



EVALUATION

USAID/Zimbabwe

Tuberculosis Support Performance Evaluation

November 2022

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Zimbabwe Tuberculosis Performance Evaluation

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ACRONYMS

3HP	Weekly high-dose isoniazid plus rifapentine for 3 months
6H	Six months of daily isoniazid
ACF	Active case finding
BDQ	Bedaquiline
CAD	Computer automated detection
CCT	Conditional cash transfer
CDC	Centers for Disease Control and Prevention
CFZ	Clofazimine
CI	Contact investigation
CITS	Comparative interrupted time series
CNR	Case notification rate
CTB	Challenge TB
CTF	Contact tracing forms
CXR	Chest X-ray
DHIS	District health information systems
DLM	Delamanid
DM	Diabetes mellitus
DNA	Diagnostic Network Analysis
DO	Development objective
DOT	Directly observed therapy
DR	Drug resistance
DRS	Drug resistance survey
DR-TB	Drug-resistant Tuberculosis
DST	Drug susceptibility test
DS-TB	Drug-susceptible Tuberculosis
ECHO	Extension for Community Healthcare Outcomes
eDOT	Electronic directly observed therapy
EGPAF	Elizabeth Glaser Pediatric AIDS Foundation
EHR	Electronic health records
EHT	Environmental Health Technician
EQ	Evaluation question
ET	Evaluation team
FQ	Fluoroquinolone
GeneXpert	Xpert® MTB/RIF
GF	Global Fund
GOZ	Government of Zimbabwe
GXP	GeneXpert
HCW	Healthcare workers
HF	Health facility
HHCI	Household contact investigation
HIV	Human Immunodeficiency Virus
HRH	Human resources for health
IBTCI	International Business & Technical Consultants, Inc.
IDDS	Infectious Diseases Detection and Surveillance
IP	Implementing partner
IQR	Interquartile range
JHWO	Jointed Hands Welfare Organisation
KII	Key informant interview
KN-TB	Kunda-Nqob'i TB Project
LF-LAM	Lateral flow urine lipoarabinomannan assay
LMIS	Logistics Management Information System
LON	Local Organization Network
LZD	Linezolid
M&E	Monitoring and evaluation
MDR-TB	Multidrug-resistant tuberculosis

MOHCC	Ministry of Health and Child Care
MSTB	Multifocal skeletal tuberculosis
mSTR	Modified short treatment regimen
MTB	Mycobacterium tuberculosis
NNT	Number needed to test
NRL	National Reference Laboratory
NTP	National Tuberculosis Program
PBMEF	Performance-Based Monitoring and Evaluation Framework
PHI	Public Health Institute
PLHIV	People living with HIV/AIDS
RIF	Rifampicin
RR-TB	Rifampicin-resistant TB
SOW	Scope of Work
STAR	Sustaining Technical and Analytic Resources Project
STR	Shorter treatment regimen
TAT	Turnaround time
TB	Tuberculosis
TB LON/KNTB	Tuberculosis Local Organizations Network
TB-LAMP	Loop-Mediated Isothermal Amplification
TCG	TB Commitment Grant
TIFA	Tuberculosis Implementation Framework Agreement
TPT	Tuberculosis preventive treatment
TRAINSMART	Training System Monitoring and Reporting Tool
TWG	Technical Working Group
USAID	United States Agency for International Development
UZT	Union Zimbabwe Trust
WHO	World Health Organization
WRMD	World Health Organization Recommended Molecular Diagnostics
XDR-TB	Extensively drug-resistant tuberculosis

EXECUTIVE SUMMARY

The United States Agency for International Development (USAID)/Zimbabwe contracted International Business & Technical Associates, Inc. (IBTCI) in September 2021 to conduct the Tuberculosis (TB) Program Performance Evaluation. This report presents the findings, conclusions, and recommendations of the evaluation team (ET) led by Dr. Ellen M.H. Mitchell, four senior international and local experts, five local data collectors, and two administrative and logistics staff. The evaluation was conducted from September 2021 to September 2022, with in-country data collection occurring from June 2022 to July 2022.

EVALUATION PURPOSE AND EVALUATION QUESTIONS

IBTCI evaluated four major USAID funding mechanisms: Local Organization Network (LON), the Tuberculosis Implementation Framework Agreement (TIFA), Sustaining Technical and Analytic Resources Project (STAR), and Infectious Diseases Detection and Surveillance (IDDS). The evaluation focused on support delivered under USAID/Zimbabwe's development objective (DO) 2: Increased Number of Zimbabweans Live Longer and Healthier Lives, intermediate result (IR) 2.3: Increased Coverage of Quality Services and Responsive Systems for TB control. Findings, conclusions, and recommendations from this evaluation will support USAID/Zimbabwe, its implementing partners (IPs), the Government of Zimbabwe (GOZ), and other national and international stakeholders in their efforts to improve TB programs. The TB Performance Evaluation findings will enable USAID to reexamine its development hypotheses related to TB, adjust program implementation based on new evidence, and consider both planned and unexpected results in making future investments.

The team conducted the evaluation to answer the following four evaluation questions (EQs):

EQ1: How do USAID investments contribute to Zimbabwe's prevention, detection, treatment, and survival cascade nationally?

- a) What proportion of people in USAID-supported districts are protected, screened, tested, treated, and cured for TB and drug-resistant TB (DR-TB) versus districts without direct support from USAID?
- b) Have districts that received USAID support performed better in terms of screening, testing, treatment (both initiation and completion), and survival compared to those which did not?

EQ2: What are the treatment outcomes among drug-susceptible TB (DS-TB) and DR-TB patients?

- a) How are USAID investments in DR-TB diagnosis and treatment perceived by healthcare providers, patients, and implementing partners (IPs)?
- b) Given low detection and suboptimal DR-TB treatment outcomes, how can USAID support improve DR-TB case management going forward?

EQ3: What health system issues are affecting the delivery of quality TB services? This question is operationalized through the following four sub-questions:

- a) How do USAID investments in technical assistance (e.g., STAR) and knowledge management (e.g., TIFA) contribute to the quality of TB policy and guidelines?
- b) How do USAID investments in overarching infectious disease and laboratory strengthening (IDDS) contribute to the quality and timeliness of TB diagnosis?
- c) What are the health system issues that contribute to poor DR-TB treatment outcomes?
- d) What are the health system issues that contribute to underdiagnosis of TB in children under five years of age and their corresponding low uptake of TB preventive therapy?

EQ4: What patient-level behaviors and socioeconomic factors are affecting treatment outcomes for artisanal miners and pediatric TB cases?

- a) What are the challenges to preventing and detecting TB in artisanal miners?
- b) What are the family-level issues that contribute to suboptimal diagnosis of childhood TB and low uptake on TB preventive treatment (TPT) among household contacts who include children under five years?

BACKGROUND

The Mission has four activities implementing TB support through the Health Project, implemented by different partners and aimed at achieving different results. Three of these activities are national in scope [Sustaining Technical and Analytic Resources Project (STAR), Infectious Diseases Detection and Surveillance (IDDS), and TB Implementation Framework Agreement (TIFA)], and one activity [TB Local Organizations, Network (TB LON/KNTB)] focuses on eight districts in the country. These activities provided health advisors and trainings, supported development and implementation of policies and procedures at the district level, and supplied hardware and software for the health diagnostics and information systems. All four activities are subject to this evaluation.

EVALUATION DESIGN, METHODS, AND LIMITATIONS

The ET designed this evaluation using a mixed methods approach, using available quantitative data collected by the national laboratories and qualitative data collected through key informant interviews (KIIs), site visits for observation and records extraction, and document reviews. The analytical approach includes (i) a cross-sectional ecological analysis at the district level to discern marginal added value of specific USAID investments, (ii) a comparative interrupted time series analysis (CITS) of USAID-supported districts versus non-supported districts to assess change in TB case notification rate (CNR), (iii) a qualitative analysis of key informant interviews, and (iv) an analysis of DR-TB patient treatment trajectories. The ET conducted a deep dive into two technical topics, DR-TB and childhood TB, because these areas are key vulnerabilities within most TB programs, Zimbabwe included. Gender analysis and access inclusion of marginalized populations was integrated in both quantitative and qualitative analysis approaches.

During the in-country data collection, the ET conducted 73 KIIs (46 percent of respondents were female) with technical stakeholders, beneficiaries of the interventions (patients or their representatives), healthcare providers, and district- and national-level TB program staff. The team conducted site visits to eight healthcare facilities (four in the districts supported by USAID/LON activity and four in districts without USAID/LON activity support) and extracted 27 cases for a DR-TB cascade investigation and 25 cases for a childhood TB cascade investigation. The team also visited the two reference laboratories (in Bulawayo and Harare) and obtained depersonalized diagnostics access data for 2020 and 2021 and the GxAlert data for 2019, 2020, and 2021.

The major limitation to the evaluation design and implementation was poor record-keeping at the facility level, which prevented the ET from discerning whether mandated TB care was provided or not. Missing registers, empty registers, missing crucial fields, and data collection systems that were not harmonized to permit linkage hampered the triangulation of data needed to cascade creation.

FINDINGS AND CONCLUSIONS

This section also includes quantitative and qualitative evidence collected during the site visits and KIIs and provides additional information based on the review of project documentation and scientific literature. Results

are organized by locus of control (USAID, TB program, health system, and communities) corresponding to the evaluation questions.

USAID SUPPORT

This evaluation found that USAID support for TB detection both in the 2015–2019 Challenge TB (CTB) and in 2019–2021 (LON) had a modest positive effect on the TB case notification trend (all forms) when compared with districts that did not receive USAID support. Case notification rate (CNR) gains after CTB support ended were not sustained, however, and thus the benefits of USAID support for active case finding upon TB CNR may be time-bound. In ecological analysis, 2021 TB case notification rates in Zimbabwe were strongly correlated with receipt of USAID support and the presence of mining, after controlling for other factors. Although successful, review of monitoring and evaluation reports suggests that the LON mechanism case finding methods can be further optimized. Suboptimal triage methods (e.g., symptoms screens and human readers of digital chest X-rays/dCXR) can be substituted to improve cost-effectiveness and sustainability. GeneXpert machines can be networked to allow better real-time monitoring and evaluation of TB yield and effectiveness.

USAID investments have allowed the networking of 132 GeneXpert machines, permitting real-time analysis and triangulation of existing estimates. These data show higher than expected pretreatment loss to follow-up, higher than expected rifampicin (RIF) resistance, and challenges in error rates for GeneXpert (9 percent) that have grown since March 2020 when they were 6.3 percent.

The two TB reference laboratories have declining throughput, but not due to declining DR-TB incidence as often asserted. Rather, they do not receive sputum samples due to fatigue and doubts about the likelihood of receiving a timely result on the part of DR-TB providers. The official estimate that 90 percent of DR-TB patients undergo drug-sensitivity testing (DST) is overestimated. In our sample, 79 percent of DR-TB treatments (almost all short regimens) have missing DST results. As found in the 2020 Diagnostic Network Assessment (DNA), the TB reference laboratories are not communicating DST results to local laboratories or clinicians in ways that leave a paper trail, do not maintain complete or interoperable data management systems, and are not held accountable for DST and sputum conversion results reaching the clinician. On a positive note, the introduction of second-line DST, facilitated by USAID, has been crucial to characterize the DR-TB resistance pattern in Zimbabwe. Of concern, the presence of bedaquiline resistance (12 percent), suggests suboptimal programmatic DR-TB management is a threat to the viability of shorter regimens in Zimbabwe. Zimbabwe should reconsider how to strengthen its clinical and resistance monitoring capacities before contemplating introduction of BPAL (bedaquiline, pretomanid, and linezolid) and mBPAL (modified BPAL). Thus, USAID investments in diagnostics are bearing fruit in some areas, and in need of robust improvement in others. The engagement of the supranational reference laboratory and other donors funding laboratory support (e.g., the Centers for Disease Control and Prevention/CDC) is recommended because a coordinated team effort will be needed to address the performance and throughput gaps of the national reference laboratories.

The USAID-supported TIFA mechanism is well-regarded by the National Tuberculosis Program (NTP), stakeholders, and the Extension for Community Healthcare Outcomes (ECHO) platform serves a variety of functions. ECHO sessions have increased collaboration and networking among clinicians countrywide, but continue to draw a large audience from experts in Harare. To meet the goal of telementoring, additional means are recommended to reach primary care providers in rural and underserved areas. The STAR Advisor is actively engaged in a broad range of issues, and the nature of the role (e.g., coordination and support) makes

it difficult to evaluate empirically. Stakeholders value the facilitation efforts of the STAR Advisor as well as his advocacy for strengthening the core components of a functional TB program.

Stakeholders found USAID support for TB essential. Although some of the funding mechanisms were regarded as cumbersome, prone to frequent reprioritization, or predestined for well-compensated nongovernmental organizations, Zimbabwean stakeholders rely on USAID funding to cover gaps at local, district, and national levels. Ministry officials lamented that sanctions did not allow the funding of the Zimbabwe TB program directly, as this was hypothesized to be a more cost-effective means of investment. However, some of the Technical Commitment Grants (TCGs) in the TIFA portfolio were implemented by the NTP, which gave these stakeholders more autonomy and satisfaction than under previous mechanisms.

Healthcare workers (HCWs) reported regular exposure to training interventions organized by implementing partners supported by USAID. HCWs were largely knowledgeable on a wide range of TB technical topics and could discuss childhood TB diagnosis, laboratory test algorithms, and the norms and guidelines for DR-TB treatment, even when registers showed that they were not necessarily rigorously following the guidelines or regularly performing contact investigation, pediatric diagnosis, or DR-TB clinical monitoring.

TB PROGRAM COVERAGE AND PERFORMANCE

Screening coverage, testing coverage, and treatment coverage data provided by the NTP were analyzed to assess how comprehensive current efforts are to identify TB. Due to past underestimation of the size of some districts, the CNR and treatment coverage are lower than official estimates (100 CNR, 42 percent treatment coverage). The TB estimates in Zimbabwe need revisitation considering the information available from GxAlert and the revised population figures from the 2020 census.

The incidence of DR-TB is only now becoming clearer because of the widespread use of the Ultra cartridge and the networking of GxAlert data permit a more granular and complete picture of the frequency of Rifampicin-resistant TB (RR-TB) samples. Analysis of the data from 132 GeneXpert machines suggests that the incidence of DR-TB is likely higher than 4.2 percent among new cases ($\approx$ 6.5 percent in 2019 and 7.6 percent in 2021). The discrepancies between TB notifications and positive test counts in GxAlert merit further study, as they can reflect problematic levels of pretreatment loss to follow-up, wasteful confirmatory testing, and/or recording and reporting challenges.

This evaluation focused on the quality, quantity, and success of DR-TB care. The evaluation concluded that the official treatment success rate of 54–56 percent for DR-TB patients is overestimated. In our evaluation sample, DR-TB treatment success was 13 percent and most patient outcomes were not evaluated. The National Strategic Plan attributes some of the problems to over-decentralization of DR-TB and lack of healthcare worker capacity at primary care level. The lack of documentation of DR-TB care made it challenging for the evaluation team to ascribe attribution for the poor outcomes. It was not possible to evaluate the quality of DR-TB because there was almost no care described in the records. Additional USAID investments in DR-TB are needed to plug the gaps in the DR-TB treatment cascade and to develop a case-based, web-enabled DR-TB surveillance system so that the national program can have better control and understanding of the situation. Stakeholders in the national program do not make optimal use of available data and lack access to patient-level data in real time.

HEALTH SYSTEMS

To minimize patients' transport costs, shorter DR-TB regimens are implemented countrywide without directed observation of treatment, and with minimal clinical or safety monitoring. Delayed or sporadic monetary, nutritional, and palliative supports were reported by patients, providers, and District TB Coordinators alike.

A major health system issue contributing to poor outcomes is stockouts of medicines for drug-susceptible and drug-resistant TB. DR-TB patients and District TB Coordinators reported frequent drug stockouts and their financial and health consequences. While drug commodity management is no longer a USAID funding priority, stockouts do limit the return on investment from USAID support.

Childhood TB has received significant USAID investment, but there is not (yet) a lot of impact from these investments. In 2020 and 2021, USAID-supported districts referred higher median numbers of children under five for testing than districts without USAID support; however, this did not translate into a difference in pediatric TB patients notified, so the referral process for children may need to be refined if gains in diagnoses are to be achieved.

COMMUNITIES

GxAlert data show that 33 percent of TB patients have high bacteriological loads at diagnosis, suggesting delayed entry to care. Shortages of drugs and services in the health sector shift the burden to households to obtain treatments elsewhere. Several families were not able to get their needs met in the public sector, and had resorted to dissavings and other strategies to obtain care in Zimbabwe's private sector. Families reported facing decisions about how much debt to take on to obtain a diagnosis or an appropriate treatment. For some families care is postponed. Surviving family members of individuals who had succumbed to TB described having to pay out of pocket for routine items and to incentivize healthcare workers to care for hospitalized patients. A desire to return to employment was a common motivation for DR-TB patients to try to expedite or curtail treatment.

A USAID-supported study found a prevalence of 2.3 percent bacteriologically confirmed TB among miners, or roughly five times the rate in the general population.¹ Key informant interviews suggest that artisanal miners face risks beyond silicosis, human immunodeficiency virus (HIV), and TB, and included labor precarity and alcohol and substance use that were felt to complicate TB treatment adherence. Some interviews suggested that migration, mobility, and price fluctuations also played a role in loss to follow-up and development of drug resistance in this population.

There are differences in the TB care cascade for children under five that make them uniquely disadvantaged by structural issues and dependent on caregivers for diagnosis. Children under five benefit disproportionately from chest X-ray, which is often not housed within the TB program and, therefore, not provided for free. The diagnosis of TB in children by midlevel providers is often discouraged, and diagnosis is task-shifted to higher cadre providers and facilities, incurring additional costs and burdens for parents and systems. Key informants frequently mentioned gastric aspiration as standard of care; however, during site visits, six out of eight health facilities (HFs) visited reported receiving recent training in stool processing for pediatric TB.

Similarly, the uptake of TB preventive therapy (TPT) by children under five exposed in a household remains controversial or confusing to some frontline staff. Parents are often dubious as to why three or six months of semi-supervised treatment would be beneficial in the absence of documented infection, symptoms, or disease. Issues with adherence and provision of TPT to children with subclinical disease were raised recently by the

publication of a study showing Zimbabwean children <15 years had a higher prevalence of isoniazid mono-resistant TB (aPR = 3.93; 95 percent CI: 1.24-12.45) than other age groups. Another recent publication argues that provider hesitancy and lack of easy diagnostic tools remain stubborn obstacles.²

The evaluation shows that USAID support is vital for Zimbabwe and contributes meaningfully to control of the epidemic via policy, capacity-building, infrastructure and active case finding. Contextual constraints and strategic choices have, at times, limited the ability of the NTP and the country to maximize the concrete benefits of USAID support.

RECOMMENDATIONS

The evaluation team provides specific recommendations to bring greater strength to the Zimbabwe healthcare system and to allow the country to address the challenges identified in this report. The report presents recommendation to USAID, its current implementing partners, the GOZ, and civil society. The recommendations stated in this executive summary are explicitly linked to specific issues identified by the ET in the main body of the report. The recommendation section also includes proposed level of urgency and priority. In summary, the recommendations for each stakeholder are as follows:

USAID

1. Increase the proportion of USAID funding allocated to address the DR-TB issue.
2. Help establish WHO-recommended preconditions for shorter DR-TB regimens (e.g., pharmacovigilance, clinical monitoring, reporting and recording, patient-centered care and support, and palliative care).
3. Continue to invest in strategic TB detection, optimizing strategies to Zimbabwe's evolving TB epidemiology.
4. Consider how to prioritize among all childhood TB interventions to catalyze use of the most game-changing technologies for a high HIV-burden setting.

LON

1. Switch from human readers to computer automated detection (CAD) software for interpretation of mobile digital chest X-ray (dCXR) in active case findings (ACF) to improve sensitivity and specificity of the triage process.
2. Trial CAD software that can also diagnose silicosis, HIV-associated lung pathologies, and lung cancers associated with smoking [e.g., qXR v.2 (Qure.ai) or Lunit Insight CXR TB algorithm v4.9.0 (Lunit Inc.)].
3. Expedite the start of the planned trial of universal testing of pooled sputum samples for household contact investigation (HHCI) and ACF to reduce the cost-per-case detected.
4. Replace symptom screening with dCXR or pooled universal sputum collection.
5. Increase the proportion of men screened from <50 percent to at least ≥65 percent.
6. Do not screen in primary schools or in populations with low pretest probability.
7. Research root causes of suboptimal sputum provision and testing and trial solutions to improve test completion to acceptable levels (>90 percent). Consider introduction of cell phone video sputum coaching and/or field induction technologies shown to increase expectoration in ACF.
8. Revisit the effectiveness and uptake of the palliative care training component, including monitoring and evaluation (M&E) indicators.

IDDS

1. Adapt existing National Reference Laboratory (NRL) data collection tools to monitor the real turnaround time (TAT) for DST results. Conduct operational research to determine the median length of time for DST results to reach treating clinicians and document when DST results oblige a change in regimen.
2. Identify and address root causes of high error rates to ensure cost-effectiveness. Ensure electrical redundancy to avoid “no result” errors due to current interruption.
3. Use GxAlert SMS capability to alert provincial medicine stores of the need for expedited DR-TB drug dispensing to primary care sites. In other words, consider the feasibility of a push system instead of a pull system.
4. Ensure that the NTP has a full national overview of GxAlert — including the private sector (mining, research) and LON GeneXpert machines to allow its use for surveillance and real-time performance improvement.
5. Endeavor to improve the interoperability of the surveillance systems by ensuring both reference laboratories collect the same data.
6. Incentivize lab staff so that unique identifiers for linkage and sociodemographic variables are included.
7. Work with Elizabeth Glaser Pediatric AIDS Foundation (EGPAF) and local partners to increase utilization of nasopharyngeal aspiration (NPA), urine LAM (PLHIV), and universal stool testing of household child contacts under five.
8. Continue to diversify diagnostic technologies such as Truenat and FujiLAM (PLHIV) suitable for high DR-TB burden, high HIV-associated TB countries. Reconsider TB LAMP (Eiken) for use in ACF due to low sensitivity in subclinical and HIV-associated TB disease and lack of RIF measurement.

TIFA

1. Further decentralize ECHO to provincial and district levels and expand sessions for wider involvement of all districts.
2. Consider boosting the telementoring aspect, perhaps with asynchronous engagement.
3. Consider audience segmentation of ECHO sessions to improve reach and diversity of needs, one for experts to exchange research and one for midlevel health workers and community health workers to discuss challenges with case management in a more supportive environment.
4. Establish “communities of practice” via WhatsApp for low bandwidth clinicians. Encourage HCW competence with short updates sent on a regular basis via WhatsApp messaging, and utilize communication via their preferred modalities to maximize support to high-need/low-access clinicians in the periphery.
5. Consider engaging more local organizations and community-based implementers in the design of solutions eligible for TWG to help fulfill the ideals of the mechanism.

STAR

1. Consider focusing the mandate and technical focus of the STAR advisor to ensure tangible outcomes and accountability for engagement on specific issues.

NTP

1. Expedite the timing and ensure the feasibility of the social support mechanism (cash transfer, food packs) for DR patients by adding a social work dimension so that it functions as intended — to promote adherence and reduce catastrophic costs.
2. Encourage use of the ASPECT system to log digital and telephone communications between health facility staff and NRL on DST results.

3. Expedite the implementation of 10-color GeneXpert in the provinces so that HCWs can avoid over-reliance upon the regional TB reference labs for DST.
4. Ensure that HCWs are aware that GeneXpert Ultra is not currently a valid clinical treatment monitoring tool. Retrain to reduce confirmatory testing
5. Revise estimates from 2015 to 2022 according to 2020 population census and inform World Health Organization (WHO) of the issue.
6. Revise estimates from 2022 using GxAlert RIF positives as the denominator instead of DR-TB register notifications.

Ministry of Health and Child Care

1. Prioritize retention of human resources for health (HRH) through improving conditions of service, recognition of excellence, and opportunities for growth and leadership.
2. Continue to increase domestic budget for TB and government/funding partners, which should subsidize user fees to support universal health coverage.
3. Strengthen Natpharm's capacity to ensure consistent availability of essential commodities for TB care and prevention.
4. Prioritize completion of the electronic health record for drug-sensitive TB.
5. Utilize a web-based, vertical, case-based DR-TB case management system linked to ASCENT (e.g., WHO TRD ODK, OpenClinica, e-TB Manager) to ensure the focal person staff from the Programmatic Management of Drug Resistant TB (PMDT) program, and the M&E focal person, laboratory focal point have real-time information on case management of DR-TB.
6. Hire a social worker with access to GxAlert who can proactively register persons who test positive for TB in economic, nutrition, and other subsidies as well as screen them for mental health, substance use, and other nonadherence risks. Create multiple mechanisms of conditional cash transfer that reach a wider population.
7. Establish a social media/cell phone community of practice to facilitate asynchronous sharing of information and enhancement of competencies.
8. Strengthen contact management to increase early case detection of TB, including DR-TB, and reduce TB-related morbidity and mortality and community transmission.
9. Make roles and responsibilities for DST turnaround time clearer and include valid turnaround time indicators (door-to-door) in supportive supervision and performance-based financing schemes.
10. Consider introduction of cell phone video sputum coaching and/or field induction technologies shown to increase expectoration in ACF, digital adherence technology, asynchronous vDOT, etc.
11. Consider pilots of more efficient ways of conducting contact investigation (CI), such as:
 - Including HHCI as part of a conditional cash transfer (CCT) program for Bac+ pulmonary TB index patients
 - Incorporating CI into the new performance-based financing scheme for health services
 - Prioritizing CI to those who will most benefit, narrowly targeting child contacts under five

Civil Society

1. Lobby the GOZ to make cash transfer accessible for women and young people with DR-TB.

I. INTRODUCTION

In settings of declining tuberculosis (TB) incidence such as Zimbabwe, there is a very robust debate about the best ways to allocate scarce resources to find the decreasing volume of TB patients. TB epidemiology in Zimbabwe is thought to be highly dynamic because of the many shifts in the underlying social and clinical determinants of TB, particularly significant strides made in TB prevention and HIV viral suppression. Interventions that were historically quite beneficial often cease to be consequential and declining returns on investment stimulate concerns among policy makers, programmers, and patient advocates. In 2018 the Zimbabwean government made ambitious commitments to reduce TB, which were supported by international donors, including USAID, with the Zimbabwe Health Project that will run through FY 2023 with the purpose of increased numbers of Zimbabweans living longer and healthier lives.

USAID/Zimbabwe contracted IBTCI to conduct the TB Program Performance Evaluation in September 2021. This report presents findings, conclusions, and recommendations of the evaluation team (ET) lead by Dr. Ellen M.H. Mitchell, including Senior Qualitative Analyst Annette Bongiovanni, Senior Evaluator Vivian Victoria James, Senior Clinical Advisor Dr. Riitta Dlodlo, and Project Director Oleksandr Rohozynsky. The team received support from Operations Managers Abigail Price and Nivetha Kannan, and Logistics Coordinator Rebecca Mabuto, and relied on the team of local data collectors including Senior Research Associate Collins Timire and Research Associates Farai Moyo, Esther Nyakurimwa, Steadyfaith Mataga, and Maxwell Mjanga.

I.A. EVALUATION PURPOSE

The USAID/Zimbabwe mission aims to understand whether tangible benefits accrued to Zimbabwe's TB program from the specific policy choices and investments that have been made to date. Findings, conclusions, and recommendations from this evaluation are intended to assist USAID/Zimbabwe, its implementing partners (IPs), the Government of Zimbabwe (GOZ), and other national and international stakeholders in their efforts to improve TB programs. It was also vital to independently verify the epidemiologic dynamics, surveillance data, and program conditions that inform USAID strategic decisions. This TB Performance Evaluation enables USAID to reexamine its development hypotheses related to TB, adjust program implementation based on new evidence, and consider both planned and unplanned results.

EVALUATION QUESTIONS

After contract award, the IBTCI ET worked with the USAID/Zimbabwe stakeholders to refine the evaluation questions (EQs) formulated in the Evaluation Scope of Work (SOW) in order to increase usability of the evaluation results and to best fill gaps in the current knowledge landscape. The revisions proposed during the Evaluation Design were accepted by USAID, and the evaluation was conducted to answer the following four questions:

EQ1: How do USAID investments contribute to Zimbabwe's prevention, detection, treatment, and survival cascade nationally?

- a) What proportion of people in USAID-supported districts are protected, screened, tested, treated, and cured for TB (and DR-TB) versus districts without direct support from USAID?
- b) Have districts that received USAID support performed better in terms of screening, testing, treatment (both initiation and completion), and survival compared to those which did not?

EQ2: What are the treatment outcomes among DS-TB and DR-TB patients?

- a) How are USAID investments in DR-TB diagnosis and treatment perceived by healthcare providers, patients, and implementing partners (IPs)?

- b) Given low detection and suboptimal DR-TB treatment outcomes, how can USAID support improve DR-TB case management going forward?

EQ3: What health system issues are affecting the delivery of quality TB services? This question is operationalized through the following four sub-questions:

- a) How do USAID investments in technical assistance (e.g., STAR) and knowledge management (e.g., TIFA) contribute to the quality of TB policy and guidelines?
- b) How do USAID investments in overarching infectious disease and laboratory strengthening (IDDS) contribute to the quality and timeliness of TB diagnosis?
- c) What are the health system issues that contribute to poor DR-TB treatment outcomes?
- d) What are the health system issues that contribute to underdiagnosis of TB in children under five years of age and their corresponding low uptake of TB preventive therapy?

EQ4: What patient level behaviors and socioeconomic factors are affecting treatment outcomes for artisanal miners and pediatric TB cases?

- a) What are the challenges to preventing and detecting TB in artisanal miners?
- b) What are the family-level issues that contribute to suboptimal diagnosis of childhood TB and low uptake on TB preventive treatment (TPT) among household contacts who include children under five years?

I.B. BACKGROUND

Recent shifts in USAID funding priorities and assistance mechanisms have tilted to favor more local, more targeted, and more diverse support for its TB program. Globally, there has been a gradual upstream pivot toward TB prevention and early detection. In countries with apparent declines in TB incidence, the role of USAID is expected to shift to catalytic investments instead of basic service delivery. This evaluation aimed to quantify the consequences of these changes across Zimbabwe's policy, service delivery, and institutional structures. Table I describes the distribution of USAID TB support.

Table 1. USAID/Zimbabwe Activities Supporting TB

Implementing Mechanism Name:	TB Local Organizations, Network (TB LON/ KNTB)	Sustaining Technical and Analytic Resources Project (STAR)	Infectious Diseases Detection and Surveillance (IDDS)	TB Implementation Framework Agreement (TIFA)
<i>Prime Partner:</i>	The Union Zimbabwe Trust	Public Health Institute	ICF Macro, Inc.	JSI Research and Training Institute, Inc.
<i>Cooperative Agreement #</i>	72061319CA00003	7200AA18CA00001	7200AA18M010	7200AA19CA000013
<i>Geographic Regions</i>	Gwanda, Kwekwe, Insiza, Chirumhanzu, Zvishavane, Gweru, Shurugwi, Mwenezi	National	National	National
<i>Start Date:</i>	10/01/2019	05/01/2018	05/22/2020	01/10/2019
<i>End Date:</i>	09/30/2024	04/30/2023	05/21/2023	01/9/2024
<i>Total Estimated Cost:</i>	\$15,000,000	\$2,000,000	\$13,000,000	\$2,000,000

Country Context

USAID has supported the GOZ to address TB for more than a decade, underwriting the major measurement efforts to understand the TB and HIV syndemic and develop strategic interventions to address it.

In keeping with underlying trends, TB case notification declined in almost all districts of Zimbabwe from 2018 to 2021 on the order of -51 cases/100K population per year. There are robust debates as to whether the observed reduction in TB case finding represents a true increase in TB treatment coverage or a declining capacity to detect TB, a reflection of the country's financial and public health crises impacting demand and health system functionality. Recently the release of the 2020 population census has shown that TB treatment coverage is significantly overestimated in the past five years.

The NTP coordinates policy formulation and resource mobilization for TB control and develops strategic plans for the interventions aligned to global TB strategies. The plans are implemented at the district level, where all comprehensive health services — including TB case finding, diagnosis, treatment, and patient follow-up — are provided. The NTP also manages two national laboratories that provide the bulk of culture-based testing.

The COVID-19 pandemic encumbered delivery of the TB services in the country in 2020 and 2021. The total number of confirmed COVID-19 cases in the country is currently 256,708, and the spikes of the pandemic happened from the end of 2020 until the end of 2021. The attention of national health authorities shifted to preventing, diagnosing, and detecting COVID with a concomitant reduction in level of effort in combatting TB. Implementing partners attest that COVID protocols prevented timely rollout of trainings and installations. Healthcare workers reported contact tracing, diagnostics, and treatment challenges attributable to COVID.

According to WHO, the number of TB cases (all forms) detected in 2020 fell 45 percent to 11,653 from 21,008 in the previous year.

Activity Background

USAID investments in TB are designed to be catalytic and stimulate local stakeholders to embrace innovation and global best practices to solve problems identified in Zimbabwe.

The Mission has four activities implementing the TB support through the Health Project, implemented by different partners and aiming at different results. The largest shares of USAID TB investment have been in the LON (Kunda-Nqob'I TB, KN-TB) Project (USD 15 million (m) from 2019 to 2024) and diagnostic strengthening (IDDS) (USD 13m from 2019 to 2024). Thus, the evaluation explored synergistic value added from these particular supports in greater depth.

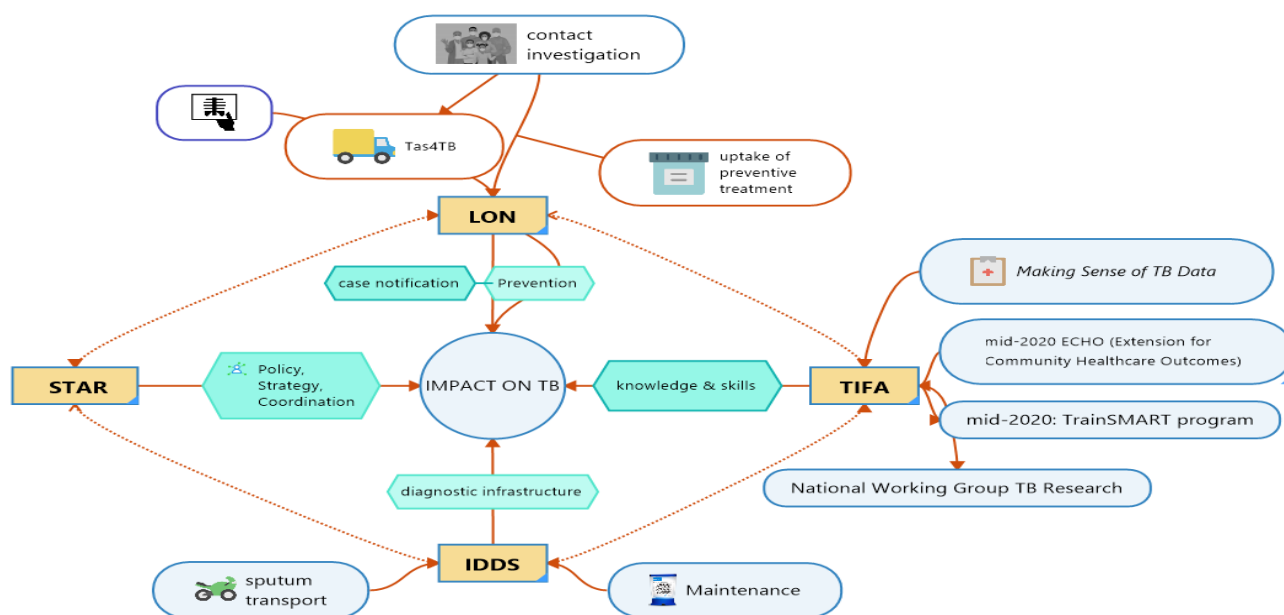
Three of activities are national in scope, and one is located in eight districts (see Table 1).

1. **The TB Local Organizations Network (TB LON)** assists NTP to design, develop, and implement policies, strategies, and services that support the prevention of TB transmission, increase the detection of TB cases, link identified cases into care and treatment, and create an enabling environment for TB control in Zimbabwe. TB LON provides support to the Zimbabwean government to strengthen laboratory services and the diagnostic network, and enhance TB case detection in facilities and in the community. It deploys mobile digital chest X-ray, which is more sensitive than other triage tools, in the target districts with the aim of increasing diagnosis among communities with low access.
2. **The Sustaining Technical and Analytic Resources Project (STAR)** is a global USAID-supported mechanism that placed a TB technical adviser embedded at the NTP to provide technical advice in the design and implementation of TB control activities. Implemented by the Public Health Institute (PHI), the STAR mechanism supports TB programs in countries with staff shortages and aims to increase coordination among stakeholders, including Global Fund, USAID implementing partners, and CDC President's Emergency Plan for AIDS Relief (PEPFAR) implementing partners.
3. **The TB Infectious Diseases Detection and Surveillance (IDDS)** is a USAID-funded global mechanism. In Zimbabwe, the IDDS project focuses on activities to accelerate the diagnosis of TB and build upon previous USAID and US Government investments and activities for improved TB diagnosis including multi-drug resistant (MDR) TB. The Activity developed a quality improvement framework for the Bulawayo National TB Reference Laboratory, and contributed to increasing the number of TB rapid diagnostic laboratories that participate in a quality assurance program. The project also provides training of personnel for laboratories and support for connecting molecular diagnostics to centralized dashboards (e.g., GxAlert platform or ASCENT).
4. **The TB Implementation Framework Agreement (TIFA)** supports the journey to self-reliance (J2SR) through implementation of TB Commitment Grants (TCGs). TIFA aims to enhance collaborative, locally led efforts to build countries' capacity to plan, finance, monitor, and sustain their own high-quality TB programs. TCGs are fixed amount awards, which are short-term ($\approx$ 12 months) performance-based awards focused on specific measurable goals. Since June 2020, there are four TB Commitment Grants (TGCs) operational in Zimbabwe (TRAINSART, ECHO, TWG, and MSTB Data).

Theory of Change

Figure 1 illustrates the mechanisms of action and theory of change behind USAID investments.

Figure 1. Hypothesized Synergies and Mechanisms of Action for TB Investment



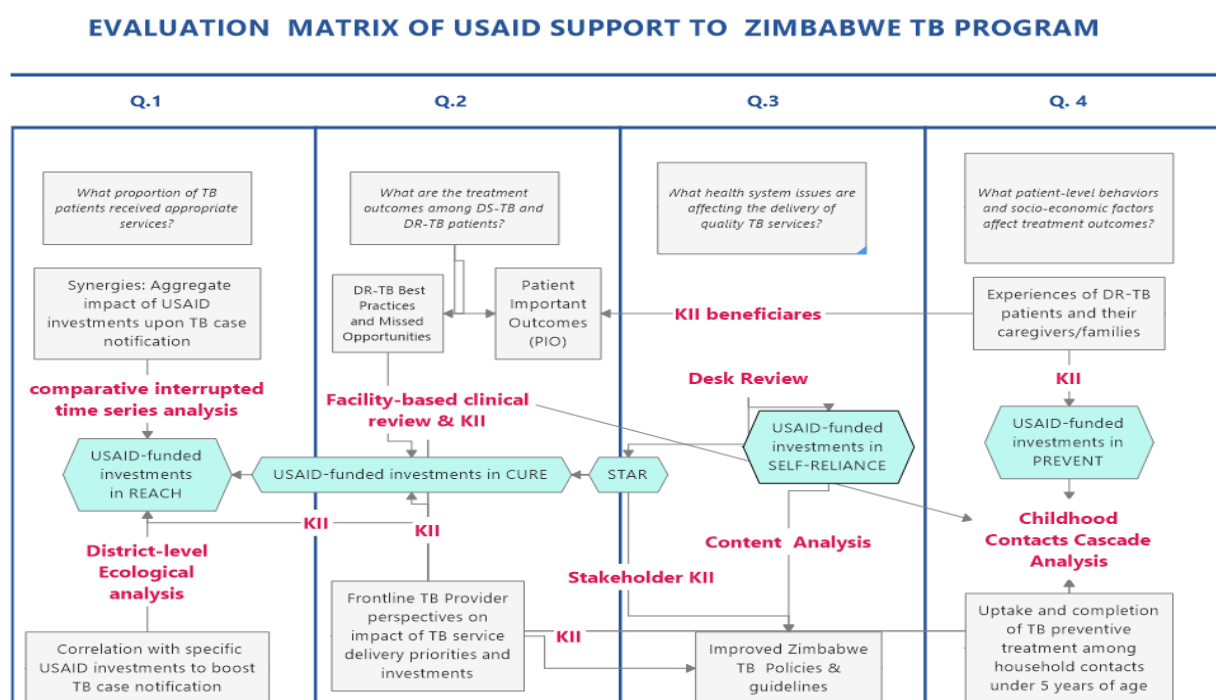
II. EVALUATION METHODS AND LIMITATIONS

The evaluation was implemented from September 2021 to November 2022. The original period of performance was extended from June 2022 to November 2022 due to the delay in obtaining GOZ approval for conducting data collection and accessing the healthcare data in the labs. This shifted the data collection period from March 2022 to July 2022, and created some additional challenges for the primary data collection and analysis.

The ET designed this evaluation as a mixed methods study, leveraging available quantitative data from the national program, implementing partners, the national laboratories, qualitative data collected through key informant interviews, site visits for observation and records extraction, and document reviews. The analytical approach included cross-sectional ecological analysis at the district level to discern added value of specific USAID investments, and comparative interrupted time series analysis (CITS) of USAID-supported districts versus non-supported districts to assess the change in TB CNR over time. USAID's Global Accelerator to End Tuberculosis employs 10 performance-based measures to reflect progress in the TB program and these were employed in this evaluation as benchmarks.

Figure 2 illustrates the ways specific data inform individual evaluation questions.

Figure 2. Evaluation Matrix



QUALITATIVE ANALYSIS OF KEY INFORMANT INTERVIEWS AND THE ANALYSIS OF DR-TB PATIENT TREATMENT TRAJECTORIES

The ET conducted a deep dive into two technical topics (DR-TB and childhood TB) because they are particularly complex problems that almost all the different types of support USAID provides is linked to. These subjects have also been the vulnerabilities of most TB programs (Zimbabwe included) in the past. Gender analysis and inclusion of marginalized populations (artisanal miners) was integrated in both quantitative and qualitative analysis approaches.

Key informant interviews

Key informant interviews (KIIs) were conducted to learn the perceptions of stakeholders regarding the strategic relevance and effectiveness of USAID support in the fight against TB. KII helped the ET understand the flow of TB care and root causes of problems experienced by providers and beneficiaries. Open-ended inquiry provided insight into patients' experiences with the TB care seeking and to obtain insights about areas of need for further interventions. We conducted KIIs with four main groups:

1. Technical stakeholders
2. Beneficiaries of the interventions (patients or their representatives)
3. Healthcare providers
4. District- and national-level TB program staff

Due to starting the evaluation during the COVID-19 pandemic, when in-person meetings were limited to prevent spread of the virus, most of the KIIs with high-level stakeholders were conducted remotely by the team lead and the senior evaluator. KIIs with healthcare providers, parents, or their representatives (next of kin) were conducted in person during site visits by the data collection teams when COVID restrictions were relaxed. As shown in Table 2, the ET conducted interviews with 73 respondents (47 percent of respondents were female and 53 percent were male).

Table 2. Number of KIIs conducted

	Female	Male	Total
Beneficiaries of Interventions	8	9	17
Donors	1	1	2
National TB Program	0	6	6
District Authority	1	6	7
Healthcare Workers	16	10	26
Technical Stakeholders	1	2	3
USAID IP	6	5	11
MOHCC		1	1
TOTAL	33	40	73

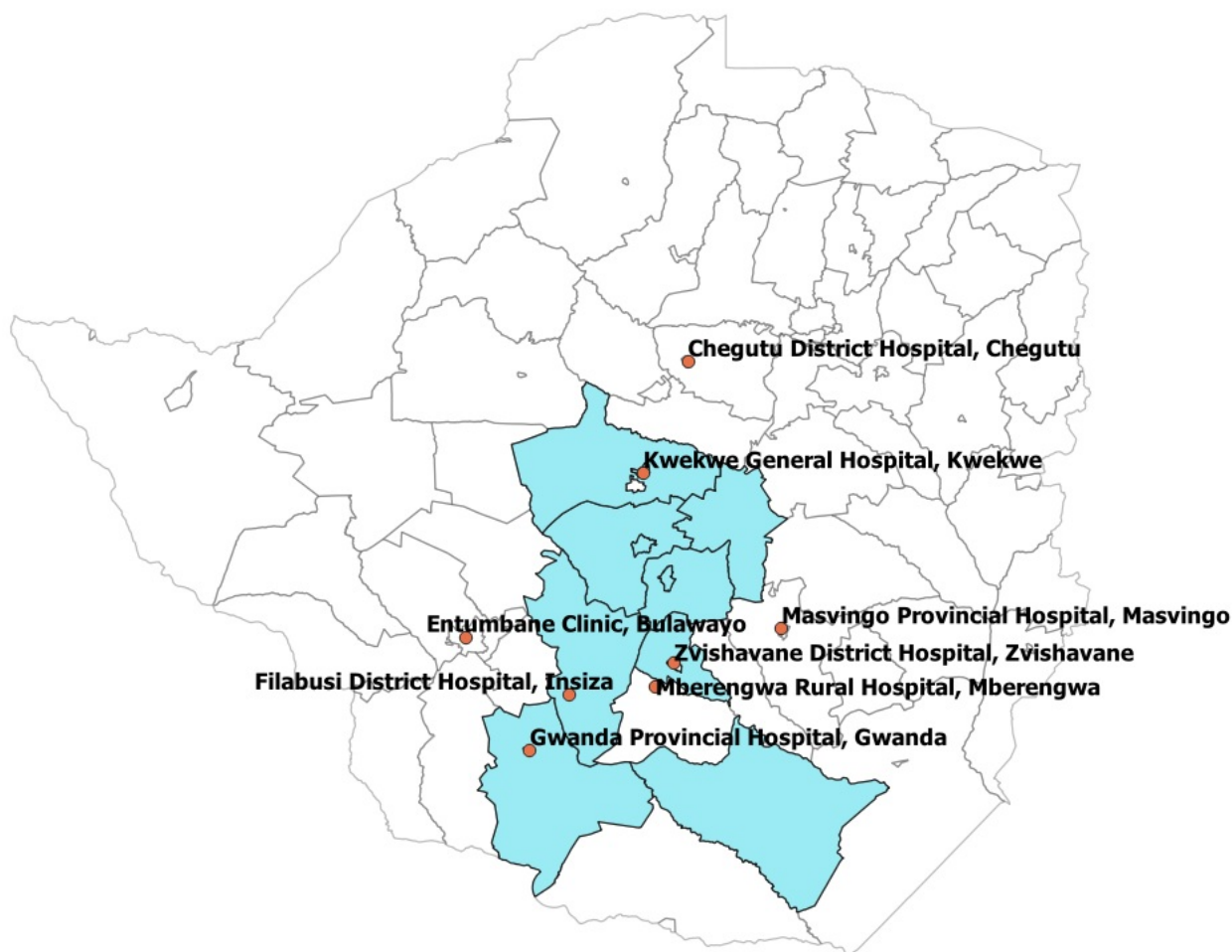
The interviews were conducted following semi-structured KII questionnaires developed specifically for each group of respondents. Given participants' consent, the interviews were recorded, and sound files were transcribed using artificial intelligence computer transcription and manually via subcontractor, who also provided translation for the interviews conducted in language other than English. The KII transcripts were coded in Dedoose using a priori and hermeneutic codes identified in the data during analyses. The coded data were "charted" into a spreadsheet to generate a matrix using the Framework Analysis Method.³ Gender, geographic, and role (e.g., beneficiary, IP, government official, nongovernmental organization, etc.) triangulation was conducted to aid interpretation of results. Framework analysis was used to identify actionable recommendations and gain insights into the quality, propriety, and perceived added value of USAID programming.

Site visits

ET conducted site visits to eight healthcare facilities and two national laboratories to conduct Clinical Review (including KIIs with staff, Record Abstraction, and DR-TB diagnostic and prevention cascade), and Childhood TB diagnostic and prevention cascade. The ET selected four facilities that were targets of the USAID interventions under the TB LON/KNTB activities, and four facilities in the districts that were not targeted by this activity (see Figure 3).

Figure 3. Health facilities visited by the evaluation data collection teams

**Districts targeted by TB
LON/KNTB are in
turquoise**



The purpose of the health facility site visits was to conduct in-depth cohort review of facility-level clinical and modifiable contributors to DR-TB treatment outcomes via a retrospective clinical review. This entailed record abstraction at sites that provide DR-TB treatment and was intended to discern how the facilities adhere to the Zimbabwe's national DR-TB guidelines (see Annex IV: Clinical Review Tool), and measure turnaround times (TAT) for each step and performance of clinical monitoring recommended by the ITSC (international TB standards of care) and the European Respiratory Society (ERS), but adapted to the introduction of new drugs and regimens. Original methodology assumed that the ET would be able to randomly select at each facility five DR-TB patients with a suboptimal outcome and five DR-TB patients with an optimal outcome. However, pretesting the instrument revealed poor record management and availability of patient contact information at the facility level. The ET revised methodology and provided data collection teams with lists of unique IDs and diagnostic dates extracted by the NTP from the GxAlert system.

The ET also conducted facility-level childhood TB diagnosis and prevention cascades in the same facilities as the retrospective clinical review. Patient cascades are routinely constructed in Zimbabwe to determine where there is leakage along the diagnostic and treatment pathway. Given the number of bacteriologically confirmed

index patients in selected facilities for 2020, the ET estimated the proportion of children household contacts under five who would benefit from TB diagnosis and prevention, and contrasted them to estimate with the actual number of child household contacts screened for TB, the number of childhood TB patients diagnosed, and the number of children in whom TB was ruled out and were offered TB preventive therapy.

Overall, the ET was able to collect facility-level information from all selected facilities, and identified three or four cases for DR-TB and child cascades in most of the visited facilities. However, the completeness of the data allowed the ET to further identify patients and conduct follow-on child loop inquiries with families of the patients primarily in the districts supported by the USAID (see Table 3).

Table 3. Data collected at each visited health facility

	Facilities	DR-TB Cascade (# of cases)	Child Cascade (# of cases)	Contact investigation (children)	Facility Overview
USAID-supported	Kwekwe General Hospital, Kwekwe	4	4	5	I
	Zvishavane District Hospital, Zvishavane	3	4	2	I
	Filabusi District Hospital, Insiza	4	4	7	I
	Gwanda Provincial Hospital, Gwanda	4	I	I	I
Supported by other donors	Mberengwa Rural Hospital, Mberengwa	3	4	4	I
	Chegutu District Hospital, Chegutu	4	4	0	I
	Entumbane Clinic, Bulawayo	I	0	0	I
	Masvingo Provincial Hospital, Masvingo	4	4	0	I

After obtaining written authorization for the data collection from the Ministry of Health and Child Care (MOHCC), the ET was also able to successfully obtain the de-identified NRL DST data for 2019, 2020, and 2021, and the GxAlert data for 2019, 2020, and 2021.

Desk Review

The ET reviewed the available USAID project documents and data related to the four TB implementing partners, including USAID TB activity SOWs; the Mission Country Development Cooperation Strategy (CDCS) and Performance Management Plan (PMP); relevant sections of the Project Appraisal Document; Annual and Quarterly Reports; Annual Work Plans; Monitoring, Evaluation, and Learning (MEL) Plans; sector assessments; performance reports; gender analyses; and miscellaneous thematic reports. The team also reviewed MOHCC national strategies, policies, guidance, protocols, etc., and select donor reports from other TB programs implemented in Zimbabwe [Global Fund, Centers for Disease Control and Prevention (CDC), etc.], and peer-reviewed literature on TB.

III. FINDINGS AND CONCLUSIONS

Findings and conclusions presented in this section are based on the analysis of the statistical information obtained from the GOZ, the national laboratories, IPs, stakeholders, donors, technical partners, and beneficiaries. It also includes quantitative and qualitative evidence collected during the site visits and key informant interviews, and provides additional information based on the review of project documentation and scientific literature. The section is organized by evaluation question, further split by sub-questions or lines of inquiry. In some cases, we reorganized the sub-questions between the main evaluation questions to present more coherent picture for each main evaluation question. The conclusions present the synthesis of the evaluation team derived from this analysis. Recommendations are categorized by stakeholder and linked to the findings that drive them.

