Introduction

All health-care settings need an infection-control program designed to ensure the following:
- Prompt detection of infectious patients;
- Airborne precautions; and
- Treatment of people who have suspected or confirmed tuberculosis (TB) disease.

In order to be effective, the primary emphasis of the TB infection-control program should be on achieving these three goals.

In all health-care settings, particularly those in which persons who are at high risk for exposure to Mycobacterium tuberculosis work or receive care, policies and procedures for TB control should be developed, reviewed periodically, and evaluated for effectiveness to determine the actions necessary to minimize the risk for transmission of M. tuberculosis.

Overview of TB Infection-Control Measures

The TB infection-control program should be based on a three-level hierarchy of control measures and include:

1. Administrative controls
2. Environmental controls
3. Use of respiratory protective equipment

The first and most important level of the hierarchy, administrative controls, impacts the largest number of people and is intended primarily to reduce the risk of uninfected people exposed to people who have TB disease. These control measures include the following activities:
- Assigning responsibility for TB infection control in the setting;
- Conducting a TB risk assessment of the setting;
- Developing and instituting a written TB infection-control plan to ensure prompt detection, airborne precautions, and treatment of persons who have suspected or confirmed TB disease;
- Ensuring the timely availability of recommended laboratory processing, testing, and reporting of results to the ordering physician;
- Implementing effective work practices for the management of patients with suspected or confirmed TB disease;
- Ensuring proper cleaning and sterilization or disinfection of potentially contaminated equipment (e.g., bronchoscopes, endoscopes);
- Training and educating health-care workers (HCWs) regarding TB, with specific focus on prevention, transmission, and symptoms;
- Screening and evaluating HCWs who are at risk for TB disease or who might be exposed to M. tuberculosis;
- Applying epidemiologic-based prevention principles, including the use of setting-related infection-control data;
- Using appropriate signage advising respiratory hygiene and cough etiquette; and
- Coordinating efforts with the local or state health department.

The second level of the hierarchy is the use of environmental controls to prevent the spread and reduce the concentration of infectious droplet nuclei in ambient air. Primary environmental controls control the source of infection by using local exhaust ventilation (hoods, tents, or booths) and dilute and remove contaminated air by using general ventilation. Secondary environmental controls control the airflow to prevent contamination of air in areas adjacent to the source (airborne infection isolation [AII] rooms) and clean the air by using high efficiency particulate air (HEPA) filtration, or ultraviolet germicidal irradiation.
The first two control levels of the hierarchy minimize the number of areas in the health-care setting where exposure to \textit{M. tuberculosis} may occur. They reduce, but do not eliminate, the risk in those few areas where exposure to \textit{M. tuberculosis} can still occur (e.g., All rooms housing TB patients and treatment rooms in which cough-inducing or aerosol-generating procedures are performed on TB patients). Therefore, the third level of the hierarchy is the use of respiratory protective equipment in situations that pose a high risk of exposure to \textit{M. tuberculosis}.

Use of respiratory protection equipment can further reduce risk for exposure of HCWs to infectious droplet nuclei that have been expelled into the air from a patient with infectious TB disease. The following measures can be taken to reduce the risk for exposure:

- Implementing a respiratory protection program;
- Training HCWs on respiratory protection; and
- Training patients on respiratory hygiene and cough etiquette procedures.

### Determining the Infectiousness of TB Patients

In general, patients who have suspected or confirmed TB disease should be considered infectious if:

- They are coughing, undergoing cough-inducing procedures, or have positive sputum smear results for acid-fast bacilli (AFB); and
- They are not receiving adequate antituberculosis therapy, have just started therapy, or have a poor clinical or bacteriologic response to therapy.

For patients placed under airborne precautions because of suspected infectious TB disease of the lungs, airway, or larynx, airborne precautions can be discontinued when infectious TB disease is considered unlikely and either:

- Another diagnosis is made that explains the clinical syndrome; or
- The patient produces three consecutive negative sputum smears collected in 8 to 24-hour intervals (one should be an early morning specimen).

