



GUIDELINES FOR INFECTION

PREVENTION AND CONTROL FOR

TB INCLUDING MDR-TB AND XDR-TB.

JULY, 2008

FOREWORD

Tuberculosis is still one of the leading causes of morbidity and mortality in Malawi despite the fact that it can be cured with adequate treatment. The emergence of multi drug resistant tuberculosis (MDR-TB) is one of the challenges in our efforts to control TB.

Health care workers in most facilities are at high risk of becoming infected with tuberculosis (nosocomial transmission) especially when they have immuno-suppression due to the human immuno-deficiency Virus (HIV). It is therefore very important to have guidelines for infection prevention and control for a better understanding in the context of health care settings on issues of TB transmission. Preventive and control measures to reduce the risk of TB infection and protection of health care workers should be given highest priority in health care planning and development. HIV testing and counseling (HTC) should be encouraged among health care workers in order to ensure that they benefit from preventive therapy, Anti-retroviral drugs and psychosocial support.

These infection prevention and control (IPC) guidelines aim at increasing awareness of TB in staff and its prevention. It is meant to be used by all health care workers in health facilities in Malawi, and can also be used to teach IPC in health care schools and colleges.

This document is for health care managers, health care workers, administrators, and stakeholders in the public, private, and nongovernmental health sector involved in providing care and treatment to persons with TB and or HIV and AIDS. It can also be helpful for persons or institutions responsible for the health and wellbeing of large numbers of persons living with HIV and AIDS (PLWHA). Settings include HTC centres, community-based outreach centres, ARV and HIV care clinics, hospices, general health care facilities, and correctional institutions such as prisons.

The Ministry of Health continues to assist health facility personnel and pledges to continue supervision at all levels to ensure that these guidelines are adhered to by all health care workers. We hope that by following these guidelines it will be possible to achieve our goal of reducing the spread of tuberculosis in the country.

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Abbreviations

AIDS	Acquired Immunodeficiency Syndrome
ARV	Anti-retroviral
BCG	Bacillus Calmette Guerin
DHO	District Health Officer
DOTS	Directly Observed Therapy Short course Strategy
DTO	District Tuberculosis Officer
HCW	Health Care Worker
HEPA	
HIV	Human Immunodeficiency Virus
HTC	HIV Testing and Counseling
IPC	Infection Prevention and Control
LTBI	Latent Tuberculosis Infection
MDR-TB	Multi-drug Resistant Tuberculosis
NTP	National Tuberculosis Control Programme
PMTCT	Prevention from Mother to Child Transmission
PLWHA	People Living with HIV/AIDS
TB	Tuberculosis
TB CAP	Tuberculosis Coalition Assistance Programme
UVGI	
XDR-TB	Extensively Drug Resistant Tuberculosis

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PREFACE

The goal of these guidelines is to help management and staff minimize the risk of TB transmission in health care facilities and other facilities where the risk of transmission of TB may be high due to high prevalence of both diagnosed and undiagnosed TB.

In this era of increasing access to HIV testing and counseling, care and treatment for people living with HIV, more people living with HIV-associated immunosuppression are attending health care and community facilities than ever before. Persons, including health care workers, with HIV-associated immunosuppression are particularly vulnerable to developing TB disease if they become infected with *Mycobacterium tuberculosis* (the germ that causes TB) as a result of exposure in these settings.

This policy aims to give the reader a greater understanding of the following:

- TB transmission in health care facilities
- Infection prevention and control procedures to reduce the risk of *M. tuberculosis* transmission in health care facilities.
- Protection of health care workers and staff through HIV testing and counseling (HTC), increasing awareness of TB in staff and preventive action.
- Importance of TB infection control in correctional institutions like prisons and other facilities where large numbers of possible TB and HIV infected individuals gather.
- Multi-drug resistant TB (MDR-TB).

CHAPTER 1

1.0 INTRODUCTION

1.1 CAUSE OF TUBERCULOSIS AND ITS SPREAD

Tuberculosis (TB) is caused by *Mycobacterium tuberculosis* (*M. Tb*). People who have TB disease in their lungs can release tiny particles containing *M. Tb* into the air by coughing, sneezing, laughing or singing. These particles are called air droplet nuclei. They are invisible to the naked eye. Droplet nuclei can remain airborne in room air for many hours, until they are removed by natural or mechanical ventilation.

