

GUIDANCE FOR THE PREVENTION AND MANAGEMENT OF LATENT AND ACTIVE TUBERCULOSIS

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INTRODUCTION

Tuberculosis (TB) is caused by bacteria (*Mycobacterium tuberculosis* or *M. tuberculosis*) and most often affects the lungs, although it can affect all parts of the body¹.

Every year, 10 million people fall ill with tuberculosis (TB). Despite being a preventable and curable disease, 1.5 million people die from TB each year – making it the world’s top infectious killer.

TB is the leading cause of death among people with HIV. Most of the people who fall ill with TB live in low- and middle-income countries, but TB is present all over the world.

About a quarter of the global population is estimated to have been infected with TB bacteria, but most people will not go on to develop TB disease, and some will clear the infection. Those who are infected but not (yet) ill with the disease cannot transmit it.

People infected with TB bacteria (also known as latent TB infection) have a 5–10% lifetime risk of falling ill with active TB disease. Those with compromised immune systems, such as people living with HIV, malnutrition or diabetes, or people who use tobacco, have a higher risk of falling ill.

This guidance developed by the Public Health Section of DHMOSH provides information on the screening and clinical management of latent and active tuberculosis, preventative measures, and management of tuberculosis exposure.

WHO Tuberculosis handbooks and guidelines can be found here: https://www.who.int/health-topics/tuberculosis#tab=tab_2

For any questions on this document, contact the DHMOSH Public Health Section at dos-dhmosh-public-health@un.org.

BACKGROUND: LATENT VS. ACTIVE TUBERCULOSIS

There are two forms of TB: latent TB infection, also known as LTBI (where the individual has no symptoms), and active TB disease (which can affect almost any organ system, the most common being the lungs).

Active pulmonary TB disease is contagious to others, but LTBI and other forms of active TB disease are not contagious to others. Individuals who have active non-pulmonary TB should also be assessed for active pulmonary TB.

Individuals who have LTBI can reactivate their TB to become active TB disease.

TRANSMISSION

TB is spread through the air when people with lung TB cough, sneeze or spit. A person needs to inhale only a few germs to become infected¹.

When a person with active TB disease (TB that can be spread) coughs, sneezes, speaks, or sings, tiny particles containing *M. tuberculosis* may be expelled into the air⁵. These particles, called droplet nuclei, are about 1 to 5 microns in diameter— less than 1/5000 of an inch. Droplet nuclei can remain suspended in the air for several hours, depending on the environment.



Not everyone who is exposed to an infectious TB patient becomes infected with *M. tuberculosis*. The probability that TB will be transmitted depends on several factors⁵:

- Infectiousness of the TB patient
- Environment in which the exposure occurred
- Frequency and duration of the exposure
- Susceptibility (immune status) of the exposed individual

TB is NOT spread by⁶:

- shaking someone's hand
- sharing food or drink
- touching bed linens or toilet seats
- sharing toothbrushes
- kissing

SIGNS AND SYMPTOMS OF LATENT TUBERCULOSIS INFECTION (LTBI)⁷

TB bacteria can live in the body without making you sick. This is called latent TB infection (LTBI). In most people who breathe in TB bacteria and become infected, the body is able to fight the bacteria to stop them from growing.

People with latent TB infection:

- Have no symptoms
- Don't feel sick
- Can't spread TB bacteria to others
- Usually have a positive TB skin test reaction or positive TB blood test
- May develop TB disease if they do not receive treatment for latent TB infection

Many people who have latent TB infection never develop TB disease. In these people, the TB bacteria remain inactive for a lifetime without causing disease. But in other people, especially people who have a weak immune system, the bacteria become active, multiply, and cause TB disease.

SIGNS AND SYMPTOMS OF ACTIVE TUBERCULOSIS DISEASE

Unlike latent TB infection, when a person gets active TB disease, they will have symptoms. These may be mild for many months, so it is easy to spread TB to others without knowing it.

Common symptoms of TB²:

- prolonged cough (sometimes with blood)
- chest pain
- weakness
- fatigue
- weight loss
- fever
- night sweats.

The symptoms people get depend on where in the body TB becomes active. While TB usually affects the lungs, it also affects other parts of the body.

If an individual has active TB disease in another part of the body, the symptoms will differ. TB lymphadenitis is the most common type of extrapulmonary tuberculosis that occurs outside of the lungs³. Lymphadenitis refers to lymph nodes that are abnormal in size, number, or consistency.



