PRESENTER'S GUIDE

"TUBERCULOSIS IN THE HEALTHCARE ENVIRONMENT"

Training for THE CDC
TUBERCULOSIS PREVENTION GUIDELINES

Quality Safety and Health Products, for Today... and Tomorrow

OUTLINE OF MAJOR PROGRAM POINTS

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The following outline summarizes the major points of information presented in the program. The outline can be used to review the program before conducting a classroom session, as well as in preparing to lead a class discussion about the program.

- **At one time, tuberculosis ("TB") was widespread and deadly enough to earn the name, "The White Plague".**
  - However, by the late 1960s, TB seemed to have met its match.
  - Modern medicine had developed antibiotics that were so effective against the disease that some doctors predicted TB would be entirely stamped out in the U.S. by 2010.

- **But for a number of reasons, tuberculosis had an alarming resurgence in the mid-1980s.**
  - Today, TB is once again a serious health concern.
  - As one of the most common infectious diseases in the world, it kills more than a million people every year.

- **You in the healthcare field are on the front lines in the fight against TB.**
  - You also have a significant risk of exposure to the disease.

- **The resurgence in tuberculosis that took place worldwide in the 1980s prompted medical science to look for more effective ways to prevent and control the disease.**

- **While there has been some success in both of these areas, the number of TB infections and fatalities continue to make this disease a critical health concern.**
  - In the U.S., more than 11 million people already carry tuberculosis in a "latent", noninfectious form.
  - Thousands of these people will eventually develop the "active" form of the disease as well, which can be fatal.

- **Worldwide, the situation is even more grim:**
  - An estimated one-third of the world's population carries the TB bacteria.
  - Every year, about 9 million people develop the active form of the disease.
  - More than a million of them die from it.

- **What caused tuberculosis to came back so strongly after the disease seemed "down for the count", and made it such a serious problem in our lifetime? There are several reasons:**
  - First, TB is a highly contagious disease.
  - It is particularly easy to be infected with tuberculosis if you have a weakened immune system.

- **So the spread of AIDS has been a significant factor.**
  - Because AIDS suppresses the immune system, people with HIV have a harder time fighting off tuberculosis bacteria, so they are prone to developing the disease.

- **Increased use of recreational drugs has contributed too.**
  - IV drug abusers have a higher risk of developing TB because they are more likely than the general public to have diseases, such as AIDS, that weaken their immune systems.
  - They also frequently have prolonged contact with fellow drug abusers who may have tuberculosis themselves.

- **The arrival of immigrants in the U.S. from countries with high levels of active TB has played a role in the growth of the disease here as well.**

- **Another factor is that people with TB often end up in homeless shelters, prisons, residential care facilities for the elderly and other crowded institutional environments.**
  - If these facilities do not have adequate TB control programs in place, the infection can spread very easily.

- **So what exactly is tuberculosis?**
  - TB is caused by a type of bacteria that is called "Mycobacterium tuberculosis".
  - The bacterium is spread through the air in microscopic droplets.
  - These droplets are created whenever an infected person coughs, sneezes, speaks or otherwise exhales.
  - This is one reason TB is so highly contagious.

- **In healthcare environments the droplets can also be produced during certain "high-hazard medical procedures", such as:**
  - Bronchoscopies.
  - Intubation.
  - Sputum induction.

- **The more infectious droplets there are in the air, the greater the chance that someone will breathe them in and become infected.**
  - Which is why they can easily reach very dangerous concentrations in spaces that are enclosed or poorly ventilated.

- **Infection occurs in two stages. First, the TB bacteria are inhaled, and begin to spread throughout the body.**
  - The bacteria spreads relatively slowly, and a healthy immune system can usually stop it within two to ten weeks.
  - During this time the body's natural defenses attack the bacteria and render them "inactive".
  - When the immune system keeps the TB bacteria in check like this, the infection is known as "latent TB" or "LTB".

- **People with latent TB do not suffer any adverse effects, and are not contagious.**
  - However, eventually about 10% of the people with latent tuberculosis will go on to develop the active form of the disease.

  - Their immune systems finally become too weak to resist the infection, and the TB bacteria begin to multiply.
- **Since the resurgence of tuberculosis has created a serious public health problem, several government agencies have taken steps to address it.**

- **The Centers for Disease Control and Prevention (the "CDC"), has established guidelines for "Preventing the Transmission of Tuberculosis".**
  - These guidelines are periodically updated to ensure that the most up-to-date information and techniques are available to everyone who needs to fight TB.

- **Additionally, OSHA (the Occupational Safety and Health Administration) has adopted the CDC policies and incorporated them into rules and recommendations that are designed to prevent TB infection in the workplace. These strategies include:**
  - Creating a written tuberculosis prevention and control plan for each facility.
  - Implementing infection controls.
  - Conducting employee training.

- **Training plays a major role in raising awareness of the tuberculosis problem, and providing healthcare workers like you with the information that you'll need to protect yourself from infection. Topics covered in this training include:**
  - The specific TB transmission hazards that you will face on the job.
  - The current status of TB infections at your facility
  - What steps you should take to keep TB from spreading.