For TB to spread, there must be a person with TB disease who produces the TB bacilli (the source), and another person who inhales the droplet nuclei containing the bacilli. Although TB is not usually spread by brief contact, anyone who is in close proximity with an infectious person is at risk of getting infected.

1.2 THE DIFFERENCE BETWEEN TB INFECTION AND TB DISEASE

1.2.1 TB Infection

TB infection is when a person has *M. tuberculosis* in the body but does not have any symptoms of the TB disease. The bacilli are inactive, but remain alive in the body and can become active later. This condition is also referred to as latent TB infection (LTBI).

Only one out of ten people with latent TB will develop TB disease in their lifetime. However this risk increases in persons with dual HIV and TB infection in whom one out of ten will develop TB disease in a year. Isoniazid preventive therapy reduces the risk of developing TB disease.

1.2.2 TB Disease

A person is said to have TB disease when he or she is infected with *M. Tb* and shows signs and symptoms of the disease. TB disease mostly occurs in the lungs. A person with TB disease of the lungs (pulmonary TB) usually has persistent cough lasting three weeks or more. General symptoms include fever, sweating at night, loss of appetite, weight loss, fatigue and general constitutional upset. With standard treatment, TB can be cured, even in persons with HIV infection. Untreated, TB is often fatal, especially in persons infected with HIV.

In general, a person with TB disease of the lungs or larynx should be considered infectious until his/her sputum smear tests negative on microscopy.

A TB suspect should be considered infectious until TB is ruled out through sputum smear microscopic examination.

1.3 TB IN HEALTH CARE SETTINGS

TB is a big problem in health care settings. This is because persons with undiagnosed and potentially infectious TB mix with others including those with HIV infection. In high TB burden settings, surveys have shown that up to 10% of persons with HIV infection may have previously undiagnosed TB at the time of HIV Testing and Counseling (HTC), including at centres providing prevention-of-mother-to-child transmission (PMTCT) services. Up to half of these may be infectious TB cases.

Persons with HIV-associated immuno-suppression may become infected or re-infected with TB if they are exposed to someone with infectious TB disease. They can progress rapidly from TB infection to disease. Health care workers and other staff are also at particularly high risk of infection with TB because of frequent exposure to patients with infectious TB disease.

1.3.1 PREVENTING TB AMONG HEALTH CARE WORKERS AND OTHER STAFF

TB prevention in health care settings for staff, guardians and other patients is very essential. Patients or health workers and other staff who are HIV infected are at a greater risk of TB infection than those that are HIV negative. The following are measures to follow in an attempt to prevent TB infection in different settings:

1.3.1.1 The general outpatient clinic

TB patients attending the general outpatient clinic need to be identified early enough by health workers so that they are given a priority for TB (triage). All chronic coughers in out patients' clinics need to be screened for pulmonary TB as soon as possible.

1.3.1.2 HTC and ART clinics

Clients attending HTC and Antiretroviral Therapy (ART) clinics need to be screened for TB on regular basis. A standard checklist should be used by any health worker attending to these clients. Clients with symptoms consistent with pulmonary TB should be screened immediately.

1.3.1.3 The hospital wards

TB suspects are a potential source of TB infection. All TB suspects should rapidly have their sputum collected and sent to the laboratory for microscopy. The pulmonary TB suspects should be placed in one part of the general ward near a

window for good ventilation. Wherever possible, these TB suspects should spend daylight hours outside the ward. Education on proper cough hygiene for pulmonary TB suspects should be given on regular basis.

For all TB wards, windows should be kept open wherever possible. Visitors to the TB wards should be kept to a minimum.

1.4 DIAGNOSIS OF PULMONARY TB

Sputum smear microscopy is the standard method of diagnosing pulmonary TB in Malawi. If bacilli are present, the patient has sputum smear-positive pulmonary tuberculosis. When the *M. tuberculosis* cannot be identified, chest x-ray is taken to assist with the diagnosis.

CHAPTER 2

2.0 HOW TO REDUCE THE RISK OF SPREADING M. TUBERCULOSIS IN OUT-PATIENT SETTINGS

There are two main ways to reduce the spread of TB in out-patient settings. These are:

- Work practice [and administrative](#) control measures and
- Environmental control measures.

