

Tuberculosis Prevention

Lesson 1: Objectives

After completion of this course you will be able to:

- Describe latent tuberculosis infection (LTBI) and tuberculosis (TB) disease;
- Identify persons at risk for infection;
- Recognize symptoms of TB disease;
- Describe the two types of tests used to detect TB bacteria in the body;
- Explain how a diagnosis of LTBI or TB disease is made;
- Describe treatment options;
- List methods to decrease the spread of TB disease;
- Describe the steps to take following unprotected contact; and
- Describe how TB disease is monitored.

Introduction

Tuberculosis (TB) is caused by a bacterium called *Mycobacterium tuberculosis*. TB bacteria are spread through the air when a person with TB disease of the lungs or throat coughs, speaks, or sings. People nearby may breathe in these bacteria and become infected. The bacteria can settle and grow in the lungs or move through the blood to other parts of the body such as the kidney, spine, and brain. TB disease in the lungs or throat can be infectious while TB in other parts of the body is usually not.

If the person's immune system can fight the bacteria and stop it from growing, this is called latent TB infection (LTBI). People with LTBI have no symptoms and cannot spread TB bacteria to others. Many people who have LTBI never develop TB disease.

If the person's immune system cannot fight the bacteria and the bacteria is active, this is called TB disease. People with TB disease are sick and can spread the bacteria to others. Some people develop TB disease soon after becoming infected before their immune system can fight the bacteria. Other people may get sick years later if their immune system becomes weak. The risk of developing TB disease is much higher for people with a weak immune system, such as those with HIV infection, than for people with normal immune systems.

Lesson 2: Who's at Risk?

The risk that a person will become infected with TB depends on the amount of TB bacteria in the air, the length of contact, and the distance to the person with TB disease. Close contacts are persons who share the same air space for weeks or months. People at higher risk for being infected include:

- Those who have spent time with someone who has TB disease,
- People from a country where TB disease is common (most countries in Latin America, the Caribbean, Africa, Asia, Eastern Europe, and Russia),
- People who live or work in high-risk settings (for example: correctional facilities, long-term care facilities or nursing homes, and homeless shelters),
- Health care workers who care for individuals at increased risk for TB disease, and
- Infants, children and adolescents exposed to adults who are at increased risk for LTBI or TB disease.

All health care workers who have the potential for contact with the TB bacteria must be screened before employment and periodically based on the facility's risk assessment.

Quiz Question:

The risk that a person may become infected with TB depends on which of the following?

- a. The amount of TB bacteria in the air.
- b. The length of contact.
- c. The distance to the person with TB disease.
- d. ***All of the above.**

Lesson 3: Symptoms of TB Disease

Symptoms of TB disease depend on where in the body the TB bacteria are growing. TB bacteria usually grow in the lungs (pulmonary TB) and symptoms include a bad cough that lasts 3 weeks or longer, loss of appetite, weight loss, night sweats, coughing up blood or sputum, chills, fever, extreme weakness or tiredness, and pain in the chest.

Quiz Question:

Select all of the symptoms of TB disease:

Shoulder pain

Stomach cramps

Dizziness

Swelling

Urinary difficulty

***Coughing for more than 3 weeks**

***Night sweats**

Blurred vision

***Loss of appetite**

- *Weight loss
- *Coughing up blood/sputum
- *Chills
- *Fever
- *Extreme weakness/tiredness
- *Pain in the chest
- Back pain
- Difficulty sleeping

Lesson 4: Testing for TB

There are two kinds of tests that are used to detect TB bacteria in the body: the TB skin test (TST) and TB blood tests.

The TST requires two visits with a health care provider. On the first visit the TST is performed by injecting a small amount of fluid into the skin on the lower part of the arm. On the second visit the health care provider looks for a reaction on the arm. This visit must take place within 48 to 72 hours of when the TST was performed. The TST is preferred for children under the age of five.

