Report of the Tanzania Mid-Term Review of the National Tuberculosis and Leprosy Programme Strategic Plan VI, 2020-2025

28 JANUARY – 10 FEBRUARY 2023

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4 Abbreviations and Acronyms

ACF	Active Case Finding
ACSM	Advocacy Community Social Mobilisation
ADDO	Accredited Drug Dispensing Outlet
aDSM	Active Drug Safety Monitoring
ADR	Adverse Drug Reaction
AIDS	Acquired Immuno-deficiency Syndrome
APHFTA	Association of Private Health Facilities in Tanzania
ART	Anti-retroviral Therapy
ARV	Antiretroviral
ASM	Artisanal Mining
BCC	Behavioral Change Communication
BPaL/BPaLM	Bedaquilline Pretomanid And Linezolid/ Bedaquilline Pretomanid Linezolid Moxifloxacin
Cap-TB	Catalyzing Pediatric Tuberculosis Innovations
CHW	Community Health Worker
CI	Contact Investigation
CHMT	Council Health Management Team
COE	Centre Of Excellence
CRG	Communities Rights and Gender
CSO	Civil Society Organisations
CSSC	Christian Social Services Commission
CTRL	Central Tuberculosis Reference Laboratory
CXR	Chest X Ray
DHIS2	District Health Information Software 2
DM	Diabetes Mellitus
DOT	Directly Observed Treatment
DTLC	District TB and Leprosy Coordinator
DQA	Data Quality Assurance
DR-TB	Drug Resistant Tuberculosis
DST	Drug Susceptibility Testing
ECHO	Extension For Community Healthcare Outcomes
EHR	Electronic Health Record
EHT	Environmental Health Technologist
ETL	Electronic TB and Leprosy Register
FLD	First Line Drugs
GDP	Gross Domestic Product
GFATM	Global Fund Against Aids, Tuberculosis and Malaria
GLC	Green Light Committee

GoZ	Government Of Zimbabwe
HIV	Human Immunodeficiency Virus
HRH	Human Resources for Health
HCW	Health Care Worker
ICF	Intensified TB Case Finding
IPC	Infection Prevention and Control
KIDH	Kibongoto Infectious Disease Hospital
KVP	Key Vulnerable Population
LF-LAM	Lateral Flow Lipoarabinomannan Assay
MAF-TB	Multisectoral Accountability Framework For TB(MAF-TB)
MDR-TB	Multi- Drug Resistant Tuberculosis
M&E	Monitoring And Evaluation
MoH	Ministry Of Health
MoHCDGEC	Ministry Of Health Community Development, Gender, Elderly and Children
mWRD	Molecular WHO Recommended Rapid Diagnostics for TB
MTB	Mycobacteria Tuberculosis
MTR	Mid-term Review
NCD	Non-Communicable Disease
NFM	New Funding Model
NSP	National Strategic Plan
NTLP	National Tuberculosis and Leprosy Programme
PEPFAR	President's Emergency Plan for AIDS Relief
PHC	Primary Health Care
PLHIV	People Living With HIV
PMDT	Programmatic Management of Drug Resistant TB
PSM	Procurement and Supplies Management
PTLD	Post TB Lung Disease
RCH	Reproductive And Child Health
RHMT	Regional Health Management Team
RR	Rifampicin Resistant
RTLC	Regional TB and Leprosy Coordinator
SLA	Service Level Agreement
SLD	Second Line Drugs
STR	Shorter Treatment Regimen
TB	Tuberculosis
TMDA	Tanzania Medicines and Medical devices Authority
TPT	Tuberculosis Preventive Therapy
TSR	Treatment Success Rate
UN	United Nations
UNICEF	United Nations Children Fund

UNHLM	United Nations High Level Meeting
USAID	United States Agency for International Development
WHO	World Health Organization
ZIHTL	Zanzibar Integrated Hepatitis, Tuberculosis and Leprosy Programme

5 Acknowledgement

The successful implementation of the recent Tanzania TB and Leprosy NSP 2020 - 2025 mid-term review shows the unwavering support and commitment from our stakeholders. It was a worthwhile engagement of all the key stakeholders from within and outside the country. Their wealth of experience and technical expertise helped a lot in successfully accomplishing this review of our Strategic Plan. Our sincere appreciation goes out to all for the enduring support and sacrifice exhibited during this review. Following this review, we now better appreciate our performance gaps and challenges that need to be addressed to mount an impactful TB and Leprosy response to accelerate the attainment of the country and global targets.

Indeed, it may have been challenging for the MoH to successfully complete this exercise without the technical, material, and financial support from our Development, and Implementing Partners. Although it may not be possible to acknowledge everyone who took part in this review independently, our appreciation goes to National, Regional, District and health facility teams that participated or supported this exercise. Special gratitude goes out to the TB and Leprosy patients, survivors as well as the survivors' networks who shared their insights and the lived experiences. Our External review experts, Internal reviewers, and the central team, deserve a big thank you for the wonderful work and the service above self. Special thanks also go to World Health Organization for the technical leadership and to USAID for the financial support and mobilization of reviewers.

This undertaking was made possible by the technical leadership from Dr IRAGENA, Jean De Dieu, WHO/AFRO, who led this review, a special thanks to his readily availability of a technical hand. Equally, many thanks go to Drs Peter Neema (NTLP Acting Program Manager) Emmanuel Heriel Matechi (GF Grant Advisor) and Mr. Emmanuel Nkiligi (Strategic information head) for their technical support and excellent coordination of this review. Lastly but not least, special thanks go to Dr Samuel Kasozi, USAID/Stop TB Partnership consultant for supporting the writing compilation of this review report and all experts who participated in this review

6 Executive Summary

The United Republic of Tanzania (URT) has 31 administrative regions (26 in Mainland Tanzania and 5 in Zanzibar), 166 administrative districts, and 194 councils. Zanzibar is a semi-autonomous territory that maintains a political union with the Tanzania Mainland. In 2022, Tanzania had a population of 61.8 million with about 51% of the population being females. Tanzania's TB incidence has been declining and by 2021, the country had reduced the TB incidence rate by 32% compared to 2015 baseline. However, 80% of TB burden is among HIV-negative individuals and there was a slight rise in TB incidence among new and relapse cases during and after the covid 19 period. The highest TB burden is among the productive age groups 25-34 and 35-44 years and the elderly ≥ 65 years but it's worth noting that men bare the blunt than women.

Tanzania's health system has faced difficulties due to COVID 19 in the recent years, however, the country's TB case notification of all forms remained stable with 85,120, 86,661 and 100,747 TB cases notified in 2020, 2021 and 2022 respectively compared to 81,492 cases in 2019. Following a reduction in COVID 19 disruptions, the TB notification of all forms increased by 16.3% between 2021 and 2022. As a result of sustained TB control efforts, Tanzania reduced the TB deaths by 55% in 2021 compared to 2015. As the 2022 WHO Global TB report, the top risk factors fuelling the TB epidemic in the country included undernutrition followed by HIV, alcohol use disorders, smoking and diabetes.

Currently, Tanzania is implementing its 6th National Strategic Plan (NSP) 2020-2025 for TB and Leprosy. This NSP paves a way of attaining the country and global TB and Leprosy targets. To measure progress achieved in the implementation of this NSP and attainment of the set targets, the country conducted a mid-term review between 28 January - 10 February 2023.

The main objectives of this mid-term review were:

1. To assess progress towards achieving NSP set targets.
2. To identify gaps in the implementation and
3. To use findings of the mid-term review to facilitate reprograming of strategic interventions to achieve NSP intended objectives and set targets as well as mobilization resources in the second half of implementation of the NSP.

The Specific objectives included:

1. To conduct TB epidemiological and Impact analysis
2. To assess progress made in the implementation of the 6th NSP against specified objectives and set target.
3. To review implementation of Programmatic Management of Drug resistance Tuberculosis (PMDT) - Green Light Committee (GLC).
4. To assess the relevance of activities planned in poorly performing areas and rationalize for reprogramming.
5. To synthesize findings and make recommendations for the 2023-2025 implementation period of the strategy.

6. To use findings of the mid-term review to support mobilization of resources for the 2023 – 2025 period of the strategy.

The main findings of the review include:

Governance, Programme management, Health Financing, Multisectoral Coordination (MAF), Partnerships and Social Protection

Good policy environment for TB and Leprosy service delivery is in place, and the TB and Leprosy program is decentralized with clear structures at national, regional, and district levels to support implementation of priority interventions. More still, the NSP VI is aligned with the National Health Sector Strategic Plan V and the National Health Policy. In terms of financing, the health sector is funded through domestic, bilateral, and multilateral sources. Donors and funding agencies (GFTAM, USAID, PEPFAR) are in the country and are actively contributing to the financing of the current NSP. Good to note that the Regional and District workplans are aligned to the national strategic plan. However, the TB and Leprosy programme suffers from inadequate financing. There is inadequate funding to cover 100% of NSP priority interventions. In the FY 2021/2022, there was a **funding gap of 35% out of the total NSP VI financial requirement of USD 38,209,932.** To improve financial management, an electronic and integrated financial management (EPICOR) tool is used. This is used to track funding allocation, disbursement, and utilization.

To foster multi-sectoral engagement for TB control, a draft MAF-TB framework has been developed and there is a plan to have it finalized in first quarter of 2023. Additionally, goodwill for MAF-TB exists among all stakeholders interviewed. The initiative is reportedly to be coordinated through the prime minister's office and MoH is secretariating its take off. To provide social protection to TB patients, a bill on Universal Health Coverage has been crafted and has gone through the first Parliamentary hearing, and the approval process is ongoing.

Despite the good policy environment in place, it's worth noting that both NSP V1 and the country guidelines do not cover urban TB control. TB control in urban areas is done same way like in rural areas (remains undifferentiated) despite the unique challenges associated with high population, extreme population mobility, high number of private providers and the semi-autonomous nature of urban areas.

To close gaps noted in this area, MoH in collaboration with implementing partners need to fast track establishment of the MAF for TB, and the approval of the Universal Health Coverage bill. Similarly, there is urgent need to mobilize financial resources to close the 35% gap in funding, and to implement an urban TB model in urban areas starting with Dar es salaam.

TB Case Finding, Integrated Patient Centred TB Care and Treatment

The TB treatment coverage increased to 65% in 2021 from 53% in 2019, but this was only 87% of the 75% of NSP set target. In 2022, a total of 100,747 TB cases of all forms were notified, however, 49.6% were New and Relapse pulmonary clinically diagnosed cases. The high proportion of clinically diagnosed TB is attributed to the low quality of TB screening and to the less sensitivity of the TB diagnostic algorithm being used. More still, the low number of bacteriologically confirmed TB cases detected is reported to be due to the limited access to molecular diagnostics, in addition to interruption in GeneXpert cartridge supply, sub-optimal sputum referral system and low knowledge on TB diagnosis among HCWs. The review also observed that the TB treatment success rate (TSR) in adult with drug susceptible TB improved from 90% in 2019 to 96% in 2022 thereby surpassing the 2025 set target of 90%. Efforts to improve drug susceptible TB treatment coverage are warranted.

Childhood and Adolescent TB Care and Treatment

In 2022, childhood TB contributed 17% to the total notification and the contribution has remained above the 15% target. Equally, Childhood TB notification increased from 15% 2019 to 17% in 2022. However, the review noted that there is inadequate capacity for TB diagnosis in children as evidenced by non-alignment to the national algorithm/ score chart, limited sample collection, limited use of stool for diagnosis, inadequate CXR access & interpretation. Contributing factors to this finding include, limited knowledge and skills which are partly linked to inadequate training and post training technical support, besides HRH shortages and staff transfers. In spite of the challenges in childhood TB case finding, case holding is good. For instance, the TSR among children started on treatment increased from 95.3% in 2019 to 97.3% in 2022 along with a significant reduction in mortality from 8.3% to 1.4% over the same period. Further strengthening of childhood and adolescent TB diagnosis is required particularly through HCW capacity building and scaling up the use of stool for GeneXpert.

TB/HIV, TB Prevention and Other comorbidities

TB/HIV collaborative activities have been implemented since 2006 and testing for HIV among TB patients, and active screening for TB among HIV patients have been scaled-up countrywide. There were 24,000 estimated incident TB patients that were HIV positive in 2021, however, only 64% were detected. Furthermore, despite 100% TB screening at CTCs, the diagnostic yield for TB among PLHIV was low (<1%). Secondly, although TB/HIV co-infection levels remain high, there is a notable decline in co-infection levels from 28% in 2018 to 16% in 2022. The main interventions implemented by the NTLP under the TB/HIV theme include HIV testing among TB patients which currently stands at 98% versus the WHO AFRO average of 85%. Of the TB/HIV co-infected patients, 99% received TB/ART co-treatment versus WHO AFRO average of 92%. Despite wide scale up of TB/ART (100% geographical coverage), the mortality ratio among incident TB patients who are HIV positive was still double that of the incident TB patients who are HIV negative (32% vs 16%), based on the WHO country TB report for 2021. Provision of TB Preventive Treatment (TPT) to PLHIV currently stands at 57%. Interventions for TB infection control and prevention are delivered at health facilities, however, there is no clear indicator to track performance in this area. On TB and Diabetes bi-directional screening, there is no comprehensive national data on this burden in Tanzania, but one study reported the TB prevalence among diabetes patients to be at 1.3% and another at 9.7%. Implementation of the "one-stop shop" model for TB/HIV/DM care across all facilities with recommended new sensitive tools like Urine LAM and digital chest x-ray is urgently needed.

TB laboratory network

In Tanzania, the diagnostic services comprise of both laboratory and radiology services under the supervision of the NTLP Diagnostic Network Coordinator. The TB diagnostic network includes a pyramidal model of dispensaries, health centres, and hospitals at the district, regional, and zonal level, with the Central TB and Reference Laboratory at national level. The lab network includes a total of 335 molecular platforms serving 1,752 Diagnostic centres. TB diagnosis in the country is largely affected by the low coverage and access to diagnostic platforms which stands at 19% (335 molecular platforms out of 1,752 TB Diagnostic centres) in the country. Secondly, TB diagnosis is further affected by the sub optimal coverage of the integrated specimen referral system. Thirdly, the country experiences erratic supply of GeneXpert cartridges including reagents for LPA and MGIT tests leading to service interruption. However, the review noted that the NTLP had also introduced four 10 colour module ultra/RIF/XDR machines to support MDR/XDR diagnosis. On the other hand, the use of GeneXpert multiplexing for TB and HIV testing was noted to stand at 51% of the GeneXpert network. Furthermore, to date, 91% (279/305) GeneXpert facilities are connected to GxAlert/Aspect and are sending performance data to the central server on a real time basis. Nevertheless, there is sub-optimal uptake of

new diagnostic tools like Truenat, urine LAM and use of stool for paediatric TB diagnosis (current only in five sites). Of the 1,752 diagnostic centres, 1245 facilities enrolled in blinded rechecking EQA and in Quarter 3, 2022, 903 (73%) facilities were rechecked and had an overall percentage true positive of 97% and overall false negatives of 0%. Presently, the country has about 391 x-rays and access to x-ray for TB screening is affected by service cost, which ranges from Tzs 15,000 to 30,000 per patient.

To improve coverage of GeneXpert, other molecular mWRDs and to limit the current long turnaround times for laboratory results there is need to deploy Truenat, TB Urine LAM and TB-LAMP. In addition, the review advises leveraging of TB/HIV multiplexing and advocating for additional procurement of mWRD from the HIV treatment and care program. At the same time, expand access to x-ray services.

Regarding equipment maintenance, the MoH established a national maintenance unit which is decentralized into zonal workshops to ensure servicing and maintenance of medical equipment in the country, but the unit has no national capacity for maintenance of the major TB laboratory equipment. However, there is an up-to-date Service Level Agreement (SLA) for GeneXpert machines with Cepheid which helps to mitigate the observed gap in equipment maintenance.

CTRL is successfully implementing a Quality Management system and as a result, the lab has been accredited under ISO 15189 since 2018 and still maintains accreditation with an extension of scope to cover seven tests by the end of 2022. The CTRL also provides technical Assistance to the TB laboratory at lower levels which has resulted in accreditation of 30 TB laboratories for GeneXpert or AFB Smear Microscopy. The lab uses both LMIS (electronic) and paper-based data system within the network. However, weak data linkages with the laboratory system were observed due to use of multiple forms and manual data entry. At the same time, duplication of effort in data capturing on paper forms and data entry in digital systems was equally noted.

Programmatic Management of Drug-Resistant TB (PMDT)

Regarding RR/MDR-TB detection, there is a steady decline from 534 in 2019 to 358 in 2022 despite an increase in GeneXpert modules in the country over the years. In 2022, only 41% of the 68.4% notification set target was achieved. This is attributed to the inconsistent supply of GeneXpert Cartridges in the country (40% gap of required GeneXpert Cartridges), coupled with ineffective sample referral system, low first line DST Coverage among TB patients (49% vs 62% target) and multiplexing of GeneXpert Machines for TB, HVL, IAD) in some diagnostic facilities. Similarly, the RR/MDR-TB treatment success rate has decreased from 83% in 2017 to 73% in 2019. Worst still, the RR/MDR-TB mortality rate increased from 12.8% in 2017 to 19.3 % in 2019 while loss to follow up rate also increased from 2.9% in 2017 to 5.4% in 2019. DR-TB management and treatment outcomes are further compromised by using a mixed model of care in which there are evolving Treatment Initiation Facilities and Follow -up facilities. The model is expensive to implement, makes it difficult to build clinical and Laboratory capacity for DR-TB management. In this model, a facility stops being a Treatment Initiating Facility (TIF) once it has no patient. Still, the model is associated with treatment initiation delay, since time is needed to mobilize medicines for the patient to be initiated from the supply chain, and all these factors contribute to the poor outcomes. Using fixed sites about 4 per region is highly recommended besides rolling out a standardized DR-TB minimum package of care interventions across all sites. Lastly, improving the patient incentives and enablers provided in line with the cost of living will go a long way in enhancing treatment adherence, mitigating against catastrophic costs besides improving the overall patients' quality of life.

Community TB care and community, rights, and gender (CRG)

Community TB care (CTBC) and Community Rights and Gender (CRG) programs are well established and functional in Tanzania. The review team observed that community TB care and CRG activities are supported by CHWs and there some efforts to integrate with leprosy community-based services. Both CTBC and CRG services were integrated during TB sensitization, screening, sputum collection and referral services at households, Active Case Finding (ACF) events, as well as during lost to follow-up tracing activities. Consequently, there has been an increase in community TB contribution to the national notification from a 30% in 2020 to 40% in 2022. However, the scale and scope of Community TB care and CRG interventions is still limited by lack of adequate resources particularly at district level. Building HCWs and CHWs knowledge and skills on community TB care and CRG is needed besides expanding community sensitizations. More still, conduction of ORs in these two areas and capturing of key variables in national electronic data systems will go a long way is availing strategic information for decision making.

Public Private Mix (PPM)

Public-Private Mix TB Strategy in Tanzania is structured as a partnership between the government and the private sector. The private health sector in Tanzania is comprised of privately owned and operated hospitals, clinics, health centres, pharmacies, dispensaries, accredited drug dispensing outlets (ADDO), traditional healers and other healthcare facilities. These facilities provide a range of medical services, including diagnostic tests, outpatient and inpatient care, and preventive health services. The sector is organized into several different types of entities, including private financed (owned by doctors, nurses, other individuals); private not for profit (aid agencies or NGOs); faith-based (Christian and Islamic), company owned (larger organizations or health care companies) and some quasi-government hospitals, pharmacies & ADDOs and private standalone laboratories. The NTLP has maintained engagement with 1440 ADDOs & 360 Traditional Healers and several private diagnostic facilities. Consequently, the contribution of the private sector to TB notification has increased from 5.6% in 2014 to 19% in 2019 although decreased to 15% in 2022. The PPM performance is constrained by the fact that APHFTA & CSSC have not been fully used to improve private sector engagement in the management of TB and Leprosy. In addition, there is lack of an intermediary agency supporting PPM delivery coupled with inadequate funding to support TB work in private facilities.

Supply Chain Management and aDSM

The country procures quality assured TB commodities through Global Drug Facility (GDF) of Stop TB Partnership while the Medical Store Department (MSD) provides support in the procurement of a few TB laboratory commodities mainly those which are not part of the GDF's products' catalogue. There is uninterrupted supply of quality-assured second line TB medicines, adult first line TB medicines, Leprosy medicines and TPT medicines in the past 12 months with 100% availability of TB medicines at the central level with no potential stock outs anticipated in the next 6 months. Equally, adequate funds approximately USD 30.7M are available for the procurement of for FLD, SLD and TB laboratory consumables under Global Fund for the period 2021 to 2023. Additionally, support is available through USAID/PEPFAR for the procurement of TPT medicines and cartridges. However, stock outs of child-friendly formulations were reported in most of health facilities visited though adequate stocks were available in the country and approximately USD350,000.00 worth of child friendly FLDs expired in 2022 at the two MSD warehouses. In addition, a significant funding gap for the procurement of GeneXpert Cartridges of USD 9M was

noted coupled with a global shortage, delays in signing service level agreements (SLA) with Cepheid and prolonged in-country procurement lead time due to late disbursement of funds for TB laboratory commodities, besides delays in providing the required procurement approvals and late payment of TMDA import permit processing fee contributing to delays in shipment of products procured via GDF. Relatedly, there was insufficient funds for procurement of 3HP with a funding gap of USD3,465,504.21. Therefore, there is need for NTLP and her partners to develop a mitigation plan to address all challenges to prevent stock out and expiries of all TB commodities.

Leprosy

Leprosy remains a neglected disease, yet it causes more physical deformities than other infectious diseases. Even though Tanzania attained global target for leprosy elimination, the country is still among those notifying more than 1,000 cases per year. In 2022, Leprosy prevalence rate was 0.3/10,000 population down from 0.4/10,000 in 2015. At the national level, the Leprosy prevalence rate has remained below 1 case per 10, 000 population since 2006. However, in 2021, 14 districts councils (12 of the mainland and 2 districts from Zanzibar) reported higher rates above the national prevalence of 1 case per 10,000 population, pointing to the disproportionate distribution of the Leprosy burden across the country. Leprosy just like TB is coordinated at all levels (regional, district, and health facility). And MDT (Multi-drug therapy) medicines were readily available. To address gaps in Leprosy control, Tanzania conducted first-ever a comprehensive country model leprosy review followed by a stakeholders' meeting in 2021/2022 during which a zero roadmap for 2022-2030 and an Action plan for 2022-2025 were developed. However, Leprosy control still suffers from lack of funds, loss of HCW clinical skills, late diagnosis (hence increased grade 2 disabilities at 10% in 2021 and stagnant at 9% in 2022), weak leprosy surveillance system, high stigma and discrimination including inadequate disability prevention and management services. Lobbying for domestic and international funds/ resources for the implementation of zero roadmaps and strengthening the integration of leprosy into other health disciplines among implementing partners is needed.

Monitoring, Evaluation and Operational Research

The National Tuberculosis and Leprosy Program (NTLP) has made significant progress in the areas of surveillance, monitoring, and evaluation (M&E) as well as operational research (OR). Since 2018, the program has developed a comprehensive electronic case-based surveillance system for TB and Leprosy called DHIS2-ETL, which was updated in September 2021 and is now functional countrywide. However, community and facility-based data are still collected using a paper-based system and reported to the district level or directly entered into DHIS2-ETL at the facility level. The TB and Leprosy registers and reporting formats effectively capture key TBL-vulnerable communities, and there are no reported shortages of recording and reporting tools and registers at the visited health facilities. The ETL has significantly contributed to improved TB data management, as storing, and retrieving of the required data is now easy. There are reduced data discrepancies in the entered data, both at different levels in the system and at the facility level. However, limited or no internet connectivity in some areas remains a challenge for ETL implementation. Thus, there is need to further build capacity of HCWs and improve internet connectivity to improve data capture, storage and reporting in line with WHO reporting requirements as well the WHO surveillance benchmark standards.

In summary, the country is on track to reach the 2025 End TB milestone of reducing TB incidence rate by 50% and number of deaths by 75%. However, the country is not on track regarding The END TB Goal of 10 cases per 100,000 population. Therefore, to accelerate the progress to the set TB country targets as well as the global TB targets, NTLP working with her partners urgently needs to close the 35% funding gap in the NSP financial requirement. In addition, there is need to strengthen the technical and managerial capacity of NTLP structures at all levels, expand the diagnostic network, improve the quality of TB screening including revision of the TB diagnostic Algorithm to improve its sensitivity to minimize clinical diagnosis (which accounted for 49.6% of the notified TB cases in 2022). Similarly, stabilize the commodity supply chain, introduce, or scale up the use of new medicines (BPal, BPalM, Shorter TPT regimens) including new diagnostic tools (Urine LAM, TB LAMP, Stool for diagnosis of TB in Children, and Whole Genome Sequencing). Furthermore, map and fix DR-TB treatment initiation sites including implementation of a DR-TB standardized minimum package of interventions across all DR-TB sites. In urban areas consider implementing an urban TB model of differentiated service delivery given the unique challenges associated with high population, high population mobility, high number of private providers and semi-autonomous nature of urban areas. Additionally, provide social protection to TB patients as the country fast tracks the Universal Health Coverage bill. Lastly, give Leprosy a new face through mobilization of adequate funding and building of capacity among health providers. Lastly, close the observed gaps in M&E systems and operation research including strengthening the use of data for decision making at all levels.

7 Country Profile

7.1 Geography

The United Republic of Tanzania (URT) is the largest country in East Africa, occupying an area of 945,087 sq. Km. It lies between latitudes 1°S and 12°S and longitudes 30°E and 40°E. The country shares borders with eight neighbouring countries, namely: Kenya and Uganda to the north, Rwanda, Burundi, and the Democratic Republic of Congo to the west, and Zambia, Malawi, and Mozambique to the South. The eastern border is formed by the Indian Ocean (figure 1). There are 31 administrative regions (26 in Mainland Tanzania and 5 in Zanzibar), 166 administrative districts, and 194 councils. The districts have about 4 - 5 divisions, which have 3-4 wards (Mainland) or Shehias (Zanzibar) and each ward has 5-7 villages. Zanzibar is a semi-autonomous territory that maintains a political union with Mainland of the United Republic of Tanzania.

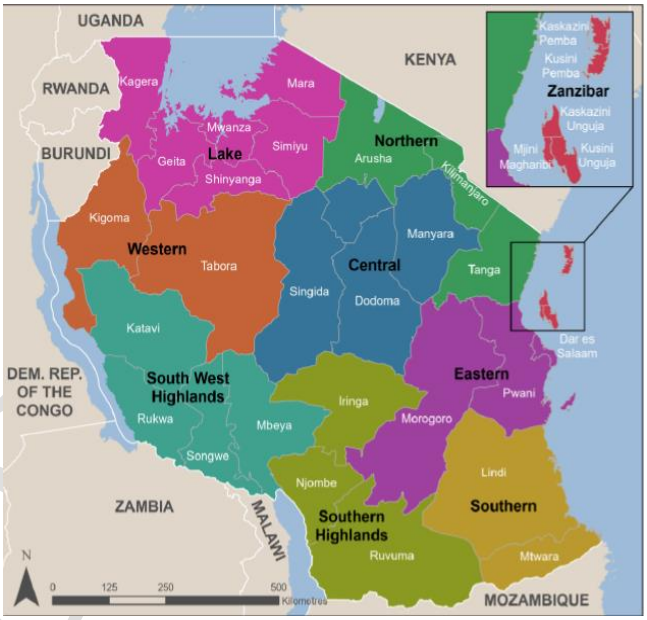


Figure 1: Map of Tanzania

7.2 Demography

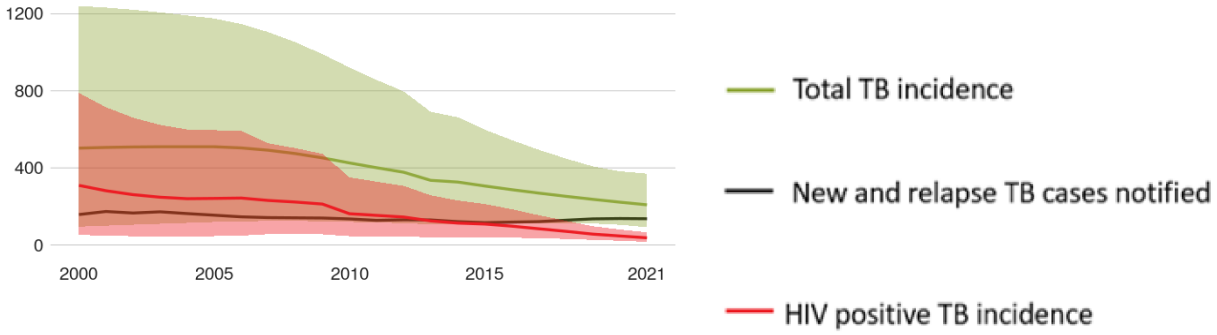
In 2022, Tanzania had a population of 61.8 million with about 51% of the population being females. Of the 61.8m, 1.9m live in Zanzibar. The population is relatively young, with 46% being under 15 years of age. The annual population growth rate, as extrapolated from the 2012 Population and Household Census, is 3.1 %. The average household size is 4.9 members while the population density is 63.58 people per sq. Km. Higher population clusters occur in the northern half of the country and along the eastern coast. Almost a third of the population (19 million) is urban. Like Tanzania mainland, Zanzibar is a low-income setting with about 28% of the population living below the poverty line. About two-thirds of the Zanzibari live in rural areas (TNBOS, 2022).

7.3 TB Incidence

An estimated 10.6 million people fell ill with TB worldwide in 2021, an increase of 4.5% from 10.1 million in 2020, reversing many years of slow decline. Similarly, the TB incidence rate (new cases per 100 000 population per year) is estimated to have increased by 3.6% between 2020 and 2021, following declines of about 2% per year for most of the past 2 decades. For Tanzania, generally, the total TB incidence has been declining (figure 2) and the country is one of the three high TB burden countries that reached or surpassed the first milestones of the End TB Strategy for both reductions in TB incidence and TB deaths: Kenya (in 2018), the United Republic of Tanzania (in 2019) and Zambia (in 2021). By 2021, Tanzania had reduced the TB incidence by 32% compared to 2015 baseline. However, it is worth to note that 80% of TB burden is among HIV-negative individuals and there was a slight rise in TB incidence among new and relapse cases during and after the covid 19 period. Nevertheless, it is worth noting that the country

is on track to reach the 2025 End TB milestone of reducing TB incidence rate by 50% and number of deaths by 75%. However, the country is not on track regarding "The END TB Goal of 10 cases per 100,000 population". In 2021, 132,000 fell ill with TB representing an incidence rate of 208 TB cases per 100,000 population.

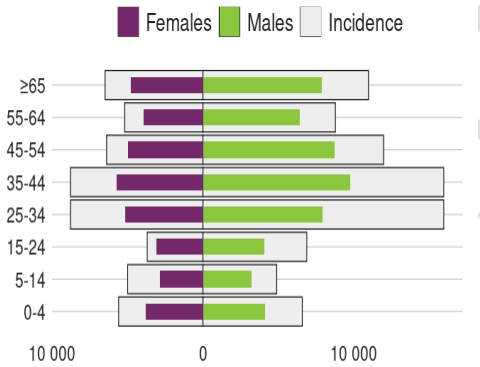
Figure 2: TB burden estimated incidence in Tanzania per 100,000 population.



7.4 Incidence by age group and sex

TB prevalence surveys globally show that TB disease affects men more than women, and that gaps in case detection and reporting are higher among men. Similarly, Tanzania data as per figure 3 below, shows that men bare that blunt when it comes TB disease than women. The highest TB burden is among the productive age groups 25-34 and 35-44 years. But it also worth noting that there is a relative high burden of TB among the elderly ≥ 65 years. Equally, there is an observed high burden among children 0-14 years. For instance, in 2021, this age group accounted for 17% of total TB case notification.

Figure 3: Incidence by age group and sex

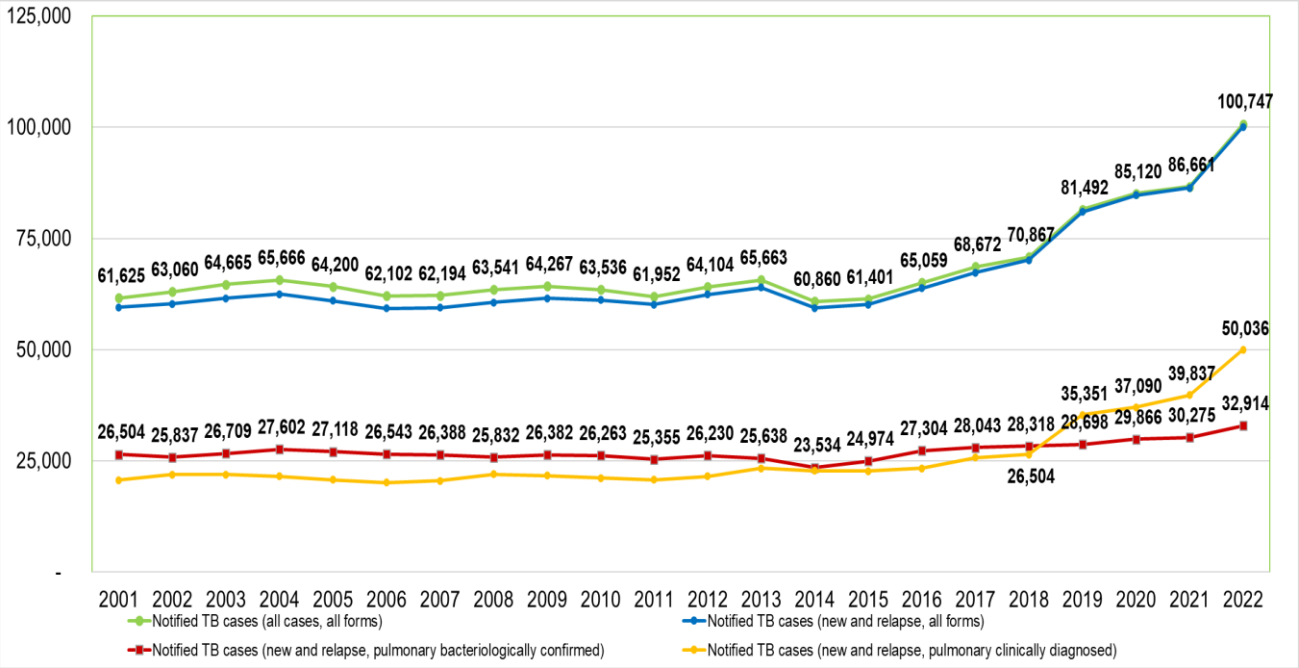


7.5 TB notification

Tanzania's health system has faced difficulties due to COVID 19 in the recent years, however, the country's TB case notification of all forms remained stable. The country notified 85,120 TB cases in 2020 and 86,661 in 2021 in comparison to 70,867 in 2018 and 81,492 in 2019. In 2022, 100,747 TB cases of all forms were notified (figure 4). TB notification of all forms increased by 15% between 2018 and 2019, since then it increased in the range of 2% to 5% annually except for 2021 to 2022 where it increased by 16.3%. This sustained performance in TB notification is attributed to several interventions that were introduced since 2020 such as, active case finding using mobile clinics TB, scale up of molecular diagnostic technologies and strengthening of community and private sector engagement. In the same period, the country expanded the microscopy diagnostic network by 84% (from 950 to 1752) and the GeneXpert network by 5-fold increase (from 62 to 305 sites). With this diagnostic network expansion, the country registered a 32.7% of the notified pulmonary new and relapse cases being Bacteriologically

confirmed at time of diagnosis. However, despite the increase in TB notification, Tanzania is still missing some TB cases. As per the 2022 Global TB Report, Tanzania's 2021 TB incidence was 208 per 100,000 population per year, translating to 132, 000 TB cases of all form. This implies that 45,927 cases were missed in 2021.

