National Guidelines
and Operational Manual for Tuberculosis Control

Fifth Edition

জাতীয় যক্ষ্মা নিয়ন্ত্রণ কর্মসূচি
স্বাস্থ্য অধিদপ্তর
স্বাস্থ্য ও পরিবার কল্যাণ মন্ত্রণালয়

World Health Organization
Country Office for Bangladesh

National Guidelines
and Operational Manual for Tuberculosis Control

Fifth Edition

Continuation

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National Tuberculosis Control Programme
Directorate General of Health Services
Ministry of Health and Family Welfare
Dhaka, Bangladesh

World Health Organization
Country Office for Bangladesh

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Abbreviations

AFB	= Acid Fast Bacilli
AHI	= Assistant Health Inspector
ACSM	= Advocacy, Communication and Social Mobilization
BCC	= Behavioral Change Communication
CDC	= Chest Disease Clinic/ Communicable Disease Control
CDH	= Chest Disease Hospital
CHW	= Community Health Worker
CHCP	= Community Health Care Provider
CNS	= Central Nervous System
CXR	= Chest X-ray
CV	= Community Volunteer
DGHS	= Directorate General of Health Services
DOT	= Directly Observed Treatment
DOTS	= Directly Observed Treatment Short-course
DPM	= Deputy Programme Manager
DR	= Drug Resistant
EPTB	= Extra Pulmonary Tuberculosis
ESP	= Essential Service Packages
FDC	= Fixed Dose Combination
FLD	= First Line Drug
HA	= Health Assistant
HRD	= Human Resource Development
HI	= Health Inspector
HE	= Health Educator
HIV	= Human Immune deficiency Virus
HPSP	= Health and Population Sector Programme
HNPSP	= Health, Nutrition and Population Sector Programme
HPNSDP	= Health, Population and Nutrition Sector development Programme
HW	= Health Worker
IC	= Infection Control
IPT	= Isoniazid Preventive Therapy
IUATLD	= International Union Against Tuberculosis and Lung Disease (UNION)
MDR-TB	= Multi Drug Resistant Tuberculosis
MOH&FW	= Ministry of Health and Family Welfare
MT	= Mantoux test
NGO	= Non Government Organization
NIDCH	= National Institute of Diseases of Chest and Hospital
NTP	= National Tuberculosis Control Programme
NTRL	= National Tuberculosis Reference Laboratory
PM	= Programme Manager
PHC	= Primary Health Care
PTB	= Pulmonary Tuberculosis
PPM	= Public Private Mix
PO	= Programme Organizer
RTRL	= Regional Tuberculosis Reference Laboratory
SCC	= Short Course Chemotherapy
SLD	= Second Line Drug
SS	= Shastho Shebika
TB	= Tuberculosis
TB-IC	= Tuberculosis Infection Control
TB DRUGS	= Tuberculosis drugs
E	= Ethambutol
H	= Isoniazid
R	= Rifampicin
S	= Streptomycin
Z	= Pyrazinamide
TLCA	= Tuberculosis and Leprosy Control Assistant
UHC	= Upazila Health Complex
UH&FPO	= Upazila Health and Family Planning Officer
VD	= Village Doctors
WHO	= World Health Organization
XDR	= Extensively Drug Resistant

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Preface

Tuberculosis is a major public health problem in the world as well as in Bangladesh. Globally about 8.6 million new TB cases occured in 2012 and about 1.3 million died of TB in the same year. In Bangladesh, an estimated 225 new TB cases per 100,000 population and 45 TB deaths per 100,000 population occurred in 2012.

To control TB, NTP Bangladesh introduced WHO recommended DOTS strategy in 1993 and has been implementing Stop TB Strategy. The Government of Bangladesh is very much committed to combatting TB and this commitment has been reflected in all the sector development programmes including HPNSDP (July 2011-June 2016) where TB control has been recognized as one of the priority programmes.

The technical aspects of TB control through DOTS concern case finding, diagnosis, treatment, recording and reporting and the operational aspects that relate to supervision, supply of drug and other materials and monitoring. Diagnosis and treatment of children have been revised in this version of the manual. The treatment regimens which are revised in these guidelines are expected to strengthen the collaboration between clinicians, the NTP and its partners.

I whole heartedly recommend this valuable document for using by the clinicians as well as programme experts as a reference guide while working for TB control.

M.M. Neazuddin
Secretary
Ministry of Health and Family Welfare
Bangladesh Secretariat, Dhaka.

Message

Tuberculosis is an ancient disease, which is still a major public health challenge in Bangladesh. The problem is aggravated by the increasing population density, rapid urbanization, poverty and illiteracy.

Since the introduction of DOTS strategy in 1993, The National Tuberculosis Control Programme (NTP) has achieved a remarkable success in terms of case detection of new smear positive TB cases and their treatment outcomes. The programme has been maintaining a high (>90%) treatment success over the last six years.

In fact the most cost effective public health measure for the control of tuberculosis is early detection and successful treatment of infectious patients. However, NTP, Bangladesh has also given emphasis on diagnosis and treatment of all types of TB including drug resistant TB, child TB and TB/HIV co-infection in the light of stop TB strategy.

Through this revised and updated edition (5th Edition) of "National Guidelines and Operational Manual for Tuberculosis Control" we are going to adopt 2- sample policy for pulmonary case diagnosis. The all six components of stop TB strategy have also been updated aiming to achieving universal access of quality care for all people affected with TB.

I sincerely acknowledge and appreciate the support and contribution of the National Tuberculosis Control Programme and its implementing partners in updating this crucial document. I would also like to express my earnest thanks to all development and technical partners for their support in this regard.

Prof. Dr. Khondhaker Md. Shefayetullah
Director General
Directorate General of Health Services
Ministry of Health and Family Welfare

Message

Despite the encouraging progress, global tuberculosis burden is still enormous with an estimated 8.6 million incident TB cases and 1.4 million TB deaths in 2012. Through GO-NGO collaborating approach for TB control, Bangladesh is also progressing well in terms of case finding and case holding of infectious TB patients under DOTS and stop TB strategy. Free of cost diagnostic and treatment services have been made available country wide. But still TB remains as a major public health challenge with large absolute number of TB incidence, prevalence and deaths. With a population of over 152 million the notification of smear negative, extra pulmonary and child TB cases still not up to the expectation.

To face the challenges and to achieve universal access to quality TB care for all people affected with TB, NTP has given special emphasis on those specific areas in the light of stop TB strategy. Under this situation revision of the **National Guidelines and Operational Manual for Tuberculosis Control** was demand of the time. I am glad to announce that now this is on board.

The revision of this national guidelines has been done through a series of consultative participatory process involving key stakeholders working in the field of TB control. This revised 5th edition has been enriched through adopting the WHO's new recommendations regarding case diagnosis, case definition, and case management and follow up. I trust from my heart that this document will be instrumental for all professionals of the public and private health care providers involved in the National Tuberculosis Control Programme.

I sincerely acknowledge the technical assistance provided by Dr. M Becx and the efforts of the NTP officials and all other stake holders in preparing this valuable document.

I do hope with the cooperation and support from all concerns, NTP, Bangladesh will be able to achieve its goal by following this revised guidelines.

Dr. Ashaque Husain
Director MBDC and Line Director TB-Leprosy
DGHS, Mohakhali, Dhaka

Acknowledgement

To combat tuberculosis that has been recognized as a public health threat for Bangladesh, National Tuberculosis Control Programme (NTP) has been implementing internationally recommended strategy for tuberculosis control (DOTS) since 1993 and Stop TB Strategy since 2006. Meanwhile NTP has made remarkable progress in terms of coverage, case detection and case holding. Currently NTP is working for achieving universal access to quality TB care for all people affected with TB under the stop TB strategy with guided by the 4th edition of "National Guidelines and Operational Manual for Tuberculosis Control", published in 2009. With the course of time, TB disease epidemiology as well as TB tackling techniques is also changing. To adopt the WHO-recommended new policies in relation to TB diagnosis and management, NTP felt the need of revising the existing guidelines.

I am pleased to say that with the valuable contributions from all stake holders NTP has been able to update the guidelines and is being published as 5th edition.

On behalf of NTP Bangladesh, I would like to express my sincere thanks to the working group consisting of experts from NTP and the partners for their enormous contribution in this regards. I also thankfully acknowledge the support from our technical and development partners e.g. WHO, USAID, GFATM for enhancing the TB control efforts in Bangladesh.

NTP sincerely acknowledges the guidance and support from the Honorable Minister, MOHFW, the Secretary, MOHFW and Director General, DGHS in implementing the tuberculosis control programme.

I hope this document will be very much helpful for anyone involved in tuberculosis control activities and at the same time any suggestion and recommendation for its further improvement would be highly appreciated.

Dr. Md. Nuruzzaman Haque
Deputy Director MBDC and
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World Health Organization
Country Office for Bangladesh

Foreword

TB is the second leading cause of death from an infectious disease worldwide, after the human immunodeficiency virus (HIV). In 2012, globally there were an estimated 8.6 million new TB cases and 1.3 million deaths (including 0.32 million deaths from TB among HIV-positive people) for which highly effective treatment is available. Most cases continue to occur in the most productive age-group of 25-54 years, with males being disproportionately affected. Successful TB control measures are of extreme importance if the epidemic is to be halted.

TB control depends on largely standardized procedures and managerial capacity to implement these countrywide. As per recommendation of Stop TB Strategy and with the expansion of DOTS, the National TB Control Programme currently emphasize on "Universal Access" for quality diagnosis and treatment for all TB patients in the community, public private partnership and advocacy, communication and social mobilization.

The World Health Organization (WHO) recognizes its critical role in supporting urgent national efforts and committed to continue providing technical assistance to the NTP to enable universal access to TB prevention, treatment and care, so as to serve all those in need and to meet the Millennium Development Goal 6 target 8 of reversing TB incidence and the global Stop TB 2015 targets of halving TB prevalence and mortality.

I expect that this Revised National Guidelines and Operational Manual for Tuberculosis Control will be helpful for all health care professionals involved in the National Tuberculosis Control Programme of Bangladesh who provide tuberculosis care at the central or peripheral level health care facilities both in public and private sector.

Dr Thushara Fernando
WHO Representative to Bangladesh

01 Introduction

1.1 Background

Nearly one-third of the global population, i.e. over two billion people, is infected with *Mycobacterium tuberculosis* and thus at risk of developing the disease. It causes ill-health among millions of people each year and ranks as the second leading cause of death from an infectious disease worldwide, after the Human Immunodeficiency Virus (HIV). Globally an estimated 8.6 million new TB cases occurred in 2012 and about 1.3 million people died of TB including 0.32 million HIV associated TB death. The 22 High TB burden countries contributed 82% global burden of TB. Of the 8.6 million incident cases, an estimated 0.53 million were children and 2.9 million occurred among women[1].

Tuberculosis (TB) is a major public health problem in Bangladesh since long. Bangladesh ranks sixth among the 22 high TB burden countries. According to WHO, the annual estimated incidence for all cases is 225 per 100,000 population per year. The prevalence (all cases) is estimated to be 434 per 100,000 population. The estimated TB mortality is 45 per 100,000 population per year[1].

In 1993 the World Health Organization (WHO) declared TB as a global emergency and recommended a standard strategy for control of the disease known as "DOTS" or Directly Observed Treatment, Short-course.

Under the Mycobacterial Disease Control (MBDC) Directorate of the Directorate-General of Health Services (DGHS), the National Tuberculosis Control Programme (NTP) adopted the DOTS strategy during the Fourth Health and Population Sector Programme (1992-98) under the project "Further Development of TB and Leprosy Control Services". The NTP started its field implementation in November 1993 in four thanas (upazilas) and progressively expanded to cover all upazilas by June 1998. NGO partners were involved from the inception of DOTS in the country. In July 1998, the NTP was integrated within the component of the Essential Services Package under Primary Health Care of Health and Population Sector Programme (HPSP). In 2003, HPSP was renamed as "Health, Nutrition and Population Sector Programme" (HNPSP) (2003-2011) and NTP has Continued its activities under the directorate of MBDC of DGHS under the Ministry of Health and Family Welfare. Now Ministry of Health and Family Welfare (MOHFW) has been implementing the Health, Population and Nutrition Sector Development Programme (HPNSDP) for a period of five years

1 Source: Global Tuberculosis Report 2013

from July 2011 to June 2016, with the goal of ensuring quality and equitable health care for all citizens in Bangladesh by improving access to and utilization of health, population and nutrition services. In all the sector programmes tuberculosis control has been recognized as one of the priority programmes. The DOTS strategy was rolled out to all metropolitan cities in collaboration with City Corporation Health authority and different NGOs. NTP also expanded its collaboration with other public and private health care providers. Administrative DOTS coverage is considered universal in the country.

The Government of Bangladesh, together with diverse partners from the public and private sectors, is committed to further strengthen the TB control programme. It has been implementing the Stop TB strategy since 2006 aiming at strengthening quality DOTS, addressing MDR-TB and TB-HIV, engaging all care providers, strengthening health systems, empowering people and the community and undertaking operational research. This was initiated with a view of sustaining the achievements of the past years and reaching the TB control targets linked to the Millennium Development Goals (MDGs).

1.2 Vision Statement of the National TB Control Programme

To eliminate TB as a public health problem in Bangladesh.

1.3 Mission Statement of the National TB Control Programme

The NTP aims to strengthen TB control efforts through establishing effective partnerships, mobilizing necessary resources and ensuring quality diagnostic and treatment services under the DOTS strategy. It strives to make services equally available to all people in Bangladesh irrespective of age, sex, religion, ethnicity, social status or race.

1.4 Goal of Tuberculosis Control

The overall goal of TB control is to reduce morbidity, mortality and transmission of TB until it is no longer a public health problem.

1.5 Objectives of the National Tuberculosis Control Programme

The objectives of NTP:

- To sustain the global targets of achieving at least 70% case detection and 85% treatment success among smear-positive TB cases under DOTS for the country as a whole; in order to then-
- Halve TB mortality and prevalence and to have halted and "begun to reverse the incidence" as stated under target 6.C, Goal 6, of the Millennium Development Goals set for 2015; and then to eliminate TB by 2050.

1.6 Strategies for Control of Tuberculosis

DOTS, an internationally recommended brand for TB control is the most cost effective strategy available for controlling the TB epidemic. The NTP of Bangladesh introduced this strategy in 1993 to achieve its objectives and targets. DOTS have the following five components:

- Secure political commitment with adequate and sustained financing.
- Ensure early case detection and diagnosis through quality assured bacteriology.
- Provide standardized treatment with supervision and patient support.
- Ensure effective drug supply and management.
- Monitor and evaluate performance and impact.

In order to achieve the TB targets set under the Millennium Development Goals, Bangladesh is expanding the scope of services in line with the Stop TB Strategy. The Stop TB Strategy consists of six elements:

- Pursue high quality DOTS expansion and enhancement.
- Address TB/HIV, MDR TB and the needs of poor and vulnerable populations.
- Contribute to health systems strengthening based on primary health care.
- Engage all care providers.
- Empower people with TB and communities through partnership.
- Enable and promote research.

1.7 Activities of the NTP

To achieve the objectives, the main activities of the NTP are:

- Developing policies, strategies and guidelines for TB control.
- Planning and budgeting for TB control activities.
- Developing human resources for TB control including training.
- Promoting early detection of smear-positive patients at all levels of the health services.
- Implementing quality assurance system for smear microscopy.
- Diagnosing smear-negative, extra-pulmonary and childhood TB.
- Ensuring Directly Observed Treatment (DOT) through community.
- Participation and involvement of government and non-government health care providers.
- Maintaining a high treatment success rate (>90%) among diagnosed new smear-positive patients.
- Ensuring uninterrupted supply of quality drugs, laboratory equipments and consumables and other logistics.

- Implementing standardized recording and reporting system.
- Involving academic medical institutes and hospitals, private practitioners, special services like prisons, defense, industries and other corporate sectors in the NTP activities.
- Strengthening cooperation and collaboration between the government of Bangladesh and Non-Government Organizations (NGOs) involved in control of tuberculosis.
- Conducting regular supervision, monitoring and evaluation of the NTP thus measuring programme performance and impact.
- Ensuring programmatic management of drug-resistant TB.
- Establishing linkage for management of TB-HIV co-infection.
- Maintaining liaison with development partners and establishing inter-sectoral and inter-ministerial collaboration.
- Carrying out operational research related to TB control.

02 General Information About Tuberculosis

2.1 Definition of tuberculosis

Tuberculosis is an airborne infectious disease, caused by bacilli called the *Mycobacterium tuberculosis*. The bacilli usually enter the body by inhalation through the lungs and spread to other parts of the body via the blood stream, the lymphatic system, or through direct extension to other organs.

Tuberculosis of the lungs or pulmonary tuberculosis is the most common form of TB and occurs in about 80% of cases. When the infection occurs in other parts of the body it is called extra-pulmonary tuberculosis.

2.2 Difference between TB infection and TB disease

2.2.1 TB infection

TB spreads from person to person through airborne particles that contain *M. tuberculosis*, called droplet nuclei. TB bacilli stay suspended in the air as droplets. Healthy people become infected with TB through inhalation of the droplets containing TB bacilli. Around 90% of the infected people do not progress to TB disease because of their immunity.

People with TB infection usually; (i) do not have symptoms; (ii) do not feel sick; (iii) cannot spread TB to others; but (iv) may have a positive skin test (Mantoux test).

2.2.2 TB disease

Around 10% of the people infected with TB bacilli may progress to TB disease in their lifetime. TB bacilli multiply in their lungs or other organs and produce the symptoms and signs. TB disease means TB infection plus presence of signs and symptoms of TB (sec 4.1).

2.3 Spread of the tuberculosis bacilli

Patients with pulmonary tuberculosis who cough up TB bacilli through coughing, sneezing and spitting are the main source of TB infection. Presence of TB bacilli in the sputum can be identified on microscopic or Xpert MTB/RIF examination of

sputum specimens. Such patients whose sputum contains TB bacilli are known as bacteriologically confirmed TB cases (smear-positive and smear-negative Xpert MTB/RIF positive cases).

If the bacilli cannot be identified on either microscopic or Xpert MTB/RIF examination of sputum specimens of pulmonary cases, and the patients are, based on a defined diagnostic process (see table 1, 4.5.2) diagnosed with pulmonary TB, these patients are categorized as smear-negative cases. Unlike smear-positive cases, smear-negative cases are less infectious and the disease is usually less severe. Extra-pulmonary cases are almost never infectious, unless they have pulmonary tuberculosis as well.

An infectious tuberculosis patient expels TB bacilli into the air through tiny droplets during coughing, sneezing, laughing singing and spitting. These droplets dry quickly, become droplet nuclei carrying the bacilli, and may remain suspended in the air for several hours. Infection occurs if the inhaled bacilli in these droplet nuclei enter and settle in the lungs of a healthy person and begin to multiply.

The degree of exposure is extensive for those who are in close and prolonged contact with an infectious case (i.e. persons who are living in the same household with infectious TB cases).

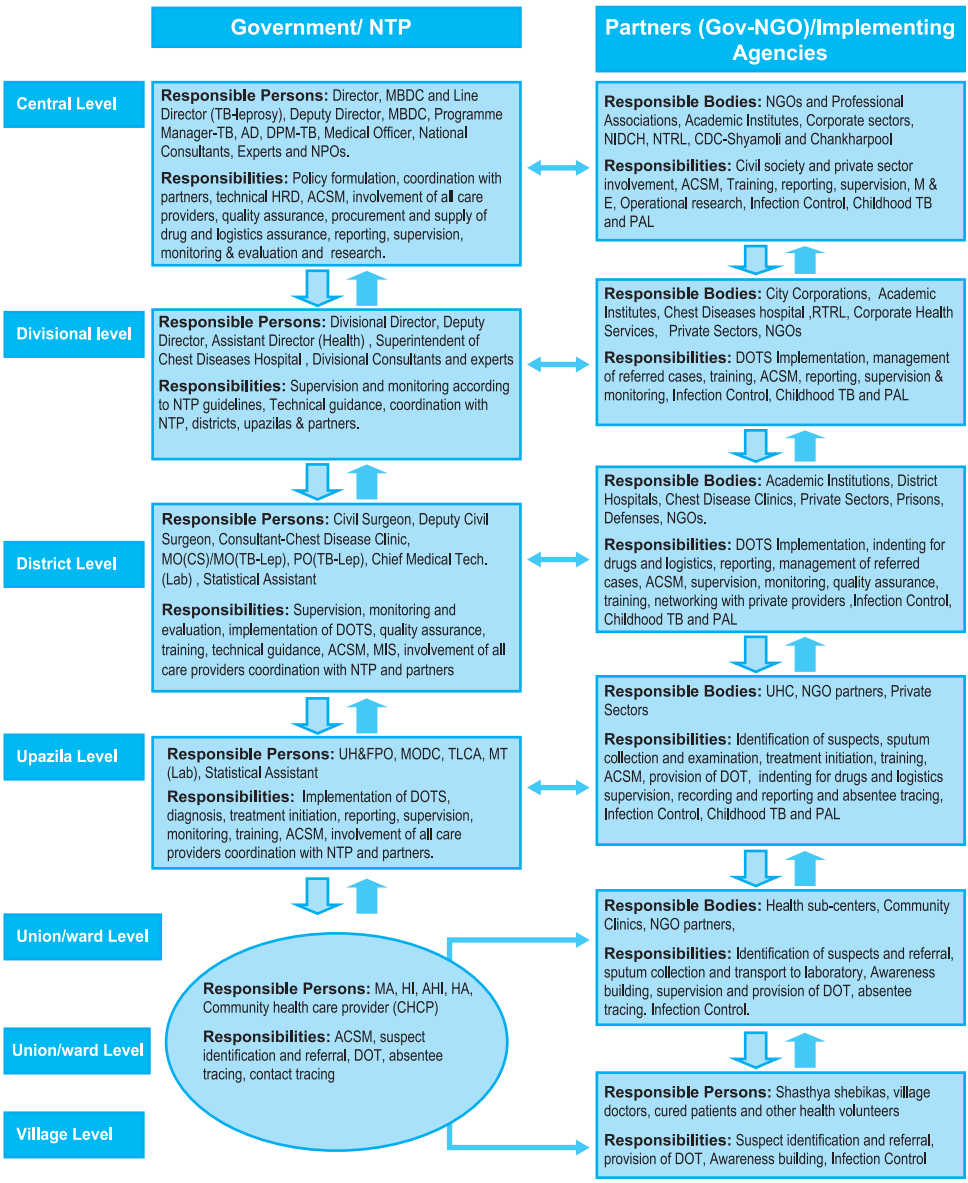
The bacilli are rapidly destroyed by exposure to sunlight and their concentration in the air is reduced by good ventilation.

2.4 Development of tuberculosis disease

If the body immune mechanism is not seriously compromised, approximately 90% of the infected cases will not develop tuberculosis disease; in this case the bacilli usually remain dormant within the body. The remaining 10% of infected individuals will subsequently develop disease, half of them within 1-2 years after infection, the other half later in their life.

03 Functional Structure of the National Tuberculosis Control Programme

Figure 1: Functional Structure of NTP



The job descriptions of the different medical and paramedical staff involved in the NTP are given in Annex 1 A-J.

04 Case Finding and Diagnosis of Tuberculosis

4.1 Signs and symptoms of TB

The highest priority for TB control is identification and successful treatment of patients who are suffering from smear-positive pulmonary TB.

Pulmonary TB should be presumed in a person who presents with persistent cough for three weeks or more, with or without production of sputum and despite the administration of a non-specific antibiotic. Thus **Presumptive TB** refers to a patient who presents with symptoms or signs suggestive of TB (previously known as a *TB suspect*)

Often a patient with pulmonary TB has one or more of the following symptoms in addition to cough:

- Respiratory symptoms: shortness of breath, chest pain, coughing up of blood
- General symptoms: loss of weight, loss of appetite, fever, night sweats Sputum microscopy for AFB should always be requested for a patient, who has cough for three weeks or longer, even in the absence of any other symptoms.

Diagnosis of Pulmonary TB should be done using the diagnosis flow chart (section 4.6)

Signs and symptoms of extra-pulmonary TB depend on the site involved. Most common examples are:

- TB lymphadenitis: swelling of lymph nodes
- Pleural effusion: fever, chest pain, shortness of breath
- TB arthritis: pain and swelling of joints
- TB of the spine: radiological findings with or without loss of function
- Meningitis: headache, fever, stiffness of neck and subsequent mental confusion

The diagnosis of extra-pulmonary TB should always be made by a graduate physician or specialist and often requires special examinations such as X-ray, MT, CT Scan, MRI, biopsies, Fine Needle Aspiration Cytology (FNAC), etc.

4.2 Methods of case finding

The most important method of case finding is identification of symptomatic patients attending a health facility, either on their own initiative or referred by another health facility, health worker, community volunteer, etc.

Patients diagnosed with any form of TB should always be asked whether there is anybody living in the same house that has a chronic cough and be encouraged to bring or send that person to the health facility for sputum examination. All child contacts below the age of 15 years of smear-positive patients should be examined for possible signs of TB. The same applies to all household contacts of identified DR TB patients. Thus these should be active approaches. In case these contacts cannot attend the health facility, the health worker or community worker involved in TB control should visit the house of the patient and identify persons with symptoms suggestive of TB.

