

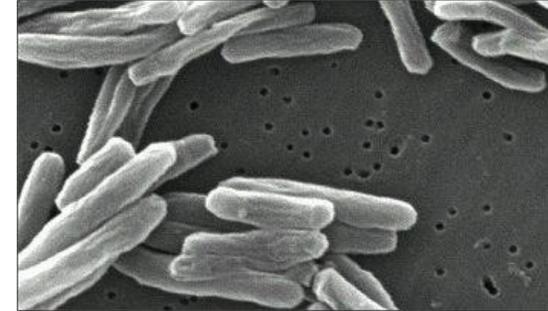
Annual TB Training

Working Well Employee Health

Learning Objectives

▶ At the end of this lesson, you will be able to:

1. Describe what causes tuberculosis (TB).
2. Describe the global situation of TB.
3. List three factors that contributed to the global resurgence of TB.
4. List continuing challenges to TB control in the United States.
5. Explain how TB is spread.
6. Explain how latent TB infection and TB disease develop.
7. Explain the difference between latent TB infection and TB disease.



What is TB?

TB is a disease caused by a bacterium called *Mycobacterium tuberculosis* (M. tuberculosis).

The bacteria usually attack the lungs, but can attack any part of the body such lymph nodes, bones and joints, the brain, and other organs.

- If TB is treated properly, most people can be cured of TB
- If TB is NOT treated properly, people can die from TB or develop drug-resistant forms of TB

The Global Threat of TB

Although TB is preventable and treatable, it is still one of the world's deadliest diseases.

An estimated 2 billion people, or one third of the world's population, are infected with *M. tuberculosis*

- Each year, approximately 9 million people develop TB disease
- 1.4 million people die of TB disease

TB in the United States (1)

TB disease was once the leading cause of death in the United States. After the discovery of drugs that could treat TB in the 1950s, death rates began to drop dramatically.

However, even today, TB is still a problem in the United States!

- Approximately 9 to 14 million people are infected with *M. tuberculosis*
- Over 11,000 people developed TB disease in 2010

TB in the United States (2)

Although the number of people with TB disease in the United States has been declining over the past several years, there remain continuing challenges to controlling TB:

- TB is reported in almost every state and is actually increasing in some areas
- TB affects racial and ethnic minorities disproportionately
- Drug-resistant TB is increasingly challenging to treat
- Management of patients with comorbidities, such as HIV, diabetes, and other immunocompromising conditions, is difficult
- More than half of all persons in the United States who have TB disease are foreign-born residents

TB Transmission

TB is spread through the air from person to person. Tiny water particles containing *M. tuberculosis* may be expelled into the air when a person with infectious TB of the lungs, airway, or larynx:

- Coughs
- Sneezes
- Speaks
- Sings

These particles, called droplet nuclei, can remain in the air for several hours, depending on the environment.

TB Transmission and the Development of TB Disease

If another person inhales air that contains droplet nuclei, they may become infected. However, not every person that is exposed to TB becomes infected with *M. tuberculosis*.

Additionally, not everyone infected with *M. tuberculosis* becomes sick. People who are infected but not sick have latent TB infection. Some people with latent TB infection go on to develop TB disease.

Thus, there are two TB-related conditions:

- Latent TB infection
- TB disease

About 5% to 10% of persons with normal immune systems will develop TB disease at some point in their lives. The risk of developing TB disease is the highest in the first 2 years after infection.

Risk of Developing TB Disease

The risk of developing TB disease is much higher for persons with weakened immune systems than for persons with normal immune systems. For example, for people with TB infection and untreated HIV infection and with no treatment for TB infection, the risk is about 7% to 10% PER YEAR, a very high risk over a lifetime.

HIV infection is the strongest known risk factor for progressing to TB disease.