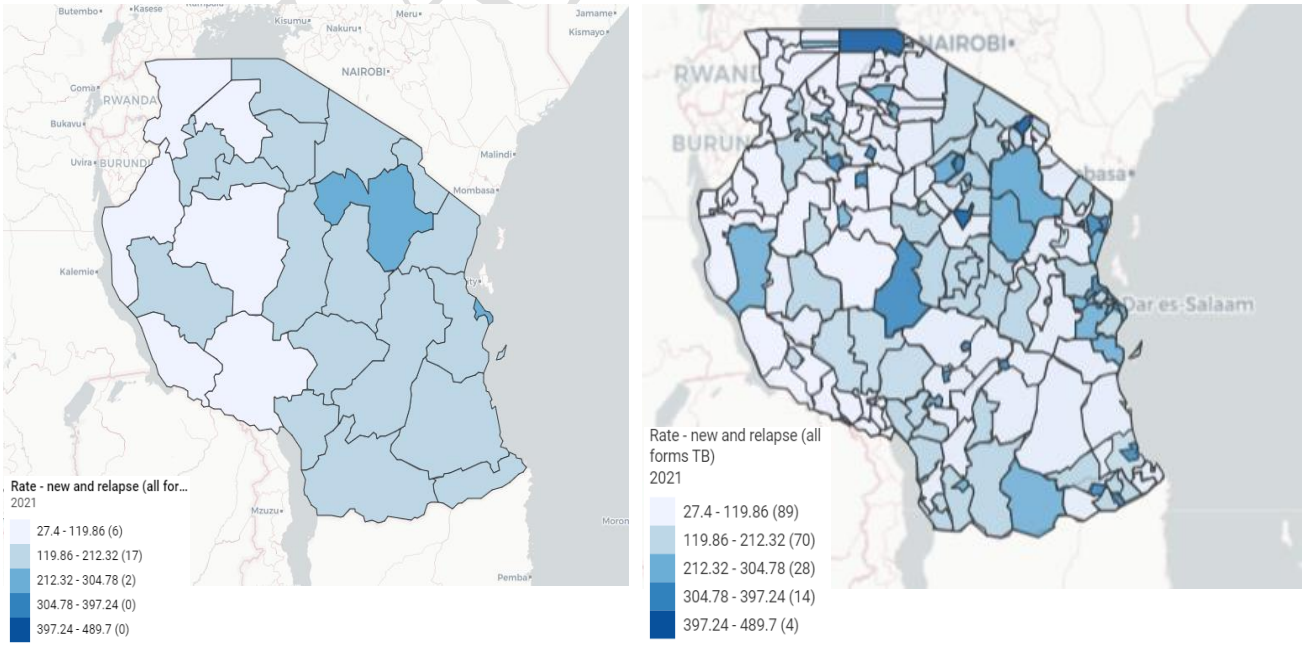
Figure 4: Trends in number of TB notifications in Tanzania 2001-2022



Data source: NTLP

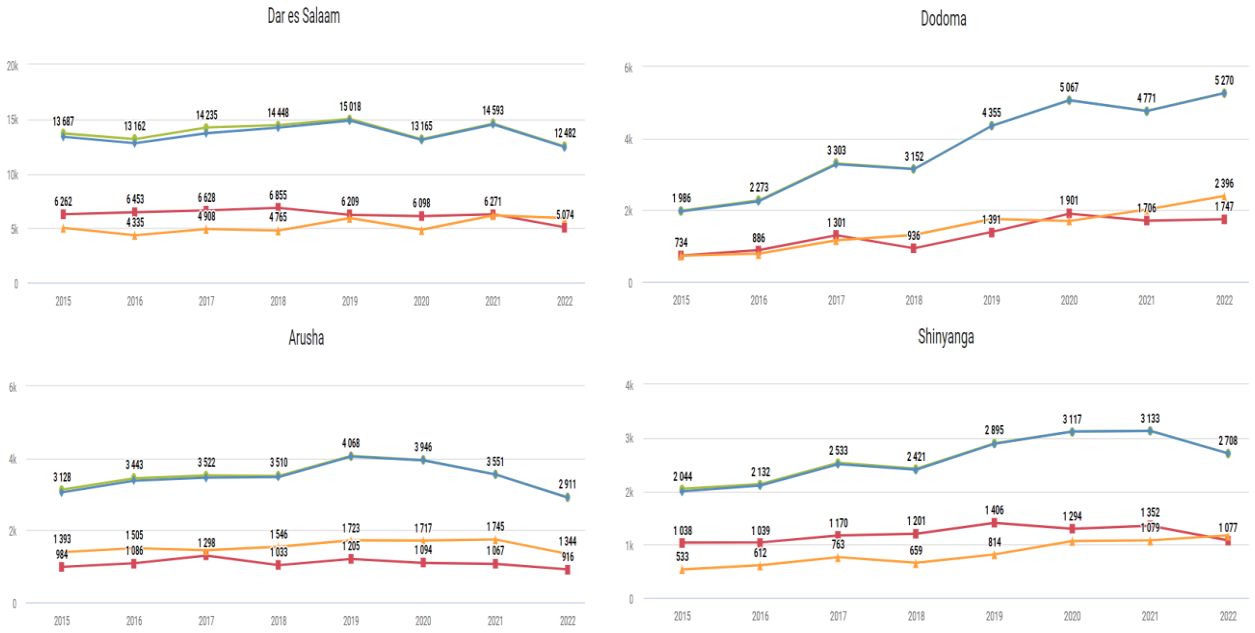
Although the notification rate is increased at national level, the regional data shows variation (figure 5 and 6) from 39/100,000 in Unguja to 265/100,000 in Dar es Salaam. Four regions with the highest contribution to the national TB notification included Dar es salaam, Dodoma, Shinyanga and Arusha.

Figure 5: TB case notification (2021 rates) per region in Tanzania



Data source: NTLP

Figure 6: Regions with largest contribution to national TB notification 2015 to 2022

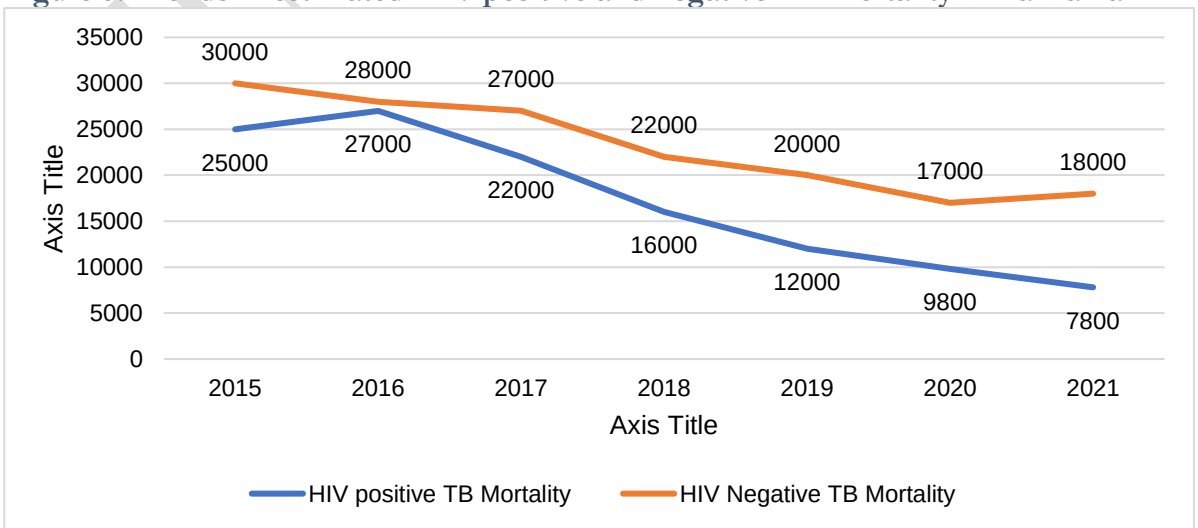


Data source: NTLP

7.6 TB mortality

Tanzania is one of the six high TB burden countries (Bangladesh, Kenya, Mozambique, Uganda, and Zambia) that had reached or surpassed the first milestone of a 35% reduction in TB deaths in 2020 compared with 2015. Again, Tanzania is one of the three high TB burden countries that reached or surpassed the first milestones of the End TB Strategy for both reductions in TB incidence and TB deaths: Kenya (in 2018), the United Republic of Tanzania (in 2019) and Zambia (in 2021). By 2021, Tanzania had reduced the TB deaths by 55%. In terms of absolute numbers, figure 7 displays trends in HIV positive and HIV negative TB mortality. From the trends, there is no significant observable effects of COVID 19 on TB mortality as seen in other settings, however there were a slowed TB notifications compared to periods before and after the covid 19 pandemic.

Figure 7: Trends in estimated HIV positive and negative TB Mortality in Tanzania

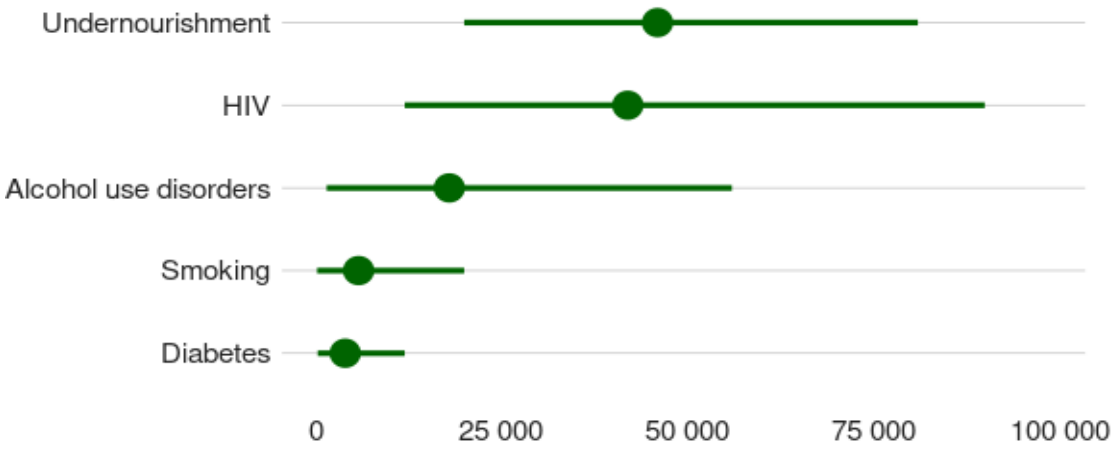


Data source: NTLP

7.7 Attributed TB risk factors

As per the 2022 WHO Global TB report, in Tanzania, undernutrition was the top most risk factor for TB followed by HIV, alcohol use disorders, smoking and diabetes. Figure 8 shows the ranking and magnitude of these risk factors.

Figure 8: Attributed TB risk factors in Tanzania in 2021



8 Mid-Term Review of the National TB, and Leprosy Programme Strategic Plan VI, 2020-2025

8.1 Background and Rationale

Tanzania is implementing its 6th National Strategic Plan (NSP) 2020-2025 for the TB and Leprosy Programme. This NSP paves a way for attaining the Global TB and Leprosy targets, which include: to reduce burden and suffering from Tuberculosis and Leprosy diseases in Tanzania by 2025 by 50 percent reduction in Tuberculosis incidence rate (compared to 2015); 75 percent reduction in the number of Tuberculosis deaths (compared to 2015); 50 percent reduction of TB affected families facing Catastrophic costs due to TB (compared to 2015); Zero children (under fifteen years of age) newly diagnosed with Leprosy presenting with Grade 2 Disabilities at the time of diagnosis.

The NSP VI is a patient-centred plan and aims to achieve the following objectives by 2025:

1. To increase TB treatment coverage from 53% in 2018 to 90% by 2025 by innovatively addressing barriers to access, utilization, and the needs of the key and vulnerable populations for TB care and prevention services.
2. To expand access to quality TB diagnostic services, including adoption of new technologies by 2025.
3. To maintain the proportion of children with TB among the notified cases at 15 percent and to increase the ratio of ages 0-4:5-14 years from 1.3 in 2019 to 1.5 by 2025,
4. To increase RR/MDR-TB cases detected and enrolled for treatment from 54 to 90 percent of the estimated TB cases among the notified by 2025.
5. To Strengthen the management of co-morbidities including Collaborative TB/HIV, TB/Diabetes
6. To strengthen TB services to the population of miners and their families by 2025
7. To reduce leprosy prevalence in all endemic councils by 2025
8. To ensure availability of supportive systems and strengthened Program management for the implementation of TB and Leprosy Services by 2025
9. To ensure implementation of evidence-based interventions and decision making through institutionalized efficient M&E system and coordination of research by 2025.

NTLP started implementing the 6th NSP in July 2020 and several interventions were introduced since then such as, active case finding using mobile clinics TB, scale up of molecular diagnostic technologies and strengthening of community and private sector engagement. Additionally, NTLP improved the management of Drug Susceptible and Drug Resistant TB. Furthermore, Tanzania developed a zero-leprosy roadmap and adapted a 2022-2025 action plan. In the same period, the country expanded the microscopy diagnostic network by 84% (from 950 to 1752) and the GeneXpert network by 5-fold increase (from 62 to 305 sites) besides other NSP IV 2020 -2025 interventions. This year, the country reached mid-way of implementation of this strategic plan.

Therefore, it is time to take comprehensive stock of inputs, implementation processes, outputs and outcomes, mid-way through the implementation of NSP IV in 2023. To measure the progress made with regards to the implementation of interventions, and strategies as well as the performance against set

targets in the National Strategic Plan VI 2020-2025, the country planned this mid-term review to evaluate the midterm performance of the TB and Leprosy Programme. The rationale for the mid-term review is to find out "what works" and "what does not work" and re-strategies to achieve the desired goals, objectives, and set targets. Therefore, the results of this review will be used to align the interventions to achieve the NSP goal in 2025 (to catch up with poorly performing indicators). In addition, the findings shall also support the putting up the forth coming Global Fund (GF) Grant Cycle 7 (GC7) application for new funding.

8.2 The main objectives of this mid-term review

1. To assess progress towards achieving NSP targets
2. To identify gaps in the implementation and
3. To use findings of the mid-term review to facilitate reprograming of strategic interventions to achieve NSP intended objectives and set targets as well as mobilization resources in the second half of implementation of the NSP.

8.3 Specific objectives

1. To conduct TB epidemiological and Impact analysis
2. To assess progress made in the implementation of the 6th NSP against specified objectives and set target.
3. To review implementation of Programmatic Management of Drug resistance Tuberculosis (PMDT) -GLC
4. To assess the relevance of activities planned in poorly performing areas and rationalize for reprogramming.
5. To synthesize findings and make recommendations for the 2023-2025 implementation period of the strategy.
6. To use findings of the mid-term review to support mobilization of resources for the 2023 - 2025 period of the strategy.

8.4 Methodology and materials

Eleven thematic review teams composed of both External and Internal reviewers conducted field visits and collected both quantitative and qualitative information and perspectives using the WHO TB review guidelines. Each team was led by an external thematic expert supported by a local reviewer. Information was gathered by reviewing appropriate background documents and interviewing key selected stakeholders using standardized checklist. At each level of data collection, the said teams applied the following data collection methods:

- Review of relevant programme documents and reports, and publications (desk review)
- Individual interviews of key informants using structured, semi-structured or in-depth interviews as appropriate,
- Direct observations of interventions and approaches being applied.

The NSP VI mid-term review followed four main steps:

8.5 Development of tools and conduction of Epi Review

An in-country secretariat comprised of NTLP officers and other key stakeholders was set up. The secretariat provided logistical support and planning for the review process. The secretariat put together data collection tools and shared background documents with the reviewers ahead of the review process. In addition, a detailed information note was developed and shared with all review participants. This included information on areas to be visited, means of transport to be used, including security and travel advisory information among others. The central team also identified and mapped out key informants and respondents from various department of relevant ministries and sectors, regional and district governments, state and non-state agencies, regulatory bodies, partners, civil society organizations, among others. Furthermore, an epidemiological review of TB including an assessment of the performance of the program's TB surveillance system against global standards and benchmarks was conducted with technical support from Babis Sismanidis, and Mathieu Bastard, WHO TB Impact Measurement, Global TB Program. Findings of the epidemiological review and country's TB surveillance system were presented to reviewers and key stakeholders during the inception meeting. It's worth noting that details of the epidemiological review and the TB surveillance benchmark analysis are a subject of an independent report from this report.

8.6 Development of Thematic areas of focus

A total of eleven thematic areas were prioritized for this review. And these included:

1 Governance, Programme management, Health Financing, MAF-TB, Partnerships, and Social Protection
2 TB Case Finding (Integrated patient-centred TB care and treatment)
3 Childhood and adolescent TB care
4 TB/HIV including TB Prevention, and co-morbidities.
5 TB Laboratory network
6 Programmatic management of Drug Resistant-TB (PMDT)
7 Community TB care, Community Rights and Gender (CRG)
8 Public Private Mix (PPM)
9 Procurement and supply chain management (PSM)
10 Leprosy
11 Monitoring and Evaluation, operational research

8.7 Sharing the scope of work with reviewers

Firstly, this included holding inception meeting to brief all external and internal reviewers on the scope of work and all the mid-term review plans in place. This was done to have a common understanding of review tools, approaches, working teams, submission of daily summaries including reporting modalities and timelines.

Secondly, to conduct field visits to interview and collect information from TB and Leprosy policy makers, national, Regional and District Health Management Teams, Development and Implementing Partners, Civil Society Organizations, health facility managers, health workers, patients and other service delivery points focal persons. To ensure representativeness of data/information collected, some sites were purposefully selected in line with representative sampling of rural versus urban, level of facility (clinic, health centre, hospital), and ownership type (public vs faith based or private. And a total of twelve regions were visited and these included: Iringa, Kilimanjaro, Mwanza, Kigoma, Dodoma, Manyara, Morogoro, Zanzibar, Mbeya, Rukwa, Tanga and Dar es Salaam.

During field activities, each team had both external and internal review members. In each team, the external reviewer led the team, and each team produced a narrative report and power point (which included synthesis of key findings and observation, key gaps, and challenges as well as key recommendations in line with thematic areas for the overall report.

8.8 Conduction of field activities and compilation of findings

The mid-term review took place between 28 January - 10 February 2023. Field teams comprising of both External and Internal reviewers, operating under each thematic group, conducted field visits. Each thematic team compiled and submitted daily field summary reports to the central team. And at the end of field visits, thematic teams consolidated daily summary reports into one field narrative report. Then power point presentations and final narrative reports were compiled and presented, taking into account of thematic findings from other regions. During these presentations, findings were validated, and more input made by all invited stakeholders. All thematic leads, then harnessed these inputs from stakeholders into the thematic findings (power points and narratives) before they prepared high level debrief slides. Lastly the NSP IV mid-term review findings were consolidated into one Power Point Presentation that was submitted to the WHO Lead Reviewer who subsequently debriefed the Ministry of Health and stakeholders.

9 Governance, Programme management, Health Financing, MAF, Partnerships and Social Protection

9.1 Background

The United Republic of Tanzania (URT) is served by 10,973 health facilities, of which 428 (3.9%) are hospitals, 1,053 (9.6%) are health centres, 7,330 (66.8%) Dispensaries, 856 (7.8%) clinics and 1,218 (11.1%) health laboratories. The TB diagnostic network of 1,752 TB Diagnostic centres with 335 mWRDs and 391 x-ray units supports access to early and accurate TB diagnosis. However, Tanzania's health system has faced difficulties due to COVID 19 in the recent years, although, the country's TB case notification remained stable but at low pace. At the moment, Tanzania's Government, Development, and Implementing Partners, as well as Civil society organizations remain committed to support priority evidence-based interventions to bolster country's TB and Leprosy control. Premised on the above, the NSP VI mid-term review provides an analysis of governance, program management and health systems, examining policies, synergies, partnerships, and collaborations as well as the programmatic challenges that affect effective TB and Leprosy control. The recommendations from this review highlight priority interventions that the Tanzanian Government and her Development partners can invest in to accelerate the attainment of the country and global TB and Leprosy targets.

9.2 Key findings

9.2.1 General observations

The country has architecture and hierarchy of health programs where TB and Leprosy programme is well positioned. TB and Leprosy has been given priority at the highest level of MoH because of the following:

TB and Leprosy is a vertical program within MoH with a designated national team and operates at 3 levels of the country, which are national, regional and district levels. The TB burden (both mortality and morbidity) is high, and the country has established additional manpower to tackle challenges and has scaled up diagnostic and treatment coverage for both TB and DR TB. Currently, there are 4,979 DOT/MDT centres, 1752 diagnostic centres, 304 MDR TB centres, 305 GeneXpert sites, five x-ray mobile vans, one Central TB Reference Laboratory (CTRL) and six (6) culture laboratories. The country not only has established the management structures, but had a funded national strategic plan, and annually commemorated both TB and leprosy world days as part of awareness creation regarding both diseases. Health system strengthening remains vertically done by diseases programs. Strengthening of the TB and leprosy program requires strengthening of the wider heath system as part of health system strengthening. In this regard, the TB program contributed to COVID-19 mitigation measures such as development TB/COVID-19 guidelines, oriented health workers on COVID-19, and supported PPEs (personal protective equipment) and patient education on cough etiquette. Table 1 shows that of the six indicators tracking progress in this area as outlined in the NSP, four had either been achieved or were on track to be achieved by the end of the NSP period. However, one was not on track and the indicator on catastrophic costs awaits a new survey, last survey was done in 2019.

Table 1: Indicator Dashboard for Governance, health financing, MAF and Social Protection

Thematic Area Indicator	Baseline 2019	Target 2022	Status (MTR)
TB Stigma index established	NA	Established	Established
Percent of TB Funding gap reduced by	42%	30%	35%
Percentage of human resource gap	24%	18%	13%
Number of annual NTLP meeting conducted	1	2	2
Percentage of TB affected families facing catastrophic costs due to TB	45	30	*Ref to Date of 2019*
Number of Prisons implementing improved TB services (active TB screening) in prisons setting	18	34	54
Green→ target achieved. Yellow→ not achieved, likely to be achieved by end of strategic plan period (>90% of target if quantitative) Red-→ not achieved, unlikely to be achieved by end of strategic plan period (<90% of target)			

Data source: NTLP Reports

9.2.2 Governance, programme management and partnerships

Good policy environment for TB and Leprosy service delivery is in place. Both Tanzania and Zanzibar operate in a decentralization policy environment where functions, legal and political power, and authority (the authority to plan, make decisions and manage public affairs) were transferred from the centre (central government and its agencies) to the local government authorities (LGAs) to improve the delivery of public goods and services, including health services like TB and Leprosy control. Consequently, NTLP technical structures exist at national, regional, and district to support TB and Leprosy control. Likewise, TB technical guidelines to support TB and Leprosy control are in place; TB Manual 2017, TB/HIV 2018, TB IC 2017, Paediatric 2017, Community TB 2018. The country health programs are led by the Permanent Secretary, with different directorates. The health sector is funded through domestic, bilateral, and multilateral sources. Tanzania is among the 30 high burden countries for TB and HIV, and TB and Leprosy have been given priority. The NSP VI is aligned with the National Health Sector Strategic Plan V and the National Health Policy.

There is a strong collaboration and coordination between TB and HIV program at managerial level of programmes, designed TB/HIV focal positions are available in both HIV and TB programmes. At HIV Programme management level, there is a joint planning and implementation with TB Programme and the existence of technical working groups (TWGs) and an implementation framework which make this collaboration even stronger. Availability of coordinators at regional and district levels (R/DTLCs, DTHO) and a recently introduced HF TB and Leprosy focal persons makes both programmes working well together. Feedback mechanisms to key stakeholders at national and subnational level exist through quarterly TWG meetings and support supervision. Strong partnership, coordination, and collaboration between NTLP/MoH and her partners exists. Equally, Partner activities are integrated into NTLP/MoH workplans, which avoids duplication and improves leveraging of resources. Furthermore, Partners are involved in policy and guideline formulation. On the other side, TB training materials exist for all major TB technical areas, though materials not integrated resulting into vertical trainings and increased operational costs. Nevertheless, comprehensive, and integrated support supervision checklist for District and facility level support were in place. Tools in form of guidelines, recording and reporting (R&R) tools, SOPs were generally available in health facilities visited. TB Annual work plans were largely not available at sub-national level. The review also noted lack of adequate transport for effective TB control, particularly for Dar es Salaam, however fuel for motor vehicles was available and was being provided at all levels.

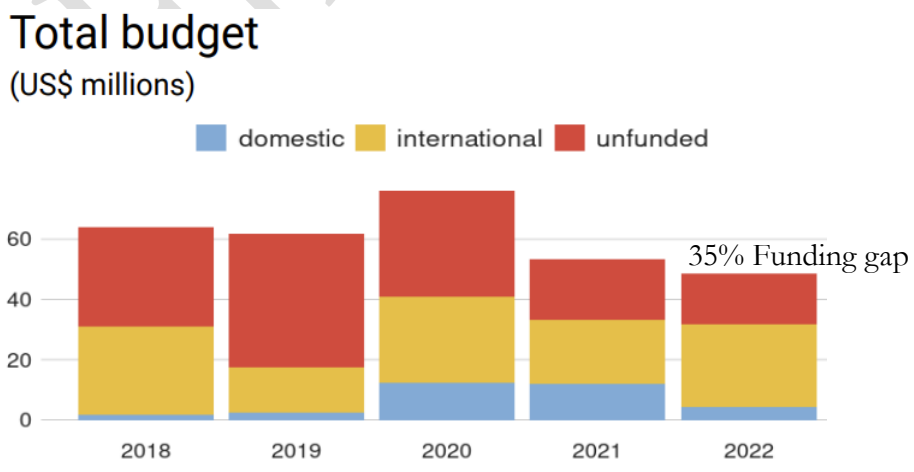
Zanzibar Integrated Hepatitis TB and Leprosy Programme (ZIHTL) uses the same TB structure as the URT to ensure effective TB service delivery i.e., RTLCs, DTLCs, HF focal persons and DOT Nurses. And ZIHTL still uses the same NTLP R&R tools though a separate MoH exist in Zanzibar. ZIHTL has plans to review her NSP and to integrate all disease (Hepatitis, TB, and Leprosy) in same document. For the case of Zanzibar, each TB and Leprosy have a coordinator.

9.2.3 Health financing

Donors and funding agencies (GFATM, PEPFAR) are in the country and actively contributing to financing implementation of the current NSP. For instance, USAID implementing partners, CDC/DOD, Deloitte, AMREF, EGPAF are supporting Integrated Sample Transport (IST), policy development, printing, and distribution of TB tools (R&R tools, guidelines, Algorithm, SoPs), HCW capacity building activities, and community TB activities. Annual planning meeting involving the Ministry of Finance are happening which helps to keep funding of TB and Leprosy on the agenda. The use of the of electronic and integrated financial management (EPICOR) makes the tracking of funding allocation, disbursement, and utilization. There is alignment of national strategic plans at central, regional and district levels. However, there is inadequate funding to cover 100% of NSP priority interventions. The **FY 2021/2022 NSP VI financial requirement was USD 38,209,932** (Thirty-eight million, two hundred nine thousand, nine hundred thirty-two). However, **only USD 24,836,456** (Twenty-four million, eight hundred thirty-six thousand, four hundred fifty-six) was available. Representing a **funding gap of 35% (USD 13,373,476 – Thirteen million, three hundred seventy-three thousand, four hundred seventy-six), table 1 and figure 9.** Despite this funding challenge, utilization of available funding is low. For instance, in FY 2021/2022, only 67% of the available funds were used. The low fund utilization is attributed to cumbersome and bureaucratic procurement procedures for commodities (which contribute to 70% of the delay). Relatedly, there is limited strategic information for the health secretariat to advocate and support resource mobilization for TB & Leprosy (having limited funds). It's also worth noting, that Leprosy remains a neglected disease with very low funding at all levels in the country.

ZIHTL receives financial (GF, AMREF, UMB) for TB and technical support from GLRA for Leprosy programming and management. Although financial land scape analysis has not been undertaken to objectively identify how much is required for effective TB control in Zanzibar, the available funding streams, the size of funding from each funding stream, and the actual funding gap, partners think that the currently available funding is inadequate for effective TB control. ZIHTL plans and budgets together with her partners with support from NTLP URT. GF funds for Zanzibar are disbursed to Zanzibar MoF on a quarterly basis. There are no funds available for Leprosy control. Both TB and Leprosy are integrated into PHC.

Figure 9: Tanzania's health financing budget in USD



Data source: WHO Country Profile

9.2.4 MAF-TB and Social protection

HIV and tuberculosis (TB) weigh heavily in the global burden of disease. Global strategies to end AIDS, and TB, with a view to reaching Sustainable Development Goal target 3.3, point to social protection coverage as a key pillar of country responses to these epidemics. These strategies further highlight the social protection needs created by long-term diseases for patients as well as their households, and the preventive role that social protection systems can play in addressing the socio-economic determinants of those diseases. As such, social protection coverage gaps can disproportionally affect people living with, at risk of and affected by HIV and TB. Despite the urgent need for social protection, Tanzania is one of the low-income countries that are lagging behind in terms of coverage, relevant policies, and guidelines and well as coordination of social protection related interventions and systems[1]. However, the country has a bill on Universal Health Coverage that has gone through the first Parliamentary hearing, and the approval process is ongoing.

Although tuberculosis (TB) care is free in Tanzania, TB-associated costs are compromising access to services and treatment adherence resulting to increased risk of transmission in the community. Results from a cross-sectional survey of a nationally representative sample of 777 TB affected households conducted in 2019 show that 44.9% faced catastrophic costs due to TB. This proportion was higher (80.0%) among households of patients with multi-drug resistant TB (MDR-TB). Overall, cost was driven by income loss while accessing TB services (33.7%), nutritional supplements (32.6%), and medical costs (15.1%). Most income loss was associated with hospitalization and time for picking up TB drugs. Most TB patients (85.9%) reported worsening financial situations due to TB, and over 53.0% borrowed money or sold assets to finance TB treatment. In multivariable analysis, the factors associated with catastrophic costs included hospitalization (adjusted odds ratio [aOR]=34.9; 95% confidence interval (CI):12.5–146.17), living in semi-urban (aOR=1.6; 95% CI:1.0–2.5) or rural areas (aOR=2.6; 95% CI:1.8–3.7), having MDR-TB (aOR=3.4; 95% CI:1.2–10.9), and facility-based directly-observed treatment (DOT) (OR=7.2; 95% CI:2.4–26.6)[2]. Currently, only RR/MDR-TB patients on ambulatory care are provided with monthly transport stipend of Tzs 50,000 as well as food support worth Tzs 50,000. The review observed that this social support was inadequate since it was set at the start of PMDT in the country and since then, it has never been reviewed. Lack of access to social protection constitutes a major obstacle to the attainment of favourable treatment outcomes as well as economic and social development among TB patients and TB affected communities.

The review noted the goodwill for MAF-TB among stakeholders interviewed (Parliament, MOH, other Ministries, sectors, and key partners). Due to this goodwill, MAF-TB in Tanzania was introduced with aim to guide and strengthen accountability of partners and stakeholders, to accelerate progress to end the TB epidemic by 2030. Consequently, the Tanzania Stop TB partnership secretariat developed a concept note that was approved by the board in 2021. And subsequently, a draft MAF-TB framework was developed and is planned to be finalized during the first quarter of 2023.

9.3 Key achievements and Best practices

9.3.1 Governance, programme management, and partnerships

[1] Making universal social protection a reality for people living with, at the risk of, and affected by HIV or Tuberculosis, ILO, 2021

[2] Kilale, A.M., Pantoja, A., Jani, B. et al. Economic burden of tuberculosis in Tanzania: a national survey of costs faced by tuberculosis-affected households. BMC Public Health 22, 600 (2022). https://doi.org/10.1186/s12889-022-12987-3

The NTLP is included on the MoH web site and highlights including all areas of intervention, and of note, it is well structured. There is a strong collaboration between TB &HIV programs at managerial level. It's worth noting that the country successfully conducted the End of Term Program Review (ETR) of NSP V and currently conducting the Mid-term Review (MTR) of NSP VI. On human resources, the MoH through the HRM Directorate is implementing productivity tool in hospitals to measure HR needs through KPIs using electronic data systems. On TB data reporting, the NTLP conducts weekly monitoring of TB notification of TB to closely track trends for prompt action. Similarly, the conduction of joint integrated support supervision with HIV programme and Partners was noted. And there was cascading of activities from National level to regions and districts resulting into quick activity implementation, and standardization of applied interventions. Also, the use of CHWs at community level to enhance TB case finding through the conduction ACF, and contact investigation was noted to be helping to compliment facility efforts in sustaining TB notification during the COVID 19 pandemic.

9.3.2 Health financing

Government counterpart financing has steadily been increasing (11.6% in 2021, 12% in 2022 and 13% in 2023). The government has adopted the Direct Health Facility Financing (DHFF) which enhances decentralization. There has been an introduction of Improved Community Health Fund, a health insurance scheme that provides social protection for the informal sector and promotes equitable access to healthcare.

9.3.3 MAF-TB and Social protection

Social welfare officers are assigned at hospitals and communities to monitor and facilitate exemption of patients who can't afford to pay for health services, including TB. And a network of ex-TB and active patients (MKUTA) works with other organizations and civil society to stand and advocate for patients' rights and equitable access to services.

9.4 Key challenges

9.4.1 Governance, programme management, and partnerships

The NTLP structure has been established, and is in draft form and not approved, some positions are acting, or vacant with a staffing gap of 11 staff at NTLP (2022 TB & Leprosy data, not yet on NTLP web). The vacant positions include paediatric TB, accounts, Leprosy POD, Training, and there is lack of HR succession plan, coupled with high staff turnover resulting frequent loss of institutional memory. And only the coordination position in programs (NACP, NTLP) are recognized as cadres within the government human resource establishment. On the other hand, the complementary cadres for TB control e.g., RTLCs and DTLCs are not supported with a comprehensive induction training before being deployed/assigned TB work, thus limiting their ability to effectively support/mentor those they supervise and support.

Under the Directorate of Diagnostic Services, the laboratory strategic plan 2020 – 2025 is a draft yet to be validated. In addition, the incentive packages for CHWs are not standardized across the country resulting into varied incentives being paid out and CHW demotivation. Relatedly, although CHWs are used during community TB activities, there isn't an agreed upon minimum package of TB interventions they should support to maximize their work outputs within the same resource enveloped. For these reasons among others, the CHWs' capacity in both quantity and quality remains insufficient to be able to effectively support community TB interventions.

It was also noted that there are frequent interruptions in GeneXpert cartridges, lab reagents, and child formulation drugs. The insufficient levels of GeneXpert cartridges and lab reagents was attributed to multiple partners using their own quantification assumptions due to lack of coordination mechanism during forecasting and quantification. Similarly, there were obsolete and varied versions of technical guidelines being used in the field thereby preventing implementation of intervention in a standard manner.

