NATIONAL STRATEGIC PLAN TO END TUBERCULOSIS IN BANGLADESH 2024 - 2030

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Public Private Mix (PPM) National Strategic Plan to END TB in BANGLADESH 2023-2026

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FOREWORD

ACKNOWLEDGMENTS

The National Strategic Plan (NSP) to END TB in Bangladesh 2024 2030 represents the leadership and commitment of Government of Bangladesh to further accelerate its mission towards ending TB. The National Tuberculosis Control Program (NTP), Directorate General of Health Service (DGHS), Ministry of Health & Family Welfare, Government of Bangladesh, wishes to acknowledge the support of the numerous individuals and development partners who have worked to revise, refresh and prepare the National Strategic Plan for TB elimination Bangladesh.

This NSP is the result of work of numerous experts from national and international organizations, whose insights have been crucial in shaping the NSP. Numerous other stakeholders, academia, and institutions, have also contributed by their valuable inputs into the draft strategy during the consultative meetings.

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A detailed list of the working group members is appended at Annex 6.

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ABBREVIATIONS

ACF	Active Case Finding
ACSM	Advocacy, Communication and Social Mobilization
ADR	Adverse Drug Reactions
aDSM	active Drug Safety Monitoring
AFB	Acid-Fast Bacillus
AHI	Assistant Health Inspectors
AIDS	Acquired Immuno- Deficiency Syndrome
ART	Antiretroviral Therapy
BBS	Bangladesh Bureau of Statistics
BDHS	Bangladesh Demographic and Health Survey
BDR	Bangladesh Rifles
BGB	Bangladesh Border Guard
BGMEA	Bangladesh Garments Manufacturers and Exporters Association
BMA	Bangladesh Medical Association
BMDC	Bangladesh Medical and Dental Council
BMRC	Bangladesh Medical Research Council
BMU	Basic Management Unit
BNMC	Bangladesh Nursing and Midwifery Council
BPaL	Bedaquiline + Pretomanid + High-Dose Linezolid
BPaL M	Bedaquiline + Pretomanid + Linezolid + Moxifloxacin
BRAC	Building Resources Across Communities
BSL	Bio-safety Lab
CAD	Computer aided diagnostics
CC	Community Clinics
CDC	Chest Disease Clinic
CDH	Chest Disease Hospital
CHCP	Community Health Care Providers
CHW	Community Health Worker
CMSD	Central Medical Storage Depot
COE	Center of Excellence
CRG	Community, Rights and Gender
CS	Civil Surgeon
CSR	Corporate Social Responsibility
CT	Contact Tracing
CWH	Central Warehouse
DIC	Drop-in Centers
DGHED	Directorate General of Health Engineering Department
DGDA	Directorate General of Drug Administration
DGFP	Directorate General of Family Planning
DGHS	Directorate General of Health Services
DHIS	District Health Information System
DHS	Demographic and Health Survey
DM	Diabetes mellitus
DNS	Directorate of Nursing Services
DOTS	Directly Observed Short Course
DRS	Drug Resistance Survey
DST	Drug Susceptibility Testing
EDCL	Essential Drugs Company Limited
EPI	Expanded Programme on Immunization
EPTB	Extra Pulmonary Tuberculosis
EPZ	Export Processing Zone
EQA	External Quality Assessment
ESD	Essential Service Delivery
ESP	Essential Service Package
e-TB	Electronic TB data management system
FAST	Find (TB patients) Actively, Separation (of infectious TB patients and Treatment (with appropriate drugs)
FDC	Fixed Drug Combinations
FLD	First Line Drugs
FM	Fluorescence Microscopy
FNAC	Fine Needle Aspiration Cytology
FP	Family Planning
FSW	Female Sex Workers
FYP	Five Year Plan
GDP	Gross Domestic Product
GDF	Global Drug Facility
GOB	Government of Bangladesh
GFATM	Global Fund to Fight AIDS, Tuberculosis and Malaria
HA	Health Assistants
HCW	Health care workers
HRH	Human Resource for Health
DGHEU	Directorate General of Health Economics Unit
HIES	Household Income and Expenditure Survey
HIV	Human Immuno-deficiency Virus
HMIS	Health Management Information System
HPNSDP	Health, Population and Nutrition Sector Development Programme
HPSP	Health and Population Sector Programme

HRD	Human Resource Development
HRH	Human Resources for Health
IC	Infection Control
icddr, b	International Centre for Diarrheal Disease Research, Bangladesh
IDF	International Diabetes Federation
IDU	Injecting Drug Users
IDH	Infectious Disease Hospital
IHT	Institute of Health Technology
IMCH	Integrated Management of Childhood Illnesses
IPT	Isoniazid Preventive Therapy
IPRSP	Interim Poverty Reduction Strategy Paper
JMM	Joint Monitoring Mission
KAP	Key Affected Populations
KAP	Knowledge, Attitude and Practice
KPI	Key Performance Indicators
LED-FM	Light Emitting Diode Fluorescence Microscopy
LLA	Local Level Advocacy
LLP	Local Level Planning
LMIS	Logistics Management Information System
LPA	Line Probe Assay
LTBI	Latent tuberculosis infection
LTCA	Leprosy and Tuberculosis Control Assistant
NGO	Non-Governmental Organization
MARPS	Most at Risk Populations
MBDC	Mycobacterial Disease Control
MC	Microscopy Centre
MCH	Maternal and Child Health
M&E	Monitoring and Evaluation
MDR-TB	Multi-Drug Resistant TB
MNCH	Maternal, Neonatal and Child Health
MO	Medical Officer
MOHFW	Ministry of Health and Family Welfare
MOLGRD	Ministry of Local Government, Rural Development and Co-operatives
MoU	Memorandum of Understanding
MSM	Men who have sex with men
MTB/RIF	Mycobacterium tuberculosis /resistance to rifampicin
MAF	Multisectoral Accountability Framework
NACP	National AIDS Control Program
NEMEW	National Electro-medical and Engineering Workshop
NIDCH	National Institute of Diseases of the Chest and Hospital
NIPSOM	National Institute of Preventive and Social Medicine
NRL	National Reference Laboratory
NSP	National Strategic Plan
NTP	National TB Control Program
NTRL	National TB Reference Laboratory
OPD	Outpatient Department
OR	Operational Research
PLHIV	People living with HIV
PDS	Public Distribution System
PMDT	Programmatic Management of Drug-Resistant TB
PO	Programme Organizer
PPM	Public-Private Mix
PPP	Public Private Partnership
PR	Principal Recipient
PSM	Procurement and Supply Management
PWID	People who inject drugs
QC	Quality Control
ROI	Return on Investment
R&R	Recording and Reporting
RR-TB	Rifampicin-resistant TB
RSSH	Resilient and Sustainable Systems for Health
SCC	Sputum Collection Centre
SDG	Sustainable Development Goal(s)
SEM	Social Enterprise Model
SK	Shasthya Kormi
SLD	Second Line Drugs
SMS	Short Message Service
SRL	Supranational Reference Laboratory
SOP	Standard Operating Procedure
SS	Shastyo Shabikas (Lady Health Workers)
SVRS	Sample Vital Registration System
TEMO	Transport and Equipment Maintenance Organization
TLCA	TB and Leprosy Control Assistant
TPT	Treatment for Preventive Therapy
TT	Tetanus Toxoid
TB	Tuberculosis
UH&FPO	Upazila Health and Family Planning Officer
UHC	Upazila Health Complex
UNHLM	UN high-level meeting
UPS	Un-interrupted Power Supply
VCT	Voluntary Counseling and Testing
VGD	Vulnerable Group Development
WB	World Bank
WHA	World Health Assembly
WHO	World Health Organization
WIMS	Warehouse Inventory Management System
ZN	Ziehl-Neelsen Microscopy

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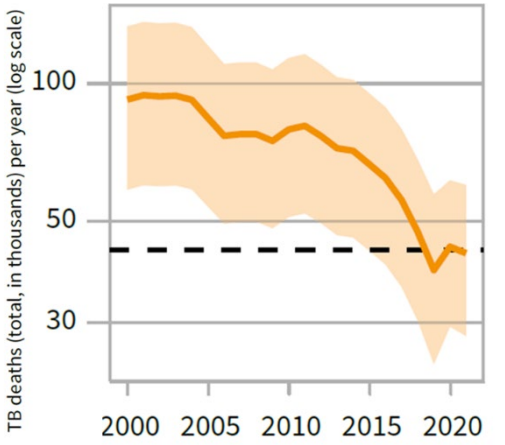
Figure 1: Bangladesh achieved first END TB milestone



The National Strategic Plan (NSP) to END Tuberculosis in Bangladesh 2024 2030 sets out the direction and key initiatives that will guide the country towards achieving the goal of ending TB by 2035[1] in Bangladesh. Following the dip in TB notification in 2020 as a result of the COVID-19 pandemic, TB notification rapidly and robustly recovered to reach pre-COVID-19 levels, which includes the highest ever notification level for the country in 2021 which led to an increase in treatment coverage to 82%. Bangladesh has implemented innovative measures to address service disruptions and mitigate the impact of the COVID-19 pandemic on TB programs. The epidemiological analysis conducted shows a steady increase in TB notification with a decreasing gap between estimated incident cases and number notified in Bangladesh. Over 80% of estimated people with TB are now identified. Treatment success rates for both drug susceptible (DS-TB) and multi -drug resistant (MDR-TB) is high (95% for DS-TB and 75% for MDR-TB). The country is also among the high TB burden countries estimated to have reached, by 2021, the first milestone of the End TB Strategy, which was a 35% reduction in the total number of TB deaths between 2015 and 2020 (Figure 1). This was made possible through a steady increase in the annual TB case notification and rapid linkage to good quality treatment and care.

However, 375,000 new TB patients and 42,000 deaths each year in the country and an unrelenting, tenacious Incidence rate which is stagnant over the past three decades are very worrisome. Hence, much more needs to be done to accelerate the progress towards its vision of a TB free Bangladesh. With only eight years left to achieve the 2030 targets, the National TB Programme infuses a sense of urgency in its efforts, with accelerated implementation efforts towards ambitious targets, innovation of programme responses in areas that have not borne sufficient results to date and strengthening of system weaknesses which hamper programme results.
There are **major constraints** limiting progress including:

1. The current levels of finances are insufficient.
2. TB response is largely limited to the health sector with very few interventions that address the social and population level determinants of TB.
3. Limited access to X-ray and WHO recommended rapid diagnostics.
4. Active case finding (ACF) is not yet scaled up to the entire country.
5. Private providers are not engaged commensurate to their size and hospital involvement is incomplete.
6. TB notification though mandatory isn't forthcoming from private sector.
7. Limited geographic coverage of innovative and successful initiatives especially digital solutions.
8. A third of TB patients and their affected families face catastrophic costs due to medical and non-medical expenses and income loss related to TB care.

[1] Achieving the END TB Targets

THE NSP to END TB IN BANGLADESH 2024 -2030

The NSP 2024 2030 is a framework to guide the activities of all stakeholders including the national and state governments, development partners, civil society organizations, international agencies, research institutions, private sector, and many others towards the goal of ending TB in Bangladesh. It articulates the bold and innovative steps required to move towards TB elimination. It is a three year (2024 2026) budgeted plan and a seven year (2024 2030) strategy document that provides objectives, interventions and targets for Bangladesh's response to END TB. It aims to direct the efforts of all stakeholders on the most important interventions or activities that will bring significant decline in the TB incidence, prevalence, and mortality. These strategies and interventions build on the ongoing activities to END TB in the country. This NSP supplements previous strategies and will inform and guide the technical and operational guidelines revisions and associated programme modifications.

Bangladesh is moving towards ending the epidemic of TB which will need a paradigm shift in approach and strategy. This NSP addresses requirements for achieving the UNLHM, SDG and End TB targets for the country and is driven by the **FIND-TREAT-PREVENT- STRENGTHEN HEALTH SYSTEM and SUSTAIN SUPPORTIVE ENVIRONMENT** approach. The focus is on **early identification of presumptive TB cases, diagnosis** of all TB patients at the first interface be it a upazilla health facility, community clinic, or the **private sector** including graduate providers, non-graduate providers, pharmacies or laboratories; **reducing transmission, and treating them best with right drugs and regimens along with suitable patient support systems including financial and nutritional support.** This is supplemented by **prevention strategies** including contact investigation and TB infection treatment for risk groups and airborne infection control. All these (**FIND-TREAT-PREVENT)** functions is supported by creating an enabling environment that provides for adequate resources, responsive, resilient systems, and accountable governance. **Community systems in the country continue to be a major strength** and support for the END TB response especially during the times of emergencies such as cyclones, floods, which the country faces often and also during the COVID19 pandemic. **Contingency planning** to ensure uninterrupted TB services during pandemics and complex emergencies is hence added in the NSP.

The **development of this NSP** has been a **collaborative effort** of all the stakeholders including the government, development partners, civil society organizations, community based organizations and the private sector in Bangladesh. It is led by the NTP and the insights in the plan have emerged from a series of workshops and consultations with the stakeholders, learning's from the implementation of the past NSP, findings and recommendations of the joint monitoring mission, and evidence generated from the pilots, models and approaches tested in the country.

Table 1: TB NSP Indicators

IMPACT INDICATORS	2021	2025	2030
1. To reduce estimated TB Incidence	370,000	290,000	70,000
2. To reduce estimated mortality due to TB	42,000	22,000	6,000
3. To achieve zero catastrophic cost for affected families due to TB*	NA	NA	0

* TB Patient cost survey to estimate the catastrophic has been planned for 2025. Currently the information is available for catastrophic expenditure on health at

CHALLENGES AND OPPORTUNITIES FOR THE NATIONAL TB RESPONSE TO END TB IN BANGLADESH

Notwithstanding the progress, TB continues to be a major public health problem in Bangladesh. The country has the 7th highest burden of TB in the world and it continues to impose significant costs on patients and their families, and it causes big losses to the national economy. The country has a significant prevalence of smoking, diabetes and undernutrition – all of which contribute to driving the TB epidemic.

The **current funding is insufficient**. The total National TB budget for 2021 was $157 million of which **39% remains unfunded** with consequences for programme expansion, innovations and multisectoral interventions. This is despite the fact that an additional $ 75 million was provided to mitigate the impact of COVID on the TB response under the Global Fund's COVID -19 Response Mechanisms (C19RM). There is continued dependency on external funding which creates challenges to sustainability. The Bangladesh government has progressively increased allocation to the NTP since 2017. However, the NTP continues to rely on international funding sources, which accounts for around 60% of the NTP costs. While the country targets are aligned to the UNHLM, SDG, and End TB Strategy the multisectoral collaboration mechanisms to address the social and structural determinants of TB and a "whole of government" approach to TB detection, treatment and prevention for achieving these targets are yet to be set-up.

There are however clear opportunities to END TB which include:

1. The country is amongst the **fastest growing economies** of the world and is moving steadily towards attaining **Universal Health Coverage (UHC)** and **social protection of the entire population**. **Attaining SDGs is a national priority** with monitoring being conducted at the Prime Minister's Office level.
2. The Bangladesh TB programme is **strategically and technically sound and focuse**d, with a strong track record of achieving results and significant implementation capacity built to date.
3. Clear policies, strategies, plans and guidelines for an effective TB response are in place.
4. The country has demonstrated a readiness to adopt and scale up innovations.
5. There exists a long-standing collaboration with the private sector, NGOs and Civil Society across the country with extensive involvement in the entire cascade of TB care of affected individuals and communities.
6. The partnerships with international agencies have been durable and robust.

HIGHLIHTS OF THE NSP TO END TB IN BANGLADESH 2024 2030

The NSP to END TB in Bangladesh 2024 2030, utilizes the opportunities and builds on the ongoing strategies and interventions, It is designed as a rolling plan for seven years and coincides with the SDG milestones and END TB strategy goals. TB elimination is poised at a crucial juncture with a "tenacious" incidence rate of TB that hasn't declined over the last three decades, and an under resourced national response. A Joint Monitoring Mission (JMM) in Oct 2022 provides insights on where the TB strategies and activities were successful and where roadblocks occurred and how to "bend the incidence curve". The JMM findings and recommendations is one of the key guiding documents in the development of the NSP along with the epidemiological review 2022, TB epidemic mathematical modelling based projections, and various national guidelines/documents on TB control in the country. The **key features** of the NSP are as follows:

1. The **major focus** over the next seven years **till 2030** is to **address the population and social determinants for TB** in addition to **strengthening and expanding the bio medical response to catalyze a decline in the TB incidence which has been stable for the past three decades.**

2. The NSP uses an approach to **FIND – TREAT - PREVENT TB** and calls to **STRENGTHEN the HEALTH SYSTEM and SUSTAIN AN ENABLING ENVIRONMENT** to support the first three pillars. **This NSP focuses its attention to addressing the social and population level determinants of TB in addition to its biomedical response to "bend the stagnant incidence rate" which is stagnant at around 220 TB patients 100,000 population over the last three decades.**

3. It uses a **sector wide approach** to address the disease with **extensive inter-ministerial and multi sectoral collaborations** envisaged.

4. It is a **seven year strategy document** out of which the first 3 years (2024 2026) will be budgeted to coincide with the Global Fund grant. However Financial and Epidemiological projections have been provided till 2030. The NSP highlights the NTP's strategic priorities and explains to a certain extent how and by whom these will be addressed. The implementation mechanisms to address these priorities is expected to be further detailed in the Divisional and District level operational plans and national plans viz the PPM NSP, the MAF TB Operational Plan, the Lab Plan, etc.

5. The NSP is aligned with the End TB Strategy and TB-related Sustainable Development Goals (SDG) targets, and actions/targets agreed in the first UNHLM on TB. It considers the country's long-term development aims as expressed by the Government's Vision 2041 document. Vision 2041 seeks to END extreme poverty and reach Upper Middle-Income Country (UMIC) status by 2031, and High-Income Country (HIC) status by 2041 with poverty approaching extinction.

MAJOR ACTIONS DURING THE NSP PERIOD

1. **Securing and sustaining enhanced funding to End TB in Bangladesh:** Current financing is only half of what is required to meet committed targets. Given the global currents limiting the national capacity to enhance funding, NTP will look at newer alternative streams of funding to fund the NSP activities. Enhanced future levels of funding are expected to gradually close the current financing gap.

2. **Aligning the End TB interventions with broader Universal Health Coverage (UHC) movement**. The alignment with the broader UHC movement, incorporation of benefits for TB patients and families in the National Social Protection schemes, and integration and collaboration with other public health programmes and initiatives will become increasingly crucial for the sustainable TB response in the near future.

3. **Setting up a high-level mechanism for coordinated national multisectoral approaches to End TB:** Ending TB requires the highest level of political commitment. Moreover, addressing the drivers of the TB epidemic requires inputs from multiple sectors beyond health. Hence, **setting up a high-level mechanism under the patronage of the highest office in the country preferably the Prime Minister's Office** will give a significant push to the TB elimination efforts by directing other ministries beyond health and big business/corporates in TB elimination.

4. **Expanding universal access to digital chest X-ray, molecular WHO recommended rapid diagnostic tests(mWRD), and newer tools for screening and diagnosis:** Introduction of ultra-portable **X-rays equipped with artificial Intelligence (AI)/CAD** to rule out CXR abnormalities and thus address the capacity and capability issues to study X-rays in a timely manner will be a key prerequisite to early diagnosis and treatment. During the NSP period the country will also **expand screening and diagnostic procedures to ensure all presumptive TB patients are tested upfront with mWRDs.** The country will expand testing including **IGRA, TB antigen based skin tests,** and **LF LAM for people living with HIV.** The country will continue to use **LPA for first and second line TB drugs** and new mWRD (like **Xpert XDR assay for second line drugs and INH DST**) as appropriate.

5. Prompt **initiation of and adherence to appropriate treatment** for all people with DS and DR TB with quality assured drugs with proven bioequivalence. The focus will be on **expanding the all oral DR TB regimens**, including 6 month regimens; introducing **4 month DS TB regimen for children with non-severe TB**; **pediatric FDCs and formulations for all forms of TB treatment**; zero day ambulatory treatment for DR TB, and supporting treatment adherence by the use of digital adherence technologies.

6. Continued **scaleup of prevention and treatment of TB Infection** with new shorter, combination therapies (3HP, 1HP and 3HR). **Infection prevention and control** beyond personal protective equipment, through environment and administrative controls will be prioritized.

7. **Engaging private care providers and strengthening the involvement of private hospitals, laboratories, pharmacies, and pediatricians:** Nearly two thirds of presumptive TB patients first approach a private provider. Pharmacies beyond the Social Marketing Company (SMC), Laboratories, and Private hospitals can contribute substantially to early TB case finding in addition to the Graduate, and Non Graduate private providers. Not all private providers and facilities are currently engaged in TB case detection and many public and private hospitals do not notify all diagnosed TB patients. **Expanding the coverage and quality of TB interventions** is expected to yield early diagnosis of TB patients contributing to greater notification during the NSP period.
8. Addressing special need of **vulnerable and key population, including slum dwellers, workers in the garment/knitwear industries, transport workers, cross country and internal migrants and cross-border issues.** The efforts of the NTP is directed towards reaching all key and vulnerable population with **customised and targeted interventions to leave no one behind.**
9. **Strengthening health product management systems and capacities**, incl. accurate quantification and forecasting, timely order placement, e-LMIS scale-up, use, and a systemic approach to CD/VAT clearance from the port. Strengthen the country's first-line medicine production and/or regulatory capacity, in line with the applicable guidance.
10. **Real time data availability** and its **use for strategic decision making** will be enhanced. **The eTB Manager will be transitioned to the NTP**. There will be regular and systemic **monitoring of the patient pathway.**
11. Actions to **reduce TB-related stigma and discrimination**, as per Community, Rights and Gender Action Plan will be undertaken.

TO CONCLUDE

The NSP period 2024 2030 is a time of immense potential with greater attention and action for addressing the social and population level determinants of TB and seeing new drugs, regimens, diagnostics and vaccines. Wider application of digital tools and innovative health financing strategies carry with it a promise for a stronger and accelerated response to the TB epidemic. The national programme is alive to these possibilities and will suitably modify the NSP and the consequent national and subnational level plans to incorporate these new tools.

To conclude, the ultimate impact of this NSP will ensure transformational improvements in the END TB efforts of Bangladesh thereby contributing to the health and wellbeing of its citizens. While NTP awaits new prevention, diagnostic and treatment tools to accelerate a decline in the TB incidence, the programme will continue to invest in being resilient to rapidly respond to complex emergencies like pandemics, floods and cyclones. The programme strives for coverage and quality improvements as well as efficiency benefits contributing to significant cost savings. By taking a **PREVENT – FIND – TREAT – STRENGTHEN the HEALTH SYSTEM and SUSTAIN AN ENABLING ENVIRONMENT** approach for the NSP interventions to succeed, the national TB programme can achieve significant results in accelerating towards a TB free Bangladesh.

CHAPTER 1: INTRODUCTION

1.1 THE PURPOSE OF THE NATIONAL STRATEGIC PLAN (NSP) FOR TB ELIMINATION

The NSP for TB Elimination 2024 2030 provides strategic direction to the national response to END TB. It takes a longer term view and hence the policies, strategies and activities described in the revised NSP look beyond the present and build on the strong foundations already in place, for ending TB in Bangladesh. While the fundamental epidemiological, economic analysis and the strategic direction of recent years remain valid, there are issues and new evidence-based developments that have progressively increased in importance and is addressed in this new NSP.

The NSP will be used by government and non-government sectors as the roadmap for programme development, expansion, and progress in the medium term (2024 2030) and will be continually updated for use in meeting longer term objectives (2030 2035) as the NTP moves towards the elimination of TB. The NSP will enable leaders of all stakeholders to articulate the direction of priorities over the upcoming seven year period. The NTP can now clearly outline the pathway for implementation of national priorities. It will be accessible online to all stakeholders for review and for information.

1.2 DEVELOPING THE NSP

The development of this NSP has been a collaborative effort between all the stakeholders including development partners, civil society organizations, and the private sector which has been led by the NTP, Directorate General of Health Services, Ministry of Health and Family Welfare.

The development of the NSP started in earnest with the NTP conducting the JMM in October 2022 (see section 2.4). This was followed by epidemiological review and impact modelling of TB epidemic in Bangladesh (see section 2.2) which covered various scenarios. The results of both served as critical inputs for this NSP. As part of the country dialogue, the draft NSP was shared with stakeholders and feedback incorporated by the technical working group for NSP development.

1.3 COUNTRY DEVELOPMENT PRIORITIES AND ALIGNMENT OF NSP WITH THE NATIONAL DEVELOPMENT STRATEGY AND GLOBAL GUIDANCE

With the goal of ensuring quality and equitable health care for all citizens in Bangladesh, Ministry of Health and Family Welfare (MOHFW) is implementing the **Health, Population and Nutrition Sector Programme (HPNSP)**. The 4th HPNSP, 2017-2022 is the foundational programme towards universal health coverage and achieving targets towards the SDGs (DGHS, 2017). Key priorities of the HPNSP include: a **stronger governance and stewardship role of the MoHFW**, building capacities in leadership, management, and regulation for better quality services; and a **more fit-for-purpose MoHFW**, restructured to increase performance, efficiency and accountability while removing duplication and waste. However, the HPNSP Operational Plan does not include TB related indicators thereby diminishing the chances of TB elimination efforts getting reviewed at the highest levels. The 4th HPNSP operation plan for January 2017 to June 2022 has been extended till June 2023 as the next 5th HPNSP is under development process.

In addition to the National development agenda (VISION 2041), this NSP also considers the Global direction to END TB as is enunciated in the Global END TB strategy 2015, the Global Plan to END TB 2023 2030, and the UNHLM.

1.3.1 The Global END TB strategy: Ending TB is not just a public health problem, but a development challenge and opportunity. WHO's post-2015 End TB Strategy, adopted by the World Health Assembly

in 2014, aims to end the global TB epidemic as part of the Sustainable Development Goals. It serves as a blueprint for countries to reduce TB incidence by 80%, TB deaths by 90%, and to eliminate catastrophic costs for TB-affected households by 2030. The Strategy is not a "one size fits all" approach and its success depends on adaptation for diverse country settings. Bangladesh, was amongst the early adopters of the END TB Strategy and continues to build upon the global framework and has adapted it for the NSP 2021 – 2030.

Vision: A world free of TB: Zero deaths, disease and suffering due to TB
Goal: End the global TB epidemic
Principles

- Government stewardship and accountability, with monitoring and evaluation
- Strong coalition with civil society organizations and communities
- Protection and promotion of human rights, ethics and equity
- Adaptation of the strategy and targets at country level, with global collaboration

Pillars and components

1. Integrated, patient-centered care and prevention
   a. Early diagnosis of TB including universal drug susceptibility testing; systematic screening of contacts and high-risk groups
   b. Treatment of all people with TB including drug-resistant TB, with patient support
   c. Collaborative TB/HIV activities; and management of co-morbidities
   d. Preventive treatment of persons at high-risk and vaccination for TB
2. Bold policies and supportive systems
   a. Political commitment with adequate resources for TB care and prevention
   b. Engagement of communities, civil society organizations, and public and private care providers
   c. Universal health coverage policy; and regulatory frameworks for case notification, vital registration, drug quality and rational use, and infection control
   d. Social protection, poverty alleviation and actions on other determinants of TB
3. Intensified research and innovation
   a. Discovery, development and rapid uptake of new tools, interventions, and strategies
   b. Research to optimize implementation and impact, and promote innovations

Table 2: The End TB Strategy's three high-level global indicators and associated targets (2030 and 2035) and milestones (2020 and 2025)

Indicators	Milestones		Targets	
	2020	2025	SDG 2030	End TB 2035
Reduction in the absolute number of TB death (compared with 2015 baseline)	35%	75%	**90%**	**95%**
Reduction in the TB incidence rate (compared with 2015 baseline)	20%	50%	**80%**	**90%**
TB affected families experiencing catastrophic costs	0	0	**0**	**0**

1.3.2 The Global Plan to END TB, 2023 2030: The Global Plan to End TB 2023–2030 provides a clear roadmap and the most detailed budget estimates to date for ending TB as a public health challenge by 2030, in line with the UN Sustainable Development Goals. It includes a comprehensive set of policy interventions for making people-centred care available to all and provides guidance to address the scarcity of resources for research and development (R&D), implementation and infrastructure—which contributes to the millions, of TB infections in high-burden countries. This Global Plan also re-imagines TB care to be focused on people and responsive to gender needs, taking into account the many facets of the TB pandemic, such as mental health challenges and the interplay with different diseases like HIV/AIDS. It is the first Global Plan for TB to anticipate the approval and widespread availability of at least one new TB vaccine.

1.3.3 United Nations High Level Meeting on TB (UNHLM): On Sept 26, 2018, the first ever UN General Assembly (UNGA) High-Level Meeting on Tuberculosis (UNGA-HLM-TB) was held in New York. The meeting resulted in the adoption of a Political Declaration on Tuberculosis on Oct 10, 2018, which

reaffirmed commitment to end the TB epidemic globally by 2030 and included ambitious and bold targets for scale-up of TB care and prevention services, as well as commitments on research for new tools, principles of equity and human rights, and resource needs targets for both implementation and research. A follow-up WHO Executive Board meeting focused on ending TB re-affirmed targets set for 2022.

1.3.4 The 2023-2028 Global Fund Strategy: The Strategy's primary goal is to end AIDS, TB and malaria, with a particular focus on making catalytic investments and leveraging innovations to spur faster progress in reducing new infections, addressing structural barriers to improved HIV, TB and malaria outcomes and building equity, sustainability and lasting impact. The new Strategy puts people and communities at the center of all GF's work. Achievement of the Strategy's primary goal to end AIDS, TB and malaria is underpinned by four mutually reinforcing contributory objectives that leverage the core strengths and comparative advantages of the Global Fund's unique partnership:

1. Maximizing People-centered Integrated Systems for Health to Deliver Impact, Resilience and Sustainability;
2. Maximizing the Engagement and Leadership of Most Affected Communities to Leave No One Behind;
3. Maximizing Health Equity, Gender Equality and Human Rights; and
4. Mobilizing Increased Resources.

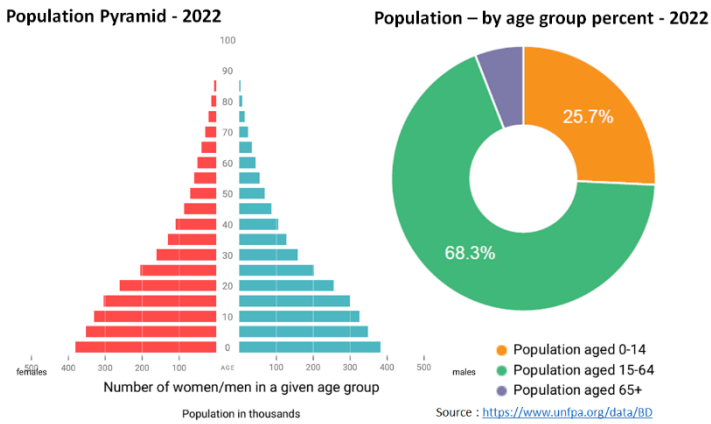
Each of these individual objectives is vital to accelerate the impact against the three diseases. By supporting all four areas together the Global Fund will catalyze system- and society-wide impact that is greater than the sum of its parts. The Bangladesh TB NSP aligns its objectives, strategies, and interventions with the GF strategic plan as well with a focus on people and community centered approach and a greater focus on the affected communities.

1.4 BANGLADESH COUNTRY CONTEXT - DEMOGRAPHIC AND SOCIO-ECONOMIC FEATURES

1.4.1 Demographic, geographic, and socio-economic features

With a population that is about or over 169 million currently, Bangladesh is the 7th most populous country in the world.

Figure 2: Demographic features of Bangladesh



It is also among the most densely populated countries with a population density of about 1000 people per km^2 throughout the country. The annual population growth rate declined from 2.4% in 1990 to 1.14% in 2021 (World Bank). The population of Bangladesh is youthful with about 20% of the total population being in the age group of 15-24 years. There are slightly more males than females (male to female ratio of 1.020) in the total population. Life expectancy at birth currently stands at 63 years for males and 67 years for females. The crude birth rate and crude death rate in Bangladesh is estimated to be 18/1,000 population and 6 per 1,000 population respectively.

a. About 39% of the Bangladesh population lives in urban areas with 54% of urban dwellers living in Dhaka, Chittagong and Khulna. The urban population growth rate is about 3.25% per year.

b. Bangladesh is a **lower middle-income country** and has shown an impressive record of steady economic growth, poverty reduction, and **improved human development**.

c. During the past 10 years, until the onset of the COVID-19 pandemic in 2020, Bangladesh continued a positive trend of **steady economic growth and poverty reduction**. The national upper poverty rate declined from 31.5 percent in 2010 to 24.5 percent in 2016. While Bangladesh's main trends have remained positive over the past decade, new developments in the country's growth and poverty reduction path have emerged. The pace of poverty reduction declined as job creation slowed; spatial disparities expanded, with the pace of poverty reduction varying across the country; the **COVID-19** crisis reversed the trends of both growth and progress in development outcomes; and the country's economic and climate vulnerabilities increased.

d. With active **community participation**, the government devised effective strategies to mitigate damage from natural disasters. Bangladesh is also widely known for its successful microcredit programs, led by NGOs.

e. **Nongovernmental organizations** (NGOs) in Bangladesh partner the government in promoting **social services to communities**, resulting in remarkable progress in human development indicators. For example, the mortality rate of children under five dropped from 121 per 1,000 live births to 40 between 1992 and 2019 and a reduction in the total fertility rate from 6.3 in 1975 to 2.3 in 2019. In addition, child stunting rates fell from 45 percent in 2000 to 31 percent in 2018.

f. Bangladesh also made significant investments in **social protection programs**—reaching 3 out of 10 households—which contributed to reducing poverty, boosting the use of education and health services, and protecting households during shocks.

a. **Progress towards universal health coverage (UHC**): Catastrophic health expenditure forces 5.7 million Bangladeshis into poverty.[2] Inequity is present in most health indicators across social, economic, and demographic parameters. Bangladesh has a comprehensive set of policies for UHC, e.g., a health-financing strategy and staged recommendations for pooling of funds to create a national health insurance scheme and expand financial protection for health. The nation has progressed in a number of areas including the roll out of the essential package of health services for all, expansion of access to primary health care services (support by donors), and the piloting of health insurance which has been piloted in three subdistricts. Political commitment for these areas is strong.

b. **Health insurance: Increasing cost of health care is a major challenge** for Bangladeshi citizens, particularly the poor. The **Health Policy 2011** set a guideline for introducing health insurance into the country. Universal healthcare is provided by both co-contributions from the government and private institutions in the form of direct health insurance to employees, however there are significant ceilings for insurance provided to individuals. The government plans to ensure universal health coverage for all citizens by 2032.[3] The **parliamentary TB caucus and the high level committee (task force) proposed in this NSP shall advocate and facilitate inclusion of TB in the list of diseases for insurance coverage and applicable benefits under social welfare schemes of the government.**

g. **Several SDG 3 indicators are close to the target:** Bangladesh shows advanced progress towards newborn and child health indicators and some infectious disease indicators. However, significant progress is required to achieve maternal mortality and family planning targets. Relatively large inequities persist in the adolescent birth rate and in neonatal and under-5 mortality.

h. There has been significant progress on **school enrollment and improvement in education**. The fast reduction in fertility and improvements in education continued to be important contributors to household consumption growth and poverty reduction.

[2] M. R. Islam, M. S. Rahman, Z. Islam, C. Z. Nurs, P. Sultana, and M. M. Rahman, "Inequalities in financial risk protection in Bangladesh: an assessment of universal health coverage," International Journal for Equity in Health, vol. 16, no. 59, 2017.

[3] The Health Care System in Bangladesh: An Insight into Health Policy, Law and Governance, Sheikh Mohammad Towhidul Karim and Shawkat Alam, Australian Journal of Asian Law, 2020, Vol 20 No 2, Article 6: 367-385

Table 3: Key demographic, education, and health indicators of Bangladesh

Total Population 2020	165 million			
Average household size	4.3 (2018-2019)			
% of households with piped water	11.6 (2018-2019)			
% of households with electricity	89.5 (2018-2019)			
Mobile phone subscribers	181.53 million (2021)* *http://old.btrc.gov.bd/content/mobile-phone-subscribers-bangladesh-november-2021			
Internet subscribers	123.82 million (2021)* 95% of the subscribers are mobile internet subscribers *http://old.btrc.gov.bd/content/internet-subscribers-bangladesh-december-2021			
	Development indicators	**2010**	**2016**	**2018**
1	Literacy (among adults older than age 15)	58.7	65.7	74.7
2	Secondary school enrollment rate (% gross)	73.9	80.4	80.7
3	Fertility rate, total (births per woman)	2.3	2.1+	2
4	Life expectancy at birth, female (years)	71.5	74.6+	74.3
5	Life expectancy at birth, male (years)	69	71.2+	70.6
6	Life expectancy at birth, total (years)	70.2	72.8+	72.3
7	Mortality rate, infant (per 1,000 live births)	38.9	26.9+	25.6
8	Prevalence of stunting, height for age (of children under 5)	41.4*	36.1**	30.8
9	Prevalence of underweight, weight for age (% of children < 5)	36.8*	32.6**	21.9
10	Prevalence of undernourishment (% of population)	16.9	15.2	13

i. However, despite these positive trends, recent headwinds are challenging the equity and sustainability of the country's growth and poverty reduction path. **In the past 10 years the pace of poverty reduction slowed despite continued rapid economic growth, spatial disparities within the country increased, the COVID-19 pandemic posed substantial challenges to continued progress in poverty reduction, and the economy became more vulnerable to exogenous shocks**.