TB blood tests are also called interferon-gamma release assays (IGRAs). A health care provider will draw a person's blood and send it to a laboratory for analysis and results. TB blood tests are preferred for people who have received the TB vaccine, BCG, and people who have a difficult time returning to a health care provider for a second visit to look for a reaction to the TST.

A negative TST or TB blood test means that LTBI or TB disease is not likely. A positive TST or TB blood test means that the person has been infected with TB bacteria. Additional tests are needed to determine if the person has LTBI or TB disease.

Quiz Question:

Place the correct description under the TB test.

TB skin test (TST)	TB blood test
requires two visits with a health care provider	performed by drawing a person's blood and sending it to a laboratory for analysis and results
performed by injecting a small amount of fluid into the skin on the lower part of the arm	preferred for people who have received the TB vaccine
preferred for children under the age of five	preferred for people who have a difficult time returning to a health care provider for a second visit

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Lesson 5: Diagnosis

A diagnosis of LTBI is made if a person has a positive TB test result and a medical evaluation that does not indicate TB disease. TB disease is diagnosed by medical history, physical examination, chest x-ray, and other laboratory tests. It is the responsibility of the health care worker to promptly report a diagnosis of TB disease.

Lesson 6: Treatment

Treatment for LTBI is based on a person's risk of developing TB disease. TB disease is treated with medication as recommended by a health care provider. These medications must be taken exactly as prescribed. If the person stops taking the medication too soon, they can become sick again and if they do not take the medication correctly, the TB bacteria that are still alive may become resistant to those medications. TB that is resistant to medication is harder and more expensive to treat.

Individuals on treatment for LTBI or TB disease should report any signs and symptoms of adverse drug reactions to their health care provider. They should also give a list of current medications to the provider to avoid drug interactions.

Lesson 7: Prevention of TB

People who work or receive care in healthcare settings are at higher risk for becoming infected with TB; therefore, it is necessary for the organization to have a TB infection control plan designed to ensure prompt detection of infectious individuals, use of airborne precautions, and treatment of those who have suspected or confirmed TB disease.

The TB infection control program includes administrative measures, environmental controls, and use of respiratory protective equipment. Administrative measures reduce the risk or exposure to persons with TB disease. Environmental controls prevent the spread and reduce the amount of infectious bacteria. Respiratory-protection controls consist of the use of personal protective equipment (PPE) in situations that pose a high risk of exposure to TB disease.

The biggest risk to health care workers is the undiagnosed or unsuspected person with TB disease. That's why it is important to collect a medical history that includes information about their risk for infection or disease and symptoms or signs of the disease. Airborne Precautions must be used when caring for an individual with suspected or confirmed TB. Airborne Precautions include the use

of respiratory protective equipment, such as an N95 mask, which must be worn by health care personnel when caring for the individual. A fit test is performed on personnel during initial training and periodically to determine the best model and size. Visitors may be offered respiratory protection and should be instructed on its use. Individuals on Airborne Precautions must also be placed in an airborne infection isolation room (AIIR). AIIR are used to separate individuals with suspected or confirmed TB from other persons, provide an area in which the amount of bacteria in the air is reduced, and prevent the escape of bacteria into nearby areas. AIIR doors are kept closed and entry of visitors and health care personnel are controlled. If an AIIR is not available, the person with suspected or confirmed TB disease should be placed in a separate room with the door closed, apart from other people and advised to wear a surgical or procedure mask. If the individual cannot tolerate a mask, they should observe strict respiratory hygiene and cough etiquette procedures. After the person has left, adequate time for the removal of contaminated room air should be allowed before entry by staff or another individual. Signs or symbols are displayed when Airborne Precautions are in effect. Airborne Precautions remain in effect for limited periods of time. Follow your organization's guidelines.

Quiz Question:

Airborne Precautions must be used when caring for an individual with suspected or confirmed TB.

