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CHALLENGE TB

CHALLENGE TB
FINAL REPORT

Cover Photo:
Cough your cough training in Burma - Hein Htet

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Challenge TB Partners

American Thoracic Society
FHI 360
Interactive Research and Development
Japan Anti-Tuberculosis Association
KNCV Tuberculosis Foundation
Management Sciences for Health
International Union Against Tuberculosis and Lung Disease
PATH
World Health Organization

List of Abbreviations and Acronyms

3HP	isoniazid/rifapentine regimen	LQMS	laboratory quality management system
3RH	rifampicin/isoniazid regimen	LPA	line probe assay
ACF	active case finding	M&E	monitoring and evaluation
aDSM	active drug safety monitoring and management	MDR	multidrug resistant
AOR	Agreement Officer's Representative	MOH	Ministry of Health
ART	antiretroviral treatment	MSH	Management Sciences for Health
ATS	American Thoracic Society	MTB	Mycobacterium tuberculosis
BDQ	bedaquiline	ND&R	new drugs and regimens
CB-DOTS	community-based DOTS	NGO	nongovernmental organization
CTB	Challenge TB	NTP	National TB Program
DLM	delamanid	PLHIV	person (or people) living with HIV
DOTS	directly observed treatment, short course	PMDT	programmatic management of drug-resistant TB
DPPM	district public-private mix	PR	principal recipient
DR	drug resistant	RR	rifampicin resistant
DRC	Democratic Republic of Congo	SHIFT	Sustainable HIV Response from Technical Assistance
DST	drug susceptibility testing	SL-LPA	second-line lie probe assay
EPHI	Ethiopian Public Health Institute	SOP	standard operating procedure
FAST	Finding TB cases Actively, Separating safely, and Treating effectively	SR	subrecipient
GF	Global Fund to Fight AIDS, TB and Malaria	SRL	supranational reference laboratory
GLI	Global Laboratory Initiative	STR	shorter treatment regimen
HCW	health care worker	STTA	short-term technical assistance
HIV	human immunodeficiency virus	TB	tuberculosis
ICF	intensified case finding	TB CAP	Tuberculosis Control Assistance Program
IPT	isoniazid preventive therapy	TBCTA	Tuberculosis Coalition for Technical Assistance
IRD	Interactive Research and Development	TSR	treatment success rate
JATA	Japan Anti-Tuberculosis Association	USAID	United States Agency for International Development
LF-LAM	lateral flow urine lipoarabinomannan assay	WHO	World Health Organization

CONTENTS

MESSAGE FROM THE KNCV DIRECTOR..... 6

MESSAGE FROM THE PROJECT DIRECTOR..... 9

EXECUTIVE SUMMARY10

INTRODUCTION14

OVERALL ACHIEVEMENTS OF CHALLENGE TB.....20

CASE FINDING.....34

INCREASED ACCESS TO DIAGNOSIS 58

CONNECTIVITY IS ESSENTIAL FOR LABORATORY MANAGEMENT SYSTEMS..... 73

PROGRAMMATIC MANAGEMENT OF DRUG-RESISTANT TB AND INTRODUCTION OF NEW DRUGS AND REGIMENS 76

TB/HIV96

SPECIAL PROJECTS.....108

CHALLENGE TB AND GLOBAL FUND COLLABORATION..... 114

CAPACITY-BUILDING APPROACH..... 120

EXTERNAL PERSPECTIVES ON CHALLENGE TB 130

OPERATIONS RESEARCH AND KNOWLEDGE MANAGEMENT136

COUNTRY PROFILES AND ACHIEVEMENTS.....142

ACKNOWLEDGMENTS 220



Message from the KNCV Director

Challenge TB brought many of the key interventions to end the TB epidemic to scale through phased implementation, assisting countries to find and treat the unreachable adults and children suffering from TB, thereby also reducing the devastating socioeconomic impact of the disease.

Tuberculosis (TB), a disease already known since ancient times, remains the number one killer among infectious diseases, affecting men, women and children, while drug-resistant TB (DR-TB) poses the greatest global threat in antimicrobial resistance for the 21st century.

Although TB is a curable disease from an individual biomedical perspective, HIV, poverty and social exclusion still drive the TB epidemic. Lack of simple tools for prevention, diagnosis, and treatment at the first level of care make management of TB a complex public health intervention. Front-line health workers and TB programs lack both the tools and resources that would allow them to effectively combat the disease.

Building on three previous flagship projects funded by the United States Agency for International Development (USAID) to fight this disease, in 2014 Challenge TB entered the arena in an exciting and optimistic time: the World

Health Organization (WHO) was launching the End TB strategy and urging the world to change gears and aim for elimination of TB by 2035. Optimal implementation of new and existing tools has laid the foundation for accelerating the fight against TB.

What did Challenge TB contribute to advance towards this goal?

Through 24 country projects and two regional projects, Challenge TB has increased health systems' capacity to manage the continuous process of technological and policy change needed to end the epidemic. By engaging and building the capacity of hundreds of local organizations in the fight against TB, Challenge TB broadened the civil society response for TB elimination. This ranged from developing patient support organizations and giving them a voice in policy development and decision-making, to mobilizing whole communities for self-screening and community

TB care. Several of these organizations are now recipients of grants from the Global Fund to Fight AIDS, Tuberculosis and Malaria and the next generation of USAID Local Organizations Network grants.

By linking disparate, uncoordinated public- and private-sector providers to National TB Programs, Challenge TB contributed to the steepest increases in notification of TB and DR-TB patients recorded in recent history.

Epidemiological surveys, reviews, and modeling have increased the understanding of the burden and dynamics of the TB epidemic and frequently led to adjustments in estimates of regional, national, and global TB burdens, and the development of strong, data-driven National Strategic Plans. In this way, Challenge TB leveraged increased resources from domestic sources and other donors.

Through many operations research studies, Challenge TB

has contributed to evidence-based decision-making, feeding into global policies and helping countries and their partners decide on the most effective, appropriate, patient centered interventions to accelerate their TB response and reach people in need.

Challenge TB brought many of the key interventions to end the TB epidemic to scale through phased implementation, assisting countries to find and treat the unreachable adults and children suffering from TB, thereby also reducing the devastating socioeconomic impact of the disease. Notably, Challenge TB facilitated the US Government-supported Bedaquiline donation program, and make new anti-TB drugs and shorter treatment regimens available to patients in need. This progress reversed some patients' diagnoses of extensively drug-resistant TB from death sentences into stories of life and hope.

Challenge TB supported countries on their journey to

self-reliance through capacity building and transfer of knowledge and skills, fostering sustainability and country ownership. Along the way, the expertise of the nine coalition partners strengthened countries' TB elimination efforts, resulting in joint learning by countries and partners alike.

Coordination, collaboration, and complementarity with partners at all levels drove the success of Challenge TB and improvements in global and national performance in TB control.

KNCV thanks USAID for being given the opportunity to able to serve the world in the fight to end TB, saving future generations from the humanitarian and economic devastation of this prehistoric disease.

Kitty van Weezenbeek
CEO, KNCV Tuberculosis
Foundation



Patient on the STR for drug-resistant TB in Kazakhstan / Nadira Osmanova

“The important lessons and best practices of this project should be linked to future opportunities in the countries.”



Message from the Project Director

It was an honor and pleasure to work with all my colleagues on the Challenge TB project. We made a significant contribution to saving lives and reducing the suffering of TB patients and their families globally. We thank all of our front-line health care workers for their strong determination to find and treat TB patients and their resilience in challenging conditions. The role of the National Tuberculosis Programs at all levels in ensuring effective coordination between the Challenge TB project and other projects in-country for efficiency was highly appreciated. We all acknowledged, however, that we are going in the right direction but are moving too slowly, and we need to scale up effective interventions and challenge the status quo to enable us to end TB in our lifetimes.

The complementary competencies of the coalition partners were a strength of the project, combining technical assistance and direct implementation of innovative

interventions, generating evidence and knowledge sharing for scaling up, and ensuring the systematic capacity building of local organizations and National TB Programs for sustainability. Therefore, I wish to thank all the coalition partners for the work done and their trust, confidence, and support throughout the project period.

My thanks to KNCV Tuberculosis Foundation, coalition partners, the Project Management Unit team, and all project staff for their strength and dedication for implementing the project and for the opportunity and support provided to me to lead while learning in steering this complex but rewarding multi-country project.

Finally, thanks to the American people for all the resources made available through the USAID to the project for the global public good of saving lives. The support and engagement of all our USAID technical colleagues were sincerely appreciated.

Special thanks to the Agreement Officer's Representative (AOR) for his leadership and facilitating role with the Agreement Officer and the head of the TB division within USAID.

Gidado Mustapha
Project Director



Children in Nigeria / Tristan Bayly

Executive Summary

Challenge TB (CTB) operated from 2014 to 2019 in 24 countries and two regions, with the overall purpose of supporting countries with high burdens of TB, multidrug-resistant TB (MDR-TB), and TB/HIV to achieve their National Strategic Plan goals, thus contributing to the US Government TB Strategic Targets (2015 -2019), and striving toward the post-2015 global goals. As the fourth in a series of flagship projects implemented by a renewed coalition of experienced partners (with addition of PATH and IRD) led by the KNCV Tuberculosis Foundation, CTB aligned with the US Government's TB strategy and built on previous projects' experience and gains.

The project had a ceiling budget of US\$524,754,500, of which 70% (US\$368,945,379) was obligated within the period of five and a half years (October 2014 through

March 2020). As evidence of good financial management and success in leveraging funding from diverse sources, CTB brought more than double (15.2%) of the required cost-share amount of 7.0% to increase the impact of the project.

To advance toward the vision of a world free of TB, four core principles guided the work of CTB:

- 1. A patient-centered approach
- 2. Local ownership through transfer of knowledge and skills
- 3. A culture of innovation
- 4. A continuous emphasis on quality.

Four strategies complemented these principles and led to:

- **Engaging** all stakeholders through a comprehensive, multi-sectoral approach
- **Empowering** decision-makers, national TB programs (NTPs),

and other local partners by building their leadership, management, and technical capacity

- **Evaluating** interventions and innovative approaches, measuring their results, and using evidence to develop targeted, high-yield solutions
- **Expanding** access to the full range of providers and removing barriers to services.

387

SUBAWARDS SIGNED WITH 163 ORGANIZATIONS

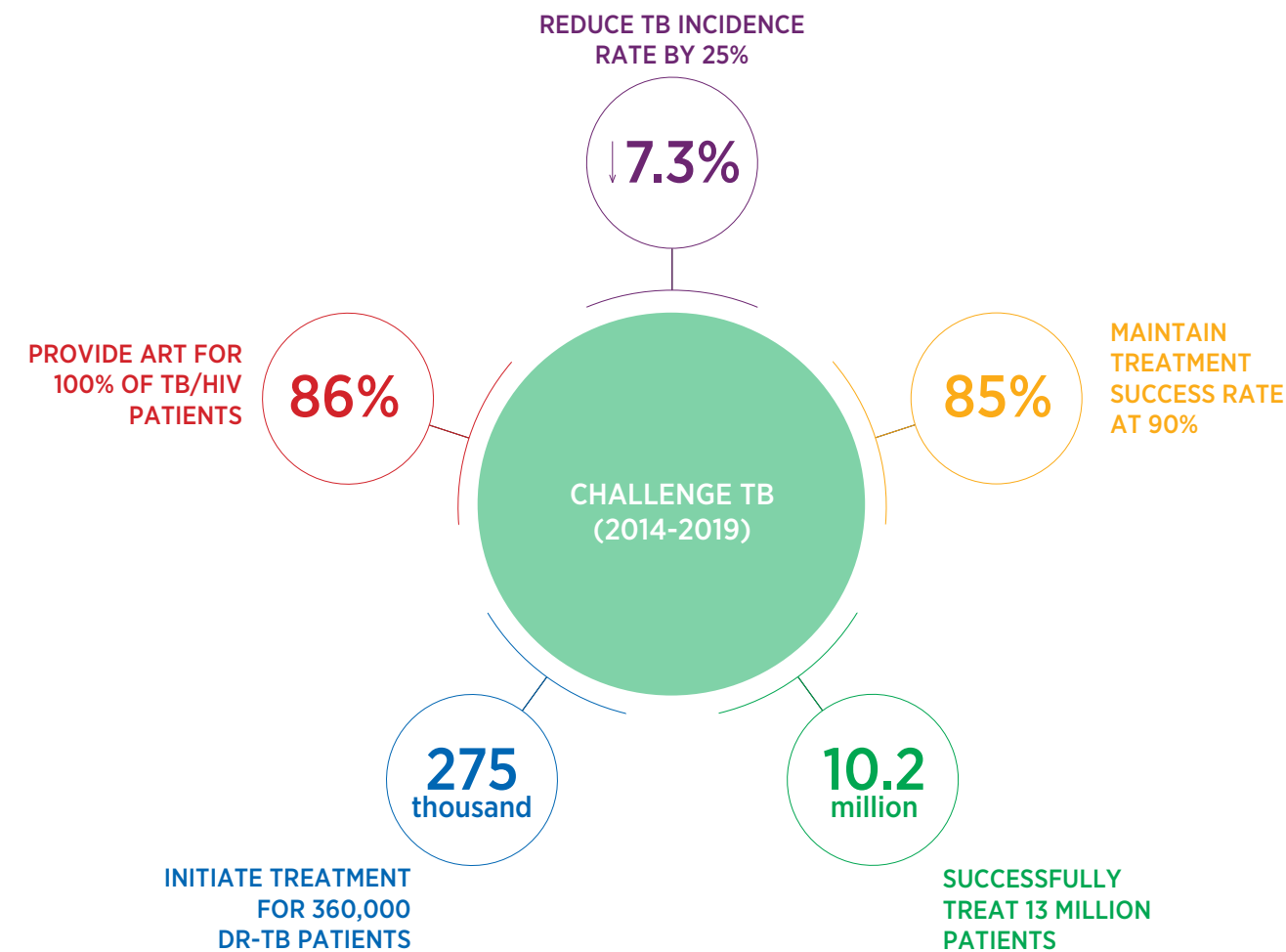
Coordination, collaboration, and complementarity with TB stakeholders at all levels drove the success of CTB and improvements in global and national performance in TB. Support and leveraging of interventions of the Global Fund to Fight AIDS, Tuberculosis and Malaria (GF), and linkages with other efforts of the US Government in TB and HIV/ AIDS, NTPs, and other partners expanded the impact of the project's achievements. For sustainability, everything was done through national health systems and with local partners, as part of countries' journey to self-reliance. Capacity building of NTPs, local organizations, and health care workers prepared these partners to identify gaps, develop work plans, and implement and monitor interventions. From 2014 to 2019, the project signed 387 subawards in various technical

areas of TB prevention and care with 163 organizations, of which 152 were local organizations. The subawards represented US\$36.55 million (10%) of the total project budget. A blended approach to project staffing meant that 37% of technical project staff were embedded in

NTP to facilitate capacity transfer and implementation. In addition, CTB supported training of 175,915 health care workers in areas related to diagnostics, TB care and treatment, and management of TB programs, including monitoring and evaluation.

175,915

HEALTH CARE WORKERS TRAINED IN DIAGNOSTICS



CTB contributed significantly to increased access to high-quality case finding and care for both drug-sensitive and drug-resistant TB (DR-TB) through different complementary initiatives; of all case finding interventions the yield is highest to lowest in the following order: strengthening health care facility/outpatient department TB screening, community referral, and the private sector. Contact investigation was useful to increase case finding but most importantly it served as an entry point for latent TB infection (LTBI). The number of TB cases diagnosed and initiated on treatment increased, from 51% national treatment coverage for all 24 CTB countries combined in 2014 to 67% in 2018. The overall treatment success rate was 85%, with 10 countries exceeding 90%. Similarly, the number of DR-TB cases diagnosed and enrolled in care increased to 42% and 89% from the baseline

in 2014, and 17 CTB-supported countries achieved DR-TB treatment success rates of 60-80% compared to a baseline of 55%, exceeding the global average of 56% because of rapid decentralization of care to community level, strengthen active TB drug-safety monitoring and management (aDSM), and improved data quality.

Between 2014 and 2018, the number of countries putting more than 90% of TB/HIV patients on antiretroviral treatment increased from two to eight. In 2018, more than 90% of TB patients were tested for HIV in seven countries (two of those reported 100% testing coverage). There is still a gap on LTBI enrollment and reporting by countries, less than 50% of countries have quality data on isoniazid preventive treatment (IPT) including reporting to WHO, however, The number of people living with HIV

(PLHIV) both newly enrolled and currently enrolled in HIV care who started treatment for LTBI increased from 343,363 in 2014 to 729,640 in 2018 in the 15 countries reporting data.

Access to quality diagnosis increased due to the systematic introduction of laboratory strengthening and optimization initiatives. The number of laboratories performing culture and drug susceptibility testing almost doubled, from 118 in 2014 to 213 laboratories by 2019. The percentage of laboratories implementing a laboratory quality management system also increased, from 50 laboratories to 126 laboratories. The dramatic expansion in the use of GeneXpert—4,561 GeneXpert machines were available in 24 countries in 2019 compared to 990 in 18 countries in 2015—enabled the scale-up of testing for multidrug-resistant TB (MDR-TB), which increased

LESSONS AND RECOMMENDATIONS

- Engagement of NTPs in the entire project cycle enabled implementation at scale and promoted sustainability.
- The use of a package of interventions customized to each country’s needs guided implementation and is a best practice.
- As a functional laboratory network is the key to a

successful TB program, continued investment in laboratory strengthening is recommended.

- A two-part approach to advocacy at the national level was effective: with politicians and policymakers for domestic funding, and with professional and regulatory bodies for uptake of innovations, new

tools, and new medicines.

- Coordination, collaboration, and communication among all TB stakeholders were crucial for project efficiency and success.

10.2M

SUCCESSFULLY TREATED FOR TB

275,000

PUT ON TREATMENT FOR DR-TB

from 7% in 2014 to 87% in 2018 among all newly diagnosed bacteriologically confirmed cases. While access to second-line line probe assay (SL-LPA) improved from 47% in 2015 to 63% in 2018 among all DR-TB cases.

The shorter treatment regimen (STR) and new drugs and regimens (ND&R) were systematically introduced in 23 countries (with the exception of South Sudan), with a standard approach for future introduction of new medicines and tools. Cumulatively, 34,145 patients on shorter treatment regimen, 9,949 on bedaquiline, and 673 on delamanid (including India). There were promising interim outcomes among 779 patients treated with bedaquiline: 71% had negative results at the end of six months. The WHIP3 trial study found that 3HP was safer and had better adherence and treatment outcomes (90%

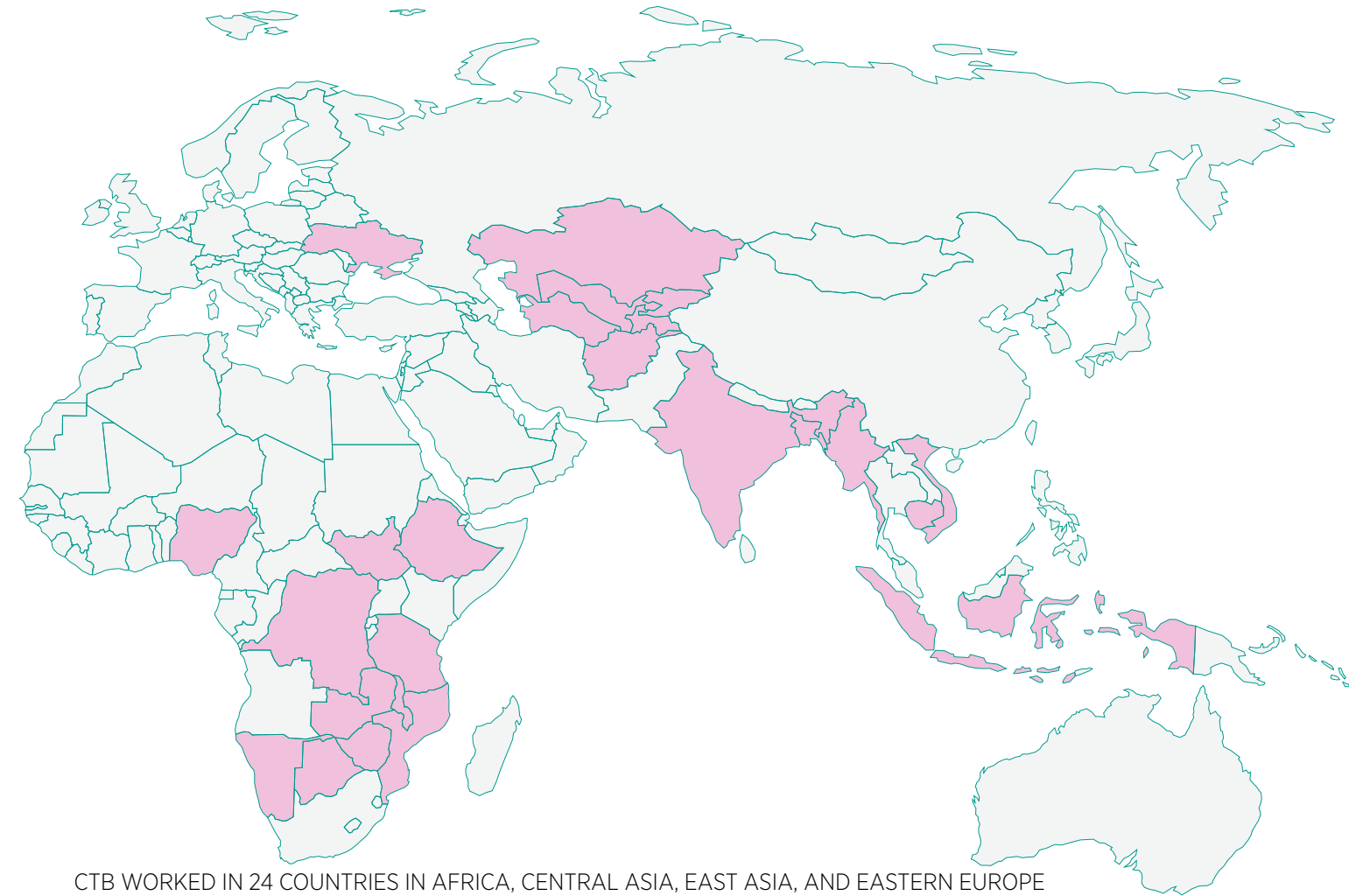
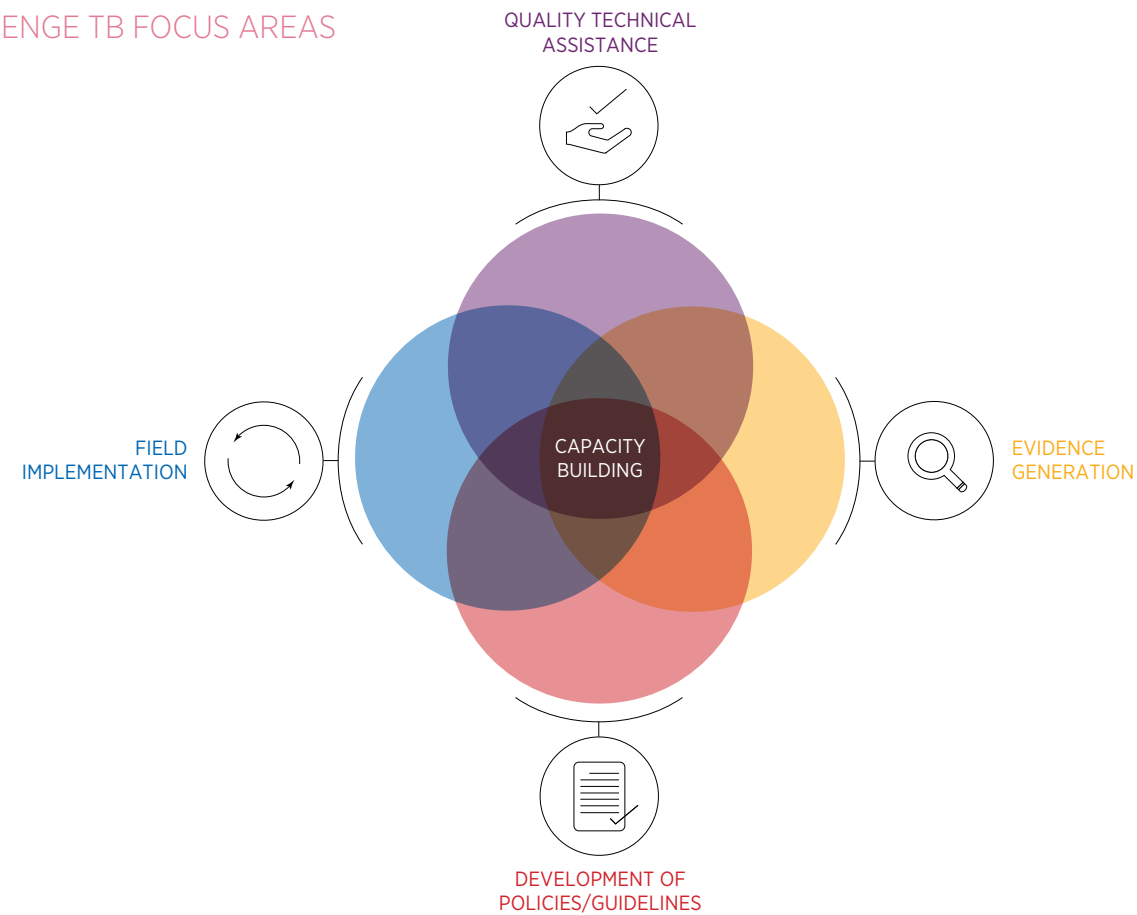
among 3HP compared to 50.5% among patients on Isoniazid); the study also demonstrated that there is no need for repeated 3HP among PLHIV.

Systems strengthening was a major focus and included helping local staff to use data to drive the selection, targeting, and performance improvement of interventions. Phased implementation of packages of interventions proved more effective than isolated or small scale interventions, for scalability and sustainability. Introduction and decentralization of innovations such as new drugs and regimens required flexibility, advocacy, and problem-solving. CTB helped countries to create processes and platforms for locally owned research and effective change management. These platforms accelerated the introduction and uptake of innovations, enabling countries to manage not only the changes of

the present era but also those of the future.

CTB made important contributions to the science of TB: In total, 35 operations research studies were completed and use of secondary data most focused on patient-centered care and treatment, the enabling environment, and comprehensive, high-quality diagnostics. A total of 213 manuscripts were developed and shared through conferences, peer-reviewed articles, and other channels. Three projects with core funding developed tools for stigma measurement and implementation; assessment of catastrophic costs to patients; and the efficacy of different combinations of drugs to prevent TB infection in PLHIV.

CHALLENGE TB FOCUS AREAS



CTB WORKED IN 24 COUNTRIES IN AFRICA, CENTRAL ASIA, EAST ASIA, AND EASTERN EUROPE

INTRODUCTION

US Government TB targets, 2015-2019:

- 1. Reduce TB incidence rate by 25%
- 2. Successfully treat 13 million TB patients
- 3. Maintain treatment success rates above 90%
- 4. Initiate treatment for at least 360,000 drug-resistant TB (DR-TB) patients
- 5. Provide antiretroviral treatment for 100% of TB/HIV patients

Challenge TB was the flagship global mechanism for implementing USAID’s TB strategy as well as contributing to TB/HIV activities under the US President’s Emergency Plan for AIDS Relief (PEPFAR). It was a five-year cooperative agreement (September 2014 to September 2019) with a budget ceiling of \$525 million. The USAID Bureau for Global Health was building and expanding on a series of successful TB programs that began in 2000.

CTB was the fourth in the series of USAID global flagship projects that supported TB programs by building on the experiences of the Tuberculosis Coalition for Technical Assistance (TBCTA), Tuberculosis Control Assistance Program (TB CAP), and TB CARE I. Each project in this 20-year journey

brought additional funding, geographical areas, and depth of implementation, with a common strategy of coordination among partners and systematic capacity transfer.

The country and regional projects were aligned with the overall U.S. Government TB Strategy, Country Development Cooperation Strategies (CDCS), USAID Mission TB portfolios, the National Strategic Plans, and Global Fund support. The aim of CTB was to contribute to the U.S. Government 2015 to 2019 TB targets.

CTB partners operated using a framework with four strategies:

- 1. **Engage** stakeholders.
- 2. **Empower** key decision-makers, people affected by TB, and marginalized and vulnerable populations.
- 3. **Evaluate** interventions, measure quality, develop evidence, and implement best practices.
- 4. **Expand** services, increase the number of providers, and remove barriers to access.

In addition, the CTB partners were committed to four principles: provision of quality-focused deliverables and technical assistance; locally owned and generated innovations, research, and solutions; innovative approaches, technologies and tools; and a patient-centered focus.

CTB had three main objectives:

- **Objective 1:** Expanded Access to Prevention Services
- **Objective 2:** Improved Patient-Centered Quality Care Systems for TB, MDR-TB, and TB/HIV
- **Objective 3:** Sustained and Enhanced Systems

Under Objective 1, the major program areas were infection control, active case finding, and latent TB infection, all aimed at prevention of TB infection. Under Objective 2, the focus was on enhancing diagnosis, treatment, and care by providing universal access to appropriate treatment, strengthening the laboratory network, providing comprehensive services for people on treatment, and ensuring the involvement of all care providers. Objective 3 centered on sustaining and

strengthening supportive systems by developing comprehensive partnerships, while focusing on demand-driven services. In addition, CTB supported improved drug policy and management and data quality as well as surveillance and monitoring and evaluation (M&E).

Several cross-cutting themes accompanied the objectives: access to services for all (including urban services); an emphasis on local innovations and research; coordination and collaboration with the GF; provision of cutting-edge technical expertise; and customization of technical approaches to the needs of priority countries.



Prisoners receiving TB education in Malawi / Tristan Bayly



Billal a cured TB patient returns to normal life in Bangladesh / Samuel Mumru

PROJECT PLANNING, DESIGN, AND IMPLEMENTATION

CTB had an overall five-year plan, including strategies, principles, and expected results. The project developed annual plans of action to align with (1) annual USAID Mission operational plans and budgets, and (2) variations in country gaps, priorities, and global policy changes. The development of annual plans was based on the four strategies and four principles. This planning approach enabled flexibility and interventions that were responsive to country needs

and global change in policies and guidelines. Development of annual plans with significant involvement of USAID, NTPs, GF, and other TB stakeholders promoted coordination, complementarity, and sharing of strategies and innovative approaches for scale-up. The process was organized in four stages: document review and inventory of other existing TB support; engagement of stakeholders at various levels; development of the plan; and a review and approval process.

DOCUMENT REVIEW AND INVENTORY

The review and inventory done as part of planning included TB National Strategic Plans, GF-approved work plans, the USG TB Strategy, USAID National Action Plan for MDR-TB (for specific countries), other USAID TB projects, PEPFAR support (especially for TB/HIV), and all other domestic support for TB activities. This review provided a foundation for the project and USAID for possible technical interventions, geographical coverage, and technical assistance needs.

ENGAGEMENT OF STAKEHOLDERS FROM ALL LEVELS:

- USAID and CTB synthesized information from the initial gap analysis and ensured alignment with USAID TB strategic direction and other existing USAID TB portfolios; organized findings about the gaps in technical areas and developed priority areas of intervention; and discussed expected results based on the investment.
- USAID, CTB, and the NTP met to discuss areas of collaboration, coordination, and complementarity of USAID support to the NTP for efficiency and avoidance of duplication of either interventions or geographical areas; and to develop

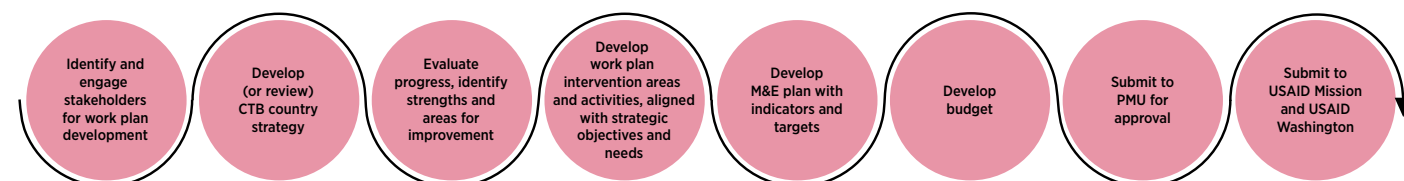
consensus on areas of technical support interventions and the geographical regions, including technical assistance, M&E, supervision, and expected government commitment. The project used existing NTP recording and reporting tools to avoid creating parallel reporting systems but negotiated areas for additional data collection for evidence generation.

- The NTP organized a national meeting of TB stakeholders in most countries so that CTB could present a draft plan for supporting the TB program in the country. This meeting provided an opportunity for communicating USAID support, obtaining additional feedback on the interventions, gaining consensus on

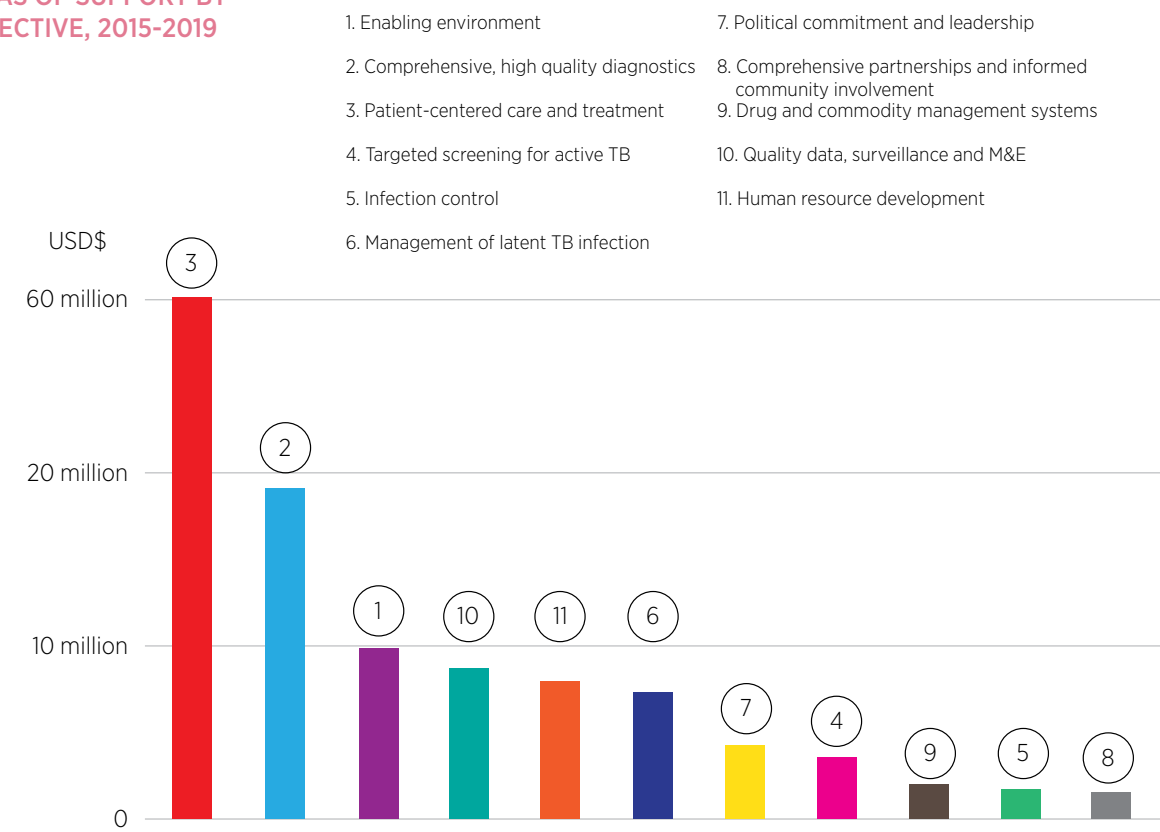
standard packages for certain interventions (e.g., patient support, GeneXpert roll-out, and specimen transportation), and coordinating monitoring and supervision.

- Based on the principle of significant engagement, both USAID and NTPs provided input into work plan development, including reviews and final submission for approval by the AOR. The timeline from development to approval of work plan varied significantly by country, but the major factor for successful early approval of the work plan was *purposeful early engagement* of all stakeholders, especially USAID.

CHALLENGE TB WORK PLAN DEVELOPMENT PROCESS



CTB AREAS OF SUPPORT BY
SUB-OBJECTIVE, 2015-2019



SUMMARY OF
INTERVENTION AREAS AND
APPROACHES

The project had two major approaches to implementation: first, national-level support in the areas of policy and guideline development and adoption of new policies; support to national laboratories; and embedding of technical staff in NTPs to transfer capacity in key areas of TB prevention and care (programmatic management of DR-TB, laboratories, procurement, and supply chain management). The second approach was direct implementation of activities at the subnational level, with project staff working directly with NTP and Ministry of Health (MOH) staff.

The project had a systematic mechanism to review and reprogram funds using a tool called the Modification Tracker. Use of this tool enabled CTB to identify savings after completion of a specific activity or if an activity was canceled, so that resources could be reprogrammed for

additional priority interventions in collaboration with USAID Missions and NTPs. The project used this approach to address crises or emergencies related to procurement and distribution, for example, the procurement of additional cartridges in Nigeria, drug clearance and distribution in Tanzania, maintenance of the National Reference Laboratory in Malawi, and printing and distribution of recording and reporting tools in many countries. Project planning and implementation were conducted in close collaboration and coordination with NTPs to foster sustainability and capacity transfer while engaging with USAID in the entire process. Interventions and geographic areas were strategically selected to ensure efficiency, scalability, and ease of mainstreaming into the NTP system.

The project was managed by the Project Management Unit at KNCV, with the support of all the coalition partners' headquarters and USAID backstops for each country. The performance of the project was monitored based a set of indicators

collected, collated, and reported quarterly to USAID Missions and Washington using a standard reporting format across the project.

The KNCV Tuberculosis Foundation, which also led USAID's previous TB projects—TBCTA (2000-2005), TB CAP (2005-2010), and TB CARE I (2010-2015)—led CTB. A unique coalition of nine international organizations in TB prevention and care implemented the project. KNCV Tuberculosis Foundation led the following coalition partners: the American Thoracic Society (ATS), FHI 360, Interactive Research & Development (IRD), International Union Against Tuberculosis and Lung Disease (The Union), Japan Anti-Tuberculosis Association (JATA), Management Sciences for Health (MSH), PATH, and the World Health Organization (WHO). Interventions and geographic areas were assigned to partners based on each partner's program management experience, technical leadership and expertise, and strong relationships at the national, regional, and global levels.



METHODOLOGY OF THE
REPORT

Methodology of the Report
This final report demonstrates the project's contribution to USAID's global targets and highlights key results across all technical areas and country projects during the life of the project. Country-specific results are reported at both the national and subnational levels, except for Botswana and Namibia, where CTB carried out only national-level activities. National results (2014-2018) for population-based indicators (e.g., case notification and treatment success) are reported from the WHO 2019 database. Data trends are based on calendar years, with 2014 as the baseline. Geographic area results for 2015-2019 are reported based on NTP data collected through CTB. Alongside the quantitative results, selected country-specific examples and case studies are provided in each thematic area, such as TB/HIV, to illustrate particular achievements, lessons learned, and challenges. Country-specific key results (based on WHO 2019 data) and

most significant achievements are reported in the individual country profiles. The key results are reported based on the CTB M&E framework, including mandatory indicators, and some key process indicators (for details see Annexes https://www.challengeTB.org/publications/CTB_Final_Report_Annexes.pdf). The level of investment in specific areas—which varied from country to country because of the customization of interventions based on local needs—and the availability of data from specific countries guided the reporting of results, which explains the variations in the number of countries for certain indicators.

Purposeful early engagement of all stakeholders, especially USAID, helped ensure sustainability and the transfer of capacity to local partners.



OVERALL ACHIEVEMENTS OF CHALLENGE TB





Nurse examining X-Ray in Ethiopia / Berhan Teklehaimanot



HIV testing in Zimbabwe / Paidamoyo Magaya

CONTRIBUTION TO THE USG GLOBAL TB STRATEGY

CTB was one of USAID's major mechanisms to achieve the US Government's global TB targets—and it played a major role in reaching all five of those targets.

The number of estimated incident cases of TB decreased from 6.0 million in 2015 (CTB baseline) to 5.8 million in 2018 in 24 CTB countries, that is, total TB incidence decreased 9%, from 241 to 219 of total TB incidence per 100,000 population for the respective years. The WHO 2019 Global TB Report compares TB incidence rates globally between

2015 and 2018. The reduction in TB incidence rates from 2015 to 2018 has been greater in CTB countries (7.3%) as compared with the TB incidence rate globally (6.3%).

Of the 24 CTB countries, a decline in the estimated TB incidence rate between 2014 and 2018 was observed in 15 CTB countries, with the highest declines reported in Botswana (40%), Ethiopia (37%), Kazakhstan (34%), and Zimbabwe (32%). Similarly, a decline in the estimated TB incidence rate among HIV-positive people was reported in 19 CTB countries, with the

highest declines reported in Ethiopia (186%), Vietnam (77%), Namibia (63%), and Tanzania (61%). In general, the decline in TB incidence both in CTB countries and globally could be attributed to the decreasing HIV epidemic and the expansion of TB and HIV prevention and care. In some countries with more prominent decreases, however, they could be related to improved incidence estimates based on the results of recent epidemiological assessments and/or prevalence surveys (e.g., Ethiopia, Namibia, and Zimbabwe).

7.3%

DECREASE IN TB INCIDENCE COMPARED TO 6.3% DECREASE GLOBALLY

SNAPSHOT OF KEY RESULTS

- Reduce TB incidence by 25%: CTB and its partners together reduced TB incidence by 7.3% in four years (2015-2018).
- Maintain treatment success rate (TSR) at 90%: In the same period, CTB reached an 85% TSR, on average, across all CTB-supported countries.
- Successfully treat 13 million patients: CTB reached millions of people around the world—successfully treating 10.2 million.

- Initiate treatment for 360,000 DR-TB patients: CTB interventions resulted in treatment initiation for 272,000 people.
- Provide antiretroviral therapy (ART) for 100% of TB/HIV patients: CTB provided ART to 88% of patients globally.

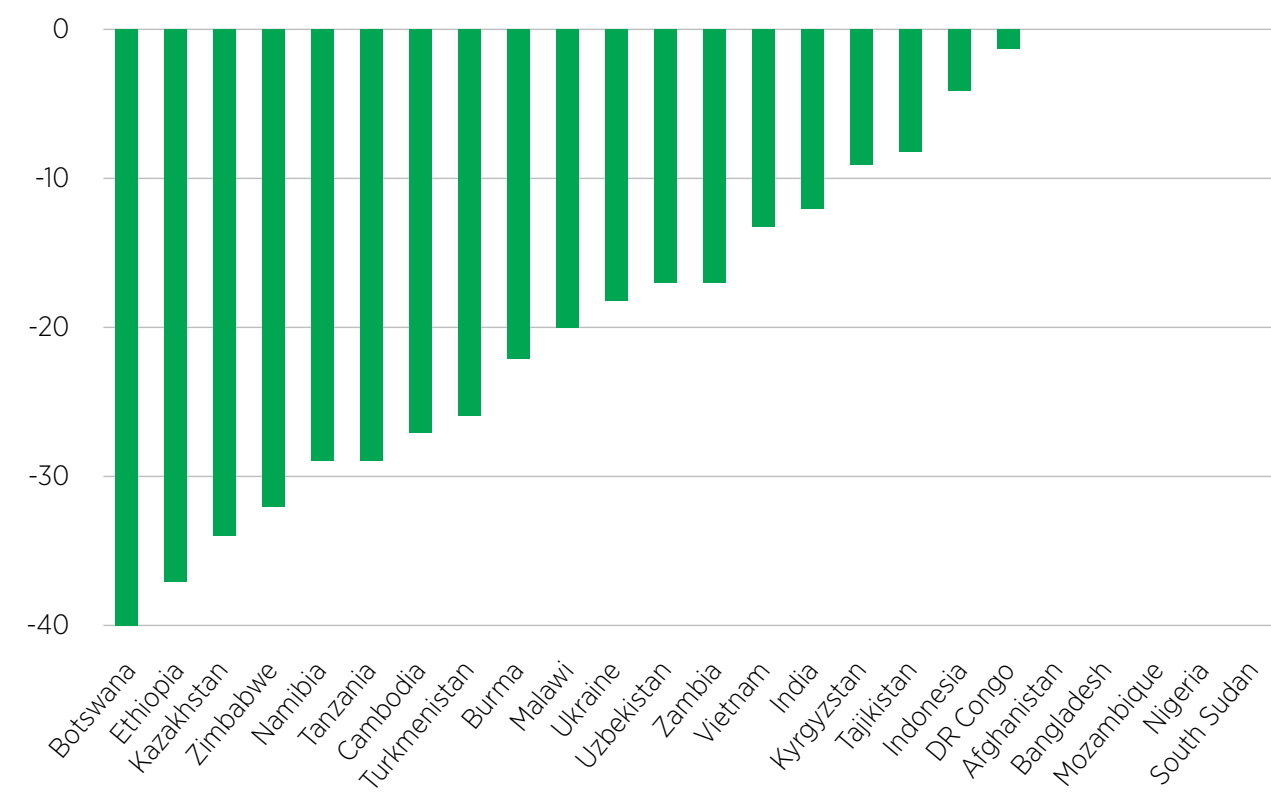
85%

TREATMENT SUCCESS RATE AVERAGED ACROSS ALL 23 COUNTRIES

88%

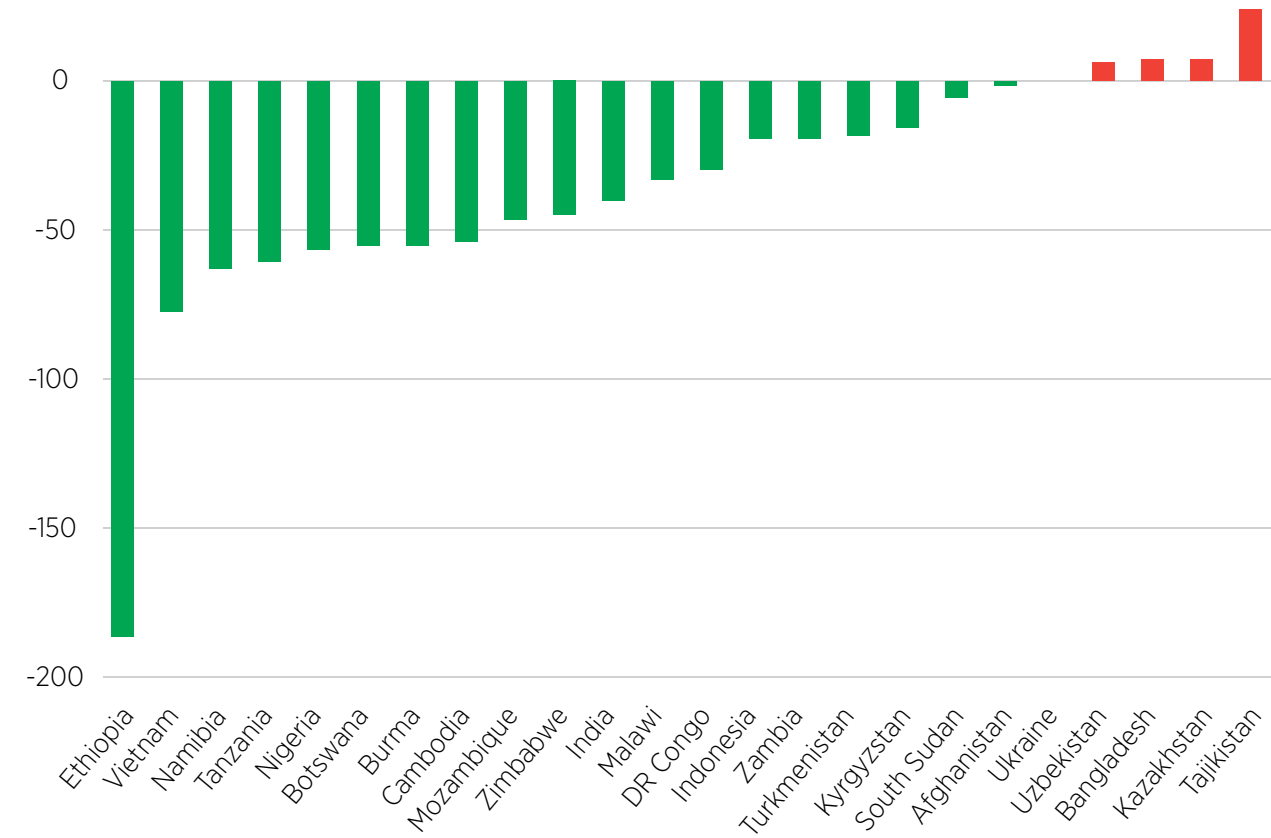
OF TB/HIV PATIENTS ON ANTIRETROVIRAL THERAPY

PERCENTAGE CHANGE FROM 2014 TO 2018 IN ESTIMATED TB INCIDENCE (INCLUDES HIV+TB)



TB Patient Support in India / Mukta Panchal

PERCENTAGE CHANGE FROM 2014 TO 2018 IN ESTIMATED TB INCIDENCE (HIV+TB ONLY)



In the 24 CTB countries, the number of estimated deaths from TB among HIV-negative people decreased from 960,000 to 882,000 and from 213,000 to 133,000 among HIV-positive people in 2014, respectively. The decline in the estimated total number of TB deaths among HIV-negative people in all CTB countries was 8%; and the decline in the estimated total number of TB deaths among HIV-positive people in all CTB countries was 62%.

The estimated total number of TB deaths among HIV-negative people decreased between 2014 and 2018 in 18 CTB countries. Similarly, the estimated absolute number of TB deaths among HIV-positive people decreased in 20 CTB countries. The dramatic reduction in TB mortality among people living with HIV can be explained by advanced implementation of TB/HIV collaborative activities in most of the CTB countries in Africa with serious AIDS epidemics. Scale-up of antiretroviral treatment (ART) for TB patients living with HIV was particularly important. For example, in Ethiopia, ART coverage among notified TB cases co-infected with HIV increased from 39% in 2014 to 91% in 2019.

8%

DECREASE IN TB DEATHS AMONG HIV NEGATIVE PEOPLE

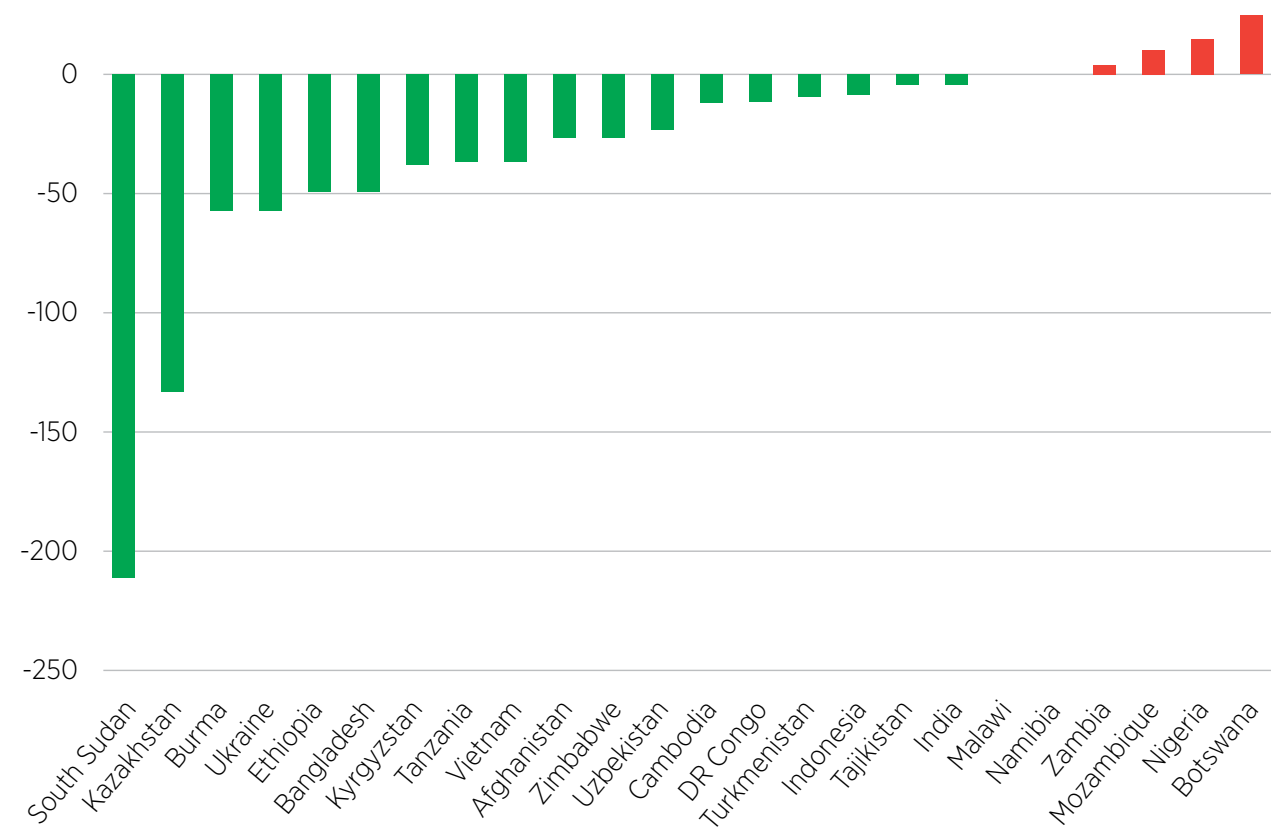
62%

DECREASE IN TB DEATHS AMONG HIV POSITIVE PEOPLE

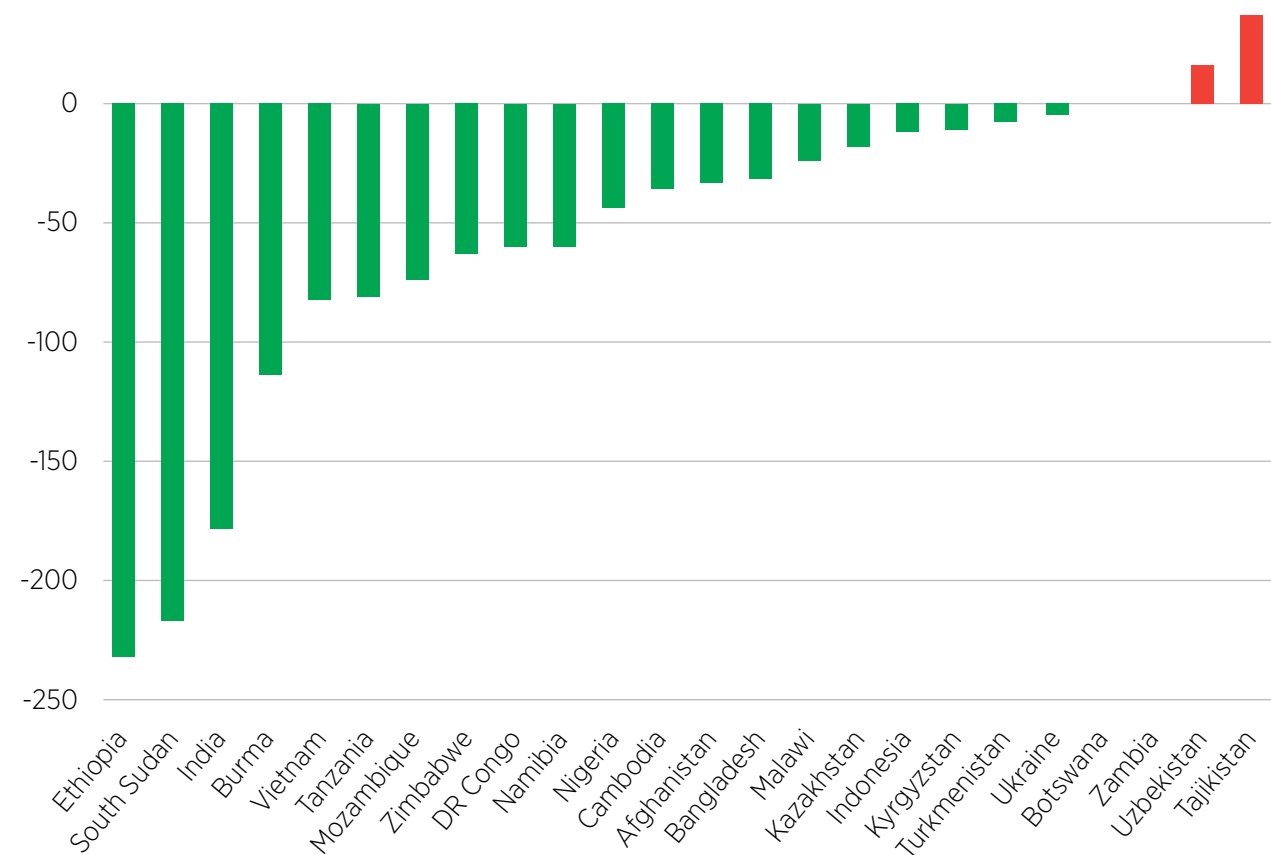
91%

ART COVERAGE AMONG HIV POSITIVE PEOPLE IN ETHIOPIA

PERCENTAGE CHANGE FROM 2014 TO 2018 IN ESTIMATED TB DEATHS (EXCLUDES HIV+TB)

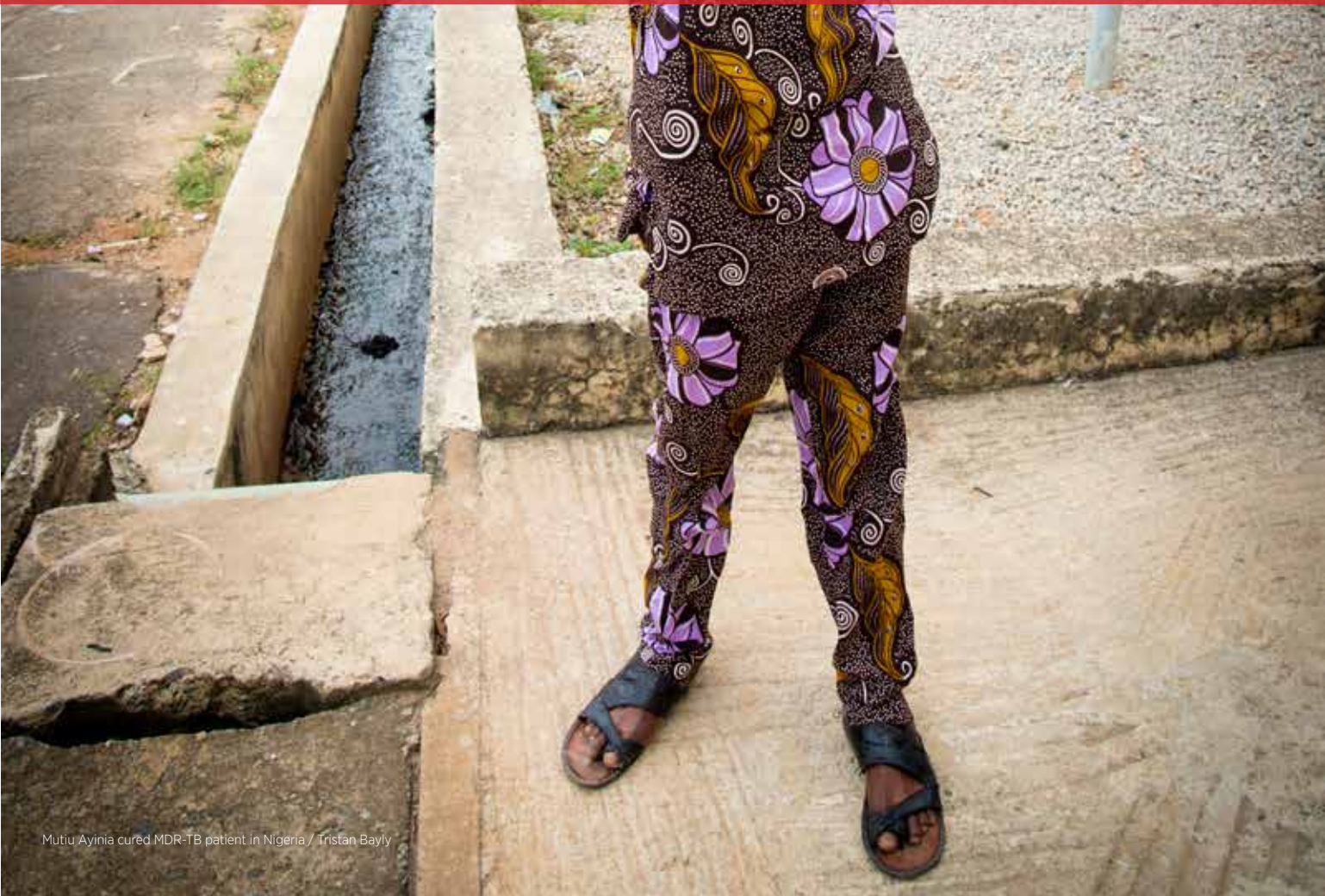


PERCENTAGE CHANGE FROM 2014 TO 2018 IN ESTIMATED TB DEATHS (HIV+TB ONLY)





SUCCESS STORY: MUTIU AYINIA



Mutiu Ayinia cured MDR-TB patient in Nigeria / Tristan Bayly

Every day over 400 Nigerians die of TB, a disease that is preventable and curable. The epidemic is fueled by the large number of people with TB that go undiagnosed and untreated. One of the TB-hotspots is Lagos State which has one of the highest TB burdens in the country.