III.A. EQ1: USAID investments contributions

How do USAID investments contribute to Zimbabwe's prevention, detection, treatment, and survival cascade nationally?

This evaluation question brings to fore the contributions from USAID investments. The implications for the understanding of specific USAID investments are large. Zimbabwe is among seven high-TB-burden countries on track to achieve the 2020 milestones for reduction in TB deaths. The 2019 WHO Global TB report reveals that Zimbabwe is making progress to end TB. However, despite this progress, TB remains one of the major causes of death in the country. USAID investment contributes to TB case detection directly and indirectly. USAID supported with specimen transport, functioning GeneXpert machines, active case finding with digital CXR, and training. This evaluation used desk review, key informant interviews, and record abstraction for retrospective clinical review of DR-TB patient care to respond to this evaluation question. In addition, district-level ecological analysis and comparative interrupted time series analysis were conducted.

Comparative interrupted time series of the impact of USAID investment on TB case notification (all forms)

The implications for the understanding of specific USAID investments are large and oblige a recalculation of all the rates used in the analysis.

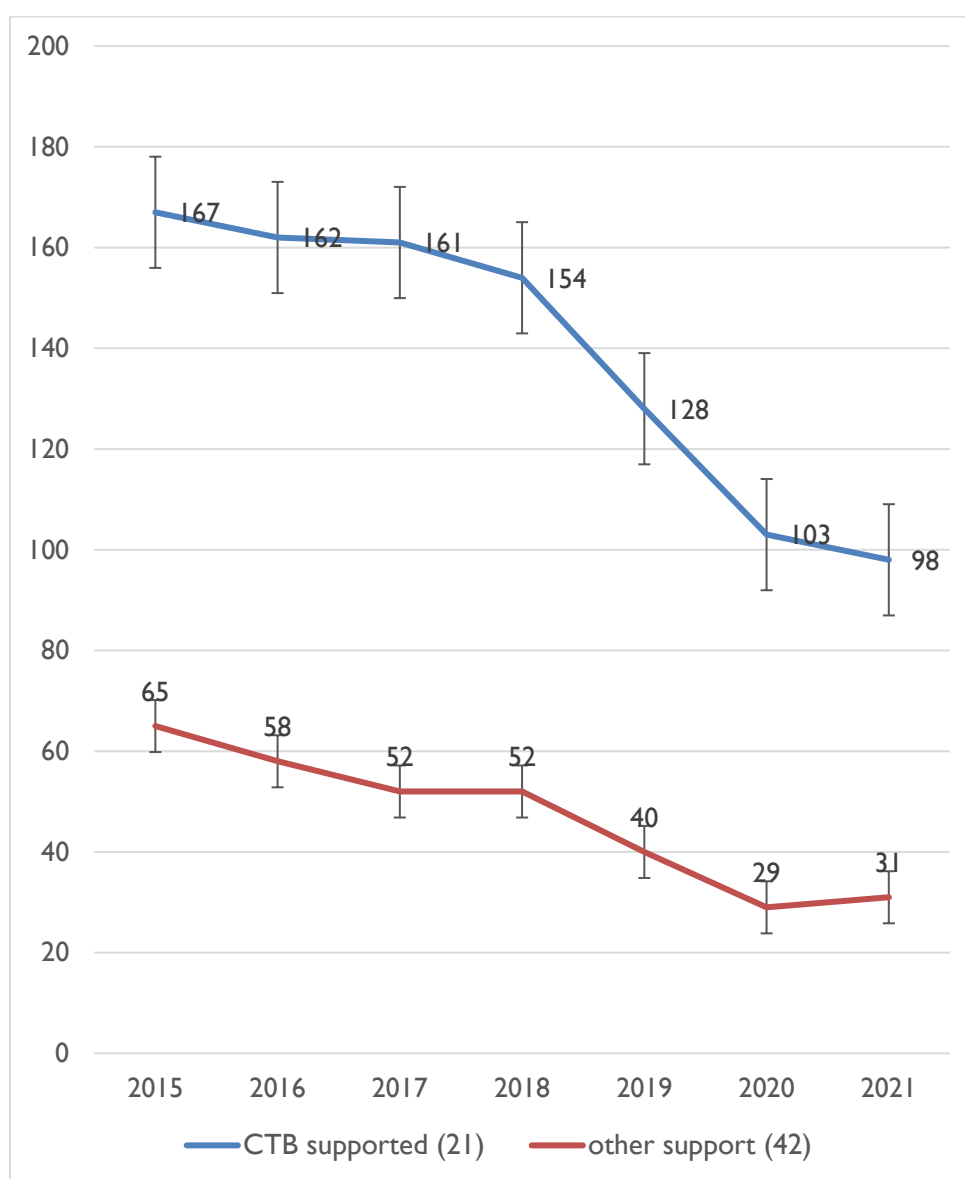
Table 4. Annual all-forms TB case notifications and case notification rates for the intervention area and control area

DISTRICT	CHALLENGE TB (CTB)				POST-CTB			CTB trend	Post-CTB trend
	2015	2016	2017	2018	2019	2020	2021		
Total TB notifications									
CTB-supported (21)	4,317	4,682	4,550	4,290	3,982	2,881	3,063	-9	-460
other support (42)	6,776	6,164	5,603	5,661	4,468	3,268	3,503	-372	-483
TB case notification rates									
CTB-supported (21)	167	162	161	154	128	103	98	-4.2	-15
other support (42)	65	58	52	52	40	29	31	-4.4	-4.8

During Challenge TB (CTB) there was a small relative difference in the slope of the trend in TB case-finding between USAID-supported districts and those receiving other support (-4.2 vs -4.4). However, the absolute difference was larger (-9 TB patients/yr. vs -372 patients/yr.). After CTB case-finding phased out in 2018, the

CNR declined in formerly CTB districts at a faster pace than comparator districts, but notification rates remain higher.

Figure 4. A comparison of CNR 2015–2021 among districts supported by USAID and those receiving other support (per 100k population)



CTB provided significant assistance with recording and reporting, and some of the decline in CNR after CTB may be attributable to reduced assistance with M&E although the TIFA Making Sense of Data intervention began in 2020 and should have provided similar support for notification in the districts.

Comparative interrupted time series of the impact of USAID investment LON mechanism on TB case notification (all forms) 2019–2021

USAID selected high-TB-burden districts for the LON mechanism. The implementation of LON was phased: in 2019, it was limited to four districts (Gweru, Gwanda, Insiza, and Zvishavane). In 2020, year 2 of the LON implementation, LON expanded to four additional districts: Shurugwi, Chirumanzu, Kwekwe, and Mwenezi. Some LON districts have previously received USAID support under CTB (e.g., Shurugwi).

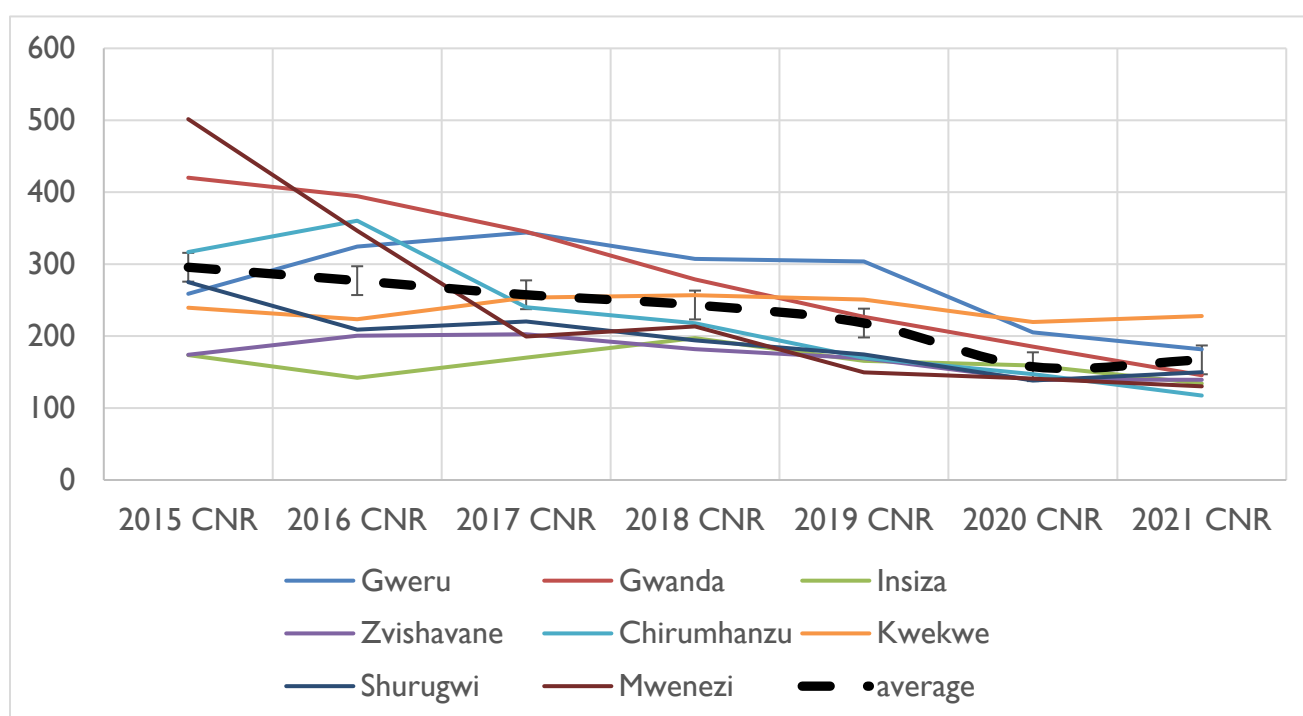
The pre-intervention trend in CNR in the eight districts was a decrease in cases notified per 100,000 of -53 cases per year. The trend in CNR in the districts implementing the LON intervention was -51 cases. Estimates were adjusted to 2021 census denominators (see Annex III).

Table 5. Time series of CNR in LON districts (2016–2021)

District	2015	2016	2017	2018	2019	2020	2021	Pre-LON CNR Trend	CNR trend LON (2020-2021)
Gweru YI	259	325	344	307	304	205	182	16	-61
Gwanda YI	420	395	345	279	227	185	146	-47	-41
Insiza YI	174	142	170	197	166	159	134	8	-16
Zvishavane YI	174	201	203	182	169	140	139	3	-15
Chirumanzu Y2	317	360	240	218	170	147	117	-20	-30
Kwekwe Y2	239	223	253	257	251	220	228	-15	8
Shurugwi Y2	275	209	220	194	175	138	150	-21	12
Mwenezi Y2	502	346	199	213	150	141	130	-86	-11
Average	296	277	257	243	218	157	167	-53	-51

LON investments were impactful in Kwekwe, Shurugwi, Mwenezi, and Gwanda. In 2021 there were improvements in case notification rate in Kwekwe (+8) and Shurugwi (+12) despite COVID-19, electricity shortages, and economic upheaval. The impact of USAID investment in Zvishavane, Insiza, and Chirumanzu is not visible in the TB notification data, but gains in GeneXpert testing are reported.

Figure 5. 2021 Census-adjusted TB case notifications (all forms) LON Districts 2015–2021



The fact that the LON intervention began on the cusp of the COVID-19 pandemic obscures the value of the support, unless it is contrasted with districts that did not have that support. While the average annual of the

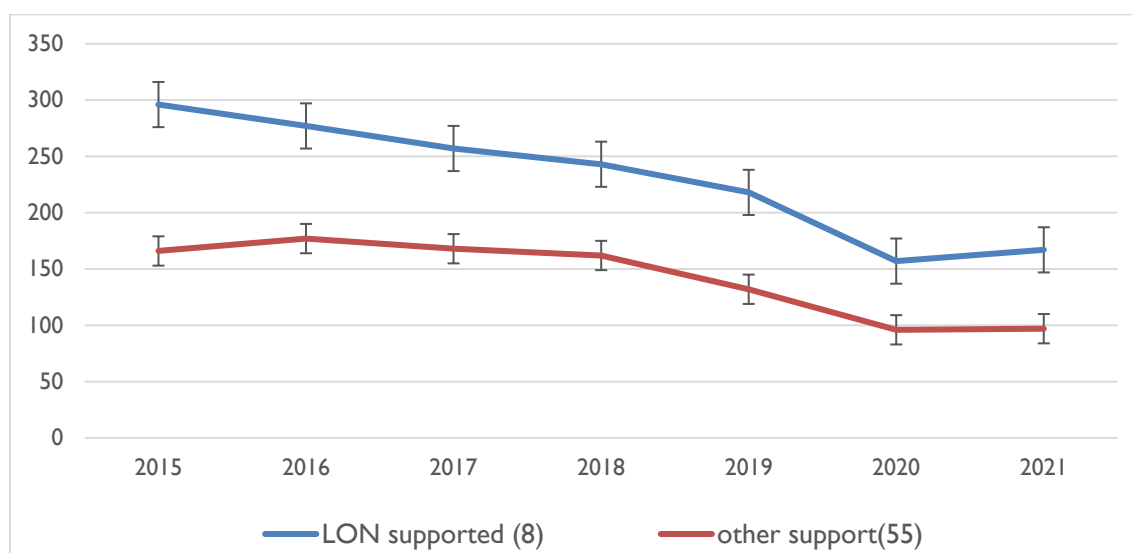
decline in CNR during the LON period (-51 cases/year) appears similar to historical trend (-53 cases/year), when compared to declines in the non-LON districts (-4 vs -53), it is significantly smaller. Moreover, the 2021 data show a bigger rebound than comparator districts (5 percent increase in CNR in LON versus 1 percent increase in non-LON districts) following lifting of the lockdowns.

Table 6. Annual all-forms TB case notifications and case notification rates for the intervention and control area

	Pre-LON period			LON period				Pre-LON trend	LON period trend
DISTRICT	2015	2016	2017	2018	2019	2020	2021		
Total TB notifications									
LON-supported (8)	4,248	4,041	3,812	3,656	3,346	2,452	2,640	3,939	2,813
other support (55)	23,347	23,347	22,497	21,990	18,334	13,558	13,853	22,795	15,248
TB case notification rate (CNR)									
LON-supported (8)	296	277	257	243	218	157	167	-53	-51
other support(55)	166	177	168	162	132	96	97	-4	-35

Ideally a more granular analysis using quarterly data and including 2022 notifications should be conducted to account for lagged effects of phased implementation of the LON. The time constraints of this evaluation hindered us from doing so.

Figure 6. 2020 Census-adjusted 2015–2021 district TB case notification rates by USAID support status

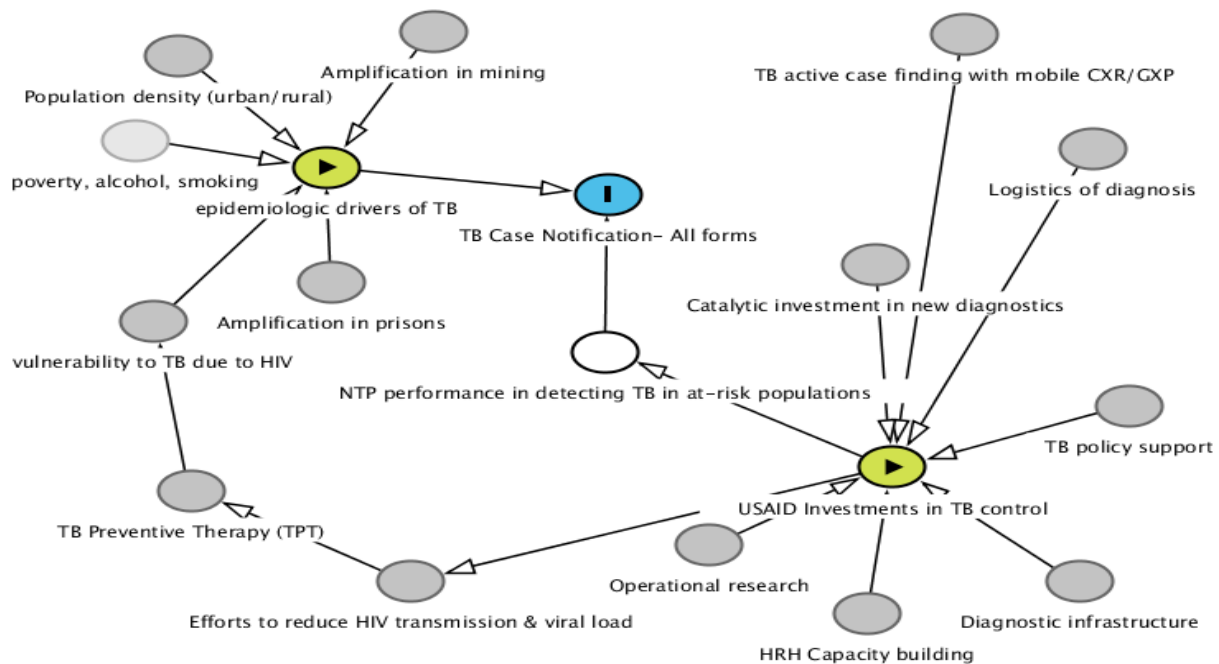


Ecological Analysis of drivers of CNR in Zimbabwe

USAID investment contribute to TB case detection directly and indirectly as shown in the directed acyclic graph in Figure 7. For the year 2021, we conducted ecological analysis to construct a model to determine which underlying epidemiologic drivers of the TB burden and TB investments best explain the observed TB

case notification rate (all forms). Drawing on previous work, we expected that estimated HIV prevalence, prison and mining amplification, population density, and food insecurity were contributors to enabling TB transmission and disease prevalence in Zimbabwe.⁴ Similarly, we hypothesized that the USAID support for specimen transport, functioning GeneXpert machines, active case finding with digital CXR, and training would be correlated with increased TB investigation rates (GeneXpert tests per 100k) and with case notification rates (all forms) after adjusting for underlying drivers of TB prevalence.

Figure 7. Directed Acyclic Graph (DAG) of hypothesized relationships of USAID support and annual TB case notification (all forms)

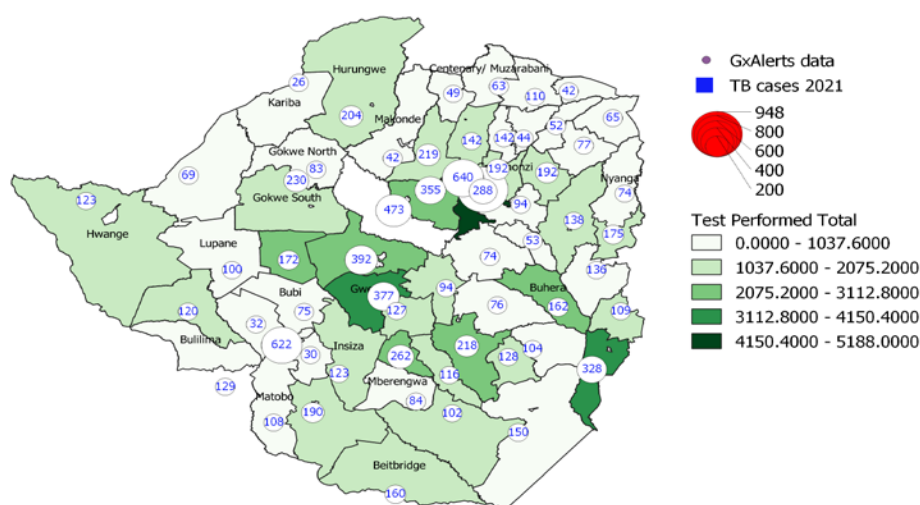


Theory of change for USAID's diverse impacts on TB case notification

First, we explored the relationship between the investigation rate, and the TB case notification rate. These two are strongly correlated, and previous research in Zimbabwe had shown that testing for TB increases the likelihood of detecting it.⁴ For 2021, a third (33.4 percent) of the variance in TB CNR could be explained just by changes in GeneXpert testing levels, with $F(1,51) = 6.621$ ($p < .013$), with each increase in GeneXpert testing leading to .339 increase in CNR ($\beta_1 = .339$, $p = .013$). The map below shows how variation in testing behavior in contiguous districts leads to very different case notification rates.

As expected, simply having placed a high number of GeneXpert machines per 100,000 population (access) was not correlated with CNR in 2021. Underutilization of installed and functional GeneXpert machines was mentioned by IPs as an ongoing concern, more of a challenge than the threats of GeneXpert machines being coopted by other disease programs for other diagnostic aims.

Figure 8. Contrasting investigation rates and TB case notification in 2021



Ecological analysis

USAID's largest TB investments focus on boosting TB case detection and this analysis suggests that USAID is an important contributor to Zimbabwe's efforts to diagnosis TB actively. We hypothesized that TB case notification would be a function of both the underlying epidemiologic forces (e.g., HIV, mining, smoking, diabetes, and prisons) and the performance of the national TB program, supported by USAID. First, we sought to establish that the underlying epidemiology played a role in observed TB case notifications in Zimbabwe in 2021 by regressing each hypothesized predictor individually.

Table 7. Univariate epidemiological predictors of 2021 TB case notifications (all forms)

	B coefficient	p-value	95% CI
Population density	0.020	0.879	-0.000001 – .0000013
HIV prevalence	0.824	0.057	-0.03 – 1.68
Incarceration rate	0.078	0.076	-0.008 – 0.17
Diabetes rate	0.486	0.180	-0.230 – 1.203
Smoking prevalence (men)	-1.058	0.619	-5.3 – 3.3

Not all epidemiologic forces were influential predictors. The classical predictors of TB burden did not have as strong statistical association on TB case notification in 2021 as in previous years, with the exception of mining activities. The presence of mining activities in a district is also thought to amplify TB.^{5,6} We compared districts with mining to those without mining and observed a significant mean difference in TB case notification in 2021 (districts CNR with mining averaged 130 SE 12.4 vs. non-mining CNR 85 SE 7.2). HIV prevalence and proportion of the population in detention, associations observed to be statistically significant at the level of alpha (α) = 0.10 in univariate analysis, were assessed as potential confounders in the association between USAID support and TB case notification rate in bivariate regression analysis. This was accomplished by comparing the crude coefficient of USAID support found on univariate analysis to its adjusted coefficient after

including the secondary variable in the model for a more than 10 percent change in coefficient value. Both HIV and mining were confounders of the relationship between CNR and USAID support.

Districts with USAID-supported mobile digital chest X-ray had higher average TB case notification rates than those who did not. Districts receiving TB/HIV training and Household Contact Investigation (HHCI) (including TPT) had higher median TB case notification; because there was no variance, we could not detect which of the LON interventions was the most impactful.

Previous work by Mapuranga (2020) had shown that diagnostic infrastructure placement had no impact on case notifications in Zimbabwe in 2019. However, we were interested in assessing the impact of a new metric of “functional” GeneXpert machines to discern a benefit to USAID-supported repairs, calibration, training, and service contracting investments via IDDS. Indeed, improved functionality of GeneXpert was associated with higher 2021 CNR as well as the degree to which they are utilized (i.e., investigation rate: GXP tests per 100,000 population). Linkage to the GxAlert and sputum transport other than Environmental Health Technician (EHT) were not significant predictors of TB CNR in univariate analysis and was not included in the multivariate analysis.

Table 8. Univariate programmatic predictors of TB case notification

	B coefficient	p-value	95% CI
Functional GeneXpert coverage per 100,000 population	25.8	0.03	2.7 - 48.9
Proportion of GXP linked to GxAlert	4.120	0.890	-55.4 - 63.7
Specialized sputum transport	5.6	.679	-21.493 - 32.780
GeneXpert investigation rate per 100,000 population	0.493	<.001	0.04 - 0.13

In the final multivariate model, USAID support and presence of mining in a district remained statistically significant predictors of TB case notification rate in 2021. Districts without USAID support had between 17 and 77 fewer TB cases per 100,000 than those who did. Districts with no mining activities had between 9 and 49 fewer TB cases notified per 100,000 inhabitants. The model has a pseudo-R squared of 0.29 suggesting that it does not explain TB case notification fully and there may be other drivers that were not included.

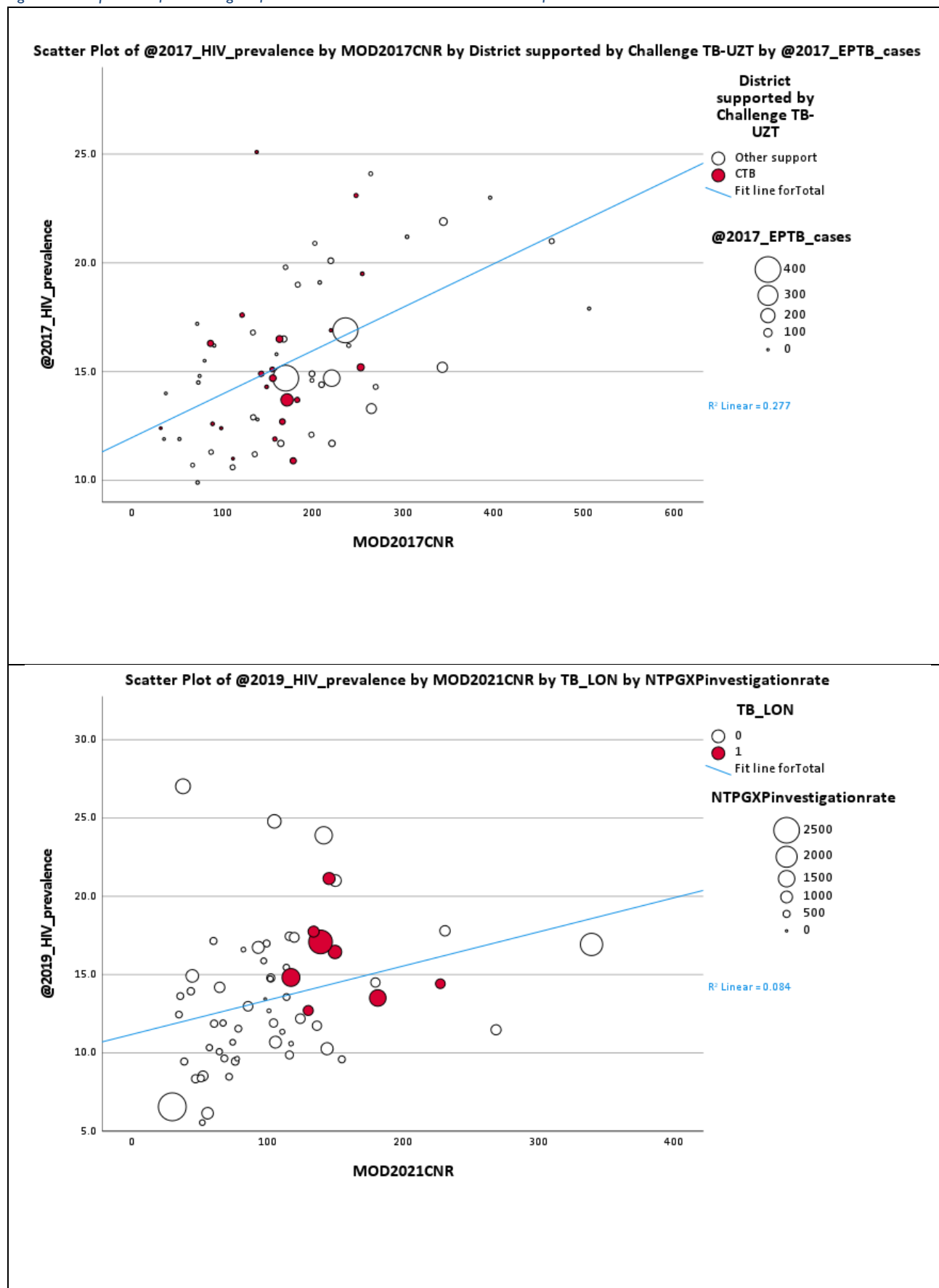
Table 9. Multivariate analysis of predictors of TB case notification rates (2021)

Parameter	Coefficient	Std. Error	t	df	Sig.	95% Confidence Interval	
						Lower Bound	Upper Bound
No Mining	-29.3	10.0	-2.9	56.0	0.001	-49.3	-9.4
Mining	REF						
Other support	-47.5	15.1	-3.2	56.0	0.001	-77.7	-17.3
USAID-supported	REF						
Functional GXP coverage 2021	8.0	6.9	1.2	56.0	0.2	-5.8	21.8
Incarceration rate	0.0	0.0	-0.8	56.0	0.4	0.0	0.0
TB investigation rate	0.0	0.0	-1.3	56.0	0.2	0.0	0.0
HIV prevalence	3.5	1.2	3.0	56.0	0.0	1.1	5.9
a. Dependent Variable: MOD2021CNR							
b. Model: (Intercept), functional GXP coverage 2021, incarceration rate, NTP investigation rate, HIV prevalence, mining, USAID support							

The successful control of TB in PLHIV has been a sustained and diverse effort in Zimbabwe. USAID (together with PEPFAR and CDC) have invested in TB/HIV integration and the prevention of TB among PLHIV has improved with the rollout of more ambitious policies and the introduction of shorter TPT regimens, lowered prices, and greater training and awareness.

This model offers further evidence of a weakening in the historically strong correlation between HIV prevalence and TB case notification in Zimbabwe. Until 2019, district-level HIV prevalence was a significant predictor of TB case notification rates, explaining up to 30 percent of the variance in CNR. However, in 2021 HIV prevalence was no longer a significant predictor of district-level TB CNR after controlling for other factors, which suggests that crude HIV prevalence is not as good an indicator of a district's TB risk (or driver of case-finding investments) as before.

Figure 9. Comparison of the strength of correlation between HIV and TB case notification rates in 2017 versus 2021



Have districts that received USAID support performed better in terms of screening, testing, treatment (both initiation and completion), and survival compared to those, which did not?

Review of LON program data

The efficiency of TB screening in LON, defined as the yield of individuals with TB among those who screened positive for symptoms or X-ray, appears suboptimal according to reports provided by the prime (Union Zimbabwe Trust/UZT). The number needed to test to detect one GeneXpert positive sample ranges from a mean of 4 to 18 across LON districts. This is not unexpected. The co-prevalence of silicosis and HIV in the districts and the use of human interpretation for digital X-ray are certain to identify persons with chest X-ray abnormalities that indicate morbidities beyond pulmonary TB. Suboptimal specificity is common in active case finding (ACF) efforts in high HIV settings. Even the recommended addition of CAD software would not fully address the challenges of such diverse TB phenotypes in Zimbabwe.

It appears that gains in efficiency of ACF may be emerging; for example, the proportion of specimens (26 percent) that are uncollected may have declined over time from 36 percent to 20 percent in 2021. Globally, the inability to collect 10 to 15 percent of samples from presumptive clients during ACF is not uncommon, particularly when the screening method is digital chest X-ray, which identifies people who have challenges to produce testable sputum samples. However, 26 percent remains above average pretest loss of presumptive clients in a mobile testing intervention given the high costs of screening with digital chest X-ray. It is important to understand the root causes of low specimen acquisition to address it. An improvement in laboratory management of specimens is also needed, although the ability of IPs to influence the full array of laboratory challenges (e.g., electricity stability) is limited.

Table 10. Yield of LON ACF screening efforts over time

	Individuals screening positive	With specimen sent	With test results	Proportion untested	Bacteriologically confirmed TB	Lost specimens, test errors	Proportion of specimens without a test result	Proportion Bac+ among presumptive clients tested
Oct to Dec 2020	7,024	5,777	5,072	22%	377	705	12.20%	6.50%
Jan to Mar 2021	4,403	3,229	2,885	36%	296	344	10.70%	9.20%
Apr to Jun 2021	6,580	4,982	4,358	32%	296	624	12.50%	5.90%
Jul to Sep 2021	6,284	5,231	4,719	20%	275	512	9.80%	5.30%
Total	24,291	19,219	17,034	26%	1,244	2,185	11.40%	7.30%

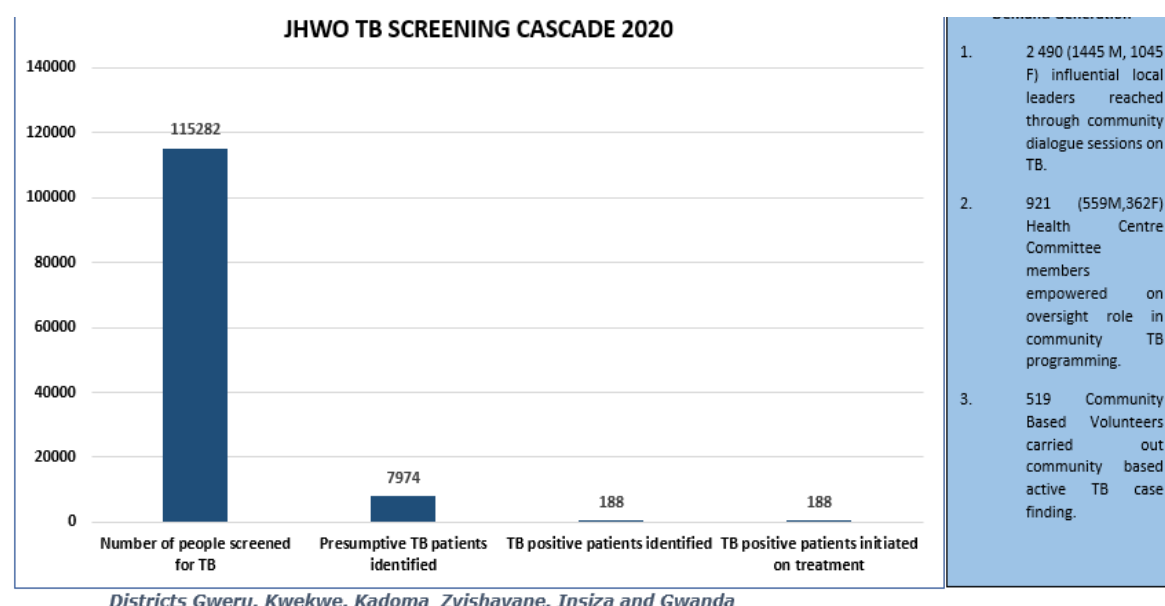
The 7.3 percent average bacteriologically positive TB yield among individuals who screened positive on chest X-ray or symptoms shown in Table 10 is acceptable for TB active case finding, where the pretest probability of TB is lower than clinical settings. However, the average (7.3 percent) seems to belie a significant variability among districts and among individual implementing partners.

Variable TB yield is expected given the wide variation in underlying TB risk factors in LON districts but yield of ACF conducted by Jointed Hands Welfare Organisation (JHWO) is particularly low. The yield from testing

conducted by JHWO appears to be as low as 2.3 percent (188/7,974) according to information published on their website. This would be 42 GeneXpert cartridges expended per each TB case, (roughly 420 USD) a lower return on investment than screening by other IPs within the LON. We were not able to determine the root causes of the low yield of JHWO ACF, but possibilities include (a) over-reporting of the denominator (referrals); (b) over-referral via use of broad symptom screens; and (c) non-testing on the part of referred community members.

According to WHO, over-referral harms community members by subjecting them to unnecessary transport, opportunity costs, and potential stigma. The JHWO screening cascade data for 2020 suggest that further fine-tuning of the screening algorithm is warranted to reduce harm to affected communities and increase the return on investment from screening. Some USAID-supported districts over-emphasized screening older children. These children are not household contacts and their risk is low, which is why this strategy yields little TB. Healthy children above five are not recommended targets of screening according to WHO.

Figure 10. JHWO TB Screening Cascade 2020 (source: website JHWO)



The LON planning document includes a trial of pooled testing, the combination of sputum from multiple persons in a single cartridge. This may be a good strategy to trial to boost the efficiency of the symptom screening performed by JHWO in particular. Symptom screening by CHWs and volunteers often seems inexpensive and beneficial because it engages affected communities, but the cost-benefit calculation often fails to consider the costs to individual community members who have to pay to travel to be tested for a disease they do not have.

As mobile digital chest X-ray has both elevated fixed costs and elevated running costs relative to other interventions, high sensitivity and high specificity are paramount to make the program cost-effective by saving testing commodities. However, the LON and KN interventions are unusual in their use of human readers instead of CAD software. Initial evaluations by the UZT indicated that the human readers were neither sensitive nor specific enough, with low yield of bacteriologically confirmed TB and possible over-reading of X-rays leading to over-diagnosis of clinical TB. While other USAID funded digital CXR screening programs have a number needed to test (NNT) in the order of 8–12, the LON seems to have NNT in the order of 30–40,

which suggests suboptimal specificity and is unlikely to be sustainable from a budgetary standpoint. To improve the sustainability and cost-per-case of investments, three changes should be piloted by the LON implementers.

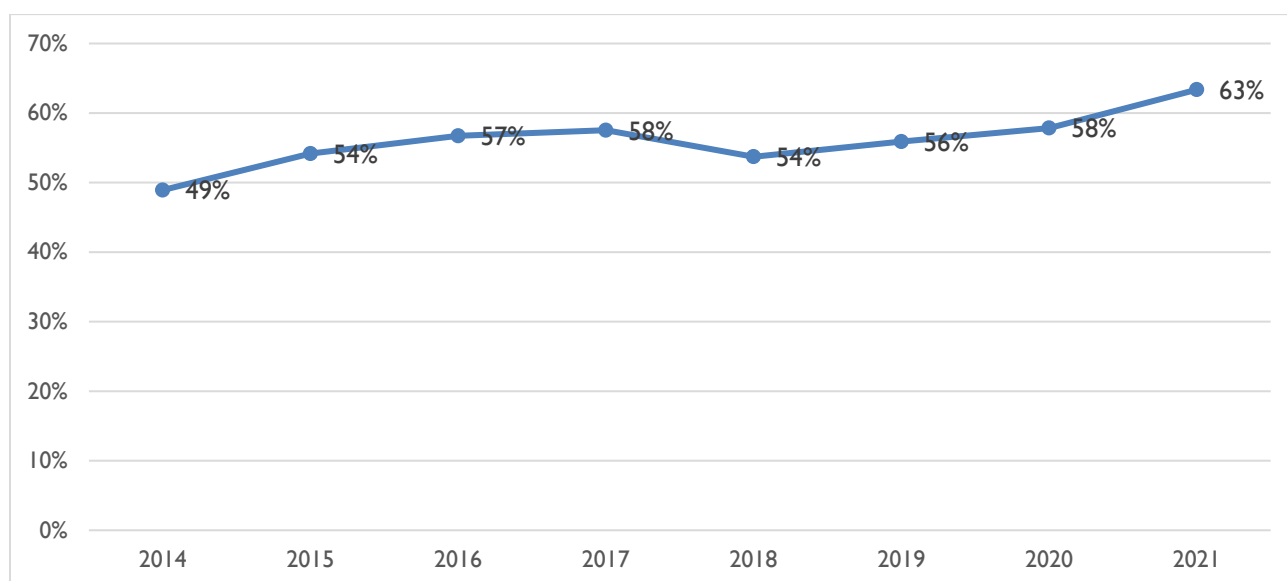
How do USAID investments in overarching infectious disease and laboratory strengthening (IDDS) contribute to the quality and timeliness of TB diagnosis?

We evaluated Zimbabwe diagnostic performance considering the 2020 Diagnostic Network Assessment and compared available data from the pre-IDDS to period to discern differences in throughput, yield, and wastage.

The impact of USAID lab strengthening on TB detection

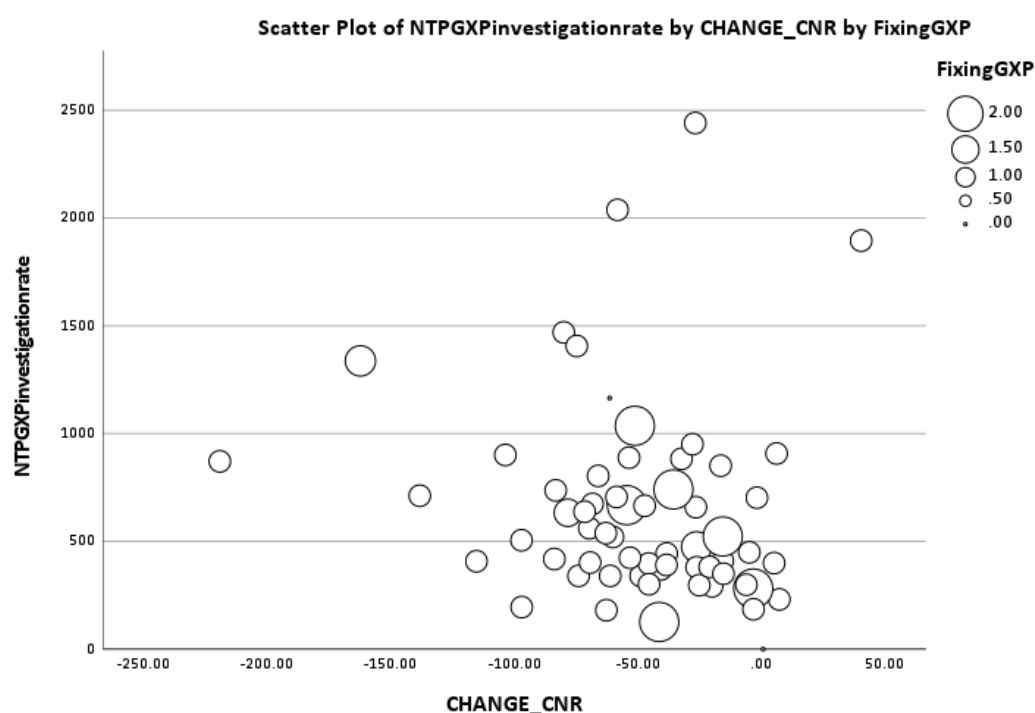
As reflected in Figure 11, a granular review of diagnostic data suggests that USAID investments in functional TB diagnostic coverage have contributed positively to observed TB investigation rates in some districts and the proportion of pulmonary TB (PTB) patients with a bacteriological confirmation, which has increased from 56 percent in 2019 to approximately 63 percent in 2021 (10,034/16,320). This 13 percent improvement is likely attributable to increased access and functionality of molecular tests as well as the added sensitivity of the cartridges in use since 2020. Although the ecological analysis of district-level correlates of CNR did not show a positive correlation with GeneXpert modular coverage and CNR, this may be due to limited demand for testing in areas with longer periods of inoperable diagnostics.

Figure 11. Bacteriological diagnosis coverage (pulmonary TB) from 2014 to 2021



One of the challenges mentioned by IDDS was their lack of control over the demand for molecular testing and the fact that under-utilization of WHO-recommended molecular tests could obscure the impacts of their efforts. Figure 12 illustrates this problem. Most districts that had one or more GeneXpert modules repaired showed increases in testing, but did not register sizable changes in TB case notification rates from 2020 to 2021.

Figure 12. Impact of repairs of GeneXpert modules upon investigation rates and case notification



The crude positivity of all samples tested in GxAlert is 11.9 percent of all tests and 13.2 percent of all valid tests in 2021, when “trace” positives are included. This suggests an efficient aggregate utilization of the technology. As expected, the trace positives are important in Zimbabwe, representing 12 percent (1,239/9,065) of all positive tests.

While 11.9 percent positivity suggests a near optimal level of aggregate positivity, it is concerning that almost 9.5 percent of all tests yield errors. This is well above the international standard (6 percent). According to the findings of the Diagnostic Laboratory Analysis (DNA) in 2020, “Across all Xpert MTB [mycobacterium tuberculosis]/RIF Ultra tests conducted between Q3/2018 and Q4/2019 in 107 facilities, overall, 6.3 percent were unsuccessful.” This suggests that error rates in GeneXpert machines have increased in Zimbabwe since 2018.

This DNA recommended that “no results” be addressed with electricity stabilization efforts and retraining under USAID IDDS. It was unclear whether solar backup and other electrical failsafe investments had been implemented.

Table 11. Bacteriological confirmation in samples tested in the GxAlert platform in 2021

MTB positive sample	#	%	Valid %
TB Negative	67,751	78.6	86.8
MTB	10,304	11.9	13.2
Total positive	78,055	90.5	100
Errors	8,184	9.5	
Total samples	86,239	100	

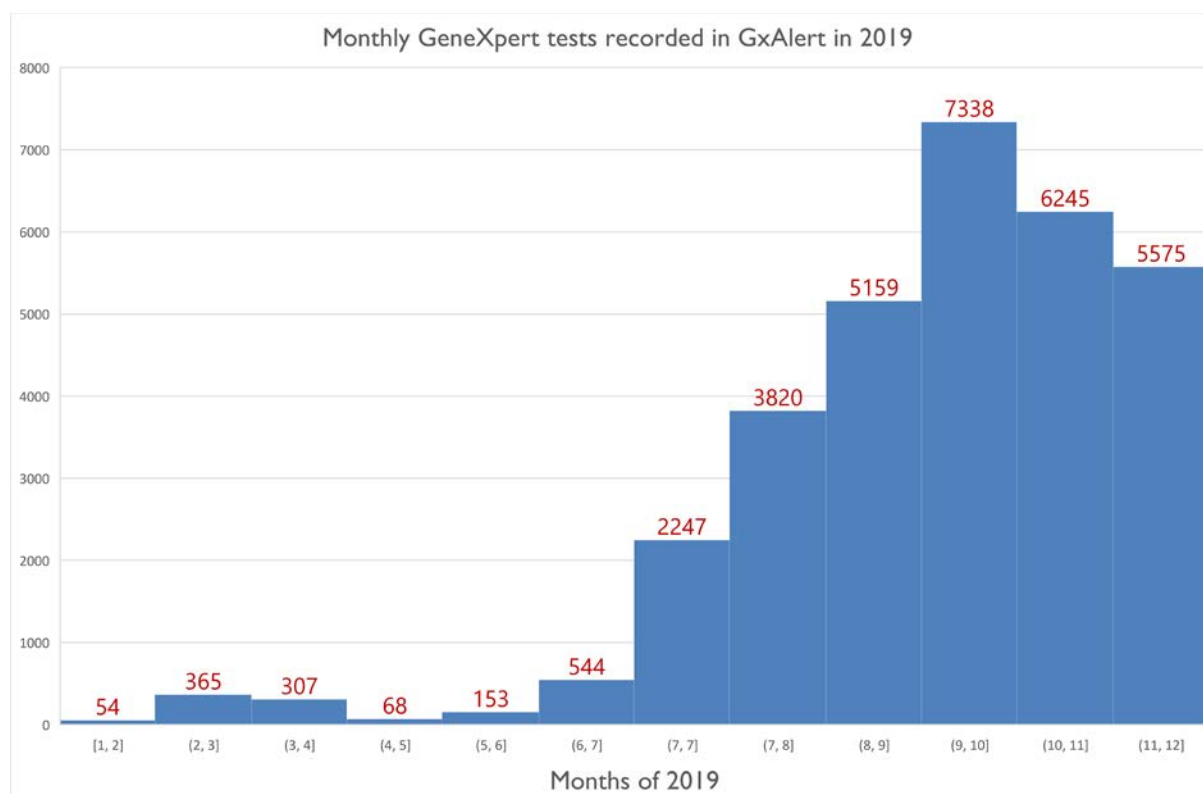
Excluding the reference laboratories from the calculation (to reduce duplicate testing of RIF-resistant samples) still yields a higher estimate (7.6 percent). With newly developed second-line DST capacity, Zimbabwean researchers have documented 12 percent bedaquiline resistance among rifampicin-resistant (RR) TB patients, which will add urgency to the ongoing efforts to improve DR-TB quality of care.

We observed that although GeneXpert is not valid as a treatment monitoring tool, serial or duplicate GeneXpert testing was not uncommon. Around 16 percent were repeat GXP tests in 2019. The proportion of repeat GeneXpert tests remained fairly constant around 14 percent (11/78) in 2020. The reasons for repeat testing with GeneXpert were not clear and should be further investigated to reduce wastage of test commodities.

IDDS: Expansion of GxAlert connectivity

As shown in Figure 13, in the first two quarters of 2019, either few GeneXpert tests were conducted or few machines were connected to the GxAlert system or both. However, starting in mid-2019, prior to the start of the IDDS mechanism in 2020, the GxAlert system started to record a progressive and substantial increase in GeneXpert testing volume.

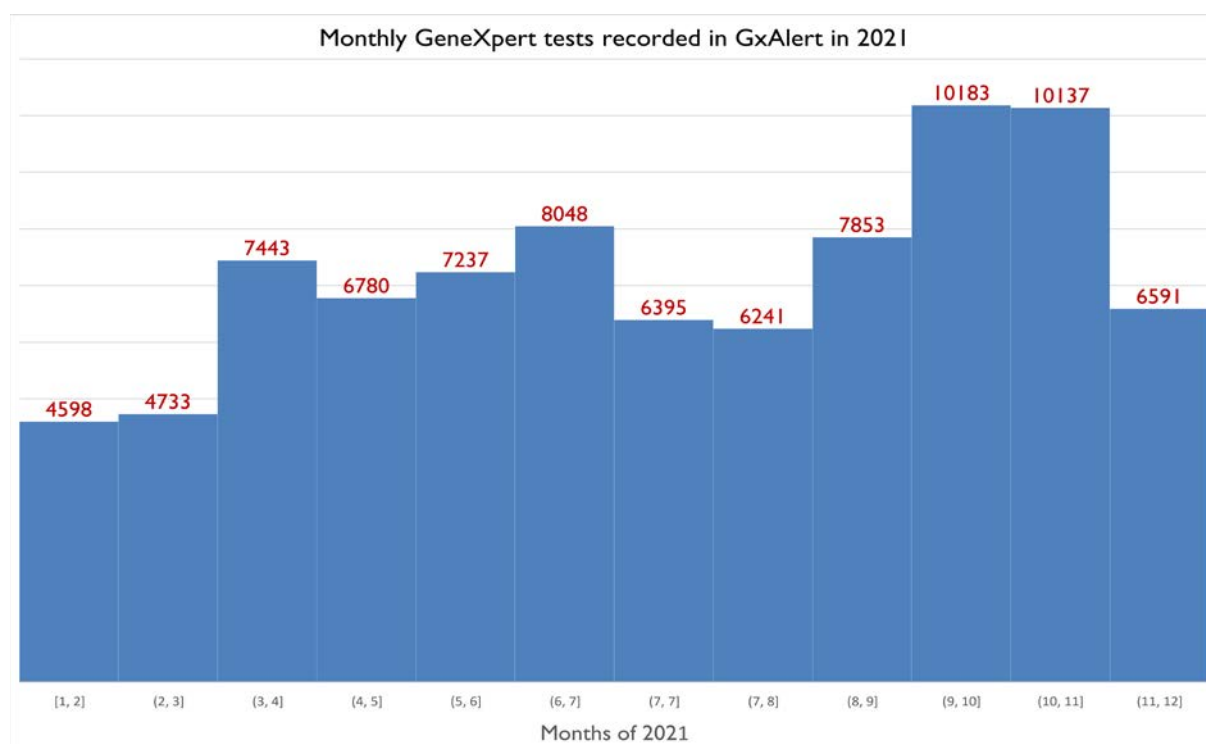
Figure 13. Monthly GeneXpert test volumes recorded in GxAlert in 2019



Increasing the connectivity of GxAlert across the country was a goal in the IDDS YI workplan and the data suggest increased connectivity was achieved and maintained through 2021. At its peak in Q4 of 2021, GxAlert captured over 10,000 GeneXpert MTB/RIF tests per month. A priority for IDDS was to engage the private sector in TB detection and GxAlert coverage. In 2021, 32 of the 126 sites (25.4 percent) connected to the GxAlert platform were private sector (31 mission and 1 mine hospitals). The mission hospitals had among the

highest median testing rates (10–11 tests run per day). Mine hospitals are not yet well integrated into the GxAlert platform, so their case counts are not yet reflected.

Figure 14. 2021 Monthly testing volumes in GxAlert



This increased utilization of GxAlert starting in the last quarter of 2019 is significant for two reasons:

1. It suggests that there was a progressive increase in the number of GeneXpert machines that were operational and able to address the MTB/RIF testing needs of the country.
2. GxAlert provided USAID with real-time information on the diagnostic performance of implementing partners and districts because USAID staff have password protected access to the GxAlert system. This in turn allows USAID to make timely interventions and policy decisions based on verifiable data.

Seven out of eight sites visited by the ET reported using the text messaging feature of GxAlert to obtain test results for patients.