Also, the sub-optimal coordination of implementing partners including TB/HIV partners by NTLP was reported to result into duplication and loss of resources. This was observed in the backdrop of a high staff attrition reported at all levels. In the same vein, limited NTLP oversight and technical support in military TB control efforts was over emphasized by partner during the review. Additionally, military facilities were reported not to accept the use of GxAlert connectivity solution since it shares test data to NTLP.

Worst still, inadequate transport for effective TB control was reported, for instance, Dar es Salaam as a region was reported to have only 1 car and 2 motorcycles which are used among the 6 RTLCs and 25 DTLCs. Besides, these cars have depreciated and the RACC – DSM, Dar Es Salaam lacks a dedicated car to support TB activities effectively and efficiently in the city.

It was also noted that there is lack of comprehensive and integrated TB training materials to foster effective capacitation of frontline health workers on all major TB areas. Again, despite the unique challenges, and the semi-autonomous nature as well as the high population mobility in urban areas, TB control services are not organized any different from rural areas. This situation limits effective TB control and limits urban managers from being in the driver's seat due to absence of area urban TB task forces. Limited availability and access to CXR services continues to affect TB screening especially among PLHIV and Children. Where available, access is affected by exorbitant cost which ranges from Tzs 15,000 to 30,000 per chest x-ray per person. Again, TB program remains relatively verticalized with limited integration into the routine PHC. Consequently, TB work is often left for TB focal persons and DTLCs. Secondly, the change in TB disease epidemiology and lab testing requirements have increased HCWs workload in the midst of a relatively stagnant renumeration.

Although ZIHTL has her own NSP, the territory can't change some of her strategies as and when desired, for instance the drug regimens applied. And sometimes, Zanzibar is not involved in guidelines/algorithm and SoP development by URT.

9.4.2 Health financing

There is inadequate funding to cover 100% of NSP, with a funding gap being 35%, high donor dependency with low domestic funding. Relatedly, there are no funds for Leprosy interventions. However, despite the low funding, only 67% of the FY 2021/2022 financial resources were utilized due to cumbersome procurement procedures for commodities. In addition, lack of adequate funding is partly attributed to the limited TB & Leprosy strategic information availed to the health secretariat to advocate and support resource mobilization. Due to budgetary constraints, not all subnational level and key stakeholders like RMOs (Regional Medical Officers) are involved in policy formulation, planning and budgeting. Commonly, planning and budgeting is done by representation.

In Zanzibar, financial landscape analysis has not been undertaken to objectively identify how much financial resources are required for effective TB control, including the available funding streams, the size of funding from each of the funding stream, and the actual funding gap. However, both ZIHTL and her partners report that the current available funding is inadequate for effective TB control.

9.4.3 MAF-TB and Social protection

The review observed that there are costs associated with medical exams prior to TB confirmation that are charged to patients, thereby creating barriers to services, and contributing to catastrophic cost. Besides this challenge, there is lack of structured social protection support for TB compared to HIV. Worst, there is inadequate visibility of TB, and low community awareness due inadequate TB Advocacy and Social Mobilization. For instance, there were no TB IEC materials at health facilities and relevant sectors. Regarding social protection in mining sector, most workers on small mines do not have formal contracts with their employers to warrant compensation when they fall sick and become incapacitated to continue working.

9.5 Key recommendations

9.5.1 Governance, programme management, and partnerships

There is need to validate and finalize the NTLP organogram based on current disease epidemiology and TBL coordination framework, get it approved, and fill in vacant positions at all levels - central, regional and district, and post on it on the MoH website. Equally, there is need to engage private sector and advocate for filling up vacant position to boost HR and have in place an HR succession plan. Likewise, update the 2022 TB & Leprosy data for all thematic areas on MoH Website.

It is also recommended that NTLP validates the laboratory strategic plan in alignment with TB & Leprosy NSP. Similarly, MOH should harmonize the incentive package for CHWs across the country including setting up the minimum package of interventions CHWs should support at community level. In addition, MoH should mitigate and simplify the procurement challenges that is contributing significantly to the observed procurements delays and subsequent low funds burn rate. Furthermore, NTLP should disseminate all revised tools and SoPs and provide orientation to the tools/SoPs. Additionally, NTLP should strengthen partner coordination mechanism particularly to implementing partners, TB/HIV partners and the uniformed forces (military, police, and prisons) to leverage synergy and prevent duplication of resources.

The NTLP should induct and train all complementary cadres on all TB program areas at all levels before being deployed/assigned TB and leprosy work. This will enhance their ability to share knowledge and to effectively support/mentor those they supervise. In addition, NTLP should establish a coordination mechanism to harmonise forecasting and quantification assumptions to mitigate the interruptions in TB and lab commodities.

Furthermore, NTLP should mobilize resources and provide adequate transport means to NTLP technical structure to effectively play its mandate in TB and leprosy control. There is need to consider developing a one to two weeks comprehensive and integrated TB training course materials to foster effective capacitation of frontline health workers on all major TB areas. In addition, consider implementing an urban TB model in urban areas starting with Dar es salaam given the unique challenges, and the semi-autonomous nature as well as the high population mobility in urban areas. This calls for establishment of area urban TB task force lead by area urban authority with technical support of NTLP to oversee implementation of area urban specific differentiated service delivery models that address observed gaps in TB control.

Again, NTLP and her partners should strive to continue integrating TB and Leprosy control into the routine PHC for ownership and sustainability. More still, NTLP should engage and involve ZIHTL more into planning, budgeting, and development of guidelines/algorithms/ and SoPs to foster ownership.

9.5.2 Health financing

NTLP in collaboration with implementing partners need to fast track the establishment and implementation of the Multi-Sectoral Accountability Framework for leveraging resources from other sectors. Relatedly, advocate for more domestic funding through innovative approaches such as Universal Health Coverage (UHC) to support TB and Leprosy interventions. At the same time, increase grant financial burn rate with fast-tracking of activity implementation. At the same time, implement an acceleration plan to mitigate cumbersome procurement procedures for timely adherence. Also package strategic TB and Leprosy information and share it with the health secretariat for informed decision making on financing. This also calls for coordination and engagement of donors and putting this financial topic on the agenda of discussion on regular basis.

9.5.3 MAF-TB and Social protection

MoH to include this package Free-of-charge medical services in health insurance scheme for presumptive TB cases prior to initial diagnostic tests. MOH, key partners, civil society should advocate to include TB in the existing social protection support for HIV. NTLP should produce and disseminate IEC materials to increase TB visibility in health facilities and other relevant sectors. In addition, strengthen inter-ministerial collaboration to ensure social protection package is in place for all workers.

9.6 Conclusion

Closing of the observed gaps using a health system approach will go a long away in ensuring sustainability and the overall quality and delivery of TB and Leprosy services. The priority areas that need attention include 1) closing the 35% gap in health care financing, 2) finalizing the NTLP organogram based on current disease epidemiology, getting it approved, and filling in key positions at all levels to boost HR and have in place an HR succession plan (4) Improving commodity supply chain management to prevent stock ruptures, 5) fast tracking the establishment of the Multi-Sectoral Accountability Framework to leverage resources from other sectors, 6) advocating for more domestic funding for TB and Leprosy, 6) Including a package of free of-charge medical services in health insurance scheme for presumptive TB cases prior to initial diagnostic tests.

10TB Case Finding, Integrated Patient Centred TB Care and Treatment

10.1 Background

TB case finding is a critical component of the END-TB strategy in Tanzania with the aim to reduce morbidity and mortality from TB in all affected population groups, including children. Systematic screening for TB plays a pivotal role in identifying patients with TB who would otherwise be missed or only be detected late. The 2021 updated WHO recommendations on TB screening identify population groups most-at-risk for TB infection and disease to be targeted with active TB case finding, and the best tools and algorithms to use based on the most recent evidence.

10.2 General observations

There is a strong government leadership and commitment to identifying missed TB cases:

- The TB program has adapted tools and systems to conduct TB screening for active case finding activities (in health facilities and community settings). TB contact investigation and other case finding initiatives (Door to door and community mass campaigns, screening at schools, markets, Traditional healers, places of worship and Accredited Drug Dispensing Outlets) are under implementation.
- The program collaborates with relevant stakeholders, partners, and other sectors to implement case finding activities both at health facilities and in community settings, and monitor TB services through a cascade (screening, referral/linkage to relevant services, diagnosis, contact tracing, care, and treatment).
- Based on the TB burden and patient pathway analysis report, vulnerable and key affected populations for TB are identified. Plans and efforts are in place for regular TB screening services in these population groups, including in prisons, among drug users, and in mining and fishing communities.
- WHO four-symptom screening is the only screening method used for all the population groups, however, its low positivity yield, due to low sensitivity, including questionable quality of the screening limits TB case detection. Microscopy is still used for TB diagnosis with mWRDs.
- In 2022, a total of 100,747 TB cases were notified, however, 49.6% were clinically diagnosed. The high proportion of clinically diagnosed is attributed low quality of TB screening and to less sensitivity of the TB diagnostic algorithm being used). In Zanzibar, case finding remains a challenge with only 60% of the expected TB cases being notified and only 5 GeneXpert machines are available, located in 5 out the 11 Districts.
- There is a huge opportunity to increase TB case finding through community sensitization activities, media, and social networks across different regions.
- Quality improvement initiatives for TB case finding are operational and monitored with the leadership of health facilities through existing Quality Improvement Teams (QIT), TB

notification is one of the important agenda in QIT meetings. More improvement is needed in terms of coordination at facility level.

- Huge variations were noted in the implementation of TB case finding activities in the facilities and communities in different geographical areas (Implementing partners' support was noted to be the main factor). In some regions community TB contribution is more than 50% (in Dodoma) whereas in others is less than 15% (in Manyara, and Njombe)
- Moderately low number of bacteriologically confirmed TB cases detected due to limited access to molecular diagnostic tests, interrupted sputum referral system and low knowledge of TB among HCWs.
- Low treatment coverage at 65% in 2022 but high treatment success in DSTB and high death rates in DRTB
- High TB treatment success rate (TSR) in adult drug susceptible TB which improved from 90% in 2019 to 96% in 2022 thereby surpassing the 2025 set target of 90%.

The implementation status on the program indicators for TB case finding is summarized in the Table 2. Out of the four indicators outlined in the NSP, only one was achieved while 2 were on track to be achieved by the end of the NSP period. However, TB treatment coverage was still far from being on track.

Table 2: TB Case finding indicator dashboard.

Thematic Area Indicator	**Baseline (2019)**	**Target (2022)**	**Results (2022)**	**Achievement (2022)**	**Status**
TB treatment Coverage	53%	75%	65%	86.60%	
TB incidence rate per 100,000 popn	253	211	208	98.50%	
TB treatment Success rate	90	90	95	105.5	
Number of TB deaths (HIV neg, positive)	38,000	23,340 (2021)	25,800 (2021)		
Green target achieved. Yellow not achieved, likely to be achieved by end of plan period (>90% of target if quantitative) Red- not achieved, unlikely to be achieved by end of strategic plan period (<90% of target)					

Data source: DHIS 2-ETL and WHO GTR

10.3 Key achievements and best practices

- TB screening is conducted at both the community and health facility levels.
    - At facility level: - Quality improvement initiative is implemented despite not being documented in reports. TB screening is conducted at all health facility entry points such as OPD, CTC, IPD, RMNCH and MAT clinics.
    - At Community level: Various mechanisms for TB cases finding are implemented, i.e., Contact investigations for contacts of bacteriological confirmed pulmonary TB patients, Door – to – Door screening, Targeted campaigns for KVP, Use of Mobile van clinics, CHWs, ADDOs, religious & traditional healers.
- There is practice of providing health education on TB, cough triage, screening and IPC measures at health facility entry points done by both HCWs and CHWs.

- Close collaboration between the CHWs and the TB clinic staffs (Referrals & Linkages, lost-to follow-up tracing and TB treatment monitoring)
- Nutrition assessment is conducted for diagnosed TB patients.
- There is a forum for CHWs and district coordinators to discuss achievement, challenges, & way forward for improving the TB case finding.
- Patient-centred approach is implemented e.g.- DOTs provision by CHWs in some remote areas where patients could not come to the health facility for various reasons.
- Deployment of five mobile vans fitted with digital X-rays installed with Artificial intelligence (CAD4TB), GeneXpert machines to support TB case finding at the community.

10.4 Key challenges

- Implementation of quality improvement initiatives is limited to facilities, especially those with implementing partner support.
- TB screening and TB presumptive indicators are not captured in the electronic system (both facility and community) hence it's difficult to measure the level of efforts and its overall impact/contribution at the different screening points in TB case finding.
- TB case finding activities and overall TB community services are implemented in limited geographical areas, even in those areas that are implementing TB community screening services have a limited number of Community Health Workers with different packages of care being implemented. Different models are used (some areas presumptive TB patients are referred to the facilities for TB testing and in other places sputum samples of TB presumptive cases are collected by CHWs at the community and sent to the testing lab)
- TB contact investigation is inadequately done, only 2% of contacts investigated are found to have TB, this is lower compared to WHO expectation of at least 3.5 – 5.5%[3] and up to 15% by Stop TB Partnership[4] .
- Efforts to engage traditional healers and ADDO for TB case finding activities have stagnated following completion of the Stop TB funded project.
- Specimen referral system from sputum collection points to testing labs is sub-optimal, not well tracked, and with limited geographic coverage. The program should learn from the HIV program which has a specific courier and electronic system to track specimens and results.
- Although the community TB initiative is encouraging, incentives for community health workers are not adequate especially while they are traveling long distances to support patients. There is inadequate IEC/BCC materials, algorithms, Job aids and fact sheets to increase public awareness on TB, leprosy and provide quality care.
- Estimated national TB incidence is known from WHO, but regional information is not known, hence limited targeted actions and investment needs to improve TB case finding in specific regions/districts.
- Although Chest X-ray is included in the new diagnostic algorithm to support TB screening, this algorithm is yet to be disseminated. And even in situations where clinicians request for Chest X-ray, patients have to pay (average cost is TZS 22,500/-). Moreover, the capacity to interpret Chest X-ray findings is inadequate particularly in lower-level facilities.

[3] Recommendations for investigating contacts of persons with infectious tuberculosis in low- and middle-income countries, WHO, 2012.
[4] Stop TB Field guide 6: Using Contact Investigation to Improve TB Case Detection, 2018.

10.5 Key recommendations

- Evaluate and document impact of Quality improvement initiatives and analyse regional specific patient pathway analysis to scale up coverage of quality improvement initiatives for TB case finding. The Program should advocate for integrating TB quality improvement initiatives for case finding in health facilities routine work.
- Consider additional indicators on TB screening and presumptive TB in the electronic TB register, to properly analyse cascades of TB case finding in the community and facility. Identify gaps in linkages and priority areas/groups in TB case identification.
- Lobby for more integration in TB community screening and overall TB care with other health programs implemented in the community (HIV, RCH, FP). This will help to leverage resources, expand reach, and ensure efficiency in implementation of community health programs.
- Update and institute use of new TB diagnostic Algorithm, SOPs, basic package for TB community services and job aids to strengthen TB case detection (should identify who, what, where and when concepts). This also includes re-defining TB Contact investigation packages and deployment of mobile vans in TB case finding activities).
- Document impact of Traditional healers and ADDO in TB case finding activities, analyse their contribution and best approach to sustain their engagement in a win-win situation (regional health team should use this opportunity to address other health issues)
- Use the opportunity of community meetings, social media, and mainstream media to periodically sensitize communities on TB symptoms (the practice has been limited during TB week with tangible impact such as an excess of 30% increase in TB case finding compared to other months of the year).
- The country should prioritize TB Prevalence Survey to understand the sub-national burden of TB.
- Tanzania is bordered by 8 countries, most of them are high TB burden countries (Kenya, Democratic Republic of Congo (DRC), Mozambique, Zambia), there is a need to strengthen cross border collaboration in TB case finding activities and use coordination mechanisms like ECSA to standardize the implementation of TB services.
- Engage stakeholders, experts, and academia on the best approach to use Chest X-ray for screening for TB; explore means to ensure user fee does not limit access to chest X-ray for TB screening.
- Expand TB case finding by reaching much more at most vulnerable populations for TB including prisoners, mineworkers, slum dwellers, PWUID and Elders.

10.6 Conclusion

In the past three years, there has been good progress in implementation and monitoring of TB case finding activities both in health facilities and beyond. Several opportunities and innovations have been implemented by the national and sub-national levels. However, a more systematic approach in implementation of these TB case finding activities, scale up efforts including resource mobilization, improvement in coordination among key stakeholders, and collaboration of TB case finding activities beyond the health sector are essential. For the final two years of the NSP VI, the program should not make any wholesome change in implementation of TB case finding, but rather address the few remaining gaps while sustaining gains achieved up to date. And there is urgent need to address the quality of TB screening and diagnosis to minimize clinical diagnosis.

11 Childhood and Adolescent TB Care and Treatment

11.1 Background

Addressing childhood and adolescent TB remains a priority for the NTLP. Specifically, objective 3 of the NSP VI that aims to maintain the proportion of children with TB among the notified cases at 15% and to increase the ratio of ages at 0-4:5 -14 years from 1.3 in 2019 to 1.5 by 2025. There are 4 strategic interventions which include: -

- 3.1 Establish burden of TB disease among children and adolescents in different regions and districts.
- 3.2 Strengthen the engagement of all care providers in the health facilities and communities in identification and linkage of all children and adolescents to comprehensive TB services,
- 3.3 Build capacity of healthcare workers to diagnose and manage childhood tuberculosis,
- 3.4 Integrate TB services to the child and adolescent health services in the facilities and communities.

Table 3 below highlights the national performance of the program indicators under the 3rd strategic objective for childhood and adolescent TB. Out of the seven indicators outlined in the NSP, three had been achieved while two were not achieved but likely to be achieved and one was unlikely to be achieved by the end of the NSP period. However, one indicator could not be assessed and ranked because of the absence of performance data.

Table 3: Childhood and Adolescent indicators dashboard

S/N	Indicator	Baseline 2019	Target 2022	Performance	Achievement 2022	Rank
3.0.1	Ratio of TB cases aged 0-4: 5-14	1.3	1.5	1.2	80%	
3.0.2	Percentage of hospitals perform sputum induction and gastric aspiration	11%	40%	29%	73%	
3.0.2	% of eligible < 5 years children household contacts of bacteriologically confirmed TB patients are started with TPT	42%	56%	85%	152%	
3.1.1	Subnational TB notification rate of children and adolescents identified (TB notified cases among children 0-14 years of age)	15%	15%	17%	113%	
3.2.1	% of under <5 years children household contact TB cases screened for TB	40%	90%			no data
3.3.1	Percentage of children and adolescent (age 0-19) who are bacteriological confirmed	12%	40%	45%	113%	
3.4.1	Percentage of notified paediatric TB cases referred from RMNCAH	2%	5.2%	1.6%	31%	

Green→ target achieved.
Yellow → not achieved, likely to be achieved by end of strategic plan period (>90% of target if quantitative)
Red-→ not achieved, unlikely to be achieved by end of strategic plan period (<90% of target)

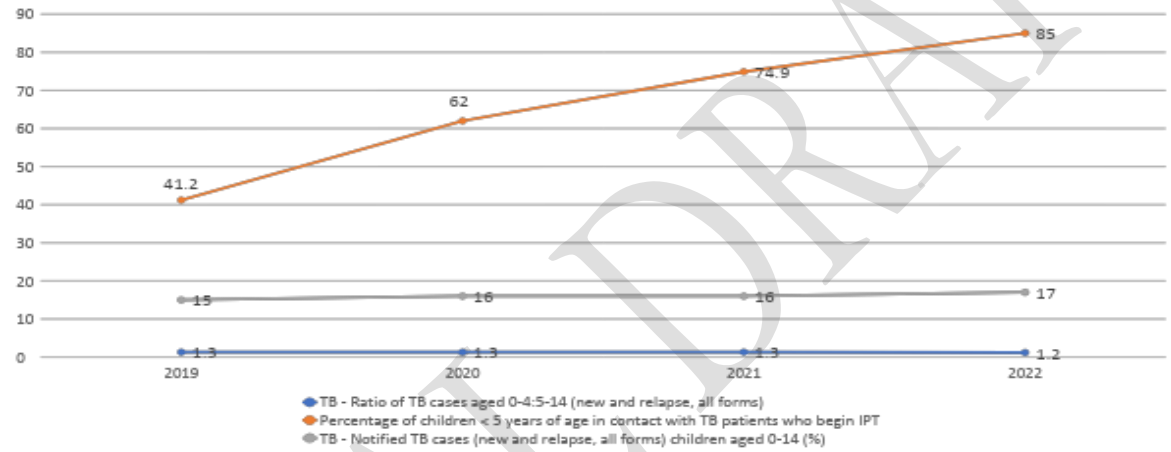
Data Source: NTLP

11.2 General observations

The childhood TB focal person at national level has not been recruited since 2021 which may hinder coordination and accountability. The NTLP has a paediatric TB TWG which meets on a bi-annual basis, a frequency that does not facilitate timely high-level discussion and resolution of challenges. The Paediatric TB TWG has a term of reference (TOR) guiding implementation which was last updated in 2018. Further, the country has standalone guidelines for the management of TB in children (version 2017) which were available at all the facilities visited.

In 2022, there were 16,909 children aged 0-14 years who were notified with TB, a figure that was in line with the 2022 UNHLM country specific target for childhood TB case notification. The national average for the proportion of childhood TB case notifications has remained above the 15% target and has increased from 15% 2019 to 17% in 2022. (Figure 10) The national average for the ratio of children aged 0-4:5-14 is still below the target of 1.5 and dropped from 1.3 in 2021 to 1.2 in 2022.

Figure 10: Trends in Childhood TB from 2019 - 2022

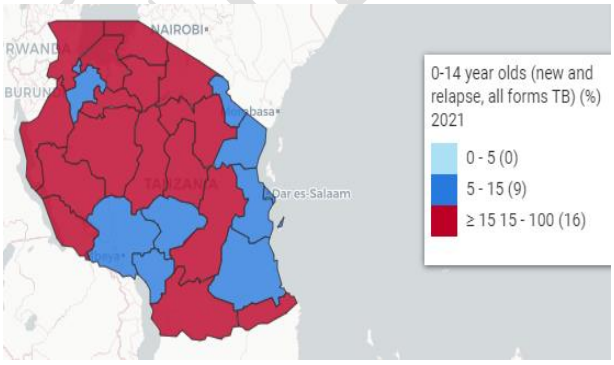


Data Source: DHIS 2 -ETL

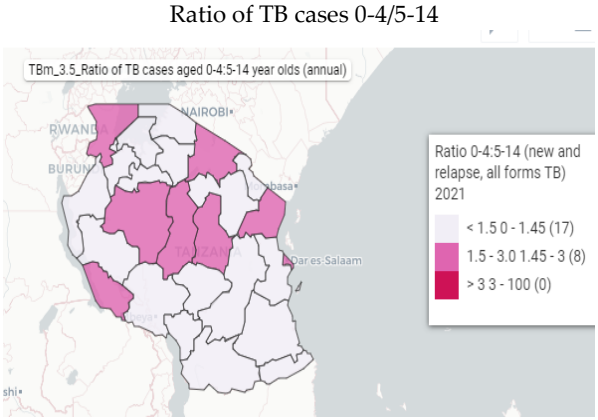
There is regional variation in case notifications (lowest at 8% and highest at 25%) and ratio of children aged 0-4:5-14 (lowest at 0.4% and highest at 2.4%) as shown in figure 11.

Figure 11: Proportion of TB cases in children and ratio of TB cases 0-4:5-14

Proportion of TB cases in 0-14 years



Ratio of TB cases 0-4/5-14



Data source: NTLP

The TSR has increased from 95.3% in 2019 to 97.3% along with a significant reduction in mortality from 8.3% to 1.4% over the same period.

The diagnosis of TB in children is mainly done by the clinicians, TB focal persons, TB DOT nurses, DTLC, and TB/HIV officers. The diagnosis is mainly clinical using the score chart however, there was variation in alignment to the national guidelines. The score charts were available at the various care points where children are managed and those with a score of > 7 are initiated on TB treatment as per the guidelines. There was varying coverage of targeted training for paediatric TB management with the majority of healthcare workers having been trained ~ 3 years ago and no post training capacity enhancement received. Sputum collection for younger children was not being performed routinely in most of the health facilities. Reasons included lack of skills among health workers, lack of dedicated space, lack of supplies, and perception that the methods are uncomfortable/complex.

In some regions, implementation of sputum induction and gastric aspiration was not sustained due to closure of the project that was supporting these regions thus resulting into lack of supplies and regular/ consistent technical support. It was also noted that some clinicians are more inclined towards using the score chart alone without attempting investigations even when they are available. The country has prioritized children under the age of five years for free CXR services, a practice that is being implemented.

Adult formulations were being used to treat children with TB in many facilities. Splitting of the adult medicines was observed, a practice that may result in inadequate dosing since the tablets are not scored. Additionally, the use of adult formulations is linked to challenges in medicine administration and compliance especially in younger children where the tablets have to be crushed.

The country has developed the first edition (2022) of national guidelines for the management of TB infection and these are aligned to the latest WHO guidance. BCG vaccination services are routinely provided at all the health facilities visited with consistent supply. TPT was available at the health facilities visited and provided for eligible groups although with regional variation in performance. TPT is mainly offered to PLHIV and under five contacts. Other eligible groups such as contacts above 5 years are included in the guidelines however, implementation has not started. In some regions and health facilities, the uptake of TPT among children under five is low because the caregivers do not see benefit since their children are not ill. TB contact investigation is conducted for household contacts of index TB patients with bacteriologically confirmed TB by community health workers who link them to the facility for further assessment and management.

11.3 Key achievements and best practices

- Paediatric TB (0-14 years) case notification accounts for 17% of all TB case notification which has been attributed to the implementation of intensified case finding strategies such as the use of the score chart.
- There is a national policy on provision of free CXR services for children < 5 years as part of social support for the vulnerable groups.
- Engagement of paediatricians and specialised child & adolescent care centres as part of the intervention. For example, specialised skills for childhood TB management and performance of a wide range of TB diagnostic tests (sputum induction, ultrasound, fine needle aspiration, ultrasound, biopsy) exist at the Baylor - clinics. The facility in Mwanza has a designated space, equipment, and supplies. For the case of Mwanza health facility, hypertonic saline is obtained from the nearby Bugando Hospital, which prepares it locally.
- There was targeted funding allocated for integrating TB into RMNCAH using Distance - Integrated Management of Childhood Illnesses (d-IMCI) learning approach under the NTLP GF grant.
- Childhood TB focused innovations such as the CaPTB, out of school days' children club have been implemented in some regions and should be scaled up to improve case finding and treatment.
- There has been recent training on nasopharyngeal and gastric aspiration in children in some of the health facilities. One child was identified as DR-TB recently using gastric aspiration in one of the regions. Rukwa

regional referral hospital reported to be trained on use of stool specimens for molecular testing of TB however implementation has not started.

- The NTLP in collaboration with Elizabeth Glaser Paediatric AIDS Foundation (EGPAF) conducted an evaluation to assess the paediatric tuberculosis cascade among children diagnosed and treated for tuberculosis in Tanzania between 2017 and 2020 as well as explore mortality trends across different characteristics. The following were the findings of the analysis:

  A total of 309,517 patients were treated for tuberculosis between 2017 and 2020. Of these 14.49% (44,855) were children below 15 years. Of the 44,855 children treated, 2,990 (6.67%) were bacteriologically confirmed; Xpert MTB/RIF 3.46%, smear microscopy 3.21% and none of the children had received culture test. Majority of children treated were males 24, 040 (53.59%). Overall, 56.63% of all treated children were below 5 years of age. Generally, HIV positivity accounted for 15.15%. Pulmonary TB was the commonest presentation (68.83%) with only 0.23% children presenting with both pulmonary and extra pulmonary TB. Of the children initiated on treatment, 23,813 (53.09%) were referred to the TB clinic from OPD and 11,524 (25.69%) were referred from community active case finding interventions. Interestingly, reproductive and child health clinics accounted for 3,255 (7.26%). Overall, 99.17% of children had HIV tested done and documented results. HIV positivity was generally highest (25.93%) in the 10-14 age group compared to other age groups. Majority of those with unknown HIV status were below 5 years of age.

11.4 Key challenges

- Inadequate capacity for TB diagnosis in children as evidenced by non-alignment to the national algorithm/ score chart, limited sample collection, limited CXR access & interpretation. Contributing factors include limited knowledge and skills which are partly linked to inadequate training and post training technical support, human resources for health (HRH) shortages and transfers. In some regions and health facilities, the score chart is also used among children > 5 years and no attempts are made to collect samples or CXR contrary to the national guidance. There were some projects that enhanced capacity for sample collection, however the practice was not sustained after the project closed. Referral of children to regional hospitals for sample collection was documented at some sites that were trained.
- Interrupted supply of paediatric TB formulations which contributes to the frequent use of adult formulations in many facilities.
- Chest radiography is provided at a cost of about 6 - 9 US dollars for children above 5 years and adolescents which presents a barrier and potential for catastrophic expenditure.
- Adolescent friendly services are not being implemented at most of the health facilities visited beyond the HIV context.
- Limited community awareness on TB in children and adolescents which has hindered timely care seeking by the caregivers.
- While TB IEC materials were available in most of the facilities, there were not targeting children and adolescents.
- Poverty coupled with challenges in linkage to social welfare services.
- Data for strategic intervention 3.2.1 cannot be obtained from DHIS2. Similarly, the age group (0-19 years) in indicator 3.3.1 is wide as it includes adolescents who are more likely to have a positive result compared to the under-five.

11.5 Key recommendations

- Recruit a childhood TB focal person at national level to strengthen coordination, leadership, and accountability.
- Enhanced targeted capacity building on TB management for children and adolescents coupled with post training technical support to improve the quality of clinical diagnosis based on the national algorithm.

- Expedite country level adaptation of the new WHO 2022 guidelines on the management of TB in children and adolescents. Specifically,
    - Introduce stool as an alternative and simpler sample for TB testing.
    - Update and Alignment of the national diagnostic algorithm
    - Introduce shorter TB treatment regimen for non-severe TB disease.
    - Implement shorter TPT regimen for eligible groups as per the 2022 national guidelines on the management of TB infection.
    - Introduce Point of care (POC) tests for PLHIV such as TB LAM
- Streamline logistics management for child friendly formulations at national and zonal levels to increase access as well as minimize expiries and shortages. The child friendly formulations are linked to better adherence and treatment completion rates.
- Consistently implement the cost exemption policy on chest radiography and advocate for expansion of the scope to include other vulnerable groups such as children > 5 years and adolescents.
- Scale up Integrated Management of Child Illnesses (iMCI) and CaPTB to strengthen integration and linkage of TB and RMCAH at facility and community levels.
- Leverage Baylor expertise to provide regular technical support to clinicians across the regions and districts including remote or virtual technical support.
- Conduct national level operational research to evaluate strategic interventions targeting childhood TB, for example implementation of the score chart for TB diagnosis in children under program settings.
- Implement a family centred care approach to mitigate missed opportunities for case finding, treatment, prevention and enhance efficiency.
- Enhance community health worker capacity for childhood TB screening and linkage including during contact tracing.
- Develop and disseminate IEC materials with information on childhood and adolescent TB to increase awareness on the same.
- Review the data tools to capture data on intervention 3.2.1 (childhood TB Percentage of under <5 years children household contact TB cases screened for TB) and disaggregate the age groups for indicator 3.3.1 (Percentage of children and adolescent (age 0-19) who are bacteriological confirmed).
- Consider inclusion of an indicator on TB treatment coverage among children in line with the END TB Strategy.

11.6 Conclusion

Paediatric TB (0-14 years) case notification accounts for 17% of all TB case notification, which is above the set target of 15%. However, Paediatric and Adolescent TB diagnosis and care remains an area that calls for further strengthening. There is inadequate capacity for TB diagnosis in children as evidenced by non-alignment to the national algorithm/ score chart, limited implementation of stool for GeneXpert, limited sample collection, limited CXR access & interpretation coupled with low community awareness and poverty. Strengthen this area calls for the adaption of the latest WHO guidelines on childhood and adolescent TB in addition to closing all other highlighted gaps.

12TB/HIV, TB Prevention and Other comorbidities

12.1 Background

TB/HIV collaborative activities have been implemented since 2006 and thus testing for HIV among TB patients, and active screening for TB among HIV patients have been scaled-up countrywide. Collaborative TB/HIV services are implemented by the two programs (NTLP and NACP) supported by the TB, and TB/HIV Implementing Partners as guided by the Collaborative TB/HIV policy guidelines (second version, 2016). The 2016 TB/HIV national policy guidelines are aligned to the WHO recommendations. The first TB/HIV M &E plan was also developed in 2016. The scale-up of the provision of integrated TB/HIV services (under-one-roof services) in Tanzania has gradually been increasing in the regional, district, health centres, dispensaries including FBO facilities. Currently, there are 1,553 facilities countrywide that offer integrated TB/HIV services under one roof. The services include HIV counselling and testing, TB screening and treatment, ART provision, and TB Preventive Therapy - TPT. This approach ensures comprehensive care to co-infected patients. The country has been performing well in collaborative TB/HIV services.

There is growing evidence in Tanzania that diabetes mellitus (DM) is becoming a significant risk factor for developing TB. Although comprehensive national data on the burden of TB-DM comorbidity is unknown in Tanzania, one study found that TB prevalence among diabetes. patients was at 1.3%[5] and others at 9.7%[6]. Furthermore, co-morbidities such as diabetes can complicate TB diagnosis, treatment, and prevention. The Program initiated interventions for Collaborative TB/DM in the NSP VI by developing the National guideline for TB/DM collaborative care. Equally, the Tanzanian Non-Communicable Diseases (NCD) strategic plan II (2016– 2020) endeavours to implement TB/DM interventions.