For Lagosian Mutiu Ayinla, who survived multidrug-resistant TB, music is more than just a form of art, it's a form of treatment. "Music really lifted me up and made me feel better when I needed it most," he says. The singer in a Fuji band - a popular type of Yoruban music with a huge following across Nigeria - Mutiu's story has been one of overcoming adversity, but now that he is cured he wants to share his experience through his music.



"Being able to sing again and rejoin the band during my treatment was fantastic! It only motivated me more to complete my treatment and get cured of this terrible disease."

When Mutiu first started feeling ill and coughing a lot he didn't think too much of it. "I thought I was coughing because of my unhealthy lifestyle. I used to drink and smoke a lot," he explains. "However, my condition continued to worsen by the day. My voice also started cracking and I was forced to stop singing, that's when I went to the local health center where I was diagnosed with TB."

Myths and misconceptions around TB abound in Nigeria. People believe that TB is caused by witchcraft, or even that it is inherited. There is a lot of stigma around TB, and those sick with the disease are often shunned by family and friends. The disease took his voice and his family too, "My wife divorced me, took the children and sold our house. She thought I was going to die. She took all our savings and left me with nothing."

Diagnosed with a form of TB resistant to at least one of the most effective anti-TB drugs, Mutiu was put on a treatment regimen of 20 months, requiring him to have several painful injections and take numerous pills.

He thought about giving up more than once. "The thought of stopping my treatment and dying crossed my mind. The medication made me feel very sick, but thankfully the health workers got me through." One of the positive things to come out of his treatment was the recovery of his voice. "Being able to sing again and rejoin the band during my treatment was fantastic! It only motivated me more to complete my treatment and get cured of this terrible disease."

Today, Mutiu is cured and is back to doing what he loves, making

music and performing for others. "I'm grateful for all the help I received during this difficult period in my life. Overcoming TB is not something you can do on your own, I appreciate all the help Challenge TB has provided me," he says.

Mutiu has written a song about TB which he plans to sing at his next performance. He hopes his music will not only be listened to for its artistic merit, but will educate others about TB as well. He sings a verse from his new song:

"If you're coughing, and it has been more than two weeks, make sure you get tested! If it's TB, you will get cured!"

With the assistance of Challenge TB, many like Mutiu have received free TB diagnosis and treatment.



Contact tracing in Cambodia / Tristan Bayly



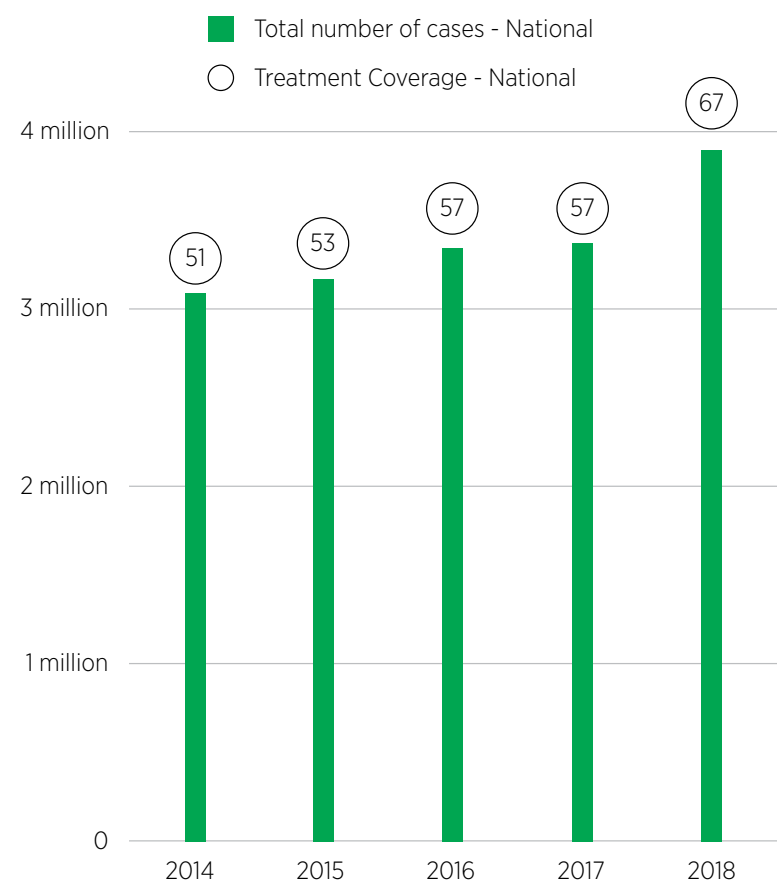
Miners waiting for TB screening in Zimbabwe / Paldamoyo Magaya

Increasing TB case finding has been a priority in all CTB countries. The increasing trend in the number of notified patients in CTB countries in 2014-2018 reflects the significant contribution of CTB interventions in coordination with GF and other partners. In 2018, 3.9 million TB patients were notified in all 24 CTB countries combined, which represents 67% of the estimated incidence (reflecting treatment coverage as defined by WHO), an increase from 3.1 million (53%) in 2014.

3.9M

TB PATIENTS NOTIFIED 67% OF THE ESTIMATED INCIDENCE

TOTAL CASES NOTIFIED IN CTB COUNTRIES NATIONWIDE AND TREATMENT COVERAGE, 2014-2018



For all 24 CTB countries, 2.7 million patients were successfully treated in the 2017 cohort compared with 2.3 million patients in the 2013 cohort. Between 2013 (baseline) and 2017 cohorts, three CTB countries (Bangladesh, Cambodia, and Tanzania) maintained treatment success rates (TSRs) above 90%; eight CTB countries (Afghanistan, DRC [Democratic Republic of Congo], Ethiopia, Kazakhstan, Mozambique, Tajikistan, Vietnam, and Zambia) improved on the 2013 cohort TSR by exceeding or reaching the 90% global target; and seven countries (Botswana, Malawi, South Sudan, Turkmenistan,

Ukraine, Uzbekistan, and Zimbabwe) improved on the 2013 cohort TSR but stayed below the 90% level. In only six countries did the TSR remain steady below the 90% level: Burma, India, Indonesia, Namibia, Nigeria (due to high levels of loss to follow-up, resulting from insecurity compelling patients to discontinue TB treatment, as well as missing data due to the high number of TB cases notified by the private sector with no subsequent reporting on the treatment outcomes); and Kyrgyzstan (due to high rates of treatment failure and death, influenced by the high frequency of RR-/MDR-TB).

2.7M

SUCCESSFULLY TREATED IN 2017 COMPARED TO 2.3 IN 2013

11

COUNTRIES REACHED OR EXCEEDED GLOBAL TREATED SUCCESS RATE



TB Drugs in Indonesia / Tristan Bayly

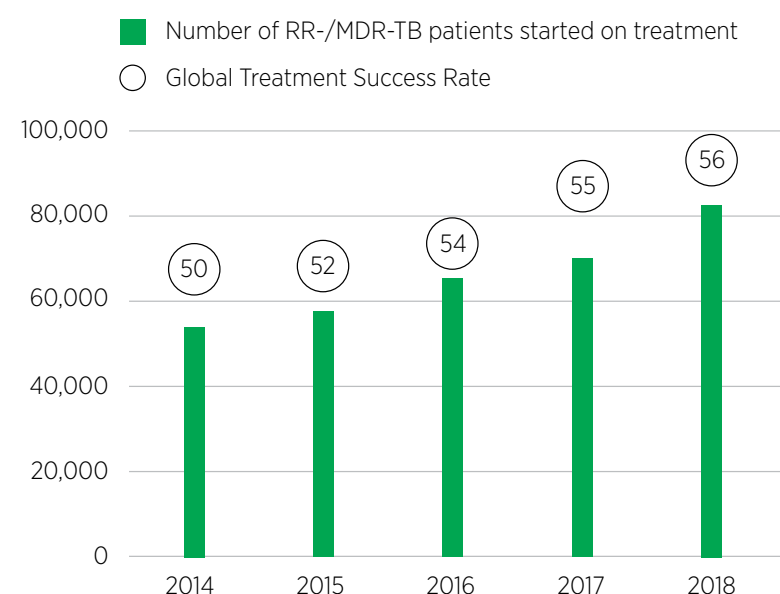
Taken together, 24 CTB countries show an increasing number of rifampicin-resistant (RR/ multidrug-resistant (MDR-TB) patients initiated on appropriate treatment (82,000 in 2018 versus 54,000 in 2014); 17 CTB countries continuously reported higher than the global TSR in 2014-2018 (i.e., 2102-2016 cohorts). The highest TSRs among the 2016 cohort of RR/MDR-TB patients were reported in DRC (86%), Kazakhstan (80%), Tanzania (80%), Burma (79%), Botswana (78%), Bangladesh (78%), and Nigeria (77%). Reasons for these higher success rates might include lower rates of death, less loss to follow-up,

and lower rates of treatment failure, as well as fewer missing data about treatment outcome. Introduction and scale-up of the shorter treatment regimen (STR) might also have contributed to improved treatment outcomes in some of these countries.

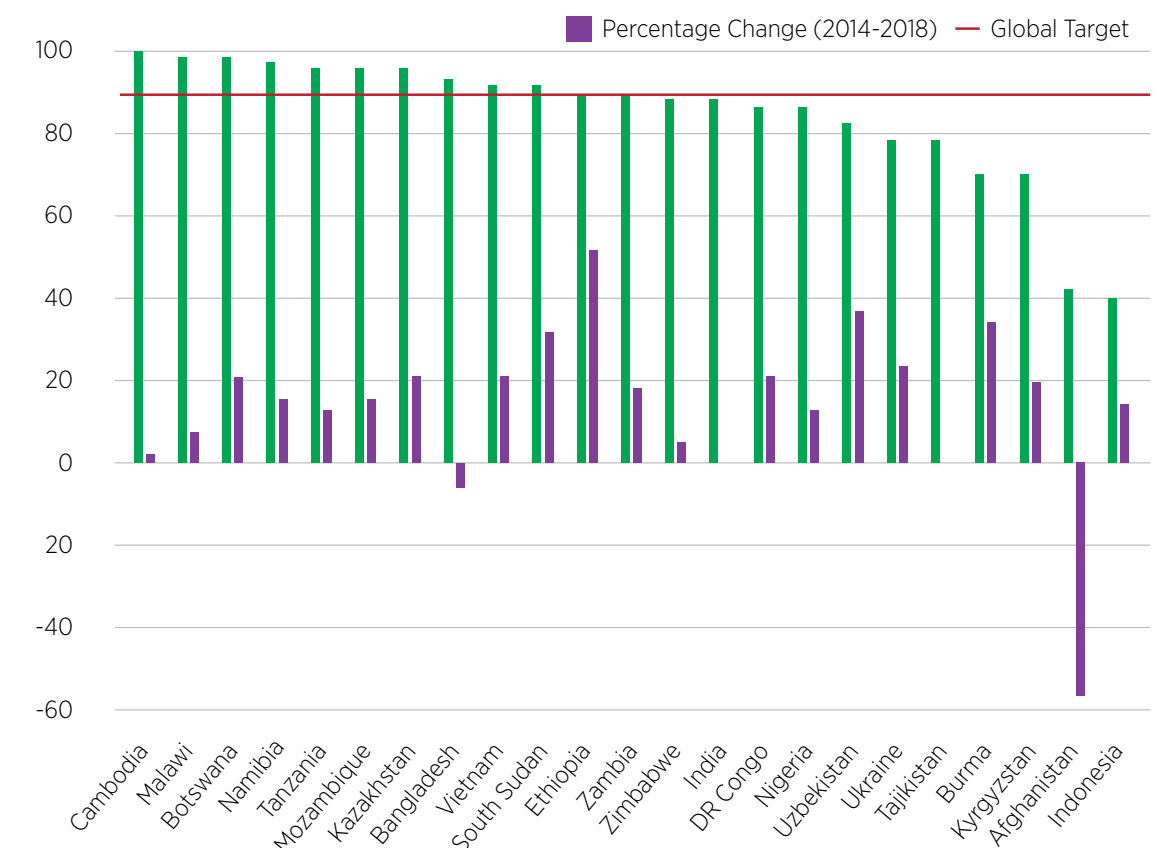
17

COUNTRIES EXCEED GLOBAL MDR-TB TREATMENT SUCCESS RATE

MDR-TB DIAGNOSIS, TREATMENT AND CARE CASCADE, 2012-2017 COHORTS



HIV-POSITIVE NEW AND RELAPSED REGISTERED TB CASES ON ART DURING TB TREATMENT 2018



(Data for Turkmenistan not available)

In 2018, the number of notified HIV-positive TB patients on ART reached 409,770, equivalent to 86% of the notified TB patients known to be HIV positive. Overall, in the 30 high-burden TB/HIV burden countries, 87% of the TB patients known to be HIV positive were on ART. Sixteen CTB countries were above the global average (87%), and 14 CTB countries were above the global target (90%) for coverage of ART for notified TB patients co-infected with HIV. Afghanistan, Burma, DRC, Indonesia, Kyrgyzstan, Nigeria, Tajikistan, Ukraine, and Uzbekistan were below the 90% global target in 2018, which might reflect inadequate performance of TB/HIV integrated services in these countries.

409,770

NOTIFIED TB/HIV PATIENTS ON ART IN 2018, 86% OF NOTIFIED TB PATIENTS KNOWN TO BE HIV POSITIVE

16

COUNTRIES EXCEED THE GLOBAL AVERAGE FOR ART COVERAGE



CASE FINDING





Active case finding in Cambodia / Ngo Menghak



WoW Truck Screening in Kano, Nigeria / Maxwell Onuoha

CASE FINDING

TB case finding and management is complex, and different interventions to need to be aligned to achieve results. At baseline, target countries had common challenges, which included low treatment coverage, with 30-40% of estimated TB cases missing along the cascade of care. Low treatment success rates were also a challenge in several countries. While a high proportion of missed people with TB was a common problem, country contexts varied considerably. In Asian countries, where private providers constitute a significant proportion of the health service delivery points, unregulated

private sectors were important targets for identifying missing patients. In Africa, on the other hand, the private-sector contribution was generally either too small or unknown, making public health systems more important targets for case-finding interventions. The role and contribution of community health workers were not well defined and key population groups were not clearly mapped. Given the diversity of CTB-supported countries and the uniqueness of their health systems, the need for tailored and country-driven approach was evident. Here, we describe CTB's contribution to overall case finding and treatment outcomes across CTB-supported countries.

SNAPSHOT OF KEY RESULTS

- The number of TB cases diagnosed and initiated on treatment increased, from 51% national treatment coverage for all 24 CTB countries combined in 2014 to 67% in 2018.
- The number of TB patients successfully treated rose by 21%, from 2.26 million in 2014 to 2.73 million in 2018.
- Despite variation by country, the high yield approaches in an order include hospital/OPD/FAST interventions, followed

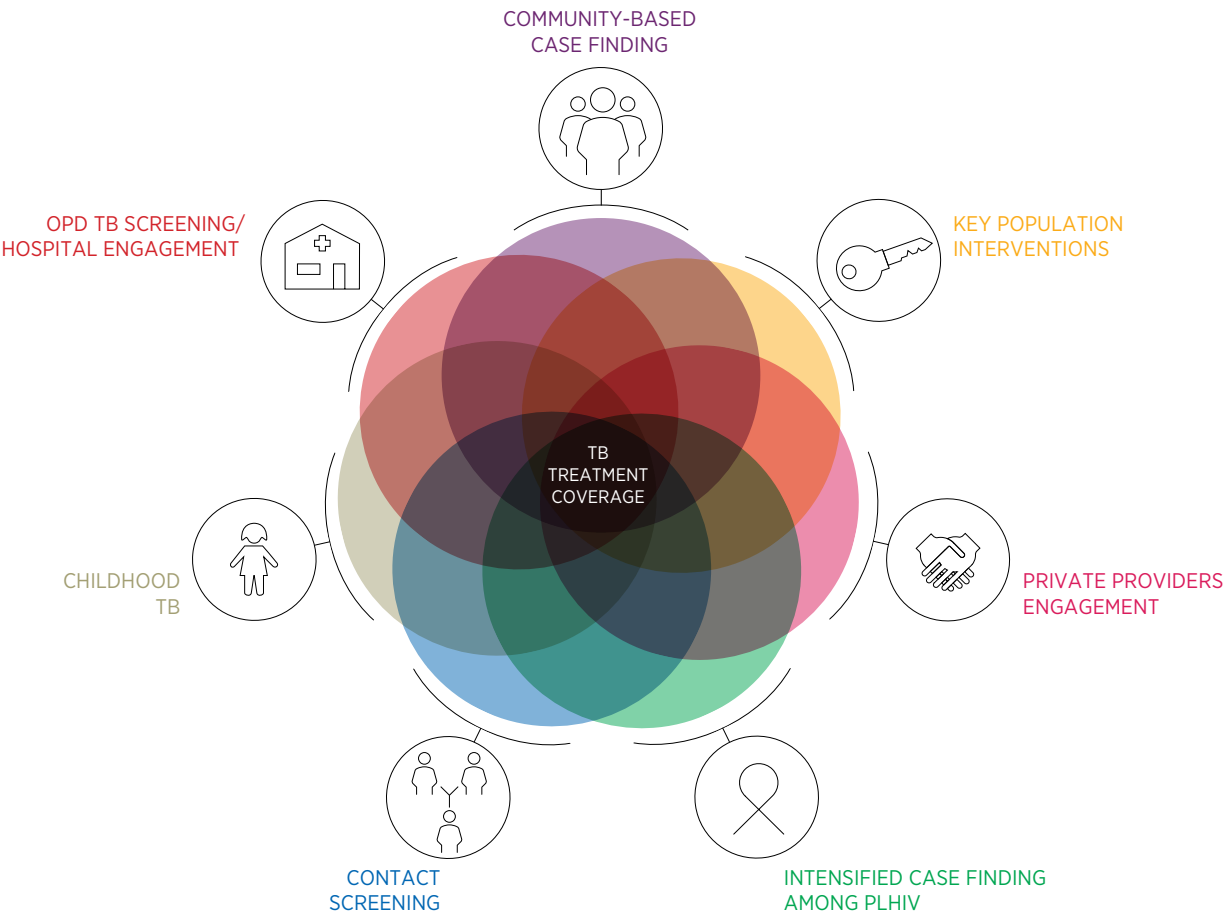
by community referral, private provides engagement, key populations, and contact investigation. However, the best option is a package of all approaches based on the data on yield and cost effectiveness.

67%

OF TB PATIENTS DIAGNOSED AND PUT ON TREATMENT

2.73M

TB PATIENTS SUCCESSFULLY TREATED

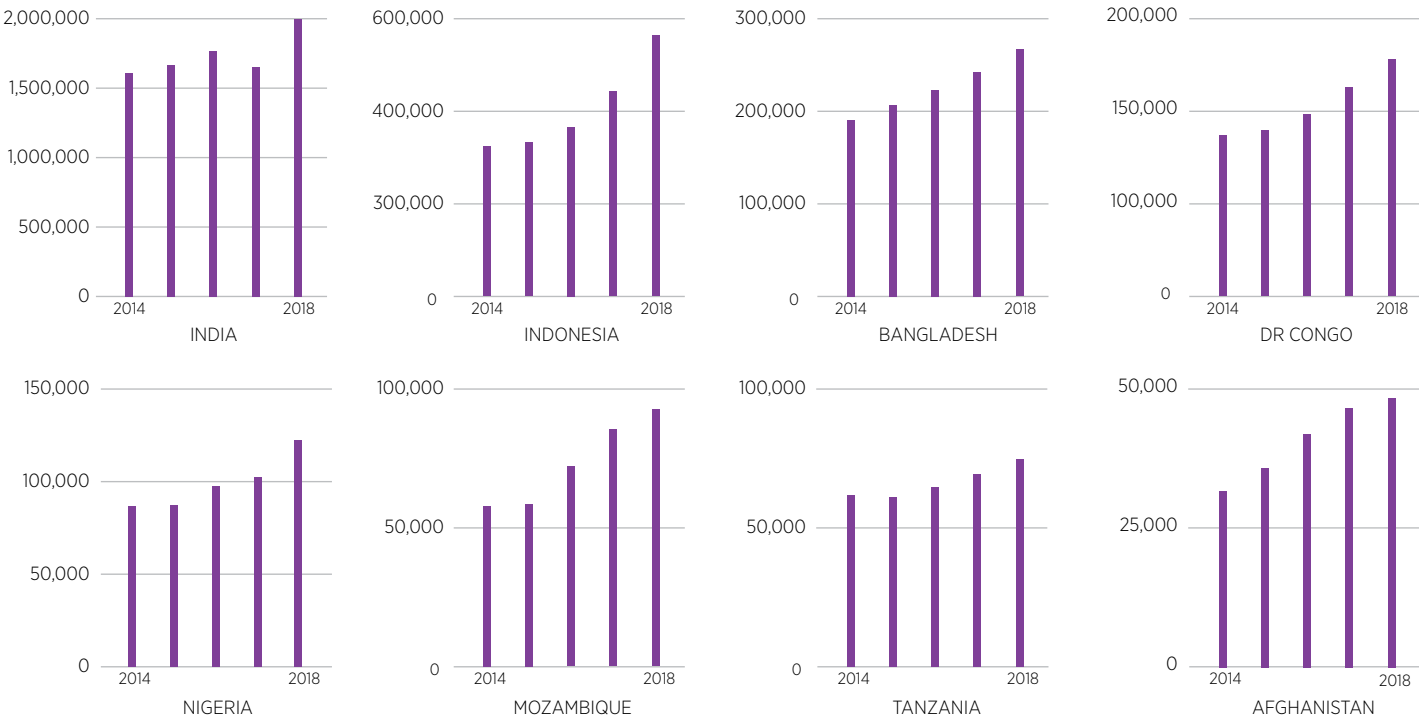


Typically, countries tested and phased in new interventions. When sufficient evidence was demonstrated in a country with similar context, interventions were scaled up to national level, including through the support of other partners. The variation in the extent and duration of implementation of the different interventions clearly reflects the country-driven prioritization and planning process used per CTB's core principles. Alongside implementation, continuous cross-learning and diffusion of knowledge occurred among countries over the project period. CTB used regular project review meetings and TB conferences as venues for knowledge and experience sharing.

All these case-finding strategies contributed to overall case notifications in CTB-supported countries, although trends in case notification rates varied from country to country. For example, the number of notified cases in eight CTB countries, including India, steadily increased, whereas a decreasing/flattened trend was reported in the remaining 15 countries.

The decreasing trend in case notifications in some of these countries should be interpreted in light of decreasing TB incidence, often accompanied by increasing treatment coverage—for example, this is the case in Ethiopia (see page 42).

CTB COUNTRIES WITH INCREASING TREND IN CASE NOTIFICATIONS IN 2014-2018



CTB COUNTRIES WITH FLATTENING OR DECREASING TREND IN CASE NOTIFICATIONS IN 2014-2018



DECREASING TREND IN CASE NOTIFICATIONS AND INCIDENCE AND INCREASING TREATMENT COVERAGE IN ETHIOPIA AND ZIMBABWE, 2014-2018



Conducting door-to-door screening among hard-to-reach communities in DRC / Olivier Bahati Rusumba

COMMUNITY-BASED CASE FINDING

Although CTB's support to community-based TB case finding was tailored to the specific needs of each country project, the overarching framework was similar in both countries. At the national level, CTB supported NTPs to develop or update their community-based case-finding guidelines, standard operating procedures (SOPs), reporting and recording tools, and performance indicators. CTB also supported countries in training community health workers on the updated or new guidelines and tools. At subnational levels, usually the district level, CTB partnered with district program offices and local partners in community awareness raising, supportive supervision, and implementation of active case-finding strategies.

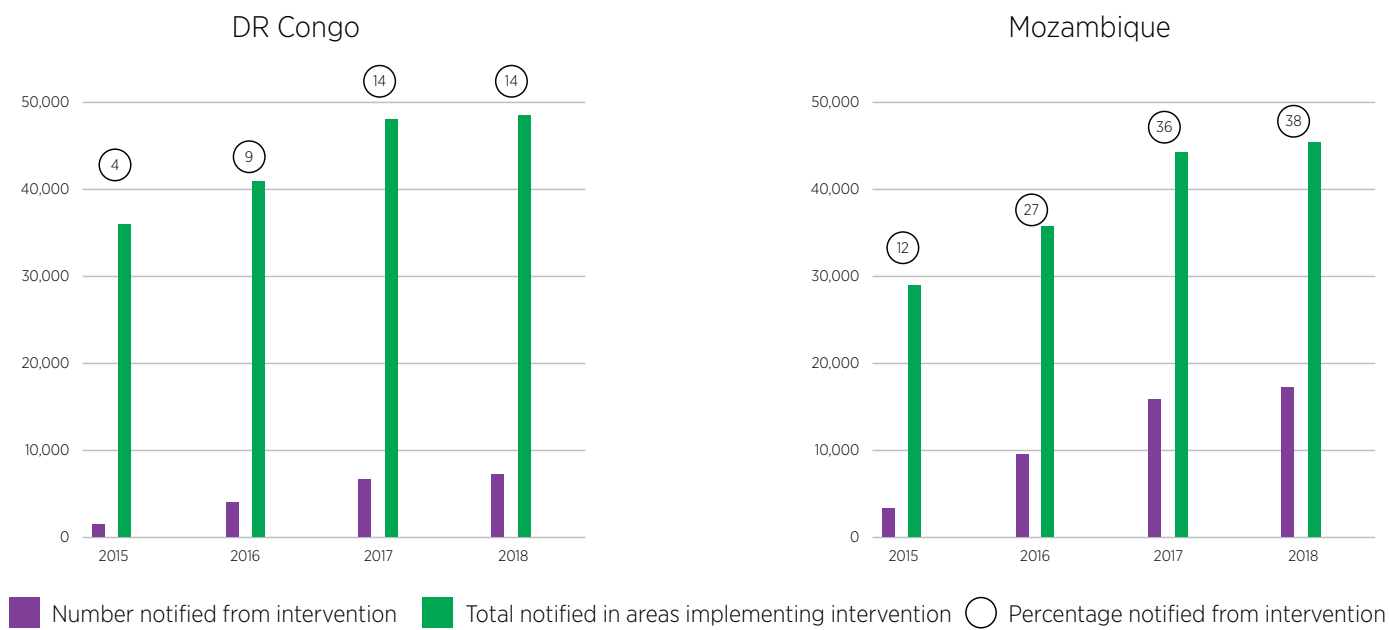
At the community level, CTB's work focused mostly on building

local capacity to implement specific case-finding activities. In DRC, cumulatively 11% (20,525/184,510) of all reported cases were identified through community referrals and community-based contact investigation in CTB areas, with an increase in the contribution of community referrals to overall case notifications in CTB areas from 4% in 2015 to 17% in 2019. This improved TB case finding was linked to the increased support provided at the community level by the four local nongovernmental organizations (NGOs) contracted through CTB for the following activities: awareness raising, home visits, and specimen transportation. Among these activities, the door-to-door strategy facilitated finding the largest number of TB cases and was considered one of the most important activities implemented by the project.

In Mozambique, cumulatively 29% (49,514/172,545) of all

reported cases were identified through community referrals in CTB areas, with an increase in the contribution of community referrals to overall case notifications in CTB areas from 12% in 2015 to 38% in 2018. In Mozambique, CTB implemented CB-DOTS in partnership with local NGOs and community-based organizations (CBOs) and played an important role in building these organizations' technical capacity through training, mentoring, and supportive supervision. These organizations are now recognized by the NTP and other stakeholders as institutions with not only the capacity and know-how to implement community-based interventions, but also demonstrate financial accountability, transparency, and compliance with donor requirements.

CONTRIBUTION OF COMMUNITY REFERRALS TO OVERALL CASE NOTIFICATION IN CTB TARGETED AREAS



Data is up to March 2019 for DR Congo and June 2019 for Mozambique



FAST promoter at work in Malawi / Tristan Bayly

OUTPATIENT DEPARTMENT SCREENING AND HOSPITAL ENGAGEMENT

Two types of case-finding strategies were used at the health facility level: (1) routine outpatient department (OPD) screening, and (2) hospital-specific case-finding interventions. CTB designed these interventions in line with the results of prevalence surveys in many CTB countries, which showed that health facilities were missing TB cases.

In Indonesia, cumulatively 57% (202,337/356,198) of all reported cases were identified through OPD screening and hospital engagement, with an increase in the contribution of this intervention to overall case notifications in CTB areas from 50% in 2015 to 64% in 2018. CTB engaged intensively with the private sector, especially private hospitals as well as public hospitals within the framework

of the district public-private mix approach (DPPM). The DPPM approach was initiated by expanding and re-introducing the Indonesian Standards of TB Care (STC) adapted from the International Standard of Care in hospitals, formally linking the hospitals to the NTP. The STC was added to the national hospital accreditation tools, as the basis for assessment regarding eligibility for health insurance contracts. Hospital linkage was implemented through a hospital TB team consisting of a coordinator, a nurse, a laboratory technician, a pharmacist, and

a specialist TB consultant. The specialist TB consultant (a member of the Coalition of Professional Organizations) guided his/her peers on diagnosis and treatment, based on the Indonesian STC. Hospitals notified their patients directly through the national TB information system (SITT).

57%

OF ALL CASES REPORTED IN INDONESIA WERE IDENTIFIED THROUGH OPD SCREENING AND HOSPITAL ENGAGEMENT

CONTRIBUTION OF OPD AND HOSPITAL ENGAGEMENT INTERVENTION TO OVERALL CASE NOTIFICATION IN CTB-TARGETED AREAS IN INDONESIA, CAMBODIA, DRC, AND MALAWI



In Cambodia, 59% (9,441/15,966) of all reported cases were identified through OPD screening and hospital engagement, and the contribution of this intervention to overall case notifications in CTB areas increased from 39% in 2015 to 76% in 2018. CTB implemented hospital linkages in 16 regional hospitals throughout the life of the project. These hospitals implemented both cough triage and the FAST strategy (Finding TB cases Actively, Separating safely, and Treating effectively). Patients with cough were separated from other patients and provided with masks. Presumptive TB patients (with and without cough) were examined for further diagnosis. TB symptom screening questions were integrated into both triage/outpatient and inpatient medical forms to remind health care practitioners to screen for TB. Regional hospitals will continue to use these forms beyond the life of the project, and technical partners will extend their reach

beyond project areas for long-lasting project impact.

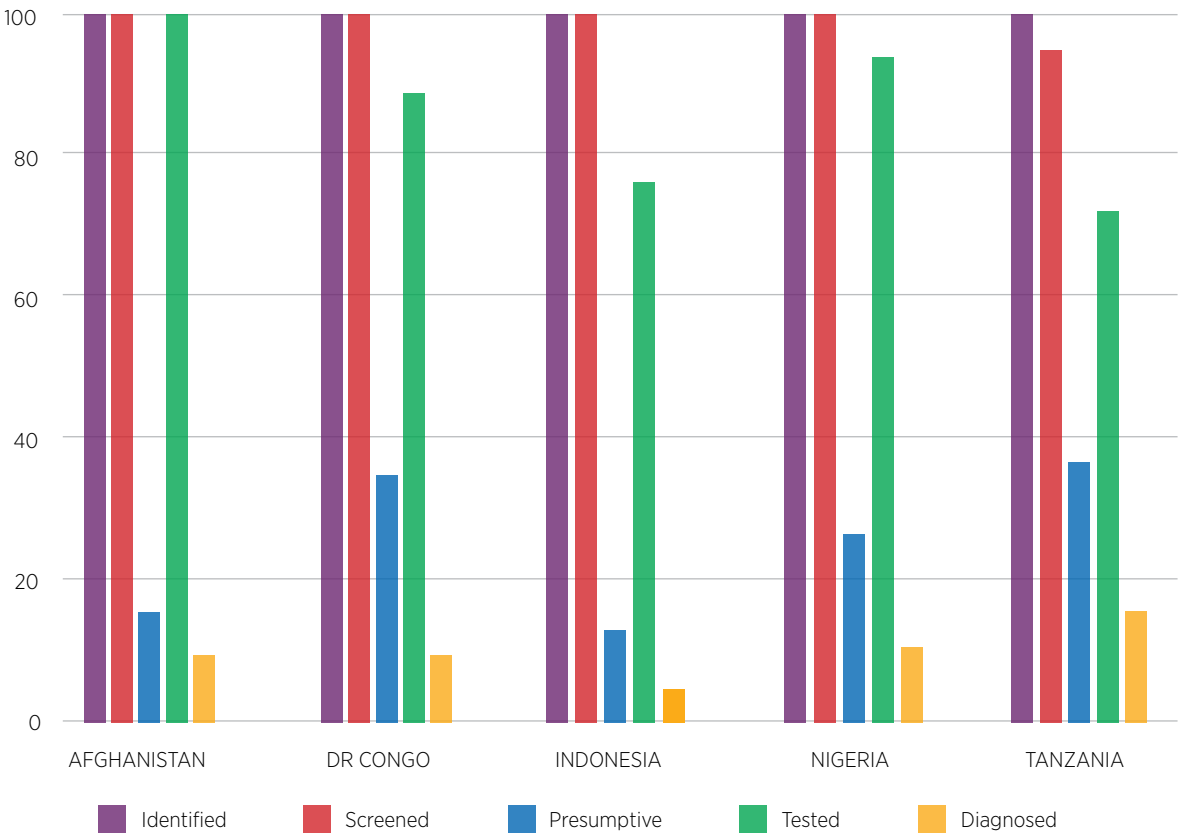
In DRC, implementation of TB case-finding activities at hospitals started in 2017. From 2017 to 2019, 32,961 (31%) TB cases all forms out of 107,709 were notified through hospital engagement. In total, 1,136 health care workers (HCWs) were trained in TB management during supportive supervision visits and through on-the-job training during 2017-2019. Five health facilities in the five CTB-supported provinces were equipped with spectrophotometers, audiometers, electrocardiogram machines, and N95 respiratory masks.

In Malawi, the FAST strategy was implemented in three district hospitals and one central hospital, from July 2018 to June 2019. The main objective of the intervention was to prevent and control TB infection by identifying patients with TB symptoms and expediting their diagnosis and treatment. The intervention demonstrated good performance in case detection. By the end of March 2019, FAST sites had contributed 52% (1,503/3,043) of overall TB notifications to districts.

32,961

TB CASES IN DRC WERE REPORTED THROUGH HOSPITAL ENGAGEMENT

THE CONTACT INVESTIGATION CASCADE IN FIVE CTB-SUPPORTED COUNTRIES



CONTACT INVESTIGATION

Contact investigation was implemented in both communities and health facilities. The yield of contact screening varied across countries due to the local context, including national policies, algorithms, and SOPs. The highest proportion of presumptive cases out of screened contacts was reported in Tanzania (37%), DRC (35%), and Nigeria (26%), whereas the highest proportion of diagnosed TB patients out of those tested or evaluated was reported in Tanzania (15%), Nigeria (11%), Afghanistan (10%), and DRC (10%).

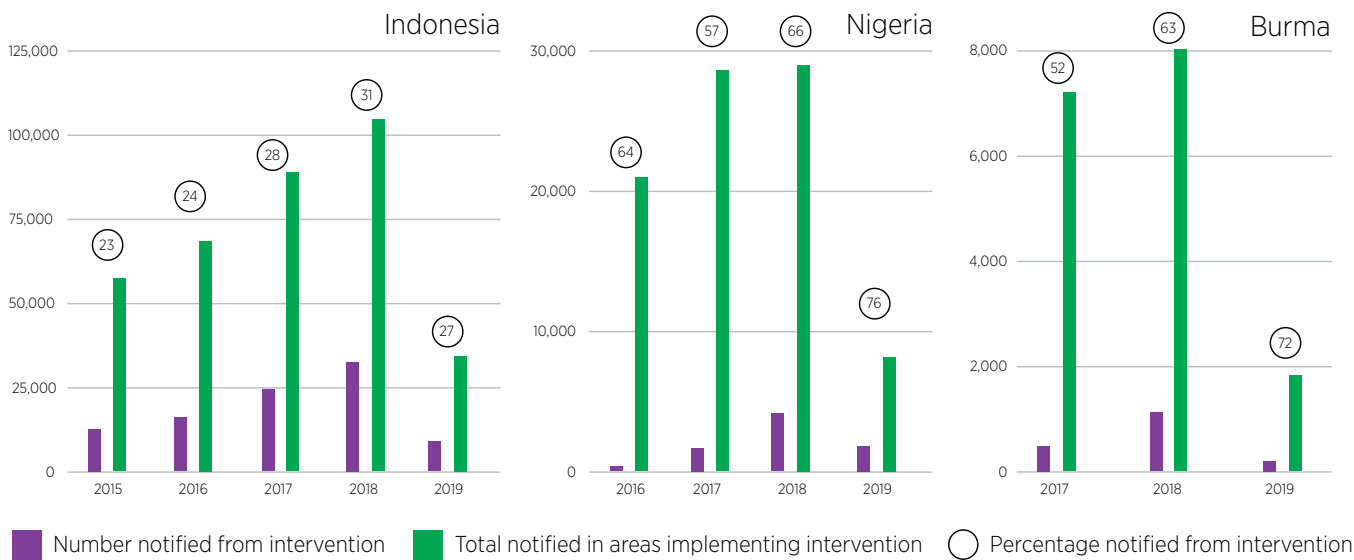
In all these countries, contact investigation was implemented mostly through two approaches:

1. In community-based contact investigation, community health workers and community volunteers identified confirmed TB cases in the community and screened their contacts. Those with TB symptoms were referred to a nearby health facility for TB evaluation. Child contacts were referred to a nearby health facility for preventive therapy if they are asymptomatic. Community workers also used these opportunities to counsel the household on the importance of contact investigation and

the essentials of preventive therapy for eligible contacts.

2. In health-facility based contact investigation, index patients brought their close contacts to health facilities for symptom screening and subsequent investigation. Child contacts were managed as described above. CTB's support to contact investigation included support to the NTP in developing SOPs, training health care workers, providing technical and financial support for supportive supervision and review meetings, and documenting pilot experiences for further learning and scale-up.

CONTRIBUTION OF PRIVATE PROVIDERS TO OVERALL CASE NOTIFICATION IN CTB TARGETED AREAS IN INDONESIA, NIGERIA, AND BURMA



(data is up to March 2019 for Burma and June 2019 for Indonesia and Nigeria)

ENGAGING PRIVATE-SECTOR PROVIDERS

CTB engaged private providers through public-private partnership models, which were tailored to each national health system's characteristics as well as the local needs in CTB countries.

In Indonesia, cumulatively 27% (96,148/356,198) of all reported cases were identified by private providers (including both private hospitals and private primary health care clinics), with an increase in the contribution to overall case notifications in CTB areas from 23% in 2015 to 31% in 2018. In Indonesia, CTB assisted the NTP with guideline development, mapping of health facilities, developing mobile apps for private clinics, and monitoring progress.

In Nigeria, CTB supported pharmacy shop owners to identify and refer patients by offering performance-based

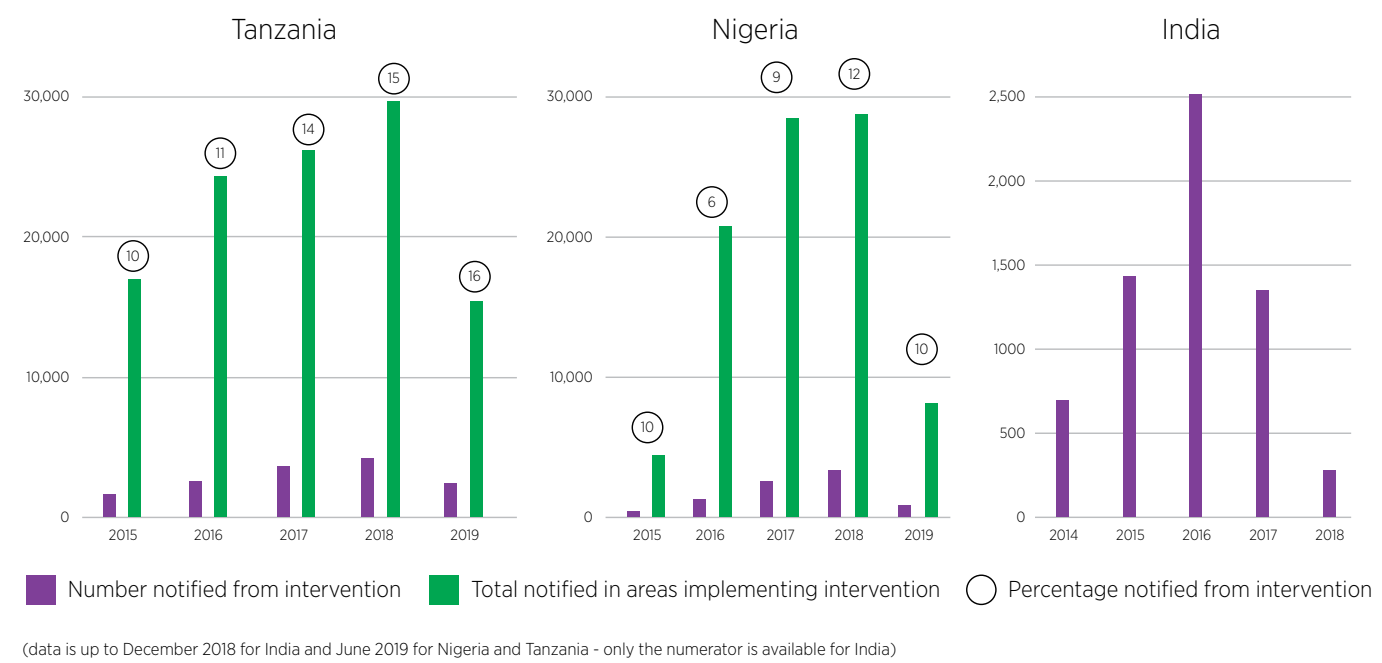
incentives. From 2016 to June 2019, pharmacy owners contributed 9% (7,507/86,024) of TB notifications overall, with an increase from 1% in 2016 to 22% in 2019.

In Burma, clients with TB symptoms often go to pharmacies to buy drugs to treat their symptoms. CTB used these pharmacies as a screening point to improve access to TB diagnosis. From the start of this intervention in 2017 till March 2019, there was an overall contribution of 10% (1,503/3,043) of TB notifications from private drug sellers, with increasing trend in the contribution to overall case notifications in CTB areas from 7% in 2017 to 14% in 2018.

27%

OF ALL TB CASES IN INDONESIA WERE REPORTED BY PRIVATE PROVIDERS

CHILDHOOD TB CASES AMONG ALL REPORTED CASES IN CTB-TARGETED AREAS IN TANZANIA, NIGERIA, AND INDIA



CHILDHOOD TB

CTB-supported interventions in this area focused on improving childhood TB diagnostic methods and criteria, as well as improving reporting to NTPs of diagnosed cases in pediatric hospitals, which included addressing issues of over- and under-reporting in some countries.

In Tanzania, the percentage of childhood TB cases among all reported cases in CTB-targeted areas increased from 10% in 2015 to 16% in 2019, which can be attributed to health facility-based active case finding as well as improved GeneXpert diagnosis. CTB provided technical and financial support for the development, printing,

dissemination, and distribution of the National Guidelines for Collaborative Care and Control of Tuberculosis and Diabetes, which aimed to complement TB case finding among children under the age of five along with other high-risk groups.

In Nigeria, the percentage of childhood TB cases among all reported cases in CTB areas increased from 6% in 2016 to 12% in 2018; a total of 10,372 children were diagnosed with TB; and 20,955 children under the age of 5 years who were eligible were initiated on IPT. In all, 35 pediatric clinics were linked to the TB program, and 260 pediatricians and HCWS were trained to suspect and identify TB cases in children.

In India, under the initiative to improve access to rapid Xpert testing among children, CTB was able to test more than 94,415 presumptive TB patients against the target of 102,000 and diagnosed 6,270 childhood TB patients during March 2014 to March 2018, of whom 89% were initiated on treatment, and 545 DR-TB patients. These findings facilitated a policy decision by India's NTP mandating the use of GeneXpert as a primary diagnostic tool for TB in children. WHO cited the project in September 2018 as a model for replication as part of the "Best Practices in Child and Adolescent Tuberculosis."



Boy cured of TB in Indonesia / Tristan Bayly



SUCCESS STORY: RAHAT

Unbeknown to his family, seven-month-old Rahat had already been exposed to TB. He got it from his grandfather who had died of the disease.

The first signs of trouble came when Rahat, a normally happy baby, stopped smiling. He lost the usual playfulness of a healthy child, rapidly lost weight, and developed a large swelling on the left side of his neck. His parents were understandably very worried.

They went to the pharmacy and purchased some antibiotics to treat his symptoms, but his condition continued to worsen each day. They sought help at the Dhaka Population Services and Training Center, where Rahat was referred to the National Institute of Chest Disease and Hospital. There, the doctors used a special diagnostic method called fine needle aspiration cytology to find out what was wrong. Rahat's parents learned the terrible news, that their ten-month-old son had TB.

Rahat was immediately started on treatment, but after two months his condition had not improved. He was taken back

to the hospital, but this time he went to the drug-resistant TB unit. There, a team of experts trained and supported by Challenge TB assessed Rahat's response to treatments and referred him for GeneXpert testing. This test eventually confirmed that Rahat was suffering from drug-resistant TB, which is why the initial course of treatment had no effect.

"I will never forget the day the doctor told me that my child had drug-resistant TB. I walked home from the hospital in a state of bewilderment and shock. How could my child have drug-resistant TB?" says Rahat's mother, Nasrin.

Given how young Rahat was and the fact that he only weighed seven kilograms, the team of doctors treating him were worried that he would not be strong enough to fight this devastating disease. To give him the best possible chance of survival, they set up community-based treatment that allowed Rahat to receive his medicines at home and to continue being breastfed by his mother.

Challenge TB's community TB coordinators closely monitored his condition and treatment through regular home visits and a mobile phone app called mHealth developed by Challenge TB. The app allows the coordinator to easily track both the treatment progress and the DOT provider, in order to ensure that TB patients like Rahat are getting their daily medicine and whether they are suffering from any adverse side effects.

With financial support from Challenge TB to cover the costs of check-ups, tests, and nutritious food, Rahat's life has been restored. He is not only smiling again, but he is active and playing like any other child his age.

Finding children with TB was a high priority for the Challenge TB project in Bangladesh. From 2017 to 2019, nearly 875,000 children were screened for TB at six selected facilities and a total of 1,423 were found to have TB, and put on treatment.

"I will never forget the day the doctor told me that my child had drug-resistant TB. I walked home from the hospital in a state of bewilderment and shock."



TB CASES NOTIFIED AMONG MINING WORKERS IN CTB-TARGETED AREAS IN DRC* AND ETHIOPIA



*CTB-DRC project was scaled down in 2019



KEY AFFECTED POPULATIONS

CTB supported countries in mapping and prioritizing key affected populations for targeted case finding among various key priority groups, including mining workers, patients with diabetes mellitus, and the elderly. Country-specific priorities were driven by the size of the population and yield of the screening.

In DRC, 24,153 miners were sensitized about TB from 2016 to 2019; 5,414 presumptive TB cases were identified, among whom a total of 3,325 (61%) TB cases were diagnosed—an increase from 172 (0.4%) cases in 2016 to 1,785 (4%) cases in 2018 and nearly 100% were started on TB treatment. TB screening activities were carried out in artisanal (informal) mining areas (gold, diamond, and coltan). In Year 2, local NGOs started active TB case finding among miners and their families in four provinces.

In Ethiopia, based on the prioritization exercise using existing service coverage, expected feasibility of reach and additional yield, mining workers were selected as the highest priority group for focused interventions. The interventions were implemented with appropriate capacity building and development of SOPs and reporting tools. Six mining districts in two zones of Oromia Region were supported to implement the intervention, with the following results: between 2016-2018, 56,756 mining workers were screened, among whom 808 patients (31 in 2016, 314 in 2017, and 463 in 2018) patients were diagnosed with TB.

56,756

MINING WORKERS WERE SCREENED IN ETHIOPIA AMONG WHOM 808 WERE DIAGNOSED WITH TB

In Bangladesh, CTB supported subgrants to local NGOs to implement community-based TB control activities targeting various high-risk populations. The Bangladesh Diabetic Association dealt with TB-diabetes comorbidity. From the start of this intervention in 2015 until June 2019, a total of 6,072 TB cases (with an increase from 380 cases in 2015 to 1,957 cases in 2018) were notified among diabetes patients.

In Indonesia, CTB implemented TB-diabetes collaborative services in two areas (Semarang City and Medan City). These pilots, which formed the basis for further technical guidance and SOP development, led to 8,533 TB cases being notified in this key population group in 16 CTB-targeted districts.

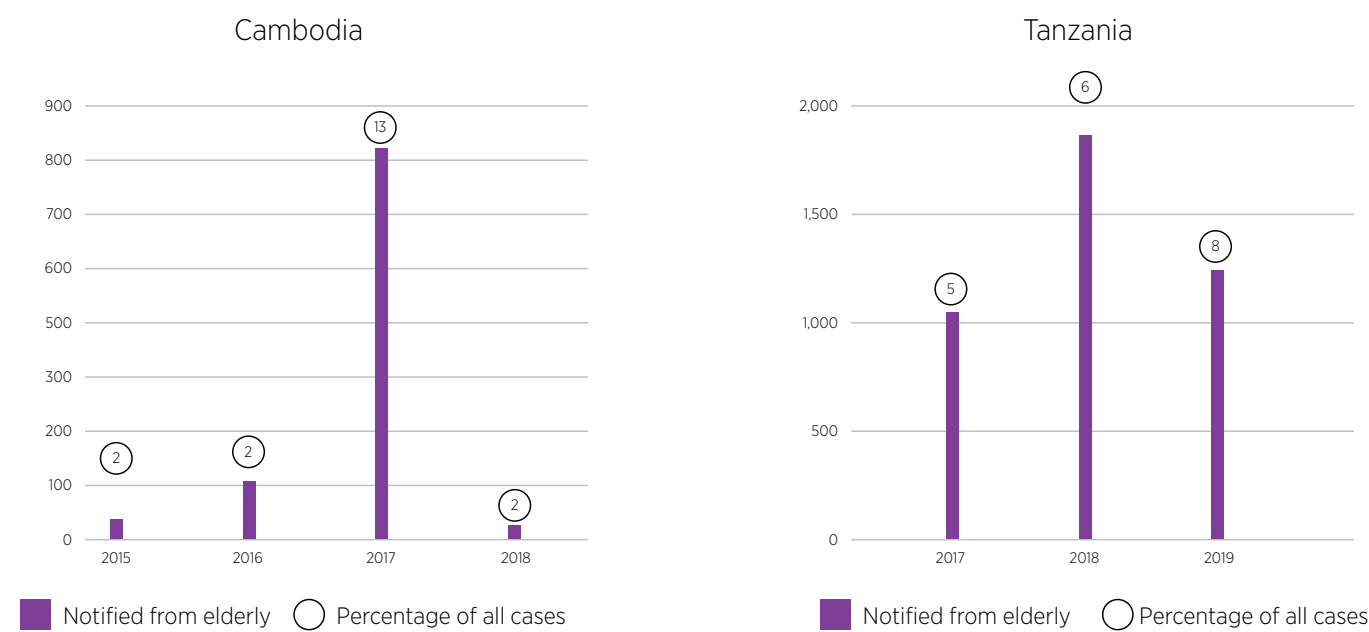
6,072

TB CASES WERE NOTIFIED AMONG DIABETES PATIENTS IN CAMBODIA

8,533

TB CASES WERE NOTIFIED AMONG DIABETES PATIENTS IN INDONESIA

CASES IDENTIFIED AMONG THE ELDERLY AMONG ALL REPORTED CASES IN CTB-TARGETED AREAS IN CAMBODIA AND TANZANIA*



*CTB project was scaled down in 2018 in Cambodia and in 2019 in Tanzania



In Cambodia, CTB supported TB screening among the elderly (defined as people over the age of 55) in religious settings. Active case finding was conducted in the 12 districts in CTB target areas. Health center staff and Village Health Support Groups together visited pagodas or mosques early in the morning during holy days to screen elderly individuals, monks, and imams for TB symptoms. Rather than referring elderly individuals with presumed TB to distant TB screening centers, the health workers collected sputum samples on site and transported them to laboratory centers for Xpert testing or to health centers for smear microscopy when Xpert was not available. A total of 1,021 TB patients were identified through this intervention, which was successfully transferred to the GF in March 2018.

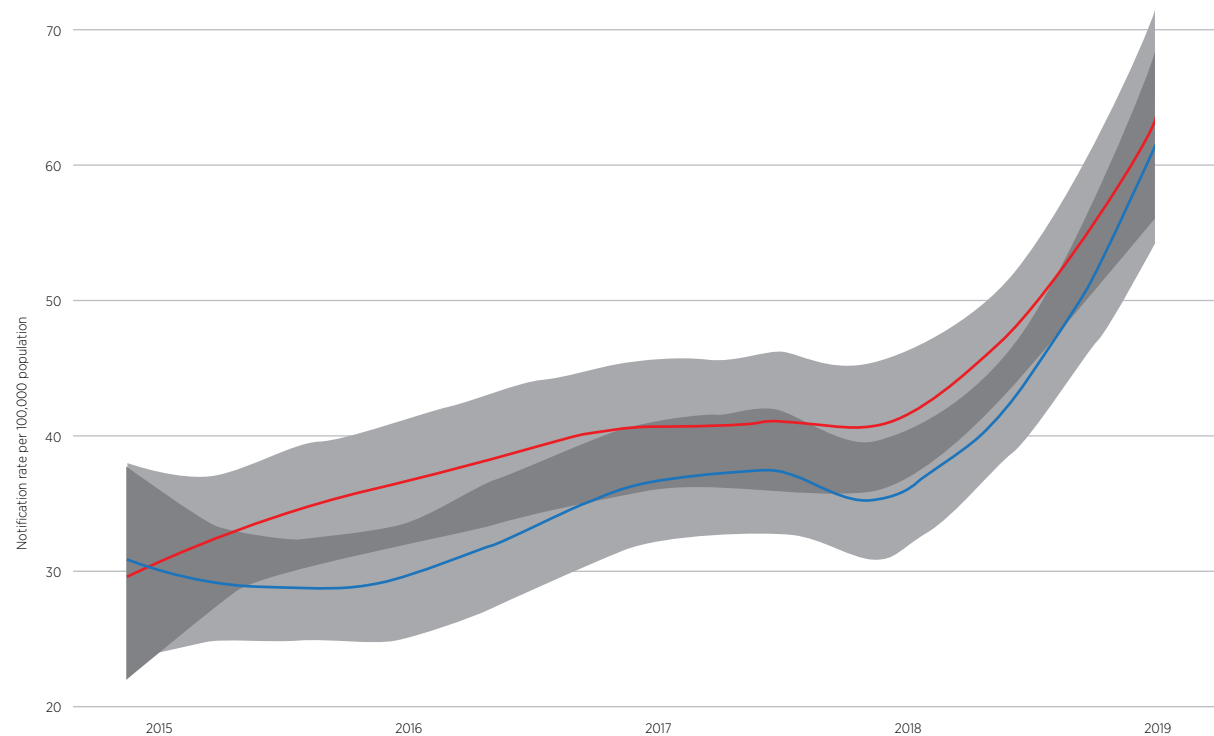
In Tanzania, 4,185 TB patients were identified among the elderly. TB screening took place at all health facility entry points as well as at the community level. CTB provided technical and financial support for the development, printing, dissemination, and distribution of the National Guidelines for Collaborative Care and Control of Tuberculosis and Diabetes, which aimed to include TB case finding among the elderly alongside the other high-risk groups.

4,185

TB PATIENTS WERE IDENTIFIED THROUGH ACTIVE SCREENING OF THE ELDERLY IN TANZANIA

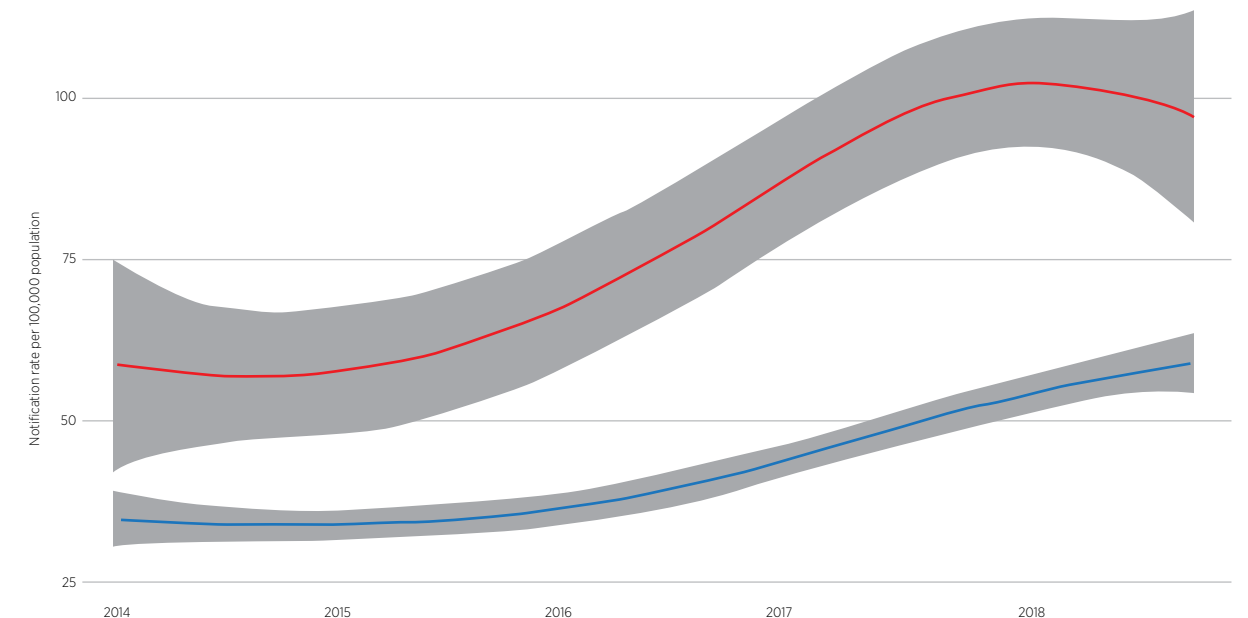
KEY FACTORS FACILITATING AND CONSTRAINING CASE FINDING

- The presence of policies and guidelines, support at the highest level of the MOH, adequate funding and partner support, presence of well-articulated community guidelines, recording and reporting tools, and availability of human resources both at community and health facility levels were key facilitators of community-based case finding.
- Several factors were identified as barriers to community-based case finding: weak M&E systems, security issues in hard-to-reach areas, high staff turnover, poor mobile coverage, lack of transportation, high turnover of community workers, and difficult topography were some of the challenges.
- Buy-in and support from the MOH/NTP were important for countries to introduce contact investigation as a key component of national case-finding strategies. Good collaboration between NGO staff and health care workers, availability of resources (including technical expertise and global recommendations), and engagement of opinion leaders from the outset were also important factors in successful implementation of contact investigation. Engaging contact investigators from the community who understand local customs, providing transport and communication support to providers and patients, and availability of simple and user-friendly tools and guidelines were the main facilitators of implementation.
- Access to remote areas, stigma, security concerns, insufficient funds, absence of contacts during home visits, limited human resources, misconceptions about the use of preventive therapy, and competing priorities among community workers were some of the key challenges encountered during implementation.
- Active involvement of local government authorities, mandatory notification policies (e.g., in Indonesia), performance-based incentives, and continuous mentoring were key to success.
- Reluctance of private providers to refer clients to the public health system (and thus lose income), the perception that data entry was time consuming, limited internet access, and incomplete data were major barriers.