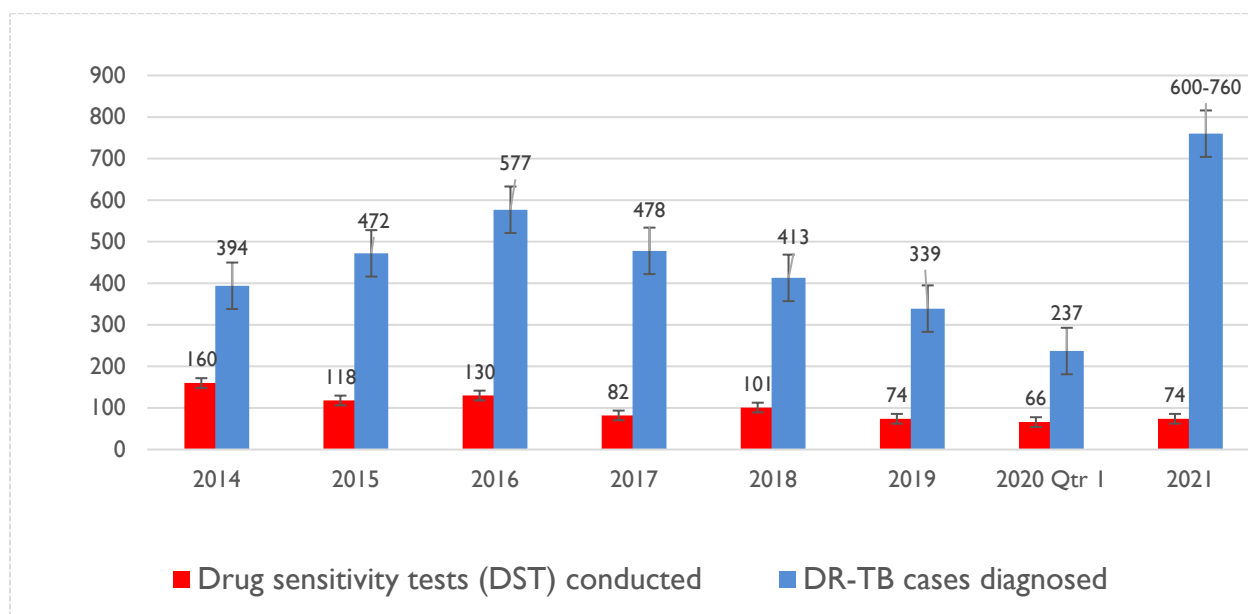
Implementing molecular diagnostics beyond GeneXpert

Field visits in eight districts indicated that diagnostic innovations have reached service delivery points over the last two years despite the COVID pandemic. Seven out of eight sites reported training both urine LAM and TB LAMP. Six out of eight HF visited reported offering stool processing for pediatric TB. IDDS is assisting with rolling out Truenat implementation starting with a STOP TB Partnership brokered donation of 20 machines. One site out of eight visited by the ET reported having been trained in Truenat by IDDS.

Have USAID investments in laboratory strengthening resulted in improved turnaround times for DR-TB drug-sensitivity test (DST) results since 2018?

The triangulation of GxAlert data, TB register data, laboratory data, and LHMIS data from the NRLS show variable performance sample management, processing, and turnaround time, with no discernable improvement from 2019 to 2021, but also no appreciable decline.

Figure 15. Drug sensitivity test volume and official DR-TB case counts* (2014–2021)



*Total DR-TB diagnoses for 2021 are not yet available, so we employed RIF+ GxAlert samples (minus external quality assurance/EQA) as a proxy for 2021 DR-TB case count.

Zimbabwe has studied the quality, linkage and outcomes of DR-TB care for 2010–2015 and 2016–2018 that offer the evaluation a unique baseline with which to contrast the current quality and outcomes of the DR-TB program.^{7–9} We repeated this analysis nationally for 2019–2021 to allow comparison.

The DST throughput recorded in the two reference labs identified in this evaluation does not tally with the statistics in the WHO Global TB Report, with the former being significantly smaller than the throughput reported by WHO for 2019–2020. The WHO 2020 TB report indicates that 224 of 231 DR-TB patients underwent DST in 2020, but this evaluation of DST found evidence of only 66.

ET review of lab records suggested that only 35 percent of RR-TB patients' samples arrive at the reference labs for DST, not the 90 percent described in the Epidemiological Review in 2019. We selected 490 records from among 1,439 RIF-resistant samples in the GxAlert system over nine quarters during 2019(4), 2020(1) and 2021(4). We randomly chose cases diagnosed with RIF-resistant TB for inclusion. This analysis excluded 66 percent of samples because insufficient information was recorded in GxAlert to permit NRL linkage or they were considered duplicates or external quality assurance samples. Almost equal numbers of people (43 percent vs. 44 percent) were sampled in 2019 and 2021 to permit comparison. They were distributed geographically as follows: 234 (48 percent) were from the Northern region and 236 (52 percent) were from the Southern region.

Figure 16. A comparison of the drug-sensitivity test cascade for 2019 and 2021

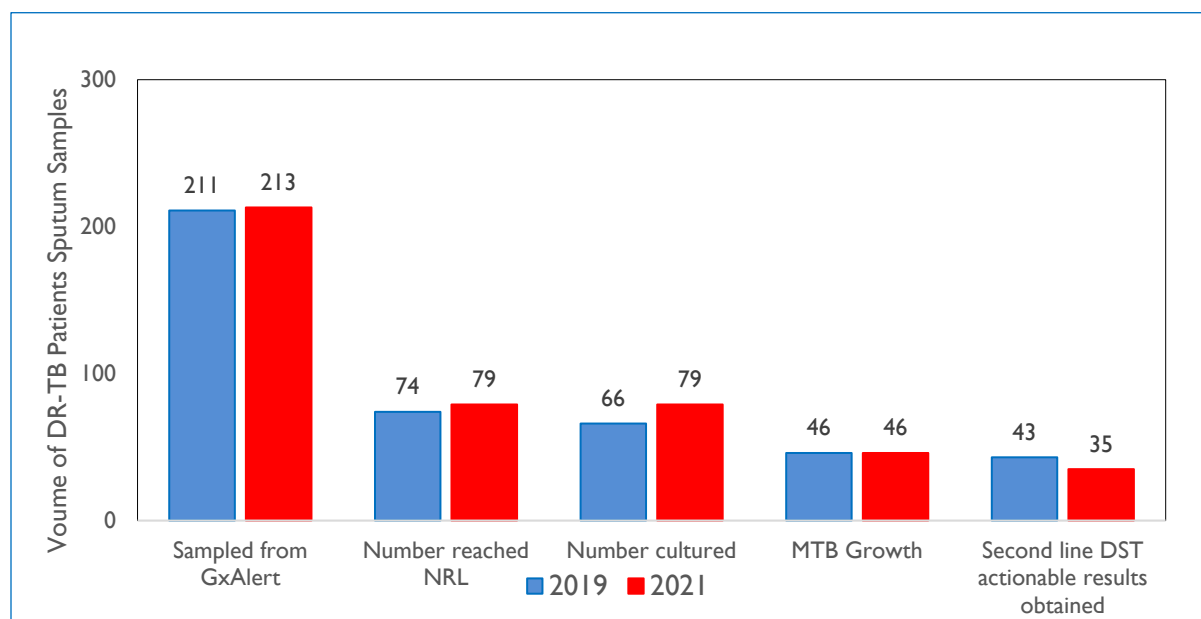


Table 12. GxAlert sample characteristics

Characteristic		Number	(%)
Total		490	
Northern region		234	(48)
	Harare	77	(30)
	Manicaland	56	(22)
	Mashonaland East	34	(13)
	Mashonaland West	41	(16)
	Mashonaland Central	26	(10)
Southern region		256	(52)
	Bulawayo	58	(23)
	Masvingo	62	(24)
	Matebeleland North	24	(9)
	Matebeleland South	41	(16)
	Midlands	71	(28)
Year of RR-TB diagnosis	2019	211	(43)
	2020†	66	(13)
	2021	213	(44)
Age category	<19	7	(1)
	20-24	13	(3)
	25-34	60	(12)
	35-44	54	(11)
	45-54	25	(5)
	55+	11	(2)
	Not recorded*	320	(65)

*Age could not be ascertained since specimens did not reach NRLs (NRL = National Reference laboratory; RR-TB = rifampicin resistant tuberculosis)

†Data for first quarter of 2020 was included. Lockdowns started around the end of March 2020. Subsequent quarters (Q2-Q4) were characterized by severe lockdowns and restrictions to movement of people and samples. Because this period is non-representative, only data for Q1 2020 was included for the evaluation.

Laboratory processes

From the sample of 490 DR-TB patients needing DST, 171 (35 percent) had specimens that reached NRLs. Of the 171 specimens that reached NRLs, 163 (95 percent) had culture results; 102 (63 percent) grew MTB (see Table 13). Of the 490, 102 (20.8 percent) of DR-TB had actionable drug sensitivity results to guide their treatment. It was beyond the scope of this evaluation to discern what proportion of the 20.8 percent of DST results were fed back to the clinicians or how long that information took to arrive. The reference laboratories do not track the last mile of this process, but rather calculate TAT only from the point samples arrive and results are generated.

Table 13. Cascade of laboratory process at NRL.

Characteristic		Number	(%)
Received at NRL	Yes	171	(35)
	No	319	(65)
Culture performed (n = 163)	No growth	51	(31)
	MTB growth	102	(63)
	Contaminated	4	(2)
	MOTT	6	(4)
Second-line DST conducted‡	Fluoroquinolone‡	88	(86)
	Any injectable	86	(84)
	Bedaquiline†	25	(25)
	Clofazimine†	23	(23)

NRL = National Reference laboratory; ‡ = denominator is 102, the number of MTB growth;

† = only offered in 2021 in one NRL; MOTT=Mycobacteria Other Than Tuberculosis

Five false-positive RIF GeneXpert results (6 percent) were recorded in 2019 and January of 2020, which was not common for the classical cartridges.¹⁰ These were individuals who tested RIF resistant on initial GeneXpert but drug susceptibility testing indicated susceptibility to rifampicin.

Table 14. Antibiotic resistance profile

	Antibiotic	Number	(%)
First line DST	Rifampicin (n = 85)	80	(94)
	Rifampicin & Isoniazid (n = 85)	26	(31)
Second-line DST	Fluoroquinolones (n = 88)	12	(14)
	Injectables (n = 86)	6	(7)
	Bedaquiline (n = 25)	3	(12)
	Clofazimine (n = 23)	2	(9)

Overall, the median time from specimen collection to receipt by NRLs was four days (interquartile range/IQR: 2–12) with large differences by region. The median turnaround time of 11 days (IQR: 3–17) recorded in the Northern region was significantly higher than the median of three days (IQR: 1–7) recorded in the Southern region, $p < 0.001$.

Once samples arrived at reference labs, the median time from specimen receipt by NRL to production of final DST result by NRLs was 57 days (IQR: 40–72).

Since the IDDS project began, there has been no statistically significant difference in the median turnaround time from specimen collection to receipt by NRLs. The switch to a more integrated multi-disease sample transport system did not show significant gains in median turnaround time in 2021. On the contrary, there was a marked increase in laboratory turnaround time from a median of 42 days (IQR: 35–56) in 2019 to 66 days (IQR: 49–80) in 2021, $p < 0.001$.

Table 15. Turnaround times by year of DR-TB diagnosis

Category	Total	Overall TAT		2019		2020		2021		p-value
		Median	(IQR)	Median	(IQR)	Median	(IQR)	Median	(IQR)	
Collection to receipt at NRL	158	4	(2-12)	4	(2-9)	3	(1-21)	4	(2-12)	0.39
Laboratory turnaround time [‡]	149	57	(40-72)	42	(35-56)	61	(54-77)	66	(49-80)	<0.001

[‡] Difference between date specimen was received by NRL and date result was produced by NRL

The median laboratory turnaround times for DST processing were not different between the Northern and Southern region, $p = 0.13$

Table 16. Turnaround times (TAT) by diagnostic region

Category	Total	Overall TAT		Southern		Northern		p-value
		Median	(IQR)	Median	(IQR)	Median	(IQR)	
Specimen collection to receipt by NRL (days)	158	4	(2-12)	3	(1-7)	11	(3-17)	<0.001
Laboratory turnaround time [‡] (days)	149	57	(40-72)	59	(40-75)	51.5	(41-63)	0.13

[‡] Difference between date specimen was received by the NRL and date result was produced by the NRL

The low level of DST throughput at the two TB reference laboratories follows a historical decline from a high of 272 DSTs conducted in 2014 to the present period. Field visits indicate that few samples are sent for DST due to a loss of faith on the part of DR-TB clinicians that the level of effort required to submit a DST sample will be rewarded with timely, actionable information to serve patients. Kils suggested that some DR-TB clinicians had grown frustrated with the reference laboratories and resigned to managing patients without insight into which drugs would cure them. This frustration was evident in the ECHO sessions on DR-TB where presenters outlined the real-life negative consequences for DR-TB patients whose DST were delayed.

Moreover, due to bypassing the local laboratories, there is no record of how many reach clinicians for patient management. The difference is that now in 2021 the National Program has a better understanding of the gap between demand for DST and supply of DST in real-time via the GxAlert dashboard so that performance indicators can be developed.

Reasons for this are twofold. Firstly, we do not have knowledge of whether specimens were collected in the first place. Sputum specimens may not be collected when HCWs do not adhere to TB management guidelines or when patients cannot produce a sputum specimen, die, or are lost to follow before specimens are collected. Secondly, we do not know the proportion of sputum specimens within the catchment area of the Northern region that are sent to Mutare Provincial hospital.

Receipt of specimens by NRLs is a function of pre-laboratory processes such as specimen collection and transportation. These were not evaluated here. It was important to note that of the specimens that reached the NRLs, the proportions that were processed for culture and/or second-line DST results were moderate. The slight decline in proportion of second-line DST from 2019 to 2021 warrants monitoring.

Finally, we do not know whether the results that were produced by NRLs reached the requesting facilities. These post-laboratory processes are crucial for results to inform clinical decision-making. This is especially important considering the prevalence of fluoroquinolone resistance of 14 percent that was observed here. Early transmittal of results aids in switching people from suboptimal therapies to effective individualized therapies. An understanding of the whole chain can be understood when people who start DR-TB treatment are tracked from GxAlert notification to TB registers to NRLs (to check whether their specimens reached NRLs and culture and DST/line probe assay results). Scrutiny of the NRL lab Logistics Management Information System (LMIS) suggests that very few samples (n = 171) have reached any NRL for DST in the past nine quarters.

We observed that although GeneXpert is not valid as a treatment monitoring tool, some patients nevertheless underwent serial GeneXpert testing during treatment. Around 16 percent (42/259) of samples tested were repeat GXP tests during the follow-up period in 2019. The proportion of repeat GeneXpert tests remained fairly constant around 14 percent (11/78) in 2020. The reasons for repeat testing with GeneXpert were not clear and should be further investigated to reduce waste.

How do USAID investments in technical assistance (e.g., STAR) and knowledge management (e.g., TIFA) contribute to the quality of TB policy and guidelines?

Both the STAR and the TIFA mechanisms are intended to boost coordination and catalyze innovation. The STAR Advisor is intended to be an external spark of ideas and encourage cross-fertilization and South-South exchange of best practices. The TIFA mechanism is intended to reduce the bureaucracy of grant funding and to foster local initiatives that respond to time-bound short-term needs identified by the national program.

The STAR program administered by PHI aims to second TB technical experts to NTPS worldwide. The program has been controversial from its inception, with some ministries of health feeling that acceptance of these individuals in-house was a non-negotiable pre-condition of TB support. In countries under financial strain and facing labor shortages, negotiations around the Terms of Reference for STAR advisors are often complex and Zimbabwe has been no exception.

While USAID aims to provide catalytic investment for TB worldwide, in some contexts the pandemic and other global crises have obligated USAID to provide resources to support more basic TB service delivery. The dire situation in Zimbabwe's economy — with mounting fiscal challenges affecting the health sector — has shaped the scopes of work of the STAR and the TIFA, obliged a return to focus on making sure basic safeguards and routine TB systems are operational in parallel with fostering new initiatives.

In interviews for this evaluation, the STAR advisor reported spearheading many efforts to improve the timeliness and value of the CCT to DR-TB patients to improve treatment adherence and survival.

Improved management and successful implementation of the Global Fund grant

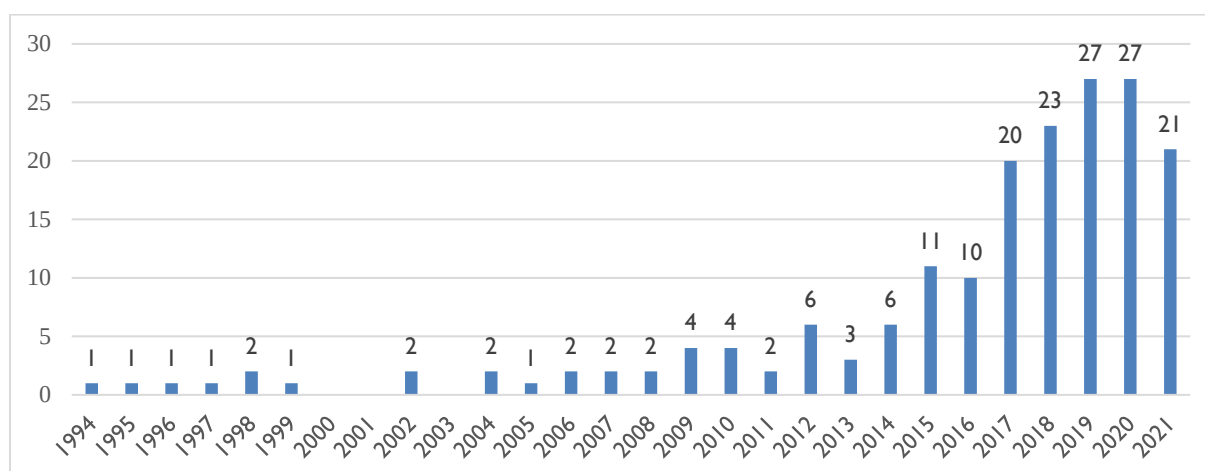
Following an allocation of USD 1.8m to NTP under 2021 CI9RM funding, STAR lobbied the Global Fund (GF) for more funding to address the decline in several TB indicators due to COVID-19. For instance, there was a 26 percent decline in TB notification between 2019 and 2020 with 50 out of 72 districts with more than a 20 percent decline in 2020. GF agreed to roll over the 2020 CI9RM grant worth USD 9m on top of the 2021 CI9RM grant worth USD 437,622. In addition, STAR provided technical assistance to the Global Fund joint TB/HIV grant application, response to Technical Review Panel (TRP) comments and the grant making process with a successful application that saw an approval of USD 26.2m for the period 2021–2023. STAR also participated in a Country Coordination Mechanism meeting and suggested ways to ensure efficient utilization of resources. It developed an Urban TB Model to address gaps in TB control in Zimbabwe's urban areas. STAR developed a CAST and Contact Investigation Model to enhance TB Case Detection of 50 priority Districts in Zimbabwe (with > 20 percent decline) and also supported the development of a TPT strategic initiative (SI) surge work plan (funded by WHO and the GF).

Build capacity of NTP in the successful implementation and scale-up of M/XDRTB activities

STAR and TIFA provided technical assistance support toward the development of rapid communication guidelines. This contributed to the development of MDR-TB Quality Improvement plan and supported the rollout of RR/MDR-TB injection-free Modified Short Regimen (mSTR), training, and dissemination of guidelines. In addition, developed new focus USAID-TIFA TCGs for implementation under USAID-TIFA/AU to address low HCW TB capacity, irregular TWG meetings, poor quality of MDR-TB program, and poor quality and use of TB data. Together with System One iNTP Project, the IDDS project reviewed Zimbabwe's diagnostic network connectivity in a bid to improve Xpert/GxAlert connectivity.

A rationale given for TWG was that although there is significant TB research in Zimbabwe, it has not always been driven or coordinated centrally by the program. Research funded by the National Institutes of Health (NIH) was highlighted as an example of TB research with suboptimal national TB program involvement.

Figure 17. Peer review publication on TB in Zimbabwe



STAR supported the National Lab Coordinator to order substances for performing second-line DST for new drugs — bedaquiline (BDQ), delamanid (DLM), linezolid (LZD), and clofazimine (CFZ) as per the link of NIH AIDS Reagent Program (<https://www.aidsreagent.org>) and for LZD and CFZ substances accessible there. STAR also shared and advocated for the adoption of the Eswatini DR-TB model of decentralization to enhance treatment outcomes in Zimbabwe (patients are reported to being decentralized back into their homes and followed up regularly by CHWs three days a week). This model was associated with better treatment outcomes. Furthermore, it supported development of mSTR study protocol and tools aimed at evaluating the Effectiveness and Safety of a modified DR-TB Short Treatment Regimen. Lastly, STAR supported the customization of Truenat training materials.

Improve coordination and reporting of NTP activities across IPs, donors, and other parties

STAR supported the development of USAID’s UZT year 3 activity work plan review. As such, STAR reviewed, edited and provided comments on the draft TB diagnostic Algorithm. As a result, for example, STAR detected that TB/COVID bidirectional screening was not included for every client entering a facility and to include Truenat as an alternative diagnostic tool to Xpert, which had not been included. Also, STAR supported the development of the TRAINSMART training curriculum (one of the TCGs under AU). Further, it provided technical assistance in NTP technical meetings to foster improvement in TB activity programming.

“STAR is a resource, not only within ECHO, but the NTP program. The advisor has travelled quite a lot; he has experience even during the inception of ECHO — he was there. He was sharing his experience that he got from Uganda when they launched their ECHO.” (male, NTP, English)

“Once in a month we have TB partners roundtable discussions to share on who is doing what and so forth including outcomes that we’ve seen, so he also comes in with technical bits, within the platform to sort of better areas, gaps that may be of interest, so he really comes in to assist there.” (male, IP, English)

STAR participated in USAID Partners meetings, which resulted in the adoption of the TB “ICF Stamp Strategy” by UZT that aims to increase TB notification. It further supported the development of the Zimbabwe PPM framework (under IDDS).

The STAR mechanism supported development of an M&E plan and costing plan for the Zimbabwe National Lab Strategic Plan. The project participated in the review of USAID’S IDDS Year 2 work plan during its

presentation to NTP for input and included monitoring and improving Xpert utilization. At the national level, STAR and TIFA supported the development of the Financial Land Scape Analysis, assessing available TB financing for the NTP/National Strategic Plan for 2021–2025. They also supported writing the 2020 and 2021 Zimbabwe TB Road Map. They supported development of the electronic health records (EHR) information system. In addition, STAR supported the TB National Strategic Plan and M&E framework 2021–2025 and the development of the HCWs Integrated TB-HIV-DM Screening and management training organized by UZT/MOHCC. Sustaining Technical and Analytic Resources Project (STAR) also supported the development of Terms of References for the Pediatric TB, M&E, IST, TB Echo, and Research TWGs. STAR supported the development of TB and COVID-19 Guide for conducting orientation trainings for CHWs.

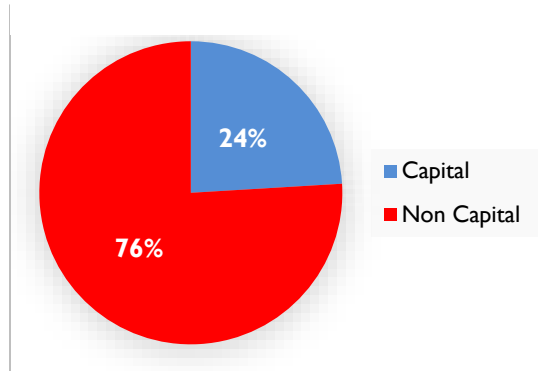
“TIFA contributed to the TB research technical working group, which produced a key output — the TB research agenda, which outlines where we want to put our efforts and serves to guide researchers who want to do anything in Zimbabwe as to the focus. The TB research technical working group can actually strengthen the utilization of research findings in the country.” (KII: Director Technical)

TIFA (Technical Working Group on Research) supported development of a TB research agenda for Zimbabwe and participated in the inauguration of the National TB Research Priorities. Several priority research papers were presented, and selected researchers were awarded prizes (see Figure 17).

The USAID contribution to TB surveillance and knowledge management includes investment in scaling up the intervention called Making Sense of TB Data under TIFA.

The USAID-supported TIFA program has funded Making sense of TB Data in an effort to stimulate data understanding, use and data-driven action at the district level. For more on the quality of TB surveillance, please refer to EQ3.

Figure 18. ECHO session attendees by geographical location



Capacity-building is a frequently voiced need in the TB field, but high staff attrition, rotation, and brain drain in Zimbabwe make it a complex challenge as confirmed by KIIs. A total of 3,480 attended various ECHO sessions. As shown in Figure 18, 24 percent of the ECHO sessions attendees were from Harare while 76 percent were from other parts of the country (see Figure 18). Most participants were doctors (46 percent), followed by other practitioners including nurses (20 percent), M&E (3 percent) and pharmacists (1 percent). (See Figure 19.) According to the project data, the attendance of the training varied significantly: fewer participants attended sessions 1 to 10, the number significantly increased for sessions 11 to 20. However, the numbers dipped between session 25 and session 30 before increasing again until session 43 (see Figure 20).

Figure 19: Proportion of ECHO sessions attendees by cadre (type of professional, total 3,480)

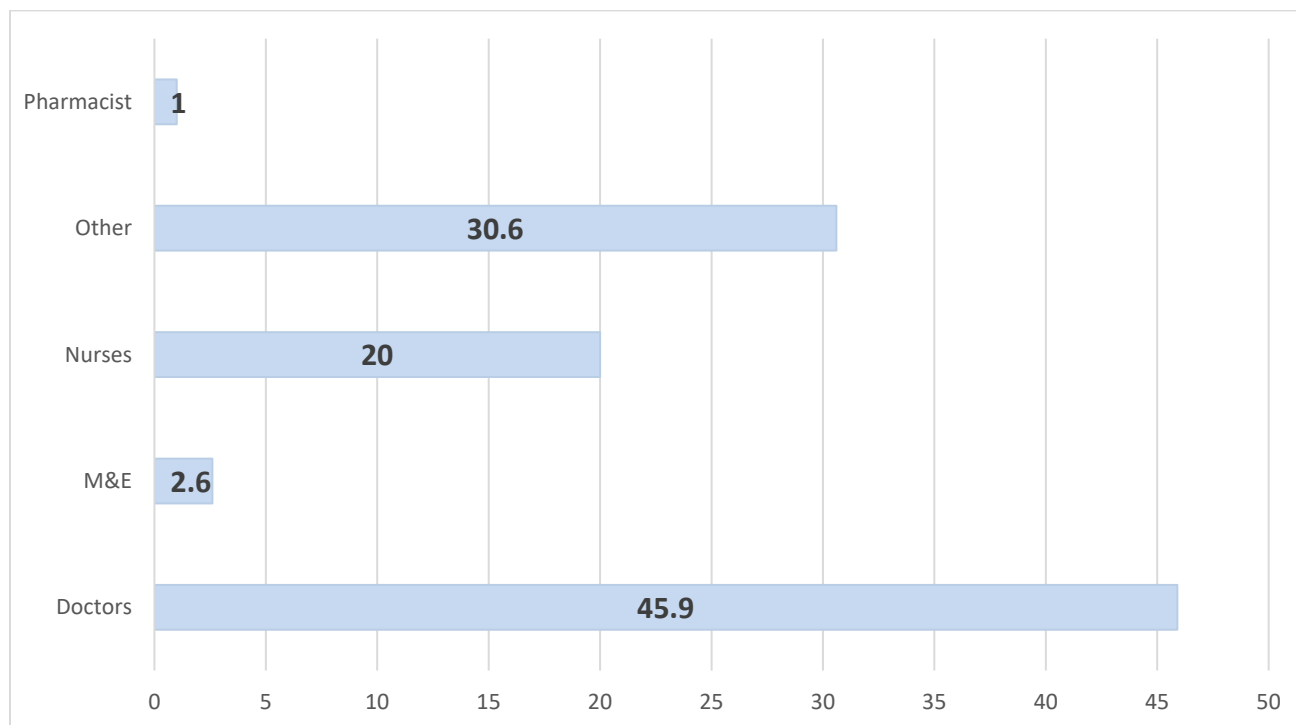
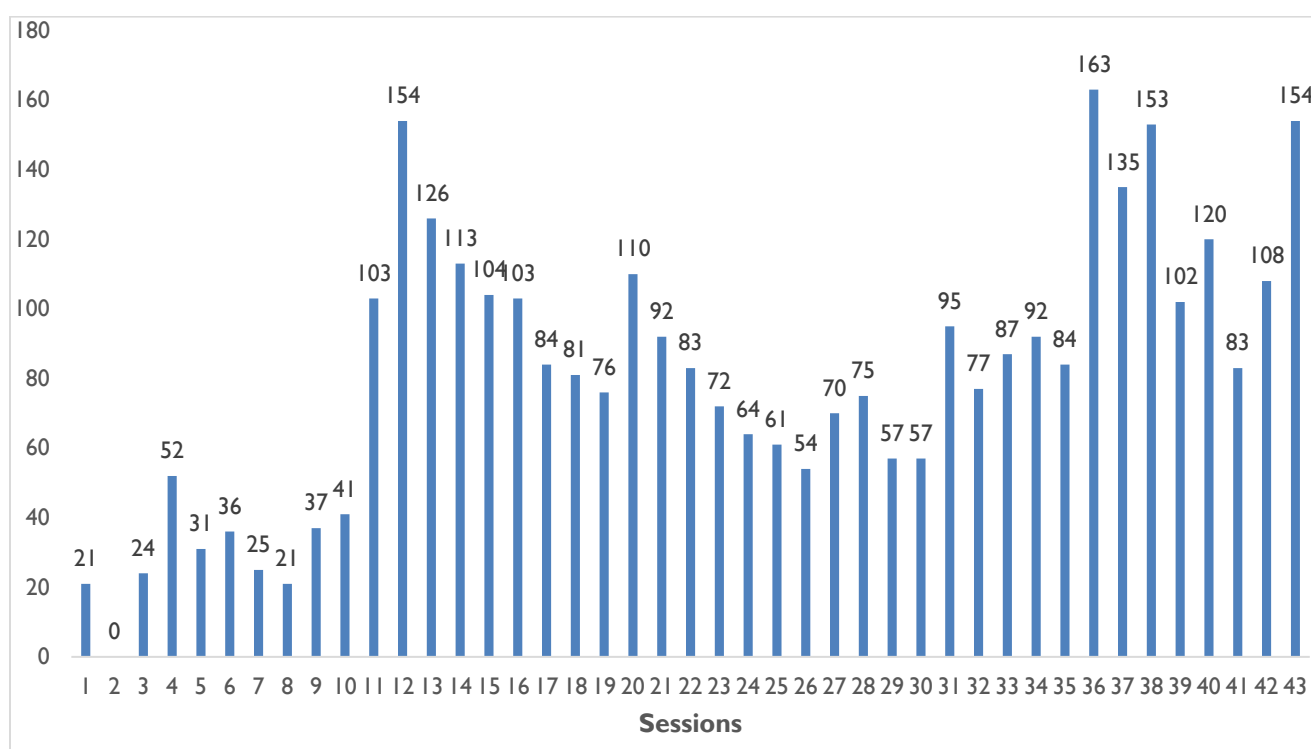


Figure 20. Number of ECHO session attendees per session



"It is not unusual to train 30 people in one district in one quarter and going back the following quarter to find only 3 are left and retraining has to be done. It is critical to retrain health workers to meet the challenges of the operating environment they are in and not all training has to be intensive. Staff attrition is a challenge." (female, CHAI-UNITAID technical, English)

TIFA supported establishment and operationalization of TB ECHO videoconferencing for TB training and management of difficult/ complex TB cases. This is a networking platform for clinicians treating challenging TB cases. KII respondents confirmed that the virtual nature of the program enabled clinicians from different parts of the country to participate in the trainings. The respondents confirmed that the equipment was installed in the district hospitals and policlinics. The respondents from NTP reported receiving multiple parses for the value of ECHO from practitioners, and request for the ECHO services in non-participating provinces. However, there is a perception of the need to further decentralize ECHO to the provincial and district level where knowledge gaps are greatest.

TRAINSART was an idea suggested by Edmund Rutta to improve the documentation of capacity-building activities and harmonization of efforts. In particular, the KII respondents mentioned M&E training provided through this system. They also mentioned that MOHCC was able to successfully manage the program after it was shifted under the ministry management.

“The shift from in-person training to ECHO and TRAINSMART was not, in principle, a bad thing. ECHO needs to be further decentralized to the provincial level so that it can be used as a problem-solving tool and less as a high-status show-and-tell forum.” (male, NTP, English)

Conclusion

USAID investments contributed to the quality of TB policy and guidelines by improving the management and successful implementation of the Global Fund grant, building capacity of NTP in the successful implementation and scale up of M/XDRTB activities and improving coordination and reporting of NTP activities across IPs, donors, and other stakeholders. USAID investments faced challenges due to high staff attrition, coupled with centralized ECHO and TRAINSMART and limited evidence of development of palliative care manuals and training of health workers translating into patient treatment outcomes at community level.

III.B. EQ2: Program performance

What are the treatment outcomes among DS-TB and DR-TB patients?

What proportion of people are protected, screened, tested, treated for, and cured of TB (and DR-TB)?

The proportion of Zimbabweans tested with WHO-recommended molecular diagnostics (WRMD) has remained strong. According to official estimates of the NTP, 89,865 were tested with WRMD in 2021.

The release of the 2020 census figures revealed stark changes in the distribution and growth of the population in Zimbabwe which impact the way TB control is understood. The mining districts have high levels of in and out migration as commodity prices fluctuate and TB case notification rates in these districts were particularly affected by weak population estimation. Applying the revised population estimates suggests that TB treatment coverage in Zimbabwe has been over-estimated by the National TB program in recent years due to a faster than expected growth of the population (1.5 percent vs. 1 percent per year). Moreover, the decline in TB notification rates has therefore been more gradual from 2018 to 2021 than official reports (see Figure 21). The implications for the understanding of specific USAID investments are large and obliged a recalculation of all the rates used in this analysis. Figure 22 compares the official CNR against the revised CNR using 2020 census estimates.

Figure 21. Comparison of official estimates of GeneXpert tests conducted 2016–2021

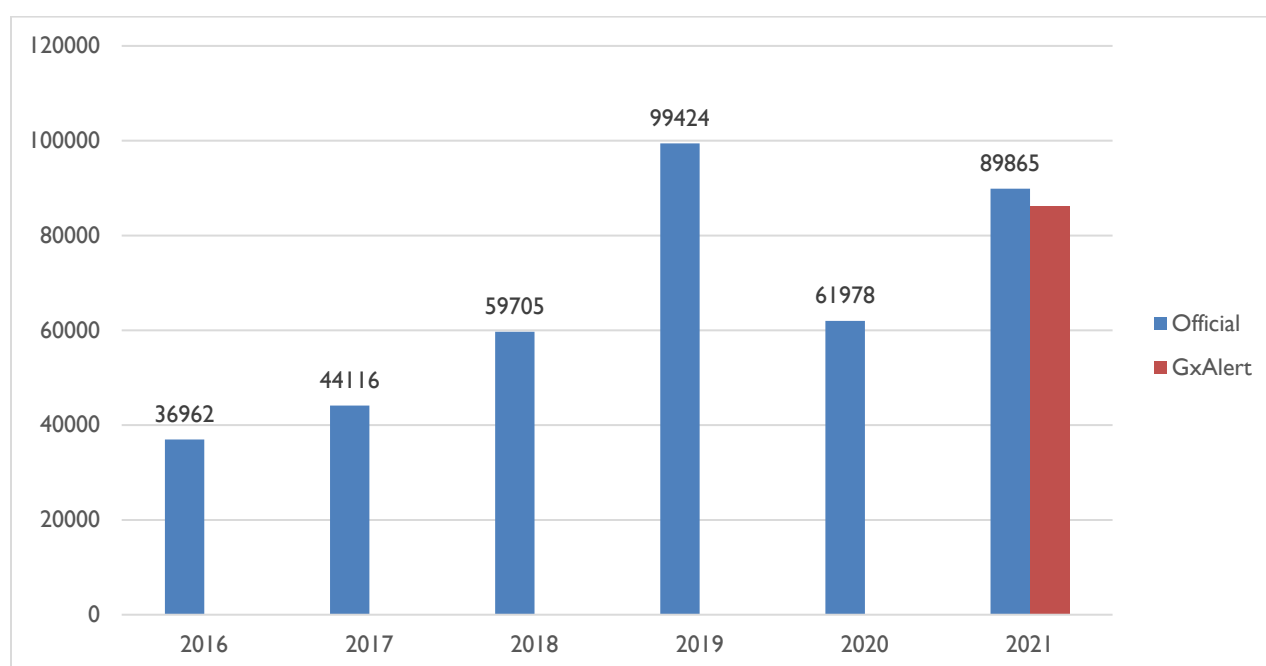


Figure 22. A comparison of official and revised TB case notification rates 2015–2021 (all forms)

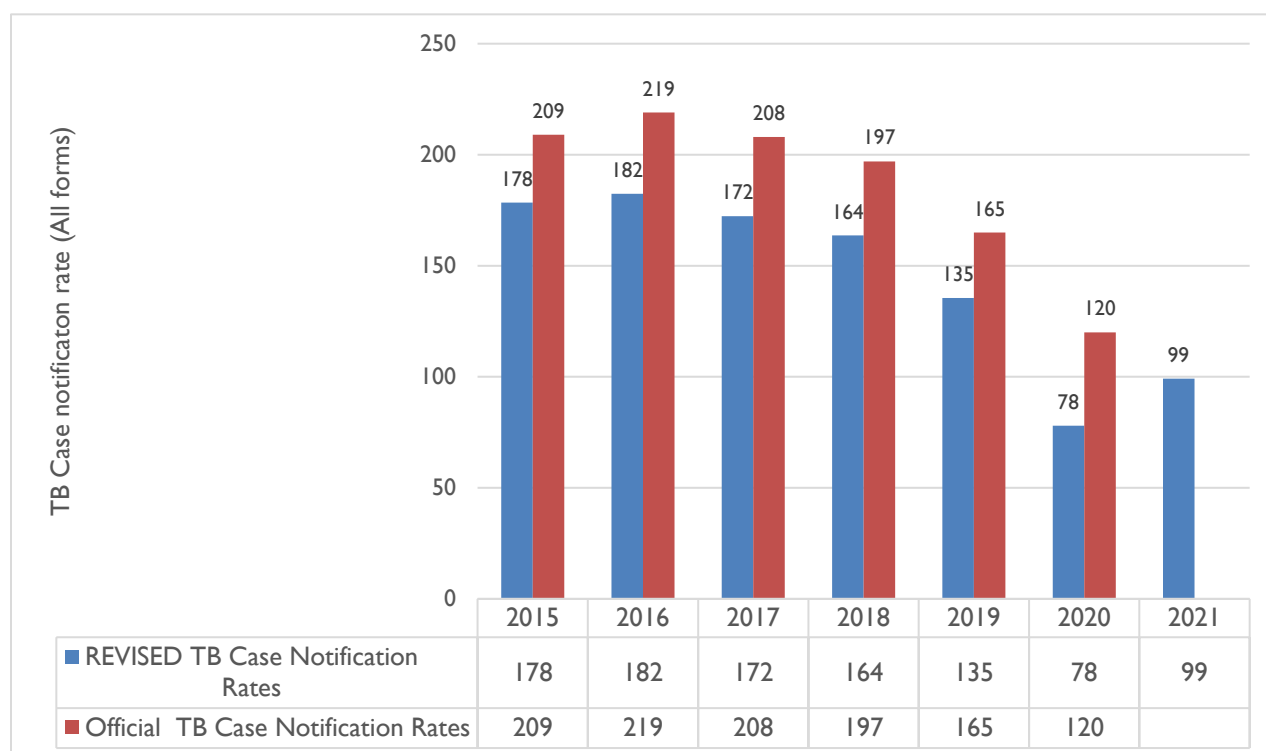


Table 17. Comparison of official estimates and evaluation finding for 10 core USAID performance-based M&E framework (PBMEF) indicators

	Official estimates 2021	Evaluation findings 2021	Possible reasons for variance
TB Case Detection Rate or TB Treatment Coverage	54%		
Bacteriological Diagnosis Coverage (Pulmonary TB)	58%	Congruent with official estimates for DS-TB but not for DR-TB	
Childhood TB Notifications	912	912	
Drug-Resistant TB Notifications	231 (28%)	≈600 (≈30%)	GxAlert data suggest that official estimates of diagnosis may be underestimated due to pretreatment loss to follow-up.
Private Sector TB Notifications	Not reported		
Contact Investigation Coverage	56.7% (2020)		Official estimates may rely on self-report.
TB Treatment Success Rate	83%	Not part of the SOW of this evaluation	
DR-TB Treatment Success	56%	17%	Official estimates may significantly over-estimate due to loss to follow-up in the course of treatment.
TB Preventive Treatment Coverage	Estimates vary dramatically by source		
Percent of TB Financing Expected from Domestic Sources		Not part of the SOW of this evaluation	

Source: TB DIAH website

Coverage of TB screening by Gender

Zimbabwean men have more TB than women and should be prioritized for TB screening.^{11,12} The proportion of men versus women screened did not predict TB case notification in 2021 but there was very little variability across districts. No district screened men and women at the recommended ratio of 2:1. Only 17 out of 126 laboratories routinely recorded age and gender in the GxAlert dashboard in 2021, hampering the analysis of the age and gender responsiveness of TB strategy in Zimbabwe.¹ This subset of laboratories records a very high TB positivity among samples from men and women, with an NNT of 5.8 versus NNT of 9.0 for samples from females. The TB yield in men and women is adequate in these 17 HFs, but the gender ratio in testing should be better calibrated to the epidemic.

The currently gender-equitable TB testing ratio reflects a strategy that does not appear to align with the gendered distribution of TB in Zimbabwe, which is skewed toward men. After adjusting for age, men had 76 percent higher odds of recording a positive test (aOR 1.76, 95 percent CI 1.43-2.16).

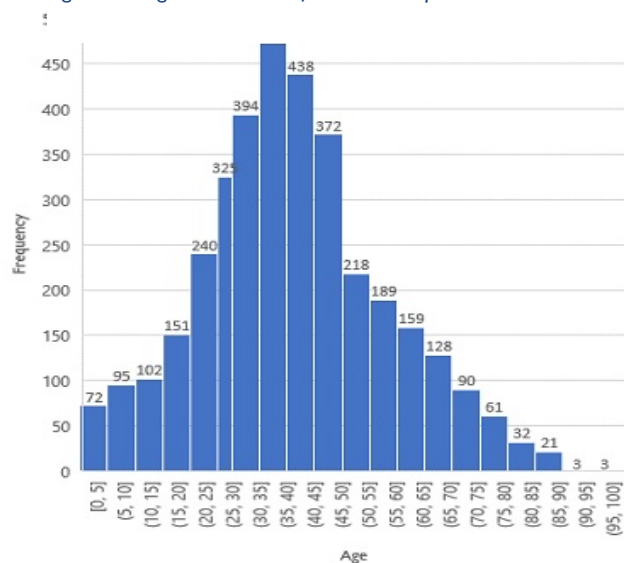
As Zimbabwe continues to make strong gains in antiretroviral coverage and viral suppression, the proportion of TB among HIV-negative men is likely to grow. Further gains in TB case finding will likely require an expanded focus upon men who appear under-served relative to the prevalence of TB disease in the population. The absence of consistent sex recording in the GxAlert dashboard reduces the ability of the TB program to assess the gender-responsiveness of TB strategy. Laboratory staff should be trained (and incentivized) to fill in the GxAlert properly with unique ID, age, and sex data. Until these data are available it will not be possible to build the PBMEF Indicators. When interviewed they say these data are frequently absent from the laboratory request forms filled by HCWs and they are unable to complete forms.

TB screening services for those in age cohorts most at risk.

Age of presumptive clients was only weakly correlated with test positivity (aOR 0.98 95 percent CI 0.98-99) suggesting TB case finding is reflective of the age distribution of TB in Zimbabwe, focusing on those age 30 and above (see Figure 23). The low number of samples tested in those under five is often a function of the difficulty in acquiring sputum samples in this population (for more on this see Q3.4).

¹ HFs with age and gender: Beatrice Road Infectious Diseases Hospital, Birchenough Bridge Hospital, Chipinge District Hospital, Glenview Polyclinic, Hatcliffe Polyclinic, Highfields Polyclinic, Kadoma General Hospital, Kariba District Hospital, Kotwa District hospital, Mabvuku Polyclinic, Mbare Polyclinic, Murewa District Hospital, Muvonde Mission Hospital, Norton Hospital, Nyanga District Hospital, Rujeko Polyclinic, and Thorngrove Hospital.

Figure 23. Age distribution of GxAlert samples



The incidence of DR-TB is only now becoming clearer because the widespread use of the Ultra cartridge and the GxAlert data permit a more granular and complete picture. Data from 2021 suggest that the DR-TB burden and rate of detection are both likely greater than official statistics suggest (see Table 19).

Figure 24. Percent drug-resistant (DR) TB cases notified among estimated DR TB cases

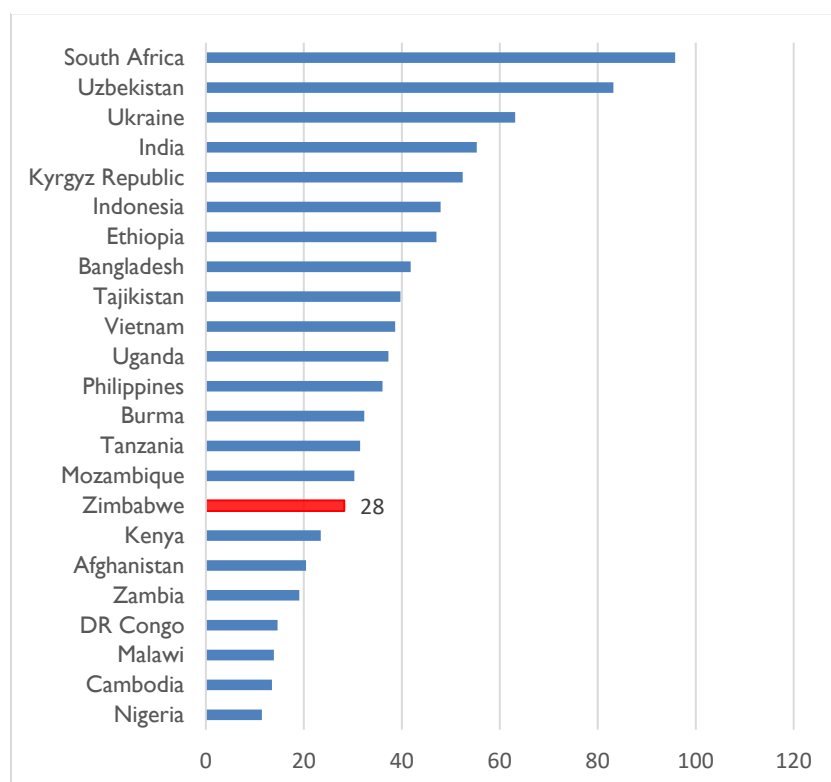
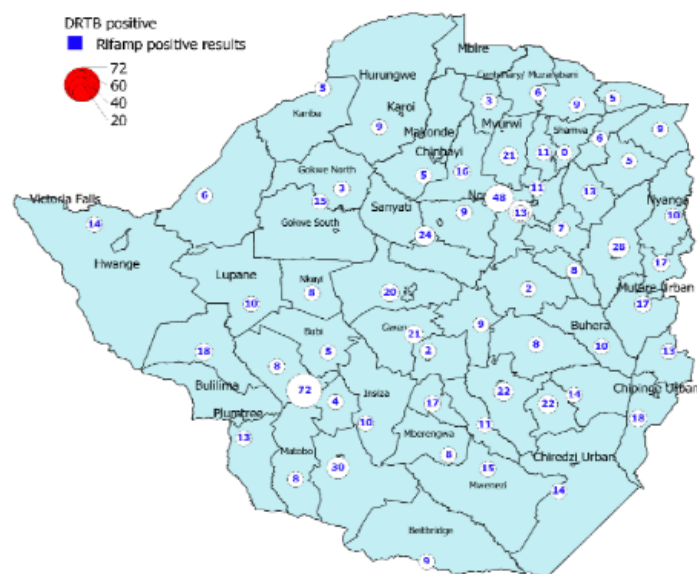
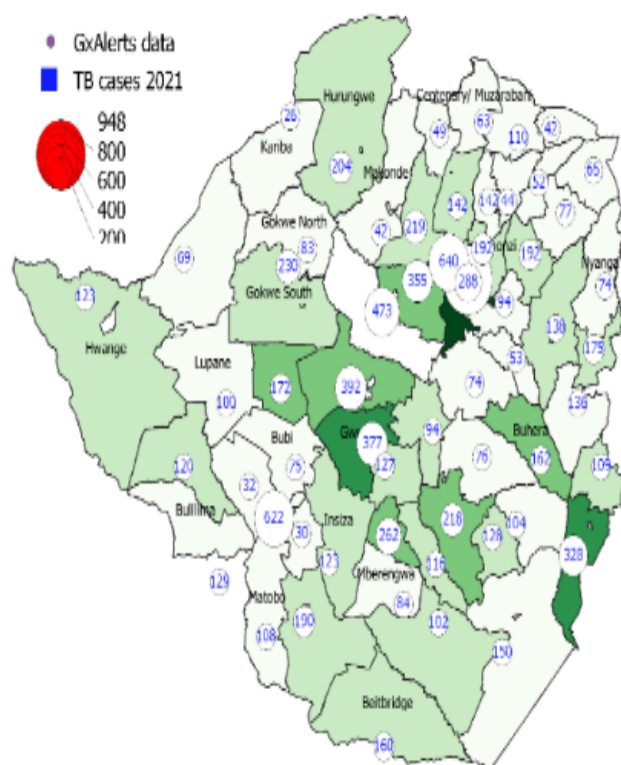


Table 18. GxAlert: MTB positive rifampicin-resistant samples

	#	%	Valid %
RIF-susceptible	9,495	11	92.2
RIF-resistant	807	0.9	7.8
Total RIF	10,302	11.9	100
Negative for TB	75,937	88.1	
Total samples	86,239	100	

Figure 25. TB cases and rifampicin positive results



The proportion of RIF-resistant cases among new cases in TB in Zimbabwe is most likely higher than official estimates (4.2 percent–4.8 percent, DRS 2017) based on a preliminary analysis of 2021 GxAlert data. While this crude analysis was not able to differentiate between new and retreatment cases, the sheer volume of RIF+ positive samples (>800) is almost certainly an indication that the WHO estimates are GeneXpert classic cartridge driven DRS thus probably underestimated DR-TB in Zimbabwe. The distribution of DR-TB in the country mirrors the distribution of RIF susceptible TB.

The 2019 TB Epidemiological review reported that 90 percent of notified DR-TB patients diagnosed were put on treatment in 2018, but now that the GxAlert data are more comprehensive, and RIF resistant samples exceeded 800 in 2021, pretreatment loss to follow-up among RR-TB patients appears to be a larger challenge than previously estimated. When asked whether DR-TB might be underestimated in Zimbabwe, there was considerable debate among NTP stakeholders and some were not convinced that the GxAlert figures were reflected actual cases, citing possible overcounting due to external quality assurance and repeat testing.

