Diseases, Disorders and Injuries

Tuberculosis

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What is tuberculosis?

Tuberculosis (TB) is an infectious disease caused by bacteria called *Mycobacterium tuberculosis*. The bacteria usually cause an infection in the lungs, but it can affect other parts of the body, such as the kidney, spine, brain, and lymph nodes. If not treated properly, tuberculosis can be fatal.

Tuberculosis was historically known as "consumption" due to the way it progressively weakened and "consumed" the body. Tuberculosis was a leading cause of death worldwide. With the discovery of antibiotics, tuberculosis became treatable; however, it remains a global health concern, particularly in low-income regions and communities with limited healthcare access.

In Canada, tuberculosis is rare, but it still exists. Most cases of active tuberculosis occur in people who were born outside of Canada. However, First Nations and Inuit communities continue to be affected at higher rates than the general population.

What are the different types of tuberculosis infection?

Tuberculosis (TB) infection is classified into two main types: latent tuberculosis infection or active tuberculosis disease.

A latent tuberculosis infection means a person is infected with the bacterium, but does not develop symptoms or illness. Latent infection occurs when the immune system of the infected person is able to keep the bacteria under control, preventing the bacteria from multiplying. The bacteria can remain dormant for years without causing the disease or symptoms.

Persons with latent tuberculosis infection:

- Do not feel sick and cannot spread tuberculosis to others.
- Still have a risk of developing active TB disease in the future, particularly if their immune system weakens.

The World Health Organization estimates that about 10% of people with latent tuberculosis will develop active tuberculosis disease during their lifetime.

Active tuberculosis disease occurs when the immune system fails to contain the bacteria, allowing it to multiply and cause illness. Disease development can happen soon after infection, known as primary tuberculosis, or years later when latent tuberculosis occurs.

For some individuals, active tuberculosis disease may develop within 18-24 months of the initial infection. Higher-risk groups for the development of active tuberculosis include people with:

- Weakened immune systems
- Chronic conditions, such as malnutrition or diabetes.
- Lifestyle factors, such as tobacco use.

If the immune system becomes compromised due to another illness, aging, or immunosuppressive medications, the latent tuberculosis may activate (or reactivate) and progress to active tuberculosis disease.

What are the signs and symptoms of tuberculosis?

The signs or symptoms of active tuberculosis infection include:

- A bad cough that lasts 2 weeks or longer
- Presence of blood or phlegm (the thick liquid that comes up from your lungs or airways) when coughing
- Pain in chest
- Loss of weight
- Loss of energy
- Poor appetite

- Fever, chills, night sweats
- Weakness or tiredness

How is tuberculosis transmitted?

Tuberculosis is spread from person to person through the release of droplets from the lungs or airways of an infected person. Transmission occurs when a person with active tuberculosis expels bacteria into the air through:

- Coughing
- Sneezing
- Singing
- Playing a wind instrument
- Talking (to a lesser extent)

To become infected, you have to breathe in the tuberculosis bacteria. The bacteria are carried in tiny droplets of saliva or sputum but do not spread through shaking hands, sharing dishes, or sitting on toilet seats.

Persons with latent tuberculosis infection cannot transmit tuberculosis because the bacteria are inactive and not present in their saliva or sputum.

When a person with active tuberculosis disease coughs, sneezes, talks, or spits, tiny droplets containing the bacteria are released into the air and can be inhaled by people who are close by. After inhalation, tuberculosis bacteria typically settle in the lungs. From there, the bacteria can spread to other parts of the body through the bloodstream. Only a small number of inhaled bacteria are needed to cause an infection. Transmission risk is highest in enclosed, poorly ventilated spaces with prolonged exposure to an infected person.

How is tuberculosis recognized?

Tuberculosis is diagnosed through skin or blood tests, which are often used to determine whether the tuberculosis bacteria is present. However, a positive skin or blood test does not confirm if there is active tuberculosis. Further testing is needed to determine whether the tuberculosis is latent or active.

Initial screening tests include:

- Tuberculin skin test: A small amount of non-infectious tuberculosis protein is injected under the skin. A reaction at the injection site is assessed 2 to 3 days later to determine if tuberculosis exposure has occurred.

- Interferon-gamma release assay: A blood test that measures the immune system's response to the tuberculosis bacteria.

