Quality of Tuberculosis Services Assessment in Uganda

Report

May 2020

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MEASURE Evaluation

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Conducting the QTSA survey outside a health clinic in Uganda. Photo: Jeanne Chauffour

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ABBREVIATIONS

ART	antiretroviral therapy
CHWV	community health worker and volunteer
DHIS2	District Health Information Software, version 2
DOTS	directly observed treatment, short-course
DR-TB	drug-resistant tuberculosis
DS-TB	drug-susceptible tuberculosis
FDC	fixed-dose combination
FGD	focus group discussion
GH	general hospital
HC	health center
IPC	infection prevention and control
JSI	John Snow, Inc.
IPT	isoniazid preventive therapy
IRB	Institutional Review Board
LTFU	lost to follow-up
MDR-TB	multidrug-resistant tuberculosis
MHREC	Mulago Hospital Research and Ethics Committee
MLI	Makerere University Lung Institute
MOH	Ministry of Health
NGO	nongovernmental organization
NTLP	National Tuberculosis and Leprosy Programme (Republic of Uganda)
PLHIV	people living with HIV
PPE	personal protective equipment
PWTB	people (or person) with tuberculosis
QA	quality assurance
QC	quality control
QTSA	Quality of TB Services Assessment
RRH	regional referral hospital
SDG	Sustainable Development Goal
SDP	service delivery point

TB	tuberculosis
TPT	tuberculosis preventive therapy
VHT	village health team
UAIS	Uganda AIDS Indicator Survey
UN	United Nations
UNHLM	United Nations High-Level Meeting
USAID	United States Agency for International Development
WHO	World Health Organization
WPR	weekly progress report

EXECUTIVE SUMMARY

Background

Despite the significant progress made to eliminate tuberculosis (TB) as a public health burden, it remains the world's leading cause of morbidity and mortality from a single infectious agent. The World Health Organization (WHO) estimates that 10 million people fell ill with TB in 2018 globally, with an estimated 1.2 million TB deaths among HIV-negative people and an additional 251,000 deaths among HIV-positive people.

Uganda is one of the 30 countries with the highest burden of TB/HIV, with an estimated TB incidence of 200 cases per 100,000. The proportion of multidrug-resistant tuberculosis (MDR-TB) and rifampin-resistant TB among new and previously treated TB cases was estimated at 1 percent and 12 percent, respectively, in 2018. For the estimated 86,000 people who fell ill with TB in 2019, TB treatment coverage was 65 percent, and the treatment success rate was 72 percent—both far below the 85 percent national target for 2019. In response, the Government of Uganda gave the Ministry of Health, through the National Tuberculosis and Leprosy Programme (NTLP), a mandate to bring the disease under control by means of providing high-quality prevention, diagnosis, and treatment services to affected Ugandans. Specifically, TB incidence is to be reduced by 5 percent by 2019/2020, and the treatment success rate among notified incident cases is targeted to increase from 75 percent in 2015/16 to 85 percent by 2019/20.

Evidence suggests that good quality of care in TB services helps patients and their families address their health needs safely and effectively (Reid, et al., 2019*;* Arsenault, Roder-DeWan, & Kruk, 2019). Studies reveal that deficiencies in quality of care often result from gaps in providers' knowledge, inappropriate use of available technology, and/or the inability of health institutions to respond to changes in patient health needs (Ibrahim, et al., 2014; Mohanan, Goldhaber-Fiebert, Giardili, & Vera-Hernández, 2016). Therefore, enhancing the use of TB services requires a system for assessing and improving the quality of TB services offered.