In general, work practice (and administrative) control measures have the greatest impact on preventing TB transmission within hospital settings, and they are the first priority in any setting regardless of available resources. These measures prevent droplet nuclei containing M. tuberculosis from being generated in the facility, and thus reduce exposure of patients and staff to TB. Since it is not possible to eliminate all exposure, environmental control measures must be added to reduce the concentration of droplet nuclei in the air (Annex 1).

2.1 WORK PRACTICE (AND ADMINISTRATIVE) CONTROLS

[Work practice \(and administrative\) control measures have the greatest impact on preventing TB transmission within health care facilities. They serve as the first line of defence for preventing the spread of TB in health care settings.](#) Their goals are,

- (i) To prevent TB exposure to staff and patients, and
- (ii) To reduce the spread of infection by ensuring rapid diagnosis and treatment.

There are five components to good work practice (and administrative) controls. These are:

- An infection prevention and control plan;
- Administrative support for procedures in the plan including quality assurance;
- Training of staff;
- Education of patients and increasing community awareness; and
- Coordination and communication with the TB programme.

2.1.1 TB INFECTION PREVENTION AND CONTROL PLAN

Each facility should have a written TB infection prevention and control plan that outlines a protocol for the prompt recognition, separation, provision of services, investigation for TB and referral of patients with suspected or confirmed TB disease. Early recognition of patients with suspected or confirmed TB disease is the first step in the protocol. A health worker should be assigned to screen patients with a cough of 3 weeks or more immediately after they arrive at the facility. Patients with cough should be allowed to be registered without queuing with other patients.

The table below summarizes the steps to be included in plan:

Five Steps for Patient Management to Prevent Transmission of TB in Health Care Settings		
Step	Action	Description
1.	Screen	<ul style="list-style-type: none"> ◆ Early identification of TB suspects or confirmed TB patients*** can be achieved by assigning a health worker to screen patients for prolonged cough immediately they arrive at the facility. ◆ TB suspects or patients on TB treatment should be separated from other patients.
2.	Educate	<ul style="list-style-type: none"> ◆ Instruct all patients with chronic cough on cough hygiene i.e. covering the nose and mouth when coughing or sneezing, <ul style="list-style-type: none"> ○ Where possible provide face masks or tissues to assist them in covering their mouths. ◆ Educate on safe sputum disposal methods
3.	Separate	<ul style="list-style-type: none"> ◆ TB suspects and patients must be separated from other patients ◆ Keep them in a separate well-ventilated waiting area, <ul style="list-style-type: none"> ○ Where possible provide face masks or tissues to cover their mouths and noses while waiting.

4.	Investigate for TB or Refer	<ul style="list-style-type: none"> ◆ TB diagnostic tests should be done onsite or, if not available, the facility should have an established link with a TB diagnostic centre to which symptomatic patients can be referred. ◆ Each facility should have a linkage with a TB treatment centre to which those who are diagnosed with TB can be referred.
5	Monitor and evaluate	Monitor and evaluate the TB prevention plan

*** Although TB patients on adequate treatment are no longer infectious, it may be difficult for the facility to determine if anyone reporting being on treatment for TB has indeed received adequate treatment. The most cautious procedure is to manage those who are on treatment in the manner described.

2.1.2 ADMINISTRATIVE SUPPORT

The facility-based (institutional) Infection Prevention & Control Committee: Each health care facility has a multidisciplinary Infection Prevention & Control Committee. TB infection prevention and control measures fall under this committee.

2.1.3 TRAINING OF STAFF

Training of all staff in infection prevention and control is essential.

Training should include the following:

- Basic concepts of M. tuberculosis transmission and pathogenesis, i.e. the difference between infection and disease;
- Risk of TB transmission to health care workers and staff;
- Cough hygiene
- Symptoms and signs of TB;
- Impact of HIV infection on increasing risk of developing TB disease and the importance of TB as a major cause of disease and death in PLWHA;
- Importance of the infection prevention and control plan and the responsibility that each staff member has to implement and maintain infection prevention and control practices;
- Specific infection prevention and control measures and work practices that reduce the likelihood of transmitting TB.

2.1.4 EDUCATION OF PATIENTS AND COMMUNITY AWARENESS

Educating communities and patients to recognize symptoms of TB and to seek health care should be routine in all settings providing care for patients. In addition, patients should be taught how to protect themselves, and others, from exposure to TB (Annex 2).

