

# Management of Tuberculosis Training for Health Facility Staff

## I. TB Infection Control in your Health Facility

SECOND EDITION



WORLD HEALTH ORGANIZATION  
Geneva



TUBERCULOSISFOUNDATION



**Management of Tuberculosis  
Training for Health Facility Staff**



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HEALTH FACILITY**

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# TB Infection Control in your Health Facility

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# **TB Infection Control in your Health Facility**

## **Introduction**

Patients with smear-positive pulmonary TB are the most infectious cases because they spray tubercle bacilli into the air when they cough or sneeze. Contacts of sputum smear-positive cases can become infected when they breathe in tubercle bacilli. The longer sputum smear-positive cases are present in the home and community before beginning treatment, the greater the likelihood that they will infect others.

Rapid detection of pulmonary smear-positive cases should be a priority for every health facility, so that those patients can be treated before spreading the infection to others. Thus, rapid detection of the most infectious cases and appropriate treatment are two of the most important ways to prevent TB transmission.

Detection and treatment of TB cases have been well described in previous modules. This module will address additional methods that a health worker should use to prevent the spread of TB and other infections in a first-level (outpatient) health facility.

A third important way to prevent TB transmission is to bring fresh air into areas of the health facility where infectious TB patients and TB suspects cough or sneeze while waiting, seeing a health worker or walking from one area to another. Good ventilation dilutes and exchanges the room air with fresh air, thereby reducing the number of particles remaining in the air and reducing the risk of another person becoming infected with TB in the facility.

Promptly identifying people who cough, separating them from other patients to the extent possible, asking patients to cover their mouth and nose when coughing or sneezing (cough hygiene), and minimizing the amount of time that patients are in the health facility are all ways to decrease the possibility of transmission of TB and other airborne infections in the facility.

In addition to TB transmission, a health facility can easily be the scene of transmission of other illnesses such as pneumonia, influenza and diarrhoea. Lack of cough hygiene, crowding and poor ventilation facilitate transmission of airborne infections. Improper use of needles or blood products can result in transmission of HIV, hepatitis or other bloodborne infections. Poor handwashing practices allow transmission of other infections. It is therefore imperative that health workers stay aware of the possible ways that infections can be transmitted and take very seriously the procedures and precautions that prevent the spread of illness.

Infection control is such an important issue that an annual refresher session is appropriate for all staff of the facility.

## Objectives of this module

### Participants will learn:

- How to ensure good ventilation in a health facility
- How to improve patient flow in the facility to decrease the risk of TB transmission
- Ways to educate TB suspects, TB patients and their families about cough hygiene
- Precautions for handling sputum specimens
- Precautions for preventing the spread of pathogens in needles
- Ways to reduce your personal risk
- How to stay alert for signs and symptoms of TB in yourself and actions to take if they develop

### Refer to section:

1  
2  
3  
4  
5  
6  
7

If you need to look up an unfamiliar word, refer to the glossary at the end of module

A: *Introduction*.

## 1. Ensure proper ventilation in the health facility

Ventilation is the movement of air in a building and replacement of inside air with air from outdoors. Natural ventilation relies on open doors, windows and skylights to bring in air from the outside; when fresh air enters a room it dilutes the concentration of particles in room air, such as droplet nuclei containing *Mycobacterium tuberculosis*.

Designing waiting areas and examination rooms so that they maximize natural ventilation can help reduce the spread of TB and other airborne infections. In warm climates, this means open-air waiting areas with a roof to protect patients from sun and rain. In cooler climates, and where enclosed buildings are provided for the health services, doors and windows in the health facility should remain in an open position that enhances cross ventilation to the extent possible. Patients should not wait for services in narrow, poorly ventilated corridors or rooms.

A fan mounted in a wall opening which blows air out of the room, sometimes called an exhaust fan or extractor, can increase the effectiveness of natural ventilation. (However, take care that room air is not blown into a hall or other room occupied by people.) A similar effect may be achieved by placing a window fan facing out of a window opening, so that it draws air from the room to the outdoors.

When an exhaust fan is combined with a way to replace room air with fresh air, such as an open window or door on the opposite side of the room, the result will be good cross ventilation. Cross ventilation will result in fewer particles overall in the room and less risk of transmission of TB. If exhaust fans are installed to face out of openings in the back wall of a building, and if doors or windows in the front of the building are kept open, the overall effect should be to draw in fresh air through the front of the building and exhaust air through the rear. If there is only one fan, place it in a window or other opening to draw air from patient care areas and blow it to the outdoors.

Because infectious TB particles remain suspended in the air for a long time, and only one is required for infection, fans that do not extract air to the outside (such as ceiling fans, small

desk fans) are not recommended. In fact, in laboratories and enclosed spaces (such as hospital wards), those fans increase the risk of infection because they more quickly dry the particles, which then remain suspended in the air (aerosolized), and may then move them to expose more people.

The risk of TB transmission is greatest in a closed room that contains air with aerosolized particles containing tubercle bacilli. High-risk areas in a health facility include sputum collection areas, outpatient waiting rooms, closed examination rooms, the emergency room and the ambulance. These are areas where people who know or who do not know that they have pulmonary TB are likely to cough, sneeze or breathe tubercle bacilli into the air. These particles remain in the air from one patient to the next. Unless these bacilli are quickly ventilated out of the area, people who later breathe the same air may breathe in those bacilli and become infected with TB.

