other parts of your body. If this happens, the germs are most often found in your lymph nodes. Lymph nodes are an important part of your body's defence system. They act as filters for germs and viruses. Lymph nodes are usually found in your neck, in your armpits and in your groin.

TB germs can also be found in:

- kidneys
- bones and joints
- intestines
- brain and spinal cord
- all over your body (called disseminated or miliary TB)

If you have active TB disease outside the lungs, you may feel sick or weak, lose weight, and have fever and night sweats. In addition, you may have symptoms in the part of your body where the TB germs can be found. It can sometimes be difficult to diagnosis active TB disease outside of the lungs because your chest x-ray will be normal and your sputum (phlegm) will not show any TB germs.

If you are infected with HIV, you are more likely to have active TB disease outside the lungs. Treatment of active TB disease in other parts of the body is the same as treatment of active TB disease in the lungs. People with active TB disease outside the lungs are usually not infectious to others because their TB germs don't usually get into the air to be breathed in by someone else.



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# Active TB disease

## What is active TB disease?

Tuberculosis (TB) disease is caused by germs (bacteria) that are spread through the air from person to person. TB germs get into the air when someone with active, infectious TB disease coughs, sneezes, sings, plays a wind instrument or to a lesser degree, talks. These germs can stay in the air for hours.

If you breathe in the TB germs, your body's immune (defence) system may kill the TB germs. If your body's defence system doesn't kill the TB germs, they can remain alive but inactive in your body – this is called latent TB infection. If TB germs become active (multiply and grow in the body), this is called active TB disease. If you have active TB disease, you will feel sick and may infect other people.

## What are the symptoms of active TB disease?

TB is a serious disease that attacks the lungs and sometimes spreads to other parts of the body (this is called active TB disease outside the lungs). You may have symptoms in the parts of your body where the TB germs are growing.

If you have active TB disease in the lungs, you may have the following symptoms:

- a bad cough that lasts longer than three weeks
- pain in the chest
- coughing up blood or sputum (phlegm)
- weakness or feeling very tired
- weight loss
- lack of appetite
- chills
- fever
- night sweats

## How do I know if I have active TB disease?

If you feel sick, see your doctor. Your doctor will examine you and order tests, such as a chest x-ray. If you are coughing, your sputum (phlegm) may contain TB germs. If you have active TB disease, you need treatment of to kill the TB germs in your body. **Persons with active TB disease of the lungs and airways are considered infectious and may spread TB germs to others.** Without treatment, you could die.

### A person with active TB disease:

- May have an abnormal chest x-ray or positive sputum smear (or culture)
- Has active TB germs in his/her body
- Usually feels sick and may have symptoms such as coughing, fever, and weight loss
- May spread TB germs to others
- Needs to take drugs to treat active TB disease

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## BCG

### What is BCG?

Bacille Calmette-Guérin or BCG is a TB vaccine developed by scientists Albert Calmette and Camille Guérin in the 1920s. It helps protect babies and young children against the most severe forms of active TB disease such as TB meningitis or miliary TB.

Today, only infants in some First Nations and Inuit communities with high rates of TB are routinely vaccinated.



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### BCG and TB skin tests

People vaccinated with BCG may have a *false positive result* to a TB skin test. In other words, the skin test may show that the person has TB but the person does not really have TB. If the person was born in Canada, was vaccinated after 12 months of age and has not spent time in a foreign country or in Canadian Aboriginal community with a high rate of TB disease, then the result may be due to a latent TB infection. New blood tests for latent TB infection can help determine if BCG caused the positive TB skin test.

As a precaution, anyone with a positive TB skin test should have further testing to rule out active TB disease.

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## Contact tracing

### What is contact tracing?

Tuberculosis (TB) is an infectious disease. If you have active, infectious TB disease, you may have spread TB germs (bacteria) to other people without even knowing it. It's the job of public health workers to help you get better and to help others that you may have infected. This helps stop the spread of TB.

Public health workers will talk to you to find out who you spend time with every day. This is called contact tracing. Your family members and close friends are usually the first contacts to be tested for latent TB infection.



### Why is it so important to find your contacts?

TB is not easily transmitted. However, if you have infected some of your closest contacts, then other people who spend less time with you may also be tested for latent TB infection.

People have a higher risk of developing active TB disease within the first two years of getting latent TB infection. Your contacts who have been infected will be offered treatment of latent TB infection to help their immune system fight the infection and reduce their risk of developing active TB disease.

Public health workers spend a lot of time and effort tracking down the contacts of people who have active, infectious TB disease. Thanks to their efforts, many cases of TB are prevented.

