
EMERGENCY TUBERCULOSIS PROJECT

IN PAPUA NEW GUINEA

CODE OF ENVIRONMENTAL PRACTICE

October 26, 2016

Introduction

The Government of Papua New Guinea (GoPNG) and the World Bank are in the process of preparing support for responding to increased tuberculosis rates through a Credit in the estimated amount of US\$15 million.

The financing would focus on Provinces with high rates of tuberculosis (TB), and aim to scale-up or replicate existing successful programs, and support aspects of TB management deemed critical for which current financing is unavailable. This will involve:

1. Early detection of active tuberculosis patients, including population based screening for TB on Daru Island and supporting systematic screening in Western Province, and the National Capital District (NCD).
2. Effective treatment of both drug susceptible and drug resistant TB including improvements to clinical management, strengthening the directly observed treatment (DOT), and supporting social mobilization.
3. Strengthening the Government system to manage the TB response by supporting capacity building at central and local levels, build and strengthen the electronic TB information system, and Project management.

As this project is in response to the unprecedented outbreak of drug resistant TB in PNG, project targeting is based on the areas with the highest numbers of active TB patients according to existing data. Of the three hotspots, the Project will be supporting activities in two: Western Province (including Daru), and the NCD.

The National Department of Health will be the Implementing Agency, and will procure/employ Contractor(s)/Firm(s)/Agency(ies) with a view to ensuring expeditious Project implementation. The safeguard aspects of the Project is covered in this Code of Environmental Practice (COEP).

Primary responsibility for implementing each Code in this COEP will rest with the entity implementing the relevant aspects of the COEP under each Component of the Project. The NDOH will be responsible for monitoring compliance with the COEP. The NDOH, as the sole Implementing Agency, is likely to require ongoing capacity-building from the World Bank to ensure they can meet the monitoring requirements. This capacity-building will involve in-person technical assistance as needed during the Project implementation period.

The COEP has been developed to cater for (a) minor impact and small scale physical intervention, such as the placement of a container laboratory on the grounds of a public health facility; (b) infection control and medical waste management at facilities receiving support for detection and treatment of TB financed by the World Bank Project; and (c) carrying out community consultations during the implementation of detection and treatment of TB in the communities targeted for such support.

The COEP is intended to ensure compliance with PNG National Law and World Bank Safeguard Policies and provides guidance regarding the safeguard measures to be carried out by (a) the contractor during the minor site activities; and (b) health care workers in carrying out infection control and proper hazardous waste disposal, including health care waste management. It also covers the principles of community consultation and grievance redress which will be implemented during Project implementation. Performance monitoring will be conducted on a semi-annual basis; findings will be included in the regular progress reports, and will be disclosed. Two of the World Bank's Safeguard Policies have been triggered by this Project: OP4.01 and OP4.10.

OP4.01 relates to Environmental Assessment. The environmental safeguard and infection control issues associated with this Project primarily relate to the management of clinical and infectious waste materials generated from diagnostic and treatment services. The main types of waste likely to be generated include human and biological waste (sputum), sharps (needles, glass slides etc.), blister packs and packaging material, plastic residual (disposal syringes, cups, glasses etc.), laboratory and general waste, and construction waste generated through the minor site works. **The requirements of OP4.01 are addressed in Codes 1, 2 and 3 of this COEP.**

OP4.10 relates to Indigenous People. All project beneficiaries, covering the entire population of Western Province (including Daru) and the NCD, have been categorised as Indigenous People, and has thus triggered OP4.10. A standalone Indigenous Peoples Planning Framework has not been prepared, because the necessary elements of an IPPF have been incorporated into project design. There are no unique ethnic groups in the project locations. Potential beneficiaries are in excess of 400,000 and, as a result, consultation will be undertaken at the time of medical screening. **Guidance on ensuring compliance with OP4.10 is included in Code 4 of this COEP,** and will also be integrated into project design and a Communications Strategy, based on examples of current successfully implemented strategies, will be prepared by the Contractor in consultation with relevant health staff undertaking the activity..

What does this COEP cover?

The objective of this COEP is to establish general guidelines for potential environmental and social impacts of the Emergency Tuberculosis Project in Papua New Guinea. It provides current practice where available, and principles and minimum standards that shall be met in (a) site preparation necessary for placement of a container laboratory; (b) practicing infection prevention and control (including health care waste management) at sites targeted for support under the Project; and (c) consultation with communities in the implementation of early detection and treatment of TB, as well as a grievance redress system. This COEP shall be read in conjunction with:

- NCD Waste Management Policy ¹
- Public Health Act 1987
- National TB Treatment Guidelines
- National Health Services Standards
- Water & Sanitation Act
- Water & Sanitation Policy
- Environmental Act 2000

All sites supported under this Project are required to comply with the National Health Services Standards of Papua New Guinea and this COEP.

