

# Training TB Infection Prevention and Control in Health Facilities

## Participants' Manual



# **Training TB Infection Prevention and Control in Health Facilities**

## **Participants' Manual**



The Global Health Bureau, Office of Health, Infectious Disease and Nutrition (HIDN), US Agency for International Development, financially supports this publication through Challenge TB under the terms of Agreement No. AID-OAA-A-14-00029. This publication is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of Challenge TB and do not necessarily reflect the views of USAID or the United States Government.

## ACKNOWLEDGEMENTS

This training package for “TB Infection Prevention and Control in health facilities” is based on the Bangladesh “National Guidelines for Tuberculosis Infection Control” (2011). The training package was developed by Dr. Jahan Kausari (Challenge TB Bangladesh) and Marleen Heus (KNCV Tuberculosis Foundation). The training package was piloted, and the trainers and participants gave feedback that contributed to the finalization of the training package. The Challenge TB project team in Bangladesh wishes to acknowledge the contributions of the following persons and organizations to the development of this training package:

- Dr. Nazis Arefin Saki, NTP
- Dr. Fahmida Khanom, NTP
- Dr. Monjur Rahman, NTP
- Dr. Pronab Kumar Modak, NTP
- Dr. Md Abul Khair Basher, BRAC
- Dr. Dipak, Damien Foundation
- Dr. Mahmudul Hassan Khan, Challenge TB Bangladesh
- Dr. Netty Kamp, KNCV Tuberculosis Foundation
- Dr. Max Meis, KNCV Tuberculosis Foundation
- Dr. Asif Mahmud, KNCV Tuberculosis Foundation

The organizations which made this possible:

- USAID/Challenge TB
- KNCV Tuberculosis Foundation

# CONTENTS

Abbreviations .....	5
Training Course Program .....	6
Basic Training Course Information .....	7
Session 1: Welcome and introduction.....	9
Session 2: Basics of TB infection and transmission control .....	10
Session 3: TB-IPC risk assessment .....	14
Session 4: Administrative and Environmental Controls .....	20
Session 5: TB-IPC among health care workers .....	26
Evaluation of day 1 .....	27
Session 6: The FAST Strategy .....	28
Session 7: TB-IPC health education .....	31
Session 8: Personal protection.....	37
Session 9: TB-IPC implementation plan .....	40

## ABBREVIATIONS

ACSM	Advocacy Communication and Social Mobilization
DR-TB	Drug resistant tuberculosis
HCW	Health care worker
IC	Infection control
IPC	Infection prevention and control
PPT	PowerPoint
Rx	Treatment
SOP	Standard Operating Procedures
TB	Tuberculosis
UVGI	Ultraviolet germicidal irradiation

# TRAINING COURSE PROGRAM

## Day 1

Time	Session	Facilitator
08:30-09:00	Registration	Secretary
09:00-10:00	Session 1: Welcome and introduction	
10:00-11:15	Session 2: Basics of TB infection and prevention control	
11:15-11:45	Break	
11:45-13.15	Session 3: TB-IPC risk assessment	
13.15-14.15	Lunch	
14.15-15.15	Session 4: Administrative and Environmental controls	
15.15-15.30	Break	
15.30-16.30	Session 5: TB-IPC among HCWs	
16.30-16.45	Evaluation of the day	

## Day 2

Time	Session	Facilitator
09.00- 09.30	Recap Introduction	
09.30-11.00	Session 6: The FAST Strategy	
11.00-11.30	Break	
11.30-13.00	Session 7: TB-IPC health education	
13.00-14.00	Lunch	
14.00-15.00	Session 8: Personal protection	
15.00-16.30	Session 9: TB-IPC implementation plan	
16.30-17.00	Evaluation of the course	

# BASIC TRAINING COURSE INFORMATION

## Background

In 2011 the “*National Guidelines for Tuberculosis Infection Control*” were launched, providing guidance to health care workers (HCWs) and hospital managers on the prevention of the transmission of tuberculosis (TB) in their facilities.

In many health facilities TB Infection Prevention and Control (TB-IPC) is not yet up to standard, creating a high-risk of TB infection for HCWs and their patients. Training and supportive supervision of HCWs and their managers is needed to build their capacity to improve their TB-IPC practices.

This participants’ manual is designed for the participants of the training “TB Infection Prevention and Control in health facilities”. The manual explains the session objectives, the exercises and background information.

## Target Audience

This training is designed for teams of four Infection Prevention and Control (IPC) key staff members (doctors, nurses, laboratory staff, hospital managers and IPC working group members) from both general and drug resistant TB (DR-TB) hospitals, and is for a maximum of 24 participants.

## Facilitators

The training course is facilitated by a group of TB-IPC core trainers.

## Goals and Objectives

### Overall Goal

By the end of this training course the participants are able to develop and implement the TB-IPC plan for their health facility, and monitor compliance with TB-IPC standards.

### Specific Objectives

At the end of the training course participants will be able to:

1. Explain the purpose and relevance of TB-IPC in Bangladesh hospitals
2. Use the *National Guidelines for TB Infection Prevention and Control* for their professional practice
3. Make a TB-IPC risk assessment for their hospitals
4. Identify the TB-IPC tasks and responsibilities of staff in their hospitals
5. Present the FAST strategy and explore how the FAST strategy might be implemented in their hospitals
6. Give TB-IPC health education to their hospitals’ health workers, patients and their family members
7. Define the TB-IPC standard operating procedures (SOPs) to be developed for their hospitals and agree on timelines
8. Develop a TB-IPC implementation plan for their hospital and advocate for its implementation
9. Assess integration opportunities with overall health facility IPC.

## Sessions

The training course includes the following 10 sessions:

Session 1: Welcome and introduction

Session 2: The basics of TB infection and Prevention Control

Session 3: A TB-IPC risk assessment

Session 4: Administrative and environmental controls

Session 5: TB-IPC among health care workers

Session 6: The FAST Strategy

Session 7: TB-IPC health education

Session 8: Personal protection

Session 9: TB-IPC implementation plan

Session 10: The course evaluation

## **Duration of the training course**

The duration of the training course is two days, with working hours from 9.00–17.00.

## **Course language**

The course is conducted in Bengali and the course materials are in English.

## **Training methodology**

The training program focuses on the competencies (knowledge, skills and attitudes) you need to practice TB-IPC in your workplace. You will assess the TB-IPC practices in your health facility and you will develop a TB-IPC work plan for your health facility, that you will be able to implement when you return to work. Supportive supervision will be provided after the training, to support your hospital team with the implementation of your TB-IPC plan.

We use group work, role plays and exercises to enhance active participation and sharing of experiences among the participants.