***True** or False

Lesson 8: Unprotected Contact

(NOTE: You may wish to display the contact information for the appropriate infection control personnel.)

If you have unprotected contact with a person with TB disease, present to your health care provider or health department for a TB test. Report any unprotected contact or symptoms or signs of TB disease to the appropriate personnel at your organization. Steps taken following unprotected contact are performed and recorded confidentially between your organization and the local or state health department.

Lesson 9: Monitoring TB

All suspected TB cases and clusters of TST conversions are promptly reported to the local or state health department as well as recorded. Local and state health department's TB control programs also conduct contact and outbreak investigations.

Lesson 10: Conclusion

(NOTE: You may wish to display the contact information for the appropriate infection control personnel.)

Your organization is committed to preventing the spread of tuberculosis. And it takes your help. If you have any questions about tuberculosis, who to report a suspected or confirmed case of TB disease to or related infection control procedures, contact the appropriate personnel for guidance and assistance.

Test Questions (10 questions Pre-test or 5 questions Post-test)

Pool 1 (6 or 3 questions)

MULTIPLE CHOICE

1. The tuberculosis bacteria can be spread when a person with TB disease:
 - a. Coughs.
 - b. Speaks.
 - c. Sings.
 - d. All of the above.

2. The risk that a person will become infected with tuberculosis depends on:
 - a. The amount of TB bacteria in the air.
 - b. The length of contact.
 - c. The distance to the person with TB disease.
 - d. All of the above.

3. Which of the following persons are at low risk for tuberculosis infection?
 - a. Persons who have spent time with someone who has TB disease.
 - b. Persons who live in homeless shelters.
 - c. Persons who work outdoors.
 - d. Persons who care for individuals at increased risk for TB disease.

4. Which of the following are symptoms of TB disease?
 - a. Headaches, shoulder pain, stomach cramps.
 - b. Dizziness, swelling, urinary difficulty.
 - c. Coughing for more than 3 weeks, bloody sputum, night sweats.
 - d. Blurred vision, back pain, difficulty sleeping.

5. TB is spread through:
 - a. Airborne particles.
 - b. Direct contact.
 - c. Blood exposure.
 - d. Wound drainage.

6. Airborne precautions include which of the following?
 - a. Placement of the individual in a regular room with the privacy curtain pulled.
 - b. Placement of a respirator on the healthcare worker.
 - c. Placement of a surgical mask on the healthcare worker.
 - d. Placement of a respirator on the individual.

7. When must healthcare workers be screened for TB?
 - a. Before employment.
 - b. Periodically based on the facility's risk assessment.

- c. After an unprotected contact with a person with TB disease.
 - d. All of the above.
8. Airborne infection isolation rooms are used to:
- a. Separate individuals with suspected or confirmed TB from other people.
 - b. Provide an area in which the amount of bacteria in the air is reduced.
 - c. Prevent the escape of bacteria into nearby areas.
 - d. All of the above.
9. Which of the following statements is correct?
- a. A person with TB disease cannot be moved within the hospital.
 - b. A person with TB disease cannot leave the Emergency Department until their fever is gone.
 - c. A person with TB disease should have a surgical mask on before moving.
 - d. A person with TB disease can only be moved after visiting hours are over.

Pool 2 (4 or 2 questions)

TRUE/FALSE

10. Tuberculosis bacteria are carried in airborne particles.
11. Airborne particles that contain the tuberculosis bacteria can float in air.
12. A person with latent tuberculosis (TB) infection is able to infect others.
13. Persons with HIV are at high risk for progressing from tuberculosis infection to disease.
14. The biggest TB risk to healthcare workers is the undiagnosed or unsuspected person with the disease.
15. A fit test is performed to determine the best surgical mask for the wearer.
16. Healthcare workers must wear respiratory protective equipment when caring for a person on Airborne Precautions.
17. An individual on Airborne Precautions must be placed in an airborne infection isolation room.