

Tuberculosis Prevention

Reviewed July 2014

Objectives

After completing this course the healthcare worker will be able to:

- Compare latent and active tuberculosis
- Describe tuberculosis diagnosis and treatment
- Describe how to prevent and control the spread of tuberculosis

What causes Tuberculosis?

- **Tuberculosis** (TB) is a disease caused by the bacterium *Mycobacterium tuberculosis*.
- **TB usually affects the lungs** (known as pulmonary tuberculosis), but it can also affect other parts of the body, such as:
 - Bones
 - Brain
 - Kidneys
 - Lymph Nodes
 - Spine

Who has Tuberculosis?

Tuberculosis (TB) is one of the world's deadliest diseases

- Over **one-third** of the world's population is infected with TB
- Each year, there are almost 2 million TB-related deaths worldwide.
- TB is a leading killer of people who are HIV infected.
- In total, 9,945 TB cases (a rate of 3.2 cases per 100,000 persons) were reported in the United States in 2012.
- In 2012, Maryland reported 224 new cases for a rate of 3.8 per 100,000 persons
- At GBMC we see 0-3 new cases of pulmonary TB annually

How Does TB Spread from Person to Person?

- TB spreads from person to person through the air by:
 - coughing
 - sneezing
 - singing
 - talking
 - or **anytime** air is forcibly expelled from the lungs
- People can become infected when they breathe in air containing TB germs.

What Happens When a Person is Exposed To Tuberculosis?

- A person may develop **active** TB disease shortly after exposure to the TB germ or...
- the TB may remain **latent** while the immune system is strong.
- Latent TB may become active TB if the immune system grows weaker.
- A person exposed to TB may **never** get active disease.
- A healthy person who is **HIV negative** has a 5 to 10% chance of developing the active disease in his/her lifetime, if exposed.

Definition of “Active” TB

- **Active Disease**

- People with **active** TB disease **feel sick** and **are contagious**
- They are sick from germs that are actively causing disease in their body
- They can spread the disease to others
- Patients are prescribed drugs that can usually cure TB

Definition of “Latent” TB

- **Latent Disease**

- People with **latent** TB infection have the TB germ present in their bodies, but they **are not** contagious
- They cannot spread the germs to others
- They are not sick because the germs are **inactive** in their bodies
- They may develop active TB disease at some time in the future
- They often receive medication to prevent active disease

Who is at Risk?

- Certain groups of people are more likely to develop tuberculosis. These groups include:
 - the elderly
 - people born in areas of the world where TB is more common (e.g., Asia, Africa, the Caribbean, and Latin America)
 - alcoholics
 - the homeless
 - intravenous drug users
 - the institutionalized
 - people with chronic diseases, such as HIV, cancer and diabetes
 - People taking biologic immunosuppressive drug therapy

Symptoms of Active TB Disease

- Signs and symptoms of active TB disease include:
 - Weight loss
 - Fever
 - Night sweats
 - Coughing for more than 3 weeks
 - Chest pain
 - Coughing up blood-hemoptysis
 - Chills
 - Difficulty breathing
 - Shortness of breath
 - Fatigue
 - Abnormal x-ray
 - Loss of appetite

Evaluation of Suspected TB

- Evaluate persons suspected of having TB disease in the following ways:
 - a physical examination
 - a **Tuberculin skin test (TST)**, also known as a PPD
 - a chest x-ray
 - a **sputum** smear and culture

Physical Examination

- A physical exam offers the first opportunity to check for tuberculosis.
- Note if the patient has **signs and symptoms** of tuberculosis.
- Is the patient in a group that is **at risk** for TB?
- Does the patient have a **medical condition** that predisposes him to develop active TB disease?

Tuberculin Skin Test (TST)

- The tuberculin skin test (**TST**) determines if a person is **infected** with the TB germ.
- It **does not** tell you if a person has **active** TB disease.
- A small amount of fluid is injected under the skin in the lower arm.
- A positive skin test is a reaction to the material injected into the skin. This reaction suggests that the individual has been infected with the TB germ.

Reading the Tuberculin Skin Test

- 48 to 72 hours later, the arm will be examined for a reaction.
- A positive reaction is based on a measurement of swelling or induration (hard swelling) and not on redness.
- Those testing positive for TB should **never** have another tuberculin skin test because they have a higher than normal risk of having a more severe local reaction.

Sputum Smear and Culture

- Sputum is the material coughed up from **deep** within the lungs. Sputum should not be confused with saliva or nasal secretions.
- Preliminarily, it shows if acid-fast bacilli (AFB) is present.
- Sputum samples are collected, once a day for three days, at the same time of day (morning samples are best).
- Presence of AFB **does not** absolutely indicate TB.
- It may take a few weeks to get final definitive culture results.

Chest X-Rays

- Chest x-rays are an important diagnostic tool. They cannot be used alone to definitively diagnose TB.
- In the past, healthcare workers with positive TSTs have had x-rays taken annually. Routine yearly x-rays are no longer necessary.

Treatment Plan

- The drug used to treat *latent* TB infection is **INH**.
- It is used *in combination with other drugs* to treat active TB disease. It is normally taken for 6 to 12 months.
- It is extremely important that people who have TB disease take the drugs **exactly** as prescribed.
- If they stop taking the drugs too soon, or take them incorrectly, the germs may become resistant to the drugs. This makes TB harder to treat.

