

REPUBLIC OF NAMIBIA

**MINISTRY OF HEALTH  
AND SOCIAL SERVICES**

**TUBERCULOSIS  
INFECTION CONTROL  
GUIDELINES**

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**USAID**  
FROM THE AMERICAN PEOPLE



**TB CARE I**

## PREFACE

Tuberculosis (TB) is endemic in Namibia, and people with untreated infectious TB are the source of transmission. Unless TB is considered when individuals attend healthcare services, diagnosis will be delayed or missed altogether, and effective TB infection control (IC) measures (including effective treatment) might not be in place.

Due to the various afflictions often associated with HIV infection, people living with HIV tend to attend health facilities more frequently than other patients. This factor, plus the fact that they are more susceptible to developing TB if they become infected, necessitates the establishment of measures to protect them from infection with *Mycobacterium tuberculosis* (*M. tuberculosis*).

The first edition of the Tuberculosis Infection Control Guidelines was developed in 2009, and has been crucial in establishing a programme for the implementation of control measures in health facilities, especially at treatment sites for drug-resistant TB. This, the second edition of the guidelines, provides updates based on new knowledge and lessons learnt during implementation of the first version.

These guidelines are complementary to the overall infection prevention and control (IPC) guidelines of the Ministry of Health and Social Services (MoHSS) and are meant to assist in the establishment of a framework for TB infection control (TB-IC) in health facilities, as well as in those congregate and community settings where the potential for transmission of TB is likely to be high. They provide both technical and operational guidance and also detail and prioritize the necessary managerial activities and administrative controls at all levels of the health system.

The document is intended for use by frontline health care workers; health system officials responsible for TB, HIV/AIDS and IPC programmes; managers of hospital services in the public and private sectors; officials of the prison, police and military services; managers of private and state-owned business enterprises and companies responsible for the housing conditions and work environment of their workers; as well as regulators of residential housing construction.

While these guidelines are based on internationally accepted IC practices, they have been formulated to address the unique situation in Namibia. Due to the varying climatic conditions and disease burden across the country, the recommended setting-specific measures and work practices included in the guidelines will be tailored to different facilities and institutions in the country.

I wish to express my sincere gratitude to all those who contributed to the revision of these guidelines, in particular Dr Farai Mavhunga, Ms Helena Mungunda, Dr Max Meis, Dr Nunurai Ruswa, Mr Titus Shilongo, Dr Abbas Zezai, Ms Albertina Thomas, Ms Benetha Bayer, Mr Pinehas Ipinge, Ms Christine Gordon, Dr Apollo Basenero, as well as all the health care workers within the MoHSS and representatives from the Ministries of Defence, Labour and Social Welfare, Safety and Security, the Social Security Commission, the Namibia Institute of Pathology, and stakeholders for their valuable input. Lastly, I would like to thank WHO, CDC, USAID, KNCV Tuberculosis Foundation and TB CARE I for the technical support they provided during the review of these guidelines.

Mr. Andrew Ndishishi  
Permanent Secretary

## LIST OF ABBREVIATIONS

AFB	acid-fast bacilli
BCG	bacillus calmette-guerin
CNR	case notification rate
DCC	district coordinating committee
DOTS	Directly-Observed Treatment - Short Course (WHO strategy)
DR-TB	drug resistant tuberculosis
DST	drug sensitivity testing
DTLC	District Tuberculosis and Leprosy Coordinator
HCW	health care worker
HIV	human immunodeficiency virus
HCT	HIV counseling and testing
IC	infection control
IPC	infection prevention and control
IPT	isoniazid preventive therapy
LPA	line probe assay
LTBI	latent tuberculosis infection
MDR-TB	multi-drug resistant tuberculosis
M&E	monitoring and evaluation
MGIT	mycobacteria growth indicator tube
MoHSS	Ministry of Health and Social Services
NPLP	National Tuberculosis and Leprosy Programme
PITC	provider initiated HIV testing and counseling
PLHIV	people living with HIV
QA	Quality assurance
RIF	Rifampicin
RMT	Regional Management Team
SOP	Standard operating procedure
TB	Tuberculosis
TB-IC	Tuberculosis infection control
TST	Tuberculin skin test
UV	Ultraviolet
UVC	Ultraviolet – electromagnetic radiation subtype C
UVGI	Ultraviolet germicidal irradiation
VCT	Voluntary HIV counseling and testing
XDR-TB	Extensively drug resistant tuberculosis
Xpert	GeneXpert MTB/Rif

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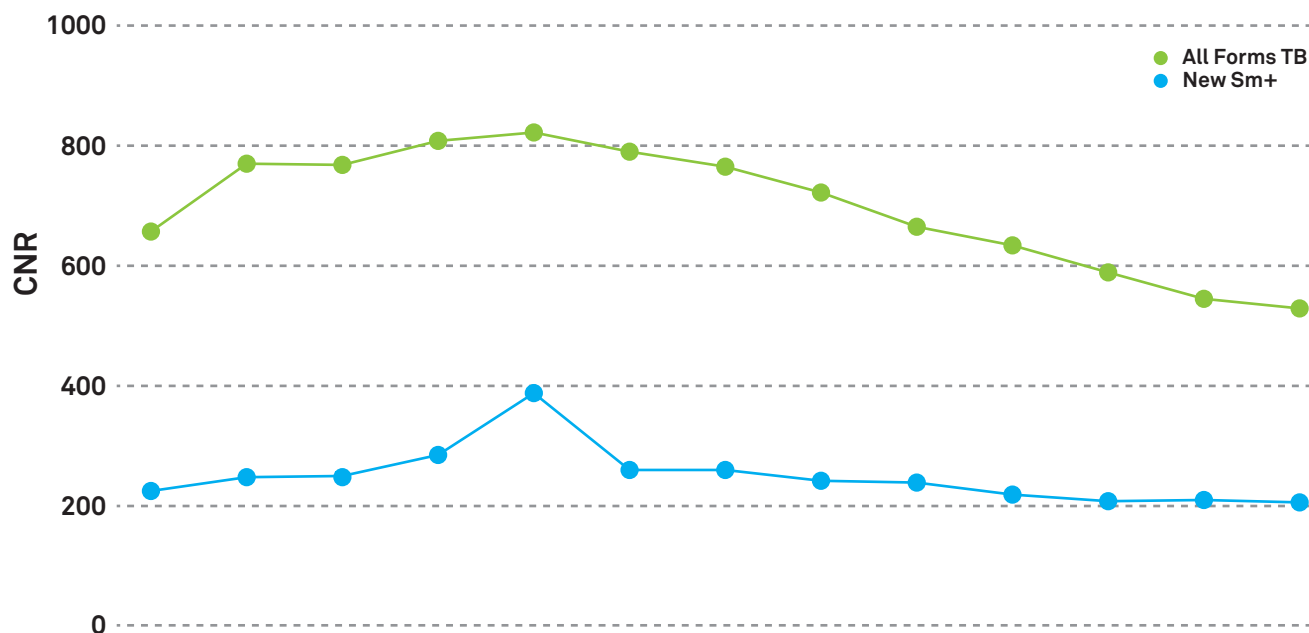
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# 1. INTRODUCTION

Namibia reports one of the world's highest incidence rates of TB and had a case notification rate (CNR) of 529 per 100,000 in 2012.

**Trends in case notification rates from 2000-2012, Namibia**



	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
All Forms TB	657	770	768	808	822	790	765	722	665	634	589	545	529
New Sm+	225	248	250	285	388	260	260	242	239	219	208	210	206

Like the rest of Southern Africa, the country is also faced with a generalized HIV epidemic, with an antenatal seroprevalence rate of 18.2% and a 47% TB/HIV co-infection rate in 2012. This high incidence of TB, as well as the high HIV prevalence, means the risk of nosocomial transmission to both patients and healthcare workers (HCWs) in Namibian healthcare settings is substantial.

Due to effectiveness of modern chemotherapy, isolation of infectious TB patients was no longer a key priority, because the short period of infectiousness after initiation of short-course treatment was considered irrelevant compared to the period before diagnosis, when most of the transmission of TB would have taken place.

The priority of TB control shifted to scaling-up early diagnosis and short-course directly observed treatment (DOTS), with other TB-IC modalities receiving lower priority in resource-constrained countries. The occupational risk of HCWs acquiring *M. tuberculosis* infection in the workplace was considered relatively low despite a number of studies demonstrating higher rates of TB among HCWs. The only exception was laboratory workers handling TB cultures for whom specific biosafety measures continued to be implemented. Namibia was no exception in this general trend regarding TB-IC.

This lack of TB-IC prioritisation needed to change urgently and drastically because of the threat posed by HIV infection and the emergence of multidrug-resistant (MDR) and extensively drug-resistant (XDR) TB. People living with HIV (PLHIV) have a 30-50 times higher risk of developing TB after being infected with *M. tuberculosis*, and drug-resistant (DR) TB is associated with very high mortality rates in PLHIV. This

situation is compounded by the fact that HIV infected TB patients may test sputum-smear negative and are more likely to have extra-pulmonary TB. In both cases they can continue to harbour DR-TB which goes untreated if drug susceptibility testing (DST) is not routinely done in these patients. Emerging evidence suggests that in the absence of effective TB-IC, outbreaks of HIV associated DR-TB will arise, leading to high morbidity and mortality among both HIV-positive patients and HCWs. This has been documented in Tugela Ferry in South Africa in 2006.

### **Tugela Ferry**

The XDR-tuberculosis epidemic in Tugela Ferry, South Africa has been highly clonal. However, the epidemic is not the result of a point-source outbreak; rather, a high degree of interconnectedness allowed multiple generations of nosocomial transmission. Similar to the outbreaks of multidrug-resistant tuberculosis in the 1990s, poor infection control, delayed diagnosis, and a high HIV prevalence facilitated transmission. Important lessons from those outbreaks must be applied to stem further expansion of this epidemic. (Ghandi et al)

In high TB burden settings, surveys have shown that up to 25% of PLHIV (Corbett) may have previously undiagnosed TB at the time of HIV voluntary counselling and testing (VCT) or provider initiated testing and counselling (PITC), and up to half of these may be infectious TB cases. Persons without TB at the time of HIV diagnosis, may still develop TB in later years, and will then be at risk of spreading *M. tuberculosis* in the community as well as to fellow patients and HCWs in their HIV care clinics. Persons with HIV-associated immunosuppression progress rapidly from *M. tuberculosis* infection to disease – over a period of weeks/months rather than a period of years, as is common for persons with a normal immune system. This explains why DR-TB, when spread in hospital settings, particularly affects HIV positive immune-compromised patients. PLHIV in a high burden TB setting may also become re-infected easily and quickly develop a second episode of TB.

The MoHSS is obligated to protect both HCWs and patients from acquiring *M. tuberculosis* infection both in the course of their professional practice and when seeking care in health facilities. The implementation of TB-IC measures in health facilities should therefore be a priority. Most of the TB-IC measures and work practices outlined in this document also apply to airborne IC in general. The purpose of these guidelines is to guide efforts aimed at reducing TB transmission in health facilities, congregate settings such as prisons and holding cells, military barracks, hostels, households and the community, through the implementation of rational, affordable and cost-effective TB-IC measures. The process of producing these revised guidelines started with consultations with relevant NTLN partners at all levels of the health system reviewing the initial guidelines which were developed in 2009. Input obtained from this process was consolidated to produce revised draft guidelines. After a consensus meeting, the second draft was produced in collaboration with the Quality Assurance Unit in the MoHSS. This draft was widely disseminated for additional input and then forwarded for review by the Directorate Special Programmes. The final version was submitted to the MoHSS Permanent Secretary for endorsement.

## 2. DETERMINANTS OF TRANSMISSION

TB is caused by mycobacterium tuberculosis (*M. tuberculosis*). Droplets of 1 to 5µm (droplet nuclei) invisible to the naked eye, containing *M. tuberculosis* are formed when a person with TB of the lung or larynx coughs, sneezes, laughs or speaks. Droplet formation can also occur in laboratories, autopsy rooms or during procedures such as bronchoscopies. Droplet nuclei laden with bacilli remain suspended in air for long periods of time, while the bigger droplets fall to the floor quite quickly. Infection occurs when a susceptible person inhales one or more droplet nuclei containing *M. tuberculosis*, which then lodge in the alveoli of the lungs. Once in the lungs, the bacilli may then spread all over the body and TB disease may develop soon after infection. In most persons an immune response generated within two to ten weeks of infection, limits further multiplication and the spread of the TB bacilli. More often than not, the bacilli remain dormant and viable, a condition called latent tuberculosis infection (LTBI). Persons with LTBI do not have the symptoms of active TB and are not infectious.

A person who has symptoms and signs suggestive of TB, but in whom the diagnosis is yet to be made, should be considered infectious until a diagnostic investigation is completed, while a person with TB of the lungs or larynx should be considered infectious until the person has completed at least two weeks of directly observed standard anti-TB therapy and whose symptoms have improved. It should be noted that some patients may have Drug Resistant TB (DR-TB), which may initially improve on standard first-line medicines; therefore HCWs should comply with IC practices throughout TB treatment.

### 2.1 Difference between latent TB infection and TB

#### LTBI

- LTBI is the state of having a small number of live TB bacilli in the body which are unable to grow due to control by the immune system. The bacteria are inactive, but can become active later
- LTBI does not cause a person to feel sick and there are no signs or symptoms of TB disease
- Tuberculin skin test (TST) is one of the methods used to diagnose LTBI. A positive result usually means that infection with *M. tuberculosis* is present, but persons with HIV associated immunosuppression can have a false negative TST even with *M. tuberculosis* infection. Conversely, persons who have received Bacillus Calmette–Guérin (BCG) vaccination may have a false positive skin test
- Only one in ten people with *M. tuberculosis* infection and a normal immune system will develop TB in their *lifetime*. Whereas one in ten People Living with HIV (PLHIV) infected with *M. tuberculosis* will develop active TB *every year*
- Treatment for LTBI with isoniazid reduces the risk of TB, though the protective benefit only lasts for a limited number of months in PLHIV after isoniazid preventive therapy (IPT) is completed.

#### TB

- Approximately 80% of TB occurs in the lungs. In PLHIV, up to half of the TB patients have disease in other parts of the body
- A person with TB of the lungs usually has a cough, which is often productive and may also have some blood in the sputum
- Frequent symptoms of TB include fever, sweating at night, weight loss and cough. However, a cough may be absent in up to 25% of patients diagnosed with pulmonary TB disease



- With standard treatment, TB is curable in over 95% of cases, even in PLHIV, provided there is no drug resistance
- Untreated TB is often fatal, especially in PLHIV.