Transmission may be delayed. The TB patient may be gone, but transmission can occur as long as the air containing suspended tubercle particles is there. This can be a few minutes with ventilation and several hours in a room with no ventilation.

**Arrange patient waiting areas and other high-risk areas in relation to doors, windows and exhaust fans to ensure the best possible ventilation.**

**Patient waiting areas** should be open to the outdoors and well-ventilated. Because waiting areas often have more people at a time and mix adults and children, there are more chances of being exposed to a coughing person if one sits there a long time. If waiting areas cannot be established in open covered areas, windows or other openings may be installed on outer walls so that the air does not remain still, but moves to the outdoors and not into other wards or waiting areas.

**Examination rooms and treatment areas** should be kept ventilated. Patient examination and treatment are often done in a small room; the higher risk of TB transmission occurs after the patient leaves and aerosolized particles remain. A room with an open window at one end provides air exchange near the window; however, little air is exchanged a short distance from the window. Therefore, the minimum acceptable ventilation involves openings on opposite ends of a room (window – window, window – door). A door on an examination room that is kept closed when occupied may be cut off (for example, trimmed 5–15 cm) to allow air flow below it.

**Sputum collection** should always be done in a very well-ventilated area or outdoors in an area away from other people, not in small rooms such as toilets or other enclosed areas. Direct patients to the most well-ventilated place to cough up sputum specimens.

Infectious patients with uncontrolled cough (for example, TB patients on treatment less than 2 weeks, MDR-TB patients who are still infectious or TB suspects) may wear masks when being moved around the clinic. Alternatively, patients can use a clean handkerchief or cloth tied over their nose and mouth. Surgical or other masks will reduce infection risk from coughs and sneezes when worn by patients with pulmonary TB but are no help in stopping infection when worn by anyone else. For this reason, it is not recommended that staff wear masks.

To improve ventilation and decrease risk in your facility:

1. **Check that all windows and doors can be opened and are easy to keep open.** Sometimes a desk or storage boxes are placed against a door and it cannot be opened. Sometimes a window may be stuck closed or may be difficult to reach because of furniture in front of it. Take whatever action is needed so that all the existing windows and doors can be opened every day. This might include, for example, moving the furniture or storage boxes so that the windows and doors can be opened easily, oiling hinges, obtaining an appropriate rod to open a skylight and keeping it available and installing a hook to hold a window open.
2. **Check that doors allow some airflow, even when closed.** Doors on examination and treatment rooms can be trimmed to increase air flow below them even when closed.
3. **Check that all exhaust fans and air conditioners are in good working order and clean.** Exhaust fans in particular get dirty and may be forgotten. Clean dirty fans, and repair or replace broken fans. To check that fans with a grille are working, hold a tissue or piece of paper against the grille. If the fan is working, the tissue or paper should be pulled against the grille. Keep exhaust fans on. If there is an air conditioner, check that its filter is kept clean.
4. **Place fans in windows to blow room air to the outdoors.** Window fans should be placed in locations so they add to natural ventilation currents. However, check where the fan will be blowing the air: it should not blow into a patient waiting area or hall where people would breathe that air.
6. **Keep doors, windows and skylights open as much as possible.** Allow air to blow into and out of the building. Though doors may need to be closed at certain times to respect patients' privacy and maintain confidentiality, they should be kept open at all other times. If open windows let in intolerable amounts of traffic noise or dust, or if the climate is too cold to keep windows open all the time, consider opening windows frequently to "air out" the space whenever the space is unoccupied, such as between patients in examination rooms, at lunch break, tea break and prior to closing.

An important part of any health facility supervision is watching to make sure that doors and windows are maintained in an open position that enhances ventilation each day, and periodically checking that exhaust fans and windows are kept in good working order.

## **2. Organize patient flow in the facility to decrease the chance of transmission of TB**

Organize patient flow so that TB patients coming for directly-observed treatment are rapidly attended to. This will minimize the amount of time that others in the facility are exposed to an infectious TB patient. Respecting the TB patient's time in this way should also facilitate adherence to the treatment schedule, increasing the likelihood of cure.

There is a large difference in the infectiousness of different TB patients. The most infectious TB cases are people with smear-positive pulmonary TB who have not yet been detected or who have been on treatment for less than 2 weeks. (After a TB case is on effective treatment more than 2 weeks, most bacilli are dead and the person is non-infectious.)

A patient who has smear-negative pulmonary TB may be infectious, but is much less likely to infect others. A smear-positive case may infect 5–10 times as many people as a smear-negative TB case. Extrapulmonary TB cases are non-infectious.

