TECHNICAL REPORT

MID-TERM EVALUATION OF THE DGD-DAMIEN FOUNDATION PROGRAMME "SUPPORT TO THE NATIONAL TUBERCULOSIS AND LEPROSY CONTROL PROGRAMMES IN BANGLADESH 2022-2026"

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And of the whole staff of Damien Foundation- Bangladesh and the health units visited

List of abbreviations

ACF	Active Case Finding
aDSM	Active Drug Safety Monitoring
AFB	Acid Fast Bacilli
AIDS	Acquired Immunodeficiency Syndrome
AO	Accounts Officer
BDQ	Bedaquiline
BI	Bacteriological Index
BRAC	Bangladesh Rural Advancement Committee
CCM	Country Coordinating Mechanism
CDC	Chest Disease Clinic
CDH	Chest Disease Hospital
CDR	Case Detection Rate
COVID-19	Corona Virus Disease 2019
CS	Civil Surgeon/ Culture & Sensitivity
CT	Complete Treatment
CXR	Chest X-Ray
DAC	Development Assistance Committee
DBLM	Danish Bangladesh Leprosy Mission
DDP	Drug Delivery Point (Leprosy, weekly)
DEPZ	Dhaka Export Processing Zone
DF	Damien Foundation
DFB	Damien Foundation Belgium
DFBD	Damien Foundation Bangladesh
DFCO	Damien Foundation Coordinating Office
DG	Disability Grade
DGD	Directorate General for Development Cooperation and Humanitarian Aid
DGHS	Directorate General of Health Services
DHIS2	District Health Information System 2
DPM	Deputy Programme Manager
DRS	Drug Resistance Survey
DSMO	District Surveillance Medical Officer
DST	Drug Susceptibility Testing
ECS	Extended Contact Survey
ENL	Erythema Nodosum Leprosum

EP	Extra-Pulmonary
EPTB	Extra-Pulmonary Tuberculosis
EQA	External Quality Assurance
F%	Female proportion
FC	Field Coordinator
FDA	Fluorescein Diacetate
FDP	Fixed DOT Provider
FTLCP	Faridpur TB Leprosy Control Project
FWA	Family Welfare Assistant
FWC	Family Welfare Centre
G0D	Grade Zero Disability
G1D	Grade 1 Disability
G2D	Grade 2 Disability
GFATM	Global Fund to Fight AIDS, Tuberculosis & Malaria
GIS	Geographic Information System
GNP	Gross National Product
GoB	Government of Bangladesh
GP	General Practitioner
GXP	GeneXpert
HCE	Household Contact Examination
HE	Health Education
HHC	Household Contact
HIV	Human Immunodeficiency Virus
HMIS	Health Management information System
HR	Human Resource
IC	Index Case/Infection control
icddr,b	International Center for Diarrheal Diseases Research, Bangladesh
IECS	Intensive Extended Contact Survey
IPC	Infection Prevention and Control
IPT	Isoniazid Preventive Therapy
IUATLD	International Union against Tuberculosis & Lung Diseases
JMM	Joint Monitoring Mission
KNCV	Dutch Tuberculosis Foundation
KOL	Key Opinion Leader
LCA	Leprosy Control Assistant
LED-FM	Light Emitting Diode – Flourescent Microscope
LEPRA	Leprosy Relief Association
LFA	Local Fund Agent
L-J	Lowenstein Jensen

kWp	Kilowatt peak power
LL	Lepromatous Leprosy
LTFU	Lost to follow up
MAF	Multisectoral Accountability Framework (For TB)
M&EO	Monitoring & Evaluation Officer
MB	Multi-bacillary
MBDC	Mycobacterial Disease Control
MDG	Millennium Development Goal
MDR-TB	Multidrug-Resistant TB
MDT	Multi- drug Therapy
MO	Medical Officer
MODC	Medical Officer Disease Control
MoH&FW	Ministry of Health & Family Welfare
MoU	Memorandum of Understanding
MTB	Mycobacterium Tuberculosis
MTLCP	Mymensingh TB & Leprosy Control Project
NC	New cases
NCDR	New Case Detection Rate
NE	Not Evaluated
NFA	Nerve Function Assessment
NFI	Nerve Function Impairment
NGO	Non-Governmental Organization
NLP	National Leprosy Programme
NSP	National Strategic Plan
NTD	Neglected Tropical Diseases
NTLCP	Netrakona TB & Leprosy Control Project
NTLEP	National Tuberculosis & Leprosy Elimination Programme
NTM	Non-Tubercular Mycobacterium
NTP	National Tuberculosis Control Programme
NTRL	National Tuberculosis Reference Laboratory
OBS	Observation case (leprosy suspect who needs review)
OECD	Organization for Economic Cooperation and Development
OPD	Out Patient Department
PAL	People affected by Leprosy
PB	Paucibacillary
PBC	Pulmonary Bacteriologically Confirmed
PCD	Pulmonary Clinically Diagnosed
PD	Project Director
PEP	Post-exposure Prophylaxis
PM	Programme Manager

PO	Programme Organiser (govt official at district level)
POD	Prevention of Disabilities
PPM	Public Private Mix
PR	Principal Recipient
PT	Physio-Technician
PTB	Pulmonary Tuberculosis
PTLD	Post TB Lung Disease
QA	Quality Assurance
QMT	Quick Muscle Tests
RCS	Reconstructive Surgery
RFT	Released From Treatment (after MDT course)
RMO	Resident Medical Officer at hospital
RPR	Reregistered Prevalence Rate
RR	Rifampicin Resistant
RR-TB	Rifampicin-resistant TB
RTLCP	Rajshahi TB & Leprosy Control Project
SDG	Sustainable Development Goal
SDR-PEP	Single-dose Rifampicin Post-exposure Prophylaxis
SSS	Slit Skin Smear
SR	Sub-Recipient
ST	Sensitivity Test/Sensory Test
SWOT	Strength, Weakness, Opportunity and Threat
TB	Tuberculosis
TB REACH	TB Resource group for Education and Advocacy for Community Health
TLCA	TB & Leprosy Control Assistant
TLCO	TB & Leprosy Control Officer
TLM	The Leprosy Mission
TO	Transferred out
ToR	Terms of Reference
TPT	TB Preventive Therapy
TTLCP	Tangail TB & Leprosy Control Project
UHC	Upazila Health Complex
UHFPO	Upazila Health & Family Planning Officer
USAID	United States Agency for International Development
UZ	Upazila/Sub-district
VD	Village Doctor
VOT	Video Observed Therapy
VR	Voluntary Reporting
WHO	World Health Organization
XDR	Extensively Drug Resistant
Xpert	Xpert MTB/RIF

ZLI	Zero Leprosy Initiative
ZN	Ziehl Nielsen

Executive summary

The evaluation was conducted in Bangladesh from October 28 to November 4, 2024, and organised as per ToR, according to the following sections: **1**. Desk analysis and document review; **2**. Evaluation of the results deriving from the interviews; **3**. Visit to Upazila health facilities at district level and DF hospitals for TB/MDR-TB and Leprosy (*TB & Leprosy Clinic, Tangail Sadar; Jalchatra Hospital; TB & Leprosy Clinic, Netrakona Sadar; Mymensingh Hospital*); **4**. Analysis of the programme indicators; **5.** Participatory end-mission workshop and debriefing; **6**. SWOT & Gap analysis; **7**. Recommendations; **8**. Conclusions; **9**. Main lessons learned.

The interview of 31 individuals representing different perspectives via questionnaire indicated a strong agreement on the effectiveness, quality and impact of the TB and Leprosy services provided by DF (>93% agreement in average). Additional interviews of staff and patients done during the visit confirmed these findings.

The field visits confirmed the excellent quality of the prevention, diagnosis and treatment services for TB and Leprosy. Guidelines, known and available, were followed, recording and reporting forms were adequately kept and correctly filled, the outcomes were correctly reported (confirming the consistency of data received at DF headquarter level), health education/counselling was performed regularly with standardised materials.

In terms of TB programme indicators all were met except the proportion of children, set at 7%, and reaching 6% in 2023 with an upward trend over time. The TB research indicators will be reached by 2025, as 4 research projects have been initiated, 3 of them having interesting data deserving rapid publication.

In terms of Leprosy, the proportion of females affected and additional disabilities during treatment are performing well relative to their targets, suggesting successful programme impact in these areas. The grade 2 disability (G2D) proportion of newly diagnosed cases on the other hand has fluctuated above and below the year 3 target of 12%, indicating a need for consistent efforts in early detection. However, the 2024 data to date on this indicator is encouraging, currently at around 7.8%. The child proportion has consistently remained slightly above the target of 8%, highlighting the importance of continued strategies to reduce transmission in the community.

The participatory end mission workshop and debriefing was conducted involving all partners (including National TB and Leprosy programmes and the non-governamental organizations (NGOs) active on the two diseases), which produced a proactive and useful discussion, after which the preliminary recommendations proposed were accepted.

Eleven recommendations were proposed for TB and **six** for Leprosy.

The DF project in Bangladesh is not only an example of technically sound implementation of TB & Leprosy prevention, diagnosis and treatment activities, but also an excellent model of NTP/NGO collaboration, as well as an ideal setting for training and implementation of operational research activities.

There was agreement among partners in supporting and further strengthening the DF project in Bangladesh, both for the priority/relevance that TB and Leprosy have in the Country and because of the quality services provided. Partners agreed on the importance of keeping the size and structure of the present intervention, strengthening some aspects (e.g., implementing at least 2 mobile computer-aided detection system (CAD)-based mobile digital radiology units with related staff).

Part A: Tuberculosis (Prof. GB Migliori, Prof. M. Rahaman)
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1. Introduction

This mid-term evaluation of the 2022-2026 support to the National TB Programme (NTP) in Bangladesh is aimed to allow the Damien Foundation (DF) and the Directorate General for Development Cooperation and Humanitarian Aid (DGD), to successfully complete the planned activities and plan the future (2027-2031) support programme in the best possible way.

This mid-term review is designed to identify strengths and weaknesses as to allow implementers to focus on best practices and implement strategic and/or operational corrections if/when and where eventually needed with emphasis on the programme's sustainability.

Furthermore, it is designed to provide added-value in terms of inclusiveness, human resource development and participation of staff, partners and local stakeholders at all levels.

The DF five-year programme has a **specific objective:**

"*Early case finding, correct management of TB (including MDR-TB) and leprosy and preventive therapy for latent TB infection in the project area is ensured by 2026, maintaining preventive and protective measures for COVID-19. Technical expertise in multi-drug resistant /rifampicin-resistant tuberculosis (MDR/RR TB) management is developed among the service providers throughout the country***"**

and **5 expected results** have been defined:

- ***Result 1*:** Management of leprosy will be improved through earlier diagnosis and more effective prevention of disabilities despite the increasing rarity of the disease.
- ***Result 2*:** Management of TB will be improved through increased collaboration with NTP and community involvement.
- ***Result 3***: Efficient TB case detection and management organisation in the newly industrialised DF districts will reduce TB transmission among factory workers (mostly women).
- ***Result 4***: DF support to the National TB Control Program in capacity building and effective management of MDR/DR-TB patients throughout the country is ensured.
- ***Result 5***: Operational research aligned with the health program objectives and research gaps is continued in collaboration with national and international institutes/organizations.

The technical proposal for the mid-term review will focus, as per Terms of Reference (ToR), on ***results 1,2,3,4 and 5***.

The evaluation of the programme considers, as per ToR, the following Development Assistance Committee of the Economic Cooperation and Development (OECD/DAC) criteria:

- **Effectiveness**: achievement of the expected results to achieve the specific objective of the programme.
- **Alignment and ownership**
- **Relevance, efficiency, sustainability and impact**
- **Transversal objectives (gender, environment and human rights)**
- **Main lesson learned**

Furthermore, the principle of *continuing training* guided the different steps of the consultancy. The mid-term evaluation has been designed to help the different programme partners to improve the implementation strategy of continuing training and ensuring its sustainability (see details below).

2. Scope

The **goal** of the *mid-term evaluation* is to assess the implementation progress and achievement of the mid-term results, identify strengths, weaknesses, probable bottlenecks, and propose corrective measures.

The *mid-term evaluation* was organised, as per ToR, starting from identification of Strengths, Weaknesses, Opportunities and Threats (SWOT analysis) in order **a)** to formulate concrete recommendations to improve or adapt the interventions in order to reach the Programme's objectives and plan the 2027-2031 activities and **b)** to identify the workforces to make this possible. To do this, the 4 Objectives listed under the ToR will be pursued, taking into account the impact that the Global Fund (GF) Principal Recipient (PR)'s decision of stopping the DF activities in Rajshahi and Faridpur regions had on the project and related indicators.

When analysing the provisional outcomes to estimate if the expected results and targets will be achieved by the end of the Programme, effectiveness, impact, alignment, ownership, and transversal objectives (e.g. gender, environment, and human rights issues) were taken into consideration.