Tests to confirm active tuberculosis include:

- A complete medical history and examination.
- Chest radiography (X-ray).
- Sputum smear microscopy: A sample of sputum (mucus from the lungs) is examined by microscope.
- Mycobacterial culture and phenotypic drug susceptibility testing: To determine if the bacteria are resistant to anti-tuberculosis drugs .
- Nucleic acid amplification testing: To determine if the tuberculosis bacterium is present and confirm infection.

How is tuberculosis treated?

Tuberculosis can be treated with specific antibiotics. Treatment is recommended for both latent and active tuberculosis.

Latent tuberculosis infection can become active tuberculosis disease over time, especially in high-risk individuals, so follow-up is important. To reduce the risk, healthcare providers may recommend

- Treatment for latent tuberculosis infection to prevent the infection from becoming active, especially if the individual is high-risk (for example, immunocompromised individuals, healthcare workers, or people living in close-contact settings).
- Completing the full course of medication as prescribed to prevent active tuberculosis.
- Monitoring for symptoms of active tuberculosis and seeking medical attention if symptoms develop.

Active tuberculosis disease requires prompt treatment with a combination of antibiotics over several months. It is essential to take all prescribed medications as directed to prevent drug resistance. Incomplete or irregular treatment can lead to drug-resistant tuberculosis, making the disease more difficult to treat.

Most tuberculosis cases can be managed without hospitalization. However, individuals with severe illness or complications may require hospitalization in an airborne isolation room to prevent transmission.

What is drug-resistant tuberculosis?

Drug-resistant tuberculosis refers to tuberculosis strains that have developed resistance towards a drug or drugs, meaning standard tuberculosis medications may no longer work. Conventional treatments cannot manage these tuberculosis strains. Drug-resistant tuberculosis can develop if:

- Medications are not taken consistently or as prescribed.
- Treatment is interrupted or stopped too early.
- The strain is already resistant because of an earlier incomplete treatment.

Multi-drug-resistant tuberculosis is resistant to at least the drugs isoniazid and rifampin, two commonly used anti-tuberculosis drugs. Some strains of tuberculosis have emerged that are resistant to almost all anti-tuberculosis drugs, known as extensively drug-resistant tuberculosis (XDR-TB).

Please see the OSH Answers "Multi-Drug Resistant Tuberculosis (MDR-TB)" for more information.

Is tuberculosis an occupational concern?

Yes, tuberculosis is an occupational health concern in certain workplaces. Workers can contract tuberculosis through direct exposure to actively infected persons or from breathing in air that contains the bacteria.

While the highest-risk workplaces include healthcare settings, correctional facilities, homeless shelters, and long-term care homes, all workplaces should be aware of how tuberculosis spreads and take appropriate precautions.

What protective measures can be taken in workplaces?

General preventative measures include:

- Workplace education to raise awareness about tuberculosis transmission, symptoms, and prevention.
- Encouraging workers to seek medical help if they develop tuberculosis-like symptoms.
- Promoting proper ventilation in indoor spaces to reduce transmission risk.

In high-risk occupations, such as in healthcare settings, implementing a tuberculosis control program is important. The program should include appropriate controls, such as:

- Negative-pressure isolation rooms.
- Adequate ventilation to dilute the concentration of contaminants. Refer to Indoor Ventilation for Respiratory Infectious Diseases (RIDs) for more information.

- Exhausting isolation room air directly outside.
- Using high-efficiency particulate air (HEPA) filtration and ultraviolet germicidal irradiation (UVGI) where applicable.
- Policies on screening, reporting, and managing suspected tuberculosis cases.
- Policies and procedures for the rapid identification, isolation, and treatment of individuals with infectious tuberculosis or those suspected of being infected.
- Implementing routine health assessments for workers at risk.
- Training workers on infection control measures and proper hygiene practices.
- Implementing a respiratory protection program.
- Adoption of routine practices and additional precautions by workers.

Where can I get more information about tuberculosis?

More information is available from*:

- Tuberculosis (TB): Symptoms and treatment - Government of Canada
- Canadian Tuberculosis Standard, 8th edition - Public Health Agency of Canada
- Tuberculosis (TB) - Center for Disease Control and Prevention (US)
- Tuberculosis - World Health Organization

(*We have mentioned these organizations as a means of providing a potentially useful referral. You should contact the organization(s) directly for more information about their services. Please note that mention of these organizations does not represent a recommendation or endorsement by CCOHS of these organizations over others of which you may be aware.)

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