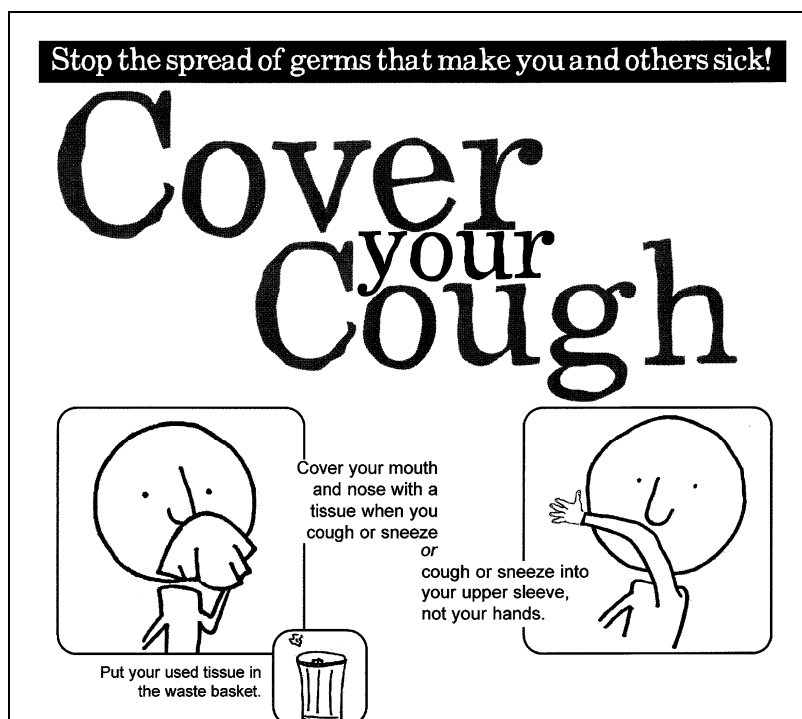
Identify people who have cough and separate them from others to the extent possible. Provide instructions in the health facility and waiting areas for people who have cough to move to the front of the queue. For example, a sign could read, "If you have a cough, tell the nurse now." Coughers may be spreading TB, and everyone is susceptible, regardless of BCG immunization or previous TB illness. Some people – such as children aged under 5 years, HIV-infected people and other immunocompromised individuals – are highly susceptible. Ask patients who have cough or suspected TB to wait near an open window or in a comfortable area separate from the general waiting room (outside when possible).

Because any TB suspect may have smear-positive pulmonary TB, every TB suspect should be attended to quickly. When asking TB suspects to collect sputum, direct them to a separate, well-ventilated area for sputum collection, preferably outdoors, and away from other people. Examination rooms and the passages leading to them should be well-ventilated also.

Ask people with cough to wait near an open window or in a comfortable area separate from the general waiting room, outdoors if possible, and attend to them quickly.

### 3. Educate TB suspects, TB patients and their families about cough hygiene

Instruct all TB suspects and TB patients to cover their mouths and noses when coughing or sneezing. This is important to control the spread of TB and is also good practice to reduce the spread of influenza, colds and other respiratory infections. Every facility should have a poster on TB infection control and cough hygiene in at least the outpatient department waiting areas. Instruct all patients to cover their mouth and nose when coughing or sneezing, with hands, with cloth such as a handkerchief or clean rag, with tissues or by wearing a paper mask.



### 4. Take precautions when collecting and handling sputum

Collecting and processing sputum specimens are essential tasks in the diagnosis of TB. Sputum collection can be potentially hazardous for health-care workers and other patients. When you ask a TB suspect or TB patient to collect sputum, explain the procedure, give the specimen cup to the patient and send the patient to an open area, preferably outdoors and away from other people, to cough up sputum. Do not stand in front of the patient when sputum is being coughed up.

After the TB suspect or TB patient provides a sputum specimen, clean the outside of the specimen cup by wiping it off (or ask the patient to do it). Always wash your hands after handling sputum specimen cups. Use running water and soap to wash hands, or you may use an alcohol-based hand rub, if available. (See Annex.) Use standard precautions for handling specimens, in the laboratory and in the health facility.

The next page shows an excerpt from Module B: *Detect Cases of TB*. It lists important points about collecting sputum for examination. Some important points on safety are highlighted.

## Collect sputum for examination

- **Explain** that the TB suspect needs a sputum examination to determine whether there are TB bacilli in the lungs.

- **List** the TB suspect's **name and address** on the **Request for Sputum Smear Microscopy Examination form**.

Do not stand in front of the TB suspect when he or she is coughing to produce sputum (or anytime)!

### TB SPECIMEN

Name: \_\_\_\_\_  
Health facility: \_\_\_\_\_  
Date: \_\_\_\_\_  
Specimen no. \_\_\_\_\_

- **Label** the sides of the container with the TB suspect's name and address (on two lids). Two samples are needed for follow-up examination.

- **Fill out** *Request for Sputum Smear Microscopy Examination form*.

- **Explain and demonstrate, fully and slowly, the steps to collect sputum.**

- Show the TB suspect how to open and close the container.
- Breathe deeply and demonstrate a deep cough. The TB suspect must produce sputum, not only saliva.
- Explain that the TB suspect should cough deeply to produce sputum and spit it carefully into the container.

Very important!

- **Collect**

- Give the TB suspect the container and lid.
- **Send the TB suspect outside to collect the sample in the open air if possible, or to a well-ventilated place, away from other people and with sufficient privacy.**
- When the TB suspect returns with the sputum sample, look at it. Is there a sufficient quantity of sputum (not just saliva)? If not, ask the TB suspect to add some more.
- Explain when the TB suspect should collect the next sample, if needed.

### Schedule for collecting two sputum samples

#### Day 1:

- Collect "on-the-spot" sample as instructed above (**Sample 1**).
- Instruct the TB suspect how to collect an early morning sample tomorrow (first sputum after waking). Give the TB suspect a labelled container to take home. Ask the TB suspect to bring the sample to the health facility tomorrow.

#### Day 2:

- Receive early morning sample from the TB suspect (**Sample 2**).

Also important!