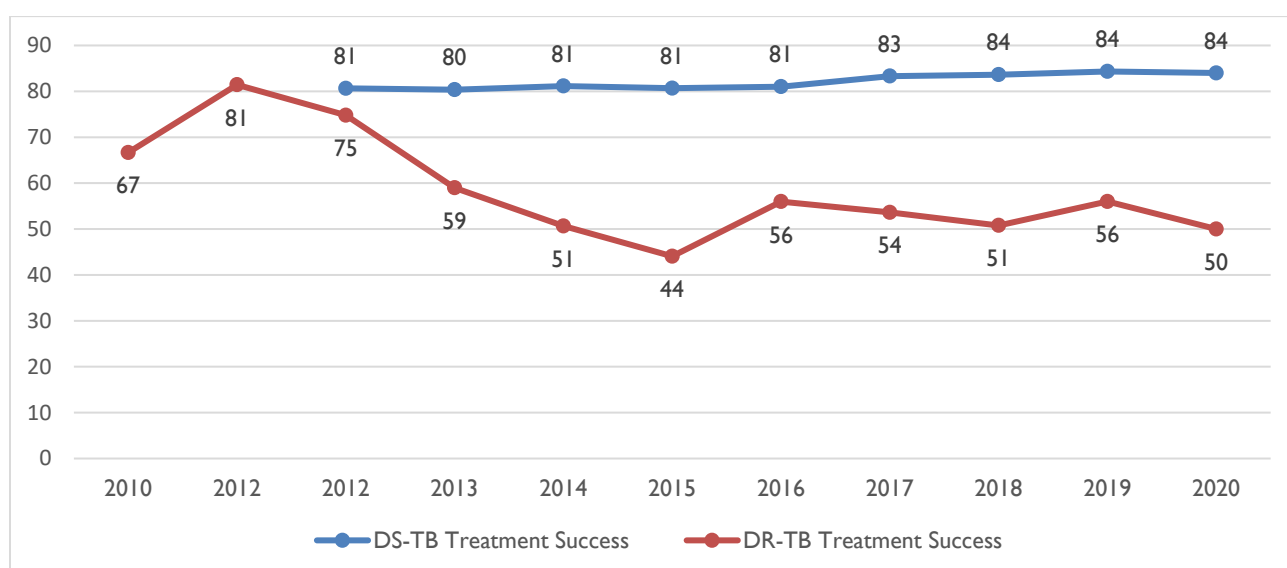
What are the treatment outcomes among DS-TB and DR-TB patients?

Officially Zimbabwe's TB treatment success for DS-TB is within global norms. There has been little change over time in DS-TB treatment outcomes and given lack of variance, this evaluation focused on DR-TB because DR-TB programs often struggle with suboptimal treatment outcomes and Zimbabwe has recently benefited from significant USAID investment.

However, the DR-TB success is among the lowest in the region. Stakeholders of all levels and technical areas are aware of this challenge and have conducted operational research to identify root causes of the problem.

USAID has invested heavily in addressing the deficits identified in the National Laboratory Assessment and the evaluation will assess the degree to which investments have yielded returns on investment in improved turnaround times and time to treatment initiation. Both of these aspects have been shown to be protective against DR-TB mortality in Zimbabwe. TIFA grantees have facilitated a number of operational research studies of treatment outcomes.^{7,13}

Figure 26. A comparison of drug-susceptible and drug-resistant TB treatment success in Zimbabwe 2010–2020



This evaluation used desk review, key informant interviews, and record abstraction for retrospective clinical review of DR-TB patient care to respond to the evaluation question.

Comparison of DR-TB services and case management in USAID-supported districts versus other districts

A sampling frame of 43 RR-TB patients diagnosed in the past 18 months were identified from the GxAlert system and research assistants attempted to link the records of these individuals to clinical records in the health facilities where they sought care. The sampled cohort of 27 DR-TB patients were selected from the TB registers at the eight facilities using the GxAlert sampling frame. However, when the facility was not connected to GxAlert, a systematic random sample from the TB register was used.

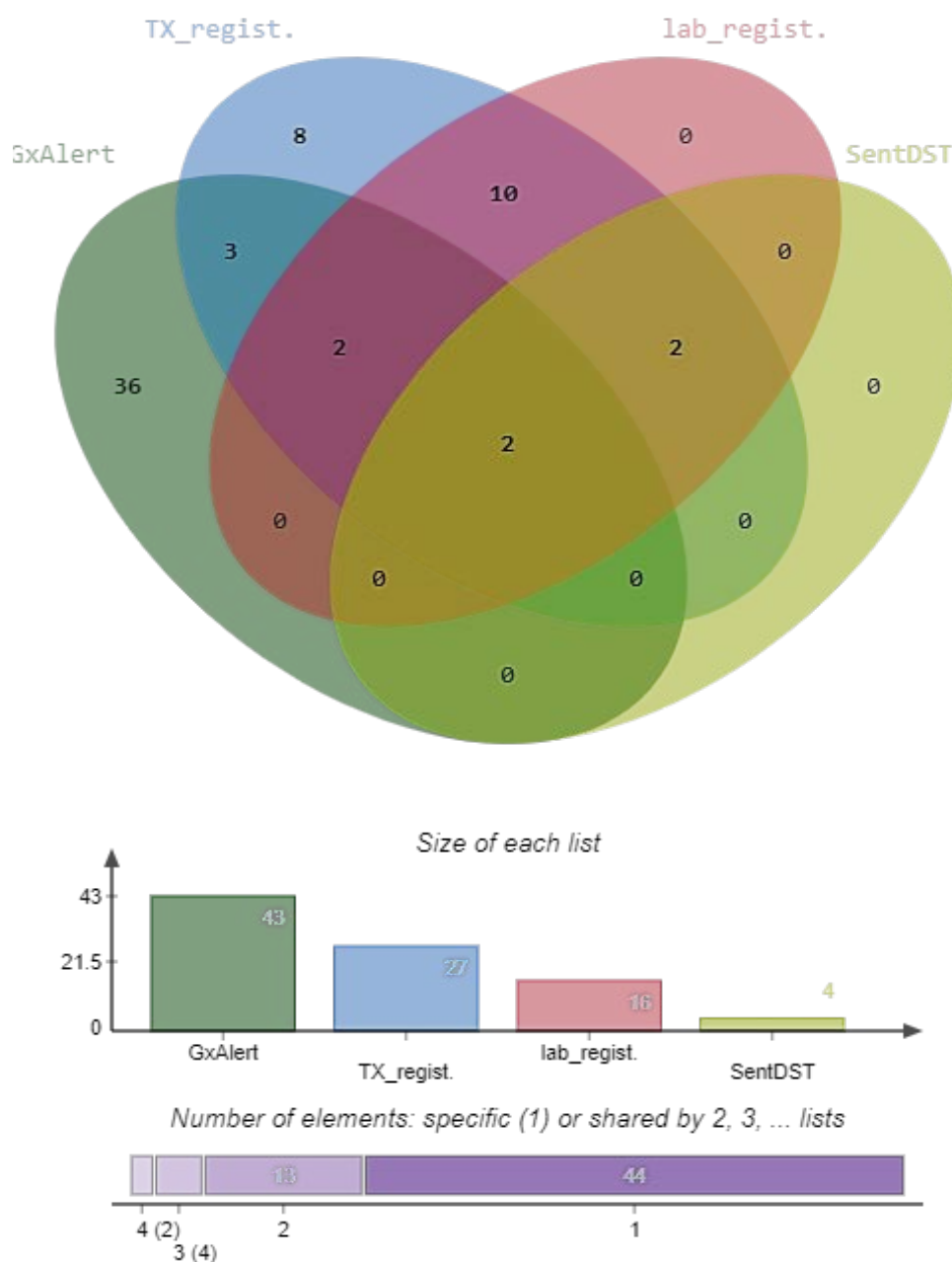
Seven DR-TB patients (17 percent) from the GxAlert sampling frame could be matched to the corresponding DR-TB register in the same site of GeneXpert testing using facility ID and three-day matching window. Nineteen DR-TB patients were registered but not readily matched with GxAlert, possibly owing to discrepancies in recorded diagnostic date (>3 days). Sixteen of 27 (59 percent) registered DR-TB patients could be matched to sample entries in the laboratory register. According to the facility laboratory registers, seven patients' samples (26 percent) were sent to reference laboratories for DST, although dates of sample collection were present for only 4 of 27 (15 percent) of registered DR-TB patients (three from Filabusi district hospital). One DST result was recorded in the TB laboratory register out of 27 DR-TB patients (3.7 percent) in this evaluation cohort. When queried, staff at facilities indicated that they had never received DST results back from the NRLs. Attempts to match this cohort with samples received by the NRL met with limited success. One sample was easily matched and results indicated RIF monoresistance, in accordance with register results. Three samples from Filabusi could not be matched with NRL records using GeneXpert date.

Despite missing DST results in the laboratory registers for this cohort of 43 DR-TB patients, results of drug resistance tests of 20 DR-TB patients (74 percent) were registered in the TB treatment register. All patients were listed as RIF mono-resistant. It is possible that NRL staff continue to communicate DST results directly to HCWs bypassing facility laboratories, despite the recommendation of the Diagnostic Network Assessment to implement a documentation system for return of DST results. Deficient record keeping made it impossible for evaluators to know whether HCWs were checking the RIF box of the DST section of the TB register on the basis of the initial GeneXpert result or as a consequence of telephonic communication of DST results by the reference laboratories.

Our findings of missing, delayed, and low demand for DST aligns with findings of the 2020 USAID Diagnostic Network Analysis (DNA). We also found that local laboratories are out of the loop on DST transport and results. Interviews reported that DST results are transmitted by telephone to DR-TB focal clinical points directly, but we could not verify this practice as results were not recorded at the sites. Interviews from the facilities pointed to the existence of a gap in confidence, where HCWs no longer ordered DST because they had lost faith that making the effort to send samples would result in the timely arrival of actionable results. Data extracted from the LMIS of the NRL and compared to facility registers showed discordant volumes of testing at sampled facilities that would be compatible with verbal transmission of DST results. The NRLs received and processed larger numbers of DST samples from the eight health facilities included in this evaluation than the local lab registers indicated. However, few DST results were rarely returned to the sites to be properly recorded in the DR-TB treatment and/or laboratory registers. The low data quality of all the

registers (missing and incomplete data) made it challenging to accurately estimate the coverage of DST, even in this very small sample with access granted to all the relevant primary data sources. For additional description of DST results and the NRLs, refer to EQ3.2.

Figure 27. Matching patients in different registers



In the sample of DR-TB patients recruited from the TB registers in Q1 and 2 of 2021 (27), two patients (7 percent) died before commencing treatment, and two patients (7 percent) died within the first four months of treatment. Twenty-one DR-TB patients commenced bedaquiline containing shorter regimens (81 percent), two patients (8 percent) were treated with individualized short regimens containing an injectable, and for two patients (8 percent) the regimen was not listed.

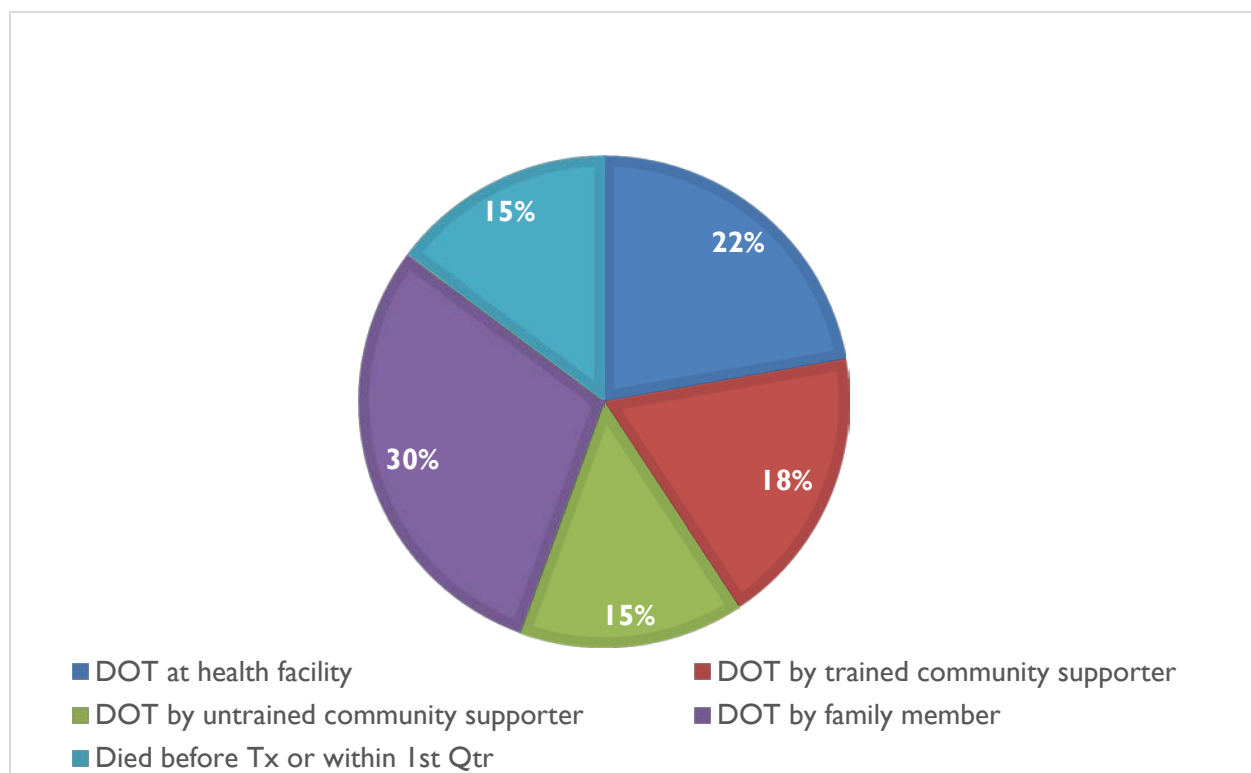
Table 19. Results cascade for TB drug susceptibility testing in USAID-supported districts versus districts receiving other support

	DR-TB patients sampled	DST samples sent (source: facility lab registers)	DST samples received from included facilities 2019-2021 (source: NRL)	DST results recorded (source: Tx register)
USAID-supported districts	14	4	38	1
Non-USAID-supported districts	13	0	28	0
Total	27	4	56	1

Methods of patient adherence support varied widely in the cohort. Almost a third (30 percent) described directly observed therapy (DOT) performed by family members, while an additional 15 percent were supervised for by untrained community members.

A minority of DR-TB patients (4/23, 17.4 percent), had documented sputum conversion at month four. Eight of 25 (34.7 percent) were described by staff as lost to follow-up in the first quarter of DR-TB treatment. Only 3 of 23 (13 percent) treated DR-TB patients were registered as cured of DR-TB. The majority of DR-TB patients (87 percent) were not evaluated or deceased at the month 12 evaluation point. Of three patients listed as “cured,” two had been treated with regimens containing injectables, obliging facility-based DOT.

Figure 28. Types of directly observed therapy in DR-TB evaluation cohort (n = 27)



Access to affordable clinical monitoring for DR-TB patients

According to the national DR-TB management guidelines (2019), clinical and laboratory monitoring of individuals on treatment with second-line TB medicines should include the following:

- Monthly weighing/calculation of body mass index (BMI)
- Asking about symptoms of peripheral neuropathy, visual acuity, and any other adverse drug events
- Monthly sputum direct smear microscopy and culture (line probe assay and DST to be repeated only if their culture remains positive or if treatment failure is suspected)
- Electrocardiogram (ECG) at baseline and at first and third month of treatment
- Audiometry at baseline and monthly if patient is receiving an injectable second-line drug
- Full blood count monthly for the first six months of treatment if patient is receiving linezolid
- Liver function tests monthly for the first six months of treatment
- Urea, creatinine, and electrolytes when clinically indicated
- Thyroid stimulating hormone (TSH) at baseline and at third month of treatment if patient is receiving ethionamide or para-aminosalicylic acid (PAS)
- Chest X-ray at baseline and at the sixth month of treatment and end of treatment
- Rapid HIV test (if not known HIV-infected patient), viral load, fasting blood glucose

Timing of the above-listed tests may depend on the duration of the DR-TB regimen. Active DR-TB drug safety monitoring and management (aDSM) necessitates record keeping in order to interpret test results over time. Persons who have completed their DR-TB treatment should be offered sputum smear and culture examinations twice a year for a period of two years to detect a possible relapse.

As reflected in Table 21, USAID-supported districts reported lower capacity for on-site audiometry (1 in 4), but higher capacity for electrocardiogram (ECG) monitoring for potential QT prolongation associated with bedaquiline (BDQ). Given the lower levels of individualized regimens with injectables, audiometry may have become a lower priority. However, the necessity to refer for monthly electrocardiograms in three out of four non-USAID-supported sites is of concern and may imply that, in practice, DR-TB patients do not receive the adverse event monitoring that shorter BDQ containing regimens require.

Table 20. Reported access to DR-TB clinical monitoring tools

	Non-USAID			USAID/LON		
	N/A	Yes, offered on-site at the facility NOW	No, patient referred to another facility	N/A	Yes, offered on-site at the facility NOW	No, patient referred to another facility
Audiometry	0	1	3	1	1	2
ECG/QTc calculation	0	1	3	0	4	0
Visual acuity testing	0	3	1	0	4	0
Color vision testing	1	2	1	0	3	1
X-ray	0	2	2	0	3	1
Screening for depression or mental health	0	3	1	0	4	0

Documentation of Clinical and Safety monitoring for DR-TB patients

We found very limited evidence of clinical treatment monitoring of DR-TB patients beyond four-month sputum testing. There was no apparent site-based system for recording clinical monitoring results. All clinical information was located on patient cards that were kept by patients themselves. Only eight patient cards (27.6 percent) of 29 DR-TB patients were available for review. Fourteen DR-TB patients (56 percent) had some clinical monitoring and 13 (44 percent) had some safety monitoring noted. The small physical size of paper patient treatment cards (and absence of privacy they provide) offers limited capacity for the detailed safety or clinical monitoring recommended by WHO. Retrospective analysis of clinical or safety monitoring of historical cohorts was not possible for evaluators because DR-TB patient cards were archived in medical records warehouses without a clear referencing system, so the public health surveillance value is also limited.

Interviews with DR-TB patients also offered limited insights into clinical monitoring frequency. Several patients complained that results of routine sputum were not returned. DR-TB patients interviewed (9) made no mention of undergoing electrocardiograms (ECG) or other cardiac monitoring. Moreover, we observed no evidence of pharmacovigilance system in any of the sites. Occasionally adverse events were recorded in the comments of the DR-TB treatment register such as “hearing loss” and patients described being tested occasionally, but there were no documents to allow evaluation of the quality, frequency, or actions taken in response to this monitoring. In contrast, several DR-TB patients interviewed reported frequent discomfort from peripheral neuropathy, nausea, headaches, and dizziness. Review of the AE/Comments section of the DR-TB register showed no side effects documented. One DR-TB patient was told that side effects would subside when treatment was complete.

Palliative care training through JHWO, with Hospice and Palliative Association of Zimbabwe and Island Hospice as technical partners, occurred in the LON districts. JHWO cascaded the capacity-building to community cadres. However, evidence of palliative care among beneficiaries and family survivors could not be established. One district stakeholder described the palliative care intervention as training only and lamented what he saw as “talking from offices” instead of having a service delivery presence in the district. Implementing

partners mentioned that palliative care indicators were added to TB registers, but M&E staff from the national TB program did not seem aware of these indicators.

The differences between USAID-supported facilities and those without support are detectable, but there is still significant room for improvement countrywide. The absence of timely access to DR-TB medicines, clinical monitoring, and laboratory testing, and substandard recording cast doubt upon the country's ability to safely offer shorter regimens under decentralized conditions. With newly developed second-line DST capacity, Zimbabwean researchers have documented 12 percent bedaquiline resistance, which adds credence to the notion that the program is not yet successful in protecting DR-TB patients on shorter regimens nor is the system providing adequate stewardship of the new drugs and regimens.

A full understanding of DR-TB outcomes is challenging to evaluate in Zimbabwe because important data are not routinely documented. We can, however, infer from the high rate of missing and inferred data, pretreatment loss to follow-up, early and late mortality, and loss to follow-up during treatment that the DR-TB care needs improvement, and that person/patient-centered support should be strengthened.

III.C. EQ3: Health system issues

What health system issues are affecting the delivery of quality TB services?

This specific focus on health systems strengthening was selected because prior external evaluations — such as the diagnostic network assessment and the 2019 Epidemiological Review by WHO — have already identified an array of health system barriers, including electricity, solar power, labor shortages, human resources deficits, patient registration fees, hidden radiography fees, delayed rollout of case-based TB surveillance, and poor maintenance of lab infrastructure. Health system issues have previously been shown to have a profound impact on delivery of TB services in Zimbabwe. This evaluation question was addressed through desk review and bibliometric content analysis. In addition, KIs with stakeholders, providers, and beneficiaries were conducted.

To assess the impact of USAID investment on data quality, we analyzed surveillance data at the national, district (macro), and facility (micro) levels. Triangulation of data sources was necessary, as local surveillance systems are in transition from paper-based aggregate registers to electronic health records (EHR) and digital dashboard systems (DHIS II, GxAlert, ASPECT). We conclude that with the exception of the GxAlert system, TB surveillance data quality in Zimbabwe is currently subpar and blunts the ability of the national program to make strategic decisions. The absence of core paper TB registers during site visits and the level of incompleteness of existing registers suggests a limited access to valid information for use to steer the TB program.

Table 21. Availability and completeness of TB registers in USAID-supported sites versus non-USAID-supported health facilities

	Non-USAID				USAID/LON			
	No	Yes, complete	Mostly complete	Incomplete	No	Yes, complete	Mostly complete	Incomplete
Is the presumptive TB register present?	0	4	0	0	0	4	0	0
Does the presumptive TB register contain complete data for 2019?	0	2	2	0	0	2	2	0
Does the presumptive TB register contain complete data for 2021?	0	2	2	0	0	2	2	0
Is the TB register present?	0	4	0	0	0	4	0	0
Does the TB register contain complete data for 2019 and 2021?	1	0	3	0	0	1	2	1
Is the DR-TB treatment register present?	0	4	0	0	0	4	0	0
Does the DR-TB treatment register contain complete data for 2019?	1	0	3	0	0	0	3	1
Does the DR-TB treatment register contain complete data for 2021?	0	1	3	0	0	0	3	1
Is the TB preventive treatment (TPT) register present?	1	3	0	0	0	4	0	0
Does the TPT register contain complete data for 2019?	0	0	2	1	0	2	2	0
Does the TPT register contain complete data for 2021?	0	1	2	0	0	2	2	0
Is the TB laboratory register present?	0	4	0	0	0	4	0	0
Does the TB laboratory register contain complete data for 2019?	1	0	2	1	0	2	2	0
Does the TB laboratory register contain complete data for 2021?	0	0	3	1	0	2	2	0

Stakeholders identified the Global Fund as the partner responsible for supporting the printing and distribution of TB registers and acknowledged that donor enthusiasm for underwriting this expense was a challenge. Lack of donor coordination in the area of TB surveillance was evident in the national reference laboratories, where competing LMIS systems continue to hamper analysis of DR-TB treatment outcomes.

Community stakeholders reported that case finding and patient management is suboptimal partly because most of the recording and reporting systems are paper-based. Paper-based system management was perceived to result in data loss and an inability to measure the quality of services.

*"As Zimbabwe there are other issues that we have, or other challenges that we have been noting with our recording and reporting system because we still heavily rely on [a] paper-based system. We have electronic-based systems or we have instances where both systems are running and so there are instances where we need to fall back on physical copies or on paper-based reporting tools so as to cover the gap that we would have realized in electronic registers or data collection tools. We are not really in a good position to confidently say that we are doing well with regards to TB case finding management as well as patient monitoring."
(female, Pediatric, English)*

The root causes of current recording and reporting problems appear complex and historically informed. This evaluation was not able to definitively conclude why TB surveillance appears to have deteriorated from earlier periods. However, stakeholders offered some hypotheses, including the following:

1. Healthcare worker shortages make filling out TB registers less feasible and lower priority than patient care.
2. Healthcare worker turnover makes surveillance more challenging because fewer HCWs are trained to complete registers.
3. The national ambition to leapfrog over digital case-based vertical TB disease systems by moving from paper registers to a comprehensive case-based integrated EHR system has resulted in less attention to paper-based systems, as they are seen as soon to be obsolete.
4. A growing politicization of health information and concern among health staff about how actual health indicators could be interpreted by the chain of command in the MOHCC. Some stakeholders implied that they were reluctant to quantify areas needing improvement (e.g., high levels of pretreatment loss to follow-up, prison populations exceeding capacity, and missing DST results). In contrast to earlier periods, information on diverse topics related to government performance are seen as increasingly sensitive and for fear of potential professional backlash, some technical partners were mindful of the importance of utilizing official statistics, even when indicators did not align with available raw data.

Real-time access to TB testing volumes, positivity rates, and RIF-resistance data have definitely improved with the GxAlert networking of the GeneXpert network. However, the ongoing difficulties in linking GxAlert, NRL HMIS, and TB registers due to missing (and possibly inaccurate) data, lack of unique identifiers, and absence of harmonized variable structures does raise questions about the utility of investments in these tools for surveillance purposes. While some stakeholders reported that these challenges had been largely resolved by the introduction of the ASPECT dashboard by System One, other stakeholders reported that the labs continue to use Excel spreadsheets to manage complex data.

Public health facilities are currently in the midst of an HRH crisis and supply chain management that is having adverse effects on TB and DR-TB case finding, patient catastrophic costs leading to poor patient treatment management, including TB and DR-TB treatment outcomes. Urgent attention to resolve underlying issues is required from the MOHCC with support from funding and technical partners including community responses.

Shortage of HR for health and HR for TB care and prevention in particular and a high degree of non-motivation of remaining healthcare providers

"As a country, we are facing an HR challenge — most of our professionals are demotivated with the current level of salaries and they are leaving, quite huge numbers for the last two years or so. So, we have those serious HR gaps within the establishment and, it means that the quality of work or the output of work that is expected is much lower than what it should be." (male, donor, English)

"One of the biggest lessons learnt is the gross inadequacy of manpower within the institutions where we've really struggled to get dedicated allocations of healthcare staff, particularly doctors to man these occupational health clinics." (male, IP representative, English)

Respondents from KIs reported that there is shortage of health workers in Zimbabwe. The majority of health workers are emigrating to western countries or the private sector due to poor remuneration in the public sector. The brain drain has left the health sector over-stretched.

To reduce healthcare workload (and patient out-of-pocket costs), DR-TB patients are not routinely directly observed. DR-TB patients are given a month of drugs at a time. This reduced frequency of patient monitoring, support, and engagement is a recognition that for many patients the trip to the health facility entails more costs than benefits.

The STAR Advisor and others are exploring alternative DOT strategies to reduce loss to follow-up and community support models are promising. However, the evidence for the cost-effectiveness of such models is limited.

Table 22. Exposure to capacity-building in DR-TB in USAID-supported facilities versus non-USAID facilities

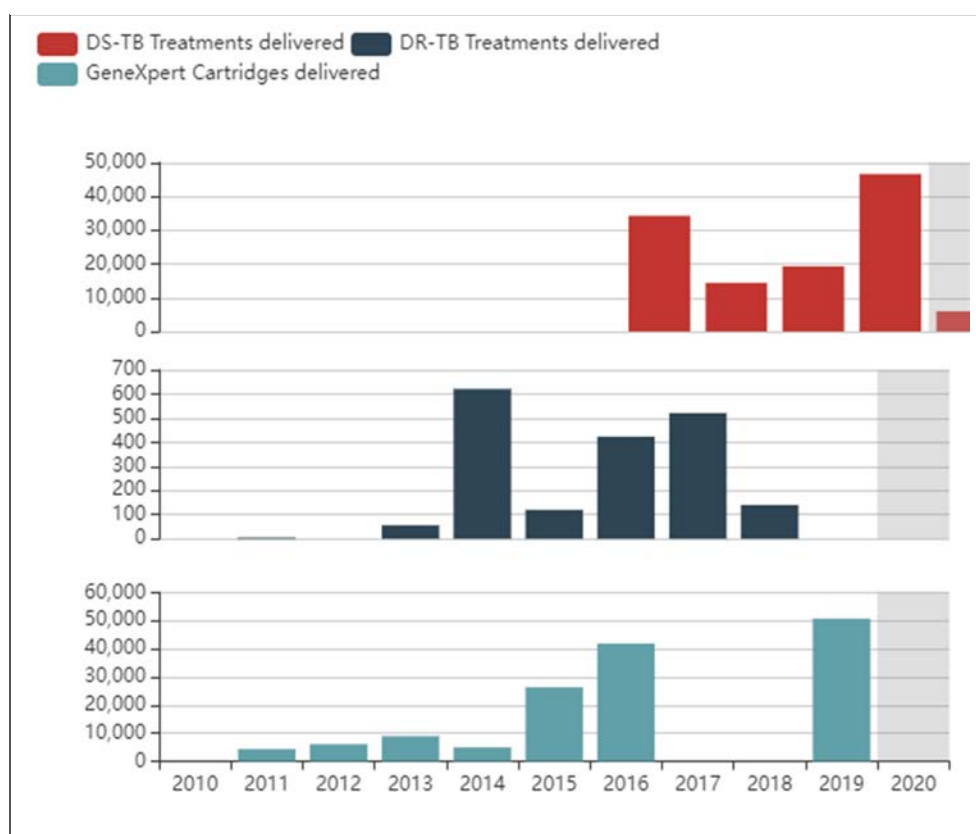
	Non-USAID			USAID/LON		
	No	Yes, in the past 3–5 years	Yes, in 2020 or 2021	No	Yes, in the past 3–5 years	Yes, in 2020 or 2021
Training in diagnosis of drug-resistant TB?	0	2	2	0	2	2
Training in treatment of drug-resistant TB?	0	2	2	1	2	1
Training in prescribing shorter regimens for DR-TB (e.g., regimens containing bedaquiline)?	0	2	2	0	3	1
Training in prescribing all oral regimens for DR-TB (e.g., regimens without an injectable)?	0	2	2	0	2	2
Management of stocks of bedaquiline?	0	2	2	0	1	2
Copies of the new DR-TB treatment guidelines	0	1	3	0	1	3
Training in clinical monitoring of DR-TB patients on shorter all oral regimens?	0	1	3	0	0	4
Training in palliative care for DR-TB patients?	3	1	0	1	0	3
Training in how to send sputum samples for drug-sensitivity testing (DST)?	0	2	2	1	3	0
Training in use of GxAlert?	1	2	1	2	1	1

There is consensus in the TB program and among donors that the HR situation in Zimbabwe leads to suboptimal returns on investment from capacity-building due to staff turnover, rotation, and outmigration. However, the rapid change of diagnostic and treatment options in TB obliges healthcare worker information sharing and updates which is often done via retraining. During the COVID-19 period, creativity and flexibility were employed to extend training to districts when travel restrictions allowed it. The use of the ECHO mechanism and telementoring were two examples of ways IPs sought to move key information to the districts. Site visits suggested that DR-TB trainings on palliative care, clinical monitoring, prescribing, and DST did occur despite the COVID restrictions. LON-supported facilities did not receive more DR-TB training exposures than non-USAID-supported facilities, with the exception of palliative care. Because the IDDS intervention is national in scope, differences in receipt of diagnostic training (e.g., GxAlert, DST) were not expected.

What are the health system issues that contribute to poor DR-TB treatment outcomes?

Zimbabwe is in the grips of an economic crisis characterized by hyperinflation, a rapidly devaluing local currency, 90 percent unemployment, an inflation rate of 135 percent, and unprecedented exodus of healthcare workers, especially nurses. Hospitals are facing dire shortages of medical supplies. Economic decline has led to striking healthcare workers and a reduction in healthcare budgets, affecting provisions at all levels, with worsening health indicators. Fluctuations in the value of currency and gaps in donor support have also led to inconsistent purchases of key commodities. Data from the STOP TB partnership data dashboard suggests that GeneXpert cartridges and DR-TB medicine deliveries during the past two years have been limited.

Figure 29. Medicine and supplies delivered to the hospitals (STOP TB dashboard)



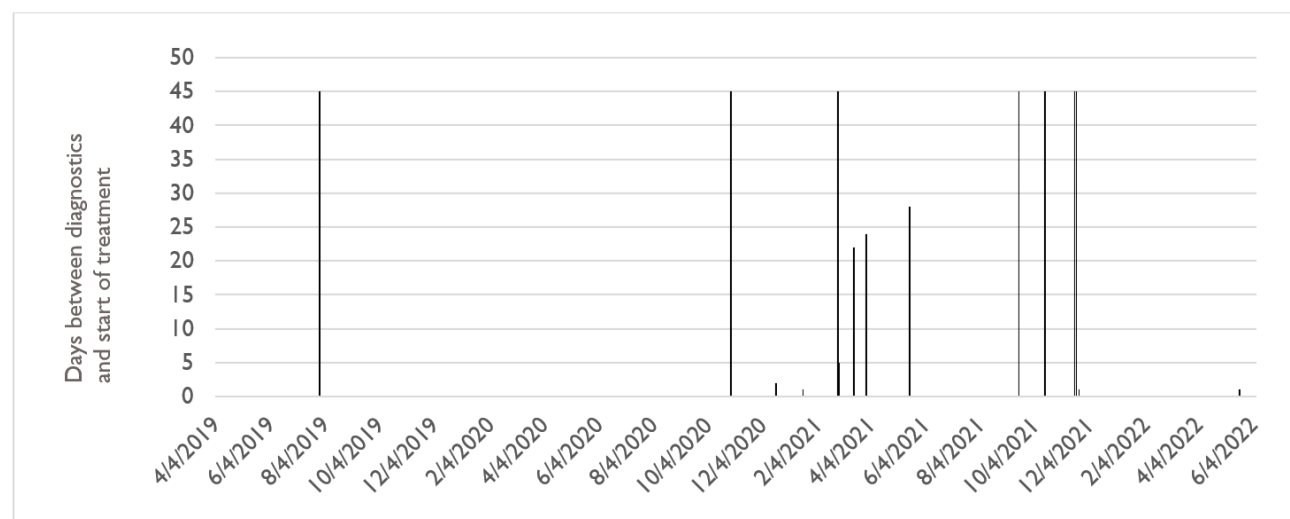
Site visits found that five of eight facilities (63 percent) reported stockouts of DS and DR-TB medicines in the past three months (see Table 24). Weak supply chain management of TB medicines and consumables results in shortages, treatment interruptions and great inconvenience to people with TB and their families who are often directed to travel to find drugs in distant facilities.

Table 23. Reported drug stockouts at USAID-supported and unsupported health facilities

	Non-USAID-supported facilities		USAID/LON supported facilities		Total HF
	No	Yes	No	Yes	
Has there been a stockout of drugs used for RR-/DR-TB treatment during the past 3 months?	1	3	2	2	8
Has there been a stockout of BDQ, DLM, and repurposed drugs (MFX, LFX, CFZ, LZD) during the past 3 months?	2	2	2	2	8

Due to the fully decentralized model of DR-TB care, DR-TB drugs rarely available at the primary care level, but must be requisitioned as needed. In our field sample of 27 DR-TB patients, the median time to treatment initiation was 0.5 but the average was 8.6 days after diagnosis, and five waited over three weeks to begin RR-TB treatment (see Figure 30).

Figure 30. Observed time to treatment by diagnostics date for 27 DR-TB patients



There were few differences in drug stockouts among USAID-supported versus non-supported districts because this is a health systems issue related to Natpharm management.

"I was collecting my pills at the hospital after two weeks, but I had a challenge that sometimes I would go there and some pills would not be there and they'd only be available after 3 weeks. There is a problem of not finding pills such as Pyrazinamide and a challenge of going back (home) without medication because of these shortages, but if I get my medication every day I would be okay." (female, DR-TB patient, local language)

National TB program staff, DR-TB focal points in facilities, District TB coordinators, and DR-TB patients all affirmed their own experiences with drug stockouts and shortages when they went to collect their treatment. Beneficiaries reported this was a major barrier that contributed to poor DR-TB treatment outcome.

Hidden Costs of Services

Treatment of DR-TB is nominally free through support from funding partners such the Global Fund. However, respondents identified that there is need to pay for some clinical monitoring tests.

"For example, TB screening, it's a questionnaire. I understand if it's more – then you are told to go for X-ray and all those things, but also X-ray is a barrier because you have to pay. That's a barrier, so treatment is free but the diagnosis, the X-ray needs money and so forth." (male, technical partner, English)

Cost of service is a major barrier to effective DR-TB treatment. Children are disproportionately harmed by chest X-ray fees because care providers often resort to diagnosis by X-ray when expectoration fails or cannot detect their paucibacillary TB.

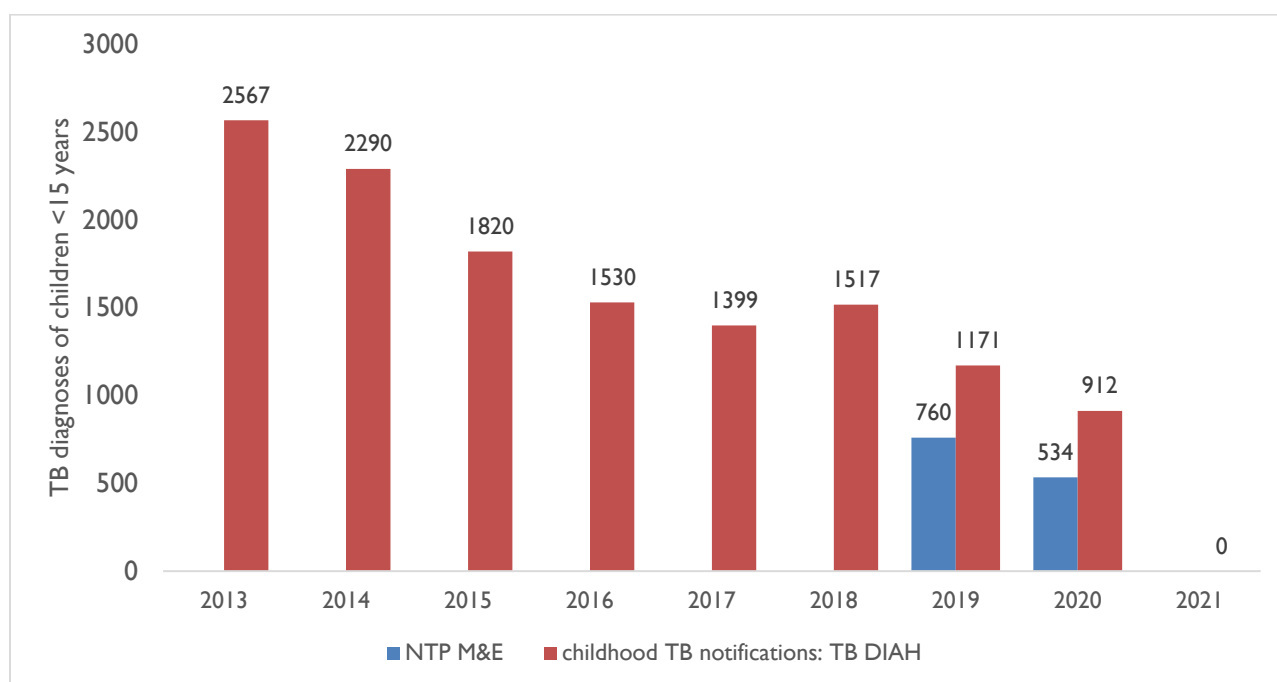
What are the health system issues that contribute to underdiagnosis of TB in children under five years of age and their corresponding low uptake of TB preventive therapy?

In addition to the global challenges of childhood TB diagnosis (e.g., inability to produce sputum, unique pediatric phenotypes and symptom presentation, lack of confidence in clinical diagnoses of childhood TB, limited diagnostic tools/equipment for childhood TB, aversion to invasive procedures, etc.), Zimbabwe has several unique advantages that favor robust diagnosis of childhood TB.

Capacity-building activities in childhood TB were conducted in 25 districts under support from partner grants such as Challenge TB through International Union against Tuberculosis and Lung disease (The Union, 21 districts) and Elizabeth Glaser Pediatric AIDS Foundation (EGPAF, 4 districts) following the revision of childhood TB desk guide and training materials in 2018. Cadres trained included HCWs and community HCWs. EGPAF has expanded to 20 sites under the CapTB project.

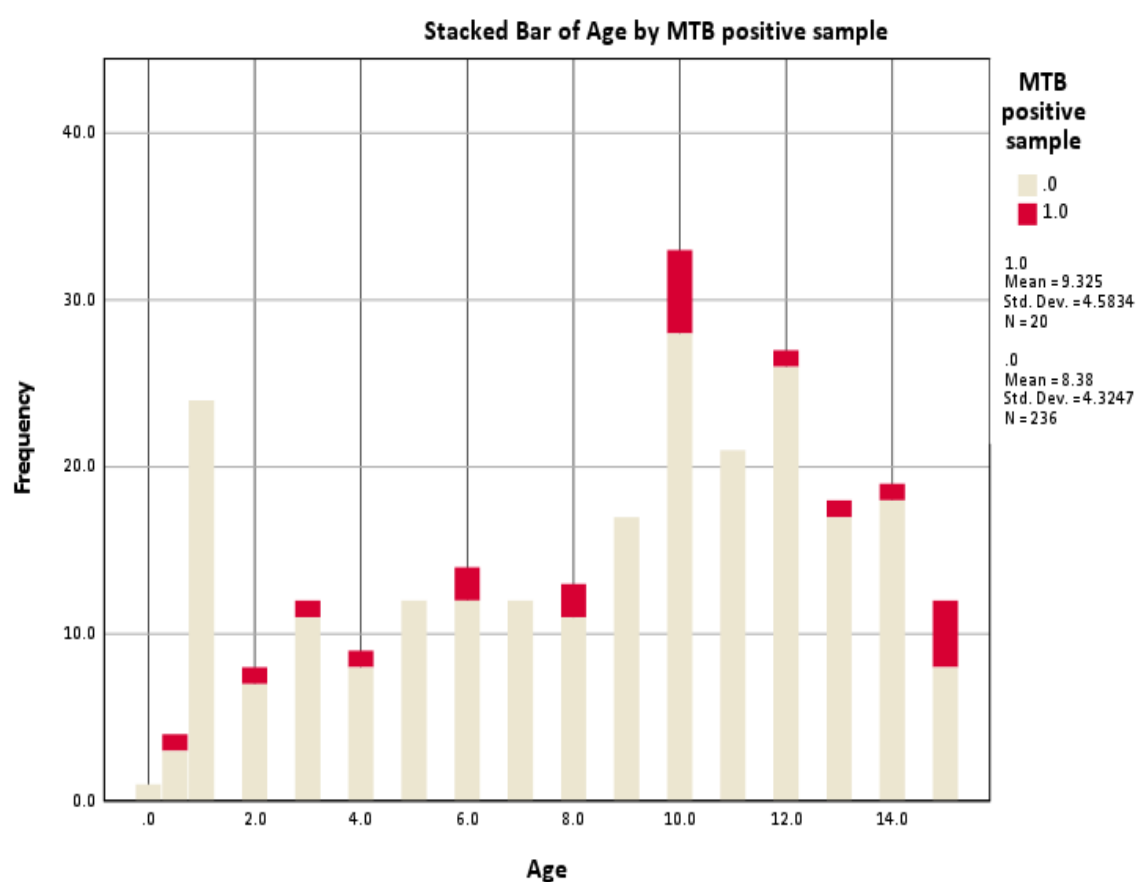
The Clinton Health Access Initiative (CHAI) supports results-based financing mechanisms for improving childhood TB notifications in Manicaland. USAID support for improvements in Childhood TB, combined with the large investments of UNITAID and Global Fund, should have a synergistic positive impact on the situation of TB among Zimbabwean children. However, the impact can be hard to detect, perhaps because the interventions are multivalent — scaling up TB prevention and TB detection simultaneously in the same population can “cancel each other out.” By reducing the underlying burden, visible gains in diagnosis are hard to detect. In the recent period there is some ambiguity regarding the actual case counts for childhood TB due to differences by source. The USAID TB dashboard (TB DIAH) and NTP sources report distinct total as shown in Figure 31.

Figure 31. Comparison of childhood TB diagnoses 2013–2020 by data source



Among a sample of 3,565 specimens with age recorded across 17 health facilities (HF), only 1.7 percent were for children under five years of age. This suggests that although a diagnostic test capable of detecting children under-five's paucibacillary TB is now in use (Ultra) the country has yet to leverage Ultra's full potential to improve detection of pediatric TB in Zimbabwe. However, a positive sign in GxAlert data from 17 HFs was considerable testing of youngest children under two years of age.¹ Childhood samples yielded a high proportion of bacteriologic confirmation (7.8 percent), suggesting competent triage, sample collection, and processing. Three-quarters of bacteriological confirmations in those under 15 were concentrated at three sites (Beatrice Road Infectious Disease Hospital, Birchenough Bridge Hospital, and North Hospital). Testing of children under five with GeneXpert Ultra is worthwhile, *even if the result is negative*, because it often enhances health worker confidence and willingness to provide TPT.

Figure 32. Age distribution and bacteriologic yield of GeneXpert testing among clients under 15 years in 2021



Half of USAID-supported facilities reported receiving capacity-building interventions during the LON period.

Table 24. Exposures to childhood TB capacity-building over time in USAID-supported facilities versus non-USAID-supported facilities

Have staff at this facility ever received training on . . .						
	Non-USAID			USAID/LON		
	No	Yes, in the past 3-5 years	Yes, in 2020 or 2021	No	Yes, in the past 3-5 years	Yes, in 2020 or 2021
Household contact investigation?	3	1	0	1	1	2
Childhood TB diagnosis and management?	1	3	0	1	1	2
DR-TB in children?	1	3	0	1	1	2
New TB/HIV for children?	1	2	1	2	1	1
Laboratory diagnostic tests for children?	3	1	0	1	1	2
Have staff at this facility ever received mentoring or telementoring?	1	2	1	0	1	3
TB preventive therapy for children under five?	0	2	2	1	2	1

The impacts of USAID investments in pediatric TB are heterogeneous and hard to measure due to the presence of confounders (ACF GF, UNITAID), as well the lagged impacts of historical investments. The absence of consistent age recording in the GxAlert dashboard encumbers the ability of the TB program to track progress in childhood TB. We identified small differences between LON and non-USAID-supported districts in terms of CI, TPT, or childhood diagnosis in 2019 and 2020. In contrast to the national comparison, at the facility level, the four USAID-supported sites were more likely to document contacts of an index patient and more likely to record carrying out contact screening and investigation (see Table 26).

Table 25. Comparison of contact investigation activity in USAID-supported facilities versus non-USAID-supported facilities

	Index pts with contacts listed found	Child Contacts investigations documented
TOTALS	25	19
USAID-supported sites	16	18
Non-USAID-supported sites	9	1

Although pediatric stool sampling for GeneXpert was introduced into Zimbabwe via operational research in 20 sites, most childhood TB focal points we interviewed had not yet incorporated it into routine practice. Some nurses were under the impression that urine LAM would also be introduced for pediatric urine testing.

As shown in Table 27, unlike the drug stockouts found for DS and DR-TB, availability of TPT was better, with 100 percent reporting access to 6H (six months of daily isoniazid) and 6 in 8 reporting presence of 3HP (weekly high dose isoniazid plus rifapentine for three months) stocks.

Table 26. Reported TB preventive therapy stockouts at USAID-supported and unsupported health facilities

	Non-USAID-supported facilities		USAID/LON-supported facilities		Total
	No	Yes	No	Yes	
Do you have stock of 3HP (3 months of INH +Rifapentine) for TB preventive therapy here in the facility?	1	3	1	3	8
Do you have stock of 6H (6 months of INH) for TB preventive therapy here in the facility?	0	4	0	4	8
Do you have any other regimens for TB preventive therapy here in the facility?	3	1	4	0	8

Conclusions

The evaluation team identified the following challenges:

- Rural HCWs do not have electricity or internet bandwidth to support ECHO engagement.
- Healthcare workers on the periphery are under-resourced and aren't necessarily able to participate in ECHO due to electricity and bandwidth constraints.
- ECHO draws TB experts in Harare for discussions of the latest research and technical innovation.
- HCWs send only 35 percent of samples to a reference lab due to a lack of confidence and transport gaps.
- The transportation of sputum samples in the Northern region takes 11 days, which is extremely long and increases the possibility for error.
- There is a lack of accountability for long turnaround times for DST, with finger-pointing by local lab staff, healthcare workers, and reference lab staff.

- There is poor documentation of each step of the DR-TB investigation cascade and thus, it is challenging to pinpoint the gaps in each context.
- The high level of repeat testing (14 percent) with GeneXpert suggests a possible misuse of GXP for treatment monitoring.
- The rate of MTB growth in culture is 63 percent, suggesting sample transport and/or processing is suboptimal.
- There is a shortage of HR for health and HR for TB care and prevention in particular, and a high degree of non-motivation of remaining healthcare providers.
- Reports of stockouts of DR-TB medicines have been blamed for late treatment initiation, treatment interruptions, and out-of-pocket costs to TB-affected households.
- The cost of service decreases accessibility of the treatment for poor families.
- There is poor TB case finding and patient management.

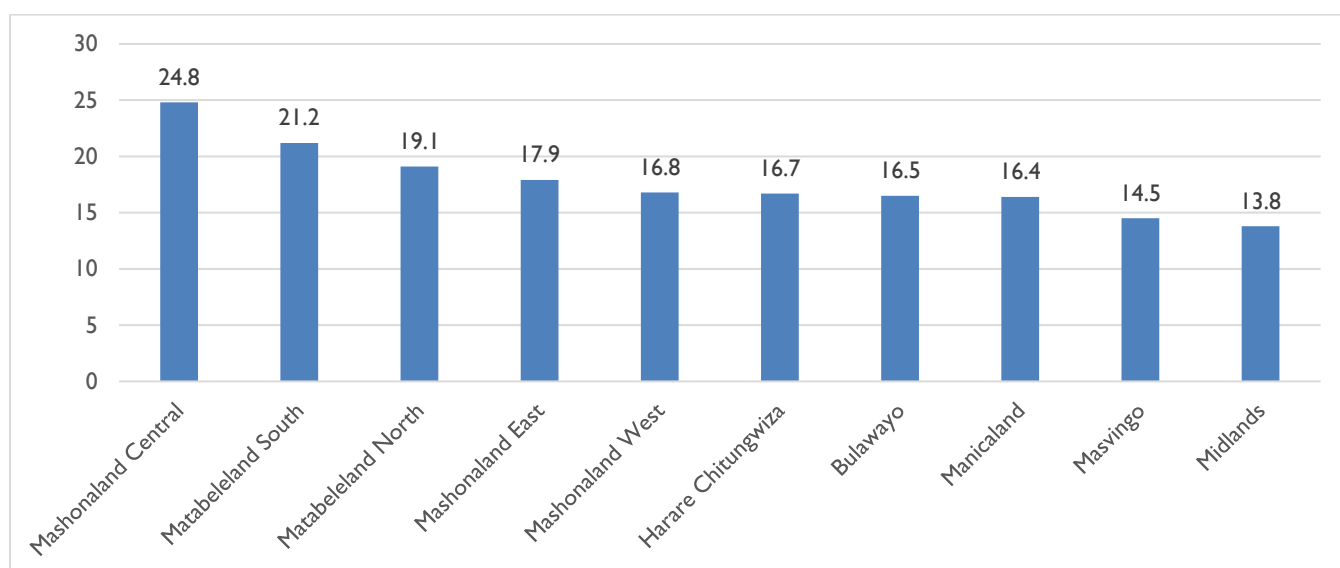
III.D. EQ4: Factors affecting treatment outcomes

What patient level behaviors and socioeconomic factors are affecting treatment outcomes?

This question was operationalized specifically for artisanal miners and pediatric TB. Zimbabwe's 2021–2025 National TB Strategic Plans and 2019 Epidemiological Review have highlighted the importance of these particular risk groups as the general population incidence declines. This focus was also chosen because there have been a set of recent studies highlighting that the behavioral and socioeconomic factors may play a role in early detection and prevention in these groups.¹⁴ USAID funds JHWO and Baines Occupational Health services (Baines) to screen artisanal miners under the LON. The results of the 2020 screening efforts suggest an evaluation of the outcomes of case finding might be beneficial. This evaluation question was addressed through desk review, bibliometric content analysis, and key informant interviews with stakeholders, providers, and beneficiaries. In addition, child contacts cascade analysis was used.

Previous studies in Zimbabwe have shown that comorbidities and late presentation are important determinants of poor treatment outcomes. In 2021, 3,406 out of 10,304 samples in the GxAlert system had a semiquantitative result of “MTB detected high” suggesting a high degree of late diagnosis persists in Zimbabwe. In a USAID-supported study of TB in artisanal miners, use of dagga and alcohol were associated with TB disease.¹ Zimbabwe is unique in Africa in the rates of tobacco smoking and the dependence of the state on tobacco revenue. Health workers reported that tobacco smoking among TB patients was common, and the District Health Information System (DHIS) shows significant rates among men (see Figure 33).

Figure 33. Proportion of Zimbabwean men who smoke cigarettes by province (DHS 2015)



Stakeholders reported that above and beyond any modifiable individual behaviors such as smoking, the single biggest threat to TB health seeking and adherence is the country's challenging economic situation. This quotation from the World Bank Zimbabwe highlights the co-occurrence of multiple catastrophes over the past three years.