The development context has **significant implications for TB elimination efforts** in the country.

1.4.2 HEALTH SYSTEMS IN BANGLADESH

a. Bangladesh has a **mixed health system** encompassing four key actors: government, for-profit private sector, not-for-profit private sector mainly the non-governmental organizations (NGOs), and the international development organizations. The government, by constitutional mandate, sets health policy and regulation and is responsible for the provision of comprehensive health services, including financing and employing human resources for health.

b. The pluralistic healthcare system consists mainly of public healthcare which is steered by the Ministry of Health and Family Welfare, through the different Directorate Generals: Health Services, Family Planning, Drug Administration, Nursing, Health Economics Unit, etc.[4]

c. The public healthcare services are organized along four levels: community level healthcare (provided by the domiciliary health providers and community clinics), primary level healthcare (provided in Rural Health Centers, Union Subcentres, Union Family Welfare Centers, and Upazila Health Complexes), secondary level healthcare (provided in District Hospitals, General Hospitals, Chest Disease Clinics, TB Clinics, and Leprosy Hospitals), and tertiary level healthcare (provided in Postgraduate Medical Institutes, Specialized Healthcare Centers, Medical College Hospitals, and Infectious Disease Hospitals).

d. Public healthcare is highly subsidized by the government, with nominal payments required from patients, especially for the outpatient care.

[4] Government of Bangladesh, Health Bulletin 2017 [Internet], Dhaka, Bangladesh, 2018, http://www.dghs.gov.bd/index.php/en/home/4364-health-bulletin-2017.

e. A divisional director for health in each division governs activities and is assisted by deputy directors and assistant directors. In each district, there is a district hospital. The civil surgeon (CS) is the district health manager responsible for delivering secondary and primary-care services. Some district hospitals have superintendents to look after the hospital management. The upazilla health & family planning officer (UH&FPO) is the health manager at the upazilla level.

f. At the union level, three kinds of health facilities exist: rural health centers, union subcenters, and union health & family welfare centers (UHFWCs). At the ward level, the MOHFW has recruited full-time community healthcare providers to operate 13,750 community clinics and 14,890 clinics are planned to be functional by 2025. The **public sector health-delivery system** is comprised of 53 District Hospitals, 425 Upazila Health Complexes, 1469 Union Health and Family Welfare Centers, and 13,750 community clinics at the ward level.

g. In Bangladesh, **private healthcare** is common and popular among all, regardless of income or location. It encompasses for-profit private, not-for-profit private (mainly the NGOs), and informal providers (village doctors and other vast array of different unqualified providers). A significant proportion of the government employed doctors also work in the private sector. The private sector incorporates medical colleges, general hospitals, health services under specific insurance schemes, NGO health facilities, corporate health facilities, private **specialists** and general practitioners, private pharmacies, diagnostic laboratories, and the informal private health-care sector. There are high-end tertiary level international standard hospitals upcoming in the country. These private healthcare providers are concentrated in urban areas with the capital Dhaka accounting for most.

h. The **NGO sector** is a critical sector for health service delivery with over 4,000 NGOs working in the health sector. NGOs are particularly active in the provision of health promotion and prevention activities. The informal sector too plays an important role in service provision, particularly as a key source of health care to the urban poor in Bangladesh, although nationally representative data on the informal sector is absent.[5] There are significant numbers of untrained or non-qualified providers in Bangladesh who offer a combination of traditional and western (allopathic) types of medicine, but they are primarily found in rural areas.

1.5 NTP STRUCTURE

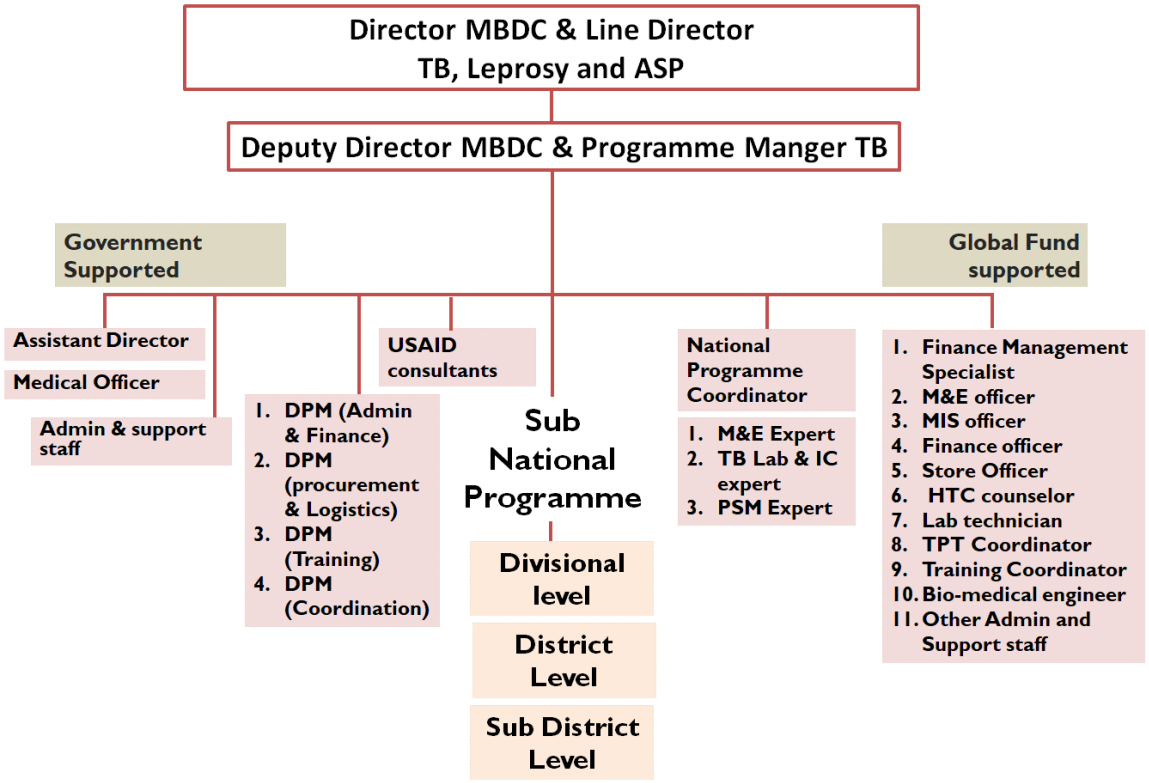
a. National TB Control Program is headed by the Director of MBDC and Line Director TB/Leprosy Control under the directorate general of health services. The Director MBDC reports to the Director-General of Health Services.

b. The posts of Director, two Deputy Directors, one Assistant Directors and one Medical Officer (Epidemiology) are permanent. Programme Manager is from the deputy directors who reports directly to the Line Director.

c. There are four Deputy Programme Manager who report to the Line Director and their activities are coordinated by the Programme Manager. The four Deputy Programme Managers are responsible for one of the four specific areas - administration and finance; training; procurement and logistics; and coordination. Furthermore, there are currently six medical officers reporting to the Programme Manager and designated as focal points for Laboratory, Epidemiology, MDR-TB; ACSM; TB/ HIV; PPM; Training; and Procurement and Logistics. Additional support is provided through a network of GF consultants. Specifically for M&E unit there are M&E expert along with 3 M&E officer and 2 MIS assistants/officers. The unit is guided under the direction of programme manager NTP. (Figure 3)

[5] Syed Masud Ahmed, Md. Awlad Hossain, Mushtaque Raja Chowdhury, Informal sector providers in Bangladesh: how equipped are they to provide rational health care?, Health Policy and Planning, Volume 24, Issue 6, November 2009, Pages 467–478, https://doi.org/10.1093/heapol/czp037

Figure 3: NTP Organogram



d. **At the sub-national level,** NTP is integrated into the general health services, under the Director (Health), the Civil Surgeon and the Upazilla Health and Family Planning Officer (UH&FPO) responsible at divisional, district and upazilla level, respectively. Their responsibilities include coordination and supervision of the NTP services.

e. **At the district level,** the Civil Surgeon is assisted by a Medical Officer (Disease Control) and in some districts by a Medical Officer full-time designated for TB and/or a Programme Organizer (PO) TB/leprosy. Programme Organizers assist in conducting mid-level training courses at district level.

f. **District and Metropolitan cities:** Forty four CDCs, located in district and metropolitan cities, support NTP in two ways: they render diagnostic and treatment services for the immediate surroundings and serve as referral center for the entire district. Junior Consultants in CDCs are qualified chest specialists who often support supervision and monitoring. They also serve as resource base for providing technical advice according to NTP guidelines. These consultants often take the lead and support NGOs and in implementation of TB services in district level.

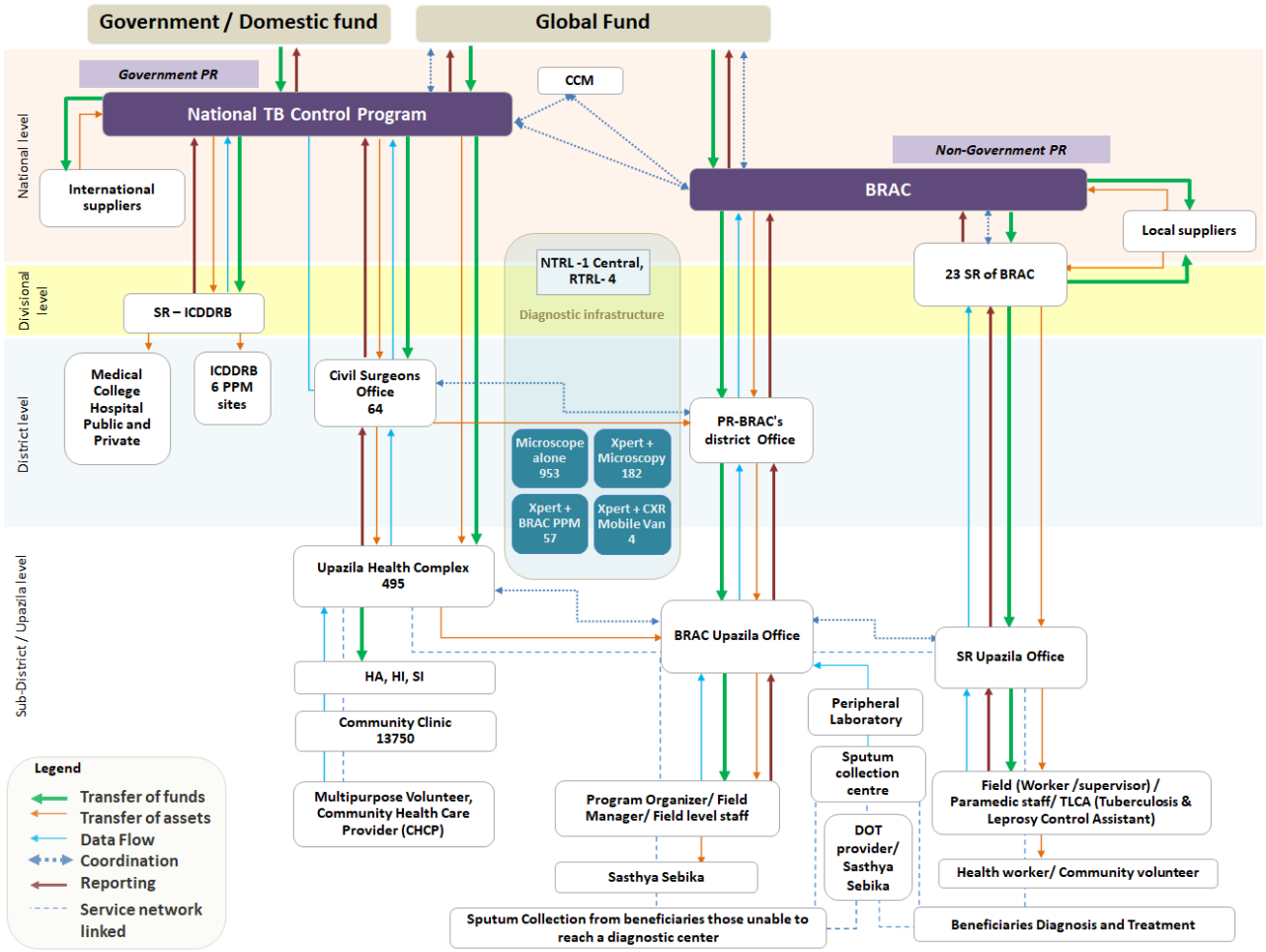
g. **Upazilla (sub district):** The UH&FPO oversees the NTP activities within the Upazilla (sub district). One UHC-based medical officer is designated for disease control including TB. The Leprosy and TB Control Assistant (LTCA) assists the Medical Officer (Disease Control) in implementing the programme at the upazilla.

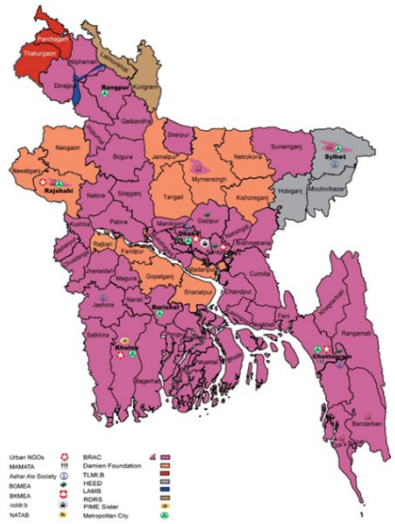
1.6 NTP IMPLEMENTATION ARRANGEMENTS

a. The TB elimination efforts in Bangladesh is implemented by the NTP in cooperation with other relevant government ministries as well as with **WHO, USAID, NGOs, and the private sector** at the central, divisional, district and sub district levels. The major part of the funding is by **Global Fund** and since 2017 domestic funding has also started to increase with the procurement of first line anti-TB medicines.

b. The overall implementation arrangement includes elements of service delivery, finance, procurement, supply chain, quality assurance, logistics, information systems, operational research to inform program policy and implementation, health promotion, and community empowerment, with each element strengthened via good planning, implementation, monitoring and evaluation. (Fig 4 below)

Figure 4: Implementation arrangement highlighting the funding, data, and reporting flows and service delivery linkages between the key stakeholders implementing the national TB response.





c. In Bangladesh, outside the major cities, government doctors (mostly at sub-district hospitals) have the responsibility for confirming all TB diagnoses and prescribing anti-TB drugs; government-employed TB and Leprosy Control Assistants (TLCA) are responsible for maintaining TB registers and reports; Divisional Surveillance Medical Officers (DSMOs) provide supportive supervision and monitoring support; and the NTP procures and distributes TB drugs to sub-district level. All other service delivery functions are conducted by NGOs and other partners (including public hospitals outside the control of the NTP).

d. NGOs and CSOs play an important role in the national TB response, providing supportive staffing for the national TB program. NGO staff carry out a variety of roles from extra lab staff to community health workers (CHWs), to active case finding personnel in the community. By far the largest is BRAC, with 31819 community health

volunteers (Shasthya Shebika) providing TB related outreach services along with other health programs, 44771 DOT providers addressing TB (and other health programmes) and 2,126 employees dedicated to TB, covering 45 of the country's 64 districts. The Damien Foundation works in a further 13 districts, and 24 other smaller NGOs (also Sub- Recipients to BRAC) cover the rest of the country. The NGOs deploy community health workers to identify presumptive TB patients, refer them to testing sites, and support confirmed patients during treatment; they also operate/ support more than 1117 sputum microscopy centres nationwide. The other NGOS involved in the TB elimination efforts include Damien Foundation, LEPRA, HEED-Bangladesh, RDRS-Bangladesh, TLMI, LAMB hospital, PIME Sisters, NATAB (Civil society), ICDDR,B (Research), 8 NHSDP NGOs, 14 UPHCSDP NGOs, 5 PPM and 4 TB-HIV NGOs, and BGMEA/BKMEA. (Figure 5)

1.7 TB LAB NETWORK

a. The TB laboratory network is organized to perform TB laboratory services under the NTP aligned with the four levels of the national health services delivery structure: national, regional, intermediate (district) and peripheral. There is one NTRL located in Dhaka and five functional regional laboratories are in Chittagong, Rajshahi, Dhaka Shyamoli, Khulna, and Sylhet. The RTRLs have been upgraded to BSL-2+ level to perform as a fully functional RTRL providing LPA (except Khulna which doesn't have LPA), culture, and DST services. The NTP plans to establish additional RTRLs in Barisal and Rangpur division. A total of 152 10 Colour machine will be used to cover all the 64 districts. At the district level, all the Chest Disease Clinics (CDC), medical colleges and hospitals, and district hospitals have functional TB laboratories where sputum samples are examined using NAAT. Most of these facilities also have GeneXpert for rapid detection of DS-TB and DR-TB. Forty External Quality Assurance (EQA) laboratories spread across the country supervise the peripheral level smear microscopy centers and their role is being expanded to monitor NAAT facilities as well.

Table 4: GeneXpert machines and modules status in Bangladesh as of October 2022.

S. No	Item	Number
1.	Division	8
2.	No. of GeneXpert Sites	477
3.	No. of Machines	518
4.	No. of Modules	2264
5.	No. of 4 Module Machine	497
6.	No. of 16 Module Machine	16

b. Waste management is performed according to the national regulations\WHO Biosafety Guidelines and facilities practices. Waste is mostly burnt in either pits or drums in an open fire. Sodium Hypochlorite/Phenol followed by alcohol solutions are used as tuberculocidal disinfectants, though implementation challenges exist. Before disposal, the contaminated materials are autoclaved at RTRLs, NTRLs and some other facilities where the autoclaves are available. Also, PRISM Bangladesh Foundation (a non-profit organization) collect medical waste from NTRL and some RTRLs for safe disposal. All peripheral labs are responsible for recording and reporting of the performance as per the national guidelines.

1.8 POLICY AND REGULATORY CONSIDERATIONS FOR TB ELIMINATION

a. The **National Health Policy 2011**, the **Tuberculosis-Leprosy and AIDS STD Programme (TB-L & ASP) guidelines** and the **National TB Strategic Plans**, provide policy and guidelines for TB diagnosis, treatment and prevention. On 22 January 2014, **Bangladesh Government published a Gazette announcing TB as a mandatory notifiable disease.** While the country does yet not have a TB specific legislation for its elimination; there exists other regulatory mechanisms that the NTP can utilize. These include:

- The **Epidemic Diseases Act**, 1897: Power to take special measures and prescribe regulations as to dangerous epidemic disease
- The **Code of Civil Procedure**, 1908: Release on ground of illness
- The **Cantonments Act**, 1924: Definitions - (xvii): This sub-section defines infectious or contagious disease that includes TB.
- The **Public Health (Emergency Provisions) Ordinance**, 1944: Power to the local authorities to take health measures

b. **TB Notification tool:** The NTP has rolled out a digital notification tool, the 'Janao' App for improved TB notification and the integration of private sector treated TB patients into the national database. It is helping the NTP to track the patient outside of the public facilities who otherwise would have missed from notification. Currently operational only in Dhaka and Rajshahi division, the NTP plans to expand the 'Janao' App or a similar digital tool for notification all over the country.

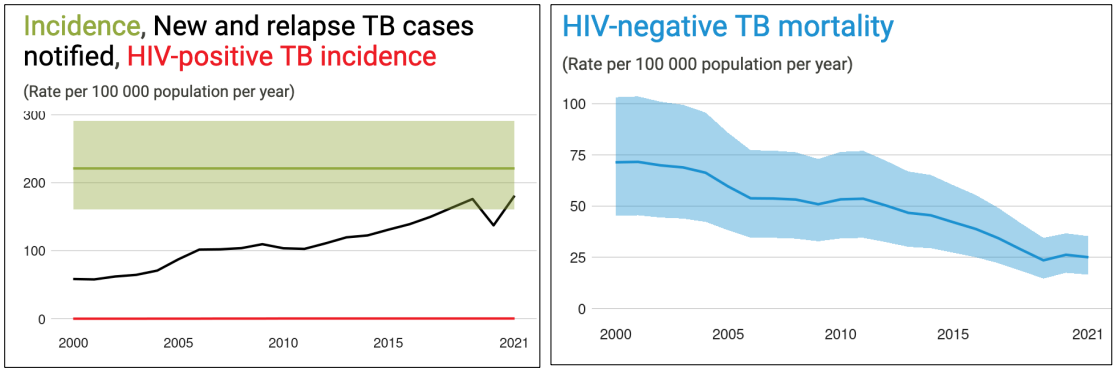
c. Currently there **no regulations that limit the sale of anti TB drugs** in the country.

CHAPTER 2: SITUATION ANALYSIS

2.1 EPIDEMIOLOGICAL CONTEXT (Data Source: Global TB Report 2022)

a. Bangladesh continues to be **amongst the 30 high TB and drug resistant TB burden countries** in the world. The **incidence of TB has been constant at 221 per 100,000** (375,000 patients in 2021) **since 1990**. It has made progress in achieving the END TB strategy milestones for 2020 especially in achieving a 36% reduction in the death rate however the rate of reduction of Incidence at 1.3% is far below the 20% target that is to be achieved.

Figure 6: Trend in TB incidence rates and TB mortality in Bangladesh from 2000 to 2020.



b. From 2012 the number of TB notifications increased on a year-by-year basis and dipped in 2020 because of the COVID-19 pandemic. There was, however, a rapid and robust rebound that returned TB notifications to the trend of an increase in TB notifications. In 2022, it was observed that TB notification has markedly slowed down. By quarter 3 2022, less than 200,000 people with TB had been notified. (figure 8).

Figure 7: TB Notification in Bangladesh 2001 – 2022 (Quarter 3).

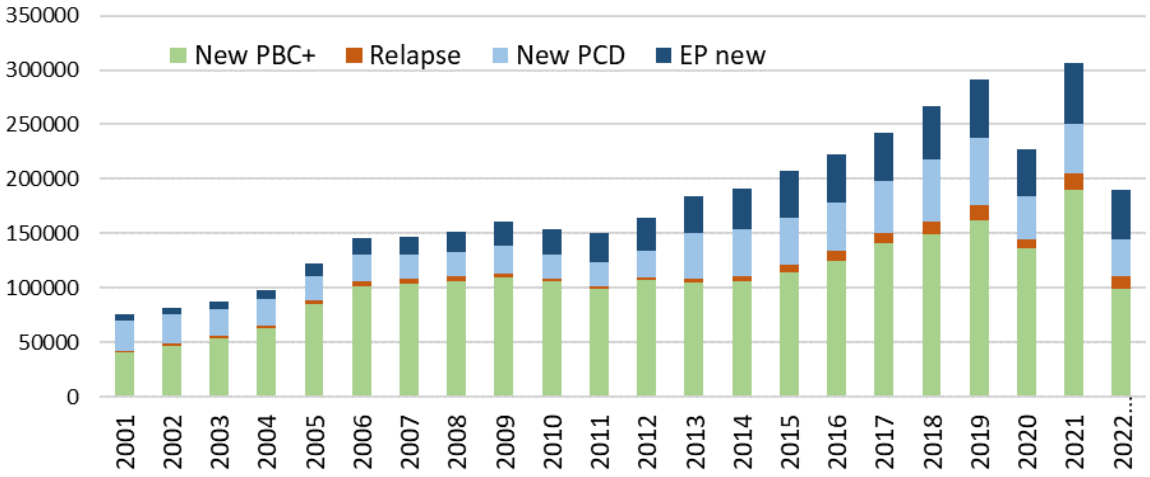


Table 5: TB-NSP output targets and achievements, 2021

Indicator	Target 2021	Achieved 2021
TB Treatment Coverage (%)	81	82
Number of people with new TB notified	292, 745	306, 701
Number of people with MDR-TB identified and treated	2,365	1, 488
Proportion of all notified TB with a known HIV status (%)	33	6.4
Proportion of all notified TB that are children in the age group 0-14 (%)	5	3
Number of people provided with TB Preventive therapy	185,560	Not available[6]

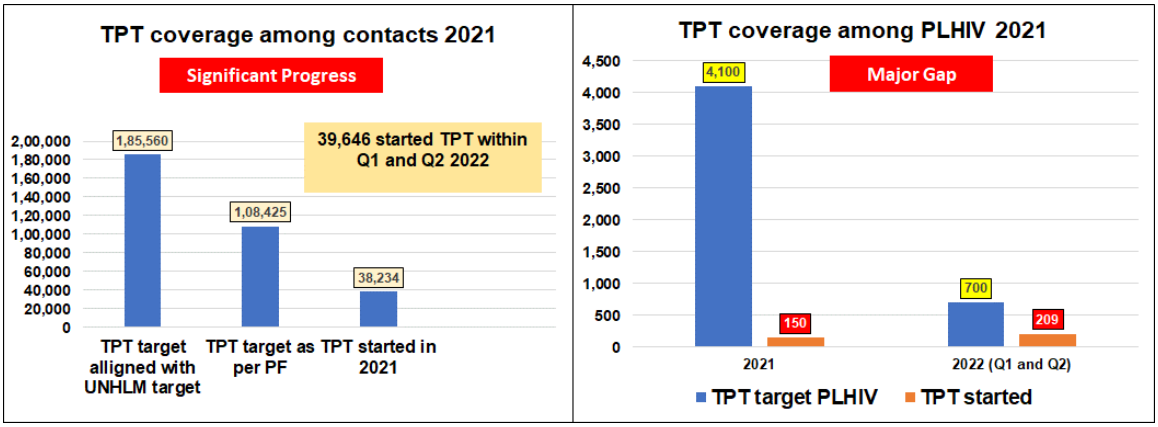
c. Although the **mortality rate** has been declining steadily, TB is still responsible for more than 42,000 deaths per year. **Treatment coverage** has increased from 73% in 2018 to 82% in 2021, and the numbers of "missing" TB patients has consequently decreased. The percentage of TB patients facing **catastrophic costs** is not known (more details in the section on UHC below).

d. The **TB treatment success rate for those who commenced treatment** has been maintained at around 95% for new and relapse patients over the past decade and also for both Pulmonary and EPTB. The highest treatment success is among the new/treatment history unknown and relapse which is over 95%. Meanwhile, TB patients who were treatment failures or treatment after loss to follow-up have slightly low treatment success of about 90% - though still high and within global target.

e. **HIV prevalence among TB patients at 0.54%** is low and not a major problem in the country. **Drug resistant TB** continues to be a concern for the NTP with only 35 % of bacteriologically confirmed TB patients tested for rifampicin resistance amongst new patients.

f. **Preventive treatment for TB** is currently being scaled up to enhance coverage. In 2021, 38% of children under five years who are household contacts of bacteriologically positive TB patients were provided TB preventive treatment (TPT). However, the coverage amongst PLHIV is low. (Figure 7)

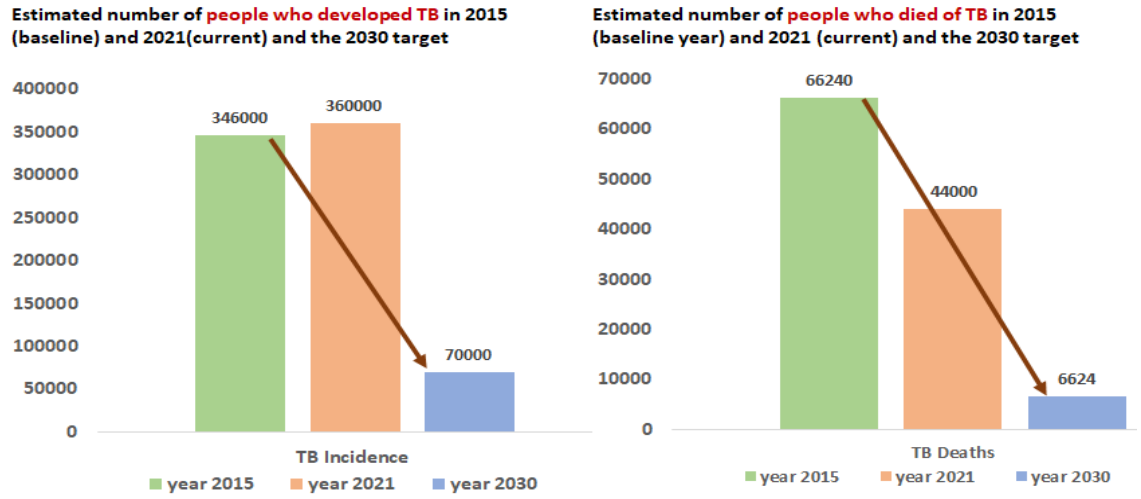
Figure 8: TPT coverage 2021 (TPT enrolment till Q-3 2022 is 93227)



g. Even though **TB notifications** have been on the right trajectory, the country remains off course and is unlikely to achieve the 2035 End TB and 2030 SDG TB targets for both TB incidence and mortality. The country may also be off course to achieve the third target of ensuring no person suffers health related catastrophic costs on account of TB. To achieve the 2030 End TB Strategy/SDG incidence and mortality targets, the NTP will have to reduce the number of people developing TB each year from the current, over 370,000 to less than 70,000 people and the number of people dying of TB from the current 42,000 to about 6,000. (Figure 10)

[6] The 2022 WHO Global TB Report indicates that 38% of children under 5, were provided with TPT in 2021

Figure 9: Estimated number of people who developed or died of TB in 2015 (baseline) and 2021(current) and the 2030 target

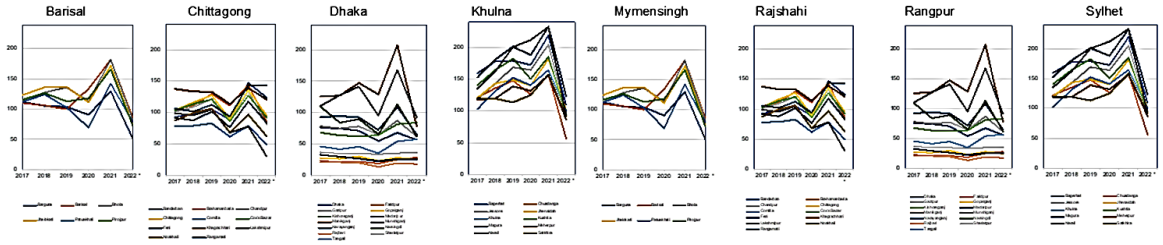


h. While TB treatment coverage is moving in the right direction and TB notification is high, it is not clear if current TB care and prevention efforts are influencing TB transmission. In the past it has been documented that, in Bangladesh, there were long TB diagnostic delays, from both person/patient factors and health related factors [7] [8][9]. The current TB algorithm attempts to increase the specificity of cough screening and therefore focuses on cough of two or more weeks for a person to be considered to have presumptive TB. A major finding of the TB prevalence survey conducted in 2015-2016 was that more than 60% of people identified to have TB did not have classical symptoms of TB including cough[10]. Recently there have been suggestions that cough is not a pre-requisite for TB transmission[11] . Therefore, **to influence TB transmission the focus going forward is to move away from cough as the all-important symptom for TB screening. This NSP provides a model diagnostic algorithm (**4.4, chapter 4**)** for refinement in the next two months.

i. **TB notification rates by regions:** Overall, Khulna and Sylhet have shown notification rates over 100 per 100,000 populations since 2017. Meanwhile, **Rangpur and most districts of Dhaka division have much lower notification rates** of 100 bacteriological confirmed TB patients per 100,000 population. For all the divisions, the rates of bacteriological confirmed TB patients have significantly decreased in 2022 due to GeneXpert cartridges stockout at the country level caused by the global shortage, and issues related with port clearance, faulty modules, poor selection criteria for testing by WRD, and power supply. Overall, for notification rates of bacteriological confirmed TB patients for treatment after failure and treatment after loss to follow-up is also relatively low.

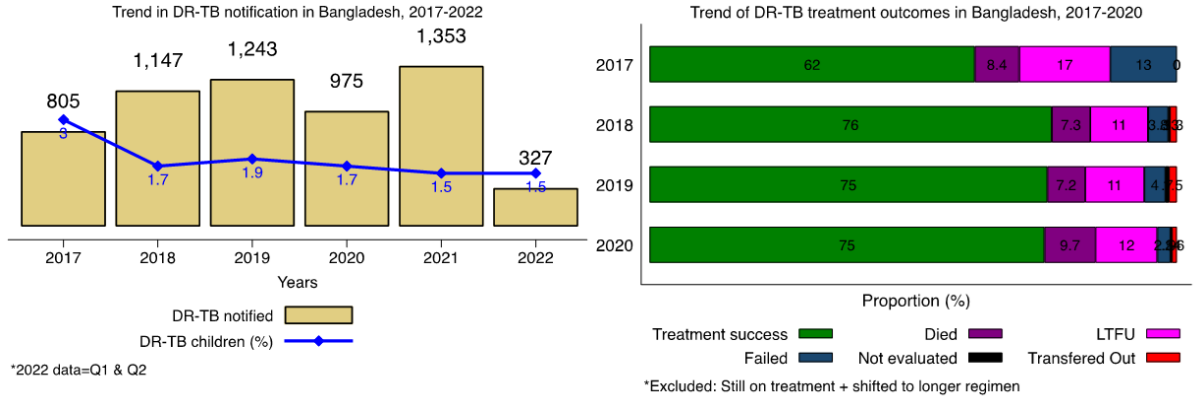
Figure 10: **New Pulmonary bacteriological confirmed TB notification rate per 1,00,000 population by Districts**

[7] Ehsanul Huq et al BMC Infectious Diseases 2018; 18:515
[8] M. Rifat et al IJTLD 2011; 15 (5): 647-651
[9] Fazlul Karim et al Health Policy and Planning 2007; 22: 329-334
[10] National TB Prevalence Survey
[11] Patterson B, Wood R. Is cough really necessary for TB transmission? Tuberculosis (Edinb). 2019 Jul;117:31-35. doi: 10.1016/j.tube.2019.05.003.



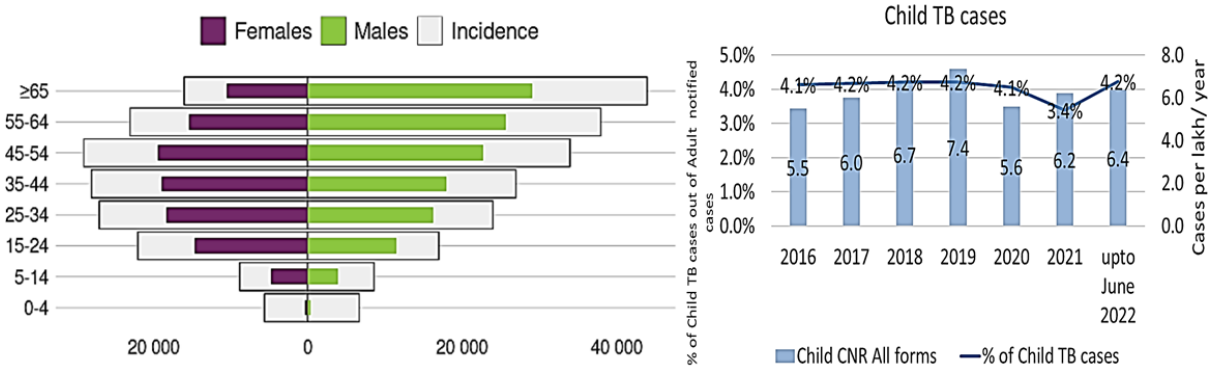
j. DSTB notification and treatment outcome: Drug resistance TB notification is increasing overall in Bangladesh with increase in investment into molecular diagnostic tests such as GeneXpert and Truenat. The procurement and supply issues related to GeneXpert cartridges have resulted in a significant decrease in 2022.

Figure 11: DR TB notification and treatment outcome trends



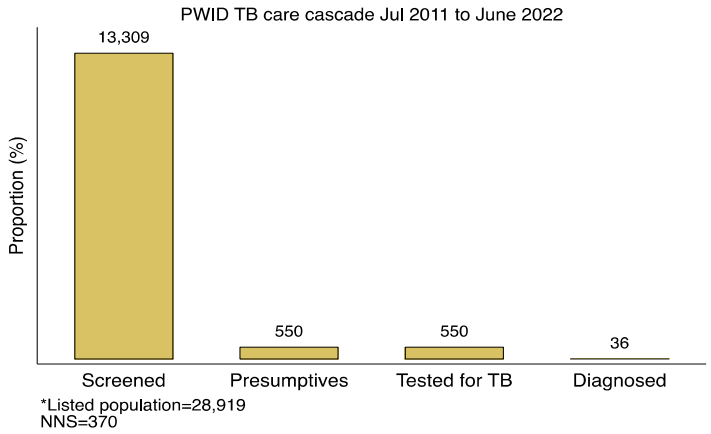
k. Childhood TB: At 4.2% the childhood TB diagnosis is sub-optimal with below the WHO recommended range of 5%-15% for high TB burden countries. Child and adolescent **TB case detection is stagnant at 4% since 2014**. All divisions have shown low child TB case finding efforts (<4%) except Dhaka (5-6%) and Mymensingh division due to ongoing child TB specific projects.