4.3 Case finding by medical staff and non-medical persons

4.3.1 By medical staff

It is the responsibility of medical doctors (with paramedic and other field level staff) of government health facilities and staff of NGO facilities involved in the NTP to select people symptomatic for TB at the health facilities and to arrange examination of sputum for acid fast bacilli (AFB) for them, as well as for Presumptive TB casess referred by different health providers and volunteers. Patients suspect of extra-pulmonary TB should be referred to the appropriate facility/specialist for diagnosis. In addition, identification of Presumptive TB casess, their sputum examination, referral for diagnosis of extra-pulmonary TB are also the responsibilities of medical doctors of academic institutes, prisons, defense, corporate sectors and private practitioners directly collaborating with the NTP or through partner NGOs.

4.3.2 By non-medical persons

Community participation plays an important role in identification of Presumptive TB casess and motivating them to have their sputum examined or to visit a health facility for diagnosis.

Non-medical community members include the following persons:

- Shasthya shebikas or other health volunteers.
- Village doctors
- Cured TB patients and patients on treatment.
- Other important persons in the community such as religious leaders, community leaders, political leaders, members of union councils, school teachers and persons who have close communication with people in the community.

4.4 Diagnosis of TB

4.4.1 Tools for diagnosis of TB

Sputum smear examination

The most cost-effective tool for screening pulmonary Presumptive TB casess is microscopy examination of their sputum by the Ziehl-Neelsen (ZN) method. More over, sputum examination is the most reliable procedure for diagnosis of Pulmonary TB. Over 65% of pulmonary TB patients are smear-positive and will be detected by the ZN method. The NTP has adopted the WHO recommendation of introduction of Light Emitting Diode (LED) fluorescence microscopy (FM) which will initially replace ZN microscopy in microscopy centres with a large smear microscopy workload and will gradually replace ZN microscopy. With LED FM about 10% more positive smears can be detected compared to ZN microscopy. In the remaining pulmonary TB patients, the number of bacilli in their sputum is too low to be detected through ZN or LED FM microscopy. The chance of finding acid-fast bacilli in sputum smears by microscopy is directly related to the concentration of the bacilli in the sputum. Sputum microscopy is likely to be positive when there are at least 5,000 bacilli per ml of sputum. At concentrations below 1000 bacilli per ml of sputum, the chance of finding AFB in a smear is less than 10%.

Radiological (X-ray) examination of the lungs

Chest X-ray findings do not specifically indicate pulmonary tuberculosis because there are other chest diseases which may show the same changes on X-ray. Chest X-ray findings suggestive of pulmonary tuberculosis in patients with smear-negative microscopy should always be supported by clinical findings. A qualified physician should decide on the diagnosis of TB based on X-ray findings.

Tuberculin skin test (Mantoux Test)

This test is only used for supporting TB diagnosis in young children (see details in the child tuberculosis section, Chapter 6). In populations with a high TB prevalence, the tuberculin skin test is of little value in the diagnosis of TB disease in adults. A positive tuberculin skin test does not by itself differentiate M. tuberculosis infection from TB disease. Previous exposure to non-TB Mycobacteria may also results in a false-positive test result. With increasing age an increasing percentage of the population will have been infected with M. tuberculosis (almost 100% at the age of 40-50 years) and 90% of them will not develop TB disease. Hence, diagnosis of TB based on Mantoux test will lead to over-diagnosis of many patients. Conversely, the tuberculin skin test result may be negative, even when the patient has TB. Conditions often associated with a

false-negative tuberculin skin test include severe malnutrition, miliary TB, HIV infection and other immuno-compromised conditions.

Culture of TB bacilli

Culture is more sensitive than smear microscopy, detecting a higher proportion of patients among presumptive TB cases. A properly performed culture can detect low numbers of TB bacilli, even below 100 per ml. However, it takes about six weeks to provide a definite result, and it is not accessible to most patients. Therefore, it is unsuitable as routine procedure.

Molecular tests

Xpert MTB/RIF and the Hain test (Line Probe Assay) are molecular tests have been indroduced in Bangladesh. These tests can confirm whether a patient has TB with or without Rifampicin resistance in one day (Hain test) and in two hours (Xpert MTB/RIF).

FNAC and Biopsy

These are special tests for confirmation of extra-pulmonary TB and should be performed by the concerned specialists.

4.4.2 Examination of sputum specimens

Sputum microscopy should be performed in all Presumptive TB casess on two sputum specimens, as follows:

- "On-the-spot" specimen: the first specimen is collected on the spot when a patient is identified as a pulmonary presumptive TB cases (spot specimen).
- Early morning specimen: the patient is given a sputum container to collect the second specimen at home on the following morning (early morning specimen).
- Early morning sputum should be collected for Xpert MTB/RIF examination in available.

The responsible medical officer or paramedic/laboratory staff should provide clear instructions to the patient on how to collect the sputum: in the open air (preferably under shade) and as far as possible away from other people. If the patient attends a centre where microscopy/Xpert MTB/RIF facilities are available, s/he should either be instructed to bring the specimens to the responsible staff or directly to the laboratory. If the patient attends a centre without microscopy Xpert MTB/RIF facility, the responsible staff should ensure that the two sputum specimens are brought to the microscopy/Xpert MTB/RIF centre within five days after collection.

To increase accessibility to diagnostic services, outreach sputum collection centres are organized by NGOs with support of government field staff at Union Health and Family Welfare Centres or other suitable places including community clinics. If the patient attends an outreach center, s/he should be instructed one day earlier to bring one sputum specimen (early morning sputum) and one will be collected in the outreach centre as spot specimen.

4.5 Case definitions

Case definition is necessary for

- Correct patient registration and reporting.
- Correct choice of appropriate standard regimen.
- Patient follow-up.
- Cohort analysis including determining trends in the proportions of different types of patients

Case definition takes the following into account

- The anatomical site of disease (pulmonary or extra-pulmonary)
- The bacteriological results (smear-positive or smear-negative)
- The history of previous treatment (new or retreatment)

4.5.1 Anatomical site of the disease

The categories by anatomical site are pulmonary and extra-pulmonary TB.

Pulmonary TB

Pulmonary TB refers to disease affecting the lung parenchyma.

Extra-pulmonary TB

Extra-pulmonary TB refers to tuberculosis of organs other than the lungs. TB may affect any organ or tissue. Examples are: mediastinal and/or hilar lymph nodes, larynx, cervical lymph nodes, pleura, meninges, central nervous system, spine, bones and joints, kidneys, pericardium, intestines, peritoneum and skin.

Miliary tuberculosis is a kind of pulmonary tuberculosis with acute haematogenous spread.

Patients diagnosed with both pulmonary and extra-pulmonary TB should be classified as pulmonary TB.

4.5.2 Bacteriological status

Pulmonary TB is divided into bacteriologically confirmed (smear-positive and Xpert positive) and smear-negative pulmonary cases. Smear-positive cases represent 65-70% of all pulmonary cases and around 50% of all TB cases. Beasd on Bacteriological status pulmonary tuberculosis is divided into two categories

- **A bacteriologically confirmed TB case** is one from whom a biological specimen is positive by smear microscopy, culture or WRD (WHO Approved rapid Diagnostic tool such as Xpert MTB/RIF). All such cases should be notified, regardless of whether TB treatment has started.
- **A clinically diagnosed TB case** is one who does not fulfill the criteria for bacteriological confirmation but has been diagnosed with active TB by a clinician or other graduate medical practitioner who has decided to give the patient a full course of TB treatment. This definition includes the cases diagnosed on the basis of X-ray abnormalities or suggestive histology and extrapulmonary cases without laboratory confirmation. Clinically diagnosed cases subsequently found to be bacteriologically positive (before or after starting treatment) should be reclassified as bacteriologically confirmed.

Defining the smear status in pulmonary cases is important to:

– Identify smear-positive cases. These patients are the most infectious cases and usually have a higher mortality.
– Record, report and evaluate programme performance (smear-positive/Xpert MTB/RIF positive cases are the cases for which bacteriological monitoring of treatment progress should be done).

Table 1: Case definition by site and bacteriological status in adults

Case classification	Definition
Pulmonary smear-positive TB (PTB+)	• A patient with at least one sputum specimen positive for AFB, including any scanty smear result.
Pulmonary smear negative TB (PTB-) but positive on Xpert (MTB+/RIF)	(If Xpert is available) • A patient with symptoms suggestive of TB with two sputum specimens negative for AFB; and • Found positive on Xpert MTB+/RIF- (MTB detected Rifampicin Susceptible)
Pulmonary smear-negative (PTB-)	A. (If X-ray is available) • A patient with symptoms suggestive of TB with two sputum specimens negative for AFB; and • Xpert MTB/RIF (if available) is Negative and • Chest X-ray abnormalities consistent with active TB; and • Diagnosis is made by a qualified physician
Extra-pulmonary TB (EPTB)	• A patient with TB of organs other than the lungs as confirmed by a qualified physician e.g pleura, lymph nodes, abdomen, genitourinary tract, skin, joits and bones, meninges.

4.5.3 Treatment history

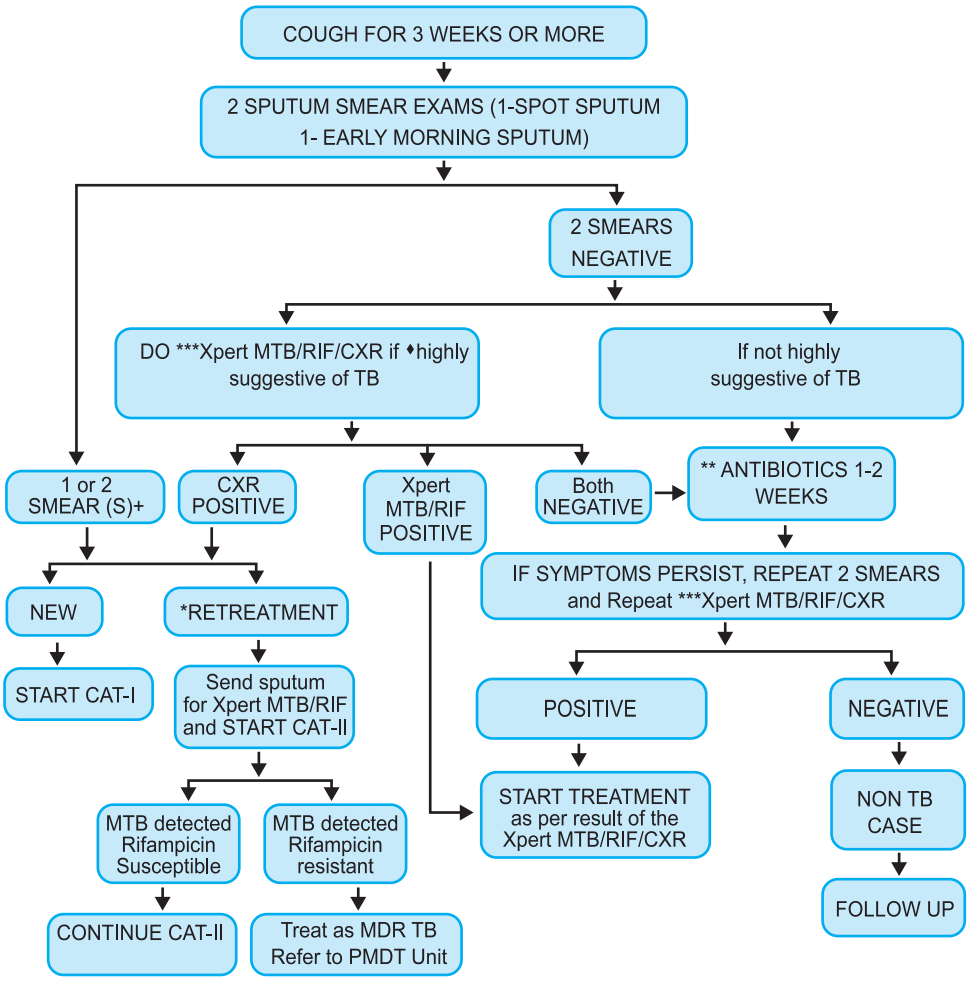
The treatment history is very important for proper categorization of the patient and subsequently choosing the correct regimen.

Table 2: Case definition by previous treatment history

Case classification	Definition
New	• A patient who has never received anti-TB drugs; or • A patient who received anti-TB drugs for less than one month
Relapse	• Relapse patients have previously been treated for TB, were declared cured or treatment completed at the end of their most recent course of treatment, and are now diagnosed with a recurrent episode of TB (either a true relapse or a new episode of TB caused by reinfection).
Treatment after failure	• Treatment after failure patients are those who have previously been treated for TB and whose treatment failed at the end of their most recent course of treatment.
Treatment after loss to follow up/default	• Treatment after loss to follow-up patients have previously been treated for TB and were declared lost to follow-up at the end of their most recent course of treatment. (These were previously known as treatment after default patients.)
Transfer in	• A patient already registered for treatment in a DOTS centre and who is subsequently transferred to another registration unit
Other (s)	• Other previously treated patients are those who have previously been treated for TB but whose outcome after their most recent course of treatment is unknown or undocumented.

4.6 Flow chart for diagnosis and follow up of pulmonary TB

Figure 2



* Previous history of treatment 1 month: CAT II

** Exclude Clarithromycin, Quinolones, Amoxyclavulanate

*** Xpert MTB/RIF should be advised by qualified physician. Do Xpert MTB/RIF first` if both Xpert MTB/RIF and CXR is available

♦ Highly suggestive of TB: Presumptive TB cases with cough for 3 weeks, fever and weight loss.

4.7 Diagnosis of extra-pulmonary TB in adults

Extra-pulmonary TB can occur at any age and can involve any organ. Many patients with EPTB may also suffer from pulmonary TB.

Definitive diagnosis of extra pulmonary TB is often difficult. Diagnosis may be presumptive, provided other conditions mimicking tuberculosis can be excluded. Patients usually present with constitutional features (fever, night sweats, weight loss)

and local features related to the site of disease. The degree of certainty of diagnosis may depend on the availability of diagnostic tools, e.g. X-ray, ultrasound, FNAC, biopsy, etc.

Diagnose the case as EPTB using the following diagnostic tools:

Figure 3

- ✓ Smear and/or culture for AFB of bodily fluids: pleural fluid, pericardial fluid, ascitic fluid (laparoscopic), cerebrospinal fluid (by lumbar puncture), urine, aspirate (FNAC) from any solid organ e.g. lymph node, spine, epididymis etc.
- ✓ Histo-pathological examination (biopsy) - finding of caseating granuloma in the biopsy material obtained from body tissues such as lymph node, peritoneum (laparoscopic), synovium, spine, bone, liver, spleen, genital tract, etc.
- ✓ X-ray of involved structure, e.g. lung, spine, bone, joint, adrenal gland
- ✓ Biochemical test, e.g. exudate.
- ✓ Cytological examination of effusions, ascites, CSF fluid, etc.
- ✓ Tuberculin skin test (TST e.g. MT)
- ✓ CT Scan
- ✓ Molecular tests- e.g Xpert MTB/RIF.

4.7.1 Features and diagnostic approach of EPTB

Tuberculous lymphadenopathy

The lymph nodes most commonly involved are the cervical nodes. Other sites may also be involved including submandibular, supraclavicular, inguinal or axillary nodes. Involvement of lymph nodes may result from direct extension of infection or from haematogenous spread.
The usual course of lymph node disease is as follows:

- Initially they are firm and discrete.
- Later become fluctuant and matted together followed by abscess formation.
- The skin may then breakdown leading to chronic sinus formation and.
- Ultimately healing with scarring.

Diagnosis is based on FNAC (smears for AFB, Xpert MTB/RIF, cultures for MTB) and or biopsy (Histopathology).

Miliary (disseminated) TB

Miliary TB results from widespread blood-borne dissemination of TB bacilli; usually in children. It is often the consequence of a recent (primary) infection, in adults it may be due to either recent infection or reactivation of old disseminated foci.

Patients present with constitutional features rather than respiratory symptoms. They may have hepato-splenomegaly and choroidal tubercles on fundoscopy. Often the presentation is associated with fever of unknown origin and wasting may be marked. A rare presentation seen in the elderly is cryptic miliary tuberculosis which has a chronic course and remains undiagnosed unless there is high degree of suspicion. An acute septicemic form, non-reactive miliary tuberculosis occurs very rarely and is due to massive hematogenous spread of tubercle bacilli.

Diagnosis is based on chest X-ray. It shows diffuse, uniformly distributed, small miliary shadows. "Miliary" means "like small millet seeds". Various hematological abnormalities may be seen including anemia, leucopenia, neutrophilic leukocytosis and leukemoid blood reactions. Liver function tests may be abnormal. Bacteriological confirmation (smear or culture) is sometimes possible from sputum, cerebrospinal fluid, bone marrow, liver or blood. Granulomas are evident in liver or bone marrow biopsy specimen from many patients. Bronchoalveolar lavage is more likely to permit bacteriological confirmation.

Tuberculous serous effusions (pleural, pericardial, ascites)

The presentation is usually with constitutional and local features.

Microscopy/Xpert MTB/RIF of the aspirate from tuberculous serous effusions rarely shows AFB because the fluid forms as an inflammatory reaction to TB lesions in the serous membrane. TB culture, even if available, is of no immediate help. The white cell content is variable, usually with predominant lymphocytes and monocytes. The aspirate is an exudate (i.e. protein content is more than 30 g/l). Interpret with caution the laboratory result of protein concentration in any aspirated fluid. If there has been a delay in laboratory analysis, a protein clot may have formed in the sample. The laboratory result may then be falsely low.

Tuberculous pleural effusion: The clinical and chest X-ray diagnosis of a pleural effusion is straightforward. Ultrasound can confirm the presence of fluid in the pleural space in case of doubt. Always perform diagnostic pleural aspiration if a patient has a pleural effusion. The fluid is usually straw-colored. The white cell count is usually high with predominant lymphocytes. Occasionally the fluid is blood-stained. The presence of pus on aspiration indicates an empyema (purulent effusion). If facilities are available, closed pleural biopsy using an Abrams needle is useful for histological diagnosis. Since the distribution of TB lesions in the pleura is patchy, the diagnostic yield of closed pleural biopsy is about 75%. Multiple biopsies increase the diagnostic yield. A small open pleural biopsy increases the yield even further.

Tuberculous pericardial effusion: The diagnosis usually rests on suggestive constitutional and cardiovascular features and investigation findings (ECG, chest X-ray and echocardiography).

Tuberculous ascites: Ascites results from peritoneal TB. Routes of spread of TB to the peritoneum include the following: (a) from tuberculous mesenteric lymph nodes; (b) from intestinal TB (pulmonary TB patients may develop intestinal ulcers and fistulae as a result of swallowing infected sputum); (c) blood-borne. Patients present with constitutional features and ascites. There may be palpable abdominal masses (mesenteric lymph nodes). Aspirated fluid is exudative with high protein content and leucocytosis with predominantly lymphocytes. The yield of direct smear and culture for AFB is relatively low; culture of a large volume ascitic fluid can increase the yield. Ultrasound may show features consistent with TB, including enlarged mesenteric or retroperitoneal lymph nodes. Definitive diagnosis rests on a peritoneal biopsy. Blind percutaneous needle biopsy of the peritoneum has a low pick-up rate and a high complication rate. In experienced hands, laparoscopy under local anesthetic has a high pick-up rate. Laparoscopy enables direct visualization and biopsy of peritoneal TB lesions. Laparotomy will confirm the diagnosis in nearly every case but is too invasive for routine use.

Gastro-intestinal TB

Any portion of the gastrointestinal tract may be affected by tuberculosis. The terminal ileum and caecum are the sites most commonly involved. Abdominal pain (at times similar to that of appendicitis), chronic diarrhea, subacute obstruction, hematochezia and a right iliac fossa mass are common findings at presentation. Fever, weight loss and night sweats are also frequent. A 'doughy abdomen' due to extensive intra-abdominal inflammation may also be detected. Diagnosis rests on barium examination of the small and large intestine or on colonoscopy.

Spinal TB (Pott's disease)

The sites most commonly involved are the lower thoracic vertebrae (with T-10 being the most common) and upper lumbar spine but the cervical spine can also be affected. TB starts in an intervertebral disc and spreads along the anterior and longitudinal ligaments before involving the adjacent vertebral bodies. With advanced disease, collapse of vertebral bodies results in kyphosis (gibbus). A para-vertebral cold abscess may also form. This may track to sites such as the lower thoracic cage or below the inguinal ligament (Psoas abscess).

Plain X-ray of the spine is usually diagnostic. The typical appearance is erosion of the anterior edges of the superior and inferior borders of adjacent vertebral bodies. The disc space is narrowed. CT scan or MRI reveals the lesions more correctly. Aspiration of the abscess or bone biopsy confirms the tuberculous etiology by histopathology and culture. The main differential diagnoses are malignancy and pyogenic spinal infections. Malignant deposits in the spine tend to erode the pedicles and spinal bodies, leaving the disc intact. Pyogenic infection tends to be more acute than TB, with more severe pain.

Joint TB

Weight bearing joints are mostly affected. Tuberculosis of the hip joints causes pain and limping. TB of the knee produces pain and swelling. A history of previous trauma is often elicited. Systemic symptoms are present in about half of the patients. Pulmonary TB is detected in approximately half of these patients. Radiological abnormalities include bone erosions, joint space narrowing, and ultimately joint destruction. Diagnosis requires synovial biopsy.

Genito-urinary TB

Tuberculosis can involve any part of genitor-urinary tract. It is usually due to haematogenous seedling following primary infection. Local symptoms predominate. Urinary frequency, dysuria, hematuria, and loin pain are common presentations. However patient may be asymptomatic and the disease discovered after severe destructive lesions of the kidneys have developed. Urine analysis gives abnormal result in 90% of cases, revealing pyuria and hematuria. Sterile pyuria first raises the suspicion of renal tuberculosis. An intravenous pyelography helps in the diagnosis. Calcification and ureteric stricture are suggestive findings. AFB/Xpert MTB/RIF from centrifuge urine specimen helps in diagnosis. Culture of three consecutive morning urine specimens yields a definitive diagnosis in nearly 90% cases. Severe ureteric strictures may lead to hydronephrosis and renal damage.

Genital tuberculosis is more common in female than in male. In female patients, it affects the fallopian tubes and endometrium and may cause infertility, pelvic pain and menstrual irregularities. Diagnosis requires biopsy and/or culture of specimens obtained by dilatation and curettage (D and C). In male patients, tuberculosis preferentially affects the epididymis (producing a slight tender mass), orchitis and prostatitis may also develop. In almost half of cases of genitourinary tuberculosis, urinary tract disease is also present.

Hepatic and Splenic TB

Disseminated TB may involve the liver or spleen and can cause diagnostic confusion. Solitary or multiple abscesses may develop. Ultrasound or CT scan and guided FNAC give diagnosis in most of the cases.

Less common extra-pulmonary forms

Tuberculosis may cause chorioretinitis, uveitis, panopthalmitis, phlyctenular conjunctivitis. In the nasopharynx, tuberculosis may simulate Wegner's granulomatosis. Cutaneous manifestations of tuberculosis include primary infection due to direct inoculation, abscess and chronic ulcers, scrofuloderma, lupus vulgaris, miliary lesions, and erythema nodosum. Adrenal tuberculosis is a manifestation of advanced disease presenting as sign of adrenal insufficiency.

CNS tuberculosis

This is described under children tuberculosis. (But it can also occur in adults).

05 Treatment of Tuberculosis

5.1 The role of treatment in the control of tuberculosis

Early treatment and cure of infectious cases of tuberculosis cut the chain of transmission of TB infection in the community. Therefore, quick idenfication of presumptive TB cases, rapid diagnosis, early initiation of treatment and successful completion of treatment are the most effective ways of preventing TB.

5.2 Aims of treatment

The aims of treating TB are:

- To cure the patient of TB
- To prevent death from active TB or its late effects (disability)
- To prevent relapse of TB
- To decrease transmission of TB to others
- To prevent the development of acquired drug resistance

5.3 Basic Principles of TB treatment

The basic principles effective TB treatment are:

A. Appropriate combination of drugs to kill different bacterial populations
B. Drugs are given for the required duration (several months) to kill the bacilli
C. Drugs are given in the correct dosage to achieve the therapeutic effect.

5.4 Fixed-dose combinations (FDCs)

Tablets of fixed-dose drug combinations have several advantages over individual drugs:

(a) Prescription errors are likely to occur less frequently because dosage recommendations are more straightforward and adjustment of dosage according to patient weight is easier.

(b) The number of tablets to ingest is smaller and may thus encourage patient's adherence. For example, a new smear-positive patient of 38-54 kg body weight has to take three tablets of 4-FDC daily during the intensive phase of treatment. On the other hand if loose drugs are used, nine tablets (three R150, one H300, three Z500 and two E400) will be required to prescribe for the same patient.

(c) Drug resistance is less likely to occur; patients swallow all drugs and cannot skip any particular drug.

FDCs have the disadvantage that if severe side-effects occur, in that case all drugs have to be stopped and the patient has to continue treatment with single drug, excluding the drug(s) which might be responsible for the side-effect. In order to manage side effects, 5% of single drugs will be supplied together with FDCs.

5.5 Standardized Regimens

Standardized regimens have the following advantages over individualized prescription of drugs:

- Better cure rate over randomized combination of anti TB drugs.
- Less risk for drug resistance development due to reduction in prescription errors.
- Better estimates of drug needs for procurement, distribution and monitoring.
- Facilitate staff training.
- Reduced costs.
- Facilitates regular drug supply when patients move from one facility to another.

Bangladesh has adopted the use of standardized regimens of anti tubercular drugs for new and relapsed/re-treatment cases.