## **Certification**

At the end of the training course the participants receive a certificate of attendance.



## SESSION I: WELCOME AND INTRODUCTION

### DURATION:

60 minutes

### OBJECTIVES:

By the end of this session, the participants:

1. Know the facilitators and the participants
2. Know the training program and have agreed on the ground rules
3. Are open to sharing experiences.

### Getting to know each other

Work with your neighbor and interview each other, using the following questions:

1. How long have you worked in TB control?
2. What do you want to learn in this training course (maximum 2 items)?

Present your neighbor briefly in plenary. Your neighbor will present you.

### How can we best learn together?

Let's set the ground rules: What are the do's and don'ts to create a conducive learning environment?

## SESSION 2: BASICS OF TB INFECTION AND TRANSMISSION CONTROL

### DURATION:

75 minutes

### OBJECTIVES:

By the end of this session, participants will be able to:

1. Explain how TB is spread and who are most at risk of TB infection
2. Present the relevance of TB-IPC and the role of the HCW
3. Present the four levels of TB-IPC and the interventions at these different TB-IPC levels
4. Advocate for TB-IPC as part of general IPC.

### I. Basics on TB infection

#### How is TB spread?

Airborne particles (droplet nuclei) carry *M. tuberculosis*. These droplet nuclei are spread when people suffering from pulmonary or laryngeal TB, sneeze, cough, laugh or sing. TB spreads from infectious droplet nuclei are 1-5 micrometers in diameter, and normal air currents can keep them suspended and airborne for up to 24 hours.

Infection occurs when a susceptible person inhales droplet nuclei containing *M. tuberculosis* and the organisms reach the alveoli of the lungs. Once in the lungs, the organisms are taken up by the alveolar macrophages and maybe contained or spread throughout the body depending on the immune response.



## When is TB transmission more likely?

The probability of a person who is exposed to TB bacilli becoming infected depends on:

- The **concentration of infectious droplet nuclei in the air**. This is influenced by the number of organisms generated by the TB patient and the amount of ventilation in the area of exposure.
- The **duration** of exposure to the infectious droplet nuclei.
- The **proximity to the source** of the infectious droplet nuclei and the virulence of organism.
- The **immune status** of the individual exposed.

## Who are most at risk for TB infection?

a. **Patients** with a high risk for infection (e.g. HIV patients, children, old people, very weak patients, diabetes patients etc.).

b. **HCWs (including community volunteers)** and visitors who are in close contact with TB patients:

1. Who have TB disease, but are not yet diagnosed
2. Who have TB but are not TB symptomatic
3. Who are not on effective treatment.

c. **Family members** living together with TB patients:

1. Who have TB disease, but are not yet diagnosed
2. Who have TB but are not TB symptomatic
3. Who are not on effective treatment.

d. **People in congregate settings** living and working together with people:

1. Who have TB disease, but are not yet diagnosed
2. Who have TB but are not TB symptomatic
3. Who are not on effective treatment.

This might be people in prisons, schools, hospital wards, industries (garment industry) and religious places (mosques and churches).

## 2. TB Infection and Prevention Control

### What is the objective of TB-IPC?

TB-IPC aims to minimize TB transmission and thus create a safe environment for patients, HCWs, and people living and working with TB patients.

TB-IPC in the health facility aims to minimize TB transmission in the facility. This will be the focus of this training course.

### Why is TB Infection Prevention and Control so important?

TB-IPC is an important intervention to “End-TB”. TB-IPC has become even more urgent with the increase of MDR-TB and XDR-TB. Preventing TB infection is a key factor in fighting the TB-epidemic.