Figure 12: Child and adolescent case detection



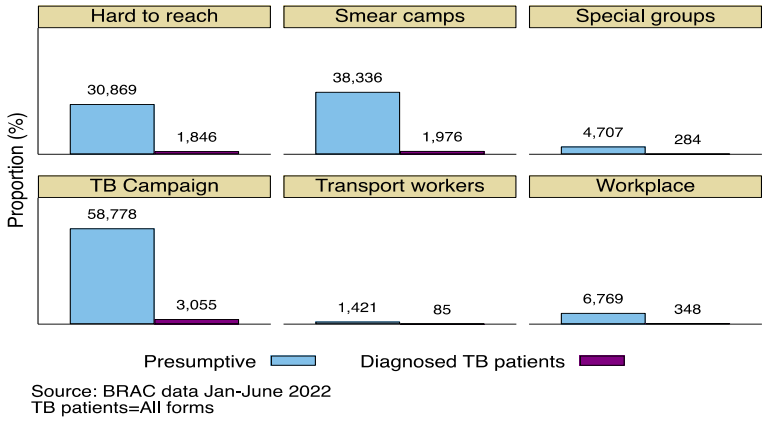
l. TB case finding in vulnerable populations: The focus on the vulnerable population is critical to increase TB notification and reduce the TB burden. TB case finding among people who inject drugs (PWID) resulted to finding 36 TB patients from 13,309 PWID screened. In this sub-population the Number Needed to Screen was 370 to find one TB patient (see Figure 14).

Figure 13: TB care cascade of PWID in 2021 in Bangladesh.



The country's efforts to reach the vulnerable populations is demonstrated in Figure 15. To better understand the yield (NNS) of these interventions is to understand the populations screened to TB diagnosis. **NTP and partners would need to capture the whole cascade of care to better focus on the sub-populations that are vulnerable for TB but also may be driving the TB epidemic in Bangladesh.** This should also include **data on situation of household contact evaluation among adult contacts.** This population should be among the top priorities both for active case finding as well as TPT provision along with child contacts.

Figure 14: Presumptive identified and TB patients diagnosed between Jan and June 2022 in Bangladesh.



Of the sub-populations for active case finding, transport workers, special groups and hard to reach had the highest proportion of TB patients diagnosed at 6.0%. The country needs to continue to target these vulnerable populations to reduce TB burden, increase TB notification and reach country targets to end TB.

Table 6: The proportion of TB patients diagnosed in the vulnerable groups in Bangladesh.

ACF activity	Description	Yield
Smear camps	Sputum collection/ smearing centres in key population (slum, refugee, brick field, mine and others)	5.2 %
Special groups	TB Screening for under 15 years age group/ elderly/ pregnant women	6.0 %
Workplace	Sputum camp at factory/garment/workplace	5.1 %
Transport workers	Screening among Transport workers (Track, Bus, Tampu) at district terminal	6.0 %
TB Campaign	TB Campaign at Sub district/Urban areas	5.2 %
Hard to reach	Outreach sputum collection to intensify service at special situation (Hard to reach)	6.0 %

m. **Progress towards UNHLM targets:** Bangladesh had adopted the UN High-Level Meeting (UNHLM) TB targets for TB case notification, DR-TB, childhood TB and TPT coverage. There are variations in trends in achieving these targets with an expected decrease in 2020. In 2021 achievements of notification to the targets was at 96% for both DS- and DR-TB. However, the country lags on childhood TB and TPT coverage achieving only 38% and 13% respectively from the set targets.

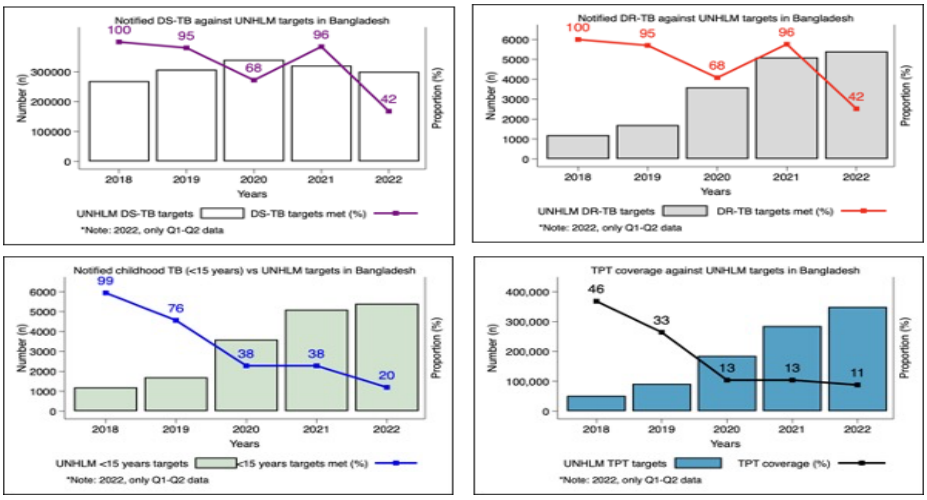
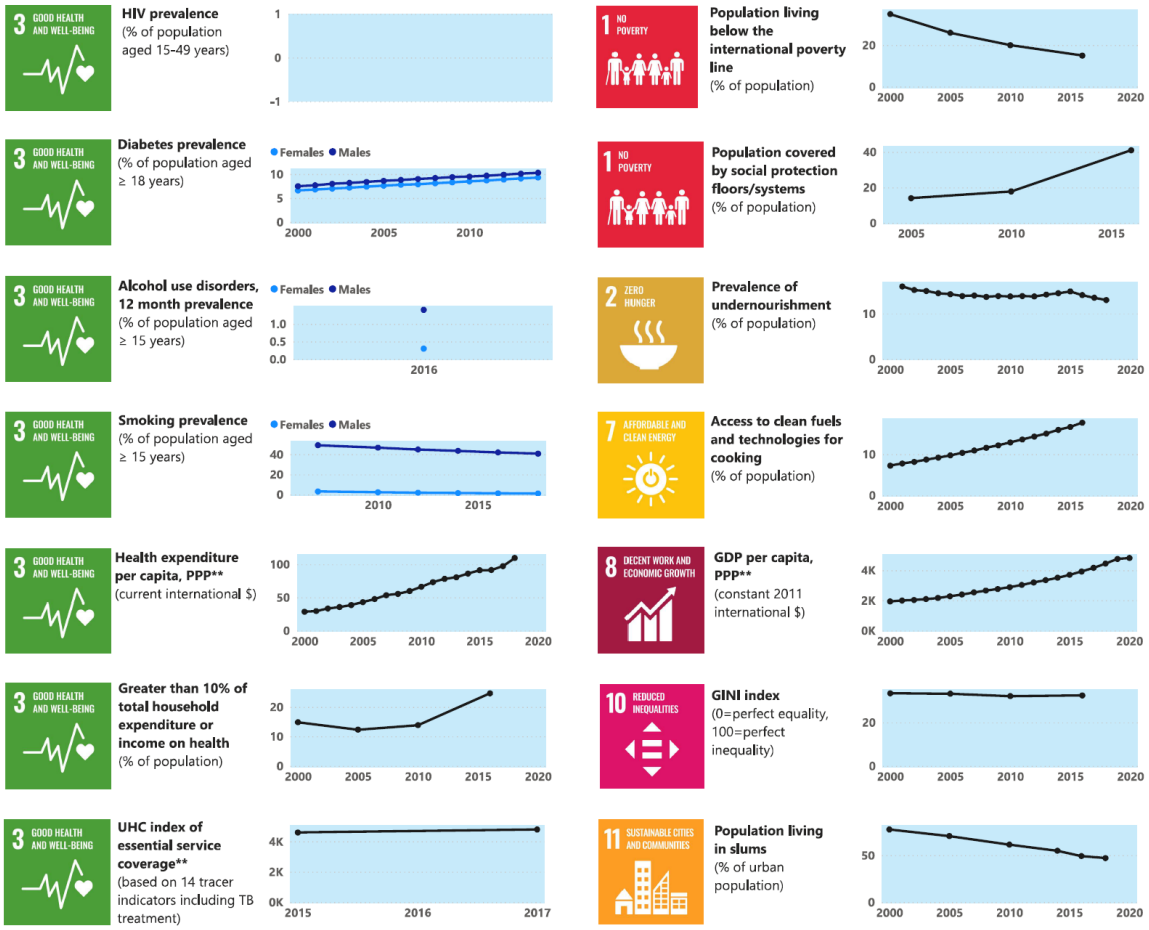


Figure 15:1 The trend in target achievements of DS TB and DR TB notification, proportion of childhood TB (<15 years) and TPT coverage between 2018 and 2022 for Bangladesh.

n. **TB-SDG monitoring framework:** The WHO has developed a **TB-SDG monitoring framework** that tracks health (SDG3) as well as population level determinants, beyond health, of TB through a series of indicators. In Bangladesh the population level determinants, though improving, continue to fuel the TB epidemic. **Monitoring the TB-SDG framework at the national level and its use in the reviews especially at the highest level given there is a SDG committee at the Prime Minister's Office, will provide impetus to the multi sectoral actions for TB elimination.**

Figure 16: Indicators in the sustainable development goals associated with TB incidence*



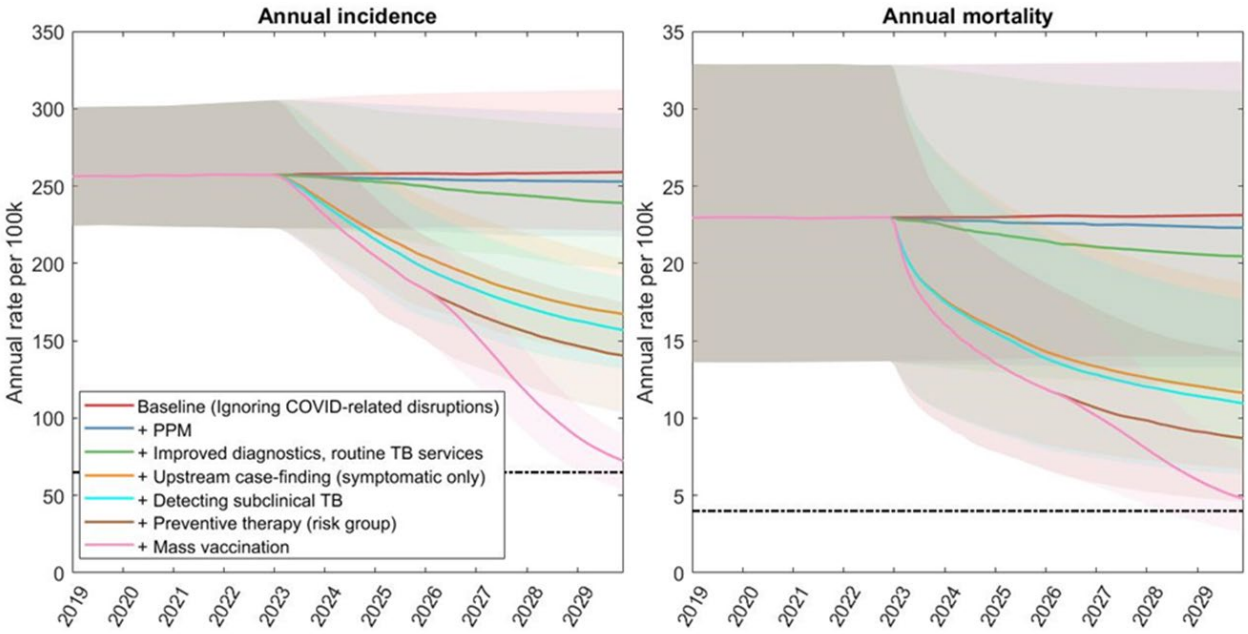
* Data sources: SDG indicators database, The World Bank. World Health Organization. Missing values and empty boxes indicate data not available in these data sources.
**GDP = gross domestic product; PPP = purchasing power parity; UHC = universal health coverage

2.2. MODELLING THE TB EPIDEMIC IN BANGLADESH

The NTP, Bangladesh is committed to achieve the 2030 END TB targets. This necessitates aggressive actions to reduce the TB incidence by 80% and TB mortality by 90% in 2030 compared to 2015. To understand the implications of these for NSP strategies and interventions, a mathematical modelling exercise is undertaken to define the TB burden (incidence, and mortality) under different scenarios of scaling-up existing and potential interventions. (see Annex 1 for greater details on the modelling exercise)

This modelling analysis suggests – consistent all previous analyses in the Region – that a combination of current tools (active TB treatment and TPT) will lead to important declines in TB incidence and mortality but will not be sufficient to reach the End TB goals by 2030. To reach those goals, it will be necessary to implement population-wide prevention. In this model, a post-exposure vaccine is one such example of prevention.

Figure 17: Meeting the 2030 goals in Bangladesh



2.3 THE NSP RESULTS FRAMEWORK

The results framework below presents the impact, outcome indicators and targets of the NSP that highlight the **thrust areas that include private sector engagement, universalising WRDs, strengthening routine TB services for DS and DR TB, active TB case-finding among key populations and specific protection for prevention from development of active TB in high risk groups, and TPT scale up**. The assumptions for the values are provided at Annex 2.

Table 7: Results Framework for the NSP period

Indicator	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Total number of beneficiaries to be initiated on TB Preventive therapy (TPT)	599758	703931	726724	769336	855211	875614	898626	852195	800325	667113
Proportion of identified/eligible individuals for preventive therapy /TPT	6%	17%	30%	50%	70%	80%	90%	90%	90%	90%
Proportion of identified/eligible individuals for TPT - initiated on treatment	37248	120000	218017	384668	598648	700491	808764	766976	720292	600402
No of presumptive TB pts to be offered bacteriological test (Sputum microscopy)	1911382	1913621	1577625	1021666	154088	92810	70892	73961	77163	80504
Coverage - Molecular diagnostics	24%	26%	40%	60%	88%	90%	95%	95%	95%	95%
No of presumptive and diagnosed TB pts to be offered rapid molecular test	705772	745584	1196717	1872799	2865700	3057727	3367348	3513145	3665256	3823953
No of presumptive TB to be tested (SSM + NAAT)	2617154	2659205	2774342	2894464	3019788	3150537	3438239	3587106	3742419	3904457
Total TB patients notified	308012	311183	307512	313429	324062	332793	342642	322771	300572	243562

Indicator	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Proportion of TB patients notified by the private sector	25%	25%	25%	25%	27%	28%	35%	35%	35%	35%
No. of childhood TB patients (0-14 years)	10419	10526	13807	18806	22684	26623	30838	32277	30057	24356
Proportion of childhood TB patients (0-14 years) among all notified	3%	3%	4%	6%	7%	8%	9%	10%	10%	10%
Proportion of identified vulnerable population screened for TB			Mapping to be done	50%	70%	90%	90%	90%	90%	90%
% of bacteriologically confirmed TB patients tested for rifampicin resistance - New cases	44%	44%	50%	75%	85%	100%	100%	100%	100%	100%
Coverage of MDR/RR TB patients notified	31%	33%	40%	47%	62%	67%	80%	90%	90%	90%
No of MDR/RR TB patients notified	1495	1503	1845	2196	2905	3162	3655	3748	3417	2769
No of MDR/RR TB patients initiated on treatment	1384	1391	1674	2088	2724	2775	2625	2153	1745	1343
Treatment success rate for DS TB	97%	>95%	>95%	>95%	>95%	>95%	>95%	>95%	>95%	>95%
Treatment success rate for RR TB	73%	75%	76%	80%	85%	>90%	>90%	>90%	>90%	>90%
Proportion of notified TB patients with known HIV test status	6%	10%	15%	40%	50%	80%	100%	100%	100%	100%
Proportion of notified TB – HIV patients initiated on ART	102	103	102	101	96	87	76	65	54	41

2.4 JOINT PROGRAMME REVIEW 2022 BANGLADESH – RECOMMENDATIONS

The ninth national TB programme review was held in October 2022 to evaluate progress, find key challenges, and identify achievable solutions to address those challenges to achieve the programme's aims by 2028, and to further reinforce the foundation to reach a sustainable end of the TB epidemic by 2030.

The key recommendations of the JMM included the following:

1. **Adopt an "urgent" and aggressive approach to ending TB:** To end TB by 2030 Bangladesh will need to not only focus on finding people who are sick with TB but will also need to address transmission of TB. Finding people with TB as early as possible, preferably even before they develop symptoms (very early pre-symptomatic TB called pre-clinical/incipient TB may also be associated with TB transmission) will be key to reducing and eventually ending TB transmission at the community and health facility level. Screening programs should utilize tools that have a high sensitivity such as the chest x-ray with or without the use of artificial intelligence and the Xpert MTB/Rif assay. **The enhanced TB case finding efforts will need to 'twinned' with scaled up efforts to provide TB preventive therapy for the best possible effect on TB incidence and mortality to accrue. Primary Duty bearers**: The MoHFW/NTP and implementing partners with support from funding and technical partners. **Timeline:** In the period covered by the TB NSP.
2. **Increase financial resources for TB care and prevention:** Adopting an urgent and aggressive approach to ending TB requires additional financial resources. The size of the populations that need to be reached with TB screening and testing services in Bangladesh is large (for example

there are more than 22 million people who live below the national poverty line in Bangladesh currently and who, therefore, are candidates for TB screening) and adopting more sensitive and more effective screening and testing approaches will cost more, however, these interventions are critical if the goal to bring TB to an end in the country is to be realized. If the TB response remains at the same level with arguments against massive scale up of screening and testing services on account of sustainability and cost -effectiveness of interventions, the country would then have to accept that the problem of TB may persist for many decades to come. **Primary Duty bearers:** The Government of Bangladesh and health financing partners. **Timelines:** In the period covered by the TB NSP.

3. **Continue and expedite efforts to support local manufacturer(s) of anti-TB medicines to get these medicines WHO pre-qualified:** Components of anti-TB medicines formulated in Fixed Dose Combinations (FDCs), such as rifampicin may not be bio-available even when manufactured under Good Manufacturing Practices (GMP). Bio-equivalence studies are critical to confirm bioavailability. As the country switches to procurement of anti-TB medicines from local manufacturers the efforts being made to ensure that these medicines are WHO pre-qualified need to be continued and expedited. **Primary Duty bearers:** MoHFW, Bangladesh Drug Regulatory Authority, the NTP, partners of the NTP. **Timelines**: As soon as possible
4. **Enhance efforts to identify children with TB aiming for zero TB deaths in children by 2025:** There is evident low detection of TB among children meaning a large number of children with TB are dying. Over more than a decade the proportion of children under 14 among all TB notifications has been between 3-4% against an expected proportion of about 10-12%. Undiagnosed children with TB are very likely to die from their disease. **Primary duty bearers:** The NTP, partners of the NTP including the Bangladesh Paediatric Association (BPA). **Timelines:** In the period covered by the next TB-NSP.
5. **Expand engagement of private providers with appropriate incentives and enablers to sustain engagement and to enhance quality of care provided by these providers:** In Bangladesh, it has been estimated that up to 80% of initial care seeking for any symptoms is to private providers especially private providers that are close to people's homes (pharmacies, general practitioners etc). Engaging these primary care level providers will have far reaching benefits for TB care and prevention in Bangladesh, including early diagnosis of TB and thus reduction in TB transmission, faster return of people to good health and a productive life, reduced risk of post TB chronic morbidity and protecting people with TB from incurring high TB associated health care costs. The opportunity to achieve all these benefits should not be missed, however, the risks of engaging private providers in the provision of TB care and prevention services should also not be ignored. These risks should be clearly defined and mitigation measures put in place. **Primary duty bearers:** The NTP and implementing and technical partners**. Timeline:** During implementation of the next TB-NSP
6. **Address TB associated co-morbidities:** The World Health Organization estimates that the major drivers of TB in Bangladesh include undernutrition, diabetes, and smoking. While there are programs that are designed to address these up-front determinants of TB, the TB response does not appear to be linked to these programs. Additionally, people with these risk factors for TB are not routinely mapped and targeted for active TB case finding. **Primary duty bearers:** The NTP and implementing/technical partners. **Timeline:** During implementation of the next TB-NSP
7. **Address congestion in health care facilities, especially the large college hospitals through the development and implementation of comprehensive facility specific infection prevention and control strategies and plans:** Current congestion levels in college hospitals makes it impossible to implement airborne infection control measures and pose a significant risk of transmission of Mycobacterium tuberculosis and other airborne infections. A comprehensive plan needs to be developed and implemented to reduce this risk. Building the capacity of lower levels of the health

service delivery system may help to reduce referral to or the need for people to seek care at the apex of the public health services delivery system. **Primary duty bearers**: the MoHFW, College Hospital administrators and financial and technical partners of the MoHFW. **Timeline:** This should be an on-going activity as part of the health system development plan and process.

8. **Continue efforts to sustain the high treatment success rates:** For Drug Susceptible TB (DSTB), Bangladesh achieved a treatment success rate (TSR) of 95% for the 2020 cohort which is commendable. For DRTB, the TSR for the 2019 cohort was 74% which is above the global average. The NTP and implementing partners have been implementing measures that ensure adherence to treatment such as community-based treatment support. These measures need to be continued so that the treatment success rate for both DS and DR TB remain high. It is however important to note that the TSR for DR -TB is still lower than it should be. With only 74% of people treated for DRTB completing treatment, it means a significant proportion of these people have outcomes that are not what is desired. Therefore, for DR-TB measures need to be put in place to also increase TSR beyond just being above the global average. **Primary duty bearers**: The NTP and implementing/technical partners. **Timelines:** During implementation of the next TB-NSP
9. **Empower lower levels of the "system" to localize the TB response:** Local planning and implementation will build ownership of the TB response and is more likely to be effective. Attempts have been made to localize SDGs. These efforts can incorporate TB care and prevention. Lower levels of the health care system should be empowered to use the TB data they generate for local planning of the TB response. **Primary duty bearers**: The MoHFW/NTP should drive the creation of inter-ministerial and multi partner engagement platforms for health and TB at all levels but especially at the district level, while empowering these levels to develop, own and implement locally appropriate plans for TB care and prevention. **Timeline**: During the period of the next TB-NSP.
10. **Integrate TB care and prevention into other health and disease programs:** The JMM noted a lack of integration of TB screening and testing services in health programs that address morbid states that increase the risk of TB such as diabetes, chronic kidney disease, under nutrition and smoking prevention and cessation. An integrated approach that includes bi-directional screening and testing is expected to have both individual and public health benefit and will optimize use of scarce resources. The inclusion of TB screening (or other disease screening in TB services) in health programs beyond those that address TB co-morbid states such as the family planning program at the community level or the immunization program will provide a synergistic and efficient way of screening and testing people for TB. This opportunity is best exemplified by the health assistants program linked to community clinics. If this cadre of health care workforce is strategically used to deliver TB screening services at the community level, a large proportion of TB key and vulnerable populations (KVPs) would be reached. **Primary duty bearers**: the NTP and implementing and technical partners of the NTP should drive the engagement of health programs that are addressing prioritized co-morbid states for TB or offer opportunities to reach a large proportion of TB KVPs synergistically and efficiently. **Timeline:** During the period of the next TB-NSP
11. **Ensure the functionality of the Xpert testing network to increase rapid molecular testing capacity (Truenat and GeneXpert) to meet the goals of the NSP in addition to developing and implementing a patient-centred specimen referral system throughout the country to improve access to TB diagnostic testing:** The capacity to use Xpert as the initial diagnostic for TB is threatened by frequent cartridge shortages and non-functional Xpert modules which could quickly lead to unacceptable delays in returning results. An urgent response and solutions are needed or else the gains achieved in the past few years will be quickly reversed. **Primary duty bearers**: The NTP and implementing partners. **Timeline:** During the period covered by the next TB-NSP
12. **Increase the number of sites where DR-TB treatment can be initiated and accelerate decentralization of PMDT while rapidly adopting a policy of ambulatory care for people to be**

treated for DRTB: Most people enrolling into treatment for MDRTB do not need to be hospitalized. Limited availability of MDRTB treatment sites leads to delays in initiation of treatment and can be costly to people when the person who needs care has to travel long distances. **Primary duty bearers**: The NTP and implementing partners. **Timeline**: Immediately and during the period of the next TB-NSP.

13. **Ensure the recently launched Community, Rights and Gender Action is fully financed and implemented:** There seems to be a general lack of knowledge on TB and high levels of TB associated stigma and discrimination. TB interventions are largely not gendered with homogenous approaches to the implementation of interventions. TB community support structures are largely missing. **Primary duty bearers**: The NTP and implementing partners. **Timelines**: Immediately and during the implementation of the next TB-NSP.

2.5 PRIORITIZATION APPROACH

a. Given the need to reconcile the ambitious goal of TB elimination with limited resources, a robust priority-setting mechanism has been used to ensure that the right trade-offs are made and the impact on the decrease in incidence, mortality, and catastrophic costs due to TB is maximised. This NSP uses the modelling exercise, epidemiological analysis of the TB epidemic, and the situation analysis findings extracted from the national documents (MAF TB, PPM Strategy, Lab Plan, M&E Plan, CRG evaluation, etc) for prioritization of strategies and interventions that will maximise the impact on population health.

b. The strategies that will be prioritized during the NSP period include:

   i. **Active screening including for identifying subclinical TB patients and Active case finding especially amongst the key and vulnerable population**

   ii. **Enhancing the accessibility to rapid molecular diagnostics to universalise high quality diagnostics for all**

   iii. **Strengthening the health systems and routine programme delivery**

   iv. **Expanding the private sector especially the hospitals, graduate and non graduate providers involvement in TB elimination activities**

   v. **Aggressive and massive increase in coverage of TB preventive treatment which is expected to exert the maximum contribution in decreasing the incidence.**

2.6 STRENGTHS, WEAKNESSES, OPPORTUNITIES, AND THREATS (SWOT) TO END TB IN BANGLADESH

Table 8: SWOT NTP

Strengths	Weakness
1. High level political and administrative commitment providing fresh impetus to TB elimination efforts in the country. 2. Increase domestic funding for NTP since 2018 3. Strong absorptive capacity for partner funds supporting TB interventions. 4. TB services are integrated with well-structured PHC. 5. Community based TB activities are extensive and well established. 6. TB laboratory network has a well-defined four level structure. 7. Molecular diagnostics (Xpert MTB/RIF) introduced and planned to be expanded nation-wide by 2025. 8. Successful PPM models with private formal and non-formal providers 9. Good liaison with different entities like Tea Garden Authority. BGMEA, BKMEA etc. 10. Regular engagement by NTP with all the partners so that all are on the same page on different activities. 11. Availability of all-oral DR-TB regimen 12. Domestic manufacturing of WHO prequalified anti-TB medicines	1. TB indicators do not a find place in the upcoming MOH Operational plan 2023 – 2028 2. Insufficient budgetary outlay for health in the national budgets compromising the allocation to TB. 3. Limited human resource at the NTP HQ which severely limits programme management at the National level. 4. Private sector involvement in public health actions related to TB elimination is not commensurate to its size and dominance in TB care. 5. TB programme structure unable to cope with the growing demands for ending TB 6. Low case detection specially Child TB and MDR TB- 4% and 20% of the estimated burden 7. Access to molecular diagnostics, X-ray and FNAC is limited, diagnosis of EP TB remains challenging. 8. EQA system of molecular diagnosis doesn't cover all labs. 9. Ambulatory treatment for DR TB not yet initiated
Opportunities	**Threats**
1. In-country innovations and pilots with potential for replication and scale up. 2. Engagement of parliamentarians and the corporates to increase domestic funding for TB 3. Potential of leveraging the programmes of other ministries to compliment NTPs actions to end TB - Integration with IMCI, NNS, MNCAH, MCRAH OPs 4. SDG Localization efforts provide opportunity for incorporating TB in the SDG actions 5. Strong PSM unit with uninterrupted supply of drugs and logistics 6. The government plans to ensure universal health coverage for all citizens by 2032. 7. Malaria amongst communicable diseases has been accorded high priority with three laws specifically directed towards malaria control. This has led to historic reduction of malaria (>93%) in Bangladesh from 2008-2020. A legislative tool (ordinance, act, bill, law) for TB care and prevention will fast track the elimination of the disease in the country.	1. Insufficient budgetary outlay for health in the national budgets compromising the allocation to TB. 2. Lack of collaboration with other ministries and programmes that can accelerate the national TB elimination response. 3. High dependence on donor support for TB program delivery 4. Shrinking external assistance for TB elimination. 5. Global and national commitment may be shifted to emerging infectious diseases

CHAPTER 3: NATIONAL TB RESPONSE FRAMEWORK

V I S I O N : The vision of the Government of the People's Republic of Bangladesh is to promote the health and quality of life by ensuring the country is free of TB thereby contributing to attainment of high income status by 2041 as is envisioned in the Bangladesh Vision 2041 (Vision '41)[12]	
G O A L : To reduce the estimated TB incidence by 80% and mortality by 90% by 2030 as compared to 2015. **Annual TB Incidence to reduce to 70,000.** **Annual TB deaths to be reduced to 6,000.**	
Long term outcome (By 2035)	• Reduce TB incidence rate by 90% by 2035 • Reduce TB mortality rate by 95% by 2035
Medium term outcome (By 2030)	• Reduce TB incidence rate by 80% (compared to 2015) • Maintain treatment success rates of over 90% for individuals with drug-susceptible TB and over 80% for drug-resistant TB • Successfully treat at least **1.57 million** TB patients over the NSP period • Initiate treatment for **16500** drug-resistant patients • Provide TPT for 100% of eligible
Short term outcome (by 2026)	• Reduce TB incidence rate by 77% (compared to 2015) • Maintain treatment success rates of over 90% for individuals with DS TB and 75% for DR TB. • Successfully treat at least **860,000** TB patients (2024-2026) • Initiate treatment for **8000** drug-resistant patients. • Provide TPT for 100% of eligible
N S P P I L L A R 1 : F I N D	
OBJECTIVE 1: Find all TB patients [drug-susceptible TB (DS-TB), and drug-resistant TB (DR TB)] by early identification of presumptive TB patients through systematic screening using sensitive digital Chest X-rays with artificial intelligence, and prompt diagnosis for TB disease using WHO approved rapid molecular diagnostic tests to provide universal access to quality TB diagnosis in public and private sectors.	
N S P P I L L A R 2 : T R E A T M E N T A N D C A R E	
OBJECTIVE 2: Initiate and sustain all patients on shorter and patient-friendly treatment regimens for DS-TB, paediatric fixed-dose combination formulations for children with TB, and shorter, safer, injection-free and all-oral treatment regimens for DR-TB, wherever they seek care, with patient friendly systems and social support.	
N S P P I L L A R 3 : P R E V E N T	
Objective 3: Prevent the emergence of TB in susceptible populations and progression of TB in infected by early identification of TB infection and its treatment using a combination of biomedical, behavioural, social and structural interventions.	
N S P P I L L A R 4: STRENGTHEN HEALTH SYSTEM, ADDRESS THE POPULATION AND SOCIAL DETERMINANTS OF HEALTH AND TB, and SUSTAIN A SUPPORTIVE ENVIRONMENT to END TB	
Objective 4: Strengthen enabling policies, empowered institutions, and human resources with enhanced capacities to create a supportive ecosystem to FIND-TREAT-PREVENT TB in the country.	

[12] The "Vision 41" is a national strategic plan to farther develop the socio-economic standing of the Peoples Republic of Bangladesh, issued by Prime Minister Sheikh Hasina. As a part of four 5-year perspective plan to be undertaken between 2022 and 2041, Bangladesh is aiming to achieve high income status. The goals related to health include Increase life expectancy to 80 years, and Extend universal health care to 75% of the population.

CHAPTER 4: CASE FINDING AND DIAGNOSIS

4.1. CONTEXT

a. The JMM has recommended a massive scale up of screening amongst the high risk groups and the use of community level health care workers for it. Attempts have been made to **screen vulnerable groups for TB** including hard to reach populations, transport workers, people who inject drugs and special groups. For example, the 2022 Bangladesh TB epidemiological review observed that TB case finding activities among vulnerable have included smear camps and TB campaigns in which 30,869 and 38,336 people were reached with the identification of 1,846 and 1,976 people with TB respectively. This effort will be scaled up substantially during this NSP period.

b. The country is expanding molecular testing as the initial TB diagnostic test which, as a result of a higher sensitivity of these tests, has the potential to increase the proportion of people with TB among all notified TB notifications who are bacteriologically confirmed, thereby improving the quality of TB diagnosis. Currently the tools available in the country include Smear microscopy, Rapid Molecular Tests, LPA, solid and liquid culture and solid and liquid DST. (Table 10)

Table 9: Diagnostic tool/technology available in the country and its turn-around time (TAT)

Sl. No.	Tools / Technology		Description	Lab TAT	Overall TAT	Advantages	Disadvantages
1	Smear Microscopy	Ziehl Neelsen	Time between receipt of specimens for smear at the laboratory and result reporting	48-72 hrs	3 days	Simple, low cost	Less sensitive
		Auramine				Sensitive compare to ZN Both could/should be used for treatment follow-up	Expensive
2	Xpert MTB/RIF		Time between testing and result reporting	24 hours	5 days for non-Xpert sites 48 hours for Xpert sites	97% Sensitive and 93% Sepcific , detects MTB and Resistance to Rif	Expensive and cannot be used for treatment follow up
3	Line Probe Assay for MDR/XDR-TB detection		Time between testing and result reporting.	Within 5 days from direct sample (From culture isolates, add this value to culture TAT)	Within 10 days	Sensitive , detects MTB and resistance to Rif and INH	Need trained-skill person, Bio-safety issue and cannot be used for treatment follow up
4	Culture	Solid	Time between receipt of specimens for culture at the laboratory and result reporting	2-8 weeks average for smear positive samples and 4–8 weeks average for smear-negative samples.	9 weeks	Sensitive, cost effective	Need trained-shill person, tedious and biosafety issue
		Liquid		8-10 days for smear-positive samples and 2–6 weeks for smear-negative samples	2 months	Short duration, ,More sensitive than solid, Could be used for treatment follow-up	Need trained-shill person, Tedious and biosafety issue
5	DST	Solid	Time between inoculation of DST and result reporting (mean, range and 90th percentile). For total DST TAT, add this value to culture TAT.	4-6 weeks	90 days/3 months	Cheaper and more widely available	Labor-intensive, less sensitive and slower than liquid culture.
		Liquid		After inoculation, 2 weeks	10 weeks	Reading of result automated. Facilitate processing of large numbers of specimens. Early TAT compared to solid DST.	Costly and more prone to contamination

c. The country is also expanding private provider engagement which will contribute to narrowing of the estimated incidence-notification gap and also facilitate early diagnosis of TB.

d. There are strong community support systems with a well-structured community participatory program across the country with a huge network of community clinics and community health workforce of both government and NGOs which support case finding in the country.

e. Shasthya Shebikas (SS) are effectively linking the community with health care facilities – mobilizing community, identifying TB presumptive cases at community level, referral of presumptive cases to TB facilities for evaluation and diagnosis. They contribute 44% of all TB notification.

4.2. CHALLENGES

Current TB case finding efforts may not be adequate to reduce/end transmission of TB and therefore the impact of these efforts on TB incidence may be subdued. The major constraints include the following:

a. Only small proportions of populations that have a high burden of TB disease are being reached with TB screening and testing services. For example, at a national poverty rate of 13.5%, it means that at the very least 22 million people in Bangladesh are poor and vulnerable or at high risk of TB and could benefit from TB screening, however, in 2021 only about 154,189 people belonging to various at-risk populations were screened for TB. There were no visible TB screening programs for at risk populations such as prisoners (whose population is estimated to be over 82,000, which is nearly twice the prison capacity of Bangladesh[13]), health care workers (whose number in the formal sub-sector was estimated to be 350,000 in 2014[14]), undernourished people, diabetics among others.

b. When screening program are undertaken the approach used is to identify people with cough using cough of at least 2 weeks as the criterion for placing a person in the group of presumptive TB. This is an insensitive way of identifying people with TB and can delay the diagnosis of this disease, thereby facilitating transmission of TB.

c. There is minimal use of more sensitive screening tests recommended by WHO such as the chest x-ray with or without artificial intelligence and the Xpert MTB/Rif assay.

d. The opportunity to screen a large proportion of the population for TB, albeit with symptom screening, using the community health care workers attached to the community clinics has been missed for many years. The community clinics and other government community health workers are an untapped resource for TB diagnostic and care. (Missed opportunity to provide Contact Evaluation (CE) and TB Preventive Therapy (TPT))

e. There is a lack of up-to-date training and coordination between community and health facility levels workforce leading to delays in TB diagnosis.

f. The evolving socio-economic prosperity in Bangladesh appears to be leaving a proportion of the population behind with rising levels of inequality. Those left behind will continue to live in poverty and social deprivation which can continue to drive TB for many years to come. While a section of the population may be undernourished, another section of the population may become overweight/obese from easy access to food, which may be inappropriate, increasing the risk of diabetes, a known driver of TB.

g. Quality Management System (QMS) implementation at NTRL and RTRL level has several challenges such as implementation of LC-DST, EQA for LC-DST and LPA, biosafety concerns at NTRL, equipment maintenance, ensuring smooth supplies of consumables, etc.