5.5.1 Treatment phases

Effective chemotherapy consists of two phases:

(a) The initial or intensive phase administered daily for two months in new cases and three months in re-treatment cases. The aim of this phase is to rapidly reduce and eliminate the multiplying bacilli without allowing the development of acquired resistance to the prescribed drugs. During the intensive phase, the tubercle bacilli are killed rapidly. The infectious patients quickly become non-infectious (within approximately two weeks).

(b) The continuation phase is essential to eliminate the remaining bacterial population (mainly persisters). Drugs are administered daily for the rest of the treatment duration according to the category.

Table 3 : Standardized treatment regimen for each diagnostic category (Adults)

TB diagnostic category	Type of Patient	Treatment regimen	
		Intensive phase (Daily)	Continuation phase (Daily)
Cat. I	• New smear-positive bacteriologically positive PTB patients • New smear-negative PTB • New Extra-pulmonary TB • New concomitant/ associated HIV/AIDS	2(HRZE)	4 (HR)
Cat. II	• Sputum smear-positive PTB with history of treatment of one month or more • Relapse • Treatment failure after Cat. I Treatment • after loss to follow up • Others	2(HRZE)S/ 1(HRZE)	5 (HRE)

5.6 Dosages of FDC tablets

FDC tablets are composed as follows:

4FDC: isoniazid 75 mg + rifampicin 150 mg + pyrazinamide 400 mg + ethambutol 275 mg

2FDC: isoniazid 75 mg + rifampicin 150 mg
3FDC: isoniazid 75 mg + rifampicin 150 mg + Ethambutol 275 mg

The dosages of FDC tablets for adults are as follows: Formulation /dosages of loose drugs

Category I

Table 4 : Drug dosages category I

Pre-treatment weight (kg)	Intensive Phase	Continuation Phase
	Daily (first 2 months)	Daily (Next 4 months)
	Number of 4FDC tablets	Number of 2 FDC tablets
30 – 37	2	2
38 – 54	3	3
55 – 70	4	4
> 70	5	5

Category II

Table 5 : Drug dosages category II

Pre-treatment weight (kg)	Intensive Phase		Continuation Phase
	Daily (first 3 months)	Daily (first 2 months)	Daily (next 5 months)
	Number of 4-FDC tablets	Injection Streptomycin	Number of 3 FDC tablets
30 – 37	2	500mg	2
38 – 54	3	750mg	3
55 – 70	4	1gm*	4
> 70	5	1gm*	5

* The dose of streptomycin should not exceed 500 mg daily after the age of 50 years

5.7 Start of treatment

Treatment should be started as soon as possible after a confirmed diagnosis is made

The responsible medical officer/graduate physician should categorize the patient. A paramedical staff may fill in the treatment card and register the patient in the TB register and maintain other documents related to the diagnosis of the patients. The first dose of drugs should be given at the respective health facility, where after the patient is referred to the DOT provider (see section 5.11). At the time of start of treatment all drugs for the whole course of treatment (intensive and continuation

phase) of the respective patient should be ensured. In case of transfer or death of a patient, the remaining drugs should be returned and added to the general stock.

The medical officer or TB manager/supervisor should weekly review and cross check the TB register with the laboratory register to ensure that all patients diagnosed in the laboratory are registered and enrolled for treatment.

Patients who are smear positive according to the laboratory register but did not start treatment should be traced within two weeks after the laboratory result is available.

5.8 Adherence to treatment

Patient compliance is a key factor to treatment success. For various reasons a proportion of patients stop treatment before completion, so strict adherence to treatment should be ensured to cure the patients and prevent the development of drug-resistant TB.

Directly Observed Treatment (DOT) is a very important component in the internationally recommended policy package for TB control (DOTS strategy).

DOT means that an observer watches the patient swallowing their drugs, which is essential for completion of treatment and recovery from TB. This ensures that the patient takes the right anti-TB drugs, in the right doses, at the right intervals and for the right period. All patients, irrespective of the treatment category, should receive all doses of the anti-TB drugs under DOT.

5.9 Ambulatory versus hospital treatment

Over 95% of the TB patients can be treated on ambulatory basis. Hospitalization itself has little or no effect on the outcome of the treatment except in severe forms of tuberculosis. Hospitalization may be necessary if the patient cannot receive ambulatory treatment under direct observation. In-patient treatment may also be necessary (often only for a short period) for severely ill patients, e.g. tuberculosis with complications viz. severe haemoptysis (bloodstained sputum), spontaneous pneumothorax (air in the inter-pleural space resulting in collapse of the lung) or for those with other associated serious diseases.

5.10 DOT providers

To ensure adherence to treatment, DOT should be provided as conveniently as possible to the patient. This often means as close to the patient's home or workplace as possible. Patients may wish to attend any of the NTP recognized DOT centres according to patients' convenience.
The DOT provider may be a facility or community-based health worker or a trained

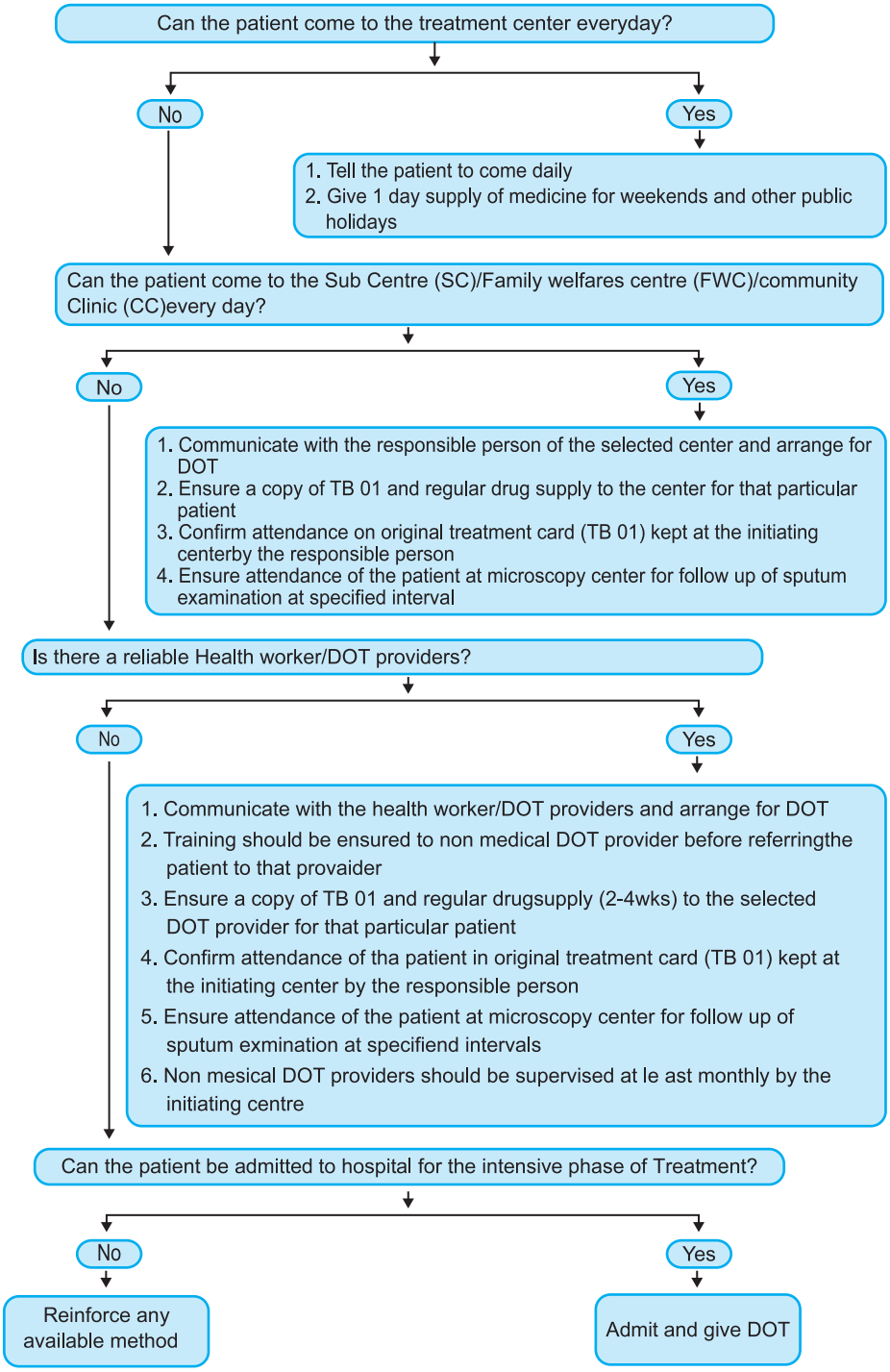
community member. These DOT providers include assistant health inspectors (AHIs), health assistants (HAs), community health care providers (CHCP), community health workers (CHWs), Shasthya shebikas, village doctors, community leaders, cured patients, etc. All non-medical personnel who deliver DOT should be supervised at least monthly.

Medical officers and paramedics in consultation with patients should identify the DOT provider, the name and address of whom should be recorded on the patient's treatment card. The medical officer or paramedic has to ensure that the DOT provider receives the filled-in copy of Treatment Card (TB 01), Identity Card (TB 02) and drugs at the specific intervals.

5.11 Methods of DOT

The following flow chart shows the decision tree for DOT.

Figure 4



5.12 Drug supplies to DOT providers

If DOT is provided at the centre where the patient is registered, the drugs for that patient for the whole course of the treatment should be kept at the place which is secured and suitable for drugs in that centre. The paramedic responsible for DOT should be given the drugs for two weeks at a time.

If DOT is provided from a sub-centre, where the patient is not registered for treatment or at community level by a health worker/village doctor/shasthya shebika drugs needed for two to four weeks should be given at a time to the DOT provider until the end of the treatment.

5.13 Regularity of treatment

DOT providers should ensure that the patients swallow the drugs according to prescription. They should organize tracing of absentees and prevent patients from becoming lost to follow up. Priority must be given to smear-positive pulmonary TB patients. If a patient misses three consecutive doses of the treatment he/she must be traced immediately to resume DOT without delay.

To ensure easy tracing of patients the detailed address should be filled on the Tuberculosis Treatment Card and TB Register (Mobile number should be included if available with the patient).

5.14 Follow-up of treatment

In order to evaluate the result of treatment, sputum smear examinations should be performed at defined intervals.

5.14.1 New smear/Xpert MTB/RIF positive patients

One sputum specimen should be examined at the end of month 2/3, 5 and 6 after the start of treatment. It is important to note that follow up sputum should always be the early morning sample. The sputum at six months can also be collected during the last two weeks of treatment.

In case the sputum smear is positive at the end of the second month:

- The patient should **NOT** be continued with the intensive phase of treatment, but be started on the continuation phase of the treatment.
- In these patients a sputum sample should be sent to Xpert MTB/RIF lab to check whehether patient is RIF resistance or not.
- Follow up of all RIF sensitive cases should be done by Smear Microscopy.
- Further management of these patients will depend on the outcome of the Xpert MTB/RIF result (see Chapter 10. Drug Resistant Tuberculosis)

If the sputum is positive at month 5 or 6 the outcome will be recorded as treatment failure and referred for Xpert MTB/RIF. The patient must be re-registered as "treatment after failure of Cat I" and be treated with a course of Category II or other appropriate regimen based on Xpert MTB/RIF results In

addition, if the Xpert MTB/RIF result is positive with RIF resistance at any point of treatment, the treatment oudcome should be "Failure" and will be rigistered in DR TB. At the time patients attend for the follow-up smear examinations, they should be weighed and the weight be recorded on the Tuberculosis Treatment Card of the patient. If by then the patient's weight exceeds his/her pre-treatment weight range, the number of daily FDC tablets should be adapted. This should be recorded on the patient's treatment card.

5.14.2 Re-treatment smear/Xpert MTB/RIF positive patients

One specimen of sputum of patients treated with Category II regimen should be examined at the end of month 3/4, 5 and 8. The sputum at eighth month can also be collected during the last two weeks of treatment.

In case the sputum smear is positive at the end of the third month:

- The patient should **NOT** be continued with the intensive phase of treatment, but be started on the continuation phase of the treatment
- In these patients a sputum sample should be sent to Xpert MTB/RIF lab to check whether patient is RIF resistance or not.
- Further management of these patients will depend on the result of the Xpert MTB/RIF (see Chapter 10. Drug Resistant Tuberculosis)

If the smear is positive at month 5 or 8, the outcome should be recorded as treatment failure and the patient should be referred for examination for DR TB.

At the time patients attend for the follow up smear examinations, they should be weighed and the weight be recorded on the Tuberculosis Treatment Card of the patient. If by then the patient's weight exceeds his/her pre-treatment weight range, the number of daily FDC tablets should be adapted. This should be recorded on the patient's treatment card.

5.14.3 Smear negative and extra-pulmonary patients

At the end of the second month of treatment one sputum specimen should be examined of all smear-negative pulmonary TB patients to ensure that they remain negative. In case the smear is positive (a second smear should confirm the result), the patient should be declared "Treatment Failure" and referred for Xpert MTB/RIF. The patient must be re-registered as "treatment after failure of Cat. I" and be treated with a course of Category II or other appropriate regimen based on Xpert MTB/RIF results. If the sputum is negative the patients should continue the treatment and progress of the patient should be assessed clinically.

In case of extra-pulmonary TB, no smear examination is necessary and the patients should be assessed clinically. If the patient is not improved clinically, patient should be assessed for DR EPTB.

Also in these patients the number of daily FDC tablets should be adapted according to weight gain during treatment and be recorded on the patient's treatment card.

5.15 Actions in case of interruption of TB treatment

Table 6: Management of new smear-positive cases after interrupting treatment

Length of Treatment	Length of interruption	Result of smear	Record Rx Outcome	Re-register	Treatment
Less than 1 month	Less than 1 month	Not required	No	No	Continue CAT 1 and prolong it to compensate for missed doses
	1-2 months	Positive	No	No	Continue CAT 1 compensate the doses for 1 extra month
		Negative	No	No	Continue CAT 1 and prolong it to compensate for missed doses
	More than 2 months	Positive	Yes, record as lost to follow up/defaulter	Yes, register as new	Restart CAT-I
		Negative	Yes, record as lost to follow up/defaulter	Go through flow chart	Depend on outcome of flow chart
1 – 2 months	Less than 2 months	Positive	No	No	Continue CAT 1 compensate the doses for 1 extra month
		Negative	No	No	Continue CAT 1 and prolong it to compensate for missed doses
	More than 2 months	Positive	Yes, record as lost to follow up/defaulter	Yes, register as *RAL/RAD	Depend on Xpert MTB/RIF result.
		Negative	Yes, record as lost to follow up/defaulter	Go through flow chart	Depend on outcome of flow chart
More than 2 months	Less than 2 months	Positive	No (if R_x < 5months)	No	Restart CAT 1
			Yes, Failure (if $R_x \geq$ 5months)	Yes, register as Failure	Depend on Xpert MTB/RIF result
		Negative	No	No	Continue CAT 1
	More than 2 months	Positive	Yes, record as lost to follow up/defaulter	Yes, register as RAL/RAD	Restart, now on CAT 2
		Negative	Yes, record as lost to follow up/defaulter	No	No (counsel for follow up)

* RAD: Return After Default
* RAL : Return After Loss to follow up

Table 7: Management of re-treatment cases after interrupting treatment

Length of treatment	Length of interruption	Result of smear	Record Rx Outcome	Re-register	Treatment
Less than 2 months	Less than 1 month	Smear not required	No	No	Continue CAT 2, and prolong it to compensate for missed doses
	1-2 months	Positive	No	No	Continue CAT 2; 1 extra month
		Negative	No	No	Continue CAT 2, and prolong it to compensate for missed doses
	More than 2 months	Positive	Yes: record as lost to follow up/ defaulter	Yes, Return after loss to follow up/default	Depend on Xpert MTB/RIF result
		Negative	Yes: record as lost to follow up/ defaulter	No	Refer if patient becomes smear positive again**
More than 2 months	Less than 2 months	Positive	No, (if treatment <5 months)	No	Restart Cat 2*
			Yes, record as "Failure" if $R_x \geq$ 5months	Yes, Failure	*Refer to specialized ** centre to/confirm/exclude DR TB*
		Negative	No	No	Continue CAT 2
	More than 2 months	Positive	Yes: record as lost to follow up/ defaulter	Yes, Return after loss to follow up/default	Depend on Xpert MTB/RIF result
		Negative	Yes: record as lost to follow up/ defaulter	No	Refer if patient becomes smear positive again**

* Restart only once
** Referral to any of the followings :
- National TB Reference Laboratory (NTRL) in National Institute of Disease of the Chest and Hospital, Mohakhali, Dhaka
- Regional TB Reference Laboratory (RTRL) in Rajshahi, Chittagong and Khulna
- Damien Foundation Hospitals in Netrokona, Mymensingh and Tangail (Jalchatra)

5.16 Drug reactions: Management of side effects or adverse reactions related to the use of anti-tuberculosis drugs

Most TB patients complete their treatment without any significant adverse effects of drugs. However, a few patients do experience adverse effects. Patients sometimes discontinue the treatment due to major or even minor adverse effects. It is therefore important that patients are clinically monitored during treatment so that adverse effects can be detected promptly and managed properly. Routine laboratory monitoring is not necessary.

Health workers/ DOT providers can monitor side effects of drugs by teaching patients how to recognize symptoms of common side effects and to report if they develop such symptoms, and by asking about symptoms when the patients report to collect drugs.

Table 8: Symptom-based approach to side effects of anti-TB drugs and their management

Side -effect	Drug(s) probably responsible	Management
Minor		**Continue anti-TB drugs, check drug doses**
Anorexia, nausea, abdominal pain	Pyrazinamide, Rifampicin	Give drugs with or after meals
Joint pain	Pyrazinamide	Give non steroidal anti-inflammatory drug (NSAID)
Burning sensation in the feet	Isoniazid	Give pyridoxine 100 mg daily
Orange/red urine	Rifampicin	Reassurance; the patient should be informed at the beginning of the treatment that it happens commonly and is normal
Itching with minor skin rash	All drugs	Exclude skin diseases. Give antihistamines
Major		**Stop responsible drug(s)**
Itching with skin Rash (waderate to severe)	All drugs	Stop anti-TB drugs. Identify the offending drug (needs expert opinion)
Deafness (no wax on auroscopy)	Streptomycin	Stop streptomycin and never use again
Dizziness (vertigo and nystagmus)	Streptomycin	Stop streptomycin and never use again
Jaundice (other causes excluded), hepatitis	Most anti-TB drugs (especially isoniazid, pyrazinamide and rifampicin)	Stop all anti-TB drugs until jaundice resolves (needs expert opinion)
Vomiting and Confusion (suspect drug induced acute liver failure if jaundice present)	Most anti-TB drugs	Stop all anti-TB drugs until jaundice resolves Urgent Liver function test and prothrombin time test (needs expert opinion)
Visual impairment (other causes excluded)	Ethambutol	Stop ethambutol and never use again
Shock syndrome, purpura, acute renal failure, acute hemolytic anaemia	Rifampicin	Stop rifampicin and never use again

5.17 Treatment outcomes

At the end of the treatment course, one treatment outcome will be recorded for each TB patient. Table 6 shows the possible, mutually exclusive treatment outcomes.

Table 9 : Treatment outcome description

Treatment Outcomes	Description
Cured	• A pulmonary TB patient with bacteriologically confirmed TB at the beginning of treatment who was smear or culture-negative in the last month of treatment and on at least one previous follow up occasion.
Treatment Completed	• A TB patient who completed treatment without evidence of failure but with no record to show that sputum smear or culture results in the last month of treatment and on at least one previous follow up occasion were negative, either because tests were not done or because results are unavailable. • EP TB cases are also recorded as treatment completed as no sputum test is done after completion of full course treatment.
Treatment failure	• A TB patient whose sputum smear or culture is positive at month 5 or later during treatment. OR • A new or retreatment smear-positive patient who was diagnosed with DR-TB during the course of treatment OR • A patient who was initially smear-negative and was found smear-positive at the end of the second month of treatment
Died	• A TB patient who dies for any reason before starting or during the course of treatment.
Lost to follow up/ Defaulted	• A TB patient who did not start treatment or whose treatment was interrupted for 2 consecutive months or more.
Transferred out	• A patient who has been transferred to another recording and reporting unit and for whom the treatment outcome is not known (this should occur only in a minority of cases) to the reporting unit
Not evaluated	• A patient whose treatment outcome is not known (other than transfer out).
Treatment success	• The sum of *cured* and *treatment completed*.

5.18 Referral and transfer of patients

A patient during treatment may require referral or transfer to another designated DOTS centre for continuation of treatment. In these cases, the medical officer of the referring/transferring centre should fill the Tuberculosis Referral/Transfer Form (TB 07) in triplicate. One copy should be sent to the referral/transfer center, one copy is given to the patient and one copy remains in the file of the treatment initiation centre.

When treatment is continued in the receiving DOTS centre, the patient should be registered there as a "transfer in" case. The lower portion of the form (TB 07) should be returned to the centre from where the patient was referred.

If a patient was treated without being registered (e.g. in a hospital or by a private practitioner) and will continue treatment in the designated DOTS centre, this

constitutes a referral and not a transfer. In this case, the receiving centre will register the patient as per treatment category (new, relapse, treatment after loss to follow up, failure) and not as transfer in.

Every efforts should be taken to collect the treatment outcome of the transferred out patients from the referred centre and final outcome be reported by the referring centre in order to minimize the number of transfer outs in treatment outcome. Referred centres should also try their best to inform the referring centres on the outcome of treatment of transfer in cases.

5.19 Treatment of tuberculosis in special situations

Drug-induced hepatitis

Anti-TB drugs can damage the liver. Isoniazid, pyrazinamide and rifampicin are most commonly responsible, ethambutol rarely. When a patient develops hepatitis during TB treatment, the hepatitis may be due to the anti-TB drugs but may also have another cause. It is important to rule out other possible causes before deciding that the hepatitis is drug-induced. If the diagnosis of hepatitis is made, the anti-TB drugs should be stopped. The drugs must be withheld until the jaundice or hepatic symptoms have resolved and liver function tests have returned to normal. If liver function tests cannot be done, then it is advisable to wait two weeks after the jaundice has disappeared before recommencing anti-TB treatment. In most cases the patient can restart the same anti-TB drugs without return of hepatitis. This can be done either gradually (one by one) or all at once (if the hepatitis was mild). However if the hepatitis produced severe jaundice, it is advisable to avoid rifampicin and pyrazinamide. A suggested regimen in such patient is 2SHE/10HE. A severely ill TB patient with drug-induced hepatitis may die without anti-TB drugs. In this case the patient should be treated with two of the least hepatotoxic dugs, streptomycin and ethambutol. After the hepatitis has resolved, usual TB treatment should be restarted. In case of extensive TB, ofloxacin can be considered in conjunction with streptomycin and ethambutol as an interim non-hepatotoxic regimen.

Acute viral hepatitis

TB treatment should be deferred until the acute hepatitis has resolved. When it is necessary to treat during acute hepatitis, the combination of streptomycin and ethambutol for three months is the safest option. If the hepatitis has resolved, the patient can receive a continuation phase of six months isoniazid and rifampicin. If the hepatitis has not fully resolved, streptomycin and ethambutol should be continued for a total of 12 months.

Chronic liver disease

Patients with liver disease should not receive pyrazinamide. Isoniazid plus rifampicin plus one or two non-hepatotoxic drugs, such as streptomycin and ethambutol can be used for total treatment duration of 8 months (2SHRE/6HR).

Renal failure

Isoniazid, rifampicin and pyrazinamide are either eliminated almost entirely by billiary excretion or metabolized into non-toxic compounds. These drugs can therefore be given in normal doses to patients with renal failure. Patients with severe renal failure should receive pyridoxine with isoniazid in order to prevent peripheral neuropathy.

Streptomycin and ethambutol are excreted by the kidney and can be given in reduced doses or intermittently where facilities for close monitoring of renal function are available. The safest regimen for patients with renal failure is 2HRZ/4HR.

Pregnancy

Most anti-TB drugs are safe for use in pregnancy with the exception of streptomycin, which is ototoxic to the fetus. The regimen thus for re-treatment of pregnant women would be: 3(HRZE)/5(HR)E (3 months of daily 4FDC followed by 5 months of daily 2FDC with Ethambutol).

Breast-feeding women

A woman with TB who is breast-feeding should receive a full course of anti-TB drugs. Regular and full course chemotherapy is the best way to prevent transmission of tubercle bacilli to her baby. The mother and baby should stay together, mother should use face mask and breast-feeding should be continued. Prophylactic treatment with isoniazid should be given to the baby for 6 months or at least three months ahead (which one is longer) of the time the mother is considered non-infectious. BCG vaccination of the newborn should be postponed until the end of the isoniazid prophylaxis.

Women taking oral contraceptive pills

Rifampicin reduces the efficacy of estrogen thus increases the risk of pregnancy. A higher dose of estrogen (50 µ) can be used with rifampicin or another form of contraception may be used.

Diabetes mellitus

During the course of anti-TB treatment a diabetes mellitus patient may require treatment with insulin.

5.20 Use of steroid in the treatment of tuberculosis

Steroids may be of benefit in tubercular Pleural effusion, pericarditis, TB Meningitis, TB peritonitis, miliary TB, tubercular osteomyelitis, laryngeal TB, TB lymphadenitis and genitourinary TB, but the evidence is scanty and the routine use of steroids cannot be recommended. Steroid treatment in these patients should be considered on a case by case basis by the attending physician.

06 Tuberculosis In Children

This chapter gives a summary of some important aspects of TB in children. Details on diagnosis of childhood TB, including drug-resistant TB, TB-HIV co-infection, treatment, prevention and operational aspects of control of childhood TB are elaborately described in the NTP "National Guidelines for the Management of Tuberculosis in Children", first Edition, 2012.