- **When you collect the second sample, tell the TB suspect when to return for the results.**

- **Store**

- **Check that the lid is tight. Wipe off the outside of the container, if needed.**
- Isolate each sputum container in its own plastic bag, if possible, or wrap in newspaper.
- Store in a cool place. (If samples will be sent for culture, keep refrigerated.)
- **Wash your hands.**

Use running water and soap, or an alcohol-based hand rub, if available.

- **Send**

- Send the samples from health facility to the laboratory.
- Total time from collection until reaching laboratory should be no more than 5 days. (Samples for culture should be sent promptly and reach the laboratory in 1–2 days.)

## 5. Take precautions to reduce the spread of HIV or other bloodborne pathogens in needles

Follow recommended procedures for giving sterile injections. Always use disposable needles and syringes or sterilize them carefully before reuse. Follow recommended procedures and use effective equipment to sterilize needles and syringes.

Always follow procedures to prevent needle-stick injuries by:

- minimizing the need to handle needles and syringes
- handling syringes and needles safely
- setting up the immunization work area to reduce the risk of injury
- practicing safe disposal of all medical sharps waste.

These procedures are explained in the WHO module titled *Ensuring Safe Injections*<sup>1</sup> and other references.

All used injection equipment except reusable syringes and needles should be placed in a **safety box** (or sharps container) immediately after use. A sharps container should be waterproof, tamper-proof and puncture-proof so that needles cannot easily pierce them. If a safety box is not available, you can use locally available materials to create a functional safety box.

The safety box should be placed within reach of the health worker. After each injection, immediately place the syringe and needle in the safety box or sharps container. Do not recap the needle.

When the safety box is three-quarters full, close the container. Find a safe place to burn the box. It is recommended to burn the box in an incinerator (or if this is not possible, a metal drum or open pit).

The remains of the needles and safety box should be buried after burning. Bury them deeply in a pit latrine, controlled landfill or a similar location where people will not have access to them.

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<sup>1</sup> Ensuring safe injections (Module 4). In: *Ensuring safe injections*. Geneva, World Health Organization, 2004 (available at <http://www.who.int/vaccines-documents/iip/PDF/Module4.pdf>; accessed September 2009).



## **6. Avoid unnecessary personal risk, and take measures to decrease personal risk**

Protect your own health. As you carry out your job and specific tasks in the health facility, always follow all recommended infection control procedures described in this module and in other references.

If you have risk factors for TB disease such as smoking, malnutrition, diabetes or alcohol dependency, reduce or eliminate them to the extent possible, for example, by quitting smoking, or following treatment for diabetes.

Get tested for HIV. Periodically undergo retesting to know your HIV status. Your health facility should provide accessible, acceptable, confidential HIV testing and retesting for staff. If you are HIV-infected, you are at increased risk of developing TB disease if exposed to TB in the workplace. However, you can decrease that risk by taking CPT and ART to improve immune function. You may be screened for TB disease and TB infection; if you have TB infection but not TB disease, you will be considered a candidate for isoniazid preventive therapy, or IPT, as part of basic HIV care. You may also request to be assigned to other areas or duties with a lower risk of exposure to TB.

Get a BCG immunization if you have not had one. All health staff should be either BCG vaccinated or offered BCG (unless they are already tuberculin positive because of TB infection). BCG does not protect from infection, but if a person is infected with TB, it reduces the risk of developing TB disease by 50–80% by accelerating the immune response.

Know the potential risks of TB infection in your health facility and the high-risk areas within the facility such as closed patient examination rooms, waiting areas and treatment rooms in the outpatient department, the emergency room and the ambulance. Take responsibility to use methods to reduce your risks:

- Ensure adequate ventilation to decrease the number of organisms remaining in the air and reduce the duration of exposure to them.
- Ensure that TB suspects and TB patients cover their mouth and nose when coughing or sneezing.
- Ensure that coughing to produce sputum is done in a very well-ventilated area.

In addition, implement other recommended infection control procedures, for example:

- Keep tables free of garbage and papers, and clean them frequently.
- Replace table tops made with a porous surface, such as wood, with a non-porous surface, such as polished stone or plastic.
- Use running water and soap for handwashing, or use an alcohol-based hand rub, if available.
- Ensure that toilets are available, functional and have paper, and that there are facilities for handwashing after using the toilet.

Wearing a face mask made of cloth or paper does not protect you or other staff, patients or visitors against TB. A face mask is only useful when worn by a coughing person to reduce the output of infectious particles produced by coughing or sneezing. (Ask about your country's policy on personal protection equipment such as respirators.)

A black octagonal sign with the word "STOP" in white capital letters.

**Now do Exercise A – Written Exercise**

When you have reached this point in the module, you are ready to do Exercise A. Turn to page 22 and follow the instructions for Exercise A.

## 7. Stay alert for possible signs and symptoms of TB in yourself

Recognize the signs and symptoms of TB and be alert to them in yourself.

If one or more of the signs or symptoms of TB develop, report promptly for assessment. It is recommended that all health-care workers undergo a health assessment including screening for TB and HIV at least annually.

A health worker can develop TB because of a TB infection acquired in the past or just recently, either in the community or at work. Although a previous TB infection or BCG immunization reduces the risk of TB disease, the protection is only partial. Poor nutrition, stress and any factor that reduces immunity (such as HIV, diabetes or smoking) increase the risk of developing TB.