The NSP VI covers TB/HIV collaborative activities, management of comorbidities and TB prevention under the strategic Objective 5, outlined as follows: To achieve universal HIV testing and ART coverage for TB cases by 2021 and sustain coverage through to 2025. Operationalization of the strategic objective was to be achieved through (1) strengthened mechanisms for delivering integrated TB and HIV services, (2) reduction in the burden of HIV and other co-morbidities in patients with presumptive and diagnosed TB, and (3) reduction in the burden of TB in people living with HIV. As mentioned above, 54% of the notified TB patients are co-infected with HIV. Although TB/HIV co-infection levels remain high, there is a notable decline in co-infection levels from 62% just four years ago (2018) to 54% (2022). The main interventions implemented by the NTLP under the TB/HIV theme include HIV testing among TB patients which currently stands at 98% versus the WHO AFRO average of 85%. Of the TB/HIV co-infected patients, 99% receive TB/ART co-treatment versus WHO AFRO average of 92%. Other interventions include provision of TB Preventive Treatment (TPT) to PLHIV which currently stands at 57% based on the NTLP annual report for 2021 versus 71% at WHO AFRO level. Finally, interventions

[55] Mtwangambate G, Kalluvya SE, Kidenya BR, Kabangila R, Downs JA, Smart LR, et al. 'Cough-triggered' tuberculosis screening among adults with diabetes in Tanzania. Diabet Med. 2014; 31:600–605. doi: 10.1111/dme.12348

[6] 31Munseri, P.J., Kimambo, H. & Pallangyo, K. Diabetes mellitus among patients attending TB clinics in Dar es Salaam: a descriptive cross-sectional study. BMC Infect Dis 19, 915 (2019). https://doi.org/10.1186/s12879-019-4539-5

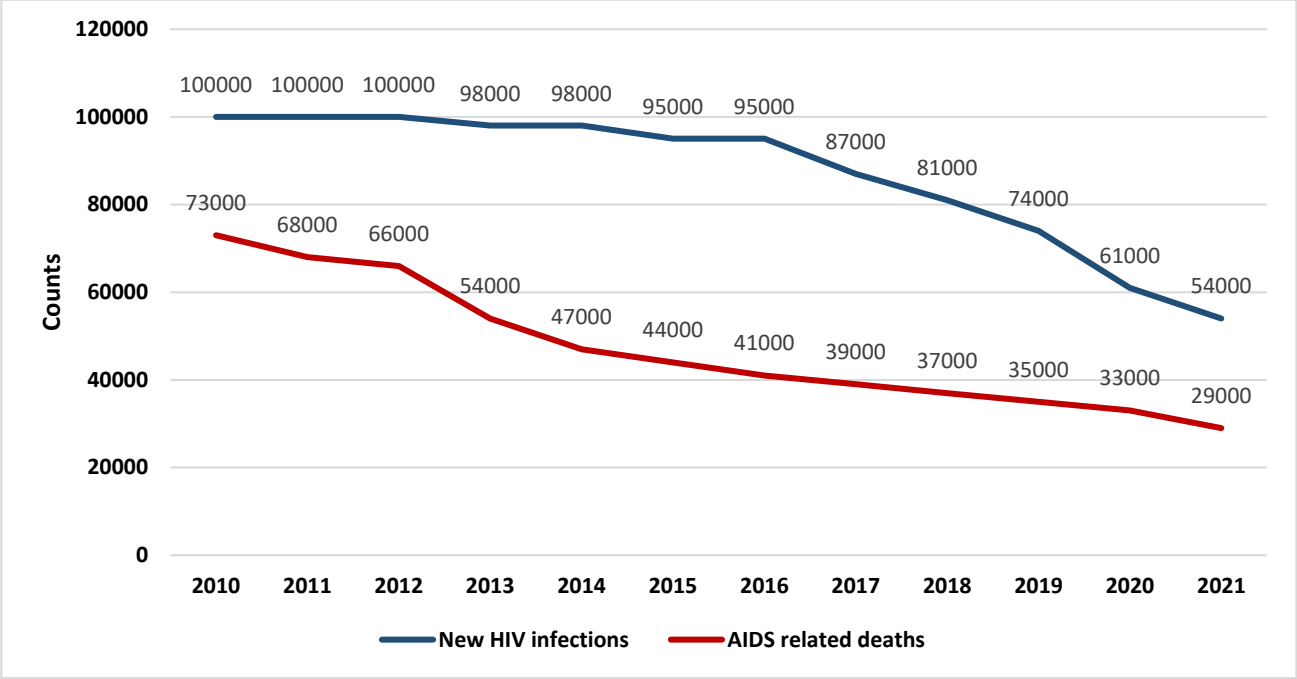
for TB infection control and prevention are delivered at health facilities. However, there is no clear indicator to track performance in this area.

12.2 General observations

12.2.1 HIV situation

Tanzania has an estimated 1.7 million people living with HIV (PLHIV), out of a total population of 61.8 million (2022). Ninety nine percent (99%) of the total PLHIV population are enrolled in HIV care and are receiving ART. Furthermore, 93% of those on ART have suppressed viral loads (VL). In this context, the country has reduced HIV incidence and HIV-associated mortality since 2010. However, HIV epidemic control is yet to be achieved as shown in the figure 12:

Figure 12: Trends in new HIV infections and AIDS related death 2010 - 2022

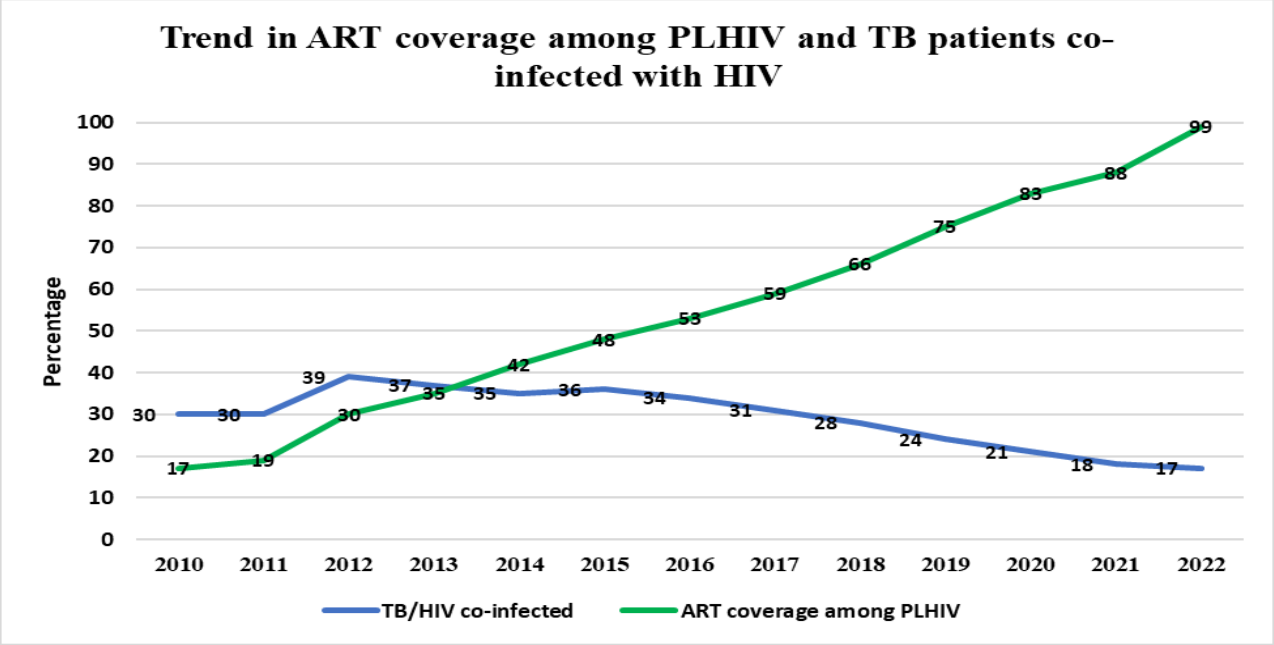


Source: Re-calculated from UNAIDS reports 2010-2021

12.2.2 TB/HIV situation

Generally, ART coverage among PLHIV increased steadily from 2010 reaching 99% in 2022. Consequently, the proportion of TB patients co-infected with HIV decreased from a peak of 39% in 2012 to 17% in 2022. The inverse relationship between ART coverage and the proportion of incident TB patients who are HIV positive suggests that widespread ART coverage among PLHIV reduced HIV transmission at the population level, resulting in fewer TB patients co-infected with HIV. This is illustrated in the figure 13:

Figure 13: Trends in coverage among PLHIV and TB/HIV co-infected patients



Data source: Re-calculated from the UNAIDS and WHO reports 2010-2021

12.2.3 Indicator status

The implementation status on the program indicators for TB/HIV including TPT and co-morbidities is summarized in the Table 4 below. In brief, of the nine indicators outlined in the NSP, five had either been achieved or were on track to be achieved by the end of the NSP period. However, the absence of baseline data for some of the achieved indicators calls for caution in assessing their implementation status.

Table 4: TB/HIV Indicator dashboard.

Green: target achieved	Yellow: Target not achieved, likely to be achieved by end of strategic plan period	Red: Target not achieved, unlikely to be achieved by end of strategic plan period

No	Thematic Area Indicator	Baseline (2019)	Target (2022)	Status (2022)
1	% of TB patients with documented HIV status	99	100	100
2	% of TB/HIV co-infected on TB/ART co-treatment	99	100	99
3	% of Public/Private hospitals implementing collaborative TB/DM activities	N/A	100	No data
4	% of eligible at-risk groups started on TPT	N/A	70	84
5	% of eligible at-risk groups completed TPT	N/A	70	79
6	Guide for TB patients to quit smoking in place	N/A	Due 2023	Due 2023
7	% of known mine workers screened for TB	N/A	25	No data
8	% of borders implementing cross border initiatives	N/A	50	67
9	% of mine workers receiving TB & OHSC services	N/A	50	3.5

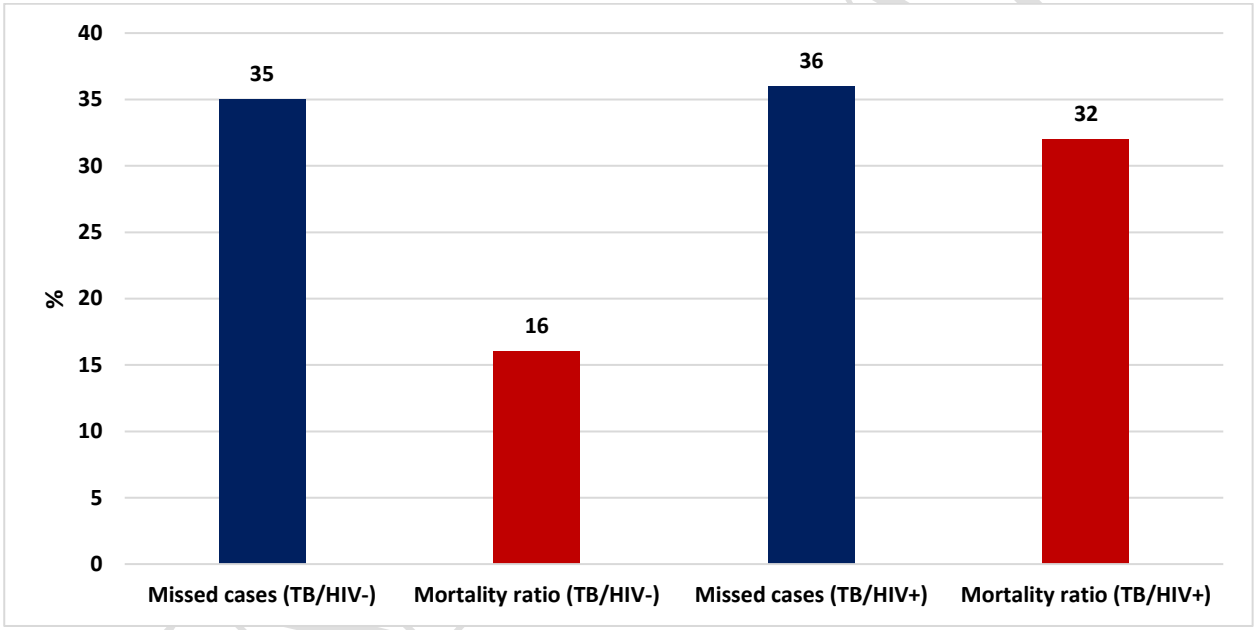
Green → target achieved.
Yellow → not achieved, likely to be achieved by end of strategic plan period (>90% of target if quantitative)
Red-→ not achieved, unlikely to be achieved by end of strategic plan period (<90% of target)
N/A → : Not data available or applicable

Data source: DHIS 2 -ETL

12.2.4 Missed cases and case mortality ratio among HIV+ TB patients.

To better understand the current situation regarding missed TB cases and case mortality among HIV positive TB patients, an analysis of the missed cases out of the estimated incidence, and case fatality out the estimated incidence was performed based on the 2022 Global TB report. The analysis indicated that 36% (8,649/24,000) of the incident HIV positive TB cases were missed in 2022. Further, the case mortality ratio for HIV positive TB cases was 36% (7,800 out of 24,000) compared 16% (18,000 out of 108,000) among HIV negative TB cases. Thus, although national data showed that HIV-associated TB mortality had decreased over time, mortality among HIV positive TB patients was still twice that of HIV negative TB patients [Figure 14]. This was possibly a result of the low diagnostic yield for TB (<1%) despite 100% TB screening at the HIV clinics due to the reliance on symptom screening approach. An earlier country study already found that this approach had low presumptive and diagnostic yield for TB[7].

Figure 14: Missed cases and mortality in TB/HIV Neg and positive patients.



Data source: Recalculated data based on Global TB report, 2022.

12.2.5 TPT coverage

Based on the field visits and interactions with various focal points, we established that TPT was provided to eligible PLHIV using the 6H regimen option. However, analysis of the national TPT cascade for PLHIV was not feasible due to limitations in data. Nonetheless, the reported data indicated that TPT coverage at national level was 79%. In the Iringa region, which served as a case study for the TB/HIV thematic area, TPT coverage among PLHIV was more than 90% with TPT treatment completion close to 90% as well. Based on the data in the ETL, contact investigation at the national level, for children under the age of five years, was established to be at 93% with a yield of only 2%, which was generally low considering the yield reported in previous country studies[8,9]. The data in the ETL could not enable

[7] Maokola W, Ngowi B, Lawson L, Mahande M, Todd J, Msuya SE: Performance of and Factors Associated with Tuberculosis Screening and Diagnosis Among People Living with HIV: Analysis of 2012-2016 Routine HIV Data in Tanzania. Frontiers in public health 2019, 7:404.
[8] Velen K, Shingde RV, Ho J, Fox GJ: The effectiveness of contact investigation among contacts of tuberculosis patients: a systematic review and meta-analysis. The European respiratory journal 2021, 58(6)
[9] Beyanga M, Kidenya BR, Gerwing-Adima L, Ochodo E, Mshana SE, Kasang C: Investigation of household contacts of pulmonary tuberculosis patients increases case detection in Mwanza City, Tanzania. BMC Infectious Diseases 2018, 18(1):110

establishment of the elicitation ratio which is useful for determining the efficiency of eliciting and reaching the contacts of the index TB patients. The NTLP has updated (2022) guidelines with a road map to introduce shorter TPT regimens (3HP/3HR) and to expand TPT coverage among (a) household contacts older than five years, and (b) additional clinical risk groups in accordance with the most recent WHO TPT guidelines[10]. A comprehensive TPT transition plan was also in place.

12.2.6 TB Infection Control

Policy guidelines on TB infection control were available and distributed to health facilities. All health facilities used natural ventilation systems in addition to mechanical systems (window fan), at some health facilities. However, because of the perceived low risk of TB transmission, patients and health workers did not use PPE (masks or respirators) for respiratory protection. Tools and data analysis plans to track the effectiveness of TB infection interventions were not in place.

12.2.7 TB co-morbidity

Since 2018, policy guidelines on TB/DM have been in place. These were updated in 2022 to account for additional TB-comorbidities other than diabetes (DM), such as undernutrition, mental health, smoking, and alcohol/substance abuse, among others. The TB-comorbidity agenda was incorporated into the NSP as objective five (5), with various interventions outlined. However, their implementation was limited to DM and on a small scale. Indeed, statistics on the TB/DM collaborative policy were scarce at the national, regional, and health-care facility levels. The NTLP could benefit from lessons learned in delivery of integrated HIV and NCD[11].

12.2.8 Post TB Lung Diseases

The current NTLP efforts on TB control are focused on detection of TB cases and achieving microbiological cure at the end of treatment. However, country studies indicate about 45% of post TB patients have disabling Post TB Lung Diseases/conditions (PTLD) such as persistent cough, wheeze, and dyspnea[12]. The unpublished TB Sequel study report has shown that about 73% of TB patients had various degrees of lung impairment of which 26**%** had severe lung impairment by spirometric measurements) despite having microbiological cure status at the end of treatment (6months. Thus, only 27% of evaluated TB patients had normal lung function test at the end of treatment. Despite the substantial burden of PTLD, there are no NTLP guidelines on the management of PTLD. However, there was adequate country-level evidence to address this gap.

12.3 Key Achievements and best practices

12.3.1 HIV cascade in TB Clinics

Analysis of the HIV cascade in the TB clinics at national level, indicated that the TB/HIV policy was implemented at scale with high performance against the TB/HIV indicators i.e., 100% HTS for TB patients, and 99% TB/ART co-treatment for TB/HIV co-infected patients (figure 15). Further,

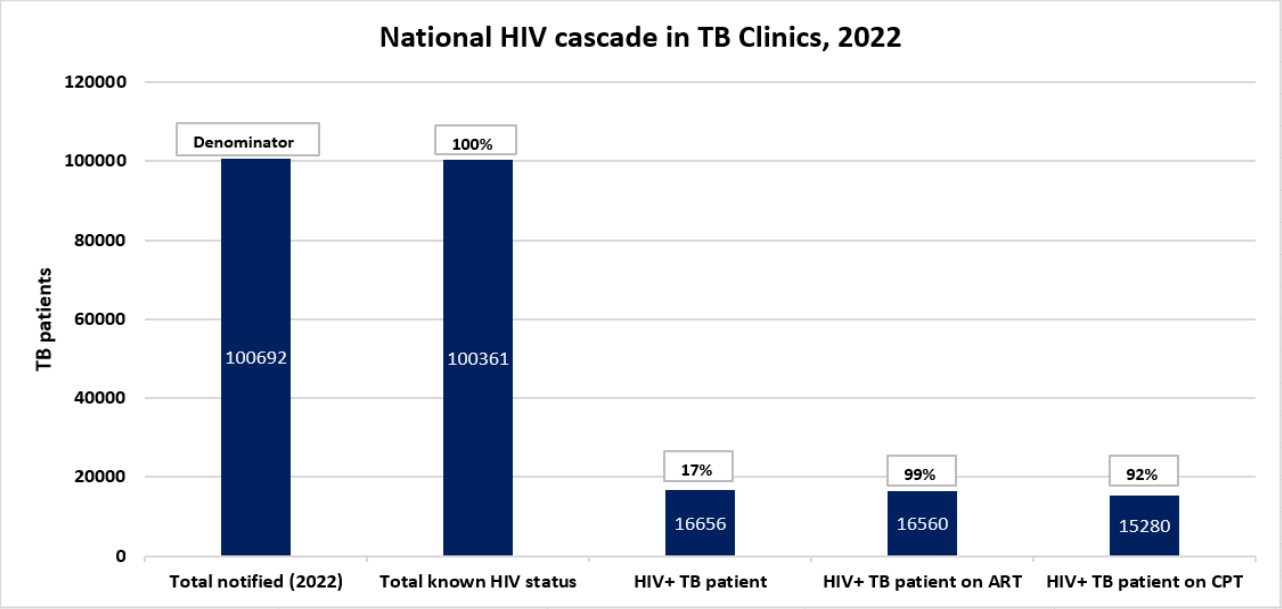
[10] Ministry of Health, Community Development, Gender; Elderly and Children: REPORT ON TUBERCULOSIS PREVENTIVE TREATMENT SCALE UP PLAN (2021-2025), 15-18 FEBRUARY 2022, DAR ES SALAAM, TANZANIA

[11] hayo EH, Kivuyo S, Seeley J, Bukenya D, Karoli P, Mfinanga SG, Jaffar S, Van Hout M-C: The acceptability of integrated healthcare services for HIV and non-communicable diseases: experiences from patients and healthcare workers in Tanzania. BMC Health Services Research 2022, 22(1):655.

[12] Mpagama SG, Msaji KS, Kaswaga O, Zurba LJ, Mbelele PM, Allwood BW, Ngungwa BS, Kisonga RM, Lesosky M, Rylance J et al: The burden and determinants of post-TB lung disease. The international journal of tuberculosis and lung disease: the official journal of the International Union against Tuberculosis and Lung Disease 2021, 25(10):846-853.

prophylactic CPT was provided to 92% HIV positive TB patients with CD4 less than 350 cell/ul. ART was initiated among HIV positive TB patients within 14 days by either clinicians, DOT Nurses, ART Nurses, or TB focal persons. This suggests successful delivery of TB/HIV collaborative services among the notified TB patients.

Figure 15: National HIV cascade in Tanzania TB clinics in 2022

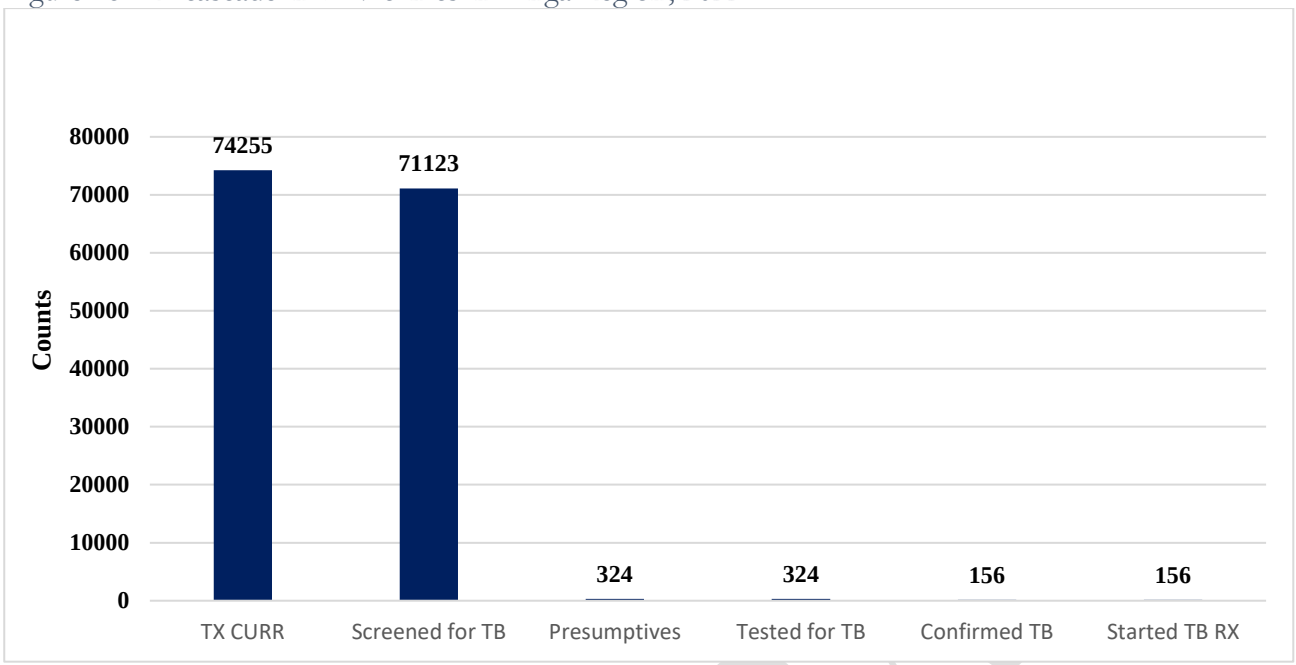


Data source: *National ETL data, 2022*

12.3.2 TB cascade in HIV Clinics

Analysis of the national TB cascade at the HIV clinics (TB screening among PLHIV) was not possible due to data gaps. However, based on the analysis for Iringa region (figure 16), which has one of the highest HIV prevalence rates in the country (11% vs 5%)[i], indicated that 96% of the PLHIV in care were screened for TB. However, the yield for presumptive TB cases was just 0.5% (324/7,1123). Further, the diagnostic yield for TB was just 0.2% (156/7,1123). All HIV patients diagnosed with TB (100%), were linked into ART/TB care.

Figure 16: TB cascade in HIV clinics in Iringa Region, 2022



Data source: Regional HIV database, Iringa, 2022

While the 2022 TB/HIV policy guidelines recommended providing TB/HIV services using a "one-stop-shop model," field visits found that TB and HIV were not provided under one roof at most of the facilities. As a result, TB/HIV patients were seen by multiple providers, and the quality of treatment monitoring, such as for side effects from the TB medicines or ARVs, was identified as a potential gap in the quality of the clinical care provided. However, providers made efforts to align the patient TB and HIV clinic appointments. There was no integration of community TB and HIV services. Furthermore, some the health authorities interviewed raised concerns about the quality of TB screening among PLHIV and advocated for the use of better tools for TB screening and diagnosis among PLHIV.

12.4 Key challenges

Based on the general observations above, below is the summary of the challenges (table 5):

Table 5: Key TB/HIV challenges

No	Challenge and description
1	Of the estimated 24,000 incident TB patients that were HIV positive in 2021, only 64% were detected. This implies that 36% were missed. Further, despite 100% TB screening at CTCs, the diagnostic yield for TB among PLHIV was low (<1%)
2	Despite wide scale TB/ART (100%), the mortality ratio among incident TB patients who were HIV positive was still double that of the incident TB patients who were HIV negative (32% vs 16%), based on the WHO country TB report for 2021.
3	Delivery of integrated TB and co-morbidity care was on a low scale despite the 2018 TB/DM and the updated 2022 TB/HIV policy-guidelines. Tools to enable recording and reporting on TB and comorbidity services delivery were generally not in place. Thus, data on TB-comorbidity services were scarce or completely unavailable at the national, regional, and health facility level.
4	Although many PLHIV were initiated on TPT nationally, the completion status was unknown. Further, delivery of TPT using the newer and shorter TPT regimens (3HP/3HR) was yet to be implemented.
	The diagnostic yield for TB among household contacts under five years of age who were investigated for TB was low (2%). This could be a result of utilizing screening and diagnostic methods with low sensitivity.
5	While the TB/HIV policy-guidelines recommend services delivery using the "one-stop shop" model, the implementation status of the model is not tracked, and data are therefore not available. This limits evidence-based technical assistance (TA) and supportive supervision for the policy.
6	The current NTLP guidelines and manual do not provide guidance on the management and care for Post TB Lung Disease (PTLD) although 45% of post TB patients experience PTLD that manifests as persistent cough, wheeze, and dyspnea. Noticeably**,** about 73% of TB patients had various degrees of lung impairment of which 26**%** had severe lung impairment by spirometric measurements despite having microbiological cure status at the end of treatment (6months)
7	Although TB infection (TB IC) control guidelines are widely distributed/circulated across health facilities, data on the impact of TB IC interventions are not available.
8	The country has a practical guide on bi-directional screening for TB and COVID-19. However, data on the duo burden of TB and COVID-19 not available (not tracked).

12.5 Key recommendations

Based on the general observations, achievements, and challenges identified above, the following are the general recommendations. These are summarized in table 6 below:

Table 6: Key TB/HIV recommendations

No	Recommendation and description
1	Improve quality of TB screening among PLHIV (TB yield) by adopting and implementing radiologic (CXR) and lab-based screening and diagnostic tools (TB-LAM, CRP).
2	Track mortality among TB patients by treatment cohort with disaggregation by HIV-positive, HIV-negative, and comorbidity status. Further, implement mortality audits among TB/HIV as part of QI approaches for TB. This is important to establish the drivers for the disproportionate high mortality among TB/HIV and to guide implementation of tailored interventions.
3	Accelerate operationalization of the updated national tools on TB/HIV and comorbidity care (2022 TB/HIV policy, 2022 TPT roadmap). Develop a comprehensive national algorithm to facilitate the operationalization and delivery of integrated TB/HIV and TB/comorbidity services[13].
4	Construct country-level TPT cascade among PLHIV (NACP) indicating the coverage and completion status by region. This will help to unveil the gaps in the PMTPT services delivery and to design data driven interventions during the remaining NSP implementation period.
	Optimize the care cascade for contact investigation by identifying which steps of the cascade have gaps and implementing appropriate interventions, for example utilization of CXR and Xpert or Truenat for TB screening and diagnosis could improve the diagnostic yield for the cascade.
5	Develop a national and sub-national dashboard to track the implementation status of the "one-stop shop" model for TB/HIV care across CTCs and DTUs. This can be updated on a semi-annual basis through various methods including data calls and periodic surveys during supportive supervisions.
6	Incorporate guidance on the comprehensive PTLD care in the NTLP guidelines. Pilot delivery of documented PTLD interventions (e.g., PTLD clinics/clubs, pulmonary rehab services) and could start with one hospital per region. Feasibility has already been demonstrated by MKUTA and KIDH study of 2022. Additionally, approaches to identify PTLD has been variably evaluated by the IMPALA and TB Sequel between 2017 to 2022
7	Adopt and operationalize the WHO indicator for TB Infection Control (TB notification rate among HCW vs the general population aged 15-64 years. This should be 1:1 if the interventions are effective.
8	Revise existing tools to enable recording, reporting, and analysis for (1) TB co-morbidity services: incorporate additional TB high-risk populations (miners, health workers, prisoners) and TB-comorbidities (DM, Hypertension (HT), undernutrition, mental health, alcohol abuse, smoking, etc.), (2) TB infection control, and (3) TPT care cascades among PLHIV (NACP) and household contacts (NTLP), and (4) the duo burden of TB and COVID-19.

[13] Foo C, Shrestha P, Wang L, Du Q, García-Basteiro AL, Abdullah AS, Legido-Quigley H: Integrating tuberculosis and noncommunicable diseases care in low- and middle-income countries (LMICs): A systematic review. PLoS medicine 2022, 19(1): e1003899

12.6 Conclusion

The quality of HIV care for incident TB patients who were HIV positive was very high and met or surpassed the international targets. Findings on the delivery of TPT and implementation of TB infection control interventions were also commendable. However, there is need to strengthen TB and co-morbidity programming, with a view of providing comprehensive prevention, screening, and management for a wider range of health risks for TB and co-morbidities (DM, HT, mental health, Alcohol, smoking,).
Further, the programme will need to address data gaps for the following areas to enable better tracking of the national response to broader TB/HIV and co-morbidity agenda.

- Implementation status of the "one-stop shop" model for TB/HIV care across facilities.
- Update the existing recording tools to enable reporting on TB co-morbidity services.
- Mortality rates among TB patients disaggregated by HIV & comorbidity status.
- National & regional TPT cascade among PLHIV indicating the coverage and completion status.
- Effectiveness of TB infection control interventions (operationalize WHO indicator)
- Develop and disseminate guide on TB patients to quit smoking in the remaining NSP implementation period.

13 TB laboratory network

13.1 Background

The TB diagnostic network ensures access to early and accurate diagnosis of TB. In Tanzania, the diagnostic services comprise of both laboratory and radiology services under the supervision of the NTLP Diagnostic Coordinator, who provide linkage between the Programme and the Diagnostic Unit of the Ministry of Health. Laboratory services are focused at closing the TB incidence - notification gap by intensifying the efforts of improving TB diagnosis, treatment management and ensuring that the proportion of bacteriologically confirmed TB cases is improved through the expansion of TB diagnostic facilities with easy access to new molecular tests. Radiology services are focused at providing simple, effective, and inexpensive ways of screening new TB cases at an early stage.

13.1.1 General observations

Table 7: TB Diagnostic network Indicator Dashboard

SN	Indicator	END TB indicators	Baseline (2019)	Target (2022)	Results (2022)	Achievement	Rank
1	% of laboratories with GeneXpert integrated to DHI2–ETL or GxAlert	100% by 2020	44%	77%	91%	118 %	
2	% of bacteriologically confirmed TB patients with DST result for at least rifampicin	100% by 2020	25%	90%	85%	94%	
3	% of diagnostic sites with adequate supply of TB lab commodities		NA	90%	50%	55%	
4	% of GeneXpert sites with ISO accredited		3%	15%	11%	73%	
5	% of health facilities with availability of TB diagnosis on site or by specimen referral		19%	25%	16%	64%	
6	% of New and Relapse Cases Tested using mWRD at the time diagnosis	90% New, 95% Relapse	38%	60%	46%	77%	
7	% of labs with adequate performance in EQA for smear microscope among total # of labs participated in EQA		61%	75%	94%	125 %	

Green → target achieved.
Yellow → not achieved, likely to be achieved by end of strategic plan period (>90% of target if quantitative)
Red-→ not achieved, unlikely to be achieved by end of strategic plan period (<90% of target)

Data source: *NTLP DHIS 2-ETL and Reports*

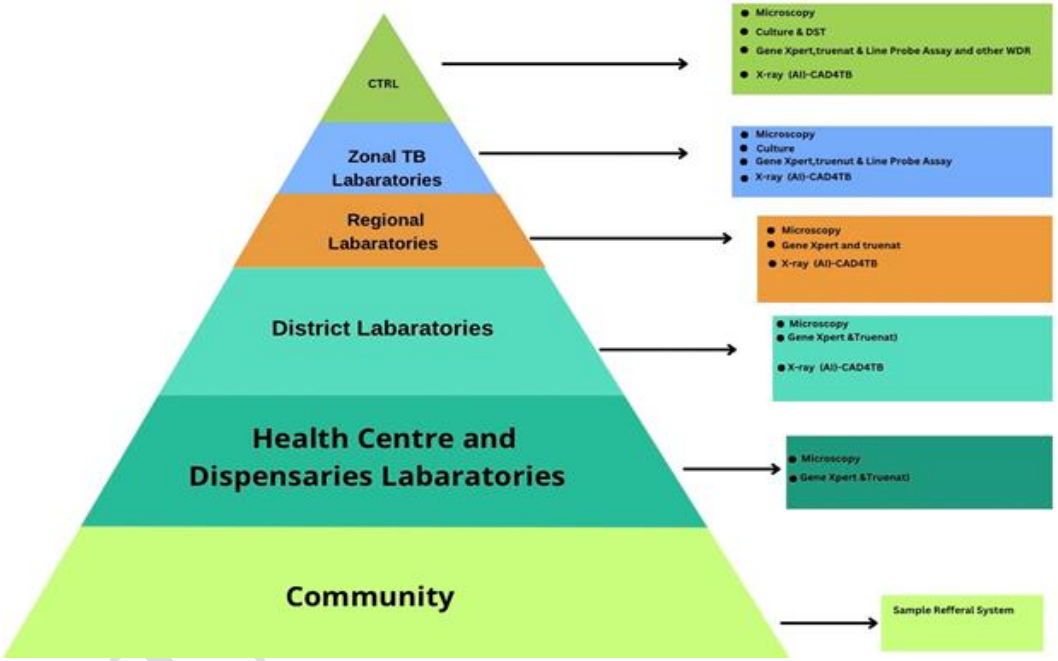
The implementation status on the program indicators for TB Diagnostic network is summarized in the Table 7. Of the eight indicators outlined in the NSP, three were achieved, two not achieved but likely to be achieved and 3 not achieved and are unlikely to be achieved by the end of the NSP period.

13.1.2 Laboratory Diagnostic Network

Tanzania TB diagnostic network includes a pyramidal model of dispensaries, health centres, and hospitals at the district, regional, zonal, and the national Central TB and Reference Laboratory (figure 17). The network is organized into four main levels according to the type of services provided as shown below: -

1. National: Central Tuberculosis Reference Laboratory (1)
2. Intermediate: Zonal Tuberculosis Reference Laboratories (5)
3. Regional/referral (31) and district (184) hospital laboratories
4. Peripheral: Health centres 670 and dispensaries (861)

Figure 17: Laboratory Diagnostic Network



13.1.3 Infrastructure of the TB laboratory network

There is a national guidance for laboratory structure within the MoH which guides the design and lay-out of the laboratories at different levels. TB laboratories are equipped according to their levels of responsibility. There are five zonal laboratories with one Central TB Reference laboratory. Five zonal laboratories are specialized to perform TB culture. Regional, District and health facilities at lower level are well designed to support GeneXpert and Microscopy. Truenat instruments have been secured and the plan is to place them in centres that provide TB services that do not require the improvement of infrastructure. The placement of Truenat is also majorly guided by the analysis of the laboratory diagnostic network and optimization assessment conducted by USAID funded partners.