Other people that have weak immune systems that put them at high risk for developing TB disease include:

- Children younger than 5 years of age
- Persons who are receiving immunosuppressive therapy
- Persons with silicosis, diabetes, chronic renal failure, leukemia, lymphoma, or cancer of the head, neck, or lung
- Persons who have had a gastrectomy or jejunioileal bypass
- Persons who weigh less than 90% of their ideal body weight
- Persons who abuse drugs and alcohol

How TB Develops in the Body (1)

Persons become infected with TB when they inhale droplet nuclei that contain tubercle bacilli and the bacilli begin to multiply in the small air sacs of the lungs.

A small number of bacilli enter the bloodstream and spread throughout the body. Usually within 2 to 8 weeks, the immune system intervenes, preventing further spread.

At this point, the person is considered to have latent TB infection.

Since the immune system is keeping the tubercle bacilli under control, people with latent TB infection do not feel sick and they cannot spread TB to others.

How TB Develops in the Body (2)

If, however, the immune system cannot keep the tubercle bacilli under control, the bacilli multiply and destroy tissue.

The bacteria usually attack the lungs, but can attack any part of the body such as lymph nodes, bones and joints, the brain, and other organs.

At this point, the person has TB disease.

People with TB disease may feel sick and may spread TB to others.

Symptoms of TB Disease

Persons with TB disease usually have one or more symptoms. Because different parts of the body can be affected by TB, symptoms can vary.

General symptoms of TB disease:

- Fever, Chills, Night sweats, Weight loss, Appetite loss, Fatigue, Malaise

Symptoms of pulmonary TB disease:

- Cough lasting 3 or more weeks, Chest pain, Coughing up blood or sputum (phlegm)

Symptoms of extrapulmonary TB disease depend on the part of the body that is affected. For example:

- TB disease in spine may cause back pain
- TB disease in kidneys may cause blood in urine
- TB disease in lymph nodes may cause swelling in the neck

Differences Between Latent TB Infection and TB Disease

Persons with Latent TB Infection:

- Do not feel sick
- Do not have any symptoms
- Cannot spread TB to others
- Are at risk for developing TB disease



Woman with latent TB infection

Persons with TB Disease:

- Usually feel sick
- Usually have one or more symptoms
- May be able to spread TB bacteria to others



Woman with TB disease

TB Contacts

Anyone can get TB. Persons who spend a lot of time in enclosed spaces with people who have TB disease are at the highest risk of becoming infected with M. tuberculosis.

This may include family members, friends, roommates, or coworkers. These persons, or contacts, are identified by public health workers through interviews with patients who have TB disease.

Public health workers are responsible for ensuring that these high-risk individuals are evaluated for TB infection and TB disease, and treated when appropriate.

This activity is called a contact investigation.

Infection Control

Since TB is an airborne disease that can be transmitted from one person to another, it is important to practice appropriate infection control procedures to protect others from getting TB.

This is especially important for health care facilities and other congregate settings. All health care facilities need an infection-control program. This program should be designed to ensure:

- Prompt detection of TB
- Airborne precautions to prevent the spread of TB
- Treatment of persons who have suspected or confirmed TB disease

Personal respirators should be worn by health care workers to prevent the inhalation of droplet nuclei. Surgical masks should be worn by infectious TB patients to prevent droplet nuclei from being expelled into the air.

Summary

TB has affected humans for thousands of years and continues to be a major public health threat worldwide. The HIV/AIDS pandemic, drug-resistant TB, and weakened health systems have contributed to the global resurgence of TB.

TB has been steadily declining in the United States for the past several years; however, TB is still a problem. To eliminate TB, prevention and control efforts must be maintained.

TB is spread through the air from person to person. Persons become infected with TB when they inhale tubercle bacilli and the bacilli multiply in the small air sacs of the lungs. Usually, the immune system intervenes, preventing further spread. At this point, the person has latent TB infection. If the immune system cannot keep the tubercle bacilli under control, the bacilli multiply and destroy tissue. At this point, the person has TB disease.