4.3 OBJECTIVE, STRATEGIC INTERVENTIONS, ACTIVITIES AND SUBACTIVITIES

Objective 1 Find all TB patients **(DS TB and DR TB)** by early identification of presumptive TB cases and prompt diagnosis for TB infection and disease using WHO approved rapid molecular diagnostic tests to provide universal access to quality TB diagnosis in both public and private sectors.

[13] World Prison Brief. https://www.prisonstudies.org/country/bangladesh

[14] Bangladesh Health Workforce Strategy 2014

Intervention 1.1 **Scale up systematic and targeted screening for TB** significantly including subclinical (asymptomatic) high risk groups by using Chest X-rays with AI/CAD and teleradiology as the preferred tool

Activity 1.1.1 Implementation of new **integrated screening and diagnostic algorithm** across the country with capacity building of HCWs to implement it. The algorithm includes screening for any TB symptoms including cough of any duration and the use of X-rays.

Activity 1.1.2 **All Upazilla will have access to X-ray including ultraportable Xray machines and human resource (existing HR may be adequately trained and reoriented)** for conducting active screening in the designated areas – hard to reach, slums, prisons, etc. The **Ultraportable X-Ray machine with AI (CAD4TB)** will be used for outreach activities in upazilla/district with increased concentration of the high risk groups prioritized first. Mobilization and campaign for active screening of high risk groups will be undertaken prior to the activity.

Sub Activity 1.1.2.1 Explore **procuring Xray services from the private sector**

Intervention 1.2 Ensure **universal access to WHO recommended rapid molecular diagnostics (WRDs)** and continue to **strengthen the lab network** at all levels for early diagnosis of TB including universal drug-susceptibility testing and systematic screening of contacts and high-risk groups. Considering XDR TB Assay has been approved by WHO and 10 colour modules are available at several GeneXpert sites, NTP will adopt and expand its implementation for wider access to universal DST (including for INH and FQs).

Activity 1.2.1 Continue to **scale up network of mWRDs to the sub-district (Upazila) level** using the already developed Xpert SOP, supervision checklist, training materials and implementation plan to facilitate the RMDs (GeneXpert) training, operation, and scale up in a timely manner. Phase-out smear microscopy for diagnosis of TB. Continue sputum microscopy for follow up examination of TB patients. Ensure External Quality Assurance (EQA) program and **Aspect/GxAlert** covers all sites. Procurement of WRDs (GeneXpert till the upazilla level and TrueNat below the upazilla level) for universalizing diagnostic capacity. The scale up of the NAATs will be supported through a **diagnostic network optimisation** (DNO) exercise which can help in estimating the capacity required (year on year) to meet the NSP targets and simultaneously planning-relocation of the existing machines, placement of new machines and designing an efficient specimen referral system for optimal utilisation of the diagnostic capacity.

Sub Activity 1.2.1.1 **Peripheral laboratories:** Located at the Upazila Health Complex (UHC) and union level, the peripheral laboratories commonly provide smear microscopy services. The NTP is currently expanding the coverage of mWRDs at the peripheral level to be used as an initial rapid test for diagnosis of TB by replacing ZN/LED microscopy. In any location if mWRD becomes non-functional, specimen will be transferred to nearby diagnostic sites. The presumptive EPTB patients will be referred to the higher-level facilities (intermediate and regional level facilities including medical college, RTRLs and CDHs) for specimen collection and testing. Specimens required for culture and DST will be transported to NTRL or RTRL.

Sub Activity 1.2.1.2 **District level laboratories:** The intermediate laboratories located at the district level require to perform the same diagnostic activities as done at the

peripheral level. In addition, these laboratories **will test non-sputum specimens for detection of EPTB with available molecular technology.** District and medical college hospitals will screen presumptive EPTB patients referred from the peripheral labs and perform the procedures for collection of non-sputum specimens. The specimens will be used both for molecular detection of MTB as well as for histopathology/ cytopathology. NTP will ensure the baseline investigations for DR TB patients in collaboration with government hospital or outsource those to private hospitals as appropriate. Capacity will be built for EPTB diagnosis.

Sub Activity 1.2.1.3 **Regional Level**: In addition to molecular diagnostic technology all RTRL are equipped with **Line Probe Assay (both first- and second-line drugs) and Liquid culture and DST (MGIT)** infrastructure (except Khulna which has only LC-DST infrastructure). All NTRL and RTRLs will receive 16M 10C machine in 2023. Additionally Phenotypic DST will start soon. All RTRLs will **undergo certification for LPA and LC-DST** (including for newer drugs). However, considering that new mWRDs like XDR TB assay will be introduced, LPA will also be judiciously used so as to utilize the available infrastructure which has been established in the last 2-3 years. LC-DST will be made available esp. for patients with resistance identified in mWRDs. Sample transportation using cold chain will be strengthened to send samples (without CPC) from periphery for this testing.

All regional laboratories will perform collection and testing of non-sputum specimens for molecular detection of mycobacterium as well as to facilitate histopathology/ cytopathology in collaboration with the medical colleges located in the area. They will facilitate laboratory human resource (HR) development, monitor the performance of the laboratory, and review and strengthen the EQA for smear microscopy and molecular diagnostics. They will also be responsible for planning and organizing lab specific training and monitoring and supervision of the peripheral and district level labs under their jurisdiction including biosafety measurements based on biological risk assessment.

Sub Activity 1.2.1.4 **Central level:** In addition to diagnostic tasks same as the regional levels **(LC-DST, LPA, mWRDs)**, the central level lab will support NTP in developing and **updating the policies** and guidelines, manuals, diagnostic algorithms, SOPs, training curricula and materials. It will **conduct trainings** and support in designing laboratory management information system. With the help of NTRL, it will **establish EQA systems for genotypic and phenotypic tests** including for the NAAT testing at peripheral level. it will be conducting **operations research**, and **monitoring and supervision** of the lower-level labs. The central level labs will also **routinely participate in EQA organized by SNR**L, ensure all **biosafety** measures are undertaken, and explore possibilities for performing histopathological examination in collaboration with leading national institutions. It will also work to strengthen its lab infrastructure as per recent assessment visit and upgrade it to comply with bio-safety standards required.

Since **10 colour machines with capacity to test 6 drugs sensitivity is being introduced in the country the NTP will reconsider the use of LPA** in the programme.

Sub Activity 1.2.1.5 **New Genome Sequencing (tNGS) Lab** will be initially established at NTRL and later based on needs/ requirement will be scaled up to RTRL such as Chittagong

and Sylhet. The progress at global level to standardize New Genome Sequencing will be taken into account during the expansion.

Moreover, with PCR instruments already available, the NTP will explore expanding the scope to account for multiple diseases (by adding the necessary sequencers and bio-informatics requirements, etc) to strengthen the whole health system.

Sub Activity 1.2.1.6 Capacity for **culture and LC-DST, and conventional DST** will be increased. Efforts will be made to utilize the existing LPA testing capacity considering newer mWRDs like XDR TB assay are being introduced in the program.

All RTRLs including 250 Bedded TB Hospital at Shyamoli, and NTRL Dhaka will be equipped for it along with the capacity of human resources. Infrastructure at NTRL will be upgraded to comply with biosafety requirements (as recommended in recent lab assessment report).

New culture and DST labs at Rongpur and Barishal Division (phenotypic and molecular both) are proposed to be established and will be established considering the utilization of available C&DST facilities in the country. The **infrastructure of the existing laboratories will be assessed, and necessary renovation and upgradation** will made to fit for the purpose.

Phenotypic Drug Susceptibility Testing (DST) of SLD, including **new drugs such as Bedaquiline and Delamanid**, will be implemented using the liquid culture system to support the current DR-TB Shorter Treatment Regimen (STR) across all RTRLs and NTRL. Necessary **staff** for the new laboratories will be recruited and trained and existing staff will be re-trained as needed.

Sub Activity 1.2.1.7 Plan to **conduct training and implementation of updated LPA interpretation guidelines for lab staff as well as clinicians** (orientation on reports). Will conduct training for all lab staff on

- bio-safety training (PPE, disinfection, spill Mx, BMW Mx, safety incl fire, chemical, etc.)
- Refresher training on existing lab technologies
- Equipment use and maintenance training (incl. calibration if required)

All microbiologists will be oriented on QMS (as per ISO 15189) and they in turn can train their own team members in house.

Activity 1.2.3 The **specimen transportation system** will be scaled up along with expansion of TB laboratory network. Transportation of specimens for LPA, culture, and DST (conventional and molecular) and GeneXpert will be performed using triple packaging in cold chain and without using CPC. **Courier services** will be provided with cold box for quality assurance and safe transportation of specimens. The **SOPs for sputum collection and transportation** will be updated with **procedures for EPTB samples** and timelines for the delivery. Laboratory, clinical and program staff will be oriented on specimen collection and transportation procedures. Mechanisms will be set up for the routine monitoring of turnaround times (TAT) and delivery conditions and electronic reporting of results.

Activity 1.2.4 Molecular diagnostic techniques will be used for the **detection of smear-negative TB especially EPTB, Child TB, & people living with HIV\AIDS**. TB test will be conducted among HIV positives patients based on policy of NTP. Concerted effort will be made to implement the NTP's policy for screening of

all HIV patients with possible symptoms of TB and enroll all HIV-positive contacts of TB patients to TPT using IPT regimen.

Activity 1.2.5 The use of **quality assured microscopy to perform treatment follow-up** through **timely maintenance, and External Quality Assurance (EQA)** will be sustained. The EQA program for microscopy is being operated through 40 EQA centers and it will be updated to include components focusing on supervision activities of the EQA centers and on performance of outreach worker/volunteers who prepare smears at outreach centers.

Given the expansion of mWRDs, the existing EQA centers for AFB Microscopy would be used to implement the EQA for GeneXpert and other mWRDs.

EQA will be implemented for NAAT sites (GeneXpert as well as Truenat). **Capacity will be built up to manufacture panel in countr**y. Implementation will be carried out in a phased manner to **cover all sites at least once a year**.

Through NTRL or SNRL (Antwerp/ NIRT Chennai), EQA for LC_DST and LPA (and will be initiated for all RTRLs. Necessary trainings will be provided. This proficiency testing mechanism will be developed to provide PT panels to all the sites at least once a year. Mechanisms for regular certification at NTP level will be introduced so that only certified labs can provide quality assured lab services for technologies used to diagnose drug resistant TB at these labs.

EQA portal as appropriate will also be developed to strengthen monitoring and implementation of PT rounds. Through NTRL or SNRL (Antwerp/ NIRT Chennai), EQA for LPA (and develop EQA guidelines) will be initiated. Subsequently EQA for LC-DST (after testing is initiated and training) will also be done.

Activity 1.2.6 Establish **Laboratory Quality Management Systems (QMS) and laboratory information management system (LIMS)** in NTRL/RTRLs in the TB laboratory network through a policy and review and framework for the TB laboratory, augmenting human resource for QMS, and operational research at the NTRL and RTRLs.

The NTP will develop/ update the QMS materials for TB laboratory services and train the staff on QMS. The NTP will take initiatives to link the NTRL and RTRLs for ISO 15189 accreditation. These TB laboratories will be mentored following SLIPTA/TB -SLMTA processes. QMS will be implemented at NTRL and RTRLs with an aim to full fill the ISO 15189 requirements and be eligible for participation in the accreditation process by 2024/25. A collaboration platform with Bangladesh Accreditation Board (BAB) will be established to facilitate the accreditation process.

The LIMS will be strengthened to link existing Aspect with E-TB Manager as well as with HMIS-2. Existing recording and reporting systems will be streamlined to ensure uniform data entries and will provide analysis mechanisms for monitoring and improving lab processes and indicator (including TAT).

Operational research and surveillance will be carried out periodically to address gaps and to identify newer drug resistance patterns.

Activity 1.2.7 Develop and disseminate **national standards and policy framework for TB** laboratory

Activity 1.2.8 The NTP will also conduct the **third drug resistance survey**

Intervention 1.3 **NTP will enhance efficiency of TB diagnostic network to increase access to testing, maintenance of equipment, connectivity solutions, biosafety, quality assurance and supply system.** The NTP will establish a **national center for the maintenance and repair of TB laboratory equipment** for microscopy, NAAT, Culture and DST (phenotypic and molecular) test, etc. as appropriate. The centers will be equipped with necessary equipment and the existing **two biomedical engineers** will be trained to meet the emerging program needs and as required the team will be strengthened further. A central bank of back-up equipment will be created (Gene Xpert, modules, cartridges, UPS, microscopes, centrifuges, balances, etc.).

The **Annual Maintenance Contract (AMC)** and **Continuous Maintenance Contract (CMC)** will be executed with capable public/private entities for the maintenance of major equipment. The NTP will use outsourcing mechanisms to engage capable local service providers for troubleshooting, annual calibration of MGIT machines and other services.

Routine/ preventive maintenance will be enhanced by provision of standard procedures, tools, training, and monitoring and supervision functions. The management of RTRLs will be strengthened through training and mentoring at least one current staff of each RTRL team.

The NTP will develop a **Preventive Maintenance Training Curriculum** to train the lab staff on preventive maintenance.

Activity 1.3.1 **Capacity building for lab staff** will be undertaken e.g. Global Laboratory Leadership Program (GLLP) for lab leadership**.**

Intervention 1.4 **Active case finding** will be strengthened and expanded amongst the **high risk groups** following the **mapping and quantification** of these groups. This strategy will focus on activities **in hard to reach areas** like Char, hill tract areas, tea garden including mass screening with X-ray targeting high risk settings such as **prisons, slums, areas with high migratory populations, and other high risk groups** (miners and other workers exposed to dust, workplace - areas with high concentrations of informal sector workers). **Attention to gender** will be an important element. Rural issues will be analysed given the particular challenges for both diagnosis and treatment due to long travel times and fewer community health resources.

Household contact evaluation including for adults will be undertaken as a priority activity.

Activity 1.4.1 Access to TB services will be enhanced for the high risk groups including workers in **garment and knitwear industries, other workplaces, driver's (Truck, Bus, Tempo) at district terminals, Slums, refugees, brick Kiln workers, miners, tea garden workers,** etc. using sputum camp approach with screening, sputum examination/transport facilities provided. **Community gatekeepers** (factory owners, tea garden owners and others) will be involved. Portable X-Rays will be used wherever feasible for screening.

1.4.2 **TB Screening among prisoners** will be strengthened by integration with ASP and integrating TB screening and treatment in the routine health care service delivery in prisons. **Close coordination with NTP, ASP, CDC** and other stakeholders for other comorbidity screening (HIV, Hepatitis B, C, etc.) will be established. In addition, advocacy /networking meeting and workshop with

prison authorities will be undertaken to deliver **right and gender sensitive TB care in the prisons.**

Intervention 1.5 **Facility based active case finding through systematic screening** at all health service delivery points will be undertaken including ensuring access to quality CXR, sample collection, prioritized use of Xpert on specimens obtained from children and TST (Mantoux test) services.

Intervention 1.6 **TB services in the urban areas** will be strengthened by a greater focus on monitoring and supervision; financing; electronic notification, recording, and reporting; referral and follow-up; rational use of medicines; and private sector and community engagement. Attention will also be given on developing best-practice urban-based contact tracing and prevention therapy interventions in collaboration with MOLGRD.

Activity 1.6.1 Establishment of **One Stop TB Service Centres** at Rajshahi, Sylhet & Rangpur like that of Shyamoli 250 bed TB hospital, and utilization of City corporation ward based health facilities for TB screening.

Intervention 1.7 **TB in medical colleges:** Other than the ongoing activities that will be strengthened to enhance case notification including formation of **committee at large medical college** hospitals for interdepartmental referrals and multi-department co-ordination, and also **Task force of medical colleges** will be formed.

Activity 1.7.1 **Task force of medical colleges** at the divisional/regional level with clear roles and responsibilities will be formed and regular meetings for addressing issues related to TB services (especially for Adult and Paediatric case detection, Operational research, DRTB case management, Airborne infection control, etc). will be conducted. The text on TB for medical students will be updated.

4.4 REVISED ALGORITHM FOR DIAGNOSIS AND TREATMENT OF TB IN BANGLADESH

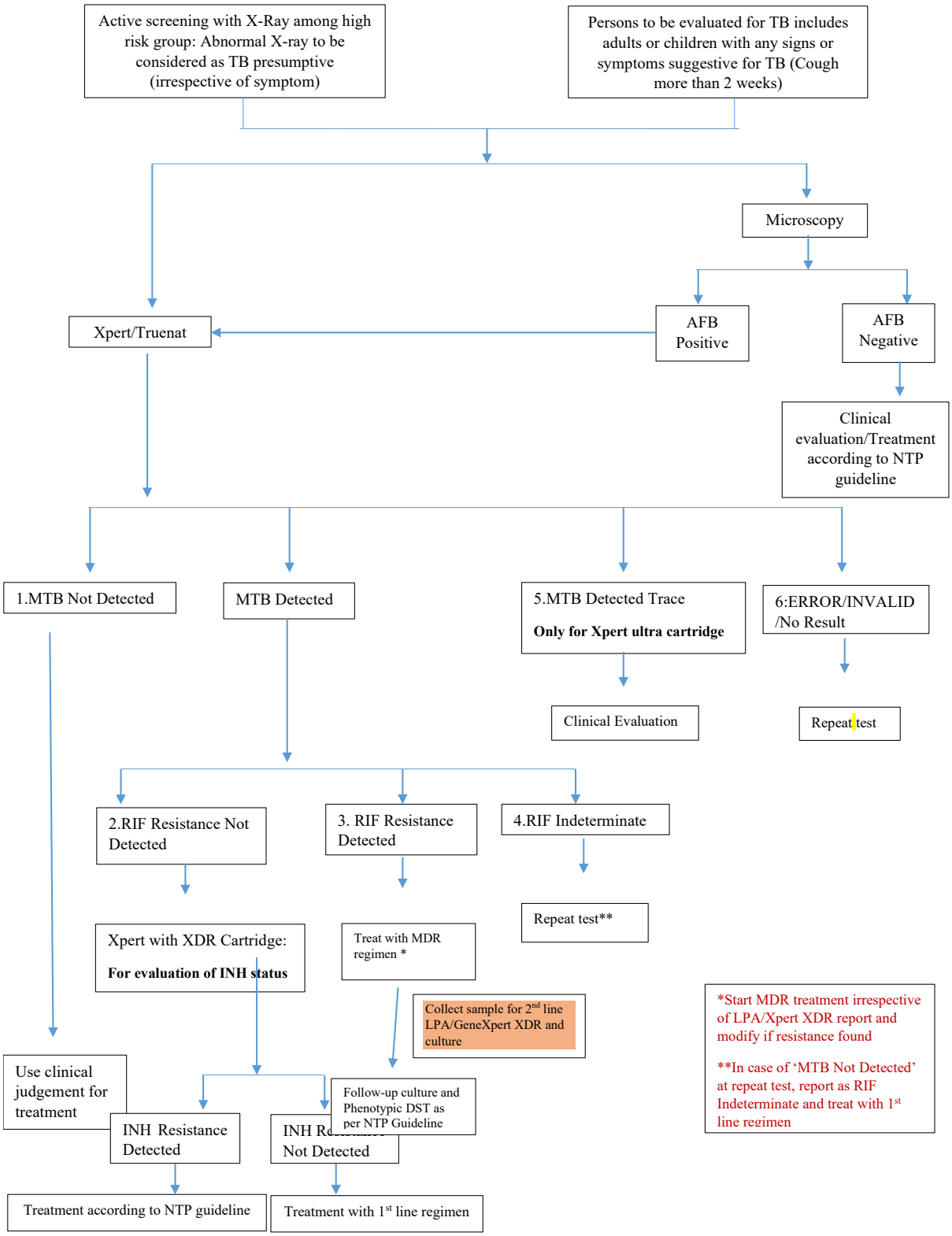
To meet the End TB Strategy targets, WHO-recommended molecular rapid TB diagnostics (WRDs) should be made available to all individuals with signs or symptoms of TB, all bacteriologically confirmed TB patients should receive DST at least for RIF, and all patients with RR-TB should receive DST at least for fluoroquinolones (FQs). Updated WHO guidelines stress the importance of DST before treatment, especially for the medicines for which WHO-recommended rapid molecular tests are available (e.g. FQs, INH and RIF)[15]. Bangladesh is aggressively scaling up the mWRDs nationwide with a plan to cover all upazilla health facilities, and below the upazilla level by 2025 adapting the algorithm for programmatic use. (Table 11 and Fig 18)

Table 10: mWRD facilities to cover all Upazila and large public/private hospitals as well as city corporation areas by 2025

Facilities	Numbers by 2025		Numbers by 2025
Upazila Health Complex	495	Narayanganj city corporation	5
Peripheral lab at centers	500	Gazipur city corporation	5
Public & private medical colleges/ specialized medical institutions	103	Barishal city corporation	3
Chest diseases clinics	44	Khulna city corporation	4
Chest diseases Hospital	08	Rajshahi City corporation	4
PPM/ Dhaka Urban to cover 12 mil pop	50	Cumilla city corporation	3
PPM/ Chattogram Urban	20	Mymensingh city corporation	3
Sylhet city corporation + tea garden	10	Rangpur city corporation	3
Total			**1,260**

[15] WHO consolidated guidelines on tuberculosis. Module 3: diagnosis – rapid diagnostics for tuberculosis detection

Figure 18: Revised diagnostic algorithm with treatment considerations based on the lab results



CHAPTER 5: ENGAGING THE PRIVATE SECTOR

REFER THE NATIONAL TB PPM SRATEGIC PLAN 2023 2026 FOR GREATER DETAILS

5.1. CONTEXT

a. In Bangladesh, an estimated up to 80% of initial care seeking for any symptoms is to private providers especially private providers that are close to people's homes (pharmacies, general practitioners, etc). Engaging these primary care level providers will have far reaching benefits for TB care and prevention in Bangladesh including early diagnosis of TB and thus reduction in TB transmission, faster return of people to good health and a productive life, reduced risk of post TB chronic morbidity and protecting people with TB from incurring high TB associated health care costs.

b. The country has developed its National TB PPM Strategic Plan 2024 – 2030 and the goals and objectives of the TB PPM NSP are as follows:

Goal: To expand, strengthen, and reinvigorate effective engagement of current and yet-to-be engaged private sector, with an emphasis on the private for-profit providers, in TB prevention and care, in order to enhance case detection, sustain treatment success of more than 90 percent (drug susceptible TB), increase access to diagnosis for multi-drug resistant TB (MDR-TB) and contribute to the reduction of MDR-TB incidence.

Objectives: The objectives of the PPM strategy are to:

1. **Objective 1:** Ensure effective PPM leadership and stewardship at the National and sub-national levels through high-level engagement, active oversight and management, and resource mobilization. Specifically, explore mechanisms to enhance the capacity of NTP/MOHFW to collaborate with the private sector effectively.

2. **Objective 2:** Ensure active participation and accountability of the private sector through the Bangladesh Medical Association (BMA), various professional associations/societies, and private sector platforms/sectoral representatives.

3. **Objective 3:** Enhance the use of digital technologies to facilitate the engagement of private providers at scale. This should include regulations and enforcement mechanisms for scaling up the use of a comprehensive cross platform application (a strengthened "Jannao" or a similar app) and may also include digital vouchers for drugs and diagnostics, adherence monitoring technologies, and digital payment of incentives and enablers to both patients and providers.

4. **Objective 4:** Increase the coverage and quality of TB services in the private sector by ensuring adherence to the standards of TB care.

5. **Objective 5:** Facilitate and expand treatment adherence and patient/social support for all patients.

6. **Objective 6:** Create an enabling environment for TB elimination in industries and factories by introducing workplace policies and regulations for annual TB screening and sustain and strengthen TB services.

7. **Objective 7:** Promote resilient, and sustainable PPM interventions through a gradual move from donor to domestic funding through innovative financing mechanisms including social contracting and strategic purchasing (SC & SP).

c. There exist **multiple engagement models** for involvement of private sector that have been customized to different provider types and contexts and are operating at significant scale. These

include 71 large hospitals with **DOTS corners**, plus engagement of 25,000 **Graduate Private Providers (GPPs)** and 50,000 **Non-Graduate Private Providers (NGPPs**). As part of this response, there are 62 TB diagnostic centers (TDCs), 10 TB Screening and treatment centres (TBSTCs), and 4 mobile vans. In Bangladesh, referrals credited to public and private hospitals have consistently constituted 22% of total case notifications. The contribution of private hospitals has increased slowly to 3% of total notifications in 2020.

HOSPITAL DOT CORNER: Hospitals attract very large numbers of outpatients, and have qualified staff, laboratories and other facilities. TB presumptive from hospitals are referred to the DOTS corner located within the hospital premises. BRAC, the main implementer of Hospital DOT Corners, has reached agreements with large hospitals under which BRAC assigns one staff member to ensure that presumptive TB patients identified in the various outpatient and in-patient departments get tested for TB, and connect them with their nearest DOT centre for registration and treatment. The hospital provides a small space (a DOT Corner) and laboratory services. If the patient lives nearby and prefers to take treatment from the hospital, they can do so. Medicine is also provided to indoor TB patients. **Screening of patients at OPD (Facility based active case finding) is undertaken in** 39 large hospital among them 5 are private. BADAS screens patients with diabetes mellitus at their 108 affiliated centers.

TB DIAGNOSTIC CENTERS - PPM SITES FOR TB DIAGNOSIS: These are dedicated non-profit TB diagnostic centres using digital chest x-ray and GeneXpert. Private healthcare providers are motivated to refer presumptive TB patients to high-quality centres that offer the latest technology, either free of charge or at very low cost, rather than to the private laboratories. These centers have convenient opening hours from morning until evening. There is a rigorous link to treatment with attention to the quality of programme. There are 10 centers run by ICDDR,B/ACTB (3 centers provide testing facility for extra pulmonary TB sample using of GeneXpert). BRAC manages 62 centers and 4 mobile vans for providing TB diagnostic facilities. This model is often referred to as the “social enterprise model” because, in ICDDR,B and CHS, some costs are recovered from patients in the form of fees for digital chest x-rays (ICDDR,B) and other laboratory tests (CHS). BRAC does not charge user fees, and all the centres depend primarily on public or philanthropic funding for the foreseeable future even if they generate 10%-20% cost recovery from users.

GRADUATE PROVIDERS (GP): There are more than 65,000 Graduate Medical Practitioners in Bangladesh, of whom more than half work exclusively in the private sector and most of those employed in government service also have private practice in the evenings. They also include 450 Chest Specialists. They work in 4,280 private hospitals and clinics and 67 private medical college hospitals. The individual private provider engagement intervention has been implemented largely by NGOs. The approach includes motivating private graduate medical practitioners operating in small clinics and hospitals in the community to link with NTP and affiliated NGOs. Networking meetings provide updated information on diagnostic centers location and referral procedures. The engaged graduate providers, refer presumptive TB patients for testing and confirmed TB patients for free treatment. The NTP has also engaged with professional associations for awareness raising and eventual inclusion of TB in Continuing Medical Education.

NON-GRADUATE PROVIDERS: This category includes people referred to as Village Doctors, drug sellers and pharmacies, but in practice their functions are similar: they sell medicines and provide advice. They are usually the first point of care for the majority of Bangladeshis in both rural and urban areas. As such, their engagement is critical for early TB case-finding and for reducing patients’ direct and indirect costs. It is also challenging, given the very large number of such providers and the relatively low yield per provider.

Their role in case finding in some areas has declined in recent years: in 2017 they referred 6% of presumptive TB patients (down from 12% in 2011) and 10% of confirmed TB patients (down from 14% in 2011). Yet they continue to play a critical role as DOT providers. They do this work without any financial incentives for either referral of presumptive patients or treatment support (except when they provide treatment support for DR patients).

PHARMACIES AND DRUG SELLERS: Private pharmacies are "first point of call" for medical advice on common health problems. So, the private medicine retailers have turned to be one of the principal players in promoting access to medicines in the country. **According to DGDA** the number of **licensed drug shops in Bangladesh is 1,07,592 and nearly an equal number of unlicensed shops** are involved in selling OTC and prescription drugs throughout the country. The Social Marketing Company (SMC) works with 8,600 "**Blue Star Providers (BSP)**", or drug sellers, and a further 4,500 "**Green Star Providers (GSP)",** or licensed pharmacies. All **Green Star providers** get a 2-day training, including one hour on TB, every two years; all **Blue Star providers** are trained for 3 days, including 1.5 hours for TB, and participate in refresher training every two years. **Blue Star Providers** submit monthly data on referral of presumptive TB patients, through an innovative automated voice recognition system. The engagement of the pharmacies is an under-utilized resource for TB.

PRIVATE LABORATORIES: In 2015, the Ministry of Health estimated that there were over 9,000 private stand-alone diagnostic facilities in Bangladesh. The current number is likely to be higher. In recent years there has been an expansion of diagnostic laboratory chains, with large numbers of affiliated collection centres. Currently, private laboratories are not systematically engaged as partners in the TB program, although BRAC and others have reimbursed patients for the costs of private chest x-rays and The country has a gazette on mandatory notification of TB patients by all sectors issued in 2014.

In addition to the engagement models above, interventions at the workplace, prisons, are described in the chapter on Multi sectoral engagement (chapter 10)

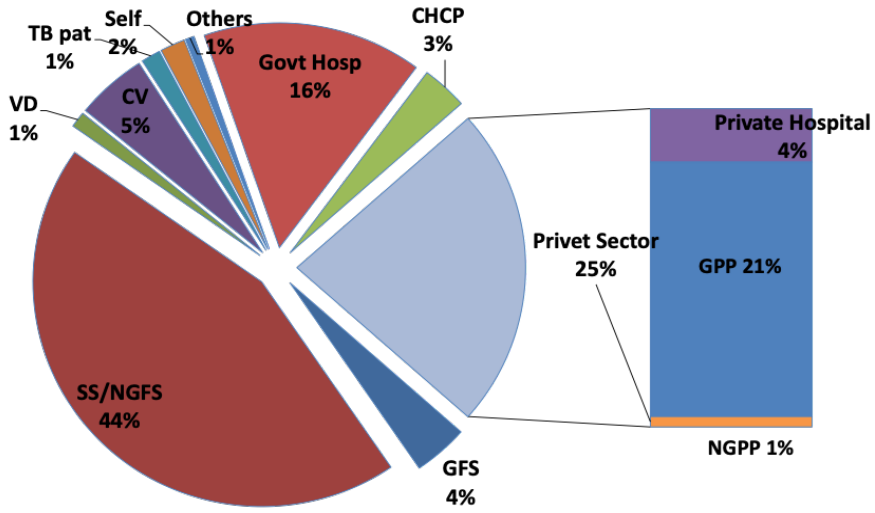
d. Corporate sectors (BGMEA, BKMEA) are involved through and provide TB care and prevention support to its employees. Among a number of workforce populations, there are regular cough campaigns done, contact tracing among co-workers, and there is 2 weeks paid leave for patients who are bacteriologically confirmed. Not all factories are involved.

e. PPM best practices in Bangladesh include the use of DOTS Corners, which involves placement of HR support, notification and treatment at a specific site in private and public hospitals. Additionally, there are diagnostic centers that have dedicated staff and flexible opening hours, provide free services to all, and have centralized x-ray readings and use of a sputum collection video to improve sputum quality. For the engagement of NGPPs, field officers are provided an incentive of 100 BDT provided per bacteriologically confirmed patient diagnosed to undertake the activity.

f. A mobile app (the JANAO application) is currently being used by GPPs and their assistants for TB case notification in Dhaka and Rajshahi City Corporations, with some private providers being sensitized and oriented to its use.

g. In 2021, 25% of the notified TB patients came from the private sector. The Graduate Private Practitioner (GPP) contributed 21% of the total 25% of the referrals (Figure 19).

Figure 19: Referrals from private sector



5.2 CHALLENGES

a. In relation to governance, the leadership and coordination on PPM strategies is driven more by centralized decision making than by local priority setting.

b. The coverage of private sector engagement still has significant gaps: a large proportion of private sector providers (e.g., 60% of large hospitals, 70% of GPPs and 90% of NGPPs) are not engaged in providing TB-related services.

c. Quality is also not always optimal: there is limited ICF/ACF for both adults and children in the private sector (particularly in high volume hospital settings), and provision of other services such as TPT are limited.

d. There is sub-optimal implementation of mandatory notification: not all diagnosed TB patients are notified due to a lack of coverage of notification systems, supervision and sensitization in the private sector, including limited roll-out of the JANAO app.

e. The country's overall health financing context limits the ability to implement more ambitious efforts. Specifically, the lack of approaches for strategic purchasing of services – either for the purchasing of clinical services directly from private providers, or of engagement services by NGOs – limits the ability to scale up private provider engagement approaches, particularly with domestic financing.