HIGH RISK INDIVIDUALS

People with latent TB infection don't feel sick and aren't contagious. Only a small proportion of people who get infected with TB will get TB disease and symptoms. Babies and children are at higher risk².

Certain conditions can also increase a person's risk for tuberculosis disease including²:

- diabetes (high blood sugar)
- being malnourished
- tobacco use
- weakened immune system (for example, HIV or AIDS)

TB AND HIV INFECTION

People living with HIV are 16 (uncertainty interval 14–18) times more likely to fall ill with TB disease than people without HIV., and TB is one of the leading causes of death among people living with HIV. A person who has both HIV infection and TB disease has an AIDS-defining condition.

- For individuals with latent TB Infection, HIV infection increases the risk of progression to TB diseases.
- People infected with HIV who also have either latent TB infection or TB disease can be effectively treated.

It is important to ensure that all individuals living with HIV are tested for TB infection.

PREVENTION MEASURES

Follow these steps to help prevent the spread of TB²:

- Seek medical attention if you have symptoms like prolonged cough (> 3 weeks), fever and unexplained weight loss, as early diagnosis and treatment for TB can help stop the spread of the disease and improve your chances of recovery.
- Your medical provider might suggest you get tested for LTBI in certain instances, for example, if you have HIV or are in contact with people who have TB in your household.
- If prescribed LTBI treatment or treatment for active TB disease, complete the full course and do not miss doses.
- If you have TB, practice good hygiene when coughing, including avoiding contact with other people and wearing a mask, covering your mouth and nose when coughing or sneezing, disposing of sputum, and using tissues properly. You must also be isolated during your infectious period.

Special measures like particulate respirators (e.g., N95) and ventilation are important to reduce infection in healthcare and other institutions.

VACCINATION

The Bacille Calmette-Guérin (BCG) is one of the most widely used vaccines for TB,

- BCG vaccine has a documented protective effect against meningitis and disseminated TB in children.
- It does not prevent primary infection and, more importantly, does not prevent reactivation of latent pulmonary infection, the principal source of bacillary spread in the community.
- BCG vaccination has limited impact on Mycobacterium Tuberculosis transmission. BCG does not always protect people from getting TB.

BCG vaccination of health care workers should be considered on an individual basis in settings in which there is a high risk of exposure to TB infection.

Additional information on the prevention of tuberculosis transmission in healthcare settings can be found here: <https://www.who.int/publications/i/item/9789240078154>



SCREENING FOR LATENT TB INFECTION AND ACTIVE TB DISEASE

Diagnosis of Latent TB infection

- Individuals should be asked about symptoms of TB before being tested for LTBI. Chest radiography can be done if efforts are intended also for active TB case finding. Individuals with TB symptoms or any radiological abnormality should be investigated further for active TB and other conditions.
- Either Tuberculin Skin Testing (TST) or Interferon-Gamma Release Assays (IGRA) can be used to test for LTBI.
 - More information on the **Mantoux tuberculin skin test** and how to administer can be found here: <https://www.cdc.gov/tb/publications/factsheets/testing/skintesting.htm>
 - More information on **Interferon-Gamma Release Assays (IGRAs) – Blood Tests for TB Infection** can be found here: <https://www.cdc.gov/tb/publications/factsheets/testing/igra.htm>

Diagnosis of Active Tuberculosis

- WHO recommends the use of rapid molecular diagnostic tests as the initial diagnostic test in all persons with signs and symptoms of TB².
- Rapid diagnostic tests recommended by WHO include the Xpert MTB/RIF Ultra and Truenat assays. These tests have high diagnostic accuracy and will lead to major improvements in the early detection of TB and drug-resistant TB.
- A tuberculin skin test (TST) or interferon-gamma release assay (IGRA) can be used to identify people with infection.
- Diagnosing multidrug-resistant and other resistant forms of TB (see multidrug-resistant TB section below), as well as HIV-associated TB, can be complex and expensive.
- Tuberculosis is particularly difficult to diagnose in children.

More information on the diagnosis of active tuberculosis can be found here:

<https://iris.who.int/bitstream/handle/10665/342369/9789240030589-eng.pdf?sequence=1>

MEDICAL MANAGEMENT OF TUBERCULOSIS INFECTION

Tuberculosis infection (latent or active) can be treated with antibiotics.