### Latent TB infection versus TB disease

	TB INFECTION	PULMONARY TB DISEASE
<b>Bacteria</b>	<i>M. tuberculosis</i> in the body	
<b>Tuberculin Skin Test</b>	Skin test reaction is usually positive	
<b>Symptoms</b>	No symptoms	Cough, fever, night sweats, weight loss
<b>Chest X-ray</b>	Normal	Abnormal
<b>Sputum Smears &amp; cultures</b>	Negative	Usually positive*
<b>Infectious?</b>	Not infectious	Often infectious before treatment
<b>Classification</b>	Not a case of TB	A case of TB

\*Sputum smears more often negative in HIV infected TB patients

## 2.2 Determinants of Transmission

The probability of nosocomial transmission of TB depends on the following factors:

### 2.2.1 Number of Infected Patients

Large numbers of TB patients cared for in a health facility, particularly those not yet diagnosed and not receiving treatment, are associated with an increased risk of nosocomial transmission. These numbers vary from facility to facility and depend upon the prevalence of TB in the facility's catchment area. In Namibia, undiagnosed TB patients are commonly found in outpatient departments and HIV care clinics, although they may also be found in other areas of the health facility. This is the most important determinant of the risk of transmission.

### 2.2.2 Infectiousness of Each Patient

The infectiousness of a patient is determined by the number of viable bacilli in the sputum. Thus a patient who is sputum smear positive for acid-fast bacilli (AFB) will infect many more close contacts than a patient with culture positive but smear negative TB.

The following characteristics of a patient with TB increase the risk of infectiousness:

- Presence of cough; patients who cough persistently are more infectious because they expel more infectious droplets
- Not covering mouth or nose while coughing
- Cough inducing procedures
- Extensive lung destruction with pulmonary cavitation on chest x-ray, often a feature of patients presenting with a delayed diagnosis
- Positive AFB sputum smear results
- Respiratory tract disease with involvement of the lung or pleura though exclusively pleural involvement is less infectious
- Laryngeal TB
- Sputum-smear and/or culture positive TB patients with undiagnosed DR-TB; these

- patients may be on treatment, though ineffective to treat their DR-TB
- Incorrect anti-TB treatment regimens.

### 2.2.3 Duration of Exposure

The risk of transmission increases with close and prolonged contact with an infectious TB patient. Early intervention with appropriate chemotherapy reduces the time of infectiousness. Conversely, prolonged transmission occurs where TB goes unrecognized as well as when TB is diagnosed and treatment is initiated, but the chemotherapy is inadequate due to improper medicine combinations, poor adherence, lower dosages, malabsorption, medicine interactions or TB strains resistant to the prescribed medicines.

### 2.2.4 Environmental Factors

Various environmental factors increase the risk of TB transmission, including:

- Exposure to TB in small, enclosed spaces
- Inadequate ventilation which results in the insufficient dilution or removal of infectious droplet nuclei
- Recirculation of air containing infectious droplet nuclei
- Inadequate cleaning and maintenance of equipment such as fixtures for ultraviolet germicidal irradiation (UVGI) and electrical fans
- Improper procedures when handling specimens.

## 2.3 Risk for HCWs

HCWs are particularly at high risk of acquiring *M. tuberculosis*:

- HCWs whose work entails regular, direct patient contact in healthcare settings where the risk of TB transmission is not assessed and effective TB-IC is not implemented and routinely adhered to
- HCWs who undertake high-risk activities which include cough-inducing procedures (sputum induction, bronchoscopy), autopsy, morbid anatomy and pathology examination, and laboratory procedures such as the handling of cultures of *M. tuberculosis*.

## 2.4 Risk of Disease Following Infection

The following categories of persons are at high risk of progressing from LTBI to TB:

- HIV infection is the highest risk factor for progression from LTBI to TB. PLHIV may become infected or re-infected with *M. tuberculosis* when they are exposed to someone with infectious TB. They can progress rapidly from infection to disease (over a period of weeks/months rather than years as is common with immunocompetent individuals)
- Those with other medical conditions such as silicosis, diabetes mellitus, malignancies, chronic renal failure and other diseases which compromise the immune system.

## 3. TB-IC MEASURES, WORK PRACTICES AND PROCEDURES

### 3.1 The Hierarchy of TB-IC

Airborne infection control including TB-IC measures, complement the standard precautions and other transmission-based precautions as elaborated in Namibia's *Infection Prevention and Control Guidelines*. TB-IC is based on a hierarchy of controls, namely administrative and environmental controls, and personal protective equipment.

Each control operates at a different level in the TB transmission process:

- Administrative control measures reduce the chances of exposure for both HCWs and uninfected patients
- Environmental control measures reduce the concentration of droplet nuclei in the air
- Personal protective equipment protects HCWs from inhaling infectious droplet nuclei in areas where the concentration of droplet nuclei cannot be adequately reduced by administrative and environmental controls.

The table below shows the TB-IC measures at each level of the hierarchy:

<b>Administrative Controls</b>	
1	Promptly identify persons with symptoms suggestive of TB (triage)
2	Separate or isolate potentially infectious patients
3	Control the spread of pathogens (cough etiquette and respiratory hygiene)
4	Minimise time spent in healthcare facilities by persons with symptoms suggestive of TB
5	Provide a package of HIV prevention, TB screening, (preventive) treatment and care interventions for staff.
<b>Environmental Controls</b>	
6	Ensure sufficient air exchange and control airflow direction by using natural and mechanical ventilation systems
7	Inactivate TB bacilli in suspended droplet nuclei by using upper-room air UVGI units, in combination with slow-moving ceiling fans
<b>Personal Protective Equipment</b>	
8	Reduce the inhalation of infectious particles by breathing air which has been effectively filtered to 0.3 microns with a particulate respirator

### 3.2 FAST Strategy

**FAST** is an infection control strategy which prioritises rapidly diagnosing and putting patients on effective treatment. **FAST**, which stands for **F**inding TB cases **A**ctively, **S**eparating safely, and **T**reating effectively, focuses HCWs on the most important infection control practices.

#### • **Finding TB Patients**

The most infectious TB patients are the undiagnosed cases who often transmit bacilli in the clinics and waiting areas, infecting HCWs, patients and other users of the facility. HCWs have to find, diagnose and effectively treat these patients in order to stop the further transmission of TB.

#### • **Actively Finding Cases**

Undiagnosed patients with TB may present themselves to the health facility for

reasons unrelated to TB, and they may not mention cough, fever, night sweats or weight loss - symptoms which may or may not be associated with pulmonary TB. The FAST approach encourages health facilities to assign “cough monitors” to all waiting areas or entrance points to identify persons with symptoms suggestive of TB, such as a current cough.

- **Separating Safely**

While waiting for evaluation, patients identified by cough monitors should be separated temporarily from other patients in a well-ventilated area to prevent further spread of TB. The sputum must be collected outdoors and away from others, and tested promptly for TB as per the *National Guidelines for the Management of Tuberculosis*.

- **Treating Effectively**

Prompt and effective treatment is an important step in preventing the transmission of TB. Patients become non-infectious soon after starting effective TB treatment.

### 3.3 Administrative Control Measures

Administrative control measures serve as the first line of defence against the spread of TB. They have the potential to have the greatest impact on preventing the transmission of TB and should be prioritised in all health facilities and congregate settings. These control measures and respective work practices prevent droplet nuclei containing *M. tuberculosis* from being spread in the facility, hence reducing the risk of exposure to TB for both HCWs and other patients.

Administrative controls consist of a combination of appropriate and applicable measures to identify persons with respiratory symptoms, separate them into an appropriate environment, educate them on cough etiquette, fast-track them through the health facility to reduce their exposure time to others and diagnose/treat them with minimal delay. Hospitalization should be reduced or avoided to the greatest extent possible.

To promptly identify persons with symptoms suggestive of TB who have come into a facility, introduce the following work practices, as applicable and appropriate for the specific setting:

- Place large eye-level notices (also translated into local languages) at entryways, stating that attendees must immediately inform staff of a current cough lasting for two weeks or more, or if they believe they might have TB
- Signs and posters should also be displayed at the exterior entrances explaining that this health facility prioritises persons with current cough which have lasted for two or more weeks, over others in the queue and makes use of designated separate waiting areas
- Screen persons with a cough at the first point of contact or when they have joined the queue or have a seat/bed
- Explain to persons with symptoms suggestive of TB why they are being selected for special attention
- Explain to other patients in the waiting area why persons with symptoms suggestive of TB are prioritised
- Direct persons with symptoms suggestive of TB to the sputum collection area first, to provide a sputum sample
- Monitor the triage process daily, to ensure that each coughing person is screened. Better screening should show an increase in the numbers of diagnosed TB patients.

**Procedures:**

- Ask all individuals at first point of contact OR when they have joined the queue OR have had a seat with others OR have been allocated a hospital bed a few simple screening questions:
  - a. “Are you coughing?” If answer is yes
  - b. “For how long?”
  - c. “Have you lost weight?”
  - d. “Do you have fever?”
  - e. “Do you sweat at night?”
  - f. “Are you being investigated or treated for TB?”
  - g. “Have you been in close contact with someone who has a prolonged cough or is a TB patient?”
- Register their names and contact details in the TB Sputum Register
- Provide a sputum cup with a screw cap.
- Explain how to provide a sputum sample in a well-ventilated place outside.
- Instruct them where to bring the sputum sample.
- Instruct them to return, immediately thereafter.
- Document (daily) and evaluate (monthly) the number of persons with presumptive TB against the total number of outpatients and against the numbers of notified and bacteriologically confirmed TB patients.

**Procedure:***Instructions to a patient for providing a sputum sample*

Sputum collection should be done outside in a well-ventilated place and not in enclosed spaces such as toilets. Health care workers should instruct the patient on how to produce a deep cough for the purpose of getting real sputum from the lungs. Ideally health care workers should observe patients producing the sputum sample, while keeping sufficient distance when the patient coughs. Healthcare workers should visually inspect the specimen to ensure an adequate specimen has been produced; if the specimen appears inadequate, the patient should be instructed to try and produce another specimen. Once the best possible sputum specimen has been collected, it should be sent to the laboratory and examined.

To physically separate infectious and potentially infectious TB patients from others, especially susceptible persons, introduce the following work practices, as applicable and appropriate for the specific setting:

- Separate persons with symptoms suggestive of TB and diagnosed infectious TB patients from other patients, in particular paediatric, HIV-positive and other immunodeficient patients
- Where designated waiting areas, clinics, isolation rooms and wards are not available, divide big areas into smaller ones. Create multiple isolation rooms or small wards
- Combine any separation and isolation measures with the highest quality of care. Ensure that any curtailing of individual freedom happens as a last resort and make great efforts to explain the process and the reasoning for such action
- Limit patient movement both within and outside the facility until a diagnosed pulmonary TB patient has converted or at least has been treated with a standardised regimen for at least two weeks
- Provide a surgical mask if an infectious patient or person with symptoms suggestive of TB has to undergo essential investigations elsewhere in the health facility or meets other patients, visitors and staff
- Inform patients, staff and visitors by placing visible signage on doorways to restricted areas (“*You are entering a restricted area*”). Ensure that patients, staff and visitors follow the information and signage as to where and when they can visit

isolated patients and how to protect themselves.

- Limit the number of visitors and visiting hours. Do not allow children to visit patients in isolation; place visible signage on doorways (“*This area is prohibited to children*”). If possible, create a designated roofed area outside, where DR-TB patients can receive visitors and socialise with other DR-TB patients.

### **Procedures:**

1. Instruct persons with symptoms suggestive of TB to return immediately from the laboratory and when they return, immediately direct them to a nearby designated well-ventilated waiting area away from other patients, where they can wait until they can be seen.
2. Separate different cohorts: persons with presumptive TB; confirmed sputum smear-positive TB patients; confirmed sputum smear-negative Xpert-positive or culture-positive TB patients; and HIV-infected TB patients.
3. Separate persons suspected of having pulmonary DR-TB and diagnosed with MDR-TB from other patients in designated MDR-TB waiting areas, clinics, isolation rooms, wards far away from paediatric, HIV care and oncology departments.
4. Separate persons suspected of having pulmonary DR-TB; confirmed sputum smear-positive DR-TB patients; confirmed sputum smear-negative Xpert positive/Rifampicin-resistant or culture-positive DR-TB patients; and HIV-infected DR-TB patients according to the drug resistance profile to prevent re-infection with different strains.
5. Isolate persons suspected of having pulmonary XDR-TB and diagnosed with XDR-TB in single-patient airborne precaution rooms.

To enforce patient, staff and visitor compliance with respiratory hygiene policy and practice, introduce the following work practices, as applicable and appropriate for the specific setting:

- Place signs and posters on cough etiquette at the exterior entrances and other sites in the facility, e.g. waiting areas, corridors, rooms/wards and communal areas. They should be where patients cannot miss them, directly in front of them and at eye-level and not on back walls
- Provide (daily) health education on cough etiquette
- Remind non-adhering persons to comply with the respiratory hygiene policy of the facility
- Use your own attitude and behaviour to set an example to others. Part of every health worker’s responsibility is to model and educate others on the best healthcare practices
- Provide tissues or disposable surgical masks to all persons with presumptive TB and confirmed infectious TB patients, especially MDR-TB and XDR-TB patients
- Provide no-touch receptacles for the disposal of used materials.

### **Procedures:**

Provide daily health education on cough etiquette, instructing patients to:

1. Cover their mouth and nose when coughing or sneezing.
2. Turn their head away from others.
3. Not spit on the floor.
4. Avoid using hands by coughing into your elbow, by lifting the shirt’s neckline to cover mouth and nose or by using tissues/disposable surgical masks.
5. Discard used tissues or disposable surgical masks in the nearest waste bin.
6. Wash hands frequently.



To reduce the risk of TB exposure to other patients and HCWs by minimising the time diagnosed TB patients and persons with presumptive TB spend within the health facility, introduce the following work practices, as applicable and appropriate for the specific setting:

- Manage patient flow by minimising the time spent receiving services, e.g. give patients specific time slots; adjust duty shifts and rosters to have more staff attending to patients when it is busy
- Define referral, admission and discharge criteria as per *National Guidelines for the Management of Tuberculosis*. Assess compliance with this criterion.
- Reduce turn-around time:
  - The maximum acceptable diagnostic turn-around time for sputum smear microscopy is two days
  - The maximum turn-around time for culture examination, after the sputum specimen arrives at the laboratory, is six weeks for liquid media
  - The maximum turn-around time for DST, after receiving the sputum specimen at the laboratory will depend on the availability of Line-Probe Assay (LPA) and automated tests for molecular detection of *M. tuberculosis* and RIF resistance
- Introduce rapid diagnostic tests (e.g. LPA, automated tests for molecular detection of *M. tuberculosis* and rifampicin resistance).