## 3. Four levels of TB infection control:

1. Managerial
2. Administrative
3. Environmental
4. Personal protection.

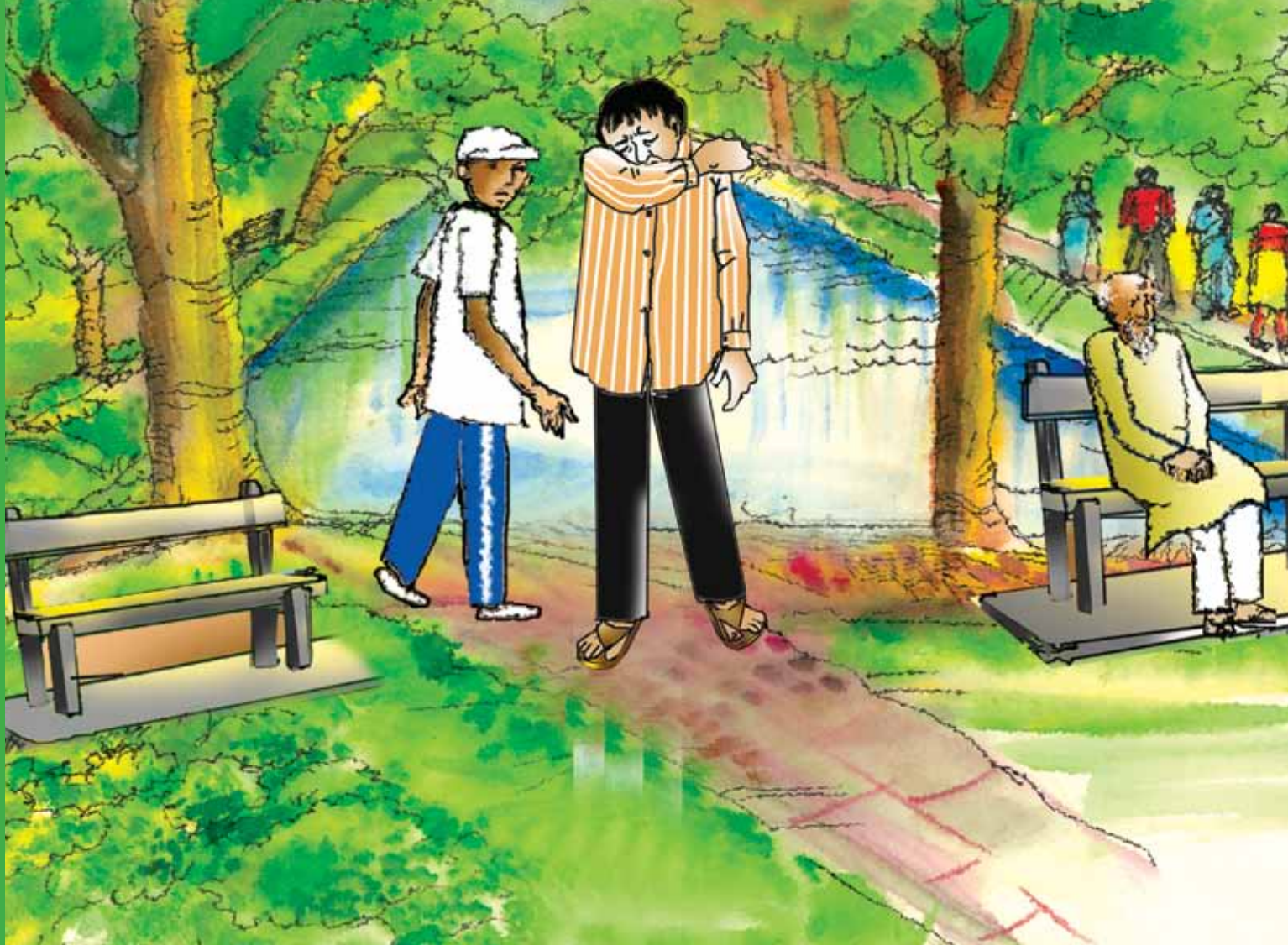
### 1) Managerial controls

- a. TB-IPC guidelines, TB-IPC plan and monitor the implementation
- b. TB-IPC committee and focal person
- c. TB-IPC risk assessment
- d. Facility design and patient flow have been assessed
- e. TB-IPC Standard Operating Procedures (SOPs)
- f. Advocacy, Communication and Social Mobilization (ACSM) materials and activities
- g. Training of staff.

### 2) Administrative controls

- a. Identify people with TB symptoms
- b. Separate infectious patients
- c. Cough etiquette guidance
- d. Appropriate sputum collection and transport
- e. Monitor the turnaround time of patients in the health facility
- f. TB/HIV prevention and care package for HCWs (workplace policy, staff education and the provision of screening).





### 3) Environmental controls

- a. Ventilation system
- b. Building (appropriate waiting areas, investigation rooms etc)
- c. Lab biosafety
- d. Ultraviolet germicidal irradiation (UVGI) system
- e. Waste management.

### 4) Personal protection

- a. The protective steps patients and HCWs take to avoid the spreading of the droplet nuclei e.g., don't share your room when you are still infectious, don't let children visit the TB ward etc.
- b. Respirators: N95 masks for HCWs and surgical masks for patients.

## 4. Key interventions to avoid transmission

Effective TB-Infection Control is a combination of various measures. The most effective measures are:

- a. Prompt detection of infectious patients
- b. Treatment of patients
- c. Airborne precautions.

## 5. Discuss in your group (5 minutes)


*“Which people have a role to play in TB-IPC in your health-facility?”*

Summarize your findings in the table below.


Staff	Role


## 6. National Guidelines for TB-Infection Control

The national guidelines for TB-IC were published in 2011 and a summary is available in Bengali. These guidelines provide guidance to health facilities on the planning, implementation and the monitoring & evaluation of TB-IPC.




**National Guidelines for Tuberculosis  
Infection Control**





**USAID** | **TBCARE II**

FROM THE AMERICAN PEOPLE | **BANGLADESH**



## SESSION 3: TB-IPC RISK ASSESSMENT

### DURATION:

90 minutes

### OBJECTIVES:

By the end of this session, participants will be able to:

1. Explain the TB-IPC risk assessment tool
2. Present the purpose and methodology of the TB-IPC risk assessment
3. Make a TB-IPC risk assessment of their health facility.

### Group work (45 minutes)

Do a TB-IPC risk assessment of your facility in your health facility team.

Present in plenary (5 minutes) the three most important poor TB practices that need to be changed.

## Health Facility TB-IPC risk assessment tool

### What is the purpose of the TB-IPC Risk Assessment?

The TB-IPC risk assessment aims to assess and analyze the risk of transmission of TB in a health facility. The results of this assessment will direct the health facility in the development of the TB-IPC facility plan and monitor the implementation of this plan.

### When should the TB-IPC Risk Assessment be done?

The TB-IPC risk assessment should be carried out in every health facility on an annual basis.

### Who will do the TB-IPC Risk Assessment?

The assessment will be carried out by the (TB) IPC focal point in the health facility together with nurses, doctors, laboratory staff, and pharmacists working in the prevention of TB and the care of TB patients.

The results of the TB-IPC Risk Assessment will be discussed with the health facility manager.

Name of the facility: \_\_\_\_\_

Date of the assessment: \_\_\_\_\_

Date of the previous assessment: \_\_\_\_\_

Name, designation and function of the person responsible for this assessment: \_\_\_\_\_  
\_\_\_\_\_

## 1. TB Infection control measures implemented

	TB Infection Control Measures	Yes	No	Comments/Suggested improvements
	Managerial			
1.	An infection control committee or person is designated at this site			
2.	A (TB) IC plan is available for this site			
3.	Facility design and patient flow have been assessed to identify the best use of space and ventilation			
4.	TB-IC standard operating procedures (SOPs) are in place			
5.	ACSM materials are available and used in the right places			
6.	Staff are trained in TB-IC			

	TB Infection Control Measures	Yes	No	Comments/Suggested improvements
	Administrative			
1.	Patients are routinely asked if they have a cough when entering the facility			
2.	Patients that are coughing are separated from others and “fast tracked” to a caregiver			
3.	A health care worker or volunteer gives cough etiquette guidance and assists with triage			
4.	Information about “cough etiquette” is present in the clinic			
5.	Sputum samples are collected in a designated area and away from others			
6.	Health care workers who assist during sputum collection take precautions			
7.	There is a tracking mechanism to monitor the turnaround time of lab results			
8.	There is a tracking mechanism to monitor the turnaround time of patients within the healthcare facility			
9.	A log is kept of all the staff who are diagnosed with TB disease			
10.	Staff are screened for TB at least annually			

	TB Infection Control Measures	Yes	No	Comments/Suggested improvements
	Environmental			
1.	Natural and/or mechanical airflow is monitored daily by staff (especially in waiting rooms, sputum collection points and at least one exam room)			
2.	Patients are not crowded in hallways or waiting areas			
3.	Outside waiting areas are provided for outpatients with cough			
4.	Signage is in place to keep doors and windows open when feasible			
5.	UVGI is available and functioning When was the last maintenance?			
6.	Waste management is done properly			

	TB Infection Control Measures	Yes	No	Comments/Suggested improvements
	Personal Protective Equipment			
1.	N95 masks are available for staff			
2.	Staff have been trained on the proper fitting of masks/respirators			
3.	Supplies are available to coughing patients (tissues, masks, trash bins etc.)			

Use this page to draw room design and patient flow



## 2. Design of the doctor's room

Make a sketch of the environmental TB-IPC Measures in the doctor's room in your facility:

- Indicate the door(s) and window(s) and show the direction of airflow
- Indicate any mechanical ventilation (fans, air-conditioning)
- Indicate if UVGI is in place.

