Tuberculosis Training

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Tuberculosis definition: Tuberculosis (TB) is an airborne infectious disease, spread from person to person when droplets are expelled from the lungs of an individual with active TB through coughing, speaking, or sneezing.

Causative agent: TB is caused when tuberculosis bacteria is inhaled and reaches the alveoli (air sacs of the lungs). A weakened immune system will permit the spread of this infection to other organs in the body if left untreated.

Modes of transmission:

- Through the air (person to person) when infected individuals with active TB cough, speak or sneeze.
- By repeated and prolonged indoor exposure to TB.
- By frequently visiting crowded, poorly ventilated places such as homeless shelters, correctional facilities, substance abuse centers, hospitals, nursing homes, factories and schools.

Signs/ Symptoms: The tuberculosis infection can be either latent or active. In the latent or inactive stage the individual is not contagious and no symptoms will appear. In the active stage, individuals are contagious and show the following symptoms:

- Loss of appetite (anorexia)
- Weight loss
- Fever
- Fatigue
- Night sweats
- Cough that persists for more than three weeks

Latent TB infection may become active when the immune system becomes weakened. The immune system may be impacted by the following:

- Stress
- Poor nutrition
- Substance abuse
- HIV/AIDS

Anyone with these symptoms should see a doctor to find out why they have them. Remember, tuberculosis has a long incubation period — it may be several months or years before the symptoms or signs appear.

Incidence: During 1993 – 2003, incidence of tuberculosis (TB) in the United States decreased 44% and is now occurring at a historic low level (14,874 cases in 2003).

There are four factors contributing to the increase: the HIV epidemic, immigration from countries where TB is common, the spread of TB in certain settings, and inadequate funding for TB control.

Methods of control: Individuals who have the TB infection are given preventive therapy to prevent TB disease. Prior to receiving preventive therapy, a medical examination should be performed to:

- Determine if the individual has ever been treated for TB infection or disease.
- Check for medical conditions the individual has that may interfere with the treatment process.
- Confirm the absence of TB disease.

Preventive therapy is not designed for individuals who have the TB disease or who have been adequately treated for TB infection. Preventive therapy is given daily for six months; children should receive the medication for nine months; and individuals with HIV should receive the medication for 12 months.

TB disease must be treated for **at least** six months. Four drugs are used for the initial treatment: isoniazid, rifampin, pyrazinamide, and ethambutol or streptomycin.

Respiratory Protection for TB

- Workers are at risk when they breathe contaminated air from known (or suspected) active TB cases.
- TB is spread by airborne droplets which may remain airborne for as long as four hours.
- TB-infectious droplets created by coughing or sneezing may contain the TB bacterium, which is small enough in size to reach the alveoli (air sacs of the lungs).
- The correct respiratory protection will provide the filtration necessary to remove the bacterium.
- Disposable High Efficiency Particulate Air respirators (HEPA) can filter out 1–5 micron-sized TB droplets.
- Wear a respirator when in an active TB patient isolation room.
- Wear a respirator when performing procedures that generate airborne secretions.
- Wear a respirator when caring for an undiagnosed patient suspected of having active TB.
- Wear a respirator when performing a vehicle transport of contagious TB patients. If possible, have the patient wear a surgical mask during transport.

Groups at Higher Risk for TB

- People in close contact with infectious TB
- People born in the areas of the world where TB is common
- Elderly people
- Low-income groups with poor access to health care
- People who inject illicit drugs
- People who live or work in nursing homes, correctional facilities, homeless shelters, drug treatment centers
- People who are exposed to TB on the job
- People who have HIV infection

Diagnosis of Tuberculosis Infection and Disease

- The Mantoux tuberculin skin test is the preferred type of skin test because of its accuracy.
- A positive test result from the Mantoux tuberculin skin test is dependent on the size of the indurations and the person's risk factors for TB (such as people who may be exposed to TB on the job).
- Several factors influence the interpretation of the skin test. Individuals who have close contact with someone with infectious TB disease should be retested 10 weeks after their last contact with a TB carrier, even though they may have had a negative reaction to the tuberculin skin test.

Four steps in diagnosing TB:

1. Medical History
2. Tuberculin skin test
3. Chest x-ray
4. Bacteriologic examination

Environmental Controls:

- To reduce the recalculation of TB droplets' nuclei, anyone suspected of having active TB must be isolated.
- Isolation rooms must have a negative-pressure with exhaust vents to the outside of the facility.
- Ventilation must be provided to all general-use areas.
- Early identification of any patient suspected of having TB.
- Isolation room ventilation should supply clean air through ceiling vents and be exhausted through floor vents by means of HEPA filters directly to the outside.
- Isolation rooms must be kept under negative-pressure, with doors closed and air flow monitored regularly with smoke tubes.
- The use of germicidal UV lamps to supplement ventilation is still recommended.
- Ventilation in general-use areas such as waiting rooms and emergency rooms: air flow should be from clean to less clean areas, and monitored regularly.
- Procedures that generate airborne secretions should be properly vented during these procedures.