¹The [NCDC Waste Management Services Group](#), acknowledges that “there is lack of appropriate and specific policy guidelines on solid, liquid and hazardous waste management – relevant and responsive to the local need of the community. This creates an unstable working environment not only for the operational aspect of waste management but also the established procedures in engaging contractors”. This COEP is intended to fill these policy shortcomings, and provide the guidance necessary to manage hazardous and medical waste associated with this project.

1. Minor Site Works (relating to Project Construction)

Minor physical works will be undertaken as part of this project. This will consist of the installation of a container laboratory on the grounds of a public health facility. The container will be used for the testing and treatment of TB patients, and will be connected to urban services through existing systems. Physical works will consist of very minor site preparation in order to install the laboratory. The tender documents used to select the provider of the container laboratory will indicate that the contract for provision of this facility includes installation of the facility, and needs to include all costs necessary to comply with this COEP.

The container laboratory will be approximately 40 feet in length. At a minimum, the following requirements apply in the installation of the containers:

- i. The container must be installed on a cleared and leveled site
- ii. The container must sit on a solid base or footing to minimise the risk of movement
- iii. Footings must be hand dug to minimise the risk of impacting underground utilities

Purchase of the container laboratory for this project will be contingent upon site readiness at the public health facility in Port Moresby. The following requirements relating to noise, soil erosion, air quality, construction waste and worker safety will provide general guidance to the contractor in the installation of the container laboratory.

General Environmental Codes of Practice (applicable to most construction activities) for environmental protection/impact mitigation measures for the following during construction:

i. Noise:

- (a) Plan activities in consultation with communities so that noisiest activities are undertaken during periods that will result in least disturbance;
- (b) Noise levels should be maintained within the national permissible limits/standards;
- (c) If necessary, use noise-control methods such as fences, barriers or deflectors (such as muffling devices for combustion engines) and select equipment with lower sound power levels where possible;
- (d) Minimize transportation of construction materials through community areas during regular working time; and
- (e) Maintain a buffer zone (such as open spaces, row of trees or vegetated areas) between the project site and surrounding areas if necessary to lessen the impact of noise.

ii. Soil Erosion:

- (a) Implement suitable project design (e.g., establish appropriate erosion and sediment control measures) to minimize soil erosion;
- (b) Use mulch, grasses or compacted soil to stabilize exposed areas; and

iii. Air Quality:

- (a) Minimize dust from exposed work sites by applying water on the ground regularly;
- (b) Do not burn site clearance debris (trees, undergrowth) or construction waste materials; and
- (c) Keep stockpile of aggregate materials covered to avoid suspension or dispersal of fine soil particles during windy days or disturbance from stray animals.

iv. Solid and Hazardous Construction Waste:

- (a) Collect and transport construction waste to appropriately designated/hazardous waste controlled sites; if these sites are unavailable, devise another procedure which will appropriately handle and dispose of hazardous waste

v. Workers' Health and Safety:

- (a) Worker Health and Safety procedures must be compliant with the World Bank's Environmental and Social Safeguard Guidelines and PNG Law. Minimum Requirements include:
 - i. Provide personal protective gear for workers as necessary (gloves, dust masks, hard hats, boots, goggles), etc;
 - ii. Keep worksite clean and free of debris on daily basis;
 - iii. Keep corrosive fluids and other toxic materials in properly sealed containers for collection and disposal in properly secured areas;
 - iv. Ensure adequate toilet facilities for workers from outside of the community;
 - v. Rope off construction area and secure materials stockpiles/ storage areas from the public and display warning signs. Do not allow children to play in construction areas;
 - vi. Fill in all earth borrow-pits once construction is completed to avoid standing water, water-borne diseases and possible drowning; and
 - vii. The site to have a basic first-aid kit with bandages, antibiotic cream, etc.

2. Health Care Waste Management

This section of the COEP relates to infection prevention and control (including health care waste management) at sites and facilities which will be supported through World Bank financing, as well as appropriate treatment and disposal of medical wastes arising from project activities.