3. Make a flow chart of the patient flow through the facility:

- Patient Entry
- Reception
- Waiting areas
- Doctors room
- Sputum collection point
- Laboratory.

Discuss: “Does the route the patient has to follow allow them to be in the health facility for the shortest time possible?” Summarize your conclusions:

#### 4. Summary of the facility assessment

Summarize your main findings:

- a. The good TB-IPC practices in your facility
- b. The poor TB-IPC practices in your facility.

Present the three priority TB-IPC practices that need to be changed (5 minutes).

## SESSION 4: ADMINISTRATIVE AND ENVIRONMENTAL CONTROLS

### Duration:

60 minutes

### Objectives:

By the end of this session the participants are able to:

- Present measures and SOPs to promptly identify persons with presumptive TB and initiate treatment
- Present measures and SOPs for environmental controls.

### 1. Administrative controls are the measures to promptly identify people with presumptive TB, initiate treatment, and protect patients, visitors and HCWs.

Promptly identify people with TB symptoms:

- Triage
- Separate infectious patients
- Cough etiquette and respiratory hygiene
- Sputum collection outside
- Minimize time spent in healthcare facilities.

Promptly initiate presumptive TB patients on treatment:

- Short turn-around times for laboratory results
- Ensure that treatment is initiated.

Provide a TB prevention and care package for HCWs at risk.

### 2. Group assignment (10 minutes)

Read in your group one or two of the SOPs on triage, separation, cough etiquette, and minimizing the time for diagnosis.

- a. What is the purpose of this SOP?
- b. Is the SOP clear?
- c. Could you use this SOP in your health facility? Please explain why or why not.

### 3. Standard Operating Procedures

Adapted from: Tuberculosis Infection Prevention Procedures; TB CARE I, September 2012, Zambia).

#### Triage – Assigned Cough monitor responsible

- a. Identify patients with cough, upon entering the facility:
  - Any client or family member with a cough that has lasted for two weeks or more.
- b. Direct patients with a cough to an outside sputum collection area FIRST, so they can provide a sputum sample:
  - Use a sputum container with a screw cap.
- c. Explain to them how and where to provide a sputum sample:
  - Take precautions if you assist with sputum collection.
- d. Instruct them where to bring the sputum sample:
  - A place outside the laboratory.
- e. When they return, immediately direct them to a designated well ventilated waiting area:
  - Away from regular patients where they can wait until they can be seen.
- f. List all presumptive TB cases in the Presumptive TB Register
- g. Document, evaluate and report the number of confirmed sputum smear positive patients against the total number of patients suspected of having TB.
- h. Document, evaluate and report in the patient book the (average) number of days between the submission of sputum, the dispatch of the sputum

#### Separation – Assigned member of staff responsible

- a. Separate patients with a cough from others
- b. Separate diagnosed TB patients who have not yet started treatment from other patients by giving them a specific time slot to visit the TB health facility.

**Cough etiquette – Assigned Cough Monitor responsible**

- a. Display cover-your-cough posters in waiting areas and examination rooms, where patients cannot miss to see them (i.e. directly in front of them at eye-level and not on a back wall).
- b. Provide health education on cough etiquette as part of one-on-one counseling or as part of pre-clinic health talks:
  - Cover mouth and nose when coughing or sneezing
  - Turn head away from others
  - Do not spit on the floor
  - Wash hands frequently.
- c. If available, provide disposable surgical masks to all confirmed infectious pulmonary TB patients and patients suspected of having TB:
  - If surgical masks are not available, provide paper tissues or serviettes.
- d. Instruct them to discard the surgical masks and paper tissues in a plastic bag and then in a trash bin.

**Minimize time for diagnosis, onset of treatment, and time spent in enclosed areas – The entire team is responsible**

- a. Move patients with a cough to the front of the queue to be seen with priority:
  - If a well-ventilated waiting area is not available.
- b. Document in the patient book the date on which:
  - Laboratory tests were dispatched and received (Ideally, the turn-around time for sputum examination is 48 hours)
  - The patient received results and medications (Ideally, the patient is started on treatment within the same day of receiving the results).
- c. Evaluate and report delays in:
  - The average time for diagnosis
  - The average time between diagnosis and the start of treatment
- d. Educate patients to minimize contact with others in enclosed areas.

**4. Environmental controls:**

To have the right infrastructure and utilization, limiting the risk for infection for patients, HCWs and visitors.

Environmental measures:

1. Avoid hallways and waiting rooms becoming overcrowded
2. Ensure good airflow using natural and mechanical ventilation. Natural and mechanical airflow needs to be checked daily
3. Use UVGI
4. Establish appropriate biosafety measures
5. Safe waste disposal.

**5. Group assignment (5 minutes)**

In your group, read one of the SOPs on natural ventilation or mixed-mode ventilation and answer the following questions:

- a. What is the purpose of this SOP?
- b. Is the SOP clear?
- c. Could you use this SOP in your health facility? Please explain why or why not.

**Open this window!**  
**Fresh air fights TB**



This sticker was developed by the U.S. Centers for Disease Control & Prevention, Global AIDS Program, South Africa through funding from the U.S. President's Emergency Plan for AIDS Relief (PEPFAR)



## 6. Standard Operating Procedures (2)

Below you find the SOP's from Tuberculosis Infection Prevention Procedures, TB CARE I, September 2012, Zambia

### Natural Ventilation

#### Mixed-mode ventilation

Natural ventilation – Assigned member of staff responsible

- a. Do not allow patients to sit in crowded hallways or waiting areas
- b. Create a designated waiting area for patients with a cough
  - In the general waiting area of the OPD
  - In the TB clinic.
- c. Ensure that the doors and windows in all exam rooms are kept open during consultation hours
  - Signage must be installed that directs HCWs to keep doors and windows open.
- d. Place furniture in examination rooms such that staff-patient interactions occur with air flow passing from the staff to the patient, rather than from patient to the staff
  - Sketch a floor plan for each room
  - Display floor plans (laminated) just inside the door.
- e. Maintain the moving parts of windows and doors (especially the stays) to allow for maximum opening and adequate air exchange
- f. Keep a log to document the date and what was done: 1) Checking; 2) Servicing; 3) Replacement of part or repair
  - Record the date when the windows should be checked again
  - Have any deficiencies repaired as soon as possible.
- g. Allocate adequate resources (budget and staffing) for maintenance.

Mixed-mode ventilation – Assigned member of staff responsible

- a. Install extractor fans in enclosed areas deemed necessary by the infection prevention control committee
- b. Service ventilation equipment on a regular schedule:
  - Administrative controls regarding the operation of the fans should be in place to guarantee flawless functioning
- c. Keep a log of the date and what was done: 1) Checking; 2) Cleaning; 3) Replacement of part or repair:
  - Record the date when the equipment should be serviced again
  - Have any deficiencies repaired as soon as possible.
- d. Allocate adequate resources (budget and staffing) for maintenance.