2.1.5 TB/HIV COLLABORATION

Collaboration between HIV/AIDS and TB programmes must be prioritized. Each facility should have an integrated system providing care for both TB and HIV. The system should establish:

- A referral mechanism for patients suspected of having TB disease to be investigated in the TB diagnostic centre and started on treatment, if indicated
- A monitoring mechanism that provides feedback to the referring facility to evaluate both the linkage with TB diagnostic services and the appropriateness of referrals as indicated by the proportion of suspects actually confirmed as having TB disease.

2.2.2 ENVIRONMENTAL CONTROL MEASURES

Environmental controls are the second line of defence for preventing the spread of TB in health care settings. It is important to recognize that if work practice or administrative controls are inadequate, environmental controls will not eliminate the risk. Many environmental control measures (like filtration and ultraviolet irradiation) are technologically complex and expensive. In Malawi, Controlled natural ventilation is the recommended control measure. It reduces the risk of spreading *M. tuberculosis* and relies on open doors and windows to bring in air from the outside. "Controlled" implies that checks are in place to make sure that doors and windows are maintained in an open position that enhances ventilation. Fans may also assist to distribute the air.

Environmental control measures include the following:

- Ventilation (natural and mechanical),
- Filtration,
- Ultraviolet germicidal irradiation.

Procedures:

2.2.2.1 Ventilation (natural and mechanical):

- Environmental Health Officer is the designated staff person to check on environmental control measures and maintain a log of monitoring and maintenance.
- Windows and doors should be checked on a daily basis to ensure they are in proper position (open or closed as called for in the plan). Generally all windows and doors should be open when natural ventilation is the primary environmental control to allow for the free movement of air (e.g. across room from window to door or vice versa). Generally all windows and doors should be closed when using mechanical ventilation to ensure controlled movement of air (from supply vent and from slots either under or in door towards the exhaust vent).
- Fans should be checked on a monthly basis to ensure they are clean, and are pulling (or pushing) the correct amount of air in the right direction.

2.2.2.2 Filtration:

HEPA filter units may be useful alternative to mechanical ventilation requiring structural changes or ultraviolet light germicidal irradiation in small rooms with limited number of patients or in other small, enclosed areas.

2.2.2.3 Ultraviolet germicidal irradiation:

M. tuberculosis is killed if the organisms are exposed sufficiently to UVGI. However, the major concerns about UVGI are adverse reactions like acute or chronic cutaneous and ocular changes in health care workers and patients from exposure to UVGI if not installed or maintained properly.

CHAPTER 3

HOW TO REDUCE THE RISK OF SPREADING TB IN IN-PATIENT SETTINGS

Prevention of TB in hospitals also requires a combined effort of infection prevention control practices. In most hospitals, TB wards are isolated from the general wards. It is however crucial to strengthen infection prevention because despite the wards being isolated, there are health workers, hospital attendants, guardians and even children who constantly come into contact with the TB patients. Whenever possible, TB Patients should be managed on out-patient basis. This should apply to all TB patients, including MDR-TB patients, who are not too sick to require hospitalization.

Specific preventive measures for minimizing TB transmission in hospital settings include:

- Infectious TB patients should be isolated from other patients. Hospital administration should always ensure that wards or rooms with such patients are located away from wards with non TB patients, especially wards with Paediatric and immuno compromised patients.
- Early identification, diagnosis and treatment of TB cases is again of highest priority in preventing TB transmission in hospital setting as in outpatient settings
- Care should be taken when infectious cases such as TB suspects and patients are scheduled for procedures like chest radiography. Measures e.g. triaging, should be adhered to as much as possible to minimize risk of mycobacterium exposure to high risk groups including the immuno-suppressed persons (this applies to laboratory services as well).

CHAPTER 4

4.0 PROTECTION OF HEALTH CARE WORKERS AND STAFF

4.1 INCREASING AWARENESS OF TB IN HEALTH CARE WORKERS

Health care workers have increased risk of TB disease than the general population. Those at risk include not only professional health care providers, but also any staff, including volunteers, who have contact with persons with TB who have not yet been diagnosed and started on treatment. PLWHA in these roles are at particular risk of rapid progression to TB disease if they become infected or re-infected due to exposure to *M. tuberculosis* in the facility. They should be included in all training programmes. A third group, staff in correctional institutions also has been documented to have higher rates of TB infection and disease than the general population.