#### **Procedures:**

1. Move known TB patients and persons with symptoms suggestive of TB to the front of the queue to be seen with priority.
2. Document in the patient's health passport the time laboratory test results were received, treatment was initiated and/or date the patient was admitted and discharged (days of admission).
3. Evaluate the minimum, maximum and average time between initial contact and diagnosis and between diagnosis and start of treatment, at least quarterly.
4. Evaluate the minimum, maximum and average duration of admission, at least quarterly.

To prevent staff, particularly HCWs, from contracting TB and to support those who have contracted TB or are HIV infected, introduce the following work practices, as applicable and appropriate for the specific setting:

- Make staff aware of the occupational risk of contracting TB. Reminders that HCWs and other staff can develop TB, regardless of previous infection status or BCG vaccination should occur with annual re-training on IPC. Training should include the purpose of screening staff for TB and should also include the personal responsibilities of each staff member. They should be alert to the signs and symptoms of TB and in case of signs and symptoms should seek care promptly
- Staff training and re-training programmes (formal/orientation/in-service training) should also encourage all staff who are at risk, to know their HIV status so that they can take additional precautions and benefit from IPT if they are HIV infected
- Staff should be investigated for TB if they have a cough which has lasted two weeks or more. Self-reporting can be done to the matron/supervisor
- Assign a person the responsibility of screening all staff on TB. Screening should be done using a standardised symptom screening questionnaire (see Annex 9.4), at the assumption of duty (during the week of induction), and periodically thereafter (annually, when need arises and upon exit of service)
- Maintain a confidential staff TB screening register, (see Annex 9.6). The register should be kept under lock and key in the matron's/human resource officer's office
- HCWs who are diagnosed with smear-positive TB should return to work when they

are no longer infectious. This is after having:

- a. Taken treatment for at least two weeks, except for those being treated for DR-TB.
  - b. Clinically improved.
  - c. Had one negative follow-up sputum smear examination result.
- All HCWs on anti-TB treatment should have a DOT supporter ensuring they adhere to their medication until their treatment is complete.
  - It is paramount that confidentiality be observed when staff are screened for TB and also for the records which are kept. At no point during this process should a HCW feel stigmatised.

### **Procedures:**

1. At least once a year, remind staff of the occupational risk of developing TB, educate them on the symptoms/signs of TB, inform them of the risks for TB in PLHIV and encourage them to seek prompt attention should they develop these symptoms/signs.

### **Baseline/Entry Screening:**

2. Using a standardised screening questionnaire, (see Annex 4), take medical history related to TB, exposure history related to TB and do symptom screening. Symptom screening includes cough of >2 week duration with/without weight loss, night sweats, fever, lymph node enlargement and chest pain.
3. HCWs found to have abnormalities on chest X-ray or found to have positive symptoms should have sputum examination done. Xpert MTB/Rif (Xpert) should be applied for diagnosis of TB in HCWs.
4. A baseline TST can be performed for individuals who will take up employment for the first time in a health facility. These can be student nurses or medical students. Follow-up TST can be performed during the periodic/annual and exit screening of these staff. Records should be kept of findings of the skin test.
5. Record in a confidential staff TB screening register, (see Annex 6): name or personnel number; date of screening; what the screening consisted of: symptoms-questionnaire; chest X-ray; physical examination; sputum examination; other lab tests; advice/action.
6. If diagnosed with TB, notify DTLC and the Social Security Commission (in compliance with the code of instruction).
7. Conduct contact investigations of the household members and immediate colleagues.
8. If diagnosed with HIV, offer staff a package of prevention, treatment and care which includes regular screening for active TB, access to HIV medications and IPT for PLHIV unlikely to have active TB disease.

### **Periodic/Annual Screening:**

9. Symptom screening should be done.
10. HCWs found to have positive symptoms will have sputum investigation done with Xpert. Annex 5 should be completed and filed.
11. Record in a confidential staff TB screening register, Annex 6: name or personnel number; date of screening; what the screening consisted of: symptoms-questionnaire; chest X-ray; physical examination; sputum examination; other lab tests; advice/action.
12. Where applicable action should be taken as stipulated under points 6-8.

### **Exit Screening**

13. Exit screening should be done for HCWs who are transferring from one duty station to another and those resigning or retiring from employment in the public health services. Annex 4 should be used.
14. As with entry screening, HCWs should have symptom screening as well as chest radiography.
15. Any abnormalities on chest X-ray or positive symptoms should be followed-up with Xpert.
16. Where applicable action should be taken as stipulated under points 6-8.



### 3.4 Environmental Control Measures and Work Practices

Environmental controls are of secondary importance *after* administrative controls in the prevention of TB transmission. In health facilities and congregate settings with inadequate administrative controls, environmental control measures alone will not eliminate the risk of TB transmission. For environmental controls to be implemented, managerial activities (described in Chapter 6) and administrative controls should also be in place to ensure availability of resources, the proper use and maintenance of equipment, the training of staff, etc. The choice of environmental control measures is largely determined by local factors and resources.

#### Ventilation

Ventilation systems can be natural or mechanical:

- Natural ventilation relies on open doors and windows to bring in air from the outside. When fresh air enters a room it dilutes the concentration of particles in air inside the room, such as droplet nuclei containing *M. tuberculosis*. Designing rooms with adequate windows, so that they maximise natural ventilation, can help reduce the spread of TB.
- Mechanical ventilation should be considered in those health facilities and congregate settings where natural ventilation is inadequate, because open windows are far too small, or the climate does not allow having the windows open all the time, for example because it is too cold, or too dusty. Mechanical ventilation measures include fans which may assist to distribute the air (thus allowing better dilution of air from “dead” corners), evacuate the air (fans pulling air out of a room) and negative pressure ventilation systems. When mechanical ventilation systems are used, management must ensure that the system is regularly maintained.

For each environmental control measure listed in the table on page 11 above consider the stepwise implementation of the following work practices and Standard Operating Procedures (SOPs).

To ensure sufficient air exchange and control airflow direction, introduce the following work practices, if applicable and appropriate for the specific setting:

- Keep as many windows and doors open at all times. It is important to guarantee a supply of fresh air, with sufficient openings in the opposite walls, for example through a grill in the door or a door which is cut short by 20 mm.
- Install ceiling fans and wall-mounted fans to improve air mixing in large rooms (high volume areas).
- Install extractor fans in consultation rooms, isolation rooms and laboratories. The use of extractor fans is the most cost effective form of mechanical ventilation. Extracted air should not be a risk for people outside the building. Contaminated air should not be exhausted into a space which is occupied by people. Extracted air should also not re-enter immediately through an opening (short-circuiting). As back up, natural ventilation should be considered in areas where a constant power supply is not guaranteed; therefore windows should not be sealed, but should remain openable.
- Wind driven roof turbines (whirly birds) can be installed as they do not require a power supply and makes use of natural air currents.
- Where technologies are used as environmental controls, the responsibility to check and service them on a regular schedule should be assigned to a dedicated person or team. Keep a log to record the date, what was done (e.g. checking, cleaning, replacement of part, repair) and when the equipment should be serviced

again. Adequate resources (budget and staffing) for maintenance are critical. Have faults repaired as soon as possible.

- Have a preventive maintenance programme and incorporate the maintenance procedures of windows, doors and fans into this programme.
- Educate staff on the use of environmental controls, not only engineers.

### Procedures:

1. Daily, check if windows and doors are in a proper position in all areas/settings and if they are easy to open/close and to keep open/closed.
2. Daily, check extractor fans by holding a tissue or a piece of paper against the grille. If the fan is working, the tissue or paper should be pulled against the grille.
3. Monthly, check if all windows and doors are in good condition. Keep a log with the date and the action: checking/maintenance/repair.
4. Monthly, check if fans are clean. Keep a log with the date and what was done: checking/cleaning/maintenance/repair.

### UVGI

In high-risk settings where optimal ventilation cannot be achieved through natural or mechanically-aided means, properly designed, placed and maintained shielded UVGI units should be considered as an effective control measure. Ultraviolet-C (UVC) radiation inactivates *M. tuberculosis* organisms when adequately exposed to the light (long enough and close enough). Effective use of UVGI ensures that TB bacilli contained in infectious droplet nuclei is exposed to a sufficient dose of UVC radiation at 253.7 nm to result in inactivation.

UVGI can be considered for health facilities managing DR-TB, particularly in areas where climate conditions preclude the utilisation of natural and mechanical ventilation and in large wards with high patient numbers. If this model is used, responsibility should be assigned to ensure the lamps are cleaned, maintained (replaced) and monitored (measure UV intensity), and adverse exposure is avoided. They work better in clean air without much dust or humidity. Natural sunlight is not very effective in killing TB bacilli and should not be relied upon in TB-IC measures. Sunlight passing through windows does not kill TB bacilli.

To inactivate TB bacilli in suspended droplet nuclei, introduce the following work practices:

- Use UVGI in specific patient care areas, for example large waiting areas, large MDR-TB wards, X-ray units, indoor sputum collection booths, or cough-inducing procedure rooms. UVGI is the ideal companion to natural ventilation when windows are closed at night and in cold weather conditions. UVGI is less effective in humid climates.
- Use upper-room air shielded UVGI units only. Bare bulbs, which can only be switched on after occupants have left the room, are not recommended. Use certified units and certified bulbs. The shields or louvers will protect room occupants from direct UVC exposure. Keep the UV lights on 24 hours a day; the units must be connected to a backup generator in case of power failures.
- Hire an engineer trained in UVGI to design the type and placement of the units.
- Install shielded UVGI always in combination with slow-moving ceiling fans.
- Ensure that units have their own switch; the switch must be out of the reach of patients and visitors.
- Define a cleaning and lamp replacement schedule which is based on manufacturer

guidelines. Bulbs must be replaced yearly or according to the manufacturer's specifications. Light bulbs must be cleaned with alcohol 70% to keep them free of dust. This should be done every 3 months.

- Keep a cleaning, replacement and maintenance log with dates and locations for all sites where UVGI is used in the health facility.
- Educate staff about use, safety and maintenance of UVGI.

### **Procedures:**

1. Have units cleaned and lamps replaced by \_\_\_\_\_, the responsible officer, according to a fixed preventive maintenance schedule:
  - a. Turn off the upper-room UVGI system and let the lamps/fixtures cool.
  - b. Open the units in accordance with the manufacturer's directions.
  - c. Remove the lamps from the unit for cleaning. Handle the lamps only while wearing clean gloves to prevent oil deposits from accumulating on the lamps and decreasing their emission efficiency.
  - d. Use a cloth dampened with alcohol to clean the lamps and reflectors - do not use water.
  - e. Dry the lamps and reflectors with a soft cotton cloth to remove any residue while continuing to wear gloves.
  - f. Lamps should be changed according to a fixed schedule based on the lamp manufacturers' recommendation. If feasible, group relamping should be done on a yearly basis. The lamp or ballast should also be replaced if the lamp stops glowing or flickers.
  - g. Close the unit.
  - h. When all appropriate lamps have been replaced in the upper-room UVGI system, turn on (re-energise) the system and verify (e.g. visually) lamp operation and that (if present) all louvers are in the correct position. If necessary, UV-protective eyewear should be used when verifying the lamps are re-energised.
  - i. Document inspection, cleaning, and lamp replacement in a preventive maintenance logbook.
2. Have UVC emission/performance of each unit measured by \_\_\_\_\_, the responsible officer, at defined distances and locations, after replacement and every quarter. Irradiance should be measured at various levels - both at upper room level and at occupancy level.

### **3.5 Personal Protective Equipment**

Respirators ('N95 masks') are the last line of defence against (nosocomial) TB infection for HCWs. Unfortunately, even the combination of administrative and environmental controls can never provide 100% safety. Respiratory protection is therefore needed in specific areas and during the performance of specific tasks, to supply the desired level of safety. The main limitation of respirators is that they may not be practical to wear at all times, and they are often not used when unsuspected (untreated) TB patients are being seen. In addition, in order to be effective, respirators need to fit properly and to be worn correctly with each use, which is not always the case.

Respirators are made of a material which filters out very small particles in the air (including the infectious particles in aerosols). Respirators are closely fitted to the face to prevent leakage around the edges. If the respirator is not fitted correctly, infectious droplet nuclei can easily enter a person's airway, potentially resulting in infection. Respirators manufactured with at least 95% filter efficiency for particles of 0.3 microns in diameter are usually recommended for use by HCWs. They are disposable but can be re-used repeatedly for one to two weeks if they are taken care of properly.

The main factors responsible for the deterioration of respirators are humidity, dirt and crushing. They should be stored in a clean dry location. One method is to fold a light paper towel around the respirator (being careful not to crush it). Another practical method is to hang the respirators on a hook or nail in the staff room. Plastic bags should never be used since they retain humidity.

Respirators are available in different makes, models and sizes, because of variation in the size and shape of people's faces (not 'one-size-fits-all'). It is recommended that HCWs be "fit tested" to ensure selection of the appropriate respirator. Qualitative fit testing of respirators should be performed to ensure that the appropriate respirator (size and shape) for each HCW is used. Qualitative fit testing involves the use of an aerosol which may be "tasted". If the HCW "tastes" the aerosol (usually saccharin or a bitter-tasting material such as Bitrex) the respirator must be adjusted (i.e. the nose clip) and retested. If the HCW fails the test a second time, a different size or type of respirator should be tested. Beard and facial hair do not allow for the proper sealing of respirators to the face and therefore staff with facial hair should shave. Any leak between the face and the mask is a potential entry point for infectious droplet nuclei.

A respirator fit testing programme should be incorporated into the IPC plan of a health facility. Qualitative fit testing should be conducted prior to the use of a respirator and preferably annually thereafter. IPC focal persons are responsible for conducting qualitative respirator fit testing.