Multi-Drug Resistant TB

- Some of today's TB bacteria are multi-drug resistant.
 - This occurs when the drugs that are usually prescribed for TB have become ineffective against the TB germ because of patients who take medication incorrectly or who stop taking the medication too soon.
 - Anyone contracting TB from a person with multi-drug resistant TB will also have multi-drug resistant TB.

Prevention and Control Measures for Tuberculosis

- Airborne Isolation Rooms
 - Respiratory Protection
- Patient Respiratory Etiquette

Airborne Isolation Rooms (Negative Pressure Rooms)

- A patient *known or suspected* to have TB must be placed in a negative pressure airborne isolation room. This keeps TB germs from traveling to other areas of the hospital.
- GBMC is fortunate to have multiple Airborne Isolation Rooms

Airborne Isolation Rooms

- An Airborne Isolation Sign will be placed on the patient door
- The patient's *door must always remain closed* to allow the airflow of the negative pressure room to work correctly
- When a suspected TB patient is admitted, the Facilities Department must be notified to ensure that the negative pressure is working as intended

AIRBORNE PRECAUTIONS

(in addition to Standard Precautions)

Patient Placement: Use a **PRIVATE ROOM** that has:

- Monitored negative air pressures,
- 6-12 air changes per hour,
- Discharge of air outdoors or HEPA filtration if recirculated.

Patient must remain in room with door closed.

A HOSPITAL-APPROVED RESPIRATOR must be worn to enter this room.



VISITORS: Must report to nurse before entering.

Respiratory Protection Program

- By law, all hospital personnel caring for a patient with TB must wear a **fit-tested** respirator (N-95 mask).
- Employees must wear appropriate make, model, and size of the respirator they were fit-tested for to be adequately protected.
- Regular surgical masks **do not** adequately protect workers from TB.
- Designated job codes in the TB Prevention Plan are required to be fit-tested each year. Check which month your department is scheduled to be fit-tested.

Patient Care Measures – Respiratory Etiquette

- Encourage patients to cough into a tissue
- Discard tissues promptly into appropriate trash receptacle
- Encourage and assist with patient hand hygiene

Patient Care Measures

- TB patients **must** wear a surgical mask [not an N95] if they leave their room.
- They are no longer considered contagious when:
 - their cough subsides AND
 - 3 successive sputum smears are negative
- This usually happens approximately 14 days after therapy begins
- The health department and hospital policy determine when a patient may be removed from Airborne Isolation Precautions

Employee Protection

Protecting the Healthcare Worker

- Risk assessment for healthcare workers consists of:
 - a periodic skin test
 - assessment of their job description
 - an evaluation of their job location
- Designated departments within in the TB Control Plan are required to get a TST each year. If you work in those departments and have had a positive TST in the past, you are still required to have a questionnaire completed annually.

Employee Skin Testing Schedule

- More frequent skin tests may be required for healthcare workers if there is a high incidence of TB among patients admitted to the hospital.
- If a healthcare worker is infected with HIV or has a compromised immune system, he/she may need to be assigned to work in areas of the hospital where the risk of contracting TB is lower.

Employee Exposure to TB: Steps to Take

- If you are exposed to TB,
 - Fill out an employee accident form and notify your supervisor.
 - Follow recommendations from Infection Prevention/Employee Health and have any required treatments and follow-up procedures.

Exposure follow-up

- If a healthcare worker is exposed to an undiagnosed active TB patient who is not properly isolated, every attempt will be made to identify all exposed employees
- If transmission of TB infection is documented, other healthcare workers in the same work area will be tested to determine if there are any additional new converters.

Exposure follow-up continued

- If additional converters (newly TST positive employees) are found, an investigation will be initiated to determine if the following are responsible:
 - patient detection
 - isolation practices
 - engineering controls

Test Results and Documentation

- The results of all employee medical evaluations, TB skin tests, and post-exposure evaluations will be recorded in the employees' medical records and maintained in the Employee Health Department
- Documented new conversions and cases of active TB in employees will be recorded on the OSHA 200 Log in the manner required by OSHA

Exposure follow-up

- Results of TB skin testing will be reported to the Infection Prevention Committee on a regular basis.
- The results of any problem investigation initiated as a result of employee skin test conversions will also be reported to the Infection Prevention Committee.

Conclusions

- As a result of this presentation you have learned:
 - what tuberculosis is and how it is transmitted.
 - the signs and symptoms of TB.
 - GBMC's policies and procedures related to TB.
 - The reporting process for all possible TB exposures
 - Discuss with your supervisor and complete the Employee Medical Referral/ Employee Accident Form. Go to Employee Health immediately during business hours or as soon as possible.
 - Complete all suggested follow-up procedures if you are exposed to TB.

Conclusions

- We hope this Computer Based Learning course has been both informative and helpful.
- Feel free to review this course until you are confident about your knowledge of the material presented.
- Click the **Take Test** button on the left side when you are ready to complete the requirements for this course.
- Click on the **My Records** button to return to your CBL Courses to Complete list.
- Click the **Exit** button on the left to close the Student Interface.