6.1 Background

Of the estimated 8.6 million new cases of TB that occurred globally during 2012, an estimated 0.53 million and 74,000 deaths occurred in children (under 15 years of age). Of the 173,619 TB patients diagnosed during 2012 in Bangladesh, only 4,842 (2.8%) were children. This indicates that there is substantial under-diagnosis of TB in children in Bangladesh. Adults with smear-positive PTB usually infect children, but not all children develop the disease after infection. The likelihood of developing disease is highest shortly after infection. Infants and children under 5 years are at particular risk of developing TB disease. Immunosuppressive illnesses including measles, malnutrition, whooping cough, and HIV infection facilitate progression of TB infection to disease.

6.2 (a) Key Risk factors:

Children with *M. tuberculosis* infection are not usually ill and do not exhibit symptoms of TB unless the disease is active. Only a small percentage of children who inhale the TB organism develop active disease. Certain groups are at far greater risk than others (see below).

Key risk factors for TB in children

- Close contact with a known case of TB (parents, siblings, close relatives, caregivers, neighbours, or teachers).
- The age of the child: the risk of developing TB disease is highest in very young (<5 years), immune immature children.
- Severe malnutrition and/or other immunosuppressive conditions (such as measles in last 3 months, whooping cough, HIV infections, taking drugs like steroids, etc.).
- The time since exposure or infection (the vast majority of children who develop TB disease do so within the first year after *M. tuberculosis* exposure or infection).

(b) Clinical spectrum of childhood TB

TB in children presents in different ways, including:

- Persistent cough for more than 2 weeks not responding to conventional antibiotics
- Persistent documented fever (for more then 2 weeks).
- Documented weight loss or no weight gain during past months.
- Fatigue and reduced playfulness.

Extra-pulmonary TB is quite common in children and the commonest presentations are:

- A painless enlarged mass of lymph nodes, usually in the neck: TB lymphadenitis.
- Cough and Difficult breathing: pleural/pericardial TB
- Abdominal pain, altered bowel habit, mass or ascites: abdominal TB
- Irritability, headache, vomiting, drowsiness, lethargy, convulsions: TB meningitis or tuberculoma of brain
- Acute angulation of vertebrae (gibbous): spinal TB or shortened limb with or without limping gait-Hip joint TB

In edition to the examples mentioned above TB can affect any other organs and therfore symptoms may vary depending on the organ involved

6.3 Diagnosis of tuberculosis in children

Diagnosis of TB in children is difficult as symptoms are often non-specific, most children cannot produce sputum for microscopic examination, X-rays are often non-specific and the Mantoux test is often negative in children with severe malnutrition.

For establishing the diagnosis in children, the physician has to combine the clinical signs and symptoms, risk factors (smear-positive household contact, age, malnutrition etc.) with the results of several tests (as described in detail in the national guidelines on management of TB in children).

6.4. Treatment regimens for children

The recommended doses of first line anti-TB drugs for children are as follows:

Table 10 : Recommended doses of first line anti-TB drugs for children

Drug	Daily dose and range (mg per kg body weight)
Isoniazid (H)	10 (5 -15) [maximum 300mg]
Rifampicin (R)	15 (10 -20) [maximum 600mg]
Pyrazinamide (Z)	35 (30 -40) [maximum 2000mg]
Ethambutol (E)	20 (15 -25) [maximum 1200mg]
Streptomycin (S)	15 (12 -18) [maximum 1000mg]

The number of 3FDC tablets during the intensive phase of treatment and the number of 2FDC tablets during the continuation phase of treatment are determined by the weight of the child.

Table 11 : Daily dosages of the FDC's in children below the age of 8 years

Body weight	Intensive Phase (2 months)	Continuation phase (4 months)
	RHZ* 60,30,150	RH 60,30
2-2.9 kg	½ tab	½ tab
3-5.9 kg	1 tab	1 tab
6-8.9 kg	1½ tabs	1½ tab
9-11.9 kg	2 tabs	2 tabs
12-14.9 kg	2½ tabs	2½ tabs
15-19.9 kg	3 tabs	3 tabs
20-24.9 kg	4 tabs	4 tabs
25-29.9 kg	5 tabs	5 tabs
30-35.9 kg	6 tabs	6 tabs
*R – Rifampicin, H – Isoniazid; Z – Pyrazinamide		

If RH(60/30) and RH (60/60) both are available, should be used 50% from each group

- Children with presumptive or confirmed pulmonary tuberculosis or tuberculous peripheral lymphadenitis who live in settings with low HIV prevalence or low resistance to isoniazid and children who are HIV-negative can be treated with a three-drug regimen (HRZ) for 2 months followed by a two-drug (HR) regimen for 4 months.

- Children with extensive pulmonary disease living in settings of low HIV prevalence or low INH resistance should be treated with a four-drug regimen (HRZE) for 2 months followed by a two-drug regimen (HR) for 4 months. Ethambutol is considered to be safe in children at a dose of 20 mg/kg (range 15-25 mg/kg) daily.

  Children above the age of 8 years or with weight more then 35kg should be treated according to the weight band schedule for adults.

Table 12 : Treatment regimens for children in each TB diagnostic category

TB diagnostic category	TB cases	Regimen	
		Intensive phase	Continuation phase
Cat. I	■ Intra-thoracic TB without lung cavities or extensive alveolar consolidation	2(HRZ)	4(HR)
	■ Intra-thoracic TB with lung cavities or extensive alveolar consolidation	2(HRZ)E	4(HR)
	■ TB Lymph Node	2(HRZ)E	4(HR)
	■ TB pleural effusion	2(HRZ)E	4(HR)
	■ Pericardial TB	2(HRZ)E	4(HR)
	■ Abdominal TB	2(HRZ)E	4(HR)
	■ TB meningitis*	2(HRZ)S**	10(HR)
	■ Osteoarticular TB	2(HRZ)E	10(HR)
Cat. II	■ Previously treated smear positive pulmonary TB (relapse, treatment afterLost to followup/default, treatment failure)	2(HRZ)ES/1(HRZ)E	5(HR)E
MDR TB XDR TB	Standardized treatment regimen with 2nd line anti TB drugs		

* Use of steroid is mandatory for TBM and tuberculous pericarditis.

** Streptomycin should be avoided when possible in children because the injection is painful and irreversible auditory damage may occur. It is mainly reserved for the first 2 months of treatment of TBM.

If RH(60/30) and RH (60/60) both are available, should be used 50% from each group

6.5 Chemoprophylaxis for children

All children aged less than 5 year, whose household contacts are under treatment for smear-positive TB, should be given chemoprophylaxis with isoniazid 10 mg/kg per day for 6 months irrespective of their BCG status if the child is free of active TB. Follow-up should be carried out at least every month until completion of chemoprophylaxis. An infant born to a mother with infectious pulmonary TB can be safely breastfed if isoniazid prophylaxis is given. If a child receiving isoniazid develops symptoms, assessment for TB should be done. If the child has not been BCG vaccinated, BCG should be given after completion of isoniazid prophylaxis. (For further details please refer National Child TB guidelines, NTP)

Table 13 : Guidance for Correct Dosing of INH Preventive Therapy

Dose recommendations for IBH preventive therapy in children	
Body weight	**Isoniazid (INH) 100mg tablet***
2-4.9	½ tab
5-9.9	1 tab
10-14.9	1½ tabs
15-19.9	2 tabs
20-29.9	2½ tabs
> 30 kg	3 tabs

* NB. INH 10mg/kg/day, single dose; Crush the appropriate fraction and dissolve in water or multi-vitamin syrup

6.6 BCG vaccination

BCG vaccine is recommended as soon as possible after birth to avoid life threatening TB diseases such as TB meningitis and military TB. However, the efficacy of the vaccine is at most 80%. Re-vaccination offers no added protection, and therefore is not recommended.

A small number of children (1-2%) develop complications following BCG vaccination. These include local abscesses, secondary bacterial infections, suppurative adenitis, and local keloid formation. Most reactions resolve over a few months. Children who develop disseminated BCG disease should be treated for TB and investigated for immuno-deficiencies.

07 Recording and Reporting

A standardized recording and reporting system is an important component of DOTS. It allows for assessment of case detection and treatment outcome against the targets set. It also allows for maintaining surveillance and monitoring with a regular two-way communication between central and peripheral levels.

The programmatic progress and achievements of NTP should be assessed at different levels of implementation e.g. upazila, district, city and central levels. The NTP recording and reporting system consists of standardized forms, cards and registers. the description of which are given below (Samples are included in Annex 2).

7.1 Tuberculosis Treatment Card (TB 01)

The medical officer or paramedic fill-up the Tuberculosis Treatment Card as soon as a patient is diagnosed with TB. The card is kept at the health facility where the patient is treated. During Intensive phase of the treatment of new cases the number of 4FDC tablet and in re-treatment cases the dose of streptomycin in addition to 4FDC should be written in the box of the front page. If a patient is treated with single or multiple loose drugs the daily dosage should be filled in the boxes for H, R, Z, and E. Similarly, during the continuation phase the dose of 2FDC tablet for new cases and 3FDC for re-treatment cases should be filled in the box at back page. If the patient is treated with single or multiple loose drugs, the doses should be filled in the appropriate boxes. There is a special box for child TB. The doses of child TB should be filled up in the box accordingly. If during treatment the number FDC tablets are increased due to weight gain of the patient, the revised number of tablets should be written underneath the boxes preceded by the date of change.

7.2 Tuberculosis Identity Card (TB 02)

The medical officer or paramedic fills this card as soon as the diagnosis of tuberculosis is made and the patient keeps the card. The most important parts of this card are the date on which treatment was started, and categorization of the patient. The patient should be instructed to bring this card each time s/he attends for anti-TB treatment, but s/he should also bring and show it if s/he attends for any complaint at a health facility, as complaints might be caused by the anti-TB drugs.

7.3 Tuberculosis Register (TB 03)

This register is kept at the TB treatment facility. The Tuberculosis Register contains all the important general information of the patient, classification of the disease, and

type of patient, date of start of treatment, smear microscopy results, Xpert MTB/RIF results and the treatment outcome. The date of registration is the date the patient is registered in the Tuberculosis Register. This date may be different from the date the patient was diagnosed in the laboratory or started treatment. Space should be kept blank at the end of each quarter to highlight the end of the quarterly cohort. This will facilitate preparation of the quarterly reports and cohort analysis of treatment outcome. At the end of the quarter, a tally can be made by sex (males and female patients), disease classification, type of patient or treatment outcome. Each quarter should be started on a new page.

From this register the quarterly reports on case notification, case detection and treatment outcome will be compiled. It is the responsibility of the staff that maintains the register to keep it up-to-date.

7.4 Tuberculosis Laboratory Register (TB 04)

The Tuberculosis Laboratory register is kept at all laboratories performing sputum examination for AFB and Xpert MTB/RIF. The microscopist or medical technologist lab who examines the smears enters all information into the register. The register gives information on the number of presumptive TB cases examined, the number of smear-positive cases detected and the number and results of smear examination for follow-up of treatment. It also gives information on the number of Xpert MTB/RIF positive cases detected (if available). The Laboratory serial number should be started with 1 at the beginning of each calendar year. Space should be kept blank at the end of each quarter in the register. After each quarter, the number of presumptive TB cases and number of total smears examined, number of smear-positive patients, number of follow up smears examined and number of positive follow up smears examined should be entered. Source of referral (referred by) also needs to be filled. The next quarter will start on a new page but the serial number will continue throughout the year.

7.5 Request form for AFB Microscopy/Xpert MTB/RIF examination (TB 05)

The medical officer or paramedic who requests the smear/Xpert MTB/RIF examinations should fill up this form. If the smears are examined at the facility where the patient attends, the form should be brought to the laboratory with the first "on-the-spot" specimen. The patient should be given a sputum cup for the early morning specimen. If smears are examined at another facility, the two smears/samples with the filled-in request form should be brought to the examining laboratory. It is essential to indicate whether the sputum is sent for diagnosis or follow-up. A detailed address (including mobile phone number) of the patient should be recorded if sputum is sent for diagnosis. This is important to trace the patient if sputum is found positive and the patient does not return to the health facility. Early morning sample is preferable to perform Xpert MTB/RIF if available. If facility to perform Xpert MTB/RIF is not availble, sputum sample should be sent to the nearest facility with Xpert MTB/RIF.

This form will be used for sample other than sputum also, for which nature of sample is to be clearly mentioned.

7.6. Form DR TB 06 - Request form for Diagnosis/Follow up of Drug Resistant TB

This form should be kept in all DOTS Centers. This form will be used for diagnosis in presumptive DR TB cases and for follow up of treatment in either the intensive phase or continuation phase. It is mandatory to fill the form completely (all four parts, A-D) and will be sent to NTRL/RTRLs or Xpert MTB/ RIF sites along with presumptive DR TB cases or samples for diagnosis or follow up from DOTS centers.

After examining samples for diagnosis in case of presumptive DR TB cases or follow up in DR TB cases during treatment the lower part (E) of the form should be filled up completely by NTRL/RTRLs or Xpert MTB/RIF sites and send back to requested sites(DOTS Centers) immediately.

7.7 Tuberculosis referral/transfer form (TB 07)

This form is used for referring or transferring patients from one health facility to another. It should be filled in triplicate: one copy goes to the receiving center, one is given to the patient and one remains in the file. The receiving facility should fill the bottom part of the form and return it to the sending institution as soon as the patient reports.

7.8 Requisition form for Drugs (TB 08)

This form should be filled quarterly with a copy to the District authority. The requirement for each item is calculated by multiplying the number of cases in the last quarter (by category), the number of treatment doses and average units per dose by which working stock or running requirement will be obtained. This figure is multiplied by 2 to obtain stock of one quarter and 100% buffer stock (i.e. buffer stock for one quarter). By subtracting the in hand stock at the time of the indent from the above multiplication result, the requirement for each drug item for one quarter will be obtained. Stock of minimum one patient's medicine for each category should be ensured at all time; even there was no patient during previous quarter (especially for Cat-II and Child TB). Over stock should be avoided by redistribution of medicines to the nearest low stock facilities before preparing request for next quarter. If there is any stock out, the actual duration should be mentioned in the remarks columns by days.

7.9 Absentee tracing form (TB 09)

This form should be used for retrieval of patients who do not turn up for their scheduled drug intake.

7.10 Quarterly report on case finding (TB 10)

Prepare this report as follows:

- Identify all patients registered in the Tuberculosis Register during the quarter under report
- Looking at the columns "Category" and "Pre-treatment smear examination", count the number of new male smear-positive cases, putting a mark with a pencil after a patient has been counted
- Continue in the same way with the new female smear-positive cases
- All new smear-positive cases have now been identified and they should be entered in the block-I (column-1)
- In the same way Xpert MTB/RIF positive cases should be identified and entered in the block-1
- Divide the new smear-positive male and female patients according to the age groups and record the numbers in block-2. Verify that the number of males and the number of females for all age groups together are the same as reported in block 1. In the same way numbers of Xpert MTB/RIF positive cases should be counted, recorded and verified according to sex and age category in block-3.
- Count (and mark) the smear-positive previously treated patients, divided into relapses, after failure and after defaults, then Xpert MTB/RIF new & previuously treated the smear-negative cases, the extra-pulmonary cases and the other previously treated, divided into males and females and enter these numbers in the respective columns of block 1
- Add the totals of column 1-8/9 and enter these in column 6
- Verify that all patients registered during the quarter concerned have been included in the report
- Do the same for smear-negative and extra-pulmonary patients and enter the numbers in blocks 4 and 5.
- In block 8 and 8B data of TB/HIV and PLWHA suspect for TB should be recorded.

The report should be filled in triplicate. One copy should be sent to the District Medical Officer, one to the NTP HQ in Dhaka and one should be kept in the records. The report should be sent promptly after the respective quarter is finished.

7.11 Quarterly Report on Treatment Results (TB 11)

This report is for cohort analysis of the treatment results. The different types of patients are evaluated separately. The evaluation is done quarterly of the cohort that started the treatment 12-15 months earlier. The information should be collected from the updated Tuberculosis Register.

Description of the treatment outcomes is presented in section 5.17, table 9. The report should be prepared in the same way as the case finding report.

7.12 Quarterly Report on Sputum conversion at 2/3 Months of Smear-positive Pulmonary TB Cases (TB 12)

This report provides information about the smear result at the end of the first two months (new smear-positive patients) or three months (retreatment patients) of treatment. In the best circumstances up to 10-15% of patients will remain positive at the end of the intensive phase. If the percentage is lower, this may indicate that scanty or low-positive smears are missed and thus provide an idea about the quality of microscopy.

The report should be prepared in the same way as the case finding report.

7.13 AFB Laboratory Performance Report (TB - 13)

This report replaces the TB 13 report:" Quarterly Report on Laboratory Findings of Tuberculosis". This report is prepared quarterly and provides information on diagnostic and follow-up smears examined, divided into positive, scanty and negative results and whether the smears were examined by ZN or FM microscopy. This report is part of the smear rechecking system and included in the EQA SOP.

7.14 Preparation of reports

The following table helps to memorize when to send the reports to the district/national authorities. The reports should be sent within four weeks after the quarter is finished.

A cohort is a group of patients diagnosed and registered for treatment during a quarter.

A year is divided into four quarters, so each quarter contains three) months. 1st quarter (January, February, March), 2 nd quarter (April, May, June), 3rd quarter (July, August, September), 4th quarter (October, November, December).

Table 14 : Reporting quarter for case finding, smear conversion treatment result.

Reporting on	Case finding (form TB 10)	Smear conversion (form TB 12)	Treatment result (form TB 11)
1.1. 13	4th Quarter 12	3rd Quarter 12	4th Quarter 11
1.4. 13	1st Quarter 13	4th Quarter 12	1st Quarter 12
1.7. 13	2nd Quarter 13	1st Quarter 13	2nd Quarter 12
1.7. 13	3rd Quarter 13	2nd Quarter 13	3rd Quarter 12

08 Supervision, Monitoring and Evaluation

8.1 Supervision

Supervision is the key element of TB control and is considered a cornerstone for sustainability of different NTP activities. It is the process of helping people to improve their performance in order to meet objectives. Supervision is the part of monitoring that looks at the job performance of the people in the programme.

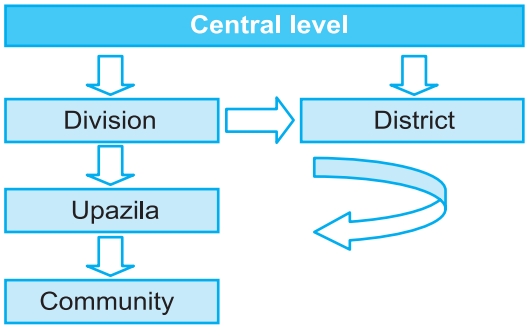
All health workers need help to solve problems and overcome difficulties. They need feedback on their performance and encouragement in their work. Supervision should encourage, motivate, train, support, monitor, guide and boost staff morale. It is a set of activities to improve staff competence, effectiveness and efficiency of work through observation, discussion, technical support and reviewing records. The focus of supervisory visits is on education through on-the-job training, coordination, motivation, facilitation and guidance in implementation of the activities as per NTP guidelines with the overall objective to achieve national targets and goals.

Supervisory visits are planned with the following aims:

- To ensure effective implementation.
- To provide technical guidance and administrative support.
- To validate reported data.
- To effect corrective measures wherever required.
- To ensure patient and staff satisfaction.
- To strengthen the relationship between the central, intermediate and peripheral levels and the implementing staff.

8.1.1 NTP supervision policy

Figure 5 : Supervision



8.1.2 Process of supervision

Supervisory visits must be planned carefully. A schedule for supervisory visit

should be prepared in advance. Before each visit, it is important to review the findings of the last supervisory visit, any notes of actions taken since the last visit, and any additional information about the health facility.

8.1.3 Tools for supervision

Supervisory checklist

Supervisory checklists are to be used to identify the administrative and technical problems systematically (Annex 3). They should be systematically filled in, calculating all indicators and answering all questions, together with the health worker. The checklist should be completed upon the end of the supervisory visit. The checklist provides a guide but a supervisory visit may never be limited to completing the checklist.

8.1.4 Points to be focused during supervision

General

- Availability of the National Guidelines and Operational Manual for TB and other NTP guidelines and SOPs including laboratory manual;
- Availability of recording and reporting formats,
- Availability of health ACSM materials for TB;
- Human resources: staff status (post sanctioned and vacant), availability of job description; training status of staff; knowledge, skills and attitude of relevant staff, job satisfaction.

Identification of suspects and laboratory diagnosis

- Trends in suspects: Number of presumptive TB casess per month; suspect notification rate (Presumptive TB casess detected during a defined period in a defined geographic area /total population of that area x 100,000)
- Inquire about any unexpected situation and provide feedback; number of sputum examined per suspect (when there are several suspects for whom single sputum smears have been examined, as this may point out to poor counseling of patients about the diagnostic procedure or wrong patients suspected for TB);
- Source of referral of suspects;
- Triangulation: check that all patients diagnosed according to the TB Laboratory Register have started treatment (treatment card available) and are registered in the TB register. Check for any inconsistency between the three formats.
- Check that smear-negative presumptive TB casess are referred to a qualified physician for further investigations according to TB diagnostic algorithm.
- Calculate sputum positivity rate among presumptive TB casess and during follow up. This amount should be around 10% for both suspects and follow up smears. Inquire in case of any very low or very high sputum positivity rate.

- Check the quality of smears (size, shape, thickness, evenness, staining)
- Check maintenance of microscope and other equipment and logistics
- Check whether there is adequate supply of laboratory consumables
- Check Infection control measures taken (patients waiting area, sputum collected outside, availability and use of mask, etc.)

Verification of TB records

Trends in case notification: Number of TB cases per quarter (smear-positive cases, retreatment cases, all cases); notification rate (cases detected during a defined period in a defined geographic area / total population of that area x 100,000) - inquire about any unexpected situation and provide feedback.

Sputum conversion rate: (a) For NSP: Total number of new smear-positive cases becoming smear-negative after two months of treatment/total new smear-positive cases registered during the same quarter x 100 (b) for retreatment smear positive: total number of retreatment smear-positive cases becoming smear-negative after three months of treatment/total retreatment smear-positive cases registered during the same quarter x 100). These rates are expected to be around 85-90%. Inquire in case of any low conversion or very high conversion and provide feedback.

Treatment success rate: Total number of new smear-positive cases who were declared "cured" or "Treatment Completed"/total number of new smear-positive cases registered in the same period x 100. This rate can be calculated in the same way for bacteriologically confirmed cases, Xpert MTB/RIF positive cases, retreatment cases, smear-negative cases and extra-pulmonary cases. Inquire about any unexpected situation and provide feedback. The treatment completion rate for smear-positive cases should not exceed 5%.

Unsuccessful outcomes: Lost to follow up (default) rate, failure rate and transferred-out rate: Total number of new-smear positive cases who "loss to follow up (defaulted)", "failed" or were "transferred out" / total number of new smear-positive cases registered during the same period x 100. These rates can be calculated in the same way for retreatment cases, smear-negative cases and extra-pulmonary cases.
Inquire about any unexpected situation and provide feedback.

Health education and counseling

- Check availability and use of health education materials
- Check counseling procedures
- Interview a selected number of patients to-
  - relate your findings with the information available on the patient cards,
  - check knowledge about the diseases, duration of treatment and consequences of interruption of treatment

8.1.6 Supervision Report

Feedback is one of the most important parts of the supervision. It is encouraged to fill the checklist on the spot together with the related health personnel. This will facilitate strengthening of a good relationship. Supervision reports should be submitted to relevant authorities and feedback must be provided to relevant field authorities.

8.2 Monitoring

Monitoring means to watch, keep track, or check usually for a special purpose. In our case it relates to maintaining and improving the health care for TB patients and suspects so that it meets our aspirations, and to take appropriate action to improve performance. It is an ongoing process carried out by the programme implementers. Monitoring is the activity that ensures that measurable information of a programme is implemented, recorded and reported.

8.2.1 Methods of Monitoring

- Routine reporting
  - The core of a monitoring system.
  - Focuses on data management, supply, finance, training, quality assurance, and drug use.
- Supervisory visits
  - Reinforce routine reporting requirements.
  - Provide on-the-spot training, informal and direct monitoring.
- Sentinel reporting
  - Supplements routine reporting.
  - Most useful when a system is undergoing rapid or substantial change; can detect unexpected or unintended outcome.
- Special studies
  - When additional information and use of experts to design and conduct the study are required.

Both monitoring and supervision are ongoing processes. There should be a plan for regular supervision and monitoring at all levels.

8.3 Evaluation

Evaluation is obtaining results of the programme that are measurable. It indicates whether the programme has achieved its targets and takes necessary steps for developing strategies and interventions for further improvement as per requirements of the programme.

The NTP advocates continuous periodical internal monitoring of the programme. External joint evaluations are conducted by both the NTP and external national and international experts at an interval of two to three years.

09 Supply of Drugs, Laboratory Consumables and Documentation Materials

A regular, uninterrupted supply of quality drugs, laboratory consumables and documentation materials to all facilities where patients are diagnosed and treated should be ensured. Diagnosis of TB through smear microscopy and treatment of all registered TB patients are provided free of charge. The central level of NTP is responsible for planning, procurement and supply of anti-TB drugs, laboratory consumables and documentation materials to its implementing partners.