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## Diagnosing active TB disease

There are three steps in diagnosing active tuberculosis (TB) disease:

1. a complete medical history and medical examination
2. a chest x-ray
3. laboratory tests

**1** During the medical history, your doctor will want to know if you have any symptoms of TB disease. The doctor will also want to know if you have been exposed to a person with active, infectious TB, if you have had a previous diagnosis of latent TB infection or active TB disease, or if you have any other risk factors for developing active TB disease.

**2** A chest x-ray is used to look for evidence of active TB disease in your lungs.

**3** The third step is a series of laboratory tests. If your doctor thinks you have active TB disease in your lungs, you will be asked to give a sputum (phlegm) sample. If your doctor thinks you have active TB disease outside of your lungs, you may have to give other types of samples.

Your sputum sample (or smear) is examined under a microscope. It is cultured (or grown) to find out if it contains the TB germ (bacteria). A positive culture confirms that you have active TB disease.

After your sample has been cultured, it is tested to find out if the type of TB you have is resistant to any TB drugs. The results of these tests can help your doctor choose the right drugs to treat you.



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# Diagnosing latent TB infection

To find out if you have latent tuberculosis (TB) infection, you will be given a TB skin test. A small needle will inject some testing material under the surface of your skin. If you are infected with TB, the spot where the needle was injected will swell up a bit and feel hard within 48 to 72 hours. Two or three days after the test, you must go back to have your reaction measured. You will be told then if the test is positive or negative.

## A positive skin test

A positive TB skin test usually means that you have latent TB infection. More tests should be done to make sure you don't have active TB disease. Your doctor may order a chest x-ray or a test of your sputum (phlegm) to look for TB germs (bacteria). A positive test without latent TB infection can happen in people who have been vaccinated with BCG vaccine or who have been infected with other TB-like germs.

## A negative skin test

A negative TB skin test usually means you are not infected with TB. But a negative test can also happen if you have only recently been infected. It takes three to eight weeks after exposure to a person with infectious TB disease for the skin test to become positive.

A negative test can also happen if your body's defence (immune) system is weak. For example, if you have HIV infection or active TB disease, your skin test may be negative even if TB germs are in your body.

## Blood test for diagnosing latent TB infection

In addition to the skin test, blood tests for latent TB infection are also now available in Canada. These tests are not recommended for routine diagnosis of latent TB infection and are only used under special circumstances.

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# Drug-Resistant Tuberculosis

## What is drug-resistant tuberculosis?

Drug-resistant tuberculosis (TB) happens when the usual drugs used to kill the TB germs (bacteria) no longer work. Drug-resistant TB is of special concern for persons with HIV infection or other conditions that can weaken the immune system.

## How do I get drug-resistant TB?

You can get drug-resistant TB if you:

- breathe in germs from someone with drug-resistant TB disease
- already have TB disease and didn't take all of your TB drugs
- develop active TB disease again, after being treated in the past

## What is multidrug-resistant TB (MDR-TB)?

TB that is resistant to the two most important “first-line” antibiotics used to fight TB is called multidrug-resistant TB or MDR-TB. A person with MDR-TB disease needs special antibiotics and must take drugs for a longer time. Unfortunately, these drugs usually have more side effects and are not as effective as the first-line drugs.

## What is extensively drug-resistant TB (XDR-TB)?

Extensively drug-resistant TB (XDR-TB) can develop when MDR-TB germs become resistant to two or more of the best second-line drugs. XDR-TB is extremely difficult to treat as there are very few drugs left that can be used.

**Note:** MDR-TB and XDR-TB are very serious diseases and should be treated by a doctor who specializes in TB.

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# Latent TB infection progressing to TB disease

## Why does latent TB infection progress to active TB disease?

Latent tuberculosis (TB) infection may develop into active TB disease if your body's defence (immune) system can't stop the TB germs (bacteria) from growing. You are at the highest risk (about five per cent) of active TB disease within the first two years of becoming infected. After the first two years, there is only another five per cent chance of you developing active TB disease in your lifetime.

## Who is more likely to get active TB disease?

You are at a greater risk of developing active TB disease if your body's defence system gets weak. The following conditions can weaken your body's defence system:

- HIV infection and AIDS (increases your risk of TB disease from 10 per cent over a lifetime to 10 per cent each year);
- organ transplants (because the patient is treated with immunity-suppressing drugs);
- a type of lung disease called silicosis;
- chronic kidney failure requiring dialysis;
- cancer of the head and neck;
- having been infected with TB bacteria within the past two years;
- a chest x-ray showing signs of old TB;
- treatment with steroids known as glucocorticoids;
- treatment with tumour necrosis factor (TNF)-alpha inhibitors (e.g., for auto-immune disorders such as rheumatoid arthritis);
- diabetes mellitus (all types);
- being underweight (for most people, this is a body mass index equal to or less than 20);
- being under five years of age when first infected with the TB bacteria; and
- cigarette smoking (one pack per day or more).