GDP contracted by 12.8% in 2019 due to poor performance in mining, tourism, and agriculture. Foreign currency and electricity shortages affected mining and tourism. Agriculture shrank about 15.8% due to cyclone Idai in March 2019, prolonged drought, livestock diseases, and currency shortages reducing the availability of inputs. Despite a global mineral price recovery, production in Zimbabwe dropped below 2018 levels. Austerity measures through the Transitional Stabilization Program 2018–20 and attendant monetary reforms constricted economic activity.
 – 2022 Zimbabwe Health Sector Development Support Project (HSDSP)

Literature review, interviews with healthcare providers, patients, and the experts allowed ET to formulate the following list of factors affecting treatment outcomes:

1. **Out-of-pocket and hidden costs of TB clinical monitoring and treatment seeking.** Most respondents identified out-of-pocket healthcare costs as the major challenge affecting TB prevention and treatment, especially early health seeking practice and treatment. DR-TB patients reported they did not have adequate finances to follow directly observed treatment at facilities or meet their transport and food needs during TB treatment. Respondents highlighted that they relied upon menial jobs and family and friends for support during DR-TB treatment.
2. **Drug stockouts cause out-of-pocket costs.** Treatment seeking due to facility DR-TB drug stockouts or fees for ancillary medications to treat side effects were also identified as a burden. Out-of-pocket costs of TB treatment contributed to missed doses.

"I got the treatment the first time — it wasn't complete, there were two tablets missing, two different types of tablets missing. Then I looked for them and found them. Then the second time, I came for a review and they said they didn't have pills. It's like if the pills run out in the morning and you come later for a review. They told me there was no medication, I had to go get treatment from Bulawayo, then it was hard for me to do it, then I ended up jumping one day and they said there's no problem." (male, DR-TB patient, Insiza)

"What I see is that when you're at the hospital and pills are not available, the hospital workers do not do a follow-up where they are supposed to be collected — that's what makes my treatment difficult. The other thing is that the hospital workers promise to call us if pills are available, but they don't call. You end up going there yourself and when you get there, you'll find that they are not there yet." (female, DR-TB patient, Insiza)

3. **Food insecurity and lack of nutritional support.** Due to financial constraints, respondents lacked sufficient food to meet their nutritional needs. A majority of DR-TB patients interviewed highlighted that sufficient nutrition is needed during TB treatment. Respondents reported that they preferred to take their medication after a meal, usually sadza. In 2022, the Zimbabwean NTP started complementing CCT with monthly grocery vouchers worth USD 20 for households affected by DR-TB. As most patients in the evaluation sample were from 2021, we were not able to evaluate the effectiveness of that more recent (but positive) policy change on the patient wellness.
4. **Access and transport costs.** Geographical accessibility hinders access to health facilities for TB diagnosis and treatment. Participants reported that they were artisanal miners and could not easily access clinics and hospitals. Since 2013, the NTP program seeks to offset transport costs by conditional cash transfer (CCT) for DR-TB. The goal of CCT is to reduce barriers to treatment by supplementing the income of DR-DR-TB patients. Many DR-DR-TB patients are already precariously employed and food insecure prior to their diagnosis.

Mechanisms of provision of financial resources to DR-TB patients have changed in the past two years, from mobile money in local currency to bank transfers in US dollars.¹⁵ This switch is plausibly attributable to USAID investment and advocacy by the STAR advisor, and community leaders as well as research and policy experts that have demonstrated the need to expedite and prioritize the transfer of cash to TB affected families as soon as possible after diagnosis.

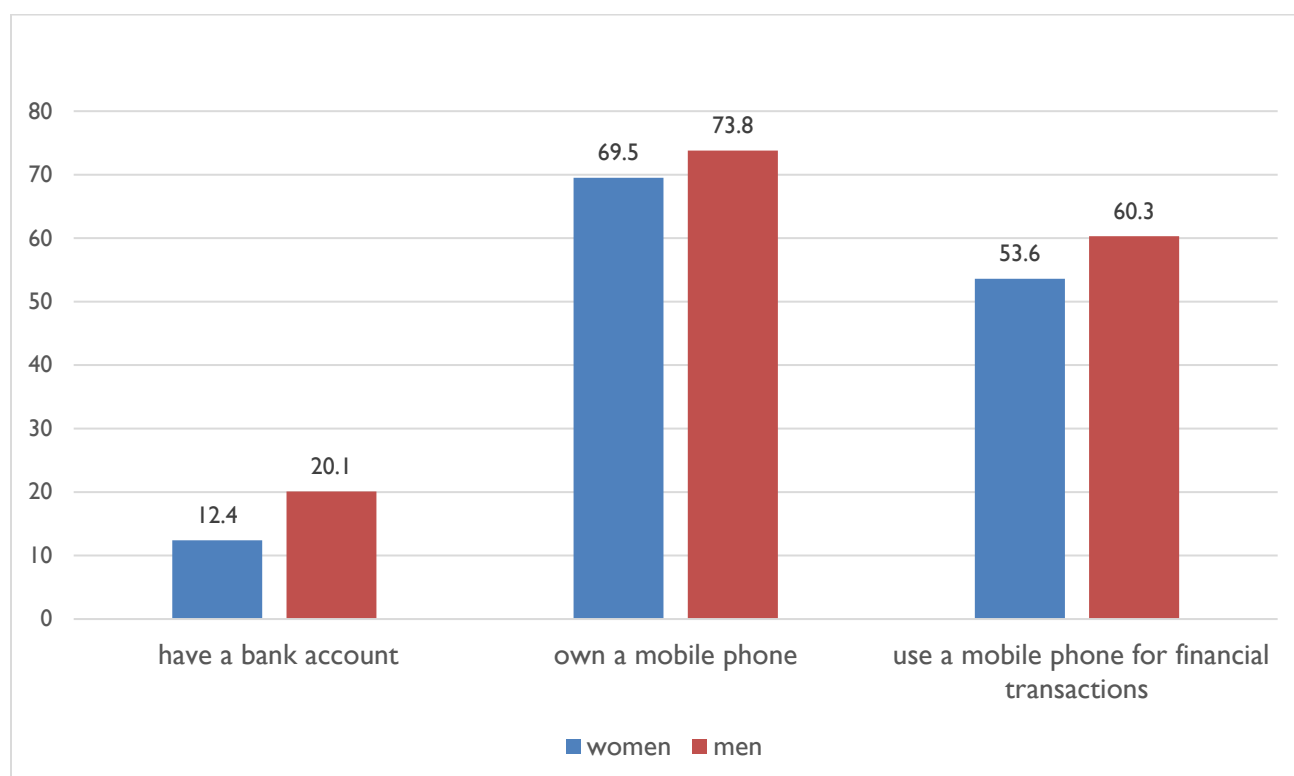
However, payments to DR-TB patients are only useful and life-sustaining if timely. Bank accounts and bureaucratic hurdles frequently lasted three months or more and served to undermine the goal of catalyzing adherence and survival.¹⁵

"Yes, but when I started I was staying far and I was using six dollars for transport, to and fro, but if I had to go to Filabusi I used 12USD. I stay here now, closer because I could not walk or maybe I would not have the money for transport and so, I would stay at home and wouldn't be able to go there. (female, DR-TB patient, Insiza)

"DR-TB patient would get transport and go, but it became difficult for me to the point that my shop ended up being empty and I didn't have the money to go anymore, so I asked someone for some money and told them I would pay them back when I got some money and they understood. They gave me some money, but I haven't been able to pay it back because I didn't get the money that I was promised at the hospital." (female, DR-TB patient)

These beneficiaries highlight the bureaucratic barriers that continue to undermine the effectiveness of the cash transfer program. CCT is denied to those who cannot open bank accounts, such as those under 18 years of age. Women in Zimbabwe are less likely to have access to bank accounts and mobile phones, so the policy may contribute to gender inequality (see Figure 34).

Figure 34. Access to banking and mobile banking by gender (Zimbabwe DHS 2015)



5. **Family and community support.** Most DR-TB patients attributed their survival to the efficacy of the medicines they (eventually) received and to the material and emotional support provided by their families. TB stigma was highlighted rarely by patients as a barrier to care.

6. **Inadequate knowledge and misconceptions among DR-TB affected families.** The majority of the participants acknowledged that at first, they were afraid of commencing DR-TB treatment because of inadequate knowledge and misconceptions about TB diagnosis. Some patients who were familiar with previous regimens (including injectables) were reluctant to start due to fear of hearing loss. Misconceptions hinder diagnosis and treatment of TB.

Conclusion

The key socioeconomic challenges affecting TB prevention and treatment include poverty, especially transport and food insecurity. Accessibility to healthcare, drug stockouts, inadequate knowledge, and misconceptions were also mentioned as challenges affecting them.

What are the challenges to preventing and detecting TB in artisanal miners?

The high mobility of artisanal miners and operation in remote areas with near absent access to health services is well documented. Access to diagnostic services for early detection and contact tracing of their contacts is limited because the location of work is not their permanent dwelling. Their migrant status, coupled with multiple health conditions associated with the hazards of mining in confined spaces such as respiratory, malaria, anaemia, diabetes mellitus, and physical injuries, and lack of wide coverage of static TB services to cater to their needs poses challenges to prevention, access, and treatment outcomes.

USAID support for TB control in artisanal mining communities includes occupational health clinics, mobile ACF, and operational research designed to measure the burden in this population, which was previously uncertain. It complements the regional investments of the World Bank, as well as The Global Fund's regional Tuberculosis in Mining Sector in Southern Africa project implemented under the leadership of the Wits Health Consortium, supported by the University of the Witwatersrand, Johannesburg (South Africa) until 2020.

"The artisanal miners research was published in an international, in fact, not only international journal, but in a high-impact, international peer-reviewed journal. We believe that our study actually is the first to be done even in Africa as a region amongst artisanal miners, they're often a neglected population. So, we are confident that the findings are also applicable not only to Zimbabwe but across the continent."
(male, IP, English)

As part of the Kunda-Nqob'! TB Project, a small observational study of TB prevalence in miners was conducted in the last quarter of 2021 by LON partners, Baines and UZT, with WITS and the NTP. Nine PTB cases among 442 miners were bacteriologically confirmed, yielding a prevalence of 2.3 percent bacteriologically confirmed TB.¹ Stakeholders were proud of having some scientific data to substantiate the burden of disease, which has always been alleged but rarely studied due to the transient and remoteness of the population.

The 2021 study identified the roots of vulnerability of miners extended beyond their exposure to silica dust but also included their lack of knowledge and frequency of use of alcohol, tobacco, and marijuana (dagga).¹

Between 20% and almost 30% of the clients who were TB patients [are] having a history of tobacco or were still using tobacco.

Interviewer: *So, how do you see alcohol use and TB in your district?*

Respondent: *Um, yeah, most of our clients are alcohol users... being small-scale artisanal miners, they will tell you that it's not easy to go underground in a sober mind. So, they then prefer using alcohol and a little bit of marijuana for them to be brave enough to go underground.*

Discussions with DR-TB patients who are miners showed variation in terms of their knowledge, capacity, and the perceived severity of DR-TB. This information was confirmed by the KIIs and direct observations of the ET members during the site visits (see Annex I for supporting quotations from the interviews).

Some miners with DR-TB were more anxious than others. One miner associated his DR-TB diagnosis with occupational exposures. While he considers his disease treatable, the lack of social protection in informal mines is his main challenge. Given all the threats to artisanal miners it is not surprising that DR-TB is often considered one of the lesser hazards they face.

Contact Investigation

Service providers who were interviewed expressed good knowledge of the contact investigation guidelines. They reported lack of transport and lack of fuel if motorcycles were functional, long distances, people with TB providing them with false addresses and lack of contact investigation stationary as reasons for being unable to implement contact investigations.

While the national contact management guidelines state that close contacts of all people with TB, DR-TB included, should be line listed, traced by environmental health technicians/CHWs, offered symptomatic screening, and further investigated if any symptoms are present, several DR-TB patients reported delayed or no contact investigations. Having observed TB among their household or family contacts prompted them to think of TB and seek services on their own accord. This was highlighted by the following interviewees (see box below).

Patient: *"For me this TB, my brother had it, he died together with his wife, maybe that's where I got this disease from."*

Interviewer: *"So they died, they were sick and they died, were you called to the hospital then or what happened?"*

Patient: *No, I was not called but since I am sick like my brother ..." [patient sought care herself] (female, DR-TB patient, local language)*

"What made me accept it (having DR-TB) is that I felt like it didn't bother me because I have a brother who got it. It's been years since he was diagnosed [with] DR-TB." (female, DR-TB patient, local language)

What are the family-level issues that contribute to suboptimal diagnosis of childhood TB and low uptake on TB preventive treatment (TPT) among household contacts who include children under five years?

Uptake and utilization of TPT for child contacts has been limited in Zimbabwe. The reasons have been well documented in operational research, and are related to the contradictions inherent in contact investigation. TB Contact investigation (CI) is a traditional epidemiologic tool with classical paradoxical problems. The yield of CI is highly dependent upon the timing, tools, and tenacity with which it is undertaken.^{16,17} CI has always entailed (Faustian) trade-offs. Many CI efforts fail due to paradoxical imperatives: CI conducted “soon” after diagnosis of an index case tends to miss incipient, asymptomatic TB when traditional symptom screens and smear are used.¹⁶ CI conducted “later” in the treatment course finds (fulminant) TB, but fails in its stated aim of averting ongoing transmission.¹⁷ CI is intended to be the entry point for TB preventive treatment (TPT) for children, but few programs have enough confidence in differential diagnosis of pediatric TB at primary care level to realize the full potential of CI as a secondary prevention tool.

Fortunately, in Zimbabwe there are large trials attempting to demonstrate the efficacy of new models of care, new diagnostics, and new shorter TPT regimens for children (e.g., CAPTB, Opt4TPT project, and IMPAACT4TB).

New TPT guidelines were issued as an Addendum to the 2016 Guidelines for ART for Prevention and Treatment of HIV in Zimbabwe in January 2020, which also included 3RH as the recommended regimen for HIV-negative child contacts below the age of 15 years. The screening algorithm for provision of TPT in TB household contacts is aligned with WHO recommendations — WHO recommends only a broad symptom screen (e.g., cough, fever, night sweats, weight loss to rule out TB, and FTT) and does not advise the use of chest X-ray, tuberculin skin test, or interferon-gamma release assay (IGRA) prior to TPT initiation.

The ambition to dramatically expand use of TPT among household contacts to bolster prevention will be hard to enact in Zimbabwe due to the absence of many basic tools. Many sites we visited for this evaluation lacked contact investigation forms and TPT registers. Field notes suggested that contact investigation is occurring on an ad hoc basis due to personnel shortage and documentation is not rigorous.

Four patients were randomly selected in the register, but their contact tracing forms could not be located. The hospital is managing DS-TB patients who are in their catchment area, but unfortunately do not have a facility Environmental Health Technician (EHT) so they are assisted by EHTs from the council clinics. These EHTs only come when they can as they will also be using council resources. The hospital has a file of all contact tracing done from around 2017 to 2022, but we could not find the contact tracing forms for the randomly selected DS-TB clients.

“It is my view that contact tracing is being done for patients at [USAID-supported] District Hospital and the CTF are being filled. It is however unfortunate that we could not find the CTF for the patients we had randomly selected.” (ET data collector)

The DTLC explained that this could either be an issue of misplacement or that the EHTs from the council had not yet submitted the forms. He tried to follow up with the EHTs, but they were all engaged else and could not assist timeously.

The Health Facility Register contacts sections was filled showing that these index cases had household child contacts who could not be cascaded.

In one non-USAID-supported site, the EHT recorded contact tracing results in her personal diary, unaware of the existence of contact tracing forms. Another non-USAID facility had a TPT register that is only being used to record PLHIV because they were not aware that HH contacts on TPT should also be recorded in the TPT register.

In our site visit to a health facility in a mining area, an observed absence of forms and registers to conduct contact investigation encumbered the ability to document coverage and verify practices. However, staff reported that shortages of surveillance tools were being creatively addressed, as these field notes show:

2 B + PTB patients were randomly selected from the health facility register. However, there were no contact tracing forms. The register indicated that contact tracing was done, and these two patients had contacts under 14 years who were initiated on TPT. The clinic had no TPT register and they were using the health facility register for the contacts on TPT. They explained that they can improvise and use other books because their books may get misplaced and the records will be lost. So, the clinic is initiating the eligible household child contacts on TPT but there were no contact tracing forms or TPT register.

While there is consensus on the importance of contact investigation, in practice it happens infrequently in sites without a pediatric TB focus due to low feasibility of the current model. USAID-supported sites recorded more contact investigations than non-USAID-supported sites, and reported more training and more access to pediatric diagnostic tools and methods.

A perceived barrier to uptake of TB prevention in children is the lackluster implementation of contact investigation by EHTs and nurses. Due to health system workload and transport issues, it was difficult for busy health workers to actively engage households. Although the guidelines stress investigation of HH contacts all TB patients, some district TB coordinators felt this was too ambitious and in practice prioritized bacteriologically confirmed pulmonary TB patients.

"Secondly, we need to focus on invest- and on introducing incentives for EHTs. We have been doing that when we were doing contact tracing for TB preventative therapy but obviously, this is not something that is sustainable because Ministry is not willing to then say, 'We will offer incentives.' This should- is deemed as part of, you know, their normal duties that they're exercising amongst the various other duties they should be doing." (female, Technical, Harare)

At the time of this evaluation, some stakeholders were debating the ethics, feasibility, and long-term sustainability of salary supplementation on Ministry employees. A recent decision by USAID to phase out per diems for national, provincial, and facility TB staff attendance at training and supervision events created much discussion at all levels of the pros and cons of salary top-ups, a perennial debate worldwide.

“So, I think for me, besides COVID-19, issues around incentivizing environmental health technicians around the importance of contact tracing and also demand generation and information dissemination amongst the general public on the importance of screening and what resources are available within the TB landscape because if you look at the common person on the ground, you know, if somebody who has contracted TB and they’re her contact, that there is no push for them to actually go to the clinic and say, ‘I’m a contact, I would like to be screened and if I’m eligible I’d like to be put on a TPT regimen that is appropriate for myself.’” (female, Technical, Harare)

Community leaders articulated a need for “demand generation” for TPT in children. Other stakeholders felt demand generation would be a challenge given the asymptomatic and hypothetical risks to children and the absence of screening for TB infection.

Our findings echo the recent site visit by Global Fund stakeholders found that TPT uptake among children was still limited and many of the basics were not in place to even assess the coverage. One positive finding was the current availability of TPT and pediatric formulations in the sites visited.

There are differences in the TB care cascade for children under five that make them uniquely disadvantaged by structural issues. Children under five benefit disproportionately from chest X-ray, which is often not housed within the TB program and, therefore, not free. The diagnosis of TB in children by midlevel providers is often discouraged, and diagnosis is task-shifted to higher cadre providers and facilities, incurring additional costs and burdens for parents and systems.^{18,19}

During site visits, six out of the eight HF’s visited reported receiving recent training in stool processing for pediatric TB.

Similarly, the uptake of TB preventive therapy (TPT) by children under five exposed in a household remains controversial or confusing to some frontline staff. Parents can be unconvinced why three or six months of supervised treatment would be beneficial in the absence of infection, symptoms, or disease. Issues with adherence and provision of TPT to children with subclinical disease were raised recently by the publication of a study showing Zimbabwean children < 15 years had a higher prevalence of isoniazid mono-resistant TB (aPR = 3.93; 95 percent CI: 1.24-12.45) than other age groups.²⁰

Whereas research on community distribution of TPT in PLHIV showed broad support for community based distribution via Community ARV care groups (CARG), less is known about what parents and children want.^{21,22} A sub-project of IMPAACT4TB, the Opt4TPT study, is an ongoing three-year programmatic assessment of TPT delivery across three countries, namely Ethiopia, South Africa, and Zimbabwe, to generate critical knowledge to improve TPT uptake, implementation, and outcomes. The success of childhood TB detection and scale-up of TPT may require doing less with greater quality in the short term.

Conclusions

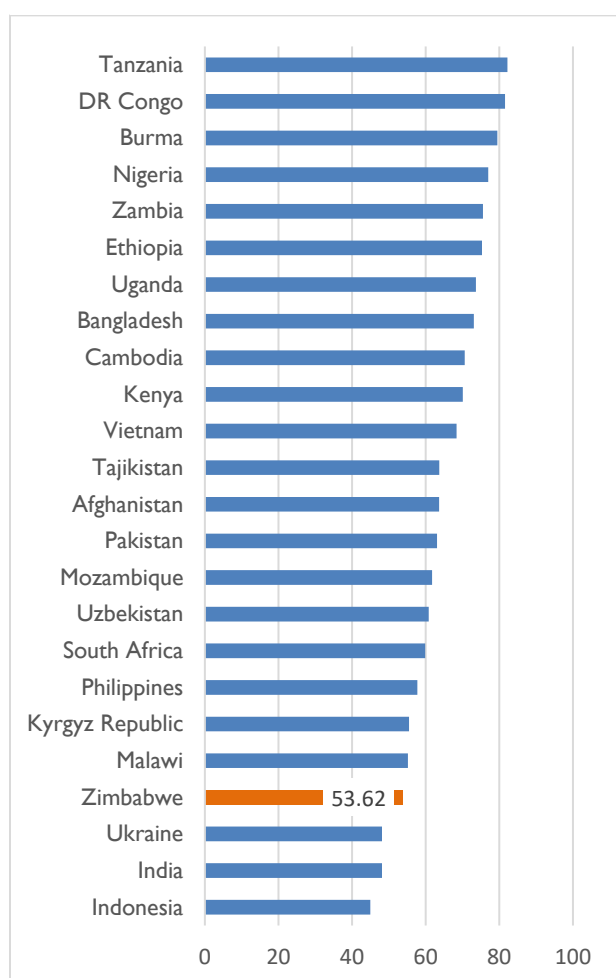
The evaluation team identified the following challenges:

- Transport costs and food costs
- Inadequate knowledge and misconceptions
- Drug stockouts
- Accessibility to health care
- Low implementation of HHCI by HCWs
- Some stakeholders believe universal HHCI is too ambitious given current circumstances
- Symptom screening of TB contacts misses subclinical TB and there is documented INH resistance in the pediatric population

IV. RECOMMENDATIONS

Given low detection and suboptimal DR-TB treatment outcomes, how can USAID support improve DR-TB case management going forward?

Figure 35. Comparison of percent of MDR-TB and XDR-TB cases successfully treated in USAID priority countries



Zimbabwe's DR-TB treatment outcomes rank among the lowest in the region for the past decade. It is a major concern of all Zimbabwean stakeholders interviewed for this evaluation. Various quality improvement interventions were outlined in the National TB Strategic plan 2022–2025. It is clear that the switch to shorter all-oral regimens, the switch to a highly decentralized ambulatory community-level treatment model, and the production of evidence-based DR-TB treatment guidelines and training have not yielded the expected improvements in survival. While the policies in place in Zimbabwe do reflect global best practices, the operational conditions and the national challenges have made it hard to reap the promised benefits of these policy and technology introductions.

The precarity of staffing of the health system and challenges with acquisition of medicines, fuel, electricity, and imported goods have forced the health system to reduce the amount of time dedicated to clinical care.

Efforts to simplify DR-TB treatment for patients have contributed to loss to follow-up on a scale much larger than official estimates suggest.

Additional USAID investments in DR-TB are needed to plug the gaps in the DR-TB treatment cascade.

Specific recommendations to USAID, implementing partners, and stakeholders

The following recommendations will bring greater strength to the Zimbabwe healthcare system and will allow the country to address the challenges identified in this report:

USAID

Finding/Conclusion	Recommendation	Timeframe	Priority
DR-TB prevalence in Zimbabwe is higher than previously estimated (5-8%) and bedaquiline resistance is 12%.	Increase the proportion of USAID funding to address the DR-TB issue.	Short term	High
The current model of programmatic DR-TB management is insufficient to manage the epidemic.	Help to establish WHO-recommended pre-conditions for shorter regimens (e.g., pharmacovigilance, clinical monitoring, reporting and recording, patient-centered care and support, and palliative care).	Short term	High
Prior and current investments in TB detection contribute(d) significantly to TB case notification.	Continue to invest in strategic TB detection, optimizing strategies to Zimbabwe's evolving TB epidemiology.	Medium	Medium
Prior and current investments in childhood TB have not shown the expected benefits.	Consider how to prioritize among all childhood TB interventions to catalyze use of the most game-changing technologies for a high HIV-burden setting.	Medium	Medium

LON

Finding/Conclusion	Recommendation	Timeframe	Priority
Variable accuracy of digital chest X-ray triage reduces the cost-effectiveness and ethics of the LON intervention. Over-diagnosis of clinical TB is likely due to over-reliance on human readers. ²³	Switch from human readers to computer automated detection software for interpretation of mobile digital chest X-ray in ACF to improve sensitivity and specificity of the triage process. Trial CAD software that can also diagnose silicosis, HIV-associated lung pathologies, and lung cancers associated with smoking [e.g., qXR v.2 (Qure.ai) or Lunit Insight CXR TB algorithm v4.9.0 (Lunit Inc.)].	Short term	High
The number needed to test (NNT) to detect one TB case is 20–40 (too high) among some IPs.	Expedite the start of the planned trial of universal testing of pooled sputum samples for HH CI and ACF to reduce the cost-per-case detected.	Medium term	Medium
TB yield of ACF by JHWO is low according to M&E reports.	Replace symptom screening with dCXR or pooled universal sputum collection. Increase the proportion of men screened from <50% to at least 65%. Do not screen in primary schools or in populations with low pretest probability.	Short term	Medium
26% of presumptive clients identified actively are not tested with a WRMD for reasons that the evaluation team could not determine.	Research root causes of suboptimal sputum provision and testing and trial solutions to improve test completion to acceptable levels (>90%). Consider introduction of cell phone video sputum coaching, and/or field induction technologies shown to increase expectoration in ACF.	Medium term	Medium
The evaluation team did not come across any patients or health workers who mentioned how palliative care assisted patients.	Revisit the effectiveness and uptake of the palliative care training component, including M&E indicators.	Medium term	Medium

IDDS

Finding/Conclusion	Recommendation	Timeframe	Priority
BDQ resistance is 12% but DST results are not reaching clinicians, nor are they documented at the facility level. Current practice in the NRL is to track TAT only until a result is obtained in the lab, not to capture when (or whether) results are received by the treating clinician.	Adapt existing NRL data collection tools to monitor the real turnaround time (TAT) for DST results. Conduct OR to determine the median length of time for DST results to reach treating clinicians and document when DST results oblige a change in regimen.	Medium term	High
Error rates of GeneXpert have increased since the USAID Diagnostic Network Assessment in 2020 from 6% to 9%.	Identify and address root causes of high error rates to ensure cost-effectiveness. Ensure electrical redundancy to avoid “no result” errors due to current interruption.	Short term	High
The very decentralized ambulatory DR-TB treatment model implies that DR-TB drugs need to be requisitioned individually for each patient, incurring delays in DR-TB treatment initiation.	Use GxAlert SMS capability to alert provincial medicine stores of the need for expedited DR-TB drug dispensing to primary care sites. In other words, consider feasibility of a push system instead of a pull system.	Short term	High
GxAlert network connectivity has been successful in providing new insights and real-time information to guide policy and programmatic decision-making.	Ensure that private sector (mining, research) and LON GeneXpert machines are included in the GxAlert (Ascent) dashboard to allow a national overview and use for surveillance.	Short term	Medium
GxAlert platform does not contain data on age, gender, or interoperability because of lack of harmonized variables to link data to registers.	Endeavor to improve the interoperability of the surveillance systems by ensuring both reference laboratories collect the same data. Incentivize lab staff so that unique identifiers for linkage and socio-demographic variables are included.	Medium term	Medium
HCWs are not aware of (or are not using) easy-to-acquire samples for childhood TB diagnosis, except in facilities with pediatric studies.	Work with EGPAF and local partners to increase utilization of nasopharyngeal aspiration (NPA), urine LAM (PLHIV), and universal stool testing of household child contacts under five.	Medium term	Medium
The TB program is highly dependent on a single diagnostic.	Continue to diversify diagnostic technologies suitable for high DR-TB burden, high HIV-associated TB countries, such as Truenat and FujiLAM (PLHIV). Reconsider TB LAMP (Eiken) for use in ACF due to low sensitivity in subclinical and HIV-associated TB disease, lack of RIF measurement.	Medium	Medium

TIFA

Finding/Conclusion	Recommendation	Timeframe	Priority
The ECHO platform sessions are vital in creating a sense of community and forum for sharing diverse technical and advocacy topics.	Further decentralize ECHO to provincial and district levels and expand sessions for wider involvement of all districts. Consider boosting the telementoring aspect, perhaps with asynchronous engagement.	Medium term	Medium
ECHO is increasingly popular among TB experts and technical leaders from Harare who favor high-level discussion of innovations. However, midlevel and rural TB providers with internet limitations need the most support.	Consider audience segmentation of ECHO sessions to improve reach and diversity of needs, one for experts to exchange research and one for midlevel health workers and CHWs to discuss challenges with case management in a more supportive environment. Establish “communities of practice” via WhatsApp for low-bandwidth clinicians. Encourage CHW competence with short updates sent on a regular basis via WhatsApp messaging, and utilize communication via their preferred modalities to maximize support to high need low access clinicians in the periphery.	Medium term	Medium
The concept of TIFA is to make grantmaking nimbler and more responsive to local challenges. Yet the origin for some TWGs is USAID (e.g., ECHO and TRAINSMART).	Consider engaging more local organizations and community-based implementers in the design of solutions eligible for TWG to help fulfill the ideals of the mechanism.	Medium term	Medium

STAR

Finding/Conclusion	Recommendation	Timeframe	Priority
The STAR Advisor has a coordination function in a challenging environment, with many stakeholders and a broad portfolio.	Consider focusing the mandate and technical focus of the STAR advisor to ensure tangible outcomes and accountability for engagement on specific issues.	Short term	Medium

NTP

Finding/Conclusion	Recommendation	Timeframe	Priority
Cash transfer to DR-TB patients is lifesaving but can be optimized to achieve adherence goals.	Expedite the timing and ensure the feasibility of the social support mechanism (cash transfer, food packs) for DR patients by adding a social work dimension so that it functions as intended — to promote adherence and reduce catastrophic costs.	Medium term	High
Healthcare workers have lost faith in the ability of the national reference labs to conduct drug sensibility testing and do not send sputum samples for DST or to monitor sputum conversion.	Encourage use of the ASPECT system to log digital and telephone communications between health facility staff and NRL on DST results. Expedite the implementation of I0-color GeneXpert in the provinces so that HCWs	Medium term	Medium

	can avoid engaging the national reference lab for DST.		
16% of RIF resistant samples are repeat tests.	Ensure that HCWs are aware that GeneXpert Ultra is not currently a valid clinical treatment monitoring tool. Retrain to reduce confirmatory testing.	Medium term	Medium
TB treatment coverage is lower than previously estimated due to population underestimation.	Revise estimates from 2015 to 2022 according to 2020 population census and inform WHO of the issue.	Short term	Medium
DR-TB treatment coverage, DST coverage, and DR-TB treatment success are lower than official estimates.	Revise estimates from 2022 using GxAlert RIF positives as the denominator instead of DR-TB register notifications.	Short term	Medium

Ministry of Health and Child Care

Finding/Conclusion	Recommendation	Timeframe	Priority
The TB program has been affected by staff attrition, demotivated low remuneration, and longstanding challenges that seem intractable.	Prioritize retention of HRH through improving conditions of service, recognition of excellence, and opportunities for growth and leadership.	Medium term	High
Zimbabwe has recently increased its domestic contribution to TB program from 2.3% in 2020 to 13.5% in 2021. However, the program remains heavily reliant on partners for funding and is constrained by donor priorities.	Continue to increase domestic budget for TB and government/funding partners, which should subsidize user fees to support universal health coverage.	Medium term	High
The evaluation documented drug supply chain management challenges, which are resulting in stockouts of DS-TB regimens and DR-TB regimens.	Strengthen Natpharm's capacity to ensure consistent availability of essential commodities for TB care and prevention.	Medium term	High
The evaluation found missing and incomplete DR-TB and TB preventive therapy registers and contact tracing forms at all levels.	Prioritize completion of the electronic health record for DS-TB.	Short term	High
The evaluation found no documentation of clinical treatment monitoring of DR-TB or pharmacovigilance	Utilize a web-based vertical case-based DR-TB case management system linked to ASCENT (e.g., WHO TRD ODK, OpenClinica, and e-TB Manager) to ensure the national program staff (PMDT focal person, M&E focal person, laboratory focal point) have real-time information on case management of DR-TB.	Short term	High
Conditional cash transfer (CCT) for DR-TB patients saves lives but CCT is frequently delayed or denied to those with no bank accounts, no cell	Hire a social worker with access to GxAlert who can proactively register persons who test positive for TB in economic, nutrition, and other subsidies as well as screen them for mental health, substance use, and other	Short term	High

phones, or less than 18 years of age, perpetuating age and gender discrimination.	nonadherence risks. Create multiple mechanisms of conditional cash transfer that reach a wider population.		
There is suboptimal support toward in-service competence training especially around new information and technologies that enhance the quality of care.	Establish a social media/cell phone community of practice to facilitate asynchronous sharing of information, enhancement of competences.	Medium term	Medium
The program experienced challenges related to weak contact management, which affected early case detection of TB including DR-TB.	Strengthen contact management to increase early case detection of TB, including DR-TB, and reduce TB-related morbidity and mortality and community transmission.	Medium term	Medium
The TB reference laboratories are not well linked to local laboratories, do not maintain complete records, and are not held accountable for results reaching the clinician.	Make roles and responsibilities for DST turnaround time clearer and include valid turnaround time indicators (door-to-door) in supportive supervision and performance-based financing schemes.	Medium term	Medium
The evaluation documented missed opportunities for enhancing the quality of care through utilization of mobile technology.	Consider introduction of cell phone video sputum coaching, and/or field induction technologies shown to increase expectoration in ACF, digital adherence technology, asynchronous vDOT, etc.	Medium term	Medium
Household contact investigation is a low priority task of environmental health officers and does not occur routinely.	Consider pilots of more efficient ways of conducting CI, such as the following: 1. Include HHCI as part of a CCT program for Bac+ pulmonary TB index patients. 2. Incorporate CI into the new performance-based financing scheme for health services. 3. Prioritize CI to those who will most benefit, narrowly targeting child contacts under five.	Medium term	Medium

Civil Society

Finding/Conclusion	Recommendation	Timeframe	Priority
Research shows that conditional cash transfer is lifesaving for DR-TB patients but distribution mechanisms exacerbate age and gender inequalities.	Lobby the GOZ to make cash transfer accessible for women and young people with DR-TB.	Medium term	High

V. ANNEXES

Annexes to the draft evaluation document are submitted as a separate file to decrease the size of the file transmitted over email.

ANNEX I: SUPPORTING QUOTATIONS FROM KIIS

ANNEX II: EVALUATION STATEMENT OF WORK

ANNEX III: EVALUATION METHODS AND LIMITATIONS

ANNEX IV: DATA COLLECTION AND ANALYSIS TOOLS

ANNEX V: SOURCES OF INFORMATION

ANNEX VI: DISCLOSURE OF ANY CONFLICTS OF INTEREST

ANNEX VII: REFERENCES

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ANNEX I: Supporting Quotations from KIIs

KII excerpts supporting “Beyond traditional Capacity Building: ECHO and TRAINSMART”

Capacity building is a frequently voiced need in the TB field, but high staff attrition, rotation, and brain drain in Zimbabwe make it a complex challenge as confirmed by KIIs below:

‘It is not unusual to train 30 people in one district in one quarter and going back the following quarter to find only 3 are left and re-training has to be done’. It is critical to re-train health workers to meet the challenges of the operating environment they are in and not all training has to be intensive’. Staff attrition is a challenge’ (female, CHAI-UNITAID technical, English)

TIFA supported establishment and operationalization of TB ECHO video conferencing for TB training and management of difficult/complex TB cases. This is a networking platform for clinicians treating challenging TB cases. The virtual nature of the programme enabled clinicians from different parts of the country to participate as supported below:

‘So in phase 1, we had 2 sub-hubs and we held three ECHO sessions with these two sub-hubs. And in this phase we distributed- purchased and distributed equipment. For phase 1 we bought equipment for the hub and we also bought equipment for the two sub-hubs. In phase 2, equipment for all the Midlands eight district hospitals and three polyclinics, Kwekwe general hospital, and Midlands State University clinic and in Bulawayo it was cascaded to three polyclinic (Phumula polyclinic, Nkhulumani and Northern suburbs) clinics.’ (male, NTP, English)

‘The greatest ECHO contribution so far is de-monopolization of knowledge. We have people phoning in calling saying that they’re appreciating sessions, for example we had a session on Leprosy, it’s a rare disease but one or two provinces are picking those cases. So, when we had a presentation on Leprosy, there was knowledge transfer and people from non-participating provinces requested for presentation for their guidance. So, I’d say ECHO is really, beneficial to the participants. We are getting more participants from non-participating provinces and private sectors and the mining community because we once held a DR TB case and it generated a lot of interest. And I’ve also learnt that because of ECHO, a lot of cases that were supposed to be referred, for specialist care, either in Harare or in Bulawayo are now treated at their nearest clinic, and this means a reduction in travel costs, and accommodation for the patient.’ (male, NTP, English)

‘I think basically, they touch a number of important areas that are challenging when people are managing TB patients in the health facility, yeah. So, I think it’s quite relevant and it’s quickly penetrating the TB family in Zimbabwe. I’m sure in future we’ll even have much more participants than what we’re having now because if you get 100 people participating in an ECHO session, it’s a lot and some of those will be participating as a team, so, I think it’s a good thing and maybe much cheaper than bringing all those people for a training physically.’ (male, NTP technical support partner, English)

However, there is a perception of the need to further decentralize ECHO to the provincial and district level where knowledge gaps are greatest as highlighted below:

'The shift from in-person training to ECHO and TRAINSMART was not, in principle, a bad thing. ECHO needs to be further decentralized to the provincial level so that it can be used as a problem solving tool and less as a high status show-and-tell forum.' (male, NTP, English)

TRAINSMART was an idea suggested by Edmund Rutta to improve the documentation of capacity building activities and harmonization of efforts.

'TRAINSMART has had a positive impact on M&E and that it has been shifted to the MOHCC to manage (including server) and is working well. We discussed how useful access to these data would be for our evaluation. Data for Decision making has improved data quality at district level (although changes in per diems will threaten this progress.' (male, NTPM&E Officer technical, English)

'On M and E we were discussing tackling on the issues of M and E tools and the current system which is under development and piloting in Zimbabwe which is the electronic health records.' (male, NTP, English)

KII excerpts supporting “Factors affecting treatment outcomes”

Respondents highlighted they relied upon menial jobs and family and friends for support during DR-TB treatment.

'Yes, but when I started I was staying far and I was using six dollars for transport, to and fro, but if I had to go to Filabusi I used 12usd. I stay here now, closer because I could not walk or maybe I would not have the money for transport and so, I would stay at home and wouldn't be able to go there.' (Female DR-TB patient, Insiza).

'DR-TB patient would get transport and go, get transport and go but it became difficult for me to the point that my shop ended up being empty and I didn't have the money to go anymore, so I asked someone for some money and told them I would pay them back when I got some money and they understood. They gave me some money but I haven't been able to pay it back because I didn't get the money that I was promised at the hospital.' (Female DR-TB patient)

Drug stock outs cause out of pocket costs.

Treatment seeking due to facility DR-TB drug stock outs or fees for ancillary medications to treat side effects were also identified as a burden. Out of pocket costs of TB treatment contributed to missed doses as described below:

'I got the treatment the first time, it wasn't complete, there were two tablets missing, two different types of tablets missing. Then I looked for them and found them. Then the second time, I came for a review and they said they didn't have pills, it's like if the pills run out in the morning and you come later for a review. They told me there was no medication, I had to go get treatment

from Bulawayo, then it was hard for me to do it, then I ended up jumping one day and they said there's no problem.' (Male, DR-TB patient, Insiza)

'What I see is that when you're at the hospital and pills are not available, the hospital workers do not do a follow up where they are supposed to be collected, that's what makes my treatment difficult. The other thing is that the hospital workers promise to call us if pills are available but they don't call, you end up going there yourself and when you get there, you'll find that they are not there yet.' (Female, DR-TB patient, Insiza)

Food Insecurity and Lack of Nutritional Support

Due to financial constraints, respondents lacked sufficient food to meet their nutritional needs. A majority of DR-TB patients interviewed highlighted that sufficient nutrition is needed during TB treatment. Respondents reported that they preferred to take their medication after a meal, usually sadza. The following statements show how food influences the TB treatment.

'I would eat before I left but by the time I got to the turn off, I would feel like I needed to eat some more sadza, and then from there I'd get to the hospital feeling hungry, they would make a plan and cook for me so that I could eat and be able to take my tablets. It's problematic when it comes to food, such that you will need to be eating all the time. Food, especially if we can get sadza and relish, it's reasonable, tea doesn't even work.' (Female DR-TB patient, Mberengwa.)

'In terms of the way I am to the TB people is that we wish to get help with transport, even as we come here to the hospital, food is scarce, we wish to get even the little they can give us so that we can get healthy food so that our bodies can quickly- our thingy can boost inside our bodies.' (Male DR-TB patient)

In 2022, the Zimbabwean NTP started complementing CCT with monthly grocery vouchers worth USD 20 for households affected by DR-TB. As most patients in the evaluation sample were from 2021, we were not able to evaluate the effectiveness of that more recent (but positive) policy change on the patient wellness.

Access and Transport Costs

Geographical accessibility hinders access to health facilities for TB diagnosis and treatment. Participants reported that they were artisanal miners and could not easily access clinics and hospitals. One community coordinator commented that

'So, there's that exposure over time and I was just saying that these mushroom everywhere, meaning that quite a number of them will be away from health facilities for them to access TB services taking into consideration, their type of work, it becomes a challenge. So, we would really need a situation whereby services are actually taken to these people, we used to do that through the TB in the mining sector project which is a SADC initiative, it was only targeting a few districts but we feel that there are quite a number of districts that can benefit from such an intervention, targeting the artisanal miners.' (male, NTP Stakeholder, Harare).

Since 2013, the NTP program seeks to offset transport costs by conditional cash transfer (CCT) for DR-TB. The goal of CCT is to reduce barriers to treatment by supplementing the income of DR-DR-TB patients. Many DR-DR-TB patients are already precariously employed and food insecure prior to their diagnosis.

‘Myself, in my life, I am someone who sells stuff to earn a living as I take care of the children my husband left me, the three children that I have. So I got sick and I had a lot of problems having to go to the hospital day in and day out because I had been treated for TB, the one that is treated in six months and then I was given those tablets and finished the whole six month course. When I finished the six month course, that’s when I got worse, my hands and legs were swollen.’ (Female DR-TB patient, Mberengwa)

Mechanisms of provision of financial resources to DR-TB patients have changed in the last two years, from mobile money in local currency to bank transfers in US dollars.³ This improvement is plausibly attributable to USAID investment and advocacy by the STAR advisor, community leaders, as well as research and policy experts that have demonstrated the need to expedite and prioritize the transfer of cash to TB affected families as soon as possible after diagnosis.

However, payments to DR-TB patients are only useful life-sustaining if timely. Bank accounts and bureaucratic hurdles frequently lasted 3 months or more and served to undermine the goal of catalyzing adherence and survival.³ These beneficiaries highlight the bureaucratic barriers that continue to undermine the effectiveness of the cash transfer program. CCT is denied to those who cannot open bank accounts, such as those under 18 years of age.

Family and Community Support

Most DR-TB patients attributed their survival to the efficacy of the medicines they (eventually) received and to the material and emotional support provided by their families. TB stigma was highlighted rarely by patients as a barrier to care.

‘There was one who used to live next door, she is the one who used to come and cook for me and leave.’ (Female, DR-TB patient, language)

Inadequate knowledge and misconceptions among DR-TB affected families

Majority of the participants acknowledged that at first, they were afraid of commencing DR-TB treatment because of inadequate knowledge and misconceptions about TB diagnosis. Some patients who were familiar with older injectable containing regimens, were reluctant to start due to fear of hearing loss. Inadequate knowledge hinders diagnosis and treatment of TB. Some participants had this to say.

‘You find someone selling his, or her bananas, and so forth, you see them coughing, coughing all day, but if they’ve got information, they’ve got right to say, Oh, you’ve been coughing, my sister, did you get, TB screening? Can’t you do something? But you’ll find someone will be coughing, by the market, forever, and no one takes note of that and so forth. It’s only now because of COVID where people were now discriminated to say, Ha, you are coughing, I think it’s COVID-19 But to me this coughing and so forth on public arenas has been going on, but no one thought it- that it could be TB, because people don’t have information.’ (CCM Member, Harare, English).

‘Uh, when they told me, as a disease that I didn’t know, that I had never encountered even from my parents, in this whole area I’d never heard of it, I was shocked. And I was just saying, Uh, I have contracted a disease that

requires you to get injections Because I didn't understand what DR even was. So, I was afraid of the injections, that if I got all those injections every day, would I be alright.' (Male, DR-TB patient, language)

'Uh, before I took the medication, I was someone who was afraid because of the way they explained it that you would get an injection and then take tablets and the tablets were so many, so I am someone who was afraid and wondered if anyone would survive so many tablets, I didn't believe it.' (Female, DR-TB patient, language).

'They should be involved because er- er- when we talk of er- er- the- the- the amakorokoza, these artisanal miners and so forth, when we talk of, er- vendors, whatever, they are now, er- well organized, they've got associations and so forth, so we need them, those organizations as well, to be part of- of- of TB information dissemination.'

KII excerpts supporting “EQ 4.1: What are the challenges to preventing and detecting TB in artisanal miners?”

Discussions with DR-TB patients who are miners showed variation in terms of their knowledge, capacity, and the perceived severity of DR-TB as these field notes describe:

He is a miner and completed treatment but is still taking it slow in term of going back to the mining pits as his chest still pains him when he does heavy duties. He also touched on issues of stigma from family and also some HCW especially those who are not well versed with the TB program. He is optimistic that he will completely recover and continue his work but hopes to see the health care system improve and become more tolerant towards TB patients in general. He also mentioned the issue of lack of IEC material for patients to read and learn more about their condition which rather forces them to rely on HCWs and the internet for more information... Patient was very knowledgeable and understood all the TB related terms, he seems to have a different view from all the patients interviewed from different facilities. In his case he noticed the inconsistencies between the lab and the health facilities as he has instances where he went to the clinic for review and his results were not there and thus had to have his sputum retaken and resubmitted, he also mentioned issues to with drug shortages which leaves the patients vulnerable and also contributes to patients defaulting. (Fieldnotes from interview #64)

Some miners with DR-TB were more anxious than others. Below a miner associates his DR-TB diagnosis with occupational exposures and while he considers his disease treatable, the lack of social protection in informal mines is his main challenge. Given all the threats to artisanal miners it is not surprising that DR-TB is often considered one of the lesser hazards they face.

R: So for now I am sitting, I do not know if anything will be okay after the course is done since its the end of the year.

I: Where were you working before you started ?--

R: I was working at the mine.

I: You were working at the mine?

R: Yeah.

R: And these mines are not like Mvumba mines that are legal, with people that are- if you do not work, you do not get anything.

I: Alright, alright (...) so how long have you been on treatment yourself?

R: Seven months now... I have two kids, one is Form 3 and the other one is little, 4 months old.

I: Alright, please may you tell me how you got infected with TB and what happened ,how do you feel about it?

R: Ah, this sickness, I started feeling pain in the chest , I went to the hospital and they took my sputum.

R: Er- then I tested TB positive. I realized that it started at the mines, since we work there without any protection, that's why people working there contract this disease, TB.

I: Alright (...) alright, what came to your mind after you were told that you have TB, er- Drug resistant TB?

R: Er- what came into my mind is that TB in Zimbabwe can be healed.

Contact Investigation

Service providers who were interviewed expressed good knowledge of the contact investigation guidelines. They reported lack of transport and lack of fuel if motorcycles were functional, long distances, people with TB providing them with false addresses and lack of contact investigation stationary as reasons for being unable to implement contact investigations.

While the national contact management guidelines state that close contacts of all people with TB, DR TB included, should be line listed, traced by environmental health technicians/ community health workers, offered symptomatic screening and further investigated if any symptoms are present, several DR-TB patients reported delayed or no contact investigations. Having observed TB among their household or family contacts prompted them to think of TB and seek services on their own accord. This was highlighted by the following interviewees:

For me this TB, my brother had it, he died together with his wife, maybe that's where I got this disease from. Interviewer): So they died, they were sick and they died, were you called to the hospital then or what happened? (Patient:) No, I was not called but since I am sick like my brother ... (patient sought care herself) (female, DR TB patient, local language)

'What made me accept it (having DR TB) is that I felt like it didn't bother me because I have a brother who got it. It's been years since he was diagnosed of DR-TB.' (female, DR TB patient, local language)

KII excerpts supporting “EQ 4.2: What are the family-level issues that contribute to sub-optimal diagnosis of childhood TB and low uptake on TB preventive treatment (TPT) among household contacts who include children under five years?”

A perceived barrier to uptake of TB prevention in children is the lackluster implementation of contact investigation by EHTs and nurses. Due to health system workload and transport issues, it was difficult for busy health workers to actively engage households. Although the guidelines stress investigation of HH contacts all TB patients, some district TB coordinators felt this was too ambitious and in practice prioritized bacteriologically-confirmed pulmonary TB patients.

I: Which contacts are screened for TB, and how are they screened?

R: Which contacts? Mostly we are focusing maybe- maybe on- although we have said 'Let's screen for- all- all contacts of the-“ In spite of the time status or- we- we tried. But the- the emphasis, we are saying we *concentrate on-* normally I think --confirmed cases, that's our priority.

At the time of this evaluation, some stakeholders were debating the ethics, feasibility, long term sustainability of salary supplementation on Ministry employees. A recent decision by USAID to phase out per diems for national, provincial, and facility TB staff attendance at training and supervision events created much discussion at all levels of the pros and cons of salary top ups, a perennial debate worldwide.

Secondly, we need to focus on invest- on- on introducing incentives for EHT's. We have been doing that when we were doing, um- contact tracing for TB preventative therapy but obviously, this is not something that is sustainable because Ministry is not willing to then say, "We will offer incentives", this should- is deemed as part of, you know, the- their normal duties that they're exercising amongst the various other duties they- they should be um- um- doing. (female, Technical, Harare)

Community leaders articulated a need for 'demand generation' for TPT in children. Other stakeholders felt demand generation would be a challenge given the asymptomatic and hypothetical risks to children and the absence of screening for TB infection.

So, I think for me, besides COVID-19, um- issues around incentivizing electro- um- environmental health technicians around the importance of contact tracing and also demand generation um- and information dissemination amongst the general public on the importance of- of- of screening and what resources are available within the TB landscape because if you look at the common person on the ground, you know, if somebody is um- if they know somebody who has contracted TB and they're her contact, that there is no push for them to actually go to the clinic and say, "I'm a contact, um- I would like to be screened and if um- I'm eligible I'd like to be put on a- a TPT regimen that is appropriate for myself. (female, Technical, Harare)

ANNEX II: Statement of Work

OBJECTIVE

The evaluation will focus on support delivered under USAID/Zimbabwe's development objective (DO) 2: Increased Number of Zimbabweans Live Longer and Healthier Lives, intermediate result (IR) 2.3: Increased Coverage of Quality Services and Responsive Systems for TB control. USAID/Zimbabwe had one activity under this IR, Challenge TB, until 2019 when the Mission made a deliberate effort to build local capacity and established a cooperative agreement with a network of local organizations as the flagship TB activity. This activity is complemented by the field support mechanisms described below.