13.1.4 Human resources for the TB laboratory network

The network comprises all levels of cadres from Laboratory scientists to attendants. Despite the existence of the mentioned cadres the network is facing a shortage of health workers for optimal functionality. The distribution of trained personnel is also mismatched with the rural and remote areas facing major shortage. The National TB and Leprosy Strategic Plan VI has earmarked the Human Resource for Health (HRH) population ratio for laboratory services to be very low below the expectation and hence strategies are in place for the improvement. The strategies are stipulated in the HSSPV (Health Sector Strategic Plan V), HRH (Human Resources for Health) Strategy and the BRN (Big Results Now) strategy.

13.1.5 Maintenance and validation of TB laboratory equipment

The MoH has established a national maintenance unit which is decentralized into zonal workshops for maintenance of medical equipment in the country. However, there is no national capacity for maintenance of the major TB laboratory equipment. These workshops support timely maintenance of laboratory equipment including biosafety cabinets and microscopes to reduce equipment downtime. In addition, the country has contracted the manufacturer of GeneXpert and a services level agreement (SLA) for the maintenance of all GeneXpert machines across the network has been established. Existing challenges include inadequate capacity for maintenance of the major TB laboratory equipment such as BSL3 containment, absence of a national database for TB laboratory equipment and national plan for equipment services.

13.1.5.1 Key achievements and best practices

- There is a structured TB diagnostic Network from CTRL, Zonal, to the Regional, through the peripheral laboratories, including public-sector, and some private sector, that supports quality assured TB diagnostic services.
- There is an up-to-date Service Level Agreement (SLA) for GeneXpert machines.
- Existence of IPs above site and regional levels who collaborate with NTLP to support strengthening TB diagnostic network.

13.1.5.2 Key challenges

- There is a draft national TB laboratory strategic plan to guide implementation of TB laboratory activities though is not finalized and approved.
- Low number of Diagnostic Centres within the network. Currently, there are a total of **1,752** TB Diagnostic centres out of **10,686** centres capable of providing TB testing services in the country.
- Sub optimal coverage of integrated specimen referral system in the entire diagnostic network.

13.1.5.3 Key recommendations

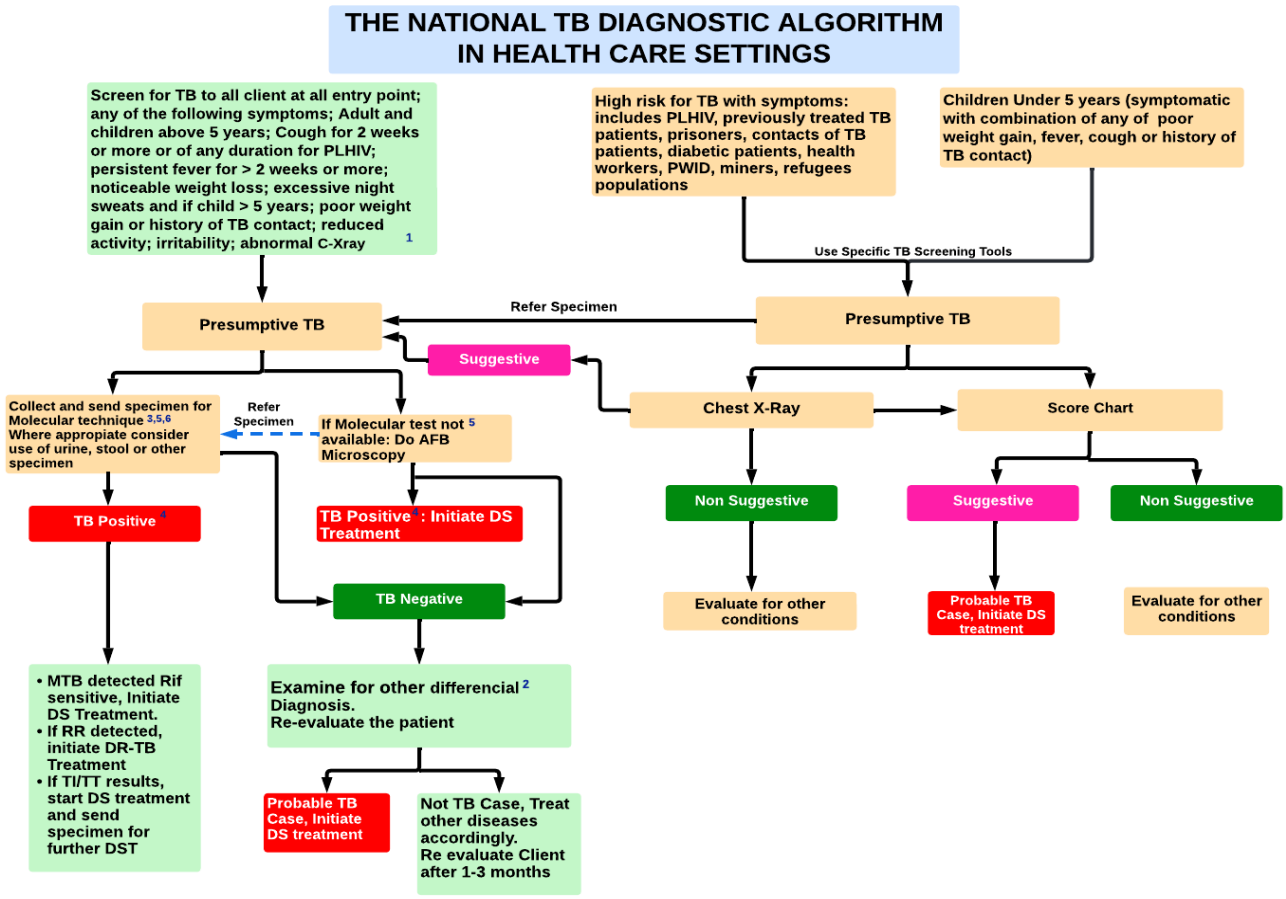
Expedite the finalization of the Laboratory strategic plan.

a. Make use of the END TB strategy indicators for strengthening laboratories
b. NTLP case finding targets.
c. Diagnostic Network Assessment (DNA) report
d. TA mission reports.

Collaborate with PORALG and regional IPs to advocate for the scaleup of TB diagnostic centres.

The NTLP has established a national TB diagnostic algorithm in line with WHO recommendations (figure 18) aimed at accessing rapid molecular diagnostics for all presumptive clients with universal DST for all bacteriologically confirmed cases.

Figure 18: Tuberculosis diagnostic network Algorithm



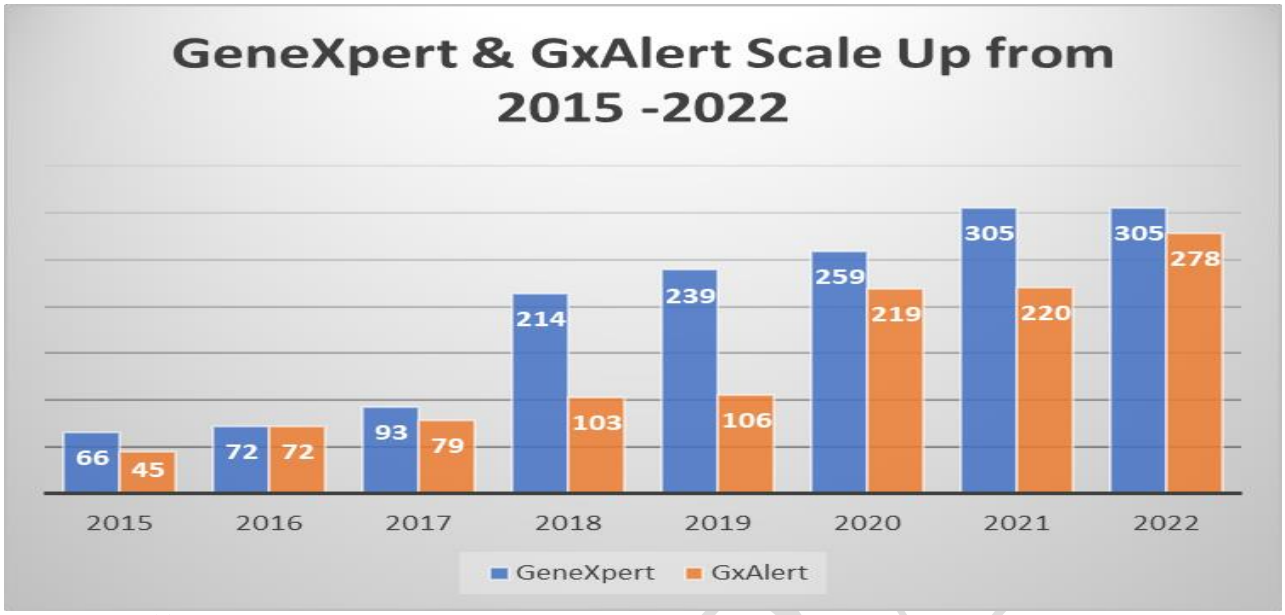
13.1.6 Country Uptake of mWRD's for diagnosis

1. GeneXpert

Tanzania adopted the implementation of GeneXpert MTB/Rif technology as per WHO guidelines in 2012, followed by the development of a national GeneXpert rollout and implementation guideline in 2015. As of 2022, there were a total 335 GeneXpert instruments across the Tanzania TB diagnostic network in 305 sites) (figure 19). The MOH has determined that rapid Molecular TB testing will be implemented as the initial diagnostic test in all presumptive TB and presumptive DR-TB cases in adults and children as indicated on the national diagnostic algorithm. The NTLP has also introduced GeneXpert XDR machines for use in MDR/XDR care and management. Multiplexing of TB and HIV at 51% of the GeneXpert sites.

To aid efficient information flow from the installed GeneXpert machines, GxAlert/ASPECT, an electronic connectivity solution/software was installed on the GeneXpert machines. This information includes GeneXpert test results and associated inventories linked from National to peripheral laboratory level. To date, 91% (279/305) GeneXpert facilities are connected to GxAlert/Aspect and are sending performance data on a real time basis (figure 19).

Figure 19: Implementation and scale up of GeneXpert technology- 2015-2022



Data source: NTLP Inventory Reports

2. TrueNat

Tanzania has adopted implementation of Truenat as per WHO guidance for the Detection of TB and Rifampicin Resistance. To date, 37 Truenat machines are in the country and 30 of these are to be installed in 30 health facilities across the network in the next few months. The procurement of 110 more Truenat machines has been initiated and expected delivery into the country is 2023.

3. High throughput molecular tools implementation status

The MOH is focused on scaling up the use of molecular tools including adoption of high throughput molecular tools in line with WHO recommendations to improve TB notification, universal access to DST and bacteriological confirmation. The country will assess the feasibility and incorporate the high throughput molecular tools in the new molecular guideline and national laboratory strategic plan under development. These tools once placed at the regional laboratories with high workload will efficiently support mass campaigns by shortening result TAT whenever community outreach active case finding strategies are implemented.

4. Line probe assay

Tanzania started implementing Line Probe Assay in 2010, the technology is placed at CTRL and four zonal laboratories namely - Mbeya, Kibong'oto, Dodoma and Bugando. Both first- and second-line genotypic DST is offered in these facilities using LPA technique.

13.1.6.1 Key challenges

- Sub-optimal coverage 19% (335/1752) of the laboratory diagnostic network as WHO recommended molecular diagnostic tools.
- Erratic supply of reagents for LPA and GeneXpert Cartridges leading to service interruption

13.1.6.2 Recommendations

- Deploy in addition to GeneXpert, other molecular mWRDs; Truenat, TB Urine LAM and TB-LAMP to improve access to molecular diagnosis and limit the current long turnaround times for laboratory results.
- Leverage TB/HIV multiplexing and advocate for additional mWRD procurements from the treatment and care program.
- Forecast supply of mWRD reagents

13.1.7 Laboratory information management systems (LIMS)

13.1.7.1 Key achievements and best practices

Both paper and electronic systems for data collection are implemented in the laboratory diagnostic network. Primary information is collected through paper based and entered electronic systems. There are three electronic systems managed by NTRL/CTRL in the country (TB-LIS, DHIS2-eTL2 & GxAlert/ASPECT). The TB-LIS is only used at CTRL to feed all Specimens' information received for Culture and DST (LPA & Phenotypic DST), it captures all specimens associated information including pre-treatment results and it provides Culture results and DST results in the well-organized printing form that can be send back to peripheral facilities.

Other systems such as eHMIS, Afya Care, Disser and GOTHIMS do send information to the national System DHIS2. The DHIS2-eTL2 is used to register specimens received for Culture and DST but only if the patients who produced those specimens are already registered in the eTL. Once the Culture and DST results are entered in the eTL the District TB coordinator (DTLC) can access the results directly in the system.

Efforts have been instituted towards LIMS interoperability solutions. As of December 2023, the country completed installation of the server at the National Internet Data Centre and completed identification of interoperability requirements for electronic TB tools.

13.1.7.2 Key challenges

- Weak data linkages with the laboratory system due to multiple forms and manual data entry. Duplication of effort in data capturing on paper forms and data entry in digital systems.
- The use of different systems for laboratory information especially at Zonal Laboratories and lack of interoperability into national data capture and recording systems.

13.1.7.3 Key recommendations

- Strengthen data linkages with laboratory data: interoperability solutions between DHIS2 and GX 360 software and other LIMS in the national diagnostic network.

13.1.8 TB diagnostics among children using stool.

The NTLP has adopted the WHO recommendation of using stool as a specimen for TB diagnosis with the GeneXpert MTB/RIF technology. National guidelines for implementation have been developed pending printing and dissemination. To date, five regions in Tanzania have rolled out the implementation. The next roll out strategy will focus on all districts as high-volume facilities and coverage will be extended to all sites with GeneXpert machines.

13.1.8.1 Key challenges

- Stool as a specimen for the diagnosis of TB in children using the GeneXpert is sub optimally implemented in the laboratory diagnostic network (currently in only 5 sites in country)
- Limited availability of X-ray screening services at high volume and GeneXpert sites

13.1.8.2 Key recommendations

- Capacitate HCW (clinical and lab) on the stool technique for childhood TB diagnosis and expand the coverage to all GeneXpert sites.
- Procure portable artificial Intelligence digital X-ray machines to cover all high volume and GeneXpert sites.

13.1.9 External quality assurance (EQA)

13.1.9.1 Key achievements and best practices

- There are 1752 TB diagnostic facilities throughout the country, among them 1245 facilities enrolled in blinded rechecking EQA. Number of facilities rechecked in Q3, 2022 were 903 (73%). Performance of blinded rechecking EQA for Q3, 2022 had an overall percentage of true positives of 97% and overall percentage false negatives was 0%. The false negative performance level and 100% concordance level between the slide checkers raises a concern on the quality of implementation of the entire blinded rechecking scheme given the fact that not even minor errors are reported amongst all the slide readers.
- CTRL conducts Supportive supervision to Zonal laboratories while Zonal laboratories conduct supervision to regional level and regional conduct supervision to district level and district conduct supervision to lower-level facilities.
- The CTRL has built capacity to prepare PT panels for GeneXpert to ensure Quality assurance & management of the diagnostic network. 305 sites/facilities with GeneXpert machines were enrolled in the 1st round in 2022. Before the in-country capacity was initiated, CTRL sought services of both SRL Uganda and CDC Atlanta for panel provision. SRL Kampala provided panels for 266 sites while CDC Atlanta (140 sites). The 1st round of PT provision by CTRL had major challenges.

13.1.9.2 Key challenges

- There were technical challenges with techs at sites to generate required data from the GeneXpert machines as CT values during GeneXpert EQA.
- There were also challenges with adhering to instructions that accompany PT panels such as reporting results on the feedback template,

- There was a noticeable delay in results submission from several sites with some responding after the closure date,
- Some facilities were giving insufficient information when it comes to filling the result report template.
- High staff turnover across the regions,
- Inadequate knowledge to some of laboratory personnel and TB coordinators who are implementing blinded rechecking EQA.

13.1.9.3 Key recommendations

- Train technicians who are implementing EQA on how to review and interpret EQA results.
- provide PT panels with forms which contains sufficient instructions on how to perform EQA.
- Review Blinded rechecking (LQAS) coming up with implementable EQA system and train techs and R/D TB coordinators on reviewed EQA regularly.

13.1.10 Radiological services for TB diagnosis

World Health Organization (WHO) recommends chest X-rays for systematic TB screening, which can show abnormalities in the lungs suggesting that a patient is likely to have TB. However, the scale of x-ray implementation and access remains limited.

13.1.10.1 Key achievements

- Currently, the country has about 391 X-Rays as per the MTR of the HSSP IV -2019. Of the 391 x-rays, 5 are Mobile x-ray vans all fitted with CAD4TB (computer aided diagnostic software for TB) to support TB screening in targeted sites.
- Chest x-ray is included in the TB Diagnostic algorithm.

13.1.10.2 Key challenges

- Coverage of X-ray services especially mobile digital x-ray for TB screening remains limited.
- During this review, it was noted that TB screening is affected by the cost associated with a chest X-ray examination, which poses a major barrier to service access by clients who are unable to pay. The cost of x-ray services ranges from **TZS 15,000 to 30,000 per patient**.
- Under the TB Diagnostic algorithm, there is no definition of clinically diagnosed using CXR reading or x-ray suggestive, possibly contributing the current observed high Clinically Diagnosed TB cases.

13.1.10.3 Key recommendations

- Scaling up of the x-ray services with CAD4TB technology is urgently required given the fact that Tanzania is a high TB/HIV burden country. To enhance TB screening and diagnosis among PLHIV and paediatric patients, unlimited access to x-ray services is required.
- Secondly, putting up measures of ensuring that presumptive TB clients and patients receive the service at no cost or subsidized cost will go a long way to improve access.
- There is need to review the TB Diagnostic algorithm and in particular the use of CXR reading in the diagnosis of TB since x-ray "Suggestive for TB" is not specific enough to treat for TB in

a population with a lot of transmission with a high prevalence of lung abnormalities which could be healed TB.

- Furthermore, it is required to conduct small-scale operations research to review medical records, and to re-reading of CXRs for concordance.

13.1.11 Central Tuberculosis Reference Laboratory (CTRL)

The Central Tuberculosis Reference Laboratory (CTRL) is a part of Tuberculosis and Leprosy Central Unit (TLCU) under the Ministry of Health (MoH). It is the reference laboratory mandated to oversee Tuberculosis (TB) diagnostic networks in the country.

13.1.11.1 Key achievements and best practices

a. CTRL mandate

The core activities of the CTRL include setting national TB diagnostic standards, oversee implementation of policies and guidelines, supply chain management of TB Laboratory commodities, support TB Routine Surveillance System (RSS) and provide capacity building pertaining to laboratory practices. The CTRL maintains close linkages with the private sectors, regulatory bodies, Implementing and Developing Partners and technically with the Supra-National Reference Laboratory (SNRL) to ensure smooth and integrated implementation of the TB diagnostic services across the country.

b. Infrastructure and biosafety

The CTRL is a BSL III laboratory which has proper design and construction of laboratory facilities. The design contributes to the protection of all laboratory workers and provides a barrier that protects the community from TB aerosols that may be created in the laboratory. CTRL uses class III biosafety cabinets which are designed to protect people, products, and the environment from infectious agents. Equipment is tested regularly to ensure that it continues to perform safely.

c. Human resource composition

The CTRL staffing is composed of different cadres with different levels of education ranging from Certificate to Doctorate. The laboratory has a total of 24 staff of those with PhD (1), master's degree (2), Certificate (5), Bachelor (7), Diploma (9). These staff have been distributed into different working sections, however there are sections which have insufficient staff to optimize efficiency of work. The following table 8 shows the status of the CTRL staffing versus the staffing norm.

Table 8: CTRL staff status by January 2023

Designation	Required	Available	Gap
Management	2	2	0
Administration	1	0	1
Quality Office	2	1	1
Data Management unit	3	3	0
Safety Office	2	1	1
Culture	4	3	1
Smear	2	2	0
Line Probe Assay (LPA)	3	1	2
Sluice/ Cleanness	5	2	3
Data Clerk	4	3	1
Phenotypic DST	3	2	1
GeneXpert coordination	2	2	0
Reception	2	2	0
ICT Personnel	1	0	1
Biomedical Engineer	1	0	1
EQA/PT Scheme Coordination	2	0	2
Driver	1	1	0
Total	**40**	**25**	**13**

Data source: *HR data base*

d. Quality Management System

CTRL is successfully implementing a Quality Management system. It has been accredited under ISO 15189 since 2018 and still maintains accreditation with an extension of scope to cover seven tests by the end of 2022. The CTRL also provides technical Assistance to the TB laboratory at lower levels which has resulted in accreditation of 30 TB laboratories for GeneXpert or AFB Smear Microscopy. Table 9 shows CTRL workload for quarter 2 and 3 in 2022.

Table 9: CTRL workload status (Q2 and Q3 2022)

Technique	Quarter 2	Quarter 3
MGIT Culture samples received	0	0
Contamination rate MGIT culture	0	0
LPA	3	119
DST	342	198
Gene Xpert	40	143
LJ culture	1026	792
Contamination rate LJ culture	4.6%	5.3%

Data source: *LMIS*

13.1.11.2 Key Challenges

- Shortage of Human resources to fulfil the role and responsibilities of the CTRL, there is lack of some cadres that is ICT personnel and Biomedical Engineer and Health administrator. and insufficient laboratory technical staff.
- Underutilization of the liquid culture MGIT and LPA due to erratic supply of the reagents as zero test performed in Q 2 and Q3 for the year 2022.

- Lack of upgrade of BSL III system at CTRL as the current system installed since 2007.

13.1.11.3 Recommendations

- Provide mechanism of provide human resource at CTRL through provide additional staff to fulfil the for missing cadres through central government or implementing partners.
- Strengthen the supply chain mechanisms for TB laboratory commodities.
- Expedite the contracting process for upgrading of BSL III lab at CTRL.

13.1.12 Conclusion

The diagnostic services comprise of both laboratory and radiology services under the supervision of the NTLP Diagnostic Coordinator. And the TB diagnostic network includes a pyramidal model of dispensaries, health centres, and hospitals at the district, regional, zonal, and the national Central TB and Reference Laboratory. The network is served by the national maintenance unit which is decentralized into zonal workshops for maintenance of medical equipment in the country, however, the unit has no national capacity for maintenance of major TB laboratory equipment. In addition, there is inadequate coverage of mWRDs which stands at 19%, interruption in GeneXpert cartridge supply, sub-optimal sputum referral system, low implementation of stool for GeneXpert, and limited CXR access & interpretation. The lab network uses both paper and electronic systems for data collection Primary information is collected through paper based and entered electronic systems. NTLP and partners need to collaborate on closely the observed gaps to optimize and improve the functionality of the network.

14 Programmatic Management of Drug-Resistant TB (PMDT) and aDSM

14.1 Background

Programmatic Management of Drug resistant TB (PMDT) is coordinated centrally at NTLP by designated Focal Person assisted by six PMDT zonal coordinators, and RTLCs plus DTLCs within the President's Office Regional Administration and Local Government (PORALG). The Ministry collaborates with Kibong'oto Infectious Disease Hospital which is a Centre of excellence in MDR TB management and implementation of PMDT interventions. There is a functional Concilium of experts who meet weekly every Tuesday through ECHO platform which links with all DR-TB treatment sites; its roles include review of difficult cases and provide consultation on management, refresher training of selected PMDT sessions and supports conduction of mortality audits/reviews. The Implementation Framework for Expanded Decentralisation of MDR TB Services in Tanzania, 1st edition, 2015 of MoH, recommends moving of all clinically stable patients to ambulatory care and management using early discharge criteria, or in selected cases, allowing ambulatory initiation of treatment for both intensive and continuation phases. Scaling-up of MDR TB management through the strengthening of regional hospitals to provide both inpatient and outpatient MDR TB care is being undertaken in a phased approach. The country is implementing a mixed model of care with evolving Treatment Initiation Facilities (TIFs). Some patients are under ambulatory care, mainly on home-based DOT, supported by a treatment supporter of their choice. Patients who cannot be treated on ambulatory basis e.g., severely ill, or socio-economic reasons (homeless and patients who abuse substances) are hospitalized. There are more than 300 health facilities in the country which have at least enrolled one DR- TB patient to treatment. For the cases of ZIHTL, MDR-TB services are provided by 2 sites, previously, this was provided at Kibongoto infectious disease hospital in URT. Table 10 shows the PMDT performance.

Table 10: PMDT indicator dashboard

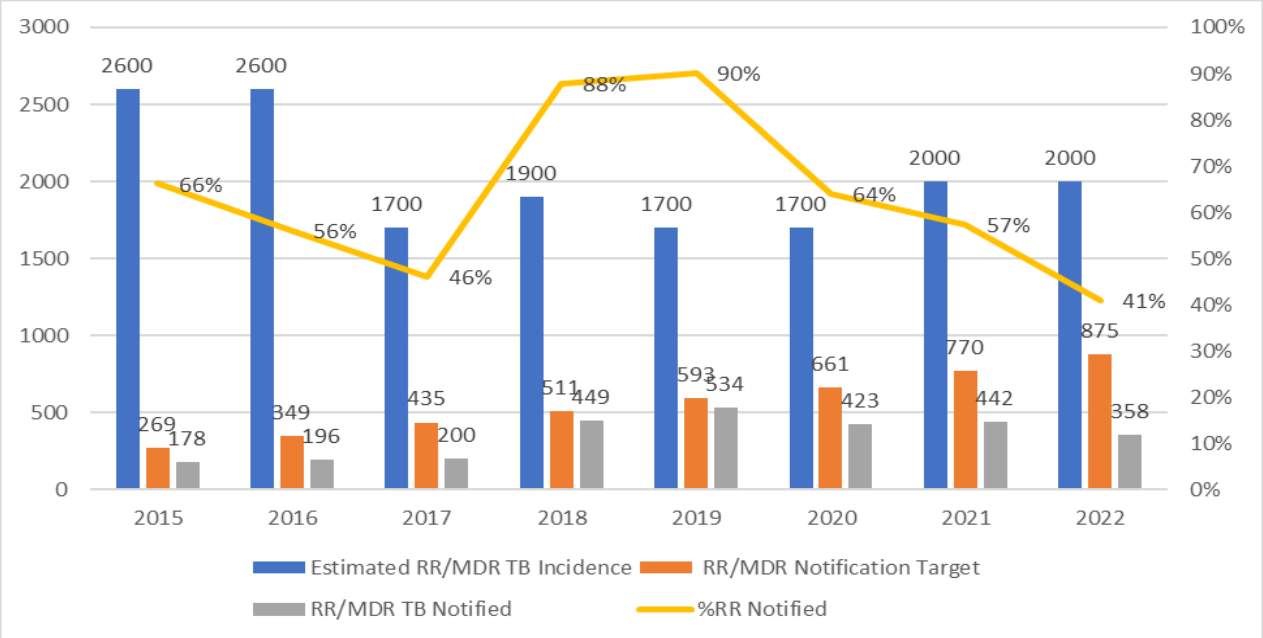
Thematic Area Indicator	Baseline 2019	2022 Target	Results	Rank
% Of RR-TB and/or MDR-TB notified among estimated drug-resistant TB (RR-TB/MDR-TB) of notified TB cases	54	68.4	41	
Treatment success rate for RR/MDR TB patients (%)	83	84	73	
% Of TB patients with DST results for at least rifampicin	37	62	49	
Percentage contacts of RR/MDR-TB patient screened for TB	26	56	88	
Green → target achieved. Yellow → not achieved, likely to be achieved by end of strategic plan period (>90% of target if quantitative) Red-→ not achieved, unlikely to be achieved by end of strategic plan period (<90% of target)				

Data source: *National ETL data, 2022*

14.2 DR-TB Case Finding and Notification

DR-TB case finding is integrated into the general TB case finding strategies. These strategies are described in the NTLP manual of TB and Leprosy Management and in the DR-TB guidelines. Both guidelines do highlight the high-risk groups for DR-TB and XDR TB that need to be screened and investigated for DT-TB. Additionally, TB case finding, and diagnosis are guided by a well-defined TB screening and Diagnostic algorithms. The initial TB diagnostic test is GeneXpert, however, TB microscopy is still used by some facilities for TB diagnosis. Tanzania has 336 GeneXpert machines located in 304 sites within the diagnostic next work. However, there is inadequate coverage and access to WHO recommended molecular diagnostics (wRMDs). The current coverage of wRMDs stands at 19% (336/1752) putting all available GeneXpert and 30 Truenat machines together. On the other hand, DST (Drug susceptibility test) services are available in the country. These include LPA (Line Probe Assay) in five sites, four 10 colour modules for GeneXpert- XDR and 6 culture laboratories. One culture lab has capacity to perform phenotypic DST. Regarding, the RR/MDR TB notification, there is a steady decline despite an increase in GeneXpert module in the country. DR-TB Treatment success rate has decreased from 534 in 2019 to 358 in 2022 (figure 20).

Figure 20: Trend in RR/MDR-TB Notification versus est. incidence and national target 2015-2022



Data source: *National ETL data, 2022*

The reasons for decrease in notification may be explained by the following reasons:

- Inadequate coverage and access of mWRDs within the Diagnostic network, currently at -19% (335 mWRDs machines are in the network all together (305 GeneXpert and 30 Truenat) out of 1752 available laboratories).
- Suboptimal utilisation of GeneXpert machines, which stands at 51%.
- Inconsistent supply of GeneXpert Cartridges in the country (40% gap of the GeneXpert Cartridges of required GeneXpert Cartridges)
- Ineffective sample referral system to the GeneXpert Sites. This is attributed to delays in

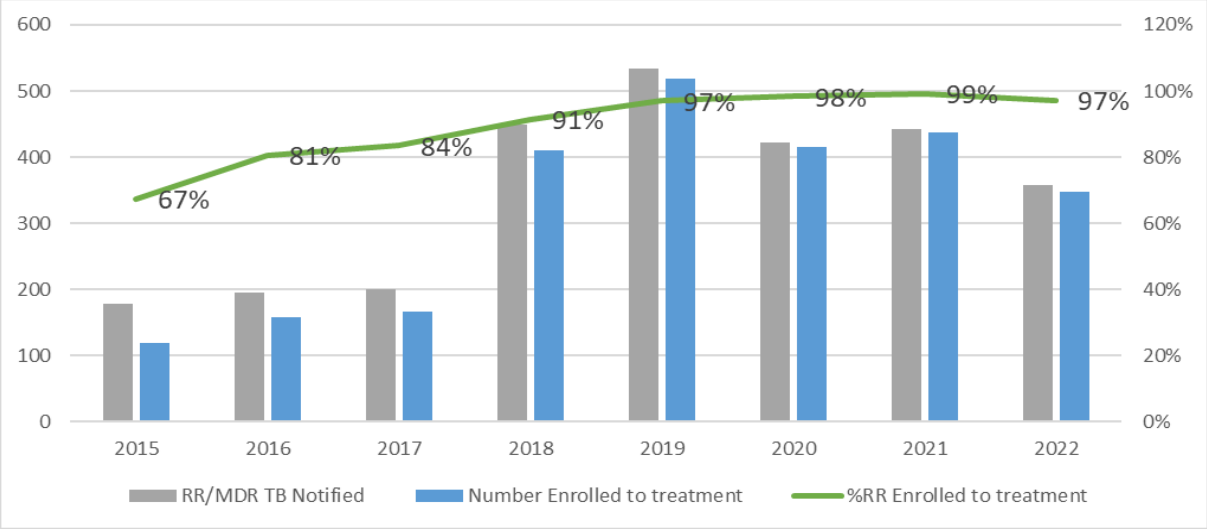
sample shipment due to limited frequency of sample pick up; sites not supported by PEPFAR where samples are picked regularly experience delay, and limited tracking including use of sample referral system indicators to optimise the referral system.

- Low index of suspicion among healthcare workers regarding TB presumption in addition to the complexity of pathway for MDR detection leading to inadequate TB screening
- Low-quality sputum sample collection
- Low first line DST Coverage among TB patients (49% vs 62% target)
- Multiplexing of GeneXpert Machines for TB, HVL, EID) in some diagnostic facilities
- Inadequate follow up testing for months 2 and 5 for patients on drug susceptible TB treatment.

14.3 DR-TB Treatment and Care

Although there is an observed decline in DR-TB notification, the proportion of patients enrolled on to treatment among the notified RR/MDR TB has remained very high 97% since 2019 (figure 21)

Figure 21: Trend in RR/MDR-TB Diagnosis versus enrolment 2015 - 2022



Data source: *National ETL data, 2022*

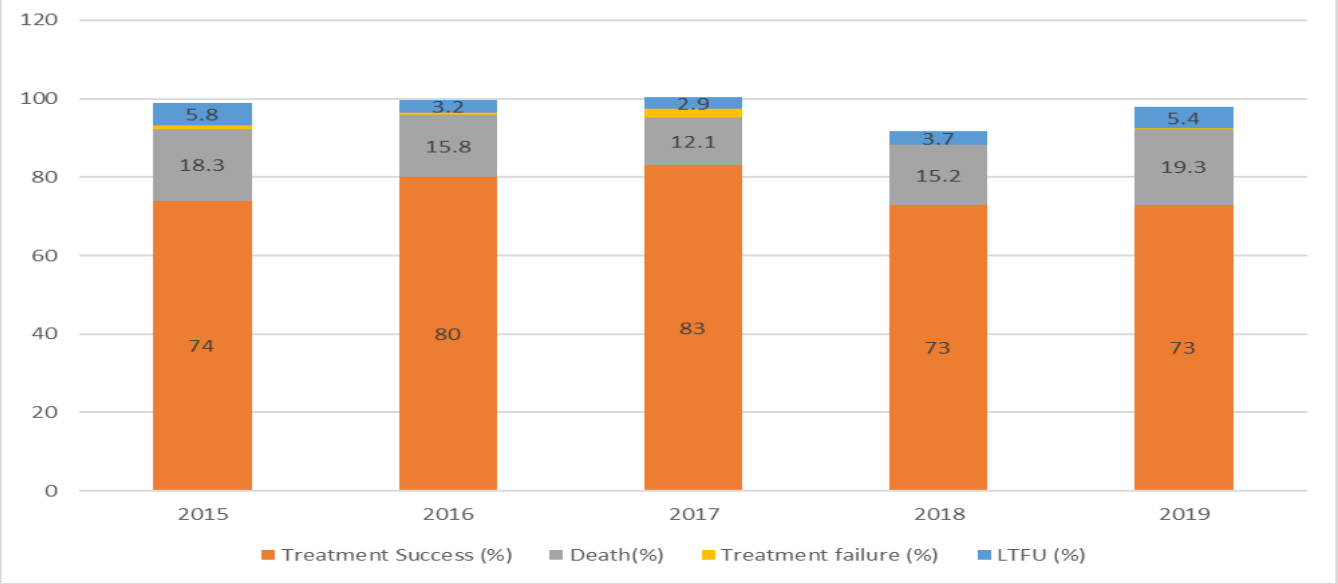
Treatment of DR-TB is integrated into the NTLP service delivery structure. The country adopted the modified fully oral shorter injection free and Longer standardized regimen for the treatment of DR-TB since 2019. The main regimens being used in the country are Modified Shorter Regimen: 6Bdq – Lfx – Lzd – Cfz – Cs - Z/ 3 -5Lfx – Cfz – Cs– Z and longer regimen: 6Bdq – Lfx – Lzd – Cfz – Cs / 12 Lfx – Cfz – Cs. Medicines are available to substitute any of the above drugs where patients cannot take/tolerate one or more of the drugs in the regimen (to individualize the regimen). These medicines include - Delamanid, Ethambutol, Prothionamide and PAS. In addition, paediatric formulations for second line treatment are also available in the country. (**Key: BDQ** – Bedaquilline, **LFX** -Levofloxacin, **LZD** – Linezolid, **CFZ** – Clofazimine, **CS** – Cycloserine, **Z** – Pyrazinamide, **DLM** -Delamanid, **E** – Ethambutol, **Pto** – Prothionamide, **PAS** – Para-amino salicylic acid).