The evaluation, as per ToR, targets the staff implementing the programme (from DF, government and private sector) and the direct beneficiaries (e.g., people affected by the disease), at all levels, including the community one.

Beyond/complementing the ToR, the mid-term evaluation, without any additional cost for the Contractor, has also:

1) Provided **support** to the DF project recently implemented in Bangladesh focused **on Post-Tuberculosis Lung Disease (PTLD)**, Prof. Migliori being a promoter and KOL (Key Opinion Leader) of this research and operational topic at the global level;
2) Provided **initial support in writing and publishing an article on the Bangladesh project** in the IJTLD/IJTLD OPEN, vis-à-vis Prof. Migliori's role of Chief Editor of the Journal.
3) Provided additional analysis of patient reported delays for leprosy cases, including exploration of factors potentially contributing to longer observed delays and disability.

3. Methodology

The *mid-term review* has been preceded by a pre-mission call with stakeholders (23 October 2024, see timeline below).

The *mid-term review* used a combination of different methodologies including the following:

- **epi and document review**
- **questionnaire and in-person interviews**
- **field visits and**
- **a participatory and didactical workshop.**

The methodology used included the following steps:

1) *Desk analysis and document review* of the core reports/publications and programmes including epidemiological data and the TB prevalence survey report (2015-2016) as well as national guidelines and DF policy documents.
2) *Questionnaire-based interview* of key stakeholders including TB programme managers, DF and government health staff, community-affected populations and patients-village doctors and TB clubs- and private practitioners among others. The questionnaire, proposed to stakeholders 3 weeks before the mission as per ToR, was then approved and finalised 2 weeks prior the mission as to allow local consultants to collect them. The questionnaires were preliminarily analysed during the mission.
3) *Visit to Upazila health facilities* at district level *and DF hospitals* for TB/MDR-TB as per ToR, taking into account logistical and feasibility issues which may be present during the mission. The visits were guided by a pre-defined check-list, and staff and patients were additionally interviewed on site (questions based on the check-list). The check-list was proposed to the stakeholders before the mission, and used with a few adaptations also for the Leprosy component. The primary data available at the clinic/Upazila level (and in hospitals) were examined during the visit (e.g., treatment cards and registers, as well as direct observation of team members at work).
4) *Analysis of the data collected through questionnaires and check-lists* (qualitative, quantitative, as well as by result, and people category).
5) *Analysis of the existing programme indicators based on monitoring and evaluation documents*. This specific analysis has been conducted in the Dhaka DF office during the mission. Consolidated records produced by DF and used for internal monitoring, as well as reports to national authorities, and reports to donors have been used for this analysis.
6) *Participatory end-mission workshop*, which worked also as debriefing on the main results of the mid-term evaluation. The workshop also had a didactical value as the Consultant will present a short summary of the principles beyond the programmatic approach to TB Control and Elimination to the staff present at the event (and a recorded version of the file will be made available to DF for inclusion in the website). This event was planned with DF staff and conducted in Dhaka on the last day of the mission.

The final sections of the report include *7) SWOT& Gap analysis* and ***8)*** *Recommendations*.

To simplify the report's reading, steps 2 and 4 above have been combined in a single section discussing the qualitative and quantitative results derived from the interviews.

The report and related annexes were prepared as per ToR according to the timeline included below.

Description	**Start Date**	**End Date**
Data assessment and relevant document reading are done remotely and assessment tools are developed and comments by stakeholders are captured (2 working days)	14/10/2024	15/10/2024
Preparatory call pre-mission (1 working day)	23/10/2024	Same day
National consultant(s) collect questionnaires and the necessary data (10 days)	27/10/2024	5/11/2024
Field mission in Bangladesh (10 days, 8 days in the country)	27/10/2024	05/11/2024
Debriefing session to stakeholders (3 days after the mission end)	Within 3 working days after the mission end, to be agreed	
First draft report writing and submission from remote	07/11/2024	07/11/2024
Feed-back received from partners	21/11/2024	21/11/2024
Final report finalised from remote.	26/11/2024	26/11/2024

All acronyms have been defined when they first appeared in the text.

4. Main findings

The findings are described into 7 main sections, and complemented by Annexes as needed:

- *Desk analysis and document review*
- *Results deriving from the interviews*
- *Visit to Upazila health facilities* at district level *and DF hospitals for TB/MDR-TB*
- *Analysis of the programme indicators (TB & Leprosy)*
- *Earlier leprosy case detection and disability prevention*
- *Laboratory diagnostics – leprosy*
- *Participatory end-mission workshop*

- *SWOT & Gap analysis*
- *Recommendations*
- *Conclusions*
- *Main lessons learned*

4.1 Desk analysis and document review

The following documents have been reviewed and commented (***Annex 1***- zipped file: Desk Review files):

1. Joint Monitoring Mission (JMM) Bangladesh TB Report (9th) _2022
2. DF Five-year plan 2022-2026 for DGD
3. StopTB Partnership and USAID. Governance of TB Programmes: third assessment of practices in 21 countries, 2024
4. DF Bangladesh Annual Report 2022 and 2023
5. Drug Resistance Survey (DRS) 2021
6. Bangladesh TB Prevalence Survey 2015-16
7. DF Web link https://www.damienfoundation-bd.com/
8. NTP Web link National Tuberculosis Control Programme – An Official Website of National Tuberculosis Control Program of Bangladesh (ntp.gov.bd)
9. WHO Global Leprosy (Hansen disease) Update, 2023
10. National Guidelines and Technical Manual on Leprosy (hard copy)
11. National Strategic Plan for Leprosy in Bangladesh 2023-2030 (hard copy)

The specific comments are summarised below:

1. **JMM Bangladesh TB Report (9th), 2022**

The 9th Bangladesh TB Programme Joint Monitoring Mission (TB-JMM) was carried out from October 16 – 30, 2022. The main objective of this JMM was to evaluate progress that has been made so far in the TB response in Bangladesh, identify gaps and challenges and propose achievable solutions to address those challenges so as to achieve the NTP's overall goal of ending TB as a public health threat by 2030 in line with the targets of the End TB strategy and the Sustainable Development Goals (SDGs).

Through discussions and by consensus, the review team then formulated recommendations for each of the ***8*** *thematic areas (Health system and TB; Financing TB response; laboratory network,*

multidrug-resistance (MDR)/ active TB drug safety monitoring and management of adverse events (ADSM); Public-private mix (PPM); children/adolescents; comorbidities; TB prevention) intended to help the country to ensure gains that have been made in the TB response are sustained and programmatic bottlenecks are overcome.

In 2021 TB remained a major public health problem in Bangladesh. It was estimated that 375, 000 people ((95% CI 273,000-493,00), including 37,500, children under the age of 14, developed TB in the country and 42,000 people (95% CI 28,000-60,000) died of the disease. Even though TB notifications have been on the right trajectory, the country remained off course and is unlikely to achieve the 2030 End TB and 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.

According to the JMM 2022 TB Report, the estimated incidence of TB has not changed for more than two decades, and the country was not on track to achieve the SDG targets of reducing TB incidence and mortality by 80% and 90% by 2030 compared with the 2015 baseline. It is important to notice that basically none of the major countries reached the targets, as: a) the targets are intrinsically difficult to reach; and b) the COVID-19 pandemic has caused an overall delay towards the pre-pandemic incidence and mortality trend decline which was estimated in 5 to 7 years. Furthermore, the New York UN Conference has pushed the targets (already impossible to reach) further forward.

Just to summarise, the actual status of the main indicators proposed in New York vs. what has been reached are as follows: TB treatment for all 54% vs 90% (the new target); access to rapid diagnostics: 63% vs. 100%; universal TPT: 42% vs. 90%; Financial risk protection: 48% vs 100%.

Note also, see document 3 review below, that Bangladesh has done pretty well in comparison of the other priority countries.

According to the programme review for Bangladesh to reach the SDG targets in the coming 8 years, the country should need to bring down the number of people developing TB in a year from the estimated 375, 000 (currently in 2022) to less than 70,000 and the number of people who die of TB in a year from the current 42, 000 to 6,000 or less. This will require a high level of political commitment with mobilization of resources, including financial and human resources, commensurate with the size of the public health problem, to upscale the TB response. An approach like what was recently witnessed with, the COVID-19 response or what has been done with other health programmes such as the programme to reduce deaths from diarrheal diseases in children is needed to address TB morbidity and mortality in Bangladesh.

In the 2022 TB JMM, it was noted that in all thematic areas reviewed, good progress was made in virtually all these areas except a few. Thus, reasonable efforts have been made to find people with TB which has led to an increase in the number of TB notifications on a year-by-year basis since 2012 except in 2020 when there was a dip in notification because of the COVID-19 pandemic. In 2022, it appeared that TB notifications could not reach the 2021 level or continue the trajectory that has been in place since 2012, most probably because of rapid changes in the stewardship of the TB response that appear to have affected TB service provision and the unavailability of various diagnostic products including Xpert cartridges. Treatment outcomes for both drug susceptible and drug-resistant TB are among the best in the world. The laboratory network has expanded with increasing use of rapid molecular diagnostic tests and there is an expanding use of private health care providers. There were however several areas of the TB response that were lagging. These included under diagnosis and notification of TB in children, inadequate attention paid to drivers of TB such as undernutrition, diabetes and smoking and inadequate screening and testing of populations that have a high burden of TB (vulnerable and high-risk populations). Screening programmes appeared not to be reaching high proportion of targeted populations and use insensitive tools such as symptom screening with a focus on cough of equal or greater than two weeks. The overall effect of these inadequacies was to delay or miss the diagnosis of TB which facilitates TB transmission, and which may explain the flat TB incidence despite a year-by-year increase in TB notification. These challenges were compounded by inadequate implementation of measures to prevent TB including TB infection transmission prevention in health care settings and the use of TB preventive therapy.

2. **DF Five-year plan 2022-2026 for DGD**

This document was the basis for the development of the technical proposal for the mid-term review and for the design of the present report. From the data presented and discussed in Bangladesh with the stakeholders, the DGD funding is by far the most important, as the contribution for the Global Fund accounts for about 10% of the whole DF funding in Bangladesh, being also lower than that provided by TB-REACH.

3. **StopTB Partnership and USAID. Governance of TB Programmes: third assessment of practices in 21 countries, 2024.**

This document is a very recently published national assessment of 21 countries, *unrelated to Bangladesh DGD project performance*. However, as it contains relevant data related to Bangladesh, and the possibility to compare different aspects from different countries, it is useful for this evaluation.

The assessment of the governance of TB responses relates to four main themes: *transparency; inclusiveness; legal framework; and process efficiency and effectiveness of national TB responses* in the 21 countries (including Bangladesh). The assessment enables the individual countries to understand their status on each of the 20 governance benchmarks, prioritize activities and track their progress. Each benchmark consists of one or more components, with a maximum cumulative score of 4. A score of zero signifies that meaningful action has yet to be initiated, a score of 4 indicates achievement of the benchmark, while a score of less than 4 signifies intermediate progress. The theme index is a percentage derived by aggregating the scores on all the benchmarks in that theme and dividing by 20.

In terms of *transparency* Bangladesh yielded 4 for the working NSP website, 0 for case-notification data in the website, 1 for the availability of the latest TB technical guidelines in the website, 3 for availability of the National Strategic Plan (NSP) and related budget in the website and 4 for the external programme review (see document 5). The theme index/score was 60%.

In terms of *inclusiveness*, Bangladesh score reached 2 for social contracting with government funds (NGOs/Private Sector), 3.5 for inclusion of key populations in the NSP, 3 for inclusion of civil society/TB survivors and 4 for communities and sub-national entities and 1.9 for gender inclusiveness. The theme index/score was 72%.

The *legal framework of Bangladesh* yielded 4 for mandatory TB notifications, 3 for drug-resistant (DR-)TB drugs available in the essential list of medicines and for free, 1 for social protection, 1.6 for law/policy on human rights, and 3 for the policy framework to reduce stigma. The theme index/score was 63%.

In terms of *process efficiency and effectiveness*, Bangladesh scores were 2 for the approval process, 2.5 for the NTP manager empowerment, 3.8 for NTP capacity, 1.3 of NTP ability to rapidly adapt/adopt international policies and 2 for the NTP capacity to absorb funds. The theme index/score was 58%.

Overall Bangladesh achieved 4 of the 20 benchmarks, being for each of the 4 areas in a position from 4th out of 21 countries (area 2) and 11th of 21 (area 4).

The documents underlined areas for improvement.

4. Annual DF Reports 2022 and 2023

The 2022 extensive Annual Report described the achievement highlights in Bangladesh as follows:

- New TB Patient Detected and treated 36,416
- Treatment success rate TB: 93%
- Health Education delivered to 4,327,751 people
- TB Preventive Therapy (TPT) offered to 25,658 people
- HIV Screening test performed on 12,232 TB patients

The comprehensive information provided in this report was of primary importance in conducting the analysis of the programme indicators (section 4.4 below).