## 7. Fact Sheet: Ventilation and TB Infection Control

Sources: “Implementing the WHO Policy on TB Infection Control” and PPT presentation TRAC Plus/Center for Treatment and Research on AIDS, Malaria, TB and other epidemics.

### Why is ventilation important in the implementation of TB Infection Control?

TB is spread through the air. Infectious particles (droplet nuclei) are suspended in the air and infection with TB occurs when these infectious particles are inhaled. Breathing clean air (air free of TB particles) will not lead to TB infection, therefore keeping the air clean is of critical importance. This can be achieved by ensuring good ventilation.

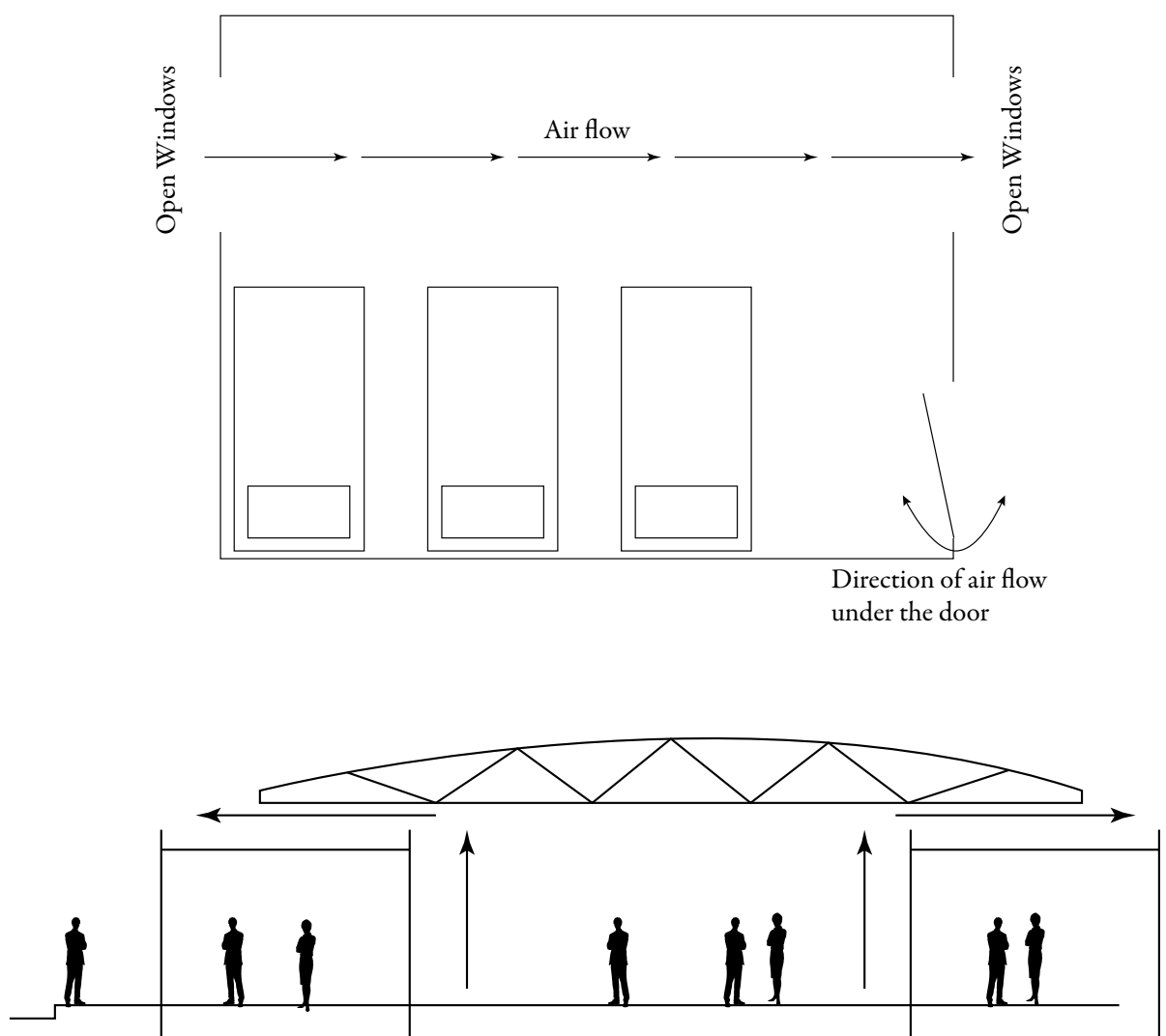
### What is ventilation?

Ventilation is the removal of old or “contaminated” air and replacing it with new, fresh or “clean” air. This has the effect of removing infectious particles and diluting those that remain, so that the chance of inhaling infectious particles is reduced.

Mechanical ventilation can also control the direction of airflow so that air flows from less contaminated to more contaminated areas and then to the outside. We distinguish between natural ventilation, mechanical ventilation and mixed ventilation.

### Natural ventilation

Natural ventilation relies on open doors and windows to bring air in from the outside.



The space between the walls and the roof allows natural ventilation

### Mechanical ventilation

Mechanical ventilation is the use of mechanical air-moving equipment, such as air conditioning and fans. Mechanical ventilation is used in situations where natural ventilation is not feasible or is inadequate.

Window (extractor) fans are generally an inexpensive and feasible method of using mechanical ventilation to direct air flow in many resource-limited settings. They only work in smaller rooms and usually don't extract all the air in a room.

Air-conditioning re-circulates and cools (or heats) the air, but it doesn't filter the air. When using air-conditioning, windows are closed and the old “contaminated” air is not removed. Air-conditioning is “the enemy of TB-IPC”.

**Mixed ventilation**

Mixed ventilation is a combination of natural and mechanical ventilation, e.g. open doors/windows and the use of fans.

**How can I mix the air?**

The mixing of air will reduce high concentration pockets of infectious particles, such as in the corners of a room or in the vicinity of patients where natural ventilation alone is insufficient. Air can be mixed by using fans or by opening the windows and taking advantage of wind.

**What is directional air flow and how can I use this to keep HCWs safe?**

Air should flow from a low concentration of infection particles towards a high concentration. The HCW should always be “upwind” of the patient, clean air should flow from behind the HCW towards the patient. The patient should be seated next to an open window at all times.

**How can I measure ventilation rates?**

Ventilation rates are measured by ‘air changes per hour’ (ACH). The National TB Guidelines give more information on how to calculate the ACH, and the number of ACH that is needed for clean air.