### **Face Masks or Surgical Masks**

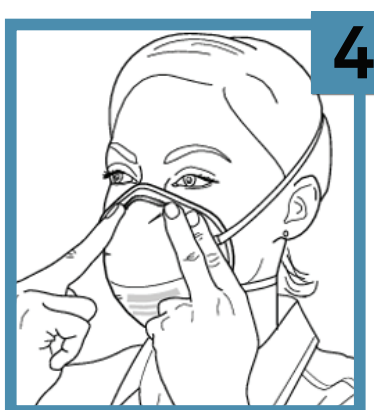
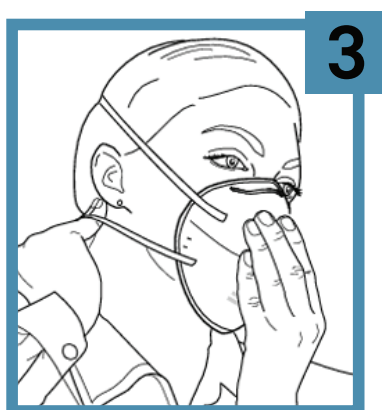
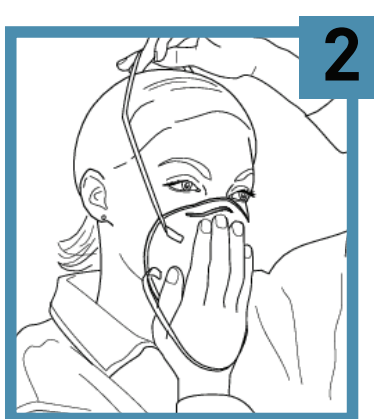
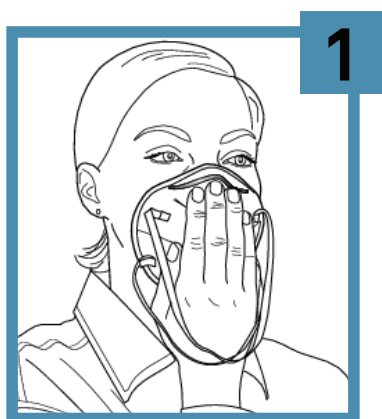
There are important differences between a face mask and a respirator. Face masks, such as surgical masks (cloth or paper) prevent the spread of microorganisms from the wearer (e.g. HCW, TB patient) to others by capturing the large wet particles near the nose and mouth but they **do not** provide protection to the wearer (e.g. HCW, patient, family member) from inhaling infectious droplet nuclei in the air. Disposable (paper) surgical masks can be used to reduce aerosols generated from potentially infectious TB patients.

Consider the stepwise implementation of the following work practices and SOPs.

To reduce the inhalation of infectious particles by breathing air which has been effectively filtered to 0.3 microns, introduce the following work practices:

- Define who shall wear, and where and when respirators are worn based on the recommendations given in these guidelines or a risk assessment. In particular, staff and visitors caring for known or suspected MDR-TB or XDR-TB patients or HCWs performing aerosol-generating procedures have to use respirators.
- Put up signs at the entrances of airborne infection precaution rooms reminding staff and visitors to wear respirators when entering the area.
- Provide information (verbal or written) to patients and visitors explaining why staff are wearing respirators and patients are wearing surgical or face masks.
- Get training on when and how to wear the respirators safely. Develop, implement and evaluate a respirator programme with the following elements: training, fit testing, selection, use, care (storage) and disposal of respirators.
- Employees should pass an appropriate qualitative fit test:
  - Prior to initial use, supervisors are responsible for informing the person responsible for fit testing, when need arises for new fit testing (e.g. new recruit).

- Whenever a different respirator (i.e. size, type, model or make) is used.
- Periodically thereafter; ideally, staff should be fit-tested every year.
- Additional fit-tests should be performed whenever changes in physical condition or job description which could affect respirator fit are noticed or reported.
- Assign and train a responsible person, preferably the IPC focal person, in qualitative fit-testing.
- Keep a register on fit-test results, i.e. name, date of fit test, result, respirator make, model, type and size, date of next fit test.
- Fit testing should be done on all HCWs, new recruits (during induction/orientation), assigned to work in areas identified for the use of respirators and when new respirators are introduced.
- Remind colleagues on the proper use and storage of respirators and correct those who are not adhering to these work practices.
- IPC focal person should liaise with pharmacy staff to ensure uninterrupted availability of respirators.
- Inspect a disposable respirator every time before re-using it. If the elastic bands are loosened or if the material is soiled then the respirator should be disposed of.
- Do not wear a respirator around the neck while not in use; this may loosen the elastic bands.
- After use store the respirator in a dry, dust-free place such as in a clean towel, in a personal locker or hanging freely on a nail or hook with the name/initials of the owner clearly indicated. **Never store the respirator in a plastic bag. Do not share respirators. Do not fold or crush respirators.**
- After use, dispose of respirators as normal waste, there is no need for disinfection prior to disposal.
- Wash hands each time after donning and removing the respirator.



**Procedures:**

1. Perform a qualitative respirator fit test, at least once a year for each eligible HCW:
  - a. Use sensitivity solution to establish if the HCW tastes the test agent (Sacharine or Bitrex)
  - b. Cover head with hood with opening in front
  - c. Squeeze the spray of fit test sensitivity solution 5-10 times
  - d. Remove hood
  - e. Replace sensitivity solution with fit test solution (higher concentration)
  - f. Don/apply respirator (Observe if the HCW applies the respirator in a correct manner)
  - g. Cover head with hood with opening in front
  - h. Squeeze the spray of fit test solution 5-10 times and repeat between next steps
  - i. Normal breathing 1 minute
  - j. Deep breathing 1 minute
  - k. Move head side-to-side 1 minute
  - l. Move head up-and-down 1 minute
  - m. Talk non-stop 1 minute
  - n. Jog or walk in place 1 minute
  - o. Normal breathing 1 minute
  - p. Remove hood
  - q. Remove elastic bands one by one from behind over the head
2. Don/apply the respirator as follows:
  - c. Find centre of nose piece and squeeze
  - d. Open respirator in a hand, looking into the inside
  - e. Place straps on back of hand
  - f. Place respirator on face
  - g. Pull top elastic band over head
  - h. Place top elastic band on crown of head
  - i. Pull lower elastic band over head
  - j. Pinch metal clip or foam cuff around nose
  - k. Pull respirator over chin
  - l. Check for major leaks



## 4. Area-Specific TB-IC Measures

Consideration should be given to reducing nosocomial TB transmission in the areas and settings outlined below, especially for PLHIV and HCWs. Airborne infection precautions should vary from one setting to another depending on the risk of transmission in a facility. Some areas of the health facility could be considered high risk relative to others. Each of the high-risk areas should have an independent risk assessment, or should have a detailed section written as part of the overall IPC programme.

Priority areas with a high risk of exposure include the following:

- Enclosed and crowded spaces where unidentified persons with symptoms suggestive of TB and particularly vulnerable patients for example PLHIV and children may interact (e.g. waiting areas, HIV care clinics, TB clinics, emergency rooms, ambulances and X-ray rooms).
- Spaces where aerosol-generating procedures are performed (e.g. bronchoscopy, spirometry, sputum induction, sputum collection/preparation, endotracheal intubation, surgical drainage and irrigation of TB abscesses and autopsy)

Below, suggestions for recommended combinations of TB-IC measures are provided for specific areas/settings. Implement those control measures which are feasible in each specific area/setting. See Annex 3 for an overview of the recommended combinations of TB-IC measures for different areas/settings.

To determine the proper combination of TB-IC measures for a specific area/setting, conduct the following:

- List the different specific patient care and auxiliary service areas/settings in your facility
- Conduct a proper risk assessment using a standardised facility risk assessment checklist, Annex 1, to evaluate the strengths and weaknesses related to work practices and infrastructure features at the different specific areas/settings.
- Prioritise the control measures and work practices described in the previous chapter for stepwise implementation, depending on the availability of resources.

### 4.1 Waiting Areas

Depending on the size of the facility, there may be one or several waiting areas. The most crowded place is probably the waiting area where patients are registered immediately after they enter the facility. Smaller multiple waiting bays offer opportunities for separation, as long as crowding in small enclosed waiting areas is prevented. Large open waiting areas can be simply divided in smaller partitions with screens, low walls or plants creating distance between waiting patients.

#### **Key recommended control measures are the following:**

- Triage
- Separation – in separate area or well-ventilated partition of large waiting area
- Cough etiquette – provide surgical mask to coughing persons (expert advice required)
- Minimising waiting time – Fast-tracking to the front of the queue
- Natural ventilation – out-of-doors waiting areas are strongly recommended
- Mechanical ventilation – ceiling fans in large indoor waiting areas and extractor fans in enclosed indoor waiting areas (expert advice required)

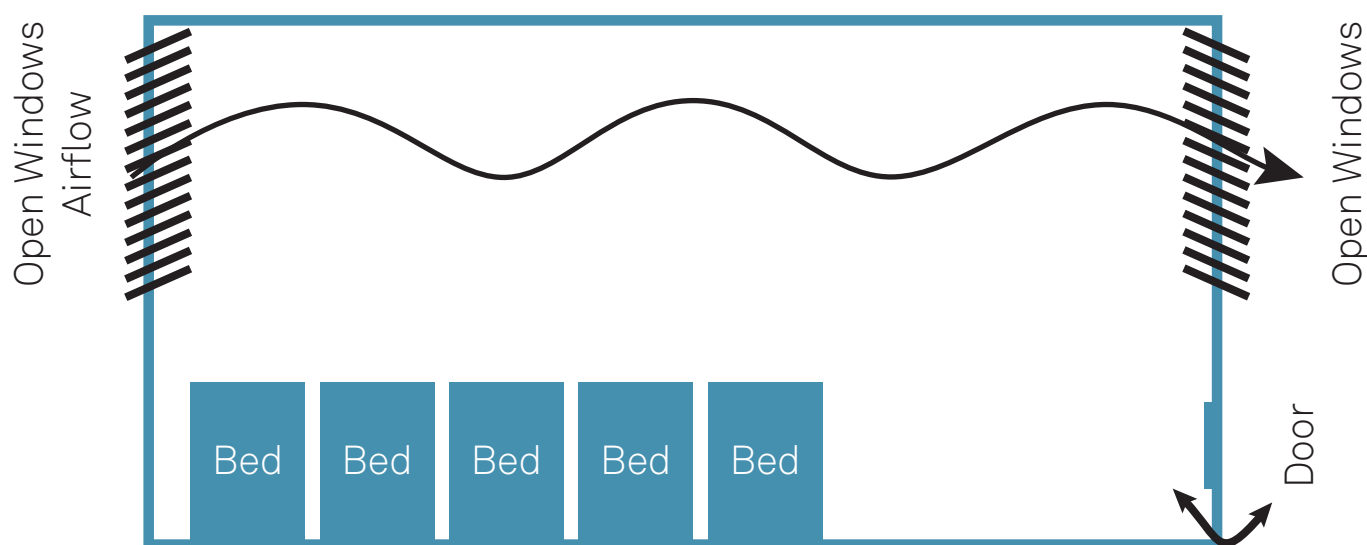
## 4.2 Consultation Rooms (including OPD)

Depending on the size of the health facility there may be several consultation rooms. The risk of the transmission of airborne infections is higher in small enclosed poorly ventilated rooms. The TB clinic and HIV care clinic are examples of high-risk departments, but general OPD consultation rooms should not be forgotten. Air conditioning units, which cool and re-circulate room air, increase the risk when HCWs keep windows closed. Even in consultation rooms with adequate natural (cross) ventilation, the placement of furniture and seating arrangement may inhibit air exchange.

### Key control measures are the following:

- Cough etiquette – provide surgical masks to coughing persons
- Natural (cross) ventilation – ensure air flow direction is not from the patient to HCW
- Mechanical ventilation – extractor fans to direct the airflow and enhance the number of air changes per hour (placement of extractor fans requires expert advice)

### Natural ventilation; free flow of ambient air in and out through open windows



## 4.3 X-ray Departments

Persons identified with symptoms suggestive of TB and infectious TB patients are often referred for a chest X-ray. X-ray rooms are by definition enclosed rooms because of the regulations for the use of radiation. Air conditioning units are often installed in X-ray rooms.

### Key control measures are the following:

- Triage
- Separation – scheduling diagnosed infectious TB patients and persons with symptoms suggestive of TB during a specific time slot preferably at the end of the morning or in the afternoon especially inpatients and identifying a specific X-ray room in the case of multiple rooms for performing chest X-rays.
- Cough etiquette – provide surgical masks for coughing persons with symptoms suggestive of TB or diagnosed infectious TB patients
- Minimising waiting time – expedite service for (potentially) infectious TB patients
- Mechanical ventilation – ceiling and extractor fans (requires expert advice)
- UVGI – in X-ray rooms where ventilation cannot be adequately improved by mechanical ventilation alone (requires expert advice)
- Respirators on staff



#### 4.4 Casualty/Emergency Departments

Acute undiagnosed patients are admitted to the emergency room while all attention is aimed at stabilizing patients whose lives may be in danger. There are often high patient and staff volumes and the area is often poorly ventilated. High-risk aerosol-generating procedures are performed in here such as resuscitation and intubation of patients. TB patients presenting with hemoptysis are also often first admitted to the emergency room until the blood circulation is stabilised and the bleeding is controlled.

##### **Key control measures are the following:**

- Triage
- Separation and isolation – as is the case for other airborne infections
- Cough etiquette – provide surgical masks for coughing persons suspected of having TB and infectious TB patients
- Minimising time spent with persons with symptoms suggestive of TB and confirmed infectious TB patients
- Natural ventilation – high level (permanent) open windows
- Mechanical ventilation – ceiling fans or extractor fan in isolation rooms (requires expert advice)
- UVGI - in large casualty rooms where ventilation cannot be improved adequately by mechanical ventilation alone (requires expert advice)
- Respirators on staff – especially when performing cough-inducing procedures on patients presenting with respiratory symptoms

#### 4.5 HIV Care Clinics

High rate of previously undiagnosed TB is common among PLHIV. Intensified case finding and early initiation of effective treatment of TB among PLHIV reduce transmission of TB by infectious patients, and also reduces mortality. Although incidence of TB also decreases in PLHIV who are on ART high standards of infection control are strongly recommended, in particular where integrated HIV and TB services are offered.

In addition, active screening for TB offers the opportunity to provide IPT to PLHIV in compliance with the national TB and ART guidelines.