- Healthcare providers can choose the appropriate TB treatment regimen based on drug-susceptibility results, coexisting medical conditions (e.g., HIV, Diabetes), and potential for drug-drug interactions.
- TB treatment can take 4, 6, or 9 months depending on the chosen regimen. The specific treatment regimen and duration of treatment can be adjusted by the healthcare provider.
- It is dangerous to stop the medications early or without medical advice. This can allow TB that is still alive to become resistant to the drugs.
- Tuberculosis that doesn't respond to standard drugs is called drug-resistant TB and requires more toxic treatment with different medicines.

Multidrug-resistant tuberculosis (MDR-TB) is a form of TB caused by bacteria that do not respond to isoniazid and rifampicin, the 2 most effective first-line TB drugs. MDR-TB is treatable and curable by using second-line drugs.

- **Comprehensive WHO general treatment guidelines for TB can be found here:**
<https://iris.who.int/bitstream/handle/10665/331525/9789240002906-eng.pdf?sequence=1>
- **Comprehensive WHO treatment guidelines for MDR-TB can be found here:**
<https://iris.who.int/bitstream/handle/10665/332398/9789240006997-eng.pdf?sequence=1>



INFECTION CONTROL MEASURES FOLLOWING EXPOSURE TO ACTIVE TUBERCULOSIS INFECTION

Contacts are persons who have shared airspace with a person with infectious TB disease. These persons may include household members, friends, coworkers, classmates, and others. During a contact investigation, investigators identify contacts by interviewing the TB case and visiting places where the case spent time while infectious³.

It is important to quickly identify, find, and assess contacts for TB infection and disease, this is to prevent the risk of developing TB infections and disease.

Contacts who have either LTBI or TB disease should be offered the appropriate treatment unless there is a compelling reason not to do so (e.g., the contact has hepatitis or end-stage liver disease).

Contact Investigation

It is important to work alongside your local healthcare department to appropriately conduct a contact investigation.

The contact investigation process should be started for persons suspected of having infectious TB disease, even before confirmation. This includes persons with positive sputum smears and a positive nucleic acid amplification test result.

Suspect Case with Sputum Smear

- For persons with positive sputum smears and a negative nucleic acid amplification test result, a contact investigation is not indicated³.

Suspect Case with Negative Sputum Smear

- For suspect cases with negative sputum smear results and no pulmonary cavities, a contact investigation should only be considered for certain circumstances, such as if the suspect was identified during an outbreak or source case investigation that included vulnerable or susceptible contacts³.
- For suspect cases with negative sputum smears or sputum smears not performed, the contact investigation process should be started if the case has abnormal chest x-ray findings consistent with TB disease³.

Cases with Noninfectious Forms of TB

- Disease cases with noninfectious forms of TB disease generally do not require a contact investigation. This includes cases that only have extrapulmonary TB disease (e.g., TB disease in the brain, the kidneys, or the bones and joints)³.

INFECTION CONTROL MEASURES FOR THE HEALTHCARE SETTING

Administrative Controls

- Effective triage of people with TB signs and symptoms or with TB disease⁸.
- Respiratory separation/isolation of people with presumed or demonstrated infectious active pulmonary TB disease⁸.
- Prompt initiation of effective TB treatment of people with active TB disease⁸.
- Respiratory hygiene (including cough etiquette) in people with presumed or confirmed active pulmonary TB disease.
- Developing and implementing a written TB infection-control plan
- Ensuring the availability of recommended laboratory processing, testing, and reporting of results⁹.
- Ensuring proper cleaning, sterilization, or disinfection of equipment that might be contaminated (e.g., endoscopes)⁹.
- Evaluating workers who are at risk for exposure to active pulmonary TB disease⁹.



Environmental Controls

- Patients should be placed in a single room and on airborne precautions⁹.
- Upper-room germicidal ultraviolet (GUV) systems are recommended⁸.
- Ventilation systems (including natural, mixed-mode, mechanical ventilation and recirculated air through high-efficiency particulate air [HEPA] filters) are recommended to reduce M. tuberculosis transmission⁸.

Respiratory Protection

- Use of appropriate personal protective equipment (PPE), which includes particulate respirators (N95 or FFP2)⁸. Seal checks should be done with each use of the respirator.
- Fit testing should be completed for all healthcare workers to ensure adequate protection.

Additional information for infection control measures to be implemented in healthcare settings can be found here:

WHO: <https://iris.who.int/bitstream/handle/10665/362508/9789240055889-eng.pdf?sequence=1>

CDC:

<https://www.cdc.gov/tb/publications/factsheets/prevention/ichcs.htm#:~:text=The%20following%20measures%20can%20be,importance%20of%20cough%20etiquette%20procedures>

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