9.1 Requirement of drugs

Quantification at all level is based on the quantity drug needed for treatment of different categories of patient (annex 4). Quantification of anti-TB drugs is usually done annually by the central level of NTP with the technical assistance of WHO and the Global Drug Facility (GDF). This estimation of amounts of drugs required is based on the number of TB cases (category-wise) treated during the previous year, annually adjusted; treatment regimen adopted, buffer stock (including amount of drugs required during lead time to supply) and stock-in-hand at the time of the drug order.

Quantification of anti-TB drugs at the upazila, CDC or city level is usually done quarterly according to the number of patients diagnosed during the previous quarter (TB-08). Local health authority in collaboration with NGOs will calculate the quantity of drugs required and fill in the requisition form for drugs (TB 08) at the end of every quarter. The form will be signed by the Upazila Health and Family Planning Officer (UH&FPO) or unit chief, countersigned by the Civil Surgeon (or supervisor for the unit) and forwarded to the central level preferably within the first week of the following month. The relevant NGOs will collect the drugs from central level and will deliver to respective indenting authority. Alternatively, the NTP may arrange for supply of the drugs to the indenting authority.

The NGOs will collect the required drugs from the UHC through indent to the UH&FPO and will report consumption and balance of drugs and other delivered logistics/laboratory consumables to the respective UH&FPO (or unit chief).

The information about drug consumption and stock at upazila level will be communicated to the central level quarterly together with case finding and treatment result reports. It is the responsibility of the UH&FPO (or unit chief) to ensure that this information is sent in time to avoid delays of supplies. The buffer stock of drugs and laboratory consumables for peripheral stores will be for one quarter.

9.2 Requirement of Laboratory Consumables

All health facilities require an adequate supply of sputum containers to collect and transport sputum specimens to microscopy centers. TB laboratories need a good quality binocular/LED microscope, regular supply of slides and reagents. The "Laboratory Request Form" (Annex 5 and 6) gives information on how to calculate the required quantities of the ingredients for the stains and other supplies. Further details are given in the "Laboratory Manual on Smear Microscopy for Tuberculosis and its Quality Control in the NTP of Bangladesh".

9.3 Requirement of Documentation Materials

Each registration unit needs a TB Register (one register will usually be sufficient for one year), TB treatment cards and patient identity cards based on the estimated number of patients. Sputum request forms should be available in the TB diagnostic facilities. One sputum request form is sufficient for requesting diagnostic examination of two sputum specimens from a Presumptive TB cases and one for each follow-up examination during treatment. Each laboratory needs one or more TB laboratory registers per year depending on the number of suspects and follow-up cases examined. On an annual basis, all registration units (UHC, CDC, urban clinic, medical college hospital, etc.) need 25 copies of the quarterly report forms on case finding, smear conversion, laboratory reporting form, IPT form and treatment outcome. All districts need 15 copies of the "Requisition Form for Drugs" and the" Laboratory Request Form". NTP will ensure procurement of the documentation materials and its supply as per indent.

9.4 Inspection and Storage of Drugs and Supplies

Upon receipt, all drugs and supplies should be inspected by a 'Survey Committee' constituted for the store. The committee will tally the supplies with the 'Invoice' and will report discrepancies or damages, if any.

Drugs and supplies should be stored in optimum conditions in a secured room. The drugs and laboratory reagents should be monitored regularly for expiry date. The drugs with shorter expiry dates should be placed in front and those with longer expiry dates behind (FEFO or first expiry-first out). A stock ledger must be maintained and updated whenever drugs and other materials are received or dispensed. In addition, a stock card (bin card) should be maintained for each drug. The bin card must be updated whenever drugs are received or dispensed, so that it always tallies the actual balance in stock as well as with the stock ledger.

The officer in charge of the store will ensure inspection of supplies, its optimum storage and proper recording as detailed in the "Standard Operating Procedures for Managing Drugs and Supplies".

9.5 Issuance of Drugs and Supplies

Drugs and other supplies will be issued quarterly upon completely filled form TB 8 "Requisition Form for Drugs form" and "Laboratory Request Form", according to distribution schedule.

9.6 Monitoring and Supervision of Stores

Monitoring and supervision of drugs/supplies management must be done at all levels. Reports of case finding and drug stock status from the upazila received through indent form as well as quarterly stock status from the Central Store should be the raw material for monitoring. Drug and other supply management (especially GDF drugs) should be included in the agenda of monitoring meetings at all levels.

Supervisory visits, including drug/other supply management, should be done by using the checklist included in the general supervisory checklist. Reports of the supervisory visits should be analyzed for monitoring and feedback.

10 Drug Resistant Tuberculosis

10.1 Definition and causes of Drug-resistant tuberculosis

Drug-resistant tuberculosis is confirmed through laboratory tests that demonstrate growth of infecting isolates of Mycobacterium tuberculosis in-vitro in the presence of one or more anti-tuberculosis drugs. By definition, there are four different categories of drug resistance, namely:

- Mono-resistance: resistance to one anti-TB drug.
- Poly-resistance: resistance to more than one anti-TB drug, other than isoniazid and rifampicin.
- Multidrug-resistance (MDR): resistance to at least isoniazid and rifampicin, the two most potent anti-TB agents.
- Extensive drug-resistance (XDR): MDR TB, plus resistance to at least one of the fluoroquinolones, and at least one of three injectable second-line drugs (capreomycin, kanamycin and amikacin).

DR TB patients: Any patient who falls into one of the above listed categories of drug resistance is considered as DR TB patient.

Although its causes are microbial, clinical and programmatic, DR TB is essentially a man-made phenomenon. From a microbiological perspective, resistance is caused by a genetic mutation that makes a drug ineffective. An inadequate or poorly administered treatment regimen allows drug-resistant mutants to become the dominant strain in a patient infected with TB. The table below summarizes the common causes of inadequate treatment. The most frequent mistakes include wrong classification of patients (Category I given to unrecognized retreatment cases) and the addition of a single drug to failing regimen.

Table 15 Causes of Inadequate Anti-TB Treatment

Health-care providers: inadequate regimens	Drugs: inadequate supply or quality	Patients: inadequate drug intake
• Inappropriate guidelines or non-compliance with guidelines; • Absence of guidelines; • Poor training; • No monitoring of treatment and poor DOT; • Poorly organized or funded TB control programmes.	• Poor quality; • Unavailability of certain drugs (stock-outs or delivery disruptions); • Poor storage conditions; • Wrong dose or combination of drugs.	• Poor adherence • Lack of information • Adverse effects of treatment; • Social barriers (stigma, restrictions); • Mal-absorption due to other causes; • Substance dependency disorders; • Mental disorders; • Non-cooperative; • Education level.

Treatment of DR TB with Category I or II may create even more resistance to the drugs used. This has been termed the "amplifier effect" of the short-course chemotherapy. Ongoing transmission of established DR TB strains in a population may also contribute to new drug-resistant cases.

10.2 Addressing the sources of drug-resistant TB

Any ongoing clinical or programmatic problems resulting in the creation of new cases of DR TB should be addressed urgently. Both prevention and treatment measures should be incorporated into NTP operational plans to have the greatest effect on DR TB control. Well-administered first-line treatment for susceptible cases is the best way to prevent acquisition of resistance. Timely identification of DR TB and adequate treatment regimens with second-line drugs administered early in the course of the disease are essential to stop primary transmission. Standardized infection control measures in all health facilities are also very critical for prevention, as well as, contact tracing of drug-resistant TB cases. In short, the integration of the national DOTS Programme with treatment of DR TB works synergistically to eliminate all the potential sources of TB transmission.

10.3 Targeting Risk Groups for DST for First-line Drugs

The following groups will be targeted as presumptive DR TB (previously known as DR TB suspects) for drug susceptibility testing (DST):

- Failures of Category II
- Failures of Category I
- Non converters of Category II (remain positive at month 3)
- Non converters of Category I (remain positive at month 2)

- All relapses (Category I and II)
- All treatment after loss to follow up (Category I and II)
- Close contact of a MDR TB patient with symptoms
- All HIV infected persons
- Others (Specify) .....

It is often easier to remember that any patient who starts Category II and not doing well on a treatment, HIV infected patients and all contacts of DR TB patients with active TB need DST to guide what TB treatment they should get while awaiting DST results, the following groups could be considered for direct enrollment in DR TB regimens:

- Category II failures;

All cases of DR TB will be reviewed by the Divisional PMDT coordinator.

10.4 Instructions for Sputum Sample Delivery to NTRL/RTRL/Xpert MTB/RIF testing centres from the Referral Facility and Reporting Processes:

Two sputum specimens (spot and early morning) should be submitted for culture. Previously treated patients may have had DST in the past but it may no longer reflect the resistance pattern of the strain they have at the time of enrollment in the DR TB control programme. If no DST has been conducted in the previous 30 days, a DST should be done at the start of DR TB treatment. All anti-TB drugs should be stopped for at least 3 days prior to sputum collection for culture. Sputum samples for culture must be processed immediately. However, in case of delay, refrigeration at a temperature range of 2^0-8^0c is recommended, provided that a prompt transfer to Lab will be made within 7 days. Otherwise falcon tube with 1% cetylpyridinium chloride (CPC) in 2% NaCl (Sodium chloride) should be used.

CPC is not permitted for liquid media, therefore, specimens decontaminated with CPC cannot be used for MGIT (Mycobacteria Growth Indicator Tube) techniques. CPC is permitted for LJ solid media.

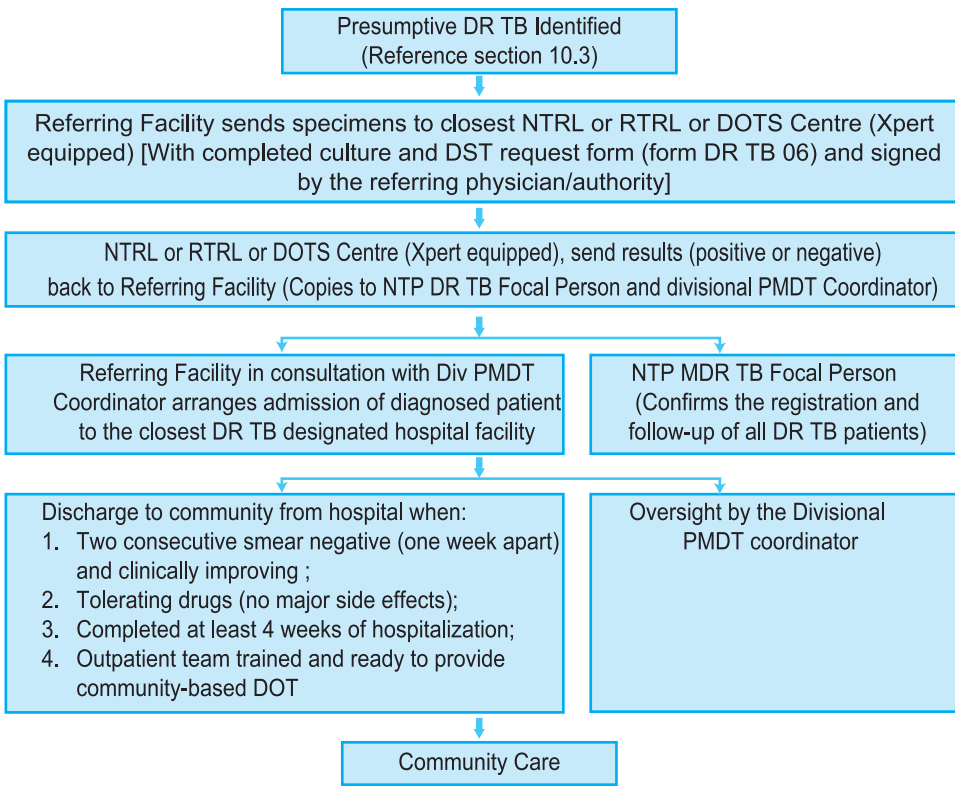
Instructions for sputum sample delivery to NTRL/RTRL/Xpert MTB/RIF testing centres. from the referral facility and reporting processes: (The "Referring Facilities" include: UHCs, Urban DOTS Centers, District Hospitals, CDCs, CDHs, Medical College Hospitals etc)

- Any health worker in the field can collect sputum from a presurptive DR TB.
- The specimen is sent from the field to a referring facility in a regular sputum cup the same day it is collected. (Note: It is encouraged to send the sputum specimen, not the patient. In complicated cases the patient may be sent to the referring centres for specimen collection and a full evaluation by the DR TB treatment team).

- The specimen is processed within a few hours at the referring facility by transferring 3- 5 ml of sputum into the Falcon tubes, containing 5ml of CPC for solid culture and DST only.
- For Xpert, fresh specimen should be sent to Xpert facility without CPC. (Cetylpyridinium chloride) solution.
- Sputum sample in the falcon tube will be sent to NTRL or the RTRL centres via a transport system set up by NTP within 7 days of collection.
- DST results will be sent back in paper system and electronically to the referring facility that sent the specimen with a copy to NTP focal person and respective divisional PMDT coordinator

Figure 6 is a summary of the flow of how a patient gets referred for DR TB screening under NTP. Each UHC or Urban DOTS Centre should have regular scheduled weekly transportation of the specimens.

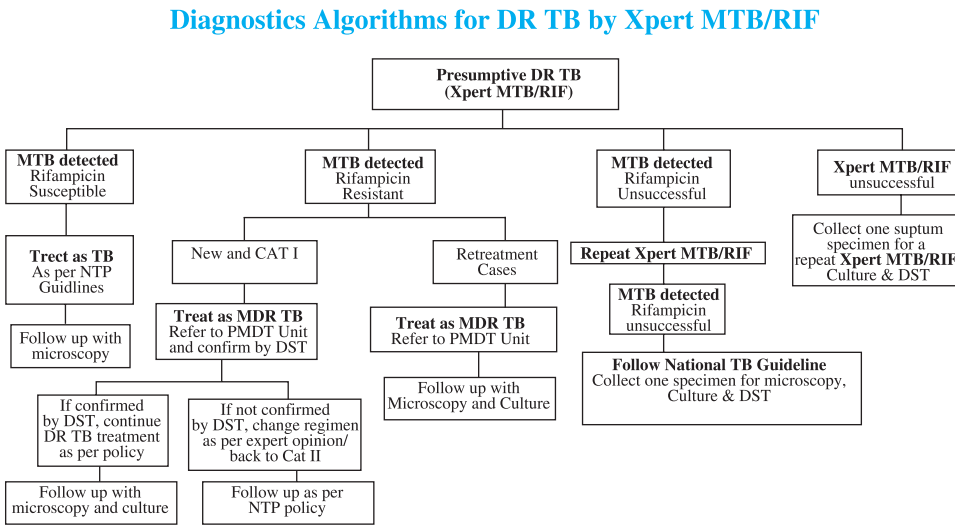
Figure 6 : Referral Flow Chart



10.5 Flow of Patients into Treatment

Patients considered for DR TB screening are described earlier in this Chapter. Once a patient has been screened, some patients can enter DR TB treatment based on the group from which they come from, before the results of the culture and DST return. The flow of patients into treatment has been diagramed in Figure 10.2

Figure 7 : Flow of patient into the DR TB programme



*Presumptive DR TB

1) Failures of Category I (remain positive at month 5 or later and smear negative patients who become smear positive at month 2)
2) Failures of Category II (remain positive at month 5 or 8)
3) Non converters of Category I (remain positive at month 2)
4) Non converters of Category II (remain positive at month 3)
5) Relapses (Category I / Category II)
6) Treatment after loss to follow up (Category I / Category II)
7) Close contacts of MDR TB patient with symptoms.
8) HIV infected
9) Others (Specify.....)

10.6 The Standard DR TB Regimen

All MDR TB and XDR TB regimens will consist of two phases: the first phase is the period in which the injectable agent is used (referred to as the intensive phase), and the second phase is after it is stopped (referred to as the continuation phase) up to the end of treatment. Treatment regimen for XDR TB cases can be constructed individually based of DST profiles and availability of drugs.

The recommended Standard MDR TB Regimen is as follows:

8{Km-Z-Lfx (Ofx)-Eto-Cs}/12{Lfx (Ofx)-Eto- Cs-Z}

The numbers in front of the drug abbreviations represent the average number of months the drugs are to be given

Table : 16 Length of Treatment for the Standard MDR TB Regimen

Date of first sustained conversion*	Length of injectable agent	Length of Total treatment for Standard MDR TB regimen
Between month 0 and 4	8 months total	20-22 months
Between months 5 and 8	Add 4 months from conversion date	Add 18 months from conversion date

*Date of first negative smear and culture by two consecutive months

The recommended Standard XDR TB Regimen is as follows:

12(Cm-Z-Mfx-PAS-Cs-Amx/Clv- Lzd -Cfz)/12(Z-Mfx-PAS-Cs-Amx/Clv- Lzd -Cfz)

XDR TB and failures of the Standard MDR TB Regimen should be treated with the above regimen.

Table 17 : Length of Treatment for Standard XDR TB Regimen

Date of first sustained conversion*	Length of injectable agent	Length of Total treatment for Standard MDR TB regimen
Between month 0 and 2	12 months total	24 months
Between months 3 and 6	Add 10 months from conversion date	Add 22 months from conversion date

Dosing of anti-tuberculosis drugs is based on the weight of the patient. Therefore, monthly monitoring of patient body weight is important, especially in paediatric cases where the adjustment of doses should be monitored closely since children gain weight rapidly. Similarly, when adults gain weight or move into a higher weight class, their medication dose should be adjusted.

Note: For details please see the National Guidelines and Oparational Manual for Programmatic Management of Drug-Resistant TB (2nd Edition).

11 Infection Control

Transmission of TB is a recognized risk in health care facilities and communities, especially in resource-limited settings where transmission is facilitated by inadequate TB infection control measures.

This chapter highlights the important aspects of infection control. Details are included in a separate national guideline: "National Guidelines for Tuberculosis Infection Control", first edition of 2011.

The goal of infection control (IC) in TB is to reduce transmission of TB within population especially in such settings as health facilities, congregate settings and households. This overall goal is further broken up in to following four major objectives:

- To strengthen coordination for implementing appropriate TB-IC.
- To reduce the generation of aerosols and thereby the exposure to droplet nuclei.
- To reduce concentrations of infectious particles
- To reduce inhalation of infectious particles.

TB infection control has four components. By order of importance, these are: managerial activities, administrative controls, environmental controls and personal respiratory protection.

11.1 Components of Infection Control

a. Managerial activities:

TB infection control requires action at national and sub-national level to provide managerial direction, and at health facility level to implement TB infection control measures. The recommended set of activities for national and sub-national TB infection control is necessary to facilitate implementation of TB infection control in health-care facilities, congregate settings and households. The range of activities includes Identifying and strengthening a coordinating body, Adopting a national strategy and Guidelines including HR development, assessments at all levels of health care and congregate settings, comprehensive planning and budgeting, surveillance of TB disease among health workers, appropriate design, construction, renovation, use and maintenance of health care facilities, ACSM and most importantly Monitor and evaluate the set of TB infection control measures.

b. Administrative controls

The administrative controls include policies and procedures for prompt identification and treatment of infectious cases, hence regarded as the first line of defense in terms of TB infection control. The aims of administrative controls are to reduce the chances of generating infectious nuclei by the patients as well as to limit the spread in environment. An important aspect of administrative control measures is the physical separation of patients known or suspected of having TB or DR TB (especially smear-positive cases) from other patients.

c. Environmental controls

Environmental controls are regarded as second line of defense. The set of measures aim to dilute the concentration of droplet nuclei already suspended in the air. Environmental control measures maximize dilution and air exchange and decontaminate air when adequate ventilation cannot be reached in high risk areas. In choosing a ventilation system (i.e. natural, mechanical, or mixed-mode), it is important to consider local conditions, such as building structure, climate, regulations, culture, cost and outdoor air quality. Any ventilation system must be monitored and maintained on a regular schedule. Maintenance facilities should be kept in hand. Adequate resources (budget and staffing) for maintenance are critical. Use of UVGI (Ultraviolet germicidal irradiation) lights or fixture is another environmental control and a very efficient way to destroy *M. tuberculosis* in indoor facility therefore the use of these fixtures is particularly important in DR TB in patient wards. However UVGI lights need regular monitoring and the health care workers should be aware of radiation hazards.

d. Personal respiratory protection

Personal respiratory protection is the third line of defense especially aimed at protecting HCWs. Respirators can protect staff against nosocomial TB transmission. Because they are visible and relatively expensive, health workers may assume that these alone will prevent TB transmission. However, they cannot be worn continuously and may not be used when an unsuspected TB case, or unsuspected DR TB case, is encountered. Staff protection can only be assured by respirators with a high-efficiency air-intake filter, and fitted tightly around the face so that no air can come in from besides the respirator.

Wearing of masks by patients minimizes dispersal of bacilli when they talk, cough, yawn or sneeze. These can be simple surgical masks; they will retain the droplets expelled by the patient effectively. In addition basic infection control measures have to be taught to patients such as covering the nose and mouth during coughing and sneezing and to discard used tissue into covered bins.

11.2 Essential Actions for Effective TB Infection Control Safety without Stigma

11.2.1 Including Patients and Community in Advocacy Campaigns

Community should be well-educated about TB infection, prevention and control. Patients should know and understand their TB status and have a right to rapid TB diagnosis and treatment. They should know that TB can be spread by coughing and should expect health care settings and community services to require persons to cover their mouths when coughing.

11.2.2 Develop an Infection Control Plan

All facilities should have an infection control (IC) plan and a facility person or team responsible for IC.

11.2.3 Ensure Safe Sputum Collection

Sputum collection can potentially be hazardous for health care workers and other patients. HCWs should explain to patients that safety without stigma iis important for good TB infection control and that sputum be collected outside.

11.2.4 Promote Cough Etiquette and Cough Hygiene

Every facility should have a poster on TB infection control and cough etiquette in at least the outpatient department waiting area, admissions area, and casualty department. Patients should be instructed to cover their mouths and nose when coughing, with hands, cloth such as handkerchief, clean rag, tissues, or paper masks.

11.2.5 Triage Presumptive TB casess for "fast-track" or separation

All patients should be screened upon arrival for chronic cough , fever, weight loss, night sweats, haemoptysis, or contact with a person with TB. Persons suspected of having TB should be "fast-tracked" for rapid diagnosis and care services or should be asked to wait near an open window or in a comfortable area separate from the general waiting room (outside when possible). Community-based treatment models should be encouraged. Where there are in-patient settings, Presumptive TB casess should be placed in a room or area separate from general wards. Patients with known or suspected drug-resistant TB should be separated from general ward patients and from other Presumptive TB casess.

11.2.6 Assure Rapid Diagnosis and Early Initiation of Treatment

Patients suspected of having TB should move to the front of the queue for all services and should undergo prompt evaluation for TB. Sputum collection should

be done away from other people. Sputum specimens are sent to a quality-assured laboratory for AFB smear. A patient-tracking system assures that Presumptive TB casess who are AFB smear-negative receive additional procedures (e.g. chest x-ray and referral visits) or treatment as quickly as possible. DOTS treatment for TB begins immediately when a diagnosis of TB is made.

11.2.7 Improve Room Air Ventilation

Patient waiting areas should be open and well-ventilated. Windows and doors should remain open when possible, to maximize cross ventilation. Appropriately placed simple fans can assist ventilation. Where weather permits, open-air shelters with a roof to protect patients from sun and rain are recommended. Patients should not wait for services in narrow, poorly ventilated corridors. Hospitals where patients with drug-resistant TB receive care should provide separate patient wards or rooms, preferably with good ventilation.

11.2.8 Protect Health Care Workers

Health care workers should know the symptoms of TB and should understand that some health care workers, especially those in contact with (suspect) DR TB patients may wear personal respiratory protection, i.e. a respirator. Safety without stigma should be the goal, a request to patients to wear a mask or cover their mouth while coughing/sneezing and to produce sputum outside, or work in a well ventilated room should not be stigmatizing but is part of a safer clinic for everybody.

11.2.9 Capacity Building

Training on TB infection control practices should be incorporated into the broader infection control trainings at hospitals and facilities (e.g. hand washing, other respiratory, and blood borne infection control trainings).

11.2.10 Monitor infection control practices

Supervision of infection control practices should be part of every supervisory visit. On-site measures include examining medical records of a sample of TB patients looking at the time interval from facility attendance to suspicion of TB, to ordering sputum for AFB or Xpert MTB/RIF, to collection of sputum, to reporting the results, and to initiation of TB treatment. In addition, some patients should be interviewed on their understanding of infection control, safety and stigma.

12 TB/HIV Co-Infection

This chapter highlights the important aspects of TB/HIV infection and its management. Details are included in a separate national guideline: "National Guidelines on TB/HIV Programme Collaboration", first edition, 2009

12.1 Definition of TB/HIV co-infection

TB/HIV co-infection denotes two diseases in one body.

There is a positive co-relation between TB incidence and HIV prevalence. Generally, the lifetime risk of developing active TB is around 10 percent while for TB/HIV co infection the risk is around 60 percent. HIV is the most powerful known risk factors for reactivation of latent tuberculosis to active disease, HIV infected people are most susceptible to develop TB when they are exposed to Mycobacterium tuberculosis. HIV increases the rate of recurrent TB, and TB-HIV cases pose an increasing risk of TB transmission to the general community. The estimated TB/HIV co-infection is 0.1% according to the study done on a sample of 1000 patients in Dhaka. The HIV prevalence amongst the most vulnerable population is still low, about 7% amongst injecting drug users (2006), but is increasing fast (1.4% in 2006).

12.2 Collaboration between the NTP and the National AIDS/STD Programme (NASP)

The collaboration between the NTP and the NSAP collaborates has gradually been strengthened in development of a strategy to respond to the national and district level requirements.