Hazardous waste can be broadly defined as any material that cannot be used further or is unwanted, and poses a risk to the community or to the environment if not properly handled. These materials include, but are not limited to, chemical, biological and radioactive wastes, sharps, contaminated glassware, balancing/dilution pit waste and some waste products generated during building maintenance, construction and demolition works. Each hazardous waste stream requires special handling to protect the health and safety of personnel generating and handling the waste, their colleagues and the wider community.

In addition to the Policies and Guidelines which have been prepared by the Government relating to health care waste management, the general hospitals which are located in the Project target areas, all have Standard Operating Procedures which include a section on infection prevention and control. Following is a list of the current Policies and Guidelines, as well as an indication of those which are in the process of being revised or updated:

- NCD Waste Management Policy
- Public Health Act 1987
- National TB Treatment Guidelines
- Water & Sanitation Act
- Environmental Act 2000
- Infection Prevention Policy Guidelines for Health Facilities 2008: currently under revision

The container laboratory to be procured under the Project comes with the built-in facility to decontaminate any waste which it generates. Therefore, the waste output from this facility, for disposal purposes, can be treated as regular waste.

The World Health Organization (WHO), in addition to providing technical guidance in the preparation of Standard Operating Procedures is also in the process of working with the National Department of Health to update/revise the current Plan. In the meantime, contractors engaged by the NDOH under the Project to support activities at hospitals and BMUs, will have terms of reference which will require their preparation of a facility specific Health Care Waste Management Plan (HCWMP) covering the health facilities covered by their assignment; these Plans will be provided to the facilities, as well as the PMU for their records. Preparation of these Plans should include consultation with the on-going revision to health care waste management in-country. These Plans will provide details of how the full waste stream will be managed, will outline the best management practices and design measures to be put in place to ensure that waste management is managed in a way which minimises environmental and social impacts.

The Contractor will be primarily responsible for designing and implementing the HCWMP, and the NDOH will be responsible for monitoring the implementation of the HCWMP.

At a minimum, the following requirements apply for the transportation of hazardous waste:

- All hazardous waste is to be collected at least weekly from all sites producing waste, including BMUs.
- Specialist hazardous waste contractors must be used to collect, re-pack (if necessary), transport, treat and dispose of the hazardous wastes.
- Waste produced in the container laboratory via medical screening must be decontaminated using the in-built systems prior to off-facility disposal.
- Both Port Moresby General Hospital and Daru General Hospital have incinerators which are currently operational. These should be used to incinerate all medical waste produced outside of the container laboratory. Therefore, the HCWMP will need to outline how waste will be transported from BMUs or other project locations to the incinerators at the respective hospitals.
- If incineration facilities within the respective hospitals become inoperable during project implementation, then arrangements will need to be made with private incineration facilities (which exist in NCD) to handle relevant waste. This, or any other, fallback position for health care waste management needs to be included in the HCWMP.

Waste produced outside of the laboratory must be collected and stored in a way which minimises the risk of contamination or spillage, and the following principles, at a minimum, apply:

- Packaging used to collect and store waste must have sufficient strength to safely contain the waste class it is designated to hold; the packaging must not be filled to more than two-thirds of its capacity;
- Wastes should be treated as soon as possible after generation;
- When storage is required, the area selected should minimize exposure to the waste and prevent increases in the numbers of potentially harmful organisms present; and
- The storage area should also be kept secure at all times, be vermin-free, and be regularly cleaned and disinfected.

3. Infection Prevention and Control

National Tuberculosis Infection Control Guidelines

A number of facilities currently supporting TB activities already have in place Standard Operating Procedures covering infection control. Any facility which lacks infection control procedures, or whose existing Procedures do not meet or exceed international good practice requirements will be required to prepare such a document. If preparation of such a document is necessary, any consultant/contractor/firm/agency whose contract is relevant to infection control, will be required to submit, as part of their proposal, agreement to and costs for preparation of such Guidelines. An overview of issues and practice guidelines is provided in Annex 1.

Summary on the TB Infection Control Guideline:

Key elements of infection control activities that should be implemented in all health care settings include:

A. Administrative Controls:

1. Training of health care workers on infection control policies.
2. Placement of written guidelines within all TB and HIV care facilities.
3. Triaging to find symptomatic TB patients and improve patient flow.
4. Separating infectious TB patients/suspects from other patients.
5. Early diagnosis and treatment of TB patients.
6. Reducing lengths of exposure of TB patient in the health care facility through reduced hospitalization and prompt attendance to TB patients.
7. Training and encouraging all patients and relatives attending health care settings on cough etiquette, respiratory and general hygiene and minimizing potential exposures to other vulnerable patients.
8. Establishing a system for monitoring and evaluation of infection control activities.