5.3 INTERVENTIONS, ACTIVITIES AND SUBACTIVITIES

NSP Objective	**1**	Find all TB patients **(DS TB and DR TB)** by early identification of presumptive TB patients and prompt diagnosis for TB infection and disease using WHO approved rapid molecular diagnostic tests to provide universal access to quality TB diagnosis in both public and private sectors.
Intervention	**1.8**	Strengthening and expansion of **Public private mix** to ensure high quality, early referrals, diagnosis, and notification from the private sector with a focus on for-profit private sector.
Activity	**1.8.1**	**Functional PPM taskforce** at the National and sub national Levels
Sub activity	**1.8.1.1**	Develop TORs for TB PPM task force
Sub activity	**1.8.1.2**	Identify members from public, private and the NGO sectors to be members of the task force

Sub activity	**1.8.1.3**	Support an **influential TB champion** to promote TB PPM activities amongst the private practitioners
Sub activity	**1.8.1.4**	Conduct one day **orientation in TB PPM** strategic plan and activities
Sub activity	**1.8.1.5**	Regular meeting of **TB PPM taskforce**
Activity	**1.8.2**	Enhance the **management capacity within NTP in partnership management** with increased consultation and information sharing that informs analysis
Sub activity	**1.8.2.1**	**Training of PPM focal person and NTP leadership** on partnership management
Sub activity	**1.8.2.2**	Identify/**hire specialized agency** for providing training on partnership management
Sub activity	**1.8.2.3**	Two day **workshop** for above at National level
Sub activity	**1.8.2.4**	International **exposure visits to** high burden country with **a strong PPM programme.**
Activity	**1.8.3**	**A mapping and quantification** of the various types of private providers in the country will be undertaken.
Activity	**1.8.4**	An **expansion strategy**, focusing on low-incomse areas and NGPPs with chambers (e.g., BlueStar) will be formulated. NGPPs will be provided with updated lists of nearby TB diagnostic and treatment centers, and NTPs and partners will use community-based advocacy approaches to reach the lowest level providers that are not engaged directly.
Activity	**1.8.5**	**TB Diagnostic centers** will have extended opening hours to align with GPP's hours and their need for rapid diagnostic turn-around time. The NTP and partners will also engage specialists working in private diagnostic/ consultation centers. Diagnostic centres will also be expanded to improve accessibility for presumptives referred by community workers.
Activity	**1.8.6**	**DOTS corners** will be added in larger private hospitals and in other large volume hospitals that do not currently have a DOTS corner.
Activity	**1.8.7**	**Intensive case finding** (ICF) will be expanded within hospitals using cough triage in high volume outpatient's department and linkage to DOTS corners to increase the yield
Activity	**1.8.8**	The existing **incentive and enabler systems (both monetary and non-monetary, such as recognition certificates)** to deliver quality TB services along the cascade of care will be continued and strengthened. **Facility-based incentive mechanisms** will also be explored, which could include strengthening the laboratory capabilities of the private facilities in order to incentivise them to declare themselves as **TB-friendly facilities**.
Activity	**1.8.9**	The capacity of private providers will be enhanced through simple, practical, short duration trainings on the standards for TB care. They will be equipped with tools to facilitate notification and monitor treatment of their TB patients (**including through digital technologies**)
Activity	**1.8.10**	Networking meetings, orientation meetings with **GPPs, NGPPs, informal providers** (**Pharmacist/Medical Representatives/ Village doctors**) will be conducted. Sensitization workshops to update on recent changes and guidelines on TB - with **pulmonologists, paediatricians, and other specialists** will be conducted. The NTP will continue to engage **village doctors and**

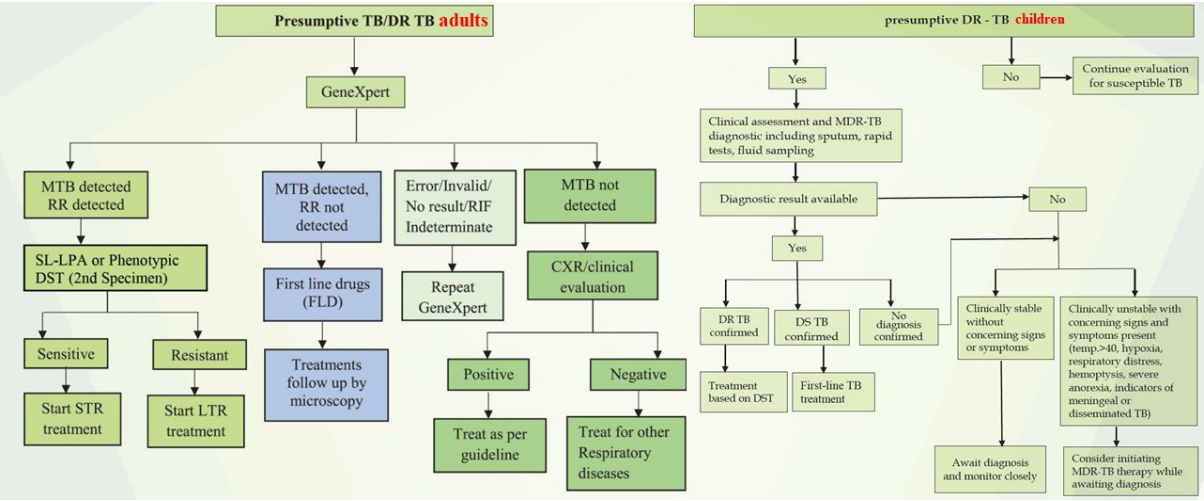
		pharmacy drug sellers as they are the first source of care in a fifth of TB patients.
Sub activity	**1.8.10.1**	The existing **IPC committee** in public and private medical college and hospitals for integrated management of TB services will be made functional
Sub activity	**1.8.10.2**	**Basic and refresher Training on TB and PPM** for PPM Staff will be regularly undertaken
Sub activity	**1.8.10.3**	**SOPs on Referral Mechanism of TB service delivery** for public-private-NGO facilities to optimize TB care will be developed and shared widely through orientation meetings/workshops of doctors in medical colleges
Sub activity	**1.8.10.4**	**TB message dissemination** in medical professional conferences
Intervention	**1.9**	**Enhance proactive participation by BMA, BPA, BPMPA, and other relevant professional associations/societies and private sector partners in co-creating, and delivering the PPM programme**
Activity	**1..91**	Enhance capacity of BMA, BPA and other association members on TB PPM
Sub activity	**1.9.1**	Formation of a Private Sector Working Group at the BMA to support knowledge management through a community of practice with key representatives from the private sector including professional agencies.
Sub activity	**1.9.2**	Consultative meetings/ activities/ events with key private sector members, industry bodies and platforms on opportunities for collaboration at the national, divisional and district level.
Sub activity	**1.9.3**	Publicize a calendar of meetings/ activities/ events on the NTP website to articulate the various roles that the private sector can play in support of PPM objectives
Sub activity	**1.9.4**	Tailored private sector workshops on the delivery of screening, diagnostic, treatment and preventive interventions, in partnership with agencies (BRAC, ICDDR,B, Damien foundation, IRB, etc,.)
Intervention	**1.10**	Sustainable PPM interventions through a gradual move from donor to domestic funding through innovative financing mechanisms including social contracting and strategic purchasing (SC & SP) will be explored over the NSP period given the strength of the private sector in these areas.
Activity	**1.10.1**	A National workshop on social contracting and strategic purchasing to generate awareness and agreement in collaboration with the Health Economics Unit. Undertake advocacy with the Ministry of health and Ministry of Finance for exploring opportunities for social contracting and strategic purchasing. Pilot a few modalities for purchasing clinical services from private providers and pilot strategic purchasing for supportive services like ACSM, Specimen collection and transport, diagnostics, treatment, etc. either individually or bundled together

CHAPTER 6: TREATMENT – DRUG SENSITIVE TB AND DRUG RESISTANT TB

6.1 CONTEXT

a. Bangladesh is one of the high TB/MDR-TB burden countries and has an estimated MDR/RR-TB incidence of 2/100,000 populations. The current diagnostic algorithm for DR TB diagnosis is being updated with latest guidance. (Fig xx)

Figure 20: Diagnostic and treatment algorithm for DR TB in adults and children



b. In the second DRS survey carried out in 2018-19 the prevalence rate of Rifampicin Resistant among new and previously treated patients was 0.7%; and 11.4% respectively. According to the second survey among total TB patients 6.9% were retreatment patients. INH overall resistance was 6.4%, with 1% among new patients and 78.3% among retreatment patients. Any fluoroquinolone overall resistance was 3.1%, with 0.9% among new patients and 33.8% among retreatment patients.

Table 12: Prevalence of Rif and H resistance among new and retreatment patients

Prevalence rate	New	Previously treated/ Retreatment	All patients
Rifampicin Resistance	0.7%	11.4%	6.9%
INH resistance	1%	78.3%	6.4%
Any fluroquinolone resistance	0.9%	33..8%	3.1%

Table 13: Prevalence of resistance to other drugs among RR-TB patients in Bangladesh

Drug	Total Tested	Total Resistant	% (95% CI)
Isoniazid	28	23	82.1 (60.7-93.2)
Streptomycin	28	19	67.9 (51.0 - 81.1)
Ethambutol	28	10	35.7 (16.7 - 60.5)
Ethionamide	28	10	35.7 (18.9 - 56.9)
Levofloxacin	28	3	11.1 (3.9 - 27.9)
Ofloxacin	28	6	21.4 (11.2 - 37.1)
Any fluoroquinolone	28	6	21.4 (11.2 - 37.1)

c. The NTP in Bangladesh started the drug-resistant TB program in 2008 with hospital-based case management and adopted a Community-based Programmatic Management of Drug Resistant TB (cPMDT) approach in 2012. In 2019, there were an estimated 3,300 MDR/RR patients, however, only 1,400 (42.4%) patients were diagnosed of whom 1,200 (85.7%) started on second line treatment. Currently the detection of MDR-TB patients is as low as 34%.

d. The treatment outcome of shorter MDR-TB cohort of 2020 showed treatment success rate 72%, death rate 9.3%, Lost to follow-up 11.3% and failure rate 2.4%. The treatment outcome of longer MDR-TB cohort of 2019 showed treatment success rate 67%, death rate 17.2%, Lost to follow-up 4.3% and failure rate 4.3%.

6.2 CHALLENGES AND CONSTRAINTS WITH BANGLADESH PMDT AND ADSM

a. There are a **limited number of health facilities which offer facilities for initial evaluation and treatment of DR-TB patients**. **Treatment sites for DR-TB treatment are not decentralized** and is available only in select hospitals across the country and is based on mandatory initial hospital admission (for 2- 5/6 weeks). Patients have to travel long distances to access the facilities leading to initial loss.

b. There are **delays in initiation of DR-TB treatment** as treatment may not be started till SL-LPA report is available which can take 4-12 days. Meanwhile these untreated patients continue to be source of infection to staff and family members and is also a missed opportunity for early treatment initiation which can kill the bacteria.

c. **Xpert isn't uniformly available for all bacteriologically confirmed TB patients**. Hence, diagnosis of RR-TB may be missing. **INH resistance is also not being tested** and may be missed. **MGIT DST for drugs- Bedaquiline, Delamanid, Linezolid, clofazimine is not being done in RTRL, NTRL**. Patients need to **travel long distances to get SL-LPA done**. Similarly, for EPTB diagnosis (LN, Pleural etc) pt. need to travel long distances.

d. There are **lack of chest specialist in CDH** in most of places or post is vacant. Most doctors, nurses and peripheral workers have not received NTP formal training although have broad knowledge of diagnosis and treatment recommendation for PMDT. There is inadequate knowledge about ADR of DR-TB drugs among doctors, nurses, DOT providers at most of DR-TB facilities. Only severe ADRs are being reported in e-TB manager and causality assessment is not done at Divisional or district level.

e. A significant number of **DR-TB patients in children are missed**. Paediatric TB and DR-TB diagnosis is suboptimal. Gastric lavage is not being done in most CDH. There is lack of awareness among doctors about the use of stool sample for paediatric patients.

f. Functional **Clinical Management Committee for DR-TB is non-existent in most TB health facilities**.

g. **Discharge policy for DR-TB patients is not well defined**. Usually, patients are admitted till two consecutive smears one week apart are negative. Even in national guidelines it is based on sputum smear conversion.

h. Currently in Bangladesh there is **no policy for TPT for contacts of DR-TB**.

i. **Pre-treatment loss-to-follow-up for DR-TB diagnosed patients is happening**. However, its causes and ways of reduction are not well understood.

j. **Loss to follow-up in drug-resistant TB** observed in around 5-12%. No recent study to understand the reasons and action required to reduce 'Lost to follow-up' is available.

6.3 OBJECTIVE, STRATEGIC INTERVENTIONS, ACTIVITIES AND SUBACTIVITIES

Objective 2 Initiate and sustain all patients on appropriate anti-TB treatment wherever they seek care, with patient friendly systems and social support and prevent catastrophic expenditure due to TB.

Intervention 2.1. The quality of **treatment of DSTB will be strengthened** and improved **including nutritional, social support, improving clinical support and with introduction of the newer (4 month) short-course regimens for DSTB**. The routine activities related to DS TB treatment will be continued.

- Capacity building of service providers on TB treatment, care and support will be continued through basic/refresher training for proper management of TB patients
- Incentives will continued to be provided to community TB service providers (Shasthya Shebika/ community volunteers/ DOT providers) for ensuring DOT and completion of TB treatment.
- The procurement, supply chain management and distribution of anti TB medication will be continued. The Government of Bangladesh will continue to procure the First line drugs.

Intervention 2.2. **Effective treatment regimens for drug resistant TB will be scale up** specifically, the use of WHO recommended shorter, safer, all-oral treatment regimens for DR-TB (including pre-XDR and XDR-TB) at the start of treatment and rapidly phase out the use of injection-based regimens, monitoring patient response to MDR/RR-TB treatment, starting antiretroviral therapy (ART) in PLHIV on second-line anti-TB regimens, surgery for patients on MDR-TB treatment, and care and support measures for patients with MDR/RR-TB.

- **Transition to the shorter, novel 6-month all-oral regimens (BPaLM or BPaLC) and the 9-month all-oral bedaquiline-containing regimens** following WHO recommendations will be ensured.
- All patients will be managed through **decentralized ambulatory care from treatment** initiation instead of hospitalization and provided **mental health wellbeing support, nutritional support, social support, ancillary costs covered, and surgical, palliative care and rehabilitation** where needed.
- Adequate **infection control for staff involved in MDR-TB activities will be ensured**: Infection control measures will continue to be implemented. All health care providers will be annually screened and provided with personal N-95 masks, as a protective measure.

Intervention 2.3. **Patient support coverage will be strengthened** to sustain favourable treatment outcomes and address catastrophic costs through patient-friendly adherence monitoring including digital adherence tools, social support through linkages with social welfare schemes/UHC schemes, nutritional support, patient travel/transport costs support, and mental health support.

Delivery of **palliative/end-of-life care** to eligible patients **including counselling, staff visit, and consumables** required for palliative care in home and health care facility settings will be provided.

Intervention 2.4 Ensure **active drug safety monitoring** (aDSM) under MDR TB management

Activity 2.4.1

- **Active drug safety monitoring (aDSM)** will be undertaken for comprehensive MDR TB management. All baseline and follow up monitoring investigations will be done according to National PMDT

guidelines with **no cost to the patient**. Patients with adverse events will be managed in the primary health care facility or referred to higher centers. The programme will **continue the provision of ancillary medicines at no cost to MDR-TB patients**. Electronic reporting and improvements in monitoring of smears, cultures and investigations while on treatment will be strengthened through **inclusion of an MDR-TB module in eTB Manager**.

- Continue to **provide home-based care, counselling, and support services by involving local/grass-root level NGO/CBO partners** is in place. However, community engagement will be strengthened further by inclusion of affected community and by forming patient support group.

6.4 DRUG RESISTANT TB REGIMENS ACCORDING TO 2020 NATIONAL DR TB GUIDELINES, BANGLADESH

The following DR TB treatment regimens are recommended in the new 3rd National DR TB Guidelines.

Table 13: DR TB Regimens Bangladesh 2022

Oral MDR TB regimens	Regimen composition	Eligible group
Shorter all Oral Treatment Regimen (SOTR)	(4 -6) Bdq (6m)-Lfx-Pto-Cfz-Z-Hh -E / 5 Mfx-Cfz-Z-E	For FQ-S MDR TB patients who meet eligibility criteria for SOTR
All oral standardized longer regimen (SLR)	6(Bdq-Lzd-Lfx-Cfz-Z)/14(Lzd-Lfx-Cfz-Z)	For FQ-S MDR TB patients who are not eligible for SOTR
	6(Bdq-Dlm-Lzd-Cfz-Z)/14(Lzd-Cfz-Z)	For FQ-R MDR TB patients
Individualized treatment regimen (ITR)	Composed of 4-5 likely effective drugs	For those who are not eligible for the SOTR or the SLOR
Operational Research on Bedaquiline Pretomanid Linezolid Regimen (BPaL)	(6-9) Bdq-Pa-Lzd	For FQ-R MDR TB patients under operational research conditions only
Isoniazid Mono- Resistant TB (Hr TB)	**Regimen composition**	**Eligible group**
Hr TB Regimen	6 (H) R- E- Z- FQ (Lfx)	For confirmed R susceptible and H resistant TB patients
All oral standardized longer regimen (SLR)	6(Bdq-Lzd-Lfx-Cfz-Z)/14(Lzd-Lfx-Cfz-Z)	For FQ-S MDR TB patients who are not eligible for SOTR
	6(Bdq-Dlm-Lzd-Cfz-Z)/14(Lzd-Cfz-Z)	For FQ-R MDR TB patients

CHAPTER 7: CHILD AND ADOLESCENT TB

7.1 CONTEXT

a. Bangladesh is currently **missing** more than 25500 child and adolescent TB (<15yrs) patients annually as per current notification trends.[16] Out of 36000 estimated (UNHLM targets 2022) child TB patients NTP is detecting 10437 in 2021 (gap of 71%). In a county where close to 26% population are children <15 years, only 4% are being detected. The diagnostic gap for children under 5 years of age is greater at 72% and they have the highest risk to develop severe forms of TB, often leading to disability and death.[17] Most of the untreated under 5 children infected with TB die (around 80%). Out of them 40-45% are attributed to undernutrition.[18] [19] Risk factors for developing TB disease following infection include young age (<3 years old) and immunodeficiency (such as caused by severe malnutrition, measles, HIV infection etc). Adolescence is another period during which there is an increased risk of developing disease.

b. The country has successfully implemented two projects focusing on active case finding of child TB patients with encouraging results using multipronged interventions like: capacity building, facility and community-based active case finding, improved diagnostic tests, awareness raising activities, Introduced sputum induction and stool sample testing of under 5 children in selected facilities.

c. National guidelines for the management of tuberculosis in children 3rd edition has been revised in October 2021.

d. Engagement with private laboratories has yielded high EPTB child TB case detection.

7.2 CHALLENGES WITH CHILD AND ADOLESCENT TB

a. There is centralized child TB care delivery till division level in the country. Consequently, there is a scarcity of diagnostic services for children at decentralized settings. More reliance on facility-based case finding efforts lead to delayed TB diagnosis clinically presenting in tertiary care hospitals with severe complicated forms of TB. Similarly, the lack of community based active case finding efforts with peripheral health worker accounts for delayed identification of childhood TB. Medical colleges (Public and Private)/ Tertiary care hospitals/ Specialty hospitals and Private sector are not fully engaged to support NTP child case finding efforts. Importantly, children are not considered as key vulnerable population and not offered upfront GeneXpert across all divisions. Child TB (especially under 5 yrs) is grossly not suspected by clinicians in routine outpatient departments, grossly underdiagnosed and under reported. (Under diagnosis of childhood TB accounts to more than 94% in 0-4 years age group and 47% in 5-14 years age group).

b. Despite the availability of revised National guidelines for the management of tuberculosis in children - 3rd edition dated October 2021, training of Paediatricians and general physicians, nursing staff, NTP staff, partner staff and general health staff is yet to be completed across all divisions.

c. Access to Tuberculin skin test is not uniform across all divisions and lack of functional Xray facilities is a challenge.

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[16] National Strategic Plan for TB Control 2021-2025 REVISION 6.0; 31 March 2020.

[17] World Health Organization. Rapid communication on updated guidance on the management of tuberculosis in children and adolescents. Geneva, Switzerland: World Health Organization: 2021.

[18] WHO operational handbook on tuberculosis. Module 5: management of tuberculosis in children and adolescents. Geneva: World Health Organization; 2022. Licence: CC BY-NC-SA 3.0 IGO

[19] Dodd PJ, Yuen CM, Sismanidis C, et al. The global burden of tuberculosis mortality in children: a mathematical modelling study. Lancet Glob Health. 2017;5(9): e898-e906

d. Contact investigation is currently at 48% and there is a high patient refusal rate up to 30%.

e. There is absence of large-scale contact screening in the country and provision of TB preventive treatment to eligible children which is largely due to insufficient health-care resources, workforce, and services.

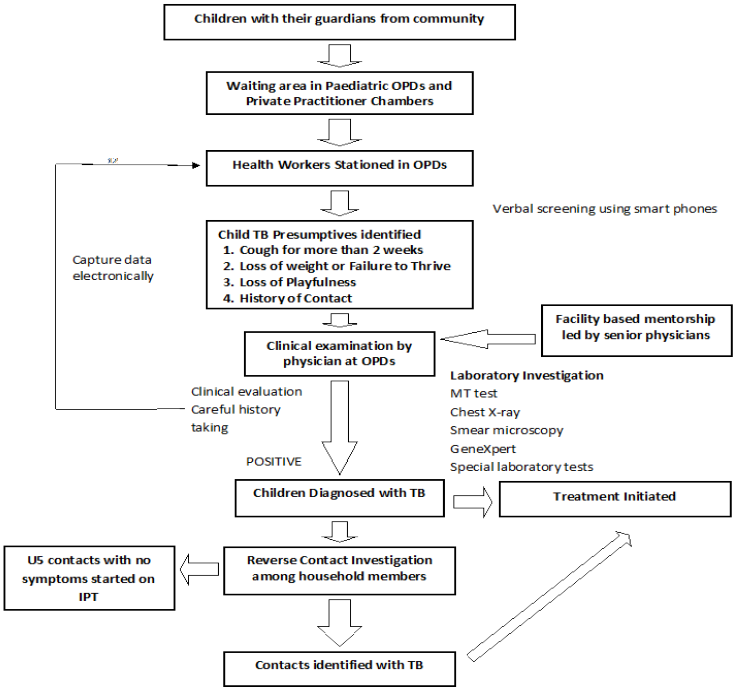
f. NTP current surveillance data regarding case finding and treatment outcome are not disaggregated data for under 5 years and 5-14 years, gender. Similarly recording and reporting of presumptive paediatric TB tested in GeneXpert reports and private sector referrals also not captured. Therefore, it results in low or overestimation of TB burden in children.

g. Lack of awareness among health care staff and in the communities. The role of stigma in adolescents (school going children) is also critical.

7.3 OBJECTIVE, STRATEGIC INTERVENTIONS, ACTIVITIES AND SUBACTIVITIES

Objective	**2**	**Initiate and sustain all patients on appropriate anti-TB treatment wherever they seek care, with patient friendly systems and social support including linkages with UHC.**
Intervention	**2.5.**	**Early identification of child and adolescent TB patients**
Activity	**2.5.1.**	Contact investigation among children and adolescents for TB/DR-TB will be undertaken including through outreach, and community-based approaches.
Activity	**2.5.2.**	Scale-up decentralized model for child TB diagnosis by following activities: • Capacity building of peripheral doctors for diagnosis, management of paediatric TB, • Identification of presumptive TB through community screening, increasing awareness, and ACF • Enhancing the skills of relevant HCWs to collect clinical specimen (Gastric lavage, BAL, stool) • Linking sample transport to testing center
Activity	**2.5.3.**	At **all facilities TB symptom screening** followed by evaluation of all children especially under 5 attending hospitals with pneumonia like symptoms will be undertaken.

Figure 21: Facility based screening flowchart for detecting childhood TB



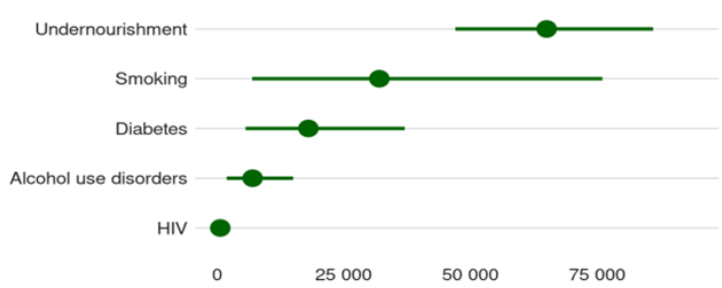
Activity	**2.5.4.**	Review existing regulatory framework and policy guidelines on TB and child and adolescent TB service delivery, child health and management of childhood illnesses (e.g., HIV, malnutrition, pneumonia), and adolescent health. **Identify child TB presumptive as key vulnerable population and offer upfront genexpert in all sites (Gxp testing for all children) with single day diagnosis workup for child TB (upfront TST + Xray + genexpert ultra either stool for under 5/ gastric lavage or sputum in 5-14yrs)**.
Activity	**2.5.5.**	**Integrated child TB screening program in school health services** will be undertaken.
Activity	**2.5.6**	National champions for childhood TB will be identified and formation of **National childhood TB working group** with representatives from all divisions will be undertaken. Their capacity will be built to represent themselves in national TB forum groups as spokespersons.
Activity	**2.5.7**	Capacity building of medical professionals for the diagnosis and clinical management of child and adolescent TB patients
Intervention	**2.6**	**Provider capacity building** for childhood TB and **extra pulmonary TB diagnosis and treatment**. This will be key to impart appropriate skills and knowledge about child and extra pulmonary TB to relevant health care personnel (HCP) at all levels of the system through the professional organization. This needs careful analysis and planning related to the competencies that HCPs require to effectively carry out their tasks. This analysis will inform the development of specific training modules. A dedicated training unit may have to be established to do all this work.
Intervention	**2.7**	**Treatment will use child-friendly TB drug formulations including 4-month regimens for non-severe TB and all oral regimens for DR-TB through decentralized and family-centered model of care.**

CHAPTER 8: TB AND COMORBITDITIES

8.1 CONTEXT

a. The three major drivers of TB in Bangladesh are undernutrition, diabetes and smoking. Studies show that undernutrition is the leading risk factor for TB, with a "population attributable fraction (PAF) of 15%, compared to 7.6% for HIV".

Figure 22: Cases attributable to five risk factors, 2021 (Numbers)



Diabetes is recognized as a serious challenge to END TB as individuals with DM have three times the risk of developing TB. Smoking has a strong influence on TB and is a major barrier towards treatment success with findings indicating that smoking cessations are an effective way to decrease treatment failure and drug resistance.

b. **MALNUTRITION AND TB:** As per the World Bank, even though extreme poverty rates fell by two-thirds to 12.9 percent of the population in Bangladesh (World Bank, 2022) but on the other hand, it is still estimated that 36% and 14.3% of children under the age of 5 were stunted and wasted respectively.

c. **DIABETES MELLITUS AND TB:** In Bangladesh in 2015, the **prevalence of diabetes in the population ages 20 to 79 was 8.3%** and **increasing at a dramatic rate**. With around seven million people of Bangladesh suffering from diabetes as the number of such patients is rising by 5-6 percent each year. As per WHO STEPS survey (2018), around **54 % of people are unaware of their diabetic condition**. More than 18% who are aware of raised blood sugar level are not on treatment. Only 11% of individuals on treatment have the desired glycemic control. In the setting of the increasing overlap of populations at risk for both diseases, the combination of TB and DM represents a health threat for Bangladesh. Due to lack of early detection and treatment of diabetes leads to increased risk of TB infection and has potential to convert TB infection to active TB. Diabetes also increases the risk of TB relapse and death. The complication from TB-DM comorbidity led to high cost on treatment and out-of-pocket expenditure. Diabetic Association of Bangladesh (BADAS), initiated program to screen diabetes patients for TB has shown a model with good results for overall program TB-DM collaboration.

d. **TB and Mental health:** Integration of mental health care is recommended under pillar 1 of WHO's End TB Strategy, which entails integrated patient-centered care and support including delivery models to specific needs of populations with mental health conditions. Mental health support including counselling and psychological interventions is recommended in the WHO Guidelines for treatment of drug susceptible TB and patient care. TB and mental health conditions share common risk factors (homelessness, HIV, substance use, migrant status, etc.) leading to high co-morbidity. TB care is often absent in mental hospitals and other institutions. Mental health care for people with TB improves adherence of TB treatment completion and cure. Psychosocial counselling for TB patients, especially for the DR TB patients is currently being provided by the programme

partners and will be scaled up going forward. Integrating TB and mental health treatment could reduce costs, increase the quality of care and life of patients, and ultimately save lives[20].

e. **TB AND SMOKING:** The World Health Organization estimates that 35% of adults currently use tobacco in Bangladesh, either in smoked or non-smoked forms. Additionally, 43% and 39% of adults are exposed to environmental tobacco smoke at work or home respectively. Bangladesh is one of 14 countries in the world facing the heavy burden of tobacco epidemic. MoHFW has recognized smoking as a problem and has established smoking control interventions for the general population.

f. **TB AND HIV CO-INFECTION:** Bangladesh has been successful in keeping the HIV prevalence to a low level with <0.1% prevalence among adults aged 15-49 years. It remains less than 1% both among key population groups and bridging populations the most at risk, but the epidemic is on the rise and is **one of the two countries in Asia/Pacific with increasing trends**. Bangladesh adopted WHO recommended collaborative TB/HIV activities and has a national TB/HIV guideline (2nd edition, 2016) in place. There exists coordination between NTP and NASP through a **national TB/HIV coordination committee**. Recording and reporting formats capture key TB/HIV data elements in NTP records and reports e.g. HIV status of TB patients, provision of co-trimoxazole preventive therapy (CPT) and ART. **TB HIV collaborative activities** like screening for HIV among all TB patients in the 23 high -burden districts and for high risk TB patients in other districts is being implemented. Routine screening for all PLHIV is offered at all the 11 ART centers and GeneXpert screening along with X-ray is offered for all TB presumptive cases among PLHIV. All the identified HIV infected TB patients are linked to these ART centers for further management with ARVs.

g. **NCD SERVICES:** NCD services are being implemented till the Upazila level with establishment of NCD corners with availability of diagnosis and drugs in order to achieve UHC through the primary health care system. Implementation of WHO Package of Essential NCD Interventions (WHO PEN) in Bangladesh has supported in NCD management guidelines, updating of essential medicine lists, training of health care providers, improving recording and reporting systems. Mental health services are also being enhanced through integration of mhGAP in primary health care, providing an opportunity to screen for TB and including mental health conditions screening in TB patients. Depression and anxiety are common in patients diagnosed with TB and certain Antituberculosis treatment also can result in psychosis and depression.

8.2 CHALLENGES

8.2.1 TB and NCDs

a. Lack of specific guidelines and/or programme implementation plans for screening, testing, diagnosis and treatment of TB with comorbidities like diabetes increases the burden on the health systems. There is a missed screening opportunity in both programmes (NCD and TB) when patient is visiting the clinic multiple times as a follow-up for the treatment. Both diseases (diabetes and TB) can adversely affect treatment outcomes and need to be addressed. Other NCDs such as COPD, Cancer etc. hampers collaborative activities. There is inadequate consultation and

[20] Annika C Sweetland, Ernesto Jaramillo, Milton L Wainberg, Neerja Chowdhary, Maria A Oquendo, Andrew Medina-Marino, Tarun Dua. Tuberculosis: an opportunity to integrate mental health services in primary care in low-resource settings. Lancet Psychiatry Vol 5 Issue 12, P952-954, 2018

engagement of broader stakeholders in the process of developing national guidelines and strategies for TB with NCDs, MCH, Nutrition, Tobacco Control and integrated care.

b. There is no formal collaboration with Maternal Child Health division, Nutrition program and Mental health services for screening, testing, diagnosis and treatment of TB.

c. Smoking, already a major risk factor is still not focused among TB patients and neither cessation interventions are being offered.

d. A recent survey among 150 multi-drug resistant tuberculosis inpatients in Dhaka found 33.8% (95% CI 26.7%; 41.7%) of patients had depression[21].

e. Even with NCD corners established at Upazilla level collaboration is not routine for verbal TB screening of NCD patients. There is no bidirectional screening, treatment and follow-up mechanism. Likewise TB labs are not being used for screening for other co-morbidities.

f. There is Insufficient coordination and communication between public and private service providers for TB and NCDs at all levels of health care.

g. Lack of availability of trained human resources to deliver integrated TB - NCD care. Also, capacity-building initiatives are lacking to train health-care workers on the co-management.

h. There is inadequate recording and reporting and documentation of TB - NCD comorbidity within the current primary health care systems.

8.2.2 TB HIV Collaboration: TB/HIV collaborative guidelines is old (2016) and not in line with latest WHO recommendations. PLHIV are still receiving 6H for TB prevention. There is inadequate Airborne infection prevention at HIV centers among PLHIV which could result in increased risk for TB. The HIV testing among TB patients is inadequate due to shortage of testing kits at facilities. There exists limited capacity of HCW on TB/HIV case management in view of inadequate trainings. There is loss of PLHIV referrals from ART center due to complex referral mechanism. The recording and reporting of TB/HIV cross referrals and case management is inadequate. Similarly, there is inadequate involvement TB and HIV collaboration at the peripheral Community Clinics.

8.3 OBJECTIVE, STRATEGIES, INTERVENTIONS, ACTIVITIES AND SUBACTIVITIES

Objective	**2**	**Initiate and sustain all patients on appropriate anti-TB treatment wherever they seek care, with patient friendly systems and social support including linkages with UHC.**
Intervention	**2.8.**	**Provide HIV counselling and testing for all people with TB and presumptive TB, Early provision of ART, cotrimoxazole preventive treatment, TB treatment for PLHIV with TB disease, and infection control measures. Provide TPT to all eligible PLHIV.**
Activity	**2.8.1**	Update, print and disseminate the TB HIV Guideline

[21] [Huque, R., Elsey, H., Fieroze, F. et al. "Death is a better option than being treated like this": a prevalence survey and qualitative study of depression among multi-drug resistant tuberculosis in-patients. BMC Public Health 20, 848 (2020).

Sub Activity	**2.8.1.1**	Capacity building for field level staff and care givers with meetings and workshops for enhancing knowledge on TB HIV interventions, and counselling will be undertaken.
Sub Activity	**2.8.1.2**	Diagnosis of TB/HIV, treatment, and support with HIV screening for all TB patients in High burden districts, establishment of VCT centre in high risk areas.
Sub Activity	**2.8.1.3**	Networking meeting with the representatives of key affected populations (KAP) (to increase case detection among them) and regular coordination meetings with ASP
Sub Activity	**2.8.1.4**	Provide for nutritional and diagnostic support for TB-HIV infected patient.
Sub Activity	**2.8.1.3**	Airborne infection prevention at HIV centers among PLHIV will be upgraded with patients with cough identified on arrival at facility, educated on cough etiquette, separated from other patients and fast-tracked through all waiting areas. Discussion with the health facility in charge to explore how best to ensure the waiting area is well ventilated. Messages on cough hygiene in all areas frequented by patients will be dispalyed.
Intervention	**2.9**	**Management of TB comorbidities in collaboration with the NCD, will be strengthened with bi-directional screening and integrated management approaches.**
Activity	**2.9.1**	The TB-Diabetes Guideline will be updated to include bi-directional screening wherein all diabetes patients will be symptomatically screened for TB at every visit and all TB patients will be screened for Blood sugar at least once and also screened for common mental disorders using appropriate tools. Reporting and recording formats for NCD bidirectional referrals will be developed. The staff at the DOTS corners and Upazilla health centers to engage with HRH in NCD corners for the conducting bidirectional screening for TB, diabetes and tobacco. A draft flow chart of Joint collaborative activity for bidirectional screening is provided at ANNEX 5. Tobacco cessation services/support will be provided to those who smoke
Activity	**2.9.2**	Incorporation of comorbidity history (eg. Diabetes, Hepatitis etc.) and smoking history in e-TB manager
Activity	**2.9.3**	The Mental Health platform is currently being developed by the NCD program. TB activities will be incorporated at all levels as they develop the program. Eligible TB patients, their families/caregivers needing mental health support will be referred to the nearest facility/counsellor as guided by NCD.
Activity	**2.9.4**	Advocacy meetings will be conducted with high level (Head/ Director/ Line director/ Representatives of respective programs, eg. TB, HIV, NCD, Respiratory diseases, Mental health, MCH, Nutrition, Tobacco cessation etc.)
Intervention	**2.10**	Rehabilitation services and assistive products for people with TB-associated disability will be explored. TA will be sought from WHO HQ.

CHAPTER 9: PREVENTION OF TB – TB PREVENTIVE TREATMENT, CONTACT INVESTIGATION, AND INFECTION CONTROL

9.1 CONTEXT

a. Ministry of health has issued an order to expand TPT services to various target populations and adopted shorter TPT. Implementation of contact evaluation has started and examples of good coverage of TPT among ALL household contacts is being undertaken. It is well understood that The enhanced TB case finding efforts will need to twinned with a scaled up effort to provide TB preventive therapy for the best possible effect on TB incidence and mortality to accrue.

b. Isoniazid is recommended TPT for contacts less than 5yr since 1994. Contacts of all age groups are recommended to receive TPT since the Q2, 2021 with implementation starting in 20 districts in January 2022 and achievement of nationwide scaleup (64 districts) since April 2022. Shorter TPT is implemented using 3HR and 3HP regimen. The progress in coverage of TPT among contacts has been rapid since the issuance of orders from the MoH.

c. Shorter TPT using three months regimens, 3HR and 3HP is being rolled out to cover the whole country.

d. Recording and reporting of contact evaluation is currently paper based but electronic modules for the case-based e-TB manager have been developed.

9.2 CHALLENGES

9.2.1 Early diagnosis and treatment of TB: this is a key step in TB prevention.

a. Only symptoms-based TB screening is being implemented. The use of chest X-ray is very limited. Access to rapid molecular testing using Xpert MTB Rif or TrueNAT remains very low.

b. Active community level TB screening is currently limited to a few NGO driven projects in limited geographies

c. There is a delay in diagnosis of TB for all forms of TB including DS-TB, DR-TB and Childhood TB

d. There is a high proportion of relapse among incident TB indicating high levels of ongoing TB transmission.

9.2.2 Identifying target populations for TB preventive treatment: Household contacts

a. **Implementation of contact evaluation:** Contact evaluation (CE) is being implemented relatively well particularly at facilities supported by partners e.g. BRAC, Damien foundation. The CE happens at patient home in large proportion of patients through community cadre. Doctors and field staff at some facilities are not yet oriented on importance of CE, particularly in government staff (e.g. Dhaka). In some districts, CE is being implemented but not followed by TPT initiation which is a missed opportunity. There are relatively low number of contacts enlisted per index case.

b. **Enablers for contact evaluation:** Job Aides developed by NTP for CE by community cadre/staff is infrequently used by the filed staff who primarily use only verbal screening thereby missing opportunity for enhancing the effectiveness of their intervention. There is limited access to digital X-ray for contacts of TB patients, only 185/494 (37%) UHC have X-ray facility with paid access in some of these facilities (Oct 2022). No travel support is being provided to contacts and health workers although they face long distances or personal expenditure to travel to health facilities or patient homes. The recording and reporting of CE and TPT in eTB Manager are considered optional

and not filled. There are limited awareness generation activities for TPT despite this being a priority program which has resulted in low community awareness of TPT which leads to difficulties in convincing contacts to take TPT.

9.2.3 Programmatic management of TPT

a. The defined target populations for TPT do not include contacts for MDR-TB patients, and HCWs. The HCWs lack awareness with regards to TB screening and TPT. There is low acceptance of TPT among adult contacts likely due to sub-optimal counselling.

b. For the diagnosis of TB infection, Tuberculin (MT 10TU) availability is very limited, adhoc and used only for TB diagnosis in children and not for decision making on TPT in adult contacts (except Sylhet/Rajshahi divisions).

c. Use of shorter TPT has been started with 3HR in most health facilities, however PLHIV are being given 6H.

d. There is limited counselling on side effects of TPT. The recording and reporting as well as management of adverse events is currently not being done in the programme.

e. There is no engagement of private practitioners in TPT provision.

f. While TPT outcome is recorded on the TPT register, it is not reported to the national level.