## What can I do to prevent active TB disease?

If you have latent TB infection it is important to protect your immune system from becoming weak. TB drugs (antibiotics) will help your immune system fight the TB germs and prevent TB disease. Talk to your health-care professional to find out if you need to take TB drugs. It's also important to find out if you have HIV. If you do, you need to take special precautions.

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# Latent TB infection

## What is latent TB infection?

You have *latent tuberculosis (TB) infection* if you have breathed TB germs (bacteria) into your lungs and your immune (body defence) system has stopped them from growing. The TB germs remain alive but inactive in your body. **You don't feel sick and can't pass TB to others.**

Treatment of latent TB infection is important because it can prevent the development of active TB disease later in life.

## How do I know if I have latent TB infection?

If you have latent TB infection, you won't feel sick. You may not know you have been exposed to TB. The best way to find out is to get a TB skin test. If you know you are infected with TB, ask to be tested for HIV. It's important to know if you have HIV because it can may your body defence (immune) system weak and increase your risk of developing active TB disease.

### A person with latent TB infection:

- Usually has a positive skin test
- Has a normal chest x-ray and a negative sputum test
- Has TB germs that are alive but inactive
- Does not feel sick
- Cannot spread TB germs to others

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# Taking TB drugs for active TB disease

## Why do I have to take TB drugs for so long?

Treatment of active tuberculosis (TB) disease takes at least 6 months. The antibiotics used to kill the TB germs (bacteria) only work when the TB germs grow and TB germs grow very slowly.

## What if I don't take all my TB drugs?

You will probably start to feel better after only a few weeks of taking TB drugs. However, it is important to keep taking the drugs because the TB germs are still alive in your body. If you stop taking your drugs, or don't take your drugs regularly, drug-resistant TB may develop. You will get sick all over again, but this time you will need to take drugs longer to be cured and there will be more side effects. You may also get active infectious TB disease again and spread the disease to your family, friends and coworkers.

## Can DOT help me?

DOT stands for Directly Observed Treatment. It is a program designed to help you take your drugs regularly. If you are on a DOT program, you will meet with a health-care provider every day or several times a week. DOT helps in several ways. Your health-care provider will remind you to take all of your drugs to complete your treatment. If you complete your treatment, you will be cured of TB disease. Your health-care provider can also see if the drugs are working as they should, watch for side effects and answer questions you may have about TB.

## Can I drink alcohol while taking TB drugs?

It is always best not to drink alcohol while taking TB drugs.

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# TB and HIV infection

## What is the connection between TB and HIV infection?

Tuberculosis (TB) is caused by germs that are spread through the air from person to person. If your body's defence (immune) system is strong, it can kill the TB germs (bacteria) or stop them from growing. But if your immune system is weak, the TB germs can grow and multiply and you may develop active TB disease. The human immunodeficiency virus (HIV) weakens your immune system. So if you have TB and HIV infection, you are at a very high risk of developing active TB disease.

## What are the chances of developing active TB disease?

Adults with latent TB infection have about a 10 per cent chance of developing active TB disease in their lifetime. Adults with TB *and* HIV infection may have up to a 10 per cent risk of developing active TB disease **every year**.

## What should I do if I think I have TB and HIV?

You need to see a doctor who is an expert in this area to find out if you have latent TB infection or active TB disease. Treatment of TB infection or treatment of active TB disease by an expert could save your life!

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## TB transmission

### How is TB spread?

Tuberculosis (TB) germs (bacteria) are spread from person to person through the air. When someone with active, infectious TB disease of the lungs or airways breathes out (or coughs, sneezes, sings, plays a wind instrument or sometimes even just talks), tiny droplets containing TB germs are released into the air. These droplets can stay in the air for hours. If you breathe in these droplets, TB germs will get into your lungs.

You cannot get infected with TB by shaking hands, sitting on a toilet seat or sharing dishes with someone who has active, infectious TB disease.



Photo credit: Corbis/Bettmann

### How contagious is TB?

TB is not as contagious as other diseases, such as the flu or chickenpox. To get infected, you would usually have to spend many hours every day with someone with infectious TB disease. If you live in overcrowded housing with poor air circulation, you may be more at risk of getting latent TB infection.

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# Treatment of active TB disease

## Can active TB disease be cured?

YES! Antibiotic drugs have cured thousands of people with active tuberculosis (TB) disease in Canada. The most common TB drugs are:

- Isoniazid (INH)
- Rifampin (RMP)
- Pyrazinamide (PZA)
- Ethambutol (EMB)

Your doctor will decide which TB drugs are best for you. TB drugs must be taken for at least six months to kill all the TB germs (bacteria). It is very important that you take your TB drugs as your doctor recommends.