A national TB/HIV Co-ordination Committee has been established, as well as functional collaboration between NTP and NASP in joint planning and implementation of collaborative TB/HIV activities

12.3 Goal of the TB/HIV strategy

The goal of the TB/HIV Strategy is to reduce TB/HIV associated morbidity and mortality through collaboration between the NTP and the NASP.

12.4 Objectives of TB/HIV Strategy

The objectives of the TB/HIV strategy are:

1. Establish the mechanism for collaboration between NTP and NASP

2. Decrease the burden of TB among People Living with HIV (PLHIV) and
3. Decrease the burden of HIV in TB patients.

12.5 Strategies to achieve the goal and objectives

The strategies to achieve the goal and objectives are:

- Conduct routine HIV testing among TB patients and national, 2-3 yearly, HIV sero-prevalence survey among TB patients.
- Carry out joint TB and HIV activities: training of HIV staff in DOTS, training TB staff in HIV counseling and testing and ART.
- Establish coordinating mechanism at health care facilities.
- Conduct monitoring and evaluation and include TB/HIV data in the MIS of the programmes.

12.6 Strategies for implementation

The strategies for implementation are:

- Establish intensified case finding among PLHIV through increasing accessibility to TB information and screening.
- Ensure TB infection control in health care facilities and congregate settings.
- Decrease the burden of HIV in TB patients through provision of HIV testing and counseling, introduction of HIV preventive measures.
- Provide Cotrimoxazole preventive therapy (CPT) to HIV-positive persons ensuring HIV/AIDS care and support and providing anti-retroviral therapy.

12.7 Criteria for TB/HIV Referral

From VCT to DOTS:

1. All HIV-positive patients.
2. Suspected TB cases among the high risk groups.
3. Immediate family/partners contacts of HIV positive patients.

From DOTS to VCT:

1. TB with history of high risk behavior (IDU, unsafe blood transfusion, SW, migrant workers, H/O STI, MSM, transgender/ Hijra).
2 Complicated extra-pulmonary TB, Relapse and treatment failure cases.
3. DR TB.
4. Clinical suspects of HIV infection.
5. Children of mothers known to be HIV-positive.

12.8 Mechanism for TB/HIV Referral

From VCT to DOTS:

The HIV-positive patient is referred to nearest DOTS centre with the referral form Sputum is collected and brought to nearest DOTS centre if the patient cannot go to the DOTS centre If an HIV-positive patient is diagnosed with TB, the VCT focal person should communicate with the responsible TB/HIV partner organization or DOTS centre for anti-TB drugs, arrange collection of anti-TB drugs, ensure daily intake of the drugs (DOT) and recording on treatment cared at VCT centre In addition the VCT focal person should refer the patient for sputum follow-up examinations, including final examination, and whenever possible side-effects of the drugs occur, discharge the patients at the end of the treatment course and provide the DOTS centre with a copy of the Treatment Card.

From DOTS to VCT:

Patient is referred with the referral card after counseling by TB staff. If the patient is diagnosed as HIV-positive, he/she should be counseled at the VCT centre and be provided with HIV care and ART.

12.9 Diagnosis and Management of TB/HIV co-infection

This is described in the "National Guidelines on TB/HIV Programme Collaboration"

12.10 Supervision, Monitoring and Reporting

Routine supervision and monitoring of TB and HIV activities will be done by the individual programmes through a joint M&E plan prepared by NTP and NASP.

13 Public Private Mix (PPM) for TB Control

This chapter highlights the important aspects of PPM. Details are included in a separate national guideline: "Guidelines for Public Private Mix for Tuberculosis Control", first edition, 2006.

Public-Private Mix is a strategy that links the resources of public and private health care providers to achieve national TB Control targets.

13.1 The importance of PPM in the context of Bangladesh

In Bangladesh private practitioners constitute a large proportion of the service delivery infrastructure. Almost half the people are estimated to seek care for chest-related problems from the private sector. Thus it is important that the private sector is an integral component in the delivery of TB services under the umbrella of the NTP. It is widely recognized and experienced that the quality of and access to health care provision can be greatly enhanced by involvement of all health care providers through PPM. The combined efforts of the public and private sector are critical for Bangladesh in order to help halt the TB burden.

Although many private providers in Bangladesh are already providing services to TB patients, TB management practices in the private sector are not standardized and the exact number of TB cases detected and treated in the private sector is not known. This is due to the lack of sufficient interaction and formal linkages between NTP, private, NGO and public sector providers. Their involvement in the delivery of services will enable provision of high quality and effective TB services by all care providers.

13.2 The PPM approaches for TB Control in Bangladesh

NTP and its partners implement several PPM approaches:

1. Public with Private (for example: NTP collaborating with NGOs and private sector)
2. Public with Public, (for example: NTP collaborating with Defense, Police Health Services etc.)
3. Private with Private health care providers (for example: NGOs working with Private Practitioners)

13.3 Current and Potential Providers of PPM

The current and potential providers of PPM are:

Institutional Providers:

- National TB Control Programme.
- City Corporation Health Services.
- NGO partners.
- Academic Medical Institutions e.g.: Medical Colleges, Specialized Institutions and Universities.
- Other Government Hospitals e.g.: District Hospitals, Upazila Health Complexes and Chest Hospitals.
- Corporate Sectors/Work Places e.g.: Export Processing Zone (EPZ), Port, Railway, Tea gardens, garment industry, knitting and other companies etc.
- Prison Health Services.
- Defense/ Police Medical Services.
- Private Hospitals and Clinics/ Private laboratories.
- Pharmacies/drug sellers.
- Refugee camp authorities.

Individual Providers:

- Specialist Physicians.
- Graduate Private Practitioners (PP's).
- Non-graduate PPs e.g.: Sub-assistant Community Medical Officer (SACMO), Medical Assistant, Practitioners with LMF (Licentiate Medical Faculty) and MFPC (Member of the Faculty of Polli Chikitsok) etc.
- Non-qualified PPs e.g.: Village Doctors.
- Community Health Volunteers e.g.: Shastho Shebika, Cured TB Patient, etc.

13.4 Roles of Diverse PPM Partners

NTP

- Central level planning for PPM for TB Control.
- Developing and distributing PPM guidelines and training modules.
- Training of trainers.
- Developing and distributing advocacy materials.
- Providing drugs and logistic supplies.
- Supervision and monitoring.
- Recognition of high performing partners.

Implementing Partners

- Local level planning for PPM.
- Training.
- Establishing successful linkages among providers.
- Providing free sputum smear microscopy and ant-TB drugs.
- Organizing delivery of DOT.
- Recording and reporting.
- Supervision and monitoring.

Contractual tools are used, such as a Memorandum of Understanding (MoU), to formalize partnership between Institutional providers and the NTP or a Letter of Agreement (LoA) to establish effective linkages with individual providers. These tools are drafted through mutual consensus and meant to clarify expected roles and responsibilities of the collaborating partners.

14 Advocacy Communication and Social Mobilization (ACSM)

Advocacy Communication and Social Mobilization (ACSM)

Tuberculosis is social diseases with medical aspect. It is regarded as a barometer of social welfare. It is a public health problem worldwide. One third of the world population is infected with TB. Bangladesh ranks 6th among 22 high burden countries. ACSM activities arc essential effective TB Control in Bangladesh.

14.1 Advocacy

The activities designed to place high the political and developmental agenda. It will deal political will and will increase the financial and other resource in a substantial basis. NTP is conducting the advocacy in the ministry, directorate and in the different policy level as routine activities. To cover TB related topics regularly and in a responsive manner for generating support from governments and donors advocacy is also conducted with the media people.

14.2 Communication

It is a theme expressing the process used by the people to exchange information, views and opinions within each other. it is a two way process involving participation and dialogue as key element to change behavior of the specific group of people. In general people are not well informed regarding the symptom of TB, the mode of spread and personal hygiene. They do not know that the TB is curable, the treatment of TB is free of cost and the service providing all over the country by DOTS strategy. Maximum effort is going on in communicating the target group of people by NTP through arranging communication meeting and/or through with the help of NGO partners wherever feasible.

14.3 Social Mobilization

Social mobilization is the process of involving and motivating interested stakeholders (general population, health workers, policy makers etc.) to organize and take action for a common purpose to assist in the delivery of resources and services to strengthen community participation for sustainability and self-reliance. The aims of social mobilization are to bring about a social change within the country and to build up partnership. NTP is now working with more than forty NGOs in the TB control activities to achieve the common goal.

ACSM helps in the TB control process by improving case detection and treatment adherence. Combating stigma and discrimination, empowering people affected with TB and mobilizing political commitment and resource for TB.

NTP has developed for distribution of substantial amount of IEC material for enhancing ACSM activities to aware the high risk, marginalized and difficult to reach, population.

Annexes

Annex-1

Job Descriptions of the NTP staff at different level

Job Description **1-(A)**

Area : DGHS
Sub-Area : National TB Control Programme (NTP),
Post : **Paramedic/Counselor, Health Assistant/Health worker/CHCP/Village Doctor**
Location : Upazila Health Complex, Upazila and union level health fecilities, mahalla/city corporation, NGO office.
Supervisor : UH&FPO, Local NGO authority.

Responsibilities:

1. Perform social awareness raising activities by disseminating information on symptoms of Tuberculosis; availing cost-free treatment at Upazila health complex, Chest Disease Clinic (CDCs) and selected NGO clinic; importance of compliance with full course treatment regimen.
2. Identification of suspects from community and refer them to respective health care outlets.
3. Perform ACSM activities and help removing social stigma related to Tuberculosis.
4. Act as DOT provider and perform following activities-
   a. Fix an appointment (time and place) after a conversation with the patient.
   b. Ensure appropriate dosage of drugs in each appointment.
   c. Update the treatment card by documenting every time a patient takes drug.
   d. Remain aware of the side effects of the drug and inform the patients about them beforehand.
   e. Send the patients to related health centers if the side effects do not subside.
   f. Inspire the patients to visit and take daily dose of drugs.
   g. In case of delays, visit patients' house to identify the problem and take necessary actions by consulting with them.
   h. Contact respective health centers if a patient is not found.
   i. Discuss and inspire the patients to undertake sputum examination during 2nd, 3rd and 5th of the treatment tenure as well as after treatment completion.
5. Assist and inspire the patients to complete full course of treatment regimen.
6. Promptly identify side effects during the course of treatment, provide assurance, guidance and timely referral for doctors advice.

Job Description 1-(B)

Area : Directorate General of Health Services (DGHS)
Sub-area : National Tuberculosis Control Programme (NTP)
Post : **Laboratory Attendant (Govt./GFATM)**
Job Location : UHC/CDC/CDH
Supervisor : Upazila Health and Family Planning Officer (UH&FPO), Medical Technologist- Laboratory, Senior Medical Technologist laboratory (SMT lab), Programme Organizer (PO), Medical Officer - Disease Control (MO-DC), EQA supervisor, Resident Consultant/NTP officer, Junior Consultant - CDC, Supervisory level NGO officials, Any govt. higher authority.

Responsibilities

1. Collect sample from presumptive TB patient/TB patient following proper sample collection procedures.
2. Assist MT lab in smearing staining of slides as per guidelines.
3. Numbering the containers and slides.
4. Keep the laboratory environment neat and clean and well ventilated.
5. Gather knowledge on laboratory procedures findings; follow up, recording, liaison, EQA and internal quality control etc.
6. Maintain all precaution? Safety measures in working time.
7. Help MT lab in documenting, display and record keeping.
8. Coordinate Govt. MT lab TLCA PO and NGO personnel in sharing findings, updates, requirements and in assessing needs.
9. Help in recording and reporting.
10. Any other duties assigned by the competent authority.

Job Description 1-(C)

Area : DGHS
Sub-Area : National TB Control Programme (NTP),
Post : **Medical Technologist (Laboratory)**
Location : Upazila Health Complex, Hospitals, Clinics (GoB, NGOs)
Supervisor : Upazila Health & Family Planning Officer (UH&FPO)/ Hospital Superintendent/ Officer in, charge (including NGO) hospital and clinic Resident Medical Officer, District authority/administrative head of respective NGOs, Jr. Consultant, Chest Disease Clinic, MO TB/Leprosy (Designated) of the District, Chief Medical Technologist (Laboratory), Civil Surgeon Office, Programme officials from divisional and national level.

Responsibilities:

1. Maintain essential safety precautions during sputum collection, laboratory work and disposal of potentially infectious materials.
2. Collect sputum samples from presumptive TB cases and patients on TB treatment, and give a unique identification number to each sample.

    - Explain the sampling procedure to the patient
    - Issue sputum containers and demonstrate how to use them

3. Prepare and examine smears for AFB according to SOP or guidelines.
4. Record results (laboratory registrar, request form) and report promptly to the requesting staff.
5. Assure adequate stock (by indenting timely) and maintain proper storage of reagents, slides, sputum containers and other laboratory materials.
6. Monitor sputum smear results periodically for internal quality control; keep smears for re-checking:

    - Analyze the microscopy results from the TB laboratory register monthly and quarterly and display the results including suspect positivity rate.
    - Preserve all slides after examination till a sample for re-checking is taken.

7. Maintenance of microscopes and other laboratory equipments as per SOP/guidelines.

Job Description 1-(D)

Area : DGHS
Sub-Area : National TB Control Programme (NTP),
Post : **Programme Organizer**
Location : Civil Surgeon Office
Supervisor : Civil Surgeon

Responsibilities:

1. Supervise NTP activities in the field level and assist in implementation of TB control measures.
2. Supervise, assist and ensure proper registration, recording and reporting of TB patients by LTCA/TLCA and take appropriate measures to take corrective actions as when required.
3. Assist to conduct district quarterly monitoring meetings (QMM), prepare meeting minutes, submit to Civil Surgeon for distribution and assist to execute recommendation of QMM up to field level.
4. Assist ensuring adequate stock (by indenting timely) and maintain proper storage of Anti-TB drugs and other logistics including ACSM material.
5. Ensure proper display of ACSM materials to all DOT centres.
6. Assist in coordination with NGOs and other private sectors for implementation of DOTS.
7. Organize awareness building activities to the community to promote self-reporting and treatment compliance of TB patients.

Job Description 1-(E)

Area : DGHS
Sub-Area : National TB Control Programme (NTP),

Post:

1. **Upazila Health & Family Planning Officer (UHFPO)**
2. **Medical Officer TB/Leprosy (MO TB/LEP) Designated**
3. **Medical Officer Chest Disease Clinic**
4. **Medical Officer Disease Control (MO DC)**
5. **Medical Officers/M&E officer, NGOs**

Location: Civil Surgeon's Office/Chest Disease Clinic/Upazila Health Complex/NGO office or clinic.
Supervisor: Civil Surgeon

Responsibilities:

1. Overall coordination of activities for NTP in the relevant geographic area.
2. Coordinate to ensure quality assured AFB Microscopy by Government and partner NGO's Medical Technologists.
3. Support NTP in sustaining and enhancing DOTS to reach all TB patients.
4. Assist to ensure DOT and treatment adherence according to the NTP guidelines.
5. Supervise and ensure regular updating of TB registrar by TLCA/ assigned TLCA/ NGO PO/ paramedic to improved case detection and treatment success.
6. Support to ensure tracing of defaulting TB patients and resumption of their treatment involving Govt./NGO field staff.
7. Ensure referral of suspects and provision of DOT by Govt./NGO field staff.
8. Follow-up clinical progress, identify and manage adverse drug reactions.
9. Coordinate, supervise and monitor management of DR TB, TB-HIV collaborative activities in line with National Guidelines.
10. Ensure appropriate public-private partnership by involving corporate, defense, prisons and other relevant sectors for TB Control Programme.
11. Ensure accurate quarterly reporting, monitor of NTP performances and take appropriate corrective action if necessary.
12. Ensure in-service training to concerned staff of TB control.
13. Assist and ensure ACSM activities to individuals and community to promote self-reporting and treatment compliance of TB patients.
14. Taking part in regular supervision of NTP at the relevant levels.

Job Description 1-(F)

Area : DGHS
Sub-Area : National TB Control Programme (NTP),
Post : **Junior Consultant, Chest Disease Clinic**
Location : CDC
Supervisor : Civil Surgeon

Responsibilities:

1. Overall coordination of activities of NTP in the relevant geographic area.
2. Coordinate quality assured laboratory networks and standard diagnostic facilities of NTP service delivery through government and partners.
3. Support NTP in sustaining and enhancing DOTS to reach all TB patients.
4. Ensure identification of Presumptive TB casess and diagnosis of TB specially Smear Negative, Extrapulmonary, DR TB and Child TB according to the NTP guidelines.
5. Ensure treatment according to the NTP guidelines, including directly observed treatment.
6. Coordinate, supervise and monitor management of DR TB, TB-HIV collaborative activities In line with National Guidelines.
7. Ensure proper records of the patients under treatment and assist in updating registers of the Tuberculosis patients loss to follow-up.
8. Ensure tracing of loss to follow up TB patients and resumption of their treatment through Government and partners.
9. Ensure clinical progress, identify and treat adverse reactions to drugs and manage complicated cases when and where necessary.
10. Ensure regular supply of Anti-TB Drugs and other logistics including ACSM material;
11. Assist and ensure accurate NTP quarterly reporting, quarterly monitoring of NTP performances and appropriate corrective action towards TB control.
12. Organize and facilitate in-service training to necessary staff, which addresses NTP services.
13. Ensure appropriate public-private partnership by involving corporate, defense, prisons and other relevant sectors for TB Control Programme.
14. Assist and ensure ACSM activities to individuals and community to promote self-reporting and treatment compliance of TB patients.
15. Ensure, Perform and monitor regular supervision of NTP activities at the relevant levels.
16. Provide expert opinion on the referred and complicated cases including DR TB.

Job Description 1-(G)

Area : DGHS
Sub-Area : National TB Control Programme (NTP),
Post : **Civil Surgeon**
Location : Civil Surgeon Office
Supervisor : Divisional Director/ Line Director/Programme Manager

Responsibilities:

1. Supervise the overall coordination procedure of NTP in the relevant geographic area.
2. Supervise and provide administrative and technical support for quality assured laboratory networks and standard diagnostic facilities of NTP service delivery through government and partners and support NTP in sustaining and enhancing DOTS to reach all TB patients.
3. Ensure quality laboratory performance for TB including Xpert MTB/RIF.
4. Supervise and provide technical support to ensure anti-TB treatment according to NTP guidelines.
5. Supervise and provide technical support for proper recording and reporting following NTP guidelines.
6. Supervise, coordinate and monitor management of DR TB with the facilities designated by NTP.
7. Coordinate and supervise TB/HIV collaborative activities when required.
8. Supervise and monitor public-private partnership by involvement of private, corporate, defense, prisons and other relevant sectors in TB control within the geographic locations.
9. Conduct district quarterly monitoring meetings (QMM) on TB control activities, monitor NTP performance and advice corrective measures if necessary.
10. Supervise proper collection, storage and distribution of anti-TB drugs, logistics and consumables.
11. Supervise and provide technical support for in-service training to relevant staff providing NTP services.
12. Monitor ACSM activities for awareness building activities.
13. Oversee the referral of suspects and provision of DOT by Government field staff.

Job Description 1-(H)

Area : DGHS
Sub-Area : National TB Control Programme (NTP),

Post

1. **Health Inspector (HI)**
2. **Assistant Health Inspector (AHI)**
3. **Family Planning Inspector (FPI)**
4. **Medical Assistant (MA)**
5. **Health Assistant (HA)**
6. **CHCP**
7. **NGO Health Workers/community vounteers.**

Location : UHC/ Union Health & Family Welfare Center (UHFWC)
Supervisor : UH&FPO/Medical Officer of UHFWC/NGO local authority

Responsibilities:

1. Assist and ensure the referral of Presumptive TB casess and patients.
2. Assist and ensure the directly observed treatment in the community, contact tracing and defaulters tracing.
3. Assist and ensure proper registration, recording and reporting of TB patients.
4. Assist in collaborating public-private sectors.
5. Assist and ensure adequate and timely supply of anti-TB drugs and other items.
6. Assist and organize awareness building activity at the community to promote self-reporting and treatment compliance.

Job Description 1-(I)

Area : DGHS
Sub-area : Tuberculosis
Post : **Leprosy and TB Control Assistant (TLCA)**
Location : Upazila Health Complex
Supervisor : UH&FPO

Responsibilities:

1. Support Diagnosis of Presumptive TB casess referred to UHC.
2. Register patients and maintain proper records of the patients under treatment and update registers of the tuberculosis.
3. Assist initiation of treatment by MODC according to the NTP guidelines.
4. Assist and ensure referral of suspect and provision of DOT by provider.
5. Assist tracing of contacts as well as defaulting TB patients and resumption of their treatment involving Govt. field staff.
6. Identify adverse reactions of drugs and refer the patient to UH&FPO/ MODC for proper management.
7. Assist appropriate public-private partnership for TB Control Programme.
8. Prepare NTP quarterly reports including Lab performance and submit to UH&FPO timely.
9. Prepare reports of NTP performance for Upazila monthly meeting and District Quarterly meeting.
10. Prepare indent for anti-TB drugs and other requirements with the help MODC and submit to UH&FPO.
11. Assist in implementing ACSM activities in the community to promote self-reporting and treatment compliance of TB patients.
12. Ensure display of updated ACSM information, proper use of available NTP ACSM materials and collect the required material from NTP.
13. Perform regular supervision of NTP activities at the field level.
14. Maintain liaison with NGOs and other partners in the field level.

Job Description 1-(J)

Area : Directorate General of Health Services (DGHS)
Sub-area : National Tuberculosis Control Programme (NTP)
Post : **Programme Organizer (PO-(govt.))/PO - GFATM**
Job location : Civil Surgeon Office/CDC/CDH

Supervisor : Civil Surgeon/Junior Consultant/Superintendant, Divisional Consultant/ NTP officials, Supervisory level NGO officials, Any govt. higher authority.

Responsibilities:

1. Organize meeting, orientation, training, seminars and sessions on tuberculosis at district level.
2. Communicate participants, resource persons, NGOs, BMA or other vital members to ensure their participation in training, meeting, seminars or sessions as when required.
3. Supervise and ensure NTP performance and effective implementation of TB control Programme in the field.
4. Supervise, assist and ensure proper registration, recording and reporting of TB patients by TLCA and take appropriate corrective action as when required.
5. Assist to conduct quarterly monitoring meeting (QMM) on DOTS, prepare meeting minutes and submit to Civil Surgeon for distribution and assist to execute recommendations of QMM up to field level.
6. Assist and ensure regular supply of anti-TB drugs and other logistics including ACSM materials and ensure proper distribution mechanism.
7. Assist and ensure proper display of ACSM materials to all DOT centers and updates the TB related information in the display board.
8. Assist in coordination with NGOs and other private sectors for implementation of DOT.
9. Assist and organize awareness building activities to educate community on tuberculosis, build linkage between community and facilities and ensure quality of services.
10. Provide referral slip to all facilities within the assigned areas.
11. Monitor e-TB manager, child TB, PAL, DR TB and referral cases along with general monitoring.
12. Acts as facilitator as when required.
13. Any other duties assigned by line/other/technical supervisors.