Treatment is provided free of charge and patient care is based on both in-patient and decentralised ambulatory models. Patients interviewed at the KIDH expressed satisfaction with the services provided. About treatment outcome, treatment success for RR/MDR TB has remained at 73% for the 2018 and 2019 cohorts which is lower by 10% compared to 2017. Treatment statistics on treatment outcomes for 2015 – 2019 are shown (figure 3). For the cases of Zanzibar, RR/MDR-TB TSR was 100% in 2019.

The rising mortality among enrolled DR-TB patients in Tanzania is a matter of concern. For instance, the mortality rate among DR-TB patients increased from 12.8% in 2017 to 19.3 % in 2019 while loss to follow up rate ranged from 2.9%in 2017 to 5.4% in 2019 (figure 22). A previous study published in 2017 found Cigarette smoking and being HIV positive as significant predictors for mortality among DR-TB patients (OR, 5.44, 95% CI: 1.09–27.19, $p = 0.039$; OR 3.4595% CI: 1.022–11.64, $p = 0.046$), respectively[14].

However, the use of a mixed model of care with evolving Treatment Initiation Facilities and Follow -up facilities remains a challenge. The model is expensive to implement, makes it difficult to build clinical and Laboratory capacity for DR-TB management since a facility stops being a Treatment Initiating Facility (TIF) once it has no patient. Still, the model is associated with treatment initiation delay, since time is needed to mobilize medicines for the patient to be initiated from the supply chain, and all these factors contribute to the poor outcomes observed.

Figure 22: Trend in RR/MDR TB treatment outcomes 2015 - 2019



Data source: *National ETL data*

Packages of care for in-patients include free meals, diagnosis, conduction of baseline and follow up lab investigations. In addition, DR-TB patients are offered treatment for free. And a monthly transport stipend of TZS 50,000 as well as food support of TZS 50,000 for patients on ambulatory patients. Baseline and follow up investigations are done by the facilities with capacity to perform the tests that have agreement with MoH to claim payment after conduction of the test. Patients/samples from facilities with no capacity to do the tests are referred to the facilities which have agreement with MoH to perform

[14] Mollel, Edson W, and Jaffu O Chilongola. "Predictors for Mortality among Multidrug-Resistant Tuberculosis Patients in Tanzania." Journal of tropical medicine vol. 2017 (2017): 9241238. doi:10.1155/2017/9241238

the required investigations. However, due interrupted availability of serum chemistry and haematology reagents, using Global Fund support, DR-TB hospitals with MoH MoUs are refunds costs incurred for performing these tests to foster robust treatment monitoring for better treatment outcomes.

Active drug safety monitoring and management (aDSM) activities are being implemented. As per WHO recommendation, Tanzania adopted an intermediate package. There is collaboration between NTLP and Tanzania Medicines and Medical devices Authority (TMDA) which is mandated to oversee pharmacovigilance activities in the country. Reporting from a facility is done using aDSM form for serious adverse events within 24 hours and the TMDA adverse drug reactions forms for adverse events of special interest is done on a monthly basis. However, the scope and regularity of reporting including use of the data collected remains to be improved. In health facilities, there is designated aDSM focal person who reports to the regional aDSM focal who then consolidates reports to NTLP pharmacist and TMDA pharmacovigilance unit. TMDA has developed a database for electronic reporting directly from the facilities, but it is not in use yet. Among the two facilities visited, KIDH is implementing aDSM activities as per the national guidelines but at Tumaini hospital aDSM is not fully implemented.

The MoH conducts quarterly DR-TB cohort review meetings to monitor patients progress and outcomes including identification of drivers of unfavourable treatment outcomes. Additionally, during cohort reviews, difficult DR-TB cases are reviewed, and their appropriate management plan are drawn in these meetings. These meetings include participants from NTLP, KIDH, CTRL and zonal laboratories, Regional and District TB and Leprosy Coordinators, regional aDSM focal person, invited specialists and representatives from implementing partners. While, these cohort reviews are being done, the scope of analysis of outcome data needs to be improved. Recent cohort reports indicate, out of 103 patients enrolled in 1st quarter and 103 in the quarter 2 were evaluated and their treatment success rate were 80% and 79.6% respectively. The interim outcomes for 141 patients enrolled in the 3rd quarter of 2021 show that 71% had culture conversion while only 65% of 124 patients registered in quarter four had culture conversion at month six of treatment. And among 2021 quarter 3 and 4 patients, 13% and 18% had unknown culture results respectively (table 11). Low treatment success is contributed by the high mortality rates, low culture conversion, limited implementation of mortality audit and limited scope cohort analysis and low coverage of second line DST.

Table 11: DR-TB Six months interim outcomes patients enrolled July-Dec 2021

Indicator	Target	Performance	
		Q3 2021 (n=141)	Q4 2021 (n=124)
The % of patients who LTFU within the first six month of treatment	<10%	4 (2.8%)	4 (3.2%)
The percent of patients dying within the first six months	<10%	21 (14.9%)	20 (16.1%)
The percent of patients with culture Negative at six months	>80%	100 (71%)	81 (65.0%)
The percent of patients with an unknown culture	<15%	15 (12.9%)	18 (18.0%)
The percent of patients with results for SL DST(LPA/phenotypic)	>80%	60 (42.6%)	44 (35.6%)
The % of Enrolled MDR-TB with nutritional status reported at baseline	100%	141 (100%)	124 (100%)
% of MDR-TB on treatment with nutritional status reported at month 6	100%	116 (100%)	100 (100%)
The percent of patients evaluated for toxicity and documented	100%	116 (100%)	100 (100%)
The percent of confirmed RR-TB with contacts evaluated	>80%	121 (85.8%)	110 (88.7%)

***Data source**: NTLP program Reports*

14.4 Key achievements and best practices

- There is an updated draft guideline for management of DR-TB currently being reviewed by the Editor before submission for approval.
- Availability of diagnostic network (305 GeneXpert sites) with capacity to diagnose at least rifampicin resistance and over 80% are connected to a reporting system (GxAlert/aspect) which notify coordinators and facility in charge once RR-TB case is diagnosed.
- Capacity to perform culture for TB and phenotypic and genotypic (LPA & GeneXpert XDR) drug susceptibility tests.
- TAT from diagnosis to treatment initiation for most patients is 1 to 2 weeks with some exception for fewer patients observed at KIDH with longer TAT.
- The country is using all oral DR TB regimens as per WHO recommendations.
- Presence of TB ECHO clinic for capacity building to healthcare workers and review of difficult cases
- Relatively good treatment success rate, that stands at 63%

14.5 Key challenges

- The country has an RR/MDR TB Notification gap; only achieved 41% of the 2022 target. RR/MDR TB cases have decreased from 534 in 2019 to 358 in 2022. This decline is attributed to several factors.
    a. Inadequate coverage and access – Diagnostic network coverage stands at 19% (335 mMRDs out 1752 facilities)

b. Chronic interruption in supply of GeneXpert cartridges, for instance, visited facilities have less than the required minimum months of stock e.g., Tumaini hospital has 1 month of stock of cartridges.
c. Suboptimal utilization of GeneXpert, that stands at 51%
d. Ineffective sample referral system
e. Inadequate HCW knowledge and skills on DR TB screening, and diagnosis
f. Inadequate TB screening and low-quality sputum sample collection at health facilities. For instance, only 6 paediatric DR-TB cases were notified in 2022.
g. Use of stool for GeneXpert TB diagnosis is still limited.

- DRS last conducted in 2017.
- Treatment success rate (TSR) declined from 83% in 2017 to 73% in 2019 (target of 84%). The steep decline is attributed to the high death rate of 19% resulting from comorbidities such as silicosis, malnutrition, and the high HIV co-infection rate of 32%. It was also reported that late presentation is another important factor attributed to the observed high mortality.
- Use of a Mixed model of care with evolving Treatment Initiation Facilities (TIFs) and ambulatory follow up facilities. Besides the model being expensive, it's difficult to build clinical and Lab capacity, and it's associated with treatment delay as well as poor outcomes.
- Inadequate implementation of a PMDT Minimum Package of interventions for impactful results.
- 2022 RR/MDR Notification far from UNHLM target, notification rate stands at 21% (358 notified out UNHLM target of 1700 for the year 2022).

14.6 Key recommendations

- Increase the number of WHO-recommended molecular rapid tests as per NTLP expansion plan to close the 81% gap in coverage of mWRDs.
- Introduce whole genome sequencing and build capacity for its use in the country.
- Increase the number of 10 colour module GeneXpert machines from existing 3 to at least 1 machine in each region and improve GeneXpert utilisation rate through:
    - Sensitization of health care workers on demand creation for GeneXpert
    - Strengthening integrated sample referral system (HIV, TB, and other samples)
    - Maximise coverage of GeneXpert Alert, linkage, and analysis
- To improve quantification by holding quantification meeting with key stakeholders to harmonise key assumptions during quantification to ensure a smooth supply of commodities.
- Procure and ensure regular supply of cartridges.
- Strengthen coordination of procurement and supply chain TB lab commodities
    - Internal coordination within MoH (NTLP, TMDA, MSD, clearing agents)
- Capacity building among healthcare workers on programmatic management of DR-TB
- Draw a transition plan for the rollout and implementing of BPaL / BPalM DR TB regimen in the country.
- Strengthen conduction of mortality audit, enhanced cohort reviews and use data for decision making.
- Use site Concilia to monitor and proper management of patients. Have a Concilium at each designated Treatment initiation facility supported by National CoE Concilium.
- Strengthen the use of GeneXpert as initial test to increase DST testing coverage.

- Scale up use of stool testing for TB diagnosis using GeneXpert among paediatric patients. Including decentralizing Paediatric TB diagnosis to PHC sites
- Use Mixed model of DR-TB care with Fixed Treatment Initiation Facility) (with both clinical and Lab capacity) with a good adherence patient centre mechanism during ambulatory care (figures 23 and 24).

Figure 23: DR-TB mixed model of care with fixed sites for improved management and outcomes

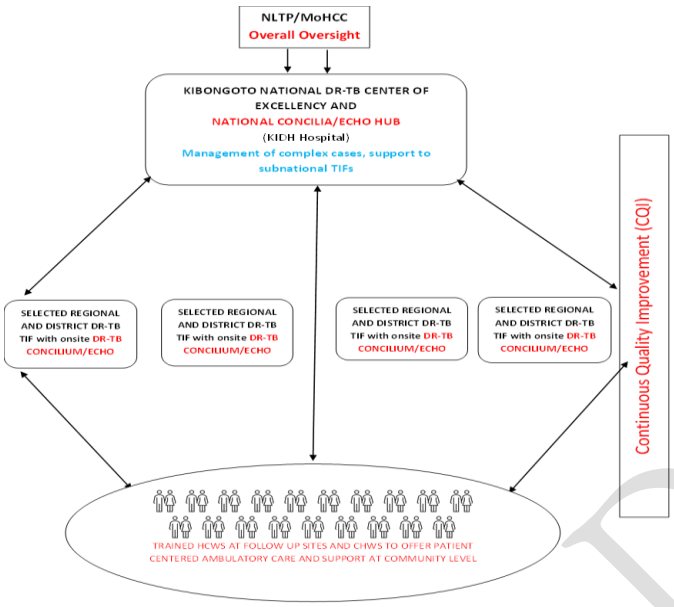


Figure 24: DR-TB Standard Minimum package of care

DR-TB Standard Minimum package of care

- Training treatment site staff (capacity to diagnose, conduct patient baseline investigation, regimen selection and construction, treatment monitoring, ambulatory care, recording and reporting, cohort reviews)
- Regular supply of DR-TB medicines and ancillary medicines
- **Availability of monitoring test/investigations**
- aDSM implementation
- Provision of adequate incentives and enablers (Food, transport, and Psychosocial support)
- Provision of recording and reporting tools (Registers, DR-TB booklet, cohort review tools, Quarterly reporting tools, contact tracing tools, lab smear/culture request forms etc)
- Continuous quality improvement (CQI) initiatives
- Availability of trained, mentored, supervised and facilitated/motivated Ambulatory HCWs and CHWs
- Facilitation with:
  - Resources for contact tracing and screening of DR-TB contacts.
  - Monthly Airtime to call Rx interrupters.
  - Data bundles for monthly and Ad hoc Echo Concilia meetings
- Transport/Fuel to pick up very sick DR-TB patients.

- Contract public/private providers to offer baseline/treatment monitoring haematology, serum chemistry at 100% level.
- Ensure access to ancillary medicines to support prompt and appropriate management of side effects.
- Strengthen aDSM implementation.
- Procure DST substances for Second Line DST for new drugs – BDQ, DLM, LZD, and CFZ
- Conduct enhanced cohort reviews to improve treatment outcomes.
- Increase incentives and enablers from TZS 100,000 (USD 45) to TZS 230,000 (USD 100) and pay these at TIFs sites. This is recommended since this rate was set at the start of PMDT in the country and despite the rise in the cost of the living, this rate has never been reviewed. Secondly, revision of this rate is needed to be able to mitigate catastrophic cost among DR-TB patients and to address the issue of malnutrition reported as one of the drivers of the high mortality. In addition, using both regional and District hospitals as fixed TIFs, might slightly increase travel distances that require transport refunds. Lastly, the average family size is about 4-5 people, and a patient can't eat food alone without his family.

14.7 Conclusion

Generally, there is a functional PMDT program in place, however, there is a need to improve the quality of PMDT program through implementation of a mixed DR-TB model using fixed treatment initiation facilities that have both laboratory and clinical capacity, putting in place a mechanism to maintain good patient adherence during ambulatory care. To further improve DR-TB treatment outcomes, there is urgent need to transition to Bpal / BpalM regimen, implement a standardized minimum package of

PMDT of impactful interventions in all sites. Furthermore, improve the scope and regularity of cohort analysis, establish DR-TB site Concilia at all treatment initiation facilities, shifting focus onto preventing DR-TB cases from getting complex or developing complications. Besides there is need to repeat the DRS survey – to re-quantify the burden. Besides, there is need to improve the coverage and access of the recommended mWRDs (GeneXpert, Truenat, and use of stool on GeneXpert for paediatric TB diagnosis).

15 Community TB Care and Community, Rights and Gender (CRG)

Tanzania recognizes that community-led implementation is a fundamental pillar in finding the missing people with TB. In Implementing the Strategic Plan VI, the NTLP committed to continue to work closely with communities local and international civil society organizations, private health providers, for-profit and not for profit organizations, regional bodies, Implementing and development partners. The Program will work closely with the non-state actors such as Stop TB Partnership, Leprosy Coordinating Committees and the Tanzania Network of people affected by TB to ensure that informed interventions are implemented.

15.1 General Observations

Community TB care (CTC) and CRG programs are well established and functional in Tanzania. The review team observed community TB and CRG activities supported by CHWs. Both CRG and CTBC services were integrated during TB sensitization, screening, sputum collection and referral services at households, ACF events, and during lost to follow-up tracing activities. Table 12 shows the community TB and CRG performance. Only one of the three indicators was achieved, the other two are unlikely to be achieved by the end of NSP period in 2025.

Table 12: Community TB and CRG Indicator Dashboard

Thematic Area Indicator	Baseline	Target	Status 2022
1.Community Contribution to TB Case Notification increased	2019 (20%)	2020 (30%) 2021 (30%) 2022 (30%)	40%
2. Number of KVP (PWUDs, fisherfolks, slums) screened for TB annually	N/A	120,000	14,134 (Data from 9 regions)
3. % Of known mine workers screened for TB			**No data available**
Green → target achieved. Yellow → not achieved, likely to be achieved by end of strategic plan period (>90% of target if quantitative) Red-→ not achieved, unlikely to be achieved by end of strategic plan period (<90% of target)			

***Data source**: NTLP and National ETL data, 2022*

15.2 Community TB care

Community TB care guidelines, policies and operational plans are developed collaboratively with the MOH/NTLP, IPS and other stakeholders. The guidelines and policies help the implementers to monitor the implementation of Community TB care interventions through funding support from partners (Global Fund, USAID, Stop TB Partnership, LHL International, CDC/PEPFAR). Community TB interventions are mobilised and supported by CHWs countrywide who provide TB and Leprosy awareness and

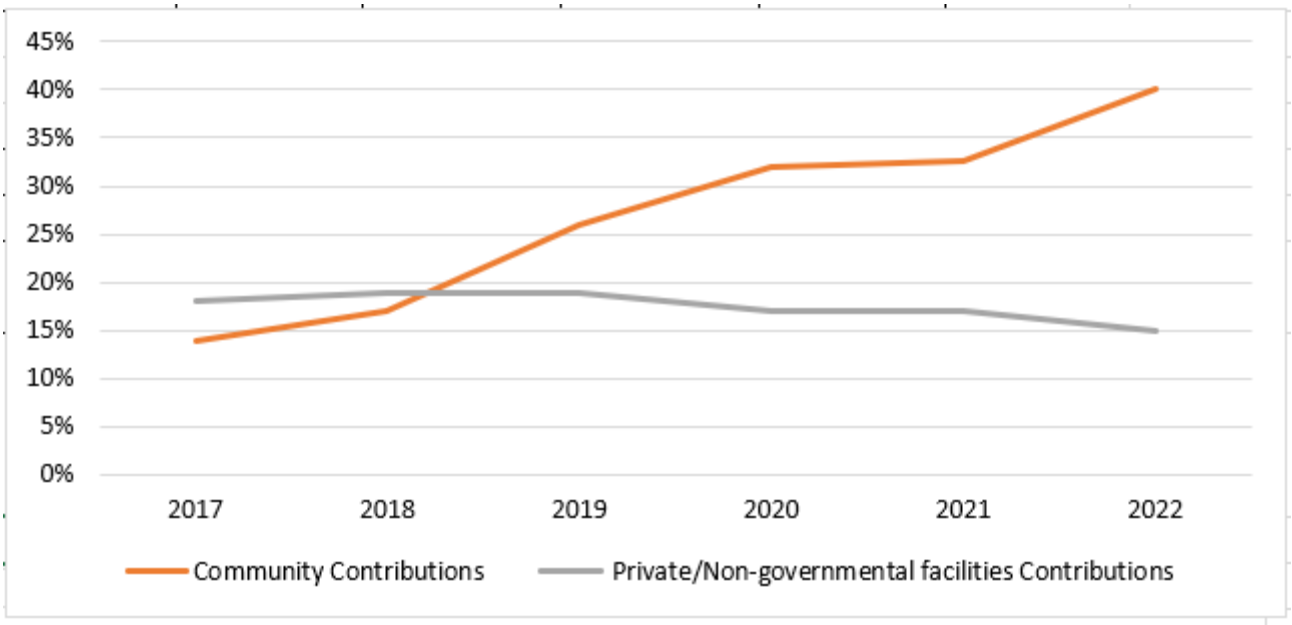
sensitization, screening, ACF, sputum referral for diagnostic testing, delivery of TB test results, and treatment support. Moreover, TB Survivor organizations and CSOs have been supported to improve outreach and TB screening programs among people at high risk as well as the general population. Educational and entertaining events like mid-media, and theatre events during ACF are used to deliver TB messages and education to the community. ADDOs and Traditional Healers who are community profit making entities also collaborate with CHWs in finding the missing people with TB at their premises. A strong working relationship with the CHWs was noted in the provision of TB and CRG services.

15.2.1 Key community TB care achievements

Standardised MoH/NTLP Community TB reporting tools and referral questionnaires are available and include TB/LEP 12, TB/LEP 13A&B, TB/LEP 14, TB/LEP 15, and (Dodoso La Uibuaji wa Changamoto za Jinsia na Haki za Binadamu Zinazohusiana na Huduma za Kifua Kikuu Na Ukoma). These tools are utilized for data collection and reporting by CHWs during community TB activities. TB affected community and TB survivor coordination platforms exist, i.e TTCN, MKUTA and Tanzania Stop TB Partnership are among the TB survivor platforms which play an important role in the coordination and management of the community TB response in close collaboration with the MoH/NTLP. Community TB activities have improved TB Knowledge to people , and adherence to the treatment in the general population and among KVPs since these activities are planned and conducted jointly with community leaders such as WEOs/VEOs and village chairman. For example, a compelling testimonial by a village community leader recorded in an interview, described the critical role CHWs play in the life of the village individuals and their tremendous work keeping the community healthy. CTBC services have somehow been integrated with leprosy, some trainings, community sensitization and contact investigation are areas with some linkages.

Due to applied community TB care interventions, there was an increase in community TB case notification from a 30% target in 2020 to 40% in 2022 (figure 28). This shows how important community led interventions are, despite the limited government support, toward achieving the End TB goal in Tanzania by 2030.

Figure 25: Contributions of community and private sector to TB case finding 2017-2022



Data source: *National ETL data, 2022*

In Tanzania, the MoH/NTLP NSP VI, recognizes the TB KVPs to include: - PLHIV, Miners, Refugees Prisoners, People who used drugs including PWIDS, People living in informal settings, People with Diabetes, Children, Elderly, Community and Health Care Workers and Fisherfolks. Community-based TB activities have contributed to improved TB KVP programming including increased availability, accessibility & quality of TB services, ie, increased adherence to treatment, and decreased mortality. This has been especially important in reaching KVPs using a differentiated case finding model that has targeted fisher folks, miners, local brewpubs, DM and PWUD through ACF campaigns and TB mobile clinic van outreaches services into the community.

CSO & IPs are fully engaged in NTLP community TB, Childhood TB, and TB in the Mining TWGs, planning and review meetings. The platforms meetings are useful to share experiences, best practices, lessons learnt and challenges where remedial actions are drawn for improving community and KVPs TB implementation. Existing of There also exists a real-time case-based electronic system (DHIS2-ETL) integrates community TB data including contact investigation outcomes for adults, children, and other TB KVPs.

CHWs and TB Survivors provide TB psychosocial support to people with TB and improving adherence to TB and Leprosy medicines. And from time to time the CHWs and rare occasion community leaders provide material support in terms of money to buy food and fare for people with TB on treatment to facilitate adherence. This was reported in Mwanza and Tanga regions. Additionally, the use of digitalized TB adherence technology (DAT) to promote TB adherence and reminder alarms to take medication at a right time was reported in HFs in Mwanza and has been helpful in ensuring uninterrupted TB treatment. Table 13 summarizes the key community TB challenges and recommendations.

15.2.2 Key challenges and recommendations

Table 13: Key Community TB challenges and recommendations

	Challenges	Recommendations
1	Inadequate capacity of Community TB among IPs, DOT nurses, CHWs, DTLC, RTLCs and other stakeholders. It was observed that there is variable understanding of Community TB at various levels, and this has impacted its implementation and performance.	Develop and roll out capacity development training on Community TB at all levels including CHWs. Provide refresher trainings and continuous capacity development of CHWs by printing and distributing comprehensive Community-based TB handbook for CHWs to support their onsite review and coaching. The National TB program through the regions/districts should provide on-the-job training, mentorship, and supervision to ensure **TB contact investigations are well implemented for all newly diagnosed child, adolescent, and adult bacteriologically confirmed or clinically diagnosed TB cases.** No child with TB should be missed and *'reverse contact investigations'* should be done on all cases to identify the source case. Furthermore, CHWs should be trained to use TB scoring charts to make a presumptive diagnosis and refer the child to the health facility for definitive diagnosis. Some CHWs reported suspected EPTB (spinal, adenitis) and if well trained will improve their ability to identify and make an effective referral.
2	DHIS2\ETL lacks adequate Community TB indicators including the recommended WHO community TBCI and ACF TB cascade. The review team found that paper-based data reported by CHWs included all TBCI and TB KV indicators in the TB cascade but was missing in the case-based database (DHIS\ETL).	Review and strengthen M&E and DHIS2/ETL to include all relevant TB indicators, and support data entry and analysis at all levels to inform program improvement. There is a need to strengthen the available electronic case-based data system (MoH DHIS2-ETL) to include key community TB variables to enable timely accessibility of community TB information and performance for decision making. Additionally, DHIS2/ETL needs to include the Community TB cascades, to make sure that the indicators currently reported follow and comply with WHO recommendations and include cascades for ACF and contact investigations conducted by CHWs at community level.
3	Unequal support by MoH and IPs to CHWs was noted when it comes to provision of training packages, monthly incentives, or visibility enablers like T-shirts, identity cards, gumboots, bicycles,	The MoH with the collaboration of NTLP and other disease programs should plan to recruit CHWs as an integral cadre of HRH to support community-based TB interventions. This will also reduce the over reliance on donor funding and

	umbrellas, backpacks etc. There is a lack of supportive supervision support from national level to sub national levels especially among the CHWs who are not allocated to available grants in the regions.	promote the sustainability of the community-based health system for TB. Sustainability of support for CHWs includes (recruitment and mobilisation of additional CHWs), increase in the remuneration of CHW monthly renumeration and ensuring availability of the relevant supporting enablers (bicycles, sputum collection containers) and reporting tools covering harmonized minimum package of interventions.
4	Lack of a dedicated TB KVP strategy to support intensified programming and scale up amongst KVPs and hotspots population including on the islands. During our review, it was established that TB KVPs are missed where there is a dis-proportional ratio between a CHW and targeted KVPs. In one region, it was observed that one CHW was serving up to 600 PWUDs. Other missing cases are likely to come from underserved populations and TB KVPs in hotspots such as islands and mining regions.	Conduct mapping and size estimation of TB KVPs thus resulting in investment prioritization on intensified and targeted strategies to KVPs and their respective hotpots.
5	Inadequate investment in CHWs has resulted in inadequate coverage and performance. For example, the GFATM and USAID support a total of 17 regions that have an active community TB program. However, even within these 17 supported regions, the number of CHWs engaged are insufficient to meet the assigned workload demands.	Scale up the coverage of CHW since the current number of CHW is insufficient to meet the need and therefore an increase is necessary at least with 1 CHW per ward with the provision of a base salary, transport stipends, and expanded performance-based incentives and development of CHW TB and Leprosy skills i.e., regular refresher training. The Community Health Program should state the standard minimum package of interventions and stipends for CHWs
6	Insufficient support has also limited implementation of community-led monitoring (CLM) except for a small-scale support from Stop TB Partnership Challenge Facility Grant which is short-term and time limited. There is also a lack of operational research and documentation of case studies and best practices. This has limited the opportunity for program improvement based on	Support the implementation of CLM monitoring using digital platforms and community led research and documentation of case studies. This could first involve the inclusion of CLM monitoring in the research agenda as well as the investigation of factors influencing clinical diagnosis for TB Disease.

	comprehensive information for decision making and advocacy.	
7	A surge in notification of clinical diagnosed TB cases was observed following the intensification of efforts to find missing cases. This was due in part to the use of the TB mobile van clinic where most of the clients are diagnosed using digital x-ray and couldn't provide sputum samples for Xpert testing. In addition, there has been a recurrent shortage of Xpert cartridges that has resulted in relying more on clinical presentation and, when available, chest x-rays to make a diagnosis. Finally, poor quality of sputum samples contributed to the increase seen in clinical TB diagnosis.	Expand up and equip the available health facilities with TB diagnostic equipment, TB drugs, human resource, and TB DOT centres to promote timely accessibility and affordability of TB services amongst TB affected communities. Conduct operational research on the factors contributing to higher clinical TB diagnosis during the Molecular diagnostic era in Tanzania.
8	Social behaviour change (SBC) materials for CHWs are needed while providing health education to the community but are currently limited in availability. These materials using pictures and familiar words and expressions in posters and brochures can effectively deliver information on TB symptoms, treatment, prevention, and cough hygiene.	Undertake awareness campaigns on TB as a curable infectious disease to dispel myths, mitigate against delays in health seeking behaviour and to deter the use of traditional healers for TB like symptoms. This should be done using local media (TV and radios) print media, local influencers, bulk SMS messaging, local and traditional leaders and/billboards and use of TAMBUA TB USSD for TB screening hence increased awareness on TB. Key events such as World TB Day, and the building activities up towards the UNHLM on TB should be used to maximise such campaigns and engagement with country leadership to prioritise TB elimination in Tanzania.
9	Inadequate knowledge for community leaders, traditional healers, and influential persons to support TB activities i.e., awareness and linkages to services	Engage and provide support to traditional healers and influential leaders including training, mentorship, supervision, and other enablers to enhance the provision of TB symptom screening while challenging misconception on TB disease at their premises and rural community.
10.	Presence of stigma among TB, TB/HIV and Leprosy patients	Provide training to HCWs and CHWs on stigma by also disseminating Stigma index survey findings and action plans to inform the magnitude of self-stigma and community stigma affecting the rural and TB affected populations hence improved screening and reporting of stigma cases.

12	There is a noted catastrophic cost to TB and leprosy patients because of low knowledge on iCHF service	Investment and strengthening of the Community Health Fund (CHF) is necessary to reach rural and high burden TB affected communities to reduce out-of-pocket costs including transport to and from the HF, file opening, costs for tests, malaria and any other prescribed tests and treatment. This will also promote the country's progress towards its UHC goals.

15.3 Community Rights and Gender

Tuberculosis (TB), as a disease that disproportionately impacts the poor and vulnerable. It inherently therefore requires a response that is not limited to health facilities, doctors, and medicine, but rather one that addresses the broader social determinants and fosters an enabling environment, and prioritizes people, key vulnerable populations (KVPs) and the promotion and protection of human rights.

The Stop TB Partnership (STP), through The Global Plan to End TB (11), posits that meaningful community engagement, the promotion and protection of human rights and gender equality are key areas of intervention required to achieve the 90- (90)-90 targets and end TB. The plan sets forth three specific actions: (i) facilitate the involvement of TB survivors and key populations in all levels of policy making and programmatic design; (ii) assess which populations are vulnerable to TB along with the barriers that prevent access to care; and (iii) remove any laws, policies and programs that discriminate against people with TB.

Furthermore, in September 2018, at the United National High-Level Meeting (UNHLM) on TB, Heads of State and other World leaders endorsed the Political Declaration, a guiding document for all TB actors working towards the global-level targets to end TB by 2030. It includes specific commitments focusing on TB affected communities, human rights and gender which serve as the enablers to achieving these targets. For countries to realize their commitments in the UNHLM TB Political Declaration, a rights-based, gender-transformative and people-centred response must be understood and operationalized.

The Global Plan to End TB 2023-2030 has set two explicit targets namely - at least 90% of all countries to develop a TB CRG costed Action Plan, budget line and monitoring mechanism and at least 90% of countries to identify key and vulnerable populations in their national plans, propose specific actions and to include a budget line and monitoring mechanism for accountability.

15.3.1 Key CRG observation and achievements

There is commitment to CRG in TB at the highest level, paving the way for the impact if institutionalized. This is demonstrated by the following:

- The inclusion of CRG as a thematic area of assessment for the mid-term review and the engagement of key CRG implementing partners in the review.
- The National Strategic Plan VI 2022 - 2026 recognizes the three CRG assessments and related findings and recommendations i.e., the legal Environmental Assessment for TB, the Gender Assessment for HIV and TB Responses and the Data Action Framework for TB Key Vulnerable Populations. The NSP also defines and prioritizes TB KVPs and has an indicator for them. The two indicators on TB KPs are Number of KVPs (PWIDs, fisherfolk, slums) screened for TB annually and percentage of known TB mine workers screened for TB.
- The development and availability of National Costed CRG Operational Plan, CRG training toolkit for CHWs, CRG M & E plan and data collection tool (DODOSO are in place) were developed.
- The development and availability of a National CRG Implementation Guide for TB and Leprosy Response 2021
- CRG principles and approaches have been integrated in the National Training Guidelines for CHWs on TB including TB Key Populations, Gender, and Human Rights. There are active implementing partners (AMREF, SHDEPHA+, MKUTA, Family Welfare Foundation (FWF), MKIKUTE, TTCN, STEPS, CHIMABA and grants (Stop TB Challenge Facility, the Global Fund, USAID LON) who support various aspects of community rights and gender (CRG).
- The implementing partners are engaged in technical working groups (TWGs) at national and regional level including in decision making on programmatic issues, in annual meetings and program reviews.
- Some of the implementing partners are also engaged in joint supervision with PORALG. NTLP is collaborating with the national TB networks namely TTCN and MKUTA. TB constituencies are also represented on the Country Coordinating Mechanism for the Global Fund (TNCM).
- CRG interventions are integrated and implemented as a component of USAID and Global Fund supported programs, and an independent component through the support of the Stop TB Partnership Challenge Facility for Civil Society.
- Quality TB services are affordable (at no cost to) to TB affected persons including TB KPs. MDR TB patients are supported with some funds to cushion them and support their daily transport needs whilst on treatment.
- RTLC and DTLCs have and some knowledge on CRG interventions that are largely skewed towards TB key populations and much less on human rights and gender.
- Community-led monitoring using the OneImpact approach for TB namely OneImpact Kiganjani has been piloted in Dar es Salaam and in Mwanza by MKUTA and FWF respectively to identify and respond to gender and human rights barriers.
- To date CHWs who support TB case finding, prevention and care efforts have been trained and mobilized to incorporate principles and approaches on CRG into community health work, e.g., stigma reduction, and orientation on patient's rights.
- TB KVPs have been identified and prioritized through the CRG assessment and there is deliberate effort to reach TB KPs with tailored TB services like TB screening, sputum collection, contact investigation, and referrals.
- TB KPs from the PWUD community have been trained as peer educators.
- The M & E system provides disaggregated data by sex, age groups, occupation, and TB KVPs namely miners, PLHIV, fisherfolk on DHIS2 ETL. The implementing partners report to the NTLP through Form TB/LEP12, TB/LEP13A and B and TB/LEP 14, TB/LEP 15 and the CRG questionnaire and DHIS2 ETL. They also report to their respective partners using donor specific tools.

- NTLP has already supported the development of the National TB CRG M&E framework and CLM specific indicators matrix which provides CRG indicators to support CRG interventions.