## Are TB drugs safe?

Drugs used to treat active TB disease are relatively safe. Sometimes the drugs may cause side effects. Some side effects are minor. Others are more serious.

Talk to your doctor immediately if you have any of the following serious side effects:

- skin rash
- itching
- yellowish skin or eyes
- brown or very dark urine
- loss of appetite
- nausea (feeling sick to your stomach)
- vomiting
- abdominal pain
- bleeding easily
- flu-like symptoms
- dizziness
- ringing in the ears
- fever for three days or more
- sore joints
- psychotic thinking (feeling out of touch with reality)
- memory problems
- blurred or changed vision
- tingling fingers or toes
- tingling or numbness around the mouth

## Can I drink alcohol when I'm taking TB drugs?

It is always best not to drink alcohol while you are taking TB drugs.

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# Treatment of latent TB infection

## What should I do if I have latent TB infection?

Your doctor may recommend that you take tuberculosis (TB) drugs to reduce the chances of your latent TB infection developing into active TB disease. For example, if you take the drug Isoniazid (INH) for nine to 12 months, it can protect you from developing TB disease. It is important that you take all your TB drugs as prescribed by your doctor.

## Are TB drugs safe?

Most people can take TB drugs without having any problems. However, these drugs may harm the liver. Talk to your health-care professional (doctor or nurse) immediately if you have any of these symptoms:

- yellowish skin or eyes
- brown or dark urine
- loss of appetite
- feel sick to your stomach
- rash
- itching
- fever

## Can I drink alcohol while taking TB drugs?

It is always best not to drink alcohol while you are taking TB drugs.

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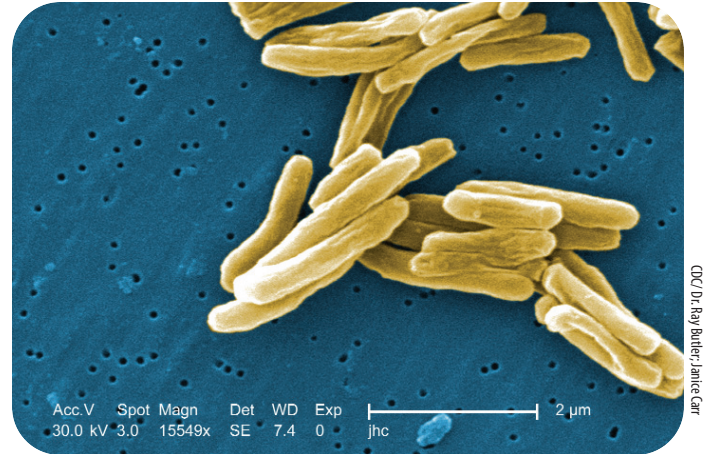
## What is TB?

Tuberculosis (TB) is a contagious disease. It is caused by germs (bacteria) that are spread through the air. TB germs get into the air when someone with active, infectious TB disease coughs, sneezes, sings, plays a wind instrument or to a lesser extent, talks.

If you breathe in the TB germs, your body's defence (immune) system may kill the TB germs. If your body's defence system doesn't kill the TB germs, they can remain alive but inactive in your body. If this happens, you have what is called *latent TB infection*. You will not feel sick and you cannot spread TB germs to others.

If you have latent TB infection and your body's defence system becomes weak because you have some other illness, you may develop active TB disease. If you have active TB disease, you will feel sick and may infect other people. TB germs usually attack the lungs but it can also affect other parts of your body, such as your lymph nodes.

Both latent TB infection and TB disease can be cured with antibiotic drugs.



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## Who is at risk for TB in Canada?

Anyone who has come in contact with someone who has active, infectious TB disease is at risk for getting latent TB infection, which may later develop into active TB disease. Those most at risk usually spend many hours every day with someone who has infectious TB disease. If you have HIV or AIDS you are at the greatest risk of getting latent TB infection and possibly TB disease because your immune system is weakened.

Certain population groups in Canada have an increased risk of latent TB infection. They include:

- people who have come into close contact with individuals with known or suspected TB (e.g., family members or people sharing living spaces);
- people with a history of active TB or an x-ray suggesting they had TB in the past but did not receive adequate treatment;
- people living in communities with high rates of latent TB infection or disease;
- the poor, especially the urban homeless; and
- residents of long-term care and correctional facilities.

People who work with any of these groups (e.g., health care workers, correctional staff) are also at greater risk of latent TB infection.

### What should I do if I'm at risk of TB?

If you think you have been close to someone with infectious TB disease, you should get tested for TB.

If you have latent TB infection and another medical condition that has made your immune system weak, talk to your doctor or nurse about getting treatment for latent TB infection before it develops into active TB disease.



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