In 2019, MEASURE Evaluation conducted a Quality of TB Services Assessment (QTSA) in Uganda, in collaboration with the Makerere Lung Institute (MLI)—a local research organization at Makerere University's College of Health Sciences and the NTLP. The purpose of the QTSA was to evaluate TB services in randomly selected health facilities to identify the current quality of TB services and gaps in service quality. The study assessed three domains of quality of care: health facility *structure*, service delivery *process*, and service delivery *outcomes*. Results of this assessment are being used to develop strategic interventions and activities in the new national strategic plan for TB for 2020–2025 and for overall programmatic planning. For example, the results reinforced the need for the NTLP to ensure the availability of social protection services for TB patients. More information on QTSAs, including reports on and tools used in the assessments in other countries, may be found at the following link: https://www.measureevaluation.org/our-work/tuberculosis/quality-of-tb-services-assessments

Methods

The QTSA was a mixed method study that included information obtained from health facilities, TB service providers, TB patients, and community members. The quantitative component was a nationally representative cross-sectional study conducted at TB diagnosis and treatment health facilities in Uganda. Two hundred and

sixteen public and private health facilities providing TB prevention, diagnosis, and treatment services were randomly selected using a multistage sampling procedure from the District Health Information Software, version 2 (DHIS2) listing. Health facility TB staff and patients were also surveyed to provide insights on the structure, process, and outcomes of TB service delivery. Patients included in the study were confirmed drug-susceptible tuberculosis (DS-TB) and drug-resistant tuberculosis (DR-TB) TB patients, ages 15 years and older, who were visiting the health facilities on the day of data collection. For the quantitative component, four data collection tools—facility audit, provider interview, patient interview, and register review—developed by the MEASURE Evaluation QTSA team were used after their adaptation to the country context.

In addition to information collected using the four quantitative tools, a qualitative component was conducted that focused on the community-level perception of TB-related stigma. It consisted of eight focus group discussions (FGDs) with non-TB patients (community members). To facilitate these discussions, an FGD guide was designed to elicit information from participants on their knowledge of TB (including myths and misconceptions) and perceived stigma and discrimination related to TB disease.

The five tools used for the Uganda QTSA are available at the following link: https://www.measureevaluation.org/resources/publications/tl-20-79/

Data collection lasted 12 weeks, from September to December 2019. Ethical approval for the study was received from the John Snow, Inc. (JSI) Institutional Review Board in the United States, and the Mulago Hospital Research and Ethics Committee (MHREC) in Uganda. Additional approval was obtained from the Uganda National Council for Science and Technology and from the President's Office. Administrative clearance was obtained from district health officers in the districts where the study took place, including the directors of the regional referral hospitals (RRHs).

Results

Sample Characteristics

The sample consisted of 216 health facilities, nearly two-thirds located in rural areas. Most health facilities (77%) were managed by the government. The remaining 23 percent were mission/nongovernmental organizations (NGOs) or nonprofit facilities, with the exception of five private, for-profit facilities.

A total of 357 TB service providers were interviewed. About three-fifths (59%) worked at a Health Center (HC) III facility, and 62 percent were attached to a rural facility. About one-half had attained a diploma qualification, and the majority (57%) were nurses or midwives. Other health worker cadres interviewed included clinical officers, laboratory technicians/officers, and community health workers (CHWs). Only two medical doctors were interviewed. The research teams also interviewed 501 patients currently under treatment for TB. About three-quarters (73%) lived in rural areas, including 60 percent of the patients attending urban facilities. The majority (91%) of the patients reported having DS-TB.

Structural Indicators

TB diagnosis and treatment services were universally available at the facilities sampled. Some facilities also saw their services supplemented and expanded in their communities by village health teams (VHTs) and community health workers and volunteers (CHWVs). All facilities sampled screened for TB, provided TB diagnosis services through either onsite or offsite laboratory services, and managed patients on TB treatment.