TB case notification rates in CTB areas vs. non-CTB areas in Afghanistan

The red line represents the 14 provinces in which CTB implemented at least one intervention. Of the 14 provinces, 7 provinces implemented community referrals only and 1 province implemented a prison intervention only. Kabul, Balkh, Herat, and Kandahar were the only 4 provinces that implemented childhood TB, prisons, contact investigation, and private provider interventions. The blue line represents the 20 provinces that did not receive any support from CTB.



TB case notification rates in CTB areas vs. non-CTB areas in Indonesia

The red line represents the 16 CTB districts in which CTB implemented at least one intervention. Of the 16 districts, 8 implemented 6 interventions—the full package: childhood TB, contact investigation, hospital engagement, private providers, prisons, and PLHIV. The remaining 8 districts implemented a minimum of four of the above-mentioned interventions. The blue line represents the 499 districts that did not receive any support from CTB.

CASE STUDIES: EFFECTIVENESS OF THE COUNTRY-TAILORED PACKAGE APPROACH

To accelerate TB case finding, CTB used a country-tailored package approach. In other words, selected priority case-finding interventions were simultaneously implemented as a package. This resulted in higher case notification rates in CTB areas compared with non-CTB areas in Afghanistan, Indonesia, DRC, and Tanzania. In this analysis, province- or district-level notification and population data for each quarter of CTB was used to derive the notification rate per 100,000 (and the respective 95% confidence intervals) for both CTB and non-CTB areas. In general, interventions supported by the NTP, GF, or other donors were equally implemented in both CTB and non-CTB areas; therefore, the differences in case notification rates observed between these

areas could be due to the CTB package of interventions.

In Afghanistan, the CTB package of interventions included:

1. Community-based TB case finding implemented by local NGOs through CB-DOTS as well as urban DOTS implemented by involving private health providers in densely populated cities
2. Contact screening implemented as part of community-based case finding
3. Childhood TB intervention implemented in large pediatric TB hospitals
4. TB case finding among prisoners.

These case-finding interventions, combined with the other CTB-supported interventions (e.g., GeneXpert scale-up), were implemented as one package (with some variations in the intervention-specific coverage in different provinces during the life of the project) in 14 CTB-

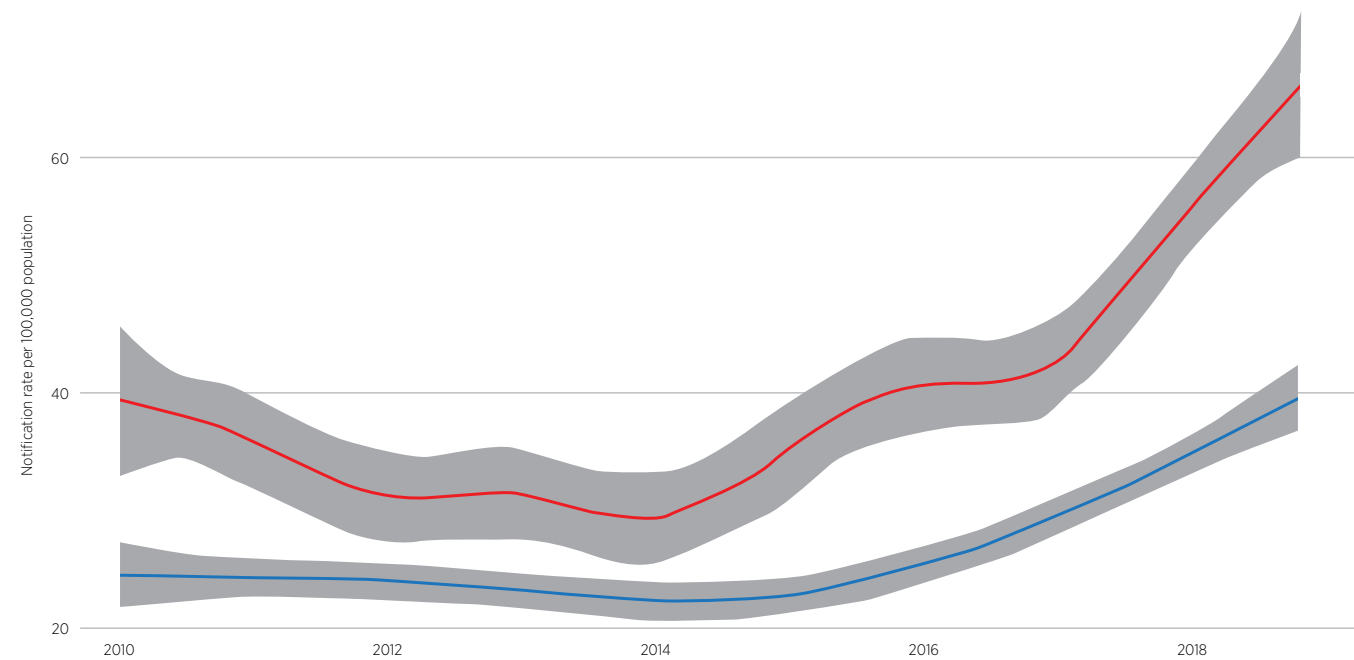
supported provinces (out of a total of 34 provinces), which might have contributed to the higher case notification rates in these provinces as compared with those in the 20 non-CTB provinces.

In Indonesia, the CTB package of interventions included:

1. OPD screening and hospital engagement within the framework of the district public-private mix (DPPM) approach
2. TB case finding through private providers (including both private hospitals and private PHC centers)
3. Contact investigation implemented at either community or health facility level (through DPPM)
4. Childhood TB intervention implemented in pediatric TB wards or hospitals and PHC centers
5. TB case finding among prisoners
6. TB case finding among PLHIV.

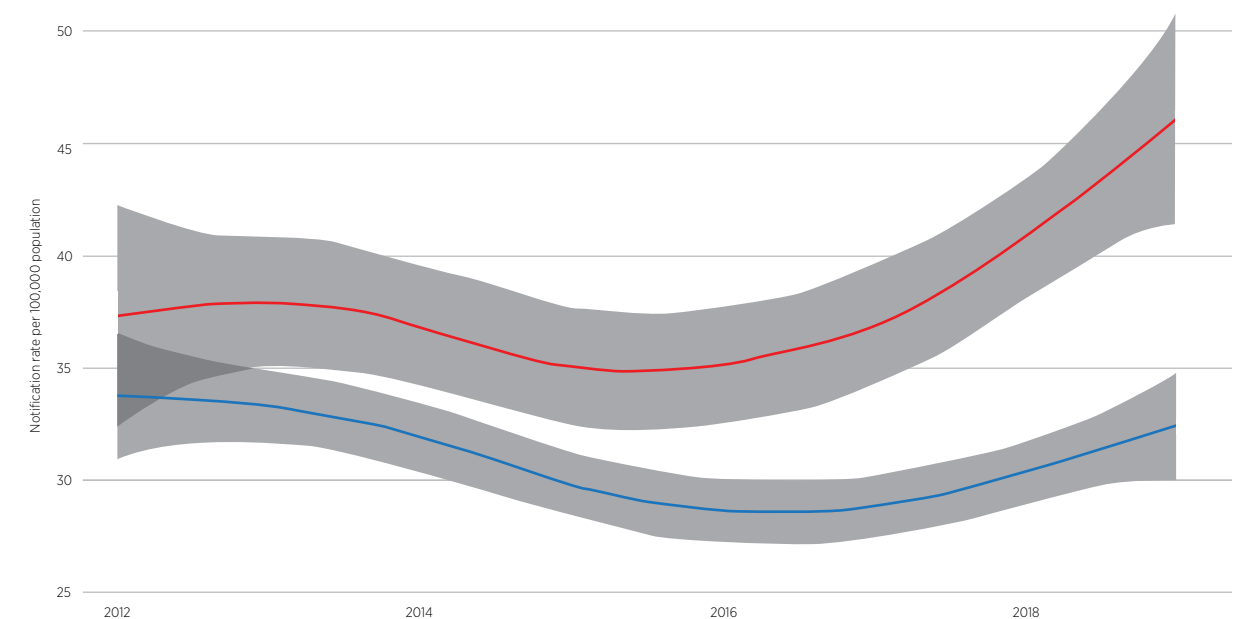
These case-finding interventions, combined with the other CTB-supported interventions (e.g., GeneXpert scale-up), were implemented as one package (with some variation in the

intervention-specific population coverage in different districts during the life of the project) in 16 CTB-supported districts (out of a total of 515 districts), which might have contributed to the higher case notification rates in these districts as compared with the 499 non-CTB districts.



TB case notification rates in CTB areas vs. non-CTB areas in DR Congo

The red line represents the 53 districts in which CTB implemented at least one intervention (although not those that implemented childhood TB only). The blue line represents the 58 districts that did not receive any support from CTB (other than those that implemented childhood TB).



TB case notification rates in CTB areas vs. non-CTB areas in Tanzania

The red line represents the 49 districts in which CTB implemented at least one intervention. The blue line represents the 147 districts that did not receive any support from CTB.

In DRC, CTB worked in eight provinces covering 53 districts from October 2014 to March 2018, then reduced its scope to five provinces for the remainder of the project. The CTB package of interventions included:

1. Community-based TB case finding by local NGOs/CBOs through door-to-door contact screening, active case finding among high-risk groups (miners, PLHIV), and sputum transportation for Xpert testing
2. TB case finding at private health facilities
3. A childhood TB intervention implemented in mother and-child health services, pediatric clinics, pediatric wards, nutrition rehabilitation services, and preschool and school health services
4. TB case finding among prisoners.

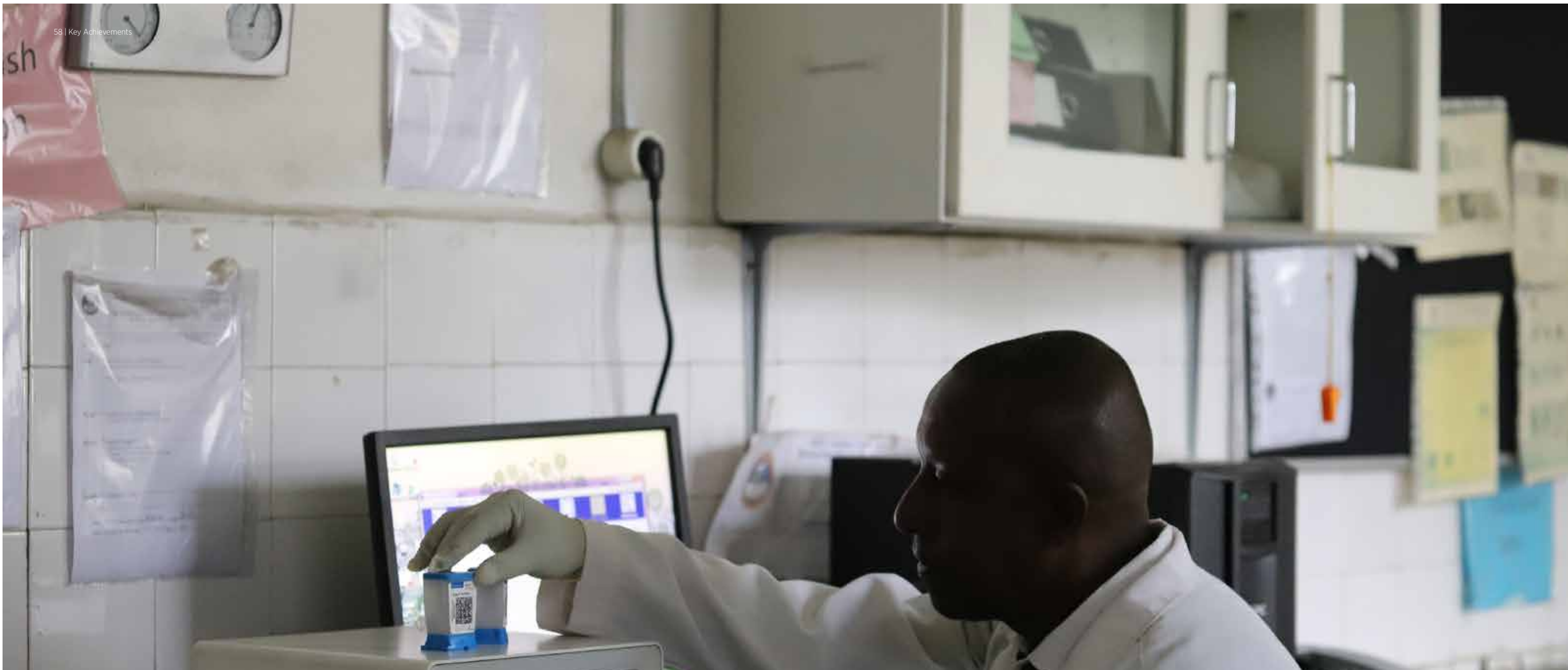
These case-finding interventions were implemented as one package (with some variation in the intervention-specific population coverage in different districts during the life of the project) in 53 CTB-supported districts (out of a total of 111 districts), which might have contributed to the higher case notification rates in these districts as compared with the 58 non-CTB districts.

In Tanzania, the CTB package of interventions included:

1. Community-based TB case finding by local NGOs/CBOs through contact investigation, health education, active case finding among high-risk groups (market and slum areas, people who inject drugs, miners, fisherfolk), and sputum transportation for Xpert testing
2. Active case finding in health facilities (including private health facilities) among PLHIV, children under the age of five, the elderly, and people with diabetes.

These case-finding interventions, combined with the other CTB-supported interventions

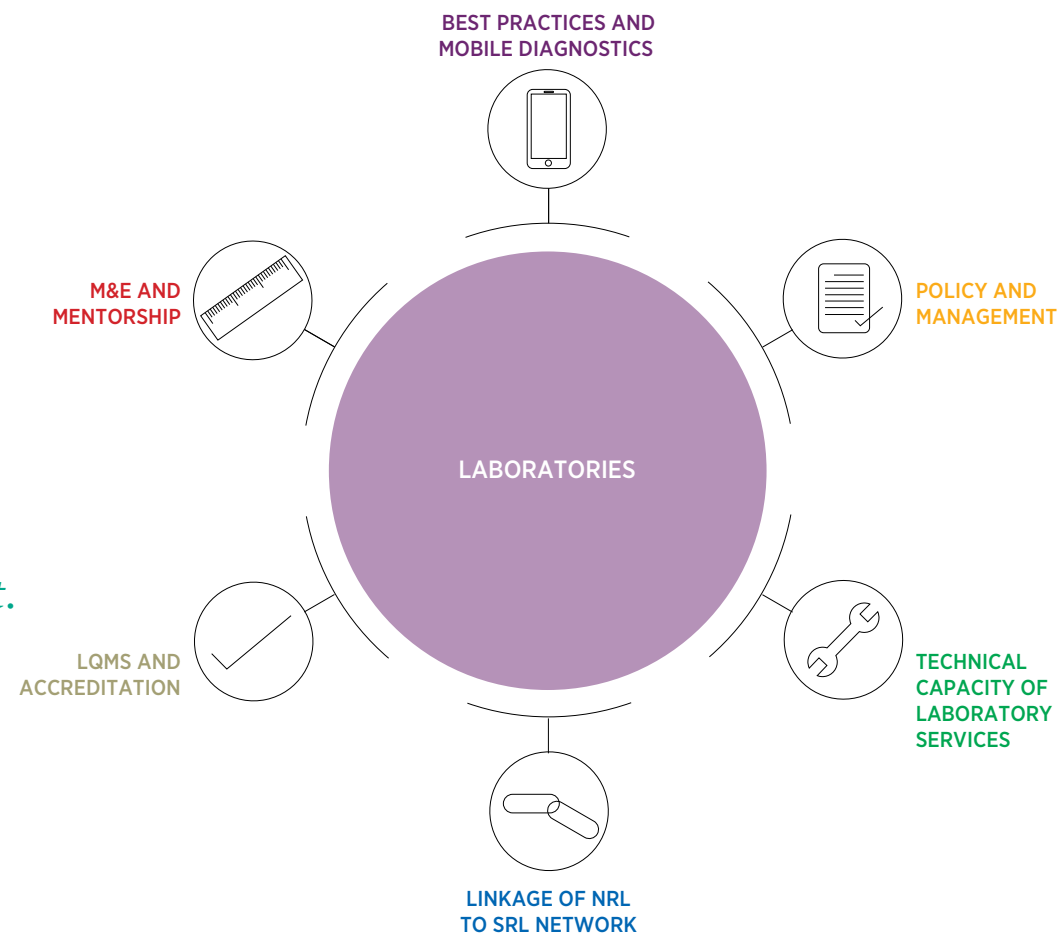
(e.g. GeneXpert scale-up; an innovative specimen transport system that used motorcyclists; a mobile health intervention for self-screening and awareness-raising), were implemented as one package (with some variation in the intervention-specific population coverage in different districts during the life of the project) in 49 CTB-supported districts (out of a total of 196 districts), which might have contributed to the higher case notification rates in these districts as compared with the 147 non-CTB districts.



Increased Access to Diagnosis



Laboratories are one of the most important components of TB management.



Laboratories are one of the most important components of TB management. Biological diagnosis of TB permits more accurate treatment follow-up and determination of treatment success, and drug resistance testing helps to ensure patients are placed on an effective treatment regimen. After a laboratory network assessment defined and conducted by CTB, a tailored, stepwise approach was used to plan activities and perform interventions. Each level of the diagnostics network, starting from the lowest level, was involved in systematically designed interventions.

CTB used a systems approach to strengthening national TB laboratory and diagnostic networks through six major activities: (1) policy and management re-tooling; (2) technical capacity expansion of laboratory services; (3) linking of national TB reference laboratories to WHO supranational reference

laboratory (SRL) networks; (4) strengthening of laboratory systems, leading to potential accreditation; (5) M&E, including a mentorship program for junior laboratory consultants; and (6) establishment of best diagnostic practices (e.g., state-of-the-art demonstration studies of mobile diagnostic technologies, and new technologies such as GeneXpert platforms and their integration with other diseases such as HIV). Over five years, the diagnostic capacity of TB laboratories in CTB countries increased significantly.

83%

OF CTB COUNTRIES HAD NATIONAL LABORATORY STRATEGIC PLANS

SNAPSHOT OF KEY RESULTS

- 83% (20/24) of CTB countries had developed national laboratory strategic plans, with budgets aligned to operational plans, and GeneXpert guidelines, by the end of the program in 2019, compared to only 25% (6/24) at baseline in 2016.
- A total of 990 GeneXpert machines were available in 18 countries in 2015, which increased to 4,561 GeneXpert machines in 23 countries in 2019.
- The percentage of TB cases tested for RR/MDR-TB among bacteriologically confirmed new cases increased from 7% in 2015 to 87% in 2018.

- The number of laboratories performing culture and drug susceptibility testing (DST) almost doubled, from 118 in 2014 to 213 laboratories by 2019. The percentage of laboratories implementing a laboratory quality management system (LQMS) also increased, from 42% in 2014 to 59% by 2019, which is equal to 50 and 126 laboratories, respectively.

- Countries have adapted different connectivity solutions for GeneXpert machines; these vary by country from SMS messages to patients to a complete M&E tool for performance of the machine.

4,561

GENEXPERT MACHINES IN 23 COUNTRIES IN 2019

87%

AMONG BACTERIOLOGICALLY CONFIRMED NEW TB CASES TESTED FOR RR/MDR-TB IN 2018



NATIONAL TB LABORATORY OPERATIONAL PLANS

CTB supported the development of National Laboratory Strategic Plans and associated operational plans. These plans identified priority activities in order to reinforce the laboratory network and facilitated the inclusion of laboratory priorities in TB National Strategic Plans. CTB baseline data showed that only 1 of the 24 supported countries had an operational plan with key targets and budget. They are a critical component for GF concept note writing, as they provide the required gap analyses and structured development plan for capacity building and expansion to increase access to diagnosis for TB and DR-TB. In total, 88% (21/24) of countries (with the exception of Kazakhstan, Turkmenistan, and Zambia) had developed laboratory operational plans by the end of the program,

compared to only 25% (6/24) at baseline. At least 13 of the countries with National Laboratory Strategic Plans had allocated a budget for activities and are implementing the End TB strategy recommendations. Many of them have also developed

a comprehensive GeneXpert operational plan with a budget as part of their National Laboratory Strategic Plans.

88%

OF COUNTRIES HAVE DEVELOPED LABORATORY OPERATIONAL PLANS

13

COUNTRIES WITH PLANS ALLOCATED A BUDGET FOR ACTIVITIES AND ARE IMPLEMENTING END TB STRATEGY RECOMMENDATIONS

XPRT MTB/RIF OPTIMIZATION AND INTEGRATION

Testing for TB and rifampicin (RIF) resistance using the Xpert MTB/RIF assay has been a game changer since its endorsement by WHO in 2010. While it has been rolled out in high-burden countries on a large scale, many challenges remain, including patient accessibility to testing services and the availability of services. Building on the previous support provided under USAID/TB CARE I, which was primarily focused on the initial implementation and roll-out of Xpert testing in high-burden countries, CTB focused on optimizing access to and availability of Xpert testing in 24 countries with a total network of 4,561 machines and 13,133 modules

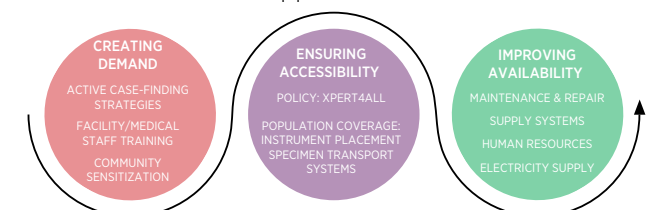
Closely connected to support provided by other partners such as GF, key approaches have been to expand the GeneXpert

laboratory network and increase population access by connecting peripheral and testing sites through a specimen transport system (see next section). CTB worked closely with the NTPs on the coordination of the GeneXpert network assessment in newly supported countries, which helped to identify gaps in GeneXpert implementation. At the same time, substantial efforts were made in countries to improve the functionality of GeneXpert machines and laboratory support systems, including timely instrument service and maintenance, functional cartridge supply systems, human resources management, provision of backup power, installation of air conditioners, orientation of health care workers on national

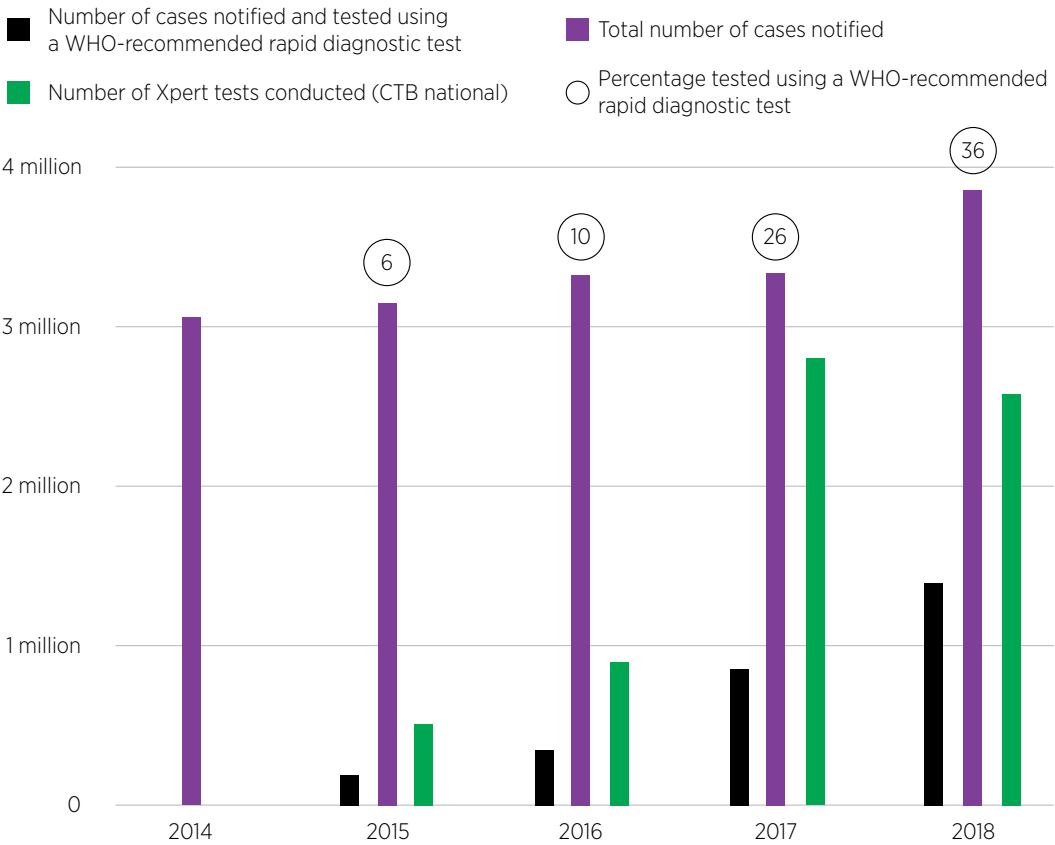
TB diagnostic algorithms, and capacity building for laboratory users on accurate testing. Interactive GIS maps of the locations of GeneXpert machines were also developed (e.g., in Bangladesh, Ethiopia, and Tajikistan). CTB support resulted in the development of a point-of-care and near-point-of-care implementation plan that includes guidance on integrated use of GeneXpert technology for both TB and HIV assays in some countries (e.g., Ethiopia and Zimbabwe).

The pillars of the optimization package intervention are *creating demand*, *ensuring accessibility*, and *improving the availability of testing*. This approach has been implemented in several CTB-supported countries.

Pillars of the optimization package in CTB-supported countries



CASES NOTIFIED AND TESTED USING A WHO-RECOMMENDED RAPID DIAGNOSTIC TEST ACROSS 24 CTB COUNTRIES



Additionally, the project supported NTPs by developing GeneXpert implementation guidelines and operational plans, providing training, and assisting with the shift to Xpert Ultra cartridges in Ukraine and Bangladesh. Tools were translated into local languages where needed. National training of trainers' courses for super users were given to laboratory technicians at the central and provincial levels to support maintenance and calibration of machines; more than 200 staff were trained as super users by Cepheid and CTB experts in Bangladesh, Ethiopia, Malawi,

and Nigeria. CTB country teams negotiated and advocated with Cepheid to establish a regional or national center to facilitate procurement and maintenance support in Bangladesh, Nigeria, and Ethiopia. In Nigeria, a toll-free number was established for super users to facilitate quick support for troubleshooting of GeneXpert platforms across the country. Power outages are another challenge, so CTB invested in strong inverters, UPS, and solar panel systems in GeneXpert sites in Nigeria. Although the level of implementation of the optimization package varies

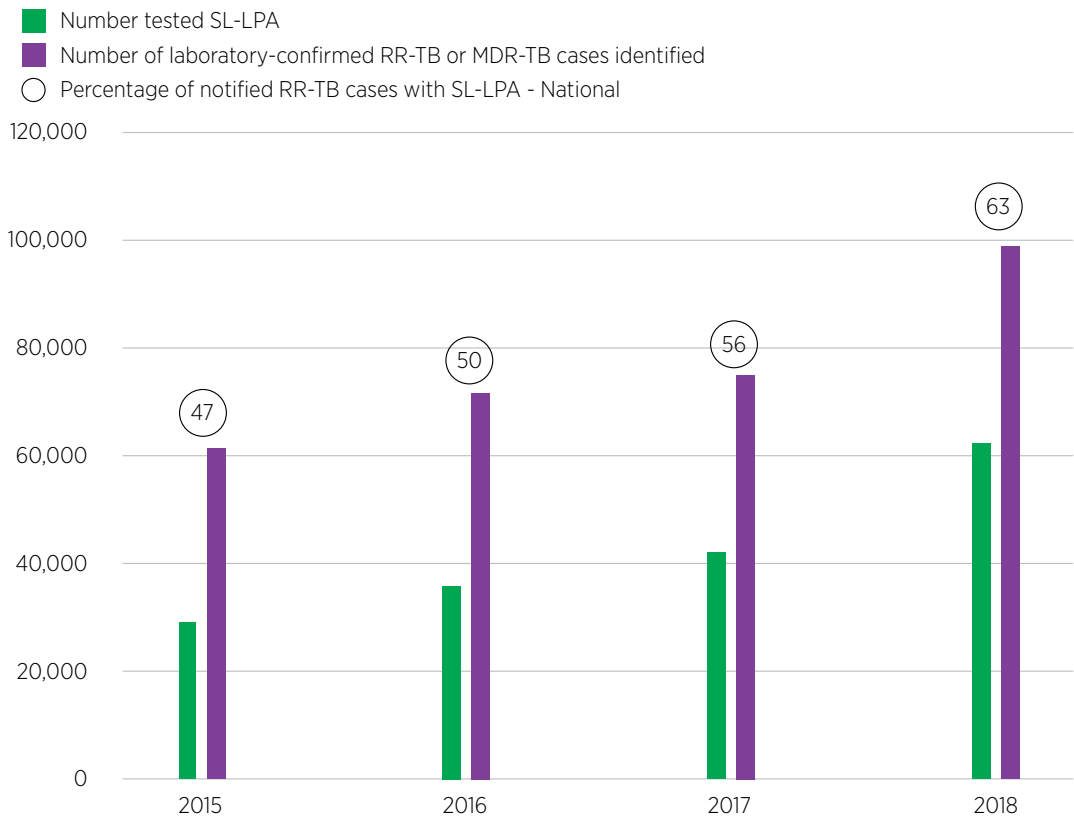
from country to country, its overall impact was a marked increase in the number of people tested for TB and RR-TB. Most countries are implementing WHO recommendations and testing all presumptive cases of TB (e.g., Kazakhstan, Mozambique, Nigeria, Tajikistan, and Zimbabwe). However, some countries have adopted restrictive algorithms based on testing only presumptive MDR-TB cases and PLHIV with presumptive TB, due to GF limitations and lack of domestic funds, which has led to low uptake of testing and decreased the overall utilization rate.

6,805,824

GENEXPERT TESTS CONDUCTED ACROSS 23 COUNTRIES



PROPORTION OF RR-/MDR-TB CASES TESTED WITH SL-LPA
ACROSS 24 CTB COUNTRIES



SCALE-UP OF LINE PROBE
ASSAY

Limited access to rapid WHO-recommended DST for second-line drugs is the one of the major barriers to comprehensive TB treatment. After the WHO endorsement of first-line line probe assay (LPA) in 2008, second-line LPA was recommended by WHO in 2016 to fulfill the demands of the conventional and shorter treatment regimens containing fluoroquinolones and injectable drugs. In brief, second-line LPA detects major mutations in *M. tuberculosis* complex species, associated with resistance to fluoroquinolones and injectable drugs such as kanamycin, capreomycin, amikacin, and ethambutol, with an optimal turnaround time of two days. The sensitivity estimates range from 75% to 80% and specificity estimates range from 91% to 100%. Like first-line LPA, second-line LPA requires

laboratory facilities of at least Biosafety Level 2, a specific set of instruments, dedicated premises, and skilled personnel with a background in molecular biology. CTB dedicated a lot of attention to the introduction of second-line LPA as a routine diagnostic test in order to achieve rapid diagnosis of drug resistance and appropriate treatment initiation. Laboratories experienced in first-line LPA were supported to introduce the new second-line LPA using existing instrument platforms and with upgraded infrastructure where necessary. CTB also emphasized accurate laboratory interpretation, and delivery of the second-line LPA result to clinicians in a format that could be translated into a clinical decision without difficulty. The CTB implementing partners involved in these activities followed the WHO and Global Laboratory Initiative updated recommendations on LPA results interpretation.

At the start of the project, CTB countries had made different levels of progress in implementing second-line LPA. Over the duration of the project, capacity for diagnosis based on second-line LPA increased in all 24 countries. This progress was possible due to the multiple efforts of CTB implementing partners focused on improving LPA laboratories' infrastructure, providing technical assistance, and training laboratory staff and clinicians on second-line LPA use and interpretation. Over the duration of CTB, a steady increase in the number of RR/MDR-TB cases notified by LPA was observed.

LINKING OF NATIONAL TB
REFERENCE LABORATORIES
TO WHO SUPRANATIONAL
REFERENCE LABORATORIES

To ensure that the Uganda SRL continued to deliver quality diagnostics and support, a subaward was signed for the retention of three staff (an SRL manager, laboratory manager, and a microbiologist), which made the transition from CTB support to self-reliance possible. The CTB project supported the SRL through the East Africa grant, which provided technical assistance for the implementation of SOPs in Somalia and continues to provide capacity development

support and quality assurance. The utilization of the SOPs has enhanced biosafety measures in the TB laboratories. A total of 99 laboratories (including 44 GeneXpert and one culture laboratory) across all the regions of Somalia are using the SOPs and implementing national biosafety standards. Phenotypic or culture-based DST remains an integral part of the diagnostic routine and is also the main DST method for the new and repurposed drugs (bedaquiline, delamanid, and clofazimine). It also serves as a backup when LPA becomes

temporarily unavailable or capacity is decreased. Thanks to the activities of CTB in strengthening the capacity of culture/DST laboratories and building collaboration with SRLs on external quality assurance and technical support, the availability of and the access to second-line DST was increased, and DST for the new and repurposed drugs was made available. The recommendations for drug-critical concentrations and clinical breakpoints were also updated following the latest WHO recommendations released in 2018.

99

LABORATORIES ACROSS SOMALIA ARE IMPLEMENTING
BIOSAFETY STANDARDS



Renovated Culture Laboratory in Malawi / Challenge TB



Sample Transport Rider in Mozambique / Mbuto Machili

UPGRADING OF BIOSAFETY AND LABORATORY INFRASTRUCTURE

Biosafety and the overall safety of working conditions in laboratories were priority areas in the CTB laboratory agenda. Improvements in laboratory infrastructure and biosafety are a long-term investment that pays off in terms of personnel safety, protection of the environment, creation of the optimal working conditions for laboratory staff, overall quality improvement, and increased confidence in laboratory results.

Major upgrades of the ventilation and air-conditioning system and the premises was done in Nigeria, Ethiopia and Malawi, to meet the international requirements for Biosafety Level 2/3 and medium- to high-risk laboratories according to the WHO definitions. Laboratory premises in Tashkent City TB dispensary in Uzbekistan were

upgraded to the level of a medium-risk TB laboratory, to be able to provide LPA testing for patients from Tashkent City and the region. A new heating, ventilation, and air-conditioning system was installed, the premises were renovated, and the complete range of equipment to perform LPA testing was procured. The personnel were trained to perform first- and second-line LPA tests and provide interpretations. Intensive technical support was provided to the Osh regional TB laboratory on infrastructure, biosafety, routine work, and administrative procedures.

Another example of interventions focused on the delivery of comprehensive TB diagnostic services to a region with limited infrastructure was the installation of a prefabricated containerized Biosafety Level 3 laboratory in Sylhet Division, Bangladesh.

CTB also supported the three reference laboratories in Malawi, including the upgrade of the National Reference Laboratory, which was essential for the laboratory component of the ongoing drug resistance survey.

880,436

TB SAMPLES TRANSPORTED ACROSS 15 COUNTRIES

LABORATORY QUALITY MANAGEMENT SYSTEM

Implementation of laboratory quality management systems (LQMS) is the one of the strategic goals of the End TB strategy with the target of 100% of culture and LPA laboratories having implemented LQMS by 2025. Over the course of the project, the number of the laboratories performing culture and DST has almost doubled, from 118 in 2014 to 213 laboratories by June 2019. The percentage of the laboratories implementing LQMS has also increased from 42% in 2014 to 59% by 2019, which is equal to 50 and 126 laboratories, respectively.

IMPLEMENTATION OF AN EFFICIENT LABORATORY SPECIMEN TRANSPORT AND RESULTS SYSTEM

A significant number of presumptive DR-TB and TB patients do not have timely access to TB reference laboratories due to limited geographical coverage and uneven distribution of GeneXpert machines. Follow-up culture tests for DR-TB patients on treatment are often delayed or not done at all. CTB implemented a sample transportation intervention to overcome these challenges in 12 supported countries, using different approaches according to country context and stakeholders' involvement.

In Bangladesh and India, CTB provided a sputum transportation SOP to field staff, all community health workers, and patients' caregivers and distributed kits to microscopy centers and GeneXpert sites to strengthen the referral system of specimens at the peripheral sites. CTB supported the cost of transport. In Bangladesh, the transport system was combined with GxAlert software for real-time results feedback to clinicians on all positive TB and RR/MDR-TB cases; the project was later customized, expanded, and supported by local organization BRAC. The GxAlert system is now embedded at the central level (NTP and National TB Reference Laboratory) for monitoring of Xpert testing.



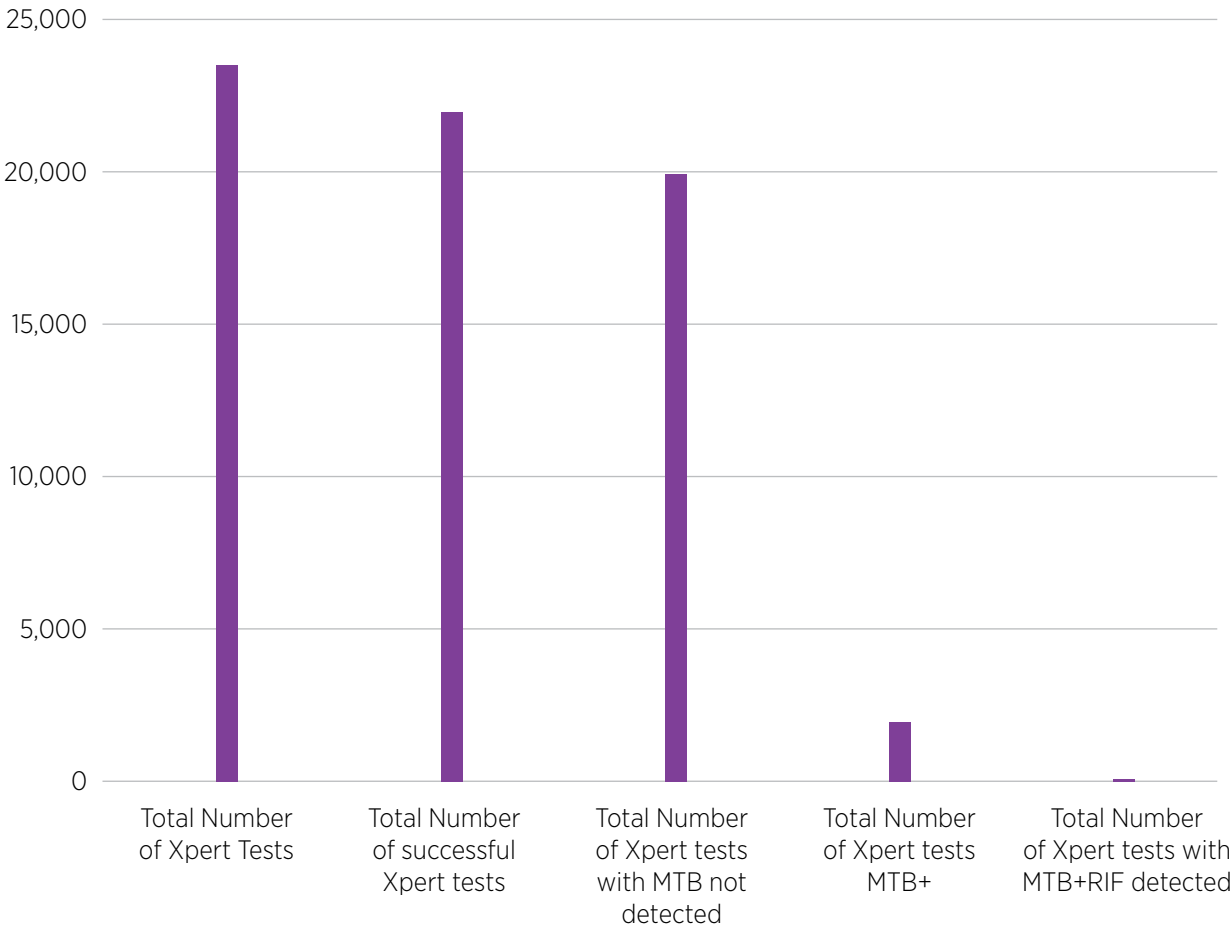
The radiographer showing a client his X-ray in the WoW truck in Nigeria / KNCV

Ethiopia's TB program suffered from a scattered, weak network for referring, collecting, and transporting disease-testing specimens and results, which hindered patient care and follow-up. Samples were often unable to be processed due to a lack of refrigeration. The Ethiopia Public Health Institute, in collaboration with CTB and other partners, developed a guide for a specimen referral system in 2018, based on geographic proximity and availability of the testing service at the nearest laboratory. The specimen transport SOP included guidance for transporting the following: sputum specimens (Xpert MTB/RIF, LPA, culture, and DST), viral load, early infant diagnosis, and CD4. To date, 4,171 (3,843 public and 328 private) health facilities have been networked in the national specimen referral system; referral documents such as recording materials have been printed and distributed; and seven rounds of national and

regional sensitization workshops have been conducted. In Nigeria, through the Global Health Supply Chain-Procurement Supply Management (GHSC-PSM) project, the Nigeria Integrated Specimen Referral Network was implemented in collaboration with all stakeholders included in the CTB-supported regions. The system addressed challenges related to timeliness and quality and improved the efficiency of sample transportation and stock management at all facilities where GeneXpert machines were deployed, and referral of RR/MDR-TB cases for complete DST profile to culture and LPA laboratories. A referral map with identified hubs was developed so that laboratories would be located within reach of all facilities. The aim was to strengthen the laboratory-clinic interface to ensure that at least 95% of all eligible patients on treatment are tested for HIV and

TB (microscopy and GeneXpert sites) and their results are documented in their patient folders to inform clinical care. In Zimbabwe, an integrated national courier system was developed in coordination with all partners. The system has since been handed over to the Ministry of Health and Child Care. Funding of US\$2 million has been secured from GF and PEPFAR to support the integrated specimen transport system after CTB ends.

GeneXpert network monitoring results (cascade) in Zambia, Jan-Apr 2019



DIAGNOSTIC CONNECTIVITY

As countries continue to scale up new rapid diagnostics for TB and focus on improving their reporting systems, TB diagnostic connectivity solutions offer the possibility of reducing result turnaround time, improving linkage to care, and tracking the functioning of diagnostic devices and diagnostic networks. The implementation of these solutions is managerial as well as technical because it requires careful planning so that programmatic priorities and expectations are met.

CTB supported implementation of TB diagnostic connectivity solutions in 10 countries. The implementation of these connectivity solutions focused on connecting GeneXpert machines to make progress toward Indicator 4 of the targets for laboratory strengthening under the End TB Strategy:

By 2020 in 100% of testing sites that use rapid diagnostics a data system has been established that transmits results electronically to clinicians and to an information management system. The majority of countries implemented SystemOne GxAlert as the diagnostic connectivity solution. In other countries, Savics DataToCare, Cepheid C360, or even multiple diagnostic connectivity solutions were implemented. Countries used different means to connect their GeneXpert machines to the diagnostic connectivity solutions, varying from routers with mobile internet, to USB sticks with mobile internet, to use of existing internet access.

Important successes in implementation of diagnostic connectivity solutions have been to enable the monitoring of the GeneXpert network in real time from one central location and the possibility to send results to selected people. For example, a

total of 239 of 285 (83%) Xpert sites have been connected through CTB support in Ethiopia. As of April 30, 2019, a total of 505,536 test results had been reported through GxAlert. And in Zambia, DataToCare had been installed in 144 of 210 sites countrywide and in 93 of 95 sites in CTB areas. A total of 75,081 patients' Xpert results were electronically transmitted to MOHs, clinicians, and patients in real time.



GeneXpert Testing in Nigeria / Tristan Bayly

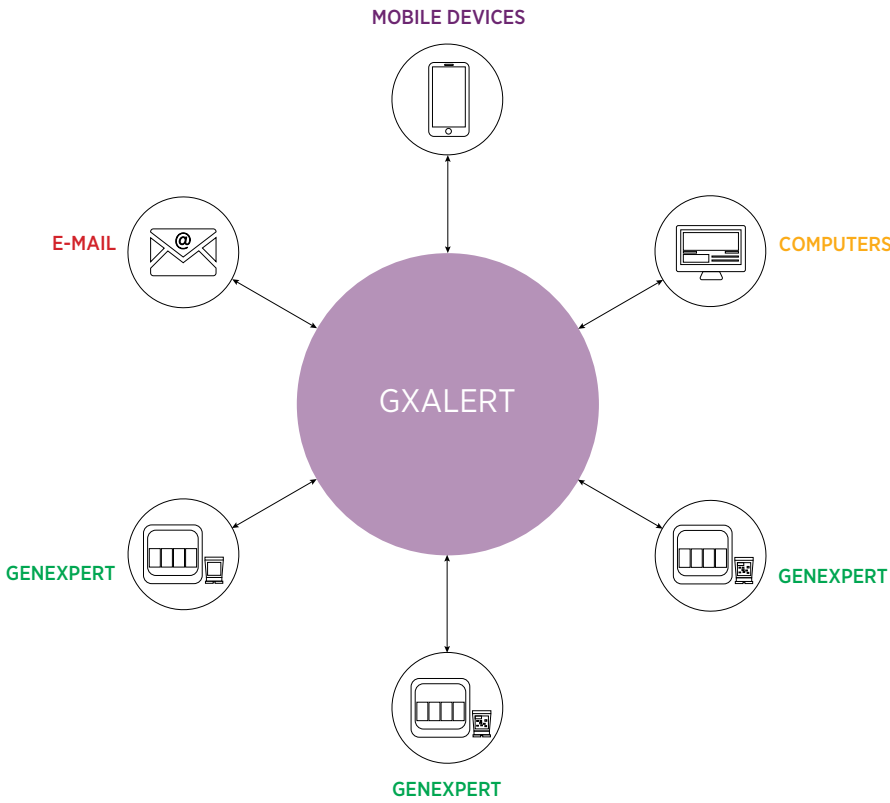
Real-time monitoring supported tracking quality and taking appropriate action on targeted laboratories and laboratory technicians. For instance, targeted technical support was provided to laboratories that showed high error rates for Xpert tests. At those facilities, laboratory technicians received additional training or improvements were made to the laboratory infrastructure. Those interventions led to a reduction in the number of test errors and invalid results. In some CTB countries, notifications from diagnostic connectivity solutions sent via text messages helped clinicians to receive patients' results faster, which led to improved turnaround times and more rapid initiation of treatment. In Bangladesh, GeneXpert data collected through GxAlert showed that most common GeneXpert test

errors were due to incorrect sample processing by laboratory technicians. Continuing analysis helped to realize a downward trend in error rates from 6.1% in 2015 to 2.8% in 2017 as sites gained expertise and supervision was targeted to sites with high error rates.

Information on the use of existing GeneXpert machines also helped NTPs plan for the distribution of additional machines. Data showed that some sites were demonstrating continuously lower utilization of machines while other sites were performing well. This was an important call for action for the NTPs to improve the referral mechanisms of those sites, transfer machines to higher-performing areas, or take other actions to optimize the network.

The number of countries and percentage of GeneXpert machines connected to a connectivity system increased in CTB countries: by the end of June 2019, 15 countries (from a baseline of 5) implemented and reported on diagnostic connectivity systems, with an average of 52% of the GeneXpert machines connected. Four CTB-supported countries reported a 100% connectivity rate: Bangladesh, Burma, Malawi, and Namibia.

TB diagnostic connectivity solutions reduce result turnaround time, improve linkage to care, and track the functioning of diagnostic devices and diagnostic networks.



Connectivity is Essential for Laboratory Management Systems

As part of laboratory strengthening and optimization of GeneXpert machines, real-time availability of quality data for decision-making was crucial, so it was important to introduce and scale up the use of GxAlert to connect all GeneXpert machines to a secure central database via the internet. This automated electronic platform reduces paper-based reporting and the potential for transcription errors and decreases the turnaround time for availability of data from multiple machines in a system.

GxAlert connectivity has a wide range of potential, and countries are using the system for different purposes; the functions and services available from GxAlert include automated messages to patients and/or health care workers, notification of TB and RR/MDR-TB cases to TB coordinators at various levels, an M&E tool for reporting on the performance of the machines using appropriate indicators (utilization, successful tests, errors, invalid tests, and patient's

sex and HIV status). Other indicators in the dashboard are cartridge stock and maintenance and warranty information. The GxAlert dashboard provides real-time information on the performance of each GeneXpert machine, and the TB program uses the data for targeted

supportive supervision and mentoring. See the last example of the GxAlert dashboard below for disaggregated information on causes of error for the GeneXpert machines and subsequent performance improvement after supportive supervision.

100%

OF GENEXPERT MACHINES CONNECTED TO A CONNECTIVITY SYSTEM IN BANGLADESH, BURMA, MALAWI, AND NAMIBIA

505,536

TEST RESULTS REPORTED THROUGH GXALERT IN ETHIOPIA



DIAGNOSTIC CONNECTIVITY RECOMMENDATIONS

Based on the implementation of diagnostic connectivity solutions in ten CTB countries, several recommendations can be made:

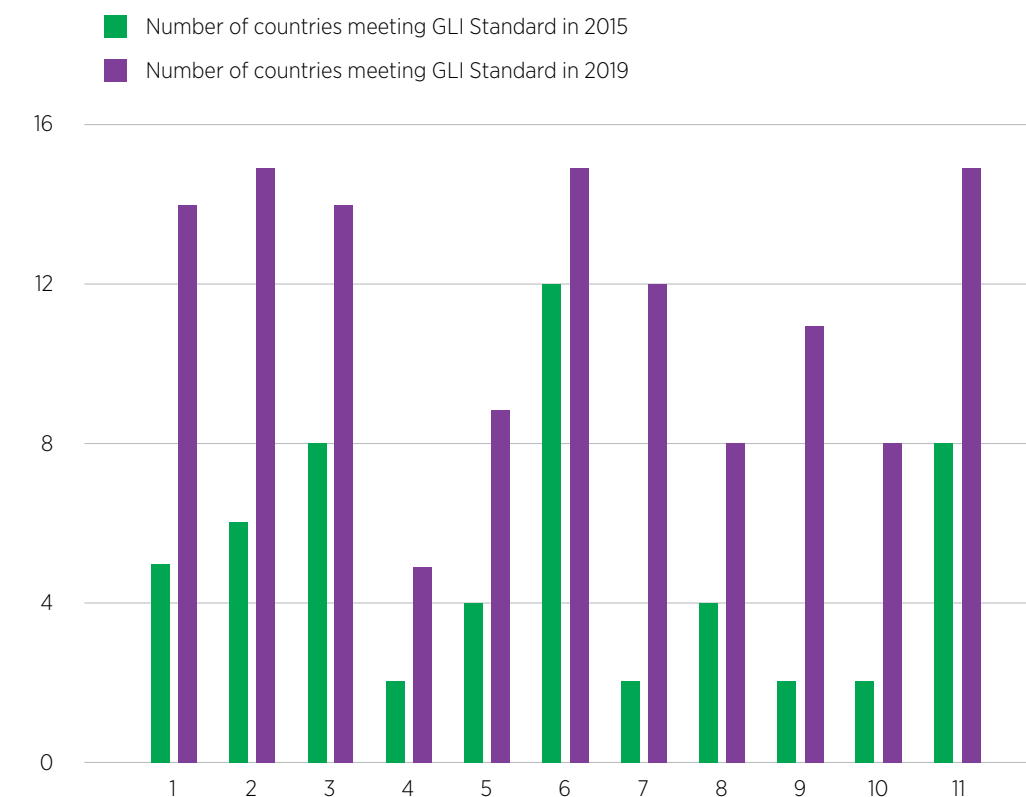
- **Infrastructure:** A large majority of the CTB countries faced challenges to ensure connection from GeneXpert to their diagnostic connectivity solution. Infrastructural requirements should be determined on a country-by-country basis. Appropriate technical support, especially in the first months, is essential to prevent and/or troubleshoot connectivity problems. A more standardized country preparation approach, with support from in-country or remote experts, could streamline guidance on selecting the right infrastructural approach. In addition, the monthly costs related to connectivity should be budgeted and managed.
- **Functionality and capacity building:** The majority of CTB countries are not fully using all the functions of the diagnostic connectivity solutions they have implemented, such as SMS notifications to patients and stock management. Perhaps staff are unaware of or do not have the capacity
- **Integration:** While three CTB countries demonstrated that their diagnostic connectivity solution is linked to a laboratory information system, most countries (> 85%) did not report integration with either patient management systems (e.g., eTB-manager, OpenMRS) or health management information systems (e.g. DHIS 2). Barriers for update and adoption of integration between different (existing) systems need to be further explored, as does the added value of integration of each specific in-country information system. In addition, lack of unique identifiers in several countries leads to difficulties when linking Xpert test results to individual patients.
- **Use of diagnostic connectivity data:** Despite successful installation and scale-up of countrywide diagnostic connectivity solutions, the use of data from these solutions often remains challenging, and the extent to which the diagnostic connectivity

to use these functions, the functions are difficult to use, or some functions are not needed. A first step could be to develop the framework of a standardized training approach, such as the GLI Training Package on Xpert MTB/RIF.

solution is used to monitor their diagnostic (GeneXpert) network differs per country. A standardized set of data elements, indicators, or recommended reports is not yet available. It is therefore recommended to identify a minimum set of data elements/indicators that can help support the monitoring of diagnostic connectivity implementation and the GeneXpert diagnostic network both in-country and at project level.

- **Roles and responsibilities:** High staff turnover and unclear roles and responsibilities also hamper full utilization of diagnostic connectivity solutions. To address this issue, more in-country capacity and ownership needs to be built for diagnostic connectivity solutions. While setting up SOPs and (re)training packages and conducting more frequent supportive supervision visits are useful, improved use of data for decision-making, activity implementation, and sustainability requires leadership at the NTP level. Establishment of a position to manage and oversee the implementation of the diagnostic connectivity system can help support this leadership.

COMPLIANCE WITH 11 GIL-APPROVED TB STANDARDS FOR MICROSCOPY



MICROSCOPY NETWORK

Although AFB microscopy (Ziehl-Neelsen light microscopy and auramine O fluorescent microscopy) is gradually being phased out as a diagnostic test and is being replaced by Xpert MTB/RIF as a first-line test, it continues to play a key role in monitoring of treatment progress and success (also for the differential diagnosis of non-*TB mycobacteria* species). Because of this, it was important to maintain the diagnostic capacity of the microscopy laboratory network, as well as to improve the quality of microscopy at all levels. The GLI's 11 standards for accreditation of an AFB microscopy network (TB Microscopy Network Accreditation: An Assessment Tool, 2013) were established as the indicators for performance monitoring of the microscopy network related to interventions across 20 CTB countries. The GLI standards comprehensively

define the most important criteria for AFB microscopy network optimization. There was steady growth in the number of the countries reporting compliance with GLI standards, with a rapid increase in the second and third years of CTB interventions and support.

RECOMMENDATIONS

- Because a high-quality, well-functioning laboratory network is the hub of the entire TB program, when designing any TB intervention, consider the role of the laboratory. Ensure the engagement of laboratory staff in the entire planning and implementation process, including M&E.
- Laboratories should be at the forefront of innovative approaches to case finding. If they are not involved from the beginning, significant inefficiencies are likely to results, as demonstrated by sample rejection, inadequate

storage, a large number of specimens not tested, excessive workload, or increased turnaround time.

- Access should be the critical determinant in laboratory expansion while avoiding the distractions that optimization, increased utilization, and integration with other diseases—however important—can pose.
- Laboratory commodity management should be integrated into routine TB program laboratory management systems for efficiency and completeness, because TB programs are very advanced in medicines management, with minimal stock-outs, and the reverse is the case for laboratory commodities.



Programmatic Management of Drug-Resistant TB and Introduction of New Drugs and Regimens



MDR-TB Patient Saima in Kyrgyzstan / Marion Biremon



Cured TB patient Muka Kifenge and her children in DR Congo / Thierry Kabengele

The prevention, diagnosis, and treatment of DR-TB depend the functionality of the overall TB program, but especially a well-functioning laboratory network. As a baseline, in 2015, out of the estimated 580,000 people newly eligible for MDR-TB treatment, only 125,000 (20%) were enrolled in treatment, with an estimated 250,000 dying from RR-/MDR-TB due largely to lack of access to effective treatment (WHO 2016). Treatment outcomes were especially poor (55% and 34% for DR-TB and XDR-TB, respectively). In most countries, access to diagnosis of MDR-TB was limited to one or a few centrally located laboratories, using slow culture-based methods, so diagnosis of MDR-TB was delayed and even that only among selected patients at high risk for MDR-TB. Few countries had started decentralizing access to more

rapid molecular tests for at least rifampicin resistance. MDR-TB treatment was accessible to patients in one or a few hospitals only, and the treatment involved combinations of six or seven medicines taken for 20-24 months, including 8 months of painful daily injections with serious side effects, including deafness. Because of weak health system capacity for rapid response to new opportunities, access to STR/ND&R was limited. With significant new opportunities, including new guidelines for both diagnosis and treatment, changes were frequent, so a systematic approach to change was needed.

CHALLENGE TB FOCUS

Improve access to diagnosis and enrollment in care by rapid decentralization from hospital-based to community-based care; decentralization, optimization, and use of specimen transport systems to improve access to first- and second-line DST and culture; introduction and scale-up of the shorter treatment regimen and new drugs and regimens (STR/ND&R); and strengthening of quality of care, including active drug safety monitoring and management (aDSM).

SNAPSHOT OF KEY RESULTS

- The number of DR-TB cases diagnosed increased from 57,994 in 2014 to 99,599 in 2018.
- The number of DR-TB patients enrolled to care increased from 53,426 in 2014 to 82,002 in 2018.
- The STR/ND&R were systematically introduced in 23 countries, with a standard approach for future introduction of new medicines and tools.
- There were promising interim outcomes among patients treated with bedaquiline: 71%

- had negative results at the end of six months (mean TSR of 77%).
- Seventeen CTB-supported countries had DR-TB TSRs above the global average of 56% (60-80%).
- All countries demonstrated improved reporting and utilization of aDSM for quality of care.

