

## Understanding Tuberculosis Exposure Risk and Detection

***Tuberculosis (TB) is caused by a bacterium - *Mycobacterium tuberculosis*. TB usually attacks the lungs, but it can also affect other parts of the body including the kidneys, spine and brain. If not treated properly, TB can be fatal.***

### Exposure Risk

TB is spread through the air from one person to another. Bacteria are expelled into the air when a person with TB disease of the lungs or throat coughs, sneezes, speaks or sings. People nearby may breathe in these bacteria and become infected. TB is not spread by:

- Shaking someone's hand
- Sharing food or drink
- Touching bed linens or toilet seats

In most instances, a healthy body is able to stop the bacteria from growing.

[The World Health Organization](#) reports that 10 million people developed symptoms and 1.6 million died of TB in 2017, including 230,000 children. However, case rates are declining. In 2018, the TB incidence rate in the U.S. was 2.8 cases per 100,000 people, the lowest rate ever reported, according to the [Centers for Disease Control and Prevention](#). Meanwhile, the global TB incidence rate is falling about 2 percent per year. However, prevalence of a multi-drug-resistant form (MDR-TB) remains a worldwide public health crisis.

People with active TB disease are most likely to spread germs to others with whom they spend a lot of time, such as family members. People who are concerned about potential exposure to someone with active TB disease are advised to consult a physician or contact their local public health department to determine whether further evaluation is needed.

### Signs and Symptoms

Inactive TB bacteria can remain alive in the body and can become active later. People with latent TB infection:

- Have no symptoms
- Are not contagious
- Usually have a positive skin test reaction
- Can develop active TB disease if they do not receive treatment for latent TB infection

### Did You Know?

[The U.S. Centers for Disease Control and Prevention \(CDC\)](#) reported a national shortage of Aplisol® Tuberculin Purified Protein Derivative (PPD), an antigen used to test for tuberculosis (TB), in June 2019. TB test providers are offering alternative testing methods with various pricing models.

During the shortage, the CDC recommends the following:

1. Substitute blood tests for tuberculin skin tests (TSTs)
2. Substitute Tubersol® for Aplisol® for skin testing.
3. Prioritize allocation of TSTs in consultation with state and local public health authorities.
4. Test only those who are at risk for TB:
  - Recently exposed to someone with active TB disease
  - Born in or frequently travel to countries where TB disease is common
  - Currently or previously lived in large group settings
  - Have compromised immune systems, including those with health conditions or who take medications that might alter immunity
  - Children, especially those under 5, if they are in one of these at-risk groups

*In settings with a low likelihood of TB exposure, the deferment of routine serial testing should be considered in consultation with public health and occupational health authorities. Annual TB testing of health care personnel is not recommended unless there is a known exposure or ongoing transmission.*

Many people who have latent infection never develop active TB. However, in some people, particularly among those with weak immune systems, the bacteria become active and cause TB disease. Susceptible populations include babies and younger children, the elderly and adults who:

- Were infected with TB bacteria in the last two years
- Inject illicit drugs
- Are sick with other diseases that weaken the immune system, such as those who have AIDS or are HIV-positive
- Did not receive correct treatment for TB in the past
- Who work or receive care in health care facilities

When active bacteria begin to multiply in the body, they destroy tissue. If this occurs in the lungs, the bacteria can create a hole in the lung.

TB in the lungs may cause symptoms such as:

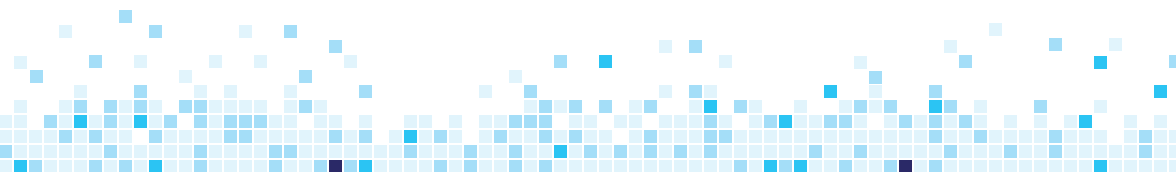
<i>A bad cough that lasts three or more weeks</i>	<i>Weight loss</i>
<i>Coughing up blood or phlegm</i>	<i>Pain in the chest</i>
<i>Weakness or fatigue</i>	<i>No appetite</i>
<i>Chills and fever</i>	<i>Sweating at night</i>

## Testing & Treatment

A skin test (TST) to detect TB is performed by injecting a small amount of fluid in the lower part of the arm. The injection site is checked for a reaction within 48 to 72 hours. Aplisol and Tubersol® are the two purified protein derivative (PPD) tuberculin antigens approved by the Food and Drug Administration (FDA) for use in the U.S. Alternatively, an interferon-gamma release assay (IGRA) blood test may be used to measure how the immune system reacts to germs that cause TB. Two IGRAs are approved by the FDA: TSpot and Quantiferon (QFT).

A blood test can show whether a person has been infected with TB or has received a BCG vaccination for TB disease. BCG vaccine is used in many countries but is not generally recommended in the United States. The BCG vaccine does not completely prevent people from getting TB, and it may cause a false-positive tuberculin skin test.

The CDC recognizes IGRA testing as comparable to TB skin tests and says it can be used in all situations where a TB skin test is indicated. This includes



exams for employees who may be exposed to silica, overseas travelers and health care personnel. For employees with silica exposure risk, a TST or IGRA is only required at baseline, unless there is a medical indication for repeat or periodic screening, for example, the employee has an immune disorder or takes certain medications.