- **Because you work in the healthcare field, you may well encounter individuals with active TB, and you could face a significant risk of contracting the disease yourself.**

- **So you need to exercise extra caution wherever TB patients are likely to be found in your facility, including:**
  - Emergency rooms.
  - Waiting rooms.
  - Outpatient clinics.
  - Intensive care units.
  - Treatment rooms.
  - Diagnostic imaging centers.
  - Laboratories.
  - Isolation rooms.
  - Hospice areas.

- **Your risk of exposure to TB in these locations can be reduced by implementing the policies, procedures and techniques prescribed in your facility's TB prevention and control plan.**

- **But for any controls to be effective, you must first be able to recognize the people who might have active tuberculosis. Symptoms to look for include:**
  - A productive cough.
  - Coughing up blood.
  - Weight loss.
  - Loss of appetite.
  - Lethargy or weakness.
  - Night sweats.
  - A fever.

- **Anyone showing these symptoms should be tested for tuberculosis.**

- **There are four testing procedures that are commonly used for tuberculosis:**
  - The IGRA test.
  - The Mantoux Skin Test.
  - Chest x-rays.
  - Sputum cultures.

- **The Interferon Gamma Release Assay, or "IGRA" is a relatively new test for latent TB.**
  - It's a blood test that determines whether the patient's immune system has been exposed to the tuberculosis bacteria, and can confirm whether someone has latent TB within 24 hours.

- **In the Mantoux Skin Test a substance called "tuberculin" is injected just under the skin of the forearm.**
  - Tuberculin is a "purified protein derivative" (PPD) that is developed from sterilized TB cultures.
  - If someone has been exposed to tuberculosis bacteria, the injection will cause a recognizable skin reaction within 48 to 72 hours.
  - A positive reaction to the test can indicate either a latent or active TB infection.
  - To determine which form a person has, further tests are needed.

- **A chest X-ray looks for signs of damage in a person's lungs that could have been caused by a TB infection.**
  - X-ray results are usually available within a day or two, but that time can be reduced significantly in emergency situations.

- **The fourth and most definitive test for TB analyzes a person's "sputum", the substance that they expectorate from their respiratory tract.**
  - This "sputum culture test" cultivates any bacteria that is present in the sputum.
  - If the cultures reveal Mycobacterium tuberculosis, then the patient has an active TB infection.
  - But one problem with the sputum culture process is that it can take up to eight weeks.

- **Whatever test is used, if a person shows indications of active tuberculosis, they should be placed in isolation immediately and evaluated for potential treatment.**

- **So how do we reduce the risk of TB infection?**

- **Your facility's tuberculosis prevention and control plan incorporates three types of infection controls:**
  - Administrative controls.
  - Engineering controls.
  - Personal protective equipment (PPE).

- **Administrative controls are policies that are put in place to help control infection. One of the most important of these is a medical surveillance program.**
  - This program keeps an eye on employees who are at risk of being exposed to TB bacteria.
  - It identifies any potential exposure to the bacteria by testing and monitoring employees on an ongoing basis.

- **The first step in a medical surveillance program is a "pre-placement evaluation".**
  - This determines if you are already infected with the TB bacteria.

- **Since the Mantoux Skin Test is the most frequently used test for TB, the "new hires" in most facilities will receive a tuberculin injection.**
  - The test results set up a baseline that all their future skin tests will be measured against.

- **Depending on the TB risks that people face in their work, retesting will typically occur every two to twelve months, or any time they have had an unprotected exposure to TB.**

- **If tests or retests show that someone has been infected, but they are not showing any active symptoms, they will be evaluated to determine what treatment they should undergo to prevent their latent tuberculosis infection from becoming an active one.**
  - Your facility will also report any TB exposures that result in positive skin tests to the local health department.

- **Another way that your facility protects you from the risk of tuberculosis infection is through the use of "engineering controls", physical safety systems that are built into the facility.**

- **There are several types of engineering controls that are used to help contain and eliminate tuberculosis bacteria in healthcare environments.**
  - For example, individuals who have, or are suspected of having active TB are placed in special isolation rooms.
  - By keeping a patient away from other people, the rooms themselves are a form of engineering control.
  - The rooms are also equipped with other engineering controls that help them limit the spread of TB even more.

- **For example, the way that the ventilation system in an isolation room circulates the air creates what is called a "negative pressure" environment.**
  - Because the pressure inside the room is lower than the pressure outside, "infected" air does not escape into other areas of the facility.

- **Since a patient with contagious TB can spread infectious bacteria constantly, negative pressure also helps to reduce the buildup of bacteria in the isolation room.**
  - To maintain negative pressure, isolation room doors should be kept closed as much as possible.
  - It is also important that healthcare personnel or visitors who enter the room wear an appropriate respirator.