The 2023 Annual Report was consulted in the DF Office in Bangladesh during the mission. Both the numbers and the overall results determining the indicators have improved, as reported below. The only indicator not formally met is the proportion of TB in children, which has increased progressively but is still below the threshold set. As shown below, the preliminary 2024 results (first 3 quarters, covering up to September 2024) have been made available for the majority of indicators, confirming the robust programmatic implementation of DF-lead activities in Bangladesh (more details in section 4.4).

The Annual DF Report 2022 also reflects a continuing concern for leprosy as a public health issue in Bangladesh, despite achieving elimination status at the national level in 1998. Case detection has steadily declined, partly due to reduced interest among healthcare providers and compounded by the COVID-19 pandemic, which significantly hindered detection efforts in 2020 and 2021. With NGOs covering 40% of the geographical area, over 70% of new cases are reported from NGO-supported areas, underscoring possible under-detection in government-managed zones. In 2022, DF detected 223 new leprosy cases in its areas, with 56% classified as MB leprosy and 25% of these testing skin-smear positive. Children accounted for 9% of the cases and 37% were female. The G2D proportion in DF areas was approximately 10%, showing a slight improvement from the previous year's rate of 12%.

In the Annual DF Report 2023, similar challenges are highlighted, with leprosy still viewed as an under-prioritised public health concern. Bangladesh continues to detect over 2,500 new cases annually, with the majority emerging from NGO-operated areas. DF reported 266 new cases in 2023, marking a slight increase from 2022. Among these, 46% were MB leprosy, a reduction from the previous year, with 18% of MB patients testing skin-smear positive. The proportion of children

among new cases rose slightly to 10.5%, while the percentage of female cases increased to 44%. However, the G2D proportion increased to 13.9%, indicating a need for continued efforts in early detection and prevention of disability among new patients. Trends in leprosy cases in DF districts compared to national case trends are shown below in Figure 1.

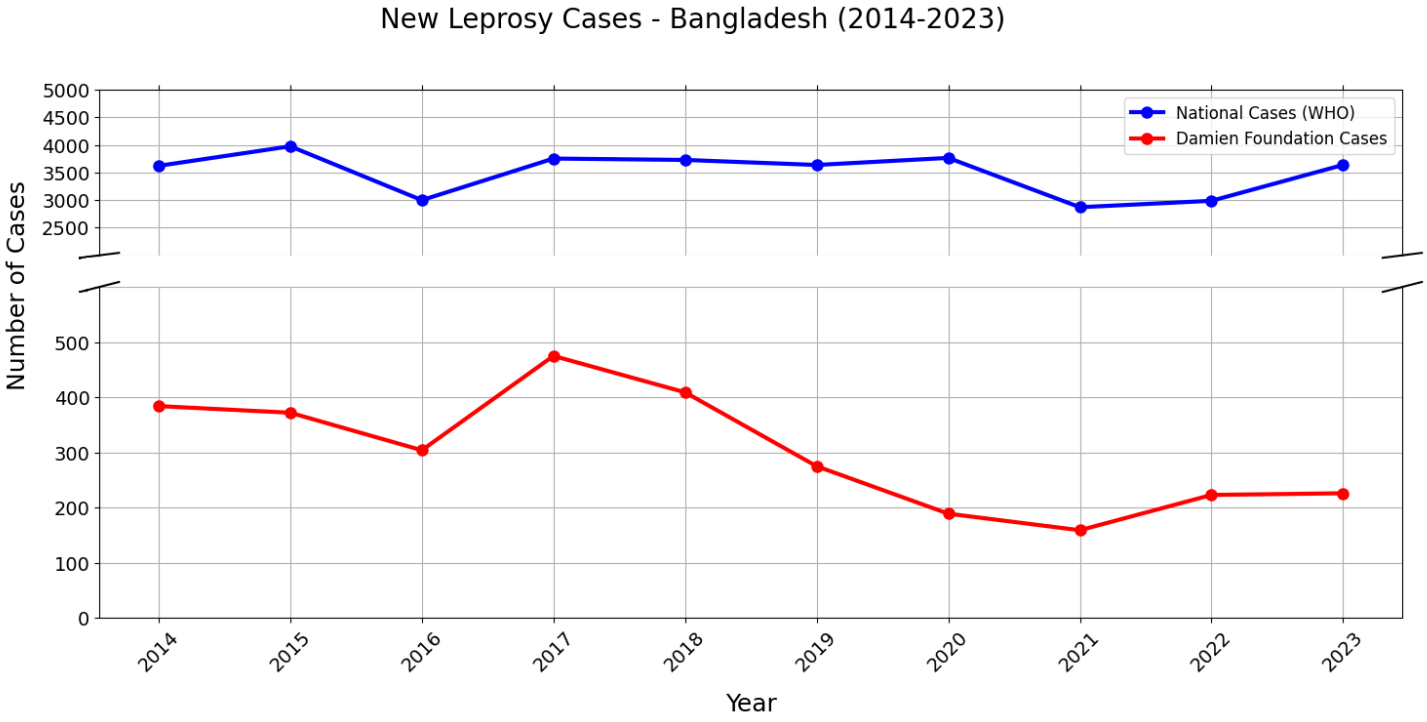

Figure 1. Trends in leprosy cases diagnosed in Bangladesh, 2014 – 2023, nationally (blue) and in DF districts (red).

5. Drug Resistance Survey (DRS) 2018-2019

Among the 2356 smear-positive patients enrolled during the survey, 63 patients belonging to under-treatment (Cat. 1 and Cat. 2 non-converters) were excluded, and thus the final number of eligible patients were 2293 who were sputum smear positive as per inclusion criteria. *Mycobacterium tuberculosis* was not identified in 31 patients among those eligible by GeneXpert and/or culture of sputum samples. Among those 31 patients (including 14 non-tubercular mycobacteria [NTM]: 6 new, 8 previously treated), 15 were from new and 16 from previously treated.

Among 2262 patients retained for final analysis, 2105 (93%) patients belonged to new and 157 (7%) to previously treated category; 33 (1.46%) with Rif resistance, 10 (0.44%) with Rif indeterminate and 2219 (98.09%) with Rifampicin susceptible in GeneXpert. Prevalence of NTM was 0.59% among enrolled (2356) sputum smear positive patients.

The prevalence of Rifampicin-resistant TB (RR-TB) among new and previously treated TB patients was calculated using logistic regression. Multivariate Imputation by Chained Equations (MICE) accounting for gender, age, treatment history and division were included in imputed data set where *the prevalence rate of RR among previously treated TB patients were 11.4%* (95%CI= 7.2-17.5), which was higher as compared to the *rate among new TB patients (0.7*%; 95%CI= 0.4-1.2). However, *no extensively drug-resistant (XDR) TB was isolated during the survey*. Risk factors for RR/MDR-TB identified in this survey included treatment history, locality, sex and being in the age group (35 – 45 yrs). Additionally, BCG vaccination, wealth index, malnutrition and smoking were also associated with higher proportion of RR/MDR-TB. Diabetes mellitus and HIV had no significant association with drug resistant TB. The prevalence of HIV among smear positive TB cases was 0.18% and all HIV positive cases were new cases.

The document concludes that the *prevalence of MDR/RR-TB detected in both new (0.7%) and previously treated (12.2%) patients remained low*, even much lower than the previous survey in 2010-2011 (1.4% and 28.5% respectively). Although the RR-TB prevalence rate is low compared to other countries, the high TB prevalence in the community will reflect a high MDR-TB burden. The findings in this study showed that the TB control programme is running effectively in Bangladesh.

6. Bangladesh TB Prevalence Survey 2015-16

This is an important document. Among the 108,834 individuals eligible for the survey, 98,710 (90.7%) participated, the proportion being 10.7% higher than that estimate to calculate the sample size. 55.1% of participants were females.

The prevalence of bacteriologically confirmed Pulmonary TB cases (PTB) above 15 years of age was estimated to be 287 per 100,000 population. Adjusting for all ages and TB forms, the overall prevalence become 260 per 100,000 pop., the estimated incidence being 221 per 100,000 pop. The prevalence was higher among males (than females), in urban areas (than in rural) and in the population older than 65 years. The prevalence to notification rate was 2.8:1. Among TB cases, only 40.6% were detected by sputum smear, while 95% was detected by Xpert (done to all samples, while in the previous survey was done only on sputum positive cases).

In 2014 WHO estimated the TB prevalence at 404 and the incidence at 227 per 100,000 pop., the detected values being both lower.

It is recommended that NTP focuses more on active case-finding and older population groups, while strenghening community screening to ensure early diagnosis and effective treatment to impact transmission. As >50% of the TB cases detected were smear negative, there is need to expand the

use of Xpert and culture for bacteriological confirmation of chest radiography as part of the screening procedures for asymptomatic TB patients.

7. **DF Web link** https://www.damienfoundation-bd.com/

The link provides useful information on the DF's activities in Bangladesh.

8. **NTP Web link** National Tuberculosis Control Programme – An Official Website of National Tuberculosis Control Program of Bangladesh (ntp.gov.bd)

The link to the NTP Bangladesh, mentioned in the document 1 above, provides important information to inform *the mid-term review*.

9. **Global Leprosy (Hansen disease) Update, 2023**

The Global Leprosy (Hansen Disease) Update, 2023 presents a comprehensive view of progress toward eliminating leprosy as a public health concern. Since the 1991 World Health Assembly's call for elimination, most countries achieved the target of reducing leprosy as a major health problem by 2010, defined as a prevalence of less than one case per 10,000 population. However, with the establishment of the Global Leprosy Strategy 2021–2030 within the broader neglected tropical disease (NTD) road map, the goal shifted towards complete elimination, targeting zero disease, disability, stigma and discrimination by 2030. This ambitious target necessitates a paradigm shift, with countries moving from merely reducing prevalence to aiming for leprosy eradication. WHO's 2023 guidance introduces the Leprosy Elimination Framework, focusing on three stages - transmission interruption, disease elimination and post-elimination surveillance - measured through epidemiological milestones.

The WHO has enhanced its monitoring tools, including the Leprosy Elimination Monitoring Tool and the Leprosy Programme and Transmission Assessment Tool, to assess countries' progress in political commitment, programme implementation and surveillance. Emphasis is placed on high-quality data collection and reporting, with WHO relying on annual data submissions from member states through DHIS2 software. For the 2023 report, 184 countries and territories contributed data, with some providing updates from prior years. Data from all six WHO regions reflect the global

effort to track leprosy cases, including reports from 23 global priority countries, which have been instrumental in documenting prevalence and identifying areas needing intensified intervention.

In Bangladesh, leprosy remains a significant public health challenge, as highlighted in the latest WHO data for 2023. With a population of nearly 173 million, Bangladesh remains one of the 23 global priority countries and reported a registered prevalence of 3,142 cases at the end of the year, with 3,639 new cases identified. Among these, 1,683 were women, 148 were children and 220 had G2D, highlighting the need for early detection efforts. Additionally, 157 cases required retreatment, including relapses, emphasising the ongoing demand for sustained leprosy care and monitoring within Bangladesh's healthcare system.

10. **National Guidelines and Technical Manual on Leprosy (hard copy)**

The National Guidelines and Technical Manual on Leprosy provides comprehensive guidance for leprosy diagnosis, treatment and management in Bangladesh. Developed by the National Leprosy Programme (NLP) with support from WHO, this manual aims to enhance the quality of leprosy care and support health providers in addressing challenges related to early detection and treatment. It emphasises the importance of active case detection, particularly in high-burden areas, and addresses the need to reduce diagnostic delays, which can lead to increased rates of G2D among newly diagnosed patients. The revised guidelines also underscore the role of updated diagnostic and treatment protocols in standardising care and supporting leprosy elimination goals at the national level.

The manual details clinical features, diagnostic criteria and the recommended steps for confirming leprosy cases, including laboratory procedures like skin smear microscopy for specific cases. Additionally, it provides protocols for managing different types of leprosy cases, including MB and PB forms, as well as guidance on handling complications and disability prevention. The manual highlights the importance of early intervention and systematic contact tracing for smear-positive cases (i.e., annual contact tracing for seven years), which is crucial for controlling disease transmission within communities. It also addresses the need for continuous training of healthcare workers on these protocols to ensure consistent and effective case management across the healthcare system.

In addition to clinical management, the manual includes guidelines on health education and community engagement to address stigma and improve public awareness about leprosy. It promotes community participation in case detection and follow-up care, as well as strategies for involving local stakeholders and health educators in leprosy control activities. The document also outlines a

framework for recording, reporting and monitoring cases, ensuring that data collection supports ongoing programme evaluation and improvement. By providing detailed, standardised procedures, the National Guidelines and Technical Manual on Leprosy aims to strengthen the capacity of healthcare providers and enhance the effectiveness of Bangladesh's national leprosy control efforts.