15.3.2 Key CRG challenges

- Despite the recognition of CRG at the highest level, (CRG Assessment and National Action Plan) the current NSP does not have any specific objective and discussion related to CRG.
- A national CRG Operational Plan, CRG M & E plan and data collection tool (DODOSA), and the national CRG implementation Guidelines for TB ad Leprosy have all been developed with support of development partners; national and subnational dissemination of the same was not provided for; similarly, no provision has been made for NTLP collaboration with its implementing partners to orient the RTLCs, DTLCs, all TB implementing on the CRG related improvements and developments. As a result, despite the national document and guidelines:
  - There is varied understanding of CRG amongst implementing partners.
  - Implementation of CRG interventions has been ad hoc largely focused on TB KVPs and discrimination without other aspects like gender and human rights left behind.
  - Community health volunteers supported by other funding partners outside beyond the challenge facility grantees have not been oriented on the updated CRG components.
- Inadequate coverage of CRG issues in the National Training Guidelines for CHWs on TB and Leprosy for CHVs. For example, issues related to TB KVPs, and Gender issues in TB are not highlighted as apart of training for CHWs.
- CHWs through are supported through implementing partners (USAID and Global Fund) with bicycles, reporting tools, sputum collection cups and boxes. However, CHWs supported through the Challenge Facility though are only expected to focus on CRG, because of demand for services end up undertaking TB screening, case finding TB CI, adherence support, stipends, supply of medicine to TB patients all this without capacity support and reporting tools M & E. There is a huge possibility of underreporting of these cases.
- Whereas TB KVPs in the Mwanza region and the country are known, there lacks a targeted programming strategy for KVPs and their respective hotpots. This is worsened by the fact that the NTLP lacks a vehicle or a boat to support its community work in the expansive regions or islands of Lake Victoria which are active hotspots and host of a range of TB KVPs (fisher folks, slum dwellers, alcohol and drug users and alongside high HIV prevalence).
- Skewed programming for TB CRG that is focused on TB KVPs with limited investment in TB human rights and gender issues in TB.
- TB KVPs data is captured on DHIS2 (ETL), its limited to miners, PLHIV and fisher folk but it's rarely filled thus not visible on DHIS2 thus limits analysis by these variables. There was little evidence of data analysis and use at facility, district, and regional level to inform decision making and programming.
- RTLC, DTLCs, HF TB focal persons and DOT nurses have limited understanding of CRG and CLM, and there is little evidence of coordination.
- CLM initiatives in TB have only been supported through the Stop TB challenge facility thus not been implemented at scale. There is also low use of the CLM findings to inform decision making at facility and district level, and advocacy at regional and national level.
- High degree of self and community stigma; and DOT nurses and CHWs not able to detect it thus remains under reported.
- Lack of operational research and documentation of best practices e.g., contribution of CHWs, TB survivors or PWUD in Community TB
- Beliefs and the proximity of traditional healers and their package of services (on credit and in-kind payment) delay the amount of time between the onset of TB symptoms and actual TB diagnosis amongst rural communities.

- Low awareness of TB among rural communities; this is a barrier to access contributing to delayed diagnosis and health seeking behaviour.
- The out-of-pocket costs of transport to and from to the Health Facility, file opening, costs for tests, malaria and any other prescribed tests and treatment is a huge barrier to access and affordability of services.
- The long distances to health facilities of 5-10 kilometres and the related transport costs (out of pocket costs) limits access to TB health facilities. Other barriers include beliefs and the proximity of traditional healers who offer services to communities on credit with option to pay in kind thus very accessible to rural communities who are trying cannot afford to pay the out-of-pocket costs. The out-of-pocket costs transport to and from to the HF, file opening, costs for tests, malaria and any other prescribed tests and treatment. The traditional healers tend to delay the amount of time between the onset of TB symptoms and actual TB diagnosis amongst rural communities.

> "*For me, it took me one year before I was diagnosed with TB, during this time I was being attended by a traditional healer until I was soo sick on the verge of death. In fact, my neighbours wanted me to relocate to my village lest I die in their hands, Others were sure I was suffering from HIV! At one time, the traditional health gave me a cigarette made from herbs that made me worse!"* – TB affected person, Buzurugu Health Centre, Mwanza

- CSOs implementing CRG interventions lack joint consultative planning and review meetings to share experiences, and to optimize synergies and complementarity.
- There is inadequate number of CHVs to vis a vis the demand for services. For example, STEPS as 8 PEERs/ CHWs. Each CHVs is support up to 12 hotspots/maskanis to cover and each hotspots have an average of 50 members. This means that each CHWs is expected to support up to 600 drugs users per month. This ratio is not proportional, and it means that there is a possibility of missing TB cases amongst the PWUD community which are yet to be diagnosed.
- Additionally, the PVUD programs are so basic, they do not have incentives for the CHWs, and they lack drop-in centres for PWUD to facilitate their access to one stop services that may include TB HIV, STI screening and treatment, adherence support, and dignity services.

15.3.3 Key CRG recommendations

- Drawing from Chapter 7 of the Global Plan for Ending TB, NTLP should develop a specific objective in the NSP and include priority actions to support programming for CRG interventions in Tanzania.
- NTLP in collaboration with TTCN should champion the dissemination of existing documentation on TB CRG at national and at regional level. The existing National TB CRG M&E framework and CLM specific indicators matrix should be operationalised to support CRG interventions in Tanzania.
- NTLP in collaboration with TB implementing partners should institutionalize refresher courses on community TB and CRG and CLM for RLCs, DTCs and DOT nurses.
- The NTLP should orient implementing partners, RTLCs and DTLCs on CRG. Hybrid means (physical and virtual) phased processed strategies should be explored and utilized.
- NTLPs i.e., DTLPs, in collaboration with implementing partners should be supported to re orient CHWs on Community TB care and CRG activities. Hybrid (physical and virtual) meetings using phased approaches should be explored and utilized.

- NTLP should lead the development of all policy guidelines for TB CRG including the review of the existing one for completeness and translation to either Kiswahili or English.
- The current National CRG Operational Plan which ends this year should be updated and costed to inform the upcoming GC 7 funding request to the Global Fund. This should also be titled the National CRG Costed Action Plan as per guidance from the Stop TB Partnership.
- NTLP should empower its teams (RTLC and DTLCs) on TB CRG to facilitate holistic planning (TB KPs, human rights, Gender) implementation, and supervision of TB CRG interventions in their areas of jurisdiction.
- NTLP should engage stakeholders in the development of a dedicated strategy for intensified case finding and CRG in TB KVPs and TB Hotpots; and support its implementation at all levels and within implementing partners supported areas.
- NTLP should conduct mapping and size estimation of TB KVPs thus resulting into investment prioritization on intensified and targeted strategies to KVPs and their respective hotpots.
- RTLCs, DTLCs and Medical Offices in-charges should be trained on the importance and how to analyse and use the data to inform decision making and programming in relation to gender, KVPS and other programmatic aspects; to supervise correct data entry that captures all variables as reported by CHWs through the paper-based forms (RSSH M & E/HMIS). Strengthen the integration of CRG information into NTLP M & E framework and DHIS2.
- TTCN and other TB CRG implementing partners should be supported to in collaboration with NTLP convene quarterly CLM implementers progress review meeting including findings and challenges to date to inform the next steps and planning for its scale up.
- NTLP in collaboration with TTCN and TB CRG implanting partners should develop simple training content on CLM using One Impact Approach (the Why, what, How, Where) for RTLCs and DTLCs on CLM at regional level to facilitate understanding and support of the same ahead of the scale processes under GC 7.
- NTLP in collaboration with implementing partners should champion awareness campaigns on TB as a curable infections disease to dispel myths, mitigate against delays in health seeking behaviour and to deter use of traditional healers for TB like symptoms. This should be done using local media (TB and radios,) print media, local influencers, bulk sms messaging, local and traditional leaders and/billboards and use of TAMBUA TB USSD for TB screening hence increased awareness on TB. Key events such as World TB Day, the activities building up towards the UNHLM on TB should be used to maximize such campaigns.
- NTLP, CRG Implementing and funding partners should invest in qualitative and operational research including documentation of best practices and advocacy.
- CRG implementing partners should undertake periodic planning and review meetings at national and regional levels. These meetings are best convened by the TTCN, and by RTLCs in collaboration with implementing partners in the regions and at national level.
- TTCN and implementing partners to on a continuous basis undertake advocacy at various levels on CRG issue affecting access, availability, accessibility, and quality of TB services.

15.4 Conclusion

Community TB and CRG interventions have proven to change the trend of TB and Leprosy notification in the country. Active Case Finding is well organized at all levels, at regional, district

and community levels. Participation of community players in the community demand creation for TB and Leprosy has impacted their capacity to identify TB & Leprosy patients. However, there isn't enough funds and strategic information to support implementation of all priority TB and Leprosy activities at community level.

16Public Private Mix (PPM)

16.1 Background

Public-Private Mix (PPM) TB Strategy in Tanzania is structured as a partnership between the government and the private sector. The private health sector in Tanzania is comprised of privately owned and operated hospitals, clinics, health centres, pharmacies, dispensaries, accredited drug dispensing outlets (ADDO), traditional healers and other healthcare facilities. These facilities provide a range of medical services, including diagnostic tests, outpatient and inpatient care, and preventive health services. The sector is organized into several different types of entities, including private financed (owned by doctors, nurses, other individuals); private not for profit (aid agencies or NGOs); faith-based (Christian and Islamic), company owned (larger organizations or health care companies) and some quasi-government hospitals, pharmacies & ADDOs and private standalone laboratories. Some of the larger private hospitals offer a wide range of specialized services, such as cardiology, obstetrics and gynaecology, orthopaedics, and paediatrics, while smaller private clinics often focus on providing primary care services. In terms of association all private facilities fall under two associations – Christian Social Services Commission (CSSC) and Association of Private Health Facilities in Tanzania (APHFTA).

In terms of regulation, the private health sector in Tanzania is overseen by the Ministry of Health which sets standards for the provision of health care services and ensures that private health facilities comply with these standards. The government of Tanzania has recently taken steps to regulate and improve the quality of private healthcare, and the sector is expected to continue to grow in the coming years.
The quality of care and services offered by private facilities can vary widely. Some private healthcare providers adhere to high standards of medical practice and patient care, while others may provide substandard care or engage in unethical practices, such as overcharging for services or providing unnecessary treatments. Despite these challenges, the private health sector in Tanzania is growing, and many Tanzanians are turning to private healthcare providers for the high quality of care and convenience that they offer.

In TB control, the government provides policy, regulatory and technical as well as commodity support, while the private sector is responsible for delivering quality tuberculosis (TB) diagnosis and treatment services to the population. The objective of the public-private mix DOTS strategy is to increase access to TB care, improve case detection and ensure successful treatment outcomes. Under this approach, private sector providers are expected to be trained and accredited by the National TB and Leprosy Programme (NTLP) to deliver DOTS services. The private sector providers receive regular supervision and support from the NTLP, and they are required to report TB cases and treatment outcomes to the national TB surveillance system. The government also provides in-kind incentives to private sector providers to encourage their participation in the DOTS program. The public-private mix DOTS strategy has been successful in increasing access to TB care and improving treatment outcomes in Tanzania.

However, ongoing efforts are needed to ensure the quality and sustainability of the program and to address any challenges that may arise.

16.2 General observation

The PPM intervention in Tanzania was initiated by the National Tuberculosis and Leprosy Program (NTLP) in 2000 with the aim of improving collaboration with the private sector to increase tuberculosis (TB) case detection. PPM guidelines were developed in 2009 and a National PPM Coordinator was appointed to lead implementation. In 2012 a private health sector assessment was commissioned in response to the Government of Tanzania's desire to leverage the capacity of the private health sector and its resources to support the gaps in health service delivery. This was one of the key activities proposed by the PPM guidelines of 2009. These were all important efforts to leverage the capacity of the private health sector and its resources to increase TB case detection, support the delivery of health services in Tanzania, address the gaps in health service delivery and improve the overall health outcomes of the population. In 2022, PPM contributed 15% of cases to national notification, a decline from 21% in 2015 (table 14).

Formal and informal health providers engaged by the NTLP include:

- Faith-based health facilities
- Private health facilities
- Quasi-governmental health facilities
- Accredited Drug Dispensing Outlets (ADDO)
- Traditional Healers

Private health facilities exist at all levels of the health system:

- Community: Health Centres, Dispensaries, Pharmacies & ADDOs, Standalone Labs
- District: Private Hospitals, Diagnostic Centres, Polyclinics
- Zonal: Super Specialist Polyclinics
- Regional: Referral Hospitals

Table 14: PPM indicator dashboard

Thematic Area Indicator	Baseline (2019)	Target (2022)	Result (2022)	Achievement	Status
Percentage of notified TB cases (all forms) contributed by private /non-governmental facilities	21%	25%	15%	60%	

Green → target achieved.
Yellow → not achieved, likely to be achieved by end of strategic plan period (>90% of target if quantitative)
Red → not achieved, unlikely to be achieved by end of strategic plan period (<90% of target)

Data source: *National ETL data, 2022*

NB: Under PPM, only one indicator is tracked and was not achieved and its unlikely to be achieved in the NSP period.

16.3 PPM Partners interviewed.

A. Association of Private Health Facilities in Tanzania (APHFTA)

Association of Private Health Facilities in Tanzania (APHFTA) is an Umbrella Organization of the Private (Self Sustaining) Health Sector in Tanzania established in 1994. It serves as a public forum for the private health sector and provides a comprehensive array of advocacy, administrative, knowledge – sharing, and networking products and service to the Private Health Care Sector. It has member facilities all over Tanzania Mainland, which includes Hospitals, Health Centres, Dispensaries, Clinics, Laboratories, Pharmacies / Accredited Drug Dispensing Outlet (ADDO's) and Maternity homes among others.

APHFTA engages over 1,000-member healthcare facilities in the private health sector in delivery of public health goods as per the Ministry of Health Community Development, Gender, Elderly and Children guidelines. APHFTA is dedicated to improving the quality of care in the private health sector in Tanzania. APHFTA provides a comprehensive array of advocacy, administrative, knowledge-sharing and networking products and services to the private health sector, and it endeavours to link with the community and thereby contribute towards poverty alleviation.

Overall, the private health sector in Tanzania plays an important role in the delivery of health care services to the population, particularly for those who are able to afford the higher costs associated with private health facilities. The sector provides a range of services, including primary care, diagnostic tests, specialist consultations, and surgeries. However, it is important to note that the quality and availability of private health care services can vary widely, and access to these services is often limited to those with higher incomes. Website: https://aphfta.or.tz/

Specific findings at APHFTA

- APHFTA coordinates the entire private health sector and has Focal Points for public health interventions including TB, however NTLP engages directly with each of the private providers.
- The organization represents interest of private self-financing health facilities, pharmacies, laboratories and has nationwide coverage.
- Engage with members through meetings- in person and virtual, and quarterly zonal meetings.
- Members subscribe to services so maintain a loyalty to APHFTA- with annual membership fees.
- Provides a platform for members to voice out their challenges within the health system.
- Negotiates with government on several issues on behalf of membership – NHIF tariffs, taxes, human resource placement, salaries, policies and parliamentary bills and regulations that affect members interest etc.
- NTLP acknowledges their role and sometimes engages with them.
- Private health facilities are supported with diagnostic tools, TB commodities, R&R tools.
- However, no reporting goes through APHFTA.

B. Christian Social Services Commission (CSSC)

The Christian Social Services Commission (CSSC) is an ecumenical body jointly established by the Tanzania Episcopal Conference (TEC) and the Christian Council of Tanzania (CCT) in 1992 to

facilitate social services, with the focus on education and health services provided by member Churches. It is the largest ecumenical organization in Tanzania, working under more than 87 dioceses and provinces which own and manage about 42% of hospital health services, 56% of health facilities in rural areas, and more than 10% of education services in Tanzania. Website: https://cssc.or.tz/

Specific findings at CSSC

- Represents interest of faith-based organizations providing health services as a means of social service responsibility to the people.
- Their facilities are located nationwide and are at all levels of health services delivery: community, district, zonal & regional.
- Facilities include hospitals, polyclinics, clinics, health centres, pharmacies, dispensaries.
- Develop policies and guidance documents to support their practice for national accreditation.
- Engage periodically with members through meetings.
- Members subscribe to services so maintain a loyalty to CSSC.
- Provides a platform for members to voice out their challenges within the health system.
- Negotiates with government on several issues on behalf of membership – NHIF tariffs, taxes, human resource placement, salaries etc.
- NTLP acknowledges their role and sometimes engages with them.
- There is a Focal Point person who leads public Health/TB/Disease Programme interventions.

C. **Ilala II Regional/District TB & Leprosy Office**

Specific findings at Ilala RTLC and DTLC

- Dedicated RTLC and DTLC for private facilities. There is a DTLC for public facilities as well. In other regions and councils, the coordinator takes care of all facilities including private ones.
- Supervision to facilities is conducted monthly.
- Feedback is provided after each visit but now in verbal format.
- Private facilities readily respond to feedback provided.
- Electronic reporting submitted to NTLP.
- All facilities use eMRS for data entry.
- Compliance to NTLP Guidelines
  Logistics are provided to all private facilities – No stock outs.

D. Shree Hindu Mandal Hospital

This facility is located in Ilala II District and not far from Muhimbili National Reference Hospital.

Specific findings at Shree Hindu Mandal Hospital

- Facility is located in a very busy and well populated part of Ilala District and within reach of most community members.

- There is a very high patronage of the facility.
- Facility has a dedicated TB & HIV Clinic – One-stop Shop approach.
- Care is provided in a Patient-centred approach.
- Dedicated staff involved in TB care who are motivated.
- QI & IPC Committees exist and interested in TB activities.
- NTLP IEC materials are displayed in various parts of the clinic.
- Presumptive Registers in each Department
- TB screening in each entry point of the facility: OPD, HIV Clinic, RCH
- Registers all properly filled.
- They prioritize the use of natural ventilation in the TB & HIV Clinic
- The NTLP has provided a GeneXpert machine for this facility to diagnose cases based on the patient load that visit this facility.

E. Aga Khan Hospital

This is a regional level referral facility with specialist services. It maintains consultant physicians, surgeons and other disciplines to provide services. Its target clientele is the middle and upper economic class within the Dar es salaam city and beyond.

Specific findings at Aga Khan Hospital

- Facility management including the Chief Medical Officer and Director of Nursing show significant interest in TB and are aware of targets to be met. An Infectious Diseases Consultant is the lead clinician to see TB patients.
- TB reports are included in Weekly Exchange review meeting.
- Maintains 5-star ranking in Safe Care Quality Improvement
- TB screening at each entry point in the hospital
- TB screening tool is integrated in the hospital system HMIS at OPD Triage. Clients cannot see a doctor if screening is not done.
- All clients coming through facility are screened for TB.
- Conduct gastric lavage on children for TB investigation.

F. Regency Hospital

This is one of the oldest hospitals in the city and has been participating in TB PPM.

Specific findings at Regency Hospital

- TB screening is done at each entry point.
- Chest X-ray of TB patients are interpreted with the panel of specialists including radiologist, physicians, and pulmonologist.

G. Specific findings at Morogoro Region/Mvomero District Council

Specific findings at Morogoro/Mvomero Council

- DMO is new (9 months) but shows a lot of interest in TB & Leprosy
- District received adequate funding from Government to support health system budget.

- Availability of additional 3 motorcycles to support Health services including TB & Leprosy.
- Regular weekly progress review meeting with all CHMTs
- TB commodities are distributed quarterly by Medical Stores Department
- USAID Afya Yangu Southern Zone supports TB activities.
- German Leprosy & TB Relief Association (GLRA) supports some leprosy activities in district.

H. **Turiani Hospital**

Specific findings at Turiani Hospital

- Well capacitated DOT nurse with more than enough experience in TB services delivery.
- Presence of diagnostics
- Treats MDR clients in facility
- Strong community involvement including contact tracing.
- Good documentation in registers and ETL
- Strong linkage of referrals from community i.e., ADDOs, nearest dispensary

I. Accredited Drug Dispensing Outlets (ADDO)s

Specific findings at ADDOs

- ADDOs trained for TB REACH project are still functional.
- Some Owners/Dispensers who were trained are still referring presumptive TB patients though the project has ended without any support.
- Some initially trained dispensers have moved / relocated to other facilities but still using the knowledge acquired in training.
- Referral of presumptive clients is still performed despite absence of supervision from DTLC and closure of the project.
- Presence of TB posters, CHWs to support referrals and linkage.
- Trained ADDO staff have not asked to be renumerated though.

16.3.1 Summary of key findings

- APHFTA & CSSC are umbrella organizations with significant influence over the private health sector. These organizations have not been fully used to improve private sector engagement in the management of TB and Leprosy. New facilities are being registered each year but not being engaged for TB & Leprosy activities.
- PPM engagement is not as strong as it used to be resulting in declining case notifications.
- There is inadequate funding to support TB work in private facilities.
- There is no Leprosy management in the private facilities.
- No community engagement occurs from private facilities hence community-based TB Care is a lost opportunity. The gains from using ADDOs in TB case finding has been eroded due to lack of supervision and engagement.

16.4 Key achievements

Major PPM achievements include:

- All regions implement PPM for TB services in line with national guidelines, contribution of PHFs in case notification is reported into DHIS 2 – ETL
- 5 models of PPM exist: for Profit, non-profit, ADDOs, Traditional healers, TB at workplaces.
- NTLP engaged small, privately operated retail outlets in rural and hard-to-reach areas (ADDOs) after training & licensing to sell a set list of essential medicines including selected prescription drugs by FDA. CSSC engaged 1440 ADDOs under TB REACH Wave 6 (2018) & Wave 8 (2020) to identify clients with TB-like symptoms and refer them to TB diagnostic centres for investigations to improve TB case detection (TUWAFIKIE & TUWAFIKIE ZAIDI)
- NTLP has maintained engagement with 1440 ADDOs & 360 Traditional Healers using an integrated approach involving community health workers, ADDO Dispensers and diagnostic facilities.
- Contribution of the private sector to TB notification has increased from 5.6% (2014) to 19% (2019) but decreased to 15% (2022).

16.5 Key challenges

- APHFTA & CSSC have not been fully used to improve private sector engagement in the management of TB and Leprosy
- There is no intermediary agency supporting PPM delivery.
- There is inadequate funding to support TB work in private facilities.
- There is a gap in initiating Leprosy treatment in the private facilities.
- Community engagement with private facilities is not robust hence opportunity for community-based TB Care is not maximised.
- Private laboratories are not fully involved in TB control work.
- Inadequate supervision and engagement by NTLP for ADDOs
- No NHIF coverage for TB patients for supportive investigations e.g., Chest X-ray, Haematology & Biochemistry

16.6 Key recommendations

- APHFTA & CSSC should be seen as allies and used as intermediary entity for PPM for better private sector engagement, coordination & monitoring.
- The engagement of ADDOs should be improved.
- DTLCs should identify CBOs and CBVs to collaborate with private facilities for community-based TB care.
- There should be more trainings to maintain capacity of private facilities to deliver TB & Leprosy services.
- Strengthen quality improvement for TB care in private facilities and integrate PPM issues.
- Patient centred approach to care should be promoted in private facilities.

16.7 Conclusion

PPM implementation is happening but still at suboptimal level with limited support, engagement, and collaboration with all partners. PPM scale up with regular provision of incentives, engagement and collaboration with all partners is required.

17 Supply Chain Management

17.1 Background

The MOH through the NTLP is responsible for coordinating quantification, procurement and management of TB and leprosy commodities. The country procures quality assured TB commodities through stop TB Partnership/ GDF while the Medical Store Department (MSD) provides support in the procurement of few TB laboratory commodities mainly those which are not part of the GDF's products' catalogue. FLDs and leprosy medicines are currently integrated into the general ordering and distribution system, and demand driven distribution approach being implemented from MSD to district level. To ensure uninterrupted supply of quality-assured TB commodities at all levels, the TB programme is implementing various interventions aimed at improving procurement, in-country distribution, stock management and TB supply chain management in general. The introduction of the TB e-LMIS was done under the previous NSP and has helped the country to successfully transition from a push to a pull inventory control system for FLDs. The key areas of focus for the 2020-2025 NSP include the need to ensure integration of SLDs and laboratory commodities within the existing supply chain to improve data visibility, and to continue building health care workers capacity in TB management including implementation of aDSM. Performance of PSM indicators are summarized in table 15.

Table 15: PSM indicator dashboard

Thematic Area Indicator	Baseline (2019)	Target (%)	Status
Percentage of Hospitals and Health Centres making direct monthly report on the e-LMIS	NA	100%	**26%**
No of Physical stocks taking of TB and Leprosy commodities conducted	1	2	**50%**
No of stockout of TB and Leprosy medicines at the district level	0%	0%	**7.5%**

Green → target achieved.
Yellow → not achieved, likely to be achieved by end of strategic plan period (>90% of target if quantitative)
Red → not achieved, unlikely to be achieved by end of strategic plan period (<90% of target)

Data source: NTLP e-LMIS

The implementation status on the PSM indicators shows that out of the 3 indicators tracked, two were not achieved but likely to be achieved while one was not achieved and is unlikely to be achieved by the end of the NSP period.

17.2 General observations

- There is a functional national quantification TWG under the leadership of the MOH/Pharmaceutical Services Unit (PSU), and TB commodities are in the process of transitioning towards bottom-up quantification approach whereby demand will be generated by end users.

- The NTLP has maintained the capacity to undertake quantification of TB medicines, manage procurement and other in-country supply chain interventions. There are 3 full time PSM staff to support the management of TB PSM component.
- There is strong collaboration and coordination between NTLP, MSD, Tanzania Medicines, and Medical Devices Authority (TMDA), HIV program, PEPFAR/USAID and WHO and ongoing TA support from partners in managing TB supply chain system.
- There is regular TB commodities quality monitoring including post-marketing surveillance through the WHO-prequalified and ISO-certified quality control (QC) laboratory located at TMDA. No TB medicine has failed QC in the past 12 months.
- There are good storage practices at the MSD warehouses visited. Storage space is adequate, and the warehouse is fully equipped and well arranged. Optimal temperature conditions and regular monitoring of temperature observed.
- Delayed adoption of the new 2022 WHO recommended DR-TB and DS-TB treatment regimens. There is currently no transition plan in place.

17.3 Key achievements

- Uninterrupted supply of quality-assured second line TB medicines, adult first line TB medicines, leprosy medicines and TPT medicines in the past 12 months. 100% availability of TB medicines at the central level at the time of the program review observed and no potential stock outs anticipated in the next 6 months (figure 26 and 27).
- There is evidence of regular quantification, stock status reviews and updating of supply plan which has helped to ensure commodity security and prevented wastage of USD 3M worth of SLDs under the current Global Fund grant due to low DR-TB notifications. Quantification reviews are conducted biannually while stock status review is conducted quarterly using QuanTB tool.
- Adequate funds available for the procurement of for FLD, SLD and TB laboratory consumables under Global Fund support. During the current NSP period, the country managed to secure approximately USD 30.7M for procurement of TB commodities to cover the period from 2021 to 2023. Additional support is available through USAID)/PEPFAR for the procurement of TPT medicines and cartridges.
- In addition to donor support, the government of Tanzania has continued to demonstrate commitment to support the TB PSM component. Funds are provided for in-country distribution of TB commodities and for customs clearance when need arises. Currently, the MSD charges 11.6% of the total procurement costs for warehousing and in-country distribution, of which 5.6% is covered by the government for in country distribution and the remaining 6% for storage is covered by the Global Fund. In addition, there is also support in procurement of ancillary medicines.
- Improved coordination between TB program, Government Procurement Service Agent (GPSA) and GF clearing agents which was one of the challenges observed during previous program review has helped to reduce the lead time for TB medicines port clearance. Third part clearing agents have been given access to online system for processing clearing documents which was recently a full responsibility of GPSA.

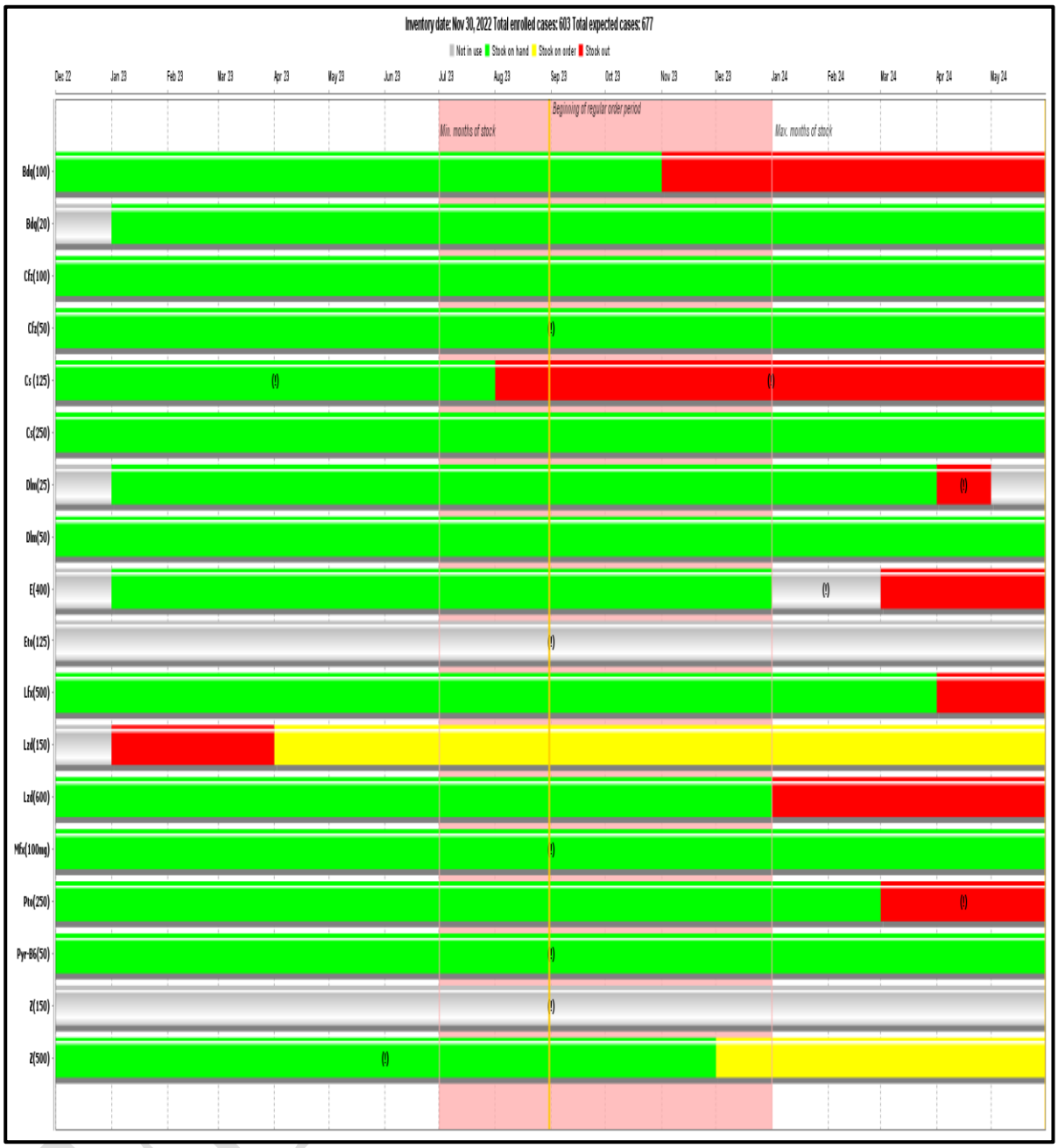
- A new optimized supply chain system for the management of DR-TB medicines has been designed with support from the USAID funded Global Health Supply Chain (GHSC) project. Once implemented, storage and distribution of SLDs will be decentralized to MSD stores in line with the ongoing efforts to decentralize MDR-TB treatment services. The new system is expected to enhance the visibility of SLD stocks at health facility level and help to reduce distribution costs. Currently, SLDs are stored and distributed through KIDH using postal express mail services (EMS).
- TB LMIS data are routinely analysed, and key supply chain performance indicators are being monitored on a quarterly basis under the leadership of the MOH/ PSU. The selected TB KPIs include stock out rates, LMIS reporting rates, timeliness, and completeness of LMIS reports.
- aDSM is being implemented. aDSM reporting tools are in place and electronic aDSM tool has been linked to TMDA online reporting platform. SOP have also been developed and the roll-out of the aDSM trainings is ongoing though coverage is still low. Only 20 DR-TB clinics facilities were trained in 2022. There is also ongoing on the job mentorship being conducted and aDSM is one of the topics discussed during TB ECHO virtual meetings.
- The shorter TPT regimens have been adopted in line with the latest WHO recommended TPT guidelines. To prepare for the roll out, a detailed transition plan has been developed including transition roadmap and some funds have been secured to support preparatory activities including guidelines review. Procurement process has also been initiated for both 3HP and 3RH.

17.4 Best practices

- Linkage of patients' data to TB e-LMIS has been helpful in informing data validation/verification process at the district and MSD level before order processing. In addition, use of WhatsApp groups to widely communicate and address PSM related challenges and facilitate redistribution of TB commodities among different districts, regions and health facilities is commendable initiative and can help to reduce stock outs and wastage of TB commodities.

Figure 26: TB FLD stock status as of 31 January 2023.

Figure 27: DR-TB SLD stock status as of 31 January 2023



17.5 Key challenges

Interrupted supply and underutilization of child friendly FLD formulations in the past 12 months because of expiries, delayed initiation of the procurement process, late disbursement of funds and lack of ordering by the health facilities. Stock outs of child-friendly formulations were reported in most of health facilities visited though adequate stocks were available in the country at the time of the review. Approximately USD350,000.00 worth of child friendly FLDs expired in 2022 at the two MSD warehouses visited despite surpassing the DS-TB children notification targets used to inform procurement for 2021 and 2022 by 12.48% (14,038/12,480 children) and 25.2% (16,892/13,482) respectively. A further analysis revealed a significant mismatch between paediatric DS-TB notifications and consumption rate for paediatric formulation with the consumption rate for RHZ being significantly

higher compared to other paediatric formulations (See table 16 below). This is likely to be due to non-adherence to the current TB treatment guidelines and use of adult formulations to manage paediatric DS-TB cases.