Implementing Mechanism Name:	TB Local Organization s Network (TB-LON/KNTB)	Sustaining Technical and Analytic Resources Project (STAR)	Infectious Diseases Detection and Surveillance	TB Implementation Framework Agreement (TIFA)
Prime Partner:	The Union Zimbabwe	Public Health Institute	ICF Macro, Inc	JSI Research and Training Institute INC
Cooperative Agreement	72061319CA00003	7200AA18CA00001	7200AA18M00010	7200AA19CA00013
Geographic Regions	Gwanda, Kwekwe, Insiza, Chirumhanzu, Zvishavane, Gweru, Shurugwi, Mwenezi	National	National	National
Start Date:	10/01/2019	05/01/2018	05/22/2018	01/10/2019
End Date:	09/30/2024	04/30/2023	05/21/2023	01/09/2024
Total Estimated Cost:	\$15,000,000	\$2,000,000	\$13,000,000	\$2,000,000

BACKGROUND

Context and Rationale

Despite recent progress in reducing the incidence of and mortality from TB, more than 29,000 TB cases were estimated in 2019 with a case fatality ratio of 22% (6,300 deaths).

TB control in Zimbabwe remains a challenge. High incidence and mortality levels may be a result of late presentation, delayed and limited diagnostic capacity, increasing drug-resistant TB challenges, and a 60% TB/HIV co-infection rate among patients diagnosed with TB. Finding individuals with TB and supporting them to get effective TB treatment early in their illness is critical to interrupting transmission. Each person with active TB who is not on treatment infects an average of 10 to 15 people each year. TB preventive therapy (TPT) has long been recommended but remains inadequately implemented with an estimated 19% of persons eligible for TPT are eventually started on and complete TPT.

Case finding approaches, prevention practices, diagnostic processes, and treatment regimens for TB are highly effective when correctly followed. However, NTP's capacity for service delivery is limited and strict adherence to treatment for TB and drug resistant (DR) -TB is challenging for most people. Treatment regimens are commonly long, difficult, and toxic. While TB treatment compliance is good, the shift towards shorter regimes particularly for drug resistant TB and TPT is expected to further improve patient outcomes. Access to medicine is impacted by cost and distance and TB drugs are fully subsidized aside from user fees.

USAID/Zimbabwe Health Project

The Health Office implements one project that will run through FY 2023. The project's purpose is: Increased numbers of Zimbabweans live longer and healthier lives. The aim is to reduce mortality and morbidity through accelerated health service delivery for near-term reductions in illness and preventable deaths with an emphasis on capacity building for effective and sustained impact. The project hypothesizes that if the burden of disease is reduced by strengthening health systems and addressing the leading causes of illness and death, then Zimbabweans will live longer and healthier lives.

The project sub-purposes are: 1) Accelerated HIV response for epidemic control; 2) Enhanced coverage of malaria control and elimination measures; 3) Increased coverage of quality services and responsive systems for TB control; and 4) Improved maternal and child health status in targeted populations. This evaluation is focused on sub-purpose three: Increased coverage of quality services and responsive systems for TB control. This sub-purpose hypothesizes that improved TB surveillance systems, proactive TB transmission prevention measures, and strong TB case management, will enhance responsive systems for TB control and increase coverage of quality TB services.

USAID TB activities implementation is a collaborative effort with the National TB Program (NTP) and multiple other donors. The NTP coordinates policy formulation and resource mobilization for TB control. Interventions are guided by strategic plans aligned to global TB strategies. The district is the functional (implementation) level, where all comprehensive health services, including TB case finding, diagnosis, treatment, and patient follow-up are provided. Other donors cooperating in TB support include the Global Fund, DFID, UNITAID and the World Diabetes Fund. Programming for increased coverage of quality services and responsive systems for TB control is organized to produce and report upon the following three expected outputs:

- Increased use of prevention strategies focused on more-at-risk populations
- Strengthened case management
- Strengthened surveillance systems

Expected Outputs of USAID/Zimbabwe's Health Project, IR 2.3: Increased coverage of quality services and responsive systems for TB control.

Output 2.3.1: Increased use of prevention strategies focused on more-at-risk populations: Access to TB diagnostic sites is difficult for many people and health providers often miss people suffering from TB. Many are not identified in the community, never receive the proper diagnosis, or start and complete treatment. More than 6,300 people died from TB in 2019 while 29,000 endured a long and difficult illness. Each person with active TB who is not on treatment infects an average of 10 to 15 people each year. Improved identification of the infected population is vital. USAID supports the development of comprehensive diagnostic networks that include multi-pronged case-finding approaches and full screening, diagnosis, care, and treatment protocols.

In contrast to a predominantly passive approach to TB case finding through the network of the public health system, USAID TB support aims to scale-up active and intensified case finding approaches. This includes community outreach, contact investigations and targeted screening among high-risk groups and key populations. Activities target people living with HIV, health care workers (HCWs), children, mining communities, diabetes patients, and TB patients' contacts in high priority districts. Incidence levels for miners, HCWs, people living with HIV, and TB patients' contacts in priority districts are exceptionally high.

In addition to targeted screening of high-risk population groups, USAID resources are upgrading the Specimen Transport System optimizing the use of diagnostic platforms, including scaling up of Xpert MTB/RIF as the initial diagnostic test; and on-the-job training to build and sustain the index of TB suspicion among HCWs.

Outreach efforts include sponsorship of community discussions and mass media campaigns to increase public awareness and knowledge of TB and TB-HIV and to further promote positive health-seeking behavior.

Output 2.3.2: Strengthened case management

USAID TB activities support integrated TB-HIV care and strengthen programmatic management of DR-TB. Activities increase coverage of patient-centered TB-HIV and diabetes services at the primary care level. In the 21 priority districts the performance target is to have all TB patients tested for HIV and to have all that

test positive being enrolled on ART. Efforts to effectively manage DR-TB center on optimized use of Xpert MTB/RIF and upgrading capacity of all other TB diagnostic platforms. Activities support training of clinicians at the sub-national level and expanding use of the GX Alert results reporting system to expedite enrollment of detected TB cases into care. USAID support improves patient-centered treatment monitoring through audiometry, cardio logical adverse events detection services, and VHW monitoring for treatment adherence.

Output 2.3.3: Strengthened surveillance systems

USAID TB activities aim to improve timely notification of surveillance data. USAID supports the customization of software used in the District Health Information System to include TB reporting requirements. USAID resources support training to strengthen recording, reporting, and use of data for decision-making at all levels including data-driven performance review sessions at national, provincial, and district levels.

USAID/Zimbabwe TB support Activities

The Mission has four activities implementing the TB support highlighted in the outputs above. Each mechanism's scope of work is briefly described below:

1. **The TB Local Organizations Network (TB-LON)** is implemented by a consortium of local organizations led by The Union Zimbabwe Trust. TB-LON assists NTP to design, develop, and implement policies, strategies, and services that support the prevention of TB transmission, increase the detection of TB cases, link identified cases into care and treatment, and create an enabling environment for TB control in Zimbabwe. These activities result in increased TB prevention, case detection, and case management, and the creation of a more sustainable enabling environment for TB control in Zimbabwe. Further, the award will build the capacity of local organizations to implement TB control activities.
2. **The Sustaining Technical and Analytic Resources Project (STAR)** mechanism supports the placement of a TB technical adviser at strategic levels of the NTP. STAR's seconded technical expert is embedded at the NTP and provides cutting-edge technical advice in the design and implementation of TB control activities. Zimbabwe's STAR Adviser ensures that program implementation is evidence-based, that implementation bottlenecks are resolved, and that the transition from evidence to services is expedited. The STAR Advisor improves the NTP's capacity to manage TB control efforts and implement the Global Fund TB grant. Further, the Advisor ensures that all support mechanisms are coherently coordinated to enhance the TB response.
3. **The TB Infectious Diseases Detection and Surveillance (IDDS)** mechanism supports the NTP to strengthen evidence-based TB diagnostic systems for effective diagnosis of TB in Zimbabwe. TB diagnosis is the key bedrock for TB control efforts, and this activity supports scaling up of national case detection efforts. TB IDDS strengthens the TB diagnostic system, reduce turn-around time of TB testing results, increase TB case detection, expedite linking of TB cases into care, assist attainment of diagnostic standards and certification, and improve TB treatment outcomes.
4. **The TB Implementation Framework Agreement (TIFA)** supports the journey to self-reliance through implementation of TB Commitment Grants (TCGs). TIFA is implemented by Africa University via John Snow International. TIFA works with the NTP to identify programmatic areas for the grants and select priority interventions that are not being implemented due to financial resource constraints. TIFA commitment grants improves NTP's capacity to coordinate and manage TB control activities, strengthen supportive supervision, improve TB data use for decision-making, and implementation of an evidence-based national TB research agenda.

STATEMENT OF WORK

This task order will accomplish the following objectives and outputs:

- Design, develop, and implement a performance evaluation on the four USAID supported TB activities and develop improvement strategies collaboratively with stakeholders;
- Utilize quantitative and qualitative methods as appropriate;

- Incorporate gender and other relevant thematic analysis;
- Produce the draft USAID/Zimbabwe TB Performance Evaluation report;
- Present the draft report to key stakeholders; and
- Produce the final USAID/Zimbabwe TB Performance Evaluation report.

EVALUATION QUESTIONS

The evaluation will answer the following key questions:

1. Provision of TB services: What proportion of individuals received appropriate services, including screening, treatment initiation and completion, TPT, per the national protocol?
2. What are the treatment outcomes among TB and MDR-TB patients?
3. What health system issues are affecting the delivery of quality TB services?
4. What patient level behaviors and socio-economic factors are affecting treatment outcomes?

Answers to these questions should pay attention to important age, sex, risk groups, geographic region and other important disaggregation identified through literature review. Findings for each evaluation question should be clearly aligned to the contributions of each of the four implementing mechanisms supported with

ANNEX III: Evaluation Methods and Limitations

EVALUATION DESIGN AND METHODOLOGY

USAID envisions a rigorous performance evaluation design that takes full advantage of available secondary data from the national health management information system (HMIS) that routinely collects demographic, diagnosis, and treatment data on TB patients. USAID expects at a minimum, a retrospective cohort analysis of a representative sample of TB patients from stratified random selection of health facilities across the country. Health facilities can be stratified according to volume, regions, level of USAID support received, etc. as informed by the literature review and expert opinion.

The evaluation is expected to compliment secondary data with primary data collection from interviews with health workers and an array of key informants. Key informants must include NTP, WHO, Global Fund, Implementing Partners, among others to gain an understanding of their experiences with the national TB program. USAID normally expects evaluation teams to interview beneficiaries, but this might not be possible for this evaluation given the ongoing COVID-19 pandemic. Illustrative data collection methods are included in the evaluation matrix below. Offerors are encouraged to refine these methods or propose alternative methods to be finalized after task order award. The evaluation team will be expected to conduct interviews with an array of stakeholders including NTP, WHO, Global Fund, Implementing Partners, among others at various levels to gain an understanding of their experiences with the national TB program.

The TB Performance Evaluation must align with the following:

- USAID ADS 201 Operational Policy for the Program Cycle (Section 201.3.6)

- Produce evaluation findings that are based on facts, evidence, and data. This precludes relying exclusively upon anecdotes, hearsay, and unverified opinions. Findings should be specific, concise, and supported by quantitative and/or qualitative information that is reliable, valid, and generalizable.

Below is an evaluation matrix summarizing the evaluation design and methodology for each key question. Offerors are requested to refine or modify this matrix based on their understanding of the work to be done and their experience conducting similar evaluations. The final evaluation design and methodology will be negotiated with USAID upon task order award and before field work begins. Findings for each evaluation question should be clearly aligned to the contributions of each of the four implementing mechanisms and supported with appropriate performance attributions.

Evaluation Questions	Suggested Data Sources	Suggested Data Collection	Suggested Data Analysis
1. Provision of TB services: What proportion of TB patients received appropriate services, including screening, treatment initiation and completion, and TPT, per the national	Health facility TB registers, Community TB reporting tools	Abstraction of key data points from facility registers and community reporting tools	Proportion of sampled TB patients receiving appropriate services
2. Treatment Outcomes: What are the treatment outcomes among TB patients?	Health facility TB registers	Abstraction of key data points from facility registers	Treatment Success rate among sampled TB patients
3. Health System Performance: What health system issues are affecting the delivery of quality TB services?	Key informants, Health care workers, Policy makers	Interviews, Survey	Qualitative and qualitative description of identified factors
4. Patient Behavior/Community practices, knowledge, and attitudes: What patient level behaviors and socio- economic factors are affecting treatment outcomes?	Health care workers, Community health workers, TB patients	Interviews, Survey, Focus Group Discussions	Qualitative and qualitative description of identified factors

USAID expects that, at a minimum, the evaluation team will:

- Upon award, familiarize themselves with documentation about the project and USAID's current assistance in the Health area in the region. USAID will ensure that this documentation is available to the team upon award of contract;
- Review and assess the existing performance and effectiveness information or data;
- Conduct site visits for field testing survey instruments (when applicable and feasible);
- Meet and interview USAID project beneficiaries, partners, and host government counterparts at appropriate levels;
- Interview USAID staff and a representative number of experts working in the sector;
- Assess TB response integration with other health services;
- Triangulate evaluation findings with findings of previous reviews;
- Observe the quality of care for a sample of TB patients where feasible

The desk review includes at a minimum:

- USAID TB activities scopes of work;
- The Mission CDCS and PMP, relevant sections of the Project Appraisal Document, Annual and Quarterly Reports, Annual Work Plans, MEL Plans, sector assessments, trip reports, performance reports, gender analyses, and miscellaneous thematic reports from other sources; and
- Secondary data sources including data from the Health Management Information System (HMIS).

The contractor will submit the preliminary evaluation design in response to the Request for Task Order Proposal (RFTOP), for review by USAID. The evaluation Contracting Officer's Representative (COR) will approve the finalized evaluation design.

- USAID/Zimbabwe will cover all costs and logistics associated with the venue for the facilitated sessions. The Mission plans to hold the sessions in the Mission Multipurpose room and break out conference rooms. USAID/Zimbabwe may also elect to hold the sessions at a venue outside the Embassy.
- USAID/Zimbabwe will designate a Contracting Officer's Representative to provide overall direction to the contractor, identify and provide copies of key documents, and assist in arranging meetings with key stakeholders.
- The contractor is responsible for arranging flights, accommodations, and drivers/vehicle rental to and within Zimbabwe. USAID will make a working space available to the contractors at the Mission as needed. Working space, internet access, printing, and photocopying outside of the USAID Mission is the contractor's responsibility, but the contractor must take document security into consideration at all times.
- The contractor will arrange any travel and lodging necessary and will be responsible for the costs of obtaining required visas, insurance, vaccinations, and any other preparation required to travel to Zimbabwe.

ANNEX IV: Data Collection and Analysis Tools

KII # I: District Leadership (District Medical Officer, District Health Executive Teams)

A. Informed Consent

Good morning/afternoon, my name is.....I am working with IBTCI which is a consulting firm conducting an evaluation of USAID support towards the TB response in Zimbabwe.

You have been selected as a respondent due to your knowledge of TB interventions in this district and your key role in the TB response. We would like your help to gather figures about TB in this district and we would also like to ask you about your experiences and opinions about whether and how different types of support to the TB program are viewed.

USAID has supported the Zimbabwean government's commitment towards eliminating TB in different ways over time. The USAID mission has commissioned us to conduct an external evaluation to understand the tangible benefits accrued to Zimbabwe's TB program, especially Case Finding/ Investigation that have been made to date. Through this evaluation we want to learn about best practices and lessons learned regarding the USAID's support to the National TB Program.

USAID began a new type of support in late 2019 so we would like to gather TB data about your district BEFORE the new support (2019) and we are also keen to gather data on last year (2021). We will skip 2020 because of the pandemic, when everything was atypical. Our main focus for the evaluation is childhood TB, contact investigation, active case finding and drug resistant TB.

Your involvement in the evaluation is voluntary and information you provide is confidential. Responses you would provide would not be linked to your name or your district. We are speaking to over 50 different stakeholders in this evaluation. Any information offered will not be used for purposes other than the evaluation. Any information you provide that can identify you will be kept strictly confidential by the parties conducting this study to the maximum extent permitted by the laws of Zimbabwe and the United States Government. The parties include the IBTCI evaluation team.

The paper questionnaire would take approximately 10-20 minutes.

The recorded interview would take about 20-35 minutes.

You may end either part at any time for any reason. You may choose not to answer any or all questions for any reason. Regardless of your responses, you should not anticipate any benefits nor repercussions to ensue. You will have a chance to review your transcript and edit it before it is analyzed, if you would like.

You may contact Victoria James, Senior Evaluator country, at +263 77 406 1851 victoria@nedico.co.zw or Ellen Mitchell at emhmitchell@gmail.com if you have questions, concerns or complaints about the study or your rights as a participant. If you have any questions for me, please feel free to ask at any time.

For the interviewer:

Do I have your permission to administer the paper questionnaire?

Informed Consent: Yes ☐ No ☐

B. Structured Questionnaire (emailed or in-person, no recording)
Pre-fill Respondent Characteristics

M1ID	Participant UUID	
MNAME1	Participant first name	
MNAME2	Participant LAST name	
M2TITL	Participant job title	
M3PHON	Participant phone number	
M4EMAI	Participant email (for sharing transcripts later)	
M5PROV	Participant province ID	
M6DIS	Participant district ID 1) Kwekwe , 2) Gwanda , 3) Zvishavane , 4) Insiza , 5) Mberengwa , 6) Chegutu , 7) Bulawayo , 8) Masvingo , 9) Pilot District ,	
M8GEN	male female unknown/non-binary	
SAMPI	USAID-supported district Not supported by USAID Pilot Global Fund-supported Other (explain)	
M9AGE	Please state age from the following ranges: (read) 21-24 25-34 35-44 45-54 55 and over	
YRSEXP	How many years have you served in this role? 0-5 year,	

	5-10 years, 11-15	
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Aggregate case finding statistics from the District Health Office:

DR-TB Case Counts for 2019

DRALLFORM19	2019 DRUG RESISTANT TB Diagnoses – (All forms)	
DRLR19	2019 total DR-TB patients on individualized treatment regimens (e.g. with injectables, for longer periods)	
DRSR19	2019 total DR-TB patients on short treatment regimens (e.g. with bedaquiline(BDQ))	
DRsuccess190	2019 total DRUG RESISTANT TB patients successfully treated	

DR-TB Case Counts for 2021

DRALLFORM21	2021 DRUG RESISTANT TB Diagnoses – (All forms)	
DRLR21	2021 total DR-TB patients on individualized treatment regimens (e.g. with injectables)	
DRSR21	2021 total DR-TB patients on short treatment regimens (e.g. bedaquiline)	
DRsuccess210	2021 total DRUG RESISTANT TB patients successfully treated	

1. Childhood TB, contact investigations, and/or TB Preventive

Please describe any staff trainings in Childhood TB, contact investigations, and/or TB Preventive Therapy in the last 3 years in this district?	
What topics were covered?	
How many health workers were trained?	
Are there some health workers who needed the training but are unable to participate in trainings? If yes, please describe.	
Which organizations provided training and support?	

2. Laboratory Strengthening

Have the TB laboratories in your district received any trainings or support or infrastructure since 2019? Please describe.	
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What topics were covered?	
How many lab staff were trained?	
Are there some health workers who needed the training but are unable to participate in trainings? If yes, please describe.	
Which organizations provided training and support?	

3. Drug-resistant TB

Please describe any trainings that health workers and others received in the last three years to support drug-resistant patients within their facilities.	
What topics were covered?	
How many health workers were trained?	
Are there some health workers who needed the training but are unable to participate in trainings? If yes, please describe.	
Have Community Health Workers and family members been trained/ sensitized on caring for drug-resistant patients (probe for infection control, monitoring patient)?	
Which organizations provided training and support?	

C. Open-ended Qualitative Interview (emailed or in-person, no recording)

In order to capture all the important insights you will share with me, I would like to audio record this interview. Do I have your permission to conduct the interview and start the recording?

Informed Consent: Yes ☐ No ☐

Consent to Record: Yes ☐ No ☐

Start recorders ☐ Remember to use 2 recorders in case one fails.

If consent to record not granted, then take notes. Inform respondent interview will take longer.

Interview and Interviewer Characteristics

INTGEN	male female unknown/non-binary	☐ ☐
INTtry	Number of respondent contacts prior to interview	☐ ☐

INTappt	Number of prior appointments set before interview	[][]
INTdate	Date of interview:	[][]/[][]/[][]
INTUUID	Interviewer unique code: Victoria James Collins Timire Onismo Mufare Shamiso Moyo Nicole Farai Esther Nyakurimwa Maxwell Mjanga Ellen Mitchell Other	[][]
INTTAB	Tablet #	[][]

I'd like to start by asking you some questions about your job and how it has changed over time.

Warm up Questions (you don't have to ask these if the conversation is already flowing well) You don't have to ask these questions as written, you can phrase them in your own style. (active listening, positive non-verbal reinforcement for sharing: eye contact, nodding, smiling, respect)

1. What types of tasks do you perform as district TB Coordinator?
2. It sounds like you have a job that has many roles and touches on all aspects of TB control
What are your favorite parts of this job?

I would like to turn now to ask about active case finding.

1. How has the district's approach to TB case finding in the community changed over time?
How important has active case finding been for detecting TB in your district? Please can you describe about how active case finding strategy has changed over time in your district.
(Probe for what was done before and what is being done now.)
2. What type(s) of active case finding activities have been carried out in the district in 2021 and 2022? (e.g., targeted mass screening using mobile trucks, symptom screening of all people attending health facilities in the district, symptom screening of all PLHIV in care at all consultations, contact tracing, other — specify).
3. Which "risk groups" are the focus of active case finding in this district? Whom are at highest risk of Tuberculosis in this setting? [probe for artisanal miners,]
 - a. How do you reach these groups?
 - b. Do they seek care for TB symptoms?
 - c. Where do they go?
4. Zimbabwe is rather unique in Africa because of the tobacco smoking among men. Do you find many TB patients are smokers in your district? How do you see alcohol use and TB in your district?
5. Do you have a prison in your district? How do you see the role of prisons in the Tb epidemic in your district? How easy or challenging is TB screening in the prisons?
6. The last few years have been challenging in terms of food security and malnutrition worldwide and Zimbabwe is no exception. How do you think malnutrition influences the TB epidemic in your district?
7. Which organizations are able to reach these groups? [probe: CBOs, NGOs, Faith, private sector]

- a. How satisfied are you with the collaboration between the TB program and the various organization? How might the collaboration be improved in the future?
 - b. Are you familiar with the Union?
 - i. If 'no' ask: Do you know perhaps Kunda Nqob'itb or sometimes called LON?
 - ii. If 'yes' ask :How does the Union Zimbabwe Trust (UZT) engage in TB support in your district? How closely do you work with them?
 - c. Are you familiar with Baines Occupational Health? How does Baines engage in TB work in your district? How closely do you work with them?
 - d. Are you familiar with Jointed Hands Welfare Organisation? How does JHWO engage in TB work in your district? How closely do you work with them?
8. Please describe the practice of contact investigation (CI) in your district.
 - a. Which contacts are screened for TB? How are they screened?
 - b. What are the contact investigations approaches/ strategies in your place (probe for who is involved, if there are outreach programs in place and how often CI is being done)?
 9. From your observations, what is working well with contact investigation and what aspects are challenging?
 - a. Have you faced any barriers negatively affect the implementation of TB contact investigation activities? [probe for: either from the health systems, the community and/or disclosure of contacts by patients]
 - b. If yes, please elaborate.
 10. Do you have standard operating procedures or guidelines for TB Contact Investigations? (probe for perceived role of IPs, USAID)
 11. Have there been any changes to the NTP guidelines for implementing TB Contact Investigation activities over the past two years?
 - a. If so, please elaborate how it has changed (probe for role of Implementing Partners, USAID)
 - b. What has facilitated this change(s)?

Now I'd like to get your thoughts on a related topic: Childhood TB:

12. Are you familiar with the recently revised Guidelines for Childhood TB?
 - a. If so, please tell me about how the new parts will be implemented in the district.
 - b. Guidelines are changing all the time. How hard is it to implement the rapidly evolving norms and mandates that are coming fast from the national and international levels?
13. What role, if any, have Civil Society Organizations (CSO) played in child contact investigation in this district? [probe specifically for Hands Joined, Baines, Union Zimbabwe Trust]
14. How does Childhood TB and Preventive Therapy (TPT) fit in your monitoring and evaluation plan?
 - a. Which registers are currently in use for childhood TB, contact investigations and TPT in this district?
 - b. What indicators are you tracking?
15. Have you received any additional technical assistance for Childhood TB Contact Investigation? (probe if there has been supervision support and from who e.g., national or provincial level)
16. Is Childhood TB included in Monitoring, Mentoring and Supervision visits and plans? If yes, please describe.
17. Tell me about the procurement of Childhood TB and TPT medicines and other consumables?
 - a. Have you faced any challenges?
 - b. How about arrival of pediatric formulations and shorter regimens for TPT in your district? Do you have them? Are they being prescribed for child contacts at a good pace?
18. Do you have standard diagnostic and treatment algorithms for Childhood TB, TB Contact Investigations and/or TPT or is the process flexible? Please elaborate.

19. Are you noticing a shift in emphasis by the national program toward Contact Investigation and TB prevention over the last two years? Please elaborate.
 - a. If yes. Who is driving this shift?: the HIV community? NTP? USAID/Implementing Partners? Donors? child health advocates? UNICEF?
20. What three (3) key lessons have you learned on Childhood TB (prevention, diagnosis and treatment) in this district?
21. What suggestions do you have to improve Childhood TB care in future (probe diagnosis, prevention, therapy and treatment)?

Now I'd like us to shift to talk about drug-resistant TB

22. Zimbabwe has had a very decentralized drug resistant TB treatment system. However in the new national strategic plan, there is mention of moving to restore some centralization to the DR-TB treatment approach. [in other words, to have DR-TB patients receive their treatment at a smaller number of sites] Can you tell me anything about how this change in strategy came about?
23. What are the most significant challenges you face in this district in diagnosing drug resistance TB?
 - a. How does the waiting time for drug sensitivity tests affect patients and staff?
 - b. Has the time changed in the last few years? [probe for how]
24. Which reference laboratory serves this district? How do your sputum samples for drug sensitivity testing (aka LPA or DST) arrive at the reference lab? How satisfied are you with the responsiveness and turnaround times for these samples?
25. Have you observed any changes in the way the laboratories function over the last two to three years? How has the laboratory performance shifted?
26. Have you heard of the Infectious Disease Detection and Surveillance (IDDS) project ? What is the role of this project and how has it worked in your district?
27. What are the most significant challenges you face in this district in initiating patients on DR-TB treatment?
28. What are the most significant challenges you face in this district in keeping DR-TB patients on their treatment?
 - a. Have you noticed any changes in adherence behavior with the arrival of shorter DR-TB regimens? [probe for specifics]
 - b. When are DR-TB patients usually at greatest risk of loss to follow-up?
 - c. How do the economic supports of the NTP work in practice? Are they helping with adherence?
 - d. How might the support for DR-TB patients be improved? (probe for diagnosis, treatment and support -support meaning food parcels, psychosocial and financial)
29. I would like to ask you about the availability of palliative and hospice care for patients who have extremely drug resistant TB or who are not responding to the treatment regimen. Are there community partners who offer palliative or hospice care in your district? [probe for specific implementers]
 - a. (if available) When did palliative or hospice care begin in this district for XDR pts?
 - b. How helpful or impactful has this palliative care been?
30. What three (3) key lessons have been learned in supporting drug-resistant patients (probe diagnosis, treatment and social support)
31. What suggestions do you have for improving drug-resistant patient treatment outcomes? (probe for: shortening times to DR-TB diagnosis, to treatment and patient supports).

Lastly I would like to ask you about health care workers and COVID

32. I would like to ask you about the TB providers. Being a TB provider is a challenging job, with many struggles. In Zimbabwe there is a human resources for health shortage which can also

add to the burden for the health care workers. could you talk a little bit about the challenges facing health care workers in TB and what you see as some of the needs for this group?

33. Have you heard of ECHO sessions? How have the ECHO sessions been implemented in this district?

34. Overall how did COVID -19 affect TB activities in your district (probe for access, prevention and treatment)?

INTLANG	Interview language English other specify	
LANG	Languages spoken in interview Shona , Ndebele , English , Chewa , Chibarwe , English , Kalanga , Koisan , Nambya , Ndau , Ndebele , Shangani , Shona , sign language , Sotho , Tonga , Tswana , Venda , Xhosa ,	String text field
INTLENGTH	Duration of interview start (time stamp)	:
QA1	Interview status (1.0) 1. Incomplete (less than 50% of all Qs answered) 2. Partial (50%-80% Qs answered), 3. Complete (> 80% Qs completed)	
QA2	Quality of the rapport between interviewer and respondent (scale of 1 (worst) to 10 (best))	
QA3	Criticisms of the KII contents from the respondent 1. Interview too time consuming 2. Questions hard to answer (wrong respondent) 3. Questions were too sensitive 4. Questions were not pertinent or relevant to my role. 5. Cannot remember the specific details requested 6. Skepticism about motives of survey 7. Other (describe)	

Many thanks for your time and your insights, and your commitment to your TB work.

This recording will be transcribed and all the identifying information will be removed – facility names, organizational names, place names, people names – everything. You can review it to make sure that the information is presented in the way you want.

KII # 2: Health Facility Overview Tool

I. Facility Characteristics

	HIDDEN TIME STAMP		
intcode	Interviewer CODE		
INTTAB	Tablet #		[]
PROVINCE	Provincial code		[]
DISTNUM	District code	1) Kwekwe 2) Gwanda 3) Zvishavane 4) Insiza 5) Mberengwa 6) Chegutu 7) Bulawayo 8) Masvingo 9) Pilot District	[]
	FACILITYNAME	1) Kwekwe General Hospital, Kwekwe 2) Gwanda Provincial Hospital, Gwanda 3) Zvishavane District Hospital, Zvishavane 4) Filabusi District Hospital, Insiza 5) Mberengwa Rural Hospital, Mberengwa 6) Chegutu District Hospital, Chegutu 7) Entumbane Clinic, Bulawayo 8) Masvingo Provincial Hospital, Masvingo 9) Pilot Facility	[]
FAC1	institution government, confessional (mission) or for private or non- governmental community based?	1) public 2) Private for-profit 3) confessional/missionary 4) non-governmental non-religious	[]
FAC2	Facility level Rural health centers/clinics (in urban areas; no inpts),		[][]

	Polyclinics/maternity centers (inpt facility for deliveries), Rural hospital District hospital Provincial hospital Central hospital		
date.int	Date of data collection dd/mm/yy	/ / 	
cadre	cadre of respondent Cadre of respondent nurse medical officer doctor administrator		
sameresp	Is this the same respondent as for child contact investigation? Yes = 1 No = 0 Unsure = 77		
initials	May I note the initial of your first and last name? (voluntary)		
gender	Please select gender of respondent male=1, female=2		
FAC4Cat	Catchment area of the health facility	population served by the facility	

2. Exposure to USAID sponsored capacity building

Now I would like to ask you about different kinds of training that staff may have received at this facility and when they received it. We are interested in who provided this training. Training can refer to in-person on-the job training, online or virtual training(e.g. ECHO sessions), or coaching on mentoring.

EDCH1	Have staff at this facility ever received training on household contact investigation?	No=0 (skip next Q) yes, in past 3-5 years=1 yes, in 2020 or 2021=2 don't know=9	
EDCH2	Which organization(s) or partner(s) provided household contact investigation training?	VERBATIM:	
E2D	Have staff at this facility ever received training on Childhood TB diagnosis and management?	No=0 (skip next Q) yes, in past 3-5 years=1 yes, in 2020 or 2021=2 don't know=9	

E2D2	Which organization(s) or partner(s) provided training on Childhood TB diagnosis and management?	VERBATIM:	
EDR1	Have staff at this facility ever received training on DR-TB in children?	No=0 (skip next Q) yes, in past 3-5 years=1 yes, in 2020 or 2021=2 don't know=9	☐
EDR2	Which organization(s) or partner(s) provided training on DR-TB in children?	VERBATIM:	
EDHIV1	Have staff at this facility ever received training on new TB/HIV for children?	No=0 (skip next Q) yes, in past 3-5 years=1 yes, in 2020 or 2021=2 don't know=9	☐
EDHIV2	Which organization(s) or partner(s) provided training on new TB/HIV tools?	VERBATIM:	
EDIC1	Have staff at this facility ever been trained on infection control?	No=0 (skip next Q) Yes=1 don't know=9	☐
EDIC2	Which organization(s) or partner(s) provided training on infection control?	VERBATIM:	
EDLAB1	Have staff at this facility ever received training on laboratory diagnostic tests for children?	No=0 (skip next Q) yes, in past 3-5 years=1 yes, in 2020 or 2021=2 don't know=9	☐
EDLAB2	Which organization(s) or partner(s) provided training on laboratory diagnostic tests for children?	VERBATIM:	
EDTEL1	Have staff at this facility ever received mentoring or telementoring?	No=0 (skip next Q) yes, in past 3-5 years=1 yes, in 2020 or 2021=2	☐

		don't know=9	
EDTEL2	Which organization(s) or partner(s) provided mentoring or telementoring?	VERBATIM:	
EDTPT1	Have staff at this facility ever received training in TB preventive therapy for children under five? Formally known at treatment for latent TB infection? sometimes referred to as IPT?	No=0 (skip next Q) yes, in past 3-5 years=1 yes, in 2020 or 2021=2 don't know=9	
EDTPT2	Which organization(s) or partner(s) provided training on TB preventive therapy for children under five?	VERBATIM:	

Now I would like to ask you about specific types of technical assistance and training you may have received from partners.

TRAINDX	Have staff at this facility received training in diagnosis of drug resistant TB?	No=0 yes, before mid-2019=1 yes, after mid-2019 =2 don't know=9
WHODX	Which organization(s) or partner(s) trained in diagnosis of DR-TB?	VERBATIM:
TRAINTX	Have staff at this facility received training in treatment of drug resistant TB?	No=0 (skip next Q) yes, before mid-2019=1 yes, after mid-2019 =2 don't know=9
WHODRTB	Which organization(s) or partner(s) trained in treatment of DR-TB?	VERBATIM:
TRAINBDQ	Have staff at this facility received training in prescribing shorter regimens for DR-TB (i.e., regimens containing bedaquiline)?	No=0 (skip next Q) yes, before mid-2019=1 yes, after mid-2019 =2 don't know=9

WHOSHORT	Which organization(s) or partner(s) trained in shorter regimens for DR-TB treatment?	VERBATIM:
TRAINORAL	Have staff at this facility received training in prescribing all oral regimens for DR-TB (i.e. regimens without an injectable)?	No=0 (skip next Q) yes, before mid-2019=1 yes, after mid-2019 =2 don't know=9 9
WHOORAL	Which organization(s) or partner(s) trained in all oral regimens for DR-TB treatment?	VERBATIM:
STOCKBDQ	Have staff at this facility received stocks of bedaquiline?	No=0 (skip next Q) yes, before mid-2019=1 yes, after mid-2019 =2 don't know=9
GUIDELINE	Has this facility received copies of the new DR-TB treatment guidelines	No=0 (skip next Q) yes, before mid-2019=1 yes, after mid-2019 =2 don't know=9
TRAINCLIN	Have staff at this facility received training in clinical monitoring of DR-TB patients on shorter all oral regimens?	No=0 (skip next Q) yes, before mid-2019=1 yes, after mid-2019 =2 don't know=9
WHOMONITOR	Which organization(s) or partner(s) trained staff in all clinical monitoring for DR-TB treatment?	VERBATIM:
PALLIATIVE	Have staff at this facility received training in palliative care for DR-TB patients?	No=0 (skip next Q) yes, before mid-2019=1 yes, after mid-2019 =2 don't know=9

WHOPALL	Which organization(s) or partner(s) trained staff in palliative care for DR-TB patients?	VERBATIM:
LABDST	Have you / laboratory staff in your facility received training in how to send sputum samples for drug sensitivity testing (DST)?	No=0 (skip next Q) yes, before mid-2019=1 yes, after mid-2019 =2 don't know=9
WHODST	Which organization(s) or partner(s) trained staff in DST?	VERBATIM:
LABGXALERT	Have laboratory staff at this facility been trained in use of GxAlert?	No=0 (skip next Q) yes, before mid-2019=1 yes, after mid-2019 =2 don't know=9
WHOGXALERT	Which organization(s) or partner(s) trained lab staff in GXALERT?	VERBATIM:
ELEC	Has this facility recently had challenges with maintaining stable electricity to perform TB testing?	No=0 (skip next Q) yes, =1
SOLAR	Has the facility received solar panels or other back-up systems (e.g. USP) to stabilize the laboratory electrical grid?	No=0 (skip next Q) (SKIP ENABLE) yes, before mid-2019=1 yes, after mid-2019 =2 don't know=9
ENABLE	(If yes to solar or back-up) Has this back-up system increased the ability to do TB molecular diagnostics?	No=0 (skip next Q) yes, before mid-2019=1 yes, after mid-2019 =2 don't know=9
WHOELEC	Which organization(s) or partner(s) helped stabilize the electricity in the laboratory?	No=0 (skip next Q) yes, before mid-2019=1

		yes, after mid-2019 =2 don't know=9
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3. Aggregate case counts – 2019 and 2021:

Please indicate the types of primary data source(s) present at the site (0=NO) and whether is being used (i.e. information has been added recently) or not. To assess completeness of a register, select one month in 2019 and 2021 'randomly' and checking whether all columns for all patients in that month are filled in?

presumptiveREG	Is the presumptive TB register present?	Yes = 1 No = 0 (inquire where it went, take notes)	☐
PresumptiveUSE2019	Does the presumptive TB register contain complete data for 2019?	Yes= 1 No = 0 mostly complete =2 incomplete=3	☐
PresumptiveUSE2021	Does the presumptive TB register contain complete data for 2021?	Yes= 1 No = 0 mostly complete =2 incomplete=3	
CHHC119	Total child household contacts investigated in 2019		☐ ☐ ☐ ☐
CHHC121	Total child household contacts investigated in 2021		☐ ☐ ☐ ☐
TBregister	Is the TB register present?	Yes = 1 No = 0 (inquire where it went, take notes)	☐

TBregisterUSE	Does the TB register contain complete data for 2019 and 2021?	Yes= 1 No = 0 mostly complete =2 incomplete=3	☐
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TB Case Counts for 2019

ALLFORM19	2019 TB Diagnoses – ALL FORMS	
Index2019	2019 total # of Bacteriologically confirmed pulmonary TB patients 15 and older	
042019	2019 total #TB diagnoses 0-4 years (All forms)	
5142020	2019 total #TB diagnoses 5-14 years (All forms)	

TB Case Counts for 2021

ALLFORM21	2021 TB Diagnoses – ALL FORMS	
Index2021	2021 total # of Bacteriologically confirmed pulmonary TB patients 15 and older	
TB042021	2021 total #TB diagnoses 0-4 years (All forms)	
TB5142021	2021 total #TB diagnoses 5-14 years (All forms)	

DRTBregis	Is the DR-TB treatment register present?	Yes = 1 No = 0 (inquire where it went, take notes)	☐
DRTBregisUSE2019	Does the DR-TB treatment register contain complete data for 2019?	Yes= 1 No = 0 mostly complete=2 incomplete=3	☐
DRTBregisUSE2019	Does the DR-TB treatment register contain complete data for 2021?	Yes= 1 No = 0 mostly complete=2 incomplete=3	

DR-TB Case Counts for 2019

DRALLFORM19	2019 DRUG RESISTANT TB Diagnoses – (All forms)	
DRLR19	2019 total DR-TB patients on individualized treatment regimens (e.g. with injectables, for longer periods)	
DRSR19	2019 total DR-TB patients on short treatment regimens (e.g. with bedaquiline(BDQ))	
DRsuccess190	2019 total DRUG RESISTANT TB patients successfully treated	

DR-TB Case Counts for 2021

DRALLFORM21	2021 DRUG RESISTANT TB Diagnoses – (All forms)	
DRLR21	2021 total DR-TB patients on individualized treatment regimens (e.g. with injectables)	
DRSR21	2021 total DR-TB patients on short treatment regimens (e.g. bedaquiline)	
DRsuccess210	2021 total DRUG RESISTANT TB patients successfully treated	

TB preventive Therapy (TPT) register (previously known as 'treatment for latent TB infection' register, sometimes referred to as 'IPT register')

Prevregis	Is the TB preventive treatment (TPT) register present?	Yes = 1 No = 0 (inquire where it went, take notes)	
PrevregisUSE2019	Does the TB preventive treatment register contain complete data for 2019?	Yes= 1 No = 0 mostly complete=2 incomplete=3	
PrevregisUSE2021	Does the TB preventive treatment register contain complete data for 2021?	Yes= 1 No = 0 mostly complete=2 incomplete=3	

Child Household Contacts Treated with TB Preventive Therapy

TPT19004	2019 preventive therapy TB offered 0-4 years	2019	
----------	--	------	----------------------

TPT190514	2019 preventive therapy TB offered 5-14 years	2019	[][][][]
TPT21004	2021 preventive therapy TB offered 0-4 years	2021	[][][][]
TPT210514	2021 preventive therapy TB offered s 5-14 years	2021	[][][][]

4. Availability of TB Diagnostic Laboratory Services

Now we'd like to know what kinds of tests are available for the clinical monitoring of DR-TR patient health and monitoring of adverse events.

I.I. AVAILABILITY OF CLINICAL DR-TB MONITORING TESTS				
Pls tick [x or √ if YES] to indicate what tests are available				
Tests	Yes, offered at the facility NOW	Yes, transferred (transported) to another facility	Cost for patient? (amount, currency)	Comments
Audiometry (hearing tests)				
ECG/ QTc calculation				Describe type of ECG, who reads
Visual acuity				
Color vision				
Depression screening				
Diabetes screening				
X-Ray				Type: _____ and who reads
Comments: If partially available, e.g. no FBC but rapid test for Hb only, put in comments				



Infection Control Measures Implemented at the Facility

Pls tick [x or √] to indicate measures indicated			
Are DS-TB patients physically separated from RR- / DR-TB patients? In- patient (if appl) ☐ Yes ☐ No ☐ N/A Out-patient ☐ Yes ☐ No ☐ N/A	Are RR-/ MDR-TB separated from pre-XDR-TB/XDR-TB patients? In- patient (if appl) ☐ Yes ☐ No ☐ N/A Out-patient ☐ Yes ☐ No ☐ N/A	Are there isolation rooms available for patients with presumed TB and/or respiratory infections (in the ward(if appl))? ☐ Yes ☐ No ☐ N/A	Are patients with cough and/or respiratory infections supplied with surgical masks? In- patient (if appl) ☐ Yes ☐ No ☐ N/A Out-patient ☐ Yes ☐ No ☐ N/A
Comments:			

I.2. DRUG STOCKS AT THE HEALTH FACILITY Pls tick [x or √] to indicate measures indicated	
Has there been a stock out of drugs used for RR-/ DR-TB treatment during last 3 months? ☐ Yes ☐ No	Has there been a stock out of Bdq, Dlm, and repurposed drugs (Mfx, Lfx, Cfz, Lzd) during last 3 months? ☐ Yes ☐ No
Comments. Please comment on the duration (how many days, weeks etc) stock out lasted:	
VERBATIM:	

Access to TB Preventive Regimens

Which regimens do you have for TB preventive therapy here in the facility? (indicate all that apply)	3HP (3 months of INH +Rifapantine) 6H (6 months of INH)
---	---



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	Other, specify
Which (if any) of these are child-friendly formulations? (e.g. dispersable, liquid, flavored)	
How long have you had the new shorter regimens available?	____/____/____ dd/mm/yy
How sufficient are stocks of medicines for preventive TB treatment?	
Are you familiar with the BPaL regimen?	Yes= 1 No = 0
Has the BPaL treatment regimen been introduced at this facility?	Yes= 1 No = 0
How and who assisted with introduction of BPAL?	

Laboratory Register 2019 and 2021

labregis	Is the TB laboratory register present?	Yes = 1 No = 0 (inquire where it went, take notes)	☐
labregisUSE2019	Does the TB laboratory register contain complete data for 2019?	Yes= 1 No = 0 mostly complete=2 incomplete=3	☐
labregisUSE2021	Does the TB laboratory register contain complete data for 2021?	Yes = 1 No = 0 mostly complete=2 incomplete=3	☐

DR-TB Diagnostic Case Counts



Count only rifampicin resistant (RR) Genexpert positives in the lab register -not all MTB positives

DRPTB19	2019 DRUG RESISTANT TB Diagnoses – pulmonary bacteriologically-confirmed	
DRPTB21	2021 DRUG RESISTANT TB Diagnoses – pulmonary bacteriologically-confirmed	

Availability of TB Diagnostic Tests

Now identify which laboratory tests are offered or available in this facility.

				Patient out of pocket cost
LMIS1	Does the lab have a Linked Laboratory management information system (LMIS) ?	Yes = 1 No = 0		
SMI	Is Smear microscopy offered?	1=Available on site 2=Offered (sent off-site) 3=No -patient referred		
XPER1	Is Xpert MTB/RIF offered?	1=Available on site 2=Offered (sent off-site) 3=No -patient referred		
TRANS1	Describe any sample transportation system			
strattrans	When did the sample transport start?		 	



GxAlert I	Is the Xpert connected to GxAlert ?	Yes = 1 No = 0	☐	
noGxAler twwhy	Why is the Genexpert machine not connected to Gxalert?			
textmsg	Do staff receive text messages when a Genexpert test is positive?	Yes = 1 No = 0	☐	
ERROR I	What is the Error rate of the onsite GeneXpert machine?		% 	
LAMI	Is Urine LAM offered for TB diagnosis of PLHIV?	1=Available on site 2=Offered (sent off-site) 3=No -patient referred	☐	
STOOLI	Pediatric stool sample processing offered	1=Available on site 2=Offered (sent off-site) 3=No -patient referred	☐	
EQA I	Does the lab participate in external quality assurance (EQA)?	Yes = 1 No = 0	☐	

TRUENAT	Are you familiar with TRUE NAT machines for diagnosis of TB?	Yes = 1 No = 0	☐	
TRUENATTRAIN	Have you been trained in use of the TRUE NAT?	No=0 (skip next Q) yes, before mid-2019=1	☐	



		yes, after mid-2019 =2 don't know=9		
HOWTRUENAT	If yes, how were you trained in TRUE NAT? (which organization trained?)			
LAMP	Are you familiar with the TB LAMP machine for diagnosis of TB?	Yes = 1 No = 0	☐	
LAMPTRAIN	If yes, Have you been trained in TB LAMP?	No=0 (skip next Q) yes, before mid-2019=1 yes, after mid-2019 =2 don't know=9	☐	
HOWLAMP	If yes, how were you trained in the TB LAMP? (which organization trained?)			
NONSPUTUM	Have you received training in processing other types of samples in the GeneXpert? (e.g. stool, gastric aspirates, nasogastric washing)?	No=0 (skip next Q) yes, before mid-2019=1 yes, after mid-2019 =2 don't know=9	☐	
HOWNONSPUTUM	If yes, How confident are you processing these non-sputum samples in the GeneXpert after the training?			

Now we would like to ask about ancillary clinical laboratory tests that are offered for the purposes of assessing the health of patients on DR-TB treatments.

Availability of DR-TB Clinical Monitoring Tests



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			patient out of pocket cost	
FBC	Full blood count offered	1=Available on site 2=Offered (sent off-site) 3=No -patient referred	☐	
LIVENZ	Liver enzymes test offered	1=Available on site 2=Offered (sent off-site) 3=No -patient referred	☐	
SERUM	Serum creatinine test offered	1=Available on site 2=Offered (sent off-site) 3=No -patient referred	☐	
POT	Serum Potassium test offered	1=Available on site 2=Offered (sent off-site) 3=No -patient referred	☐	
MAGCAL	Serum Magnesium/ Calcium test offered	1=Available on site 2=Offered (sent off-site) 3=No -patient referred	☐	
URIC	Uric acid test offered	1=Available on site 2=Offered (sent off-site) 3=No -patient referred	☐	
TSH	Test for thyroid stimulating hormone offered	1=Available on site	☐	



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		2=Offered (sent off-site) 3=No -patient referred		
GLUC	Blood glucose offered	1=Available on site 2=Offered (sent off-site) 3=No -patient referred	☐	
SERUMALB	Serum albumin offered	1=Available on site 2=Offered (sent off-site) 3=No -patient referred	☐	
LIPASE	Lipase offered	1=Available on site 2=Offered (sent off-site) 3=No -patient referred	☐	
LACTIC	amylase Lactic acid offered	1=Available on site 2=Offered (sent off-site) 3=No -patient referred	☐	
HIV	HIV test offered	1=Available on site 2=Offered (sent off-site) 3=No -patient referred	☐	
VIR	Viral load test offered	1=Available on site 2=Offered (sent off-site) 3=No -patient referred	☐	



CD4	CD4 test offered	1=Available on site 2=Offered (sent off-site) 3=No -patient referred	☐	
HEP	Hepatitis virus panel offered	1=Available on site 2=Offered (sent off-site) 3=No -patient referred	☐	
PREG	Pregnancy test offered	1=Available on site 2=Offered (sent off-site) 3=No -patient referred	☐	

Thank you for your time.

KII # 3: DR TB Cascade

Sampled DR-TB Patient Treatment Register Summary

Randomly select 5 (if available) bacteriologically confirmed pulmonary patients from the DR-TB register who completed DR-TB treatment in the last 6 months in this facility and meet the selection criteria. If that is not possible 12 months. Record the DR-TB Number which is unique for each patient, and it is generated local at the health facility e.g., Patient number: 000106060A0113 (0001 is the serialized number of the patient, the first 06 is provincial code, the following 06 is the district code, 0A is the health facility code, 01 is the month, 13 is the year. In this case, the patient number 000106060A0113 represents the first patient who was registered in Matabeleland South Province at Umzingwane district by Esigodini health facility in January 2013.

How many DR-TB patients did you select from the register? (From 0 to 5)

Patient 1

DR-TB number of DR-TB patient on shorter treatment regimen

A shorter regimen is a treatment lasting 6 to 12 months

Write the National Identification #



TB Number of the DR-TB patient on shorter treatment regimen

Telephone of

record the telephone number listed in the register for the patient

Telephone of next of kin

record the telephone number listed in the register for the next of kin

Date of registration of the DR-TB patient on the shorter regimen.

Record the date when the patient was registered in the DR-TB register, using date format of DD/MM/YY yyyy-mm-dd

Date of notification of the DR-TB patient on the shorter regimen.

Record the date when the notification form was filled , using date format of DD/MM/YY. yyyy-mm-dd

Date of diagnosis

Record the date when the client was diagnosed as a DR-TB patient, using date format of DD/MM/YY. yyyy-mm-dd

Date of treatment initiation

Record date when treatment was started, using date format of DD/MM/YY
yyyy-mm-dd

If DR-TB treatment started more than 7 days after DR-TB diagnosis, what was the main reason?	1=Drug stock out, 2=TX Consultations needed, 3=PWTB refusal, 4=Early death, 5= Other	☐ ☐
--	--	---

DST result recorded?

Is the section DST result filled ? For example: "R" = resistant; "S"= Susceptible; "C" = Contaminated; "I" = Invalid

Yes

No



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What TB drug resistance was identified?

Record the DST result for all the drugs tested as: "R" = resistant; Rifampicin

- ☐ Isoniazid
- ☐ Pyrazinamide
- ☐ Ethambutol
- ☐ Moxifloxacin
- ☐ Levofloxacin
- ☐ Amikacin
- ☐ Kanamycin
- ☐ Capreomycin
- ☐ not known

Type of treatment regimen

Record the treatment regimen as: 1= Short Treatment regimen; 2= Individualized Treatment regimen

- ☐ Short Treatment Regimen

Treatment regimen drug composition

Record whether regimen contains bedaquiline (BDQ), delamanid (DLM), both BDQ and DLM or an injectable. A comment on the regimen composition recorded.