Approximately 90 percent offered TB screening or treatment services for children. The provision of TB/HIV services, such as HIV testing for TB patients and HIV treatment services for coinfected patients, was also found at most facilities. However, only nine facilities (eight in urban locations and one in a rural area) initiated DR-TB patients on second-line TB treatment. All facilities in the sample used clinical signs and symptoms and smear microscopy to diagnose TB, whereas 42 percent used GeneXpert (Xpert MTB/RIF®) and 12 percent reported using x-ray as a diagnosis method. For TB diagnosis testing, the findings indicated that 98 percent of facilities had at least some onsite laboratory services available, such as smear microscopy (96%) and Xpert (42%) testing. Despite having onsite laboratories, most facilities (83%) reported that they also used offsite laboratory services because their laboratories were not equipped to provide all of the tests needed for TB diagnosis. All patients received services at the health facilities, regardless of their phase of treatment, and almost all facilities (89%) offered directly observed treatment. The facilities emphasized preventing loss to follow-up by focusing on patient tracking for missed appointments and providing reminders to support adherence to treatment.

Although the facilities provided a wide range of TB care, support and treatment services, patients reported a desire for additional elements that could enhance their treatment. For example, nearly 60 percent of the patients said that such services as home-based treatment, transport assistance, nutritional support, small group health education sessions, and rehabilitative services would be helpful for their treatment; however, fewer than one-quarter of the facilities offered these services.

VHTs/CHWVs played a major role in TB prevention and care by providing an array of services to support TB patients. More than 90 percent of the facilities used these cadres in such roles as tracing patients who missed follow-up visits, bringing patients back into care, providing community education about TB, and making home visits. A significant proportion of facilities also had VHTs and CHWVs carrying out other tasks, including screening for TB symptoms at the facility and in the community, linking TB patients back to the community, and conducting adherence counseling, psychosocial support, and triage.

The results showed that most laboratories in the assessed facilities used some type of quality control and quality assurance (QC/QA) procedures; 65 percent used both internal and external QC/QA procedures for smear microscopy tests. Most facilities had basic supplies of common medical equipment needed for physical exams. However, supplies for providing oxygen were limited.

Seventy percent or more of the facilities had first-line TB drugs observed on the day of the assessment, and 90 percent or more of those few facilities that provided services for DR-TB had the second-line TB drugs observed on the day of the assessment. Few facilities reported the availability of Q-TIB (1%) and 3HP (8%), which were not yet routinely provided in Uganda. For TB preventive therapy (TPT), 84 percent of facilities had isoniazid 100 mg, and 73 percent of facilities were found to have isoniazid 300 mg available on the day of the assessment.

Generally, most facilities' medicines and other essential supplies were stored appropriately and were well organized, especially at the RRHs and general hospitals (GHs). However, there was a need to ensure that supplies and commodities at all facilities were stored away from direct contact with walls, and that functional thermometers were present for regular temperature monitoring.

Adherence to general infection prevention and control (IPC) measures was observed at many facilities, but there was a general lack of IPC resources, such as IPC plans and confidential logs for staff with possible or

confirmed TB. Most facilities performed poorly on IPC, except for providing patient waiting areas with access to continuous fresh air (90%) and supplies for coughing patients (67%).

Most providers had a good knowledge and understanding of proper IPC measures and educated the TB patients accordingly; for example, requesting TB diagnosis tests if symptoms were present, providing basic information on TB prevention for close contacts of TB patients, and screening all family members of confirmed TB patients. However, provider practices did not include the use of personal protective equipment (PPE). Although 97 percent of the providers knew that using N-95 particulate respirators could protect them from inhaling the TB bacteria, only 67 percent reported doing so and despite 72 percent reporting that they had received training in TB infection control in the past two years.

Most (86%) of the TB units observed had at least one private area for TB counseling and consultations, especially facilities in rural areas. Most patients (90%) said that the waiting times to see healthcare providers when at the clinic were generally acceptable and reported an average waiting time of 48 minutes to see a healthcare provider.

Eight of 10 facilities sampled had received supervision from a higher-level office in the past three months, as per NTLP guidelines. An overwhelming majority (98%) of providers had received a programmatic monitoring and supportive supervision visit in the past three months. Guidelines for the diagnosis and treatment of TB among adults (desk guide) and flowcharts or algorithms on TB screening were the most common guidelines/protocols observed at the facilities.