## 8. Fact Sheet: Ultraviolet Germicidal Irradiation (UVGI)

Sources: “Implementing the WHO Policy on TB Infection Control” and “Guidelines for Preventing the Transmission of Mycobacterium tuberculosis in Health-Care Settings”, CDC 2005.

### What is ultraviolet light and how does it kill bacteria?

Ultraviolet (UV) light is like sunlight and is effective in killing bacteria (including *M. tuberculosis*) by damaging bacterial DNA and preventing bacterial replication. UV light can be produced by low-pressure mercury vapor lamps which are used in commercial ultraviolet germicidal irradiation (UVGI) fittings.



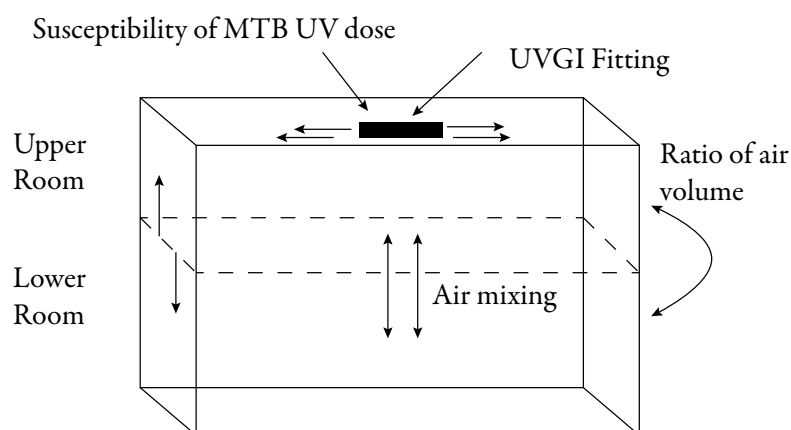
UVGI lamp suspended from the ceiling

### What is the role of UVGI in TB infection control?

UVGI devices do not replace ventilation systems; rather they should be considered as a complimentary intervention.

### Air mixing is essential if UVGI is to be effective

UV light kills bacteria when they are exposed to it for a sufficient length of time and with enough intensity (brightness). UV light can damage human skin and corneas, so UV fittings are designed to allow UV light to only shine in the upper part of the room. UVGI therefore relies on the mixing of air from lower to upper room, meaning that air circulation must be present where UVGI fitting are installed. Air circulation can be achieved by opening windows and by using slow-moving ceiling fans.



Air mixing between the upper to the lower room

### Maintaining the effectiveness of UVGI fittings

UV fittings attract dust and insects that reduces the amount of UV light released from the lamp. Therefore regular cleaning of UVGI fittings is necessary. Always be sure to switch off power from the fitting before cleaning. The UV light output of lamps declines with age, so UVGI tubes should be changed and cleaned according to the instructions of the manufacturer or when irradiance measurements indicate that output is below effective levels.

Make sure the maintenance of these fittings is included in the facility's TB infection control plan. The monitoring of the fitting's performance should be conducted every three to six months and must be done by a qualified service technician.

### Safety considerations when using UVGI fittings

Over-exposure to UV light can cause redness of the skin (erythema), inflammation of the cornea (photo keratitis) and inflammation of the conjunctiva (conjunctivitis). Symptoms of these conditions normally commence about 6-12 hours after exposure and include a feeling of sand in the eyes, tearing and sensitivity to light, all of which are reversible. If staff or patients complain of these symptoms, UV light is escaping into the lower part of the room, which means the lamp is poorly positioned, or the UV light is being reflected off shiny surfaces and repositioning should be considered. In settings that use UVGI systems, patients and visitors should be informed of the purpose of UVGI systems and be warned about the potential hazards and safety precautions.

## SESSION 5: TB-IPC AMONG HEALTH CARE WORKERS

### Duration:

60 minutes

### Objectives:

By the end of this session the participants are able to:

- Present the risks of HCWs for TB Infection
- Educate their colleagues on how to prevent transmission of TB infection
- Advocate for safe working conditions.

#### 1. Discuss in subgroups

- What are your fears about TB as a HCW?
- What do you do to protect yourself?
- What could your hospital management do to protect you more?

#### 2. What are your lessons learned?

HCWs have a higher risk for TB infection because they:

What is the TB incidence among HCWs in Bangladesh?

What can HCWs do to protect themselves?

What can hospital management do to protect HCWs?

## EVALUATION OF DAY 1

Take a moment to reflect at the end of this first day of training, and answer the following questions:

1. What are the three most important things you have learned?
2. What TB-IPC practices do you want to change in your hospital?
3. What questions do you still need answered?
4. Do you have any suggestions for the facilitators?

SESSION 6: THE FAST STRATEGY

Duration:

90 minutes

Objectives:

- By the end of this session the participants are able to:
- Explain the FAST strategy to their team members
  - Discuss FAST implementation in their facility.

1. What does FAST stand for:

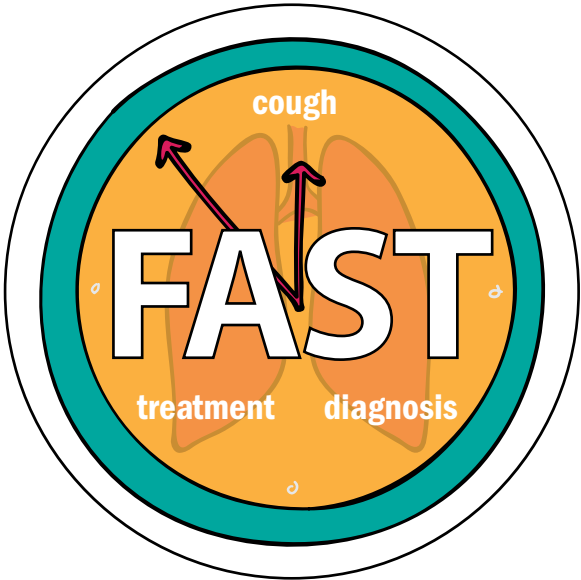
- a. Finding TB cases
- b. Actively
- c. Separating safely and
- d. Treating Effectively.

2. What is the purpose of FAST:

To reduce TB or DR-TB transmission in congregate settings.

3. Group Work: Implementing FAST in your facility? (20 minutes)

- a. Read “FAST, a Tuberculosis Control Strategy” pages 4–8.
- b. “Would you like to introduce FAST in your facility? Why or why not?”



Yes we would like to introduce FAST in our facility because:	No we don't want to introduce FAST in our facility because:

4. Monitoring and Evaluation of the FAST strategy

On the next pages there is a FAST facility self-assessment tool and a FAST reporting format, to monitor and evaluate FAST implementation.