- ☐ bedaquiline (BDQ)
- ☐ delamanid (DLM)
- ☐ both BDQ and DLM
- ☐ an injectable

Type of directly observed therapy (DOT)

Enter the DOT Model for the patient

1. DOT at health facility
2. DOT by trained community supporter
3. DOT by untrained community supporter
4. DOT by family member

Was there evidence of DR-TB treatment response monitoring of this patient?	Yes No UNSURE	Treatment response monitoring would be: regularly tracking the weight of the patient
--	---------------------	--



		testing monthly sputum samples to see whether the patient has converted to culture negative.
Was there evidence of DR-TB Treatment safety monitoring of this patient?	Yes No UNSURE	Treatment safety monitoring would include conducting regular blood and hearing tests, conducting electrocardiograms to see if the regimen is affecting heart rhythms,

4 Month Interim Outcome

Record the interim outcome at 4 months as 1 = Negative culture by 4 months; 2 = Positive culture at 4 months; 3 = Died; 4 = Lost to Follow Up; 5. Other (specify)

- ☐ Negative culture by 4 months
- ☐ Positive culture at 4 months
- ☐ Died
- ☐ Lost to Follow Up
- ☐ Other

12 Month Interim Outcome

Record the final outcome for patients that are on a SHORT treatment regimen: 1 = Cured; 2 = Treatment Completed; 3 = Died; 4 = Treatment

Failure: 5= Lost to Follow Up (OR 77=not applicable)

- ☐ Negative culture by 4 months
- ☐ Positive culture at 4 months
- ☐ Died
- ☐ Lost to Follow Up
- ☐ Other

Adverse Event(s) Occurred During Treatment

Record whether any adverse events were experienced by the patient during treatment; "Y" = Yes; "N" = No Corresponding details of the adverse event should be recorded on the adverse event reporting form and patient booklet.

- ☐ Yes
- ☐ No



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Remarks

Record site of extra-pulmonary TB, transferring treatment center or program, initial loss to follow-up etc. or cause of death or etc....

Was telephone contact successful?

- ☐ Yes
- ☐ No

Was patient or family willing to be interviewed?

- ☐ Yes
- ☐ No

Was interview conducted?

- ☐ Yes
- ☐ No

Duration of visit (time stamp) in minutes Interview completeness

1. Incomplete (less than 50% of all Qs answered)
2. Partial (50%-80% Qs answered),
3. Complete (> 80% Qs completed)

Quality of the rapport between interviewer and respondent

(Scale of 1 (worst) to 10 (best))

Criticisms of the contents from the respondent

1. Too time consuming
2. Qs hard to answer (wrong respondent)
3. Too sensitive
4. Not pertinent
5. Cannot remember specifics requested
6. Skepticism about motives of survey
7. Other

Was patient's DR-TB treatment card availed for data extraction?

Yes



No

Patient 2

DR-TB number of a Retreatment DR-TB patient

A retreatment case is patient who was previously diagnosed with drug susceptible TB and treated with a standard first line regimen but was not cured (Registration Group = 4 or 5)

Write the National Identification Number of the Retreatment DR-TB patient.

Telephone of DR-TB patient on shorter treatment regimen

record the telephone number listed in the register for the patient

Telephone of next of kin

record the telephone number listed in the register for the next of kin

Date of registration of the Retreatment DR-TB patient.

Record the date when the patient was registered in the DR-TB register, using date format of DD/MM/YY yyyy-mm-dd

Date of notification of the Retreatment DR-TB patient.

Record the date when the notification form was filled, using date format of DD/MM/YY. yyyy-mm-dd

Date of diagnosis

Record the date when the client was diagnosed as a DR-TB patient, using date format of DD/MM/YY. yyyy-mm-dd

Date of treatment initiation

Record date when treatment was started, using date format of DD/MM/YY yyyy-mm-dd

If DR-TB treatment started more than 7 days after DR-TB diagnosis, what was the main reason?	1=Drug stock out, 2=TX Consultations needed, 3=PW/TB refusal, 4=Early death, 5= Other	☐ ☐
--	---	---

DST result recorded?

Is the section DST result filled? For example: "R" = resistant; "S"= Susceptible; "C" = Contaminated; "I" = Invalid



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☐ Yes

☐ No

What TB drug resistance was identified?

☐ Rifampicin

☐ Isoniazid

☐ Pyrazinamide

☐ Ethambutol

☐ Moxifloxacin

☐ Levofloxacin

☐ Amikacin

☐ Kanamycin

☐ Capreomycin

☐ Not known

Was DR-TB Treatment regimen adjusted according to the DST results or intolerance of drugs?	Yes No
--	-----------

Type of treatment regimen

Record the treatment regimen as: 1= Short Treatment regimen; 2= Individualized Treatment regimen

☐ Short Treatment regimen

☐ Individualized Treatment regimen

Treatment regimen drug composition

Record whether regimen contains bedaquiline (BDQ), delamanid (DLM), both BDQ and DLM or an injectable. A comment on the regimen composition recorded.

☐ Bedaquiline (BDQ)

☐ Delamanid (DLM)

☐ Both BDQ and DLM

☐ An injectable

Type of directly observed therapy (DOT)

Enter the DOT Model for the patient

1. DOT at health facility
2. DOT by trained community supporter
3. DOT by untrained community supporter
4. DOT by family member

Was there evidence of DR-TB treatment response monitoring of this patient?	Yes No UNSURE	Treatment response monitoring would be: regularly tracking the weight of the patient testing monthly sputum samples to see whether the patient has converted to culture negative.
Was there evidence of DR-TB Treatment safety monitoring of this patient?	Yes No UNSURE	Treatment safety monitoring would include conducting regular blood and hearing tests, conducting electrocardiograms to see if the regimen is affecting heart rhythms,

4 Month Interim Outcome

Record the interim outcome at 4 months as 1 = Negative culture by 4 months; 2 = Positive culture at 4 months; 3 = Died; 4 = Lost to Follow Up; 5. Other (specify)

- ☐ Negative culture by 4 months
- ☐ Positive culture at 4 months
- ☐ Died
- ☐ Lost to Follow Up
- ☐ Other

12 Month Interim Outcome

Record the final outcome for patients that are on a SHORT treatment regimen: 1 = Cured; 2 = Treatment Completed; 3 = Died; 4 = Treatment Failure; 5= Lost to Follow Up (OR 77=not applicable)

- ☐ Negative culture by 4 months
- ☐ Positive culture at 4 months
- ☐ Died
- ☐ Lost to Follow Up
- ☐ Other

24 Month Interim Outcome (only if individualized treatment outcome selected)



Record the final outcome for patients that are on an individual treatment regimen:

- ☐ 1 = Cured;
- ☐ 2 = Treatment Completed;
- ☐ 3 = Died;
- ☐ 4 = Treatment Failure;
- ☐ 5 = Lost to Follow Up (OR 77=not applicable)

Adverse Event(s) Occurred During Treatment

Record whether any adverse events were experienced by the patient during treatment; "Y" = Yes; "N" = No Corresponding details of the adverse event should be recorded on the adverse event reporting form and patient booklet.

- 1. Yes
- 2. No

Remarks

Record site of extra-pulmonary TB, transferring treatment center or program, initial loss to follow-up etc. or cause of death or etc....

Was telephone contact successful?

- ☐ Yes
- ☐ No

Was patient or family willing to be interviewed?

- ☐ Yes
- ☐ No

Was interview conducted?

- ☐ Yes
- ☐ No

Duration of visit (time stamp) in minutes

Interview completeness

- 1. Incomplete (less than 50% of all Qs answered)
- 2. Partial (50%-80% Qs answered),
- 3. Complete (> 80% Qs completed)



Quality of the rapport between interviewer and respondent

(Scale of 1 (worst) to 10 (best))

Criticisms of the contents from the respondent

1. Too time consuming
2. Qs hard to answer (wrong respondent)
3. Too sensitive
4. Not pertinent
5. Cannot remember specifics requested
6. Skepticism about motives of survey
7. Other

Was patient's DR-TB treatment card availed for data extraction?

Yes

No

Patient 3

DR-TB number of a 'complex case' DR-TB patient

A complex case is a patient with a comorbidity (e.g., HIV, diabetes) or special situation (e.g., pregnant) or unique resistance pattern (e.g., XDR)

Write the National Identification

Number of the complex case of DR-TB patient.

Telephone of the complex case

record the telephone number listed in the register for the patient

Telephone of next of kin

record the telephone number listed in the register for the next of kin

Date of registration of the complex case

Record the date when the patient was registered in the DR-TB register, using date format of



DD/MM/YY yyyy-mm-dd

Date of notification of the complex case

Record the date when the notification form was filled, using date format of DD/MM/YY.

Date of diagnosis of the complex case

Record the date when the client was diagnosed as a DR-TB patient, using date format of DD/MM/YY.
yyyy-mm-dd

Date of treatment initiation of the complex case

Record date when treatment was started, using date format of DD/MM/YY

yyyy-mm-dd

If DR-TB treatment started more than 7 days after DR-TB diagnosis, what was the main reason?	1=Drug stock out, 2=TX Consultations needed, 3=PWTB refusal, 4=Early death, 5= Other	
--	--	---

DST result recorded?

Is the section DST result filled ? For example: "R" = resistant; "S"= Susceptible; "C" = Contaminated; "I" = Invalid

- ☐ Yes
☐ No

What TB drug resistance was identified?

- ☐ Rifampicin
☐ Isoniazid
☐ Pyrazinamide
☐ Ethambutol
☐ Moxifloxacin
☐ Levofloxacin
☐ Amikacin
☐ Kanamycin
☐ Capreomycin

☐ Not known

Was DR-TB Treatment regimen adjusted according to the DST results or intolerance of drugs?	Yes No
--	-----------

Type of treatment regimen

Record the treatment regimen as: 1= Short Treatment regimen; 2= Individualized Treatment regimen

- ☐ Short Treatment regimen
- ☐ Individualized Treatment regimen

Treatment regimen drug composition

Record whether regimen contains bedaquiline (BDQ), delamanid (DLM), both BDQ and DLM or an injectable. A comment on the regimen composition recorded.

- ☐ Bedaquiline (BDQ)
- ☐ Delamanid (DLM)
- ☐ Both BDQ and DLM
- ☐ An injectable

Type of directly observed therapy (DOT)

Enter the DOT Model for the patient

1. DOT at health facility
2. DOT by trained community supporter
3. DOT by untrained community supporter
4. DOT by family member

Was there evidence of DR-TB treatment response monitoring of this patient?	Yes No UNSURE	Treatment response monitoring would be: regularly tracking the weight of the patient testing monthly sputum samples to see whether the patient has converted to culture negative.
--	---------------------	---



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Was there evidence of DR-TB Treatment safety monitoring of this patient?	Yes No UNSURE	Treatment safety monitoring would include conducting regular blood and hearing tests, conducting electrocardiograms to see if the regimen is affecting heart rhythms,
--	---------------------	---

4 Month Interim Outcome

Record the interim outcome at 4 months as 1 = Negative culture by 4 months; 2 = Positive culture at 4 months; 3 = Died; 4 = Lost to Follow Up; 5. Other (specify)

- ☐ Negative culture by 4 months
- ☐ Positive culture at 4 months
- ☐ Died
- ☐ Lost to Follow Up
- ☐ Other

12 Month Interim Outcome

Record the final outcome for patients that are on a SHORT treatment regimen: 1 = Cured; 2 = Treatment Completed; 3 = Died; 4 = Treatment Failure; 5 = Lost to Follow Up (OR 77 = not applicable)

Negative culture by 4 months

Positive culture at 4 months

Died

Lost to Follow Up

Other

24 Month Interim Outcome (only if individualized treatment outcome selected)

Record the final outcome for patients that are on an individual treatment regimen:

1 = Cured;

2 = Treatment Completed;

3 = Died;

4 = Treatment Failure;

5 = Lost to Follow Up (OR 77 = not applicable)

Adverse Event(s) Occurred During Treatment



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Record whether any adverse events were experienced by the patient during treatment; "Y" = Yes; "N" = No Corresponding details of the adverse event should be recorded on the adverse event reporting form and patient booklet.

Yes

No

Remarks

Record site of extra-pulmonary TB, transferring treatment center or program, initial loss to follow-up etc. or cause of death or etc.

Was telephone contact successful?

☐ Yes

☐ No

Was patient or family willing to be interviewed?

☐ Yes

☐ No

Was interview conducted?

☐ Yes

☐ No

How was interview conducted?

☐ by phone

☐ in person

Duration of visit (time stamp) in minutes

Interview completeness

1. Incomplete (less than 50% of all Qs answered)

2. Partial (50%-80% Qs answered),

3. Complete (> 80% Qs completed)

Quality of the rapport between interviewer and respondent

(Scale of 1 (worst) to 10 (best))

Criticisms of the contents from the respondent

1. Too time consuming
2. Qs hard to answer (wrong respondent)
3. Too sensitive
4. Not pertinent
5. Cannot remember specifics requested
6. Skepticism about motives of survey
7. Other

Was patient's DR-TB treatment card availed for data extraction? Yes

No

Patient 4**DR-TB number of patients on individualized DR-TB treatment regimen**

A long regimen is a treatment lasting 24 months

Write the National Identification Number of the DR-TB patient on long regimen.

Telephone of DR-TB patient on long treatment regimen

record the telephone number listed in the register for the patient

Telephone of next of kin

record the telephone number listed in the register for the next of kin

Date of registration Patient on long DR-TB treatment regimen

Record the date when the patient was registered in the DR-TB register, using date format of DD/MM/YY yyyy-mm-dd

Date of notification Patient on long DR-TB treatment regimen

Record the date when the notification occurred yyyy-mm-dd



Date of diagnosis

date the notification cation form was filled , using date format of DD/MM/YY.

Record the date when the client was diagnosed as a DR-TB patient, using date format of DD/MM/YY.
yyyy-mm-dd

Date of treatment initiation

Record date when treatment was started, using date format of DD/MM/YY

yyyy-mm-dd

If DR-TB treatment started more than 7 days after DR-TB diagnosis, what was the main reason?	1=Drug stock out, 2=TX Consultations needed, 3=PWTB refusal, 4=Early death, 5= Other	[] []
--	--	---------

DST result recorded?

Is the section DST result filled ? For example: "R" = resistant; "S"= Susceptible; "C" = Contaminated; "I" = Invalid

- ☐ Yes
☐ No

What TB drug resistance was identified?

- ☐ Rifampicin
☐ Isoniazid
☐ Pyrazinamide
☐ Ethambutol
☐ Moxifloxacin
☐ Levofloxacin
☐ Amikacin
☐ Kanamycin
☐ Capreomycin
☐ Not known

Was DR-TB Treatment regimen adjusted according to the DST results or intolerance of drugs?	Yes No
--	-----------



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Type of treatment regimen

Record the treatment regimen as: 1= Short Treatment regimen; 2= Individualized Treatment regimen

- ☐ Short Treatment regimen
☐ Individualized Treatment regimen

Treatment regimen drug composition:

Record whether individualized regimen contains an injectable. A comment on the regimen composition recorded.

- ☐ an injectable
☐ no injectable

Describe the regimen here: _____

Type of directly observed therapy (DOT)

Enter the DOT Model for the patient

- ☐ DOT at health facility
☐ DOT by trained community supporter
☐ DOT by untrained community supporter
☐ DOT by family member

Was there evidence of DR-TB treatment response monitoring of this patient?	Yes No UNSURE	Treatment response monitoring would be: regularly tracking the weight of the patient testing monthly sputum samples to see whether the patient has converted to culture negative.
Was there evidence of DR-TB Treatment safety monitoring of this patient?	Yes No UNSURE	Treatment safety monitoring would include conducting regular blood and hearing tests, conducting electrocardiograms to see if the regimen is affecting heart rhythms,

4 Month Interim Outcome

Record the interim outcome at 4 months as 1 = Negative culture by 4 months; 2 = Positive culture at



4 months; 3 = Died; 4 = Lost to Follow Up; 5. Other (specify)

- ☐ Negative culture by 4 months
- ☐ Positive culture at 4 months
- ☐ Died
- ☐ Lost to Follow Up
- ☐ Other

12 Month Interim Outcome

Record the final outcome for patients that are on a SHORT treatment regimen: 1 = Cured; 2 = Treatment Completed; 3 = Died; 4 = Treatment Failure; 5= Lost to Follow Up (OR 77=not applicable)

- ☐ Negative culture by 4 months
- ☐ Positive culture at 4 months
- ☐ Died
- ☐ Lost to Follow Up
- ☐ Other

Adverse Event(s) Occurred During Treatment

Record whether any adverse events were experienced by the patient during treatment; "Y" = Yes; "N" = No Corresponding details of the adverse event should be recorded on the adverse event reporting form and patient booklet.

Yes

No

Remarks

Record site of extra-pulmonary TB, transferring treatment center or program, initial loss to follow-up etc. or cause of death or etc....

Was telephone contact successful?

- ☐ Yes
- ☐ No

Was patient or family willing to be interviewed?

- ☐ Yes
- ☐ No

Was interview conducted?

- ☐ Yes



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☐ No

How was interview conducted?

☐ by phone

☐ in person

Duration of visit (time stamp) in minutes

Interview completeness

1. Incomplete (less than 50% of all Qs answered)
2. Partial (50%-80% Qs answered),
3. Complete (> 80% Qs completed)

Quality of the rapport between interviewer and respondent (scale of 1 (worst) to 10 (best))

Criticisms of the contents from the respondent

1. Too time consuming
2. Qs hard to answer (wrong respondent)
3. Too sensitive
4. Not pertinent
5. Cannot remember specifics requested
6. Skepticism about motives of survey
7. Other

Was patient's DR-TB treatment card availed for data extraction?

Yes

No

Patient 5

DR-TB number of the new case of DR-TB

A new case is a DR-TB patient who has never been treated for any kind of TB previously-
(Registration Group =1)

Write the National Identification Number of the new case DR-TB patient.

Telephone of new case

record the telephone number listed in the register for the patient

Telephone of next of kin

record the telephone number listed in the register for the next of kin

Date of registration of the new case of DR-TB

Record the date when the patient was registered in the DR-TB register, using date format of DD/MM/YY yyyy-mm-dd

Date of notification of the new case of DR-TB

Record the date when the notification form was filled , using date format of DD/MM/YY.

Date of diagnosis of new case

Record the date when the client was diagnosed as a DR-TB patient, using date format of DD/MM/YY. yyyy-mm-dd

Date of treatment initiation

Record date when treatment was started, using date format of DD/MM/YY
yyyy-mm-dd

If DR-TB treatment started more than 7 days after DR-TB diagnosis, what was the main reason?	1=Drug stock out, 2=TX Consultations needed, 3=PWTB refusal, 4=Early death, 5= Other	
--	--	---

DST result recorded?

Is the section DST result filled ? For example: "R" = resistant; "S"= Susceptible; "C" = Contaminated; "I" = Invalid

Yes

No



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What TB drug resistance was identified?

- ☐ Rifampicin
- ☐ Isoniazid
- ☐ Pyrazinamide
- ☐ Ethambutol
- ☐ Moxifloxacin
- ☐ Levofloxacin
- ☐ Amikacin
- ☐ Kanamycin
- ☐ Capreomycin
- ☐ Not known

Was DR-TB Treatment regimen adjusted according to the DST results or intolerance of drugs?	Yes No
--	-----------

Type of treatment regimen

Record the treatment regimen as: 1= Short Treatment regimen; 2= Individualized Treatment regimen

- ☐ Short Treatment regimen
- ☐ Individualized Treatment regimen

Treatment regimen drug composition

Record whether regimen contains bedaquiline (BDQ), delamanid (DLM), both BDQ and DLM or an injectable. A comment on the regimen composition recorded.

- ☐ Bedaquiline (BDQ)
- ☐ Delamanid (DLM)
- ☐ Both BDQ and DLM
- ☐ An injectable

Type of directly observed therapy (DOT)

Enter the DOT Model for the patient

1. DOT at health facility
2. DOT by trained community supporter

3. DOT by untrained community supporter

4. DOT by family member

Was there evidence of DR-TB treatment response monitoring of this patient?	Yes No UNSURE	Treatment response monitoring would be: regularly tracking the weight of the patient testing monthly sputum samples to see whether the patient has converted to culture negative.
Was there evidence of DR-TB Treatment safety monitoring of this patient?	Yes No UNSURE	Treatment safety monitoring would include conducting regular blood and hearing tests, conducting electrocardiograms to see if the regimen is affecting heart rhythms,

4 Month Interim Outcome

- ☐ Record the interim outcome at 4 months as 1 = Negative culture by 4 months; 2 = Positive culture at 4 months; 3 = Died; 4 = Lost to Follow Up; 5. Other (specify)
- ☐ Negative culture by 4 months
- ☐ Positive culture at 4 months
- ☐ Died
- ☐ Lost to Follow Up
- ☐ Other

12 Month Interim Outcome

Record the final outcome for patients that are on a SHORT treatment regimen: 1 = Cured; 2 = Treatment Completed; 3 = Died; 4 = Treatment Failure; 5 = Lost to Follow Up (OR 77 = not applicable)

- ☐ Negative culture by 4 months
- ☐ Positive culture at 4 months
- ☐ Died
- ☐ Lost to Follow Up
- ☐ Other

24 Month Interim Outcome

Record the final outcome for patients that are on a LONG treatment regimen: 1 = Cured; 2 = Treatment Completed; 3 = Died; 4 = Treatment Failure; 5 = Lost to Follow Up (OR 77 = not applicable)

- ☐ Negative culture by 4 months
- ☐ Positive culture at 4 months
- ☐ Died
- ☐ Lost to Follow Up
- ☐ Other

Adverse Event(s) Occurred During Treatment

Record whether any adverse events were experienced by the patient during treatment; "Y" = Yes; "N" = No. Corresponding details of the adverse event should be recorded on the adverse event reporting form and patient booklet.

- ☐ Yes
- ☐ No

Remarks

Record type of adverse events, site of extra-pulmonary TB, transferring treatment center or program, initial loss to follow-up etc. or cause of death or etc....

Was telephone contact successful?

- ☐ Yes
- ☐ No

Was patient or family willing to be interviewed?

- ☐ Yes
- ☐ No

Was interview conducted?

- ☐ Yes
- ☐ No

How was interview conducted?

- ☐ By phone
- ☐ In person

Duration of visit (time stamp) in minutes



Interview completeness

1. Incomplete (less than 50% of all Qs answered)
2. Partial (50%-80% Qs answered),
3. Complete (> 80% Qs completed)

Quality of the rapport between interviewer and respondent

(Scale of 1 (worst) to 10 (best))

0 10

Criticisms of the contents from the respondent

1. Too time consuming
2. Qs hard to answer (wrong respondent)
3. Too sensitive
4. Not pertinent
5. Cannot remember specifics requested
6. Skepticism about motives of survey
7. Other

Was patient's DR-TB treatment card availed for data extraction?

- ☐ Yes
- ☐ No

Laboratory Register Data Extraction

Patient 1

DR-TB number of DR-TB patient on shorter treatment regimen

Could you locate the initial RIF resistant GeneXpert result of the DR-TB patient on shorter treatment regimen in the lab register?

- ☐ Yes
- ☐ No

Date of RIF resistant result

Record the date when the client was tested RIF resistant result, using date format of DD/MM/YY.

yyyy-mm-dd



Was additional sputum collected for SL-DST

SL-DST refers to samples sent for 2nd line drug susceptibility testing in Bulawayo, Mutare, or Harare TB reference labs

- ☐ Yes
☐ No

When was the sputum sample sent to the reference lab for DST?

using date format of DD/MM/YY.

yyyy-mm-dd

Was second line DST result received from REFERENCE LAB THAT WAS TO DO THE DST??

- ☐ Yes
☐ No

When was the second line DST result received from the TB reference laboratory? using date format of DD/MM/YY.

yyyy-mm-dd

Why wasn't the second line DST result of the DR-TB patient on shorter treatment regimen received?

Ask lab staff for reason(s) that DST (or LPA) results were not returned from the reference lab

Was there any resistance to FQ for the DR-TB patient on shorter treatment regimen?

- ☐ Yes
☐ No

Patient 2

DR-TB number of a Retreatment DR-TB patient

Could you locate the initial RIF resistant GeneXpert result of DR-TB patient on the shorter treatment in the lab register?

SL-DST refers to samples sent for 2nd line drug susceptibility testing in Bulawayo, Mutare, or Harare TB reference labs

- ☐ Yes
☐ No



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Date of RIF resistant result

Record the date when the client was tested RIF resistant result, using date format of DD/MM/YY.
yyyy-mm-dd

Was additional sputum collected for SL-DST from the DR-TB patient on shorter treatment regimen?

SL-DST refers to samples sent for 2nd line drug susceptibility testing in Bulawayo, Mutare, or Harare TB reference labs

- ☐ Yes
☐ No

When was the sputum sample sent to the reference lab for DST? using date format of DD/MM/YY.

yyyy-mm-dd

Was SLDST result received from REFERENCE LAB THAT WAS TO DO THE DST?

SL DST is sometimes also referred to as LPA: line probe assay

- ☐ Yes
☐ No

When was the second line DST result received from the TB reference laboratory? using date format of DD/MM/YY.

yyyy-mm-dd

Why wasn't the second line DST result of the of the Retreatment case received?

Ask lab staff for reason(s) that DST (or LPA) results were not returned from the reference lab

Was there any resistance to FQ shown for the Retreatment case?

- ☐ Yes
☐ No

Patient 3



DR-TB number of a complex case DR-TB patient

Could you locate the initial RIF resistant GeneXpert result of the retreatment case DR-TB patient in the lab register?

- ☐ Yes
☐ No

Date of RIF resistant result

Record the date when the client was tested RIF resistant result, using date format of DD/MM/YY.

yyyy-mm-dd

Was additional sputum collected for SL-DST from the retreatment case?

SL-DST refers to samples sent for 2nd line drug susceptibility testing in Bulawayo, Mutare, or Harare TB reference labs. SL DST is sometimes also referred to as LPA: line probe assay

- ☐ Yes
☐ No

When was the sputum sample sent to the reference lab for DST?

using date format of DD/MM/YY. yyyy-mm-dd

Was SLDST result received from REFERENCE LAB THAT WAS TO DO THE DST?

SL DST is sometimes also referred to as LPA: line probe assay

- ☐ Yes
☐ No

When was the second line DST result received from the TB reference laboratory? using date format of DD/MM/YY.

yyyy-mm-dd

Why wasn't the second line DST result of the complex DR-TB case received?

Ask lab staff for reason(s) that DST (or LPA) results were not returned from the reference lab

Was there any resistance to FQ shown for the complex DR-TB case?

- ☐ Yes



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☐ No

Patient 4

DR-TB number of patients on individualized DR-TB treatment regimen

Could you locate the initial RIF resistant GeneXpert result of the DR-TB Patient on individualized DR-TB treatment regimen in the lab register?

Record the date when the client was tested RIF resistant result, using date format of DD/MM/YY.

☐ Yes

☐ No

Date of RIF resistant result

Record the date when the client was tested RIF resistant result, using date format of DD/MM/YY.

yyyy-mm-dd

Was additional sputum collected for SL-DST from the complex case?

SL DST is sometimes also referred to as LPA: line probe assay

☐ Yes

☐ No

When was the sputum sample sent to the reference lab for DST?

using date format of DD/MM/YY.

yyyy-mm-dd

Was SLDST result received from reference lab that was to do the DST??

☐ Yes

☐ No

When was the second line DST result received from the TB reference laboratory? Using date format of DD/MM/YY.

yyyy-mm-dd

Why wasn't the second line DST result of the DR-TB patient on long treatment regimen received?

Ask lab staff for reason(s) that DST (or LPA) results were not returned from the reference lab



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Was there any resistance to FQ found for the DR-TB patient on long treatment regime

- ☐ Yes
☐ No

Patient 5

DR-TB number of the new case of DR-TB

Could you locate the initial RIF resistant GeneXpert result of the new case of DR-TB in the lab register? Yes/No

Date of RIF resistant result

Record the date when the client was tested RIF resistant result, using date format of DD/MM/YY.
yyyy-mm-dd

Was additional sputum collected for SL-DST?

SL DST is sometimes also referred to as LPA: line probe assay

- ☐ Yes
☐ No

When was the sputum sample sent to the reference lab for DST?

using date format of DD/MM/YY.

yyyy-mm-dd

Was SLDST result received from reference lab that was to do the DST??

- ☐ Yes
☐ No

When was the second line DST result received from the TB reference laboratory? using date format of DD/MM/YY.

yyyy-mm-dd

Why wasn't the second line DST result of the new case received?

Ask lab staff for reason(s) that DST (or LPA) results were not returned from the reference lab



Was there any resistance to FQ found for the new case?

- Yes
- No

KII # 4: Health Care Workers DR TB Services

A. Informed Consent

Good morning/afternoon, my name is.....I am working with IBTCI which is a consulting firm conducting an evaluation of USAID support towards the TB response in Zimbabwe. USAID has supported the Zimbabwean government's commitment towards eliminating TB. The USAID mission has commissioned an external evaluation to understand the tangible benefits accrued to Zimbabwe's TB program, especially Case Finding/ Investigation that have been made to date. As well, through this evaluation we want to learn about best practices and lessons learned regarding the USAID's support to the National TB Program.

You have been selected as a respondent due to your knowledge of TB interventions and your key role in the TB response. Your involvement in the evaluation is voluntary and information you provide is confidential. Responses you provide will not be linked to your name and information will not be used for purposes other than the evaluation. Any information you provide that can identify you will be kept strictly confidential by the parties conducting this study to the maximum extent permitted by the laws of Zimbabwe and the United States Government. The parties include the IBTCI evaluation team. These parties will use the information for analytical purposes and will not reveal your identity.

The interview should take approximately 60-90 minutes. You may choose not to answer any or all questions for any reason. At any point during the interview if you wish to end, please let me know and I will stop asking you questions. In other words, you have the option to not participate and there will be no consequences for your non-participation. Regardless of your responses, you should not anticipate any benefits nor repercussions to ensue. You may contact Victoria James, Senior Evaluator country, at +263 77 406 185 | victoria@nedico.co.zw or Ellen Mitchell at emhmittchell@gmail.com if you have questions, concerns or complaints about the study or your rights as a participant. If you have any questions for me, please feel free to ask at any time.

In order to capture all the important insights you will share with us, we would like to audio record this interview.

Verify materials needed are available	Yes/No
---------------------------------------	--------



Verify the consent form and materials needed for the interview are available for each moderator

Tablet and/or Audio recorder and protective cases (e.g., ziplock bag) that can be sprayed and wiped after each use

Soaps and hand-sanitizers of greater than 60% alcohol

A personal cloth face-mask for each facilitator/moderator and note-taker

Single-use face-masks for participants (if participants do not already have a face-mask) = number of respondents for the day/session + 2

Consent forms (verbal consent)—if not e-form on tablet, count should be number of respondents for the day/session + 2

Do I have your permission to continue with the interview and start the recording?



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B. Structured Questionnaire (emailed or in-person, no recording)
Pre-fill Questionnaire

M1ID	Participant UUID	[][] [][]
MNAME1	Participant first name	
MNAME2	Participant LAST name	
M2TITL	Participant job title	
M3PHON	Participant phone number	[][] [][][][] [][]
M4PROV	Participant province ID	[][]
M5DIS	Participant district ID	[][] []
M6FAC	Participant health facility ID	[][] [][]
M7Gen	What is the respondents gender?	☐ male ☐ female ☐ non-binary []

BIO	What is your current profession (title)?	Community health worker Nurse Aid Primary care nurse Registered nurse General Doctor TB doctor DR-TB doctor Midwife Medical Records Personnel Pharmacist or Pharmacy technician Laboratory Technician or Scientist Peer Educator Pulmonologist Radiologist Other	[][]
BIO	How many years have you been working in this role?	[] years [] months	



BIO	Please state your age from the following ranges: (read aloud)	☐ 21-24 ☐ 25-34 ☐ 35-44 ☐ 45-54 ☐ 55 and over	
BIO	Have you ever performed contact investigation? (including volunteer work)	No=0 yes, in past 2-3 years=1 yes, in past year=2 don't know=9	

BIO: Now I would like to ask you about the work you have performed in the last 12 months.

BIO	conducted TB symptom screening and referral for testing?	1=yes, 0=no,	
BIO	collected, transported or processed sputum samples for TB testing?	1=yes, 0=no,	
BIO	Provided clinical care and treatment to TB patients?	1=yes, 0=no,	
BIO	Provided clinical care to drug-resistant TB patients?	1=yes, 0=no,	
BIO	Provided HIV counselling and testing?	1=yes, 0=no,	
BIO	Provided care to people living with HIV?	1=yes, 0=no,	
BIO	Provided care to people with COVID-19?	1=yes, 0=no,	

C. Structured Questionnaire (emailed or in-person, no recording)

Transcript Number:

Transcriber Name:

Date transcription completed:

May I have your permission to start the interviewing and begin recording?

Turn on audio recorder.

Topic Guide: DR-TB and COVID [RDI] Health Care Workers



Introduction: Good morning/afternoon, my name is [Name of interviewer], and I will be interviewing you today. If you don't mind, my colleague, [Name of observer], will be sitting in the room observing the interview. I will start with some general questions, then I will go into more details of your experiences with DR-Tuberculosis care in the last few years. Before we begin I would like to remind you of how grateful we are for their time and that there are no wrong or right answers. This is a time for you to share your knowledge. This interview will be audio recorded. I would like to reassure you that anything they say will be treated in confidence and that your name will not be published on any documents to do with the study. You are allowed to skip questions if you feel uncomfortable or you can ask me to repeat a question if it's not clear.

Key area of investigation	Themes	Example questions
Basic background questions WARM UP	Education Age Healthcare experience Household	• Can you tell me a bit about yourself? • Are you originally from [place]? How did you come to live there? • What do you do for work? • How do you get to work?
Daily Work Life	Work structure Challenges Colleague Relationships	• How did you come to work here? • How do you feel about your job? Corona impact? • What do you find the most challenging about working on DR-TB? • How much support from external partners do you receive in your work? • How do you cope with these challenges? • How are your relationships with the external partners who come here to advise, support, teach, collect data? • What does the facility administration think of DR-TB services?



Infection control	Policies Practices Fear/Blame Colleague infection	• How does this facility prevent the spread of DR-TB? • What mask do you wear on the DR-TB ward? • Are there sufficient infection control supplies? • Are you worried about getting -DR-TB? • What could be done to make you feel safer? • What recommendations do you give to the DR-TB patients about household transmission? Is it possible to do HH contact investigation? How does that occur? • Have any of your colleagues ever been diagnosed with DR-TB or MDR-DR-TB? • Explore, why, who?
Relationship with patients	DR-TB clinic visits Treatment adherence Blame	• What are the patients like? • How are DR-TB patients likely to behave? (i.e. adherence, attitude, feeling) • How are DR-TB patients potentially different from DR-TB patients? • What is your relationship like with the patients? Can you give an example? • Do you have many non-adherent patients? Why do you think they are non-adherent? • How do you and the team handle these patients? • How do you think the other HCW view DR-TB patients?
Knowledge Management: Evolving surveillance systems and paperwork-	MDR-DR-TB symptoms Treatment side effects HCW views of the symptoms and side effects Adherence	• Do the patients ever tell you about their drug side effects? • What do you think it would be like to take DR-TB treatment? • Do you think it would be difficult? (side-effects/adherence)[RD2] • How much paperwork is involved in documenting the clinical care of patients with DR-TB? How much of a burden is it? • Does recording keeping take time from your clinical work? • What is done with all the data? Who uses it?
Mental /emotional consequences of stigma	Disclosure Blame/shame HCW perspectives	• Local innovations and Best practices emerging from situations specific to Zimbabwe • Change Management: Coping with rapidly evolving policy requirements vs practical realities at facility, district, laboratory, and IP level. • External threats to implementation in 2019-2021 such as electricity cuts, COVID-19 lock downs that impinge upon possible performance at facility, lab, district, and IP levels. • Comparative perceptions of the push toward self-reliance and evolving partnership with USAID



Support network	Support networks Facility Private Social isolation Coping mechanisms	• Are there any social services to help them? • How does the nutritional /economic support get to the DR-TB patients? Is it making a difference? • Would something else be useful? (probe – what) (counselling) • What do you think helps keep the patients to go through this difficult treatment? • How about adherence support for DR-TB? • Has COVID changed how patients are observed taking their medicines works? How?
Capacity building		• Have you been able to attend any capacity building (trainings) in TB and DR-TB? • Which ones have you participated in and how did you like them? • How were they organized and what was the goal? • Who gets chosen for these trainings? • Are their specific areas where you feel you could use more skills or information?
Policy	Stressors Enabling Environment	• Being a HCW in times of COVID and so much happening can be very frustrating. What are some of the frustrations that staff are having? • What are some of the policies that could be improved to help HCWs do their jobs better?
Closing	Expressing gratitude for their time so far Final additions Express gratitude again	• We're nearly done, so thank you for your time in this interview. It has been really interesting and I have already learnt a lot that will be very helpful for our study. • Is there anything else that you think we should know about or would like to share with me for the valuation of USAID funded interventions?

Interview and Interviewer Characteristics

INTGEN	male female unknown/non-binary	☐
--------	--------------------------------------	--------------------------



INTtry	Number of respondent contacts prior to interview	
INTappt	Number of prior appointments set before interview	
INTdate	Date of interview:	
INTUUID	Interviewer unique code:	
INTTAB	Tablet #	
INTLANG	Interview language English other specify	
LANG	Languages spoken in interview	String text field
INTLENGTH	Duration of interview start (time stamp)	
QA1	Interview status (1.0) 1. Incomplete (less than 50% of all Qs answered) 2. Partial (50%-80% Qs answered), 3. Complete (> 80% Qs completed)	
QA2	Quality of the rapport between interviewer and respondent (scale of 1 (worst) to 10 (best))	
QA3	Criticisms of the KII contents from the respondent 1. Too time consuming 2. Qs hard to answer (wrong respondent) 3. Too sensitive 4. Not pertinent 5. Cannot remember specifics requested 6. Skepticism about motives of survey 7. Other	
QA4	Specific criticism	

KII # 5: DR TB Patient Beneficiary/Survivor

Verify materials needed are available	Yes/No
Verify the consent form and materials needed for the interview are available for each moderator	



Tablet and/or Audio recorder and protective cases (e.g., ziplock bag) that can be sprayed and wiped after each use	
Soaps and hand-sanitizers of greater than 60% alcohol	
A personal cloth face-mask for each facilitator/moderator and note-taker(unless respondent has infectious pulmonary DRTB, then both should wear A RESPIRATOR)	
Single-use face-masks for participants (unless they have infectious pulmonary DRTB, then both should wear A RESPIRATOR) = number of respondents for the day/session + 2	
Consent forms (verbal consent)—if not e-form on tablet, count should be number of respondents for the day/session + 2	

A. Informed Consent

Good morning/afternoon, my name is.....I am working with IBTCI which is a consulting firm conducting an evaluation of USAID support towards the TB response in Zimbabwe. USAID has supported the Zimbabwean government's commitment towards eliminating TB. The USAID mission has commissioned an external evaluation to understand the tangible benefits accrued to Zimbabwe's TB program, especially Case Finding/ Investigation that have been made to date. As well, through this evaluation we want to learn about best practices and lessons learned regarding the USAID's support to the National TB Program.

You have been selected as a respondent due to your knowledge of TB interventions and your key role in the TB response. Your involvement in the evaluation is voluntary and information you provide is confidential. Responses you provide will not be linked to your name and information will not be used for purposes other than the evaluation. Any information you provide that can identify you will be kept strictly confidential by the parties conducting this study to the maximum extent permitted by the laws of Zimbabwe and the United States Government. The parties include the IBTCI evaluation team. These parties will use the information for analytical purposes and will not reveal your identity.

The interview should take approximately 60-90 minutes. You may choose not to answer any or all questions for any reason. At any point during the interview if you wish to end, please let me know and I will stop asking you questions. In other words, you have the option to not participate and there will be no consequences for your non-participation. Regardless of your responses, you should not anticipate any benefits nor repercussions to ensue. You may contact Victoria James, Senior Evaluator country, at +263 77 406 1851 victoria@nedico.co.zw or Ellen Mitchell at emhmitchell@gmail.com if you have questions, concerns or complaints about the study or your rights as a participant. If you have any questions for me, please feel free to ask at any time.

In order to capture all the important insights you will share with us, we would like to audio record this interview.

Do I have your permission to continue with the interview and start the recording?



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For the interviewer:

Informed Consent: Yes ☐ No ☐

Consent to Record: Yes ☐ No ☐

Start recorder ☐

For co-habitants or witnesses to the care of the DR-TB patient who died.

I am.. and this is..... who will help me by taking notes during this interview. We want to have this discussion so that we can use your ideas and opinions to improve the care of people with drug-resistant tuberculosis so that poor outcomes like {insert name} do not happen in the future. Listening to families we can better understand what it was like for **[insert name]** and your family. We hope that by talking with you, we can learn how to avoid these sad situations in the future and improve the care of families affected by DR-TB in this community.

Sometimes it is difficult to be open, especially when you are being asked about how other people do their work or talking about sad times. However I hope you can be open and honest with me because what you have to say can help others. Your information will be combined with the interview of many other families and your names will never be used. If you feel uncomfortable, we can take a break and return later. You may end this interview at any point and no one will be angry with you.

Because there will be a lot of information that I will not be able to remember or write down, I would like to tape record this discussion. If you do not feel comfortable with that, it is OK for me to take notes only.

Community code:	[][]
Date of interview:	[][]/[][]/[][]
Field worker code:	[][]

B. Pre- Filled Socio- Demographic Data

Date of Birth of DRTB patient	[][]/[][]/[][]	
Gender:	☐ Female ☐ Male ☐ non-binary/Transgender	
Age of the patient (in years)		[][]
Education level of patient:	Include relevant categories	[][]
Occupation of patient: (adapt as required)	Include relevant categories	[][]
Patient's marital status	If relevant, include categories	[][]
Relationship to the patient of respondent	mother/father spouse brother/sister son/daughter other household member Other (specify)	[][]

Warm up Questions

Transcript Number:

Transcriber Name:

Date transcription completed:

May I have your permission to start the interviewing and begin recording?

Turn on audio recorder.

Pre- Filled Socio- Demographic Data

M1ID	Beneficiary UUID	[][] [][]
MNAMEI	Beneficiary first name or initial	
M2TBnum	Beneficiary TB number	
M3PHON	Beneficiary phone number	[][] [][][][] [][]
M4PROV	Beneficiary province ID	[][]
M5DIS	Beneficiary district ID	[][] []
M6FAC	Beneficiary health facility ID	[][] [][]
M7Gen	What is the Beneficiary gender?	☐ male ☐ female ☐ non-binary []

DR TB Patient Formative Interview Guide For patients who are alive

Introduction: Good morning/afternoon, my name is [Name of interviewer], and I will be interviewing you today because I want to understand more about care of people with DR-TB in this area. I will start with some general questions, then I will go into more details of your experiences as a MDR-TB patients. Before we begin I would like to remind you of how grateful we are for their time and that there are no wrong or right answers. This is a time for you to share your story and your knowledge. This interview will be audio recorded. I would like to reassure you that anything you say will be treated in confidence and that your name will not be on any documents to do with the study. You are allowed to skip questions and topics if you feel uncomfortable or you can ask me to explain a question if it's not clear.

Key area of investigation	Rationale	Themes	Example questions (without probes)	Explanatory notes
WARM UP RAPPORT Basic background questions	To learn the basic characteristics of the participant and start to make them feel comfortable	Income Education MDR-TB treatment months Age	How are you feeling this day? Can you tell me a bit about yourself?	This is important to make a good first impression and to help the participant feel at ease. Listen carefully and adapt the questions the person.
Diagnosis		Household Relationships Social activities	Was the initial assessment of the [insert name]'s condition technically adequate? Was [insert name]'s medical condition (and complications) correctly diagnosed? If not, why does the family think it was not? Was there any delay in seeking the DR-TB diagnosis? Was there any delay in communication among members of staff (e.g. between lab and doctor	

			on duty) that contributed to delayed DR-TB diagnosis?	
BACKSTORY	Try to identify if the DR-TB is primary or acquired	Diagnostic journey	Can you tell me a bit about your TB story? How did you get sick? How did you get diagnosed? What kinds of thoughts and feelings were foremost in your mind when you found out your TB was drug resistant? How were you treated? What have you learned about TB and TB treatment? Has anyone else in your family had TB? Was it drug-resistant TB?	How patients make sense of their experience is very important. Listen for what is said, and also what is NOT mentioned.
Health facility experiences and treatment	Problems with health care facilities can perpetuate stigma and deter patients from commencing or continuing with treatment. Some treatment side effects can cause anxiety and depression. If possible we try to differentiate internal stigma from treatment side effects	How they started treatment Treatment adherence Health care workers Knowledge Personable Side-effects	How far is this facility from your home? How do you travel here (by foot, bus, own car, other person's car)? What do you think about the care being provided? How are your relationships with the health care workers? And with other patients whom you may have met in this clinic/hospital? How long have you been taking treatment for? How do the medications affect you? How have these side-effects affected your life? Do you feel like the medications are working?	This section is to gain an understanding of their interactions with the MDR-TB treatment facility. This can include with health care workers, other patients and the public that see them there. Don't ask leading questions, don't assume that it is a negative experience.
Access to Care	This is to give an insight into the patient's burden of treatment	Interpretation to infection control Opportunity costs	Please can we talk a bit about taking the TB drugs? How does that go for you? How do you cope with the treatment? What would make it easier?	

		impact on employment, education	How does it impact you to have to regularly collect the medicine? How much time have you devoted to this? What about the costs that this disease has caused you? How did you expect the treatment and care to be? and how does it compare with the reality? How much time do you spend getting care, getting treatment, taking the drugs and bringing samples for testing? What have you observed about the laboratory? How do think that the laboratory performs? What is the lab staff view TB patients? (Hmmm... tell me a bit more about that) Do you think all TB patients, including MDR-TB patients, are treated the same in the facility? Why/why not?	
Quality of Family Care/ Support	This topic will explore how the people in their lives treat them in regards to their diagnosis. This will be the first aspect of stigma to be discussed as it is more objective then the conversation can go into more depth into the participants feelings.	Community members Microaggressions Friends Family	Since you learned about DR-TB, have you made any changes in your social relationships? Has your diagnosis impacted your relationship with your spouse/partner/family? Friends? employer? How? Have your close contacts been screened for DR-TB? Please can you tell me about how that is done?	This section is to focus on their experienced discrimination, social exclusion. It may be difficult for them to talk about this, make sure you listen and acknowledge their experiences. Try and touch on the 4 themes, but allow the participant to control which ones have affected them the most
QUALITY OF CLINICAL MANAGEMENT		monitoring of clinical progress adherence behavior	What additional investigations (e.g. DST, ECG, X-ray) are needed? How are the costs of these additional tests covered? If by you, do you ever need to postpone examinations due to financial issues?	

			Do you find the investigations necessary? why/why not? Did the family perceive any delays in carrying out and reporting investigations? Are there health system issues that have made your treatment more challenging?	
Coping	This area will identify any supports that patients find impactful, coping mechanisms and also assess the participants internal stigma by identifying 'hopelessness' which is a previously identifies feeling for MDR-TB patients	Coping Aspirations Hopes Plans	When you think about your future, what do you see for the year ahead? Has there been anything in your life that has helped you to keep going? Are there any supports that were important? Did the program or any particular organization or group support you in ways that made a difference? Do you have any plans for when you have completed treatment? What would you like to happen next?/What do you think will happen? Why / How do you think this DR-TB happened to you?	Try and identify the positive aspect of their life that have supported them throughout their illness. Reinforce the positive influences in their lives so that they leave the interview feeling slightly better. "That's great that you have such a supportive family"
Patient Important outcomes and policies	This area is to identify priority areas of programmatic change	Expert advice Policy recommendations	What kind of changes or supports in the way the treatment is provided in the facility do you think would have made your MDR-TB treatment easier? What advice or recommendations do you have for policy makers for improving the quality of DRTB treatment?	Probe well her for specific recommendations
Closing	Close on less emotive subjects- prepare them for follow up.	Expressing gratitude for their time so far Final additions Express gratitude again	We're nearly done, so thank you for your time in this interview. It has been really interesting and I have already learnt a lot that will be very helpful for our study. Is there anything else that you think I should know about or would like to share with me for this research?	Hopefully they will be more relaxed by the end of the interview and provide anything we may have missed

				Ask a final open ended question inquiring if there is anything else relevant to the study that they thing we should know
Closing: Thank you for participating in this study. Thank them for letting me be privileged to hear you story. We really appreciate you taking the time to talk to us about this sensitive and very important issue. This interview will be analyzed together with other interview to gain an understanding of how DR-TB patient's experiences can be improved.				

Interview and Interviewer Characteristics

INTGEN	male female unknown/non-binary	☐ ☐
INTtry	Number of respondent contacts prior to interview	☐ ☐
INTappt	Number of prior appointments set before interview	☐ ☐
INTdate	Date of interview:	
INTUUID	Interviewer unique code:	
INTTAB	Tablet #	
INTLANG	Interview language English other specify	
LANG	Languages spoken in interview	String text field
INTLENGTH	Duration of interview start (time stamp)	
QA1	Interview status (1.0) 1. Incomplete (less than 50% of all Qs answered) 2. Partial (50%-80% Qs answered), 3. Complete (> 80% Qs completed)	
QA2	Quality of the rapport between interviewer and respondent (scale of 1 (worst) to 10 (best))	
QA3	Criticisms of the KII contents from the respondent 1. Too time consuming 2. Qs hard to answer (wrong respondent) 3. Too sensitive 4. Not pertinent 5. Cannot remember specifics requested 6. Skepticism about motives of survey 7. Other	
QA4	Specific criticism	

C. Interviewer field notes (for each question write a minimum of 5 sentences)

Questions to be answered by the interviewer in the fieldnotes

Diagnosis

- a. Was the initial assessment of the [insert name]'s condition technically adequate?
- b. Was [insert name]'s medical condition (and complications) correctly diagnosed?
- c. If not, why does the family think it was not?
- d. Was there any delay in seeking the DR-TB diagnosis?
- e. Was there any delay in communication among members of staff (e.g. between lab and doctor on duty) that contributed to delayed DR-TB diagnosis?
- f. Were all the necessary investigations (e.g. DST, ECG, X-ray) ordered?
- g. If not, why does the family think they were not ordered?
- h. Were all the necessary investigations carried out?
- i. If not, what why not?
- j. Were all the investigations perceived as necessary by the family?
- k. Did the family perceive any delays in carrying out and reporting investigations?

I. DR-TB Treatment

- a. How did the family perceive the initial DR-TB treatment? Were care and treatment regimen viewed as adequate? (e.g., stabilize the [insert name]'s condition)?
- b. How did the family perceive the subsequent DR-TB treatment as adequate (e.g. monitoring, interventions, drugs, identification of complications or infection)?
- c. How did the family perceive the timeliness and responsiveness of patient management? What specific words or phrases were used to describe the speed of intervention?
- d. Did the family perceive that the treatment was based on a standard DR-TB treatment protocol or an approach tailored to this individual?
- e. Did the family perceive that the DR-TB treatment given in accordance with what is supposed to occur?
- f. Were each of the problems identified dealt with properly in their view?
- g. Was there any delay in ordering or dispensing DR-TB treatments, e.g. because of a delay in key staff seeing the patient or in recognizing the need for treatment?
- h. Was there any delay in receiving any necessary treatment? Please be specific.
- i. Were there socio-economic barriers?

2. Monitoring and further treatment

- a. Did the family perceive that the correct follow-up DR-TB treatment was prescribed?
- b. Was it based on guidelines? Was it carried out as prescribed?
- c. Was adequate monitoring ordered? Was it based on guidelines? Was it carried out as prescribed?
- d. Was DR-TB or ancillary medicine access a challenge for this family? How?
- e. Was adherence to the regimen a challenge for this family? How?

3. Discharge

- a. Did the family perceive that the timing of discharge appropriate?
- b. Did the family perceive that follow-up DR-TB management after discharge was adequate?
- c. Was HOSPAZ involved in palliative care?

KII # 6: Health Care Workers (Childhood TB and Child Contact Diagnosis and Prevention)

A. Informed Consent

Good morning/afternoon, my name is.....I am working with IBTCI which is a consulting firm conducting an evaluation of USAID support towards the TB response in Zimbabwe. USAID has supported the Zimbabwean government's commitment towards eliminating TB. The USAID mission has commissioned an external evaluation to understand the tangible benefits accrued to Zimbabwe's TB program, especially Case Finding/ Investigation that have been made to date. As well, through this evaluation we want to learn about best practices and lessons learned regarding the USAID's support to the National TB Program.

You have been selected as a respondent due to your knowledge of TB interventions and your key role in the TB response. Your involvement in the evaluation is voluntary and information you provide is confidential. Responses you provide will not be linked to your name and information will not be used for purposes other than the evaluation. Any information you provide that can identify you will be kept strictly confidential by the parties conducting this study to the maximum extent permitted by the laws of Zimbabwe and the United States Government. The parties include the IBTCI evaluation team. These parties will use the information for analytical purposes and will not reveal your identity.