- **CDC guidelines require isolation rooms in existing facilities to have the air inside them replaced at least six times per hour by their ventilation systems.**
  - When new facilities are built or existing facilities are renovated, that requirement increases to at least twelve times per hour.
  - The more often the air in the room is replaced, the more effectively airborne tuberculosis bacteria will be removed.

- **The air that is removed from an isolation room is either exhausted out of the building, or recirculated through filters or other devices.**
  - The filters and venting systems that are used to remove bacteria from the air are another type of engineering control.

- **High Efficiency Particulate Air (HEPA) filters can effectively "clean" TB bacteria out of the air that is ventilated from isolation rooms, and are used in both "built-in" and portable ventilation units.**

- **Where the risk of TB transmission is especially high, another engineering control that is frequently used is "Ultraviolet Germicidal Irradiation", which is created by a high-energy light that kills bacteria in the air.**
  - When it's used in a room, Germicidal Irradiation depends on air circulation to bring bacteria close enough to be killed by the radiation from its ultraviolet light bulbs.
  - When it is used inside ventilation ducts, the effect of the radiation is even more direct and intense.
  - This makes it especially effective in killing tuberculosis bacteria in areas where air is being recirculated.

- **The third type of infection control that is addressed in your facility's TB prevention and control program is personal protective equipment (PPE).**
  - Since tuberculosis is spread through the air, what you'll need is a respirator that's designed to filter tuberculosis bacteria out of the air that you're breathing.

- **As with any kind of PPE, it's critical that you us the right type of respirator with the right filters to fully protect you.**
  - Some filters can't trap the airborne droplets that spread TB bacteria.

- **OSHA currently requires all employees who are at risk of TB exposure to use respirators with filters that have a rating of at least "N95".**
  - This means that the respirator can filter out at least 95% of the particles that are in the air, which includes the droplets that contain TB bacteria.

- **But regardless of their rating, all respirators must be used correctly to be effective.**
  - You will receive training on how to put your respirator on and how to wear it so it will provide you with full protection.
  - You will also need to "fit test" your respirator, to make sure that the "seal" that it makes against your face won't let any outside air leak through.

- **There are essentially three situations when you will be required to wear a respirator.**
  - One of the most important is when you will be entering any space, such as an isolation room, that contains a patient suspected or confirmed to have active TB.
  - You should also wear a respirator whenever you are present at high-hazard medical procedures, such as bronchoscopies, intubations and sputum inductions, that are being performed on patients with suspected or confirmed tuberculosis.

- **The third situation that requires respirators applies specifically to first responders.**
  - If your job includes first response activities you should always wear appropriate respirators when you encounter someone with a suspected or confirmed case of active TB.

- **As we've seen, your employer does a lot to protect you and others from TB infections.**
  - You also need to know how active tuberculosis is treated, as well as what can be done to prevent it from spreading to other people.

- **A person who has active tuberculosis needs medical attention, and the sooner they get it the better, because they aren't the only one who is in danger.**
  - We've discussed how TB becomes very contagious when it goes active, and how easily it can spread.

- **To help limit this spread of TB bacteria in a healthcare facility, people with the active form of the disease should be isolated from other patients.**
  - As a further safeguard, tuberculosis patients should be instructed to cover their nose and mouth with a tissue if they begin to cough or sneeze.

- **When TB patients are required to leave the isolation room for treatment, they should wear a properly fitted surgical mask to catch any bacteria that they breathe out.**

- **Today tuberculosis can almost always be cured with a course of antibiotics.**
  - For typical TB patients the treatment takes six to twelve months.

- **But what's most important is for a patient to follow their medication schedule and complete it.**
  - Unfortunately, not all of them do.
  - Fifty percent of TB patients interrupt or discontinue their treatment before they have taken all of their medication.
  - This can cause the patient to get sick again, and potentially infect other people as well.

- **Even more seriously, it can lead to their TB infection becoming "drug-resistant".**
  - When TB bacteria is only partially destroyed by a drug, it can develop a resistance to that drug.
  - This means the medication will no longer be effective against that particular strain of bacteria, in effect making it drug-resistant.

- **The resulting "modified" strains of TB are known as "DR TB", and they are appearing more and more frequently.**
  - Just like the original TB bacteria, they can easily spread to others.
  - Because they are harder to kill off, drug-resistant TB bacteria require a much longer course of treatment than the non-resistant strains do.
  - The patient is more likely to die from them as well.

*** * * SUMMARY** * * *

- **Although great strides have been made over the years against tuberculosis by medical science, the disease has recently made a resurgence.**
  - Today, it kills more than a million people worldwide annually.

- **The CDC and OSHA have established guidelines and standards to protect healthcare workers from TB infection.**

- **Your facility has a formal, written TB control plan that sets out how the risk of infection will be minimized.**

- **The TB control plan makes use of administrative and engineering controls, as well as personal protective equipment, to prevent TB transmission.**

- **As part of the TB control plan, you will receive training in what procedures to follow to reduce your risk of TB infection.**

- **Following the guidelines in your TB control plan and participating in your training sessions will help you limit the spread of tuberculosis, and keep yourself, your coworkers and patients in your facility free from infection!**