4.2 INCREASING ACCESS TO HIV COUNSELLING AND TESTING

Encouraging and enabling health care workers and all staff to know their HIV status should be a priority of all health care services, and HIV care programmes in particular. The rate of HIV infection among health care workers and staff may be similar to that of the broader community. Stigma, lack of confidentiality, and lack of treatment options have contributed to failure of health care workers to know their HIV status. Health care workers and all staff should be encouraged to know their HIV status.

This could be achieved through providing accessible, acceptable, confidential HTC, including periodic retesting, to staff. However, there is no role for mandatory HIV testing of health care workers, because health care workers have the same rights as all individuals to confidential HIV testing with counseling and conducted only with an informed consent. HIV-infected health care workers and other staff are at increased risk of developing TB disease if exposed in the workplace, and additional precautions should be taken to protect them. Immuno-compromised health care workers should be given opportunities to work in areas with a lower risk of exposure to TB.

Education directed to health care workers concerning HIV testing must be linked to their role in educating patients and communities about the benefits of testing and knowing one's HIV status. This may further reduce stigma.

4.3 PERSONAL RESPIRATORY PROTECTION

Personal respiratory protection refers to the selection, training and use of respirators. Respirators can protect health care workers from inhaling M. tuberculosis only if standard work practice and environmental controls are in place. In addition, they are expensive to purchase and require specialized equipment to determine proper fit. Their use should be restricted to specific high-risk areas in hospitals and referral centres, such as rooms where spirometry or bronchoscopy are performed or specialized treatment centres for persons with MDR-TB. If a respirator is needed, a certified N95 (or greater) respirator should be used. Respirators are different from facemasks. Surgical masks are made of cloth or paper. It is believed that use of a facemask does not protect health care workers, other staff, patients, or visitors against TB. Rather, the moisture around the mouth and nose from breathing through these ordinary masks creates a favourable environment for bacteria including TB bacilli. Therefore, it is NOT recommended that health care workers and other staff or visitors in TB and or HIV care settings wear them. However, these masks may be useful in reducing release of bacteria from the patient to the environment. Hence they can be used by TB patients.

CHAPTER 5.

5.0 INFECTION PREVENTION IN SPECIAL CIRCUMSTANCES

5.1 MULTI-DRUG RESISTANT TB (MDR-TB)

TB disease that is caused by organisms susceptible to the first-line anti-TB drugs can generally be treated effectively without side effects from treatment, even in persons with HIV infection. TB disease caused by organisms resistant to at least the two most potent first-line drugs (Isoniazid and Rifampicin) is called multi-drug resistant TB (MDR-TB). Treating MDR-TB takes long (up to 24 months in Malawi) *Because of the risk of severe morbidity and mortality to HIV-infected persons from MDR-TB, persons with known MDR-TB should receive routine care outside of normal HIV care setting at home or in specialized MDR-TB treatment centres where available.* HIV care facilities can obtain estimates of the prevalence of MDR-TB in their community from the local TB programme. Through joint coordination and communication programmes can plan for how to care for these patients. For instance the TB and HIV programmes can jointly implement infection prevention measures to protect immuno-compromised people from contracting TB.

5.2 PRISONS AND OTHER CORRECTIONAL INSTITUTIONS

In many areas the proportion of persons with HIV infection in correctional institutions i.e. prisons, is much higher than in the general population. TB is spread even more readily in these settings than in outpatient settings because of the longer duration of potential exposure, crowded environment, poor ventilation, and limited access to health care services. The WHO (2000) has published guidelines for TB control in correctional institutions. The guidelines emphasize effective administrative and environmental controls, including screening detainees upon entry into the facility, and on a regular basis during times of prolonged detention.

Because the same TB infection control policies will protect HIV-infected and uninfected detained persons as well as staff, it is not necessary to know who in the population at the institution is HIV-infected to conduct effective TB infection prevention and control. This also applies to other congregate settings e.g. guardian shelters, traditional healers, TBAs, and other care givers where patients gather.