9.2.4 TB infection prevention and control

a. **Administrative controls:** IPC committees exist in most health facilities; however Airborne infection control is not included in their mandate. IPC plans are not in place, no staff member has been designated in charge of infection control in the facility and there is no systematic training on infection-control. There is a lack of triage and fast tracking in OPDs with large patient load.

b. **Environmental controls** is not implemented including in tertiary care facilities. Cross ventilation is lacking in DOTS centers and consultation rooms in busy facilities. There are no UV light /any other mechanical ventilation systems in the DR TB wards. Few facilities have segregation and disposal of hospital bio-medical waste.

c. **Respiratory protection:** PPE (N95 masks) is not available for staff in public facilities. There is burden of TB among Staff and families however HCWs are not screened for TB and not offered TPT.

9.3 OBJECTIVE, STRATEGIC INTERVENTIONS, ACTIVITIES AND SUBACTIVITIES

Objective	**3**	**Prevent the emergence of TB in susceptible populations and progression of TB in infected by using a combination of biomedical, behavioural, social and structural (administrative, environmental controls and respiratory protection) interventions**.
Intervention	**3.1.**	Rapid scale up of screening and evaluation of **ALL household contacts of TB patients**, people living with HIV and other key and vulnerable populations with high risk for TB infection will be undertaken
Activity	**3.1.1.**	Contact screening procedures at all facilities with enablers such as travel support, provided for successful outcomes of CI will be implemented. Access to free chest X-ray at least for adult contacts/PLHIV on ART will be ensured.
Intervention	**3.2**	The coverage and access to TB infection testing will be expanded.

Activity	**3.2.1.**	Tuberculin Skin Test (TST) will be continued while preparing to introduce newer and effective TPT diagnostics including IGRA and antigen based skin test such as C-TB.
Intervention	**3.3.**	**Scale up coverage and treatment adherence of TB preventive treatment (**TPT) and monitoring in PLHIV and ALL contacts including child contact of TB patient by developing standardized SOPs for TPT (to include updated guidance from WHO). 3HP will be the preferred regimen for TPT among adult contacts and PLHIV. Child friendly, dispersible 3RH will be the preferred for children until the time child friendly formulations of the weekly 3HP regimen become available in market. Capacity building activities will be undertaken for doctors and staff on starting, counselling and follow up of TPT; and community health workers on counselling and follow up of TPT. In addition, generate demand through ACSM activities in the community, and improve acceptability of TPT, address provider and recipient hesitancy, provide shorter regimens for TPT and support for treatment completion.
Activity	**3.3.1.**	**Build capacity and use digital tools for expansion of coverage:**
Sub activity	**3.3.1.1**	The app currently used for TB screening in OPD for CE (in use at Dhaka Medical College) will be explored for adaptation and scaleup
	3.3.1.2	Online tool for training on contact evaluation for front line workers e.g. https://training.tbdiah.org/ will be explored or Targeted e-learning modules on TB prevention will be developed and used for HCWs training for which the necessary technical support will be procured.
Intervention	**3.4.**	**Expand and strengthen TB and Air borne infection control (AIC) at all levels both at the community and institutional levels.**
Activity	**3.4.1.**	Scale up TB-infection control (TB-IC) measures at home, community, and health care facilities
Activity	**3.4.2.**	Policy support will be enhanced with the development and implementation of a comprehensive infection control policy for all implementation sites (Facility TB infection control plan). A designated person responsible for TB infection control), human and financial resources to mainstream AIC with establishment of **TB infection prevention committee (IPC) at facilities**, **PPE (N95) for staff**, **cough triage and fast tracking in large OPDs**, and **health care worker screening** every year will be undertaken.
Activity	**3.2.3.**	**Systematic annual TB screening for all staff in health care facilities** including nurses, doctors, paramedical workers, with chest X-ray and Skin testing/IGRA and provision of shorter TB preventive treatment at least once will be undertaken. This is critical given the high TB burden and extremely high foot fall at the health facilities in the country and protect health care workers for efficient service delivery.
Activity	**3.2.4.**	Airborne Infection Control (AIC) will be strengthened through effective implementation of administrative and environmental measures at the workplaces.

CHAPTER 10: MULTI SECTORAL ENGAGEMENT AND ACCOUNTABILITY

REFER THE NATIONAL MULTISECTORAL ACCOUNTABILITY FARMEWORK AND ENGAGEMENT PLAN AND OPERATIONAL HANDBOOK FOR GREATER DETAILS

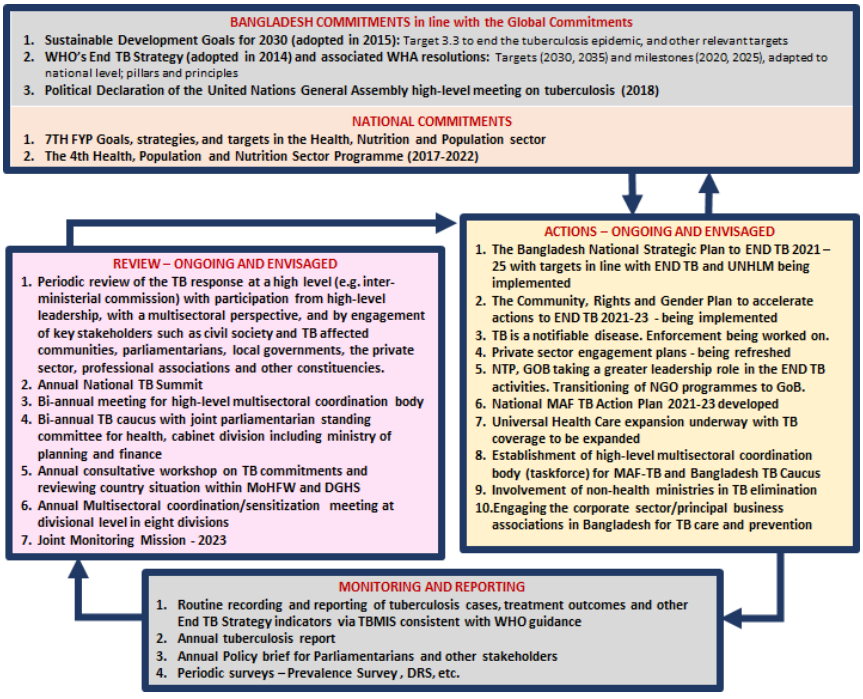
10.1 CONTEXT

a. As a cause of morbidity and mortality, TB leads other infectious diseases in Bangladesh and should be receiving the highest possible level of policy and political attention. The nation is a signatory to the ministerial statement of commitment of the **High level meeting for renewed TB response in the South East Asia Region,** 2021 wherein it commits to actualize and intensify essential interventions. The nation has also pledged to end TB by 2030 during the '**Global Ministerial Conference on ending TB in Moscow'** (2017), the '**Call to action ministerial meeting 'Towards Ending TB in the South-East Asia**', 2017, and the '**UN General Assembly High-Level Meeting on the fight against TB'** 2018.

b. The Bangladesh MAF-TB is **an attempt at making national development programmes an essential component of TB elimination.** It aims at establishing partnerships and collaborations with stakeholders from all sectors **for convergent and integrated actions** for a holistic TB response to the TB epidemic. The framework reinforces the fact that TB can be eliminated only through coordinated efforts across various sectors. It is used to promote coordination, collaboration, and mutual accountability both within the health sector and between different sectors and stakeholders in TB response. It is also expected that the MAF-TB **will serve as the basis for fulfilment of the political commitments and ensure that the commitments made to END TB are implemented into practice** through specific actions, which are measurable and could be monitored, reviewed, and reported on.

c. There are four components of the MAF-TB that form **a cycle for strengthening accountability: Commitments, Actions, Monitoring and Reporting**, and **Review** (Fig 18).

Figure 23: MAF Framework Bangladesh



d. The MAF-TB provides guidance on defining elements under each of these components. It also aims to support the process of defining who is accountable, what they are accountable for, and how they will be held accountable, at National, Divisional, and District levels.

e. The country has established impressive partnerships and collaborations with the NGOs and Civil Society

across the country with extensive involvement in the entire cascade of care of affected individual and communities. The NTP has engaged select corporate sector and work places for e.g.: Bangladesh Garments Manufacturing Exporters association (BGMEA), Export Processing Zone (EPZ), Port, Railway, Garments, Knitting and other Companies, etc.

f. Most development partners are leaning towards financing public health programs strongly focused on programs for Maternal, Neonatal and Child Health (MNCH), Family Planning (FP) and the expanding threat of non-communicable diseases. The GoB also appears to have prioritized these public health areas leaving the financing of a major proportion TB services to external sources. Owing to competing priorities within the Ministry of Health, scarce domestic resources are shifted away to other programs.

g. Actions including the development of the MAF-TB action plan and operational handbook, have been undertaken to pursue the commitments made at the Ministerial Meeting in Moscow and at the TB-UNHLM. However, the progress to create a multi-sectoral coordination mechanism intended to lead to a robust multi- sectoral approach to the fight against TB is slow.

10.2 CHALLENGES

a. The 4th HPNSP targets and strategic actions are not updated in line with END TB Strategy, SDGs and UNHLM. Accordingly, the Operational Plan (OP) TB-L & ASP also are not updated nor aligned with global targets and commitment. The 5th HPNSP and OP should reflect the targets and commitment.

b. The very high OOP expenditure, at 66%, is among the highest in South East Asia, suggesting that a significant proportion of TB patients and their families may be experiencing financial hardships (catastrophic expenditure) as they attempt to cope with the disease.

c. During 2019-2020 there are 125 social safety net programmes; implemented by 25 line ministries, with a budget of Tk. 955.74 billion, accounting for 16.83% of the Government budget, and 3.01% of GDP.[22] [23] These programmes present an opportunity for the NTP to link poor TB patients to the schemes through formal collaboration with the Ministry of Social Welfare .

d. Currently there is no National high level forum and engagement with parliamentarians for review of the END TB actions at the highest level.

10.3 INTERVENTIONS, ACTIVITIES AND SUBACTIVITIES

Objective	**4**	**Strengthen enabling policies, empowered institutions, partnerships, and human resources with enhanced capacities to create a supportive ecosystem to FIND-TREAT-PREVENT TB in the country.**
Intervention	**4.1**	**Multi-sectoral accountability framework with a strong community engagement focus**
Activity	**4.1.1**	Finalize the Multisectoral Accountability Framework (MAF) and engagement operation plan before July 2023.
Activity	**4.1.2**	Establish the high-level multisectoral coordination body for MAF-TB under the patronage of the Honourable Prime Minister
Activity	**4.1.3**	Liaise with the SDG Affairs committee at Prime Ministers Office to promote and utilize TB as a marker for progress on SDG. Pursue **localization of the TB response** through initiatives such as "**SDG localization**"

[22] General Economics Division Bangladesh Planning Commission, Ministry of Planning GED (2015). National Social Security Strategy (NSSS) of Bangladesh, Dhaka.
[23] Project Fact Sheet, Social Security Policy Support (2018). Available at: http://socialprotection.gov.bd/en/2018/11/04/project-factsheet/ Access on 02.08.22.

Activity	**4.1.4**	Build the **Bangladesh Parliamentary TB Caucus** and support it to engage with political networks, the Government and civil society groups to raise domestic resources, the profile of the disease and confront the stigma and social isolation associated with it.
Activity	**4.1.5**	Involve the **10 prioritized ministries other-than-health** and the other departments within the MOH for TB elimination (*Refer Fig 8 below and Operational Handbook for Multisectoral Accountability and Engagement For TB, BANGLADESH, 2023-2026 for details*)
Sub activity	**4.1.5.1**	Draft TORs with scope of partnership and specific activities to be carried out
Sub activity	**4.1.5.2**	Conduct meetings/workshops with the ministries for sensitization.
Sub activity	**4.1.5.3**	Sign MOUs or any formal document for collaboration between NTP/MOH/other ministry
Activity	**4.1.6**	Include TB in the 5th Operation Plan of the Ministry of health and family welfare.
Activity	**4.1.7**	Involve other programmes (NCD, IMCI, EPI) of the MOH in TB elimination
Activity	**4.1.8**	Engage the corporate sector/principal business associations in Bangladesh for TB care and prevention.
Intervention	**4.2**	Review and implement **SBCC strategy** to include meaningful community engagement, gender, stigma, discrimination, and human rights issues related to TB

10.4 SPECIFIC ACTIVITIES BY THE KEY MINISTRIES FOR TB ELIMINATION

Ten ministries have been prioritized for collaboration as is depicted below (Table 14). The matrix provides information on 1) why the NTP/MoH&FW should partner with the prioritized ministry, 2) how it can partner, 3) the areas of collaboration with potential to provide impetus to tb elimination efforts in the country, and 4) at which level can it be implemented.

Table 14: Involvement of other-than-health ministries in TB elimination

Ministry	Why to collaborate?	How to partner?	What areas of collaborations?	At what level?
Ministry of Local Government, Rural Development and Co-operatives	• Urban Coverage • Its own health infrastructure and service facilities • Dedicated HR	• Enter into a formal partnership with the ministry • Solicit directive from higher authority (TB taskforce/ Parliamentary TB caucus can facilitate) • Advocacy using policy briefs • Sensitization meetings	• Diagnostic and treatment integration • HR capacity building • Awareness/ TB prevention • Explore Funding opportunities (operating TB services in health facilities, capacity building)	• Ministry/ policy • City corporation • Service delivery and community
Ministry of Education Directorate of Secondary and Higher Education (DSHE)	• Dedicated HR • Large Infrastructure • Large geographical coverage (both community and urban)	• Enter into a formal partnership with the ministry (MOU) • Advocacy using policy briefs	• Introduce TB in the curriculum of Teachers Training • Introduce TB in all class curriculum incorporating TB basics and stigma • Develop age specific IEC materials	• Ministry/ policy • Directorate

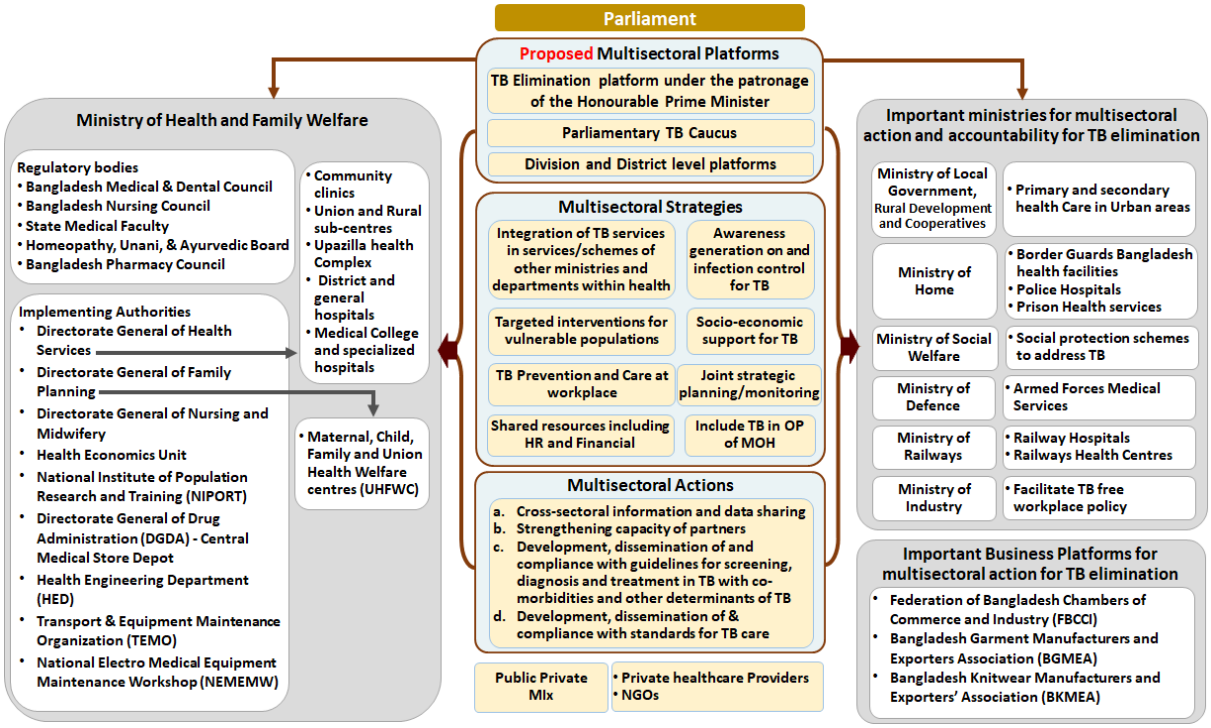
Ministry	Why to collaborate?	How to partner?	What areas of collaborations?	At what level?
Directorate of technical and madrasa education		• Sensitization meetings	• Awareness generation with students and their parents • Health camp on TB screening at educational institutes • Incorporate TB in "little doctor initiative"	
Ministry of Women and Children Affairs	• HR • Large Infrastructure • Large geographical coverage (both community and urban)	• Enter into a formal partnership with the ministry - signing an MOU • Conduct periodic sensitization of higher officials from the ministry	• Greater advocacy for female and child (working women, pregnant women, and children) to incorporate TB into their agenda • Funding for nutritional support, social support for female and child TB case detection • Integrate TB into Women and Children related training curricula • Develop integrated IEC materials for working women hostels, daycare centers, and workplaces such as RMG and others	• Ministry/ policy • Directorate
Ministry of Planning	• The ministry can institutionalize inter-ministerial collaboration and also allocate enhanced funding and resources for accelerating TB elimination in the national development planning process	• Policy Advocacy • Conduct periodic sensitization of higher officials from the ministry	• Facilitate high level Inter-ministerial coordination and collaboration for TB elimination • Enhance the cooperation with other departments/ ministries • Allocate funds for TB in relevant OPs	• Ministry/ policy • Directorate
Ministry of Finance	• The ministry can allocate enhanced funding for accelerating TB elimination	• Policy advocacy using policy briefs on TB elimination and investment case for TB • Continuous sensitization	• Scope for allocating enhanced funding for TB services in relevant OPs • Can facilitate high level political commitment and cooperation by other departments/ministries • Inter-ministerial coordination & collaboration	• Ministry/ policy • Directorate
Ministry of Home Affairs	• Has a large health infrastructure with dedicated HR • Deals with congregate settings (special settings i.e. law enforcement agencies) • Community police	• Partnership with the ministry • Solicit directive from higher authority (TB taskforce/ Parliamentary TB caucus can facilitate) • Advocacy and sensitization	• Ensure compliance with the national guidelines for TB care and prevention • Capacity building of the HR • Awareness generation on relevant aspects of TB care and prevention • Align the strategic plans of the ministry and MOH&FW /NTP • Strengthen diagnostic and treatment integration • Designing of responsive program	• Policy • Service delivery • Community

Ministry	Why to collaborate?	How to partner?	What areas of collaborations?	At what level?
			• Integrate TB into training curricula	
Ministry of Defence	• There exists an MOU between DGHS and DGMS • It has a large health infrastructure • Skilled HR / Service providers • Services available for general population and large population of all cantonments • Congregate settings (special settings i.e. military etc.)	• Partnership with the ministry • Solicit directive from higher authority (TB taskforce/ Parliamentary TB caucus can facilitate) • Advocacy and sensitization	• Strengthen and expand screening, diagnostic and treatment integration into the ongoing health services of the MOD. • Integrate TB into training curricula • Designing of responsive program	• Policy • Service delivery • Community
Ministry of Posts, Telecommunications, and Information Technology	• GOB commitment for digital Bangladesh • Immense scope for access to large population with quick and high coverage for creating awareness, generating demand and community connect.	• Advocacy and sensitization • Align the strategic plans of the ministry and NTP	• Incorporating TB in the communication strategy of the ministry • Support the development of relevant program design • Use the existing mass media channels (television, radio, mobile phone, apps, etc.) for propagating information on TB	• Policy • Program level • Community
Ministry of Social Welfare	• Large infrastructure • HR • Congregate settings (special services/projects for third gender, tea garden, snake charmers, differently abled persons, etc.) • Old age stipend, widow stipend • Expanded health infrastructure • Child protection and services projects	• Enter into a formal partnership with the ministry • Solicit directive from higher authority (TB taskforce/ Parliamentary caucus can facilitate) • Align the strategic plans of the ministry and NTP • Advocacy and sensitization	• Integrate TB services into the ministry's service delivery points • For provision of social scheme benefits, prioritization, and fast tracking of applications of eligible TB patients or eligible members of their households to schemes under National Social Assistance Programme • Designing a more responsive program (for eg. stipend/ honorarium for nutrition of TB patients, compensation for EPTB diagnostics)	• Policy • Service delivery • Community
Ministry of Industries	• Large infrastructure • Dedicated HR • Wide network of industrial parks (BSIC Shilpa Nagari) and individual Industries • Covers millions of labors and workplaces	• Partnership with the ministry • Solicit directive from higher authority for the partnership (TB taskforce/ Parliamentary TB caucus can facilitate)	• Policy formulation for TB Free Workplace including support for those affected by TB • Capacity building of health providers at workplaces • Integrate TB screening into the routine health check-up of workers • Sensitization of factory workers and develop and host IEC materials in factories	• Policy • Service delivery

Ministry	Why to collaborate?	How to partner?	What areas of collaborations?	At what level?
			• Awareness building (IEC + Orientation) with students and their parents	

10.5 A SNAPSHOT OF MAF-TB PLATFORMS, STRATEGIES AND ACTIONS IN BANGLADESH

Figure 24: Proposed multisectoral platforms, strategies and actions and its linkages with the departments within the ministry of health and other key ministries and business platforms



10.6 INVOLVEMENT OF RELEVANT DEPARTMENTS IN THE MOH&FW IN TB ELIMINATION

Coordination and collaboration within the departments of MOH&FW is critical to ensure TB services are universal and of high quality. Certain determinants and risk factors of TB like malnutrition, diabetes and HIV are necessary to be addressed to enhance coverage and outcomes of NTP. Hence involvement of departments and national programmes like National Nutrition Services (NNS), Non-communicable Disease Control programme, and National AIDS/ STD Control (ASP) is critical. Similarly, TB programme relies on the efficiency of departments dealing with procurement, supply chain management, reconstruction and repairs, etc. for its smooth operation. The table below provides details of the key departments of MOH&FW that the NTP needs to coordinate and collaborate with more closely.

Table 16: Collaboration with specific departments in the MOH&FW

Department/ National Programme	Why to collaborate?	How to collaborate?	What areas of support?	At what level?
National Nutrition Services (NNS)	Malnourished patients are more likely to get infected by TB. So, involving NNS can be fruitful to address malnourishment of TB patients. NNS has specific activities, especially for Severe Acute Malnutrition (SAM) and Moderate Acute Malnutrition (MAM).	• Sensitization • Sign MOU. • Development of policy. • Regular working group meetings.	• Assessment for nutritional disorders • Nutritional support to TB patients through Vouchers.	At all levels

Non-communicable Disease Control	Diabetic patients are prone to develop TB disease. Non-communicable disease control can help to get the necessary testing and treatment support for the TB patients for NCDs.	• Sensitization, • Capacity building • Regular working group meetings.	• Screening and routine diabetic tests of TB patients. • Bi-directional screening • Social and behavior change communication (SBCC)	Upto Upazila level.
Maternal, Neonatal, Child & Adolescent Health (MNC&AH)	As a priority service, MNC&AH can facilitate support for TB care especially amongst mothers, and children given the reach and success of MNC programmes in the country.	• Sensitization and bi-annual meeting.	• BCG vaccination, • Regular screening of pregnant women during routine ANCs.	At all levels
Directorate General of Drug Administration (DGDA)	They are the drug regulatory authority and working for aDSM.	• Sensitization regarding new drugs of TB. • Create institutional mechanism.	• Permission for new drugs and monitoring of aDSM, • Strengthening pharmacovigilance of TB drugs.	Central level
Central Medical Store Depot (CMSD)	They are the authorized body for procurement, customs clearing and storage of drug	• Regular meetings. • Create institutional mechanism	• Making the procurement process and clearing mechanism easy	Central level
Hospital Services Management	They provide support for supplying related equipment, chemical reagent, medicine and diet for hospital	• Sensitization meeting with key bodies. • Create institutional mechanism.	• Timely, regular and adequate supplies of TB related equipment, chemical reagent, medicine, and diet	CDC, CDH
Waste Management Services	They provide support for disposal of waste products	• Sensitization & meeting with key bodies. • Create institutional mechanism.	• Manage TB related waste products	All TB service delivery centers
NEMEMW (National Electro Medical Equipment Maintenance Workshop)	They are the authority to maintain and repair medical equipment	• Sensitization, regular meeting with key bodies. • Create institutional mechanism.	• Repair and maintain the TB diagnostic equipment according to need	Central level
Health Education Bureau	They provide educational support to national health programmes	• Sensitization, capacity building. • Create institutional mechanism.	• Development and dissemination of IEC materials. • Development of training module.	Country wide
Directorate General of Medical	Responsible body for development of curriculum for the medical students.	• Sensitization and regular meeting.	• Handbook of TB for medical students. Current to be updated with latest	Central level

Education (DGME)			information and guidance	
National AIDS/ STD Control (ASP)	HIV is one of the cause of immunosuppression of TB patients. ASP have a good health system.	• Sensitization. • Create institutional mechanism.	• Bi-directional TB/HIV testing & referral. • Ensure TPT.	Country wide
Health Engineering Department	They are responsible for construction of government and public health facilities.	• Meeting and sensitization. • Create institutional mechanism.	• Construction and renovation as per need.	At all levels
Bangladesh Medical Research Council (BMRC)	BMRC is the focal point for Health Research.	• Sensitization. • Create institutional mechanism.	• Support for research.	Central level

10.7. ROLE OF MOH&FW AND NTP IN MULTISECTORAL ACTIONS AND ACCOUNTABILITY FOR TB

The role of MOH&FW is critical in galvanizing and obtaining commitment from other sectors. The NTP will support the MOH&FW in coordinating with the other departments within health and also the other ministries. The NTP will provide support in cross-cutting functional areas that are essential for the inter-ministerial collaborations.

Table 17: Role of MOH&FW and NTP in MAF TB and multisectoral engagement

	Functional Areas	Specific Actions to be undertaken by MOH&FW
1	**Technical Support and Capacity Building**	• Trainings and workshops for sensitization, awareness on TB services • Standardized protocols and guidelines
2	**Advocacy, Partnerships and Innovation**	• Development and dissemination of IEC materials • Facilitating intersectoral/inter-ministerial action through Letter of Intent / Memorandum of Understanding / Agreements etc. • Create institutional mechanisms and incentives for partnerships with technical / research institutes, private sector, civil society
3	**Surveillance, Monitoring and Evaluation**	• Ensuring accountability through reviews to ensure timelines and achievement of indicators for multisectoral action • Periodic reporting of progress across sectors
4	**Knowledge Management, Learning and dissemination**	• Sharing of best practices across divisions, upazilla and stakeholders • Development and maintenance of TB databases/ knowledge repository • Convening workshops/ conferences for dissemination of information/ evidence on TB • Support for research on people centric, human-rights based approaches to TB prevention and treatment.

CHAPTER 11: COMMUNITY, RIGHTS, AND GENDER

11.1 CONTEXT

- Bangladesh has a national costed TB CRG Action Plan. It provides a comprehensive framework for identifying and overcoming communities, human rights and gender barriers in the TB Program. The Plan highlights TB CRG barriers such as: accessibility, availability, acceptability and quality of services; stigma and discrimination; privacy, confidentiality and information; key and vulnerable populations; gender; participation of TB survivors; and legal remedies.
- Strong community support systems with a well-structured community participatory program across the country with a huge network of community clinics and community health workforce of both government and NGOs are the hall mark of the national TB response.
- Shastho Shebikas (SS) are effectively linking community with facilities – mobilizing community, identifying presumptive cases at community level, referral of presumptive cases to TB facilities for evaluation and diagnosis. They contribute 44% of all TB notification.

11.2 CHALLENGES

- There is a great deal of enthusiasm and support for strengthening national TB response through CRG. However, there is minimal involvement, capacity and leadership of people with or who have survived TB. While community engagement is strong, mobilization of survivors is suboptimal. There is limited knowledge or understanding of stigma and gender issues. And there are limited opportunities for engagement with TB KVPs.
- Despite the effective engagement of the community; it is seen that the community clinics and other government community health workers are untapped resource for TB diagnostic and care (missed opportunity to provide CI and TPT).
- There is a lack of up-to-date training and coordination between community and facility levels workforce leading to delays in diagnosis

11.3 INTERVENTIONS, ACTIVITIES AND SUBACTIVITIES

Objective	**4**	**Strengthen enabling policies, empowered institutions, partnerships, and human resources with enhanced capacities to create a supportive ecosystem to FIND-TREAT-PREVENT TB in the country.**
Intervention	**4.3**	**Alleviate human rights and gender barriers to TB services and address TB stigma and discrimination in communities, healthcare settings, and workplaces**
Activity	**4.3.1**	Conduct **qualitative assessment on the range of TB related stigma and GBV experienced by women in different economic strata** using the TB Stigma Assessment Implementation Handbook
Activity	**4.3.2**	Implement **workplace programs for stigma and discrimination reduction**
Activity	**4.3.3**	Integrated medical ethics and gender-responsive trainings for health care workers
Activity	**4.3.4**	Implement a mass media campaigns on removing human right and gender barriers to TB services

Activity	**4.3.5**	The "**Declaration of the Rights of People Affected by TB" will be translated into local language and disseminated widely. Integrated 'know-your rights' trainings** (based on Declaration of the rights of people affected by TB) for peer supporters, TB Champions, TB key populations will be undertaken.
Activity	**4.3.6**	Conduct **Facility-level accountability meetings/Patient-Provider committee** to discuss the Community Led Monitoring (CLM) outcomes.
Activity	**4.3.7**	Develop a **network of paralegals and lawyers** who can support access to justice initiatives for people affected by TB who are unable to realise their legal rights.
Activity	**4.3.8**	Conduct TB, rights and the law **sensitization training** (meeting) with law society, magistrates, judges and prison wardens
Activity	**4.3.9**	Organize a **Human Rights Capacity Building Workshop** for Persons Living with and Experienced TB/TB Peer Support Groups/Clubs, TB survivors and people with TB- associated disability, TB key population representatives, community outreach workers using the Stop TB – TB and HR Training Manual for TB affected communities - Asia & Pacific
Activity	**4.3.10**	Capacity building programme focusing on TB, human rights and gender for people affected by TB
Activity	**4.3.11**	**Develop Communication materials on TB, human rights and legal literacy**
Intervention	**4.4**	**Strengthen the legal and policy framework and their implementation in the TB response**
Activity	**4.4.1**	Conduct review of national and sub-national laws and policies including: employment, insurance, education, prisons, refugees (FDMN) and social security that impact access to TB services amongst people who affected by TB with a specific analysis on each of the focus key populations
Activity	**4.4.2**	Develop policy brief on CRG specific legal, social, and economic barriers to access that must be identified, monitored and overcome to end TB in Bangladesh
Activity	**4.4.3**	**Round table with journalists** to discuss human rights and gender related barriers to accessing TB services that must be overcome to end TB
Activity	**4.4.4**	Assess barriers and facilitators of implementing collaborative TB activities at different settings: DM, OPD, and in-patient departments
Intervention	**4.5**	**Support the community and community led organizations for community led monitoring (CLM), community led research and advocacy (CLRA), capacity building and leadership development, and their engagement, linkages and coordination.**
Activity	**4.5.1**	Development of CLM frameworks and strategies to coordinate CLM efforts.
	4.5.2	Use digital application (one impact tool) for community led monitoring (CLM)
Activity	**4.5.3.**	Secure technical support and training for CLM indicator selection, data collection, data management and security, data analysis, or use of CLM data to improve programs.
Activity	**4.5.4**	Piloting and implementation of CLM to identify and address barriers and gaps in services and programs.

Intervention	**4.6**	**Develop an effective CRG monitoring and evaluation system to inform country progress, share lessons and improve programming**
Activity	**4.6.1**	Conduct **mid-term review on the implementation of CRG Operational plan**
Activity	**4.6.2**	Support development and implementation of the national platform to share lessons on CRG implementation
Activity	**4.6.3**	**Complete the TB Stigma Assessment and report on the indicators**
Activity	**4.6.4**	Community led Monitoring barriers observed and feedback reported
Activity	**4.6.5**	Sensitize lawyers/paralegals, magistrates/judges on TB and engage them in addressing issues related to TB, rights, and access to justice
Activity	**4.6.6**	Train TB survivors in TB and human rights and form TB survivor network, with proportionate representation from geographic, gender and TB key population
Activity	**4.6.7**	Train service providers in TB and gender related barriers to access
Intervention	**4.7**	**Operationalize the CRG Action Plan**
Activity	**4.7.1**	Conduct a meeting of partners especially civil society representatives and NGOs to review and rank order priority activities
Activity	**4.7.2**	Conduct a community-led announcement of the launch of specific CRG activities within TB care
Activity	**4.7.3**	Conduct **community-based capacity building sessions** to outline the Community, Rights and Gender principles that will guide the actions planned
Activity	**4.7.4**	Establish, coordinate, and support a **national network of TB champions** that includes **Patient Clubs and representatives of TB key populations**
Activity	**4.7.4**	Develop **TB survivor community network** and TB affected community communication materials
Activity	**4.7.5**	Support **community representatives** to participate in country's strategic and resource mobilization meetings including the GF-CCM and other forums
Activity	**4.7.6**	Conduct **extensive capacity building trainings with network members** - TB survivors, TB affected communities and TB key populations on TB literacy, TB treatment literacy, TB rights, community-led monitoring of the service delivery, quality and rights-violations, including stock-outs, drug side effects, stigma, discrimination and other rights-violations
Intervention	**4.8**	**Reaching urban male population through targeted approach:** the prevalence of TB among men is nearly three times that of women as shown in the national TB prevalence survey. Key reasons is often the inconvenient business hours.
Activity	**4.8.1**	**Extended business hour** services to for enhancing access to TB services will be provided.
Activity	**4.8.2**	Other targeted approaches will be used to reach urban **underprivileged male population** such as, Rikshaw puller, CNG Auto/Bus/Truck drivers etc. with **sensitization meetings** and **sputum camps** organized. Additionally, **mosque announcements** and leaflet distribution after the 'Jummah' prayers, outside the mosques as well as in the tea stalls of the slum areas are specifically designed to supplement this targeted approach of detecting more cases in men.

CHAPTER 12: TB IN KEY AND VULNERABLE POPULATION

12.1 CONTEXT

Key and vulnerable population groups for TB in Bangladesh consist of people in prisons, mobile population both migrants and internally displaced populations (IDPs), tea garden workers, garment and knitwear factory workers, mining communities, transport workers (rickshaw, tempo, truck, drivers), those living in the hill tracts, children and adolescent, people with comorbidities, urban poor/slum dwellers who are all disproportionately affected by the disease, poverty, stigma and discrimination, human rights and gender related barriers.

12.2 CHALLENGES

The key and vulnerable population is disproportionately affected by the disease, poverty, stigma and discrimination, human rights and gender-related barriers. Children (covered in this NSP in a separate chapter on childhood TB) represent a unique key and vulnerable population - disadvantaged by less sensitive TB diagnostics, without access to economic means, and unable to self-advocate.