B. Environmental Controls: Ensuring good ventilation in rooms and places where patients access through mechanical (ceiling fans, exhaust fans, etc.) and natural (wind & sunlight) ventilation. There should be good movement of air in all rooms accessible to smear positive TB patients. Good movement of air in all rooms helps the infection containing aerosols to disseminate quickly from the ambient air. The use of good cross ventilation and natural air-flow and sunlight can kill TB bacilli and stop TB transmission in health care facilities.

C. Personnel Protection Controls:

1. Use of respirator masks such as N95 masks by the health worker when available. The normal surgical mask offers no protection to the wearer but is beneficial if it is worn by the infectious TB patients.
2. HIV care and treatment (ART, CPT, IPT) of health workers living with HIV and regular TB screening and relocate them to areas with minimum risk of TB transmission.
3. Regular screening of health workers for TB and relocation of health workers with active TB to non HIV care facilities

4. Communications Strategy and Grievance Redress

This Code outlines communications strategies used by NDOH and the GoPNG to communicate public health related activities to affected communities, including infection prevention. A Communications Strategy is to be developed in partnership with NDOH and the relevant Contractor so that all affected communities fully understand the project and who is responsible for each activity. In particular, this Strategy will ensure that the Grievance Redress Process is clearly articulated.

Below are mechanisms currently used to provide information about TB. This section also outlines the Grievance Redress Mechanisms currently employed by the NDOH and how these will be made available to affected communities.

National TB Treatment Protocol 2011

“Communication” is the process people use to exchange information about TB. This could make use of some sort of media or channels of communication. In the context of programme communication, this is related to creating awareness and empowering people to take action. The main forms of TB communication that health workers will need to be familiar with in PNG includes posters which corrects common misconception, TB brochures and information cards.

Tuberculosis Strategic Plan 2015-2020

Information on TB will be transmitted to communities through community awareness activities dovetailed with outreach activities organized by Provinces. Standardized community level information guides developed by the National Tuberculosis Programme will be used by health workers and liaison officers to deliver the needed culturally sensitive information, including those appropriate to indigenous persons, to communities. Radio Doctor through local radio stations, Church gatherings and Haus Krai will also provide information on TB. Community TB Associations have also been formed and are expected to be used as a medium to transfer information to affected communities.

Communications with Indigenous People

All people in PNG are considered by the World Bank as Indigenous. This project is likely to have beneficiaries that number in the hundreds of thousands, and as a result of this, consultation will occur at the time of medical screening. Beneficiaries must be made aware of the project prior to the commencement of medical screening, through various communication networks including radio, print media and church groups. The mechanism for carrying out this activity will be clearly described in a Communications Strategy which will be prepared early in project implementation by the Project Management Unit (PMU), or any firm contracted to execute screening and/or treatment support. Lessons from on-going successful outreach/consultation activities being utilized in different settings should be taken into consideration. All project

information must be communicated to affected communities in a culturally appropriate manner, reflecting the protocols stated here.

Once medical screening commences, beneficiaries will have the opportunity to discuss the project with a relevant health care representative. This will be a free and informed consultation, occurring prior to the undertaking of any medical testing or procedures. Following this, beneficiaries will be consulted by relevant health care representatives each time they are undergoing any medical testing or procedures. Ongoing support from health care representatives will be available throughout the beneficiaries' involvement with the project, and appropriate grievance redress services will be available, as outlined below.

Management of Patient Information and Records

Documentation in health care records must provide an accurate description of each patient/client's episodes of care or contact with health care personnel. The policy requires that a health care record is available for every patient/client to assist with assessment and treatment, continuity of care, clinical handover, patient safety and clinical quality improvement, education, research, evaluation, medico-legal, funding and statutory requirements. Only approved health care personnel, including those who provide assessment, diagnosis, treatment and ongoing care, will have access to patients' confidential health records. Anyone who is not an approved health care personnel may be granted restricted access to patient information in accordance with legislative requirements.

To preserve patient confidentiality, the e-health system which will be designed with support under the World Bank Project, will include mechanisms to ensure this aspect is addressed in accordance with PNG laws and global best practice.