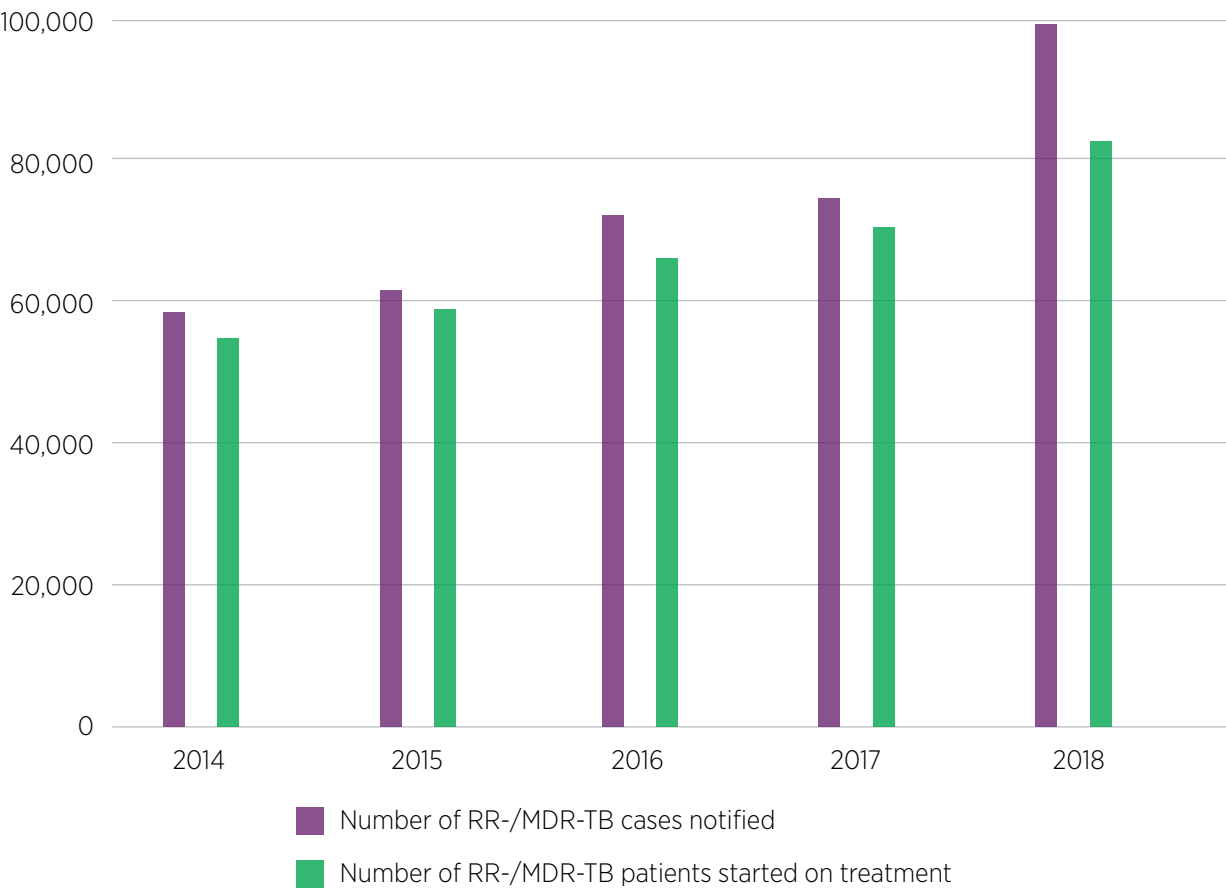
99,599

DR-TB PATIENTS DIAGNOSED IN 2018

82,002

DR-TB PATIENTS ENROLLED TO CARE IN 2018

RR-/MDR-TB CASES NOTIFIED AND PUT ON TREATMENT IN 24 CTB COUNTRIES, 2014-2018



RESULTS AND ACHIEVEMENTS

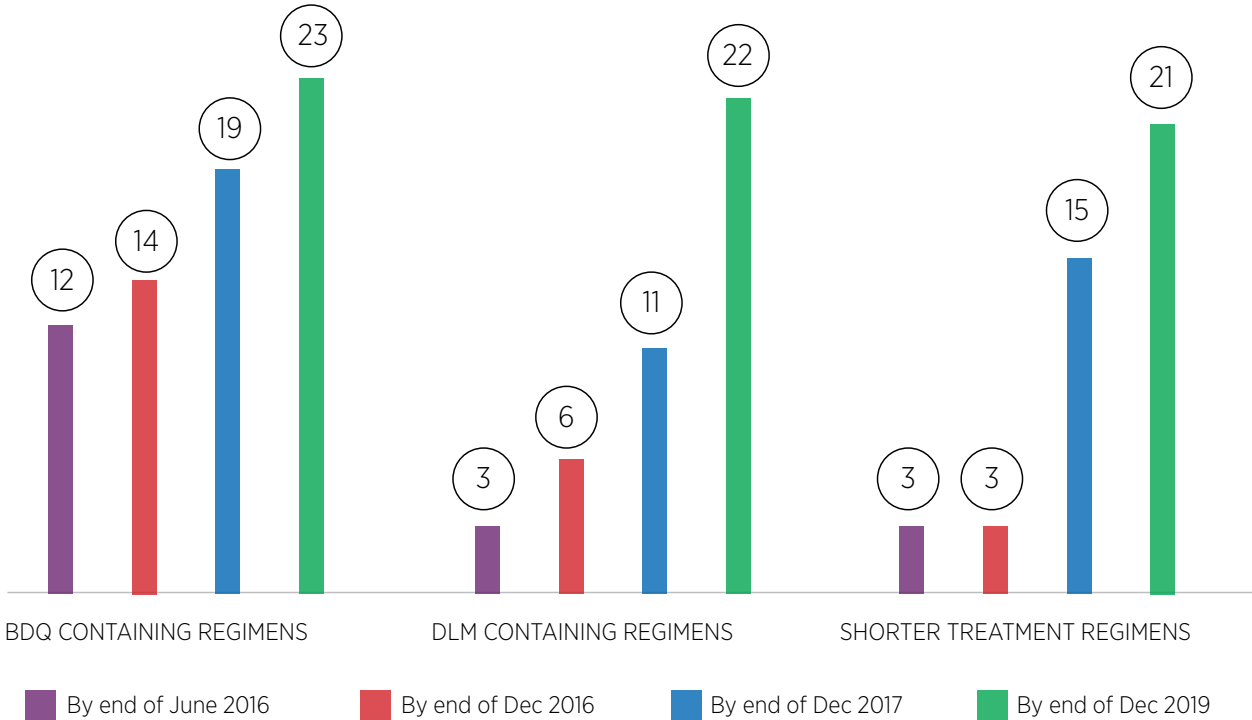
The CTB project, in collaboration with other in-country TB stakeholders, enabled the countries to diagnose 308,735 DR-TB patients and enrolled 275,383 patients (89%) on appropriate regimens. The number of cases diagnosed in 2018 represents a 42% increase compared to the baseline of 2014. Seventeen CTB countries had TSRs above the global average of 56%.

The project's achievements in case finding and better treatment outcomes are attributed to the following combination of interventions: GeneXpert scale-up and optimization, including specimen transportation; decentralization of DR-TB care to communities; strengthened patient support (adherence, social, and auxiliary investigation and care); improved clinical care through supervision and mentoring of clinical field staff; and better use of electronic reporting systems, including GxAlert, for notification and tracking of enrollment of diagnosed patients.

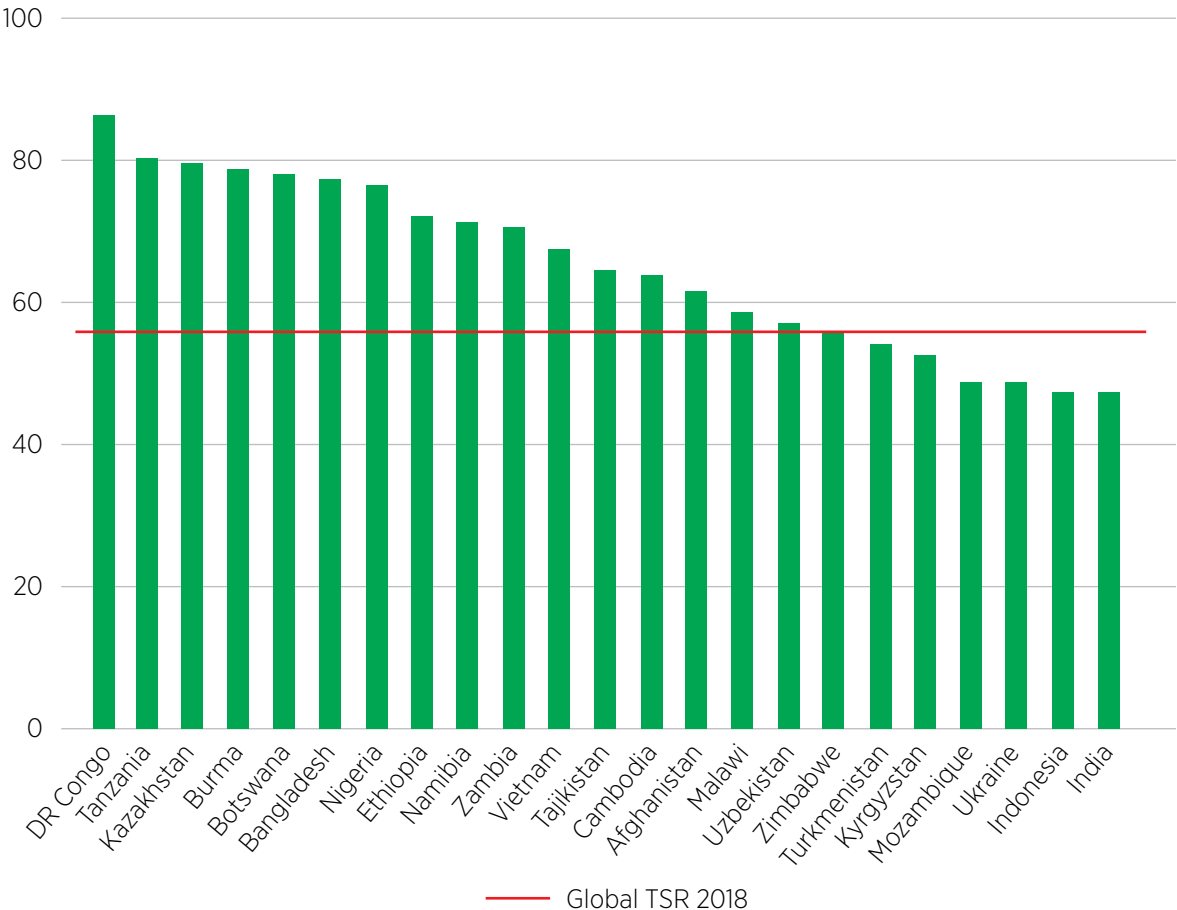
The project successfully facilitated the introduction of the STR/ND&R, in close

collaboration with other partners. As of the end of December 2019, bedaquiline (BDQ), delamanid (DLM), and the STR had been introduced in 23, 22, and 21 countries, respectively. There was a significant increase in the number of patients enrolled in either the STR or an individualized treatment regimen with BDQ and DLM, with overall numbers within three years (2016-2019) of 16,118 patients on the STR, 9,398 on an individualized treatment regimen with BDQ, and 976 on an individualized treatment regimen with DLM.

SCALE-UP OF ND&R ACROSS CTB COUNTRIES



GLOBAL AND COUNTRY-SPECIFIC TSRs AMONG RR-/MDR-TB PATIENTS IN 23 CTB COUNTRIES IN 2018 (2016 COHORT)



Note: Data from South Sudan are not available.

SUMMARY OF PATIENT ENROLLMENT 2016-2019

	ITR-Bdq	ITR-Dlm	STR	ITR-Bdq+Dlm
National number of patients reported as enrolled from Jan to Dec 2016 (# of countries that reported data to CTB)	556 (11 countries)	30 (5 countries)	972 (5 countries)	9 (2 countries)
National number of patients reported as enrolled from Jan to Dec 2017	1,636 (18 countries)	244 (10 countries)	2,380 (16 countries)	36 (4 countries)
National number of patients reported as enrolled from Jan to Dec 2018	4,743 (22 countries)	221 (16 countries)	8,363 (20 countries)	180 (11 countries)
National number of patients reported as enrolled from Jan to June 2019	2,463 (20 countries)	178 (16 countries)	4,403 (18 countries)	193 (9 countries)

Interim treatment outcomes from patients treated with a BDQ-containing regimen show promising results, with 71% having a negative culture at the end of six months of treatment. Final treatment outcomes for the 2016 cohort of patients show a success rate of around 60%. Considering that at the beginning of the introduction of BDQ, most patients that qualified for treatment with BDQ were patients with either extensive patterns of resistance, including XDR-TB and/or advanced disease, with a global success rate of less than 35%, the reported achievements should be seen as a major success.

High TSRs (range 67-89%, mean 77%) were reported from seven countries (Burma, Cambodia, DRC, Kyrgyzstan, Namibia, Tajikistan, and Zambia) on 1,084 patients enrolled on the STR in 2017. This is a significant improvement on the globally

reported success rate of 55% for MDR-TB patients. However, the results observed in Indonesia have not been as good, with only 51% success. A very high lost-to-follow-up rate of 24.3% and a death rate of 14.3% were reported, the causes of which urgently need further analysis while solutions are found to bring these rates down.

The introduction of aDSM has gone hand-in-hand with the introduction of ND&R in CTB-supported countries. An increasing number of countries where ND&R have been introduced with CTB support are reporting serious adverse events: In 2016, 105 serious adverse events were reported in patients being treated with ITR-BDQ from 5 countries. By the end of 2018, 536 serious adverse events had been reported from 18 countries.

ITR-BDQ FINAL TREATMENT OUTCOME RESULTS FOR DR-TB PATIENTS ENROLLED IN 2016

Country	Number of Patients Enrolled in Treatment	Final Treatment Outcomes											
		Cured		Treatment completed		Treatment failed		Died		Lost to follow-up		Still on treatment	
		#	%	#	%	#	%	#	%	#	%	#	%
Burma	12	5	42%	2	17%	0	0%	4	33%	1	8%	0	0%
DRC	18	0	0%	7	39%	0	0%	11	61%	0	0%	0	0%
Indonesia	43	25	58%	3	7%	8	19%	4	9%	3	7%	0	0%
Tajikistan	12	8	66.7%	0	0%	2	16.7%	1	8.3%	0	0	1	1
Total	85	38	44.7%	12	14.1%	10	11.8%	20	23.5%	4	4.7%	1	1.2%

ITR-BDQ INTERIM TREATMENT OUTCOME RESULTS (AT THE END OF 6 MONTHS OF TREATMENT) FOR DR-TB PATIENTS ENROLLED IN TREATMENT FROM JANUARY 2017 TO JUNE 2018

Country		Number of Patients Enrolled in Treatment ^a	Interim Treatment Outcomes					
			Culture negative at 6 months ^b		Died by 6 months		Lost to follow-up by 6 months	
			#	%	#	%	#	%
2017	Afghanistan	2	2	100%	0	0%	0	0%
	Burma	11	9	82%	1	9%	0	0%
	Cambodia	2	2	100%	0	0%	0	0%
	DRC	23	19	83%	4	17%	0	0%
	Ethiopia (ALERT Hospital Centre only)	9	8	88.9%	1	11.1%	0	0%
	Indonesia	163	70	43%	20	12%	35	22%
	Kyrgyzstan	60	53	88%	3	5%	6	10%
	Mozambique (CTB-supported areas)	1	1	100%	0	0%	0	0%
	Nigeria (12 CTB-supported states)	3	3	100%	0	0%	0	0%
	Tajikistan	46	40	87%	3	6.5%	1	2.2%
	Ukraine	46	42	91%	0	0%	3	7%
	Total	366	249	68%	32	8.7%	45	12.3%
2018 (Jan-June)	Afghanistan	6	4	66.6%	1	16.7%	1	16.7%
	Burma	45	34	76%	9	20%	2	4%
	Cambodia	8	6	75%	2	25%	0	0%
	DRC	6	5	83%	1	17%	0	0%
	Ethiopia (ALERT Hospital Centre only)	4	4	100%	0	0%	0	0%
	Indonesia	100	43	43%	13	13%	8	8%
	Kazakhstan CTB	75	67	89%	3	4%	2	2.7%
	Mozambique (CTB-supported areas)	3	2	67%	0	0%	0	0%
	Nigeria (12 CTB-supported states)	22	10	45%	9	41%	0	0%
	Tajikistan	63	54	85.7%	3	4.8%	0	0%
	Ukraine	81	78	96%	2	2%	0	0%
	Total	413	307	74.3%	43	10.4%	13	3.1%
Combined Totals		779	556	71.4%	75	9.6%	58	7.4%

a. Only laboratory-confirmed RR-TB, MDR-TB, pre-XDR-TB and XDR-TB cases patients who started treatment are to be counted for the reporting of interim treatment outcome results. When calculating the proportion of cases with negative culture by 6 months, all patients started on treatment remain in the denominator, including patients who have died or were lost to follow-up before the end of 6 months of treatment. If a patient is lost to follow-up and then dies before the end of the 6th month of treatment, then the result retained will be “Lost to follow-up,” having been the first outcome reported.

b. Based on the result of the last culture performed and available after the patient has completed 6 months of treatment.

STR FINAL TREATMENT OUTCOME RESULTS FOR DR-TB PATIENTS ENROLLED FROM JANUARY 2016 TO DECEMBER 2017

	Country	Number of Patients Enrolled in Treatment	Final Treatment Outcomes											
			Cured		Treatment completed		Treatment failed		Died		Lost to follow-up		Not evaluated	
			#	%	#	%	#	%	#	%	#	%	#	%
2016	Tajikistan	1	1	100%	0	0%	0	0%	0	0%	0	0%	0	0%
	Total	1	1	100%	0	0%	0	0%	0	0%	0	0%	0	0%
	Burma	15	11	73%	0	0%	0	0%	1	6.7%	0	0%	3	20%
2017	Cambodia	9	8	89%	0	0%	0	0%	0	0%	0	0%	1	11%
	Indonesia*	230	93	40.4%	19	8.3%	16	7%	33	14.3%	56	24.3%	3	1.3%
	Namibia	3	3	100%	0	0%	0	0%	0	0%	0	0%	0	0%
	Tajikistan	61	39	64%	8	13.1%	8	13.1%	0	0%	6	9.8%	0	0%
	Total	318	154	48%	27	9%	24	8%	34	11%	62	19%	7	2%

* 10 patients (4.3%) are still on treatment in Indonesia



APPROACH AND INTERVENTIONS LEADING TO RESULTS

The support mechanisms for programmatic management of DR-TB (PMDT), including the introduction of the STR/ND&R at country level, were conducted by several partners. To ensure standardization and nationwide scale, CTB used a comprehensive approach, with coordination of partners as the key pillar of the support. An engagement process supported the development of generic tools, guidelines, and capacity development materials.

Clinical care, advocacy, and M&E for quality improvement were other major components of the support package.

By the end of CTB, ND&R had been successfully implemented under programmatic conditions in all 23 CTB-supported countries. Although it took up to two years for initial introduction, further expansion was generally rapid. Treatment sites and numbers of patients benefiting from ND&R increased significantly. With good planning, stepwise introduction, and close monitoring, ND&R can

be introduced and scaled up in different settings with good outcomes. The lessons learned can be replicated for the introduction of newer treatment regimens (e.g., BPaL: BDQ plus pretomanid and linezolid) that are expected in the near future. Countries will, however, require continued technical assistance not only to introduce their previously developed ambitious nationwide ND&R expansion plans, but also to support them to transition and align with WHO's updated guidelines for the treatment of DR-TB released in March 2019.

TECHNICAL DOCUMENTS, JOB AIDS, AND IMPLEMENTATION TOOLS AND THEIR APPLICATION

During the project period, the following types of technical documents, job aids, and implementation tools were developed to support countries to introduce ND&R, and many were translated into several languages:

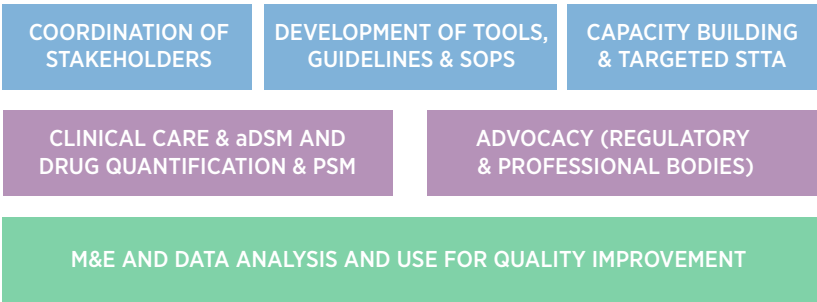
- Implementation planning tool, guidance documents and a

generic programmatic and clinical guide to facilitate the introduction of ND&R

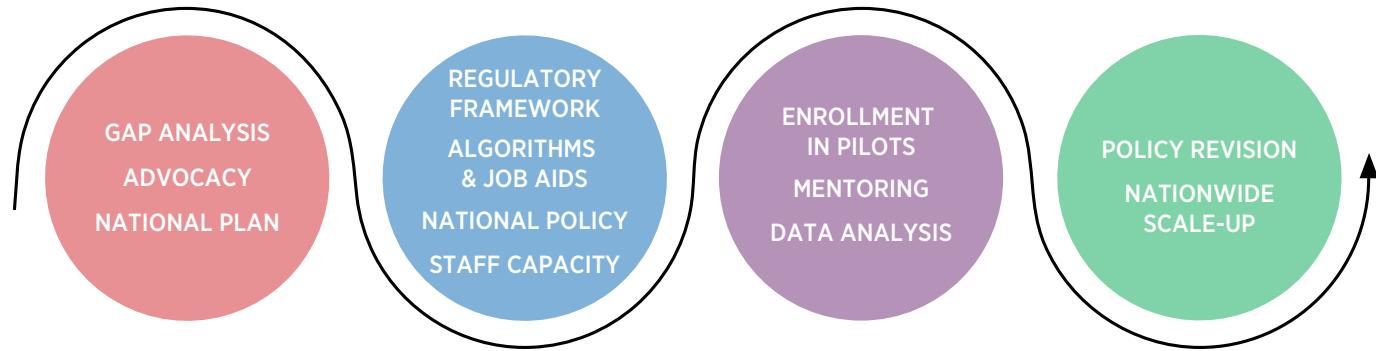
- Guidance documents on electrocardiograms (with management algorithm) and audiometry
- Job aids on the diagnostic algorithm, including interpretation of laboratory DST results for both genotypic and phenotypic tests as well as drug dosages for adults and children, ECG reading, audiometry and a treatment algorithm for HIV patients

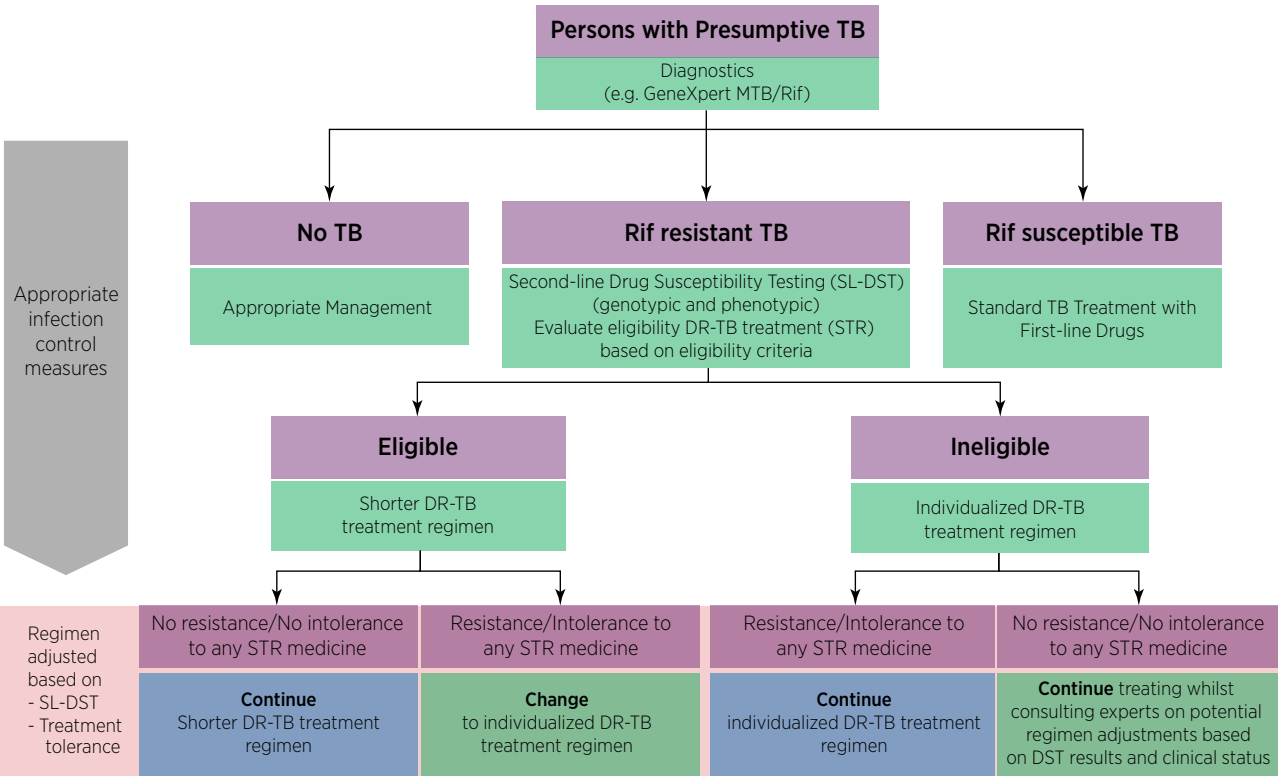
- Information note for patient organizations to support treatment adherence and monitoring of adverse events
- Bedaquiline dosage charts for nurses and patients
- Fact sheet on the introduction of aDSM for SLDs and ND&R in CTB countries (including most common adverse events and their management)
- DR-TB Patients' Clinical Management: Quality Improvement Tool

COMPREHENSIVE APPROACH TO PMDT



STEPS AND PROCESSES FOR PMDT AND STR/ND&R STRENGTHENING AT COUNTRY LEVEL





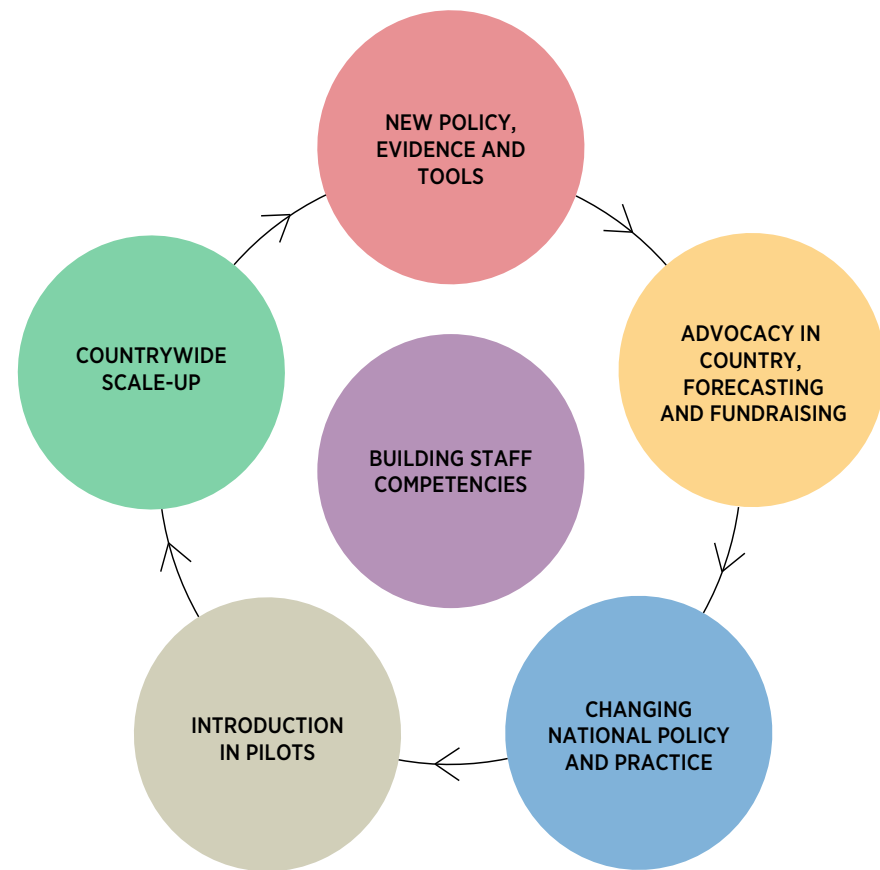
IMPLEMENTATION PLANNING TOOL

CTB developed an implementation planning tool to assist countries in creating a stepwise approach for the programmatic introduction of ND&R. The tool covered gathering political support, adapting national strategic plans, selecting and preparing the sites where the ND&R would first be rolled out, enrolling patients, and conducting M&E. Technical support was provided for updating national guidelines, and the “right diagnosis, right treatment” triage approach was introduced.

Once triaged, patients are either allocated to receive the STR or an individualized treatment regimen containing BDQ and/or DLM. CTB staff joined national technical working groups on TB and MDR-TB. The project supported NTPs to develop national guidelines and policy documents, SOPs, training materials, job aids, and reporting forms. In the Central Asian Republics and Ukraine, CTB strengthened the existing expert groups (“conciliums”), and in other countries, helped NTPs to establish and run such expert groups.



MDR-TB nurse in Kyrgyzstan / Maxime Fossat



REGISTRATION OF DRUGS AND QUANTIFICATION OF NEEDS

CTB assisted in the registration of the drugs with the national regulatory authorities in some countries and helped secure waivers for importation of the respective drugs in other countries. BDQ and DLM had to be registered for the first time in CTB countries, and certain drugs in the STR (e.g., clofazimine) had to be registered for a new use (it was previously authorized for use in patients with leprosy). Other countries allowed the drugs to be used only in research institutes until the registration process was completed. Quantification of drugs needs were done based on the number of sites and number of expected patients for each regimen. In some countries, a supply chain management specialist was embedded in the MOH. Technical assistance was

also provided in the introduction and use of drug quantification tools, where possible in collaboration with the Global TB Drug Facility.

CAPACITY BUILDING OF MEDICAL STAFF

CTB supported numerous trainings of clinicians and health care personnel on ND&R. International experts also provided short-term technical assistance (STTA) when needed. To streamline the trainings, CTB created a set of generic training modules for the introduction of ND&R, as well as job aids, treatment algorithms, and technical guidance documents, as described above. A package of generic ND&R training materials was developed in 2018. The curriculum includes presentations and a facilitators' guide on PMDT, including diagnostics, treatment and care, supply chain, M&E, and interim cohort analysis, and was

upgraded for the use of all staff in NTPs and other organizations. A quality improvement tool was also developed to ensure good quality of patient care in all treatment sites. Staff working on M&E also benefited from technical support, including training on cohort analyses.

ACTIVE DRUG SAFETY MONITORING AND MANAGEMENT

A fundamental component of PMDT, aDSM is defined as the active and systematic clinical and laboratory assessment of patients on treatment with new TB medicines, novel MDR-TB regimens, or XDR-TB regimens to detect, manage, and report suspected or confirmed drug toxicities. CTB provided trainings and technical assistance on how to develop national and implement aDSM guidelines and policies. CTB also purchased audiometers and electrocardiogram machines and organized trainings on how to use them, interpret their results, and adjust treatment if needed. CTB also assisted the respective national pharmacovigilance bodies in reporting severe adverse events to the Global Drug Facility and the WHO Collaborating Centre for International Drug Monitoring, Uppsala, Sweden.

RECOMMENDATIONS

- Early engagement of in-country regulatory and professional bodies by the NTP/MOH is an essential step in the introduction of new tools and medicines to avoid delays. Global approval of tools and medicines is only one step in the process of in-country registration and usage in many countries and the agencies are mostly independent of the MOH.
- Professional colleagues at country level need to be supported to correctly use “conditional recommendation and weak evidence” by WHO. This can be achieved through advocacy, training, and dialogue.
- The TB program is a like a “spider web” in that introduction or strengthening of any element cannot be done alone; it has to be guided by the entire patient pathway and the complex relationships

among different components of TB programs, from community demand creation to laboratory strengthening, quality of care, procurement and logistics, and overall M&E and surveillance. For example, increased case finding for DR-TB can take place only if there is increased TB case finding in general, which depends on all the factors stated above.

- Considering the frequent evidence-based changes and introduction of new tools into the TB environment, which represent new opportunities, it is essential to develop a robust mechanism and generic processes to accommodate changes in field settings, including an adequate capacity-building package for NTPs to manage change.
- By strengthening the health systems in countries the NTPs are empowered to adopt and adapt new innovations better (and faster).





MDR-TB patient Neha Suve in India / PATH

Case Study: A “test-and-refer” model of care for DR-TB cases in the Mumbai private sector in India

Through CTB core funding, PATH established a test-and-refer model of care for DR-TB cases in the Mumbai private sector from 2016 to 2018. The project engaged 137 providers in the implementation area who catered to more than 80% of the TB patients in the city, allowing the project to access a higher number of DR-TB presumptive cases. All the presumptive cases received Xpert testing and those diagnosed with RR-TB were included in the project, leading to an improvement in the number of microbiologically diagnosed DR-TB cases.

By providing the diagnosed RR-TB patients with all pre-treatment tests under a single roof as well as individualized follow-up, the total time required to initiate the RR-TB patients on treatment decreased significantly, to an average of 13 days from the date of diagnosis as compared to 20 days in the

non-intervention geographic areas.

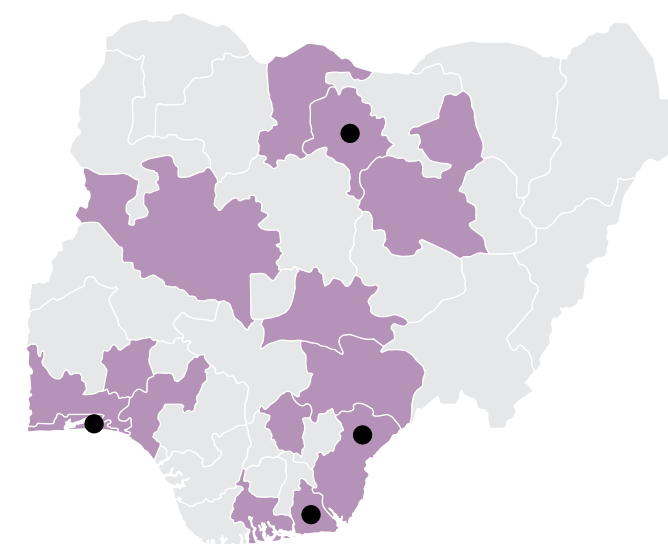
The project also ensured access to standardized, high-quality treatment by providing the RR-TB diagnosed patients with DST and linking them to the public sector for treatment, which reduced the patients’ out-of-pocket expenditures and encouraged adherence. The adherence support provided by the project staff also ensured that patients continued treatment, by linking them to nearby treatment centers on as well as to different states through coordination with the Revised National TB Control Program. The information gained through this project about the TB burden, especially the DR-TB burden, in the implementation geography aided the public sector in understanding the actual burden in the community.

Peer group support meetings also improved treatment

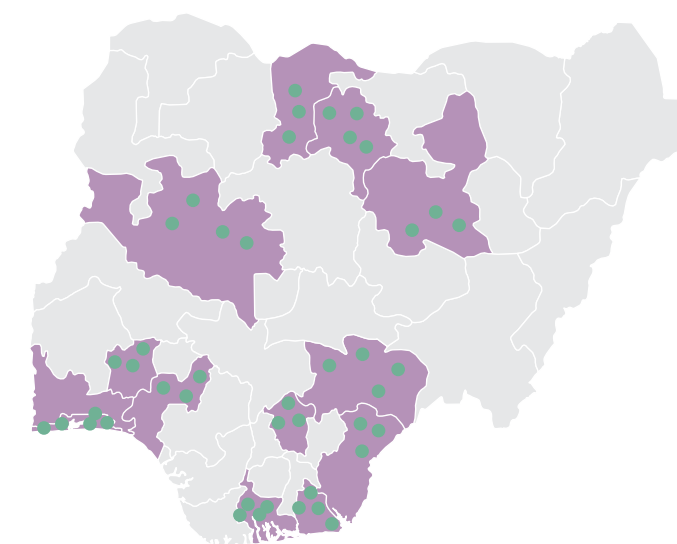
adherence and were well received by the public sector, leading to the government’s including these activities in its annual budget for TB programs, thereby sustaining the intervention.

During the transition of the Private Provider Interface Agency to the Patient Provider Support Agency, the project supported the forecasting of the required logistics for inclusion of private-sector patient testing and treatment in the public sector. CTB provided technical assistance to the public sector for transitioning the services as well as optimizing the uptake of the services in the public sector.

At the conclusion of the project, the test-and-refer model was established for the private-sector patients and transitioned to the Global Health Security Agenda project, where it is currently being implemented.



DR-TB treatment centers at the inception of the CTB project in Nigeria



Decentralized DR-TB OPD clinics under the CTB project in Nigeria

Case Study: Decentralization of PMDT care and treatment in Nigeria

PMDT began in 2010 in Nigeria. The initial policy of the National Tuberculosis & Leprosy Control Programme (NTBLCP) of admitting all DR-TB patients during the four-month intensive phase of treatment to ensure quality care created challenges, however: huge number of patients on the waiting list due to limited bed space; difficulties in accessing treatment due to long distances; and separation of patients from their families and means of livelihood. The rapid scale-up and installation of GeneXpert machines also increased the number of diagnosed RR/MDR-TB patients. These challenges resulted in many patients refusing treatment—hence the need to decentralize PMDT services and move them closer to patients.

At the start of CTB in 2015, there were only 4 DR-TB treatment facilities across the 12 states of

geographical coverage, as shown in the left-hand map below. In addressing the challenges above, CTB, in collaboration with the NTBLCP and other implementing partners, established 43 decentralized DR-TB outpatient department clinics (OPDs) across the 12 states, as shown in the right-hand map. Furthermore, by 2016 CTB and implementing partners facilitated the implementation of the STR/ND&R, including aDSM to support DR-TB patients’ adherence and treatment completion. This achievement was made possible through capacity building of state DR-TB teams, clinicians, and health care workers; and review and distribution of guidelines, SOPs, and national recording and reporting tools. Through the decentralized approach to DR-TB treatment across 12 CTB geographical coverage areas, a total of 3,395 patients were notified, and 2,987 were enrolled

on treatment. By the end of the project in 2019, DR-TB patients’ treatment enrollment had improved from 65% to 88%, while the number of patients initiated on treatment in the community at decentralized OPD clinics had increased from 61% in 2018 to 76% in 2019.



Case Study: Better Care in Kyrgyzstan

The CTB case management model decreased the rate of loss to follow-up from 23% in 2016 to 15% on the STR (2017 cohort) and 3% on the individualized treatment regimen (January–March 2017 cohort). All patients were regularly consulted, checked for side effects, and provided with social, psychological and legal help when needed. CTB published a guide for patients with MDR/XDR-TB to educate them and their families on the disease and treatment and to help them complete treatment. CTB also successfully developed a digital platform to help case managers register information on patients, contacts, visits, and adverse events. This helped them efficiently monitor treatment, support patients, and check household contacts for possible TB symptoms.

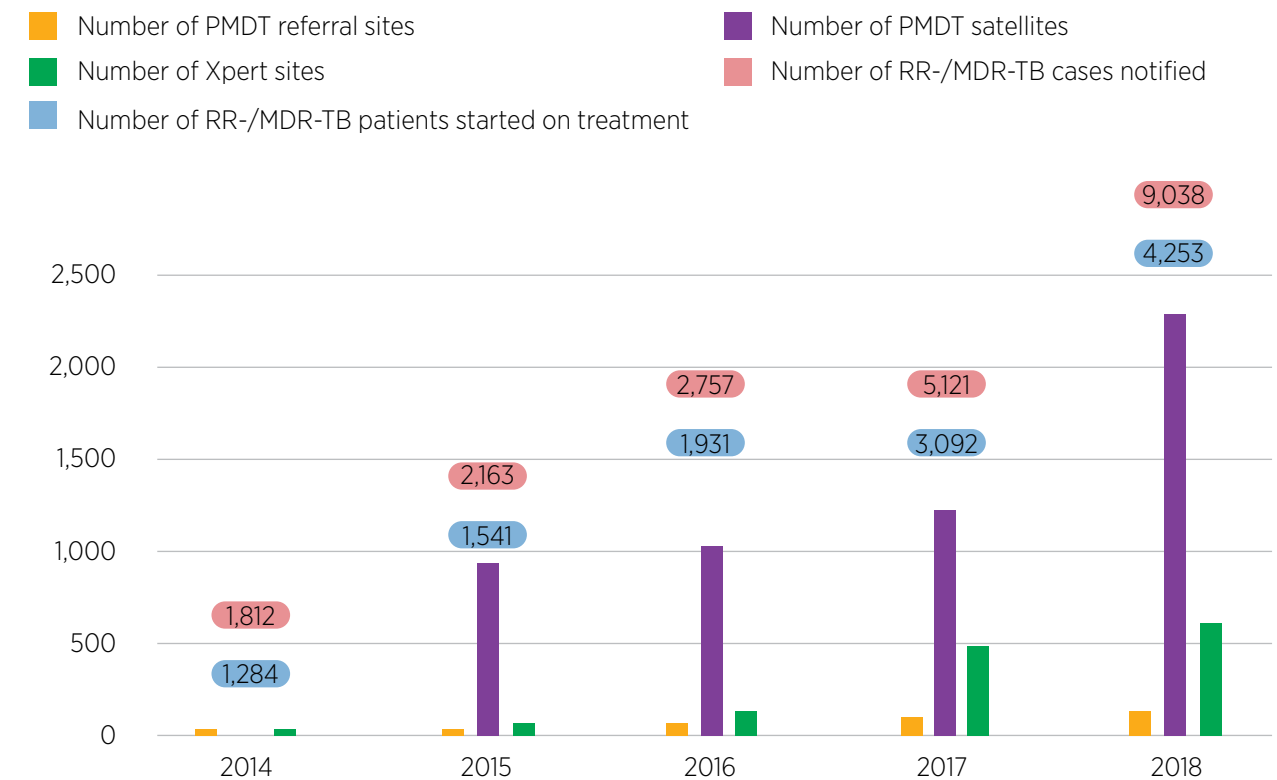
For patients in difficult situations (e.g., patients with co-infections, severe health conditions, financial difficulties, patients living far from the health facilities, or who had to go to work), the project offered two solutions: treatment supporters, who brought the medicines to patients' homes every day, or video-observed treatment, which allowed patients to take their pills at home. The latter method was novel to the country, and with the approval of the MOH, was expanded to all regions less than a year after the pilot.



Syuta (above left) and her three brothers lost their mother to XDR-TB. At the time there were no drugs available to save her. Now their grandmother has to take care of them. The introduction of BDQ and DLM halted the growing trend in people dying from MDR-TB in Kyrgyzstan.

3%

LOSS TO FOLLOW UP ON ITR DOWN FROM 23%
ON STANDARD TREATMENT



Case Study: Expansion of the DR-TB diagnosis and treatment network in Indonesia

At the start of CTB, Indonesia lagged in the identification and treatment of DR-TB, enrolling only 1,284 (19%) of an estimated 6,700 MDR-TB patients among all notified patients. CTB contributed significantly to the nationwide increase of 77% in overall TB notification (from 320,000 in 2015 to 568,000 in 2018) and diagnosis and treatment of DR-TB, increasing enrollment from 1,284 in 2014 to 5,850 in 2019.

The CTB project supported rapid scale-up of diagnosis of DR-TB by providing technical assistance for planning and implementation of laboratory network strengthening and expansion and by introducing technological innovations. The numbers of laboratories with capacity for conventional and liquid culture increased (from 11 to 21) quality-assured first-and second-line DST increased (from 5 to 11); and Xpert MTB/RIF testing was

introduced and scaled up, with subsequent transition to Xpert Ultra and the introduction of LPA in 7 sites for second-line TB drugs for DR-TB patient triage. GeneXpert expansion, from 40 to 791 sites with both GF and domestic resources, resulted in a rapid increase in the number of DR-TB patients diagnosed. At the same time, CTB supported the NTP with the updating of guidelines and SOPs and the development of standards for the management of DR-TB, in support of scale-up of DR-TB treatment capacity. The number of DR-TB treatment sites increased from 36 to 192, and the initiation of decentralized provision of treatment resulted in establishment of 2,346 treatment satellites by 2019.

To match the increase in diagnosis of DR-TB, CTB introduced the patient triage approach and the STR/ND&R, including aDSM.

During the rapid scale-up of DR-TB treatment capacity, maintaining and restoring quality of care was a great concern; therefore, the project developed several quality improvement tools for use at DR-TB treatment facilities and at the district level. Among these was the monthly interim cohort analysis, which in CTB-supported areas dramatically reduced the number of people lost to follow-up. A PMDT benchmarking tool and regular clinical audits also contributed to quality of care. While more people now have access to diagnosis and treatment of DR-TB in Indonesia, the treatment results are still below the targeted 80% TSR, so more efforts are needed, especially for the management of adverse events and the patient-centered organization of care, to prevent loss to follow-up and enable patients to adhere to treatment until cure.



SUCCESS STORY: MAKSUDA



“During my treatment, I made a mistake that almost cost me my life,” says 31-year-old Maksuda from Sharora, a village about 20km from Dushanbe, the capital of Tajikistan.

In 2017, six months after her fifth child Majid was born, Maksuda was feeling weak, her appetite had gone, and she burned with fever. She sought medical help and was quickly diagnosed with TB. She decided to be treated as an outpatient, so her doctors said that she should stay away from her family, who had all tested negative. “I was put on treatment, and my children all moved in with their grandparents who lived nearby. I was living in my house alone and feeling lonely. On my second month of treatment, I felt better, and wanted to be back with my family” recalls Maksuda.

“Doctors told me over and over again, about the importance of finishing the course. I assured them that I was taking pills, but in reality, I wasn’t,” she explains with a deep sigh. Her family moved back in, and their normal life resumed.

She thought that she had managed to trick the TB doctors,

but later she realized that she had just been deceiving herself and putting her family at risk.

Exactly one year later, the TB was back, and this time Maksuda was diagnosed with drug-resistant TB.

“I finally realized how dangerous TB is, especially when you stop taking your medication,” she admits, her voice trembling.

It was at this time that Challenge TB was introducing a new shorter treatment regimen to treat patients with drug-resistant TB in the city of Gissar. This new regimen splits the treatment time in half, and it couldn’t have arrived at a better time for Maksuda.

The new treatment only takes 9 months instead of 24, but make no mistake this is no easy ride. The side effects of the 14 different daily pills took their toll on Maksuda.

Every morning she awoke already feeling exhausted, and each day she regretted not finishing the treatment the first time when it had been so much easier to cure. It got so bad that she found herself contemplating quitting

again, despite knowing the consequence would be death. “I thought - let it happen, it was the most difficult time of my life, but conversations with Zuhro helped me to pull myself together, and to push towards recovery,” says Maksuda.

Zuhro is one of two psychologists involved in the activities of the Challenge project. “If she hadn’t been there, I would not have had the willpower to get to the end,” says Maksuda.

When Maksuda finished treatment, she became one of the first patients in Tajikistan to be cured thanks to the shorter regimen. She is now back living with her family, they are all happy and healthy. She is taking care of her health, and every six months, she makes sure she goes to the health facility to check she is still free from TB.

“Now, when I see a coughing person, I recommend they visit a doctor immediately,” says Maksuda, “And if I know a person on TB treatment, I tell them they must not make the same mistake as I did, they have to finish their treatment completely, no question.”

“Now, when I see a coughing person, I recommend they visit a doctor immediately”





TB/HIV



ART Clinic in Malawi / Max Meis



TB Awareness Raising using Music in Zambia / Gift Sitenge

DESIGN AND IMPLEMENTATION OF TB/HIV INTERVENTIONS

TB is the leading cause of morbidity and mortality among people living with HIV. TB is also the leading cause of death among people with HIV. One in three people who die of HIV-related illnesses dies of TB. These deaths can be prevented by screening all HIV-affected people for TB and linking them to TB treatment. In addition, linking HIV-positive TB patients to ART will also prevent deaths. This means that it is vital to screen all TB patients for HIV and to screen all HIV-positive individuals for TB on a regular basis.

TB/HIV global policy scale-up was one of the priority interventions of CTB. TB/HIV was a specific priority in countries that were entirely or partly funded by PEPFAR via USAID. These were Botswana, Namibia,

and Vietnam. DRC, Ethiopia, India, Malawi, Nigeria, Tanzania, Ukraine, and Zimbabwe were partly PEPFAR funded.

The CTB project portfolio included 24 countries, of which 13 appear in the high-TB/HIV-burden country list of WHO. These are Botswana, Burma, DRC, Ethiopia, India, Indonesia, Malawi, Mozambique, Namibia, Nigeria, Tanzania, Zambia, and Zimbabwe. Most of the PEPFAR-funded CTB countries have invested in optimizing integrated care and prevention for TB/HIV patients, from a patient perspective, ensuring that TB and ART medication, counseling, and education are provided by competent care providers during single clinic visits (one-stop-shop approach). The focus was on improving the quality of TB care in HIV care and prevention centers and supporting them to implement systematic TB symptom screening and recording of PLHIV

and the use of Xpert MTB/RIF testing as a standard of care. The PEPFAR-supported countries and projects also began focusing on the systematic offering of TB preventive treatment for eligible PLHIV. In Namibia and Vietnam, CTB focused on the systematic recording and reporting of the fraction of PLHIV completing TB preventive treatment. Only in Ethiopia did CTB support the national adoption of the latest WHO guidelines on TB preventive treatment, including STRs (3HP, 3RH).

SNAPSHOT OF KEY RESULTS

- In 2018, more than 90% of TB patients were tested for HIV in seven countries (two of those countries reported 100% testing coverage).
- Between 2014 and 2018, the number of countries starting more than 90% of HIV-infected TB patients on ART increased from two to eight.
- Screening PLHIV on care for TB increased in DRC, Malawi, Tanzania, and Ukraine between 2017 to 2019.
- The number of ART patients who completed a standard course of TB preventive therapy increased significantly in Namibia, Nigeria, Tanzania, and Zimbabwe.

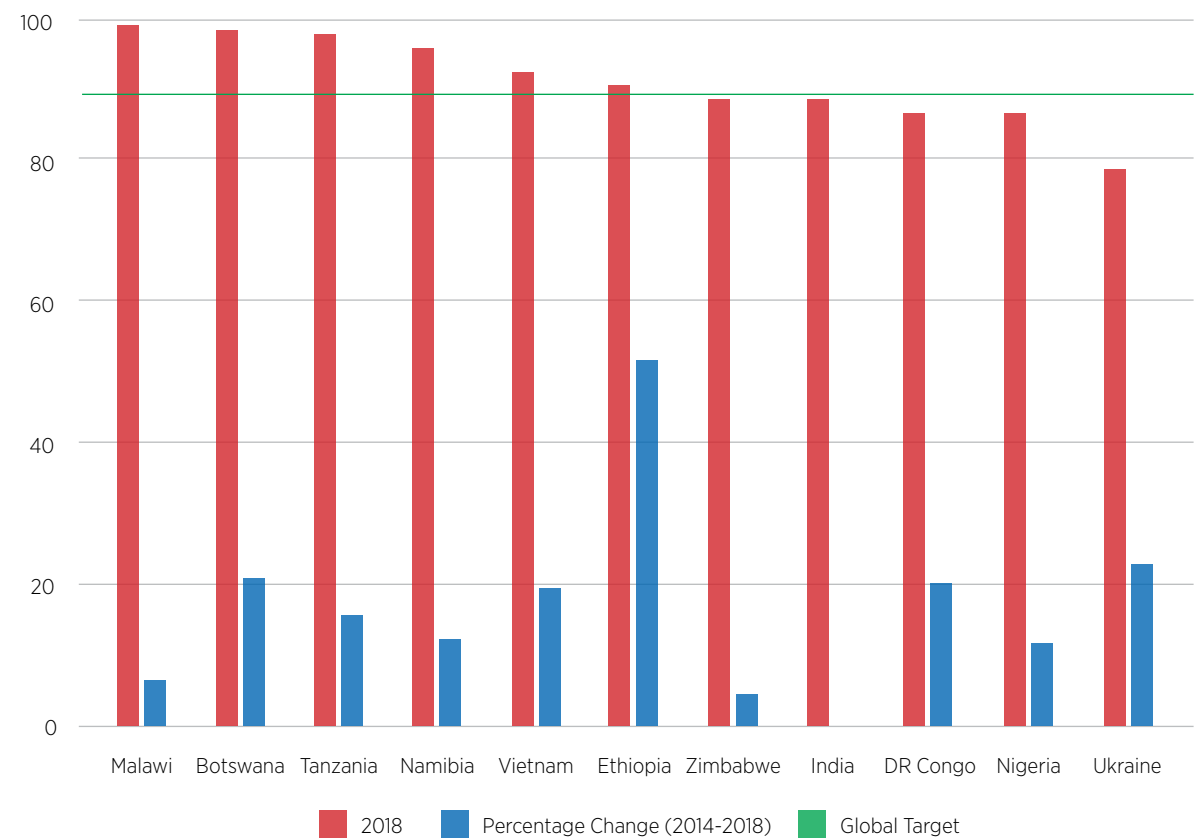
>90%

OF TB PATIENTS TESTED FOR HIV IN 7 COUNTRIES

8

COUNTRIES STARTED MORE THAN 90% OF TB/HIV PATIENTS ON ART

HIV-POSITIVE NEW AND RELAPSED REGISTERED TB CASES ON ART DURING TB TREATMENT



TB infection prevention and control received less priority in CTB countries than systematic TB screening and preventive treatment. In PEPFAR-supported CTB country projects, the focus of TB infection prevention and control was on implementing the FAST strategy among general outpatients and inpatients (Malawi and Namibia), cascade/on-the-job training and mentoring (DRC, Ethiopia, Malawi, Namibia, Tanzania, and Vietnam), TB screening and surveillance among health care workers (DRC, Ethiopia, Namibia, Tanzania, and Vietnam) and routine M&E in compliance with TB infection prevention and control standards (Ethiopia and Malawi). In Malawi, CTB supported the piloting of lateral flow urine lipoarabinomannan assay (LF-LAM) testing for TB among eligible PLHIV from September 2018 onward, based on WHO guidance. In Tanzania, CTB assisted in the inclusion of LF-LAM in the updated 2018 national TB guidelines.

ART DURING TB TREATMENT

All PEPFAR-supported CTB countries showed remarkably good performance or improvement on this indicator compared to 2014. In 2014, two countries reported this indicator at 90% or higher (Malawi and India), and in 2018, eight CTB countries reported a performance of 90% or higher (Malawi and India), while DRC and Nigeria achieved 87%, and Ukraine, 79%.

HIV TESTING AMONG TB PATIENTS

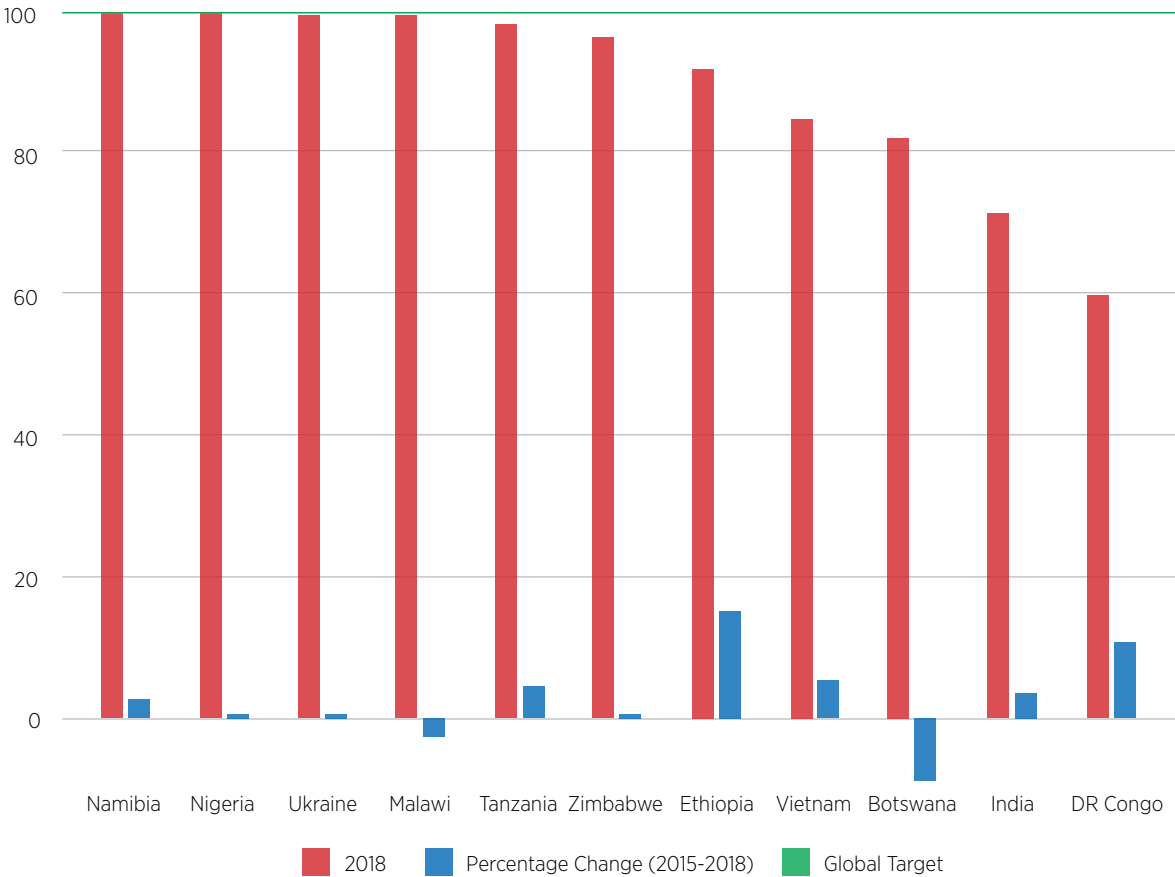
In 2018, two PEPFAR-supported countries (Namibia and Nigeria) reported a performance of 100% on HIV testing among TB patients, and five countries reported a performance of 90% or higher on this indicator (Ukraine, Malawi, Tanzania, Zimbabwe, and Ethiopia). Vietnam reported 85%, Botswana 82%, India 72%, and DRC 61%.

100%

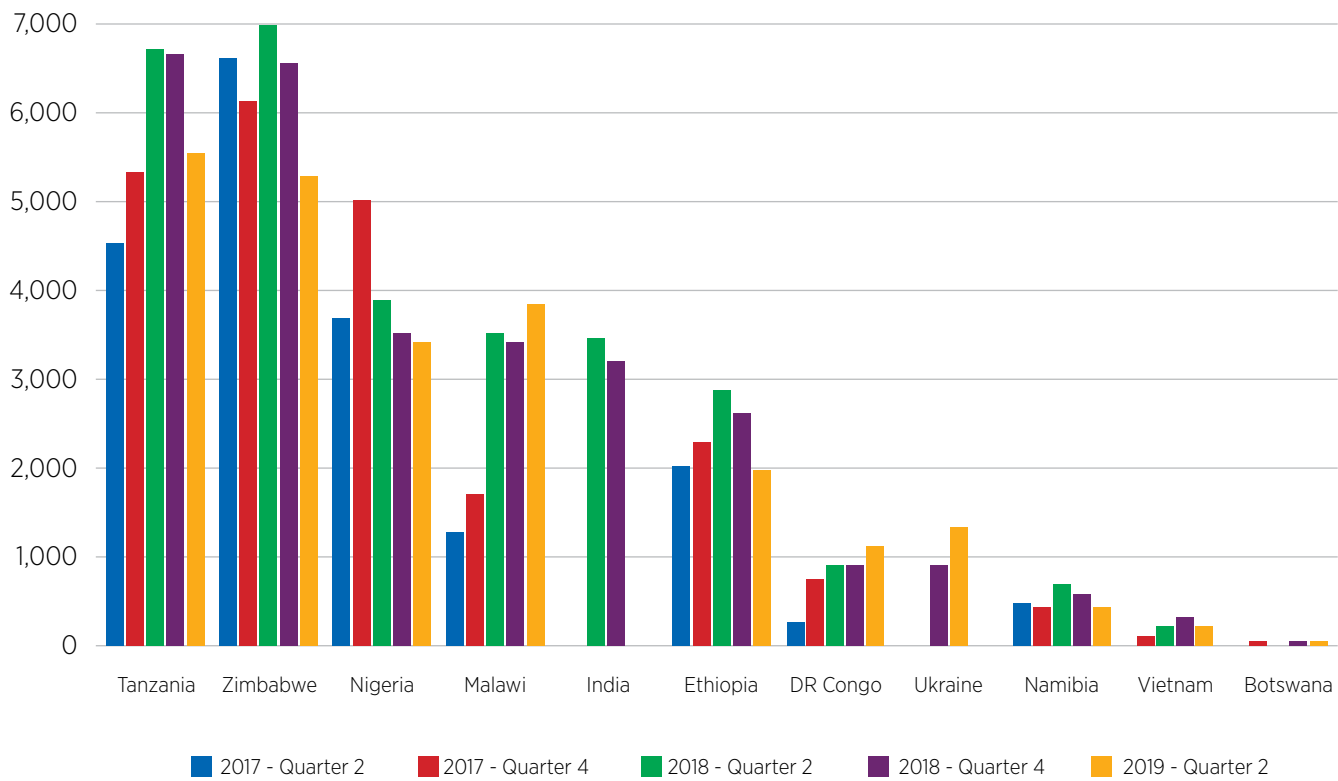
OF TB PATIENTS TESTED FOR HIV IN NAMIBIA AND NIGERIA



REGISTERED NEW AND RELAPSE TB CASES WITH DOCUMENTED HIV STATUS



NUMBER OF ART PATIENTS SCREENED FOR TB IN THE SEMIANNUAL REPORTING PERIOD WHO ARE RECEIVING TB TREATMENT



TB SCREENING AMONG ART PATIENTS

Based on the data for (fully and partly) PEPFAR-funded CTB countries for 2017-2019, there has been an increasing trend in the number of PLHIV on ART screened for TB in Tanzania, Malawi, DRC, and Ukraine. Consistent and quality-assured reporting of this indicator is challenging for the HIV care reporting system.