12.3 OBJECTIVE, STRATEGIC INTERVENTIONS, ACTIVITIES AND SUBACTIVITIES

Objective	**4**	**Strengthen enabling policies, empowered institutions, partnerships, and human resources with enhanced capacities to create a supportive ecosystem to FIND-TREAT-PREVENT TB in the country.**
Intervention	**4.9**	Understand the **size, location and special needs** of key and vulnerable populations in the country.
Activity	**4.9.1**	Conduct **mapping and needs assessment** of the vulnerable population in the country
Intervention	**4.10**	Remove **barriers to TB services** for key and vulnerable populations
Activity	**4.10.1**	Engage and target vulnerable populations for TB screening and diagnosis through **mobile outreach**
Activity	**4.10.2**	Engage vulnerable populations for TB screening and diagnosis by **community-based or community-led services** (see chapter on CRG)
Activity	**4.10.3**	Provide **special allowances** for key and vulnerable populations to avail TB services
Activity	**4.10.4**	Develop linkage to social protection schemes (food, financial support, nutrition supplements, transport, labor protection etc.)
Activity	**4.10.5**	Conduct programs to address stigma and discrimination (see chapter on CRG)
Activity	**4.10.6**	Protect human rights and provide legal services (see chapter on CRG)
Intervention	**4.11**	Consider **cross-border policies**, legal framework and interventions to facilitate continuum of TB care services.
Intervention	**4.12**	**Train health care workers** on infection prevention and control and provide them with access to a **safe working environment**, which includes adequate

		supplies of personal protective equipment, regular screening for TB, and support for treatment completion.
Intervention	**4.13**	**Scale up innovative interventions to increase access to TB prevention, care, and treatment among key and vulnerable populations**
Activity	**4.13.1**	Develop/adopt/implement SOP for TB programming among hard to reach key and vulnerable populations
Activity	**4.13.2**	Strengthen TB Champions among key populations (interventions in hard to reach areas including prisons, refugee camps, garment factories and slums. Following the mapping of vulnerable populations newer groups may be added.)
Activity	**4.13.3**	Scale up implementation of SOPs for TB programming among hard to reach key and vulnerable populations in order to increase case findings
Activity	**4.13.4**	Update in-service training for HCWs to incorporate human rights, TB key population sensitivities, medical ethics, and legal literacy module in the context of TB
Activity	**4.13.5**	Recruit and continue to train persons living with and affected by TB, including from TB key populations, to become Peer Counselors and involve in the implementation of Snowball Approaches for supporting TB case detection amongst hard to reach populations and TPT, HIV, etc activities
Activity	**4.13.6**	Conduct a country dialogue to identify opportunities to increase social protection among vulnerable, such as urban poor, garment workers and Rohingya refugees, and TB affected communities

CHAPTER 13: HEALTH PRODUCTS MANAGEMENT SYSTEMS

13.1 CONTEXT

a. TB prevention, diagnosis, treatment and cure of drug susceptible (DS TB) and drug resistant TB (DR TB) require availability and utilization of quality drugs and diagnostics. Thus, to END TB in Bangladesh, the end-to-end Supply Chain system needs to function efficiently and be robust with adequate resources, management support and medical products regulatory and quality assurance systems in place. The supply chain management system ensures right drugs and diagnostics are available at the right place at the right quantity, with the right quality for the right client.

b. The Government of Bangladesh (GOB) has shown high level of political will and commitment, since 2017. **First line TB Drugs (FLDs) have been procured through domestic funding**. In addition, GOB **procures ancillary medicines**, while the Global Fund support the procurement of second-line TB drugs (SLDs) and the major diagnostic equipment and supplies for microscopy, culture and drug susceptibility testing (DST), including GeneXpert machines and cartridges. Previously, GOB procured FLDs from Global Drug Facility (GDF), however, in 2022, GOB decided and procured from a local manufacturer for the first time.

c. To ensure uninterrupted supply of TB medicines and avoid or minimize expiries, the country continues to use **QuanTB tool for quantification and as an early warning system for TB medicines and for stock management**. Thus, there has been uninterrupted supplies of first line Drugs (FLDs) and adult Second Line Drugs (SLDs). Even during the COVID 19 pandemic, the country had adequate supply of TB commodities and personal protective equipment.

d. NTP uses a mix of paper-based and electronic platforms for recording, reporting and ordering for TB commodities. The **electronic logistics management information systems (e-LMIS)** introduced in 2022, aids better management of stock since it captures real-time stock status of TB commodities end-to-end logistics management information for TB Commodities from the central to peripheral level. So far (October 2022), 158 Upazila health complexes of 20 districts under 3 divisions namely Mymensingh, Rajshahi, and Rangpur, have been trained on e-LMIS for TB commodities and these facilities in addition to the TB central warehouse use e-LMIS for reporting and ordering of TB commodities.

e. TB commodities (drugs and diagnostics) are distributed from **central warehouse located in Dhaka to Upazila health complexes,** NGO partners as well as health facilities located in different parts of Bangladesh and are done through the coordination between NTP and NGO partners. There are different partners providing TA for PSM in different areas.

f. The country has a quality assurance and quality control system in place and coordinated by the Directorate General of Drug Administration (DGDA) and performs regulatory functions which include continuous monitoring of the quality of TB medicines. The national quality control lab is World Health organization prequalified, and there is pharmacovigilance (PV) system under the coordination of DGDA. NTP is using e- TB manager which has a module for capturing ADR (Adverse Drug Reaction) for DR TB patients

13.2 CHALLENGES

a. **Inadequate Human resource and capacity:** There is limited manpower for robust PSM functions across all levels with **67% positions at national level vacant and inadequate number of graduate pharmacists and storekeepers at district and Upazila level**. Vacant positions also have a negative

impact on the effectiveness of the technical assistances provided by different partners. Supportive supervision is not done to lower level by national or district PSM team. Lack of training on TB commodity and inventory management especially at the peripheral level. There is limited HR responsible for picking and packing of shipments at central level leading to long lead time for distribution.

b. **Quantification:** The **quantification subgroup is not active due to HR constraints**; thus, the quantification files are not updated quarterly and not timely.

c. **Procurement and import challenges:** Importation challenges have caused shortages in lab supplies which prevent diagnosis of TB patients due to constraints in payment of custom duty and Value Added Tax (VAT)

d. **Storage and Distribution:** There is inadequate space and storage equipment leading to sub-optimal storage conditions at TB central warehouse and Upazila level. The transition of peripheral storage system to government facilities hasn't been done following a physical conditions upgrade. The staff handling the stock aren't trained to facilitate the transition. Waste disposal has not been done for about 5 years, thus the central warehouse has obsolete items.

e. **Logistics Management Information Systems (LMIS) and recording and reporting (R& R) tools:** e-LMIS tool has been implemented only at central level and in 3 out of 8 divisions so reducing pipeline visibility across the country. Different tools are used for recording at HFs, coupled with Incomplete documentation. There is an absence of updated SOPs causing differences in stock management and distribution.

f. **Regulatory and Quality Assurance System:** DGDA has WHO Prequalified national quality control lab, and they use minilabs for field screening, however they do not have modern screening equipment which can ease surveillance. **Locally manufactured FLDs and anti-TB medicines are not WHO Prequalified.** The **Essential medicines list was last updated in 2017**, the new tools like **Bedaquiline, Delamanid and others have not been included and the EML is obsolete**. There is no DGDA ADR reporting format in UHCs and HFs and Adverse Drug Reactions (ADRs) are reported in e-TB manager in some facilities mainly for PMDT.

13.3 OBJECTIVE, STRATEGIC INTERVENTIONS, ACTIVITIES AND SUBACTIVITIES

Objective	**4**	**Strengthen enabling policies, empowered institutions, partnerships, and human resources with enhanced capacities to create a supportive ecosystem to FIND-TREAT-PREVENT TB in the country.**
Intervention	**4.14**	Build effective, integrated and sustainable HPM systems to deliver uninterrupted availability of health products with a focus on equitable access to quality assured health products.
Activity	**4.14.1**	Insurance cost for Machineries including Insurance cost for Drug store/Warehouse/GeneXpert/X-ray facilities/Mobile X-ray Van
Activity	**4.14.2**	Rent & utilities including Rent & utilities for warehouse / drug store
Activity	**4.14.3**	PPM through SEM
Sub activity	**4.14.3.1**	. Procurement of Refrigerator for drug Stores at the peripheral level . Insurance cost for Warehouse Building & Stocks . Fire Hydrant System Setup for Warehouse . Procurement of Forklift- 3/5 Ton . Procurement of Handheld Pallet truck . Construction of New Warehouse and Lab . In the interim third-party logistics will be used.

		. Reconstruction of CDH/CDC . Procurement of Passenger & Cargo Lift for 10 persons . Procurement of Office Furniture and Fixtures
Activity	**4.14.4**	HR required for procurement, supply chain management, and warehousing and distribution functions will be augmented. The current HRF gaps in PSM will be addressed. Capacity building for field level PSM personnel in quantification, forecasting, etc. will be provided. The programme will ensure that the staff are reattained and their upskilling is done on a regular basis.
Sub activity	**4.14.4.1**	. 2-Day training/retraining on Procurement and Supply Chain Management & Logistics for TLCA & Storekeeper. . Quarterly PSM working group meeting . Training on electronic indent (WIMS)
Sub activity	**4.14.4.2**	A supportive supervision plan, checklist, and regular supervisory visits will be undertaken to .
Activity	**4.14.5**	Transportation cost for logistics (drugs, other supplies) from NTP to Upazila
Activity	**4.14.6**	Ensure adequate supply of lab consumables and PPEs
Intervention	**4.15**	Procurement of antiTB drugs: first line drugs and all oral 2nd line drugs for DR TB
Activity	**4.15.1**	Supportive activities related to the procurement of medicines like port clearance costs, e.g. CDVAT and import duties, port charges, warehousing costs, distribution costs, etc. will be ensured
Intervention	**4.16**	Strengthen and expand the use of eLMIS for TB commodities
Intervention	**4.17**	Procurement of TPT drugs
Intervention	**4.18**	Procurement of logistics for peripheral storage
Activity	**4.18.1**	Updating the SOPs on TB supply management
Intervention	**4.19**	1. Activities to support the drug regulatory systems and quality assurance should be considered including the recommendations in the JMM. Equipment to support QC testing, activities to support WHO prequalification of TB medicines, EML update, pharmacovigilance 2. Waste management activities should also be included and budgeted for **Continue to support the local manufacturer(s) of anti-TB medicines to get these medicines WHO pre-qualified**
Activity	**4.19.1**	Facilitate the financing, technical assistance, pharmaceutical manufacturers engagement etc. by exploring domestic resources and donor sourcing beyond USAID.

GF FEEDBACK

Compared to other chapters, this one is less precise and detailed. It would be useful to add more details of the various activities and what is envisaged to be done - For example, please ensure that interventions/activities to address the challenges related to quantification, import, etc. are clearly detailed considering the recommendations in the recent JMM.

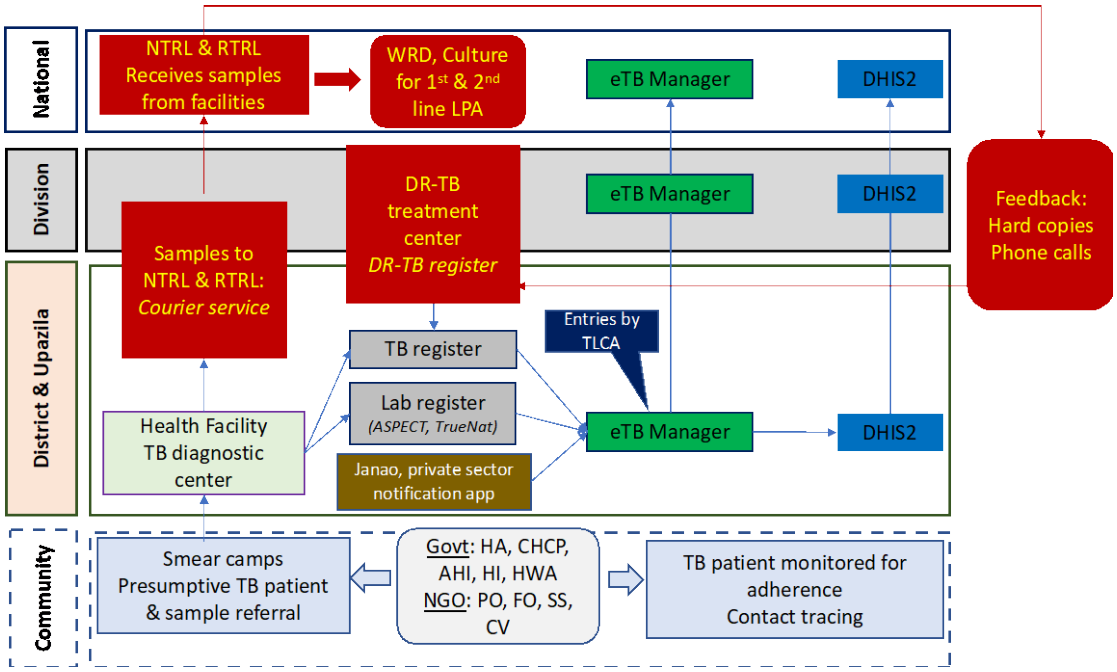
CHAPTER 14: SUREVILLANCE, MONITORING AND EVALUATIONS, AND RESEARCH

14.1 CONTEXT

a. The country has a strong TB surveillance system (routine recording and reporting on TB via national information system) in place and are reporting annually to WHO via the global TB data collection system. The surveillance systems meet WHO requirements for standardization and consistency in the case definitions used and type of data collected. The country has an M&E plan developed for 2020 2025.

b. **TB surveillance system:** Timely, accurate, and complete recording and reporting of TB patients along with analysis of trends in the number and distribution of TB patients is crucial to monitor and evaluate TB prevention and control programs and inform TB care and prevention program activities. The TB surveillance system in Bangladesh has both the paper- and electronic-based systems. The coverage of eTB manager a digital case-based system is in all the eight divisions. Dhaka has about 40% coverage and has an expected full coverage in Q1 of 2023. eTB manager is interoperable with DHIS2, which is a ministry standard of data storage and analysis. The eTB manager has also integrated other data streams like ASPECT from GeneXpert. Below is the description of the TB activities and surveillance at the community, Upazila, district, division and the national level as shown in Figure 19.

Figure 25: TB data flow and TB surveillance system in Bangladesh in 2022.

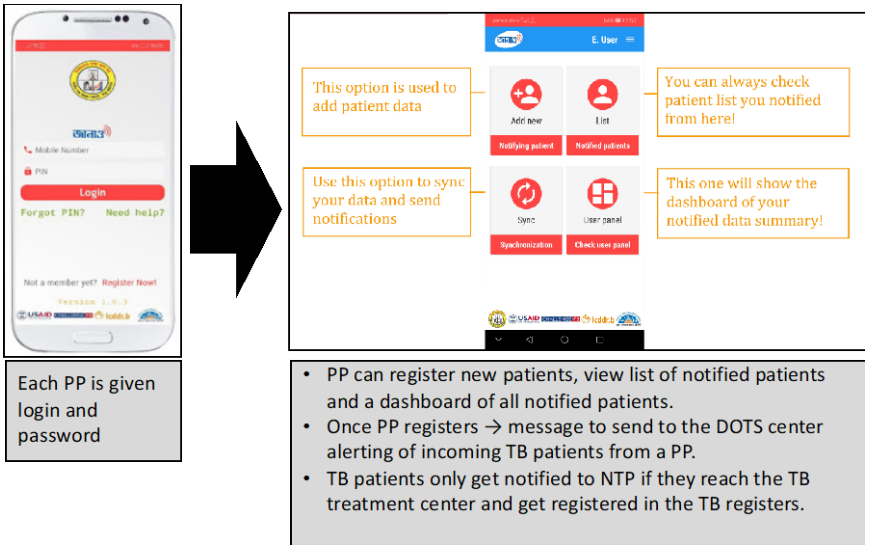


c. **Community level:** In the community, there are five types of community health workers groups namely i) Health Assistant (HA), ii) Community Health Care provider (CHCP), iii) Assistant Health Inspector (AHI) iv) Health Inspector (HI) and v) Family welfare assistant (FWA) – employed by the government. Shastha Shebika, Field Workers, Community Volunteers – employed/supported by non-government organization employment. The roles of community health workers (representing all types), are as follows:
   - Conduct sputum outreach centers: presumptive TB patients are mobilized to come to the outreach centers to produce sputum. Sputum smears are sent to nearby TB diagnostic hubs for microscopy examination
   - Refer presumptive TB patients to a nearby TB diagnostic centers for CXR and GeneXpert
   - Monitor TB treatment adherence for TB patients already started on TB treatment.
   - Contact tracing in some areas especially for bacteriologically confirmed TB patients.
   - Track confirmed TB patients who are referred to a treatment center to ensure they are started on TB treatment.

The community contribution needs to be quantified and evaluated especially in the current efforts of finding missing TB patients. NGO led efforts collect data which later may be shared with the TB program.

d. **District and Upazila level:**
   - **Laboratory register** is used to record all the presumptive TB register and serves as a proxy for presumptive TB register.
   - **TB treatment register**: the treatment card of the TB patients feeds into eTB manager which is a case-based electronic TB system.
   - **Digital case-based systems** (see figure 19 above): eTB manager is a case-based electronic system in Bangladesh, and currently covers all the 8 divisions.
     - **DHIS2**: is interoperable with eTB manager which pushes aggregate data at the health facility. The aggregate data is then available for use at all levels. DHIS2 use started in 2018 with still no WHO recommended standard dashboards.
     - **Microsoft Excel**: About 40% of health facilities in Dhaka still use Microsoft Excel data reporting tool to NTP as digitization is yet to cover all facilities. Data aggregation follows the union → Upazila → district → national level.
     - **Janao**: is a mobile app used by the private practitioners to notify and refer TB patients to treatment centers which are often public health facilities. The coverage is still low at around 20% in Dhaka. Data is pushed to eTB manager, but only few entries are linked to the main eTB manager – meaning the entries by Janao have the district TB number (see **Error! Reference source not found.**XX).
     - **ASPECT**: is a software linking the molecular diagnostic tests (GeneXpert and TrueNat) test results to eTB manager.

Figure 26: Janao app to improve TB notification by the private practitioners.



e. Research

The Bangladesh Medical Research Council (BMRC), an autonomous organization established under the Ministry of Health and Family Welfare, is the nodal agency responsible for health research in Bangladesh. In addition to BMRC, the Bangladesh Council for Science and Industrial Research (BCSIR), and the University Grants Commission are some of the other national agencies financing health research. In Bangladesh, TB specific research has been carried out in academic institutions, national professional associations (Diabetic Association of Bangladesh (BADAS), National Pediatric Association), autonomous research organizations and institutes (icddr'b), and by non-governmental development organizations (BRAC, Damien Foundation, IRD Bangladesh), including pharmaceutical industries. Operational research aims to improve the quality, effectiveness, efficiency and accessibility (coverage) of the END TB efforts. The NTP will continue to promote and support research on issues which are of key relevance to guide interventions and to monitor and evaluate the impact of the programme through collaboration with specialized institutions.

14.2 CHALLENGES

a. The coverage of eTB manager is 100% in seven divisions and Dhaka has about 40% coverage by Sept 2022.

b. NTP has introduced electronic referring system (JANAO app) for private practitioners.

c. The country has **partially transitioned from paper to digital case-based surveillance systems (eTB Manager)**.

d. **Data and reporting practices** on TB management in hospital-based additional interventions are **often not in line with national guidelines** with different indicators used under different projects.

e. There is **limited awareness about JANAO app** among physicians

f. Medical research remains an optional endeavour without a proactive mandatory approach and practice. There are inconsistencies between funding, strategy, personnel, skill and attitude towards medical research in general and TB research in particular. There is no national TB research strategy, protocol, or identified research priorities.

14.3 OBJECTIVE, STRATEGIC INTERVENTIONS, ACTIVITIES AND SUBACTIVITIES

Objective	**4**	**Strengthen enabling policies, empowered institutions, partnerships, and human resources with enhanced capacities to create a supportive ecosystem to FIND-TREAT-PREVENT TB in the country.**

Intervention	**4.19**	**Establish, progressively scale-up and maintain a comprehensive, real-time, digital case-based TB surveillance systems and ensure analysis and use of TB data for decision-making at all levels of TB services.**
Activity	**4.19.1**	The **DGHMIS will be engaged** to ensure the **support for e-tb manager and data systems is included in the operational plan**
Activity	**4.19.2**	Develop a **National Digital strategic for TB Elimination** (ensuring alignment with the national digital health strategic plan) informed by a **comprehensive assessment of the current digital strategies and tools** used in the field. An implementation plan for scale-up of the digital case-based surveillance system based on the strategic plan will be developed subsequently.
Activity	**4.19.3**	Develop **standardized guidelines** on the presentation and analysis of program performance data during quarterly monitoring meetings.
Activity	**4.19.4**	**Procurement** of IT equipment for supporting referral mechanism and enhance coordination with different departments, HR for Program Management will be done
Activity	**4.19.5**	**Periodic meetings and workshop** will be conducted for enhancing knowledge on TB Program for various facets of the programme
Activity	**4.19.6**	Monitoring and supervisory visits for enhancing collaboration with other ministries, departments, agencies, partners of NTP
Activity	**4.19.7**	**Maintain the currently implemented management systems** with the following additions: • Implement DHIS2 WHO standard dashboard and expand scope of users (NTP, NTP partners, other stakeholders) • The reporting forms for TB needs to align with modules in the eTB manager and will be updated
Activity	**4.19.8**	Strengthen the **eTB manager** • **Module updates**: the eTB manager modules will be updated to align with WHO and country guidelines whereby capturing of risk groups and risk factors such as malnutrition, smoking, diabetes and others. • **Transition plan:** the Medicine, Technologies and Pharmaceutical Services (MTaPS) support of eTB manager ends in September 2023. The country has a transition plan developed in Nov 2022. NTP and DGHIMS will define the transition plan along with timelines, roles and responsibilities for administrative, technological and operational control of the finalized application or applications and its combinations with defined resources and skillsets. • **Unique Identifiers:** The NTP will explore expanding to a national unique identifier for Health facility/providers (UHID-F) and individuals' health records (UHID) with interoperable systems, standards and data
Activity	**4.19.9**	Fully **digitalize recording and reporting** (both aggregated and individual patient tracing) system functioning at all level (e-TB manager, DHIS2 and etc)
Activity	**4.19.10**	Develop **WHO approved Dashboards** to be used for data analysis at all levels
Activity	**4.19.11**	Capacity building of M&E unit with regular trainings

Intervention	**4.20**	**NTP will collaborate in the National Health Research Strategy development process and introduce the TB Research Strategy covering the full spectrum of research (fundamental, translational, clinical, epidemiological, and operational) to be able to channel efforts and funds in the right direction.**
Activity	**4.20.1**	Create a **TB Research Cell (Unit)** within NTP with involvement of TB researchers, public health scientists, academia, donor organizations, and civil society for developing and implementing the national TB research strategy, agenda, protocol and prioritized research issues through relevant Task Forces, identifying national and international collaborations and additional funding sources.
Activity	**4.20.2**	Appoint a **trained focal point for TB OR at the National and each Division level**. Capacity building should be expanded through workshops, mentorship, trainings possibly targeting junior faculty and students from medical colleges and the NTP staff (all levels).
Activity	**4.20.3**	Introduce **TB as a PG Thesis topic or as a research topic in medical colleges** with funding support (only as an incentive) provided by NTP to encourage the uptake of TB among future specialists.
Activity	**4.20.4**	Undertake nationally representative **OOP/Catastrophic cost survey,** publish report and disseminate findings widely through dissemination workshop at national level.
Activity	**4.20.6**	Conduct **Patient cost survey**, report publication and dissemination workshop at national level.
Activity	**4.20.7**	Conduct **national level inventory study** to identify health facilities / providers missing patients & to quantify total missing TB patients, total initial loss-to follow up, un-notified TB deaths after diagnosis, outcomes / fate of missing TB patients amongst other important outcomes.

CHAPTER 15: HUMAN RESOURCES FOR TB ELIMINATION

15.1 CONTEXT

a. Bangladesh's success in providing TB services can be attributed significantly to the human resources (HR) made available by the Government and the various partners for a coordinated TB response. A large network of Sathya Sebikas, community volunteers, health assistants, community mobilisers, etc contributes to referring people suspected with TB to public health facilities and serve as treatment supporters for patients in their own communities.

15.2 CHALLENGES:

a. HR issues relate largely to **staff adequacy** (*especially lack of sufficient medical technologists, radiology technicians, TLCA and multipurpose workers at the community and facility levels*) to implement comprehensive tasks related to TB diagnosis, treatment, prevention and monitoring; **staff competence and motivation** to sustain quality services, implement innovative approaches and make analysis and use of routinely collected data; frequent **staff turnover** outpacing training and retraining opportunities; and **incentives** available (or unavailable) to staff working on TB.

b. A significant number of District Surveillance Medical Officers (**DSMOs)** (one for each districts) are recruited for the TB program but are underutilized and their inputs is suboptimal. There is no plan for the sustainability of these positions. Moreover, there is close to **40% vacancy in the TLCA cadre**.

c. Bgd has >100 medical colleges with **close to 4000 students added to national pool of medical practitioners every year**, a majority of whom will work in the private sector given the limited capacity of government to absorb them. Though the medical education curriculum is supplemented with a brief on programmatic aspects of TB, it isn't used uniformly for teaching students. There has been no follow up/updating after the introduction of the programmatic brief on TB in the medical curriculum. Private sector doctors who receive a large proportion of presumptive TB cases receive **limited in-practice training** in TB care through the PPM prog.

15.3 OBJECTIVE, STRATEGIC INTERVENTIONS, ACTIVITIES AND SUBACTIVITIES

Objective	**4**	**Strengthen enabling policies, empowered institutions, partnerships, and human resources with enhanced capacities to create a supportive ecosystem to FIND-TREAT-PREVENT TB in the country.**
Intervention	**4.21**	**HRH mapping and their roles in TB care and prevention. Use the results to update the terms of reference for each cadre of contractual staff to ensure placing the right person for the services – SMOs, TLCAs, MTs and other health workers.**
Activity	**4.21.1**	Procure TA for HRH mapping, analyses of findings and use of results for TOR revision.
Intervention	**4.22**	**Enhance the capacity of the UHC / district level leadership to manage the TB programme as a part of decentralizing the TB response will be enhanced.**
Activity	**4.22.1**	Develop tools and conduct capacity building workshops/meetings in management, data analysis and data based decision making, and sub-

national (District programme implementation plan) planning for TB elimination.

Intervention 4.23 **Enhance the remuneration of Sastho Shebika's** – the current 600 Taka is inadequate. **Provide allowance for follow-up communication and/or transport**.

Intervention 4.24 Urgently **fill up all the vacant positions** in the TB programme

CHAPTER 16: CAPACITY BUIDLING AND TECHNICAL ASSISTANCE

16.1 CONTEXT

a. The NTP is overall responsible for training of all categories of health workers (medical doctors, nurses, laboratory technicians, paramedical staff, field-level staff, community health workers and volunteers, NGO staff, corporate sector health workforce, graduate and non-graduate private practitioners) at all service delivery levels. Partners can be involved based on their comparative advantage.

b. Inadequate human resource at different levels and capacity building is a challenge of the public health sector. Recruitment, retention and continuous capacity building and standardized monitoring are required. Capacity building is crucial especially in new and emerging issues of, developments, and guidance in TB care and prevention.

c. In some facilities and among certain providers (college hospitals, private providers) a large proportion of patients are clinically diagnosed and there are extra-ordinarily high proportions of extra-pulmonary forms of TB (53% in one health facility). These observations raise concern about the quality of TB diagnosis in these settings.

d. There is a felt need for training with focus on building the capacity of clinicians/paediatricians and health care workers at the primary and secondary level for early diagnosis of childhood TB.

16.2 CHALLENGES

a. NTP and Partners have engaged with the private health sector where TB patients are being managed by untrained people (last NSP), without following the NTP algorithm.

b. Diagnosis and treatment of Childhood TB at all levels and facilities are inadequate primarily owing to capacity issues.

16.3 INTERVENTIONS, ACTIVITIES AND SUBACTIVITIES

Objective	**4**	**Strengthen enabling policies, empowered institutions, partnerships, and human resources with enhanced capacities to create a supportive ecosystem to FIND-TREAT-PREVENT TB in the country.**
Intervention	**4.25**	**Expand and strengthen on-going in-service training for all health workers involved in the implementation of END TB interventions.**
Activity	**4.25.1**	**Update the in-service training curriculum** for different categories of health workers involved in the implementation of NTP activities.
Activity	**4.25.2**	Develop a **comprehensive training package.** Training courses will be prepared in close collaboration and coordination with other priority health programmes and NTP partners. To the extent possible, integration with other disease control programmes training programmes will be pursued. The **basic TB management courses** will be offered to the medical doctors and supervisors at all levels including partners. This course will be complemented by **specific training courses on procurement and supply management** and on **managing information for action** (MIFA).

The NTP will concentrate on **building capacity of civil surgeons and UH&FPOs on a continuous basis**. The training courses on basic laboratory diagnosis, EQA, culture and DST and new diagnostic tools will be offered to the relevant laboratory technicians. The **mid-level course generally targets all paramedical staff based in upazilla and district health facilities** while the field-level modules are intended for community health workers and volunteers. Other training courses/orientations should be tailored to the staff needed for implementation of various sub-components of END TB.

Activity **4.25.3** Examine and **update current medical, pharmacy and nursing curricula on TB** to ensure that fresh medical, nursing and pharmacy graduates are well equipped with essential knowledge and information on TB regardless of whether they work in the public or the private sector. The BMDC should be roped in as a partner.

Activity **4.25.4** **Conduct training of trainers:** Course facilitators/master trainers for the different training programmes will be trained with particular attention to the technical and educational competencies with a special focus towards independent thinking and problem solving for quality implementation of TB services. A mechanism will be developed for **improving the quality of training courses** conducted by the master trainers on a continuous basis. Supervisors will be additionally trained to ensure better implementation.

Follow-up activities will be conducted at the relevant sites to monitor post-training implementation. This will help trainers to provide supportive supervision to service providers, help to utilize their skills and knowledge acquired during the training and promote application of what was learnt. It is expected that this will result in a further improvement of the quality of services and in the identification of performance gaps and future training needs.

Activity **4.25.5.** **Participation in international training courses** and sharing of experience through attending international meeting, congresses and conferences will acts as an incentive for improving programme performance. Managers and supervisors in various levels will participate in the Regional or global meetings. The NTP will prepare a plan for international training based on capacity gaps and according to the strategic outlines. Criteria will be defined for potential participants to international training courses, meetings or exchange visits.

Activity **4.25.6** Develop a **computerized system for training** and link it to programmatic data so that training courses will be prioritized based on identified gaps. This data base will be further developed.

Intervention **4.26** Procure and provide Specialized Technical Assistance (TA) for complex tasks

Activity **4.26.1** TA for Joint Monitoring Mission (WHO)

Activity **4.26.2** TA for developing the National Specimen Transport Guidelines and SOPs (WHO)

Activity **4.26.3** TA for social contracting and strategic purchasing of services from private sector (WHO)

Activity **4.26.4** TA for establishment of Parliamentary Caucus to END TB

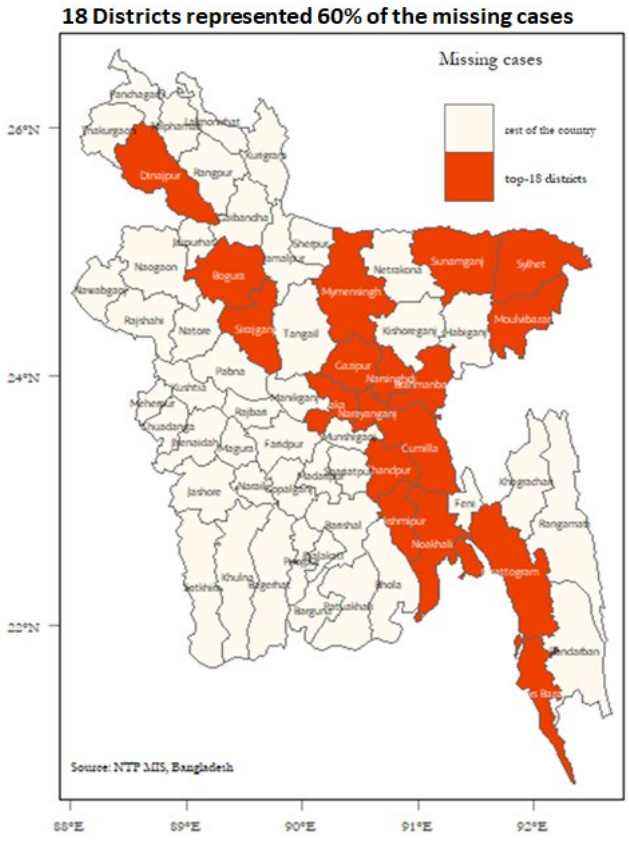
Activity **4.26.5** TA for Lab Network strengthening

Activity	**4.26.6**	TA for Developing a comprehensive National Contingency Planning for TB during complex emergencies
Activity	**4.26.7**	TA for Readiness assessment for implementation of digital case-based surveillance system conducted and report available
Activity	**4.26.8**	TA for Multisectoral Plan implementation (7% add)
Activity	**4.26.9**	TA for (GF) or lab capacity development
Activity	**4.26.10**	TA for assessment of Lab network
Activity	**4.26.11**	TA for developing rehabilitation services and assistive products for people with TB-associated disability (WHO HQ)

CHAPTER 17: CONTINGENCY PLANNING

17.1 CONTEXT

Since 2019, the COVID-19 pandemic has had enormous health, social and economic ramifications globally. The pandemic has significantly affected the global response to health priorities including TB, reversing recent progress towards the achievement of the SDGs. There have been large falls in TB notifications in 2020 compared with 2019, highlighting the implications of infectious disease outbreaks and also unanticipated emergencies on essential health services. Bangladesh mirrored the global effect with a drop in case notification. The country reported significant drops in TB notification: 21% for sensitive TB and 22% for drug resistant TB. The gap analysis shows that more than 60% of missing patients were concentrated in the 18 out of 64 districts of the country (Figure XX). The pandemic induced lockdown and other social restrictions resulted in an economic crisis given that a fifth of the country's population lives below the poverty line and a large proportion of the work force are day laborers, factory workers, rickshaw pullers, and petty businessmen, who were seriously affected by the above measures. This directly as well as indirectly impacted the health sector both public and private resulting in challenges related to accessibility, availability, and affordability of health services. The same is expected in case of complex emergencies like cyclones, floods which the country is prone to.



The main effects on the health system and TB services include:

- The weak health infrastructure of the country over stretched,
- challenges in maintaining supply chains, service provision, and human resources,
- lack of services for gender and sexually diverse and marginalized people,
- inadequate infection prevention and control (IPC) measures,
- social stigma, fear and economic impact,
- Inadequate public awareness and attitudes, and rumors.

The Ministry of Health of Bangladesh initiated its preparedness and response to the pandemic, with community participation as one of the key components of the national preparedness and response plan. The NTP also prepared the mitigation plans and undertook activities in line with the national plan and global guidance.

To cope with future events like the COVID 19 pandemic, the NTP will prepare a detailed preparedness plan with the key elements to be covered detailed in the matrix below. The contingency planning identifies, plans for and summarizes potential risks or events that may adversely affect access to and availability of TB care and prevention services along the continuum of care.