CHAPTER 6

6.0 Monitoring implementation of TB infection control plans

The IPC plan should be implemented and adherence with its recommendations should be monitored. The Infection Prevention Committee (IPC) (e.g., district hospital IPC), should have the responsibility to write, implement and monitor the IPC plan. It is not adequate to have an IPC plan alone without the actual implementation. Therefore it is essential that appropriate monitoring mechanisms are instituted. In addition to the IPC plan, the monitoring and evaluation (M&E) plan is also required.

The areas to be considered for monitoring may include the following:

- Identification of risk areas
- Assessment of TB among HCWs (include risk areas i.e. wards, laboratory, general medical wards)
- Assessment of HIV prevalence in the patient population (where feasible)
- Assessment of HCW training needs
- Area-specific infection control standards
- Time-line and budget (e.g., material and personnel costs)

The following points can serve as a guide in monitoring & evaluation of the infection prevention and control:

6.1 DETERMINE FREQUENCY OF THE INFECTION CONTROL PLAN

- a. During initiation of procedures, monitoring and evaluation should be done frequently, perhaps monthly or bi-monthly.
- b. When procedures are running well, less frequent evaluation will be necessary-at a minimum, annually.
- c. The plan should be revised after every two years (see also 6.5).

6.2 EVALUATE THE SCREENING PROCESS

- a. Were patients with significant cough missed when entering the facility and only detected at a later time or in the examination room? The table below can be used as a tool for monitoring the screening process e.g. detecting missed suspects/patients;

TB CASE AND SUSPECT LOG

Date	Patient Name	Case or Suspect (c/s)	Missed at intake?* (y/n)	Referred to (name of facility)	Outcome** (TB, not TB, NS)

*Missed at intake = symptoms or history detected only after patient enters private room with clinician or counselor instead of upon entry to the facility; or after numerous visits while symptomatic yet undetected: y=yes, n=no

**Outcomes: TB diagnosed or confirmed=TB; TB ruled out after diagnostic investigation=not TB; Did not present to referral facility for investigation=NS (not seen).

- b. What correctable factors were associated with these potential exposures?
- c. Is the patient flow arranged to minimize the time that TB suspects and patients are with or pass by other patients?
- d. Is there good ventilation in the waiting area, in-patient care areas and where TB treatment is directly observed?

6.3 EVALUATE THE SUCCESS OF REFERRALS TO THE TB DIAGNOSTIC CENTRE

- a. Did referred patients access care?
- b. Did referred patients have TB disease?
- c. What changes in screening or referral process, if any, should be made?
- d. If there is a microscopy unit, does it have good air flow? Are the work areas slides and supplies well organized and maintained?

6.3 EVALUATE THE TRAINING PROCESS

- a. Did all new staff receive training on TB infection control during their induction?
- b. Did all staff receive annual re-training on TB infection control?
- c. Revise the infection control plan to reflect changes in staff responsibilities, policies and procedures.

- d. Develop a plan for correcting inappropriate practices or failure to adhere to institutional policies
- e. Identify corrective actions if policies are not followed

BIBLIOGRAPHY

List of annexes

ANNEX I: INFORMATION ON VENTILATION AND FAN

Controlled natural ventilation

Natural ventilation refers to fresh dilution of air that enters and leaves a room or other area through openings such as windows or doors. Natural ventilation is controlled when openings are deliberately secured open to maintain air flow. Unrestricted openings (that cannot be closed) on opposite sides of a room provide the most effective natural ventilation.

Propeller fans

Propeller fans may be an inexpensive way to increase the effectiveness of natural ventilation, by increasing the mixing of airborne TB as well as assisting in the direction of air movement by pushing or pulling of the air.

Types of propeller fans

Propeller fans include:

- Ceiling fans,
- Small fans that sit on a desk or other surface,
- Fans that stand on the floor, and
- Fans mounted in a window opening.

Air mixing and removal

A propeller fan helps mix air in a room. Mixing of air will reduce pockets of high concentrations, such as in the corners of a room or in the vicinity of patients where natural ventilation alone is not enough. The total number of infectious particles in the room will not change with mixing; however, the concentration of particles near the source will be reduced, and the concentration in other parts of the room may increase.

If this dilution effect is combined with a way to replace room air with fresh air, such as by opening windows and doors, the result will be fewer infectious particles in the room. A room with an open window, open door, and a fan will

have less risk than an enclosed room with no fan, an enclosed room with a fan, or a room with an open window but no fan. In addition, mixing may increase the effectiveness of other environmental controls.