The 90-90-90 HIV treatment targets are well established (meaning that 90% of PLHIV know their HIV status, 90% of people diagnosed with HIV infection are on ART, and 90% of those are virologically suppressed), but they have only recently been applied for TB. That is, of all HIV patients in care, 100% should be screened for TB, 100% of all those identified as having presumptive TB should be tested with Xpert, and 100% of those with a positive Xpert test

should receive anti-TB treatment.

Over three years the percentage of HIV patients in Malawi who were in care and screened for TB remained stable between 85% and 90%; the percentage tested slightly decreased in 2018 due to shortage of cartridges, while the absolute number of HIV patients identified with presumptive TB gradually increased. More recently, the proportion of HIV patients in care who tested positive among those identified with presumptive TB and tested with Xpert is also included in the TB care cascade for PLHIV (see the FAST case study page 106).

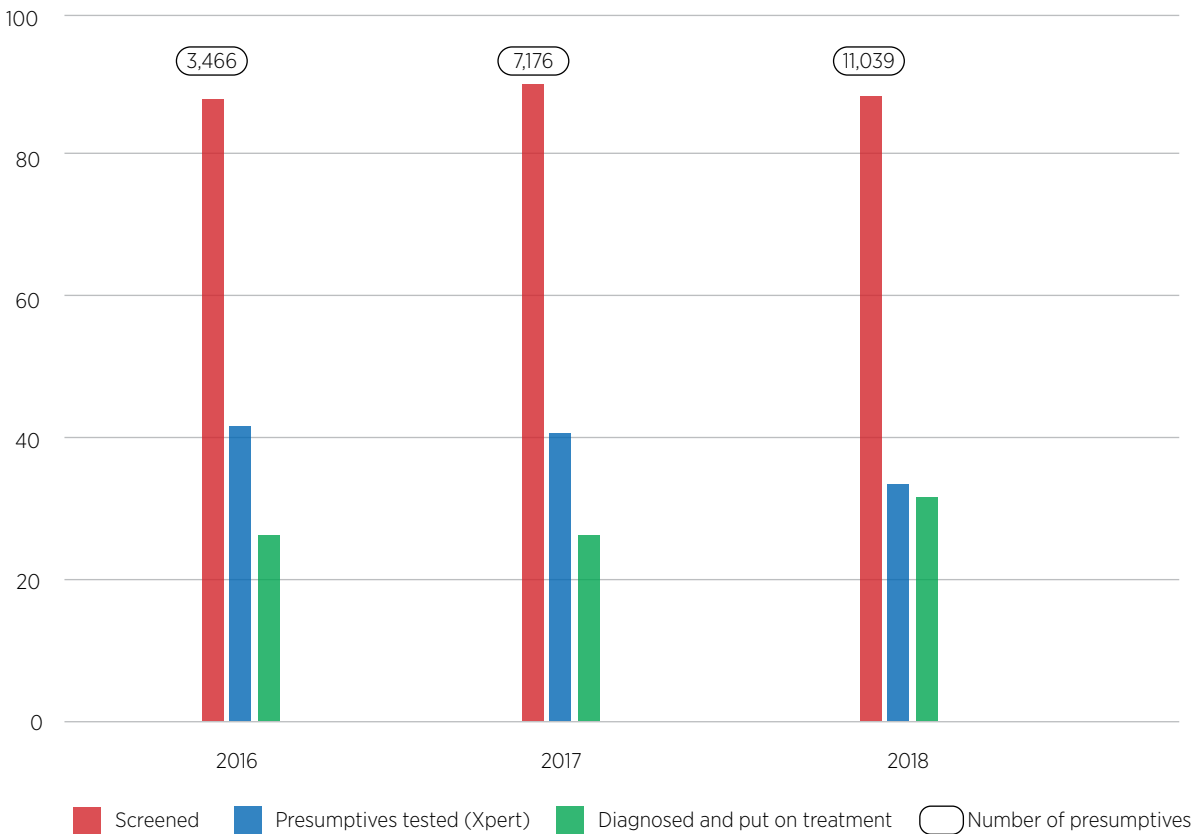
TB PREVENTIVE THERAPY

The number of ART patients who completed a standard course of TB preventive therapy in Nigeria, Tanzania, Namibia, and Zimbabwe also increased. Data are lacking for Botswana because TB preventive treatment was (re-)started as national policy only in 2019. The reporting of this indicator is challenging for HIV programs and does not allow evaluation of the percentage of PLHIV completing this treatment, in the absence of a denominator of the number of PLHIV who started TB preventive treatment in a particular period (cohort reporting).

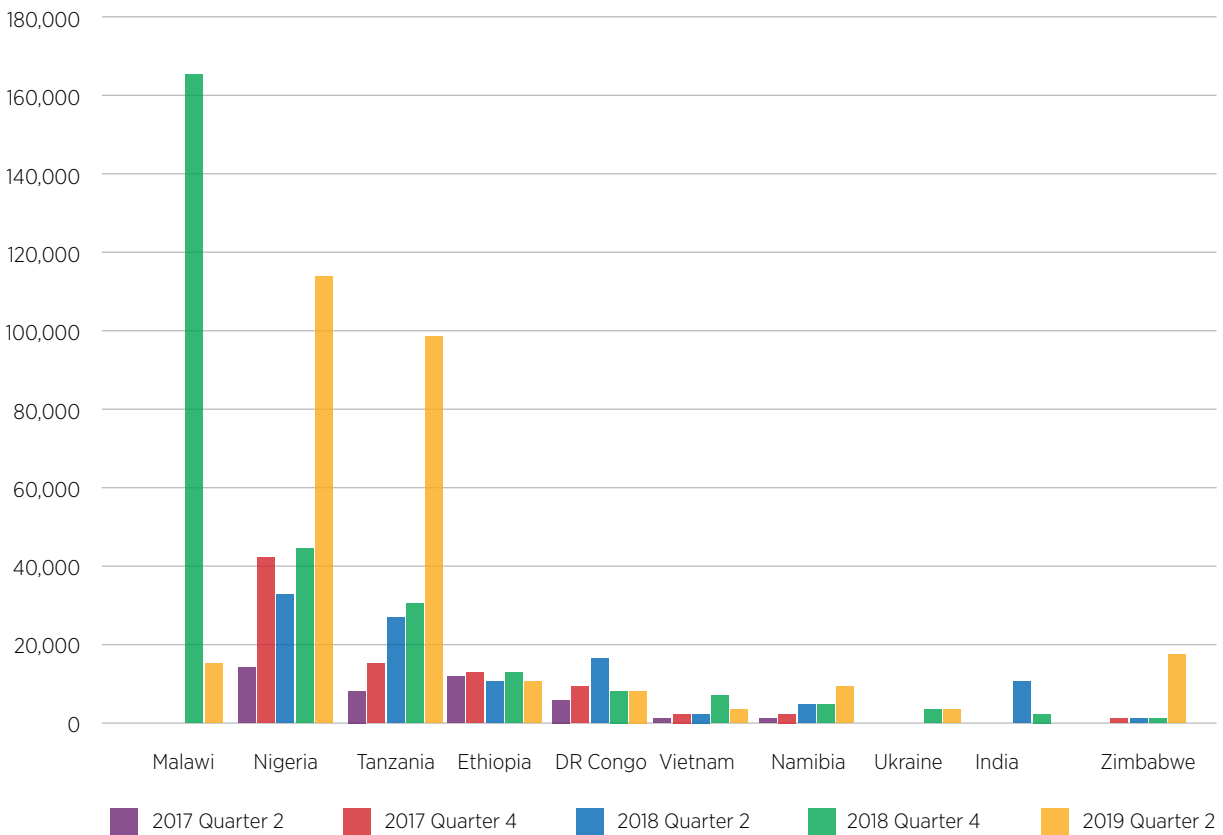
>85%

OF PLHIV TESTED FOR TB IN MALAWI

TB CARE CASCADE AMONG PLHIV, MALAWI, 2016-2018



ART PATIENTS WHO COMPLETED A STANDARD COURSE OF TB PREVENTIVE THERAPY





TB/HIV patient Manh Cuong at home with his family in Vietnam / KNCV

Case Study: Focusing on comprehensive and integrated care for PLHIV with TB disease in Vietnam

CTB successfully phased in a new model of integrated TB/HIV care in two districts, one each in the provinces of Hung Ha and Nho Quan. This pilot aimed to improve the quality of TB/HIV care by organizing integrated TB/HIV services and disease surveillance. The MOH decided to roll out the integrated TB/HIV care model in 5 provinces in 2015, 7 provinces in 2016, and 18 provinces in 2017. After a positive evaluation with support from the USAID Sustainable HIV Response from Technical Assistance (SHIFT) project and CTB, the NTP and the national MOH HIV program issued technical guidance in 2017 on integrated TB/HIV service delivery as the standard of care. The new policy was scaled up by leveraging GF and domestic resources.

CTB continued to support the national expansion of Xpert MTB/RIF testing for persons with presumptive TB, specifically including PLHIV. By the end of June 2019, 174

GeneXpert systems were operational in 124 facilities in all 63 provinces. During the period 2012-2018, 320,736 Xpert tests were performed, of which 138,938 (43%) tests showed *M. tuberculosis* positive results and 15,772 (11%) were positive for rifampicin resistance.

CTB organized a national workshop in 2017 to discuss and agree on a national strategy for use of the existing GeneXpert machines as multi-disease platforms for MTB/RIF, HIV viral load (for monitoring of HIV treatment) and early infant diagnosis. The 100 participants, representing the MOH, USAID, and PEPFAR partners, committed to the integrated use of GeneXpert infrastructure for reaching the End TB and 90-90-90 targets.

CTB invested in training 563 NTP staff in 17 provinces on provider-initiated HIV counseling and testing among TB patients in 2017 and 2018. This

capacity building contributed to an increase in the national percentage of notified TB patients with an HIV test result, from 79% in 2016 to 85% in 2018—of whom 3% were HIV positive.

CTB also developed and implemented an innovative strategy to increase case finding among TB high-risk groups in Vietnam. The diagnostic algorithm used both X-ray and GeneXpert for TB diagnostic evaluation of PLHIV who were found positive on TB screening—at every attendance. This approach was implemented in 29 HIV outpatient clinics and 3 methadone maintenance treatment clinics in eight provinces. A total of 14,005 (73%) of 19,117 PLHIV and persons attending methadone clinics were screened for TB, among whom 99 patients were diagnosed with TB by GeneXpert and sputum smear examination and started on TB treatment.



TB patient checkup in Vietnam / KNCV

The Finding TB cases Actively, Separating safely, and Treating effectively (FAST) intervention was implemented in Malawi in three district hospitals (Chikwawa, Machinga, and Zomba) and Zomba Central Hospital. Four other hospitals were selected based on three criteria: (1) type of hospital, (2) district notification rate, and (3) proximity to the three FAST intervention sites. The FAST intervention showcases a distinct improvement in TB and HIV case-finding by integrating TB FAST and HIV screening among OPD clients.

Although FAST for all OPD patients is a national policy, this operational study tested the hypothesis that the engagement of carefully selected, trained, and supervised community volunteers, as compared to the

standard FAST approach with hospital health workers, would produce better outcomes. The intervention was implemented for 12 months, from July 2018 to June 2019. The main objective of FAST is to prevent and control TB infection by identifying outpatients aged 15 years and above with presumptive TB symptoms and expediting their diagnosis and treatment initiation. A second objective of this study was to improve HIV testing among presumptive TB patients and diagnosed TB patients through provider-initiated HIV counseling and testing for all patients without a recent HIV-negative test result.

The intervention demonstrated good performance in TB case detection. The total number of OPD attendees screened was

219,872, of whom 11,190 (5%) were identified with presumptive TB. The FAST strategy was implemented by volunteers recruited and working for Development Aid from People to People through a subaward from CTB/KNCV. The good achievement was attributed to the engagement and commitment of the volunteers who were performing health education, HIV counseling, TB screening, fast-tracking samples to the laboratory, and expediting treatment initiation by tracking and linking positive tests to patients. All persons with presumed TB were tested using Xpert MTB/RIF.

Case Study: Malawi implemented FAST in a setting with high TB and HIV burdens

The table shows a distinct difference in identification of persons with presumed TB, of 5% in the FAST sites and 1% in the control sites. The 5% in the FAST group is in line with the TB National Strategic Plan, which is based on the TB prevalence

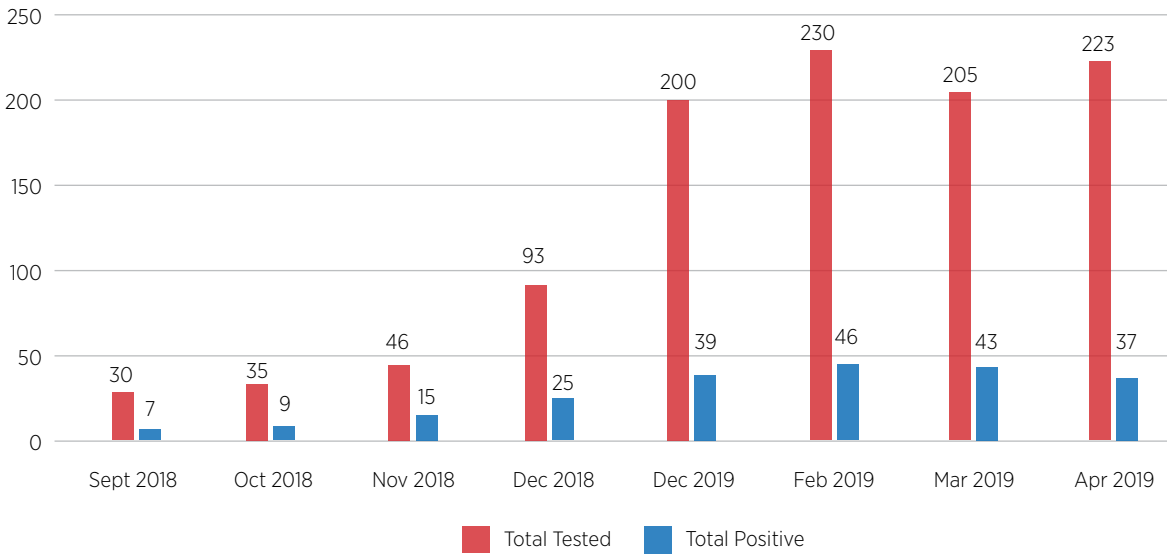
survey data. The FAST sites collected data on the HIV status among the presumptive TB patients. The HIV co-infection rate among the diagnosed TB patients was 56% (399 individuals) in the control sites against 54% (686 individuals)

in the FAST sites, of whom 167 (24%) were newly diagnosed HIV-positive patients.

RESULTS OF FAST IN FOUR HOSPITALS AND CONTROL SITES, JULY 2018 TO JUNE 2019

	FAST Sites	Control Sites
Total OPD patients	336,581	478,319
Target population for TB symptom screening of OPD patients aged 15 and above	219,872 (65%)	303,406 (63%)
Presumptive TB patients	11,190/219,872 (5%)	2,814/303,406 (1%)
Known HIV status	7,190/11,190 (64%)	-
TB all forms	1,279/11,190 (11%)	706/2,814 (25%)
Total HIV positive	686/1,279 (54%)	399/706 (56%)
Newly tested and HIV positive	167/686 (24%)	-
Bacteriologically confirmed pulmonary TB	618/1,279 (48%)	148/706 (21%)
Xpert MTB positive	582	94
Xpert RR positive	21/1,279 (4%)	16/706 (17%)

LF-LAM TESTS AND POSITIVE TEST RESULTS



Case Study: LF-LAM testing increases the diagnosis of TB among PLHIV in Malawi

The LF-LAM test is a urine dipstick test for TB that can be used at the point of care or the bedside, or in the OPD. Despite guidance from WHO in 2015, the test was not widely implemented by the NTP because it was focused on the implementation and scale-up of Xpert MTB/RIF testing. From September 2018 onward, CTB supported the NTP in the phased implementation of the urine LF-LAM test in Malawi, beginning in 5 districts.

Before the commencement of the LF-LAM pilot, CTB and the NTP did an assessment in the selected hospitals on the cause of death within eight weeks after starting TB treatment among TB/HIV patients for the years 2015-2016. The findings showed that many TB/HIV patients died in the hospital or were very sick due to late TB diagnosis.

Following the findings from the death audit and the benchmarking exercise, CTB and the NTP selected one central and four district hospitals that had

death rates of >10% among TB/HIV patients in 2015 and 2016. The objectives of the pilot were to assess the utility of the urine LF-LAM test in improving TB case detection and reducing mortality among eligible patients. The eligibility criterion of CD4 count was expanded to ≤ 200 cells/ μ L, and all LF-LAM-positive patients were negative on Xpert MTB/RIF testing.

Testing increased dramatically starting in December 2018 (see graph), following intensified mentorship. All patients diagnosed through LF-LAM were classified as having extrapulmonary TB, given their negative test result on Xpert MTB/RIF. During October-December 2018, 49 patients were diagnosed with TB using LF-LAM, and a death rate of 5% (n = 2) in the first two months of treatment was reported among this population. In the January-March 2019 period, 128 patients were diagnosed using LF-LAM, of whom 13% (n = 17) died in the first two months of treatment.

The use of LF-LAM testing resulted in an increase of TB diagnosis among PLHIV from 49 to 126 in the respective quarters in 2018 and 2019. The study produced essential lessons on proper implementation of TB LF-LAM in a non-research setting. The pilot implementation period was too short to evaluate final treatment outcomes.

A national LF-LAM review meeting organized by NTP with CTB support in June 2019 provided national policy and strategy recommendations for nationwide roll-out of the test. It was agreed that LF-LAM testing should become available in all health facilities. LF-LAM testing is now included in the revised national strategic plans of both the national TB and HIV programs. Because the GF supports LF-LAM testing as national policy, future GF grants will sustain its funding in Malawi.



Special Projects



Development of Global Fund concept note in Kyrgyzstan / Bakyt Myrzaliyev

Several initiatives were centrally funded by USAID/Washington with core project funding. These initiatives were implemented across a number of countries as innovations to catalyze other in-country TB support mechanisms, such as GF (the Global Fund Hub) and global advocacy (UN Envoy for TB); to generate evidence (prevention study); and to support the development of tools and guidelines (stigma, BDQ project). This section provides only a synopsis of the core-funded projects (for details, please refer to the separate report on the end of the core projects). The results and deliverables of the core project in India and the BDQ project were discussed in earlier chapters on case finding and PMDT, respectively.

CHALLENGE TB SUPPORT TO GLOBAL FUND IMPLEMENTATION

One of the guiding principles of CTB was to enable GF investment to succeed through high-quality identification of needs and support for the development of concept notes and all preliminary activities, such as epidemiological assessments, National Strategic Plan mid-term evaluations, and development of National Strategic Plans.

CTB support to GF was implemented using two strategic approaches:

1. The Global Fund Hub
2. In-country coordination and collaboration:
 - Development of complementary plans, including monitoring and supervision mechanisms
 - Assignment of geographical areas or specific thematic areas for efficiency and avoidance of duplication

- Coordination of technical assistance
- Cooperation in sharing information and participation in quarterly review meetings, including discussion with GF country teams
- Identification and solving of problems that posed barriers to implementation

LESSON LEARNED

Global Fund grant implementation needs to be supported and resources leveraged

The Global Fund Hub was a two-year CTB project that operated from March 2016 to February 2018 with the aim of ensuring successful implementation of GF grants in the countries where it operated. This was achieved by building on the experience of TB CARE I and TB Team to coordinate technical assistance and make it even more efficient, as well as actively monitor GF grant performance and offer direct support to identify bottlenecks and local solutions to improve performance.

Through its country offices and, where necessary supported by short-term technical assistance (STTA) coordinated by the Global Fund Officer at the Project Management Unit, CTB developed and implemented a model for assisting countries at all stages of preparation, the funding process, and grant implementation. The approach empowered country offices to coordinate and collaborate

effectively with GF for improved performance and impact at the country level. In particular, CTB provided support to find local solutions, broaden and strengthen local partnerships, and expand local ownership through strengthened leadership and capacity building among relevant stakeholders and deliverance of appropriate technical assistance.

The Hub coordinated and collaborated with all major players, such as:

- USAID/Washington TB Team
- USAID Missions
- USAID in-country GF Advisors
- CTB country teams and any other bilaterally funded partners
- All GF principal recipients (PRs) and subrecipients (SRs)
- GF country teams (portfolio managers and staff)
- WHO TB team
- GF Disease Committee

The Hub developed a system to map all active TB and TB/HIV grants and partners, as well as technical assistance visits, with links to reports with recommendations and results. The system also supported monitoring grant performance in all CTB countries through a designated section in the CTB country quarterly reports and anticipating technical assistance needs, as well as coordinating technical assistance with other technical partners.



India vs. TB charity cricket match between celebrities and parliamentarians / The Union



Children in a Tea Garden in Bangladesh / Tristan Bayly

Of the total of US\$10.9 billion GF allocation in 2016 for eligible countries, US\$1.084 billion was allocated for TB activities among the 24CTB-supported countries, and 8 CTB countries were eligible for catalytic matching funds, for a total of US\$81 million. The Global Fund Hub played an active role in supporting not only coordination of technical assistance but also activities related to the development of funding requests for the 19 CTB countries that submitted funding requests. The Global Fund Hub was able to quickly provide STTA from core funding to the CTB countries, mainly to support the development of concept notes and grant making. In some instances, the Global Fund Hub supported the National Strategic Plan, epidemiological assessments, and program reviews. A total of 53 STTA assignments were completed.

Other support from the Global Fund Hub included capacity building for African epidemiologists and M&E officers in conducting epidemiological assessments; training of NTP and CTB M&E staff from eight countries and one region (DRC, East Africa Region, Ethiopia, Malawi, Mozambique, Namibia, Nigeria, Tanzania, and Zimbabwe) and data analysis and use for decision-making.

Finally, the Hub supported Papua New Guinea over six months to improve treatment outcomes

for DR-TB by strengthening treatment regimens using new drugs and by building technical capacity within different levels of the health system to support patients throughout treatment. Through this project, CTB provided technical assistance (remote and in-country), developed protocols and SOPs, and provided training and workshops in-country.

US\$1B

OF GF FUNDS ALLOCATED TO TB ACTIVITIES IN 24 COUNTRIES

KEY ACHIEVEMENTS OF THE GLOBAL FUND HUB

- Supported 2 program reviews, 5 epidemiological assessments, development of 3 National Strategic Plans, and writing of 25 concept notes, as well as 6 grant negotiations
- Successful division between GF and CTB according to geographical and technical areas in most countries for efficiency
- Major procurement assigned to GF and most in-country technical assistance to CTB
- Establishment of coordination mechanisms with NTPs for

periodic review of performance and implementation of improvement plans

- Overall GF performance in all 24 countries: B1 and A1.

KEY CHALLENGES

- Different planning cycles
- Weak harmonization and standardization of packages
- Delays in procurement
- Difficulty with reprogramming

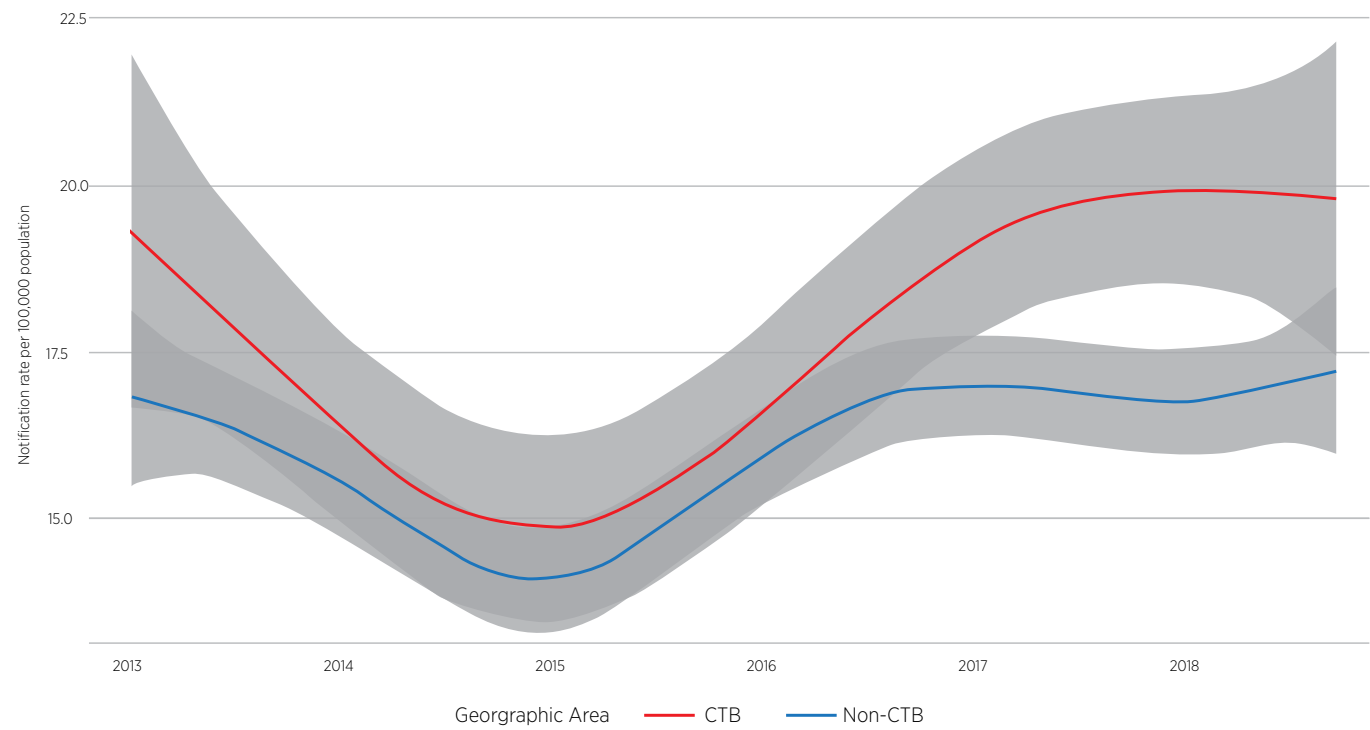
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EPIDEMIOLOGICAL ASSESSMENTS SUPPORTED

3

NATIONAL STRATEGIC PLANS SUPPORTED

INCREASED TB CASE NOTIFICATION RATE IN CTB AREAS NIGERIA, 2016-2019



Challenge TB and Global Fund Collaboration:
A Nigerian Case Study

As part of collaboration and coordination, GF and CTB committed to task allocation by interventions and geographical areas with a platform for coordination. At the national level, GF was responsible for major procurement of all drugs and laboratory supplies; printing and distribution of recording and reporting tools; and provision of logistics, including vehicles for M&E and supervision. CTB provided technical assistance for development of National Strategic Plans, GF concept notes, and national guidelines and SOPs and embedded technical staff in NTPs at the national and state levels for quality implementation of both CTB and GF projects. Both projects aligned to the NTP's National Strategic Plan and recording and reporting tools, including its M&E structure and system.

At the subnational level, CTB was designated to implement package interventions in a number of states and Local Government Areas. The interventions were developed in close collaboration between CTB, the GF PRs and SRs, and the NTP. CTB and the GF PR and SRs implemented a core package for case finding, PMDT, and laboratory strengthening in 50% of the districts each among the 14 high-burden states, while the GF PR provided support for routine TB activities in the remaining states.

The common platforms for coordination and knowledge sharing included:

- PR/SR with CTB and NTP TB technical review meetings
- Joint supervision (CTB, GF PR, and NTP)
- Engagement of GF PR/SR during CTB annual planning

- GF country team engagement with USAID and CTB

The increase in TB case notification rates across both CTB states and the NTP (shown above) can be attributed to effective collaboration, coordination, complementarity, and communication.

PREVENTION STUDY

Identification and treatment of individuals with latent tuberculosis infection is a major intervention to end the TB epidemics, and new treatment options now exist for patients using an STR: a combination of two medicines (rifampicin and isoniazid) daily for three months (3RH), and rifapentine and isoniazid weekly for three months (3HP). Three ongoing studies were designed to generate more evidence, including this randomized pragmatic, open-label trial to evaluate the effect of three months of high-dose rifapentine plus isoniazid administered as a single round or given annually in HIV-positive individuals (WHIP3TB).



The **WHIP3TB Phase IIb** trial was a parallel two-part, open-label, individually randomized pragmatic trial among HIV-positive individuals, evaluating the use of annual 3HP as TB preventive therapy for PLHIV. Part A was an observational randomized comparison of a single round of weekly high-dose rifapentine plus isoniazid for three months (3HP) to six months of daily isoniazid (6H). The comparison was done to demonstrate the feasibility of implementing 3HP in high-burden countries, explore its safety and effectiveness, and generate evidence to guide a WHO recommendation. Part B, a randomized controlled trial, compared periodic 3HP (p3HP) to a single round of 3HP, to confirm if repeat courses of TB preventive therapy were needed. The primary objective of the Part A analysis was to compare treatment completion in HIV-positive participants taking 3HP to those taking 6H. The single round of 3HP was also compared to 6H with respect to TB incidence, all-cause mortality, and permanent discontinuation of therapy due to treatment-related adverse

events. The primary objective in Part B was to compare TB incidence among individuals randomized to two periodic (annual) rounds of 3HP (p3HP) versus a single round of 3HP. Secondary objectives were to compare p3HP versus 3HP with respect to TB incidence, all-cause mortality, treatment completion, permanent discontinuation of therapy due to treatment-related adverse events, and incidence of rifampicin-resistant TB. The trial was conducted at four sites in South Africa, two sites in Ethiopia, and one site in Mozambique.

Participants were enrolled in the study from November 2016 to November 2019 and randomly assigned to one of the three arms (3HP, p3HP, or 6H) at a ratio of 9:9:2. Part A participants were followed up for 12 months after enrollment, and Part B participants, for 24 months after enrollment. Participant follow-up was completed at the end of September 2019. Overall, 4,027 participants were randomly assigned to one of three arms: 1,802 to the 3HP arm, 1,810 to the p3HP arm, and 405 to the 6H arm. The results of the trial

will be presented at the Annual Conference of Retroviruses and Opportunistic Infections in March 2020.

After two years of follow up, rates of TB were virtually the same in participants who received either one (three-month) course or two (three-month) courses of 3HP. The 3HP regimen was found to be safe, with similarly low rates of adverse effects in both 3HP arms of the trial. It was also found that adherence was higher among patients on 3HP compared to patients who were prescribed six months of isoniazid. There was a higher treatment completion rate of 90% among patients on 3HP compared to only 50.5% among patients on the longer isoniazid regimen. This demonstrates conclusively that there is no need to repeat a course of 3HP annually, a finding that has huge implications for health programs caring for millions of PLHIV globally.

The trial was a collaboration between the Aurum Institute, London School of Hygiene and Tropical Medicine, KNCV Tuberculosis Foundation, and Johns Hopkins University School of Public Health.



MDR-TB patients waiting for hearing tests in Nigeria / Tristan Bayly



TB Doctor Vo Van Tam examines a patient in Vietnam / KNCV

STIGMA

Stigma is a major barrier in the fight against TB. Stigma stems from associations with poverty and risk of transmission of TB and HIV. Stigmatizing language (such as defaulters and suspects), mandatory screening, and administrative controls linked to infection control fuel stigma. It contributes to catastrophic costs when people with TB lose their jobs, homes, and important relationships within their families and communities. There is a renewed focus on reducing stigma by measuring stigma and implementing interventions to reduce it. However, no appropriate measurement tools or guidelines for implementing stigma reduction were available.

The aim of the project was to develop valid and efficient methods to measure stigma due to TB at the patient, community, and health worker levels. During this core project, the following tools were developed/published:

- 14 articles in a supplement of the International Journal of Tuberculosis and Lung Disease, ranging from country examples to papers on TB-related stigma more generally;
- Handbook, “TB Stigma Measurement Guidance,” available from: https://www.challengeTB.org/publications/tools/ua/TB_Stigma_Measurement_Guidance.pdf;
- A study of and report on stigma in Ethiopia.

At the start of the project, two expert meetings on TB stigma were held in The Hague. The meetings leveraged support from experts from outside the TB community (e.g., HIV, leprosy, and neglected tropical diseases). As a result, six new studies on TB stigma measurement methods were completed and presented internationally: two literature reviews, two secondary data analyses based on data from Demographic and Health Surveys/Service Provision Assessments, a scale validation in

health care workers, and a scale validation in presumptive clients.

In 2017, CTB organized a meeting on TB-related stigma at the Union World Conference on Lung Health in Guadalajara, Mexico. It focused on how to strategize and bring more geographically diverse and multidisciplinary stakeholders into the stigma reduction effort. The TB stigma supplement of the International Journal of Tuberculosis and Lung Disease was also launched as a set of 11 open-access research articles and three editorials.

In 2018, the TB Stigma Measurement Guidance was finalized and released. Phase 1 of the CTB pilot of the stigma measurement tool among HCWs in Ethiopia was concluded, with 70 interviews having been conducted. A draft code book of emerging themes was developed, which still requires validation. The next steps involve transitioning the stigma work to the country strategic and work plans.

PATIENT COST SURVEY PROJECT, 2016-2017

The WHO End TB Strategy focuses on reducing TB mortality and incidence as well as achieving zero catastrophic costs for families affected by TB. The reduction of catastrophic costs leads to the attainment of universal health coverage, a situation in which people are able to use quality health services they need and which they do not suffer financial hardship to attain. Therefore, a measurement tool was needed to assess the burden of catastrophic costs, design interventions, and monitor progress across countries.

CTB built on the Patient Cost Tool developed by TB CAP and its adaptation for MDR-TB patients under TB CARE I. WHO developed a generic protocol and instrument to conduct patient cost surveys and measure, at the national level, the proportion of patients experiencing

catastrophic costs. This protocol was developed in 2015 under TB CARE II.

In 2016, WHO conducted surveys to measure the costs faced by TB-affected households, which were coordinated by the NTPs in Burma, Ghana, Mongolia, the Philippines, Solomon Islands, Timor-Leste, Uganda, and Vietnam, with different funding sources. CTB supported a consultation meeting with the objective of learning from the field testing in 2016 and producing a final generic protocol. The handbook was promoted during a session on patient costs during the Union conference in Guadalajara in October 2017 and the final version was released in December of the same year.

“HIV and TB are partners in crime with TB being the leading cause of death among people living with HIV. Now is the time for our leaders to be standing strong behind global health investments.”

Dr. Eric Goosby



UN SPECIAL ENVOY FOR TB 2015-2018

From 2015 to 2018, Challenge TB supported Dr. Eric Goosby to serve as the UN Special Envoy for TB. Despite all the challenges that remain, it is good to reflect on the progress that has been made in raising the profile of TB and preparing a pathway for accelerated progress. The impact of Dr. Goosby's work is evident both in technical forums and broader political spheres.

THE UNITED NATIONS HIGH-LEVEL MEETING ON TB

On September 26, 2018, the leaders of 194 nations endorsed a declaration that has strong operational targets in a politically relevant time frame, financial targets, recognition of the need for research and development, and a commitment to revisit TB in 2020 and 2023. The Office of the UN Special Envoy played a unique role in supporting the preparation of this meeting. As a representative of the UN Secretary-General, the UN Special Envoy served as a bridge between the community, the member states of the general assembly, and the office of the Secretary-General. Supported by CTB, Dr. Goosby paid visits to and had speaking arrangements in several countries and forums, as a follow-up on existing relationships. He made five trips to New York to engage bilaterally with countries and to participate in TB briefings for the member states.

In addition to the work focused on the UN High-Level Meeting on TB, efforts were made in the following areas:

- Ensuring integration of TB into the universal health coverage and antimicrobial resistance agendas, from both a technical and political perspective;
- Urging countries and their ministries and implementing partners to focus on data-driven decision-making and putting the science of TB care in front of those who need it;
- Encouraging donor countries to make stronger commitments to TB;
- Raising general awareness about TB.

The efforts the UN Special Envoy has made in advocacy, education, and awareness raising are organized along themes that translate into work streams. These themes reflect the best opportunities to use the Office of the Special Envoy to push the TB agenda forward.





Capacity-Building Approach



PMDT training participants in Rwanda / Charles Ogolla



Childhood TB training participants in Zimbabwe / Phoebe Nzombe

The capacity-building approach was based on four guiding principles: quality long-term technical assistance, targeted short term-technical assistance (STTA), health systems strengthening, and focus on sustainability.

IN-COUNTRY CAPACITY TRANSFER

The composition, quantity, skill mix, and distribution of in-country technical staff was guided by the scope of work (especially technical areas), project coverage area, budget, and negotiation with NTPs and USAID.

Overall, there were 460 technical staff across the 23 countries and two regions. Thirty-seven percent of all technical staff were embedded within the NTP structure or health care facilities (especially national reference

laboratories). The numbers of project staff embedded in NTPs varied across the project, with the highest numbers (above 50%) in Indonesia, Botswana, Afghanistan, DRC, Nigeria, and Malawi as strategic choices. The major benefits of embedding project staff within NTPs were sustainable capacity building, knowledge transfer, direct support for implementation, and leveraging of other resources for implementation; however, clear terms of reference and good communication or reporting lines were needed to ensure accountability.

460

TECHNICAL STAFF ACROSS 23 COUNTRIES

SNAPSHOT OF KEY RESULTS

- CTB used a blended approach to project staffing, with 37% of project staff embedded into the NTP structure for ease of implementation and capacity transfer.
- 175,915 HCWs were trained throughout the project in major areas related to TB care and treatment, diagnostics, and management of TB programs, including M&E.
- Capacity building of 152 local organizations took place through subawards totaling at least 10% of the project budget.

- STTA was targeted, with 65% devoted to three key areas: PMDT/ND&R, laboratory strengthening, and data quality and surveillance. Its quality and value were heightened through application of a new package of management tools, including a Standards of Excellence Checklist.

37%

OF PROJECT STAFF EMBEDDED INTO THE NTP STRUCTURE

175,915

HEALTH CARE WORKERS TRAINED IN TB CARE AND TREATMENT, DIAGNOSTICS, AND MANAGEMENT



M&E training participants in Tanzania / Tristan Bayly



Film students receiving TB training in Indonesia / Trishanty Rondonuwu

IN-COUNTRY TRAINING

CTB supported capacity building of NTP staff at all levels to ensure quality implementation of the project and sustainability. Over the project period, a total of 175,915 staff were trained (76,063 female and 99,852 male) with most participants trained on patient-centered care and treatment, enabling environment, and diagnostics.

REGIONAL MONITORING AND EVALUATION TRAININGS

In 2017-2018, the CTB Project Management Unit conducted a series of regional M&E trainings. The main purpose of these trainings was to enable country-level projects entering into the “reporting and learning” phase in their project cycle (the final years of CTB implementation) to develop and share data-driven and impactful stories to communicate CTB’s results and unique contributions. Topics included M&E data analysis (using data from the CTB global M&E database as well as country-level datasets),

data visualization (advanced level) and presentation skills, measurement and reporting of CTB achievements at the country and regional levels, and development and use of project dashboards and scorecards for improving performance management. Participants also reviewed the implementation status of the End TB top 10 indicators in their own countries, while identifying relevant CTB interventions to address M&E challenges. More than 150 people, including M&E and TB technical staff, participated in seven regional trainings, with nearly 50%-50% representation between CTB and NTPs.

150

TECHNICAL & NTP STAFF TRAINED IN DATA ANALYSIS, DATA VISUALIZATION, MEASUREMENT AND REPORTING

CAPACITY BUILDING OF LOCAL ORGANIZATIONS

Local organizations have been trained on both USAID rules and regulations as well as TB technical areas. The capacity building was led by the respective coalition partners, and CTB also hired an internationally recognized business consultancy organization to teach and train local NGOs on topics ranging from internal controls to project management to financial monitoring to USAID rules. This approach was applied successfully in DRC, where CTB contracted a management consultancy company for the first two years of the project to build the capacity of four local organizations. After trainings, mentorship, and supportive supervision, the local organizations were able to continue providing support to CTB for the last three years of the project on their own.

CTB worked with local and international organizations through subawards to implement project activities while building capacity. From 2014 to 2019, the project signed 387 subawards in various technical areas of TB prevention and care with 163 organizations, of which 152 were local organizations and 11 were international organizations. The subawards represented \$36.55 million (10%) of the total project budget.

The amount and scope of the subawards varied among CTB countries depending on country needs, available resources, and country project targets. Of the 24 countries, only 3 had no subawards during the lifetime of the project.

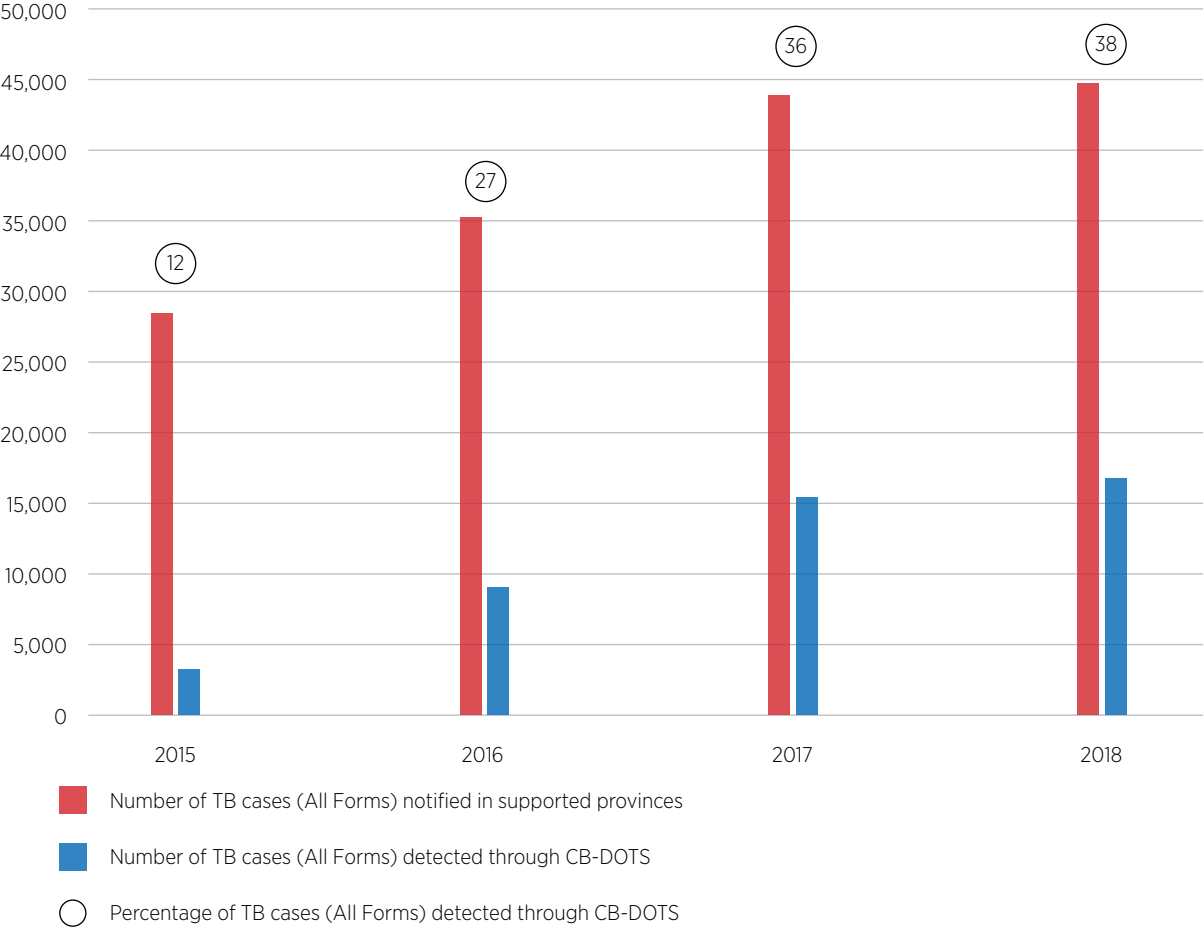
Of the total value of the subawards, 71% (US\$26.12 million) was invested in active case finding, quality treatment, service provision, and specimen transport. The other four main interventions areas were

community empowerment, social support, political commitment, and rapid diagnostics (15%, US\$5.58 million).

TECHNICAL AREAS WITH MORE THAN \$1 MILLION IN SUBAWARDS:

Active case finding: 11.13 M
Quality Treatment: 6.29 M
Service Provision: 4.72 M
Laboratory Specimen Transport: 3.99 M
Community Empowerment: 1.93 M
Social Support: 1.55 M
Political Commitment: 1.08 M
Rapid Diagnostics: 1.02 M

TB CASES, ALL FORMS, DETECTED THROUGH CB-DOTS IN MOZAMBIQUE



Case Study: The Impact of Subawards on Achievement of Project Targets

Mozambique and Burma are the two good examples of the impact of working with local organizations to find TB patients. In Mozambique, CTB invested in active case finding through eight CBOs. This amounted to 10% (US\$3.76 million) of the total subaward budget. The figure above shows the increase in contribution to case notification—which more than tripled over four years—and the positive impact of working with CBOs.

Burma is another country with a high investment (US\$3.45 million, 9% of the total CTB subawards), which was used to increase identification of patients in hard-to-reach areas and support the referral system. The table

shows the contribution of three local organizations to referral of TB presumptive patients to TB diagnostic services.

As a result of the capacity-building activities that CTB

undertook in different countries, some local organizations applied for and received new funding from other mechanisms—for examples, in Burma, DRC, Indonesia, Malawi, and Nigeria.

ACCESS TO HARD-TO-REACH AREAS THROUGH LOCAL ORGANIZATIONS IN BURMA, JULY 2017–MARCH 2019

Local Partner	State/Region	Townships	Population Covered	Approx. Number of Referrals	Additional TB Cases Identified
MHAA	Sagaing Region	8	1,087,447	~14,000	1,366
Pyi Gyi Khin	Chin State	3	153,045	~7,000	612
World Vision	Kayah State	3	129,021	~5,000	284
Total		14	1,369,513	~26,000	2,262



RECOMMENDATIONS

- Capacity building requires a minimum package consisting of TB knowledge (related to expected tasks), project management (especially basic financial management systems), and monitoring and reporting (use of NTP reporting tools, basic data analysis and use). Where feasible, NTP recording and reporting tools should be adapted for ease of use. Use of appropriate training tools and methods, such as adult task-based training, is a key to success.
- There should be a clear mechanism for supervising the activities of the local NGO to ensure quality of care by adhering to standards. It is also essential to verify and analyze performance data and plan and prioritize improvements.

CAPACITY BUILDING AND SUSTAINABILITY

One of the main achievements and lessons of CTB with regard to local organizations is to “think globally and act locally” by ensuring international partners capacitate local organization on new global policies and guidelines (including innovations) on TB prevention and care. This approach paves the way to building the capacity of local organizations in line with globally accepted standards and at the same time to benefit from the local opportunities and capacities to promote self-reliance and a sustainable development approach.



Laboratory Training in Ethiopia / Berhan Teklehaimanot



Sharing TB knowledge and information in Burma / FHI 360

SHORT-TERM TECHNICAL ASSISTANCE

The project focused on delivering high-quality, targeted, needs-based, and well-coordinated STTA to ensure efficiency and return on investment. STTA served as a mechanism for capacity building and transfer to the CTB-supported countries; for introduction of innovations, such as new medicines and tools for diagnostics; and for supporting surveys and design of TB electronic surveillance systems. The majority of STTA (65%) was implemented as part of three technical areas:

- Patient-centered care and treatment (29%);
- Quality data, surveillance, and M&E (20%);
- Comprehensive, high-quality diagnostics (16%).

STTA was implemented in close collaboration between USAID, NTP, and GF TB implementing partners. As described in the

STTA Standards of Excellence Checklist, STTA should always build the capacity of specific in-country personnel to take over the role of the consultant in future. Therefore, the number of STTA assignments should decrease over time, and this was the case even though the number of work plans increased. There was a peak in year three related to rapid scale-up of the STR for DR-TB, introduction and optimization of GxAlert and other TB electronic reporting systems, and conduct of TB and DR-TB prevalence surveys.

EXAMPLES OF PRINCIPLES FROM THE CTB STANDARDS OF EXCELLENCE CHECKLIST FOR STTA

1. STTA is planned in consultation with all key stakeholders during the annual work planning process, after considering alternatives for providing the technical support through in-country or nearby sources.
2. STTA provides expertise that is not available in-country and is done in synergy with ongoing efforts in the specific technical area as part of the five-year strategy.
3. STTA builds upon and does not duplicate the recommendations and activities of previous STTA missions or other stakeholders.

MONITORING AND IMPROVING THE QUALITY AND EFFECTIVENESS OF SHORT-TERM TECHNICAL ASSISTANCE

Having learned about the need to manage the quality and cost-effectiveness of technical assistance, CTB intensified the monitoring of STTA compared to previous TB flagship projects. A monitoring system was set up in 2014. Through this system, the Project Management Unit tracked three components: justification for the STTA in the work plan, concurrence on terms of reference by USAID Missions and NTPs, and production of a clear final report with actionable recommendations. As a follow up to the recommendations from the External Management Review in 2016, the project undertook additional steps to increase the quality of technical assistance:

- An STTA package—containing SOPs, a Standards of Excellence Checklist, and

templates—was developed and shared with all partner organizations;

- A two-step review before submission of STTA reports was introduced;
- Coordination with the NTP and GF was strengthened to avoid duplication and ensure leveraging of other resources;
- A follow-up mechanism for implementation of recommendations was institutionalized as part of country meetings and quarterly reports.

In terms of efficiency, the number of summary Mission reports received by the project and distributed among stakeholders remained high, on average 96%, compared to 50% in previous TB flagship projects. Capacity building remained an integral component of STTA; for example, CTB initiated a local capacity-building inventory among all CTB countries following one of the key principles of CTB to build in-country capacity, including

that of NTPs. The inventory assessed the technical capacity of CTB staff embedded in NTPs and documented successes and strategies for capacity building of NTPs.

A USAID GUIDING PRINCIPLE IS THAT STTA SHOULD BE:

“QUALITY, LONG TERM, AND TARGETED TO CONTRIBUTE TO LONG TERM RESULTS”



External Perspectives on Challenge TB



STRENGTHS

- Good coordination with the GF and support for GF implementation in most countries
- Increased focus on supporting local resource partners and building local partners' capacity
- Increased focus on key populations in some countries, including prisoners, miners, and PLHIV
- Successful efforts to partner with the private sector in some countries, such as IRD's work in Indonesia
- Alignment with WHO policies

WEAKNESSES

- Limited or no progress in increasing contributions from domestic resources
- Activity timelines and implementation dependent on timely GF disbursements, with significant delays in a few countries
- Difficulty building capacity at the subnational level, especially in a context where NTP capacity is low
- Weak mechanisms for targeting STTA and lack of systems to track or document changes attributable to STTA
- Weak mechanisms for leveraging partners' strengths.

SUMMARY OF EXTERNAL EVALUATIONS

The project was privileged to have an external mid-term evaluation at the global level, two mid-term evaluations (in Nigeria and Indonesia), and a final project evaluation in Ethiopia. The evaluations were funded by USAID and not through the project. The global mid-term evaluation assessed overall project management, successes, and opportunities for improvement (with an emphasis on management systems), while for the country level it assessed performance, outcomes, and progress toward intended results, and recommended actions to improve and enhance the project.

- The following common themes related to the project's strengths emerged:
- Working in collaboration with NTPs and GF through the health system to identify gaps, develop work plans, and implement activities together;
 - Introducing innovative approaches and supporting NTPs to scale them up;
 - Using a systematic programmatic approach to the introduction of laboratory initiatives and new drug regimens for MDR-TB patients to ensure sustainability;
 - Strengthening the capacity of health care workers in different TB technical areas, including TB surveillance systems;
 - Contributing significantly

to the performance of TB programs in quality case finding and care for both drug-sensitive TB and DR-TB.

Areas identified for improvement included the need for specific strategies for ensuring the sustainability of effective interventions by NTPs; data analysis and use at subnational levels (districts and regions) for planning; more engagement of subnational governments for commitment and domestic funding; and, finally, appropriate and timely dissemination of operations research to guide policy changes.

CHALLENGE TB ACTIONS IN RESPONSE TO THE EVALUATION REPORT

STRENGTHENED WORK PLAN DEVELOPMENT PROCESS TO ENSURE:

- Targeted, coordinated, and justifiable STTA in collaboration with the NTP, GF, and USAID TB portfolio
- Commitment to in-country capacity building and knowledge transfer
- Tracking of the quality and documentation of program benefits from STTA
- Data-driven planning, including leveraging other mechanisms for TB support
- Heightened efforts in public-private mix and community engagement
- Implementation of a subnational work plan development process to advocate for domestic funding in a number of countries.

STRENGTHENED COORDINATION, COMMUNICATION, AND RESPONSIVENESS BY ESTABLISHING REGULAR UPDATE BETWEEN THE PROJECT, USAID (MISSION/DC), AND NTP

DEVELOPED A QUALITY IMPROVEMENT PLAN

- Global database for the project
- Analysis and use of quarterly monitoring reports
- Targeted support to countries

DEVELOPMENT OF A COMPILATION OF TECHNICAL BRIEFS AND BEST PRACTICES LEVERAGING COALITION PARTNERS' STRENGTHS SHARED WITH THE DIFFERENT COUNTRIES FOR APPLICATION.



Cover your Cough training for school children in Burma / Hein Htet



Schoolgirls on World TB Day 2018 in Zambia / Robertson Chimbumba

FEEDBACK FROM CLIENTS: NATIONAL TB PROGRAMS AND USAID

To assess clients' satisfaction with CTB, the project conducted a short anonymous online survey, among NTP managers, USAID country Mission activity managers, and USAID/ Washington country technical backstops. The survey included 19 questions; in addition, respondents were asked to provide three strengths of CTB and three recommendations for future projects based on experience with the project. Out of 71 respondents, 22 people (response rate 31%) completed and submitted their responses; of those, 30% of respondents were NTP managers, and the rest were USAID staff; 60% were males. In terms of overall satisfaction

with the project's performance, the majority (79%) of the respondents were very satisfied or satisfied. More specifically, 91% were (very) satisfied with the level of CTB collaboration with the NTP as well as with CTB project engagement in the annual work plan development process; 86% were (very) satisfied with the CTB project's contribution to the overall TB program performance. Furthermore, 74% of the respondents were (very) satisfied with the CTB responsiveness to NTP problem-solving for TB; 71% were (very) satisfied with the capacity of in-country project technical staff; 68% were (very) satisfied with the quality of STTA; and 68% were (very) satisfied with the CTB financial and operational management system.

CTB STRENGTHS ACCORDING TO CLIENTS

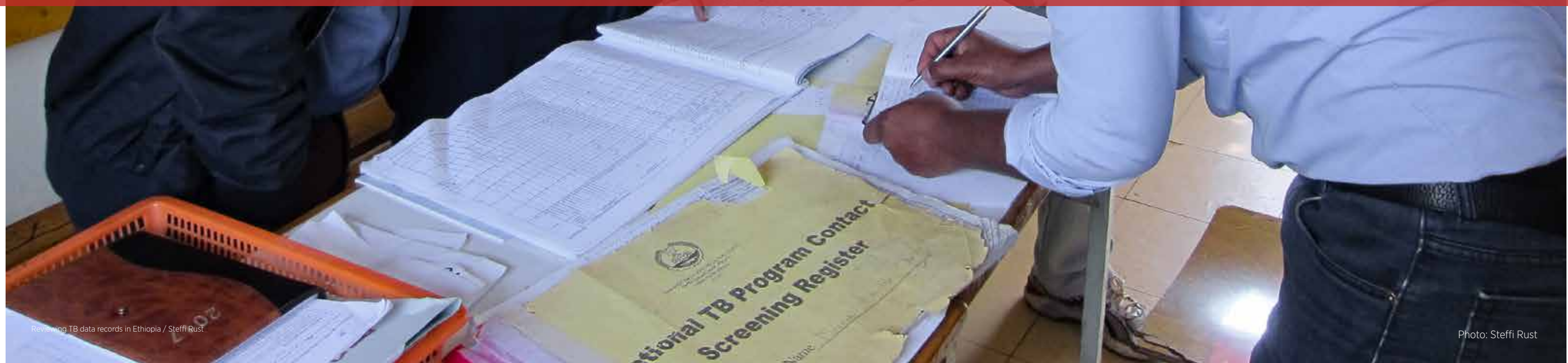
- "CTB in-country leadership engaged the NTP very well and were responsive to reasonable NTP needs in the shortest time possible. CTB participated in NTP- wide program reviews, giving the project an opportunity to have a broader understanding of what is happening in the entire program"
- "Ability to maintain high performance of program reaching national targets"
- "Identified evidence-based TB interventions that can work"
- "Joint planning for the National TB Annual Work Plan"
- "Testing out innovative strategies for case finding"
- "Flexible mechanism to address NTP's urgent needs"

RECOMMENDATIONS

- "Should be [a] big focus on sustainability of efforts and host country journey to self-reliance"
- "Adopt a more aggressive strategy to improve case finding and notification"
- "Deploying long-term TA with reporting lines to the NTP leadership other than the project leadership, minimize on STTAs"
- "Engagement of local organizations and enabling the system to do the work by itself rather than the project does the work"
- "Additional staff whilst welcome present a non-sustainable solution because with the end of the project they are gone. Future projects should focus on capacitation of NTPs for a more sustainable response and if additional staff are required they should be 'embedded' in the NTP so that Government may take over eventually"
- "Assist countries to build robust data systems for surveillance to find missing TB cases, guide geographical locations of subnational interventions with the ultimate goal of finding TB patients"
- "Transform TB data management and improve NTP capacity to do it on their own"
- "More data focused with an emphasis on identifying and fixing gaps along the TB continuum of care cascade"
- "Creating an accountability mechanism for joint planning and reporting at national level and involving all major program players i.e. Global Fund, USAID and others like World Bank project to minimize duplication and maximize impact."



Operations Research and Knowledge Management





Respondents of the knowledge, attitude, practice and behavior survey, Zimbabwe / Paidamoyo Mafava



Workshop on the development of an OR protocol for the introduction of Bedaquiline in Kyrgyzstan / Bakyt Myrzaliev

INTRODUCTION

One of the principles of the project was to share knowledge locally and across the project, contributing to the body of implementation science and supporting strategic choices. This exchange was facilitated through operational research and secondary data analysis. Manuscripts, conference presentations, technical/implementation briefs, and training materials were developed. All of these are available in the compendium of Challenge TB products, the report entitles Results and Dissemination of CTB Operations Research Studies, and the CTB website at: <https://www.challengetb.org/>

SNAPSHOT OF KEY RESULTS

- In total, 35 operations research studies were completed, of which 12 formed the basis for publications in peer-reviewed journals.
- Most research focused on patient-centered care and treatment (29%), enabling environment (23%), and comprehensive, high-quality diagnostics (23%).
- A total of 213 manuscripts were developed and shared through various channels, including conferences and peer-reviewed journal articles.
- A total of 33 technical/implementation briefs were developed by CTB country teams and partner organizations to share lessons from the project.
- In total, 213 abstracts were accepted and presented at the Union's annual international conferences.

213

MANUSCRIPTS DEVELOPED

33

TECHNICAL & IMPLEMENTATION BRIEFS PUBLISHED

OPERATIONS RESEARCH AND SECONDARY DATA ANALYSIS

Operations research was based on the *Framework for Operations and Implementation Research in Health and Disease Control Programs*, published by GF, USAID, WHO, the Special Program for Research and Training in Tropical Diseases, UNAIDS, and the World Bank. A standard approach was used for designing and approving country operations research studies, with rigorous technical review by experienced researchers within the CTB coalition and USAID. Country boards and NTPs reviewed proposals for studies and analyses to provide ethical approvals and permissions for data access and use.

EXAMPLES OF POLICY CHANGES BASED ON RESEARCH

- *Addressing tuberculosis control in fragile states: urban DOTS experience in Kabul, Afghanistan, 2009-2015* was published in PLoS One in 2017, and urban DOTS strategies and interventions were adopted as part of the Afghanistan TB National Strategic Plan for 2017-2021.
- *Cost-effectiveness of contact investigation, hospital linkages and semi active tuberculosis case finding at pagodas in Cambodia*: Use of a targeted, data-driven approach and alignment with other interventions were the key lessons in the publication, and these recommendations were used during joint program review and the development of Cambodia's National Strategic Plan on TB 2021-2030.
- *Assessment of GeneXpert MTB/RIF performance by*

type and level of health-care facilities in Nigeria was published in the Nigerian Medical Journal in 2019 and recommended that Nigeria rapidly scale up and decentralize GeneXpert services to the private sector, which showed significantly better performance. GeneXpert scale-up among private health care facilities is now part of the GF concept note and the National Strategic Plan.