### Signs and symptoms compatible with TB:

- cough for 2 weeks or more
- bloody sputum
- night sweats
- fever
- history of fever
- fever now (temperature over 37.5 °C)
- weight loss
- previous history of TB in the patient or family contacts

Investigations in countries in Africa, Asia and South America have documented increased risk of TB disease or infection in health workers as compared with the general population. Those at risk include not just health-care providers, but any staff or volunteers who have contact with infectious TB patients (including those who have not yet been diagnosed and started on treatment). Staff at risk could include porters and cleaners, as well as peer educators, adherence supporters and volunteers working as counsellors or in support groups. HIV-infected staff are at particular risk of rapid progression to TB disease if they become infected or reinfected due to exposure to *M. tuberculosis* in the facility.

Even if all recommended TB infection control precautions are taken, the risk to staff will never be zero. An additional aspect of protecting staff is promoting early recognition of TB disease and standard treatment. With your knowledge and experience, you are the most important person for recognizing possible signs or symptoms of TB in yourself or your family member. If you develop signs or symptoms that may be compatible with TB, you should seek immediate assessment and care. If you are diagnosed with TB, you should start treatment promptly and adhere to treatment until it is completed.



**STOP**

### Now do Exercise B – Written Exercise

When you have reached this point in the module, turn to page 24 and follow the instructions for Exercise B. When everyone is ready, the facilitator will lead a discussion.

## Summary of important points

- Good ventilation in waiting areas and examination rooms of a health facility can reduce the spread of TB and other airborne infections.
- High-risk areas in a health facility include sputum collection areas, outpatient waiting rooms, closed examination rooms, the emergency room and the ambulance. In these areas, people who have pulmonary TB are likely to cough or sneeze tubercle bacilli into the air where they remain in the air from one patient to the next. Transmission can occur as long as the air containing suspended tubercle particles is there – a few minutes with ventilation to several hours with no ventilation.
- Good ventilation uses open doors, windows, skylights and exhaust fans to dilute and exchange room air with fresh air, thereby reducing the concentration of particles remaining in room air, such as those containing tubercle bacilli. When an exhaust fan is combined with an open window or door in the opposite wall, the result will be good cross ventilation. Fans that do not extract air to the outside, such as ceiling fans and desk fans, are not recommended.
- Patient waiting areas should be open to the outdoors and well-ventilated. An open-air waiting area with a roof is ideal in warm climates.
- Patient examination rooms should be kept ventilated. The minimum acceptable ventilation involves openings on opposite ends of a room (window – window, window – door).
- To increase ventilation and decrease risk of TB transmission in your facility:
  1. Check that all windows and doors are able to be opened and are easy to keep open.
  2. Check that doors allow some airflow, even when closed.
  3. Check that all exhaust fans and air conditioners are in good working order and clean.
  4. Place fans in windows to blow room air to the outdoors.
  5. Keep doors, windows and skylights open as much as possible (while still respecting privacy).
- The most infectious TB cases are people with smear-positive pulmonary TB who have not yet been detected or who have been on anti-TB treatment for less than 2 weeks. Because any TB suspect may be infectious, attend to every TB suspect quickly. Identify coughers quickly and ask them to wait near an open window or in a comfortable area separate from the general waiting room (outdoors when possible).
- Send the TB suspect outdoors to collect a sputum sample in the open air if possible, away from other people. Do not stand in front of the TB suspect when he or she is coughing to produce sputum (or anytime).
- Educate TB suspects, TB patients and their families about the need to cover their mouths and noses when coughing or sneezing, to prevent transmission of TB as well as colds, influenza and other respiratory infections.

- Take precautions to reduce the spread of HIV or other bloodborne pathogens in needles. Follow recommended procedures to give sterile injections and prevent needle-stick injuries. Use a safety box (or sharps container) for safe disposal of all medical sharps waste.
- Always follow recommended infection control procedures in your work in the health facility.
- If you have risk factors for TB disease such as smoking, malnutrition, diabetes or alcohol dependency, decrease your risk factors for TB disease to the extent possible, such as by stopping smoking, or following treatment for diabetes to increase your immunity.
- Know your HIV status; get retested periodically. If you are HIV-infected, you may decrease your risk of developing TB by taking CPT, ART and IPT if appropriate.
- Get a BCG immunization if you have not had one.
- Stay alert for possible signs and symptoms of TB in yourself. If one or more of these develop, report promptly for assessment and care. If you are diagnosed with TB, start treatment promptly and adhere to treatment until it is completed.

## Self-assessment questions



*Answer the self-assessment questions below to check what you have learned. Then compare your answers to those on pages 17–18.*

1. In the following drawings, circle what is good practice; put a box around what is a problem. Then explain why.

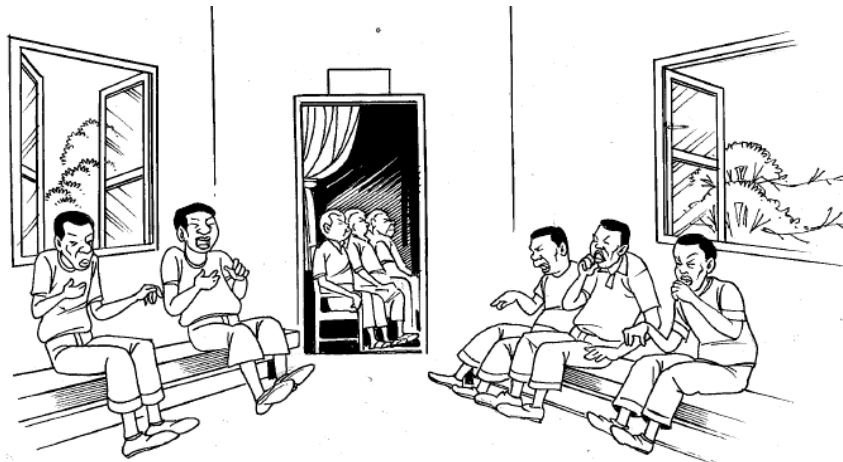
a.