Directional airflow

If placed in or near a wall opening, propeller fans can also be used to enhance air movement into and out of a room. Consider fans installed in the windows or through wall openings on the back wall of a building. The fans exhaust air outside, away from people or areas where air may come back into the building. If doors and windows in the front of the building are kept open, the overall effect should be to draw in fresh air through the front of the building and exhaust air through the rear. Health care staff should be mindful of the direction of airflow to ensure the patient is closest to the exhaust fans and the staff is closest to the clean air source.

With this arrangement, the risk that TB will be spread is greater near the back of the building; however, once the contaminated air is exhausted, dilution into the environment will be fast.

Exhaust fans

There are a wide variety of exhaust fan systems. A system can be as simple as a propeller fan installed in the wall, or it could include a ceiling grille, a fan, and a duct leading to discharge on an outside wall or on the roof.

Over time, dust and lint accumulate on exhaust fan blades. The fans, motors, blades, and ducts become dirty and less air is exhausted. For this reason, these systems should be cleaned regularly.

Checking natural ventilation

People can usually feel the existence or lack of air movement in a space. A ventilated space has a slight draft. In the absence of ventilation, air will feel stuffy and stale and odours will linger. Use the following checklist to assess natural ventilation in your waiting areas and examination rooms:

- Check air mixing and determine directional air movement in all parts of rooms or areas. One way to visualize air movement is to use incense sticks as described in these six steps.
 - a. Hold two incense sticks together and light them.
 - b. As soon as the incense starts to burn, blow out the flame. Now the incense should produce a continuous stream of smoke.
 - c. Observe the direction of the smoke.
 - d. Observe how quickly the smoke dissipates. This is a subjective test that may require some practice (see box below). It does not give a definite result but is useful for comparing one room or area to another.

- e. Check natural ventilation once a year after the prevailing wind patterns have been determined. Recheck if any changes in the physical environment are made and confirm procedures for ensuring free movement of air are followed.
- f. Keep records of all routine activities and dates.

Checking fans

- Check that all room fans are working and cleaned once a month. Use cloth or vacuum cleaner to remove dust and lint from fans, grilles, and ducts.
- Check that exhaust fans are working and cleaned once a month. Use cloth or vacuum cleaner to remove dust and lint from fans, grilles, and ducts. Clean ducts behind grilles as far back as can be reached.
- To check fans that have a grille, hold a tissue or piece of paper against the grille. If the exhaust fan is working, the tissue or paper should be pulled against the grille

ANNEX 2: POLICY AND PROCEDURES

The facility will implement each policy by following the procedure(s) that accompany it.

Policy 1:

Screening patients to identify persons with symptoms or recent history of TB disease.

Procedures:

1. Before patients enter an enclosed part of the facility, a designated staff person should ask each adult and any child capable of coughing (usually age 14 or above) about symptoms or recent history of TB. This should be done before patients wait in line for long periods to register or obtain services.
2. Many combinations of symptoms have been recommended as sensitive and specific for TB. A simple screen is
Do you have a cough? **If yes how long**
An adult who has coughed for three weeks or more may be considered a TB suspect for pulmonary TB.
To determine whether a patient may be under investigation or is a diagnosed case of TB who may still be infectious, ask

Are you being investigated or treated for TB? **If yes classify as TB suspect or case .**

3. As patients who are not identified as suspects or cases on the initial symptoms screen enter an examination room they should again be asked simple screening questions by the attending health worker. Those who report a cough of three weeks or more should be managed as in procedures under 2-5 below. Staff seeing patients in examination rooms should refer patients they find to be suspect or case to the TB office immediately.

Policy 2.

Instructions on cough hygiene

Procedures:

1. Patients who are found to be TB suspects or cases should immediately be informed about the importance of cough hygiene and advised to cover their mouth and nose with a hand when they cough or sneeze. Alternatively should be given face masks and wear while in the facility

and disposal of used tissues or masks in identified no-touch receptacles and not on ground.

2. No-touch receptacles for disposal of used tissues and masks should be available in the waiting areas.

Policy 3.

Placing TB suspects and cases in a separate waiting area

Procedures:

A staff person should direct or escort the patient to a separate waiting area. This special waiting area should have the highest natural ventilation possible. Patients should be assured of their place in the line for service.