GeneXpert in Zambia / Robertson Chibumba



The Union Conference in Hyderabad, India / KNCV

TECHNICAL BRIEFS

To share lessons learned from the project countries, country teams and partner organizations developed 36 technical briefs. Most of these focused on strategies and innovations for TB case finding (45%) and laboratory network, services, and optimization (30%). Sections of selected technical briefs are shown below and all are available in the Challenge TB Compendium of Technical Briefs.

Optimizing and Understanding the Use of Xpert MTB/RIF Testing (KNCV, 2019)

Using examples from Nigeria and Tajikistan, we described successful approaches to optimize Xpert MTB/RIF testing. The approach was to provide a package, including demand creation (awareness raising, capacity building of laboratory and clinic staff, and active case-finding activities), accessibility

(ensuring agreement on the Xpert4All policy, instrument placement based on population coverage, and linkage to a specimen transport system), and availability (ensuring proper maintenance and repair, reliable supply systems, human resources, and electrical supply).

Using mHealth to Self-Screen and Promote TB Awareness in Tanzania (PATH, 2019)

In Tanzania, CTB focused on reaching communities to increase awareness and demand for TB services, since one of the country's strategies is to increase case notification. PATH partnered with the NTLN and Cardno Tanzania to develop a mobile application that allows people to self-screen for TB using a basic mobile phone to increase knowledge and awareness, and to promote and verify adherence for patients put on treatment. From September 2018 to April 2019, 229,898 individuals self-screened using the application.

Lessons included the need for a strategy on the follow-up of presumptive patients identified.

Patient Enrollment in Shorter Treatment Regimen under National DR-TB Program: Lessons from Bangladesh (MSH, 2019)

CTB was asked to support the revision and finalization of the draft SOP for programmatic implementation of the STR, incorporation of aDSM, and adaptation of the current recording and reporting forms to accommodate STR data. Between April 2017 and December 2018, 1,242 patients were enrolled on the STR. Patient support and strengthening of laboratory services are important prerequisites for the implementation of the STR.

UNION WORLD CONFERENCES ON LUNG HEALTH

In total, 213 abstracts were accepted and presented at the Union's annual international conferences. The table below shows the description by type and year of presentation. Details of publication will be part of the Challenge TB Contribution to the Implementation Science document:
https://www.challengetb.org/publications/CTB_Science.pdf

RECOMMENDATIONS

- All operations research must be country driven, both so that it has the best chance of being applied in TB programs and so that research capacity is transferred to local institutions.
- In the context of a five-year project, studies should begin within the first two or three years so that they can be finished and their findings shared and applied before the end of the project.
- Return on investment—application of research and evidence of its utilization—is difficult to track. A process for M&E of the impact of research and reports or publications should be designed as part of every study. For example, researchers can return to study sites or follow up with NTP managers six months after the dissemination of the findings to verify if an innovation has been successful.

	Cape Town	Liverpool	Guadalajara	The Hague	Hyderabad	
	2015	2016	2017	2018	2019	Total
Poster	11	17	23	41	16	108
Other	1	0	37	2	0	40
Oral Presentation	5	7	12	13	5	42
Abstract	0	0	17	5	0	22
E-poster	0	6	2	3	8	19
Symposium	2	5	0	0	1	8
Postgraduate Course	0	0	3	1	0	4
Total	19	35	94	65	30	243



Country Profiles and Achievements

AFGHANISTAN

“The majority of us suffered from TB, and so we feel the pain and suffering of other people who are suffering from TB, it makes us happy to help TB patients, and to change their lives for the better.”

TB Association Member - trained by CTB to identify and refer presumptive TB patients for diagnosis and treatment.



TB awareness raising with school children in Afghanistan / Dr Ahmad Gul

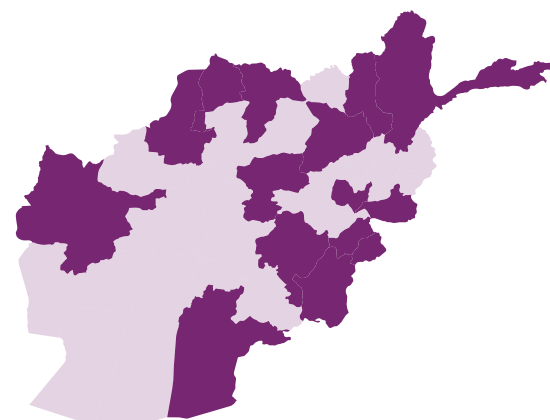
TB BACKGROUND

- TB incidence - 189 cases per 100,000 population
- TB mortality rate 29 per 100,000 people
- The case notification rate for new TB cases 148 per 100,000 people (i.e., 73% treatment coverage)
- The TSR (2017 cohort) 91%.
- In 2018, 452 RR/MDR-TB cases were notified and 327 of them were enrolled on treatment
- The TSR (2016 cohort) of 85 RR/MDR-TB patients 61%.

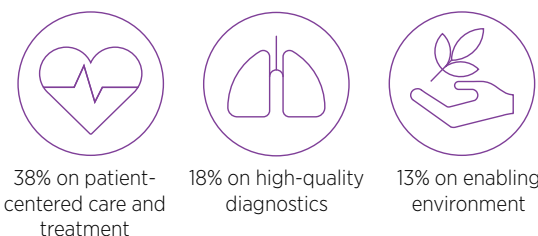
PROJECT BACKGROUND

- The project was implemented from 2015 to 2019 by MSH in collaboration with KNCV and local and international NGOs.
- CTB supported NTP to improve universal access to TB services (Urban DOTS and CB-DOTS), strengthening health system, TB infection control, and strengthening M&E and operations research.
- CTB supported NTP to achieve its strategic objectives of increasing case detection and treatment outcomes for case detection, diagnosis, treatment, TB infection control, and TB in children in 15 provinces (i.e., 65% of total country population).

GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS



CTB KEY PRIORITY INTERVENTIONS



Roll-out of new drugs and regimens



Specimen Transportation System



Laboratory Strengthening

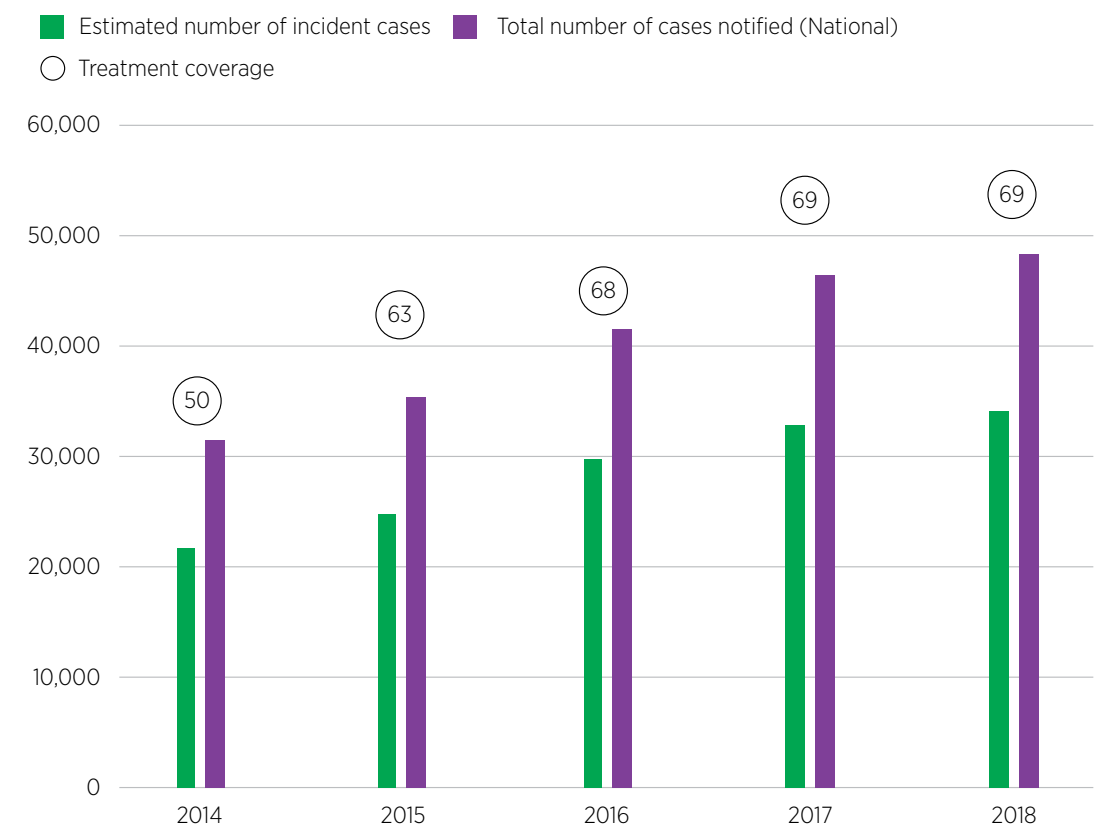


Innovative Case Finding



TB Preventive Treatment

NUMBER OF CASES NOTIFIED AND TREATMENT COVERAGE



CASE FINDING

National TB treatment coverage increased from 50% in 2014 to 69% in 2018. Community-based case finding approaches such as CB-DOTS, urban DOTS (by engaging private healthcare providers), and contact screening as well as childhood TB and TB case finding among prisoners contributed to the increasing trends both nationwide and in CTB-targeted areas

QUALITY DATA, SURVEILLANCE AND M&E

CTB assisted NTP and the MOH to build on the gains from previous USAID supported projects in M&E, surveillance and research. The TB information system was integrated into the national health information system and electronic reporting was enhanced. Electronic reporting improved from 40% in 2014 to 98% completeness and timeliness of reported TB data.

LABORATORY STRENGTHENING

CTB assisted NTP to decentralize MDR-TB diagnostic services through the provision of 30 GeneXpert machines in 15 CTB-supported provinces and one complete set of LPA with all accessories required for DST. From January 2015 to December 2019, CTB provided 56,800 cartridges and performed 43,800 GeneXpert tests and notified 16,295 (46%) MTB positive and 569 RR-TB cases. Thanks to these efforts, the RR-/MDR-TB case notification increased from only 18 RR-TB cases in 2017 to 381 in 2019 in CTB intervention areas.

CTB set up a sample transportation system to test new and previously treated smear positive TB cases for RR/MDR-TB. The CTB contribution was only 500 tests in 2017, but increased to 8,467 in 2019.

CTB assisted the NTP to maximize the utilization and functionality of GeneXpert machines by introducing the GxAlert laboratory connectivity system. Forty-five GeneXpert machines in 25 provinces were connected to GxAlert and CTB trained 45 laboratory technicians and 5 provincial lab supervisors in those provinces on the use of the system.

69%

TREATMENT COVERAGE IN 2018
- UP FROM 50% IN 2014



Sputum collection for testing in Afghanistan / Sayed Mirza



Tristan Bayly

BANGLADESH

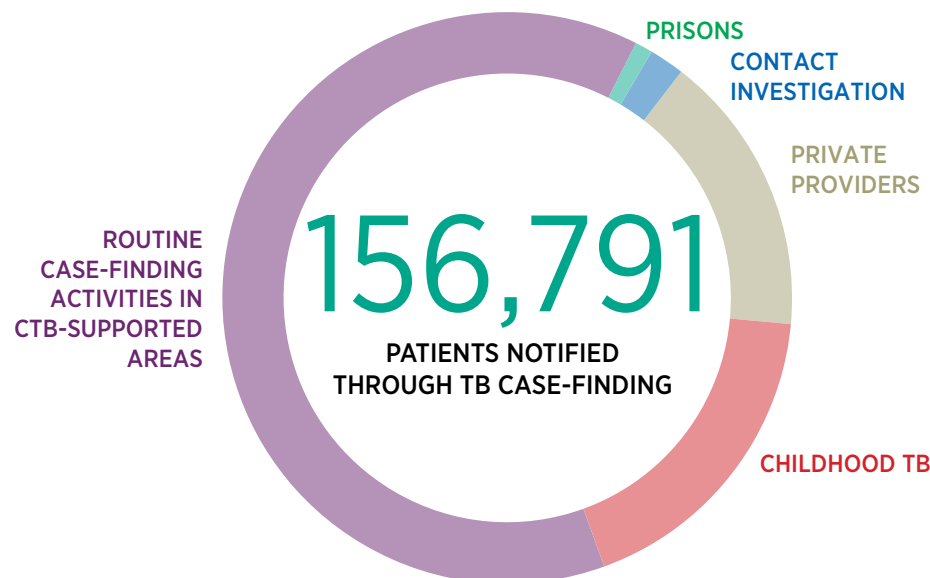
“I have diabetes and I thought it was under control, then I started having problems with my blood sugar level, I was irritable one minute and unbelievably fatigued the next. I was diagnosed with TB and put on treatment. Thankfully things are slowly getting back to normal.”

Minara - Diabetes sufferer and cured TB patient from Sylhet in north-east Bangladesh

BEST PRACTICE

Launched in July 2009 in Kabul, Urban DOTS allowed TB services to be brought closer to patients and resulted in significant improvement of case notification and quality of TB services. In addition, engaging private health sector in TB service provision enabled the NTP to increase case detection in supported provinces. Urban DOTS changed the passive strategy of contact screening into an active strategy and reached more index case households and provided IPT for children.

CB-DOTS is an effective approach to bring TB services to the doorsteps of TB patients, increase community awareness and decrease stigma around TB. CB-DOTS increased coordination among health care staff and community, it helped to improve knowledge of community and motivated health facility staff and CHWs.



43,800

GENEXPERT TESTS NOTIFYING 16,295 MTB AND 569 RR-TB CASES

TB BACKGROUND

- Bangladesh is one of the world's 30 high-TB-burden countries.
- Annual estimated incidence rate of 221 per 100,000 population (357,000 TB patients).
- TB mortality rate of 29 per 100,000 population.
- An estimated 25% of all TB patients remain undetected.
- Estimated incidence rate of 3.7 per 100,000 population (47,000 MDR-TB patients), meaning that MDR-TB is a huge challenge for the country.

PROJECT BACKGROUND

- The project was implemented from 2015 to 2019 by MSH in collaboration with IRD and KNCV and 13 local NGOs.
- CTB support at both national and service delivery levels to the NTP to strengthen leadership, human resources, health financing, medical products and technology, innovation, and research.
- Covered 12% of the country's population (Oct. 2014-Sept. 2017 see map) but was scaled down to Dhaka City (2% of population).

GEOGRAPHIC COVERAGE



78%

TREATMENT SUCCESS RATE FOR MDR-TB IN 2018 - UP FROM 72% IN 2014

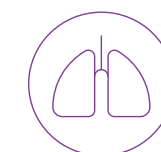
HIGHEST EXPENDITURE AREAS



34% on patient-centered care and treatment



28% on enabling environment



21% on high-quality diagnostics

INCREASE IN CASE NOTIFICATION AND TREATMENT COVERAGE



Nurse giving MDR-TB patient medicine in Bangladesh / Naoshin Afroz

CASE FINDING

National TB treatment coverage increased from 56% in 2014 to 75% in 2018. Active case finding approaches such as FAST (2017-2019), hospital engagement (TB-diabetes), contact investigation, and childhood TB were implemented through local NGOs, and directly by the project in urban areas.

MDR-TB CARE AND TREATMENT

From 2015 to March 2019, 1,872 patients were enrolled on the STR. CTB supported the NTP in 2017 to roll out the new regimen by updating SOPs, developing and providing training to HCWs. Community-based PMDT activities were also supported. CTB also provided incentives for nutritional support for patients and an incentive for DOTS providers to monitor patients and report any adverse effects. Which led to a close in the treatment gap and increased TSRs.

LABORATORY STRENGTHENING

In collaboration with the NTP (which covered 33% of the cost) the first prefabricated Biosafety Level 3 Laboratory in Bangladesh was established in Sylhet Division. CTB provided support to revise the EQA policy, and maintenance support was provided to further strengthen diagnostic capacity. GxAlert software was installed on all GeneXpert machines. This resulted in all 39 GeneXpert and more than 89% of modules being functional, compared to only 69% in 2015. CTB also supported a sample transport system in three city corporations and 22 districts from October 2014 to September 2017. Samples from 2,314 presumptive DR-TB patients and 1,700 DR-TB patients on treatment were collected and transported.

CTB KEY PRIORITY INTERVENTIONS

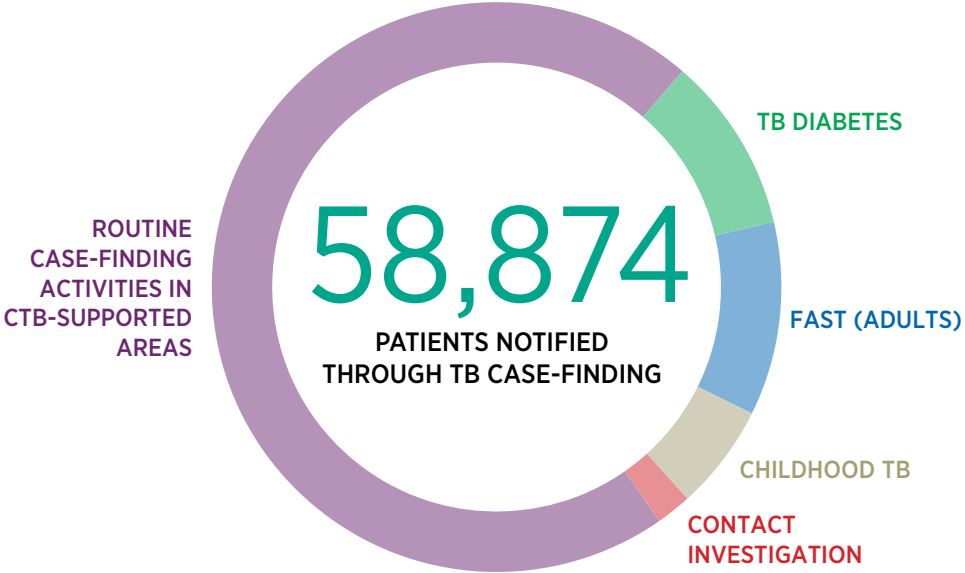
- Roll-out of new drugs and regimens
- Diagnostic Connectivity
- Laboratory Strengthening
- Innovative Case Finding
- TB Preventive Treatment

1,872
PATIENTS ENROLLED ON THE STR

TB PREVENTION SCALED UP AND INSTITUTIONALIZED

A demonstration project on systematic contact investigation and community-based preventive treatment was implemented among the household contacts of 883 DS-TB patients. The contacts who were identified as TB free were approached and enrolled in preventive treatment using a 12-dose weekly 3HP regimen. A total of 3,193 contacts were screened and 1,673 were identified as eligible for TB preventive treatment; of those, 1,216 started 3HP and 97% (1,175) completed all 12 doses.

CTB supported the NTP to formulate a TB infection prevention and control working group, develop an infection control training curriculum and manuals for facilitators and participants, and train trainers on TB infection prevention and control.



BEST PRACTICE

Active case finding has proven to be an effective strategy to improve TB case detection. It needs to be supported by strengthening the diagnostic network with timely maintenance, which can improve early TB case detection and treatment.



NUMBER OF INCIDENT TB CASES, TOTAL CASES NOTIFIED, AND TREATMENT COVERAGE



TB BACKGROUND

- Botswana is among the top 30 TB/HIV high burden countries
- TB incidence - 275 per 100,000 population
- TB/HIV incidence - 148 per 100,000 population
- TB mortality - 78 per 100,000 population
- TB/HIV mortality 53 per 100,000 population
- TB treatment coverage is 59%.

PROJECT BACKGROUND

The project was implemented from January 2015 by KNCV and provided support to the NTP at national level on various interventions and was 100% PEPFAR funded.

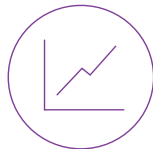
CASE FINDING

Treatment coverage was 71% on average between 2014 and 2018, while incidence was decreasing until 2018. Following the national TB strategic plan 2018-2023, CTB supported the development of national ACF strategies including optimizing of the GeneXpert utilization, (digital) chest X-ray capacity, and Computer Aided Diagnosis for TB (CAD4TB) to find and treat all missing persons with TB.

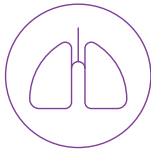
GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS



45% on quality data, surveillance and M&E



24% on high-quality diagnostics



11% patient-centered care and treatment

MDR-TB CARE AND TREATMENT

The average treatment success rate for DR-TB has been 69% for the 2013-2016 cohorts, exceeding the global and African average. A total of 397 DR-TB patients, including six MDR-/XDR-TB patients, were notified and enrolled on treatment from 2015 to September 2019. Of these, a total of 70 DR-TB patients were initiated on ITR including BDQ (62) and DLM (8). By providing technical and financial support the MDR-TB guidelines were aligned with WHO treatment guidelines for DR-TB including the use of ND&R. CTB also supported the NTP in implementation of SL-LPA as a first and only rapid test for detection of additional resistance in MDR-TB patients as well as XDR-TB.

GENEXPERT AND CONNECTIVITY

GeneXpert MTB/RIF was adopted as the initial diagnostic method for all TB presumptive patients in May 2016. However, the implementation was not optimal, and there was an underutilization of the GeneXpert platform. For instance, the proportion of new TB cases tested for RR-/MDR-TB stood at 68% by the end of 2018. The total number of GeneXpert tests has increased from 1,181 tests in 2014 to 21,307 in 2018. The number of MTB and RR positive test results detected increased from 227 MTB positive and 86 (38%) RR positive to 2,142 MTB positive and 81 (4%) RR positive, respectively, during the same period.

Since the implementation of GeneXpert in 2012, GeneXpert facilities have increased from the 13 to 36 in 2019 across all 27 health districts in Botswana. At the end of the project, 31

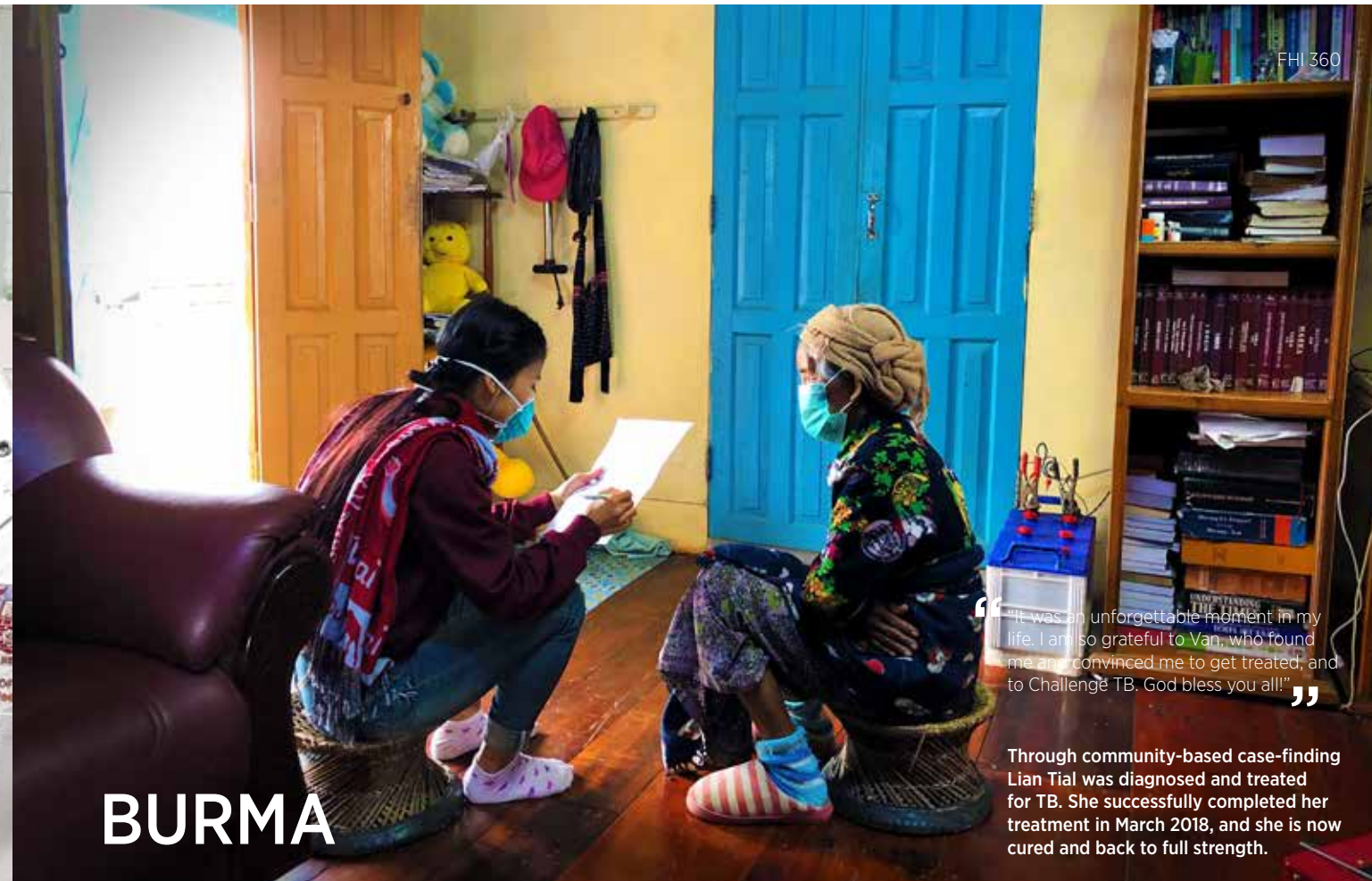
out of 36 (86%) GeneXpert devices have the GxAlert software installed and are registered on the platform. Over the past three years, CTB procured 12,500 cartridges to minimize interruptions with GeneXpert testing. With the many interventions put in place, GeneXpert utilization, defined as the number of tests conducted divided by standard instrument capacity, has increased from 8% in Year 3 to 40% in Year 5.

397

DR-TB PATIENTS ENROLLED ON TREATMENT



Lab technician setting up GeneXpert equipment for testing in Botswana. Weyan Dlamini



FHI 360

“It was an unforgettable moment in my life. I am also grateful to Van, who found me and convinced me to get treated, and to Challenge TB. God bless you all!”

Through community-based case-finding Lian Tial was diagnosed and treated for TB. She successfully completed her treatment in March 2018, and she is now cured and back to full strength.

BURMA

TB/HIV COLLABORATIVE ACTIVITIES

A demonstration project on systematic contact investigation and community-based preventive treatment was implemented among the household contacts of 883 DS-TB patients. The contacts who were identified as TB free were approached and enrolled in preventive treatment using a 12-dose weekly 3HP regimen. A total of 3,193 contacts were screened and 1,673 were identified as eligible for TB preventive treatment; of those, 1,216 started 3HP and 97% (1,175) completed all 12 doses.

CTB supported the NTP to formulate a TB infection prevention and control working group, develop an infection control training curriculum and manuals for facilitators and participants, and train trainers on TB infection prevention and control.

BEST PRACTICE

To keep up with the changing programmatic management for DR-TB a robust health system platform is necessary. This can be achieved by engaging all TB stakeholders in updating guidelines, capacity building, dissemination of guidelines and appropriate SOPs including drugs and supplies to the last mile.

CTB KEY PRIORITY INTERVENTIONS

-  Roll-out of new drugs and regimens
-  Diagnostic Connectivity
-  Laboratory Strengthening
-  TB Preventive Treatment

21,307

GENEXPERT TESTS IN 2018 NOTIFYING
2,142 MTB AND 81 RR-TB CASES

TB BACKGROUND

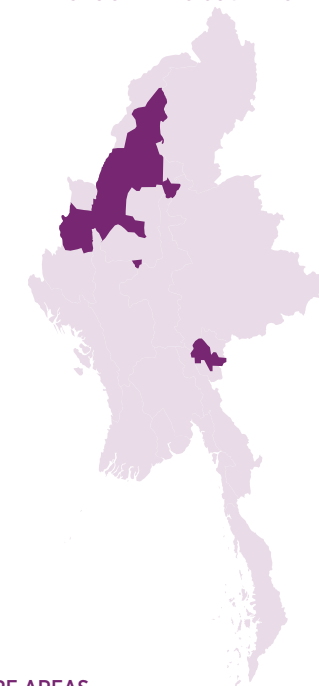
- Burma is among the top 14 high TB, TB/HIV, MDR-TB burden countries
- TB incidence per 100,000 population is 388 (29 for TB/HIV, and 21 for RR-/MDR-TB)
- TB mortality per 100,000 population is 46 (7 for TB/HIV)
- TB treatment coverage is 76%, leaving 24% (43,440 TB cases) missed in the country.

PROJECT BACKGROUND



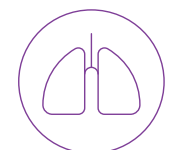
- Implementation started in May 2015, led by FHI 360 in collaboration with The Union, KNCV, IRD, two local community-based organizations (MHAA and PGK) and an international NGO (World Vision).
- In the first two years, CTB focused on supporting the NTP at the national level and in 2017 started interventions in seven regions covering 11%

(5.7 million) of the country's population. The areas of work include reaching hard-to-reach patients, strengthening access to high-quality TB diagnostics, strengthening the MDR-TB response in Yangon Region, and building the NTP's capacity through targeted TA to develop policies and tools for key technical priorities.

GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS

-  46% patient-centered care and treatment
-  17% on enabling environment
-  14% on high-quality diagnostics

NUMBER OF TB CASES NOTIFIED AND TREATMENT COVERAGE



CASE FINDING

From 2014 to 2018 treatment coverage increased from 64% to 76%. CTB implemented various case finding interventions such as finding patients in hard to reach areas (i.e., 22 townships in Sagaing, Chin and Kayah), DPPM/FAST in public hospitals (three general hospitals and three TB/HIV hospitals) and in pharmacies/drug shops (in 15 drug seller intervention townships in Bago region), Childhood TB (national level support by updating policies and guidelines), and screening household contacts of (MDR-) TB patients in 13 high-burden townships in Yangon Region.

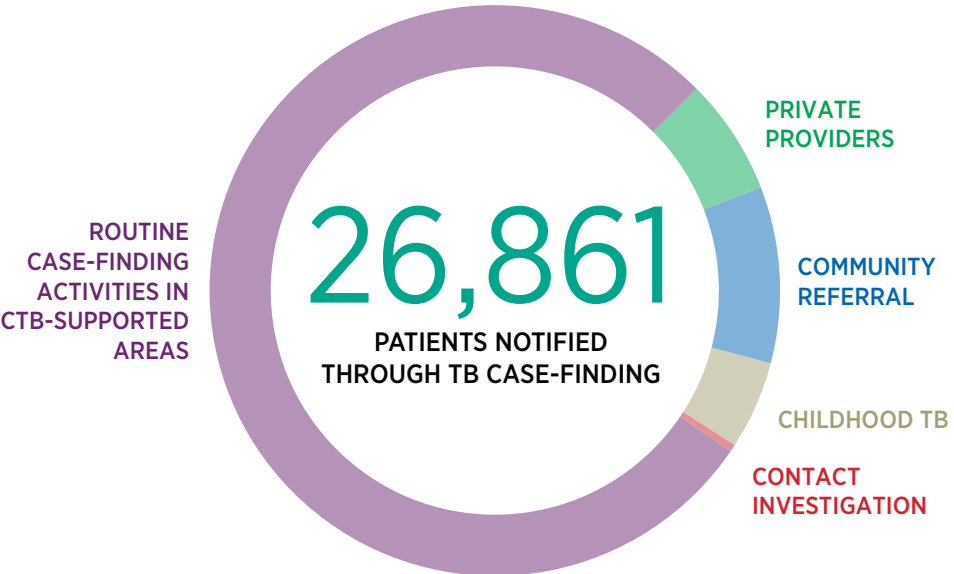
LABORATORY NETWORK STRENGTHENING

To improve the quality of laboratory services for TB and MDR-TB diagnosis and management, CTB provided STTA and LTTA to implement the LQMS. Additionally, TA was provided to strengthen the capacity and skills at national level laboratories. The TA focused on quality c/DST for first- and second-line TB drugs by providing day-to-day mentoring and supportive supervision. The number of tests performed and the utilization rate improved every year with 41,957 tests and an utilization rate of 26% in 2015 to 130,060 tests and 48% utilization rate in 2018.

CTB established sputum collection centers which served 12,807 presumptive TB patients by transporting 25,614 samples for diagnosis (2 samples per patient) and identifying 194 bacteriologically confirmed TB patients. This represents 27% of all notified bacteriologically confirmed patients from the 22 CTB-supported townships in hard-to-reach areas.

INTRODUCTION OF NEW DRUGS AND REGIMENS

As of 2016, 375 patients were enrolled on ITR (303 BDQ, 21 DLM, 51 BDQ/DLM combined). The STR pilot started in November 2017 and 534 patients were enrolled up to June 2019. The aDSM was introduced to ensure quality care for patients on ND&R. In 2018 and 2019, CTB supported eight National Core Committee for aDSM (NCCA) meetings. These served as a venue for causality assessment and case review. As a result all patients on ND&R were covered under the aDSM system. The aDSM data was also submitted to the global aDSM database. This resulted in revised and improved national DR-TB management and treatment policies which greatly improved patient health outcomes.



BEST PRACTICES

Strategizing interventions based on assessments to address the highest priorities - focus on gaps in achieving NSP targets and ensuring that activities are aligned with national priorities, and avoid overlap with other TB partners.

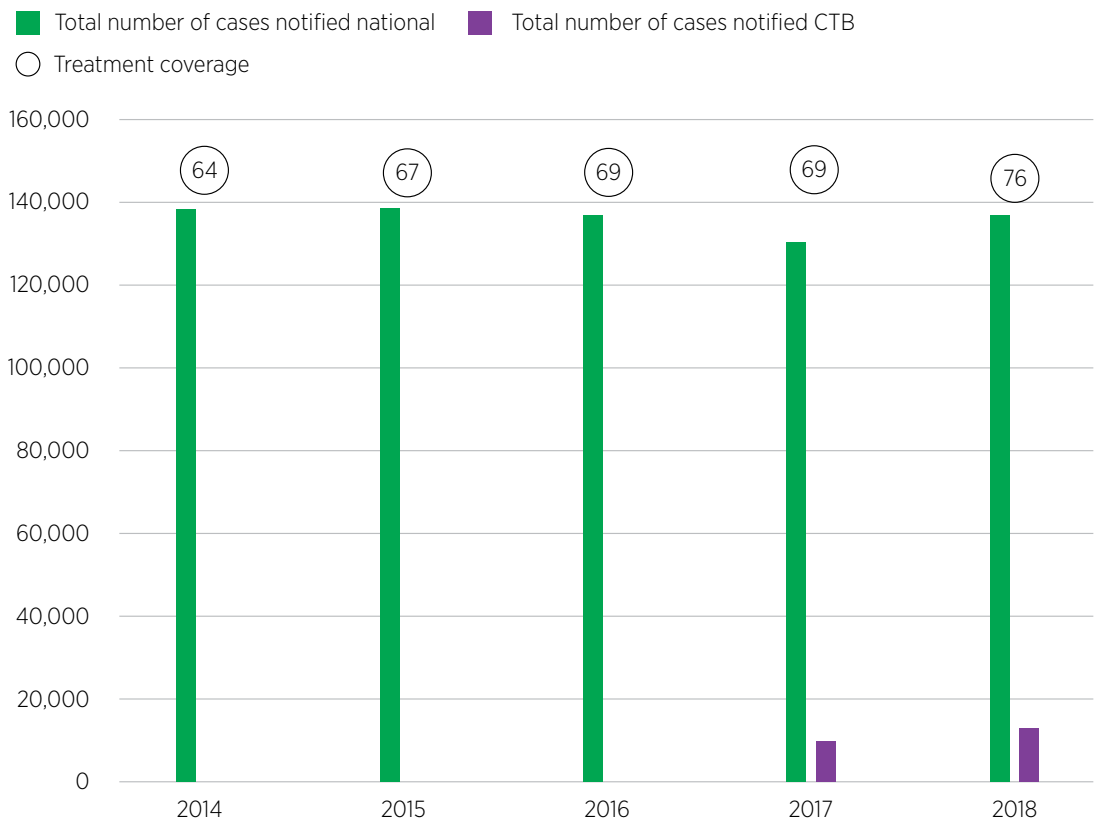
Improving collaboration and coordination with in-country TB partners - collaboration and coordination with existing in-country technical agencies, local and international organizations and funding agencies is essential to understand what was happening on the ground, what is needed, and how to effectively participate as an integral partner in TB care and management.

CTB KEY PRIORITY INTERVENTIONS





NUMBER OF TB CASES NOTIFIED AND TREATMENT COVERAGE



TB BACKGROUND

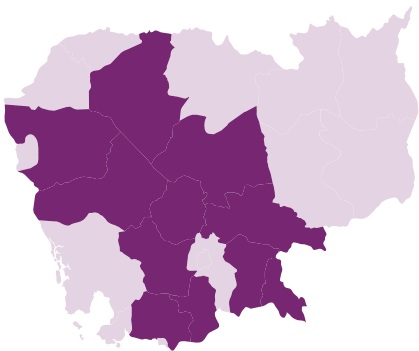
- Cambodia is among 30 high TB burden countries
- TB incidence 302 per 100,000 population
- TB mortality 21 per 100,000 population
- TB treatment coverage is 58%.

PROJECT BACKGROUND

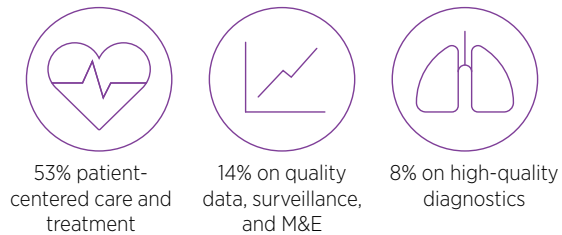
- CTB was implemented from October 2014 to September 2019 as a continuation of previous USAID TB prevention and treatment projects including TB CARE I (2011 to 2015) and TB CAP (2006 to 2010).
- FHI 360 was the lead implementing partner and supported the NTP to increase TB case notifications, and to close the gap of “missing cases” through innovative interventions from health facility to community levels.

- Between October 2015 and March 2018 the project worked with 364 health centers and 25 operational districts (ODs) in 12 provinces. CTB also implemented Hospital Linkages (HL) activities in 16 Referral Hospitals (RH) within 9 operational districts. In addition, CTB provided technical and financial support to local organizations to implement PMDT and ACF nationwide. These target areas have now transitioned to the NTP under GF support.

GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS



CASE FINDING

The project achieved a continuous increase in the number of TB case notifications from 2015 to 2017 despite an overall reduction in national TB cases.

The scope of the case finding interventions varied in coverage areas and time frames. The main intervention contributing to the total case notification were contact investigation and active case finding at health facilities (Hospital Linkages). From 2015 to March 2018 TB detection among elderly in religious settings (screening in pagodas), and children were also supported. The approaches for increased case detection were transitioned and expanded for scale-up by the NTP with support from GF.

MDR-TB CARE AND TREATMENT

In 2015-2019, cumulatively, 508 MDR-TB patients were enrolled in treatment - on STR (155), on regimens containing the BDQ (33), DLM (2) and on an individualized treatment regimen (318). Working towards sustainability for lasting impact, CTB collaborated with key partners, including the NTP, to develop platforms and six SOPs to provide technical guidance to improve TB diagnosis and treatment.

CTB KEY PRIORITY INTERVENTIONS

- Roll-out of new drugs and regimens
- Laboratory Strengthening
- Innovative Case Finding
- TB Preventive Treatment

508

DR-TB PATIENTS ENROLLED ON TREATMENT



Village Health Support Group reviewing TB data in the contact investigation record, Cambodia / Ngo Menghak



The Union

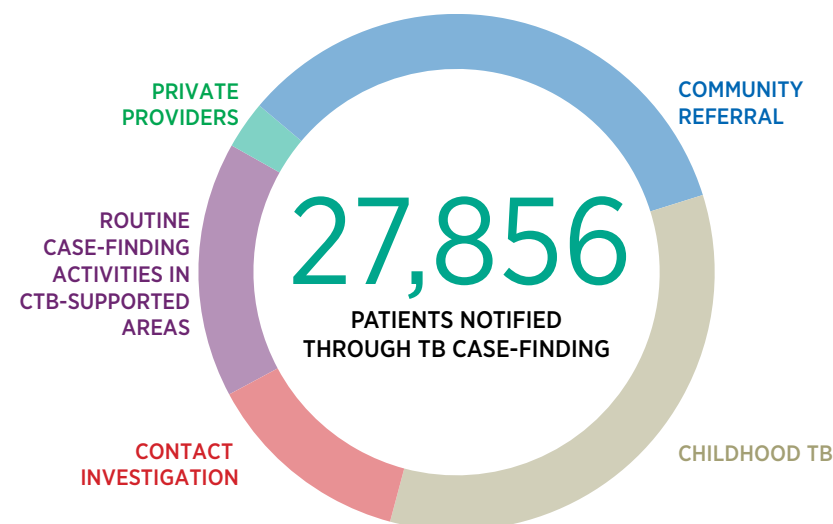
DR CONGO

“I was having trouble sleeping at night. At first, I thought I was just tired from work. But my health continued to deteriorate, and at a certain point, I could not manage to walk any more.”

Kapinga Kabeya from DR Congo, who got pregnant whilst on treatment. Today she is cured of TB, and her baby is in good health.

TRANSITIONING CTB INNOVATIONS TO THE NTP

Together with key partners, including the NTP, the following platforms and SOPs were developed to provide technical guidance to improve TB diagnosis and treatment: eTB Manager, national TB laboratory guidelines (technical guidance on microscopy, GeneXpert, culture, and DST), guidelines on PMDT for implementation and scale-up of ND&R, national training curriculum on childhood TB as well as SOPs on hospital linkages, contact investigation and active case finding. All these documents have been transitioned to the NTP, NGO partners, and donors for their TB activities.



BEST PRACTICE

The hospital linkage approach was found to be more cost-effective and sustainable than active case finding and contact investigation (higher yield with a minimum cost: \$68 per case diagnosed) and has been streamlined into the health system. A high proportion of TB cases were identified through

case finding in the other settings (e.g., congregate settings, the community); while these strategies appear promising, further analysis of their cost-effectiveness is needed to support future scale-up and sustainability. In addition, quality assurance on TB diagnosis needs to be integrated to ensure that patients receive the correct diagnosis and treatment.

TB BACKGROUND

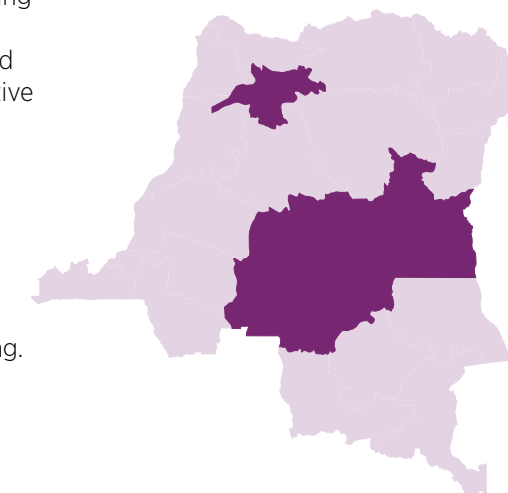
- DR Congo is among the top 30 TB/MDR-TB/TB/HIV high burden countries
- TB incidence 321 per 100,000 population (37 for TB/HIV, and 7 for RR-/MDR-TB)
- TB mortality 63 per 100,000 population (12 for TB/HIV)
- TB treatment coverage is 63%.

PROJECT BACKGROUND

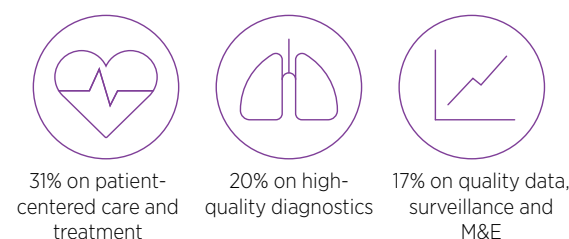
- The project started in February 2015 and was implemented by The Union in collaboration with MSH and four local CBOs
- Implementation started with national support (technical assistance on procurement supply management, policy and guidelines) and direct service delivery in 11 provinces (2015-2018) and was scaled down to five provinces as of March 2018. The coverage varied from 30% (24M) to 19% (17M) of the country's population.

- The main focus of CTB interventions was on improving case detection through support to the NRL, improved specimen transportation, active case finding among high-risk populations, integration of private (for profit) health facilities and community involvement for active TB screening.
- From 2015-2017 the project also received PEPFAR funding.

GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS



NUMBER OF TB CASES NOTIFIED AND TREATMENT COVERAGE



CASE FINDING

The number of case notifications increased during the CTB implementation period, with 184,510 TB cases all forms out of the target of 201,330 notified from 2015 to March 2019 along with an increase in treatment coverage (from 48% in 2014 to 63% in 2018). Various case finding interventions that were implemented contributed to the case notification. CTB supported CBOs, private providers, screening of household contacts and case finding among risk groups (such as children, miners, prison population). There was a continuous increase in case notifications through community referral and contact investigation. This improved TB case finding was linked to the increased support provided at community level by the four local NGOs contracted through CTB for the following activities: awareness raising, door-to-door strategy, home visits and

specimen transportation. Among these activities, the door-to-door strategy facilitated finding of the largest number of TB cases and was considered as one of the most important activity implemented by the project.

GENEXPERT TESTING

The GeneXpert utilization rate increased to 50% in 2019 from 12% in 2015. A total of 68,890 sputum samples were transported for TB diagnosis in CTB areas. This was mainly due to the improvement of the specimen transportation system, the engagement of community workers, and the use of an adjusted diagnostic algorithm of GeneXpert as the first test for all new TB cases.

CTB KEY PRIORITY INTERVENTIONS

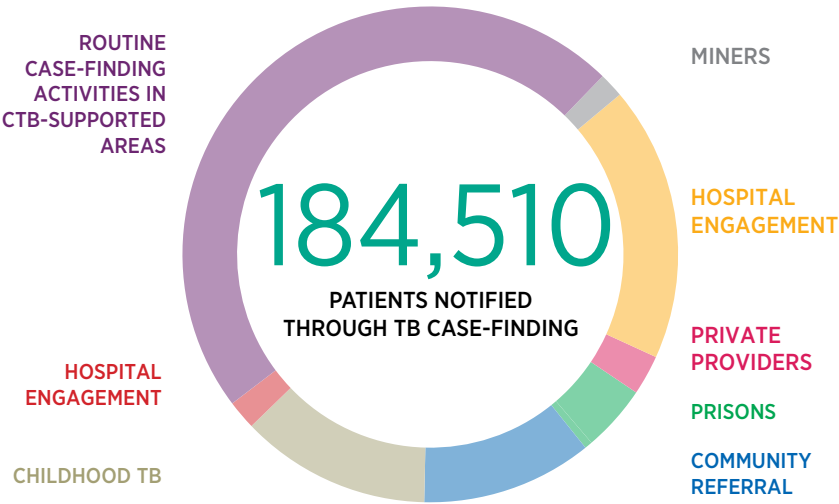
- Roll-out of new drugs and regimens
- Laboratory Strengthening
- Specimen Transportation System
- Innovative Case Finding
- TB Preventive Treatment

761

TB PATIENTS STARTED ON ND&R

MDR-TB CARE AND TREATMENT

A total of 786 DR-TB patients, including four pre-XDR-/XDR-TB patients, were notified in the CTB areas from 2015 to June 2019. Of these, a total of 761 DR-TB patients were initiated on the STR and the ITR-BDQ. This result was achieved by screening all individuals at risk of DR-TB, expanding Xpert use in TB diagnosis, strengthening the sample transportation system and supplying the NTP with an LPA machine and reagents. In addition, to increased availability of second-line drugs, support for initial assessment testing and expansion of the 9-month short-course treatment regimen.



LESSONS LEARNED

The implementation of EQA, availability of solar kits, improved specimen transportation system at reduced costs (by creating a specimen transportation map) has contributed to the improvement of TB and MDR-TB diagnosis. DR-TB

management benefited from the revised national DR-TB guidelines to include STR as well as support provided to clinical management (e.g. initial and follow-up assessment, nutritional and psycho-social support for treatment adherence, etc.).



People crossing the River Dawa from Ethiopia into Kenya / Victor Ombeka

EAST AFRICAN REGION



Children in Uganda / Tristan Bayly

PROJECT DESIGN

- The project initiated cross-border TB activities in 13 border areas covering eight countries (Djibouti, Ethiopia, Kenya, Uganda, Somalia, South Sudan, Sudan and Tanzania).
- Most of these countries are among the top 30 high burden TB, TB/HIV, MDR-TB countries.
- The project was designed as a regional project covering activities that are beyond the capacities of individual countries.

PROJECT BACKGROUND

- In 2015 the project started and was implemented by KNCV with the Union and MSH as collaborating partners and worked together with the East Central and Southern Africa Health Community (ECSA-HC), the PMDT Centre of Excellence (CoE) in Rwanda, the Supra National Reference laboratory

(SNRL) in Uganda and the Intergovernmental Authority on Development (IGAD) in Eastern Africa.

- At the start, CTB worked with the CoE on regional training for childhood TB. The project aligned its activities with the Intergovernmental Authority for Development (IGAD)/East Central and Southern Africa Health Community (ECSA-HC) region.

GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS



53% on enabling environment



21% on human resource development



11% on drug and commodity management systems

CROSS-BORDER TB ACTIVITIES

A total of 2,690 TB patients were notified across five of the eight border areas that used the inter-country referral tool which was developed by CTB to support the 13 border health committees that were formed to facilitate coordination and communication amongst the border area facilities. Of the patients notified 121 patients were successfully transferred across the border areas. The inter-country referral system tool and protocol were shared with the NTPs from the IGAD region. The country referral tool has shown the need for ongoing communication between the border health facilities across the countries and support from the cross-border health committees and the NTPs.

REVIEW OF TB GUIDELINES

Through desk review, in-country consultations, and a validation meeting all the TB policies and guidelines of the IGAD member states were reviewed to identify areas for harmonization. Following this, the member states made the following recommendations:

1. Strengthen commitment, communication, and coordination among IGAD member states.
2. Align interventions and approaches to ensure sustained and effective management and follow-up of TB patients from cross border populations
3. Enhance mechanisms that provide effective management and follow-up of TB in cross border populations.

ASSESSMENT OF TB HEALTH SERVICES

Informed planning and implementation of cross border activities was made possible by the assessment of cross border and mobile populations and TB health services. The assessment was done in 25 border districts to document the current barriers and challenges for the target populations; existing and potential social and health resources; stakeholders in selected sites and potential linkages. The assessment found that the investment in TB services and management is low and that there is a lack of harmonized referral systems and TB management protocols across the border areas.



Baby in Uganda / Tristan Bayly



A TB patient accompanied by a community mobilizer arrives at hospital in South Sudan / MSH

REVIEW OF EXISTING CHALLENGES

With CTB support, a roadmap was developed based on the combined review and cross border and health services assessment. This roadmap outlines the steps that need to be taken to transition from a paper-based reporting system to a fully digital system. The review found that there are no inter-country referral mechanisms in place, although patients are moving between the countries. The need for inter-country referral systems was confirmed by the review and formed the basis for developing a roadmap.

SUPPORT TO DRUG AND COMMODITY MANAGEMENT

To ensure that TB medicines (especially SLDs) do not expire in one country due to overstocking while another is stocked out, the project supported the development of a regional TB commodities portal at the East, Central and Southern Africa Health Community (ECSA-HC). This electronic platform is designed to improve data visibility and facilitate monitoring of commodities in ECSA countries. After piloting in Tanzania, the portal was scaled up to Rwanda and Uganda. It is now being used to create reports to disseminate TB commodities supply chain information including stock status, pipeline monitoring and selected indicators. This enables borrowing and redistribution of anti-TB drugs in the region. The portal is live at: <https://ecsasportal.org>

BEST PRACTICES

Implementation of a regional project: the pace of implementation of activities was slow compared to the country projects. There must be buy-in from the different countries before activities can be initiated. This calls for intensive advocacy and continuous communication with the different countries and requires support in terms of technical assistance. Country implementation is not the focus as this can be taken up by the countries themselves. Additionally, the technical assistance should be focused on the development of tools, guidelines and supportive systems.

Cross-border TB control activities: all stakeholders need to be involved, i.e. immigration officials, security officials, national health officials, district health officials, NTPs and partners working in the area.

To ensure ongoing communication cross-border committees should be in place on both sides of the countries. In addition, a regional body that can facilitate communication with the member states helps avert stockouts and medicine wastage.

Security: to mitigate security risks projects need to work closely with government officials, partners on the ground, and their headquarters and safety organizations such as the International NGOs Safety Organization to ensure that implementers receive regular updates of the security situation on the ground to inform the planning of activities.

2,690

TB PATIENTS NOTIFIED USING THE INTER-COUNTRY REFERRAL TOOL DEVELOPED WITH CTB SUPPORT



Berhan Teklehaimanot

“I was really happy to find out what was wrong with my child. When I was sick, I went to a private health facility to get help, and it took more than five months to diagnose me with TB. When I started treatment, my child was already coughing and had lost his appetite. The doctor asked for a stool sample, and he was tested the same day.”

Almaz Irdaw and her son Issayas both had TB. Both are now recovered and back to full health

NUMBER OF INCIDENT TB CASES, TOTAL CASES NOTIFIED, AND TREATMENT COVERAGE



TB BACKGROUND

- Ethiopia is a high TB burden country with an estimated TB incidence of 151 per 100,000 population and in 2018, 27,000 people lost their life due to TB.
- The pathway to end TB in the country is a priority, and the TB incidence has been on the decline since 2010.

PROJECT BACKGROUND

- CTB was implemented from October 2014 to August 2019, by a coalition of three partners: KNCV, MSH, and WHO.
- CTB focused its support on finding the missing cases and providing quality care for both DS-TB and DR-TB patients.

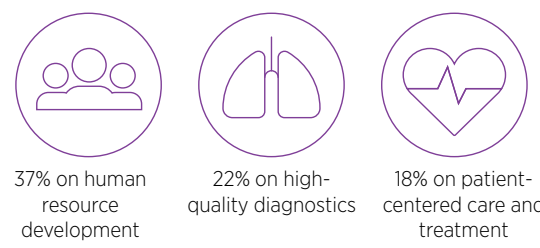
CASE FINDING

Treatment coverage increased from 59% in 2014 to 69% in 2018, with CTB areas contributing approximately 76% of all cases notified per year. Both case notifications and incidence have fallen at an average rate of 7% since 2015. A total of 401,183 TB cases were notified in CTB supported areas in 2015-2019. Several case-finding interventions that were implemented contributed to the case notification. CTB supported CBOs, screening of household contacts and case finding among risk groups such as children, miners, and the prison population.

GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS



MDR-TB CARE AND TREATMENT

Of the 2,693 DR-TB patients enrolled on treatment over the course of the project, 75% were successfully treated, surpassing global and African regional achievements. To strengthen of MDR-TB case finding, capacity building activities were implemented. HCW were mentored, catchment area meeting and cohort review was organized, and supportive supervision including a quarterly cohort review were conducted.

In addition, different DR-TB job aids (Pamphlets, desktop references, and posters), and national PMDT guidelines were distributed.

A total of 233 DR-TB patients have been put on ND&R since July 2016. As of June 2019, there are nine centers providing treatment. CTB supported the NTP in the development of national training material and trainings. Also CTB procured and distributed ten audiometry sets to MDR-TB treatment centers.

CTB KEY PRIORITY INTERVENTIONS

- Roll-out of new drugs and regimens
- Diagnostic Connectivity
- Laboratory Strengthening
- Specimen Transportation System
- Innovative Case Finding
- TB Preventive Treatment

233

DR-TB PATIENTS ON ND&R



First patient on the Shorter Treatment Regimen, Ethiopia / Ben Phillips

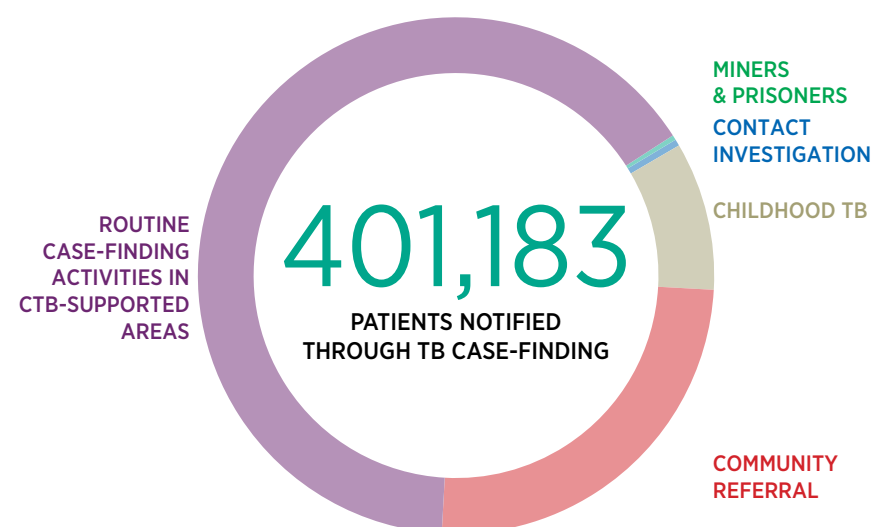


INDIA

TESTING IMPROVED AND EXPANDED

CTB had a significant role in the expansion of GeneXpert availability, starting from just 28 machines in 2013 to 314 in 2019. The utilization rate improved from 28% in 2014 to a peak of 68% by June 2017. As a result, the proportion of bacteriologically confirmed TB cases has improved from 34% to 41%. Similarly, the notification of confirmed RR-TB cases has also increased in the country.

CTB facilitated the introduction of an integrated specimen referral system using eight refrigerator-fitted vans in three regions (Addis Ababa, Amhara, and Oromia). Its impact has been shown through a reduced specimen contamination rate from 23% to 5%, specimen rejection fell from 3.4% to 0.3%, and testing turnaround times improved from 5-7 days to just 1.



BEST PRACTICE

A targeted approach in finding cases was high yielding and efficient, and should be further strengthened. Through its experiences during implementation and through national gap analyses exercises, CTB was able to select different high priority intervention areas to find missed cases and improve

case finding in Ethiopia. The measurement of results to show level of contribution of each intervention was often difficult, due to the overlap and comprehensive nature of patient care. This requires 'patient pathway analysis' or a system that monitors performance through case-based surveillance.

TB BACKGROUND

- India continues to bear a high burden of TB, with an estimated 2.74 million incident cases and 421,000 TB deaths each year
- Additionally, around 135,000 MDR-TB cases of TB among notified pulmonary TB cases are estimated each year
- The country notified 1.9 million TB cases leaving a gap of >800,000 undiagnosed, untreated and unreported TB patients.

