Module 2: Safety Precautions for Tuberculosis Microscopy

Purpose

To provide the participants with necessary attitudes, knowledge and skills about laboratory safety so they will take precautions to prevent tuberculosis infections in the laboratory

Pre-requisite Modules

None

Module Time

1 hour 10 minutes

Learning Objectives

At the end of this module, participants will be able to

- Explain airborne transmission of TB
- Describe the risks associated with collecting sputum
- Describe personal health and safety practices
- Describe why there should be three areas in the TB laboratory
- Describe methods for the disposal of contaminated material
- Describe chemical safety precautions in the laboratory.

Module Overview

Step	Time	Activity / Method	Content	Resources Needed
1	10 min	Presentation	Module introduction	Slides 1–4; prepared flipchart – content outline
2	10 min	Presentation	TB Transmission	Slides 5–7
3	10 min	Presentation	Safe Specimen Collection	Slides 8–9
4	30 min	Presentation; Discussion	Safety Precautions for TB Microscopy	Slides 10–21
5	10 min	Q & A	Summary	Slide 22

Material and Equipment Checklists

- PowerPoint slides or transparencies
- Overhead projector or computer with LCD projector
- Prepared flipchart – content outline, discussion questions

Teaching Guide

Slide Number	Teaching Points
1	**Module 2: Safety Precautions for TB Microscopy** DISPLAY this slide before you begin the module. Make sure participants are aware of the transition into a new module.
2	**Learning Objectives** STATE the objectives on the slide
3 **Flipchart** 	**Content Overview** (Suggested format for presentation) WRITE the content outline before beginning this session. REFER to flipchart frequently to orient participants to where they are in the module. EXPLAIN that these are the topics that will be covered in this module.
4	**Importance of Laboratory Safety** STATE - The most important factor in the prevention of laboratory-acquired infection is good technique on the part of the individual worker ASK participants to express concerns about laboratory-acquired infection. EMPHASIZE the greatest risk is exposure in the community and from coughing patients. EMPHASIZE these type infections can be prevented through good laboratory practice. Specialized equipment may aid good laboratory practice but does NOT replace it
5	**Transmission of TB Bacilli** STATE the message on the slide
6	**Aerosol Formation: Spread of droplets** EXPLAIN that many infectious particles can be produced when a persons coughs or sneezes. Coughing is the most effective means of spreading droplet nuclei ASK participants which healthcare workers are at high risk for TB infection.

Slide Number	Teaching Points
7	**Relative Risk from Exposure to Infectious TB Case** STATE the relative risk of TB infection to the different health care workers • Doctors and nurses working in a TB ward encounter coughing TB patients much more often that do laboratory staff • Staff involved in collecting sputum specimens do have a higher level of risk than laboratory staff who only prepare smears but a lower risk compared to the doctors and nurses working in the TB ward • The lowest level of risk is associated with the safe preparation of smears
8	**Safe Specimen Collection** STATE the message on the slide EMPHASIZE sputum specimens must be colleted outside for infection control purposes.
9	**Never Stand In Front Of The Patient During Collection** EXPLAIN why it is important to NOT stand in front of someone during collection of specimen.
10	**Safety Practices: Airflow** EMPHASIZE the importance of directing potentially infectious particles away from personnel. The direction of airflow is associated with risk of potential lab-acquired infection.
11 	**Personal Protective Equipment** ASK participants to share stories about their beliefs in the use of masks, gloves, and laboratory coats. EXPLAIN that the reality of using various pieces of personal protective equipment will be discussed in detail in the next few slides.

Slide Number	Teaching Points
12 	**<u>Personnel Protective Equipment: Masks</u>** STATE that surgical masks are used by surgical staff to try to prevent them from contaminating the sterilized operation site EMPHASIZE that these masks were never designed to prevent transmission of TB POINT OUT that these masks have a number of gaps above the nose, side of the face and under the chin
13 	**<u>Personnel Protective Equipment: Gloves</u>** STATE the messages on the slide • EMPHASIZE that gloves can become contaminated without the wearer becoming aware that it has happened. • EMPHASIZE frequent hand washing
14 	**<u>Personnel Protective Equipment: Laboratory Coats</u>** STATE the messages on the slide
15	**<u>Laboratory Design- Working Area</u>** EMPHASIZE the following: • A clean area means that the sputum sample should not enter this area • A dirty area means that sputum samples are handled within this area
16	**<u>Laboratory Design: Bench Area</u>** STATE that record keeping and storage is a clean area for paperwork and storing slides and paperwork EMPHASIZE that smear preparation and staining must have sufficient ventilation to ensure that contaminated air is removed from the work area
17	**<u>Laboratory Arrangement –Microscopy Bench</u>** STATE message on the slide

Slide Number	Teaching Points
18	**Biological Safety Cabinets** EMPHASIZE that Biological Safety Cabinets (BSC) are not required to prepare sputum smears • They must be maintained every year to ensure safe performance. Poorly maintained BSCs are hazardous as the filters may become blocked and not filter the air properly • They are required when culture and drug susceptibility testing is performed FACILITATE a group discussion on the how BSCs are maintained in your setting.
19 	**Waste Disposal** STATE the message on the slide. EMPHASIZE all materials used throughout the AFB testing process should be considered contaminated, and must be properly disposed. ASK participants what their current method is for disposing waste. FACILITATE a discussion on how burning, burying and autoclaving can be performed in microscopy centers.
20	**Chemical Safety** HIGHLIGHT phenol is corrosive and causes burns • Avoid getting onto skin and into eyes • Avoid the vapor that rises when carbol fuchsin is heated Only stain 12 slides at one time to avoid too much vapor Dry stain powder should be handled very carefully and the dye dust should not be inhaled. Acids are corrosive by nature and extreme caution should be taken while making solutions form them.

Slide Number	Teaching Points
21	**<u>Chemical Safety: Handling Acids</u>** EMPHASIZE the importance of safety while handling acids. Care must be taken when mixing strong acids and water. Mixing of acid and water generates large amount of heat and this can cause the mixture to explode, resulting in acid splash. • Adding slowly the acid into water, prevents splashing and boiling. This also avoids splashes of acid that can cause burns to the skin or eyes
 *TIPS*	Stories or scenarios that evoke emotions (fear, shock, sympathy, sorrow, etc.) are excellent ways in getting participants to pay attention and adopting the right attitudes and practices about lab safety.
22	**<u>Summary</u>** ASK the participants to answer the questions on the slide. ANSWER any remaining questions the participants may have.