The following are some advantages of using IGRA instead of TST:

1. Requires a single clinic visit.
2. Results are available within 24 hours.
3. No boost response with subsequent testing. A skin test has a booster phenomenon in which the initial test might be negative but subsequent testing boosts the immune response and is positive; two-step skin testing is recommended in certain populations such as health care personnel. Blood tests do not require this.
4. Prior BCG vaccination does not cause a false positive test result as may occur with a skin test.
5. No subjectivity in interpreting test results. A skin test reading is subject to individual variability.
6. Less likely than TST to require repeat testing, which may increase overall cost.

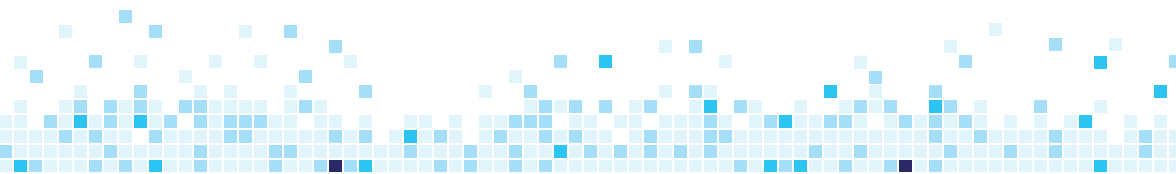
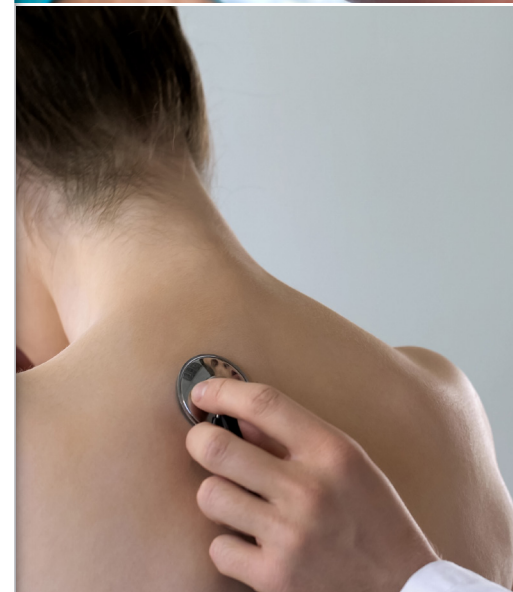
Disadvantages of IGRA include:

1. May be more expensive than TST.
2. "Indeterminate" results require repeat test.
3. Blood samples must be processed within 8-30 hours after collection.

Testing following exposure to someone with latent TB infection is not required. Testing is necessary following exposure to someone with TB disease or TB symptoms. Neither test determines whether a person has progressed to TB disease. Other tests, such as a chest X-ray, are used to make a diagnosis. When an individual is exposed to a patient with active TB and a follow-up test is positive, a secondary TB test should not be performed; a physician should be immediately consulted about obtaining chest X-rays.

If an initial skin test is negative and a second TB skin test is positive, a physician should be consulted about getting a chest X-ray and taking prophylactic medication to help prevent disease onset.

In the event of latent TB infection but not TB disease, a physician may recommend medication to kill bacteria. This recommendation is based on the likelihood of developing TB disease. For example, people with HIV infection



or who were recently exposed to someone with TB disease would be likely candidates for medication. Latent TB infection is easier to treat than TB disease, which requires a combination of drugs to combat the spread of bacteria.

TB disease can be cured by taking several drugs for six to 12 months. It is important that people who have TB disease finish the medicine and take the drugs exactly as prescribed. If they stop taking the drugs too soon, they can become sick again; if they do not take the drugs correctly, the germs that are still alive may become resistant to those drugs. Drug-resistant TB is harder and more expensive to treat.

## Prevention

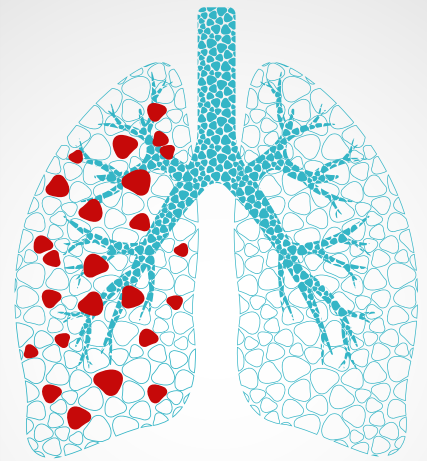
In health-care settings, a TB infection control plan includes:

- Prompt detection of infectious patients
- Airborne precautions
- Treatment of people who have suspected or confirmed TB disease

The plan includes administrative measures, environmental controls and use of respiratory protection equipment.

International travelers who will be working where TB patients are likely to be encountered should consult infection control or occupational health experts. Testing prior to travel is recommended to establish a baseline for employees who anticipate possible prolonged exposure to people with TB (for example, routine contact with clinic, hospital, prison, homeless shelter or detention center populations).

If exposure to someone with TB disease is suspected, it's important to contact a local health care provider or health department to be tested. TB is addressed in specific federal [Occupational Health and Safety \(OSHA\) standards](#) for recording and reporting occupational injuries and illnesses and in standards for general industry.



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