Process Indicators

Although the assessment showed good overall provider-patient interaction, there were some gaps. Only 60 percent of the providers reported talking to patients about how their medications should be taken and the importance of completing the full course of treatment; fewer than one-half discussed possible side effects of the TB medications.

Nevertheless, the findings revealed that the majority of the patients knew that TB was transmissible and that crowded conditions increased the risk of TB transmission. However, a sizeable number of patients incorrectly assumed that TB can also be transmitted by sharing utensils and food, suggesting a need for clearer education on this issue.

Most (87%) providers interviewed reported that their facilities carried out contact investigation. Although one-half felt that all confirmed TB patients should have their contacts traced, only 38 percent said that they would prioritize contact investigations for DR-TB patients.

The assessment findings indicated a considerable presence of stigma. Perceived stigma among healthcare workers toward healthcare workers with TB was lower than perceived stigma by healthcare workers toward patients with TB. The patients also reported perceived stigma and discriminatory attitudes from the community, family/relatives, healthcare providers, and self-stigma. They perceived stigma as highest among community members, followed by self-stigma, family/relatives, and healthcare workers.

The assessment results showed a high level of patient satisfaction with the care they had received, with 59 percent saying that they were "satisfied" and 34 percent saying that they were "very satisfied." However, the patients suggested several improvements for the facilities' environment and infrastructure, such as building

more shelters or wards for TB patients, social protection interventions (transportation support, nutritional support/food baskets), and strengthening contact investigation.

As part of TB case management, providers reported on how they established trust with patients and what they discussed during the initial assessments. The findings showed that although providers communicated clearly with patients, fewer than one-half discussed key topics with their patients, including the patient's ability to follow the TB treatment plan, attitudes and beliefs about TB, potential barriers to treatment, and resources for facilitating access.

Overall, the patients did not report any major barriers to accessing TB care, especially in terms of the availability of medicines and clinic hours. However, 30 percent reported that the facility was not close enough to allow easy access, and some patients said that they had been turned away, or that they could not attend during work hours, suggesting the need to consider measures to facilitate transport and expand facility hours to broaden availability and accessibility of treatment.

Performance and Outcome Indicators

Only 30 percent of patients interviewed reported that they sought care at a health facility within two weeks of the onset of TB symptoms. One-fourth of patients did not have a treatment supporter to monitor their adherence to TB treatment, although the majority reported having treatment supporters, mainly family members, who observed the patients taking their medicine nearly every day. Almost all DS-TB patients interviewed had been on treatment for fewer than six months; DR-TB patients had been undergoing treatment for a longer period—seven months or more.

Results for TPT showed that 81 percent of adults living HIV and 67 percent of child contacts of TB cases completed the full courses of TPT. However, 14 percent of HIV-positive adults on TPT, and 29 percent of children had an unknown outcome status, suggesting the need for more rigorous data collection and timely updates to registers.

The findings showed that 57 percent of patients in the study cohort had successful treatment (28% cured and 29% with completed treatment); died (9%); lost to follow-up (7%); and unknown outcome that included those who transferred out (26%). The high percentage of unknown outcome should be a concern. Results could be due to the fact that the cohort evaluated had only recently completed their recommended treatment period and their outcomes were still being updated at the time of data collection.

The treatment outcomes differed markedly by type of facility. The treatment success rate was 39 percent at the RRHs compared with 51 percent at GHs, 68 percent at HC IVs, 59 percent at HC IIIs, and 71 percent HC IIs. These findings indicate an urgent need to examine the factors that may contribute to the variations in outcomes, and to develop strategies and activities to improve treatment outcomes.