11. **National Strategic Plan for Leprosy in Bangladesh 2023-2030 (hard copy)**

The National Strategic Plan for Leprosy in Bangladesh 2023-2030 aims to advance efforts towards the vision of "Zero Leprosy by 2030," focusing on zero infections, zero disabilities and zero stigma and discrimination associated with leprosy. This plan is built on the foundation of the preceding strategy, with an emphasis on addressing persistent challenges, including social stigma, limited resources and gaps in healthcare infrastructure. By enhancing active case detection, treatment and follow-up, the plan seeks to control leprosy transmission and improve the quality of life for those affected. The strategy highlights the importance of integrating leprosy services with general healthcare systems, improving surveillance and strengthening community involvement.

To achieve these ambitious goals, the plan introduces four strategic pillars and a range of objectives aimed at guiding leprosy control initiatives over the next decade. A major component is the establishment of a national advocacy platform to monitor and support the Zero Leprosy Initiative, involving government and community stakeholders. This platform will provide political and operational support to ensure successful implementation. The plan further emphasises the need for governmental ownership, increased funding and coordinated partnerships with national and international organisations.

The four strategic pillars are:

1. Strengthening of the integrated Zero Leprosy Initiative (ZLI) within the National Leprosy Program.
2. Expansion of active case detection and leprosy prevention initiatives to reduce new infections.
3. Comprehensive leprosy management and disability prevention, focusing on the early diagnosis and management of complications.
4. Community engagement and reduction of stigma and discrimination, empowering individuals affected by leprosy and promoting inclusive rights and dignity.

Below are the noteworthy objectives and indicators:

- Reduction of leprosy prevalence: Achieving a rate of less than one case per 10,000 people in every Upazila by 2030.
- Attainment of zero leprosy cases in children (<15 years) and exhibiting G2D at the time of diagnosis by 2030.
- Reduction of social stigma and eliminating discriminatory practices, such as forced isolation in hospitals and social separation from family members.
- Strengthening of health system integrations through integration of leprosy with general health services.
- Introduction of web-based surveillance integrated with Health Management Information System (HMIS) under the Directorate General of Health Services (DGHS).
- Reinforcement of government ownership and coordination with partners, involving political reinforcement, increased fund allocation, coordinated activity implementation and enhanced monitoring and evaluation.

4.2 Results deriving from the interviews

The interviews were conducted using the agreed-upon questionnaire shown in ***Annex 2a.***

Overall, the survey results strongly underline the important role played by the DF-supported TB & Leprosy project in Bangladesh as perceived by staff, stakeholders and patients.

The vast majority of 35 persons who underwent the survey via the agreed-upon questionnaire, agreed on the importance, impact and quality of the DF project in Bangladesh, with an average agreement score of 93.93%.

The detailed analysis of the survey is available in ***Annex 2b***.

4.3 Visit to Upazila health facilities at district level and DF hospitals for TB/MDR- TB and Leprosy

The following hospitals were visited (see ***Annex 3***, Mission agenda):

- *TB & Leprosy Clinic, Tangail Sadar*
- *Jalchatra Hospital*
- *TB & Leprosy Clinic, Netrakona Sadar*
- *Mymensingh Hospital*

The agreed-upon checklist (***Annex 4***) was used.

The individual checklists for the TB & Leprosy Clinic in Tangail and Netrakona Sadar are included (*4a-4b*).

Both Jalchatra and Mymensingh hospitals visited were extremely well kept and managed. We appreciated the laboratory, providing shoes and other orthopedic devices for leprosy patients, and the in-patient departments where quality treatment is provided for DS- and DR-TB, as well as for leprosy patients and the laboratories. In particular the laboratory in the Mymensingh Hospital is high level, providing also culture and DST for first-line drugs and fluoroquinolones in locally-produced solid media. MGIT equipment is on the way to be implemented, allowing to add liquid DST, and further completing the laboratory network capacity in the region.

Importantly, given the relative under-occupancy of TB beds for MDR-TB due to the increased implementation of shorter regimens (and also the BPaL(M) one), ambulatory based, these hospitals are the perfect location to implement Post-TB Lung Disease (PTLD) activities planned under the TB-REACH project. Furthermore, the potentiality of Jalchatra hospital to host residential trainings (e.g., Bangladesh-adapted version(s) of existing TB international courses) was discussed (see recommendations).

Additional details on the methodology of the field visit, of the survey results, specific findings (analysis of patients who died, LTFU, detection by gender, treatment delay) and persons met are summarised in *Annex 2b* (TB Consultant's report).

During the field visits to four DF health facilities in Bangladesh, key findings emerged that provide insights into the strengths, challenges and needs in leprosy diagnosis and management across these facilities (*Annex 12*). At Tangail Sadar's TB & Leprosy Clinic, TB and Leprosy Control Assistants (TLCAs), who receive specialised training, showed deep community knowledge and diagnostic skill, with extensive experience in detecting leprosy cases. Community awareness of leprosy appeared strong, with no stigma reported, largely due to the long-standing presence of DF and its outreach work since the 1970s. The clinic ensures adherence to treatment with regular follow-ups and contact tracing, especially for smear-positive MB leprosy cases (yearly contact tracing of household contacts and nearby community contacts for seven years), and maintains a robust system for monitoring and reporting. The clinic operates without leprosy resistance testing, as the relapse cases are reportedly very rare. Treatment monitoring is limited to manual records, which are later entered into digital forms to be shared with the DF office in Dhaka and the NLP.

At Jalchatra TB & Leprosy Hospital, lab facilities, including slit-skin smear (SSS) testing, allow for leprosy confirmation and long-term contact tracing. Patient interviews highlighted the enduring physical and social impacts of leprosy, with patients returning annually for support. These interviews were not designed before hand, but rather guided through the support of a translating

local health worker with questions posed based on the circumstances of each patient. One patient, previously diagnosed with MB leprosy over two decades ago, expressed satisfaction with the treatment, though challenges remain, such as mobility due to distance from the facility. Netrakona Sadar's TB & Leprosy Clinic reflects a positive DF-government partnership, with effective quarterly review processes and electronic case management. Staff emphasised the need for additional field workers, noting the high demand and challenges of accessing remote areas. Contact tracing and patient education remain priorities and DF's involvement is seen as crucial to effective operations.

Finally, at Mymensingh DF Hospital, laboratory capabilities extend to leprosy diagnostics, with microbiologists such as Akter Hossain supporting SSS testing. A microbiologist and Medical Laboratory Technologist at Mymensingh DF Hospital, Akter plays a central role in leprosy diagnostics. He analyses 20-30 leprosy slides monthly for case confirmation, working on both TB and leprosy samples. With two years of experience at DF and eight years at another NGO, he noted his own experiences so far: "I like working at DF, it's a great working environment, they have their own hospital and a strong culture." Akter highlighted areas for improvement, including additional training on the latest diagnostic technologies, more staffing support and enhanced transport resources for patients and samples, especially for suspected cases that currently receive limited support.

Staff across sites appreciated DF's continued training initiatives, expressing interest in more digital tools for patient tracking and leprosy management. A senior TLCA with 28 years of experience noted advancements in TB and leprosy screening practices, reflecting DF's impact in transitioning to proactive case detection. Overall, the field visits underscored the value of DF's resources and expertise in supporting early detection, maintaining community trust and ensuring continuity of care for leprosy patients.

4.4 Analysis of the programme indicators (TB & Leprosy)

Tuberculosis

The indicators are reported below as per DF proposal and specific comments are provided for each indicator.

All Strengths, Weaknesses, Opportunities and Threats are reported in the SWOT analysis below, from which gaps are derived and recommendations based-upon.

Tables and figures are reported in ***Annex 5***.

Outcome: **early case finding, correct management of TB (including MDR-TB) and leprosy and preventive therapy for (latent) TB infection in the project area is ensured by 2026 maintaining preventive and protective measures for COVID-19. Technical expertise in MDR/RR-TB management is developed among the service providers throughout the country.**

Result 1: Management of leprosy will be improved through earlier diagnosis and more effective prevention of disabilities despite the increasing rarity of the disease.

Outcome Indicator 1: additional disabilities during leprosy treatment

Indicator 1 description:
Additional disabilities during leprosy treatment: People with disabilities have an increased risk of developing new disabilities despite treatment with multidrug therapy (MDT) and disability prevention services. The disability prevention services through the correct management of leprosy reactions and neuritis and the proper counselling of people with insensitive extremities are considered as effective if not more than 5% of people develop new disabilities during MDT.

Baseline: Average 5% of leprosy patients developed new disabilities during leprosy treatment (MDT)
Target Year 3 – 31/12/2024: Average disabilities during leprosy multidrug treatment (MDT) in DF Bangladesh will remain <5%.
Target Year 5 – 31/12/2026: Average disabilities during leprosy multidrug treatment (MDT) in DF Bangladesh will remain <5%.

Comments: as the indicator is formulated, it is Leprosy-specific.

For further action: see below and the Leprosy-specific section of the report.

Outcome indicator 2: Delay in diagnosis

Indicator 2 description:
Delay in diagnosis: patients with TB spread the disease through sneezing, coughing, talking etc. Delay in diagnosis of TB leads to increased mortality, continued transmission of TB in the

community and decreased productivity resulting in increased poverty. Early detection and prompt initiation of treatment cuts the chain of transmission, facilitates quick recovery and timely return to work. This indicator measures the duration from onset of disease symptoms to initiation of treatment.

Baseline: Average delay in diagnosis was 1.59 month but there were upazilas with higher duration (4 – 6 months).
Target Year 3 – 31/12/2024: Average delay in diagnosis remains < 2 months in all upazilas
Target Year 5 – 31/12/2026: Average delay in diagnosis remains < 2 months in all upazilas

Comments: The evidence from M&E documents (Graph 15, page 23 DF Report 2023, ***Figure 1-Annex 5)*** is that the average diagnosis delay in 2022 in all the areas managed by DF was lower than 2 months (1.54 in males; 1.78 in females and 1.61 total). This was also observed in all areas except Tangail, where females had a delay of 2 months, although the overall delay was 1.97 given that in males it was lower (1.68).
The report 2023 showed improved results, with a diagnostic delay decreasing from 1.61 to 1.46 (1.44 for men and 1.50 for women). In Tangail, the location with the higher delay, in 2023 the average delay was 1.66, being 1.58 in males and 1,81 in females.
There are no reasons to think that the Year 3 targets will not be reached as they have been reached already in 2022.

For further action: The indicator's evolution shows a progressive reduction of the diagnosis delay overall, and within men and females. The difference between men and women delay is minor and not significant, showing that women have access to diagnosis and care. Focus on this should be maintained over time. The way to further decrease diagnosis delay and boost screening and active case-finding is to implement mobile CXR units, potentiating what is presently done at the outreach level (see conclusions and recommendations).

Result 2: Management of TB will be improved through increased collaboration with NTP and community involvement which includes partnership and engagement of all, leaving no one behind. As such, engagement of all including community will lead to early detection with
increase in the number of TB cases (all forms), increase in treatment success and increase in
child TB cases (emphasis on contact checking and screening using available sensitive tools.

Indicator 1: TB case notification rate

Indicator description:

TB case notification rate: trends over time in case notification usually indicate changes in programme coverage and capacity to detect TB cases. An upward trend in case notification rates can reflect an improvement in programme performance or in some cases, an impact of HIV/AIDS epidemic. The case notification rate provides data for programme planning and M&E purposes, and it is to guide these activities.

Baseline: TB case notification rate (All forms) in DF area 82/100,000 pop.

Target Year 3 – 31/12/2024: With partnerships and engagement of all stakeholders along with use of more sensitive diagnostic tools TB case notification rate (All forms) expected 95/100,000 pop

Target Year 5 – 31/12/2026: With continued partnerships and engagement of all stakeholders along with use of more sensitive diagnostic tools TB case notification rate (All forms) expected 110/100,000 pop.

Comments: The evidence from M&E documents (DF Report 2023, Graph 2 page 9, ***Figure 2 Annex 5)*** is that in 2022 in DF regions the notifications exceeded the indicator (95 for year 3) being 121 per 100,000 population. The notification rate, which was 103 per 100,000 in 2019, lowered to 82 because of COVID-19, promptly recovering to 109 per 100,000 in 2021. In 2021 it has further increased to 121 and in 2023 to 135 per 100,000 population. In the first 3 quarters of 2024 it is even higher (153 per 100,000 pop). The trend in TB case notifications is summarised in ***Figure 3 (Annex 5),*** showing, in absolute numbers and percentage, the total number including retreatment cases and cases not confirmed bacteriologically (sputum smear negative and extrapulmonary). All seems to indicate that the indicator will be met for year 3 and year 5 as planned. In the same Annex, in ***Figure 4***, the trend of new sputum smear positive/bacteriologically confirmed patients per 100,000 population is presented per DF Region.

For further action: As mentioned above, the present results exceed expectations as a result of an integrated approach (health education, correct management of diagnostic tests and algorithms, outreach activities) within an increased trust of the population for the (TB) health services in the areas served. A further step to increase case-finding would be implementing the mobile CXR units, as discussed above, in the recommendations and conclusions.

Indicator 2: Treatment success rate of TB cases.