Annex-2 Forms and Cards

NATIONAL TUBERCULOSIS CONTROL PROGRAMME
Directorate General of Health Services, Bangladesh
Tuberculosis Treatment Card (Front page)

TB 01

Name : _____
Father's/ Husband's name : _____
Address (in full) : _____
_____ Phone No.: _____
Name & Address of contact person :
_____ Phone No.: _____
Occupation : _____
Sex : M ☐ F ☐ Age : _____ BCG: no scar. ☐ Scar seen ☐
Name & address of person providing DOT : _____

Refd by:	Graduate PP	GFS	VD	Gov. Hospital	TB Patient	CHCP
	Non Graduate PP	SS	CV	Private Hospital	Other specify	

TB Registration No. :
Name & Address of Health Institution/ DOT Center:

Disease Classification		
Pulmonary		Extra pulmonary ☐
Smear positive	☐	
Xpert MTB/RIF positive	☐	
Smear negative	☐	Site _____

New	☐	Failure	☐
Transfer in	☐	Relapse	☐
Treatment after loss to follow up/default	☐	Others (Specify)	☐

Month	Dete	Result of sputum examination				Weight (kg)
		Smear 12	Smear	Lab No.	Xpert result	
0						
2/3						
3/4						
5						
6/8						

TB/ HIV		
	Date	Result
HIV Test		
CPT start		
ART start		
Others		

** CPT= Co- trimoxazole preventive Therapy

I. INTENSIVE PHASE- Prescribed regimen and dosages
Frequency: Daily
Tick category and indicate number of tablets per dose and doses of S(gms)

CAT 1 ☐ CAT 2 ☐ Child ☐
4FDC ☐ 4FDC ☐ 3FDC ☐

☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
R	H	Z	E	R	H	Z	E	S	R	H	Z	E	S	

Enter ☑ in the appropriate box to indicate the data when the drugs have been swallowed under direct observation; enter — if swallowed but not supervised; enter ○ when not taken

Month/ Year	Day																												
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

PP = Private Practitioner, GFS= Government field staff, SS= Shastho Shebika, VD= Village Doctor, CV= Community volunteer, CHCP=Community Health Care Provider

Signature of Medical Officer

TB 01

Tuberculosis Treatment Card (Back page)

II. CONTINUTION PHASE- Prescribed regimen and drug dosages

Put tick ☑ mark in the appropriate box

CAT 1 ☐ 2FDC ☐ R H

CAT 2 ☐ 3FDC ☐ R H E

Child ☐ 2FDC ☐ R H

Enter ☑ in the appropriate box to indicate the data when the drugs have been swallowed under direct observation; enter ⊟ if swallowed but not supervised; enter ⊡ when not taken

Month/ Year	Day																													
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31

Treament outcome

Date of decision _____

- ☐ Cured
- ☐ Treatment completed
- ☐ Died
- ☐ Treatment failure
- ☐ Lost to Follow up/Defaulted
- ☐ Transferred out
- ☐ Not Evaluated

Types of drug reaction (if any):

_____

Remarks: _____

_____

_____

_____

Name & Address of contact person

_____

Signature of Medical Officer

Front

টিবি ০২

জাতীয় যক্ষ্মা নিয়ন্ত্রণ কর্মসূচি
স্বাস্থ্য অধিদপ্তর ঢাকা, বাংলাদেশ
পরিচয়পত্র

রোগীর নামঃ _____

পূর্ণ ঠিকানাঃ _____

(ক) বর্তমানঃ _____

(খ) স্থায়ীঃ _____

লিঙ্গঃ পুরুষ ☐ মহিলা ☐ বয়সঃ

যক্ষ্মা রেজিস্ট্রেশন নংঃ _____

চিকিৎসা শুরুর তারিখঃ _____

CAT 1 ☐ CAT 2 ☐ Child ☐

স্বাস্থ্য প্রতিষ্ঠানের নামঃ _____

রেফারকৃত ব্যক্তি/ প্রতিষ্ঠানের নামঃ _____

প্রতিষ্ঠানের ফোন নং _____

ডট (DOTS) প্রদানকারীর নামঃ _____

ঠিকানাঃ

রোগীর শ্রেণি	
ফুসফুস ☐	ফুসফুস বহির্ভূত ☐
জীবাণুযুক্ত ☐	স্থানঃ _____
জীবাণুমুক্ত ☐	

রোগীর শ্রেণি	
নতুন (New) ☐	পুনঃআক্রান্ত (Relpase) ☐
অবস্থান হতে প্রেরিত (Transfer in) ☐	
খেলাপী রোগীঃ (Loss to Follow up/ Defaulter) ☐	অন্যান্য _____ (Others)

Back

টিবি ০২

স্বাস্থ্য কেন্দ্রে উপস্থিতির তারিখ ঃ

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

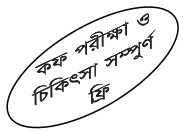
চিকিৎসা শেষের ফলাফল ঃ -

_____

চিকিৎসা শেষের তারিখঃ

_____

৩ সপ্তাহের বেশি কাশি যক্ষ্মা রোগের প্রধান লক্ষন!



(১) আপনার কার্ডের যত্ন নিন।
(২) নিয়মিত সঠিক মাত্রার নির্দিষ্ট সময় পর্যন্ত ঔষধ সেবন করুন।
(৩) অসম্পূর্ণ চিকিৎসা মারাত্মক যক্ষ্মা রোগের সৃষ্টি করে যা সহজে আরোগ্য হয় না।
(৪) যেখানে সেখানে কফ ও থুথু ফেলবেন না।
(৫) হাঁচি বা কাশির সময় নাক-মুখ ঢেকে রাখুন।

বিঃ দ্রঃ ঔষধ সংগ্রহের সময় এই কার্ডটি অবশ্যই সঙ্গে আনতে হবে।

TB 03

NATIONAL TUBERCULOSIS CONTROL PROGRAMME

Directorate General of Health Services, Bangladesh

Tuberculosis Register

Date of Registration	TB Registration No.	Name in full	Sex M/F	Age	Occuparion	Address in full	Name of treatment unit	Date of start of treatment and category	Disease classifiction P/EP	*Type of patient							
										New (N)	Relapse (R)	Transfer in (T)	Treatment after Loss to follow up/ default (L)/(D)	Treatment failure (F)	Other Specify (O)	Refd by	Remarks

*Enter the appropriate code:

N = New case : a patient, who has never taken tuberculosis drugs or has taken drugs for less than a month.

R = Relapce : a previously treated patient, who was declared cured, but is now smear-positive again.

T = Transfer in : a patient, who has been transferred from one reporting unit to another. For transfer in patient name of the center from where patient was transferred out should be written in the remarks column.

L/D = Treatment after loss to follow up/default : a patient who returns to treatment after having interrupted for who consecutive months or more.

F = Treatment failure : A TB patient whose sputum smear or culture is positive at month 5 or later during treatment. or A new or retreatment smear-positive patient who was diagnosed with DR TB during the course of treatment or A patient who was initially smear-negative and was found smear-positive at the end of the second month of treatment

O = Others : patient, who cannot be classified to any previous category.

TB 03

NATIONAL TUBERCULOSIS CONTROL PROGRAMME

Directorate General of Health Services, Bangladesh

Tuberculosis Register

Sputum examination : Upper space Result; Lower space Lab. Serial number and Date								Treatment Outcome and Date						TB/HIV activities			Remarks
Pretreatment				Follow up smear				**Outcome						HIV Result	***ART	****CPT	
Smear 1	Smear 2	*(Xpert MTB/ RIF result if done	X-Ray Result	2nd/3rd (new) 3rd/4th (Retreatment) month	5th month	6th month	8th month or more	1. Cured	2. Treatment completed	3. Died	4. Treatment Failure	5. Lost to follow up/ Defaulted	6. Transferred/ Not Evaluated	*P/N (Date)	Y/N (Start date)	Y/N (Start date)	

**Enter date in the appropriate code:

***ART-Anti retroviral Therapy

****CPT-Cotrimoxazole Preventive Thearpy

* P = Positive

* N = Negative

1. Cured : Treatment completed and negative smear results on 2 or more consecutive occasions at 5 months and at the end of the treatment.
2. Treatment completed : Full course of Rx completed but sputum result is not available. 3. Died : Patient known to have died from any cause during treatment.
4. Treatment failure : A TB patient whose sputum smear or culture is positive at month 5 or later during treatment. or A new or retreatment smear-positive patient who was diagnosed with DR TB during the course of treatment or A patient who was initially smear-negative and was found smear-positive at the end of the second month of treatment
5. Lost to follow up/(Defaulted) : A TB patient whose treatment was interrupted for 2 consecutive months or more.
6. Transferred out/not evaluated : Patient who has been transferred to another DOT Centre and whose treatment outcome is unknown to the reporting unit. Name of the where the was transferred out should be written in the remarks column.

NATIONAL TUBERCULOSIS CONTROL PROGRAMME

Directorate General of Health Services, Bangladesh

Tuberculosis Laboratory Register

TB 04

Lab Serial No.	Date of specimen received	Name in full	Address in full (patientsfor diagnosis)	Occupation	Age	Sex (Tick)		Name of treatment/ referring facility	Reason for examination		Result of Smear Examination		Result of Xpert MTB/ RIF Examination	TB Registration no.	Referred by **	Signature	Remarks
						M	F		Diagnosis (Tick)	Follow up* (Tick)	1	2					

* Enter TB Registration Number & month of follow-up

** GOPD - Government outpatient patient Department, GFS - Government Field Staff, IPD – In patient Department, PP - Private Practitioner, VD - Village Doctor, SS – Shasta Sebeka, NFS – NGO Field Staff, CTP – Cured TB patient, CHCP= Community Health Care Provider Others (please specify)

TB 05

NATIONAL TUBERCULOSIS CONTROL PROGRAMME

Directorate General of Health Services, Bangladesh
Request Form for AFB Microscopy/Xpert MTB/RIF Examination
(The completed form with results should be sent promptly by the Laboratory to the referring facility)

Name of Referring Facility[1]: _____ Date: _____

Name of Patient: _____ Age: _____ Sex: M ☐ F ☐

O ccupation: _____ Name of Father / Husband: _____

Full Address of Patient: _____

_____ Telephone no of patient/contact person: _____

OPD Reg. No.: (if any); (For Presumptive TB cases/suspects only): _____

Reason for examination: Diagnosis ☐ Follow-up ☐ If follow-up, No. of month of Treatment: _____

Disease Classification: Pulmonary ☐ Extra-pulmonary (EP) ☐ If EP, Site _____

Nature of Specimen: Sputum ☐ Urine ☐ Pus ☐ Other ☐ Specify _____

Specimen identification no: _____ Patient TB Registration No: _____
(For follow-up patients)

Signature of person requesting examination: _____

Name & designation of person requesting examination: _____

1.Including all public and private health facility/providers

RESULTS (To be completed in the Laboratory)

Lab Registration No: _____

Visual appearance of the specimen (if it is sputum): Muco-purulent ☐ Blood-stained ☐ Saliva ☐

Microscopy results

Date of Collection*	Specimen	Result				
		Negative	Scanty (1-9)**	1+	2+	3+
	1					
	2					

Xpert MTB/RIF results

Date of Collection*	ID number	Result			
		RR=MTB detected,	T= MTB detected,	N=MTB not	I=invalid/no

Sputum collected by:

Signature: _____

Name: _____

* To be completed by the person collecting the sputum
**Please Mention the number

Examined by: _____

Signature of Medical Tech (Lab):

Name: _____

Date: _____

Name of Lab/Organization:

DR TB 06

Government of the People's Republic of Bangladesh

Programmatic Management of Drug Resistance Tuberculosis (PMDT)

National TB Control Programme

Request and Reporting form for Diagnosis/Follow up of Drug Resistant TB

A. Patient identification (ID):

TB registration No (Current): _____ Previous TB registration No (If any):_____ DR TB registration No: _____

Name of patient: _____ Age (yrs):_____ Sex:____ *HIV-status: Pos / Neg / Unknown

Address: _____

_____

Cell Phone #:_____

B. TB Disease type and treatment history

Site: Pulmonary Extra pulmonary (specify):_____

History:

1) Failures of Category I (remain positive at month 5 or later and smear negative patients who become smear positive at month 2)
2) Failures of Category II (remain positive at month 5 or 8)
3) Non converters of Category I (remain positive at month 2)
4) Non converters of Category II (remain positive at month 3)
5) Relapses (Category I / Category II)
6) Return after lost to follow up (Category I / Category II)
7) Close contacts of DR TB patient with symptoms.
8) HIV infected
9) Others (Specify.....)

C. Origin of request:

Division name & ID:_____ District name & ID:_____ Local laboratory name & ID:_____

Local laboratory registration/serial number: _____ Date of test: ...../...../..... Smear result: 1st ___ 2nd _____specimen

Microscopy technique used: hot Ziehl-Neelsen (ZN) LED Fluorescence microscopy (FM)

D. Request for testing at the reference laboratory:

1) Diagnosis 2) Follow Up: Month of .....

Date specimen(s) collected: ____/____/20____ Specimen Identification number (s): _____

Specimen: Sputum Sputum in preservative, type ..... Other specify):_____

Requested tests: o microscopy (type: ZN/LED o culture (L-J / MGIT) o Xpert MTB/RIF o DST Conventional o Line Probe Assay (LPA) :

Others (Specify)_____

Person requesting examination: Name:_____ Position:_____ Cell Number (patient/contact person): _____

Organization: Government/Non Government (specify: _____ Signature (with official seal) and Date:_____

* Information that can be disclosed optionally

E. Reference laboratory results:

Date of Specimen received/Collection in the Reference Laboratory _____ Reference Laboratory specimen ID:_____

1. Microscopic examination: Date reported _____ Previous Report and Date (If any) _____

ID #	Neg	Scanty	1+	2+	3+

hot Ziehl-Neelsen direct smear LED fluorescence concentrated smear Others (specify)_____

2. Xpert MTB/RIF (MTB/RIF) result: Date reported _____ Previous report and Date (If any) _____

ID #	RR=MTB detected, Rif resistance detected	T= MTB detected, Rif resistance not detected	N=MTB not detected	I=invalid/no result/ error

3 Method used: Solid (LJ) Liquid (MGIT) , Culture result: Date reported _____ previous report and Date (If any) _____

ID #	Contaminated	Neg	Positive	Atypical Mycobacteria (species)	Mycobacterium tuberculosis complex			
					<20 =1-19 colonies Actual count	1+=20 – 100 colonies	2+=>100 - 200 colonies	3+=>200 colonies

4. Results of M. tuberculosis drug susceptibility testing: Date reported:_____

Method used: ☐ Proportion method (L-J) ☐ Liquid (MGIT 960 system) ☐ Line Probe Assay (LPA)

ID #	Legend: S = susceptible; R = resistant; C = contaminated; ND = not done						
	INH (H)	Rifampicin (R)	Ethambutol (E)	Streptomycin (S)	Pyrazinamide (Z)	FQ : Ofloxacin/ Levofloxacin	Kanamycin (Km)
Result							

Date: _____/_____/20_____ Signature with official Seal _____

TB 07

NATIONAL TUBERCULOSIS CONTROL PROGRAMME

Directorate General of Health Services, Bangladesh

Tuberculosis Referral/ Transfer Form

(Fill out in triplicate with carbon paper between sheets)

Name of Referring/ Transferring Unit _____

Name of Institution to where patient is referred (If known) : _____

_____

Name of Patient : _____ Age :_____ Sex : _____

Address (in full) : _____

_____ Phone No.:_____

TB Registration No. : _____

Type of Patient:

- ☐ New smear positive
- ☐ New smear negative/EP
- ☐ Re-treatment
- ☐ Others (specify) _____

Type of Treatment:

- ☐ CAT 1
- ☐ CAT 2
- ☐ DR TB
- ☐ Child

Date of treatment started : _____

No. of days for which patient received drugs at last attendance _____

Reasons for referral : _____

Remarks : _____ Signature : _____

Designation : _____

Date Referred/ transferred: _____

For use by the institution where the patient is referred to send the outcome report to the institution where patient was initially registered

Name of patient : _____ TB registration No. : _____

Age : _____ Sex : M ☐ F ☐

TB Registration no (of the organizationfrom where the patient was referred) : ☐

Treatment result:

Cured ☐ Treatment completed ☐ Failure ☐ Lost to follow up/ Defaulted ☐ Died ☐

Date : _____ Date : _____ Date : _____ Date : _____ Date : _____

Signature : _____ Name : _____

Date : _____ Designation : _____

Send this part back to the referring unit as soon as the treatment outcome report is available.

For use by institution where patient has been referred

Name of patient : _____ TB registration No. : _____

Age : _____ Sex : M ☐ F ☐

DateReferred/ Transferred: _____

Date of Received at this institution on : _____

Signature : _____

Designation : _____

Name of institution from where patient was referred : _____

District : _____ Date : _____

Send this part back to the Referred Unit as soon as patient has reported and been registered and also send the treatment outcome to the center from where the patient was referred after completion of treatment.

TB 08

NATIONAL TUBERCULOSIS CONTROL PROGRAMME

Directorate General of Health Services, Bangladesh

Requisition Form for Drugs

Year: _____ Quarter: _____

Name of Health Facility: _____

City/ District/ Upazila: _____

Name & Designation the person filling in the form: _____

Name & Contact no. of the UH&FPO/ Center chief: _____

Number of registered cases during the previous quarter		
Adults		Children (□15 years)
Category I = (n)	Category II = (n_1)	Category I = (c_1)

Drug requirements estimation

Drug	[1]Quantity required for one quarter			[2]Total Required Quarterly (+Buffer) (b)=2x(a)	[3]Existing balance with expiry date (c)	Amount to be supplied = (b) - (c)	Actual amount supplied	[4]Remarks
	Cat I = (1)	Cat II =(2)	Total (a) =(1+2)					
4FDC	= n x 180	=n_1 x 270						
3FDC (R150/ H75/E275)		=n_1 x 450						
2FDC (R150/ H75)	= n x 360							
3FDC (R60/H30/Z150) (Dispersible)	= c_1 x180							
2FDC (R60/H60) (Dispersible)	= c_1 x360							
2FDC (R60/H30) (Dispersible)	= c_1 x360							
Z 400 mg (Dispersible)								
H 100 mg (Dispersible)- for IPT	= c_1 x360							
R 150 mg								
H 300 mg								
R 450 mg								
Z 500 mg								
E 400 mg								
E 100 mg	= (c1x180)÷2							
S 1 g		= n_1 x 60						
Inj. Water, 5ml		= n_1 x 60						
D/ Syringe, 5cc		= n_1 x 60						

[1] Multiply the number of patients (n/n1/c1) in each treatment category with the number needed for treatment of one patient.

[2] The quantity includes buffer stock (100%) for a quarter.

[3] Indicate the remaining balance from the drug ledger at the end of the previous quarter.

Note: 1) Stock of minimum one patient's medicine for each category should be ensured at all time; even there was no patient during previous quarter (especially for Cat-II and Child TB).

2) Over stock should be avoided by redistribution of medicines to the nearest low stock facilities before preparing request for next quarter. If there is any stock out, the actual duration should be mentioned in the remarks columns by days.

Prepared by: _____ Signed by UH&FPO/ Center chief: _____

Checked by: _____ Counter Sign by CS/Controlling authority: _____

টিবি ০৯

জাতীয় যক্ষ্মা নিয়ন্ত্রণ কার্যক্রম
স্বাস্থ্য অধিদপ্তর
গড়-হাজিরা, যক্ষ্মা রোগীর বাড়ি পরিদর্শন ফরম

উপজেলা স্বাস্থ্য কমপ্লেক্স/ টিবি ক্লিনিক/ লেপ্রোসী হাসপাতাল .....

প্রতি,

.....

স্বাস্থ্য সহকারী,

ওয়ার্ড নং .....

ইউনিয়ন .....

জনাব/ জনাবা ..... পিতা/ স্বামী .....

বয়স ..... রেজিঃ নং ..... গ্রাম .....

ইউনিয়ন .....

একজন যক্ষ্মা/ কুষ্ঠ রোগী। তিনি গত ..... তারিখ হতে ঔষধ গ্রহণে বিরত থাকায় অতি সত্বর তাহার বাড়ি পরিদর্শন করে মেডিকেল অফিসার (ডেজিগনেটেড) টিবি-লেপ্রোসী- এর নিকট রিপোর্ট প্রদানের জন্য আপনাকে নির্দেশ দেয়া হলো।

আদেশক্রমে

উপজেলা স্বাস্থ্য ও পরিবার পরিকল্পনা কর্মকর্তা

বাড়ি পরিদর্শনের রিপোর্ট

স্বাস্থ্য সহকারী

TB 10

NATIONAL TUBERCULOSIS CONTROL PROGRAMME - BANGLADESH

Directorate General of Health Services, Bangladesh.
Quarterly report on case finding of tuberculosis

Name of District: Name of Upazila/Address & Ward No: Name & Signature of UH&FPO/ In-charge of DOTS/ Health Unit:	Patients registered during [ ] quarter [20.....] Year Population of the area: No. of Smear +ve Case notifified : ..... No. of Xpert MTB/RIF +ve Case notifified : ..... Smear +ve Case notification Rate: ..... Bacteriologically Confirmed Case notification Rate:	Date of Completion of this Form: Name, Signature & Contact no. of Person completed the Form:

Block 1: All TB cases registered (excluding "Transfer in" and "Chronic cases")

Bacteriologically confirmed TB cases												New smear negative (7)		New extra Pulmonary (8)		Others* (9)		Total (10)		
Pulmonary sputum smear microscopy positive								Xpert MTB/RIF positive RIF sensitive cases												
New cases (1)		Previously treated																		
		Relapses (2)		After failure (3)		Loss to follow up/ After default (4)		New cases (5)		Previously treated cases (6)										
Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total

Block 2: Smear Positive New Cases (From Column 1 above)

Age-groups																TOTAL		
0-4		5-14		15-24		25-34		35-44		45-54		55-64		>= 65				
Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total

Block 3: Xpert MTB/RIF Positive New Cases (From Column 5 above)

Age-groups																TOTAL		
0-4		5-14		15-24		25-34		35-44		45-54		55-64		>= 65				
Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total

Block 4: New Smear Negative (From column 7)

Age-groups																TOTAL		
0-4		5-14		15-24		25-34		35-44		45-54		55-64		>= 65				
Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total

* Others include pulmonary cases with unknown history of previous treatment, previously treated sputum smear microscopy negative pulmonary cases and previously treated extrapulmonary cases. Transferred in and chronic cases are excluded.

TB 10

Block 5: New EP Cases (From column 6)

Age-groups																TOTAL		
0-4		5-14		15-24		25-34		35-44		45-54		55-64		>= 65				
Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female	Total

Block 6: No of Patients Referred by**:

PP (graduate)	Non-graduate PP	GFS	SS	VD	CV	Govt. Hospital	Private Hospital	CHCP	TB Patient	Other (specify)	To tal

Note: Like as treatment card

Block 7: Laboratory Activity - Sputum smear microscopy/Xpert MTB/RIF

No. of Presumptive TB cases/ suspects examined for diagnosis by sputum smear microscopy			No of Presumptive TB cases/ suspects with positive sputum smear microscopy result			No. of Presumptive TB cases/ suspects examined for diagnosis by Xpert MTB/RIF			No of Presumptive TB cases/ suspects with positive Xpert MTB/RIF result		
M	F	Total	M	F	Total	M	F	Total	M	F	Total

* This information to be included in the Lab report form

Block 8: TB/HIV activities

8 (A) Diagnosed TB cases	No of TB patients tested for HIV before or during TB treatment		No of patients found HIV positive before or during TB treatment	
	Male	Female	Male	Female
New smear positive TB				
Xpert MTB/RIF positive TB cases				
New smear negative TB				
Re-treatment cases				
Extra Pulmonary				
Others				

8 (B) ***PLWHA suspect for TB	No of PLWHA tested for AFB		No of AFB positive result among tested PLWHA	
	Male	Female	Male	Female

** PP-Private practitioner, GPS-Govt. Field staff, SS-Shashtha Ahebika, VD-Village Doctor, CV- Community Volunteer , CHCP= Community Health Care Provider

*** PLWHA-People living with HIV/AIDS, CHCP= Community Health Care Provider

TB 11

NATIONAL TUBERCULOSIS CONTROL PROGRAMME - BANGLADESH

Directorate General of Health Services, Bangladesh.
Quarterly Report onTreatment Results of Pulmonary TB Patients Registered 12-15 months earliers

Name of District: Name of Upazila/Address & Ward No: Name & Signature of UH&FPO/ In-charge of DOTS/ Health Unit:	Patients registered during quarter | 20 | Year Treatment Success Rate of new bacteriologically positive cases during above quarter :	Date of Completion of this Form: Name, Signature & Contact no. of Person completed the Form:

Total No of Patients reported during the above quarter			Type of Patients	(1) Cured		(2) Treatment Completed		(3) Died		(4) Failure		(5) Lost to followup Defaulted		(6) Transferred out		(7) Not Evaluated		(1 to 7) Grand Total		
M	F	T	1. New Cases	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	Total
			1.1 Smear Positive																	
			1.2 Xpert MTB/RIF Positive																	
			1.3 Smear Negative																	
			1.4 EP																	
			1.5 Total																	
M	F	T	2. Retreatment																	
			2.1 Relapses																	
			2.2 Failures																	
			2.3 Loss to Follow up/Treatment after Default																	
			2.4 Others (+ve)																	
			2.5 Total																	

TB/HIV activities*

All TB Cases	No. of patient on CPT		No of patients on ART	
	M	F	M	F

* Includes TB Patients continuing on CPT started before TB diagnosis and those started during TB treatment (till last day of TB treatment)

* Includes TB Patients continuing on ART started before TB diagnosis and those started during TB treatment (till last day of TB treatment)

TB 12

NATIONAL TUBERCULOSIS CONTROL PROGRAMME - BANGLADESH

Directorate General of Health Services, Bangladesh.
Quarterly Report on Sputum Conversion at 2/3 Months of Smear Positive/Xpert MTB/RIF positive
Pulmonary TB patients regitered 3-6 months earlier

Name of District: Name of Upazila/Address & Ward No: Name & Signature of UH&FPO/ In-charge of DOTS/ Health Unit:	Patients registered during [ ] quarter [20.....] Year	Date of Completion of this Form: Name, Signature & Contact no. of Person completed the Form:

Total No of Pulmonary Patients reported during the above quarter			Type of Patients	(1) Smear Negative		(2) Smear Positive		(3) Died		(4) Failure		(5) Lost to follow up/Defaulted		(6) Transferred out		(7) Not Evaluated		(1 to 7) Grand Total		
M	F	T	1. New Cases	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	Total
			1.1 Smear Positive																	
			1.2 Xpert MTB/RIF Positive																	
			1.3 Smear Negative																	

Retreatment Cases			2. Retreatment	M	F	M	F	M	F	M	F	M	F	M	F	M	F	M	F	Total
M	F	T	2.1 Relapses																	
			2.2 Failures																	
			2.3 Treatment after loss to follow up/Default																	
			2.4 Others																	
			2.5 Total																	

Sputum Conversion Rate of Smear positive cases

New ..... Retreatment .....