Policy 4.

Triaging TB suspects and to the head of the line to receive services in the facility.

Procedures:

TB suspects and cases should be moved to the head of the line for what ever services they want, e.g. HTC, medication refills, or medical investigation. This reduces the duration of potential exposure while they wait in the facility and may be an incentive to those who disclose information during screening.

Policy 5.

Referring TB suspects to TB diagnostic services

Procedures:

- District TB Officer is the responsible staff person to counsel patients about obtaining TB diagnostic services.
- Patients will be referred to a clinical officer (TB diagnostic centre the HIV care facility has previously negotiated)
- Patients should be given a referral slip. These referral slips can be collected at the TB centre and used as anonymous check on number of referrals who successfully obtain services.

Policy 6.

Providing confidential TB and HIV services to health care workers and staff

Procedures:

- Health care workers and all staff working at the facility should be educated about the signs and symptoms of TB and encouraged to seek investigations if they develop symptoms and signs of TB.

- Health care workers and staff should be informed about the special specific risks for TB for HIV-infected persons.
- Health care workers and staff should be encouraged to undergo HIV testing, and given information on relevant HIV care resources.
- Staff training should include reduction of stigma of TB and HIV.
- Clinical Officer is responsible for determining when staff who develop TB disease may return to work.
- Staff who develop TB disease may return to work when determined to be no longer infectious after:
 - i. Completing at least two weeks of standard anti-TB therapy; and
 - ii. Exhibiting clinical improvement; and
 - iii. Having continued medical supervision and monitoring of treatment until cured.

Policy 7.

Training of staff on all aspects of TB and the TB infection control plan

Procedures:

- District Health Officer is the designated staff person to provide training to new staff as it is hired and maintain a log indicating who has had initial training.
- District TB Officer is the designated staff to provide annual training to all staff and to maintain a log indicating who has attended training.

ANNEX 3: EDUCATION MESSAGES ABOUT TB FOR PATIENTS

Health care workers can use this guide to remind them of what to ask and say about TB during an initial information session with any patient. Questions they can ask to find out how much the patient knows about TB are in bold on the left; and messages related to the questions are on the right. They can emphasize different messages with different patients depending on the patient's current knowledge about TB.

What is TB?	TB is an illness (i.e., disease) caused by a germ that is breathed into the lungs. TB germs can settle anywhere in the body, but we most often hear about TB of the lungs. When the lungs are damaged by TB, a person coughs up sputum (mucus from the lungs) and cannot breathe easily. Without correct treatment, a person can die from TB.
What kind of symptoms do you think people with TB have?	People with TB of the lungs have a chronic cough, generally lasting for more than two weeks. They can also cough up blood. People with TB in any part of the body have fevers, night sweats, and weight loss. People with these symptoms should tell a health care provider so they can be evaluated for TB.
Have you ever known anyone with TB? What happened to that person?	<i>(just listen to their response)</i>
Do you know that TB can be completely cured?	TB can be cured with the correct drug treatment. The patient must take all of the recommended drugs for the entire treatment time (six or eight months) to be cured. Drugs for treatment of TB are provided free of charge, and treatment can be done without interrupting normal life and work.
How do you think that TB spreads?	TB spreads when an infected person coughs or sneezes, spraying TB germs

<p>into the air. Others may breathe in these germs and become infected. It is easy for germs to pass to family members when many people live closely together. Anyone can get TB. However, not everyone who is infected with TB will become sick.</p>	
<p>How can someone with TB avoid spreading it?</p>	<p>There are several ways that a person with TB can prevent infecting others. An important step is to take regular treatment to become cured. Another measure to prevent infecting others is for infected persons to cover their noses and mouths when coughing or sneezing. Finally, infected persons should open windows and doors to allow fresh air into their homes.</p>
<p>Is TB a problem for people with HIV infection?</p>	<p>People living with HIV/AIDS are at extra risk of getting sick from TB because their body cannot fight off germs very well. If someone develops symptoms of coughing for more than two weeks, coughing up blood, weight loss, fevers or night sweats, it is important to get checked for TB. TB can be cured even in persons with HIV/AIDS.</p>

Source: Stop TB Department, WHO: Management of Tuberculosis Training for Health Facility Staff, Geneva, 2003.