Indicator description:

Treatment success rate of TB cases: treatment aims at curing patients, saving their lives, reducing the transmission and ultimately bringing them back to normal life (productivity, contributing to the sustained development). As cases are detected in early stage of the disease with less complication and as community is involved in provision of treatment so, adherence to treatment (=success) is expected to improve.

Baseline: Treatment success rate of TB cases (all forms) has been 91%

Target Year 3 – 31/12/2024: Treatment success rate of TB cases (all forms) is expected to be maintained at above 90%

Target Year 5 – 31/12/2026: Treatment success rate of TB cases (all forms) is expected to be maintained at above 90%

Comments: The evidence from M&E documents (DF report 2023, Graph 9 page 13, ***Annex 5, Figure 5)*** is that treatment success remained above 90% since 2012, being 94% in new cases and 93% in all cases in 2022. A further increase has been in 2023 and 2024 (first 3 quarters), with 94 and 96% respectively.

Considering historical data, it is very likely the indicator will be met as planned.

For further action: The treatment success rate is very high and remains historically very high as a combined results of the quality health education performed, the attention to directly observed therapy (DOT)/patient's adherence, and the proactive search for the patients not reporting. Piloting video observed therapy (VOT) might further enhance adherence (and aDSM, management of adverse events), see recommendations.

Indicator 3: proportion of child TB cases

Indicator description:

Proportion of child TB cases: children get TB from adults and diagnosis of TB in children is difficult. WHO estimates (Global TB report 2020; *note: still 12% in the 2023 the Global WHO report*) that among incident cases in 2019, 12% were children. Child TB detection has been far below the estimates, possible due to the lack in capacity in NTPs in child TB diagnosis.

Baseline: Proportion of child TB cases among total has been 6%

Target Year 3 – 31/12/2024: Proportion of child TB cases among total is expected to increase to 7%

Target Year 5 – 31/12/2026: Proportion of child TB cases among total is expected to increase to 8%

Comments: The evidence from M&E documents (DF report 2023 Graph 10, page 14, ***Annex 5-Figure 6***) is that an increase in the proportion of cases among children was observed from 2008 to 2020, where 7% was reached. The influence of COVID-19 lowered then the proportion to 5% in 2021 and 2022. However, in spite of the stable 5% rate, in 2022 136 more children were detected than in 2021, and the proportion has increased to 6%. Overall, the proportion of children has increased, although being at 5% in the first 3 quarters of 2024 we need to see how the last quarter 2024 will confirm the 2023 progress. To note also that in the DF areas the proportion of children was higher than the corresponding one in the whole Bangladesh, reported to be at the level of 4% (2023 data).

For further action: Although we found an increasing trend in the indicator (in the order of 1% per year) in 2022 and 2023) and in the TB and Leprosy Clinic in Tangail it was 8.6%, more can be done beyond using stool-based tests. We recommend to expand the use of the stool-based test more, which is easy to implement in peripheral facilities. It has comparable sensitivity than nasogastric aspiration/gastric lavage. Nasogastric aspiration/gastric lavage was not done in the health units visited (see report in the checklists, ***Annex 4.*** As it can be implemented at hospital level specific training and an operational research project on this will be useful, in selected sites. A potential factor rendering this difficult to implement is that in Bangladesh naso-gastric aspiration is considered a medical procedure (in Africa nurses commonly perform it), which may require charges for patients. The availability of the proposed 2 CXR CAD mobile units will further boost the quality and quantity of diagnoses in children.

Result 3: Efficient organization of TB case detection and management in the newly industrialised DF districts will reduce TB transmission among factory workers (mostly women). Rapid and growing urbanization and industrialization resulted in internal migration from rural to industrialized areas. Bad living (shared accommodation in small rooms) and working (inadequate space with lack in adequate ventilation) conditions facilitate in TB transmission among co-workers and family members.

Indicator 1: Number of TB cases (women focus) registered from the DF industrial areas.

Indicator description:

Number of TB cases (women focus) registered from the DF industrial areas: most workers in

these factories, with minimum health care services, are women (restricted access for others than workers). Increasing the number of TB cases detected amongst workers will indicate increase in their access to TB services and thus impact in TB transmission amongst this population.

Baseline: A total of 871 TB cases were detected from about 200,000 workers in these industrial areas

Target Year 3 – 31/12/2024: With increased access to TB services by the target group, number of TB cases expected to increase to 1000 in year 3

Target Year 5 – 31/12/2026: With continued increased access to TB services by target group, number of TB cases expected to increase to 1200 in year 5

Comments: The evidence from M&E documents (DF report 2023, Graph 8, page 12, ***Annex 5, Figure 7***) is that 1278 TB patients were diagnosed in industrial areas in 2022 and 1078 in 2023, exceeding the indicator for year 3 (1000) (and also for year 5 in 2022) (1200). The number of diagnoses in the first 3 quarters 2024 is in line or slightly lower than that of the previous year (504). The expected results are likely to be reached.

For further action: Although the indicator was met, the availability of an Xpert equipment devoted to the industrial areas might further boost the effectiveness of the intervention, particularly if the already mentioned mobile CXR units will be able to visit periodically this setting.

Although health education and outreach activities can be (and will be) further boosted we presently observe a 'plateau. The present 'plateau' in case-finding may be due to two main reasons:

1) a flattering down of the post-COVID-19 wave of diagnosis and

2) an initial effect of the control interventions on the TB epidemic, resulting from increased case-detection and appropriate treatment in the area, which contributed to cut the chain of transmission.

Indicator 2: TB treatment success among factory workers

Indicator description:

TB treatment success among factory workers: improving and sustaining high treatment success among factory workers will lead to improved health and decrease in poverty and hunger.

Baseline: TB Treatment success among factory workers is around 90%

Target Year 3 – 31/12/2024: TB Treatment success among factory workers >90% maintained

Target Year 5 – 31/12/2026: TB Treatment success among factory workers >90% maintained

Comments: The evidence from M&E documents (DF report 2023) is that in both 2022 and 2023 the target was reached, with 93 and 97% respectively.

For further action: As mentioned above, beyond continuing the effective intervention implemented so far, the additional effect of VOT could be explored.

Result 4: DF support to the National TB Control Programme in capacity building and effective management of MDR/DR-TB patients throughout the country is ensured, will lead to skill development in achieving the national goal together through partnership approach. DF has long experience in implementing DR programme while NTP started implementation and scaling up of DR-TB programme in other parts of the country about 10 years after DF and implementing partners there lacks in technical capacity for DR TB programme management.

Indicator 1: Proportion of MDR/RR-TB patients enrolled under all oral shorter treatment regimen (SOTR)

Indicator description:

Proportion of MDR/RR-TB patients enrolled under all oral shorter treatment regimen (SOTR): shorter duration of treatment along with replacement of injectable drugs by an oral one is expected to have a high treatment adherence (=success). Adoption of new technologies and new treatment regimen require capacity building of implementing agencies. Proportion of MDR/RR- TB patients enrolled on SOTR will indicate the capacity developed in NTP along with adoption of the WHO recommended new technologies.

Baseline: All oral shorter treatment regimen not started in 2020 though shorter treatment regimen with injectable drug was given to 872 DR-TB patients out of 973 enrolled.

Target Year 3 – 31/12/2024: 80% of all eligible MDR/RR-TB patients enrolled on SOTR

Target Year 5 – 31/12/2026: 90% of all eligible MDR/RR-TB patients enrolled on SOTR

Comments: The evidence from M&E documents (section 3.6, page 20, DF report 2022 and section 4.6, page 15, report 2023) is that SOTR were introduced by NTP in 2021; in 2022, 299 MDR-TB patients were prescribed SOTR, with a proportion of 89% in 2022 and 93% in 2023, well above threshold.

Data suggest that the planned targets will be reached, taking also in account that BPaL and BPaLM regimens are also under implementation.

For further action: The indicators are brilliantly increasing and the scale-up of the BPaL(M) regimen will further improve them. A deeper analysis finalised to a specific publication is recommended.

Indicator 2: MDR-TB treatment success rate

Indicator description:

MDR-TB treatment success rate: the drugs used in the treatment of MDR-TB are highly toxic and require close monitoring along with timely management of side effects to ensure treatment adherence (=success). Failure in ensuring treatment adherence (irregularity) leads to acquired drug resistance along with failure of treatment, continued transmission and death of patients. Early diagnosis and effective treatment (success) of MDR-TB prevents disease transmission and reduce the MDR-TB burden.

Baseline: MDR-TB treatment success rate is 75%

Target Year 3 – 31/12/2024: MDR-TB treatment success rate >80%

Target Year 5 – 31/12/2026: MDR-TB treatment success rate >80%

Comments: The evidence from M&E documents (section 3.6, page 20, DF report 2022 and section 4.6, page 16, DF report 2023) is that SOTR were introduced by NTP in 2021; in 2022 299 MDR-TB patients were prescribed SOTR.

The treatment success rate has increased from 75% in 2022 to the 80% target in 2023, suggesting the indicator will be reached also in the future.

For further action: As above

Result 5: Operational research aligned with the health programme objectives and research gaps in collaboration with national and international institutes/organizations is continued.

DF operational research findings contributed to important policy recommendations by WHO and adoption by the NTPs e.g. engagement of village doctors, non-prolongation of intensive phase of treatment, shorter treatment regimen for MDR-TB.

Indicator 1: number of studies conducted

Indicator description:

Number of studies conducted: efforts at improving the programme performance starts from identification of the problem (low performance, weaknesses), critical analysis of the data, planning / designing the new approaches (operational researches) and their execution (conducting the research), aiming at finding better approaches (improved access and utilization, improved treatment adherence or reduced adverse outcomes, reduce programme costs etc.).

Baseline: One study funded by Leprosy Research Initiative study

Target Year 3 – 31/12/2024: At least one new study undertaken

Target Year 5 – 31/12/2026: At least one new study (additional) undertaken during this period

Comments: The evidence from M&E documents is that 1 study has been implemented in the areas of Post-Tuberculosis Lung Disease (PTLD), and 1 on leprosy is at the level of manuscript writing. Furthermore 3 operational research studies will be initiated soon, covering outcomes of tuberculosis preventive treatment (TPT), yield of outreach activities and safety and effectiveness of shorter MDR-TB regimens. Additional studies will be implemented on Leprosy.

For further action: The PTLD project, funded by TB-REACH, will produce several publications, which will benefit from the advocacy support of TB-REACH and the STOP TB Partnership. To support this initiative, which is gaining importance day after day (WHO is drafting its first guidance and McGill has started the first IPD on PTLD targeting 6000 patients, results expected in late 2025 and publications in 2026). Technical assistance was provided to the PTLD project, with the suggestion (see below) to implement spirometry (through portable spirometers) which, on top of improving the scientific level of the project, will represent a Health System Strengthening activity. Additional publications will further boost the visibility of DF, NTP and donors/stakeholders.

Indicator 2: Number of research papers published

Indicator description:

Number of research papers published: sharing research findings through publication in international journals allows sharing the new results/knowledge within the international scientific community. Evidences from different settings contribute to policy recommendations.

Baseline: No research paper published

Target Year 3 – 31/12/2024: At least one research paper published in the international journal

Target Year 5 – 31/12/2026: At least one (additional) research paper published in the international journal during this period.

Comments: An important research package is under development and will produce interesting results.

For further action: see above.

A summary of the indicators for 2022, 2023 and 2024 (3 quarters, up to September 2024 included, when available) are shown in ***Annex 5, Figures 8-9***. The green arrows indicate the indicators reached, and the green/yellow arrows those who are near to be reached or under development (e.g. research activities).

The comparison between the performances of DF-supported areas and the average national data are summarised in ***Annex 5, Table 1***.

Leprosy

The analysis of DF leprosy programme indicators in Bangladesh provides critical insights into both the efficacy of early detection efforts and the accessibility of leprosy services across populations. There are four indicators for leprosy that are monitored in this programme. The grade 2 disability (G2D) proportion among new cases serves as a marker for delays in diagnosis, with high G2D proportions indicating the need for timely detection to prevent disabilities. The proportion of female cases can indicate potential barriers women face in accessing leprosy services, and a low female proportion may require further outreach. Monitoring the proportion of children among new cases is considered a proxy for ongoing transmission in a community, as a high child proportion indicates recent, active transmission and underscores the importance of transmission reduction. Lastly, tracking new disabilities during treatment gauges the effectiveness of disability prevention and management, with best practice aiming to keep this rate below 5% among treated cases. Together, these indicators guide strategic programme adjustments to enhance early diagnosis, reduce transmission and improve overall case management. Progress for the programme indicators for leprosy are shown below in Figure 2.