PROJECT BACKGROUND

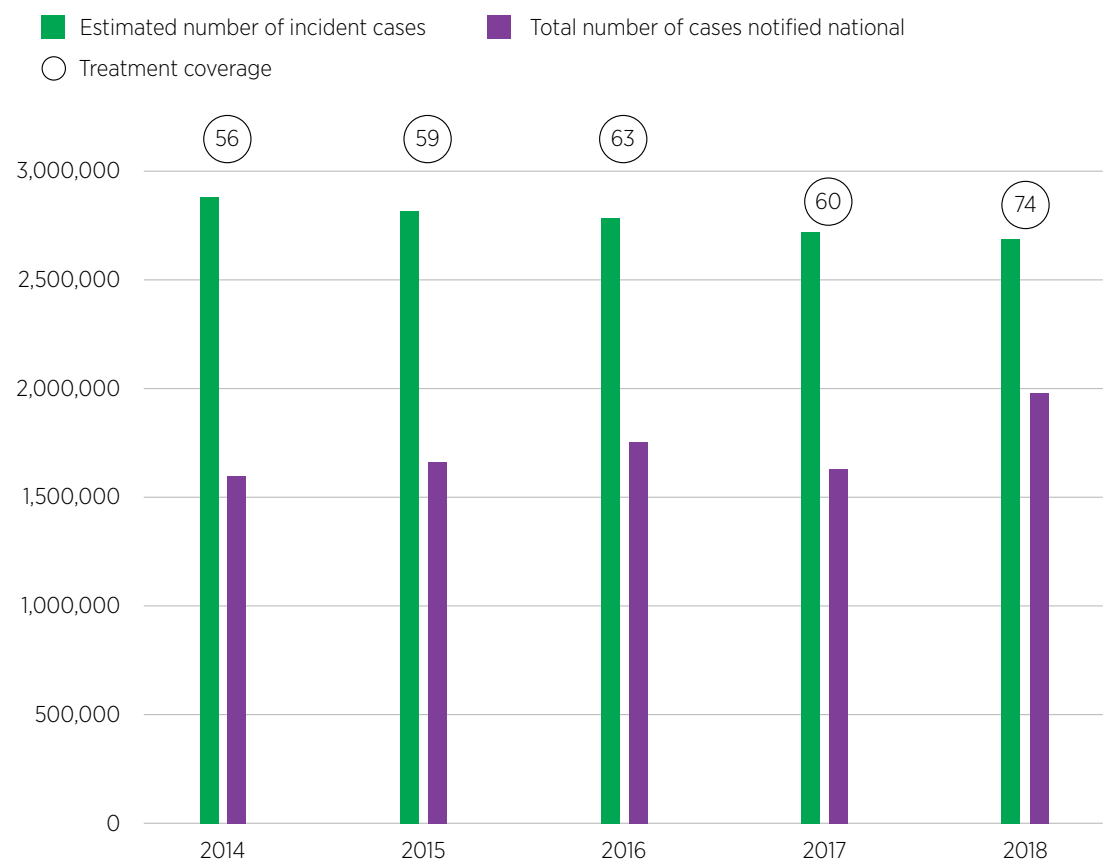
- The project started in October 2014 and was led by The Union in collaboration with PATH and KNCV (through a sub-award to FIND up to March 2018).
- The geographic coverage varied from support to the NTP at the national level to several specific (BDQ) sites; the project was implemented in 21 states across the country.

- The project focused on elevating the profile of TB, increasing domestic resources for TB, increasing the uptake of new drugs and regimens, increasing pediatric TB testing, and improving the quality of care.
- The project was implemented in two phases; Phase I the "Call to Action" campaign between 2014-2017 and Phase II on DR-TB between 2017-2019.
- The project had a national reach in terms of impact on policy and practices. The Call to Action for a TB-Free India intervention had a 'pan India' reach whereas the presumptive pediatric patients' initiative targeted 10 cities of the country covering around 53M of the population and PATH targeted 6 districts covering 17M population.

GEOGRAPHIC COVERAGE



NUMBER OF INCIDENT TB CASES, TOTAL CASES NOTIFIED, AND TREATMENT COVERAGE



CASE FINDING

TB case notifications increased from 1,609,547 in 2014 to 1,994,000 in 2018.

MDR-TB CARE AND TREATMENT

4,122 patients were enrolled in the BDQ containing ITR against a target of 7,600. In addition, 22,000 courses of BDQ were secured for the country. In CTB areas, 2,637 patients were enrolled on BDQ. The success of the BDQ Conditional Access Programme led to a pan India scale-up of BDQ access in 2018. It also fast-tracked the adoption of DLM and the STR. From the end of 2017 up to March 2019, 84 patients were enrolled on DLM. In March 2018, the STR was rolled out across the entire country.

CTB KEY PRIORITY INTERVENTIONS

- Roll-out of new drugs and regimens
- Laboratory Strengthening
- Specimen Transportation System
- TB Preventive Treatment

HIGHEST EXPENDITURE AREAS

- 48% on patient-centered care and treatment
- 30% on high-quality diagnostics
- 16% on political commitment and leadership

22,000

DOSES OF BDQ SECURED FOR THE COUNTRY

CHILDHOOD TB & LABORATORIES

Under the initiative to improve access to rapid molecular testing among the pediatric population, the project was able to test more than 94,415 children with presumptive TB; 6,270 childhood patients were diagnosed with TB from March 2014 to March 2018 (of which 89% were initiated on treatment). Also, 545 DR-TB patients were diagnosed and enrolled in care. This initiative was well-documented (six articles in peer-reviewed journals) and won accolades nationally and globally including a mention in the WHO document “Best practices in child and adolescent tuberculosis care” (2018). The project donated 11 GeneXpert machines to the RNTCP, which were placed at 10 sites.

MULTI-SECTOR COORDINATION FOR A TB-FREE INDIA

Multi-sectoral coordination to eliminate TB from the country was another successful and innovative initiative under the CTB project, which involved inter-ministerial coordination and a cohesive effort to fight TB. As a result of this initiative, the Ministry of Labour and Employment with the support of CTB developed a TB-Workplace policy framework, which more than 4,000 employers working in the government and private sector committed to implementing.

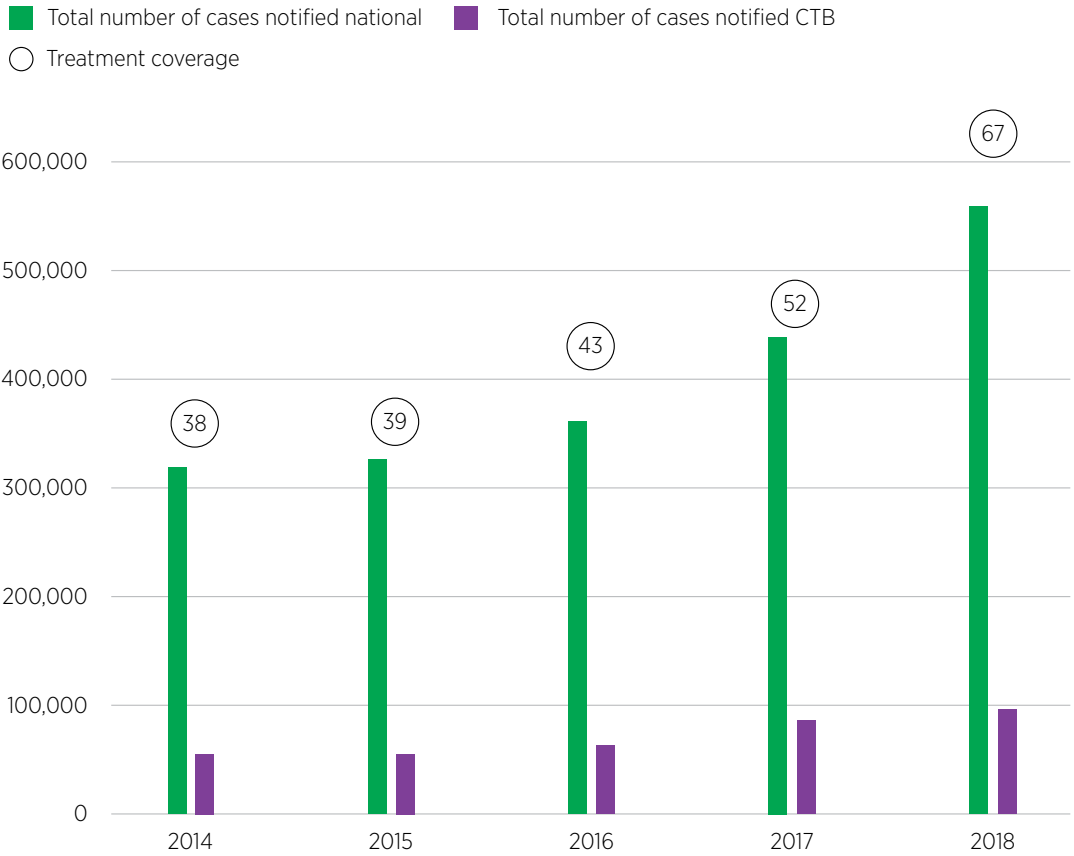
BEST PRACTICES

Everyone matters, engage all: The Call to Action activities to involve leading personalities, politicians, bureaucrats, businesses, and parliamentarians (India TB Caucus) who contributed to increasing the visibility of TB and ensuring political commitment to develop the National Strategic Plan to eliminate TB by 2025.

Small actions for BIG Change: CTB and the central TB division came together to mobilize public sector undertakings (government owned corporations), companies and CSOs to join the fight against TB and contribute to the national goal to eliminate TB by 2025. This initiative generated funds for TB initiatives and motivated the leading organizations to come up with the “TB Free campaign” in their respective geographical areas.



NUMBER OF CASES NOTIFIED AND TREATMENT COVERAGE



TB BACKGROUND

- Indonesia has the third highest incidence of TB, after India and China, and is among the top 30 TB, TB/HIV, and MDR-TB burden countries
- TB incidence is 316 per 100,000 population
- TB mortality is 37 per 100,000 population
- Treatment coverage is 67%.

PROJECT BACKGROUND

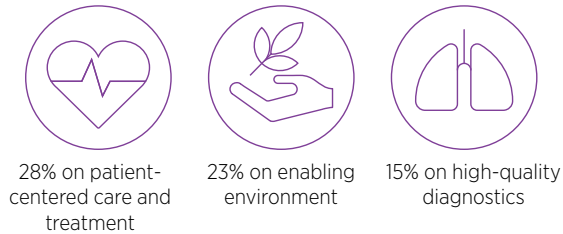
- The project started in 2015 and was implemented by KNCV in collaboration with ATS, FHI 360, IRD, and WHO.
- The project worked in 16 different districts, both urban and rural, located in six provinces (North Sumatra, Jakarta, West, Central, and East Java, and Papua), covering approximately 11% of the country's population.

- CTB provided technical assistance to the NTP on the district public-private mix approach, the roll-out of GeneXpert as the first test for the diagnosis for TB, closing the diagnostic-treatment gap for DR-TB patients and supporting the introduction of ND&R, the uptake of TB/HIV collaborative interventions, and the development of a district action plan to enhance the mobilization of district-level resources.

GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS



CASE FINDING

Treatment coverage increased from 38% in 2014 to 67% in 2018, with CTB areas contributing to approximately 20% of all cases notified per year. CTB engaged extensively with public and private hospitals, and it focused on the implementation of the district public-private mix approach. Under this approach, various interventions were implemented to contribute to TB case finding. The NTP was supported in screening household contacts, TB case finding among children, screening visitors at health facilities (hospital engagement), comorbidity such as PLHIV and diabetes, and screening in prisons. The interventions were implemented in different geographic areas and followed different timelines while some were overlapping (e.g. children, PLHIV or TB-Diabetes can also be reported under private or hospital engagement).

MDR-TB CARE AND TREATMENT

To increase DR-TB treatment enrollment, CTB developed and implemented the Monthly Interim Cohort Analysis in 16 CTB-supported districts. This resulted in increased patient enrollment from 73% in 2016 to 79% in 2018. A total of 3,725 DR-TB patients have been initiated on the STR (806 on ITR-BDQ, 76 on ITR-DLM) since its introduction in September 2017.

In 2015, CTB in collaboration with the National Pharmacovigilance Center supported the NTP with the introduction of BDQ in the country. CTB provided TA in development of implementation plan for the BDQ pilot, the technical guidelines, with the development of cohort event monitoring tools in eTB manager, as well as in supervisory visits to treatment centers.

CTB KEY PRIORITY INTERVENTIONS

- Roll-out of new drugs and regimens
- Diagnostic Connectivity
- Laboratory Strengthening
- Specimen Transportation System
- Innovative Case Finding
- TB Preventive Treatment



Challenge TB World TB Day photo booth in Indonesia / Glooini



MDR-TB patient on treatment in Indonesia / Tristan Bayly

LABORATORY NETWORK STRENGTHENING

The main approaches have been the following: GeneXpert expansion, improving culture/DST capacity including SL-LPA, transportation of specimens and the development of referral networks, developing microscopic laboratory networks with focus on PMDT services, strengthening the EQA for microscopy and a LQMS, and developing and piloting GeneXpert examination of stool specimens for the diagnosis of childhood TB.

The roll-out of GeneXpert resulted in 464,201 GeneXpert tests in 2018 nationwide, up from 3,610 in 2014. CTB-supported districts contributed to 30% of GeneXpert testing nationwide, with a utilization rate of 55% in the year 2018 as compared to 17-28% in other districts. This was enhanced through the specimen transportation system (SITRUST).

In total, 23,406 specimens were transported in the year 2018 (GF funding) in 12 CTB-supported districts, against 5,063 in the year before.

The project also supported the expansion of culture and DST. The number of laboratories implementing conventional and liquid culture increased from 11 in 2014 to 21 in 2018. The number using quality assured first-line DST increased from 8 to 11 laboratories, and those using second-line DST increased from 5 to 11 laboratories. In 2019, 95% of enrolled DR-TB patients in CTB-supported districts were tested with SL-LPA, compared to 10-25% in other districts.

TB/HIV

The percentage of TB patients in CTB-supported districts knowing their HIV status, increased from 8% in 2014, to 42% in 2018, and ART enrollment of TB/HIV co-infected patients increased from 25% to 52%. The best results were achieved in Jember and Tulungagung districts in East Java, where almost 100% of TB patients know their HIV status. This was a result of a combination of support from CTB, the GF, and changes to the national TB strategy.

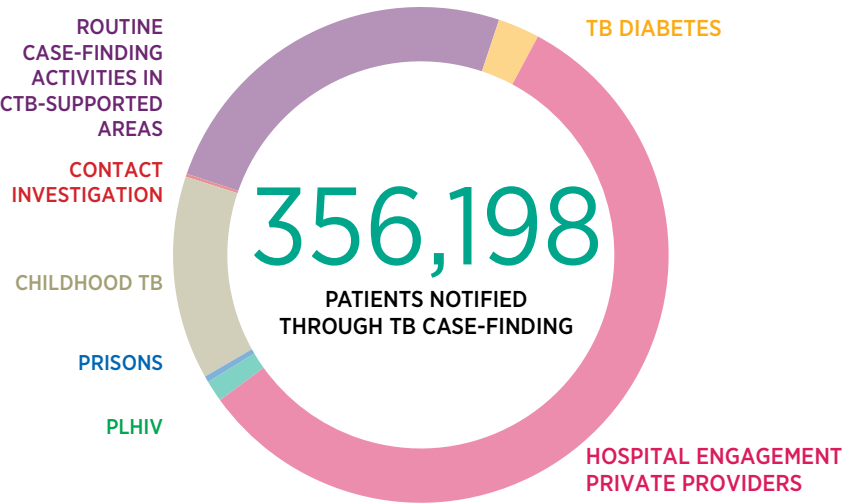
23,406

SPECIMEN SAMPLES TRANSPORTED IN 2018

BEST PRACTICES

Effective models to engage with private providers need to be explored with a focus on innovative payment schemes for universal access to TB care. This includes a solution for the capitation system to create benefits for private providers (GPs/clinics and hospitals) for diagnostic options and access to public or private labs by private providers.

Gradual decentralization to the district level should be considered for the procurement of GeneXpert machines and cartridges, to leverage domestic funding and stimulate the use of GeneXpert as the primary test for all presumptive TB.



100%

OF TB PATIENTS KNOW THEIR HIV STATUS IN JEMBER & TULUNGAGUNG DISTRICTS IN EAST JAVA



“My doctor informed me about the new drugs. She told me I had a very big chance of being cured, as long as I stuck to my treatment. Sometimes I wished the time would go by more quickly, but I know the wait is worth it.”

Nineteen-year-old Alisher was cured after 11 months of treatment and who experienced no side effects from the new drugs

KAZAKHSTAN

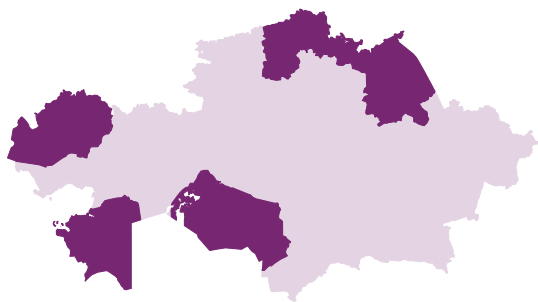
TB BACKGROUND

- Kazakhstan is among the top 30 MDR-TB high burden countries
- RR-/MDR-TB incidence 21 per 100,000 population
- TB incidence 66 per 100,000 population for TB all forms
- TB mortality 0.9 per 100,000 population
- TB treatment coverage 100%
- An estimated 26% of new cases (44% of previously treated cases) have RR-/MDR-TB.

PROJECT BACKGROUND

- The project started in November 2017 and was implemented by KNCV.
- The focus was on five regions not covered by other projects and it reached 18% (3.4M) of the country's population.
- The main areas of work included expanding access to new TB drugs and proper safety monitoring.

GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS



85% on drug commodity management systems



14% on patient-centered care and treatment

MDR-TB CARE AND TREATMENT

The main goal of the project was to improve PMDT through the comprehensive scale-up of ND&R (containing BDQ, DLM and STR) for the treatment of MDR-/XDR-TB).

In total, 417 MDR-/XDR-TB patients were enrolled on ND&R (274 BDQ, 15 DLM, 119 on the STR, and 9 on repurposed drugs only) in the 5 CTB sites. A high proportion of culture conversion at six months of treatment was achieved in patients on the STR and ITR.

An interim analysis of 108 patients enrolled on the STR from April (start of enrollment) until December 2018, showed a culture conversion rate of 95% (103/108).

In the patients enrolled on ITRs from February (start of enrollment) until December 2018, 90% (178/198) showed culture

conversion after 6 months of treatment. In comparison, the culture conversion rate in patients on the conventional MDR-TB regimen was 74% (727/918) after 6 months of treatment.

BEST PRACTICE

To avoid patients moving to other areas to get access to treatment with new drugs, which increases the likelihood of defaulting and increases living costs, ND&R need to be rolled-out quickly across the entire country. To enable this, all stakeholders need to be involved and aware of the consequences.

CTB KEY PRIORITY INTERVENTIONS



Roll-out of new drugs and regimens



Laboratory Strengthening



Specimen Transportation System



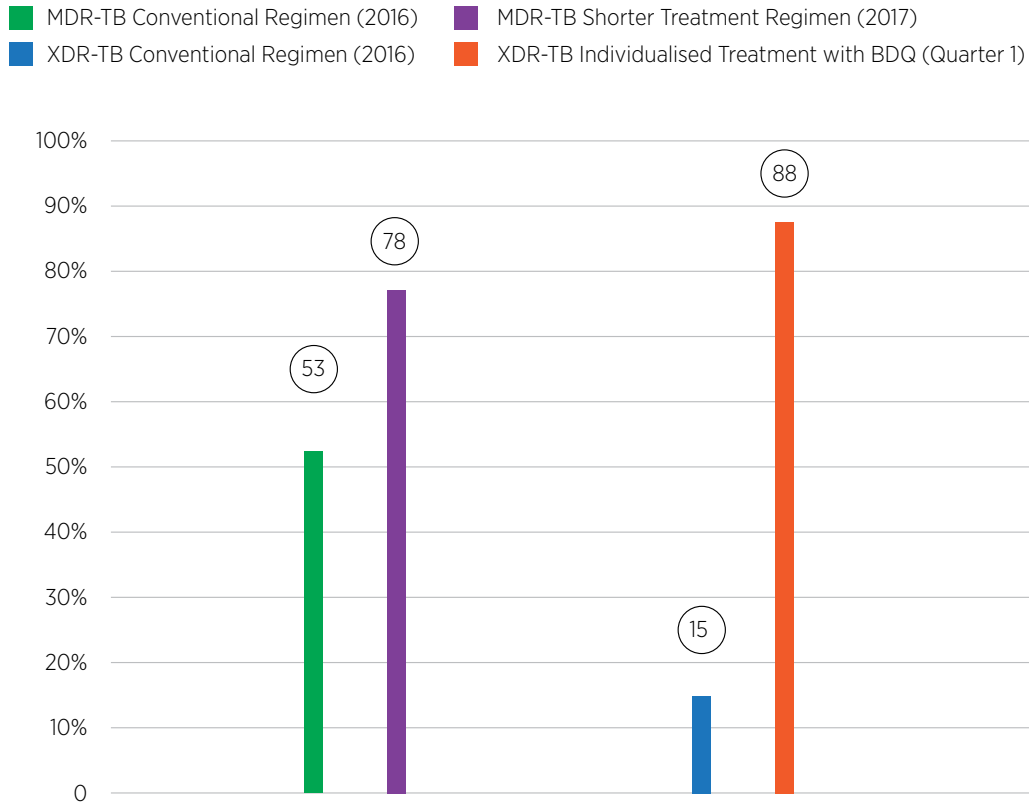
TB Preventive Treatment



KYRGYZSTAN

Four-year-old Ilias and his sister Sumaya, were diagnosed with DR-TB in February 2017. They were two of the first people to be started on the STR in Kyrgyzstan. After nine months of treatment they were both successfully cured.

TREATMENT SUCCESS RATES FOR ND&R VS. CONVENTIONAL TREATMENT REGIMENS



TB BACKGROUND

- Kyrgyzstan is among the top 30 MDR-TB high burden countries
- TB incidence of 144 per 100,000 population
- RR-/MDR-TB incidence 50 per 100,000 population
- TB mortality 6.7 per 100,000 population
- TB treatment coverage 77%
- An estimated 26% of the new cases and 61% of the previously treated cases have RR-/MDR-TB.

PROJECT BACKGROUND

- Implementation by KNCV started in January 2015
- The project initially covered two regions (Bishkek and Chui oblasts) covering 31% (1.9M) of the country's population. In 2018, the project expanded its scope to cover the entire country
- The main focus was to support the NTP with the introduction of ND&R containing BDQ, DLM, and the STR.

GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS



36% on patient-centered care and treatment



22% on enabling environment



9% on human resources development

MDR-TB CARE AND TREATMENT

ND&R became available in 2017, and CTB supported the NTP with the introduction of ND&R through policy change, improvement of diagnosis and treatment, modernization of laboratories, updating medical competencies, patient education and support including the implementation of innovative approaches.

In total, 1,375 MDR-/XDR-TB patients were enrolled on ND&R (594 BDQ, 26 DLM, 366 on the STR, and 389 with repurposed drugs), between January 2017 and March 2019.

Preliminary results show a 78% treatment success rate for patients on the STR (2017 cohort)

and an 88% treatment success rate for those on the ITR-BDQ (Jan-Mar 2017 cohort). This is a significant increase compared to the average TSR of 50% for the conventional regimen (2016 cohort).

BEST PRACTICE

CTB designed and introduced a model of case management, which was effective in ensuring treatment adherence and responding to any adverse events. The number of TB patients lost to follow-up was significantly reduced for patients on the new treatments. From 23% for the 2016 cohort, the rate dropped to 15% on the STR 2017 cohort, and to just 3% in the January – March 2017 ITR cohort.

CTB KEY PRIORITY INTERVENTIONS



Roll-out of new drugs and regimens



Diagnostic Connectivity



Laboratory Strengthening



TB Preventive Treatment

1,375

PATIENTS WITH DR-TB INITIATED ON ND&R BETWEEN 2017 AND 2018



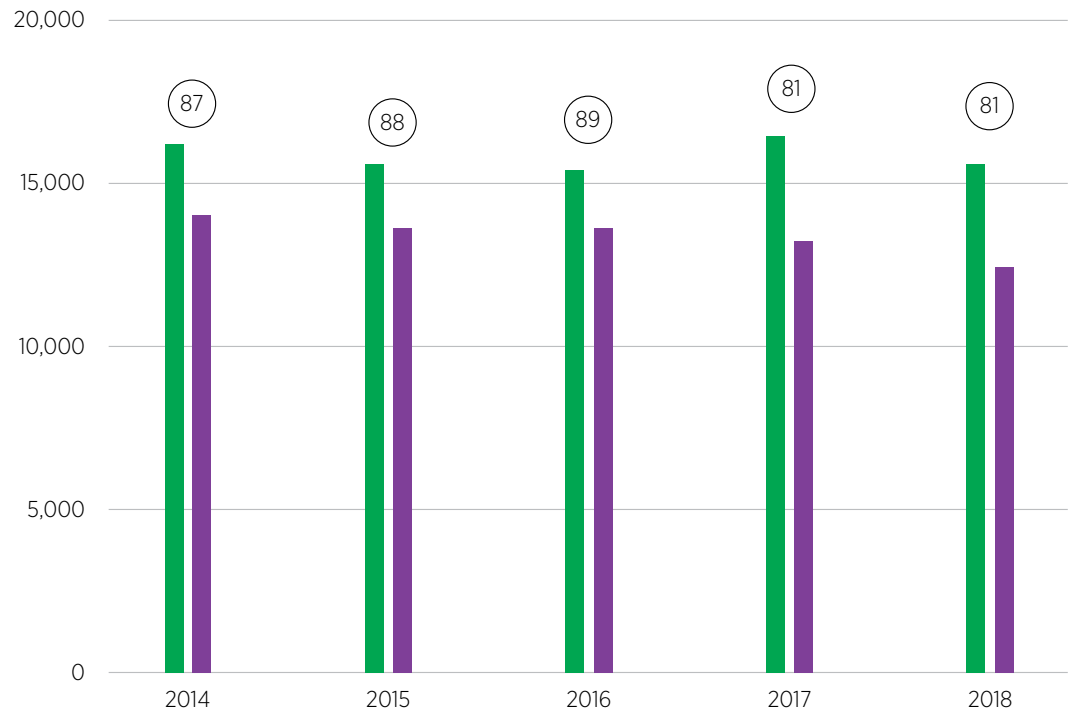
TRISTAN BAYLY

Benadetta has XDR-TB and her son also has TB. Both are being treated and are expected to make a full recovery.

MALAWI

NUMBER OF CASES NOTIFIED AND TREATMENT COVERAGE

■ Total number of cases notified national ■ Total number of cases notified CTB
○ Treatment coverage



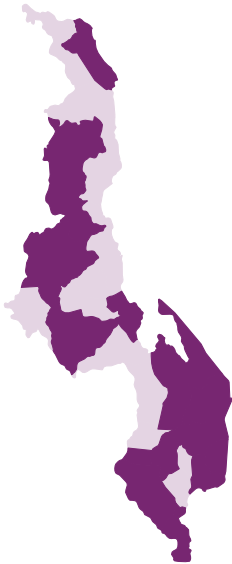
TB BACKGROUND

- Malawi is one of the top twenty high-burden TB/HIV countries in the world, while still maintaining low burden of both TB and RR-/MDR-TB
- TB incidence per 100,000 population 181
- TB/HIV incidence 88 per 100,000 population
- TB mortality 61 per 100,000 population (38 for TB/HIV)
- TB treatment coverage is 48%.

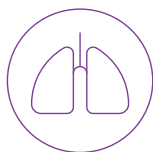
PROJECT BACKGROUND

- CTB was implemented from October 2014 to August 2019, led by KNCV
- The project supported the NTP working through national and zonal levels supporting 15 out of 28 districts in the country
- The project also supported national level activities that included DR TB management using ND&R, laboratory EQA, laboratory supervision, GeneXpert expansion and utilization, procurements and supply management and joint TB/HIV supervision visits
- CTB initiated facility-level ACF and FAST, the urine TB LAM test, and district level training and mentoring.

GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS



36% on high-quality diagnostics



35% on patient-centered care and treatment



9% on enabling environment

LABORATORIES STRENGTHENING

CTB worked with the NTP to strengthen the national TB laboratory network, which resulted in the NTRL and Mzuzu reference laboratories being fully functional and achieving internationally accepted standards. By June 2019, the NTRL had handled over 5,000 samples for the national TB drug resistance survey. TB microscopy EQA coverage improved from 24% in 2016 to 91% in 2018. CTB also supported the expansion and coordination of the GeneXpert network, which expanded from 51 machines (46 sites) in 2016, to 83 machines (72 sites) in 2019, with 100% of the machines connected to GxAlert by June 2019. In addition, warranties for 38 out of 83 machines and 52,000 Xpert MTB/RIF cartridges were procured. The total number of tests increased from 22,465 in 2016 to 59,774 in 2018.

CASE FINDING

In total, 57,202 TB cases were diagnosed in CTB areas from 2015 to March 2019 (80% of total notified nationally). The results were achieved through the systematic screening of household contacts of TB patients (contact investigation), mass screening campaigns in prisons, case finding among children, hospital engagement/FAST (screening health facility visitors), and case finding among PLHIV.

CTB KEY PRIORITY INTERVENTIONS



Roll-out of new drugs and regimens



Diagnostic Connectivity



Laboratory Strengthening



Innovative Case Finding



TB Preventive Treatment

57,202

TB PATIENTS DIAGNOSED IN CTB AREAS
80% OF TOTAL NOTIFIED NATIONALLY



Peer education on TB at Maula Prison in Malawi / Justin Bayly



MOZAMBIQUE

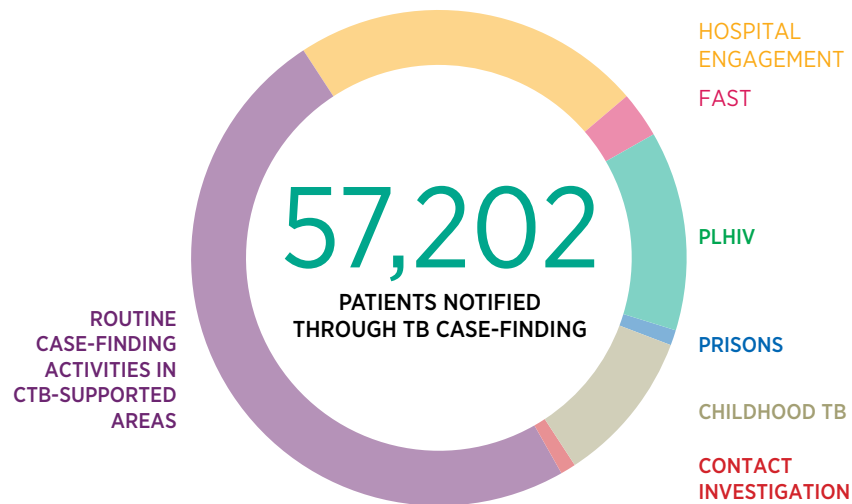
MDR-TB CARE AND TREATMENT

Treatment enrollment for MDR-TB increased from 59 patients in 2017 to 107 in 2018, representing 90% of the 2018 annual treatment target. The treatment gap improved from 39% in 2014 to 15% in 2018, (with only 11% in 2016). By December 2018, all 28 districts in Malawi had started the implementation of the STR and ITR.

BEST PRACTICES

Facility based TB Case Finding - Through the implementation of FAST and active case-finding interventions, through well operationalized case finding with clear standard operating procedures and job aids, case detection efforts and TB case notifications improved at health facility level.

Besides the clinical management of MDR-TB patients at facility level, Malawi adopted MDR-TB management through community-based DOTS. In order for this intervention to be successful, there should be a system to effectively identify community MDR-TB supporters for training and support.



TB BACKGROUND

- Mozambique is among the top 14 TB/MDR-TB/TB/HIV high burden countries
- TB incidence per 100,000 population 551
- (197 for TB/HIV, and 28 for RR-/MDR-TB)
- TB mortality per 100,000 population 145 and (79 for TB/HIV)
- TB treatment coverage 57%.

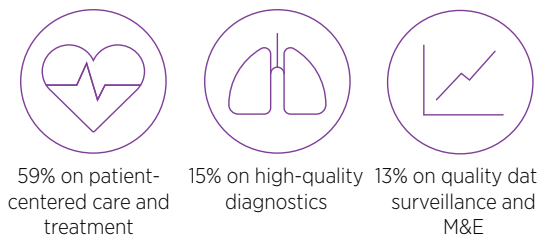
PROJECT BACKGROUND

- The project started in January 2015 and was implemented by FHI 360 as the lead partner in collaboration with ATS, KNCV and four local CBOs
- The project covered 68 districts between Year 1 to 4 and was scaled down to 15 in the last year. The coverage varied from 56% (16M, Years 1-4) to 18% (5.6M Year 5) of the country's population
- The main areas of work included patient-centered quality care for TB, MDR-TB, and TB/HIV patients and the prevention of transmission and disease progression, and strengthening the health system through TB platforms.

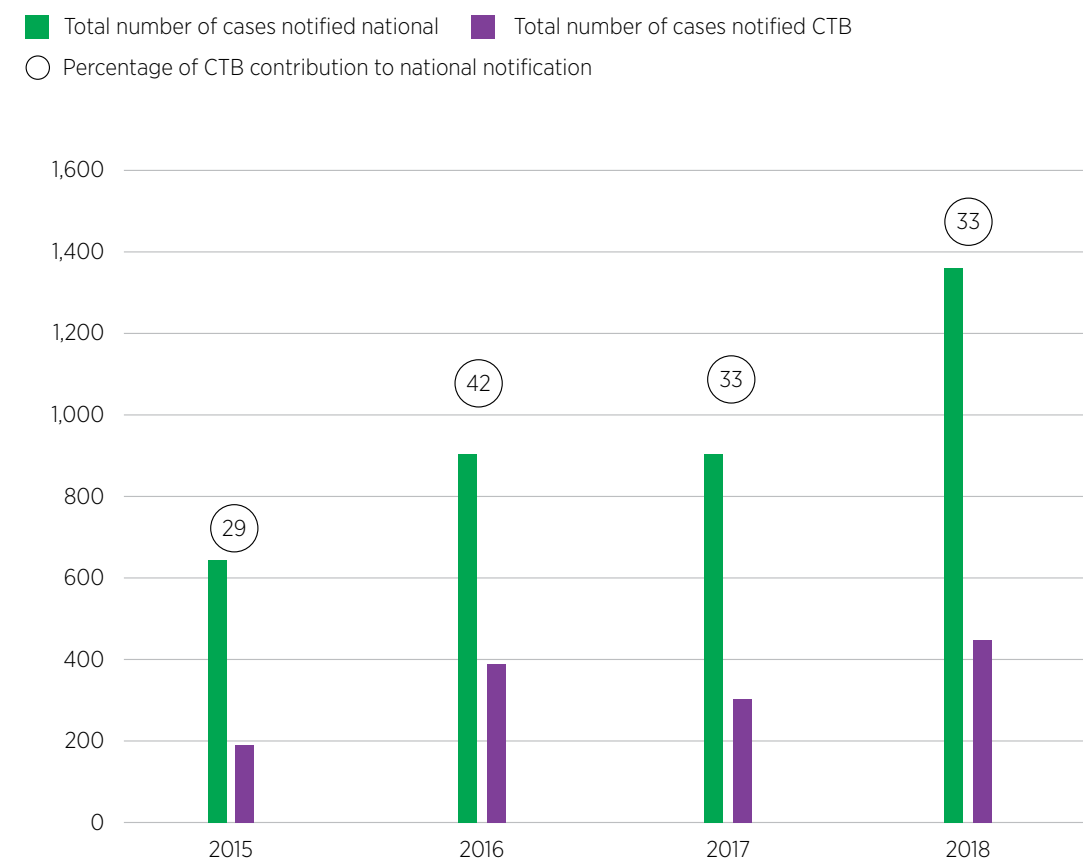
GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS



NUMBER OF CASES NOTIFIED AND THE PERCENTAGE OF CTB CONTRIBUTION



CASE FINDING

Treatment coverage increased from 40% in 2014 to 57% in 2018. CTB areas contributed approximately 50% of the total TB notifications throughout each year of implementation.

Local CBOs were engaged to implement various community interventions. Community health workers also contributed to the house-to-house visits for screening household contacts (contact investigation) and follow-up on treatment adherence, monthly cough days and screening visitors of health facilities (FAST).

Additionally, CTB supported prisons across its areas by training of prison guards and prisoners to screen for TB.

MDR-TB CARE AND TREATMENT

From 2015 to June 2019, 1,511 DR-TB patients, were notified in the CTB areas. Of these 1,480 (98%) were enrolled on treatment. In collaboration with the NTP and other partners, an interim Excel-based provincial database was developed to track MDR-TB patient cohorts. In addition, CTB designed a monthly reporting form that was used by district supervisors to report monthly MDR-TB data to the provincial level. Advocacy helped to include second-line TB drugs on the national essential drug list as well as to implement an effective aDSM system which was one of the key requirements for the introduction of ND&R.

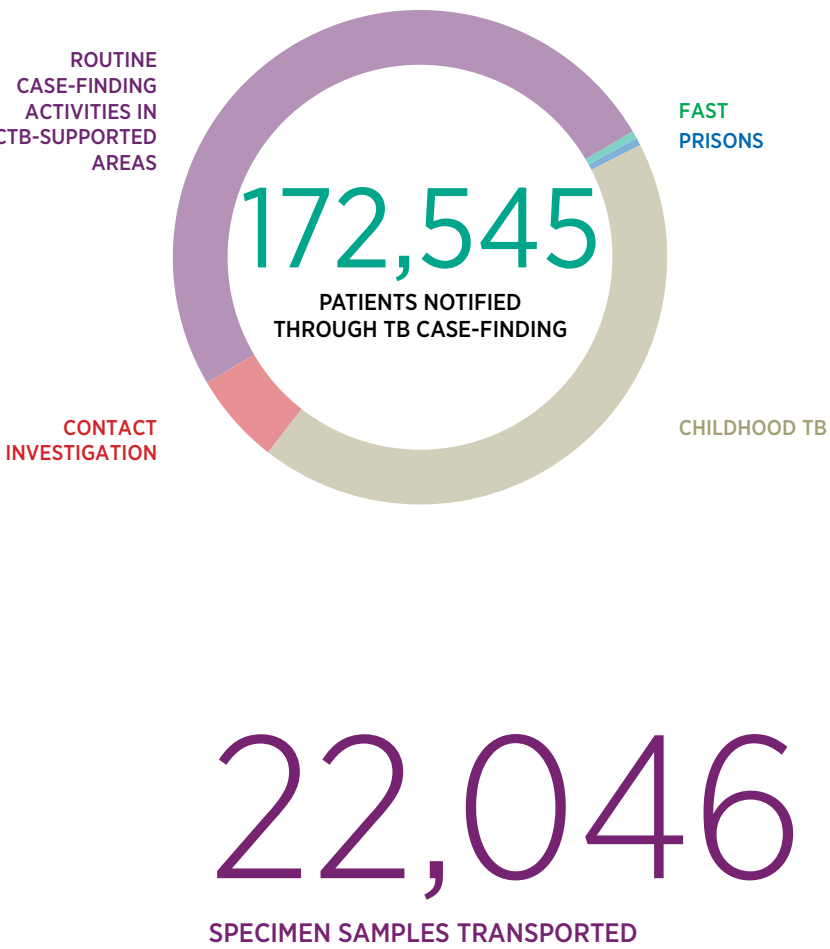
- CTB KEY PRIORITY INTERVENTIONS**
- Roll-out of new drugs and regimens
 - Diagnostic Connectivity
 - Laboratory Strengthening
 - Specimen Transportation System
 - Innovative Case Finding
 - TB Preventive Treatment

SPECIMEN TRANSPORTATION SYSTEM

To ensure access to quality diagnostics and care, CTB's specimen transportation system used motorbikes managed by implementing partners to link the community, peripheral health facilities, and district-level laboratories. Between 2016 and March 2019, 22,046 samples were transported. The NTP endorsed this approach, and other partners were encouraged to learn from the success of the project and to adopt the system.

BEST PRACTICE

To increase treatment success for DR-TB, the DR-TB registers and the data for case management were updated and utilized on a regular basis. Technical working groups that are involved in regular coordination of clinical, psychosocial, laboratory, and M&E activities ensured that patients had access to the appropriate treatment regimens.





NAMIBIA

NUMBER OF CASES NOTIFIED AND TREATMENT COVERAGE



TB BACKGROUND

- Namibia is among the top 30 TB and TB/HIV burden countries, although a steady decline in notified cases of TB has been recorded since 2004.
- TB incidence per 100,000 population is 524 (182 for TB/HIV)
- TB mortality per 100,000 population 126 (62 for TB/HIV)
- TB treatment coverage of 61% in 2018.

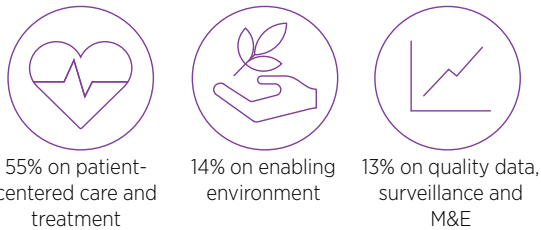
PROJECT BACKGROUND

- CTB started in October 2015 and was led by KNCV in collaboration with the NTP and other governmental partners, CBOs, and various other TB/HIV stakeholders
- The geographic coverage changed during implementation from 25 districts (from Oct 15 to Sep 17) to 9 Districts (Oct 17-Sep 19) and covering the entire country in the last year (Oct 18-Aug 19)
- CTB focused on TB/HIV, TB diagnosis, prevention and treatment, infection control, contact investigation, PMDT, M&E, surveillance, and operations research
- The project was 100% PEPFAR funded.

GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS



CASE FINDING

Treatment coverage remained around 62% between 2014-2018, while the estimated number of incident cases showed a 13% decrease over the same period. CTB supported the NTP to implement key interventions such as case finding among children, TB and HIV integration, intensified case finding at health facilities (private providers) and screening household contacts in line with national guidelines. The geographic coverage and implementation time frames differ per intervention.

MDR-TB CARE AND TREATMENT

CTB provided PMDT technical support at the national level and a total of 1,412 DR-TB patients were diagnosed of which 1,403 (99%) were enrolled on treatment. The TSR for drug-susceptible TB stands at 82%, and the treatment success rate for DR-TB rose from 68% in 2014 to 71% in 2018, moving closer to the 2021 target of 77%.

CTB supported the introduction and use of ND&R, and from 2016 to June 2019, 187 patients were enrolled on the STR, 114 on BDQ, 14 on DLM and 15 on a combined regimen with BDQ+DLM.

CTB KEY PRIORITY INTERVENTIONS

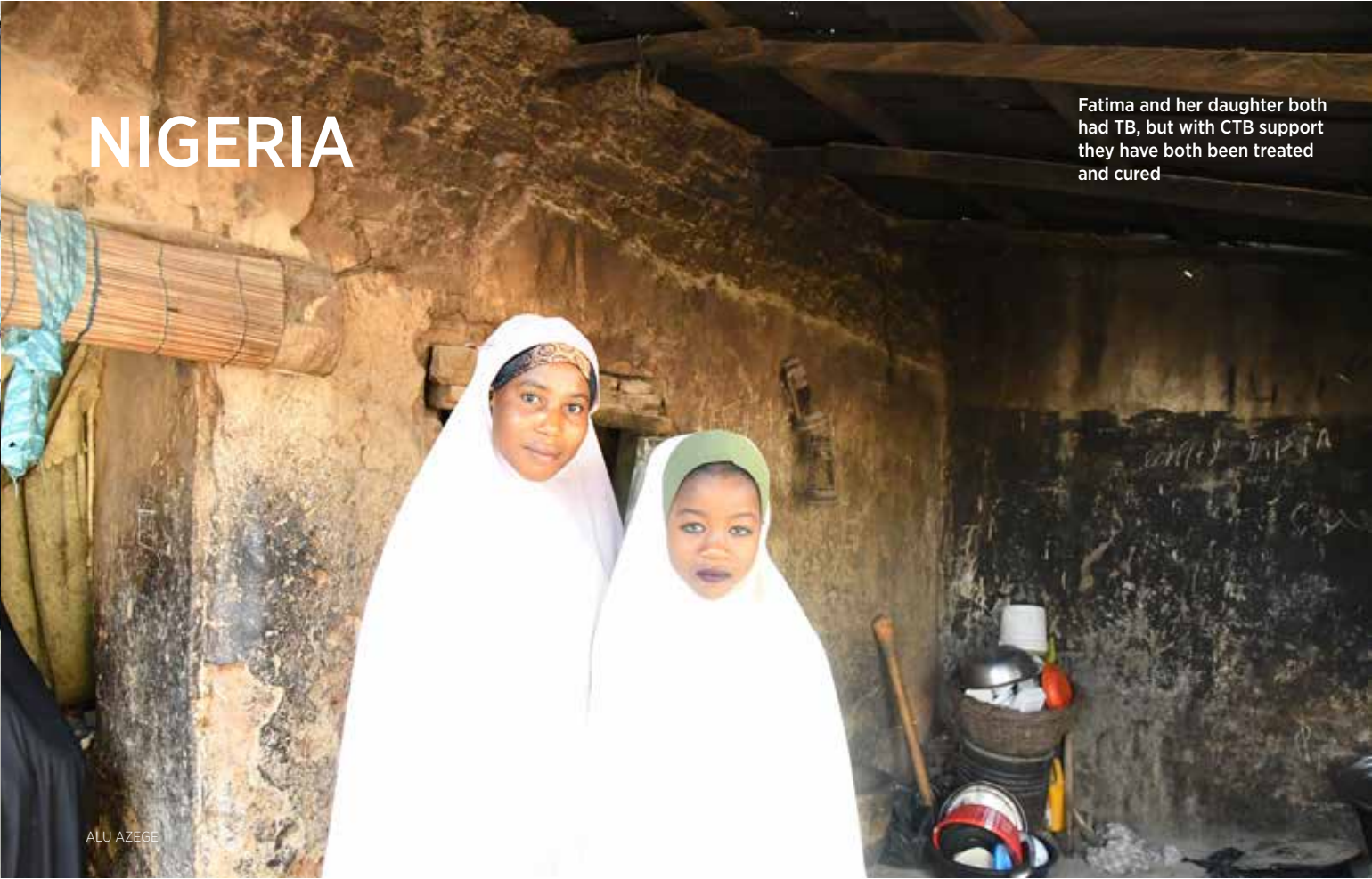
- Roll-out of new drugs and regimens
- Diagnostic Connectivity
- Laboratory Strengthening
- Innovative Case Finding
- TB Preventive Treatment

20,000

PEOPLE ACCESSED HIV SERVICES THROUGH CTB SUPPORTED DOTS CONTAINERS



Challenge TB-Funded integrated DOTS and HIV point in Namibia



Fatima and her daughter both had TB, but with CTB support they have both been treated and cured

NIGERIA

ALU AZEGE

TB/HIV

Through CTB's interventions in 89 health facilities in the CTB-supported districts, the proportion of facilities with the integration of TB/HIV services increased from 16% in 2015 to 92% in 2018. CTB procured and installed five DOT containers and around 20,000 people accessed TB/HIV services using these containers. Furthermore, the CTB model for TB/HIV integration increased the use of DOT points and assisted referrals within the same facility.

Between 2014 and 2018 the proportion of TB patients with a documented HIV status increased from 92 to 99%; the proportion of TB patients with a positive HIV status on ART increased from 84% to 93%; the proportion of PLHIV on ART completing a course of TB preventive treatment increased from 30 to 41%.

BEST PRACTICE

Important progress was made on TB/HIV integration, such as at the TB DOT point in Tsumeb district. In collaboration with IntraHealth, the scope of services at this point was expanded to include comprehensive primary health care. Additionally, in Engela, a DOT point at the

border post with Angola, allowed cross-border patients to access integrated services at no additional cost. These community 'one-stop shops' can be further promoted and supported to provide health services closer to the community.



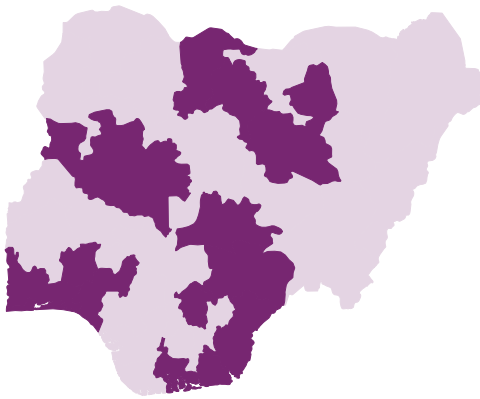
TB BACKGROUND

- Nigeria is one of the 14 countries with a triple burden of TB, TB/HIV, and MDR-TB
- TB incidence per 100,000 population 219 (27 for TB/HIV, and 11 for RR-/MDR-TB)
- TB mortality per 100,000 population 64 for HIV-negative TB (16 for HIV-positive TB)
- TB treatment coverage was 24% at the end of 2018.

PROJECT BACKGROUND

- CTB was launched in Nigeria in August 2015
- The project was implemented by WHO, MSH and KNCV (the lead partner) in 14 CTB supported states. CTB-covered areas accounted for about 46% of the estimated total country population as of the end of 2019.

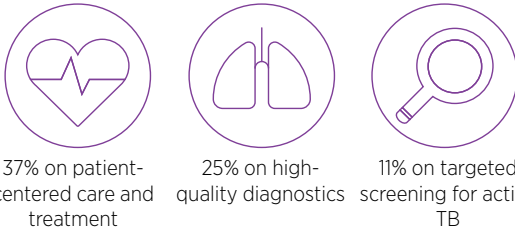
GEOGRAPHIC COVERAGE



568,454

GENEXPERT TESTS CONDUCTED

HIGHEST EXPENDITURE AREAS

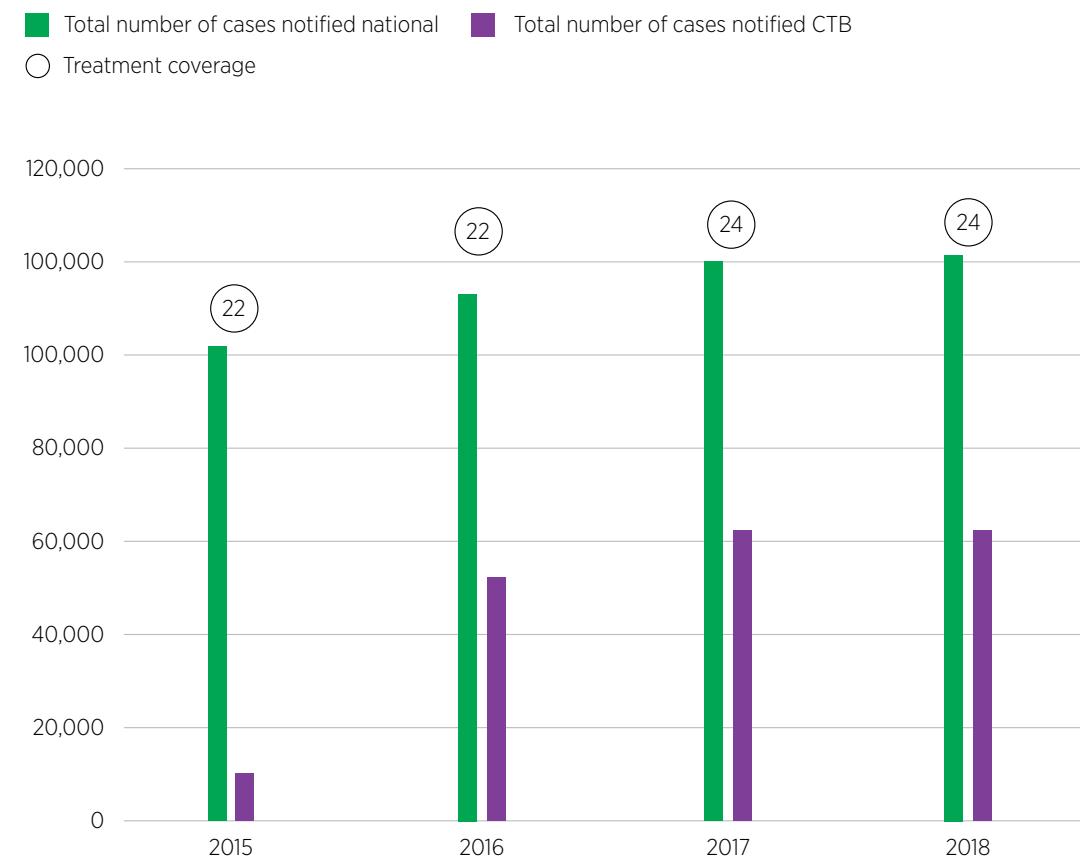


37% on patient-centered care and treatment

25% on high-quality diagnostics

11% on targeted screening for active TB

NUMBER OF CASES NOTIFIED AND TREATMENT COVERAGE



CASE FINDING

Between 2015-2018, there was an increasing trend in TB case notifications nationwide as well as in CTB areas. The CTB contribution to the national case notifications increased from 38% in 2015 to 40% in 2019.

Various case finding interventions contributed to the increase in case-notification in CTB areas including the FAST strategy and TB surge initiative, TB case-finding with two mobile diagnostic units (WoW trucks), TB screening activities in targeted communities by CBOs, engaging and training informal health sector providers such as patent medicine vendors and community pharmacists, household contact investigations, and active screening of children in pediatric outpatient departments.

MDR-TB CARE AND TREATMENT

When the CTB project closed in 2019, the enrollment of DR-TB patients on treatment had improved from 65% to 86% in CTB areas; while patients initiated on treatment in the community at decentralized OPD clinics improved from 61% in 2018 to 76% in 2019. At start of the CTB project in 2015, there were only 4 DR-TB treatment facilities across the 12 states of geographical coverage. The CTB project, in collaboration with NTBLCP and other implementing partners, established an additional 43 decentralized DR-TB OPD clinics across the 12 States to facilitate early-enrollment and close monitoring of DR-TB at the community level.

CTB supported the NTP in the national roll-out of ND&R, including establishing an aDSM for newly diagnosed DR-TB

patients, which resulted in 3,865 DR-TB patients enrolled on appropriate treatment across 2017-2019 (2,987 DR-TB patients in CTB geographic coverage areas).

CTB KEY PRIORITY INTERVENTIONS

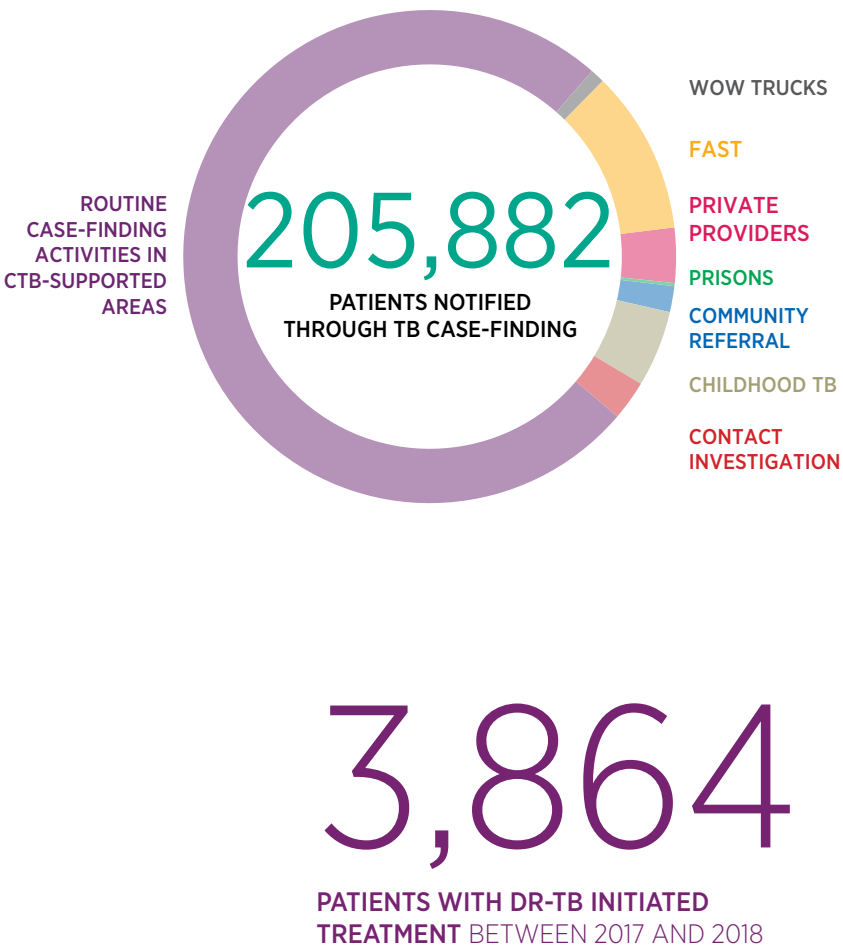
- Roll-out of new drugs and regimens
- Diagnostic Connectivity
- Laboratory Strengthening
- Specimen Transportation System
- Innovative Case Finding
- TB Preventive Treatment

XPERT MTB/RIF SCALE-UP

Support to GeneXpert diagnostic services through the engagement of ad hoc laboratory staff, backup power and ancillary equipment increased utilization from 21% to 60%; in the same period, the total number of Xpert tests conducted rose from 158,043 to 568,454 nationwide.

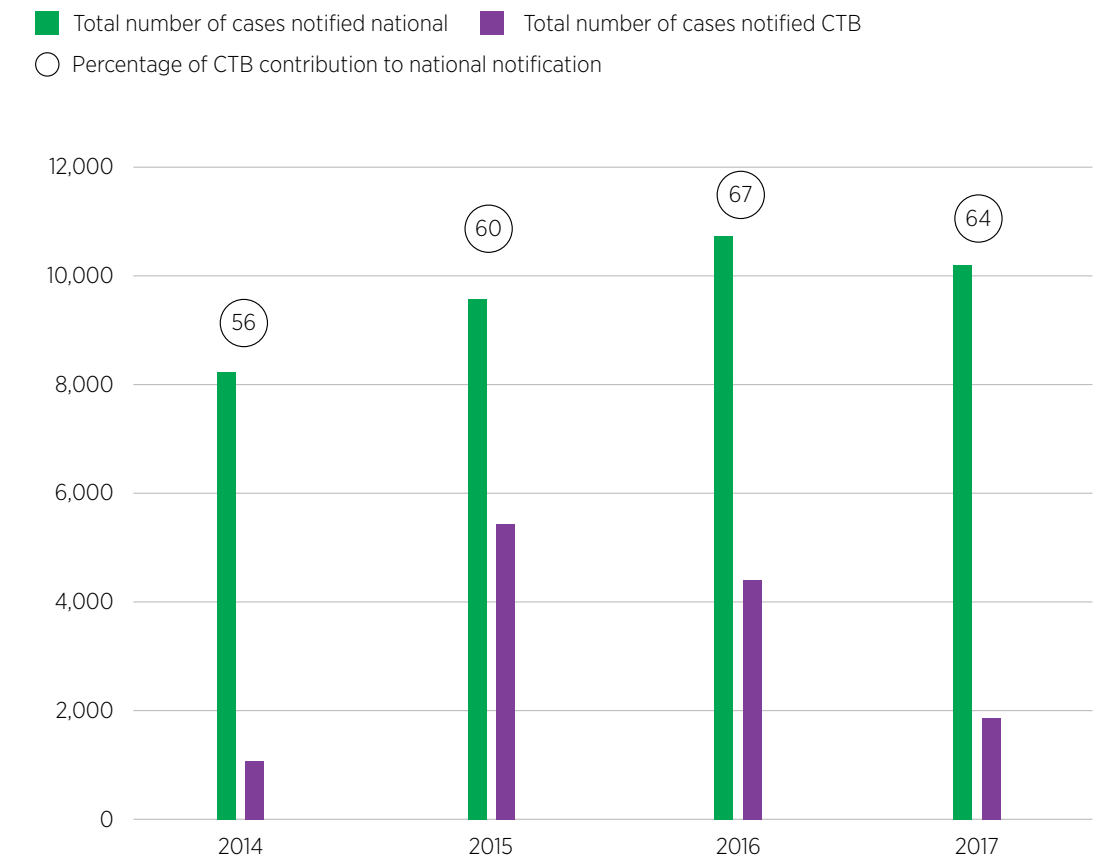
BEST PRACTICES

Addressing power and human resource issues significantly improved GeneXpert services and ultimately led to increased diagnosis of TB cases. Engaging additional ad hoc GeneXpert staff to run shifts and work beyond eight hours in facilities with very high workload increased testing capacity and machine utilization rates. Supporting an effective sample transportation system increased access to diagnostic services especially in the hard to reach areas where diagnostic tools were unavailable.





NUMBER OF CASES NOTIFIED AND TREATMENT COVERAGE



TB BACKGROUND

- South Sudan is a high TB burden country
- In 2017, the WHO estimated TB incidence rate was 146 new cases per 100,000 population, and TB treatment coverage was 56%
- The country is also facing an increasing MDR-TB burden with an estimated 2.5% and 14% prevalence of MDR-TB among new and previously treated TB patients, respectively.

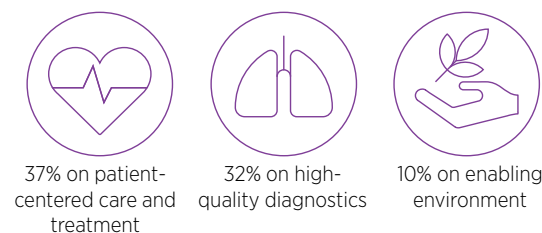
PROJECT BACKGROUND

- CTB was implemented by MSH and focused on targeted communities in the states of Central, Eastern, and Western Equatoria as well as internally displaced populations and the protection of civilian sites between October 2014 and September 2017.
- The areas of work included enabling environment, a high-quality diagnostic network, patient-centered care and treatment, targeted screening for active TB; TB infection control; comprehensive partnerships and informed community involvement, quality data, surveillance and M&E, and human resource development.

GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS



CASE FINDING

Treatment coverage increased significantly from 56% in 2014 to 64% in 2017. A total of 13,099 TB cases were notified in CTB areas during 2014-2017. CTB supported the NTP with case finding activities through intensified case finding at health facilities, case finding in camps for internally displaced populations, screening of household contacts, and engaging private health facilities. The case-finding interventions were implemented during different periods and covering different geographic areas.

MDR-TB CARE AND TREATMENT

From 2014 to 2017, 68 RR/MDR-TB patients were notified, of which 12 were enrolled on treatment. A total of 1,422 specimens were transported for Xpert testing between October 2014 - September 2017 in CTB areas, contributing 79% (1,422/1,800) to national sample transportation. Among the samples tested for RR-/MDR-TB, 4% (52/1,422) were RR-TB. A total of 42 RR-/MDR-TB cases were notified in CTB areas.

CTB KEY PRIORITY INTERVENTIONS



13,099

TB CASES NOTIFIED IN CTB AREAS
BETWEEN 2014 AND 2017



Contact Investigation in South Sudan / MSH

“Taking the drugs every day was very difficult for me, after I took drugs I felt terrible, my head became heavy, my hearing was affected, and my vision was blurred.”

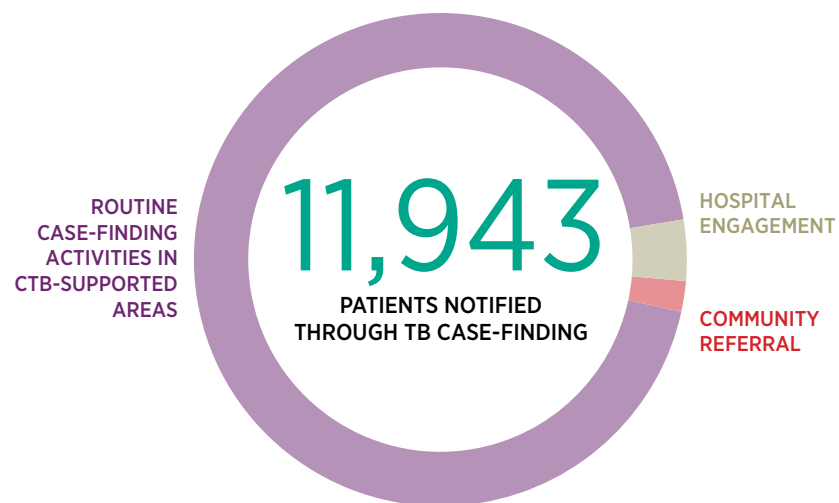
Mother of five Zarifa, was struck down by XDR-TB, but with help from CTB she successfully completed treatment and is cured.

SAYORA ZIYOYEVA

TAJIKISTAN

BEST PRACTICE

The diagnosis of MDR-TB among TB cases has increased since the introduction of GeneXpert testing at the NTRL. The use of motorbike riders resulted in an increase in samples transported despite frequent cartridge stock outs. The RR-TB cases have been identified early and the turnaround time for the GeneXpert results was shortened to less than 24 hours compared to the previous turnaround time of months when samples were sent to Nairobi for culture & DST.



TB BACKGROUND

- Tajikistan is among 30 high MDR-TB burden countries
- TB incidence 84 per 100,000 population (20 for RR-/MDR-TB)
- TB mortality 9 per 100,000 population.

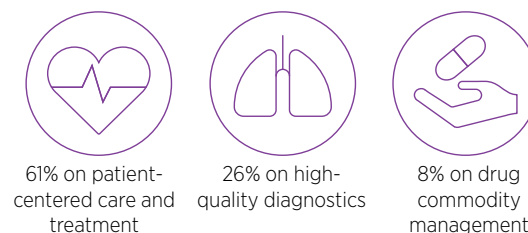
PROJECT BACKGROUND

- CTB was implemented by KNCV and began in 2014
- The main interventions supported the enrollment of patients on ND&R through capacity-building of TB and public healthcare providers, improving case detection through the establishment of an specimen transportation system, the introduction of SL-LPA and MTB/RIF Xpert testing, optimizing the LIMS by the introduction of the GxAlert, scale-up the aDSM system, and improving TB drug management by building the NTP's capacity and the implementation of e-LMIS and early warning system by using QuanTB at the central and regional levels.

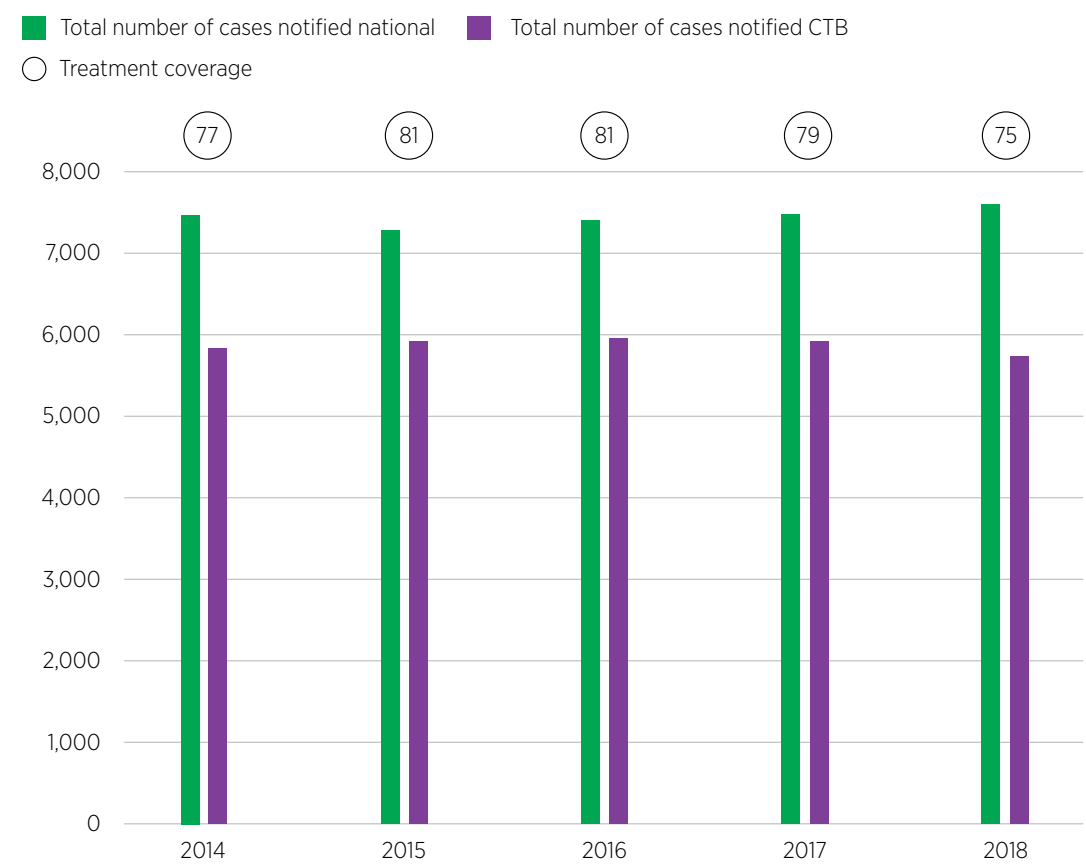
GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS



NUMBER OF CASES NOTIFIED AND TREATMENT COVERAGE



CASE FINDING

TB treatment coverage remained above 79% over the project period.

MDR-TB CARE AND TREATMENT

From Jan 2015 to Jun 2019, 1,277 DR-TB patients were diagnosed in CTB areas out of 3,692 nationally. CTB contributed 65% (279/429 during Jan-Jun 2019) of the MDR-/XDR-TB patients diagnosed in the country. 1,276 of the MDR-/XDR-TB patients diagnosed in CTB areas were enrolled on treatment, with 522 enrolled on new drugs regimens: 189 on the STR, 312 on an ITR-BDQ, 9 on an ITR-DLM, and 12 on an ITR-BDQ-DLM.

CTB's work significantly impacted on improving the treatment success rate in its sites, reaching 75% (77/102) in the cohort of patients enrolled on the STR from Dec 2016 to Jun 2018. The same treatment success rate of 75% (26/36) was achieved in patients who completed treatment with an ITR containing both BDQ and DLM from Dec 2016 to Jun 2017 (the national TSR was only 58% in 2015, i.e., before the CTB interventions).

CTB KEY PRIORITY INTERVENTIONS

- Roll-out of new drugs and regimens
- Diagnostic Connectivity
- Laboratory Strengthening
- Specimen Transportation System
- TB Preventive Treatment

1,277

DR-TB PATIENTS DIAGNOSED IN CTB AREAS BETWEEN 2015 AND 2019

LABORATORY STRENGTHENING

Since 2015, 60,811 samples were delivered to the laboratories, and 98% (59,594) were tested (Xpert/SL-LPA). CTB developed the SOPs, trained PHC and laboratory personnel (a total of 1,881 HCWs during 2016-2019), and improved the electronic laboratory information management system. By the end of June 2019, all 46 GeneXpert machines operating in the country were connected to GxAlert.

IMPROVED DRUG MANAGEMENT

With CTB support, drug forecasting and quantification were improved through the introduction of the QuanTB tool, which is used as an early warning system to prevent drug stock-outs at the regional and district levels. The e-LMIS was also introduced countrywide. As a result, during 2018-2019, there were no shortages of anti-TB drugs at the central or regional levels.

BEST PRACTICE

CTB used an effective approach for the introduction and implementation of ND&R. The project first developed a comprehensive platform including plans for adjusting the regulatory framework, improving infrastructure, establishing an specimen transportation system, training of providers, updating clinical protocols and an aDSM system. Significant advocacy was conducted with the MOH to convince policymakers on the effectiveness of the ND&R and to ensure their commitment for starting implementation, which allowed it to be both fast and successful.

60,811

SAMPLES DELIVERED TO LABORATORIES 98% OF WHICH WERE TESTED USING XPERT/SL-LPA



TANZANIA

Junior and Joyce Jackson aged two, were nearly killed by TB, but after being successfully treated they are back on their feet and doing well.

NUMBER OF CASES NOTIFIED AND TREATMENT COVERAGE



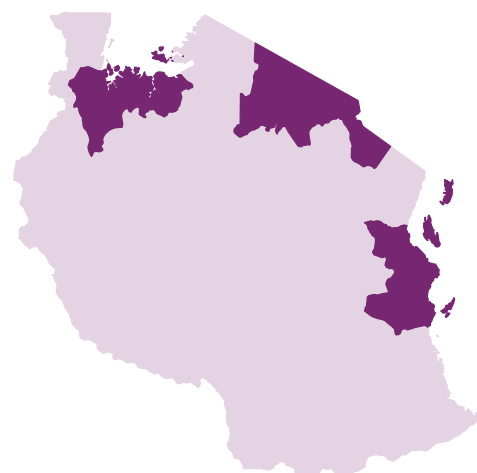
TB BACKGROUND

- Tanzania is among 30 high TB and high TB/HIV burden countries
- TB incidence 253 per 100,000 population
- TB/HIV incidence 71 per 100,000 population
- TB mortality 69 per 100,000 population (29 for TB/HIV)
- TB treatment coverage is 53%.

PROJECT BACKGROUND

- The project started in October 2014 and was led by the KNCV in collaboration with PATH, ATS, and six local CBOs
- The project worked in seven regions covering 30% (15.6M) of the country's population
- The areas of work included community TB prevention and care, targeted systematic TB screening, comprehensive high-quality diagnostics, TB/HIV integration, PMDT, TB infection control, management of LTBI, strengthened TB platforms, and human resource development.

GEOGRAPHIC COVERAGE



481

PATIENTS WITH DR-TB INITIATED ON ND&R FROM 2018

HIGHEST EXPENDITURE AREAS



CASE FINDING

National TB treatment coverage increased from 38% in 2014 to 53% in 2018. CTB contribution to the national case notifications increased from 38% in 2015 to 40% in 2019.

Various case finding interventions were implemented from 2017-2019, such as community engagement (including contact investigation and CBOs going into communities at risk), health facility-based active case finding (including TB-Diabetes, children, etc.), screening of PLHIV, and engaging private providers.

MDR-TB CARE AND TREATMENT

CTB championed the decentralization of PMDT services, from one DR-TB treatment initiating center 'Kibongoto Infectious Diseases Hospital' in the period 2009 to 2015 to 103 treatment initiating sites covering all 31 regions by June 2019. This has significantly contributed to the improvement of treatment coverage to 60% in 2018 compared to 16% in 2015, with a notable decrease in the treatment gap from 72% in 2014 to 9% in 2018. The treatment success rate improved from 73% in 2014 (2012 cohort) to 80% in 2018 (2016 cohort).

Beginning in January 2018, the CTB project pioneered the introduction of ND&R for DR-TB. A total of 481 DR TB patients were initiated on ND&R (399 STR, 75 ITR-BDQ, 7 ITR-DLM) as recommended by WHO. This is now implemented in 24 out of 31 regions nationwide.

CTB KEY PRIORITY INTERVENTIONS

- Roll-out of new drugs and regimens
- Diagnostic Connectivity
- Laboratory Strengthening
- Specimen Transportation System
- Innovative Case Finding
- TB Preventive Treatment



Movement of Youth Against Poverty, Ignorance and Diseases outreach work in Tanzania / PATH



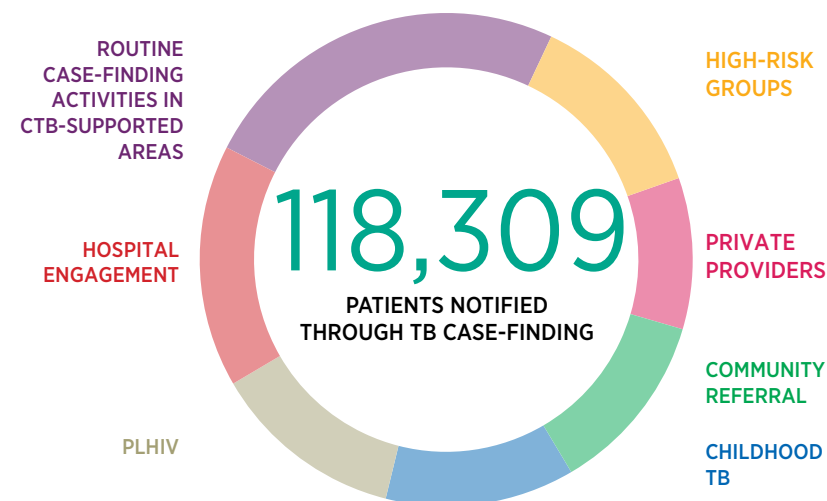
TURKMENISTAN

TB/HIV

CTB successfully expanded the coverage of TB/HIV collaborative activities from 27% of service delivery sites in 2015 to 87% by 2019, almost reaching the end of the project target of 90%. The proportion of TB/HIV patients on ART increased from 85% in 2015 to 98% in 2019.

LABORATORY STRENGTHENING

Through CTB support, the CTRL raised its status from a baseline of 2 stars to 5 stars (SLIPTA star rating) in Year 3. CTB procured and installed 8 GeneXpert machines and supported the maintenance of 217 GeneXpert machines; 106 (49%) of these machines are connected with GxAlert. The GxAlert connectivity rate improved from 38% in 2017 to 90% in 2019.



GeneXpert utilization increased from 45% in 2017 to 80% in 2019 in CTB areas. Motorcycles transported a total of 20,052 sputum-specimens in 2018 compared to 1,690 transported in 2016; 11,974 (60%) specimens were transported in CTB supported regions (7% MTB positive, 0.3% RR-TB).

TB BACKGROUND

- In 2018, there were an estimated 2,700 incident TB cases in Turkmenistan, equivalent to a rate of 46 per 100,000 population
- TB mortality rate 13 per 100,000 population
- TB treatment coverage 80%.

PROJECT BACKGROUND

- CTB was implemented by WHO in partnership with KNCV, from October 2017 to June 2019
- The Joint TB, HIV & Hepatitis Program at WHO/EURO provided the overall support to CTB in Turkmenistan
- WHO is also implementing a joint project with the Project Implementation Unit of the GF aiming to strengthen TB control activities in Turkmenistan, and both projects were complementary to each other

GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS



42% on patient-centered care and treatment

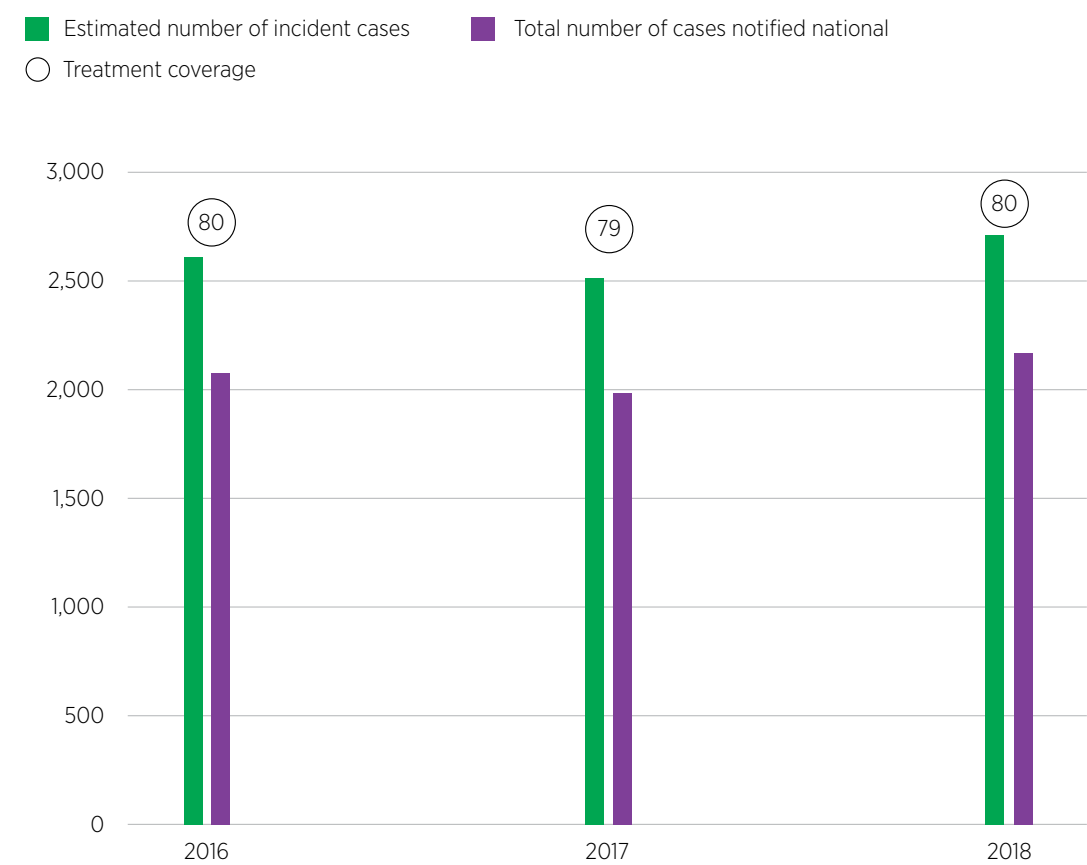


37% on drug commodity management



7% on infection control

NUMBER OF INCIDENT CASES, NOTIFIED CASES, AND TREATMENT COVERAGE



Patient hand with new TB drugs / KNCV

CASE FINDING

Throughout 2017 and 2018, a total of 4,125 TB cases were diagnosed in the country, equating to 79% of the WHO estimated TB incident cases being detected and notified. In 2018, the NTP undertook the second drug resistance survey - preliminary results show 24% MDR-TB among new cases and 55% among previously treated cases (NTP unpublished data).

INFECTION CONTROL

To expand access to prevention services, CTB conducted several trainings on infection control for TB specialists and epidemiologists, where participants learned about infection control measures to be implemented/observed at TB facilities.

STRENGTHENING TB DRUG MANAGEMENT

CTB contributed to strengthening TB drug management by training the NTP specialists on the use of a quantification and cost estimation tool 'QuanTB'. This serves as an early warning mechanism, providing information on actual versus planned consumption, impending expiries, and medicine stockouts.

CTB KEY PRIORITY INTERVENTIONS

- Roll-out of new drugs and regimens
- Diagnostic Connectivity
- Laboratory Strengthening
- Specimen Transportation System
- Innovative Case Finding
- TB Preventive Treatment

4,125

TB PATIENTS DIAGNOSED 2017-18
79% OF THE ESTIMATED TB CASES

MDR-TB CARE AND TREATMENT

CTB supported the NTP with the introduction of ND&R, the first patients were enrolled in Ashgabat, and in 2017 a total of 22 patients were enrolled on BDQ and 38 on DLM. CTB provided technical assistance to the NTP on updating the national treatment guidelines and developing a transitional plan, in line with the WHO updated treatment guidelines for programmatic management of DR-TB issued in March 2019. CTB provided support to the NTP in building the national capacity for PMDT through the development of training materials and training of trainers followed with cascade training in all regions of the country. As a result of the CTB support, the NTP is now ready to roll out the ND&R (including the STR) to the regions, as soon as regional TB facilities are equipped with the means to implement aDSM. CTB facilitated

the following trainings:

- A two-day workshop for the national working group to review all relevant national documents and discuss the proposals on updating and supplementing indicators in the current version of the M&E guidelines. CTB built on this by training the TB doctors on aDSM and specialists of the National Drug Registration and Quality Assurance Center on proper practices of pharmacovigilance.
- Two workshops on the management of DR-TB in children, and the treatment of LTBI for clinicians from all regions of Turkmenistan.
- Study tours and international study courses were arranged to facilitate hands-on experience on the implementation of the latest WHO recommendations on the treatment of DR-TB. These study tours were attended by 15 TB specialists, including TB specialists of the prison system.

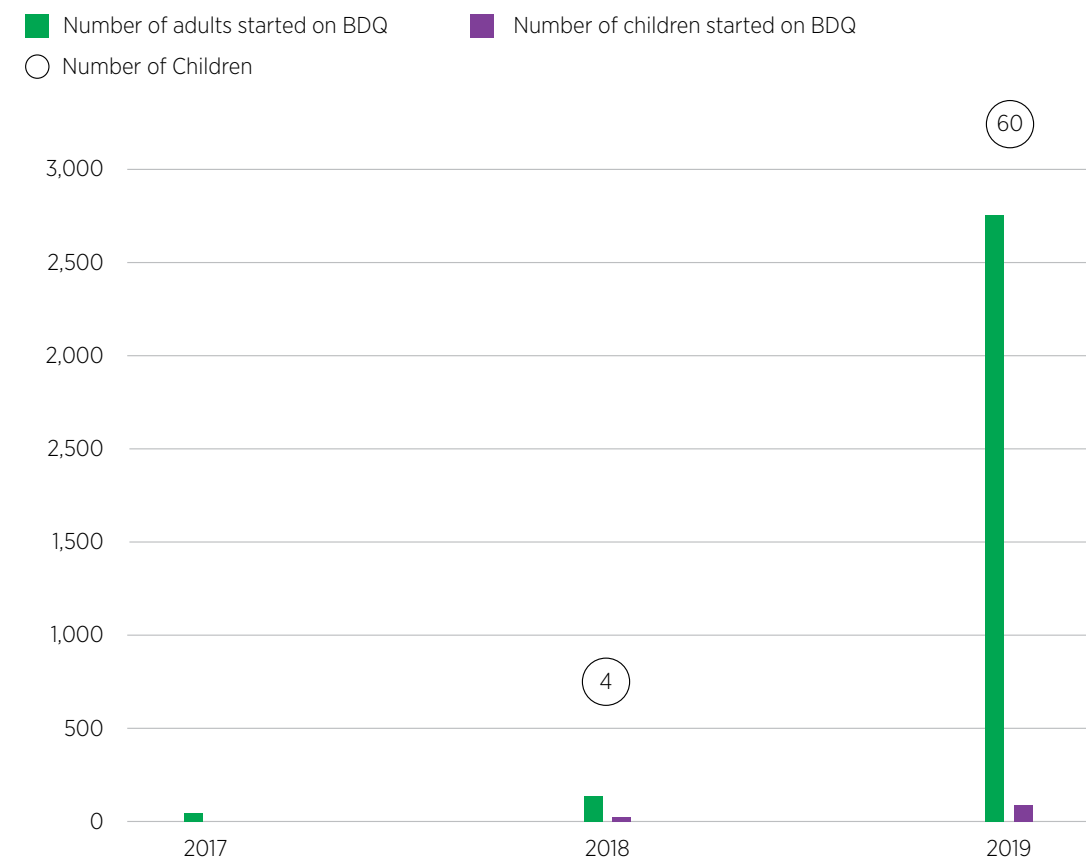
BEST PRACTICE

Engagement of community volunteers and CBOs facilitates early TB diagnosis and treatment. Community volunteers can reach those who may be reluctant to interact with the formal health system or face barriers in accessing it. Through engaging community leaders including traditional healers, and persistent follow-up with those undergoing treatment, community strategies can be a complementary to case notification in high-burden TB settings like Tanzania where case notification rates are low.

Organizational capacity building is essential to CBO sustainability. The introduction to financial management, sustainability planning, instituting managerial processes, and quality improvement mechanisms was well-received and successfully implemented by CBOs.



NUMBER OF ADULTS AND CHILDREN STARTED ON REGIMENS CONTAINING BDQ



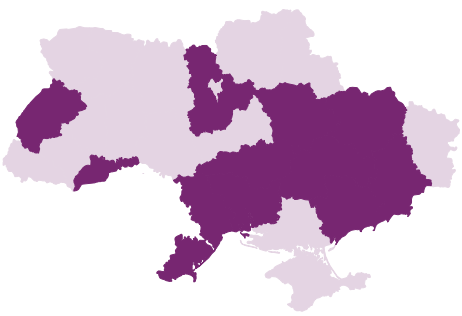
TB BACKGROUND

- Ukraine is among the top 30 MDR-TB high burden countries
- TB incidence 80 per 100,000 population
- RR-/MDR-TB incidence 29 per 100,000 population
- TB mortality 8.3 per 100,000 population
- TB treatment coverage 75%
- An estimated 29% of the new cases and 46% of the previously treated cases have RR-/MDR-TB.

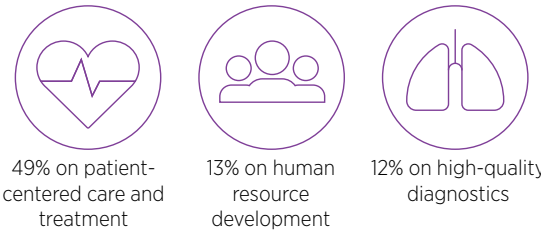
PROJECT BACKGROUND

- The project began in January 2015 and was led and implemented by PATH, in collaboration with KNCV.
- It covered approximately 53% of the population (22M people) and focused on strengthening PMDT, the introduction of ND&R, and increasing ART coverage for people with TB/HIV.

GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS



MDR-TB CARE AND TREATMENT

The project provided guidance and technical assistance to the Ukrainian Center for Public Health for the countrywide scale-up of new drugs and regimens. CTB staff supported regional leaders and technical focal points during the implementation. Between June 2017 and December 2019, a total of 3,026 patients were enrolled on treatment with BDQ. The project has supported the adjustment of the national online system for pharmacovigilance. Based on the results of cohort analysis, out of 193 pre-XDR-TB and XDR-TB patients enrolled in the BDQ treatment program, 153 patients were cured and 28 continue treatment with good intermediate results.

LABORATORY STRENGTHENING

CTB successfully transformed Ukraine's ability to quickly diagnose MDR-/XDR-TB cases, updating the national molecular diagnostic strategy using SL-LPA, assisting in internal laboratory quality control implementation and supervision, installing the GxAlert system and training personnel in using it.

CTB KEY PRIORITY INTERVENTIONS

- Roll-out of new drugs and regimens
- Diagnostic Connectivity
- Laboratory Strengthening
- TB Preventive Treatment



TB patients enrolled in the BDQ pilot in Ukraine / Andrii Gorb



“I felt weak, totally lacking in energy and completely unmotivated, physically and mentally broken. I used to work in a kindergarten, but when I was diagnosed with TB, my boss just fired me.”

In July 2018, Svetlana became one of the first patients in Uzbekistan to be enrolled on ND&R in Turkmenistan. She is now cured.

UZBEKISTAN

INCREASING ART COVERAGE

In CTB supported areas, clinicians placed an increasing proportion of TB/HIV co-infected patients on ART; coverage increased from 56% in 2014 to 79% in 2018. The average time to enroll patients on ART decreased from 2-3 months to 3-4 weeks.

Sustainable TB/HIV program management mechanisms were established at the oblast level, the interaction of services were institutionalized through the development of collaborative complex road maps, and the monitoring mechanism enabled leaders to identify and solve existing problems and also to make sound planning and management decisions.

BEST PRACTICE

The introduction of ND&R, as well as new WHO-recommended non-injectable DR-TB regimens, requires political will and an adjustment of documents, drug procurement and legislation. It also requires close monitoring to ensure proper use of new drugs and proper prescription of treatment regimens to avoid building resistance to these drugs.

Adverse events during MDR-TB treatment are the main barrier for treatment completion. The results of the CTB project implementation reveal that proper guidelines, capacity-building of providers, system strengthening, and appropriate availability of laboratory supplies for diagnostics and drugs to manage adverse events can significantly enhance overall prevention and management and lead to improved treatment adherence.

3,026

PATIENTS WITH DR-TB ON BDQ
BETWEEN JUN 2017 AND DEC 2019

TB BACKGROUND

- Uzbekistan is among the top 30 high MDR-TB burden countries in the world, and one of the 18 high-priority countries in the WHO European Region.
- TB incidence 70 per 100,000 population
- RR-/MDR-TB incidence 70 per 100,000 population
- TB mortality 6 per 100,000 population
- Treatment coverage 71% by end of 2018.

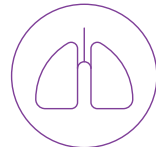
PROJECT BACKGROUND

- The CTB has been implemented in Uzbekistan since June 2016 by WHO in partnership with KNCV.
- CTB supported interventions and technical assistance, focusing on PMDT/introduction of ND&R, pharmacovigilance, and TB infection control.

GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS



34% on high-quality diagnostics

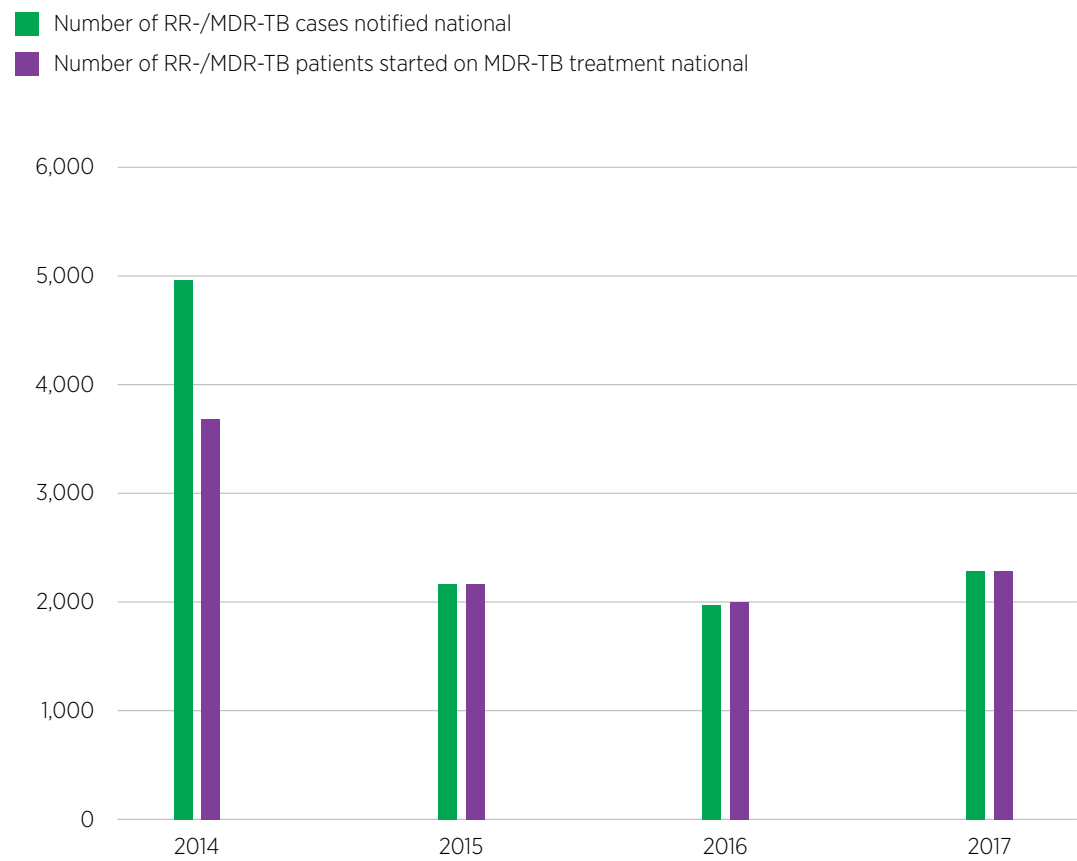


25% on patient-centered care and treatment



12% on human resource development

NUMBER OF MDR-TB CASES DIAGNOSED AND PUT ON TREATMENT



MDR-TB CARE AND TREATMENT

CTB helped to strengthen the quality of DR-TB care delivery with the focus on patients receiving ND&R. The MDR-TB treatment gap decreased from 26% in 2014 to 0% in 2017.

Nationally, 856 patients were enrolled on ND&R as of 2016. Enrollment under CTB support started in June 2018, and during this period, 647 patients were enrolled on ND&R: 227 on the STR, 413 on ITR-BDQ and 7 on ITR-DLM.

CTB contributed to the improvement of DR-TB detection and increasing enrollment on DR-TB treatment through supportive supervision visits, creating a system for continuous technical support of medical doctors on clinical issues and supporting the NTP to establish a system for the monitoring of treatment efficacy and safety in accordance

with the WHO recommendations. According to preliminary results, treatment success for DR-TB in Tashkent city reached 88-90% for patients on STR started treatment in 2018, compared with 59% among RR-/MDR-TB patients started second-line treatment in 2015.

CTB KEY PRIORITY INTERVENTIONS

- Roll-out of new drugs and regimens
- Laboratory Strengthening
- TB Preventive Treatment

856

PATIENTS WITH DR-TB STARTED ON ND&R SINCE 2016

LABORATORY STRENGTHENING

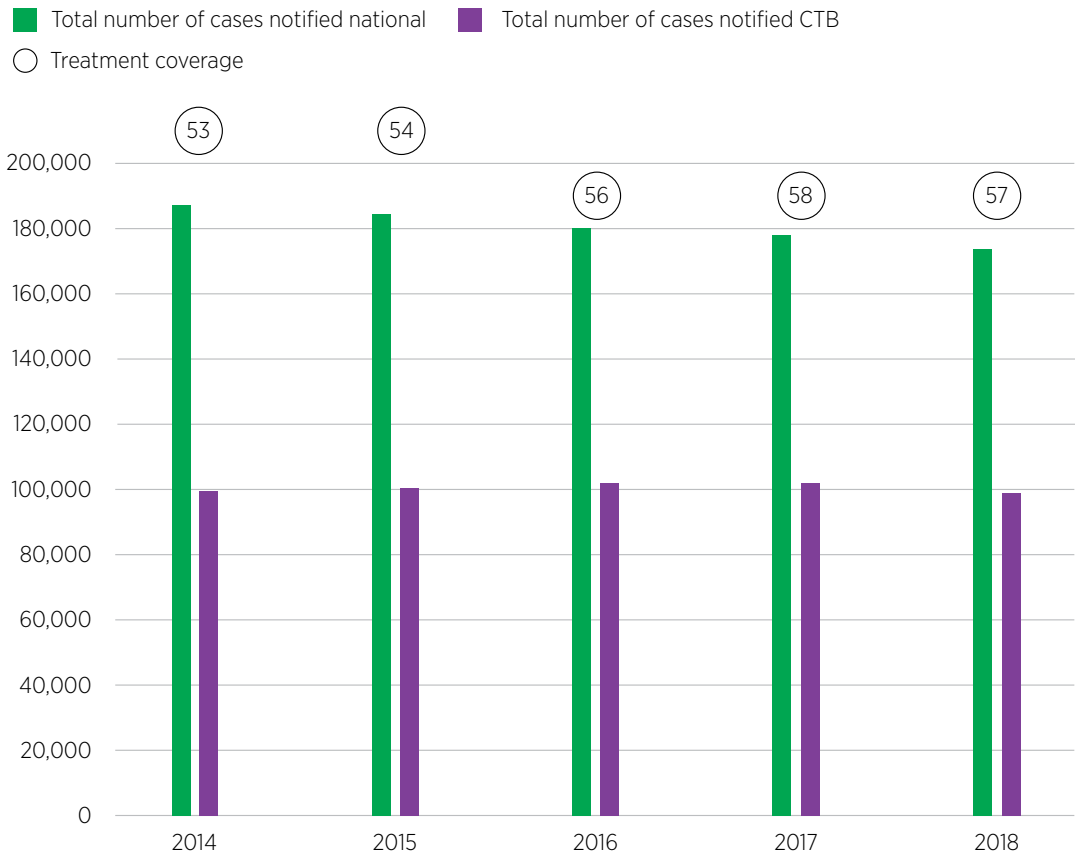
With CTB support, the diagnostic capacity for the rapid diagnosis of DR-TB was strengthened and scaled up. A five-year TB-specific national laboratory strategic plan was developed. In addition, CTB provided the country with modern laboratory equipment for rapid TB diagnosis – four Xpert MTB/RIF instruments and a SL-LPA diagnostic tool and consumables.

BEST PRACTICE

Current regulations and funding mechanisms for TB treatment and care are focused on hospital and in-patient care. There are promising trends at the governmental level, i.e., the country's plan to implement a national health insurance from 2021, where it is hoped that the current long hospitalization practices will be revised and rationalized with the focus on considering ambulatory treatment from the very beginning, by involving the respective healthcare providers.



NUMBER OF INCIDENT CASES, NOTIFIED CASES, AND TREATMENT COVERAGE



TB BACKGROUND

- Vietnam is among the top 30 countries with the highest TB and MDR-TB burden in the world
- TB incidence 182 per 100,000 population (9 for RR-/MDR-TB)
- TB mortality 13 per 100,000 population
- Treatment coverage was 57% by end of 2018.

PROJECT BACKGROUND

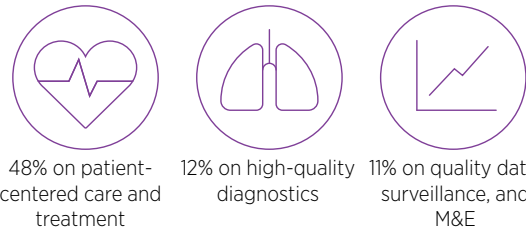
- The project started in October 2014 and was led by KNCV in collaboration with the WHO, during the first two years of the project. Partners at the central level included the NTP, and the Vietnam Administration for HIV/AIDS Control (VAAC)
- The project was implemented in 16 provinces, 230 districts, 3,734 communes covering a 43.5 million people, accounting for about 45% of the population

- The overall strategy of CTB in Vietnam was to develop, pilot and evaluate TB care and prevention innovations that are planned under the National Strategic Plan 2015-2020. As of 2016, the scope shifted to reaching the HIV 90-90-90 targets and focused on strengthening joint TB/HIV service delivery in high HIV prevalence populations, specifically targeting PLHIV
- The project was 100% PEPFAR funded.

GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS



CASE FINDING

The estimated number of incident cases decreased by 7% between 2014 and 2018, from 188,000 in 2014 to 174,000 in 2018.

Treatment coverage increased from 53% to 57% during the same period. CTB developed and supported the NTP to implement nationwide ACF plans among risk groups (PLHIV, people attending Methadone Maintenance Treatment clinics) and combined this with community mobilization and strengthening of routine TB/HIV services.

In 2015, CTB contributed to the roll-out of TB contact screening and the management of TB in children nationwide.

GENEXPERT TESTING

CTB continued to provide technical assistance and supervision to the roll-out of GeneXpert testing. The introduction and scale-up of the GeneXpert platforms provided a tremendous contribution to the diagnosis of MDR-TB and more sensitive diagnosis of TB for PLHIV in Vietnam. The number of GeneXpert machines increased from 47 in 2014 to 174 in 2018, and the number of sites from 58 to 124. The number of Xpert tests reached 107,198 in 2018, up from 21,799 at baseline.

CTB KEY PRIORITY INTERVENTIONS

- Roll-out of new drugs and regimens
- Diagnostic Connectivity
- Laboratory Strengthening
- TB Preventive Treatment

107,198

GENEXPERT TESTS CONDUCTED IN 2018
UP FROM 21,799 AT BASELINE



TB Screening in Vietnam / KNCV

“If TB is to be eliminated not only healthcare workers, but the whole community must be able to identify people who might be infected with TB early, and once they are diagnosed.”

Peter Ng'ombe is a peasant farmer who was diagnosed with TB after CTB undertook screening in the community.

ROBERTSON CHIBUMBYA

ZAMBIA



TB/HIV

A new model of TB/HIV integrated service delivery (integrating diagnosis, treatment, etc.) was developed and scaled-up by leveraging GF and domestic resources. CTB developed and implemented a case-finding approach in 29 HIV outpatient clinics and 3 methadone maintenance therapy (MMT) clinics in 8 provinces in 2017, 2018 and 2019 respectively. A total of 14,005 (73%) out of 19,117 HIV patients and people attending MMT clinics were screened for TB; 99 TB patients were diagnosed by Xpert MTB\ RIF and enrolled on TB treatment

MDR-TB CARE AND TREATMENT

CTB assisted the country in pioneering the patient triage approach for RR-/MDR-TB patients, using SL-LPA as the initial diagnostic test. Increasing numbers of patients with DR-TB were diagnosed and started treatment, starting from 2,131 MDR-TB patients in 2015 to 3,111 patients in 2018. The treatment success rate was 75% in 2014 and 2015 and 68% in 2016.

A total of 152 pre-XDR-TB and XDR-TB patients have been triaged and enrolled on BDQ-containing treatment regimens (1,182 have been enrolled on the STR). The interim outcomes of patients on BDQ-containing regimens showed impressive culture-conversion results at three and six months of treatment. Culture conversion at 180 days of treatment was achieved in 87% of patients that were culture-positive at baseline; and 77% within 90 days.

BEST PRACTICE

The leadership and directions of Provincial Department of Health was critical for joint TB/HIV service delivery at district and commune level. TB/HIV outpatient clinics were established under the general out-patient departments. Reporting and recording forms and registers were more simplified for the use at commune level, and TB/HIV data was integrated in the hospital information system.

TB BACKGROUND

- Zambia is ranked among the 30 high TB and TB/HIV burdened countries in the world
- TB incidence 346 per 100,000 population (205 for TB/HIV)
- TB mortality 102 per 100,000 population
- Treatment coverage was 58% by the end of 2018.

PROJECT BACKGROUND

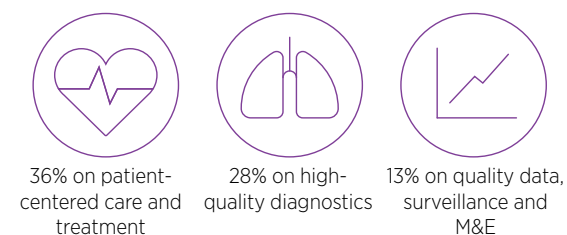
- CTB started in January 2017 and was led by FHI 360 in collaboration with KNCV
- The project worked in six target provinces (Northern, Central, North Western, Copperbelt, Muchinga, and Luapula)
- Due to the time-limited nature of the project (only 32 months of operation), CTB focused on rapidly scaling-up of time-bound, high-impact, interventions, such as strengthening laboratory

networks by supporting quality diagnostics and mentoring, improving the infrastructure of spaces for TB patients in health facilities to support infection control and quality service provision, building health care staff capacity to implement ND&R, and strengthening data management/data quality audits.

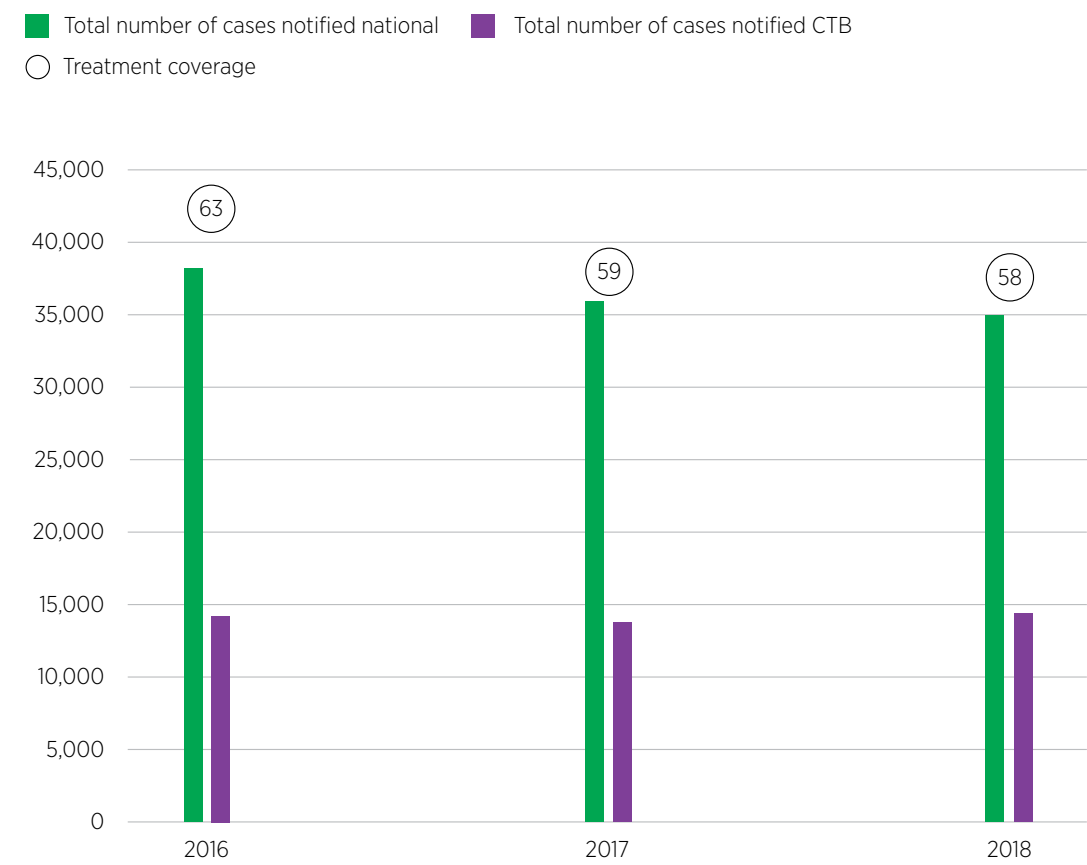
GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS



NUMBER OF NOTIFIED CASES AND TREATMENT COVERAGE



CASE FINDING

Treatment coverage remained around 60% during 2016-2018, while both TB incidence and TB case notifications showed a decreasing trend over the same period. Between 2017 and March 2019, a total of 32,506 TB patients were diagnosed and enrolled in treatment in CTB supported areas representing 41% of the nationally diagnosed patients and put on treatment (79,869).

MDR-TB CARE AND TREATMENT

The number of patients diagnosed with RR-/MDR-TB and started on treatment nationwide increased from 136 in 2016 to 465 in 2018. In 2017-2019, a total of 1,025 and 504 RR-/MDR-TB patients started on treatment countrywide and in CTB areas, respectively. During the life of the project, a total of 569 DR-TB patients were initiated on ND&R nationwide. The treatment success rate of MDR-TB patients has improved at the national level from 37% for the 2014 cohort to 68% for the 2017 cohort (from 42% in the 2014 cohort to 85% in the 2017 cohort in the CTB-supported areas).

CTB contributed to the expansion of the number of DR-TB treatment sites in Zambia from 2 in 2015 to 30 in 2019 as part of the decentralization process. The project played a key role in decentralizing DR-TB

services through implementing activities at national, provincial, and facility levels. CTB supported renovations of DR-TB spaces in selected hospitals and the NTRL, as well as the training/mentoring staff, including clinical expert committee members, in DR-TB with a focus on ND&R.

CTB KEY PRIORITY INTERVENTIONS

- Roll-out of new drugs and regimens
- Diagnostic Connectivity
- Laboratory Strengthening

LABORATORY STRENGTHENING

DST coverage among new and previously treated TB cases increased from 10% in 2016 to 67% in 2019, which could be linked to the number of GeneXpert machines rising from 69 in 2017 to 210 in 2019. To improve data utilization, CTB analyzed and produced weekly DataToCare reports and submitted them to the NTP for further action. The installation and scale-up of the DataToCare platform provided an opportunity for real-time data reporting and transmission for immediate

clinical decisions. CTB also trained 30 provincial and district TB managers, including on-site orientation for facility staff from 144 facilities. Over the life of the project, a total of 75,081 patient Xpert results were electronically transmitted to the MOH, clinicians, and patients in real-time from 144 DataToCare connected machines (out of 210 machines in total). Of the patients tested, 7,502 (10%) were MTB-positive and 298 (4%) were RR-TB.

BEST PRACTICE

Secondment of staff to NTP with specific expertise helped to mitigate the staff shortages and improved service delivery. To strengthen human resource capacity at NTP, CTB hired and seconded an M&E specialist, an MDR-TB officer, and a biomedical scientist. Two of these staff members were based at the NTP offices, and one at the NTRL.

32,506

TB PATIENTS DIAGNOSED AND TREATED BETWEEN 2017 AND MARCH 2019

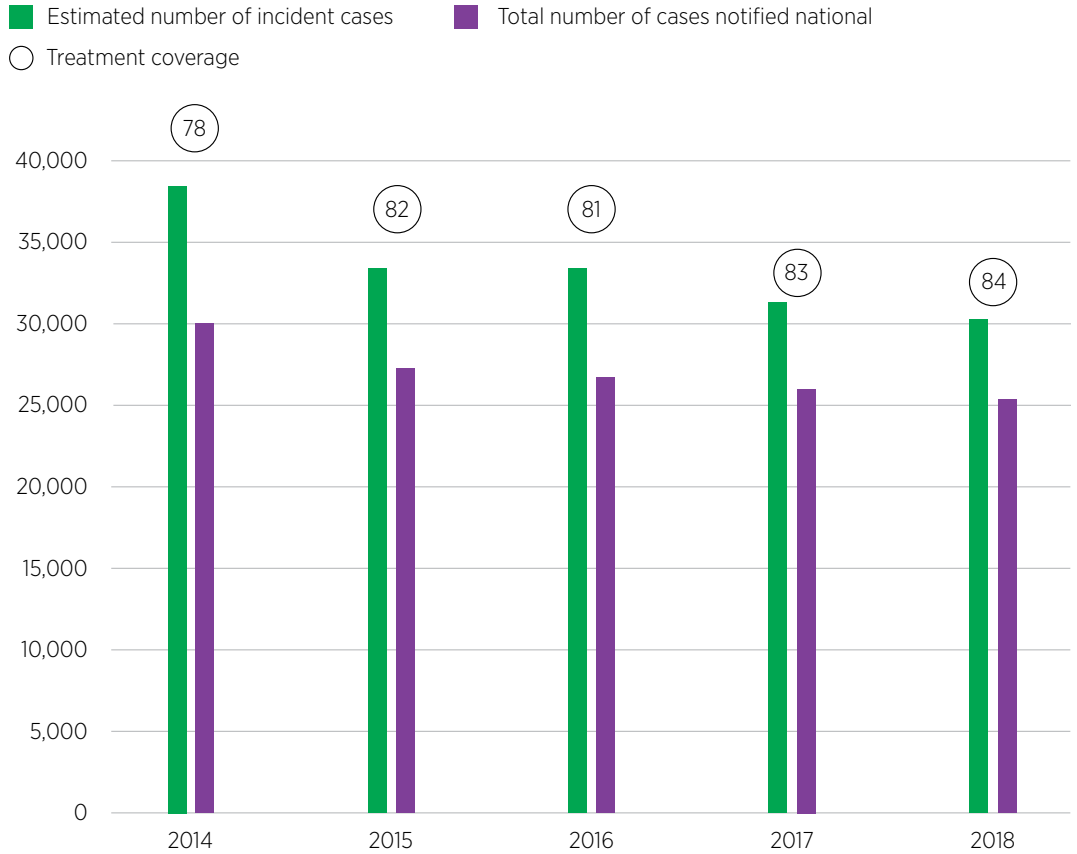


Talapia lost her husband to TB and she was treated for both TB and HIV. She now supports other TB patients on treatment in her community.

“I wish everyone the community would get screened for TB regularly, there are so many miners here, and they do not wear protective clothing when they go in the pits. We worry that they will get TB and spread it to their families and the wider community.”

Paidamoyo Magaya

ESTIMATED NUMBER OF INCIDENT CASES, NOTIFIED CASES AND TREATMENT COVERAGE



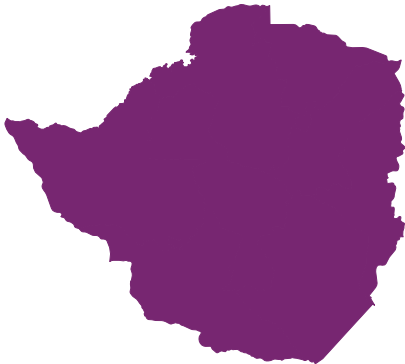
TB BACKGROUND

- Zimbabwe is one of the 14 countries with a triple burden of TB, TB/HIV, and MDR-TB
- TB incidence 210 per 100,000 population (130 for TB/HIV, and 10 for RR-/MDR-TB)
- The estimated mortality for HIV-negative TB 7.7 per 100,000 population and 24 for HIV-positive TB
- TB treatment coverage is 83%
- TB in Zimbabwe has been fueled by HIV, with a prevalence estimated at 14.3% among adults aged 15-49 years in 2014 and a decline to 13.3% was observed in 2017.

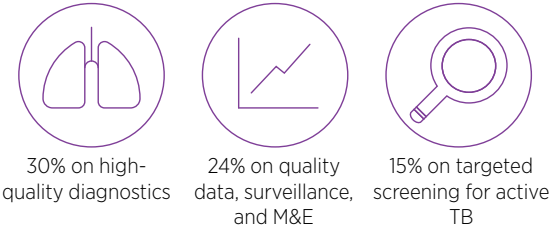
PROJECT BACKGROUND

- The project began in 2015 and is led and implemented by The Union, with WHO, KNCV, IRD, Family AIDS Caring Trust, Riders for Health, OPHID Trust, and WizEar as collaborating partners
- The project covered the entire country except for targeted screening for active TB, which was implemented in 21 out of 59 districts
- The main areas of work included finding missed TB cases, integrated TB/HIV care, PMDT, monitoring and evaluation, and operations research.

GEOGRAPHIC COVERAGE



HIGHEST EXPENDITURE AREAS



CASE FINDING

Since 2014, there has been a decreasing TB incidence in the country, with national TB treatment coverage increasing from 78% in 2014 to 84% in 2018.

Various case finding interventions contributed to the increased case-notification in CTB areas including targeted screening for active TB, contact investigation, and childhood TB.

MDR-TB CARE AND TREATMENT

With the expanded use of the Xpert MTB/RIF technology through CTB support, 2,089 patients with MDR-TB were diagnosed and 94% initiated treatment from January 2015 to 2019 nationally. Roll-out of ND&R for DR-TB contributed to 67 patients being initiated on BDQ and seven on DLM based regimens following advanced clinical MDR-TB and PMDT trainings for health care workers in 2015 and 2018.

CTB KEY PRIORITY INTERVENTIONS

- Roll-out of new drugs and regimens
- Diagnostic Connectivity
- Laboratory Strengthening
- Specimen Transportation System
- Innovative Case Finding
- TB Preventive Treatment



A couple were all smiles after showing no signs of TB during the targeted screening for active TB in Zimbabwe / Paidamoyo Magaya



Cured TB Patient Faustina in Zimbabwe / Paidamoyo Magaya

LABORATORY STRENGTHENING

CTB promoted universal access to Xpert MTB/RIF as the initial test for TB, resulting in a two-fold increase in the number of tests done nationally from 62,370 (2015) to 144,488 (2018). An exponential rise in the proportion of TB diagnosed using an Xpert MTB/RIF, from 24% (7,585/32,016) in 2014 to 94% (15,311/16,333) among new and relapse cases by September 2019.

Zimbabwe is one of the first countries to implement the GeneXpert multiplex assays platform at the programme level with four tests being uploaded onto the platform; namely Xpert MTB/RIF, Xpert MTB/RIF Ultra, Xpert HIV-1 Qual and Xpert HIV-1 Viral load.

SPECIMEN TRANSPORT SYSTEMS

Over the lifespan of CTB, more than one million specimens were transported, of which 16% were sputum specimens, contributing to the diagnosis of 43,274 bacteriologically confirmed TB cases, representing 80% of those bacteriologically confirmed nationally. This CTB-supported specimen transportation system used dedicated motorcycles to transport sputum samples and other specimens that required laboratory investigation to the nearest diagnostic center on a daily and/or weekly basis, depending on the geographic location in 42 districts and three major cities. The riders also delivered the results back to the referring health facility. This not only improved early TB diagnosis but also strengthened the overall functioning of the health system at the district level.

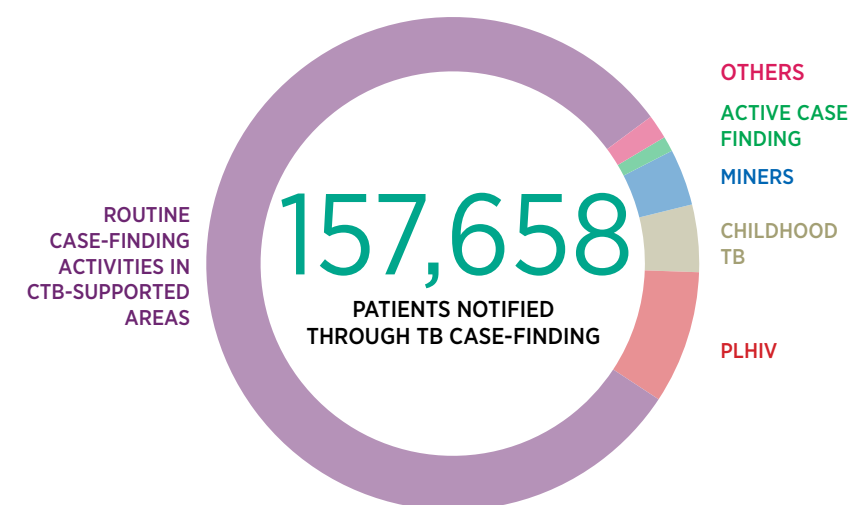
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SAMPLES TRANSPORTED
OVER THE LIFETIME OF CTB

TB/HIV AND DIABETES

Over 95% of TB cases had known HIV results in most of the CTB supported years, and ART provision among co-infected patients increased from 87% in 2015 to 96% in 2018.

CTB scaled up the patient-centered one-stop-shop model of TB/HIV care, integrating diabetes screening at 45 TB/HIV sites, drawing lessons from a pilot supported by the World Diabetes Foundation. CTB expanded routine bi-directional screening of TB and diabetes to all integrated TB/HIV care sites through clinical attachments and the provision of consumables to facilitate screening. Between 2016 and 2019, among 5,070 TB patients screened, 38 (1%) were newly diagnosed with diabetes and 21/2,161 (1%) diagnosed with TB among diabetes patients. This is now a priority intervention which the NTP will scale up using other funding mechanisms.



BEST PRACTICE

A dedicated specimen transportation system improved the efficiency of specimen referral from peripheral health facilities to the nearest laboratory resulting in the reduction of the turnaround time from 21 days to 1 day in urban areas. There is need to integrate the various specimen transportation systems supported by different partners for better coordination.



Acknowledgments

This report is dedicated to the memory of our colleagues Alick Mwale, Bashir P. Zakariyya, Eyob Moges, Jan Voskens, Omar A. Omar, and Weston Njamwaha, and the countless millions who have lost their lives in the fight against TB.

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