Grievance Redress

With respect to existing mechanisms for Grievance Redress, there does not appear to be a harmonized or formally established system, although individual facilities may have their own mechanism. One mechanism being used includes a place for patients or health workers to provide comments, or suggestions, which is located at a spot easily accessible by the public. There is a mechanism for reviewing comments/suggestions/complaints, and a means for escalating within the facility if necessary.

An overall tiered grievance mechanism for addressing concerns of patients, from community level up to the Department level, will be prepared and included in the Project Operational Manual. Examples of Grievance Forms are available to the National Department of Health and an example should be included as a recommendation for use at least by health facilities receiving support under this Project. Facility specific mechanisms should be developed and documented following the format provided in the Project Operational Manual. The system should include a table showing a mechanism and identified position for addressing and/or escalating any concerns related to the Project supported activities. Copies of site specific

grievance mechanisms will be forwarded to the designated person in the PMU, as outlined in the Project Operational Manual, and available for review by the World Bank. The NDOH will ensure that Grievance Redress Procedures are included in the Communications Strategy, and that these Procedures are accessible to all affected communities, as well as stakeholders involved in the Project. The NDOH will particularly ensure that Grievance Redress Procedures are accessible to Indigenous People, including, where necessary, translation into all appropriate languages, and the use of multiple mediums of communication including letters, phone lines, email and others where appropriate.

The terms of reference for each contract, as relevant, will include the requirement that a Grievance Redress System be in place and the design of such system is expected to be included in their bid. At a minimum, the following requirements apply:

- The first point of grievance redress must be a locally appointed grievance redress manager within the BMU; this will most likely be the Manager of the BMU. This person will receive all grievances from the community, and will determine whether to escalate the grievance to a higher level, or resolve the grievance locally.
- If the grievance is escalated, it will be referred to an appropriate representative from the NDOH who must either address the grievance immediately, or refer it to a member of the NDOH Executive.
- Following this, the grievance can be escalated further to a more senior member of PNG Government if necessary.

The World Bank also houses a Grievance Redress Service, which ensures that complaints to the World Bank are being promptly reviewed and addressed by the responsible units in the World Bank. The objective is to make the World Bank more accessible for project affected communities and to help ensure faster and better resolution of project-related complaints. Details pertaining to the World Bank Grievance Redress Service will be included in communications with affected communities.

5. Overall Responsibility Matrix for the COEP

Overall responsibility for the COEP rests with the Contractor(s) and the National Department of Health. Following is a matrix which provides an outline of relative responsibilities of different stakeholders.

Organization	Responsibility
National Department of Health (NDOH)	<p>Overall responsibility for Project implementation, including ensuring implementation, and supervision, of the COEP.</p> <p>Preparation of Operational Manual which includes, as appropriate, aspects of the COEP.</p>
Implementing/Executing Agencies:	
<ul style="list-style-type: none"> • Contracted UN organizations 	<p>Include requirements for safeguards related to installation of the laboratory container in the tender documents.</p> <p>Supervision of site works.</p>
<ul style="list-style-type: none"> • Contracted firms 	<p>If utilized for World Bank financed aspects of active case finding and/or treatment support then could be responsible for ensuring the preparation of a consultation plan including mechanisms for doing so, in consultation with Provincial Health Authorities and Provincial Governments, as well as NDOH.</p>
<ul style="list-style-type: none"> • Provincial Health Authorities <ul style="list-style-type: none"> ○ Western Province ○ National Capital District 	<p>Ensure that health care waste management activities are being carried out in accordance with the COEP, existing Guidelines, or relevant new Guidelines, and reporting on the same on a semi-annual basis.</p> <p>Participate in preparation and conducting of consultation relating to active case finding and treatment.</p>

Organization	Responsibility
<ul style="list-style-type: none"> • Provincial Governments <ul style="list-style-type: none"> ○ Western Province ○ National Capital District 	<p>Receive reports on management of health care waste management in their respective Provinces provided by the Provincial Health Authority for facilities supported by the World Bank Project.</p> <p>Participate, as appropriate, in preparation and conducting of consultation relating to active case finding and treatment.</p>
Project Management Unit (PMU)	<p>Ensure inclusion of relevant COEP requirements in tender documents.</p> <p>Preparation of a Communication Strategy (see Contracted firms above for more detail).</p> <p>Support NDOH in monitoring and reporting on the COEP.</p>
Safeguards Specialists in the PMU	Responsible for reporting on specifics of the COEP related to their field of expertise.
Conservation and Environmental Protection Authority (CEPA)	Administration and enforcement of the Environment Act 2000 and its regulations
World Bank Task Team	<p>Conduct reviews of activities carried out in relation to the COEP on an annual, or semi-annual basis depending on activities implemented during the relevant period.</p> <p>Provide hands on implementation support, including ensuring relevant tender documents include appropriate aspects of the COEP.</p>

6. Record of Consultations

Consultations have been held with the following stakeholders:

- The Conservation and Environmental Protection Authority (CEPA)
- Port Moresby General Hospital
- BMUs in Western Province which are targeted for support
- BMUs in National Capital District which are targeted for support
- NCD Waste Management Manager
- National TB Technical Working Group
- National Emergency Response Taskforce

Consultations with all stakeholders will continue throughout the project life cycle.