Table 18: Matrix for contingency planning

Stages of care continuum	Consequences for care continuum	Description	Countermeasures (interventions)	Location	Implementer	Other stakeholders to be engaged
Vulnerable groups with TB infection	Reduced access to preventive treatment for vulnerable groups (e.g. high-risk contacts of people with TB, homeless people and people living with HIV)	Health care workers responsible for TB and contact tracing are deployed to the emergency response	● Engagement of community health workers to support contact screening and investigation ● Use of digital technologies to support contact tracing and referral	Subnational level (health facility and community)	Staff at all health facilities and community health workers	Relevant technical and funding partners, civil society organizations, community health workers, service providers for digital health technologies
Symptomatic disease, not yet in care	Reduced access to TB diagnosis	● Reduced access to health facilities due to the impact of the emergency (e.g. damaged roads and security concerns) ● Closure or repurposing of health infrastructure to respond to the emergency	● Engagement of community health workers to support TB screening and sputum collection ● Redirection of the specimen transportation system to facilities that are still operational ● Use of digital technologies to support screening and delivery of laboratory results ● Ensure inclusion of TB in relevant community outreach activities as part of the emergency response	National and subnational level (health facility and community)	Staff at national and subnational level (health facility) and community health workers	Relevant technical and funding partners, civil society organizations, community health workers, specimen courier service, and service providers for digital health technologies
Symptomatic disease, in care	Treatment interruption due to interruption of supplies of TB medicines and other health comorbidities	● Reassignment of health workers and other resources to the emergency response ● Disruption of the supply chain system due to the emergency ● Loss of records of	● Ensure inclusion of TB in the package of essential services to be maintained during the emergency response ● Close monitoring of supplies, with redistribution to sites with inadequate stock Multi-month dispensing of anti-TB treatment drugs ● Use of digital technologies to support treatment adherence	National and subnational levels	Staff at national and subnational level (health facility)	Relevant technical and funding partners, civil society organizations, community health workers, supply chain management team, and service providers for digital health technologies

		people in care	● Public outreach to people on treatment whose records have been lost			
Others as locally relevant	(to be completed as Locally relevant)	(to be completed as locally relevant)	(to be completed as locally relevant)	(to be completed as locally relevant)	(to be completed as locally relevant)	(to be completed as locally relevant)

17.2 OBJECTIVE, STRATEGIC INTERVENTIONS, ACTIVITIES AND SUBACTIVITIES

Objective	**4**	**Strengthen enabling policies, empowered institutions, partnerships, and human resources with enhanced capacities to create a supportive ecosystem to FIND-TREAT-PREVENT TB in the country.**
Intervention	**4.27**	Develop contingency planning to ensure uninterrupted TB services in the event of major disruption to the provision of TB services.
Activity	**4.27.1**	Procure TA for situation analyses including social and economic ramifications of COVID19 and other major emergencies in the country like floods and cyclones.
Activity	**4.27.2**	Develop the National TB contingency Plan and disseminate it widely.
Activity	**4.27.3**	Conduct trainings/sensitization of all service providers and community stakeholders in the implementation of the plan
Intervention	**4.28**	Build front-line capacity for detection and rapid response to epidemics and pandemics at facility and community levels
Intervention	**4.29**	Scale up and integrate community systems capacity for detection and response
Intervention	**4.30**	Strengthen disease surveillance systems, including the use of real-time digital data and detection capacity
Intervention	**4.31**	Strengthen the laboratory systems, supply chains and diagnostic capacity to meet program demand and respond to outbreaks

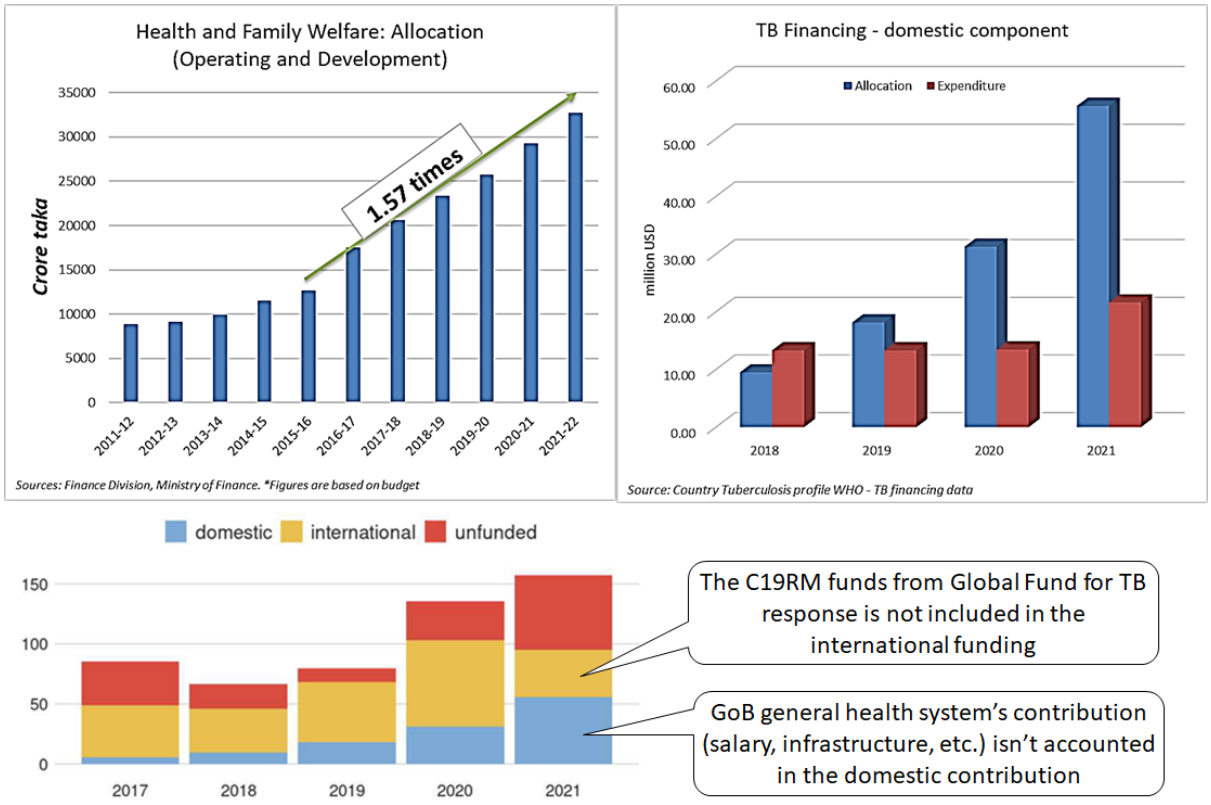
CHAPTER 18: FINANCING AND COSTING THE NSP

18.1 CONTEXT

a. Despite the largest economic crisis triggered by Covid-19, GoB successfully managed the national response by mobilizing the required resources from domestic as well as external funding demonstrating the potential and mechanisms of raising resources for a cause. The learnings should be utilized for TB response in Bangladesh.

b. The budget allocation towards Health and Family Welfare (including operating and development budget) has increased 1.57 times over the last seven years. Inspite of this rise, the proposed budget allocation for health is BDT 32731 crore which is around 5.4% of the total National budget for FY 2021-22. The current health expenditure (CHE) is 2.48% of GDP in 2019 as per World Bank data set.

Figure 27: TB Financing – Domestic and International components



c. The domestic component of TB financing allocation as reported to WHO has almost doubled annually over last four years indicating the commitment of the country towards Ending TB. But the reported expenditures have not shown the same trend. The reported figures of expenditure have not considered the domestic investments of General health system (infrastructure, salaries, logistics, supervision etc) providing TB services. There is need for systematic assessment to estimate these investments and correct reporting.

d. Long standing engagement with both the Global Fund and USAID have been the main sources of external financing for the TB response in Bangladesh and they have ongoing commitments to fund TB.

18.2 CHALLENGES

a. Even when the funding from the GoB is available administrative bottlenecks in funds disbursements have the potential to derail implementation of interventions including the procurement of medicines and the recruitment of Human Resources for Health (HRH) as evident from low expenditure figures against allocation.

b. Very high Out of pocket (OOP) expenditure 72.7% of CHE is suggests that a significant proportion of TB patients and their families may be experiencing financial hardships (catastrophic expenditure) as they attempt to cope with the disease.

18.3 SUSTAINABILITY

a. Sustainability of the Bangladesh national response to the TB epidemic will result from:

   I. Strengthening the national health sector planning (including for TB). However, currently (2023) the Operational Plan of the MOH (OP) does not include indicators for TB and hence TB does not get prioritized in reviews and discourse at the highest levels. Moreover, TB in other health department and non-health sector is a non-starter. This NSP envisages a bold attempt at initiating collaborations across other than TB health departments and non-health ministries and sectors over the NSP period.

   II. Strengthening financing of health and the NTP. The OP has been given a no cost extension till 2025 and the domestic contribution for NTP has been frozen till 2025. Hence the domestic contribution is not expected to increase till 2026. The NTP envisages to maximize the outputs from its investments by process efficiency and innovations through the use of digital technology to reach patients and providers, build capacity using online tools, use newer tools like AI for chest x-rays for enhancing diagnostic accuracy, etc. all of which will save costs in the long run.

   III. The country has strengthened the laboratory network with multiplex platforms which have been used for both TB and COVID19. Similarly, investments in radiological systems have benefited the other conditions requiring such support. The focus going forward is to invest in resilient, sustainable systems for health and support integration of TB interventions into and delivery through the primary health care system and the individual vertical programmes and also the broader health systems.

   IV. Sustaining access to quality health products;

   V. Increasing efforts to address human rights and gender-related barriers to access, especially for key and vulnerable populations; and

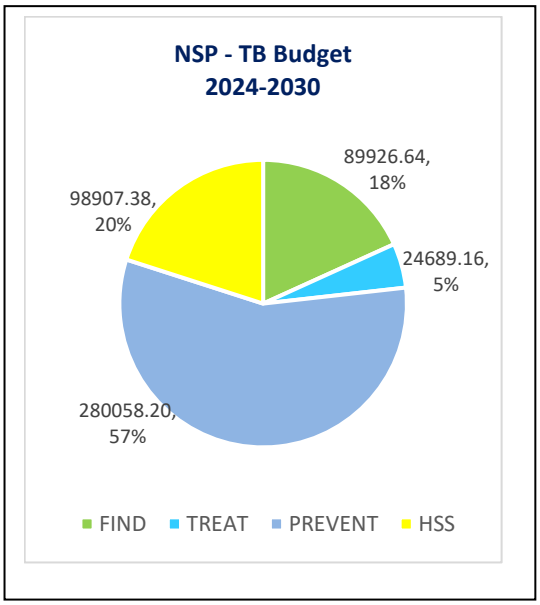
   VI. Strengthening national governance.

b. Importantly, sustainability entails priority setting and explicit consideration of trade-offs on what to finance in the context of finite resources and multiple competing demands on these resources. The NSP attempts to prioritize investments in strengthening the health systems, including TB in the agenda of other health programs and non-health sector through advocacy and partnerships. (Refer chapter on Multi Sectoral Engagement and Accountability)

c. Enhancing and increasing domestic financing is an integral aspect of strengthening sustainability and fostering successful transitions of interventions from international funding. The areas earmarked for transitioning include the procurement of first line anti TB drugs; phased inclusion of the human resources currently funded by Global Fund into the domestic resources.

CHAPTER 19: BUDGET

National Strategic Plan for TB budget is based on the outputs of the various thematic groups. The thematic groups discussed various activities and sub-activities under each objective. Excel based template tool was developed and was used by thematic groups to provide information on the activities / sub-activities under each thematic area. Information also included the quantity projections for the year 2024 to 2030 and suggested unit cost, if any. The quantity and unit cost were rationalized based on the discussions with the group members, existing project implementation and based on the targets planned to be achieved. The unit costs were projected for future years after adjusting the inflation. The activities and sub-activities were grouped as per the Pillars of NSP i.e. FIND-TREAT-PREVENT-HEALTH SYSTEM STRENGTHENING. The details of the budgets are available in the excel file with National TB Program. The summary is as follows



SUMMARY BUDGETS:

(Amount in BDT million)

PILLARS	2024	2025	2026	2027	2028	2029	2030	TOTAL	%
FIND	**Objective 1: Find all TB cases (DS TB and DR TB) by early identification of presumptive TB cases and prompt diagnosis for TB infection and disease using WHO approved rapid molecular diagnostic tests to provide universal access to quality TB diagnosis in both public and private sectors.**								
	12187	11912	11069	13118	12786	14404	14450	**89926.64**	18%
TREAT	**Objective 2: Initiate and sustain all patients on appropriate anti-TB treatment wherever they seek care, with patient friendly systems and social support including linkages with UHC.**								
	3401	3712	3387	3719	3731	3625	3114	**24689.16**	5%
PREVENT	**Objective 3: Prevent the emergence of TB in susceptible populations and progression of TB in infected by using a combination of biomedical, behavioural, social and structural (administrative, environmental controls and respiratory protection) interventions.**								
	1520	1271	1984	6881	46739	107603	114060	**280058.20**	57%
HSS	**Objective 4: Strengthen enabling policies, empowered institutions, partnerships, and human resources with enhanced capacities to create a supportive ecosystem to FIND-TREAT-PREVENT TB in the country.**								
	15234	12731	13008	14163	13419	14143	16208	**98907.38**	20%
TOTAL	**32343**	**29626**	**29448**	**37882**	**76676**	**139774**	**147832**	**493581.38**	**100%**

SUMMARY BUDGETS by Objectives: ***(Amount in US$ million)***

	OBJECTIVE	2024	2025	2026	2027	2028	2029	2030	TOTAL	%
FIND	Find all TB cases (DS TB and DR TB) by early identification of presumptive TB cases and prompt diagnosis for TB infection and disease using WHO approved rapid molecular diagnostic tests to provide universal access to quality TB diagnosis in both public and private sectors.	132.47	129.48	120.32	142.59	138.98	156.56	157.06	977.46	18%
TREAT	Initiate and sustain all patients on appropriate anti-TB treatment wherever they seek care, with patient friendly systems and social support including linkages with UHC.	36.97	40.35	36.81	40.43	40.56	39.40	33.84	268.36	5%
PREVENT	Prevent the emergence of TB in susceptible populations and progression of TB in infected by using a combination of biomedical, behavioural, social and structural interventions.	16.52	13.82	21.56	74.80	508.03	1169.60	1239.79	3044.11	57%
HSS	Strengthen enabling policies, empowered institutions, partnerships, and human resources with enhanced capacities to create a supportive ecosystem to FIND-TREAT-PREVENT TB in the country.	165.59	138.38	141.40	153.95	145.86	153.72	176.18	1075.08	20%
	TOTAL	351.55	322.03	320.09	411.76	833.43	1519.28	1606.87	5365.01	100%

The summary budgets in US$ (at conversion rate of $1=92 BDT)

The detailed NSP budget is available as a separate 31 page document.

ANNEX 1

Projection of Tuberculosis incidence and mortality in Bangladesh under different intervention scenarios

The NTP, Bangladesh is committed to achieve the 2030 END TB targets. This necessitates aggressive actions to reduce the TB incidence by 80% and TB mortality by 90% in 2030 compared to 2015. To understand the implications of these for NSP strategies and interventions, a mathematical modeling exercise is undertaken to define the TB burden (incidence, and mortality) under different scenarios of scaling-up existing and potential interventions.

A deterministic, compartmental model that has been used for Global Plan (for Indonesia) as well as for the SEA Regional Strategic Plan has been adjusted for Bangladesh. The model takes account of public and private sectors in Bangladesh, as well as delays in TB diagnosis arising from care seeking delays, and diagnostic delays. (At present, the model is estimating care seeking delays at 6 months (4 – 11), and diagnostic delays at 1/4 months). The model is calibrated to WHO estimates of incidence, mortality and notifications in 2019 (i.e. the pre-pandemic period). At present, it does not address the impact of COVID-19 disruptions, but these estimates will be available subsequently.

The modelled interventions are listed below:

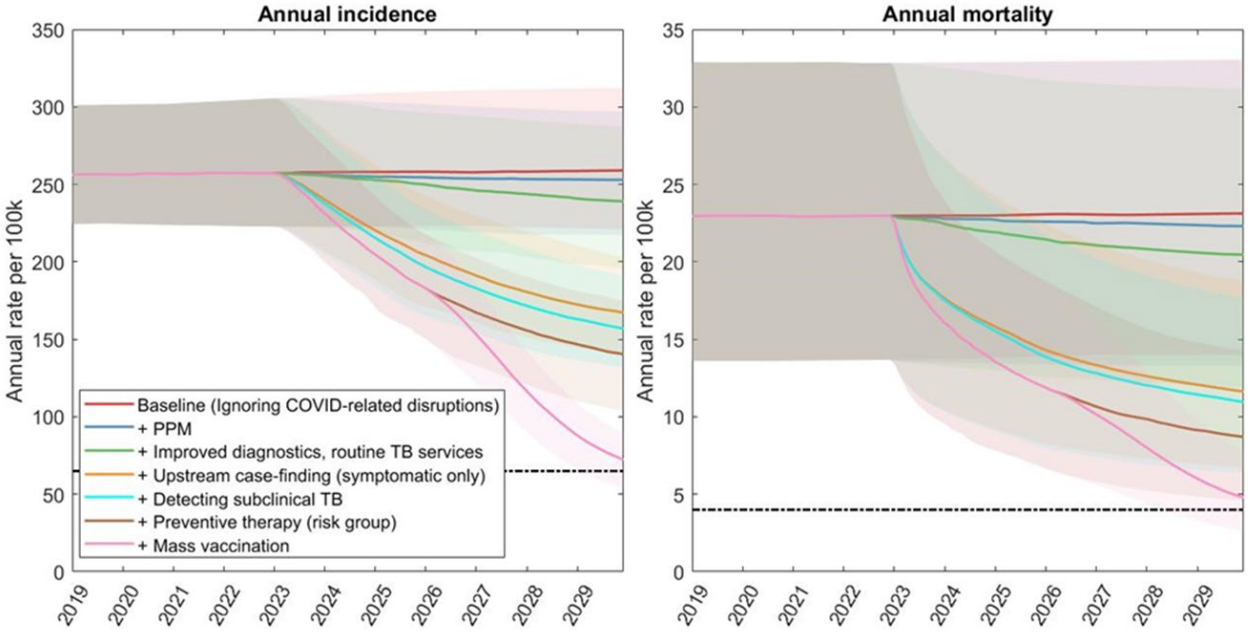
Core Intervention	Coverage
Public-private mix	Engage with 80% of private providers who manage TB, improving standard of diagnosis and treatment to same levels as in public sector
Improved diagnostics, routine TB services	Modernise TB diagnostics throughout routine TB services so that 90% of people with symptomatic TB are diagnosed when presenting for care
Upstream case-finding (symptomatic TB)	Among those with symptomatic TB, active case-finding and demand generation to decrease the delay-to-diagnosis by 30%
TB preventive therapy, risk groups	Per WHO guidelines, full uptake of TPT amongst all-age household contacts and PLHIV
TB vaccine	Post-exposure vaccine with 60% efficacy, rolled out to cover **65%** of people with LTBI each year
Additional intervention	**Coverage**
Detecting subclinical TB	Detect and treat 30% of people with subclinical TB before they develop symptoms (facility-based X-ray screening)

Certain interventions may need further interpretation in terms of programmatic activities. For example, the intervention 'upstream case-finding' may include active case-finding, but these activities are likely to be focused on specific risk groups such as urban slums. To have an effect on the broader population level, additional measures would be needed to generate demand for TB services, including lowering barriers of access to care (e.g. stigma, or opportunity costs of care seeking).

This modelling analysis suggests – consistent all previous analyses in the Region – that a combination of current tools (active TB treatment and TPT) will lead to important declines in TB incidence and mortality but will not be sufficient to reach the End TB goals by 2030. To reach those goals, it will be

necessary to implement population-wide prevention. In this model, a post-exposure vaccine is one example of such prevention.

Figure 1. Meeting the 2030 goals in Bangladesh



Incidence per 100,000 population											
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Baseline	256	256	256	256	256	256	256	256	256	256	256
+ PPM	256	256	256	256	256	255	255	254	253	253	253
+ Improved diagnostics, routine TB services	256	256	256	256	256	253	250	246	244	241	239
+ Upstream case-finding (symptomatic only)	256	256	256	256	242	222	205	192	181	173	167
+ Detecting subclinical TB	256	256	256	256	240	217	198	184	172	164	157
+ Preventive therapy (risk group)	256	256	256	256	234	207	184	168	157	147	140
+ Mass vaccination	256	256	256	256	234	207	184	156	119	90	72

Mortality per 100,000 population											
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030
Baseline	23	23	23	23	23	23	23	23	23	23	23
+ PPM	23	23	23	23	23	23	23	22	22	22	22
+ Improved diagnostics, routine TB services	23	23	23	23	23	22	21	21	21	21	20
+ Upstream case-finding (symptomatic only)	23	23	23	23	18	16	14	13	13	12	12
+ Detecting subclinical TB	23	23	23	23	18	16	14	13	12	11	11
+ Preventive therapy (risk group)	23	23	23	23	16	14	12	11	10	9	9
+ Mass vaccination	23	23	23	23	16	14	12	10	8	6	5

Data used for modelling

- Annual incidence per 100,000 population in 2019 = 221 [161 - 291]

- Annual mortality per 100,000 population in 2019 = 24 [15 - 34]
- Total notification in 2019 = 292942
- Proportion of prevalent TB that has symptoms = 0.5 [0.36 – 0.80]

Table of parameters

Table 1. List of model parameters, values and sources. The notation U[x,y] denotes a uniform probability distribution on the range [x,y]. Otherwise, parameter values in round brackets show 95% percentiles from the respective marginal posterior densities.

Parameter		Symbol	Value (Gujarat, for illustration)	Source/Notes
Natural history				
Infection rate (number of annual infections per case)		β	25 (14 – 29)	Model calibration, with priors U[0, 30]
Per-capita annual rate of progression from 'fast' latent infection		u	0.09 (0.06 – 0.11)	Calibration: Menzies (2018) [1] for central value, and U[0.1 - 20] on multiplying factor
Per-capita annual rate of reactivation from 'slow' latent infection		v	0.0006 (0.0004 – 0.0008)	Menzies (2018) [1] for central value, and taking uniform priors of +/- 25%
Per-capita annual rate of stabilisation from 'fast' to 'slow' latent status		w	0.63 (0.51 – 0.82)	Calibration: Menzies (2018) [1] for central value, and U[0.1 - 20] on multiplying factor
Per-capita annual rate of developing symptomatic disease from sub-clinical		r_{sym}	52 (5.8 – 96.6)	Calibration: To fit proportion of prevalent TB that has symptoms 0.5 (0.36 – 0.8)
Per-capita annual rate of TB mortality		μ_{TB}	0.55 (0.23 – 1.3)	Calibration: Drawing from Tiemersma 2011 [3] for central values, that untreated TB has 50% case fatality over 3 years, and adopting uniform priors of +/- 25%
Per-capita annual rate of TB self-cure		σ	0.18 (0.13 – 0.21)	
Protection from reinfection amongst those with prior infection		h	0.53 (0.20 – 0.74)	Andrews (2012) [4], assuming uniform priors of +/-25%
Per-capita annual rate of relapse in first two years after treatment completion		$\rho^{(lo)}$	0.030 (0.022 – 0.035)	Romanowski (2019)[5], Menzies (2009) [6] and Weis (1994) [7], with uniform prior using intervals of $\pm$ 5%
Per-capita annual rate of relapse in first two years after self-cure or incomplete treatment		$\rho^{(hi)}$	0.16 (0.12 – 0.20)	
Per-capita annual rate of relapse >two years after last TB episode		ρ	0.0017 (0.0013 – 0.0021)	Most relapse occurs in first two years after recovery: Guerra-Assuncao (2015) [8]
Per-capita annual rate of 'stabilising' from high to low relapse risk		s	0.5	
TB services				
Rate-of-presentation to care, first careseeking visit	Public sector, 2019	$\gamma^{(pu)}$	2.06 (1.1 – 3.2)	Model calibration
Rate-of-presentation to care, second and subsequent careseeking visits	Public sector, 2019	$\tilde{\gamma}^{(pu)}$	13 (2.1 – 23.4)	Model calibration
Per-capita annual rate of offering diagnosis		δ	52	Assumption, corresponding to 1 week
Probability of successful TB diagnosis and treatment initiation per careseeking visit	Public sector	$p_{Dx}^{(pu)}$	0.83 (0.75 – 0.90)	U[0.7, 0.9], motivated by Subbaraman (2016) [9]
	Private sector	$p_{Dx}^{(pr)}$	0.53 (0.40 – 0.68)	U[0.3, 0.9], assumption
Per-capita annual rate of treatment completion		τ	2	Corresponds to average duration of 6 months
Per-capita annual rate of treatment interruption	Public sector	$\epsilon^{(pu)}$	0.34 (0.11 – 0.63)	Calculated using $\epsilon^{(pu)} = \frac{1-P}{P}\tau$, for treatment completion rate P, and assuming U[0.75, 0.95] for P
	Private sector	$\epsilon^{(pr)}$	1.3 (0.57 – 2.7)	As above, but assuming U[0.4, 0.8] for P

Demographics			
Per-capita annual rate of background mortality	μ	1/72	Corresponds to average lifespan of 72 years (World Bank 2021) [10]

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ANNEX 2

DETAILED PROJECTIONS AND ASSUMPTIONS

Indicator	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	ASSUMPTIONS
Incidence rate	221	221	221	221	219	217	208	187	168	135	
Decrease in incidence rate	0%	0%	0%	0%	1%	1%	4%	10%	10%	20%	Assumption: Baseline 221 will remain constant in 2022; Moderate reduction of 2% assumed in 2023 as time will be spent on planning and resource mobilization; Activities will start implementing in 2024 and scaled up over years; Vulnerability mapping in 2023, Major change in molecular testing, TPT coverage, PPM coverage, Vulnerability screening twice a year, Vaccination introduction in 2027
Estimated TB Cases	375000	379491	384390	389353	390436	391522	380713	347065	316392	256381	Calculated based on incidence rate x estimated population
Estimated PLHIV	14000	14252	14436	14623	14812	15003	15196	15393	15591	15793	TO BE TAKEN FROM HIV Program division; Projected based on baseline as proportion of PLHIV in population and same proportion used for future years.
PLHIV enrolled	8900	9060	9177	9296	9416	9537	9661	9785	9912	10040	TO BE TAKEN FROM HIV Program division; Projected based on baseline as proportion of PLHIV in population and same proportion used for future years.
Proportion of TB patients with known HIV status	6.40%	10%	15%	40%	50%	80%	100%	100%	100%	100%	Baseline from GTBR; Gradual increase in till 2023; Improved to 100% in 2027 and beyond
TB Patients with known HIV status who are HIV-positive	106	107	106	108	112	115	118	111	103	84	Baseline proportion used for projections.
TB Patients with HIV positive on ART	102	103	102	104	107	110	113	107	100	81	
Household contacts of pulmonary bacteriologically confirmed TB patients	599758	605931	628724	671336	757211	777614	800626	754195	702325	569113	Household size as per latest census provisional report is 4.01; Number of household contacts are 3.01; All pulmonary bacteriologically confirmed TB patients
Vulnerable population (slum)	1800486	1800486	1823731	1847275	1871124	1895281	1919749	1944534	1969638	1995067	Slum population as per provisional report of census 2022; Projected as % of the estimated population for future years
Vulnerable population (congregate settings, prison)	~80000	80000	80000	80000	80000	80000	80000	80000	80000	80000	Baseline assumed based on the number of prisoners from the available information; Considered the same for future years.
Vulnerable population (miners, garment industry)		400000	400000	400000	400000	400000	400000	400000	400000	400000	Information not available; It is estimated to be 4 million as per research reports. Considered 4,00,000 which can be priortized to be reached.
Vulnerable population (others including PLHIV))		50000	50000	50000	50000	50000	50000	50000	50000	50000	Included co-morbidities / at risk popualtion like PLHIV, DM, People who are on immune therapy like renal disease, malignancy etc.

Estimated person eligible for TPT/LTBI/Preventive treatment	**599758**	**703931**	**726724**	**769336**	**855211**	**875614**	**898626**	**852195**	**800325**	**667113**	Average household size 4.01 member; Household contacts of all notified pulmonary bacteriologically confirmed TB cases+10% of slum population (assumed)+20% of other groups annually
Number of patients to be / are initiated on preventive treatment / LTBI	**37248**	**120000**	**218017**	**384668**	**598648**	**700491**	**808764**	**766976**	**720292**	**600402**	Calculated - coverage x estimated person eligible for TPT/LTBI/Preventive treatment
Number of presumptive TB person examined	**2822285**	**2867632**	**2991794**	**3121331**	**3256477**	**3397474**	**3544576**	**3698048**	**3858164**	**4025213**	Baseline from M&E section; It includes molecular diagnostics, smear microscopy and presumptive TB examined with X-ray.
Number of presumptive TB per 100,000 population	**1670**	**1670**	**1720**	**1772**	**1825**	**1880**	**1936**	**1994**	**2054**	**2115**	Annual increase of 3% considered.
Number of presumptive TB examined with molecular diagnostics	**705772**	**745584**	**1196717**	**1872799**	**2865700**	**3057727**	**3367348**	**3513145**	**3665256**	**3823953**	Baseline from program division; Proportion tested with molecular diagnostics increased to reach 90% by 2025
Number of presumptive TB examined with microscopy	**1911382**	**1913621**	**1577625**	**1021666**	**154088**	**92810**	**70892**	**73961**	**77163**	**80504**	Baseline from program division; Projected for future years after considering the molecular tests and X-ray; minimum 2% was assumed to be examined with microscopy for operational reasons.
Number of presumptive TB examined with X-ray	**205131**	**208427**	**217451**	**226866**	**236689**	**246937**	**257629**	**268784**	**280421**	**292563**	Baseline proportion used for projections; X-ray used for diagnosis specially for extra-pulmonary cases, paediatric cases, co-morbid / at risk cases; This does not include screening.
Number of people screened for preventive treatment with X-ray			**218017**	**384668**	**598648**	**700491**	**808764**	**766976**	**720292**	**600402**	
Number of notified TB cases	**308012**	**311183**	**307512**	**313429**	**324062**	**332793**	**342642**	**322771**	**300572**	**243562**	Applying coverage to estimated TB cases which are calculated applying estimated incidence rate
Pulmonary Cases among notified TB cases - Bacteriological confirmed	**199255**	**201306**	**208878**	**223035**	**251565**	**258343**	**265989**	**250563**	**233330**	**189074**	Assumed to increase 5% in 2024 and 10% annual increase from 2025 onwards with increase in proportion of molecular diagnostics.
Pulmonary cases among notified TB cases - Clinically confirmed	**50415**	**50934**	**40387**	**31026**	**11114**	**11414**	**11752**	**11070**	**10309**	**8354**	Assumed 81% pulmonary TB cases and deducted the bacteriological confirmed cases
Extra-pulmonary TB	**58342**	**58943**	**58247**	**59368**	**61382**	**63036**	**64901**	**61138**	**56933**	**46134**	Assumed to be 19% as per baseline
Pulmonary	**249670**	**252240**	**249265**	**254061**	**262680**	**269757**	**277740**	**261633**	**243639**	**197428**	Assumed to be 81% as per baseline
Pulmonary NEW bacteriologically confirmed	**190461**	**192422**	**199660**	**213192**	**240463**	**246942**	**254250**	**239505**	**223033**	**180730**	
Pulmonary RETREATMENT bacteriologically confirmed	**8794**	**8885**	**9219**	**9844**	**11103**	**11402**	**11739**	**11058**	**10298**	**8345**	
Adult	**297593**	**300656**	**293705**	**294623**	**301377**	**306170**	**311804**	**290494**	**270515**	**219206**	Total notified - Childhood TB
Child (0-14)	**10419**	**10526**	**13807**	**18806**	**22684**	**26623**	**30838**	**32277**	**30057**	**24356**	Baseline proportion and increasing projected proportion

Proportion of childhood TB (0-14) among total notified TB cases	3.4%	3.4%	4.5%	6.0%	7.0%	8.0%	9.0%	10.0%	10.0%	10.0%	Increase in proportion from 3.4% in 2023 to 10% by 2027 and then maintain it.

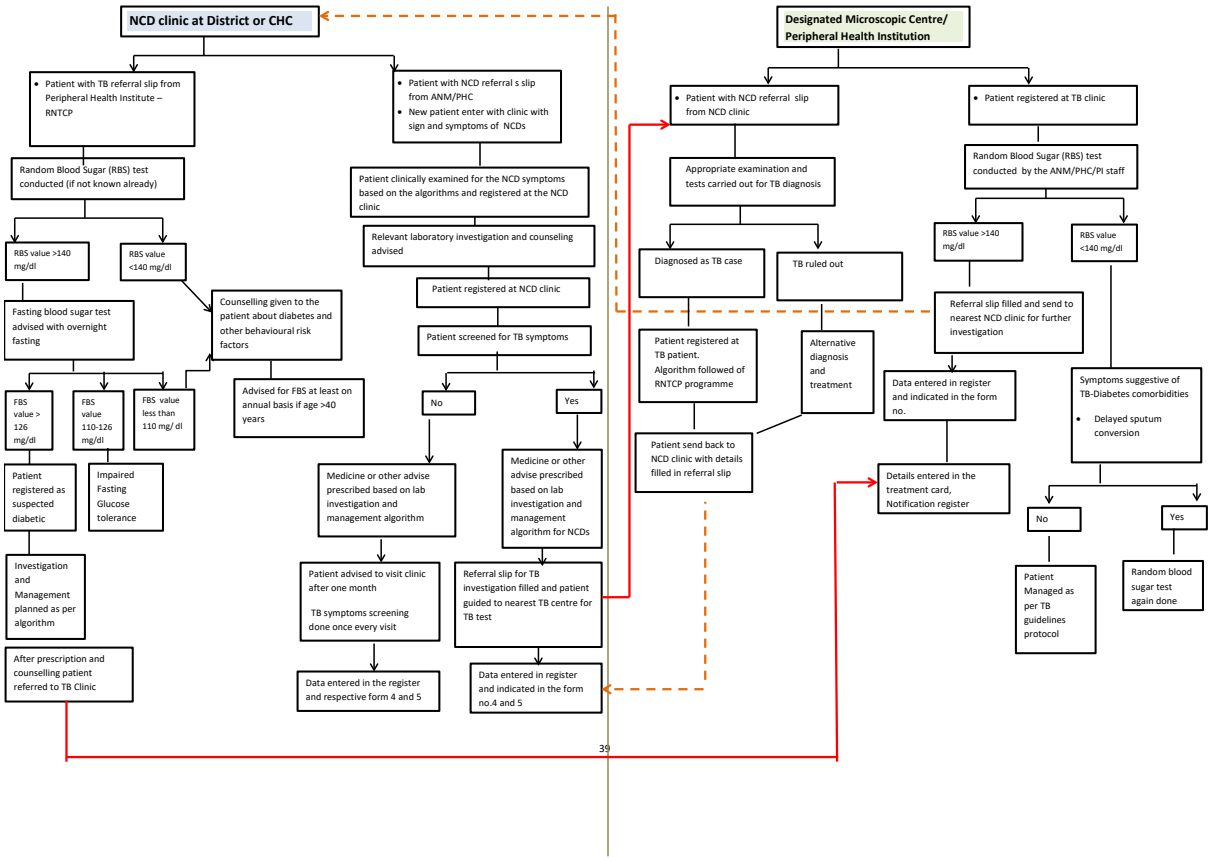
RESULTS FRAMEWORK WITH ASSUMPTIONS USED FOR PROJECTIONS

Indicator	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
Total number of beneficiaries to be initiated on TB Preventive therapy (TPT)	599758	703931	726724	769336	855211	875614	898626	852195	800325	667113	Average household size 4.01 member; Household contacts of all notified pulmonary bacteriologically confirmed TB cases+10% of slum population (assumed)+20% of other groups annually
Proportion of identified/eligible individuals for preventive therapy /TPT	6%	17%	30%	50%	70%	80%	90%	90%	90%	90%	Reach 50% in 2024 and 70% in 2025 and 80% in 2026; Maintain 90% from 2027 and beyond
Proportion of identified/eligible individuals for TPT - initiated on treatment	37248	120000	218017	384668	598648	700491	808764	766976	720292	600402	Calculated - coverage x estimated person eligible for TPT/LTBI/Preventive treatment
No of presumptive TB pts to be offered bacteriological test (Sputum microscopy)	1911382	1913621	1577625	1021666	154088	92810	70892	73961	77163	80504	Baseline from program division; Projected for future years after considering the molecular tests and X-ray; minimum 2% was assumed to be examined with microscopy for operational reasons.
Coverage - Molecular diagnostics	24%	26%	40%	60%	88%	90%	95%	95%	95%	95%	Baseline coverage remain same in 2022; and increase it to 90% by 2026 and beyond
No of presumptive and diagnosed TB pts to be offered rapid molecular test	705772	745584	1196717	1872799	2865700	3057727	3367348	3513145	3665256	3823953	Baseline from program division; Proportion tested with molecular diagnostics increased to reach 90% by 2025
No of presumptive TB to be tested (SSM + NAAT)	2617154	2659205	2774342	2894464	3019788	3150537	3438239	3587106	3742419	3904457	Baseline from M&E; 10% increase annually with improved efforts for ACF, Vulnerable population coverage, PPM, TPT
Total TB patients notified	308012	311183	307512	313429	324062	332793	342642	322771	300572	243562	Applying coverage to estimated TB cases which are calculated applying estimated incidence rate
Proportion of TB patients notified by the private sector	25%	25%	25%	25%	27%	28%	35%	35%	35%	35%	Improved PPM coverage; PPM Mapping in 2023 and activities initiated from 2024 to improve coverage and contribution to notification of cases from 25% to 45% by 2028 and maintain it onwards.
No. of childhood TB patients (0-14 years)	10419	10526	13807	18806	22684	26623	30838	32277	30057	24356	Baselin proportion and increasing projected proportion
Proportion of childhood TB patients (0-14 years) among all notified	3%	3%	4%	6%	7%	8%	9%	10%	10%	10%	Increase in proportion from 3.4% in 2023 to 10% by 2027 and then maintain it.
Proportion of identified vulnerable population screened for TB			Mapping to be done	50%	70%	90%	90%	90%	90%	90%	Vulnerable population mapping in 2023; Systematic screening atleast twice a year; Coverage to reach 90% by 2026 and maintain it beyond
% of bacteriologically confirmed TB patients tested for rifampicin resistance - New cases	44%	44%	50%	75%	85%	100%	100%	100%	100%	100%	Baseline from GTBR; Improved to 75% in 2024 and 100% in 2026 onwards
Coverage of MDR/RR TB patients notified	31%	33%	40%	47%	62%	67%	80%	90%	90%	90%	In 2021, 1482 initiated on treatment out of estimated 4500 patients, and coverage to improve to 90% in 2027 and to be maintained.
No of MDR/RR TB patients notified	1495	1503	1845	2196	2905	3162	3655	3748	3417	2769	Baseline from GTBR; For 2022 kept as baseline; Increased coverage from 2023 onwards

Indicator	2021	2022	2023	2024	2025	2026	2027	2028	2029	2030	
No of MDR/RR TB patients initiated on treatment	1384	1391	1674	2088	2724	2775	2625	2153	1745	1343	Baseline from GTBR; Currently 93% initiated on treatment among notified. Increased to 95% from 2026 onwards considering scale-up of molecular diagnostics for early diagnosis and ambulatory treatment.
Treatment success rate for DS TB	97%	>95%	>95%	>95%	>95%	>95%	>95%	>95%	>95%	>95%	
Treatment success rate for RR TB	73%	75%	76%	80%	85%	>90%	>90%	>90%	>90%	>90%	
Proportion of notified TB patients with known HIV test status	6%	10%	15%	40%	50%	80%	100%	100%	100%	100%	Baseline from GTBR; Gradual increase in till 2023; Improved to 100% in 2027 and beyond
Proportion of notified TB – HIV patients initiated on ART	102	103	102	101	96	87	76	65	54	41	

ANNEX 3

FLOW CHART FOR JOINT ACTIVITY TO ENSURE BI DIRECTIONAL SCREENING FOR TB AND DM



ANNEX 4

WORKING GROUP MEMBERS