Patients for whom the suspicion of infectious TB disease remains after the collection of three negative sputum smear results should not be released from airborne precautions until they:

- Receive standard multidrug antituberculosis treatment (minimum of 2 weeks); and
- Demonstrate clinical improvement.

- For these patients, additional diagnostic approaches (e.g., sputum induction) and, after sufficient time on treatment, bronchoscopy may need to be considered.
- Patients who have drug-susceptible TB of the lung, airway, or larynx, should remain under airborne precautions until they:
- Produce three consecutive negative sputum smears collected in 8 to 24-hour intervals (one should be an early morning specimen)
- Receive standard multidrug antituberculosis treatment (minimum of 2 weeks); and
- Demonstrate clinical improvement.

Note: The Centers for Disease Control and Prevention (CDC) is not a regulatory agency; CDC recommendations on infection control provide evidence-based guidance. For regulations in your area, refer to state and local regulations and contact your local Occupational Safety and Health Administration (OSHA) office. A directory of OSHA offices may be found at [http://www.osha.gov/html/RAmap.html](http://www.osha.gov/html/RAmap.html).

### References


### Additional Information

1. CDC Division of TB: [www.cdc.gov/tb](http://www.cdc.gov/tb)

TB Elimination
The Difference Between Latent TB Infection and TB Disease

What is TB?

Tuberculosis (TB) is a disease caused by a germ called Mycobacterium tuberculosis that is spread from person to person through the air. TB usually affects the lungs, but it can also affect other parts of the body, such as the brain, the kidneys, or the spine. When a person with infectious TB coughs or sneezes, droplet nuclei containing M. tuberculosis are expelled into the air. If another person inhales air containing these droplet nuclei, he or she may become infected. However, not everyone infected with TB bacteria becomes sick. As a result, two TB-related conditions exist: latent TB infection and TB disease.

What is Latent TB Infection?

Persons with latent TB infection do not feel sick and do not have any symptoms. They are infected with M. tuberculosis, but do not have TB disease. The only sign of TB infection is a positive reaction to the tuberculin skin test or TB blood test. Persons with latent TB infection are not infectious and cannot spread TB infection to others.

A person with latent TB infection
- Usually has a skin test or blood test result indicating TB infection
- Has a normal chest x-ray and a negative sputum test
- Has TB bacteria in his/her body that are alive, but inactive
- Does not feel sick
- Cannot spread TB bacteria to others
- Needs treatment for latent TB infection to prevent TB disease; however, if exposed and infected by a person with multidrug-resistant TB (MDR TB) or extensively drug-resistant TB (XDR TB), preventive treatment may not be an option

What is TB Disease?

In some people, TB bacteria overcome the defenses of the immune system and begin to multiply, resulting in the progression from latent TB infection to TB disease. Some people develop TB disease soon after infection, while others develop TB disease later when their immune system becomes weak.

The general symptoms of TB disease include
- Unexplained weight loss
- Loss of appetite
- Night sweats
- Fever
- Fatigue
- Chills

Overall, without treatment, about 5 to 10% of infected persons will develop TB disease at some time in their lives. About half of those people who develop TB disease will do so within the first two years of infection. For persons whose immune systems are weak, especially those with HIV infection, the risk of developing TB disease is considerably higher than for persons with normal immune systems.

Of special concern are persons infected by someone with extensively drug-resistant TB (XDR TB) who later develop TB disease; these persons will have XDR TB, not regular TB disease.
The symptoms of TB of the lungs include

- Coughing for 3 weeks or longer
- Hemoptysis (coughing up blood)
- Chest pain

Other symptoms depend on the part of the body that is affected.

**Persons with TB disease are considered infectious and may spread TB bacteria to others.** If TB disease is suspected, persons should be referred for a complete medical evaluation. If it is determined that a person has TB disease, therapy is given to treat it. TB disease is a serious condition and can lead to death if not treated.

**A person with TB disease**

- Usually has a skin test or blood test result indicating TB infection
- May have an abnormal chest x-ray, or positive sputum smear or culture
- Has active TB bacteria in his/her body
- Usually feels sick and may have symptoms such as coughing, fever, and weight loss
- May spread TB bacteria to others
- Needs treatment to treat TB disease

**Additional Information**