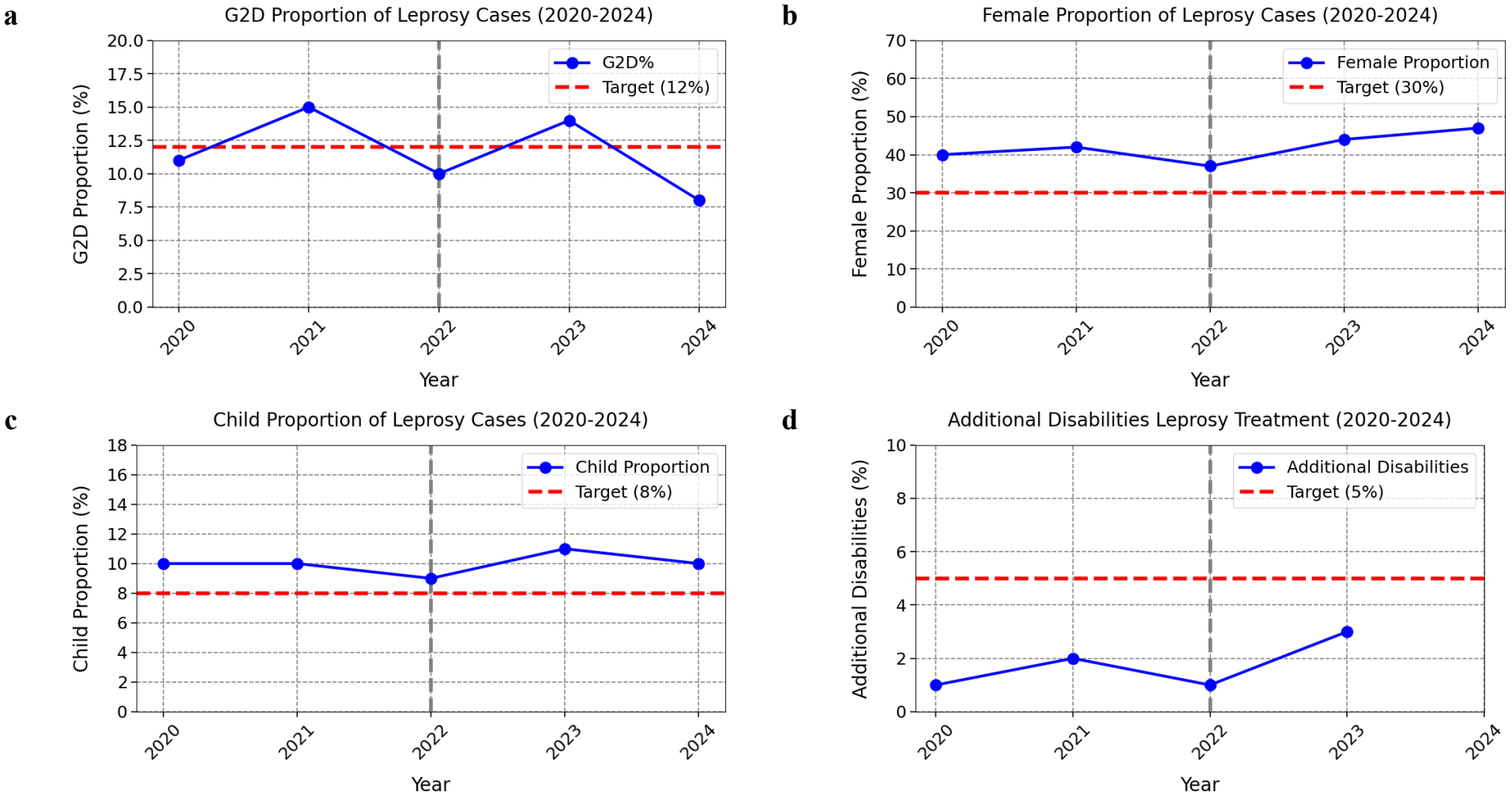

Figure 2. Recent trends (blue) and targets (red) in DF programme indicators for leprosy in Bangladesh, 2020–2024: (a) Proportion of persons with grade 2 disability among new cases; (b) Proportion of females affected by leprosy among new cases; (c) Proportion of children (<15 years) affected by leprosy among new cases; (d) Proportion of additional disabilities during the course of leprosy treatment among new cases (yet to receive 2024 data).

Grade 2 disability proportion among new leprosy cases

For the proportion of persons with G2D among new cases, the target for this indicator is set at 12%, as represented by the red dashed line. From 2020 to 2024, the G2D proportion has fluctuated around this target. In 2021 and 2023, the proportion exceeded the target, peaking around 15%. However, the most recent data from 2024 indicates a decrease, with the G2D proportion falling below the target level. This trend suggests some variability in the early detection of leprosy cases with disabilities, though the recent decline is promising for achieving or maintaining rates below the target in the future.

Proportion of female among new leprosy cases

The target for female proportion among leprosy cases is 30%. Throughout the period from 2020 to 2024, the actual proportion of females affected has consistently remained well above this target, ranging between approximately 40% and 50%. This suggests that the programme has been effective in detecting and addressing leprosy cases among females, exceeding the target and indicating stronger gender inclusivity in case detection.

Proportion of children among new leprosy cases

The target for proportion of children (<15 years) among new cases is 8%. The data from 2020 to 2024 shows that the proportion of children affected by leprosy has remained relatively stable, with slight fluctuations but consistently above the target. This consistent trend above the target indicates that while child cases are being detected, further strategies may be needed to reduce transmission and early exposure among children.

Additional disabilities during leprosy treatment

The target for additional disabilities developed during leprosy treatment is set at 5%. Over the evaluation period, this indicator has remained well below the target, fluctuating between approximately 1% and 3%. This is a positive outcome, as it suggests that the programme has been effective in preventing additional disabilities during treatment, likely due to appropriate management and follow-up of cases throughout the treatment process.

In summary, the most recent data show that two indicators (the proportion of females affected and additional disabilities during treatment) are performing well relative to their targets, suggesting successful programme impact in these areas. However, the G2D proportion, while recently below the target, has shown fluctuations, indicating a need for consistent efforts in early detection. The child proportion has remained above target levels, highlighting the importance of continued strategies to reduce transmission in the community.

4.5 Earlier leprosy case detection and disability prevention

Leprosy case management aims to improve early diagnosis and disability prevention, even as the disease becomes rarer. Health care providers may lose diagnostic skills due to infrequent cases, and patients often delay seeking care until disabilities affect daily activities. One of the key objectives of the DF programme is to achieve earlier leprosy case detection and disability prevention. This is also reflected in the National Leprosy Program (NLP) in Bangladesh and their National Strategic Plan for Leprosy in Bangladesh 2022-2030, to intensify early case detection initiatives through engaging relevant health staff at district and sub districts level (P2a1. o1). A summary of leprosy case data in DF programme districts from 2020 to 2024, including new patients, G2D and child leprosy is shown in ***Annex 9***.

Across the DF-supported districts, the G2D proportion among new leprosy cases has varied, suggesting that early detection efforts have had mixed success. While some districts like Tangail and Kishoreganj show promising trends, others like Mymensingh and Netrakona still show persistent G2D cases, indicating a need for targeted improvements. In Tangail, disability proportion is generally low, with G2D cases making up around 10-20% of new cases in most years, except in 2024 where it dropped to 0%. The low and recently declining G2D proportion suggests effective early case detection and disability prevention in Tangail. Continued efforts to maintain this trend are encouraged. In Jamalpur, G2D proportion has varied significantly, reaching as high as 35% in 2022 before dropping to around 12.5% in 2024. High proportions in some years indicate challenges in early detection, but the recent decline may reflect improved operational effectiveness. The G2D proportion in Sherpur is generally low, with G2D cases constituting between 0% and 23% of new cases, with a slight rise in some years. There appears to have been moderate success here in keeping in identifying cases earlier, but the occasional increases highlight a need for more consistent early detection efforts.

In Mymensingh, the proportion of G2D cases has been around 10-15% of total cases consistently each year, although the overall case burden is also higher compared to most other DF districts.

Conversely, the G2D proportion in Kishoreganj over the past five years was very low, with G2D cases making up less than 10% of new cases consistently over the years. Although the total number of cases identified is quite low, the results suggest Kishoreganj has demonstrated strong performance in preventing disability, indicating effective early case detection. Efforts should be focused on sustaining this low proportion. Finally, Netrakona has fluctuated and occasionally been very high, with G2D cases constituting 10-20% of new cases, peaking in 2021 at over 40%. However, the total number of leprosy cases is quite low compared to other areas. In summary, across all these districts, the G2D proportion showed variation, with some districts like Kishoreganj maintaining low rates, while others like Mymensingh and Netrakona facing challenges with higher proportions.

In Rajshahi, G2D cases among new leprosy detections have fluctuated considerably, with a notable peak in 2023, where G2D cases rose to around 16% of new cases. In most other years, however, the G2D proportion has remained relatively low, generally under 10%. This suggests some success in earlier detection efforts, although the increase in 2023 highlights the need for reinforced strategies to maintain low disability rates. In Chapainawabganj, G2D rates have been kept generally low, ranging between 5% and 20% of new cases, with a minor increase observed in 2023. The increase in presumptive cases and overall cases suggests that intensified case-finding efforts could benefit from targeted awareness programs in certain communities to further reduce G2D cases. Naogaon has also observed varying G2D proportions, with a sharp increase in 2023, accounting for around 10% of new cases. This trend indicates the need for a sustained focus on early detection and disability prevention, especially as the overall number of new leprosy cases in Naogaon has been increasing.

To investigate this further, an analysis was performed on case detection delay estimates across all DF districts from 2020 to 2023, which were collected as part of a recent study on intensified case finding (***Annex 10***). While the median delay has remained relatively consistent at 12 months each year, there is a slight upward trend in the mean delay, increasing from 19.2 months in 2020 to 22.7 months in 2023. This suggests that while most cases are still being detected within a year of symptom onset, a small proportion of cases are experiencing increasingly longer detection delays over time. The presence of these outliers with extended detection delays could potentially contribute to higher rates of G2D, as prolonged delays before diagnosis increase the likelihood of disease progression to more severe forms. However, given the modest increase in the mean delay, it is unlikely that this factor alone explains the fluctuations in G2D proportions observed in recent years, particularly the higher G2D% seen in 2022 and 2023. The slight increase in detection delays suggests there may be barriers to early diagnosis that affect a subset of cases each year. These could

be due to factors such as limited access to healthcare in remote areas, lack of awareness about leprosy symptoms among patients, or delays in referral and diagnosis within the health system.

While the overall trend in case detection delay does not appear to be the primary driver of increased G2D proportions, addressing these detection delays remains important to further reduce disability rates in certain districts where many individuals receive their diagnosis >24 months after manifestation of first signs and symptoms. On the other hand, when looking at the data summary tables, it is clear that leprosy cases are presenting with long delays (>24 months) across several districts in recent years, namely Chapainawabganj, Jamalpur, Netrakona, Rajshahi and Tangail. During the field visit, an additional evaluation of leprosy case detection delays was performed (***Annex 11***), which also highlighted longer reported delays in Netrakona and Tangail, as well as in Sherpur.

4.6 Laboratory diagnostics – leprosy

In Bangladesh, leprosy diagnosis is primarily based on clinical assessment, with laboratory confirmation through SSS samples used selectively, as it is not mandatory according to national guidelines. Nonetheless, SSS testing facilities are available, with at least one laboratory per zone designated for slide testing to confirm MB leprosy cases. For cases confirmed as smear-positive, national guidelines stipulate contact tracing over a seven-year period to monitor and manage potential transmission.

During our field visits, we observed leprosy diagnostics at several DF-supported facilities. At the Tangail Sadar TB & Leprosy Clinic, one medical technologist is responsible for laboratory analysis, including SSS testing for leprosy. The Jalchatra and Mymensingh DF Hospitals also have laboratory facilities equipped for leprosy diagnostics, specifically for confirming smear-positive cases (Annex 12). These facilities play a critical role in identifying MB leprosy cases, which allows for targeted contact tracing and case management, reinforcing DF's support for national leprosy control efforts.

4.7 Participatory end-mission workshop

The end-mission workshop was conducted in Dhaka on 3 November 2024.

The core stakeholders attended, including NTP, NLP, USAID MDR/GF Consultant, NGOs (TLMI, LEPRA and Icddrb) and all DF Bangladesh staff.

Prof. G.B. Migliori, as per technical proposal, introduced the workshop with a presentation on TB Control and Elimination and Post-TB Lung Disease (PTLD) (***Annexes 6,7***), as a didactical contribution towards a better understanding of the mid-project evaluation.

Dr. T. Hambridge presented a summary of leprosy epidemiology in DF-supported districts in Bangladesh, the findings of the mid-project evaluation with regards to the leprosy programme and recommendations for focus areas in the future.

The main findings of the mission were presented and discussed (see ***Annex 8***).