## FACILITY (SELF)-EVALUATION TOOL

Instructions: This form is used by the Facility TB-IPC focal person to assess FAST implementation every month. Use the questions as guidance for your discussion with the healthcare workers who implement FAST. Provide a summary of the discussion and the agreed actions and comments. Maintain for record keeping.

Date:		Department:	Name of FAST focal Person:
1	Observations and Actions on outpatient triage		
2	Observations and Actions on inpatient triage		
3	Observations and Actions on Fast-tracking/Separation of patients		
4	Observations and Actions on sputum collection and transportation (if applicable)		
5	Observations and Actions on laboratory investigations		
6	Observations and Actions on the correct and complete use of registers		
7	Observations and Actions on time to diagnosis and treatment		
8	Observations and Actions on the detected numbers and percentages of presumptive TB and TB cases compared with other months, targets		
9	Any other Observations and Actions		
10	Any questions for technical support		

Source: FAST a Tuberculosis Infection Control Strategy, Federal Ministry of Health, Department of Public Health, National Tuberculosis and Leprosy Control Programme, Nigeria

## Reporting Format

Name of the Health Facility:					
Month and Year of reporting:					
INDICATOR	# Same Day	# Next Day	# 3-5 Days	# >5 Days	Total #
1. Time to TB diagnosis					
2. Time to TB treatment					
3. Time to DR-TB diagnosis					
4. Time to DR-TB treatment					
5. Total number of outpatients					
6. Total number of inpatients					
7. Number of presumptive TB patients					
8. Number of TB patients diagnosed					
8. Number of TB patients started on Rx					
9. Number of TB patients referred elsewhere					
10. Number of presumptive DR-TB patients					
11. Number of DR-TB patients diagnosed					
12. Number of DR-TB patients started on Rx					
13. Number of DR-TB patients referred elsewhere					

Short narrative report with relevant information extracted from the Facility self-evaluation form:

Name of reporting officer: \_\_\_\_\_ Date of submission: \_\_\_\_\_/\_\_\_\_\_/20

*Source: EAST a Tuberculosis Infection Control Strategy, Federal Ministry of Health, Department of Public Health, National Tuberculosis and Leprosy Control Programme, Nigeria*

### Defining the indicators:

1. Time to diagnosis = Time between the day the patient meets the HCW and the day the patient receives the diagnostic result
2. Time to treatment = Time between the day the patient diagnosed as a TB case and the day of treatment initiation
3. Time to DR-TB diagnosis = Time between the day the patient meets the HCW and the day the patient receives the DR-TB diagnostic result
4. Time to DR-TB treatment = Time between the day the patient diagnosed as DR-TB case and the day of DR-TB treatment initiation
5. Total number out-patients = Total number of out-patients in this health facility in the reporting period
6. Total number in-patients = Total number of hospitalized patients in this health facility during the reporting period
7. Number presumptive TB patients = Total number of presumptive TB patients during the reporting period.

### Reporting procedure:

- Report written by the facility (TB)-IPC focal person, based upon the self-assessment results.
- Report sent quarterly to the IPC focal person at the NTP.

## SESSION 7: TB-IPC HEALTH EDUCATION

### Duration:

90 minutes

### Objectives:

By the end of this session the participants are able to:

- Present the TB-IPC health-education materials, the key messages and the target groups
- Use the health education materials to give TB-IPC health education.

#### 1. TB-IPC materials

The TB-IPC health education materials available in Bangladesh are:

1. Leaflet - Cough etiquette leaflet
2. Infection control - Poster
3. Flip Chart: MDR-TB
4. TB Poster.

#### 2. Group work (1)

Your group has one or two TB-IPC health education materials.

Discuss the questions below:

1. Who is the target audience for this brochure/poster?
2. What is the TB-IPC message of this brochure/poster?

Write this information in the table below.

Present the health education materials and the results of your group work in plenary.

Health education material	Target audience	TB-IPC message
Cough etiquette leaflet		
Infection control Poster		
Flip chart: prevent the spread of TB		
Regular treatment with anti-TB drugs Poster		

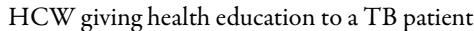
#### 3. Group work (2)

Prepare a health education session, making use of the brochure/poster discussed before.

Define together:

- Who is the target audience? Is this an individual or a group?
- Where does the health education take place: At the health facility?, at the patient's home?
- Will you sit or stand?

Ask one group member to volunteer to give the health education in plenary.







## যক্ষ্মা রোগ প্রতিরোধে হাঁচি কাশি দেওয়ার সময় কিছু নিয়ম মেনে চলুন



হাঁচি, কাশির সময় হাত দিয়ে মুখ ঢেকে  
রাখুন অথবা মুখ একপাশে ঘুরিয়ে নিন

হাঁচি, কাশি দেওয়ার সময় রুমাল  
কিংবা টিস্যু দিয়ে মুখ ঢেকে রাখুন



হাঁচি, কাশির পর রুমাল ধুয়ে ফেলুন অথবা  
ব্যবহৃত টিস্যু নির্দিষ্ট জায়গায় ফেলুন

হাঁচি, কাশি দেওয়ার পর  
সাবান দিয়ে হাত ধুয়ে ফেলুন



**TB CARE II**  
BANGLADESH



# সাধারণ কিছু নিয়ম মেনে যক্ষ্মারোগের প্রতিরোধ গড়ুন



হাঁচি-কাশির সময় রুমাল বা  
টিস্যু ব্যবহার করুন অথবা  
হাত দিয়ে মুখ ঢেকে রাখুন অথবা  
মুখ একপাশে ঘুরিয়ে নিন



ব্যবহারের পর রুমাল ধুয়ে ফেলুন  
অথবা  
টিস্যু নির্দিষ্ট জায়গায় ফেলুন



হাঁচি-কাশি দেওয়ার পর  
সাবান দিয়ে হাত ধুয়ে ফেলুন



কফ, থুথু নির্দিষ্ট পাত্রে  
ফেলার অভ্যাস করুন



ঘরে পর্যাপ্ত আলো-বাতাসের  
ব্যবস্থা রাখুন



যক্ষ্মারোগে আক্রান্ত হলে  
পূর্ণমেয়াদে চিকিৎসা নিন

## নিয়ম মেনে চলুন যক্ষ্মা থেকে দূরে থাকুন



TB CARE II  
BANGLADESH



Flip chart: prevent the spread of TB



যক্ষ্মা রোগের চিকিৎসায় পূর্ণমেয়াদে ঔষধ খেতে হবে,  
তা নাহলে আপনি ঔষধ প্রতিরোধী জটিল যক্ষ্মায়  
আক্রান্ত হতে পারেন যার চিকিৎসা দীর্ঘমেয়াদি  
এবং ব্যয়বহুল।



নিয়মিত পূর্ণমেয়াদের চিকিৎসায়  
যক্ষ্মা সম্পূর্ণ ভালো হয়



TB CARE II  
BANGLADESH



## SESSION 8: PERSONAL PROTECTION

### Duration:

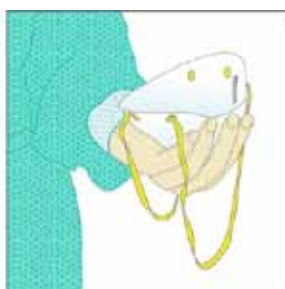
60 minutes

### Objectives:

By the end of this session the participants are able to:

- Inform their colleagues about the use of masks for TB infection control
- Put on the N95 mask.