##### **Key control measures are the following:**

- Triage – TB screening in compliance with the National Guidelines for the Management of Tuberculosis at every visit
- Separation – separate waiting area, preferably outdoors
- Cough etiquette – provide surgical masks for coughing persons
- Minimise waiting time and frequency of visits
- Natural (cross) ventilation
- Mechanical ventilation – ceiling and extractor fans in waiting areas, passages and rooms where adequate natural (cross) ventilation cannot be realised (expert advice required)
- Respirators for staff

#### 4.6 The TB Clinics/TB Wards

Patients diagnosed with TB should in principle be treated on an ambulatory basis. TB patients on effective treatment are considered to be no longer infectious after two weeks of treatment. However, with the emergence of DR-TB, undiagnosed smear-positive DR-TB patients are unlikely to convert as long as they are on first-line

drugs only. Also, HIV-infected TB patients are often smear-negative, but may still be infectious, which calls for high standards of TB-IC in TB clinics and TB wards.

**Key control measures are the following:**

- Separation – in particular sputum smear-positive or culture-positive TB patients, as well as persons suspected of having drug-resistant TB
- Cough etiquette – provide surgical masks for coughing persons
- Minimising waiting time and admission – preferably ambulatory treatment
- Natural (cross) ventilation
- Mechanical ventilation – ceiling and extractor fans in waiting areas, passages and rooms/wards where adequate natural (cross) ventilation cannot be realised (requires expert advice)
- UVGI - in large TB wards where adequate ventilation cannot be realised (requires expert advice)
- Respirators for staff – when patients are not yet on a continuation phase regimen, in particular if risk of initially undiagnosed DR-TB patients among TB patients on first line drugs is high; ventilation is not optimal; and supported by surveillance findings

#### 4.7 The MDR-TB Ward

From an infection control perspective, preventing initial infection with MDR-TB and XDR-TB and managing the treatment of existing cases effectively, are key to containing the spread of DR-TB. Meanwhile, the highest standards of TB-IC should be applied to MDR-TB and XDR-TB care settings.

**Key control measures are the following:**

- Separation and isolation – preferably in designated treatment sites with a separate entrance; in single-patient rooms or otherwise cohorted according to infectiousness and (if known) drug resistance profiles; restriction of patient movement; visiting hours and designated outdoor areas to meet with visitors.
- Cough etiquette – surgical masks on patients when not in their room.
- Minimising waiting time (when visiting other departments such as the X-ray department) and admission.
- Natural (cross) ventilation – **to the maximum**
- Mechanical ventilation – extractor fans in waiting areas, passages and rooms/wards where natural (cross) ventilation is inadequate (< 12 air changes per hour). (requires expert advice)
- Mechanical ventilation – of single-patient isolation rooms for XDR-TB patients.
- UVGI - in combination with slow-moving ceiling fans where adequate ventilation rates cannot be realised (requires expert advice).
- Respirators on staff and visitors – in areas where the signage on entry doors indicates that respirators must be used.

#### 4.8 General Wards

Undiagnosed infectious TB patients may occupy the general ward together with other vulnerable patients who are at risk of acquiring TB. From the perspective of airborne precautions, extra attention must be paid to the prompt identification and separation of patients with symptoms suggestive of TB and confirmed infectious TB patients. They should be housed in a designated partition of the general ward away from other patients, ideally, in an isolation room. If separation is not possible and ambulatory treatment is not an option, it is recommended to refer the patient to a specialised facility as soon as possible, especially if DR-TB is suspected.

**Key control measures are the following:**

- Triage – screen for TB symptoms as a routine work practice for all new admissions
- Separation – of patients with symptoms suggestive of pulmonary TB in a well-ventilated part of the ward; away from immune-compromised patients (e.g. diabetes, malignancies and HIV infection)
- Cough etiquette – provide surgical masks to coughing patients
- Minimising admission in the general ward
- Natural ventilation

**4.9 Sputum Collection Areas**

Sputum collection areas are very high-risk areas and therefore should be situated outside. Simple shelters with screens on one or two sides offer sufficient privacy. The use of toilets by patients to provide a sputum sample should be prohibited as they are not well ventilated.

Procedures like sputum induction lead to coughing and aerosol production which increase the risk of the transmission of TB. These procedures should only be done as a last resort, after less risky diagnostic measures have been taken. The rooms for these procedures should have proper mechanical ventilation coupled with respiratory protection with N95 respirators.

**Key control measures are the following:**

- Natural ventilation – sputum collection must be ideally collected in a designated outdoor area. Also, bed ridden patients suspected of having pulmonary TB should be assisted to collect sputum in a well-ventilated area, preferably outside.
- Mechanical ventilation – extractor fan in a closed sputum collection booth and in areas where aerosol generating procedures are undertaken; adequate time should be allowed between patients for disinfection of air. (requires expert advice)
- UVGI – direct (open source) UVGI in a closed sputum collection booth; time slot in between patients for disinfection of air (requires expert advice).
- Respirators on staff – when performing sputum induction.

**4.10 High-Risk Procedure Rooms**

The risk of exposure is high in areas where aerosol generating procedures (bronchoscopy and spirometry rooms; surgical theatres where patients are intubated, and autopsy suites where post mortems may also produce aerosols *M. tuberculosis*) are performed particularly on TB patients and patients with presumptive TB.

These settings require special TB-IC consideration for preventing TB transmission. Poorly ventilated surgical and autopsy rooms pose considerable risk of TB transmission and subsequent infection to HCWs whenever surgical or dissection procedures are done on infectious TB patients or cadavers.

In general, elective surgery on infectious TB patients should be postponed until patients have received adequate treatment and are no longer infectious. Efforts should be made to establish adequate environmental controls and personal protection for all the HCWs involved in the procedures.

### Key control measures are the following:

- Triage – as part of the pre-operative screening protocol
- Separation – schedule TB patients at the end of a morning or afternoon programme
- Mechanical ventilation – extractor fans; closed (laminar flow) air supply and exhaust ventilation systems (requires expert advice)
- Respirators on staff – surgeons and theatre staff should not wear a respirator with an exhalation valve or wear a surgical mask under the respirator; a surgical mask under the respirator will negatively influence the seal.

#### 4.11 Laboratories

Of all the cadres of HCWs, laboratory personnel have the highest occupational risk of contracting TB.

### Risk precaution levels, associated laboratory activities and risk assessment for tuberculosis (TB) laboratories (WHO Tuberculosis Laboratory Biosafety Manual)

Risk level of TB laboratory*	Laboratory Activities	Assessment of Risk
Low Risk	Direct sputum-smear microscopy; preparation of specimens for use in an automated nucleic acid amplification test cartridge (such as the Xpert® MTB/RIF assay)	Low risk of generating infectious aerosols from specimens; low concentration of infectious particles
Moderate Risk	Processing and concentration of specimens for inoculation on primary culture media; direct DST (for example, line-probe assays on processed sputum)	Moderate risk of generating infectious aerosols from specimens; low concentration of infectious particles
High Risk (TB-containment Laboratory)	Culture manipulation for identification; DST or line-probe assays on cultured isolates	High risk of generating infectious aerosols from specimens; high concentration of infectious particles

\*The risk level refers to how likely it is that someone in the laboratory will become infected with TB as a result of procedures performed in the laboratory.

### Key biosafety measures are the following:

- Access control: laboratories are restricted areas except for authorised staff only; patients are only allowed to enter well-ventilated rooms for blood sample collection.
- Code of Practice: specialised laboratory equipment should always be accompanied by, but can never replace, appropriate procedures and good microbiological technique
- Natural ventilation: the overall direction of air flowing through the laboratory should be from functionally clean areas to dirty areas
- Use of open bench: separation of dirty and clean areas
- Mechanical ventilation: extractor fans for maintaining unidirectional airflow: negative pressure systems in anterooms and DST areas; and ventilated class II bio-safety cabinets protecting worker and environment in laboratories with a high workload (requires expert advice).
- Use of PPE: Protective laboratory clothing must be worn at all times while staff are working in the laboratory. The use of respirators may be considered if the risk of accidental spillage increases in cases of unusual workload, understaffing, or to meet specific requirements related to the medical status of the laboratory worker. Respirators should be used when performing culture concentration technique, DST, LPA (extraction of DNA), MGIT (centrifugation of sample).

#### 4.12 Patient Transport Services

The infectiousness of the patient should always be considered during transportation. Every patient sharing transportation services with other patients or HCWs should have been screened for TB, and the necessary precautions should be taken when transporting persons with symptoms suggestive of TB or diagnosed infectious TB patients.

##### **Key control measures are the following:**

- Triage: this should be a routine work practice even when the reason for ambulance transportation is known and medical information of the patient is available.
- Cough etiquette: surgical masks should be used by patients with a cough which has lasted for two or more weeks or diagnosed with infectious TB.
- Natural (cross) ventilation: open windows; after patient transport air out the vehicle with all windows/doors open for 30 minutes.
- Respirators on staff: in the case of transportation of persons with symptoms suggestive of TB and those diagnosed with TB.

## 5. CONGREGATE SETTINGS & HOUSEHOLDS

Congregate settings include a heterogeneous mix of facilities which range from prisons, detention centres, police holding cells, hostels, military barracks, workplaces (such as fisheries, factories and mines), homeless centres, schools, orphanages, churches, bars and nursing homes. Congregate settings differ in the risk of TB transmission compared to the risk of TB transmission in the general population.

Because of the diversity in settings, recommendations for TB-IC measures and work practices in congregate settings are less specific than those for health facilities. However, any health facility within a congregate setting should be considered as a healthcare setting, in which airborne precautions, TB-IC measures and work practices should be implemented as in any other health facility.

Congregate settings, especially prisons, police holding cells, military barracks and hostels, should be included in risk assessments for TB-IC. The risk assessment carried out by trained and experienced HCWs (together with non-medical staff of the institution) will be useful in determining the level of risk in that setting and the relevant control measures which should be addressed in the TB-IC programme.

The risk assessment should result in a written TB IPC plan which outlines the combination of TB-IC measures and requirements along with the specific roles and responsibilities of staff involved.

### 5.1 Prison Cells/Prison Halls/Police Holding Cells

Prisons are often overcrowded and TB is common. Detainees in police holding cells and new inmates should be screened for TB as soon as possible. Detainees can be involved as cough monitors to identify fellow inmates who have a cough. Separation in prison may be possible in a designated area of the sick bay (TB ward) or designated cells. Inmates on anti-TB treatment who are released or transferred to another facility should be referred to prevent them getting lost to follow up. Upon release, the transfer-out procedure is as per the *National Guidelines for the Management of Tuberculosis*.

#### **Key control measures are the following:**

- Triage: medical screening of detainees and new prisoners and active case finding by cough monitors
- Separation
- Cough etiquette
- Voluntary screening of staff for TB
- Natural ventilation: especially in planned construction and renovation

#### **Procedure for patient transfer:**

- The TB Patient Transfer Form should be completed in triplicate and the original given to the patient who wishes to move to another district for continuation of his/her TB treatment
- The second copy should be sent to the receiving district PMO, for the attention of the DTLC, while the third copy remains in the booklet
- The DTLC at the receiving district will record the patient in the *District TB Register* as a "Transfer In" patient and will open a new TB Treatment Card, recording all the information on the *TB Patient Transfer Form*.

## 5.2 Military Barracks

Barracks are often overcrowded places, although the capacity and number of soldiers in each military barrack is always not the same. Military personnel who have been coughing for more than two weeks should report this to their superiors and the infection control officer. They should be taken to hospital for further investigations, and if TB is diagnosed, contact investigations among fellow barrack occupants (close contacts) should be carried out.

### Key control measures are the following:

- Self-reporting cough of more than two weeks and contact investigations, if TB is diagnosed
- Separation
- Cough etiquette
- Natural ventilation

## 5.3 Households

Household members, in particular children and PLHIV are at high risk of becoming infected with *M. tuberculosis* and consequently developing the disease (WHO Recommendations for investigating contacts of persons with infectious tuberculosis). The major risks of infection through contact lie in exposure to the infectious case before diagnosis. Whether the patient subsequently remains at home or moves to a health facility appears to be of little importance, provided the patient is treated effectively.

Early case detection, treatment and health education of the index patient and preventive therapy for eligible infected family members and other close contacts remain the most important control measures for reducing the risk of transmission in households.

Contact investigation of household members and close contacts of diagnosed TB patients, including PITC for HIV, is paramount for intensified case finding. At least one home visit (and one follow-up home visit, if needed) should be conducted as soon as possible for an assessment and the planning of interventions based on the assessment. Family members of infectious TB patients, close contacts and community health workers (CHWs) should be educated on how to minimise exposure.

### Key control measures are the following:

- Triage: contact investigation of household members especially children and PLHIV
- Separation: infectious TB patients should spend as little time as possible in crowded public places/transportation; if possible, infectious TB patients should sleep in a separate room during the initial phase of treatment. Advise patients to minimise contact with infants and children during the initial months of treatment.
- Safe sputum collection and transportation: outdoor collection of sputum samples and transportation of the sample as per the *National Guidelines for the Management of Tuberculosis*.
- Cough etiquette: anyone who coughs should be educated on cough etiquette
- IPT for eligible household members especially children and PLHIV
- Natural ventilation: Houses should be well-ventilated, particularly rooms where infectious TB patients spend much time. Respirators for CHWs while visiting MDR-TB patients and while caring for bed-ridden patients because of the risk of undiagnosed XDR-TB. Whenever possible, consultation with DR-TB patients should not be done in enclosed areas. Each CHW should receive two disposable particulate respirators (N95 or FFP2) per month if the patient is smear or culture positive and be trained on how/when to use them.



## 5.4 Other Community Settings Where People Congregate

There are other community settings where people congregate as mentioned above. Key populations with a high burden of TB and HIV are more common in informal settlements where houses are occupied by many people and are poorly ventilated, favouring the transmission of TB, favouring transmission of TB.

### **Key control measures are the following:**

- Triage: targeted active case finding strategies (peer-to-peer and door-to-door) through campaigns among key populations in close collaboration with community based organisations
- Cough etiquette: health education campaigns and IEC materials
- Natural ventilation: this should be addressed in collaboration with the local municipal authorities



## 6. MANAGERIAL ACTIVITIES

Managerial activities are the policy and programme level activities which need to be in place to facilitate the implementation of TB-IC. The selection of the combination of control measures will be based on the IC risk assessment of the facility/area and be informed by local epidemiological, climatic and socioeconomic conditions.

Managerial activities provide an enabling environment for the implementation of TB-IC. They are based on public health principles and represent the foundation of any public health programme. The managerial activities include establishing coordinating bodies at all levels of the health system, planning, ensuring the availability of the necessary resources, assessing the problem, developing policy and guidelines, setting up surveillance activities, increasing community awareness, enhancing communication between HIV and TB programmes, and conducting operations research and monitoring & evaluation.