4.8 SWOT& Gap analysis

The results of the agreed-up SWOT analysis are included below

SWOT ANALYSIS - TB

	Strengths	**Weaknesses**
Internal Factors	• Trained staff • Motivated staff • Effective infrastructure and logistics • Access to drugs, whose 'continuum' is ensured by DF • EQA quality laboratory in a well-connected network, connected with internationally renown institutions (ITM, Antwerp) • Availability of Xpert and Xpert XDR • Effective referral of samples • Quality clinical and programmatic management of MDR-TB • Introduction of the BpaL(M) regimen • Effective model of outreach activities with community involvement	• Rare episodes of stock-out of drugs, diagnostics (HIV tests) and cartridges (related to NTP distribution) • Tendency to staff reduction due to budget cuts • Important dependence on external donors' funding • Limited availability and use of digital radiology to rule out TB before TPT • No mobile digital CAD CXR equipment to boost outreach activities • Resistance to use nasogastric lavage for paediatric diagnosis and potentials for further implementation of stool examinations
External Factors	**Opportunities**	**Threats**
	• New DGD funding cycle, which is the basis of DF budget in Bangladesh • New TB-REACH funding for the PTLD project • MoU with academia for the PTLD project • New international collaborations for research on TB and Leprosy	• Rapid changes/increased senior staff turn-over at NTP level • Potential future changes at MoH level related to the new government

Gap analysis - TB

As a result of the SWOT analysis the following **gaps** have been identified:

1) Although the outreach activities are brilliantly managed, with referral of an additional 50% of presumptive cases and diagnosis of 30% of TB patients, the absence of CAD-based mobile digital CXRs self-limits the effectiveness of screening and active case-finding. The possibility to run at least 2 mobile units will further boost the yield of both ACF and screening activities and will allow to implement radiological rule out of TB before initiating TPT.
2) Although efforts in training, clinical attention and use of stool-test for TB has increased the diagnosis of TB in children, nasogastric lavage is not used by non-paediatricians, and resistance to its implementation exists among physicians including government ones. The implementation of 2 pilot areas routinely doing it will allow to evaluate its effectiveness in the context of paediatric TB, in parallel with operational research activities on this area.
3) As per existing guidelines, the TPT cascade does not include presently neither the diagnosis of TBI nor the systematic exclusion of TB through CXR. Although correct in the present national context of Bangladesh, and in agreement with WHO guidelines, the implementation of a at least 1 pilot project implementing these elements (e.g., taking advantage of the new skin test like C-TB and mobile CXR units) will contribute to create capacity in Bangladesh in the context of operational research.
4) The recent political changes in Bangladesh have been underlined under 'Threats' in the SWOT Analysis above. Their consequences in both the short and medium term are not easy to evaluate. The first potential consequence may be a rapid turn-over of staff and changes at NTP level, which may cause additional turn-over at lower levels. This might need special efforts from DF to re-establish working collaboration with new staff. However, DF is well known and well considered, and the Country Representative and her staff have the necessary capacity to make this effectively. A second consequence may be of financial nature, and its consequences are in our opinion impossible to evaluate as of today. A third consequence can be at the executive level, and these potential changes are also impossible to evaluate at present.

SWOT ANALYSIS- LEPROSY

	Strengths	Weaknesses
Internal Factors	• Established presence and community trust, with low stigma reported in several districts.	• Limited electronic data capture and centralisation, relying heavily on manual data entry and paper records.

	• Low stigma reported in several districts. • Well trained and motivated clinical, laboratory and administrative staff. • Effective partnership between DF and government health services. • Regular follow-up and monitoring of patients to ensure MDT adherence and contact tracing. • Skilled TB and Leprosy Control Assistants with strong community expertise in early diagnosis.	• Varying G2D rates indicate inconsistent early case detection across different districts. • Insufficient staffing in some clinics to manage field-based detection and follow-up activities. • Lack of leprosy case classification as suspected autochthonous / non-autochthonous. • No data on resistance testing for leprosy cases.
External Factors	**Opportunities**	**Threats**
	• Introduction of door-to-door campaigns, mobile health units and skin camps for intensified case finding. • Potential to implement single-dose rifampicin post-exposure prophylaxis (SDR-PEP) as for contacts. • Use of GIS mapping and electronic tools to identify transmission hotspots and improve data monitoring. • Continued alignment with WHO's Leprosy Elimination Framework to classify districts by elimination phase and target interventions accordingly.	• Declining focus on skill retention in leprosy management among general health staff due to perceived low burden of the disease. • Reliance on external funding for programme sustainability and ability to expanding initiatives. • Risk of imported cases from highly endemic areas in neighbouring countries. • Potential changes to healthcare cabinets related to the new government.

Gap analysis - Leprosy

As a result of the SWOT analysis the following gaps have been identified:

1) Varying G2D rates and long patient reported delays highlight the need for enhanced early detection strategies in districts where disability rates remain high, indicating that cases are being detected later than optimal.

2) Lack of digital tools for real-time data collection and centralisation hinders efficient monitoring and rapid response to transmission hotspots. This limits the programme's capacity for timely interventions, although new tools are currently being developed with plans to train and upskill field staff in the near future.

3) Insufficient staffing in some regions and limited access to ongoing training opportunities reduce the programme's effectiveness in field-based detection and follow-up, as well as active case finding through screening of community contacts, impacting the consistency of programme outcomes.

5.Recommendations

TB component

The gaps mentioned above allowed to formulate the following recommendations addressed to:

1. **DF and donors***: plan and procure 2 mobile CAD digital CXR (cost: approx. 200,000 euros total).* The timeframe for this project depends on the funding stream, and requires training on the use of the equipment.

2. **Donors via DF**: *to consider boosting outreach activities ACF with at least 2 additional TLCA per district, within the for X-ray-outreach package (as a minimum*). The timing, as above depends on funding, although recruitment 'per se' can be done more rapidly.

3. **DF/NTP***: Where not done, ensuring HIV testing of TB patients in the Districts/sub-districts where this is recommended.* The timing to implement the recommendation is rapid (1 month), depending mainly on test availability.

4. **DF*:*** *Refreshing training on TB-IPC in the area of respirators for staff and ACH calculation in the health facilities.* This recommendation can be implanted by the second quarter 2025 following procurement of 1 vaneometer per health unit, and the ACH calculation in health units can follow a pre-established calendar following training. Ideally, given the limited equipment necessary (vaneometer, basically), 1 health staff per unit can be trained on this.

5. **DF/NTP/GF/Donors***: consider running residential TB course taking advantage of the existing facility (Jalchatra Hospital) with a common ''basket funding", taking the advantage of creating capacity for PTLD management and ACH measurements.* This can be done within 2025.

6. **DF***: consider publishing relevant evidence on TPT completion, outreach activities and their contribution to case-finding, effectiveness and safety of SOTR for MDR-TB.* This can be implemented by mid-2025.

7. **DF***: consider designing one or more pilot project for VOT.* This can be implemented by mid-2025.

8. **DF and NTP***: intensify training on children TB diagnosis, with focus on nasogastric aspiration/gastric lavage and implementation of e.g. 2 pilot projects whose data can be used both to advocate for the methodology and for operational research. The 2 centres can be used as training centres for other staff.* This can be implemented by mid-2025.

9. **DF, NTP***: considering boosting ACF in the industrial setting by providing 1 Xpert machine and using 1 of the 2 CXR mobile units at regular intervals.* This can be implemented by mid-2025.

10. **DF, NTP and USAID***: continuing the monitoring of the proportion of bacteriologically confirmed cases vs the non-confirmed ones (sputum smear negative and extrapulmonary), periodically validating a sample of them during supervision visits*. Useful to include comments on this in the annual DF report from 2025 (2024 Report) onwards.

11. **DF*:*** *consider implementing at least 1 pilot project implementing TBI diagnosis (e.g., taking advantage of the new skin test like C-TB) and rule out of TB before TPT (e.g., taking advantage of mobile CXR units) in order to create capacity in Bangladesh in the context of operational research.* As per existing guidelines, the TPT cascade does not include presently nether the diagnosis of TBI nor the systematic exclusion of TB through CXR. Although correct in the present national context of Bangladesh, and in agreement with WHO guidelines, the future upgrade of TB activities will benefit from the availability of similar models.

Leprosy component

The following recommendations for enhancing the leprosy programme in DF districts in Bangladesh are proposed:

1. **Field-Based Electronic Data Capture for Contact Tracing and GIS Mapping:** Implementing electronic data capture for leprosy contact tracing would improve data accuracy and accessibility, while integrating GIS mapping with a centralised data monitoring system will support real-time analysis. This will help to identify clusters of cases and areas of ongoing transmission. There are already plans to implement this, with a digital version of the contact tracing form developed in Kobo Toolbox by the DF data management

team (*Annex 13*). This approach will enable a more targeted intervention strategy, allowing resources to be focused on high-risk regions while facilitating rapid response to new cases.

2. **Continued and Intensified Case-Finding Activities:** Sustaining and expanding intensified case-finding activities, especially in high-burden sub-districts, is strongly advised. The DF team should also consider deploying mobile health units and conducting door-to-door screenings (and possibly skin camps) in these areas to detect cases earlier and prevent further spread. Targeted campaigns in communities with historically high incidence are an effect way to strengthen early detection efforts and reduce delays in diagnosis, thereby decreasing disability rates among new cases. Furthermore, they offer a good opportunity for community engagement and health education. Additionally, post-exposure prophylaxis with single dose rifampicin (SDR-PEP) could be implemented in select districts to interrupt transmission and reenergise leprosy case finding activities.

3. **Assessment with WHO Leprosy Elimination Framework Classification:** Utilise the WHO's 2023 Leprosy Elimination Framework (and accompanying Excel-based Leprosy Elimination Monitoring Tool) to classify DF districts according to the phases of transmission interruption, disease elimination and post-elimination surveillance (*Annex 14*). This classification will guide interventions according to the epidemiological status of each area. To enhance this assessment, it is recommended to begin collecting data on case origin (whether autochthonous or potentially imported) to evaluate the influence of cross-border transmission, e.g., from neighbouring countries. Along with sporadic child cases, this data is part of the criteria for classification of the different phases of elimination.

4. ***M. leprae* Resistance Testing Survey:** According to a recent WHO report (*Annex 15*), countries are encouraged to implement AMR surveillance in leprosy and include this in their AMR National Action Plans. Conducting a survey on *M. leprae* resistance will provide essential data to monitor the efficacy of current treatments and detect emerging resistance patterns. Regular resistance testing will enable prompt identification of drug-resistant cases, ensuring that treatment protocols remain effective. It will also support global efforts to track *M. leprae* resistance and inform regional leprosy management strategies.

5. **Leprosy Training Sessions for Health Workers:** Conduct dedicated refresher courses on leprosy diagnosis and management for health workers and clinic staff to address skill gaps and ensure consistent case detection in low-prevalence areas, using practical examples and case studies. It could also serve as an opportunity for dedicated TLCAs with extensive

experience in identifying early signs and symptoms of leprosy (e.g., skin patches, numbness) to share their knowledge, particularly for newer team members. These sessions can be integrated into upcoming training for TB and other diseases, with certification certificates provided after completion to encourage participation and add professional value for providers.

6. **Expansion of Leprosy Research Projects:** DF's leprosy programme has a strong foundation in research and offers an excellent opportunity to attract further funding through research collaborations. Expanding research initiatives, especially those focused on novel diagnostic methods, transmission prevention and PEP regimens (such as single-dose rifapentine) will not only enhance programme effectiveness but also position DF as a leader in leprosy research. Research findings can contribute to global knowledge and shape best practices, particularly in under-resourced settings.

6.Conclusions on the TB & leprosy components

With reference to the important elements underlined in the ToR as guide for the report, some concluding remarks are summarised below:

Effectiveness: achievement of the expected results to achieve the specific objective of the programme.

The analysis of indicators performed on DF reports (see section 4.4, and ***Table 1*** comparing the indicators in DF-supported areas versus those for of the entire Bangladesh), supported by the observations done during the field visit (e.g., data reported by DF in aggregated format are consistent with what done in the peripheral units), shows that all indicators have been met with the single exception of the proportion of children among detected cases.

The performances of DF appear to be in general higher than those of NTP when comparing the indicators (***Annex 5, Table 1***) except for the national case notification. The national case notification is higher than that detected in DF- supported areas as includes area with extraordinary high estimated (and notified) incidence. To note that the notification rate trend in DF areas is on a constant increase.

The indicators from the DF-supported areas exceeded the national ones in the areas of gender balance, diagnosis delay, child TB diagnosis and MDR-TB management/outcomes.

Overall, the mission findings exceeded my/our expectations, although the mission was preceded by a careful desk review of the available documents and by several phone calls/TCs focused at

providing me additional details. The specific situation of children requires further training and mid-term investment in DF-supported projects as well as in Bangladesh in general. Although more attention has been recently given to diagnosis of TB in children and new approaches are under implementation (e.g. stool testing), clinicians in the health units visited do not use nasogastric aspiration/gastric lavage, a technique which is easy to perform, with limited discomfort for patients, and which provides good results as demonstrated in different settings. My/our recommendation is to include this specific aspect in the coming trainings and encourage clinicians and non-medical staff to learn how to do it, as this is not necessarily a procedure that should be done by medical doctors. A properly planned pilot study (which will boost the present package of operational research project) will convince local clinicians and will definitively help improving diagnosis. Another additional advantage of investing into a package of (at least) 2 mobile CAD-equipped mobile CXR devices plus 2 additional staff per District will allow to increase and peripheralise the access to CXR in children, who are contacts of index cases or who have signs and symptoms compatible with TB.