7. Budget for Implementation of the COEP

The current budget for implementing each component of this COEP is as follows:

Activity	Location	Approach	Estimated Implementation Cost
Minor site works for container laboratory	Central Public Health Laboratory or NDOH land	Site work ready prior to purchase; installation costs included in contract.	\$40,000
Waste Management/ Infection Control	NCD and Western Province	Individual facilities have standard operating procedures relating to infection control (including health care waste management) Progress will be reported on semi-annually.	\$30,000
Consultation Plan	NCD and Western Province	Conducting of Financing is available under the Project for community consultations.	\$110,000

Annex 1: Overview of TB Issues and Practice Guidelines at Health Facilities

In any health facility, when a smear positive TB patient enters, he/she breathes out or coughs out droplets containing infectious bacilli. These are small droplet nuclei containing TB bacilli at its core and it is usually invisible to the naked eye.

Sunlight quickly kills TB bacilli, so a room where there is plenty of natural light will have faster killing of TB bacilli by the sunlight. Attending to coughing patients quickly from outpatients, treatment rooms and other venues in health facilities reduces transmission of TB.

The following are methods of air-borne infection control to be used in health facilities:

1. Patient triage and organization of patient flow.
2. Ensuring adequate ventilation into rooms.
3. Patient education and cough etiquette.
4. Sputum collection and management of hazardous bio-medical waste.
5. Take measures to decrease personal occupational risk as a health worker.

To reduce chances of TB transmission, it is advisable to quickly attend to coughing patients or suspected TB patients as these are likely to be smear positive patients and thus reduce the time spent by them in the health facility. Have separate waiting areas for patients with cough and do not let them mingle freely with children and/or immuno-compromised patients such as HIV positive patients. Prepare, install and maintain bio-hazard signs for areas where TB patients are examined and preferably keep these areas as 'No thoroughfare' areas.

All health facility rooms should be designed to allow good movement of air in all rooms which are accessible to smear positive TB patients.

Some health facilities may use mechanical ventilation systems – these may consist of one of the following:

1. Exhaust fans – A fan which sucks air out of the room is installed at a window.
2. Local filter units for specific rooms or isolated areas.
3. Central ventilation mechanisms with air handling units and HEPA filter.
4. A mechanical ventilation unit that usually consists of:
 - a) A fan or a motorized unit which helps to suck air out of the room;
 - b) An air filter at the point of exhaust; and/or
 - c) Sometimes, a germicidal irradiation mechanism such as UV lights.

To improve ventilation and decrease the risk of infection in the facility:

1. Check that all windows and doors can be opened and are easy to keep open.
2. Check that doors allow some airflow, even when closed. Doors on examination and treatment rooms can be trimmed to increase air flow below them even when closed.

3. Check that all exhaust fans and air conditioners are in good working order and clean. Clean dirty fans, and repair or replace broken fans. Keep exhaust fans on. If there is an air conditioner, check that its filter is kept clean.
4. Place fans in windows to blow room air to the outdoors. Window fans should be placed in locations so they add to natural ventilation currents. However, check where the fan will be blowing the air: it should not blow into a patient waiting area or hall where people would breathe that air.
5. Keep doors, windows and skylights open and allow air to blow into and out of the building.

Sputum collection is an activity which can be carried out with manageable risks. Omitting to take certain precautions could increase risk of TB transmission at the time of sputum collection and during handling of sputum in labs. At all times, those collecting sputum should follow the precautions below:

1. Encourage patients to cough for sputum in open well ventilated, sunny areas. Do not use poorly ventilated, closed or poorly lit closed rooms or corridors or even toilet facilities.
2. Never stand in front of a coughing patient when observing a patients sputum collection.
3. Stand upstream of wind-direction when patient is coughing to bring out sputum. Keep good cross ventilation in the rooms.