### 6.1 Training of Staff

TB-IC is only effective if each HCW working in a facility understands the importance of TB-IC work practices and their role and responsibility for implementing and following safe work practices and SOPs. Each HCW should receive instructions appropriate to their job category. All facility staff and volunteers, including those who do not directly provide TB care, such as administrators, cleaners, data clerks, security guards, rehabilitation staff and social workers, should undergo training and re-training (formal/orientation/in-service) on the risks of TB transmission. This should be done at least every six to twelve months and for all new staff in the facility. The National and Regional Health Training Centres, QA units, Public and Environmental Health and Special Programmes staff are responsible for the training programme.

Training should include the following components:

- Basic concepts of TB transmission, pathogenesis, diagnosis and the risk of transmission to HCWs and patients, including TB/HIV interaction.
- Epidemiology of TB in Namibia and the risk factors for TB disease.
- IPC plan: Each staff member should be made aware of the details of the facility's IPC plan, the prioritised combination of TB-IC measures, related work practices and SOPs. As every person is responsible for TB-IC, understanding the IPC plan will ensure that staff hold each other accountable for its successful implementation.
- TB and Public Health: HCWs should also be made aware of the overall TB control strategy, including the roles of the local as well as national TB control programmes, other health programmes and ministries, the private sector, community based organisations and the population at large.
- Occupational risk: All staff and volunteers working at health facilities should be educated on the symptoms of TB to ensure that they get tested for TB and treated where necessary.

### 6.2 Education of Patients and Raising Community Awareness

Targeted public health campaigns educating communities and patients to recognise symptoms of TB and to seek health care and further investigations should be routine in Namibia due to the high co-infection rate of TB and HIV. In addition, patients should understand how to protect themselves and others from exposure to TB

by simple cough hygiene measures. Information, education and communication materials such as posters and pamphlets emphasising cough etiquette should be widely displayed. TB-IC messages should also be included in both TB and HIV communication activities.

### **6.3 Coordination and Communication with the TB and HIV Programmes**

The national TB and HIV programmes should ensure that each health facility caring for PLHIV has well-coordinated service delivery for HIV and TB care. This should be done based on the local setting and staff complement. TB-IC in HIV care settings and HIV counselling and testing centres should be prioritised. To ensure the joint planning of TB and HIV activities the IPC focal person should participate in both TB/HIV review meetings and training.

Health facilities including private health facilities without integrated services for both TB and HIV should develop an agreement between the local care providers which establishes:

- A (referral) mechanism for patients with symptoms suggestive of TB to be investigated appropriately and started on effective treatment if indicated
- A monitoring mechanism which provides feedback to the referring health facility to evaluate both the linkage with TB diagnostic services and the appropriateness of referrals as indicated by the proportion of referrals actually confirmed as having TB.

### **6.4 The Infection Prevention and Control (IPC) Plan**

All health facilities are visited by patients with TB in their often prolonged process of seeking diagnosis and cure. Therefore, all health facilities should have a written IPC plan to ensure the stepwise implementation of TB-IC measures and compliance with relevant work practices and SOPs. Facility risk assessment reports, resources and other guiding documents are needed to provide input to the infection prevention and control plan.

The facility infection prevention and control plan should include the following measures:

- Prompt screening of all patients at first contact after entering the facility to identify persons with symptoms suggestive of TB or those who are being investigated or treated for TB disease
- Instructing persons with symptoms suggestive of TB and confirmed TB patients in respiratory hygiene/cough etiquette. This includes instructing them to cover their nose and mouth when coughing or sneezing, and providing face masks or tissues. Face masks help reduce the spread of TB from the patient to others. Paper tissues are less likely to be used effectively but are less costly and less likely to identify people as TB suspects with the attendant risk of stigma. Tissues and face masks should be disposed of in waste receptacles. Clients and staff should be encouraged to wash their hands after contact with respiratory secretions. TB cannot be spread from the hands, but other respiratory infections such as flu can
- Placing persons with symptoms suggestive of TB and confirmed TB patients in a separate well-ventilated waiting area such as a sheltered outside space
- Speeding up the management of these persons so that they spend as little time as possible at the facility

- Ensuring rapid diagnostic investigation of persons with symptoms suggestive of TB and ensuring that persons reporting TB treatment are adhering to it
- Using and providing regular maintenance of appropriate environmental control measures
- Training and educating all staff on TB, TB-IC measures and the IPC plan including screening all HCWs for TB, and diagnostic investigation for those with signs and symptoms suggestive of TB
- Providing voluntary, confidential HIV counselling and testing for HCWs and adequate access to treatment and care
- Monitoring and evaluation of the implementation of the IPC plan
- Enforcing adherence to the institutional work practices and related SOPs, and correcting any inappropriate practices.

*Put above content in the existing ministerial format for the facility Annual Work Plan.*

## **6.5 Administrative Support for the Infection Prevention and Control Plan**

The IPC plan must be supported by the Chief and Senior Medical Officers, the Hospital Matron and the Primary Health Care Supervisor in the regions and districts and its day-to-day implementation should be coordinated by the facility IPC focal person. Referral and district hospitals should also have an infection control committee. District coordinating committee (DCC) members, unit managers, lead cleaner, laboratory technologist, IPC focal person, DTLC, QA officer and the Health Information System (HIS)/Surveillance Officer may sit on the committee, which ideally should meet at least quarterly.

The Medical Superintendent (for referral hospitals) or the Senior Medical Officer (for district hospitals), is responsible for overseeing the infection control committee and the development of a written IPC plan, monitoring its implementation, and providing effective training for HCWs and other staff. For health centres and clinics, the Principal Registered Nurse is responsible for overseeing all IPC activities and reinforcing institutional policies, work practices and SOPs.

The responsibilities of the Medical Superintendent, Principal Medical Officer and Principal Registered Nurses regarding TB-IC are the following:

- Preparing the costed annual and quarterly plans
- Compiling monthly/quarterly reports
- Identifying training needs
- Convening and coordinating meetings.

### **SOP for the stepwise introduction of effective TB-IC at facility level:**

1. Have a facility risk assessment conducted as per Annex 1 of these guidelines.  
Responsible person: facility manager
2. List the areas/settings available at the facility as described in Chapter 4 of these guidelines.  
Responsible persons: IPC focal person, TB focal person, HIV focal person and laboratory manager
3. Based on the risk assessment report, select/prioritise the key TB-IC measures as described in Chapter 4 and Annex 3 of these guidelines.  
Responsible persons: IPC focal person, TB focal person, HIV focal person and laboratory manager

4. Based on the risk assessment report, select/prioritise appropriate and applicable TB-IC work practices including the respective SOPs as described in Chapter 3 of these guidelines.  
Responsible persons: IPC focal person, TB focal person, HIV focal person and laboratory manager
5. Submit the plan to the facility manager.  
Responsible persons: IPC focal person, TB focal person, HIV focal person and laboratory manager;
6. Incorporate the plan with cost estimates for each planned intervention in the annual work plan of the facility.  
Responsible person: facility manager
7. Evaluate progress of implementation on monthly/quarterly basis.  
Responsible persons: IPC focal person, TB focal person, HIV focal person and laboratory manager
8. Plan the introduction of TB-IC measures which were not fully realised during the year and in addition select (some) previously not prioritised TB-IC measures and work practices to be implemented in the next year.  
Responsible person: facility manager advised by the IC committee and district.

## 7. MONITORING & EVALUATION

The effectiveness and impact of the TB-IC implementation should be monitored and evaluated. This will provide the data needed to guide the planning, coordination, and implementation of TB-IC efforts, assess its effectiveness, and identify areas for programme improvement. Monitoring the results of the TB-IC programme will allow health facilities, districts, regions as well as the community, to determine if the TB-IC measures already in effect are working well or if changes (internal and external) are required.

### 7.1 Objectives of M&E in TB-IC

The following are some of the objectives of conducting M&E of TB-IC measures:

- To facilitate the most effective and efficient use of human and financial resources to achieve maximum health benefit for the population served
- To provide information to inform and improve programme management. In this regard M&E of TB-IC can help to:
  - Measure programme performance in TB-IC
  - Ensure quality and effectiveness in service provision
  - Measure progress towards the achievement of specific objectives
  - Identify problems and possible solutions
- To help promote a learning culture focused on service quality improvement
- To define roles and responsibilities and to improve accountability
- To attract resources for TB-IC.

### 7.2 M&E Framework for TB-IC

To achieve the above objectives, the NTLP will be guided by a strategic framework for national and sub-national level programmatic implementation of TB-IC. This will clearly outline and visually conceptualise the project inputs, processes, outputs as well as desired outcomes and impact.

**Aim:** To minimise transmission of TB in health facilities, congregate settings and households

**Objective:** To implement appropriate TB-IC measures in all health facilities, congregate settings, households and other community settings

### 7.4 Indicators for TB-IC

M&E indicators in the context of TB-IC relate to managerial activities, administrative and environmental control measures and personal respiratory protection. Ideally, each facility and each level should formulate a target for each of the indicators outlined in table below. The TB-IC indicators should be incorporated into the facility's quarterly report. The head of the institution is responsible for the report. The quarterly report is submitted to Regional Management Team (RMT), Quality Assurance (QA) and DSP (see figure on page 39).

## Indicator Matrix for TB-IC in Health-care and Congregate Settings

#	Indicator	Indicator definition (numerator/ denominator)	Source (s)	Level	Periodicity	Type
IC 1	Proportion of hospitals and health centres with TB-IC plans	<b>Numerator:</b> Number of hospitals and health centres with written infection control plans. <b>Denominator:</b> Number of hospitals and health centres evaluated	Supervisory visits reports	National	Annual	Process
IC 2A	Proportion of nurses screened for TB	<b>Numerator:</b> Number of nurses in hospitals and health centres screened for TB in the past 12 months <b>Denominator:</b> Number of nurses in hospitals and health centres employed within these facilities by the end of the year	Staff TB screening register/TB register	National	Annual	Impact
IC 2B	Proportion of nurses diagnosed with TB in past 12 months	<b>Numerator:</b> Number of nurses in hospitals and health centres diagnosed with TB in the past 12 months <b>Denominator:</b> Number of nurses in hospitals and health centres screened for TB in the past 12 months	Staff TB screening register/TB register	National	Annual	Impact
IC 3	Proportion of hospitals and health centres with nurses trained in TB-IC	<b>Numerator:</b> Number of hospitals and health centres with at least one nurse trained in TB-IC <b>Denominator:</b> Number of hospitals and health centres evaluated	Supervisory visit reports	National	Annual	Process
IC 4	Availability of outside waiting areas at HIV care facilities	<b>Numerator:</b> Number of HIV care facilities with outside waiting areas <b>Denominator:</b> Number of HIV care facilities evaluated	Supportive Supervisory reports/surveys	National	Annual	Input

## 7.5 Monitoring

IPC and performance improvement should be linked through information gathering and clinical analysis. There should be continuous collection and analysis of data to identify weakness in implementation of TB-IC and any undesirable trends. Comprehensive periodic surveillance data on patients and on HCWs who developed TB should be analysed and utilised to develop remedial action plans.

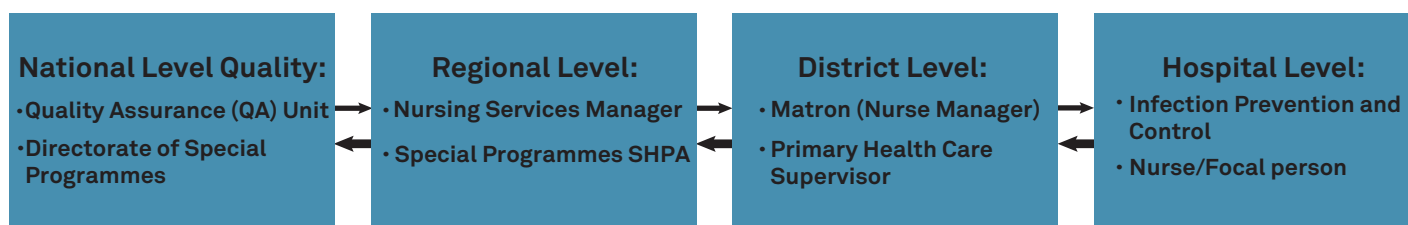
The tools which will be used for monitoring TB-IC are the *Facility TB-IC Risk Assessment Checklist, Facility TB-IC Review Checklist (Dashboard), External Supervision Checklists as well as the Facility Sputum Register*. Measurement with the checklists will be done at baseline and quarterly thereafter. The checklists will be completed by the IPC focal person in collaboration with the DTLC and DCC and forwarded to the regional level and subsequently to the national office. However, data from the cough register needs to be monitored and reported on a monthly basis by the DTLC. Periodic external assessment will be done by central offices (DSP and QA).

The tools that will be used for monitoring TB-IC are the Facility TB-IC Risk Assessment Checklist, Facility TB-IC Review Checklist (Dashboard), External Supervision Checklists as well as the Facility Sputum Register. Frequency of measurement with the checklists will be done at baseline and quarterly basis thereafter. The checklists will be completed by the IPC focal person in collaboration with the DTLC and DCC and forwarded to the regional level and subsequently to the national office. However data from the cough register needs to be monitored and reported on a monthly basis by the DTLC. Periodic external assessment will be done by central offices (DSP and QA).

## 7.6 Reporting

Routine monitoring and surveillance data as well as results of special studies should be analysed and shared with the TB-IC committee. This information should be compared with current statistics historical data, findings of surveys, and findings from internal and external inspections. Reporting on routine monitoring and surveillance should be done on quarterly basis.