However, it should be noted that the overall proportion of children among diagnose cases is increasing in the DF-supported areas, and they are higher than those found in other areas of Bangladesh. To note also that in Tangail this proportion was 8.6% as a result of the increased attention on this issue.

The indicators planned are very likely to be reached, including children given the upward trend.

The mid-term evaluation of the DF-supported leprosy programme in Bangladesh highlights notable achievements in early case detection, disability prevention and integration with community health systems. The programme’s extensive coverage across multiple districts has enabled significant improvements in contact tracing, awareness-building and access to treatment, particularly in areas served by experienced health workers, including dedicated TB and Leprosy Control Officers and Assistants. However, despite progress, challenges in detecting cases early persist. Efforts to address these challenges are essential to meet programme goals and reduce disability among affected individuals.

From an operational perspective, the programme’s successful partnerships with local government and health facilities have reinforced its capacity to deliver consistent care and follow-up, yet resource limitations can constrain its potential impact in larger areas. The evaluation suggests that strengthening the infrastructure supporting case management, such as digital health tools, real-time surveillance and GIS mapping would enhance both the accuracy and efficiency of leprosy service delivery. Additionally, investing in expanded training programs for health providers would ensure

that staff maintain diagnostic skills, even in low-incidence areas where cases of leprosy are relatively rare compared to TB.

The DF-supported leprosy programme has made significant strides in supporting Bangladesh's national leprosy elimination strategy, contributing meaningfully to early detection and reducing child cases. Moving forward, leveraging advanced data tools and mobilising community resources will be essential to further reduce transmission, improve case outcomes and ensure sustainability. With continued focus on these areas, the programme is well-positioned to meet the indicator targets and support Bangladesh's broader goal of achieving zero leprosy, aligning with the WHO Global Leprosy Strategy and supporting lasting progress in leprosy control and disability prevention.

Alignment and ownership

The activities conducted by DF staff in collaboration with NTP staff is aligned with WHO and National guidelines. Staff expressed high motivation and enthusiasm, as well as ownership. An interesting finding (see ***Annex 5, Figure 10***) is that staff use data to take decision and manage activities, which is not always the case at peripheral level.

Relevance, efficiency, sustainability and impact

The TB-related activities are relevant, as TB is one of the top health priorities globally and in Bangladesh. They are relevant as they have impact, as they clear add on the performances NTP would provide without the DF-supported project.

The activities are efficiently performed, as clearly visible form the DF reports 2002 and 2023, the analysis of indicators and the observations done at field level.

Relevant to mention is the professionality used to deliver counselling and health education as observed in Netrakona Sadar (***Annex 5-Figure 11***, see also ***Annex 4b***).

Last but not least, an impressive amount of training courses was attended by DF staff (136 staff trained in 17 national and 1 international training in 2023).

Some examples of impact, exceeding expectations, deserves to be published in international peer-reviewed journals. The examples are the very high TPT completion rates (in the order of 97-98%), the additional gain in terms of presumptive cases (+50%) and diagnosed TB cases (+30%) resulting from DF-supported outreach activities; activities that cannot be supported with the present staff quantity available in the DF-supported areas. To note also that in the 2 areas which the Principal

Recipient (PR) in agreement with the GF ‘removed’ from the DF’s package for unclear reasons, case-finding and indicators were improving, as it was observed in all other DF-supported projects.

In fact, the current Global fund cycle (GC7, 2024-2026) had a rearrangement of areas, and DF supported 8 districts (2 project area) were shifted under the principal recipient NGO of the Global Fund. These 8 districts showed a historical reliable trend in case notifications over decades with 12,715 and 13,902 patients treated in 2022 and 2023 respectively. These areas showed increasing trends in recent years, mainly, due to expansion of molecular diagnostics. The number of patients increased 12% between 2021 and 2022 and 9% between 2022 and 2023. We observed a practice of flat notification target-setting at subnational level by the Global Fund which is scientifically questionable. Furthermore, the treatment success of these areas was 92% in 2022 and 93% in 2023 in these 8 districts.

The leprosy-related activities under the DF programme are highly relevant, as leprosy continues to be a public health challenge in Bangladesh despite the country's official elimination status. The programme addresses a critical need by supporting both early case detection and disability prevention, two of the most impactful leprosy control strategies. The programme’s integration within the NLP framework ensures alignment with national priorities and its emphasis on long term community-level contact tracing and engagement strengthens its reach among high-risk populations. The approach of combining medical intervention with community-based awareness and training enhances programme relevance, particularly in underserved areas where government support may be limited.

Efficiency within the programme is demonstrated through coordinated field operations and effective utilisation of resources. The DF has a structured monitoring system based on both paper and Excel records, helping to maintain a consistent overview of patient follow-up for treatment adherence and contact tracing, while ensuring they are well-documented. Observations at field sites, such as Tangail and Netrakona Sadar, revealed that DF-trained staff members, including TLCAs, efficiently handle diagnostic and contact-tracing tasks, reducing the burden on government health systems and effectively improving programme reach.

The programme’s sustainability is bolstered by its collaborative approach with government facilities, which fosters local ownership and integration. Training of general health providers within government clinics aims to embed leprosy management skills within the national health workforce, creating a foundation for sustained leprosy control. However, sustainability could be further enhanced by introducing field-based electronic systems for contact tracing, which would streamline data collection and improve data accuracy. Additionally, sustained efforts to strengthen leprosy

awareness and encourage early care-seeking behaviours among communities are essential for the long-term sustainability of early detection and disability prevention.

The impact of DF's leprosy programme is significant, with marked improvements in case detection and a reduced proportion of G2D cases in some districts. This was also reiterated by other personnel in the field, underscoring the programme's effectiveness in mitigating disease progression and preventing disability. In certain areas like Kishoreganj, the programme's focus on early detection has kept G2D rates low, reflecting an overall positive trend towards earlier intervention. Nonetheless, districts with higher G2D proportions such as Mymensingh and Netrakona, may require additional support to ensure equitable impact across all DF-supported areas. Expanding leprosy research and documenting successful programme outcomes in peer-reviewed journals could further amplify the programme's impact by informing global leprosy control strategies and garnering support for innovative interventions.

Further comments on impact and sustainability will follow, see below.

Transversal objectives (gender, environment and human rights)

In terms of gender balance, although more males are detected than females with TB (which are around 40%), the difference found in diagnosis delay is between males and females is small and not significant, this showing that progress was done and females have access to services. In terms of TB patients detected in 2022 they were 38%, in 2023 36%, and in 2024 (3 quarters) 35% (***Annex 5, see also Table 1***).

The trend in the proportion of female leprosy cases across DF-supported districts has consistently exceeded the 30% target set by the programme. From 2020 to 2024, the female proportion of cases has been around 40–50%, indicating that efforts to make leprosy services accessible to women are achieving notable success. This sustained higher proportion of female cases suggests that targeted interventions, such as community awareness campaigns and gender-sensitive outreach, may be effectively reaching female populations. The trend underscores the programme's progress in promoting equitable access to leprosy diagnosis and treatment, although continued efforts are needed to maintain and further improve these gains, ensuring that women in all districts can access care without barriers. Recognising that women may face additional barriers to accessing healthcare, the programme aims to ensure equitable access to leprosy services for both men and women.

In terms of DF staff, in 2023 the females were 31% for DGD-funded staff and 37% for the whole DF-covered staff. The country representative is also female.

DF is very careful towards human rights, and the mission's findings support this. We have seen, for example, practical sign of additional support to patients in need far beyond the established 'contractual' obligations. Examples are a patient with leprosy, cured, who is living hosted free-cost since >30 years in a little house within the Jalchatra Hospital. Another example is the support given to a patient with MDR-TB, with cardiological complications, whose additional examinations to manage her cardiomyopathy were covered by DF.

We cannot say much of environmental aspects as the DF is not directly focused on climate changes. However, several initiatives have been implemented:

- the DF-supported sites are clean and well maintained;
- the waste is managed as per rules;
- initiatives have been taken to limit the plastic use in drugs and reagents storage;
- the use of cars have been rationalised, limiting their unnecessary use (e.g,, outreach activities conducted using public transportation means;;
- efforts are done at office level to limit unnecessary printing of documents with other similar environmental-sensitive behaviours.
- Furthermore, and important investment was done by DF by equipping in the hospitals managed with solar panels for a total of 90 kWp (Grid.Connected Solar PV System).

7.Main lessons learned

TB component

The overall finding is that the DF's TB project (and, so far, I/we have seen although not on our ToR, this is true also per Leprosy activities) is brilliantly managed both at the Dhaka Office and peripheral level. Staff are motivated, competent and efficient. This is reflected by the outcomes and indicators (see section 4.4).

The patients interviewed were happy and grateful of the services provided.

The survey results also confirm the statements above.

The non-DF staff interviewed during the mission confirmed the importance of the support given by DF to NTP, and the excellent collaboration ongoing at the different levels. This was confirmed also by the NTP manager (Dr. Zahangir Kabir) and by the senior USAID advisor for MDR at NTP level (Dr Abdul Hamid Selim), both met on 31 October 2024 at the NTP HQ Office.

Considering the impact of the DF-supported project in Bangladesh, I think any effort should be done by donors and stakeholders to support it and further potentiate over time as:

1. It provides a 'plus' in terms of case finding (30 to 50% more cases) and treatment outcomes (particularly in the area of MDR-TB), with direct impact of the TB epidemic in the regions served;
2. It represents a technical model of how to implement prevention, diagnosis and treatment of TB, which can be used as permanent training/refresher spot for the entire country;
3. It is also an excellent example of NGO-NTP collaboration in therefore an example on MAF can be implemented, as testified by the survey results and other findings (e.g., the vast majority of the 31 persons interviewed agreed on the importance, impact and quality of the DF project in Bangladesh, with an average agreement score of 93.93%). Furthermore, consistent results were given interviewing a sample of patients (see ***Annexes 2b and 4***),
4. It allows to conduct scientific and operational research activities Bangladesh needs at different levels (advocacy, funding, training, etc.). The 3 publications planned will further boost the impact of the DF project.
5. The DF-supported hospitals (e.g. Jalchatra and Mymensingh) will allow soon to run a pilot population-based project on implementation of Post-TB Lung Disease management (see TB-REACH funded project) and the basis for future training and scale-up in Bangladesh.
6. Jalchatra Hospital can host, at low cost, residential courses. This potentiality should be further used, e.g. considering the organization of a skill-based international course in collaboration with NTP, WHO, stakeholders and donors, as successfully done before COVID-19 in Dhaka.
7. Impact and relevance of the DF-project will continue if it will not be further downsized. Ideally it should be strengthened by implementing at least 2 mobile CXR units which will potentiate screening, active-case-finding and outreach activities.

Leprosy component

The overall finding is that DF's leprosy programme, which is integrated with TB services, is excellently managed both at the Dhaka office and peripheral levels. Staff are motivated, competent and efficient, which is clearly reflected in the program's outcomes and indicators.

The patients interviewed were happy and grateful of the services provided.

The survey results also confirm the statements above.

The non-DF staff interviewed during the mission confirmed the importance of the support given by DF to NLP and the excellent collaboration ongoing at the different levels. This was reiterated during discussions with the NLP, where it was clear that the leprosy control efforts by the DF were greatly appreciated.

Considering the impact of the DF-supported leprosy programme, it is essential that donors and stakeholders continue to support and further strengthen it over time as:

- Leprosy case finding and effective treatment outcomes are enhanced, which have a direct impact on the control of leprosy in the regions served by DF.
- It serves as a model for comprehensive leprosy prevention, diagnosis and treatment, functioning as a valuable resource for knowledge for other NGOs and health providers across Bangladesh.
- It is also an excellent example of NGO-NTP collaboration in therefore an example on MAF can be implemented. Survey results and other findings reflect strong support. A majority of the 31 stakeholders interviewed expressing high levels of satisfaction with the DF project's impact and quality, with an average agreement score of 93.93%. Patient interviews further underscore these positive outcomes (***Annexes 2b and 4***).
- It enables critical scientific and operational research activities needed in Bangladesh across various domains (advocacy, funding, training, etc.). Upcoming publications will further enhance the visibility and impact of DF's work on leprosy in Bangladesh.
- DF-supported hospitals (such as Jalchatra and Mymensingh) can serve as pilot centres for community-based projects, including active case finding activities and PEP initiatives, providing a foundation for future training and potential scale-up across Bangladesh.
- The impact and relevance of the DF-supported leprosy project will continue if maintained and ideally strengthened. Expansion could include additional mobile health units to enhance screening, or active case finding campaigns such as community-based skin camps, extending DF's reach and supporting the goal of zero leprosy.

Reducing funding to the project in the years to come will cause reduced impact and- at the end, both a missed opportunity (or damage) for Bangladesh (which is a priority country for TB as well as for Leprosy) and a loss of visibility for the donor(s).