#### 1. How to put on the N95 mask



- 1 Cup the respirator in your hand with the nosepiece at your fingertips allowing the headbands to hang freely below your hand.



- 2 Position the respirator under your chin with the nosepiece up.

- 3 Pull the top strap over your head resting it high at the back of your head. Pull the bottom strap over your head and position it around the neck below the ears.



- 4 Place fingertips of both hands at the top of the metal nosepiece. Mould the nosepiece (USING TWO FINGERS OF EACH HAND) to the shape of your nose. Pinching the nosepiece using one hand may result in less effective respirator performance.



- 5 Cover the front of the respirator with both hands, being careful not to disturb the position of the respirator.

#### 5A Positive seal check

- Exhale sharply. A positive pressure inside the respirator = no leakage. If leakage, adjust position and/or tension straps. Retest the seal.
- Repeat the steps until respirator is sealed properly.

#### 5B Negative seal check

- Inhale deeply. If no leakage, negative pressure will make respirator cling to your face.
- Leakage will result in loss of negative pressure in the respirator due to air entering through gaps in the seal.

Source: *Infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in health care*, WHO Guidelines 2014.

## 2. Factsheet

### N95 respirators and surgical masks for TB infection Control

Sources: “Implementing the WHO Policy on TB Infection Control”, “Infection prevention and control of epidemic- and pandemic-prone acute respiratory infections in health care, WHO Guidelines 2014, “Respiratory protection guidelines for KNCV Tuberculosis Foundation Staff, 2014”

#### Introduction

When used with administrative and environmental controls, particulate respirators may provide HCWs additional protection from TB. Respirators and masks are NOT a substitute for administrative and environmental controls.

#### N95 respirators

N95 respirators can act as filters, to capture infectious particles and prevent them from being inhaled. In this way, infection with TB can be prevented. For effective protection against TB infection, respirators should filter out at least 95% of particles of at least 0.3 micrometers (“microns”) in size. These respirators used should meet or exceed the United States National Institute for Occupational Safety and Health (NIOSH) certified N95 standards.

#### Who should use N 95 masks?

HCWs should use N95 respirator/masks in specific high-risk areas:

- When dealing with patients with presumed (DR-) TB and patients with confirmed pulmonary TB/DR-TB who are still infectious.
- When working in TB culture and DST laboratories.

#### Instructions for the proper wearing of N95 masks:

- Masks can only be assigned to a single individual and must not be shared with others. The mask should fit the user. Don't write the staff member's name on the mask, as it will destroy the filter.
- Take off your glasses when putting on the mask.
- Facial hair impedes good fit and decreases the effectiveness of the mask.
- The N95 mask can be used for several weeks, however proper fitting may decrease with frequent wearing.
- They may be used for 1 – 2 weeks as long as they don't become moist and the straps have not lost their elasticity. Before each use the outside material of the filter should be inspected.
- If the filter material is physically damaged or soiled, or the straps are slack, the respirator should be discarded.
- Store the mask properly: in a clean and dry location (hang it on the wall at room temperature and write the date that you started using it on it). A second option: Fold a tissue with your name and the date that you started using around the respirator (being careful not to crush it).

#### Fitting an N95 respirator

A respirator will provide no protection if it is not properly fitted, as air will flow through ‘gaps’ between the mask and the wearer's skin. Qualitative fit-tests could be done when selecting the type of mask that your facility uses as variability in facial structure can mean that different types of respirators fit better. Any facial hair, such as beards or long sideburns, may prevent the respirator from fitting properly. An informal way to test the fit of your respirator is as follows:

- Fit the respirator according to manufacturer's instructions.
- Once the respirator is in place, inhale sharply. The respirator should be drawn in towards your face, indicating that a negative pressure has been generated.
- If the respirator does not draw in towards your face, or you feel leakage at the edges, adjust straps by pulling back along the sides and/or reposition respirator.
- Repeat until the respirator is sealed properly.

#### Surgical masks

A surgical mask is not a respirator. Masks are provided to TB patients to limit the spread of droplets or droplet nuclei during coughing or sneezing. These masks do not protect the wearer from inhaling small infectious aerosols.

### 3. Do masks increase stigma among TB patients?

Discuss in plenary:

How do you react when you meet somebody wearing a mask?

How do patients react when you wear a mask?

How can this stigma be addressed?

## SESSION 9: TB-IPC IMPLEMENTATION PLAN

### Duration:

90 minutes

### Objectives:

By the end of this session the participants:

- Have developed a draft TB-IPC plan for their hospital
- Agree on what needs to be done to get the plan implemented
- Agree on how to monitor the implementation of this plan.

### Group work:

TB-IPC plan for your health facility (40 minutes)

Start developing the TB-IPC plan for your health facility. Make use of the IPC risk assessment that you made previously.

Prepare a five minute plenary presentation to inform your colleagues on:

- The three priority activities
- Why these are priority for your health facility
- What you need to finalize this plan.



## TB-IPC PLAN

Every health facility needs a TB-IPC plan, which will be part of the overall facility IPC plan.

The TB-IPC plan guides the implementation, monitoring and evaluation of TB-IPC activities. The TB-IPC risk assessment will guide the prioritization of the activities.

Facility: \_\_\_\_\_

Name and designation of the TB-IPC focal person: \_\_\_\_\_

Year: \_\_\_\_\_

MANAGERIAL					
Activities (what and where)	Estimated cost	Who is responsible?	When will this be implemented?		
			Start	End	On going

ADMINISTRATIVE					
Activities (what and where)	Estimated cost	Who is responsible?	When will this be implemented?		
			Start	End	On going

ENVIRONMENTAL					
Activities (what and where)	Estimated cost	Who is responsible?	When will this be implemented?		
			Start	End	On going

PERSONAL PROTECTION					
Activities (what and where)	Estimated cost	Who is responsible?	When will this be implemented?		
			Start	End	On going