This is a problem because:

This is good practice because:

b.



This is a problem because:

This is good practice because:

2. Label the following according to the likelihood of being infectious and transmitting TB as either: 3 = the worst risk; 2 = medium risk; 1 = the least risk.
- \_\_\_\_\_ A room with window and door; the window and door are closed during clinic hours.
  - \_\_\_\_\_ A room with an open window, open door, and an exhaust fan running during patient examination.
  - \_\_\_\_\_ A room with an open window; door is shut during patient examination but kept open between patients; no window fan.
3. Rate each case below according to likelihood of transmitting TB as either “D” for Danger of transmitting TB, or “U” for Unlikely to transmit TB.
- a) \_\_\_\_\_ Post-partum woman bringing child for immunization; she has been coughing since delivery
  - b) \_\_\_\_\_ TB patient on treatment for three months using DOT
  - c) \_\_\_\_\_ A man coming to be checked because his wife has TB and he is coughing
  - d) \_\_\_\_\_ A teenager with pulmonary TB on treatment for 1 week
  - e) \_\_\_\_\_ Patient with pneumonia returns for sputum results; sputum was positive
  - f) \_\_\_\_\_ Patient with TB meningitis (no other site)
  - g) \_\_\_\_\_ Patient just diagnosed with sputum smear-negative pulmonary TB
  - h) \_\_\_\_\_ Unknown patient coming for first visit, coughing for three weeks, has fever, not covering mouth.
4. Write “T” for true or “F” for false beside each of the following statements:
- \_\_\_\_\_ A face mask (surgical type) worn by a coughing patient who has TB can help prevent TB transmission.
  - \_\_\_\_\_ A face mask worn by a health worker is a good way to prevent TB transmission.
  - \_\_\_\_\_ Coughing patients should be sent outdoors to produce sputum samples.
  - \_\_\_\_\_ A person who enters a closed examination room (no ventilation) 30 minutes after a newly-diagnosed pulmonary TB patient was there is at no risk of infection with TB.
  - \_\_\_\_\_ BCG will give health staff complete protection from TB.
  - \_\_\_\_\_ Health staff should be checked for TB whenever they develop a cough for more than 2 weeks.

***Now compare your answers with those on the next pages.***



## Answers to self-assessment questions

*If you had difficulty answering any question, turn back and study the section indicated. If you do not understand something, discuss it with a facilitator.*

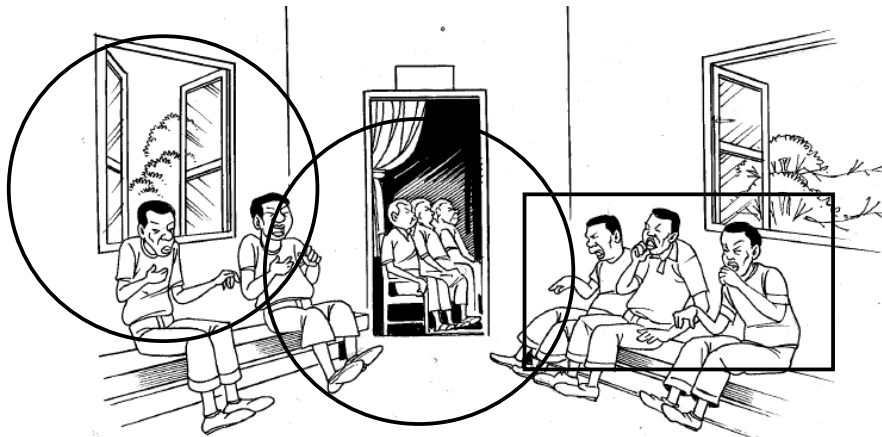
1.  
a.



This is a problem because:

*the patients who are coughing are waiting with the patients who are not. The coughers should go to the head of the queue. Also, they are close together and there is no movement of air into or out of the area. The coughers do not have tissues or anything to cover their mouth and nose when they cough.*

b.



This is a problem because: *The coughers do not have tissues or anything to cover their mouth and nose when they cough. There should be a sign on the wall to remind people to cover their mouth and nose when coughing or sneezing.*

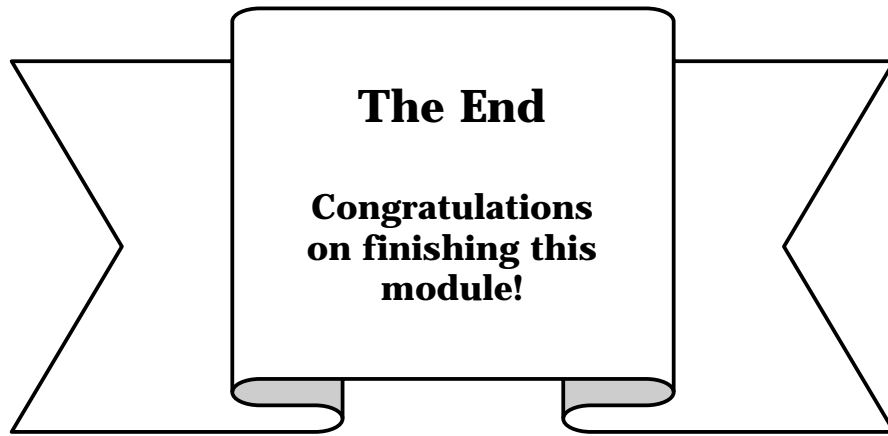
This is good practice because: *The coughers are separated from the patients who are not coughing, and they are waiting next to open windows. There is good cross ventilation in this area*