Conclusion

The QTSA in Uganda highlights the strengths and gaps in the NTLP's ability to provide high-quality TB services to patients. The results show good performance on program indicators, such as the availability of drugs/medicines, HIV services, pediatric TB screening and treatment services, and provider training and behaviors. However, the assessment also highlights gaps, such as the unavailability of rapid TB diagnosis testing, long testing turnaround times, and limited services for DR-TB (only nine facilities in the sample

provided DR-TB services). The gaps identified also include knowledge and understanding of TB among patients, health-seeking behavior of symptomatic patients, supportive services for TB patients on treatment (such as transport and nutrition support), continuing stigma and discrimination, and data on treatment outcomes. These findings provide evidence not only for programmatic input, but also for designing responsive programs and interventions to enhance TB services countrywide. The results of this assessment have been used by the NTLP to support evidence in suggesting interventions and approaches to reduce stigma toward TB patients and the social protection of TB patients. This assessment and its findings can also be used in the coming years to continue to measure and improve the quality of services offered to TB patients and their families. A stakeholder data review meeting was conducted in Kampala in January 2020 at which the key findings were shared and recommendations were collaboratively prepared. They are provided in this report.

INTRODUCTION

Background

Tuberculosis (TB) remains a public health challenge around the world. In September 2018, heads of state committed to ambitious targets aimed at eliminating TB during the first-ever United Nations (UN) High-Level Meeting (UNHLM) on Tuberculosis, conducted at the UN General Assembly (WHO, 2018a). According to the 2018 Global Tuberculosis Report released by the World Health Organization (WHO), TB is one of the 10 leading causes of death worldwide, and the leading cause of death from a single infectious agent (WHO, 2019). An estimated 1.2 million deaths among HIV-negative people and 251,000 deaths among HIV-positive people were caused by TB in 2018. The case fatality rate for TB deaths was 16 percent, and there were an estimated 10 million new cases of TB disease in 2018, which is equivalent to 133 cases per 100,000 population. For drug-resistant tuberculosis (DR-TB), there were an estimated 558,000 new cases of rifampicin-resistant TB, 82 percent of which were multidrug-resistant tuberculosis (MDR-TB) cases (WHO, 2019).

WHO has identified Uganda as one of the highest TB/HIV burden countries (WHO, 2019). Based on the most recent WHO Global TB Report, Uganda had an annual TB incidence of 200 cases per 100,000 people, with an estimated 86,000 new TB cases and 19,000 TB-related deaths (including 11,000 deaths among people living with HIV [PLHIV]) in 2018. The majority (64%) of the estimated TB cases were among men; 12 percent of the cases were among children (WHO, 2018b). The evidence of high prevalence of TB across age groups in Uganda suggests that TB transmission is still widespread despite implementation of the End TB Strategy.

HIV remains a key driver of the TB epidemic in Uganda. For example, a cross-sectional HIV seroprevalence survey among TB patients revealed that 41 percent of the cases in the country were HIV seropositive (Kirenga, et al., 2015), indicating the tremendous burden of this dual epidemic. Uganda is therefore maintaining a high antiretroviral therapy (ART) uptake and is strengthening TB preventive therapy (TPT) coverage among the HIV-affected population. ART coverage among TB patients coinfected with HIV was 97 percent, and more than one-half million PLHIV were initiated on TPT between January 2015 and September 2019. Twenty-eight percent (5,176 of 18,631) of the under-five contacts were initiated on isoniazid preventive therapy (IPT) between June 2018 and July 2019 (Ministry of Health [MOH], 2019). The initiative to increase TPT included a 100-day IPT campaign that led to more than 300,000 PLHIV initiated on TPT in 100 days between July and October 2019 (MOH, 2019).

Despite improvements in TB case notification, TB treatment coverage in Uganda remained around 65 percent, with a treatment success rates of 72 percent for drug-susceptible tuberculosis (DS-TB) (although these rates varied by region). The treatment success rate for TB/HIV patients was 70 percent between June 2017 and July 2018. The DR-TB treatment success rate was 64 percent among patients who started second-line treatment in 2016, whereas mortality stood at 19 percent, and 15 percent of participants were lost to follow up (LTFU) (MOH, 2019). The treatment success rate among children (0–14 years) was also low, at 73 percent. Mortality was 6 percent and 14 percent were LTFU. However, among the TB/HIV coinfected children, the treatment success rate was 71 percent, mortality was 10 percent, and LTFU was 9 percent (MOH, 2019).