TB 13

Lab Report Form

National Tuberculosis Control Programme, Bangladesh

QUARTERLY REPORT ON LAB FINDINGS OF TUBERCULOSIS

Centre: _____ Upazila: _____ District: _____ Division: _____

Name of Lab technologist: _____ Date of report preparation: _____

Technologist trained by the NTP: Yes (year:)/ No No. of microscope in running condition: _____

Quarter/ Year	Diagnosis Examinations (Case Finding)					
	Presumptive TB cases tested (No. of people tested) (a)	AFB positive cases (No. of positive people) (b)	Smears tested (No. of smears tested) (c)	Positive smears		Only one sample tested (f)
				(1+, 2+ & 3+) (d)	Scanty (1-9AFB/100) (e)	

Follow-up Examinations		
Smears tested (No. of smears tested) (g)	Positive smears	
	(1+, 2+ & 3+) (h)	Scanty (1-9AFB/100) (i)

Diagnosis by Xpert MTB/RIF				
Presumptive TB cases tested (No. of people tested) (j)	Results			
	RR=MTB detected, Rif resistance detected (k)	T= MTB detected, Rif resistance not detected (l)	N=MTB not detected (m)	I=invalid/no result/error (n)

Total no. of smears tested (c+g) *1	(W)
Total no. of (1+, 2+ & 3+) smears (d+h) *2	(X)
Total no. of Scanty smears (e+i) *2	(Y)
Total no. of Negative smears (W-X-Y) *2	(Z)
Positive rate among TB suspects (%) *3	(b)/(a) x100 %
Positive rate among Follow-ups (%) *3	(h+i)/(g) x100 %

Problems identified and supports required by the Centre from NTP/EQA centre:

_____

_____

*1 This data will be used for planning of supplies.
*2 This data will be used for quarterly report of re-checking in EQA centre.
*3 This could be used to monitor programme performance.

Copy to:
Respective EQA centre

Prepared by:
Lab Technologist NTRL/RTRL Coordinator/UH&FPO / Jr. Consultant / NGO Clinic Manager

Approved by:
UH&FPO / Jr. Consultant / NGO Clinic Manager

EQA form 1

National Tuberculosis Control Programme, Bangladesh

RE-CHECKING OF SPUTUM SMEARS FOR AFB

Master Form and Feed Back Form to Microscopy Centre

Microscopy centre: _____ 1st controller: _____

Lab technologist: _____ 2nd controller: _____

Sampling by : _____ Period covered by sample: _____

* Signature of in charge of the facility: _____ Sampling date: _____

* In charge of each microscopy centre or his/her equivalent will sign on here for approval when random sampling carried out by EQA supervisor

	Microscopy Results	Evaluation of				
Slide no. of Microscopy centre	Microscopy centre (MC)	1st control (1st C)	2nd control (2nd C)	MC (MC vs. 2ndC)	1st control (1stC vs. 2ndC)	Remarks

		Result by Microscopy Centre					
		Neg	1-9AFB/100	1+	2+	3+	Total
Result by 2nd control	Neg	Correct	SFP	HFP	HFP	HFP	
	1-9AFB/100	SFN	Correct	Correct	QE	QE	
	1+	HFN	Correct	Correct	Correct	QE	
	2+	HFN	QE	Correct	Correct	Correct	
	3+	HFN	QE	QE	Correct	Correct	
	Total						

HFP: High False Positive, HFN: High False Negative

SFP : Scanty False Positive, SFN: Scanty False Negative, QE: Quantification Error

Numbers of errors on microscopy centre detected by 2nd control	Major error		Minor error		
	HFP	HFN	SFP	SFN	QE

Over all comment:

_____

_____

_____

_____

_____

_____

After discordant slide(s) are checked by 2nd controller and fill-in the form then feed-back to:

- Respective microscopy centre

Prepared by:

EQA coordinator, EQA controller

EQA form 2

National Tuberculosis Control Programme, Bangladesh

RE-CHECKING OF SPUTUM SMEARS FOR AFB
List of Discordant between Microscopy Centre and EQA 1st Control

District: _____
(Use different sheet for each district)
Date: _____

1st controller: _____
2nd controller: _____
Period covered by sample: _____

ID & Name of microscopy centre checked	Slide No.	Microscopy results			Remarks
		(Result 1)	(Result 2)	EQA 2nd control	

Comments: _____

After completed by 2nd control copy to:

EQA Coordinator will:

- EQA Coordinator
- Fill-up bracket ( ) under the result 1 & 2 to identify centres that of 1st control & microscopy centre then make a copy & send to NTP with EQA 3 form

EQA form 3

National Tuberculosis Control Programme, Bangladesh

Re-Checking Of Sputum Smears For Afb

Quarterly Report Form

District: _____ EQA (1st control) centre: _____ 1st controller: _____

(Use different sheet for each district)

Period : 1st Quarter / 2nd Quarter / 3rd Quarter / 4th Quarter 2nd controller: _____

Year: _____ EQA coordinator: _____

ID & Name of Microscopy Centre checked	No. of smears tested during the period			No. of smears re-checked			No. of errors detected in re-checking *2				
	Positive (1+, 2+ & 3+)	Scanty (1-9AFB/100)	Negative	Positive (1+, 2+ & 3+)	Scanty (1-9AFB/100)	Negative	Major error		Minor error		
							H FP	H FN	S FP	S FN	Q E
	(X)*1	(Y)*1	(Z) *1	a	b	c	d	e	f	g	h
District Total											

*1 This data should be same as quarterly report on lab findings of TB
*2 Microscopy centre result compared to 2nd control's result
*3 1st control's result compared to 2nd control's result

EQA Coordinator is responsible to prepare this quarterly.
Copy to: NTP

No. of result by 1st controller			Evaluation of the 1st controller *3				
			Major error		Minor error		
Positive (1+, 2+ & 3+)	Scanty (1-9AFB/100)	Negative	HFP	HFN	SFP	SFN	QE

Prepared by:
EQA coordinator, EQA controller

EQA form 4

National Tuberculosis Control Programme, Bangladesh

Report on Lab Findings of Tuberculosis

Quarterly Report Form

District: _____ EQA (1st control) centre:

(Use different sheet for each district)

1st controller: _____

Period : 1st Quarter / 2nd Quarter / 3rd Quarter / 4th Quarter

EQA coordinator: _____

Year: _____

ID & Name of Microscopy Centre	Diagnosis Examinations (Case Finding)						Follow-up Examinations			Training by NTP	
	TB suspects tested (No. of people tested)	AFB positivecases (No. of positivepeople)	Smears tested(No. of smearstested)	Positive smears		Only one sample tested	Smears tested(No. of smearstested)	Positive smears		Yes	No
				(1+, 2+ & 3+)	Scanty (1-9AFB/100)			(1+, 2+ & 3+)	Scanty (1-9AFB/100)		
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)		
District Total											

EQA Coordinator is responsible to prepare this quarterly.
Copy to: NTP

Prepared by:
EQA coordinator, EQA controller

EQA form 5

National Tuberculosis Control Programme, Bangladesh

Monitoring Tool for Re-checking of Sputum Smears for AFB

Year: _____

Name of Lab: _____ District: _____

Month /Quarter	No. of smears tested during the period			No. of smears re-checked			No. of errors detected in re-checking							Assessment of smear preparation					
	Positive (1+, 2+ & 3+)	Scanty (1-9AFB/100)	Negative	Positive (1+, 2+ & 3+)	Scanty (1-9AFB/100)	Negative	Major error		Minor error			Total error(s)	% Total error	Sputum quality	Stain -ing	Clen -ness	Thick -ness	Size	Even -ness
							HFP	HFN	SFP	SFN	QE								
	(X)	(Y)	(Z)	a	b	c	d	e	f	g	h	(d+e+f+g+h)	i/(a+b+c) x100	Number of smears assessed as good					
January																			
February																			
March																			
1st quarter																			
April																			
May																			
June																			
2nd quarter																			
July																			
August																			
September																			
3rd quarter																			
October																			
November																			
December																			
4th quarter																			
Annual													%						

- This is monitoring tool for EQA Coordinator/EQA Centre. Prepare this form for each microscopy centre and fill-in with information/data obtained from lab findings report and re-checking of sputum smear.

Annex-3

National Tuberculosis Control Programme-Bangladesh

Directorate General of Health Services

Mohakhali, Dhaka

Supervision Check List

Date of Visit: _____

Name of Centre: _____

Address: _____

Catchments Population: _____

Estimated Number of TB patients (All Forms): _____

Name of Supervisor: _____

Follow up of previous visit

Date of last visit: …….. / …….. / 2000

Problems identified and recommendations of last visit:

_____

_____

_____

_____

_____

Status of implementation according to recommendations:

_____

_____

_____

_____

_____

Training status of health worker (s), including laboratory technologist, at the time of the visit:

1. Number of health worker(s) directly involved in TB Control Programmeme
   - i) Health Center ☐
   - ii) Peripheral Health Workers ☐
2. Number of Health Worker(s) present on the day of visit ☐
3. Interview with health workers/DOTS providers (If available during visit):
   - * Knowledge of the disease — Satisfactory ☐ Unsatisfactory ☐
   - * Do they refer suspects — Yes ☐ No ☐
   - * Do they supervise treatment — Yes ☐ No ☐
   - * Do they follow-up drug reaction cases — Yes ☐ No ☐

4. Interview some patients to check their knowledge and satisfaction of services available (Answered satisfactorily)

- Name of the disease he/she is suffering from? Yes ☐ No ☐
- How can we suspect whether a person has TB or not? Yes ☐ No ☐
- Duration of treatment Yes ☐ No ☐
- Understanding of irregular treatment Yes ☐ No ☐
- Danger of irregular treatment Yes ☐ No ☐
- Availability of free treatment (who and where) Yes ☐ No ☐

5. Availability of NTP manual / Laboratory Manual (Available) Yes ☐ No ☐

6. Documentation:

6.1 Treatment Cards

Complete ☐ Incomplete ☐

6.2 Laboratory register (check last quarter)

a. Number of suspect with negative smear ☐ e. Number of cases registered in TB register ☐

b. Number of suspect with positive smear ☐ f. No. of +ve smear among follow-up exam ☐

c. No. of follow up examination ☐ g. Case/Smear positivity rate ☐

d. No. suspects with 1 smear examination ☐ h. % of suspects with 1 smear examination ☐

6.3 TB register: Yes ☐ No ☐

6.4 Patient Statistics (Available)

i. Case registered Yes ☐ No ☐

ii. Sputum conversion Yes ☐ No ☐

iii. Treatment outcome Yes ☐ No ☐

7. Laboratory services:

7.1 Microscope functioning

i. Presence of fungus Yes ☐ No ☐

ii. Preservation of Microscope Yes ☐ No ☐

iii. Stock of slides Sufficient ☐ Insufficient ☐

iv. Stock of containers Sufficient ☐ Insufficient ☐

v. Lab regents Sufficient ☐ Insufficient ☐

7.2 Reagents (Carbol fuchsine, methyl blue, HCL etc) Sufficient ☐ Insufficient ☐ Absent ☐

7.3 Date of last supply

7.4 Examining slides

7.4.1 Size of the smear appropriate ☐ Inappropriate ☐

7.4.2 Thickness of the smear appropriate ☐ Inappropriate ☐

7.4.3 Evenness appropriate ☐ Inappropriate ☐

7.4.4 Staining of slides appropriate ☐ Inappropriate ☐

7.5 Quality Assurance in place Yes ☐ No ☐

7.6 Regular Collection of slides for EQA Yes ☐ No ☐

7.7 Feed back of EQA available Yes ☐ No ☐

7.8 Action taken Yes ☐ No ☐

7.9 Disposal of lab. wastage (properly done) Yes ☐ No ☐

8. TB register

8.1 Information of patients Complete ☐ incomplete ☐

8.2 Cross check whether all +ve from lab register are registered Yes ☐ No ☐

9. Patients statistics:

9.1 No. of all cases registered: ☐

9.1.1 Case Notification rate (all cases): ☐

9.1.2 Case detection rate (all cases): (No. of all cases in last 4 quarter x 100)/ No. of expected cases for a year ☐

9.2 No. of new smear +ve cases registered: ☐

9.2.1 Case notification rate NSP: (No. of NSP cases in last 4 quarter x 100000)/Population:

9.3 No. of patients referred by private practitioner: +ve ☐ -ve ☐ EP ☐

9.4 Check for the correctness of the last quarter report

9.4.1 Sputum conversion Correct ☐ Incorrect ☐

(No. of new smear +ve cases that became negative at the end of the intensive phase/No. of new smear positive cases registered previous quarter) ☐/☐

9.4.2 Treatment success rate: ☐ Correct ☐ Incorrect ☐

(No. of new smear positive cured / No. of new smear positive cases registered of 9-12 months ago) ☐/☐

10. Drug Management and other logistics

10.1 Drugs stock

10.1.1 Drugs available for full quarter with reserve stock Sufficient ☐ Insufficient ☐

10.1.2 Anti-TB drugs are stored in cool and dry space and labeled appropriately Yes ☐ No ☐

(a) Cool and dry space Yes ☐ No ☐

(b) Labeled appropriately Yes ☐ No ☐

(c) Temperature chart maintained Yes ☐ No ☐

10.1.3 Bin Card (Available) Yes ☐ No ☐

10.1.4 FEFO principle (Applying) Yes ☐ No ☐

10.1.5 Expiratory statement (Available) Yes ☐ No ☐

10.1.6 Are stock ledger updated with information of all receipt, deliveries and signed by responsible officer?

Yes ☐ No ☐ Please specify, if no ☐

10.1.7 Are stores maintained with exhaust fan/ well ventilated?

Yes ☐ No ☐ Please specify, if no ☐

10.2 Other logistics

i. Form/cards/register Sufficient ☐ Insufficient ☐

11. ACSM Activities:

i. Presence of Posters / Sticker Yes ☐ No ☐

ii. Display of poster / sticker Yes ☐ No ☐

iii. Presence, distribution and use of educational materials (Leaflet, flip, char, flash chart, brochure) Yes ☐ No ☐

iv. Signboard with DOTS facilities in front of health center Yes ☐ No ☐

v. Health education on TB by health facility Yes ☐ No ☐

vi. DOTS committee meeting held regularly Yes ☐ No ☐

vii. DOTS committee meeting minutes available Yes ☐ No ☐

12. Infection Control:

12.1 Any designated person/coordinating body to supervise TB infection control in the facility

Yes ☐ No ☐ Comment ☐

12.2 How many health care workers have been trained in TB infection control

Yes ☐ No ☐ Comment ☐

12.3. Have any ACSM/IEC materials (for example leaflets, stickers, posters on cough etiquette) are in place

Yes ☐ No ☐ Comment ☐

12.4. Appropriate ventilation present in facility

Yes ☐ No ☐ Comment ☐

12.5. Provision for separation and fast track in place

Yes ☐ No ☐ Comment ☐

12.6. Sputum collection, slide processing and disposal are being ensured following guideline

Yes ☐ No ☐ Comment ☐

13. TB/HIV

13.1 No of TB patients screened for HIV in last quarter ☐

13.2 No of TB patient found HIV positive in last quarter ☐

13.3 No of PLWHIV in last quarter screened for TB in last quarter ☐

13.4 No of TB cases diagnosed among total PLWHIV examined in last quarter ☐

14. DR TB:

14.1 No. of DR TB suspects referred for diagnosis in last quarter ☐

14.2 No of DR TB patients confirmed among them ☐

14.3 No of DR TB patients under treatment ☐

14.4 Have health care workers been trained in MDR TB Yes ☐ No ☐

14.5 Documents updated (Register, Treatment card) Yes ☐ No ☐ Not available ☐

14.6 Interview with health workers/DOT providers/Patiuent (If available during visit): ☐

14.6.1 DOT provider's Knowledge of the disease and treatment satisfactory ☐ Not satisfactory ☐

14.6.2 Patient's Knowledge of the disease and treatment satisfactory ☐ Not satisfactory ☐

15. PAL (If visiting place is UHC):

15.1 PAL activities initiated Yes ☐ No ☐

15.2 If initiated no of TB patients identified through PAL activities in last quarter ☐

16. ETB manager activities in place Yes ☐ No ☐

17. Childhood TB:

17.1 Number of under-5 children eligible for IPT in last quarter ☐ ☐

17.2 Number of under-5 children registered for IPT in last quarter ☐ ☐

18. Name and designation of key personnel's present during supervision:

1. .....

2. .....

3. .....

19. Summary of major findings

_____

_____

_____

_____

_____

_____

_____

20. Recommendation / Comments of supervisor

_____

_____

_____

_____

_____

_____

_____

21. Name of Supervisor/s with signature:

1.

2.

How to calculate:

Case notification rate (CNR) : Number of cases registered and reported to NTP per one hundred thousand population per year.

CNR = (Number of cases registered in last 4 quarter / Total population) x 100,000

Case detection rate (CDR): Number of cases detected expressed as a percentage of cases estimated to occur during a period of one year.

CDR = (Number of cases registered in last 4 quarter / No. of estimated cases in last 4 quarter) X 100

Treatment success rate: Total number of new smear-positive cases who were declared "cured" or "Treatment Completed" X 100 / total number of new smear-positive cases registered in the same period.

Annex-4

Quantities of Drug needed for the different categories of patients Quantities needed for Cat I, adult patients (body weight 38-54 kg) 2(RHZE/4(RH):

INTENSIVE PHASE: (DAILY)	DOSE	NO. OF TABLETS PER ADULT PATIENT
4 FDC tablet containing: R 150 mg/H75 mg/Z400 mg/E275 mg	3 tablet daily for 60 doses	60 X 3 = 180

CONTINUATION PHASE: (DAILY)	DOSE	NO. OF TABLETS PER ADULT PATIENT
2 FDC tablet containing: R 150 mg/H75 mg	3 tablets daily for 4 months = 120 doses	120 X 3 = 360

Quantities needed for Cat II, adult patients (body weight 38-54 kg): 2S(RHZE)/1(RHZE)/5(RHE)

INTENSIVE PHASE: (DAILY)	DOSE	NO. OF TABLETS /INJECTION PER ADULT PATIENT
4 FDC tablet containing: R 150 mg/H75 mg/Z400 mg/E275 mg Streptomycin vials 1 gm Water for injection vials use with Streptomycin	3 tablets daily for 90 doses 1 vials daily for 60 doses 1 vials daily for 60 doses	90 X 3 = 270 60 60

CONTINUATION PHASE: (DAILY)	DOSE	NO. OF TABLETS PER ADULT PATIENT
3 FDC tablet containing: R 150 mg/H75 mg/E 275 mg	3 tablets daily for 5 months = 150 doses	150 X 3 = 450

Quantities needed for all children:
2(RHZ)E/4(RH)

INTENSIVE PHASE: (DAILY)	DOSE	NO. OF TABLETS PER CHILD PATIENT
3 FDC tablet containing: R 60 mg/H30 mg/Z150 mg Ethambutol 100 mg	3 tabs daily for 60 doses 3 tabs daily for 60 doses	60 X 3 = 180 60 X 3 = 180

CONTINUATION PHASE: (DAILY)	DOSE	NO. OF TABLETS PER ADULT PATIENT
2 FDC tablet containing: R 60 mg/H30 mg 2 FDC tablet containing: R 60 mg/H60 mg * for children weighing 20 kg or more	3 tablets daily for 4 months = 120 doses 3 tablets daily for 4 months = 120 doses	120 X 3 = 360 120 X 3 = 360

Annex-5 A

NATIONAL TUBERCULOSIS CONTROL PROGRAMME
Directorate General of Health Services, Bangladesh
Laboratory supply request form of District or EQA lab level to Central (Quarterly)

Name of District/EQA Centre: _____ Date of request: _____

(A) : Number of total smears tested in previous quarter: (B) : Number of microscopy centres:

	Factor (C)		Calculation*		Amount calculated (D)	Amount in stock (E)	Amount indented (F) = (D x 2 - E)	Amount received	Remarks
Basic fuchsin	0.03	g	A x C	=	g	g	g	g	Reagent preparation centre only
Phenol crystals	0.15	g	A x C	=	g	g	g	g	Reagent preparation centre only
Methanol (or denatured ethanol)	0.30	ml	A x C	=	ml	ml	ml	ml	Reagent preparation centre only
Methylene blue	0.003	g	A x C	=	g	g	g	g	Reagent preparation centre only
Sulphuric acid cone.	1.50	ml	A x C	=	ml	ml	ml	ml	Reagent preparation centre only
Burning spirit	1.50	ml	A x C	=	ml	ml	ml	ml	
Slides	1	pc	A x C	=	pc	pc	pc	pc	
Sputum containers	1	pc	A x C	=	pc	pc	pc	pc	
Immersion oil	0.05	ml	A x C	=	ml	ml	ml	ml	
Xylene	25	ml/MC	B x C	=	ml	ml	ml	ml	EQA centre only
Filter paper	100	pc/MC	B x C	=	pc	pc	pc	pc	
Request form (TB 05)	1	pc	A x C	=	pc	pc	pc	pc	
						(E)	Amount required		
Lab register (TB 04)	1	book				book	book	book	
Diamond pencil	1	pc				pc	pc	pc	
Slide box	1	pc				pc	pc	pc	

MC: microscopy centre
* Calculations based on consumption of 3ml Carbol-fuchsin solution & Methylene blue solution and 6ml 25% Sulphuric acid solution per slide

Annex-5 B

NATIONAL TUBERCULOSIS CONTROL PROGRAMME
Directorate General of Health Services, Bangladesh
Laboratory supply request form of periphery lab level to District or EQA Lab (Quarterly)

Name of Laboratory: _____ Date of request:_____

(A) : Number of total smears tested in previous quarter: ____

(B) : Number of person tested of previous quarter: (both diagnosis & follow-up) ____

	Factor		Calculation*		Amount calculated	Amount in stock	Amount indented	Amount received
Reagents	(C)				(D)	(E)**	(F) = (D x 1.5)-(E)	
Carbol fuchsin (1%) solution	3.0	ml/sm	A x C	=	ml	ml	ml	ml
Methylene blue (0.1%)	3.0	ml/sm	A x C	=	ml	ml	ml	ml
Sulphuric acid (25%)	6.0	ml/sm	A x C	=	ml	ml	ml	ml
	(C)				(D)	(E)	(F) = (D x 2 - E)	
Burning spirit	1.5	ml/sm	A x C	=	ml	ml	ml	ml
Slides	1	pc/sm	A x C	=	pc	pc	pc	pc
Sputum containers	1	pc/sm	A x C	=	pc	pc	pc	pc
Immersion oil	0.05	ml/sm	A x C	=	ml	ml	ml	ml
Filter papers	100	pc/MC	1 x C	=	pc	pc	pc	pc
Request form (TB 05)	1	pc/person	B x C	=	pc	pc	pc	pc
						(E)	Amount required	
Lab register (TB 04)						book	book	book
Diamond pencil						pc	pc	pc
Slide box						pc	pc	pc

sm: smear, MC: microscopy centre
* Calculations based on consumption of 3ml Carbol-fuchsin solution & Methylene blue solution and 6ml 25% Sulphuric acid solution per slide
** Only reagents that have more than one month of shelf-life would be considered as stock

Annex-6

Laboratory supply request form of District or EQA lab level to Central (Quarterly)

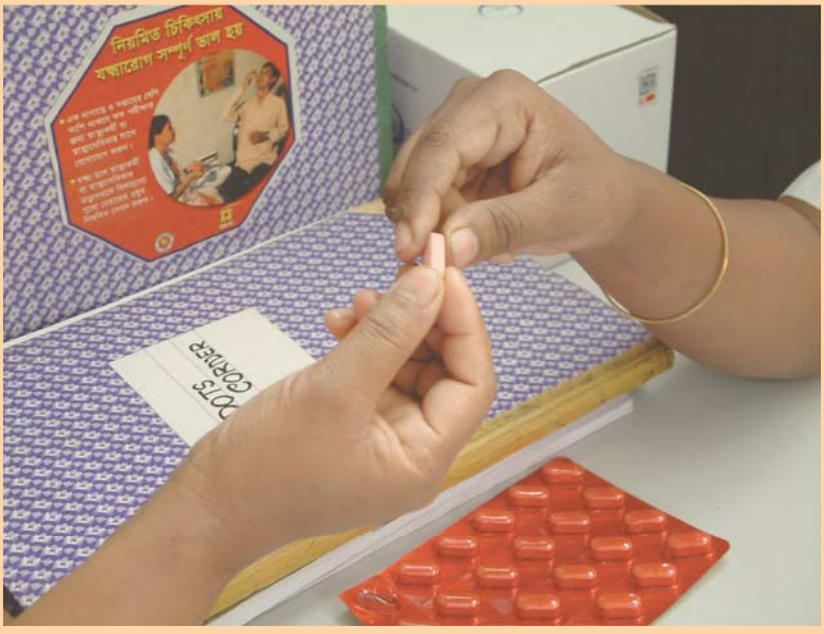
Name of District/EQA Centre: _____ Date of request: _____

(A): Number oftotal smears testedin previous quarter: | | (B): Number of microscopy centres: | |

	Factor (C)	Calculation*	Amount calculated (D)	Amount in stock (E)	Amount indented (F) = (D x 2 -E)	Amount received	Remarks
Auramine O	0.003 g	A x C =	g	g	g	g	Reagent preparation centre only
Phenol crystals	0.09 g	A x C =	g	g	g	g	Reagent preparation centre only
Methanol (or denatured ethanol)	6.27 ml	A x C =	ml	ml	ml	ml	Reagent preparation centre only
Methylene blue	0.009 g	A x C =	g	g	g	g	Reagent preparation centre only
37% hydrochloric acid	0.015 ml	A x C =	ml	ml	ml	ml	Reagent preparation centre only
Burning spirit	1.50 ml	A x C =	ml	ml	ml	ml	
Slides	1 pc	A x C =	pc	pc	pc	pc	
Sputum containers	1 pc	A x C =	pc	pc	pc	pc	
Filter paper	100 pc/MC	A x C =	pc	pc	pc	pc	
Request form (TB 05)	1 pc	A x C =	pc	pc	pc	pc	
				(E)	Amount required		
Lab register (TB 04)	1 book			book	book	book	
Diamond pencil	1 pc			pc	pc	pc	
Slide box	1 pc			pc	pc	pc	

MC: microscopy centre

* Calculations based on consumption of 3ml 0.1% auramine 0 & Methylene blue solution and 6ml 0.5% acid alcohol per smear



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