*(See section 1)*



2. Label the following according to the likelihood of being infectious and transmitting TB as either: 3 = the worst risk; 2 = medium risk; 1 = the least risk.
- 3 A room with window and door; the window and door are closed during clinic hours.
  - 1 A room with an open window, open door, and an exhaust fan running during patient examination.
  - 2 A room with an open window; door is shut during patient examination but kept open in between patients; no window fan.
- (See section 1)
3. a) D Post-partum woman bringing child for immunization; she has been coughing since delivery
- b) U TB patient on treatment for three months using DOT
- c) D A man coming to be checked because his wife has TB and he is coughing
- d) D A teenager with pulmonary TB on treatment for 1 week (*This patient will be non-infectious after 2 weeks of treatment.*)
- e) D Patient with pneumonia returns for sputum results; sputum was positive
- f) U Patient with TB meningitis (no other site)
- g) D Patient just diagnosed with sputum smear-negative pulmonary TB (*A smear-negative patient is one-fifth as likely to infect others as a smear-positive patient. However, there is still a risk of transmission; one-tenth of household contacts of an untreated smear-negative patient will become infected.*)
- h) D Unknown patient coming for first visit, coughing for three weeks, has fever, not covering mouth.
- (See section 2)
4. Write “T” for true or “F” for false beside each of the following statements:
- T A face mask (surgical type) worn by a coughing patient who has TB can help prevent TB transmission.
  - F A face mask (surgical type) worn by a health worker is a good way to prevent TB transmission.
  - T Coughing patients should be sent outdoors to produce sputum samples.
  - F A person who enters a closed examination room (no ventilation) 30 minutes after a newly-diagnosed pulmonary TB patient was there is at no risk of infection with TB.
  - F BCG will give health staff complete protection from TB.
  - T Health staff should be checked for TB whenever they develop a cough for more than 2 weeks.

(See sections 1, 4, 6, 7)



**Exercises for Module I:**  
**TB Infection Control in your Health Facility**





## Exercise A

### Written Exercise – Choosing TB infection control procedures

The supervisor of the Panola Health Facility was not able to attend the district-sponsored training workshop about preventing the spread of TB and other infections in the health facility. However, she thought about the problem and prepared a list of procedures for TB infection control in the Panola Health Facility. The list below is posted on the staff room wall.

Read the procedures listed. If the procedure is effective, place a checkmark beside it. If not, change the statement to be more effective, or cross it out and write a better one.

#### **Panola Health Facility Infection Control Procedures**

1. All health workers should wash their hands before and after each patient contact.
2. The waiting area for sick patients is moved to the outdoor breezeway.
3. The waiting room for well patients and non-infectious patients is still in the front room. The fan in the waiting room should stay in front of the open window to blow fresh air into the room.
4. People with HIV are asked to wear masks in the waiting area so that they will not catch TB or other infections. Masks or tissues may be given to others who request them to protect themselves from infection.
5. The exhaust fans in the three examination rooms will be maintained in working order and should remain on during the day.
6. Keep all other windows closed all day, and air out the facility at closing time.
7. Staff should wear masks when giving directly-observed treatment to new TB patients.
8. TB suspects should be sent to the toilet to cough up sputum, not into the hall.
9. HIV-infected individuals who do not have TB will be given IPT.
10. Dispose of all needles in the sharps container.

When you have finished this exercise,  
discuss your answers with a facilitator.

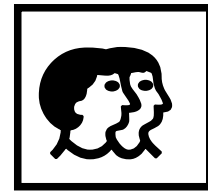


Then **GO BACK** to page 11, section 7,  
and read until the next stop sign.



## Exercise B

### Written Exercise – Reducing risk of TB transmission in your facility



In this exercise, you will assess whether your facility needs improved TB infection control measures and how such improvements could be made. To prepare for the discussion, write answers to the questions below.

1. Describe the outpatient waiting area in your facility and its ventilation. Can the ventilation be improved? If yes, how could it be improved to decrease the risk of transmitting infections? If no, describe why not.
2. Describe the location of the patient examination area or examination rooms in your facility. Is ventilation good in the examination room(s)? Can ventilation be improved? If yes, how? If no, describe why not.
3. Describe the patient flow in the facility. Could the patient flow be improved to decrease the risk of transmitting TB within the facility? (Consider when coughers are identified, where and how long they wait, where they go in the facility and cough hygiene behaviours.) If yes, describe how improvements could be made. If no, describe why not.
4. In what ways are TB suspects, patients and their families educated about cough hygiene? Could this be improved? If yes, how? If no, why not?

5. Are sputum samples and needles handled correctly and safely in your facility? If there are problems, what are they?
6. List several ways to reduce your personal risk.
- a)
  - b)
  - c)
  - d)

Are any of these ways new to you? If so, which?