### Reporting Flow diagram for TB-IC





## 8. GLOSSARY

Air-borne infection	The dissemination of microbial aerosols to a suitable portal of entry, usually the respiratory tract.
Air-borne precautions	Measures taken to prevent the spread of infection through the air from one person to another.
Active TB	Infection with <i>M. tuberculosis</i> resulting in disease as evidenced by symptoms or signs.
Aerosol	A cloud of solid or liquid particles in the air, usually produced by coughing, sneezing, talking or laughing.
Biosafety cabinets class 1	A hood (or cabinet) under which some special laboratory procedures are performed. It protects the worker and the work environment from exposure to an aerosol by drawing air into the cabinet, but does not protect the specimen from contamination.
Biosafety cabinets class 2	A hood (or cabinet) under which some special laboratory procedures are performed. This type of cabinet uses laminar air flow in addition to exhaust, and protects both the specimen and the HCW and the work environment from contamination.
Bronchoscopy	A procedure whereby an instrument (bronchoscope) is introduced into the respiratory tract in order to see inside the airways.
Close contact	A person who has been in close proximity in an enclosed environment for a prolonged period (i.e. 8 hours or longer) with a person with infectious or potentially infectious TB and who is therefore considered to be at risk of infection with <i>M. tuberculosis</i> .
Cohorting	The process of separating patients who are potentially infectious from those who are not so that appropriate precautions can be instituted
Contact tracing	The process of identification, assessment and follow-up of close contacts of index cases.
Cough hygiene/etiquette	Measures taken by a potentially infectious coughing patient to prevent the generation of aerosols (e.g. covering the mouth when coughing)
Cough inducing procedures	Procedures which can stimulate the patient to cough, or can aggravate cough in a coughing patient, such as bronchoscopy
Congregate settings	Institutions where large groups of people can be found in one place. Airborne infections can therefore spread to many people within a short time
Directly observed therapy (DOT)	Microscopic particles (1-5 microns in size) which can become airborne when a person coughs, sneezes, shouts, sings, breathes, or talks.
Droplet nuclei	TB disease caused by <i>M. tuberculosis</i> strains which are resistant to at least one anti-TB medicine



Drug-resistant TB (DR-TB)	TB caused by strains of <i>M. tuberculosis</i> which are resistant to isoniazid and rifampicin and to any of the fluoroquinolones and to at least one of the injectable second-line anti-TB medicines.
Extensively drug resistant TB (XDR-TB)	TB of organs other than the lungs: e.g. pleura, lymph nodes, abdomen, genito-urinary tract, skin, joints and bones, meninges etc.
Extra-pulmonary tuberculosis (EPTB)	A device worn over the mouth and nose by operating room personnel during surgical procedures to protect both surgical patients and operating room personnel from transfer of microorganisms and body fluids. Surgical masks also are used to protect healthcare personnel from contact with large infectious droplets (>5 µm in size). They do not protect against inhalation of small particles or droplet nuclei and should not be confused with particulate respirators which are recommended for protection against selected airborne infectious agents, (e.g. <i>M. tuberculosis</i> ).
Surgical masks	Evaluation of how well a respirator fits on an individual. It includes the use of flavoured solution and the determination of whether the employee can detect the taste.
Fit testing	This is a filter which is capable of removing 99.97% of particles 0.3 microns in diameter or greater. HEPA filters remove all particles in the size range of TB droplet nuclei.
High-Efficiency Particulate Air (HEPA) filter	A committee set up in all hospitals and which is tasked with addressing all IPC issues in the facility, and should be chaired by the medical superintendent or principal medical officer of the facility.
Infection control committee	A plan to ensure prompt identification of TB suspects and institution of airborne precautions, as well as expediting the diagnosis and start of treatment for those found to have TB.
Infection prevention and control plan	A patient who has TB (diagnosed or undiagnosed) of the lungs or larynx and is capable of transmitting <i>M. tuberculosis</i> to others. These patients are usually sputum smear positive.
Infectious TB patient	The treatment of subclinical latent TB infection with isoniazid to prevent progression to active TB.
Isoniazid preventive therapy (IPT)	The process whereby a patient needing airborne precautions is assigned to a private room with special ventilation requirements. If a patient must move from the isolation room to another area of the hospital, the patient should be wearing a mask during the transport. Anyone entering the isolation room to provide care to the patient must wear a respirator.
First line TB medicines	Infection with mycobacteria of the <i>M. tuberculosis</i> complex, usually diagnosed by a positive TST, without clinical evidence of disease.

Isolation	Infection control activities including risk assessments, the development and periodic review/monitoring of IPC policies and guidelines and ensuring the availability of resources.
Latent tuberculosis infection (LTBI)	Use of artificial devices to enhance movement of air into and/or out of a room/area/building.
Managerial Activities	TB caused by strains of mycobacteria of the <i>M. tuberculosis</i> complex which are resistant to at least isoniazid and rifampicin.
Mechanical Ventilation	The namesake bacterium of the <i>M. tuberculosis</i> complex and the most common causative agent of TB in humans. The <i>M. tuberculosis</i> complex also includes <i>M. bovis</i> and five other related species.
Multidrug-resistant TB (MDR-TB)	Use of wind or temperature (stack) to facilitate movement of air into and/or out of an area/room/building by keeping windows and doors open.
Mycobacterium Tuberculosis	Respirators designed to provide respiratory protection for the wearer. They have filter efficiency levels of 95% or greater against particulate aerosols free of oil when tested against a 0.3 micron particle.
Natural ventilation	Infections which are a result of treatment in a hospital or hospital-like setting, but secondary to the patient's original condition.
N95 respirators/masks	Reasonably anticipated skin, eye, mucous membrane, or parenteral exposure to blood or other potentially infectious materials which may result from performance of duties, despite the appropriate use of protective attire or equipment.
Nosocomial infection	Equipment used to prevent transmission of communicable diseases from patients to HCWs.
Occupational exposure	Resistance to more than one anti-tuberculosis medicine, other than both isoniazid and rifampicin.
Personal protective equipment	An infection control measure whereby patients are placed in different sections of the facility based on defined criteria (e.g. separating culture positive patients from culture negative patients in a ward for DR-TB patients).
Polydrug-resistant TB	A test of the air capacity of the lung which utilises a machine called a spirometer to measure the volume of air inspired and expired by the lungs, and involves forceful expiration which can generate aerosols.
Separation	A laboratory technique in which sputum is smeared on glass slides, stained (e.g. carbol-fuchsin or auramine – Ziehl- Neelsen method), and washed with an acid. Slides are subsequently examined by microscopy for the presence of stained acid-fast bacilli (AFB).
Spirometry	The process where a patient's sputum samples change from having enough bacilli to be detectable under the microscope, to having no detectable TB bacilli in follow-up sputum samples.

Sputum smear examination	A procedure used to obtain sputum for diagnostic purposes when patients are unable to spontaneously expectorate a specimen. The procedure uses sterile water or hypertonic saline to irritate the airway, increase secretions, promote coughing, and produce a specimen.
Sputum smear conversion	The process of identifying patients who are potentially infectious (coughing, on anti-TB treatment or being investigated for TB) so that airborne precautions can be instituted.
Sputum induction	The use of ultraviolet radiation to kill or inactivate microorganisms.
Triage	The process of supplying and removing air.
Ultraviolet germicidal irradiation (UVGI)	
Ventilation	Is a cartridge-based, automated diagnostic test which can identify Mycobacterium tuberculosis and resistance to rifampicin (RIF).

## 9. ANNEXES

### 9.1 Facility Risk Assessment Checklist

This worksheet should be considered for use in performing TB risk assessments for health facilities. Facilities with more than one type of setting will need to apply this to each setting.

**Scoring Y=Yes N=No**

#### 1. Incidence of TB

a. Number of notified TB patients/100 000 in your facility, or region served by the healthcare setting?	Catchment Population_____		
	Regional rate_____		
	Facility rate_____		
b. Are patients with suspected or confirmed TB encountered in your setting (inpatient and outpatient)?	Yes <input type="checkbox"/> No <input type="checkbox"/>		
c. Number of general outpatients with presumed TB	1 year ago_____		
	2 years ago_____		
d. Number of TB suspects among general outpatients with presumed TB	1 year ago_____		
	2 years ago_____		
e. Number of PLHIV	1 year ago_____		
	2 years ago_____		
f. Number of PLHIV in HIV care (being evaluated) with presumed TB	1 year ago_____		
	2 years ago_____		
g. How many patients with confirmed TB were treated in this facility?	Year	Number Notified	Cured and Treatment completed
	1 year ago	_____	_____
	2 years ago	_____	_____
h. Health care worker surveillance (for the past 12 months)	Total number of nurses	Number of nurses screened for TB	Number of nurses diagnosed with TB
	_____	_____	_____

#### 2. Classification

<b>Inpatient settings</b>	
a. How many inpatient beds are in your inpatient setting?	Number _____
b. How many patients with TB disease were hospitalised in 1 year?	Previous year _____
c. Does you triage all new admissions for cough?	Yes <input type="checkbox"/> No <input type="checkbox"/>
<b>Outpatient settings</b>	
d. How many TB patients were evaluated at your outpatient setting in 1 year?	Number _____
e. Is your health-care setting a TB clinic?	Yes <input type="checkbox"/> No <input type="checkbox"/>
f. Is your health-care setting a HIV care clinic?	Yes <input type="checkbox"/> No <input type="checkbox"/>
g. Providing ART?	Yes <input type="checkbox"/> No <input type="checkbox"/>
h. Have patients with drug-resistant TB (Poly-and-DR-TB) been encountered in your healthcare setting in the previous year?	Yes <input type="checkbox"/> No <input type="checkbox"/> Number _____

i. Does your healthcare setting have a triage procedure for the identification of persons with symptoms suggestive of TB among attendees of the general OPD and of the HIV care clinic?	Yes <input type="checkbox"/> No <input type="checkbox"/>
j. Does your healthcare setting have a separate outdoor waiting areas at both the general OPD and HIV care clinic?	Yes <input type="checkbox"/> No <input type="checkbox"/>

### 3. Screening of HCWs for *M. tuberculosis* Infection

a. Does the healthcare setting have a TB screening programme for HCWs?	Yes <input type="checkbox"/> No <input type="checkbox"/>
b. If yes, which categories of HCWs are included in the TB screening programme?	
c. How frequently are HCWs screened for TB disease?	
d. Who conducts the screening and maintains the records?	Screening done by: _____ Records kept by: _____

### 4. TB Infection Prevention and Control (IPC) Plan and Programme

a. Does the health-care setting have a written TB IPC plan?	Yes <input type="checkbox"/> No <input type="checkbox"/>
b. Who is responsible for the IPC programme?	Yes <input type="checkbox"/> No <input type="checkbox"/>
c. When was the TB IPC plan written?	d. Last review or update date:
e. Does the written IPC plan need to be updated? (based on the timing of the previous update, changing TB epidemiology, change in national guidelines, or other factors related to a change in risk for transmission of <i>M. tuberculosis</i> )?	Yes <input type="checkbox"/> No <input type="checkbox"/>
f. Does the healthcare setting have an infection control committee (or another committee with infection control responsibilities)?	Yes <input type="checkbox"/> No <input type="checkbox"/>
g. Has a person been designated to be responsible for implementing an infection prevention and control plan in your healthcare setting? If yes, list the name: _____	Yes <input type="checkbox"/> No <input type="checkbox"/>
h. Review 20 patient records (random) for the past 6 months. Based on a review of the medical records, what is the average number of days for the following: <ul style="list-style-type: none"> <li>• Presentation of patient until collection of specimen _____</li> <li>• Specimen collection until receipt by laboratory _____</li> <li>• Receipt of specimen by laboratory until smear results are provided to healthcare provider _____</li> <li>• Diagnosis until initiation of standard anti-tuberculosis treatment _____</li> <li>• Receipt of specimen by laboratory until culture results are provided to healthcare provider _____</li> <li>• Receipt of specimen by laboratory until drug-susceptibility results are provided to healthcare provider _____</li> <li>• Receipt of DST results until adjustment of anti-tuberculosis treatment, if indicated _____</li> </ul>	

i. Is annual in-service training and education regarding TB-IC practices provided for HCWs?	Yes <input type="checkbox"/> No <input type="checkbox"/>
---	--

### 7. Environmental Controls

a. Which environmental controls are in place in your healthcare setting?		
b. What are the actual air changes per hour (ACH) and design for various rooms in the setting?		
<b>Room</b>	<b>ACH</b>	<b>Design</b>
_____	_____	_____
_____	_____	_____
_____	_____	_____
c. Are environmental controls regularly checked and maintained with results recorded in maintenance logs?		Yes <input type="checkbox"/> No <input type="checkbox"/>
d. Who is responsible for ACH measurements?		

### 8. Respiratory-Protection Programme

a. Are respirators used in this setting for HCWs working with TB patients?	
b. Does your health-care setting provide respirator fit testing for HCWs?  -If yes, when is it conducted? -New employees upon resuming duties -Annually -When a new type of respirator is procured	Yes <input type="checkbox"/> No <input type="checkbox"/>
	_____
	Yes <input type="checkbox"/> No <input type="checkbox"/>
	Yes <input type="checkbox"/> No <input type="checkbox"/>
c. What method of fit testing is used? Describe.	Qualitative
	Yes <input type="checkbox"/> No <input type="checkbox"/>
	Bitrex Yes <input type="checkbox"/> No <input type="checkbox"/> Saccharine Yes <input type="checkbox"/> No <input type="checkbox"/>
d. Who is responsible for respirator and fit testing?	