Table 16: 2021 Paediatric TB notification vs proxy consumption of paediatric FLD formulations

Medicine	Estimated annual consumption (In packs) based on 2021 notifications	Actual quantity issued from MSD warehouses	Percentage difference
RHZ	24'064	20'414	85%
Ethambutol100mg	24'064	9'867	41%
RH75/50mg	48'129	12'810	27%

***Data source**: NTLP commodity reports*

Unstoppable supply of key TB laboratory commodities including GeneXpert Cartridges and consumable kits. Stock level for GeneXpert cartridges were critically low (0.52MoS) and stock outs were reported in most facilities at the time of the review. There was also a shortage of sputum containers (3MoS) and stockouts of ZN and LED consumable kits. Erratic supply of TB laboratory commodities can be attributed to several procurement challenges. These include:

- Significant funding gap for the procurement of GeneXpert Cartridges. For 2021-D2023, the budget for procurement of GeneXpert Cartridges was estimated to be USD 20'114'278.71. However, only 60% was funded under the current Global Fund grant therefore a funding gap of approximately USD 9m if all GeneXpert machines function optimally.
- Global supply shortage of GeneXpert Cartridges and delays in signing service level agreement with Cepheid.
- Prolonged in-country procurement lead time due to late disbursement of funds for procurement of TB laboratory commodities affecting both MSD and GDF procured products, delays in providing the required procurement approvals and late payment of TMDA import permit processing fee contributing to delays in shipment of products procured via GDF. Currently, TMDA charges 0.25% of FOB value for all public health products as a fee for quality control and quality assurance. Funds for import permit processing were allocated under the current Global Fund grant. However, there is lack of clear agreement on how disbursement of these funds should be managed. There are some clearing agents who pay the respective TMDA fee and get reimbursed by the Global Fund upon completion of the port clearance process while some do not find this as their responsibility and fail to pay.
- Tender failures due to small volumes mainly affecting MSD procurement. These occurs when suppliers do not show interests because some orders for TB laboratory commodities are small in quantity, contributing to tender failure and thus the need for re-advertisement.
- Inadequate quantification and supply planning capacity for TB laboratory commodities. There is currently no tool for quantification and supply planning and knowledge gap on TB laboratory commodities supply chain management among key NTLP/laboratory staff.
- Insufficient funds for procurement of 3HP following the adoption of the WHO recommended shorter TB regimens-3HP and 3RH. The budget for procurement of TPT medicined was estimated to be USD 9'168'811.21 to cover the needs until December 2024. However, only

USD5.6M were secured through USAID/PEPFAR and the Global Fund therefore a funding gap of USD3,465,504.21

- Delayed implementation of the new optimized supply chain system for DR-TB and redesigned e-LMIS for TB laboratory commodities due to inadequate stock to fill the pipeline to allow health facilities to pull based on their needs and insufficient funds to conduct trainings on the new systems as cited by the NTLP. While SLDs are currently distributed through KIDH using EMS, TB laboratory commodities follow a push system from MSD to the district level except for GeneXpert Cartridges where distribution plan prepared by NTLP covers health facility level.
- There is inadequate stock visibility of TB medicines at health facility level due to the slow rollout of the redesigned health-facility-level e-LMIS. Only 9 out of 32 regions were trained in 2022 due to inadequate funding with less than 300 out of the approximately 1300 targeted facilities implementing the new e-LMIS system.
- LMIS data are routinely analysed, and monitoring of the key public health commodities supply chain indicators is being on quarterly basis by the MOH/PSU. However, a relatively few indicators have been selected under the current NSP to monitor PSM performance which are not regularly tracked at NTLP level. There is also inadequate LMIS data quality (incomplete reports, incorrect stock levels reported, overestimation of quantity to order) and delays in ordering TB medicines from MSD and KIDH. Over 40% of TB treatment sites did not submit request for FLDs/SLDs replenishment timely in 2022.
- Excessive wastage of TPT medicines which could be attributed to overestimations of TPT targets or slow TPT uptake than earlier planned. USD485,501.31 worth of Isoniazid 300mg expired in quarter 4, 2022 at the MSD warehouses visited. There is also a risk of expiry of additional stock while transitioning to the shorter TPT regimens.
- Overstock of SLD and potential wastage of child-friendly DR-TB formulations due to low DR-TB notifications in the past two years when compared to the target used to inform 2021-2023 procurement plan. 442 DR TB cases were enrolled on treatment in 2021 and 358 in 2022 against the target of enrolling 770 (57.4% achieved) and 851 DR-TB cases (42% achieved) in 2021 and 2022 respectively. There has also been slow uptake of child friendly DR-TB formulations. The country had planned to enrol 5% of DR-TB on paediatric-DR TB regimens in 2021 and 2022. However, only one paediatric DR-TB case was enrolled on treatment each year contributing to expiries.
- Low ADR reporting rate despite the ongoing efforts to strengthen pharmacovigilance system. This is contributed to inadequate knowledge on ADR reporting/aDSM and lack funding to support training of HCWs on aDSM.

17.6 Key recommendations

- Coordinate with key stakeholders and mobilize additional financial resources to cover the identified funding gap for procurement of GeneXpert Cartridges and 3HP as well as for implementations of planned PSM interventions including e-LMIS roll out and aDSM implementation.
- Ensure timely procurement, ordering and distribution of paediatric formulations, assess and address factors contributing underutilization of paediatric FLD formulations. Sensitize HCWs on the use of child-friendly formulations in managing paediatric DS-TB cases and closely monitor uptake to avoid future wastage.

- NTLP to develop a mitigation plan to address all challenges contributing to long procurement lead times and interrupted supply of TB laboratory commodities including those related to processing of TMDA permit and accelerate on-going system reforms at MSD to address procurement delays for TB laboratory commodities.
- Consider adopting the exiting quantification tools and strengthen capacity to quantify TB laboratory commodities,
- Need to conduct more frequent review of TB medicines quantification data. Consider changing frequency of quantification reviews from biannual to quarterly reviews to allow regular updating of supply plans and ensure optimized procurement frequency based on actual TB performance to avoid stock imbalances in case of low notifications or slow uptake of some products.
- Fast track the roll-out of the optimized system for the management of DR-TB medicines, accelerate countrywide roll-out of the health-facility-level e-LMIS for FLDs and leprosy medicines and integrate trainings e-LMIS for TB laboratory commodities in the on-going trainings.
- NTLP to conduct regular follow up and on the job mentorship to ensure effective use of the new e-LMIS systems, address LMIS data quality issues and delays or lack of ordering of paediatric FLD formulations.
- NTLP/NACP to ensure harmonization of TPT targets used to inform quantification of TPT medicines, conduct periodic review of TPT uptake and ensure timely adjustment of TPT supply plans to avoid future wastage.
- Incorporate additional supply chain performance indicators in the current NSP, maximize the use of selected KPI at NTLP level in tracking TB supply chain performance and regularly disseminate the findings to RHMT, CHMIT, for further actions. The proposed additional indicators include order fill rate, LMIS reporting rate, timeliness of e-LMIS reporting and percentage of DR-TB treatment sites sending ADR report to TMDA.

17.7 Conclusion

The country procures quality assured TB commodities through stop TB Partnership/ GDF while the Medical Store Department (MSD) procures TB laboratory commodities not on GDF's products' catalogue. There is uninterrupted supply of quality-assured second line TB medicines, adult first line TB medicines, leprosy medicines and TPT medicines in the past 12 months with 100% availability of TB medicines at the central level with no potential stock outs anticipated in the next 6 months. And adequate funds approximately USD 30.7M are available for the procurement of for FLD, SLD and TB laboratory consumables under Global Fund for the period 2021 to 2023. And support is available through USAID)/PEPFAR for the procurement of TPT medicines and cartridges. However, stock out of child-friendly formulations and interrupted GeneXpert supply was observed with a significant funding gap of USD 9M for the procurement of GeneXpert Cartridges and USD3,465,504.21 for the procurement of 3HP. Therefore, there is need for NTLP and her partners to develop a mitigation plan to address all challenges to prevent stock outs and expiries of all TB commodities.

18Leprosy

18.1 Background

Leprosy is a neglected tropical disease, which causes more physical deformities than other infectious diseases. Even though Tanzania attained global target of leprosy elimination for over 15 years ago, the country is still among those notifying more than 1,000 cases per year. In 2022, Leprosy prevalence rate was 0.3/10,000 population down from 0.4/10,000 in 2015. At the national level, the Leprosy prevalence rate has remained below 1 case per 10, 000 population since 2006. However, in 2021, 14 districts councils (12 of the mainland and 2 districts from Zanzibar) reported higher rates above the national prevalence of 1 case per 10,000 population, pointing to the disproportionate distribution of the Leprosy burden across the country. Leprosy control indicators are summarized in table 17 below.

Table 17: Leprosy indicator dashboard

Indicator	2019	2021		2022		
	Baseline	Target	Achievement	Target	Achievement	Grading
Number of leprosy endemic councils (with >1/10,000 patients)	16	12	14	12	18	
Percent of new leprosy cases household contacts are screened for leprosy	NA	50%	94%	80%		No data
Number of new leprosy cases detected	1650	1300	1511	1200	1,652	
Children (<15 years age) diagnosed with leprosy, rate per 1,000,000 population	5	4%	3%	3	3	
Percentage of PB Leprosy cases completed MDT treatment	80	81	84%	82	86%	
Percentage of cases with disability grade 2 among newly diagnosed leprosy patients	9	8%	10%	7%	9%	
Number of PALs received assistive devices	2000	2200	1847	2500	2568	
Percent of eligible leprosy household contacts provided with PEP		50%	90%	70%		No data

Green → target achieved.
Yellow → not achieved, likely to be achieved by end of strategic plan period (>90% of target if quantitative)
Red → not achieved, unlikely to be achieved by end of strategic plan period (<90% of target)

***Data source**: NTLP Reports*

18.2 General observation

TB and Leprosy services are coordinated at all levels (regional, district, and health facility). At the regional level, Regional TB, and Leprosy Coordinator (RTLC), at the district level District TB and Leprosy Coordinators (DTLC), and at the health facility level TB and Leprosy Focal persons were all available. Medicines (MDT)were readily available in the region with only one health facility in the Dar es Salaam region reporting inadequate stock.

RTLC and DTLC are members of the Regional Health Management Team (RHMT) and Council Health Management Team (CHMT)

Availability of standardized facility/community Leprosy data recording and reporting tools
No Leprosy-specific IEC materials in most visited sites apart from sites in Tanga region.
Currently, Tanzania is undertaking a leprosy antimicrobial-resistant survey (LARS) to prepare for the introduction of routine AMR (Antimicrobial Resistance) surveillance.

18.3 Key achievements and best practices

In 2021/22 Tanzania conducted first-ever a comprehensive country model leprosy review followed by a stakeholders' meeting which developed a zero roadmap for 2022-2030 and an Action plan for 2022-2025

Leprosy is incorporated in policy guidelines for CTBC, ACSM, PMDT and TB/HIV and a practical guide for the management of TB and Leprosy in the era of covid-19 and some Leprosy services are integrated with TB and coordinated at all levels (regional, district, and health facility).

Active case finding both at community and health facility levels although not at all entry points. Single-dose Rifampicin PEP for Leprosy contacts in study sites is being implemented and Leprosy clients are aware of their diagnosis, and well-informed of their treatment dosage and duration.

Quarterly TB/Leprosy meetings with a focus on activity implementation.
Although some TB/leprosy activities were in the work plan, those supported by partners were not reflected because implementing partners do not share their activity plan and budget to health facilities.

18.4 Key challenges

Lack of funds to implement a Zero leprosy roadmap, and only one partner supporting Leprosy activities (supporting only 10 councils out of 184).

Loss of Clinical Skills and late diagnosis of due to lack of training for the past three years leading to late diagnosis and increased grade 11 disabilities at 10% in 2021 and stagnant at 9% in 2022.
Lack of mental health screening tools or referral guidelines for leprosy-related mental health.

Health facilities are not able to receive feedback for the referred-out leprosy patients.
High stigma and discrimination against leprosy patients were reported in the visited regions with one patient(adolescent) reported being chased away by her mother after being diagnosed with leprosy and is currently staying with a relative.

Prevention of disabilities (POD) activities are not fully implemented (self-care groups in most regions, demonstrated by stock out of assistive devices). While weak leprosy surveillance system, with no Leprosy-specific IEC materials in most visited sites was observed apart from sites in Tanga region.

Support supervisions are conducted randomly and uncoordinated making it hard for health facility teams to timely follow up with supervision action plans also compromising their routine activities.
Over-ambitious targets aiming at sudden reduction of cases without not considering the missing cases.

18.5 Key recommendations

Lobby for domestic and international funds/ resources for the implementation of zero roadmaps and strengthening the integration of leprosy into other health disciplines among implementing partners.

Train health teams on leprosy disease and scale up Leprosy screening services across the country for active case finding and early case detection. Promote POD agenda at all levels.

Avail, and promote the use of mental health screening tools/algorithms for timely mental health management, relating to the impact of Leprosy on mental health and integration of Leprosy into mental health.

Update referral forms TBLEP02 to include the phone number of referring facility/clinician which will facilitate the receiving health facility to give feedback on referrals.

Continuous sensitization and counselling of Leprosy affected family members on stigma reduction, advocacy, and awareness creation e.g., through commemorating World Leprosy Day on January 29th.

Set realistic targets which will aim at increasing case notification in the first 2 years then reduce cases in the subsequent years and strengthen the Leprosy surveillance system including Epi data analysis at all levels.

18.6 Conclusion

Even though Tanzania attained global target for Leprosy elimination, the country is still among those notifying more than 1,000 cases per year. In 2021/2022, the country conducted first-ever a comprehensive country model leprosy review followed by a stakeholders' meeting in 2021/2022 during which a zero roadmap for 2022-2030 and an Action plan for 2022-2025 were developed. However, Leprosy control still suffers from lack of funds, loss of HCW clinical skills, late diagnosis with increased grade 2 disabilities, weak leprosy surveillance system high stigma and discrimination against leprosy including lack of disability prevention and management services. Lobbying for domestic and international funds/ resources for the implementation of zero roadmaps and strengthening the integration of leprosy into other health disciplines among implementing partners is highly warranted.

19 Monitoring, Evaluation, and Operation Research

19.1 Background

The National Tuberculosis and Leprosy Program (NTLP) has made significant progress in the areas of surveillance, monitoring, and evaluation (M&E) as well as operational research (OR). Since 2018, the program has developed a comprehensive electronic case-based surveillance system for TB called ETL/DHIS2, which has been updated as of September 2021 and is now functional countrywide. However, community and facility-based data are still collected using a paper-based system and reported to the district level or directly entered into ETL/DHIS2 at the facility level (table 18). The collated data is then incorporated into district-level electronic reports on a quarterly basis. There have been gains in improving the system's coverage to include community case finding, DS-TB, and DR-TB cases reported in ETL, as well as work in prisons, military, and private sectors. However, further improvements need to be made to ensure the quality of the data. Data management capacity needs to be enhanced at all levels. The data from ETL should be used in real-time with an analysis plan beyond the standard reports and predefined indicators to guide program activities at all levels and to monitor M&E indicators. At the national level, the NTLP generates annual and other reports. The program also provides guidance through the provision of standardized, internationally accepted M&E policies, tools, and guidelines such as the M&E plan and the TB research agenda. Additionally, the NTLP verifies and analyzes the data from the regions in the DHIS2 and conducts supportive supervision visits thereafter. The M&E Research TWG supports national-level activities.

19.2 Monitoring and evaluation

Table 18: M&E and OR indicator dashboard

Thematic Area Indicator	Baseline 2019	Target 2022	Status (MTR)
Routine data indicators listed in NTLP M&E Plan are measured and reported through electronic platforms	60%	70%	70%
% Of TB and Leprosy key epidemiological Indicators are generated through the DHIS 2-ETL	80%	90%	90%
TB Under reporting rate (%)	<5%	<5%	No Data
% Of regions produce quarterly analytical report as per nationally agreed plan and reporting format	NA	100%	100%
% Of NTLP interventions monitored and evaluated by 2025	NA	90%	90%
% Of TB and Leprosy Operational Research agenda conducted and inform programme and policy change	NA	50%	50%
# of TB and Leprosy Operation Research Symposium conducted	NA	2	1

Green → target achieved.
Yellow → not achieved, likely to be achieved by end of strategic plan period (>90% of target if quantitative)
Red → not achieved, unlikely to be achieved by end of strategic plan period (<90% of target)

***Data source**: NTLP Reports*

19.2.1 General observations

Recording and reporting formats, registers, and reporting templates for TB and leprosy are available and in use at health facilities. TB data at the facilities is entered using both paper-based and electronic DHIS2-ETL systems. However, the electronic system was not updated in a timely manner. Additionally, the practice of developing annual work plans and monitoring program implementation is still weak. Data for presumed TB cases are entered at all service points by various cadres, including clinicians, DOT/MDT nurses, and data clerks. Some research practices have been implemented on various aspects of the program, including new drug trials, epidemiological analysis, and operational research in some areas. Training of DOT nurses to fast-track data collection on all TB indicators is ongoing.

19.2.2 Key achievements

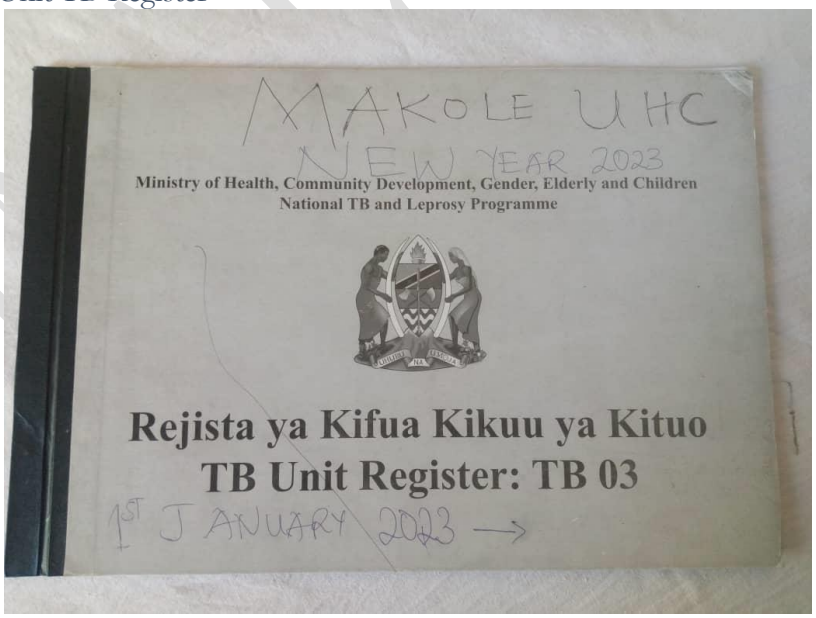
A. Recording and Reporting Tools

The TB and Leprosy registers and reporting formats effectively capture key TB-vulnerable communities, and there are no reported shortages of recording and reporting tools and registers at any health facilities. The required tools are provided and available at all health facilities.

The ETL has significantly contributed to improved TB data management, as storing, and retrieving required data is now easy. There are reduced data discrepancies in the entered data, both at different levels in the system and at the facility level.

Currently, the electronic community TB data register (figure 28) is being piloted to be linked into DHIS2-ETL. Quality data is collected through the ETL due to built-in checks during data entry in the system.

Figure 28: Sample Unit TB Register



B. Support Supervision

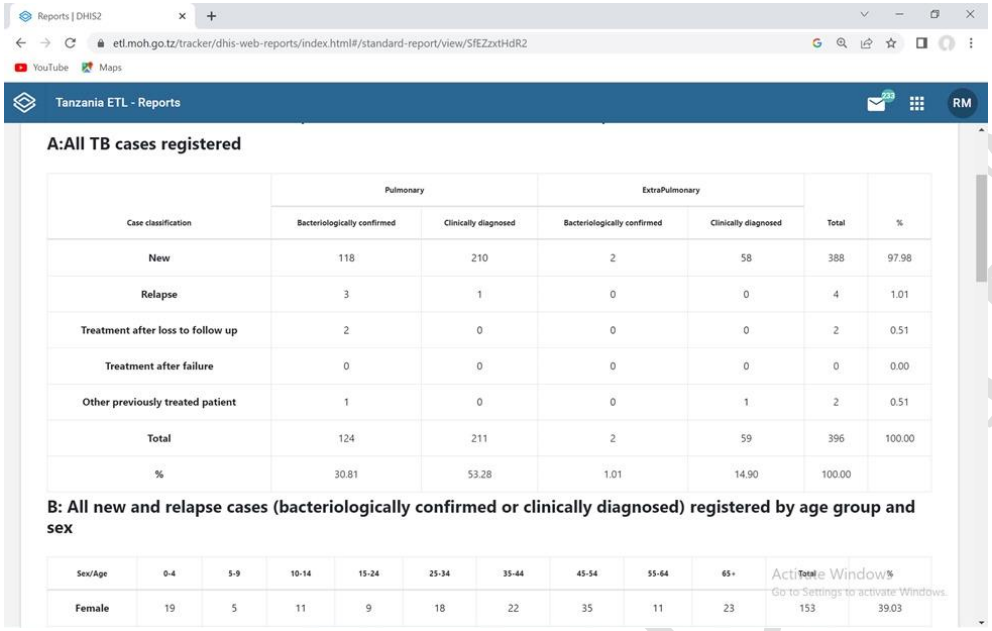
TB supervision is conducted by the DTLC and RTLC every quarter. On-site and written feedback is provided to some sites.

The NTLP M&E team utilizes the AfyaSS for supportive supervision of the health facilities.

C. Data use

Quarterly performance review meetings are held in all districts which have enabled better planning based on data-driven decisions at national and subnational levels (figure 29).

Figure 29: Sample Tanzania-ETL report



Source: ETL interface

19.2.3 Key challenges

A. Recording and Reporting Tools

Some M&E tools such as the TPT register, presumptive registers, and TB/LEP 01 forms are not available at some sites. At some health facilities, some fields in the data tools are only partially completed, and some columns are not systematically filled in the registers. Again, the NTLP M&E tools, such as the TB treatment card (TB 01), lack age and sex disaggregation. Additionally, the TB 03 register has rows with small spaces to fill in clients' IDs and names.

B. Use of ETL

Limited or no internet connectivity in some areas remains a challenge for internet network coverage, which affects the data clerk's ability to carry out data entry without internet support. Additionally, there is a lack of hardware such as computers and electronic tablets that can be used for data entry into the ETL. The DTLCs and health facilities have not been provided with computers to support data entry in the last two years, making it difficult to enter data into the system.

The integration of all TB data into the national health information and vital registration systems for the collection of high-quality data for reliable tracking of the TB epidemic is still a challenge. Some health workers at different entry points do not know how to fill the TB PTB register properly, leading to delays in data entry into the DHIS2 ETL. Data entry is then done late or on a quarterly basis instead of

daily/real-time because they have to wait for District TB and Leprosy coordinators to enter data into the system.

DOT nurses trained to enter data into the ETL but the ETL itself has some configuration issues. Firstly, some fields on the ETL system, such as the patient's telephone, are mandatory, yet some patients do not have a telephone and neither do their next of kin. Secondly, in the "Other laboratory results" section, after GeneXpert, there is no option for other tests that the patients may have undergone. Lastly, some indicators in the M&E plan are not tracked in the ETL, such as indicators on childhood TB (3.2.1-Percentage of under <5 years children household contacts of TB cases screened for TB).

While national CRG operational guidelines and a national M&E framework and data collection tools (DODOSO) exist, the information collected here does not feed into the NTLP M&E framework and DHIS2. Furthermore, TB KPs data captured on the DHIS2 ETL is limited to miners, PLHIV, and fisher folk, and this information is rarely filled, thus not visible on DHIS2.

C. **Data quality and Use**

1. Data from health facilities is incomplete and sometimes misses key indicators such as treatment outcomes.
2. Data analysis and interpretation of collected data remain a challenge at the facility level, and there is no displayed QI run charts or dashboards in the facilities.
3. There is low data use at the facility level, with no plan to use the available data for program improvement due to a knowledge gap on data management by the health workers.
4. The TB burden in the general population is not clearly understood.

D. **M&E staff**

High turnover of RTLC, DTLCs and staff at health facilities and this high attrition of health workers affects work at the TB clinics.

E. **Data use guide**

No data use guide is available to guide collecting, analysing, and using TB data for health care workers at the sub-national level.

F. **Data timeliness**

Late entry and update data into the ETL by the DTLC and facility teams.

G. **Locking data set**

There is no system in place to lock datasets once they are complete and accurate after submission by reporting units. This lack of a locking system allows for perpetual changes, which compromise the consistency of the data as a quality attribute.

19.2.4 Key recommendations

Strengthen on-the-job training by providing annual refresher training for health workers on data entry for both paper-based tools and the ETL, for both new and existing staff in TB clinics. Additionally, the training package could be made available as an online course accessible to health workers. Promote the routine use of ETL dashboards among all users through workshops, trainings, and meetings.

M&E teams at the NTLP and district level, through the DTLC and RTLC, should conduct more support supervision visits to district facilities to support teams in M&E activities, including analysis and interpretation of results. Equip service providers with knowledge to interpret TB data/indicators,

including their implications for program performance and the quality of TB care and control in general. This will support improvements in the quality of recording and reporting. Regular support and mentorship visits are needed for data completeness and performance review meetings.

Leverage staff from other clinics, such as HIV clinics, including data clerks, to support data entry of TB data onto the ETL, expanding the collaboration beyond TB/HIV co-infected patients.

Strengthen data quality by developing a data quality app to monitor completeness and outliers (by type of facility). The app should differentiate between no reporting and 0 cases reported. Measure TB under-reporting with record linkage exercises (annually), such as record linkage between the ETL and national-level laboratory data. Repeat the TB inventory study to map and measure under-reporting from the private sector. Introduce data set locking once data is verified as complete and accurate to data consistence.

Investigate the simplification of data entry at the facility level through small-scale operational research. For example, consider phasing out paper TB03 with the presumptive register TB16, lab register TB05, and treatment cards TB01 as backups. Define what "high" data quality is and monitor it in pilot facilities.

Develop a data guide and plan for the use of available program data for planning and program implementation. Develop a master analysis plan using the raw ETL and other relevant data. The plan should describe the data collected, the objectives of routine surveillance, and the programmatic needs the analyses address. Redesign ETL dashboards according to this analysis plan. Make ETL dashboards available at all administrative units for subnational analyses (e.g., zone, region, district, health facility).

To measure the burden of tuberculosis in the general population, a national TB prevalence survey should be carried out. A protocol development workshop is required to make key design and implementation decisions for the survey, such as the use of GeneXpert, computer-aided detection for TB, and digital data management.

The DHIS2-ETL system should be functionalized to capture data on multidrug-resistant TB indicators and link molecular data into DHIS2-ETL. Strengthening TB data collection is essential, including linkages that enable treatment cascades of TB patients from case finding to treatment outcomes.

The ETL system should be reviewed for software developers to address all configuration errors during data entry. The MoH/NTLP DHIS2 ETL should be upgraded to capture other TB key population data to generate real-time data and inform programming and tailoring of services to these populations.

Where computers cannot be provided, cheaper options such as Android phones or tablets should be explored and provided to facility teams to facilitate data entry in ETL. Coordination with DTLC or other nearby facilities that have better internet connectivity should be established. The option of sending un-entered data to DTLC for entry should be explored, especially where DTLC can access places with more stable internet. Lobbying and advocating for more funding for ICT infrastructure that includes the provision of computers and data to facilities to support data entry and transmission is necessary.

Clear health facility TB indicators and targets should be provided for each health facility and tracked during support supervision by the DTLC and NTLP. The allocation of a budget for information, education, and communication (IEC) is crucial. Lockable notice boards should be provided for display, and well-defined metrics and means for measuring IEC interventions should be developed.
The use of digitized/electronic IEC materials should be explored alongside traditional paper-based materials. IEC materials should be placed outside health facilities, such as bus/taxi stops, markets, bars, prisons, etc.

19.3 Research and Innovation

19.3.1 General observations

There are multiple partners available for implementing TB and Leprosy research, as well as a National TB and Leprosy Research Coordinator whose role is to coordinate research activities. International and local collaborative research initiatives are also present to advance research and innovation. The engagement of stakeholders and key players in TB research has greatly improved and there are now more players from academia, NGOs, and other partners.

There is a predictable regulatory process for the review of clinical trials and TB products, which involves procedures and policies available at national, sub-national, and institutional levels. These are implemented through regulatory authorities such as NMRI and IRBs.

NTLP holds annual conferences on TB and Leprosy where research findings and best practices are disseminated. Additionally, there is a National TB and Leprosy Research Committee comprised of 8 members from research institutes, NGOs, and academia, whose role is to oversee the implementation of TB and Leprosy research. This committee meets twice a year.

Research findings are often disseminated through the national TB program and in scientific journals. NTLP in collaboration NIMR was able to initiate the implementation of shorter regimen for MDR TB patients through Global Fund and USAID TIFA research projects which has been successful and accepted; The shorter regimen has been initiated in 77 health facilities across the country with more than 222 patients already initiated since 2019.

Currently, the NTLP is in the process of developing the National TB and Leprosy Research Repository.

19.3.2 Key achievements and some good practices

The TB research agenda for the period 2021-2025 has been updated and consists of 12 TB research focus areas. It serves as a guide for the implementation of TB research in Tanzania. Additionally, the NTLP is in the process of developing a Leprosy Research agenda that will be combined with the TB research agenda.

The NTLP has conducted a mapping exercise of all ongoing studies in the field of TB research, and it was found that over 194 studies/abstracts on TB in Tanzania were published in the period 2021-2022 (see annex 2).

A National TB and Leprosy Research Committee (NTLRC) exists to support and guide research activities. Moreover, some stakeholders are engaged in internal and local collaborative research. They jointly raise key research questions and feel a sense of ownership in the research process.

19.3.3 Key challenges

- Limited opportunities for capacity building for junior TB and Leprosy researchers.
- There is no clear information system in place for collecting implemented research reports and publications between the Ministry of Health-National Tuberculosis and Leprosy Program (MoH-NTLP) and TB and Leprosy research partners.

- NTLP does not have a clear tracking system for implementers' dissemination and publication of research findings in scientific journals.
- There is no mandatory mechanism in place that allows TB and Leprosy implementers to submit implemented research findings to NTLP to be kept in the database.
- Donors have different priorities, and there is a gap in responding to country-specific local needs as outlined in the NTLP operations research agenda.
- The National research agenda lacks funding from the government.
- TB and Leprosy research receives low priority from donors.
- There is low awareness and sensitization among stakeholders to conduct leprosy research, resulting in few studies on leprosy being conducted in the country. The research agenda has not been widely disseminated.

19.3.4 Key recommendations

NTLP, in collaboration with other partners, should support the capacity building of junior researchers, especially at the implementation level, to gain a better understanding of conducting operational research. Data should be made accessible to junior researchers who develop protocols that are approved for study.

The government should allocate funds for the implementation of the national TB and Leprosy research agenda.

Opportunities for funding from Temporal Dynamics of Learning Centre-TDLC and WHO should be tapped into, as they have mechanisms that allow local researchers to prioritize their own research topics that align with the national research agenda.

NTLP should expedite the process of developing the National TB and Leprosy Research Repository, increase collaboration with academic institutions, and assign research questions on the national TB and Leprosy agenda to students as part of their primary focus. The research agenda should be widely shared and made more accessible.

TB should benchmark how the leprosy research initiative operates and tap into this knowledge to better respond to research grant calls.

NTLP, through the research Technical Working Group (TWG), should actively track all disseminated TB and leprosy research findings by building search terms in PubMed, which should be run every quarter.

NTLP and NIMR should develop a mechanism for TB and Leprosy research implementers to submit their publications to the MoH-NTLP national Repository.

Create a feedback mechanism that allows researchers to know if their findings are contributing to policy change. This will motivate them to bring their study findings to NTLP and carry out more studies.

19.4 Conclusion

The National Tuberculosis and Leprosy Program (NTLP) has made significant progress in the areas of surveillance, monitoring, and evaluation (M&E) as well as operational research (OR). Since 2018, the program has developed a comprehensive electronic case-based surveillance system for TB called ETL/DHIS2, which has been updated as of September 2021 and is now functional countrywide. However, community and facility-based data are still collected using a paper-based system and reported

to the district level or directly entered into ETL/DHIS2 at the facility level. The ETL has significantly contributed to improved TB data management, as storing, and retrieving required data is now easy. There are reduced data discrepancies in the entered data, both at different levels in the system and at the facility level. However, low HCW knowledge and skills plus the limited or no internet connectivity affect ETL implementation. Thus, there is need to further build capacity of HCWs and improve internet connectivity to foster data capture, storage and reporting in line with WHO reporting requirements as well the WHO surveillance benchmark standards.

Annex 1: List of External and Internal Reviewers:

Thematic Area	Group Members	Supporting Organization
1. Policy, Governance, health financing, MAF-TB, Partnerships and Social Protection	**Moses Kerkula (Overall Thematic Lead Expert)**	
	Samuel Kasozi (Lead Expert, Dar and Zanzibar)	USAID/Stop TB Partnership
	Peter Neema	THPS
	Liberate Mleoh	NTLP
	Mageda Kihulya	PORALG
	Julius Mtemahanji	NTLP
	Juma Said	NTLP
	Josiah Otege	NTLP, Zanzibar
	Valeria Rashid	NTLP, Zanzibar
	Glory Thadei	NTLP
	Crispin Mwamkinga	NTLP
	Anna Kirivu	BDH
	Emmanuel Heriel Matechi	NTLP
	Kennedy Amadi	Stop TB Partnership/GDF
	Johnson Lyimo	WHO/Tanzania
2. Diagnostic network	**Kenneth Musisi (Lead Expert)**	USAID/GHTAMS
	Ali Kwizera	USAID
	Amri Kingalu	NTLP
	Salim Boss	NTLP
	Samuel Mulungu	PATH - IDDS
	Pascal Seleman	CTRL
	Edgar Luhanga	NTLP
	Ms. Stella Mwanjute	NTLP - CTRL
3. TB case finding (integrated patient centred TB care and treatment)	**Ismael Hassen (Lead Expert)**	WHO
	Kanjinga Kakanda	USAID
	Bhavin Jani	USAID
	Allan Tarimo	NTLP
	Alfredy Galus	NTLP
	William Mtumbuka	TB Specialist
	Julius Mshana	NTLP
4. Community TB Care, and Community Rights and Gender	**Ezra Mwijarubi (Lead Expert Community TB)**	USAID
	Rhoda Lewa (Lead Expert CRG)	Stop TB Partnership
	Peter Kerndt	USAID
	Hassan Mattaka	MDH
	John Msaki	NTLP

	Rose Olutu	AMREF
	William Mbawala	MKUTA
	Lilian Ishengoma	AMREF
	Rabia Khaji	SHDEPHA+
	Mwambi Jaka	FWF
	Dickens Bwana	MKUTA
	Godwin Munuo	AMREF
5.Paediatric and adolescent TB	**Moorine Sekaddi (Lead Expert)**	USAID/GHTAMS
	Wanze Kohi	UMB
	Robert Kisanga	ICAP
	Prisca Jackson	NTLP
	Felix Bundala	RCH – MoH
6.Public Private Mix	**Nii Nortey (Lead Expert)**	USAID/STP
	Robert Balama	NTLP
	Meanahamis Hassan	PORALG
	Aneth Mbunga	NTLP
	Berezy Makaranga	APHFTA
	Anthony Leonard	CSSC
	Rose Marwa	CSSC
7.Programmatic Management of Drug Resistant TB (PMDT)	**Samuel Kasozi (PMDT Lead Expert)**	USAID/Stop TB Partnership
	Adeline Uwamahoro (Lab Lead Expert)	WHO
	Daphne Mtunga	NTLP - CTRL
	Isack Lekule	NTLP
	Pamela Kisoka	PORALG
	Happiness Mvungi	KIDH
	Stella Mwanjute	NTLP - CTRL
	John Minde	NTLP
8.TB/HIV, TB Prevention, and other comorbidities	**Simon Walusumbi (Lead Expert)**	USAID/GHTAMS
	Isaya Jerry	NACP
	Chacha Mangu	NIMR
	Aden Mpangile	NTLP
	Leodgard Benedict	Delloite
9.Procurement and Supplies Management (PSM)	**Salama Mwatawala (Lead Expert)**	GDF/Stop TB Partnership
	Kennedy Amadi (Lead Expert)	GDF/Stop TB Partnership
	Marko Mkumbo	NTLP
	Romantiezer Robert	NTLP
	Athuman Mohamed	KIDH
	Jacob Grista	NTLP
10. Leprosy	**Evelyn Tibananuka (Lead Expert)**	WHO
	Deus Kamara	NTLP
	Issa Garimo	GLRA
	Leonard Ndamugoba	NTLP
	Paul Shunda	NTLP

11. Monitoring and Evaluation, and Operational Research	**Nicholas Kirirabwa (Lead Expert)**	USAID/GHTAMS
	Hamimu Kigumi	NTLP
	Judith Philip	NTLP
	Claud Kumalija	MoH
	Emmanuel Nkiligi	NTLP

Key: Names **bolded in black** – External Lead Reviewers. Names in blue – Local Lead Reviewers