Do you keep these ways to reduce your personal risk in mind, every day?

When you have finished writing answers to this exercise, tell your facilitator that you are ready for the group discussion.



After the discussion, **GO BACK** to page 13, and read and work until the end of the module.



## **Annex**

### **Guidelines for hand hygiene\***

#### **Using soap and water**

Wet hands with water and apply the amount of product necessary to cover all surfaces. Rinse hands with water and dry thoroughly with a single-use towel. Use clean, running water whenever possible. Avoid using hot water, as repeated exposure to hot water may increase the risk of dermatitis. Use towel to turn off the tap or faucet. Dry hands thoroughly using a method that does not recontaminate hands. Make sure towels are not used multiple times or by multiple people. The technique for handwashing is illustrated in Figure 1 (page 28).

Liquid, bar, and leaf or powdered forms of soap are acceptable. If bar soap is used, provide soap racks that facilitate drainage so that the bars can dry.

#### **Using alcohol-based handrub**

Apply a palmful of alcohol-based handrub and cover all surfaces of the hands. Rub hands until dry. The technique for handrubbing is illustrated in Figure 2 (page 29).

\* Text adapted and figures taken from *WHO guidelines on hand hygiene in health care*. Geneva, World Health Organization, 2009.

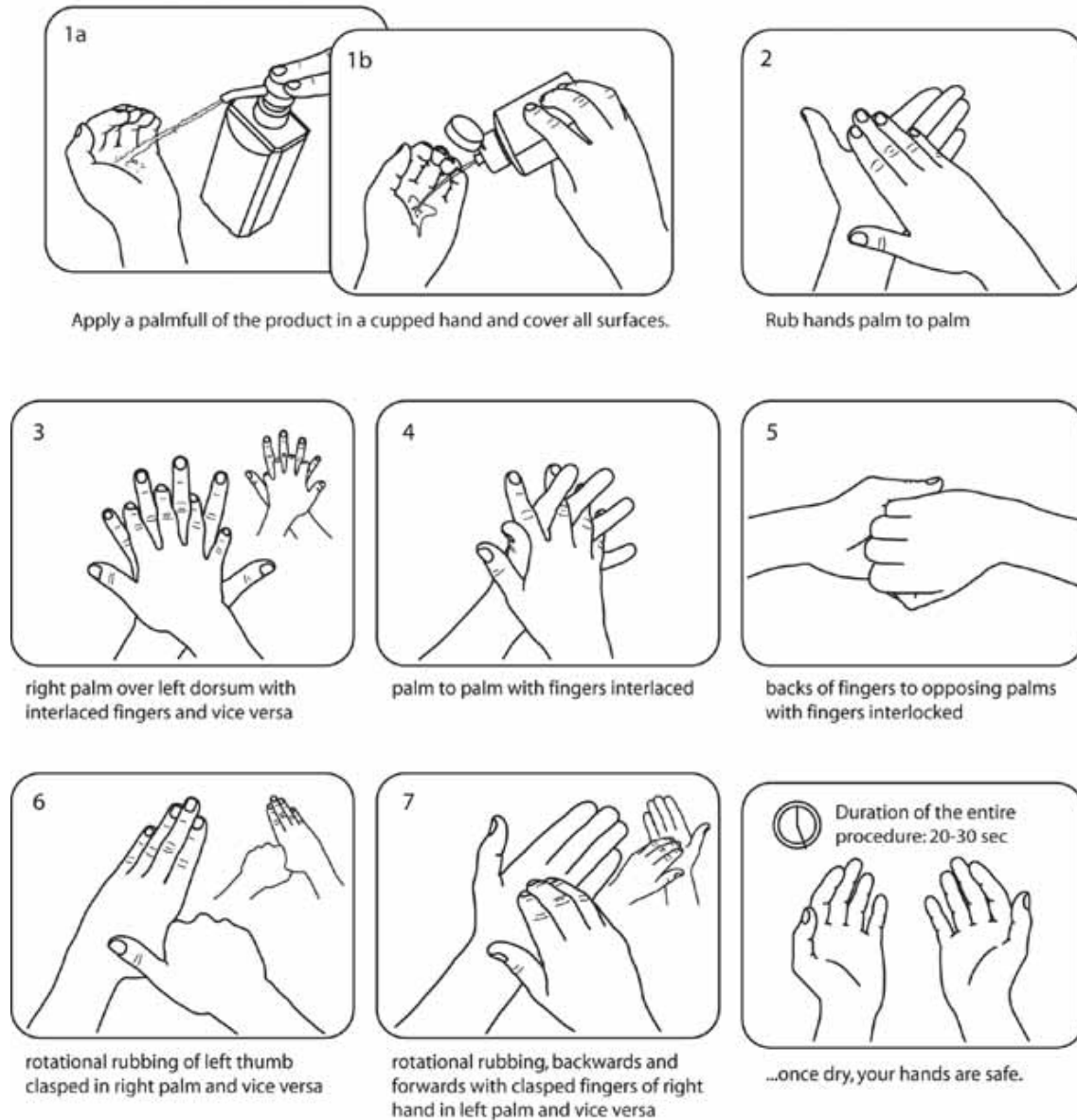
**Figure 1:**  
**Handwashing Technique with Soap and Water**



Modified according to EN1500

**Figure 2:**

**Hand Hygiene Technique with Alcohol-Based Formulation**



Modified according to EN1500