## 9.2 Facility Review Checklist (Dashboard)

Name of Facility: \_\_\_\_\_ Date of review: \_\_\_\_\_

Region and District: \_\_\_\_\_

Name of reviewer: \_\_\_\_\_

### Instructions for completion:

- Use checklist for baseline and follow-up evaluation
- Score each box: score = 1 (green colour code) if verified as YES i.e. at least one means of verification is observed - reported is not enough
- Score box: score = 0 (red colour code) if NO means of verification observed - reported is not enough
- Use comments box to state if agreed for improvement and for any other comment

##	Work Practice - Managerial	Score Y=1;N=0	Comments	Means of Verification
1.	A written Infection Prevention and Control Plan is available for this site			Document available.
2.	TB-IC training done for staff in current year			List of participants Training topics documented.
3.	Supplies are available to coughing patients (tissues, serviettes, masks, bin, etc.)			Stock card/order sheet available Practice observed.
Administrative Controls		Score Y=1;N=0	Comments	Means of Verification
4.	Patients are routinely screened for cough			Policy (SOP) available. Practice observed
5.	Coughing patients are separated from others or “fast tracked” to caregiver/patients separated according to disease profile			Policy (SOP) available. Practice observed.
6.	Coughing patients practice cough etiquette and hygiene including use of face mask			Policy (SOP) available. Practice observed.
7.	A “Cough Monitor” gives education on cough etiquette and assists with triage			Roster available. Practice observed.
8.	Signage for cough etiquette is present in the facility			Poster displayed.
9.	Sputum samples are collected in a designated area and away from others			Designated collection area available outside
10.	There is a tracking mechanism to monitor diagnostic turnaround time.			Complete, up-to-date register with dates of receipt of samples and dates of sputum examination result recorded



11.	Tracking mechanism to monitor turnaround time for treatment initiation. Date of start of treatment are also recorded in the TB sputum register			Up-to-date TB Cough Register <u>and</u> Facility TB register with dates of receipt of sputum examination result and initiation of treatment recorded
12.	Staff are screened at least annually for TB			Up-to-date separate staff register available and 'HCW' recorded on TB register
<b>Environmental Controls</b>		<b>Score Y=1;N=0</b>	<b>Comments</b>	<b>Means of Verification</b>
13.	Natural and/or mechanical airflow is monitored daily by staff (especially in waiting rooms, wards if available, and at least one exam room)			Daily log available. Practice observed.
14.	Regular maintenance for directional and/or extractor fans is conducted. A maintenance log is available on site			Up-to-date log available
15.	Signage is in place to keep doors and windows open			Signage displayed
16.	If UV lighting is used, routine cleaning and maintenance is scheduled			Up-to-date log available with date for next cleaning and maintenance
17.	Passages within the facility is kept free of crowding by controlling the number of patients			Practice observed
18.	Patient waiting areas are outdoors			Outdoor waiting areas present
<b>Personal Protective Equipment</b>		<b>Score Y=1;N=0</b>	<b>Comments</b>	<b>Means of Verification</b>
19.	N95 respirators are readily available for eligible staff			Stock card or order available <u>and</u> no stock outs in last six months
20.	Eligible staff have been trained on proper fit of respirators			Up-to-date list of fit-tested staff with results of test available. Staff have certificate of pass
<b>Overall Score</b>			%	

### 9.3 Overview of Setting-Specific TB-IC Measures

The table below should be used as a guide for applying TB-IC measures in different areas encountered by HCWs. These measures may be applied in the specific areas as indicated, taking into consideration important variations such as patient burden and the geographical area. Please refer to the relevant sections of these guidelines for more information on how to apply each of the control measures. This table may also be used as a checklist for monitoring and supervision, as well as to guide health education package for health facilities, the community and congregate settings.

Specific Area/ Setting	Administrative Control Measures						Environmental Control Measures			PPE
	Triage Active case finding	Separation Cohorting	Cough Etiquette	Surgical Mask	Reduce time in facility	Staff screening	Natural ventilation	Mechanical ventilation	UVGI	Respirator (N95)
Waiting Areas	+	+	+	+/-	+	+	+	+/-	--	--
OPD consulting rooms	N/A	+	+	+	N/A	+	+	+/-	--	--
X-ray room	+	+	+	+	+	+	N/A	+/-	+/-	+
Casualty room	+	+	+	+	+	+	+	+/-	+/-	+
HIV care clinic	+	+	+	+	+	+	+	+/-	--	+
TB clinic/ward	+	+	+	+	+	+	+	+/-	+/-	+
CB-DOT point	+	+	+	+	+	+	+	--	--	--
MDR-TB ward	N/A	+	+	+	+	+	+	+	+/-	+
General ward	+	+	+	+	+	+	+	--	--	--
Sputum collection area	N/A	N/A	N/A	N/A	N/A	N/A	+	--	--	N/A
Sputum induction room	N/A	N/A	N/A	N/A	N/A	+	+	+	+/-	+
TB microscopy laboratory	N/A	N/A	N/A	N/A	N/A	+	+	+/-	N/A	N/A
TB culture laboratory	N/A	N/A	N/A	N/A	N/A	+	N/A	+	N/A	+
High risk procedure room	+	+	N/A	N/A	N/A	+	N/A	+	--	+
Patient transport services	+	N/A	+	+	N/A	+	+	--	--	+
Prison cells/Police holding cells	+	+	+	--	N/A	+	+	--	--	N/A
Prison halls	+	+	+	--	N/A	+	+	+/-	--	N/A
Military Barracks	+	+	+	--	N/A	N/A	+	--	--	N/A
Households	+	+	+	--	N/A	+	+	--	--	+
Other community congregate settings	+	--	+	--	N/A	N/A	+	--	--	--

+ = Control measure must be applied

-- = Control measure is not necessary/required

N/A = Control measure is not applicable

+/- = Control measure may be applied depending on risk in consultation with an expert

## 9.4 Staff TB Screening Questionnaire

### Identification

1. Health Facility: \_\_\_\_\_ Date: \_\_\_/\_\_\_/20\_\_
2. Screened by (name and designation): \_\_\_\_\_
3. Employee number: \_\_\_\_\_
4. Written informed consent:  Yes  No (if no then defer screening).
5. Date of birth: \_\_\_/\_\_\_/\_\_\_\_\_
6. Gender:  Male  Female

### Exposure history in job

7. Job title: \_\_\_\_\_
8. Current Department/Duty Station: \_\_\_\_\_
9. Years of employment: \_\_\_\_\_

### TB Contact

10. Did you have direct contact with TB patients in the last year?  
(More than 1 answer possible)  
 Yes, in own household     Yes, outside household  
 Yes, in healthcare facility     No     Don't know

### TB History

11. Did you ever use medication to prevent you from developing TB, such as Isoniazid preventive therapy (IPT):  
 Yes  No  Unknown. If yes
  - a. In which year did you take IPT? \_\_\_\_\_
  - b. Duration of treatment: \_\_\_\_\_ weeks/months
12. Are you currently on TB treatment?  Yes  No
13. Did you ever have TB disease (if current fill yes):  Yes  No  Unknown  
If no, skip to next section on HIV  
If yes can you tell about latest or current episode:
  - a. Date of diagnosis: \_\_\_/\_\_\_/\_\_\_\_\_ (if unknown tick here: )
  - b. Where was your TB diagnosed?  
 Government facility     NGO facility     Private facility  
 Elsewhere, specify: \_\_\_\_\_
  - c. How was the TB confirmed?
  - d. Smear     Yes  No  Unknown
  - e. Culture     Yes  No  Unknown
  - f. Chest x-ray     Yes  No  Unknown
  - g. Other     Yes  No  Unknown specify: \_\_\_\_\_
  - h. Where did you receive treatment for your TB?  
 Government facility     NGO facility     Private facility  
 Elsewhere, specify: \_\_\_\_\_
  - i. Where was the TB notified?     Own workplace  Elsewhere  Unknown
  - j. Was your TB cured?     Yes  No  Unknown
  - k. Have you had TB more than once?     Yes  No  Unknown

### HIV Test and ARV Use

14. Have you ever been tested for HIV?  Yes  No
15. Date of latest HIV test: \_\_\_/\_\_\_/20\_\_ Is this less than 1 year ago?  Yes  No
16. Latest HIV test result:  Positive  Negative  Unknown  Not willing to disclose

a. If negative, never tested or unwilling to disclose: refer for voluntary counselling and testing

b. If HIV positive: are you currently using ART?  Yes  No  Not willing to disclose

### Other Risk Factors

17. Smoking history

a. Current smoker:  Yes  No

b. If no, past smoker:  Yes  No

18. History of diabetes:  Yes  No  Don't know

### TB symptoms

19. Do you currently have any of the following symptoms?

a. Cough  Yes  No if yes: duration \_\_\_\_\_ days

b. Weight loss  Yes  No if yes: duration \_\_\_\_\_ days

c. Drenching Night sweats  Yes  No if yes: duration \_\_\_\_\_ days

d. Fever  Yes  No if yes: duration \_\_\_\_\_ days

*If the employee has a cough for 2 weeks or more, or another combination of TB symptoms, consider TB. For staff known or suspected to be HIV infected, duration of symptoms is irrelevant.*

20. Is this employee a TB suspect:  Yes  No  Unknown

**If yes, fill Staff TB Suspect Investigations form and Staff TB Register.**

### ACTIONS (tick if done):

If TB suspect referred for sputum smear, Xpert, culture and Chest X-ray to rule out TB

For TB suspects who are HIV negative or unknown: arranged HTC

HIV test result date: \_\_/\_\_/\_\_  Positive  Negative  Unknown

## 9.5 Staff TB Suspect Investigations

1. Health Facility: \_\_\_\_\_ Date: \_\_/\_\_/20\_\_
2. Personal unique number: \_\_\_\_\_
3. Where was the employee referred for testing? (ask preference for testing location)
  - a. Sputum smears     Own facility     Elsewhere; where? \_\_\_\_\_
  - b. Xpert® MTB/RIF     Own facility     Elsewhere; where? \_\_\_\_\_
  - c. Sputum culture     Own facility     Elsewhere; where? \_\_\_\_\_
  - d. CXR     Own facility     Elsewhere; where? \_\_\_\_\_
 (This question is needed to collect outstanding results)
4. Test results

	Date Sputum Collected	Date of Result	Result
Smear 1			<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Unknown <input type="checkbox"/> ND
Smear 2			<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Unknown <input type="checkbox"/> ND
Culture 1			<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> contaminated <input type="checkbox"/> Unknown <input type="checkbox"/> ND
Culture 2			<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> contaminated <input type="checkbox"/> Unknown <input type="checkbox"/> ND
Xpert® MTB/RIF			<input type="checkbox"/> Positive <input type="checkbox"/> Negative <input type="checkbox"/> Unknown <input type="checkbox"/> ND
Chest x-ray			<input type="checkbox"/> Normal <input type="checkbox"/> Cavitory <input type="checkbox"/> Infiltrate <input type="checkbox"/> Miliary <input type="checkbox"/> Pleural effusion <input type="checkbox"/> Other, specify: _____ <input type="checkbox"/> ND

Indicate ND if not done

5. Does the employee have active TB disease:  Yes  No . If yes continue. If no STOP.

**Encourage staff to disclose positive results to department in charge or facility in charge; but stress that project will not do this.**

6. Site of active TB disease:
  - Pulmonary  Extra-pulmonary  Both pulmonary and extra-pulmonary
7. Does the employee have bacteriologically confirmed MDR-TB?  Yes  No  Unknown
8. When did TB treatment start? \_\_/\_\_/\_\_\_\_\_
9. Where is the employee obtaining TB treatment:  Own facility  Elsewhere: \_\_\_\_\_  DK
10. Was the employee hospitalised?  Yes  No  DK. If yes, how long? \_\_\_\_\_ days  DK
11. Where was the case notified?  Own facility  Elsewhere: \_\_\_\_\_  DK
12. How many days was the employee on sick leave? \_\_\_\_\_ days  DK
13. Treatment outcome: assessed date: \_\_/\_\_/\_\_
  - a.  Cure     Treatment completed
  - b.  Default     Death     Failure     Transfer     Other
14. Any remarks? \_\_\_\_\_

**9.6 Facility Staff TB Screening Register**

**List all staff; to assess participation rate and whether screening procedures completed.**

**Facility name:**..... **Name person responsible for HCW TB screening and reporting:** .....

Name of staff	Sex M/F	Department	Cadre*	ID Number	Date of assessment dd/mm/yyyy	Informed consent Y/N	TB suspect Y/N	TB diagnosed? Y/N	If left facility tick here

Cadre: MO = Medical Officer, N = nurse, A = administration/clerical officer, CDE=classified daily employee (driver, cleaner, kitchen, laundry, housekeeper, cleaner, guard), L = lab staff, EO = environmental officer, ML = Medical Licensees, TS = TB treatment supporter, P = pharmacy staff, O = other

## 9.7 Roles and Responsibilities in the Implementation of TB-IC

### MoHSS Regional Management Level

#### **Key person should be the Nurse Manager for nursing services**

- Monitor adherence to National and Regional infection control guidelines and practices
- Evaluate infection control resource needs, including training needs
- Participate in annual reviews of infection control guidelines and practices
- Compile and communicate annual reports to National Quality Assurance Unit
- Appoint or allocate a focal person at district level to manage, coordinate and support activities at the district level
- Ensure surveillance and monitoring at the district level
- Support annual training activities and meetings
- Advise and support implementation of preventative and control measures

### MoHSS District Management Level

#### **Key persons should be the Nurse in Charge of the District Hospital and Primary Health Care Supervisor**

Provide managerial oversight and support to the district management team and nurses in charge of district facilities in:

- The implementation of preventative and control measures
- Training of implementers
- The development of communication links within the district
- Review facility surveillance reports and compile reports for the Regional Level
- Monitor and support facilities for adherence to policies and guidelines
- Evaluate infection control resource needs, including training needs
- Conduct regular meetings and forums for infection control management
- Contribute to the review of infection control guidelines

#### **Responsibilities of the Infection Prevention Control Nurse (Focal person)**

- Training in IC practices (formal and informal), at induction and on continuous basis
- Conduct assessment for compliance to standard practices, using monitoring and evaluation tools
- With assistance from the IC committee, develop, review and oversee the implementation of infection control plan
- Oversee daily and routine implementation of IC measures in facility
- Respond to issues of concern on daily and ad hoc basis
- Report to the Infection Control Committee on a monthly basis
- Ensure maintenance of infection control equipment and keep an inventory of such equipment
- Ensure compliance with local and national guidelines
- Liaise with relevant district health structures and others where appropriate

#### **Functions of the Hospital Infection Control Committee**

- Identify the needs of the facility in relation to infection control
- Prioritise needs and develop a IC plan, make recommendations for adequate funding to present to management
- Analyse infection control risks and make recommendations on improving practices and/or to acquire new equipment and products for effective infection control practices
- Develop an annual infection control programme budget in relation to agreed upon priorities, resource needs and scheduled activities
- Conduct regular monitoring and evaluation to review the infection control programme implementation



- Participate in regular reviews of infection control guidelines and practices
- Ensure regular training, surveillance and auditing for effective infection control practices
- Ensure the identification of structural needs for infection control as part of facility repair and maintenance
- Conduct regular management meetings to review programme implementation
- Scrutinise and approve infection control reports for submission to the Regional and National level

### **Hospital Infection Control Committee – Core Members**

- Medical Practitioner in Charge of Hospital
- Medical Practitioner assigned for infection control
- Nursing Manager in Charge of Hospital
- Infection Control Nurse/Nurse assigned to infection control
- Infection Control link Nurses from all clinical departments
- Laboratory Technician
- Pharmacist
- Administrative Support Manager (cleaning, catering, maintenance)
- Health and Safety Manager (Occupational Health Officer)

### **Co-opted Members (members attending when required)**

- Nursing Unit Managers – Operating Theatre, Central Sterilising Depot, Specialised services e.g. ICU, Surgical, Paediatrics, Medical Wards, High Care Ward
- Clinical instructors
- Surgical, Medical Practitioners
- Works department representative (maintenance)

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