The interview should take approximately 60-90 minutes. You may choose not to answer any or all questions for any reason. At any point during the interview if you wish to end, please let me know and I will stop asking you questions. In other words, you have the option to not participate and there will be no consequences for your non-participation. Regardless of your responses, you should not anticipate any benefits nor repercussions to ensue. You may contact Victoria James, Senior Evaluator country, at +263 77 406 1851 victoria@nedico.co.zw or Ellen Mitchell at emhmitchell@gmail.com if you have questions, concerns or complaints about the study or your rights as a participant. If you have any questions for me, please feel free to ask at any time.

In order to capture all the important insights you will share with us, we would like to audio record this interview.

Do I have your permission to continue with the interview and start the recording?

For the interviewer:

Informed Consent: Yes ☐ No ☐

Consent to Record: Yes ☐ No ☐

Start recorder ☐

Goals

1. Seek evidence of exposure to specific childhood TB support by USAID supported IPs
2. Seek evidence of outcomes of specific childhood Tb support from USAID supported Implementing Partners.
3. Understand the challenges HCW and families experience in contact investigation and preventive therapy.

HOW	How can childhood TB bacteriologically confirmed in this facility?	Xpert on sputum Xpert on stool	
REFER	If diagnosis is not done at the facility, where do you refer them to (probe for name of facility, how far the facility is, how much does transport on average cost to the referral facility and back, what (estimated) proportion of parents of children with presumed TB are able to attend the referral facility and how long does it take for results to come back to the facility)?		
EXCLUDE	What methods are used to rule out and rule in active TB in children under five contacts?	Symptom checklist Chest x-ray Xpert stool urine LAM TB LAMP tuberculin skin test IGRA Other, specify	Check all that apply
ELIGIBL	What makes a child contact under five eligible for preventive TB therapy (aka IPT)?	Absence of symptoms Negative TB test Other, specify	
estYIELD	What is the yield of TB contact investigation among under-fives at this facility? In other words, how often do you diagnosis TB in child contacts? (probe for specifics) Estimate the proportion of child contacts screened who are diagnosed with active TB?		
CII	What approaches/strategies of TB Contact Investigation are in place in this facility?	I) Pull – ask to bring contacts for screening II) Push- go to HH to screen in house III) Other, specify	
HELP	What organizations are engaged in contact investigation support in this district?	CSOs, CHW, CHVs visit homes of TB patients?)	

Introduction: Good morning/afternoon, my name is [Name of interviewer], and I will be interviewing you today. If you don't mind, my colleague, [Name of observer], will be sitting in the room observing the interview. We would want to learn about child TB management here. I will start with some general questions, then I will go into more details of your experiences with childhood contact investigation and preventive therapy. Before we begin I would like to remind you of how grateful we are for their time and that there are no wrong or right answers. This is a time for you to share your knowledge and understanding about childhood TB management in this area. The second part of the interview will be audio recorded, if you agree. I would like to reassure you that anything they say will be treated in confidence and that your name will not be published on any documents to do with the study. You are allowed to skip questions if you feel uncomfortable or you can ask me to repeat a question if it's not clear.

Key area of investigation	Themes	Example questions
Basic background questions WARM UP	Education Age Health care experience Household	Are you originally from [place]? How did you come to live there? What do you do for work? How long have you been doing this job? What is your role in childhood TB in this facility? How do you get to work?
Daily work life	Work structure Strengths Challenges Colleague relationships	What do think of child TB services here? What is working well in your opinion? What do you find the most challenging about working on childhood TB? What does the facility administration think of childhood TB services?
CHILDHOOD TB	Diagnosis	Now I'd like to ask about your caseloads and specific approaches to childhood TB used here. Who is considered qualified to make the childhood TB diagnosis? What methods are used to rule out and rule in or investigate for active TB in children under five who are household contacts? How about bacteriological confirmation? What strategies are being tried here? Probe for stool testing for GeneXpert, urine LAM, biopsy, How are sputum samples obtained from the young children?

		How do you obtain chest x-ray for a child under five here?
USAID SUPPORTED IPS	Exposure Impressions of quality	How much support from external partners do you receive in your facility? Which are the external partners that support the TB work in general and childhood TB work in particular? What are your impressions of the external partners who come here to advise, support, teach, and support you in your work? How have they effected the work on contact investigation and childhood Tb in particular?
New shorter regimens	Pediatric formulations Shorter regimens	How was it to adapt to the new formulations and shorter regimens? Do you think all children under five exposed to TB should be initiated on the shorter regimen of TPT? Why/why not? What makes a child contact under five eligible for preventive TB therapy (aka IPT)? And makes a child contact not eligible for TPT? Are all/most eligible child contacts started on TPT in this facility? If yes, how have you achieved that? If not, why not? In your experience, how do children and their parents cope with TPT?
TPT challenges	Logistics Treatment side effects HCW views of the symptoms and side effects Adherence	What are the trade-offs or challenges in providing TPT for eligible child contacts < 5 for you? How do the children on TPT (or their parents/guardians) ever tell you about their drug side effects? how is preventive therapy monitored ? In theory or in practice? what are some of the challenges families face to complete TPT in childnre under 5? probe – why? How doare the challenges managed
Data and surveillance	HCW paperwork burden for contact tracing and TPT	How much paperwork is involved in documenting the clinical care of patients with childhood TB? Please describe the types of forms and information that needs to be gathered in the event of contact tracing and childhood contact evaluation. How much of time is needed to do contact evaluation including to fill out the various registers and do follow-up? Does recording keeping take time from your clinical work? What is done with all the data? Who uses it? Does it help you in your work? If yes, how? If not, why not?
Capacity building	Exposure to USAID IP interventions Satisfaction with exposures	How confident in the diagnosis of childhood TB and initiation of TB preventive treatment do you feel ? Are there gaps where mentoring might be useful or do you feel that you've received sufficient information?

		Have you been able to attend any capacity building (trainings) online this year? Which ones have you participated in and how did you like them? How were they organized? And what was the goal? Who gets chosen for these trainings? Are their specific areas where you feel you could use more skills or information? How have these trainings changed your practice?
Policy	Stressors Enabling environment	How familiar are you with the TB preventive therapy guidelines in Zimbabwe from 2020? Have you heard about the amendment in 2022? What are some of the policies that could be improved to help HCWs do their jobs better? What 3 key lessons have been learned in CI for children (probe at facility, community and family levels) What 3 key suggestions do you have to improve on childhood TB (diagnosis, prevention, therapy and treatment)?
COVID		Overall how did COVID -19 affect TB activities at this facility (probe for access, prevention and treatment)? Specifically how did COVID-19 impact contact investigation? What else (besides COVID) do you think accounts for the decline in pediatric case finding in 2020 at your facility? What do you think explains the 57% increase in coverage of preventive treatment for household contacts in 2020 nationally the context of a strong decrease in overall case notifications? Being a HCW with so much happening can be very stressful and even frustrating. What are some of the frustrations that staff are having?
Closing	Expressing gratitude for their time so far Final additions Express gratitude again	We're nearly done, so thank you for your time in this interview. It has been really interesting and I have already learnt a lot that will be very helpful for our study. Is there anything else that you think we should know about or would like to share with me for the valuation of USAID funded interventions?

I thank you again for your time and information. All the information from all districts will be compiled and only aggregate results shared (i.e. without mention which facility or person said what).

B. Interview and Interviewer Characteristics

INTGEN	male female unknown/non-binary	[][]
INTtry	Number of respondent contacts prior to interview	[][]
INTappt	Number of prior appointments set before interview	[][]
INTdate	Date of interview:	[][]/[][]/[][]
INTUUID	Interviewer unique code:	[][]
INTTAB	Tablet #	[][]
INTLANG	Interview language English other specify	[][]
LANG	Languages spoken in interview	String text field
INTLENGTH	Duration of interview start (time stamp)	[][]:[][]
QA1	Interview status (1.0) 1. Incomplete (less than 50% of all Qs answered) 2. Partial (50%-80% Qs answered), 3. Complete (> 80% Qs completed)	[]
QA2	Quality of the rapport between interviewer and respondent (scale of 1 (worst) to 10 (best))	[][]
QA3	Criticisms of the KII contents from the respondent 1. Too time consuming 2. Qs hard to answer (wrong respondent)	[]

	3. Too sensitive 4. Not pertinent 5. Cannot remember specifics requested 6. Skepticism about motives of survey 7. Other	
QA4	Specific criticism	

KII # 7: Laboratory Staff

I. Informed Consent

Good morning/afternoon, my name is.....I am working with IBTCI which is a consulting firm conducting an evaluation of USAID support towards the TB response in Zimbabwe. USAID has supported the Zimbabwean government's commitment towards eliminating TB. The USAID mission has commissioned an external evaluation to understand the tangible benefits accrued to Zimbabwe's TB program, especially Case Finding/ Investigation that have been made to date. As well, through this evaluation we want to learn about best practices and lessons learned regarding the USAID's support to the National TB Program.

You have been selected as a respondent due to your knowledge of TB interventions and your key role in the TB response. Your involvement in the evaluation is voluntary and information you provide is confidential. Responses you provide will not be linked to your name and information will not be used for purposes other than the evaluation. Any information you provide that can identify you will be kept strictly confidential by the parties conducting this study to the maximum extent permitted by the laws of Zimbabwe and the United States Government. The parties include the IBTCI evaluation team. These parties will use the information for analytical purposes and will not reveal your identity.

The interview should take approximately 30 minutes. You may choose not to answer any or all questions for any reason. At any point during the interview if you wish to end, please let me know and I will stop asking you questions. In other words, you have the option to not participate and there will be no consequences for your non-participation. Regardless of your responses, you should not anticipate any benefits nor repercussions to ensue. You may contact Victoria James, Senior Evaluator country, at +263 77 406 1851 victoria@nedico.co.zw or Ellen Mitchell at emhmittchell@gmail.com if you have questions, concerns or complaints about the study or your rights as a participant. If you have any questions for me, please feel free to ask at any time.

In order to capture all the important insights you will share with us, we would like to audio record this interview.

Do I have your permission to continue with the interview and start the recording?

For the interviewer:

Informed Consent: Yes ☐ No ☐

Consent to Record: Yes ☐ No ☐

Start recorder ☐

Introduction: Good morning/afternoon, my name is [Name of interviewer], and I will be interviewing you today. If you don't mind, my colleague, [Name of observer], will be sitting in the room observing the interview. We would want to learn about child TB management here. I will start with some general questions, then I will go into more details of your experiences with childhood contact investigation and preventive therapy. Before we begin I would like to remind you of how grateful we are for their time and that there are no wrong or right answers. This is a time for you to share your knowledge and understanding about childhood TB management in this area. The interview will be audio recorded, if you agree. I would like to reassure you that anything they say will be treated in confidence and that your name will not be published on any documents to do with the study. You are allowed to skip questions if you feel uncomfortable or you can ask me to repeat a question if it's not clear.

Warm ups	What does a typical day in the lab look like for you? How long have you been doing this job?	
Access	2. Can you describe for me the laboratory services that your facility offers to TB patients? Probe: Tell me more? 3. How often do you receive training in TB laboratory services? Follow up: a. What topics have you received training in in the last few years? b. Who provides the training? How useful was it? 4. How is the availability of diagnostic tests commodities for TB during COVID?	

	5. Which types of diagnostic tests for TB can you offer here in this lab? Follow up: c. Tell me more about the distribution of diagnostic tests in the health facilities? d. Are there TB tests you have heard about that you would like to offer? e. Have you been trained recently in any new diagnostics for TB	
maintenance	6. Tell me, has there ever been a time when the GenExpert machines didn't work? Follow up: a. What was that like for you? b. What was done to make sure that the machines are functional? c. Who was involved in the fix? Who maintains the different TB machines? Which partners are helpful?	IP
HRH	6. Tell me about the staff that works on TB diagnostic tests? Probe: Tell me more about human resources? 7. How is staff retention in your health facility? What could be the reason?	
	How regularly does the health facility send a sputum for monitoring of DR-TB treatment (for example at 2,3,6, 12 months and end of treatment)? Probe: a. Can you tell me more? 8. How do you communicate DST results with patients?	
referral	9. If the sample does not get processed at this health facility, can you describe the process for testing samples? Follow up: a. Where do you send the samples? b. How far are the next facilities that patients can get tests? c. How often do you send samples to the laboratory? d. Where do you store the sample until you transport to the next level of the lab facility? e. How do you transport the samples from the health facilities to the hospital laboratory?	

TAT	10. Can you tell me about the average turnaround time(TAT) from the reference lab for drug sensitivity results? Follow up: a. Tell me about a fast around time from your experiences b. Tell me about the slow turnaround time? c. What do you think the problems or root causes of the slower times? d. Have you seen any changes in turnaround times in the last year or so? If so, what do you think is causing the change?	
Quality/connectivity	11. Could you tell me about the sputum sample rejection rate in your laboratory? Follow up: a. what are the main reasons? Probe: a. Tell me more about that? Do you have external quality assurance? How does that work? How about Gx Alert or ASPECT? How long has this lab been connected? How do you use it? How does internet and electricity fluctuation impact the lab?	
commodities	12. How regular is the stock of the supply of reagents for the laboratory? Probe: tell me more? 13. Can you tell me the process of laboratory supply requisition? Follow up: a. How efficient is it? Has the situation changed in the last year or two? How?	
	14. What are the mains challenges that you have in your laboratory? Follow up: a. What does that challenge mean for your work? b. How has this challenge evolved since 2019? 15. What could help overcome that challenge? 16. What could be done to improve TB diagnostics, from your point of view? 17. Is there anything you want to ask me?	

Many thanks for your time.

Interview and Interviewer Characteristics

INTGEN	male female unknown/non-binary	☐ ☐
INTtry	Number of respondent contacts prior to interview	☐ ☐
INTappt	Number of prior appointments set before interview	☐ ☐
INTdate	Date of interview:	/ /
INTUUID	Interviewer unique code:	
INTTAB	Tablet #	
INTLANG	Interview language English other specify	
LANG	Languages spoken in interview	String text field
INTLENGTH	Duration of interview start (time stamp)	:
QA1	Interview status (1.0) 1. Incomplete (less than 50% of all Qs answered) 2. Partial (50%-80% Qs answered), 3. Complete (> 80% Qs completed)	
QA2	Quality of the rapport between interviewer and respondent (scale of 1 (worst) to 10 (best))	
QA3	Criticisms of the KII contents from the respondent 1. Too time consuming 2. Qs hard to answer (wrong respondent) 3. Too sensitive 4. Not pertinent 5. Cannot remember specifics requested 6. Skepticism about motives of survey 7. Other	
QA3b	Specific criticisms (define)	

intcode	Interviewer CODE		
PROVINCE	Provincial code		[]
DISTNUM	District code	1) Kwekwe 2) Gwanda 3) Zvishavane 4) Insiza 5) Mberengwa 6) Chegutu 7) Bulawayo 8) Masvingo 9) Pilot District	[]
	FACILITYNAME	1) Kwekwe General Hospital, Kwekwe 2) Gwanda Provincial Hospital, Gwanda 3) Zvishavane District Hospital, Zvishavane 4) Filabusi District Hospital, Insiza 5) Mberengwa Rural Hospital, Mberengwa 6) Chegutu District Hospital, Chegutu 7) Entumbane Clinic, Bulawayo 8) Masvingo Provincial Hospital, Masvingo 9) Pilot Facility	[]
FAC1	institution government, confessional (mission) or for private or non- governmental community based?	1) public 2) Private for-profit 3) confessional/missionary 4) non-governmental non-religious	[]
FAC2	Facility level Rural health centers/clinics (in urban areas; no inpts), Polyclinics/maternity centers (inpt facility for deliveries), Rural hospital District hospital Provincial hospital Central hospital		[][]
date.int	Date of data collection dd/mm/yy	[][]/[][]/[][]	

Pick four (4) patients from the QTR 4 2021 of the TB register randomly

B+ PTB INDEX CASE #I

Indexnumber I	Which B+PTB index patient is this (1-4)		
AGEI	Age of the indx		
BACI	Confirm index had bacteriologically confirmed TB (i.e. GeneXpert positive patients only)	Yes No	
PTBI	Confirm index had pulmonary disease (not extrapulmonary)	Yes No	
HHI	Confirm index lives in a household?—exclude cases from prisons or other residential settings (because they are not households).	Yes No	
Indexregistry I	What is the Index B+ PTB patient's TB registry number?		
Linkname I	last name of index case (for linking only)do not enter in database		
Genderindex I	gender of index case	male=1, female=2	
Formavail I	Is the contact tracing form available for this index case?	Yes No unsure/ not recorded	
Fromfill I	Is the contact tracing form filled completely for this index case	Yes= 1 No = 0 mostly complete=2 incomplete=3	
total.hhcontacts I	How many household child contacts does this index case have?		
WHYMISS I	Why is the tracing form incomplete or missing?		

WHYNOTDONE	Why was contact investigation not conducted?		
IndexI_diagnosis_date	What date was the index patient diagnosed with TB?	[][]/[][]/[][][][]	
IndexI_risk_factors	Which risk groups did the index patient belong to?		
PrevI_tb_hiv	Has the index patient been tested for TB/HIV?		

B+ PTB INDEX CASE #2

Indexnumber2	Which B+PTB index patient is this (1-4)		
AGE2	Age of the indx		
BAC2	Confirm index had bacteriologically confirmed TB (i.e. GeneXpert positive patients only)	Yes No	
PTB2	Confirm index had pulmonary disease (not extrapulmonary)	Yes No	
HH2	Confirm index lives in a household?—exclude cases from prisons or other residential settings (because they are not households).	Yes No	
Indexregistry2	What is the Index B+ PTB patient's TB registry number?		
Linkname2	last name of index case (for linking only)do not enter in database		
Genderindex2	gender of index case	male=1, female=2	
Formavail2	Is the contact tracing form available for this index case?	Yes No unsure/ not recorded	
Fromfill2	Is the contact tracing form filled completely for this index case	Yes= 1 No = 0 mostly complete=2 incomplete=3	
total.hhcontacts2	How many household child contacts this index case have?		
WHYMISS2	Why is the tracing form incomplete or missing?		
WHYNOTDONE	Why was contact investigation not conducted?		

Index2_diagnosis_date	What date was the index patient diagnosed with TB? (QTR 4 2021)	[][]/[][]/[][][][]	
Index2_risk_factors	Which risk groups did the index patient belong to?		
Prev2_tb_hiv	Has the index patient been tested for HIV?		

B+ PTB INDEX CASE #3

Indexnumber3	Which B+PTB index patient is this (1-4)		
AGE3	Age of the indx		
BAC3	Confirm index had bacteriologically confirmed TB (i.e. GeneXpert positive patients only)	Yes No	
PTB3	Confirm index had pulmonary disease (not extrapulmonary)	Yes No	
HH3	Confirm index lives in a household?—exclude cases from prisons or other residential settings (because they are not households).	Yes No	
Indexregistry3	What is the Index B+ PTB patient's TB registry number?		
Linkname3	last name of index case (for linking only)do not enter in database		
Genderindex3	gender of index case	male=1, female=2	
Formavail3	Is the contact tracing form available for this index case?	Yes No unsure/ not recorded	
Fromfill3	Is the contact tracing form filled completely for this index case	Yes= 1 No = 0 mostly complete=2 incomplete=3	
total.hhcontacts3	How many household child contacts this index case have?		
WHYMISS3	Why is the tracing form incomplete or missing?		
WHYNOTDONE	Why was contact investigation not conducted?		

Index3_diagnosis_date	What date was the index patient diagnosed with TB? (QTR 4 2021)	[][]/[][]/[][][][]	
Index3_risk_factors	Which risk groups did the index patient belong to?		
Prev3_tb_hiv	Has the index patient been tested for TB/HIV?		

B+ PTB INDEX CASE #4

Indexnumber4	Which B+PTB index patient is this (1-4)		
AGE4	Age of the indx		
BAC4	Confirm index had bacteriologically confirmed TB (i.e. GeneXpert positive patients only)	Yes No	
PTB4	Confirm index had pulmonary disease (not extrapulmonary)	Yes No	
HH4	Confirm index lives in a household?—exclude cases from prisons or other residential settings (because they are not households).	Yes No	
Indexregistry4	What is the Index B+ PTB patient's TB registry number?		
Linkname4	last name of index case (for linking only)do not enter in database		
Genderindex4	gender of index case	male=1, female=2	
Formavail4	Is the contact tracing form available for this index case?	Yes No unsure/ not recorded	
Fromfill4	Is the contact tracing form filled completely for this index case	Yes= 1 No = 0 mostly complete=2 incomplete=3	
total.hhcontacts4	How many household child contacts this index case have?		
WHYMISS4	Why is the tracing form incomplete or missing?		
WHYNOTDONE	Why was contact investigation not conducted?		
Index4_diagnosis_date	What date was the index patient diagnosed with TB? (QTR 4 2021)		
Index4_risk_factors	Which risk groups did the index patient belong to?		

Prev4_tb_hiv	Has the index patient been tested for TB/HIV?		
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Please fill in this form for each new TB Household child contact under 15 years of age of each of the 4 index cases

welcome			
Indexnumber I	To which B+PTB index patient does this child belong (1-4)	1 2 3 4	[]]
Indexregistry I	What is the Index B+ PTB patient's TB registry number?	[][][] [][][][][][] []	
childlink	What is the link between index case and this child?	son/daughter niece/nephew neighbour fosterchild grandchild sibling other	[]]]]]]
hhccontact _demograp hics	Please enter the Household child contact's details below		
hhccontact_fi rstinitial	What is the TB Household child contact's first initial?		[]
hhccontact_l astinitial	What is the TB Household child contact's last initial?		[]
hhccontact_d ob	What is the Household child contact's date of birth? (dd/mm/yyyy)	[][]/[][]/[][][][] [][][][]	
gender	What gender is the Household child contact?	male=1, female=2	[]
birthORDER	What is the birthorder of the child HH contact?	Hint: order the children by age	[]]]
hhccontact_r isk_factors2	Household child contact's risk factors for progression to TB disease		
hhccontact_h ighrisk	What risk factors does the Household child contact have for progression to TB disease?		[]
prev_tb	Has the child HH contact previously been treated for TB?	Yes No unsure / not reported	[]]
BCG	Does the child HH contact have a BCG scar?	Yes No unsure/ not recorded	[]]
tested_hiv	Has the child HH contact been tested for HIV?	Yes No unsure/ not recorded	[]]

hiv_outcome	If yes, what was the outcome of the HIV test?	Yes No unsure/ not recorded	[]
pollution	Does the Household child live with indoor air pollution? (i.e. smoking or wood fuel)	Yes No unsure/ not recorded	
screened	Was this child screened for TB symptoms?	Yes No unsure/ not recorded	[]
wherescreen	Where did TB symptom screening take place?		
whynotscreen	Why was the child not screened for TB symptoms?		
datescreen	If screened, indicate the date when child was screened (dd/mm/yyyy)	[][]/[][]/[][][][]	
symptoms	Is the Household child contact currently symptomatic for TB?	Yes No unsure/ not recorded	[]
Give some detail of the child's TB symptoms if they are symptomatic			
what_symptoms	Please select ALL the TB symptoms the child had at screening	failure to gain weight irritability lethargy cough fever weight Loss wheeze lymphadenopathy night sweats crying	
hhcontact_symptom	How many weeks has the child had symptoms?	1 week 2 weeks < 1 month 1-6 months >6 months	[]

		unsure/ not recorded	
presumptive	TB presumed?	Yes No (skip to TPT) unsure/ not recorded	[]]
idhhcontact_case_number	What is this child contact's presumptive TB registry number?	[][][] [][][][][] []	
Which TB investigations have been requested for symptomatic child contact?			
Collectattempt	Sputum sample collection attempted	Yes No unsure/ not recorded	[]]
sputum_obtained	Was a sputum sample obtained?	Yes No unsure/ not recorded	[]]
sputum_GXP	Was a sputum sample sent for Genexpert?	Yes No unsure/ not recorded	[]]
WHYno_sputum	Why was a sputum sample not collected for the child?		
yes_sputum_tested	What was the outcome of the sputum Genexpert test?	0=negative 1=positive 3=no results (error, indeterminate) 77=not applicable-no test	[]]
stool	Was a stool sample collected for GeneXpert?	Yes No unsure/ not recorded	[]]
stooldx	What was the outcome of the stool Genexpert test?	0=negative 1=positive 3=no results 77=not applicable	[]]
urine_lam	Was a urine sample collected for urine LAM testing?	Yes No unsure/ not recorded	[]]
	What was the outcome of the urine LAM test?	0=negative 1=positive 3=no results	[]]

		77=not applicable	
cxr_request	Was a chest x-ray (CXR) requested for the child?	Yes No unsure/ not recorded	[]
CXRDX	What was the interpretation of the chest x-ray?	0=negative for TB 1=chest x-ray abnormalities compatible with TB 77=no chest x-ray completed	[]
tst_request	Was a test for LTBI requested/done, such as a tuberculin skin test?	Yes No unsure/ not recorded	
prev_test_outcome	If yes, what was the child HH contact's latent TB test result?	0=negative 1=positive 3=no results 77=not applicable	[]
referral	Has the child been referred for TB diagnosis elsewhere?	Yes No unsure/ not recorded	[]
wherereferred	Where was the child referred?		
whyrefer	Why was the referral needed?		
TB PREVENTIVE TREATMENT FOR ASYMPTOMATIC CHILD CONTACTS (TPT)			
screenTPT	Was asymptomatic child screened for eligibility for TB preventive treatment	Yes No unsure/ not recorded	[]
WhynoTPT	Why did eligibility screening for TPT not occur?		
ineligible	Was the child eligible for TPT	Yes No unsure/ not recorded	[]
WHYineligible	What was the reason for ineligibility?	AT Active TB disease, PN Peripheral Neuropathy,	[]

		AI Active Liver disease, DDI Drug to drug interactions, AA Heavy Alcohol Abuse, ON on TB treatment, CPT Completed IPT in the past 3 years, SR Severe skin rash, H Hypersensitivity reactions, PB Pregnant or breastfeeding, parental opposition Other-specify	
complTPT	Did the child complete TPT?	Yes (skip) No unsure/ not recorded	☐ ☐
discontinue	Why did the child discontinue TPT		
whichTPT	Which regimen was taken?	1. 3HP 2. 6H	☐ ☐
comment	Additional comments on this child:		

For Child Contacts Diagnosed with TB Disease

TBDX	Was the child diagnosed with active TB disease?	Yes No unsure/ not recorded	☐
BACCLIN	What was the diagnosis based upon	1. clinical information 2. bacteriological confirmation	☐
STARTTX	Did the child start TB treatment	Yes No unsure/ not recorded	☐
WHYNOTX	Why did the child not start TB treatment		

COMPLETETB TX	Did the child complete TB treatment successfully?	Yes No unsure/ not recorded	☐
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KII # 9: DR TB Patient Beneficiary/Survivor

A. Informed Consent

Good morning/afternoon/evening!

My name is ____ and assisting me are _____. Thank you for taking the time to listen to our explanation of the need to obtain your consent to participate with an interview and agreeing to talk with us. We are conducting an evaluation of USAID/Zimbabwe's TB Program. Your perspectives and suggestions are very important. There are no wrong answers but rather differing points of view.

Moreover, you will not receive any additional benefits nor will there be any consequences due to the nature of your responses. Keep in mind that we are just as interested in negative comments as positive comments. You may have noticed the microphone. We are recording part of the session because we do not want to miss any of your comments. People often say very helpful things in these discussions, and we cannot write fast enough to get them all down. We will not use your full name in the session. You may be assured of complete confidentiality and only members of our research team will have access to these recordings.

We anticipate that the interview will take approximately 1 hour.

For co-habitants or witnesses to the care of the DR-TB patient who died.

I am and this is..... who will help me by taking notes during this interview. We want to have this discussion so that we can use your ideas and opinions to improve the care of people with drug-resistant tuberculosis so that poor outcomes like {insert name} do not happen in the future. Listening to families we can better understand what it was like for **[insert name]** and your family. We hope that by talking with you, we can learn how to avoid these sad situations in the future and improve the care of families affected by DR-TB in this community.

Sometimes it is difficult to be open, especially when you are being asked about how other people do their work or talking about sad times. However I hope you can be open and honest with me because what you have to say can help others. Your information will be combined with the interview of many other families and your names will never be used. If you feel uncomfortable, we can take a break and return later. You may end this interview at any point and no one will be angry with you.

Because there will be a lot of information that I will not be able to remember or write down, I would like to tape record this discussion. If you do not feel comfortable with that, it is OK for me to take notes only.

Community code:			
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Patient's marital status	If relevant, include categories	☐ ☐
Relationship to the patient of respondent	mother/father spouse brother/sister son/daughter other household member Other (specify)	☐ ☐

C. Questionnaire

1. Gently ask 'what happened?' and 'why?'... and listen carefully, and probe a little. What do you think caused the problem that led to [insert name]'s death?
When did this problem start? ☐☐/☐☐/☐☐
2. Why do you think the illness started when it did?
3. What do you think the sickness does to people who have it? How does it work?
4. Were there any particular reasons why [insert name] got [insert name of sickness]?

Health seeking

1. When the [insert name] first had symptoms, was health seeking delayed?
2. Was support needed for [insert name] to obtain the initial diagnosis?
3. Was help available?
4. If not, was there a delay before the [insert name] was first seen by a staff member?

Diagnosis

1. Was the initial assessment of the [insert name]'s condition technically adequate?
2. Was [insert name]'s medical condition (and complications) correctly diagnosed?
3. If not, why does the family think it was not?
4. Was there any delay in seeking the DR-TB diagnosis?
5. Was there any delay in communication among members of staff (e.g. between lab and doctor on duty) that contributed to delayed DR-TB diagnosis?
6. Were all the necessary investigations (e.g. DST, ECG, X-ray) ordered?
7. If not, why does the family think they were not ordered?
8. Were all the necessary investigations carried out?
9. If not, what why not?
10. Were all the investigations perceived as necessary by the family?
11. Did the family perceive any delays in carrying out and reporting investigations?

Now I would like to ask you about the care [insert name] have received during his/her illness. I will read aloud an experience and please indicate how often (if ever) he/she had this experience during treatment . You can say never, very rarely, sometimes, often or almost always. You can also say "choose not to answer"

Health care experiences

	Compassionate care		
COMI	Did you feel that the health workers cared for helped [insert name] with kindness	Never=0, very rarely=1, Sometimes =2, Often=3, Almost always=4, choose not to answer =9	☐

COM2	Health workers helped to solve problem [insert name] was having.	Never=0, very rarely=1, Sometimes =2, Often=3, Almost always=4, choose not to answer =9	☐
COM3	A health workers talked positively about his/her recovery	Never=0, very rarely=1, Sometimes =2, Often=3, Almost always=4, choose not to answer =9	☐
COM4	The health workers showed concern and empathy for him/her	Never=0, very rarely=1, Sometimes =2, Often=3, Almost always=4, choose not to answer =9	☐
COM5	A health worker tried to help reduce his/her suffering	Never=0, very rarely=1, Sometimes =2, Often=3, Almost always=4, choose not to answer =9	☐
	Unethical care		☐
RIG1	[insert name] was attended in a place where other patients could hear or see me (clarify: lacking privacy).	Never=4, very rarely=3, Sometimes =2, Often=1, Almost always=0, choose not to answer =9	☐
RIG2	The health worker threatened [insert name]with negative consequences if I did not obey him/her	Never=4, very rarely=3, Sometimes =2, Often=1, Almost always=0, choose not to answer =9	☐
RIG3	The health workers mistreated [insert name]because I hadn't done all that [insert name] was told to do	Never=4, very rarely=3, Sometimes =2, Often=1, Almost always=0, choose not to answer =9	☐
RIG4	[insert name] was assured that my personal information would be protected (not shared)	Never=0, very rarely=1, Sometimes =2, Often=3, Almost always=4, choose not to answer =9	☐
RIG5	[insert name] was isolated from others or made to wear a mask although he/she was no longer infectious	Never=4, very rarely=3, Sometimes =2, Often=1, Almost always=0, choose not to answer =9	☐
RIG6	[insert name] was hospitalized even though [insert name] was not sick	Never=4, very rarely=3, Sometimes =2, Often=1, Almost always=0, choose not to answer =9	☐
	Discriminatory care		☐
DIS1	Some of the health workers did not treat [insert name]well because of how he/she looked	Never=0, very rarely=1, Sometimes =2, Often=3, Almost always=4, choose not to answer =9	☐
DIS2	Some health workers insulted him/her or his/her companions due to who he/she was	Never=0, very rarely=1, Sometimes =2, Often=3, Almost always=4, choose not to answer =9	☐
DIS3	[insert name] was treated with the same respect as any other client	Never=4, very rarely=3, Sometimes =2, Often=1, Almost always=0, choose not to answer =9	☐

DIS4	At the facility, [insert name] was made to feel that he/she deserved to have TB	Never=0, very rarely=1, Sometimes =2, Often=3, Almost always=4, choose not to answer =9	☐
	Disrespectful care		☐
QU1	[insert name] was kept waiting for a long time before receiving DR-TB services	Never=0, very rarely=1, Sometimes =2, Often=3, Almost always=4, choose not to answer =9	☐
QU2	Care for him/her was delayed due to internal problem of the health facilities'	Never=0, very rarely=1, Sometimes =2, Often=3, Almost always=4, choose not to answer =9	☐
QU3	All health workers listened to what he/she said	Never=4, very rarely=3, Sometimes =2, Often=1, Almost always=0, choose not to answer =9	☐
QU4	The health workers spoke to [insert name] in a language that he/she could understand	Never=0, very rarely=1, Sometimes =2, Often=3, Almost always=4, choose not to answer =9	☐
QU5	The health workers greeted [insert name] politely and knew his/her name	Never=0, very rarely=1, Sometimes =2, Often=3, Almost always=4, choose not to answer =9	☐
	Empowering care		☐
EMPI	[insert name] was encouraged to choose his/her own DR-TB treatment supporter	Never=0, very rarely=1, Sometimes =2, Often=3, Almost always=4, choose not to answer =9	☐
EMP2	[insert name] was given enough control over his/her own DR-TB treatment decisions	Never=0, very rarely=1, Sometimes =2, Often=3, Almost always=4, choose not to answer =9	☐
EMP3	[insert name] was given enough information to understand DR-TB disease and treatment	Never=0, very rarely=1, Sometimes =2, Often=3, Almost always=4, choose not to answer =9	☐
EMP4	I received information and tools to help me to protect his/her family and friends from DR-TB	Never=0, very rarely=1, Sometimes =2, Often=3, Almost always=4, choose not to answer =9	☐
EMP5	The health workers discussed with [insert name] how best to engage your family in DR-TB screening while preserving privacy	Never=0, very rarely=1, Sometimes =2, Often=3, Almost always=4, choose not to answer =9	☐

Community Care and Support

Did the [insert name] receive any kind of extra support from the TB program or the community to help get better?	I=yes, 0=no , 9=I don't know(skip to #)	☐
What treatment support did the patient receive?		

Food support?	1=yes, 0=no 7=n/a	☐
Financial support?	1=yes, 0=no 7=n/a	☐
Home-visits by health care provider?	1=yes, 0=no 7=n/a	☐
Counseling?	1=yes, 0=no 7=n/a	☐
Treatment reminders (SMS)?	1=yes, 0=no 7=n/a	☐
Transport reimbursement?	1=yes, 0=no 7=n/a	☐
Treatment supporter?	1=yes, 0=no 7=n/a	☐
Other (specify)	1=yes, 0=no 7=n/a	☐

When [insert name] was growing more ill, was there ever a time that nurses or doctors discussed palliative care options? Have of Hospice and Palliative Association of Zimbabwe (HOSPAZ)?

Thank the participant and tell her/him that their contribution has been very valuable. Emphasize that this information will be kept confidential and will only use to improve the care for future patients.

Make sure to give extra time to go over some of the misconceptions that were discussed. A TB factsheet could be handed out, but where literacy is an issue, talking with the people further would be more effective.

Remember that the household members of a person who has passed away from DR-TB are in need of TB screening themselves. Consider bringing screening tools and equipment to offer free diagnosis and treatment.

Interview and Interviewer Characteristics

INTGEN	male female unknown/non-binary	☐ ☐
INTtry	Number of respondent contacts prior to interview	☐ ☐
INTappt	Number of prior appointments set before interview	☐ ☐
INTdate	Date of interview:	
INTUUUID	Interviewer unique code:	
INTTAB	Tablet #	
INTLANG	Interview language English other specify	
LANG	Languages spoken in interview	String text field
INTLENGTH	Duration of interview start (time stamp)	
QAI	Interview status (1.0)	

	1. Incomplete (less than 50% of all Qs answered) 2. Partial (50%-80% Qs answered), 3. Complete (> 80% Qs completed)	
QA2	Quality of the rapport between interviewer and respondent (scale of 1 (worst) to 10 (best))	
QA3	Criticisms of the KII contents from the respondent 1. Too time consuming 2. Qs hard to answer (wrong respondent) 3. Too sensitive 4. Not pertinent 5. Cannot remember specifics requested 6. Skepticism about motives of survey 7. Other	
QA4	Specific criticism	

A. Informed Consent

Transcript Number:

Transcriber Name:

Date transcription completed:

May I have your permission to start the interviewing and begin recording?

Turn on audio recorder.

B. Pre-filled Socio-demographic Data

M1ID	Beneficiary UUID	
MNAMEI	Beneficiary first name or initial	
M2TNum	Beneficiary TB number	
M3PHON	Beneficiary phone number	
M4PROV	Beneficiary province ID	
M5DIS	Beneficiary district ID	

M6FAC	Beneficiary health facility ID	
M7Gen	What is the Beneficiary gender?	☐ male ☐ female ☐ non-binary

C. DR-TB Patient Formative Interview Guide – For patients who are alive

Introduction: Good morning/afternoon, my name is [Name of interviewer], and I will be interviewing you today because I want to understand more about care of people with DR-TB in this area. I will start with some general questions, then I will go into more details of your experiences as a MDR-TB patients. Before we begin I would like to remind you of how grateful we are for their time and that there are no wrong or right answers. This is a time for you to share your story and your knowledge. This interview will be audio recorded. I would like to reassure you that anything you say will be treated in confidence and that your name will not be on any documents to do with the study. You are allowed to skip questions and topics if you feel uncomfortable or you can ask me to explain a question if it's not clear.

Key area of investigation	Rationale	Themes	Example questions (without probes)	Explanatory notes
WARM UP RAPPORT Basic background questions	To learn the basic characteristics of the participant and start to make them feel comfortable	Income Education MDR-TB treatment months Age	How are you feeling this day? Can you tell me a bit about yourself?	This is important to make a good first impression and to help the participant feel at ease. Listen carefully and adapt the questions the person.
Daily life and social circle	To explore their household and social networks. This will be used to identify potential enacted stigma sources or treatment support network later in the interview	Household Relationships Social activities	How many are you in your family? Are they living with you? How was your life before you were told about this drug resistant TB disease? Can you tell me about your home? Do you have running water? Electricity? Radio? TV? A cellular phone? What sort of a toilet you have (a flush toilet, Blair, pit latrine)?	This will help to make the participant feel at ease. Listen carefully and adapt the questions to the person. Remember some of the details to ask later on in the interview “I remember you said that...”

Key area of investigation	Rationale	Themes	Example questions (without probes)	Explanatory notes
BACKSTORY	Try to identify if the DR-TB is primary or acquired	Diagnostic journey	Can you tell me a bit about your TB story? How did you get sick? How did you get diagnosed? What kinds of thoughts and feelings were foremost in your mind when you found out your TB was drug resistant? How were you treated? What have you learned about TB and TB treatment? Has anyone else in your family had TB? Was it drug-resistant TB?	How patients make sense of their experience is very important. Listen for what is said, and also what is NOT mentioned.
Health facility experiences and treatment	Problems with health care facilities can perpetuate stigma and deter patients from commencing or continuing with treatment. Some treatment side effects can cause anxiety and depression. If possible we try to differentiate internal stigma from treatment side effects	How they started treatment Treatment adherence Health care workers Knowledge Personable Side-effects	How far is this facility from your home? How do you travel here (by foot, bus, own car, other person's car)? What do you think about the care being provided? How are your relationships with the health care workers? And with other patients whom you may have met in this clinic/hospital? How long have you been taking treatment for? How do the medications affect you? How have these side-effects affected your life? Do you feel like the medications are working?	This section is to gain an understanding of their interactions with the MDR-TB treatment facility. This can include with health care workers, other patients and the public that see them there. Don't ask leading questions, don't assume that it is a negative experience.

Key area of investigation	Rationale	Themes	Example questions (without probes)	Explanatory notes
Access to Care	This is to give an insight into the patient's burden of treatment	Interpretation to infection control Opportunity costs impact on employment, education	How does it impact you to have to regularly collect treatment? How much time have you devoted to this? What about the costs that this disease has caused you? How did you expect the treatment and care to be and how does it compare with the reality? How much time do you spend getting care, getting treatment, taking the drugs and bringing samples for testing? What have you observed about the laboratory? How do think that the laboratory performs? What is the lab staff view TB patients? (Hmmm... tell me a bit more about that) Do you think all TB patients, including MDR-TB patients, are treated the same in the facility? Why/why not?	
Quality of Family Care/ Support	This topic will explore how the people in their lives treat them in regards to their diagnosis. This will be the first aspect of stigma to be discussed as it is more objective then the conversation can go into more depth into the participants feelings.	Community members Microaggressions Friends Family	How has your social circle responded to your diagnosis and treatment? Are they aware? How have they engaged with you since they learned? How are the relationships? (Mmm can you tell a bit more specifically what you've felt?) Since you learned about DR-TB, have you made any changes in your social relationships? Has your diagnosis impacted your relationship with your spouse/partner/family? Friends? Work colleagues? How? Have your close contacts been screened for DR-TB? Please can you tell me about how that is done?	This section is to focus on their experienced discrimination, social exclusion. It may be difficult for them to talk about this, make sure you listen and acknowledge their experiences. Try and touch on the 4 themes, but allow the participant to control which ones have affected them the most

Key area of investigation	Rationale	Themes	Example questions (without probes)	Explanatory notes
Health Transmission Stigma Adherence	The area focuses on their feelings and the impact of MDR-TB has had on them. They may have experienced some forms of mental illness such as anxiety or depression.	From diagnosis (intrinsic) From experiences (extrinsic) Coping mechanisms Blame/shame side effects/adverse events adherence behavior	Why / How do you think this DR-TB happened to you? Please can we talk a bit about taking the TB drugs? How does that go for you? How do you cope with the treatment? What would make it easier?	Best to use very open ended questions, listen carefully and engage to show the participant that you are interested in what they are saying. If the person has difficulty getting up in the morning, it may also indicate that they are depressed. Ensure you are sensitive to possible distress that discussing their mental state may cause.
Coping	This area will identify any supports that patients find impactful, coping mechanisms and also assess the participants internal stigma by identifying 'hopelessness' which is a previously identifies feeling for MDR-TB patients	Coping Aspirations Hopes Plans	When you think about your future, what do you see for the year ahead? Has there been anything in your life that has helped you to get through this period in your life? Were there any supports that were important? Did the program or any particular organization or group give you anything that made a difference? Do you have any plans for when you have completed treatment? Why/why not? What would you like to happen next?/What do you think will happen?	Try and identify the positive aspect of their life that have supported them throughout their illness. Reinforce the positive influences in their lives so that they leave the interview feeling slightly better. "That's great that you have such a supportive family"

Key area of investigation	Rationale	Themes	Example questions (without probes)	Explanatory notes
Policy	This area is to identify priority areas of programmatic change	Expert advice	What kind of changes or supports in the facility do you think would have made your MDR-TB treatment easier? What advice or recommendations do you have for policy makers for improving the quality of DRTB treatment?	Probe well her for specific recommendations
Closing	Close on less emotive subjects- prepare them for follow up.	Expressing gratitude for their time so far Final additions Express gratitude again	We're nearly done, so thank you for your time in this interview. It has been really interesting and I have already learnt a lot that will be very helpful for our study. Is there anything else that you think I should know about or would like to share with me for this research?	Hopefully they will be more relaxed by the end of the interview and provide anything we may have missed Ask a final open ended question inquiring if there is anything else relevant to the study that they thing we should know
Closing: Thank you for participating in this study. Thank them for letting me be privileged to hear you story. We really appreciate you taking the time to talk to us about this sensitive and very important issue. This interview will be analysed together with other interview to gain an understanding of how MDR-TB patient's experiences can be improved.				

D. Interviewer Characteristics

INTGEN	male female unknown/non-binary	☐ ☐
INTtry	Number of respondent contacts prior to interview	☐ ☐
INTappt	Number of prior appointments set before interview	☐ ☐
INTdate	Date of interview:	/ /
INTUUID	Interviewer unique code:	
INTTAB	Tablet #	
INTLANG	Interview language English other specify	
LANG	Languages spoken in interview	String text field
INTLENGTH	Duration of interview start (time stamp)	:
QA1	Interview status (1.0) 1. Incomplete (less than 50% of all Qs answered) 2. Partial (50%-80% Qs answered), 3. Complete (> 80% Qs completed)	
QA2	Quality of the rapport between interviewer and respondent (scale of 1 (worst) to 10 (best))	
QA3	Criticisms of the KII contents from the respondent 1. Too time consuming	

	2. Qs hard to answer (wrong respondent) 3. Too sensitive 4. Not pertinent 5. Cannot remember specifics requested 6. Skepticism about motives of survey 7. Other	
QA4	Specific criticism	

E. Interviewer Field Notes

For each question, please write a minimum of five sentences.

I. DR-TB Treatment

- a. How did the family perceive the initial DR-TB treatment? Were care and treatment regimen viewed as adequate? (e.g. stabilize the [insert name]'s condition)?
- b. How did the family perceive the subsequent DR-TB treatment as adequate (e.g. monitoring, interventions, drugs, identification of complications or infection)?
- c. How did the family perceive the timeliness and responsiveness of patient management? What specific words or phrases were used to describe the speed of intervention?
- d. Did the family perceive that the treatment was based on a standard DR-TB treatment protocol or an approach tailored to this individual ?
- e. Did the family perceive that the DR-TB treatment given in accordance with what is supposed to occur?
- f. Were each of the problems identified dealt with properly in their view?
- g. Was there any delay in ordering or dispensing DR-TB treatments, e.g. because of a delay in key staff seeing the patient or in recognizing the need for treatment?
- h. Was there any delay in receiving any necessary treatment? Please be specific.
- i. Were there socio-economic barriers?

2. Monitoring and further treatment

- a. Did the family perceive that the correct follow-up DR-TB treatment was prescribed?
- b. Was it based on guidelines? Was it carried out as prescribed?
- c. Was adequate monitoring ordered? Was it based on guidelines? Was it carried out as prescribed?
- d. Was DR-TB or ancillary medicine access a challenge for this family?

- e. Was adherence to the regimen a challenge for this family?
- 3. Discharge
 - a. Did the family perceive that the timing of discharge appropriate?
 - b. Did the family perceive that follow-up DR-TB management after discharge was adequate?
 - c. Was HOSPAZ involved?

ANNEX V: Sources of Information

Desk Review: The team conducted a desk review and bibliometric content analysis to understand the theories of change and purported mechanisms by which each grant/contract is expected to support the reduction in the incidence, morbidity and mortality from TB.

Key informant interviews (KII) were conducted with stakeholders, providers, and beneficiaries are needed to triangulate with the other data in order to interpret the meaning of the quantitative findings and to glean stakeholders, health care providers, and beneficiary perspectives on TB services.

Record Abstraction was conducted to solicit a retrospective clinical review of DR-TB patient care.

Childhood TB diagnostic and Prevention cascade was conducted facility level Childhood TB diagnosis and prevention cascades in the same facilities as the retrospective clinical review. Patient cascades are routinely constructed in Zimbabwe to determine where there is leakage along the diagnostic and treatment pathway

ANNEX VI: Disclosure of any Conflicts of Interest

Disclosure of Conflict of Interest for USAID Evaluation Team Members

Name	Riitta Dlodlo
Title	Senior Clinical Advisor
Organization	IBTCI
Evaluation Position?	☐ Team Leader ☒ X Team member
Evaluation Award Number (contract or other instrument)	
USAID Project(s) Evaluated (Include project name(s), implementer name(s) and award number(s), if applicable)	USAID Zimbabwe Health Project
I have real or potential conflicts of interest to disclose.	☐ X Yes ☐ No
If yes answered above, I disclose the following facts: <i>Real or potential conflicts of interest may include, but are not limited to:</i> 1. Close family member who is an employee of the USAID operating unit managing the project(s) being evaluated or the implementing organization(s) whose project(s) are being evaluated. 2. Financial interest that is direct, or is significant though indirect, in the implementing organization(s) whose projects are being evaluated or in the outcome of the evaluation. 3. Current or previous direct or significant though indirect experience with the project(s) being evaluated, including involvement in the project design or previous iterations of the project. 4. Current or previous work experience or seeking employment with the USAID operating unit managing the evaluation or the implementing organization(s) whose project(s) are being evaluated. 5. Current or previous work experience with an organization that may be seen as an industry competitor with the implementing organization(s) whose project(s) are being evaluated. 6. Preconceived ideas toward individuals, groups, organizations, or objectives of the particular projects and organizations being evaluated that could bias the evaluation.	I have a potential conflict of interest in that I have had and continue to have professional interaction with an organization (The Union Zimbabwe Trust) that leads the TB-LON implementation in the country (point #6). However, I note that I have not been involved in any way in the design or implementation of the above-mentioned activity (point #3). In addition, as requested by the national TB program, I reviewed and submitted my edits etc. (pro bono and among numerous other reviewers) the draft 2nd edition of the 'Making sense of TB data: guide for collection, analysis and use of TB data for health care workers'. The draft was circulated by Africa University.

I certify (1) that I have completed this disclosure form fully and to the best of my ability and (2) that I will update this disclosure form promptly if relevant circumstances change. If I gain access to proprietary information of other companies, then I agree to protect their information from unauthorized use or disclosure for as long as it remains proprietary and refrain from using the information for any purpose other than that for which it was furnished.

Disclosure of Real or Potential Conflict of Interest for USAID Evaluations

Instructions:

Evaluations of USAID projects will be undertaken so that they are not subject to the perception or reality of biased measurement or reporting due to conflict of interest.¹ For external evaluations, all evaluation team members will provide a signed statement attesting to a lack of conflict of interest or describing an existing conflict of interest relative to the project being evaluated.²

Evaluators of USAID projects have a responsibility to maintain independence so that opinions, conclusions, judgments, and recommendations will be impartial and will be viewed as impartial by third parties. Evaluators and evaluation team members are to disclose all relevant facts regarding real or potential conflicts of interest that could lead reasonable third parties with knowledge of the relevant facts and circumstances to conclude that the evaluator or evaluation team member is not able to maintain independence and, thus, is not capable of exercising objective and impartial judgment on all issues associated with conducting and reporting the work. Operating Unit leadership, in close consultation with the Contracting Officer, will determine whether the real or potential conflict of interest is one that should disqualify an individual from the evaluation team or require recusal by that individual from evaluating certain aspects of the project(s).

In addition, if evaluation team members gain access to proprietary information of other companies in the process of conducting the evaluation, then they must agree with the other companies to protect their information from unauthorized use or disclosure for as long as it remains proprietary and refrain from using the information for any purpose other than that for which it was furnished.³

Real or potential conflicts of interest may include, but are not limited to:

1. Immediate family or close family member who is an employee of the USAID operating unit managing the project(s) being evaluated or the implementing organization(s) whose project(s) are being evaluated.
2. Financial interest that is direct, or is significant/material though indirect, in the implementing organization(s) whose projects are being evaluated or in the outcome of the evaluation.
3. Current or previous direct or significant/material though indirect experience with the project(s) being evaluated, including involvement in the project design or previous iterations of the project.
4. Current or previous work experience or seeking employment with the USAID operating unit managing the evaluation or the implementing organization(s) whose project(s) are being evaluated.
5. Current or previous work experience with an organization that may be seen as an industry competitor with the implementing organization(s) whose project(s) are being evaluated.
6. Preconceived ideas toward individuals, groups, organizations, or objectives of the particular projects and organizations being evaluated that could bias the evaluation.

¹ USAID Evaluation Policy (p. 8); USAID Contract Information Bulletin 99-17; and Federal Acquisition Regulations (FAR) Part 9.5, Organizational Conflicts of Interest, and Subpart 3.10, Contractor Code of Business Ethics and Conduct.

² USAID Evaluation Policy (p. 11)

³ FAR 9.505-4(b)

Signature	
Date	May 7, 2021