As stakeholders continue to work to achieve the goal and targets of ending TB set during the 2018 UNHLM, there is a need to focus on the quality of TB care offered to TB patients (WHO, 2018a). Quality of care is crucial to TB elimination. It impacts timely diagnosis, treatment initiation and adherence, and treatment outcomes. Studies across multiple high-TB-burden countries have shown deficiencies in healthcare providers' knowledge and self-reported practices for TB. Weaknesses identified include practices for ordering diagnosis tests for presumptive TB patients, provider knowledge about medications for DS-TB, and higher levels of knowledge and practice among public health workers compared with private healthcare workers (Cazabon, et al., 2017). Scholars have also examined the quality TB of care based on user experience and patient satisfaction (Cazabon, et al., 2020) because non-adherence to the treatment plan by TB patients has led to a reduced number of cases whose outcome is a cure, and to an increased number of cases that develop resistance to the medication used in TB treatment (Mesfin, Newell, Walley, Gessessew, & Madeley, 2009). Other studies have assessed delays in care as a proxy for the quality of TB care. A systematic review found that the median time interval between onset of TB symptoms and initial contact with a healthcare provider was 31.7 days (Sreeramareddy, Panduru, Menten, & Van den Ende, 2009). The same review found that the median time interval between the onset of pulmonary TB symptoms and the initiation of TB treatment was 67.8 days.

The global agenda to address the TB burden has been ambitious, creating strategies in line with the UNHLM on the fight against tuberculosis (WHO, 2018a); the Sustainable Development Goals (SDGs); and the WHO's End TB Strategy (WHO, 2015a). SDG 3 ("Ensure healthy lives and promote well-being for all at all ages") specifies that the TB epidemic should be ended by 2030, with these targets: (1) 90 percent reduction in the absolute number of TB deaths; (2) 80 percent reduction in TB incidence compared with 2015; and (3) zero percent of TB-affected households experiencing catastrophic costs because of TB. Aside from reducing the incidence rates of TB, the SDGs include addressing TB under the universal health coverage framework. To further strengthen implementation and monitoring efforts, SDG 17 ("Strengthen the means of implementation and revitalize the global partnership for sustainable development") aims to increase the availability of data and further disaggregate the data appropriately.

This report describes the findings of a Quality of TB Services Assessment (QTSA) conducted in Uganda by MEASURE Evaluation and its partners. The document summarizes the findings and recommendations for interventions and approaches to address the gaps identified and to continue to improve TB services to meet national and global targets.

Tuberculosis Response in Uganda

Efforts to control TB in Uganda date back to 1965. The National Tuberculosis and Leprosy Programme (NTLP) was established in 1990 with the combination of TB and leprosy program activities. The NTLP is a branch of the National Disease Control department of the MOH, and is mandated with the following core functions: (1) establishment of countrywide facilities for quality diagnosis and treatment of TB and leprosy; (2) coordination and supervision of the implementation of TB and leprosy prevention and care; and (3) prevention and management of leprosy-related disabilities. The NTLP operates in all health districts. Operational zones are headed by Regional TB Supervisors. At the district level, the NTLP has a District Health Officer, District TB and Leprosy Supervisor, and District Laboratory Focal Person. The county and sub-county levels both have focal persons in charge of quality assurance (QA). These administrative levels

also have a supervisor for health facility workers and sub-county health workers charged with administering directly observed treatment, short course (DOTS). The NTLP developed a National Strategic Plan and has standard guidelines to coordinate and facilitate the implementation of the TB interventions in Uganda.

The National Strategic Plan (2015/16–2019/20) developed by the NTLP aims to bring TB under control by ensuring the availability of diagnosis, care, and treatment services (NTLP, 2017a). The plan aims to reduce TB incidence by 5 percent in 2019/2020 while increasing the treatment success rate among notified cases from 75 percent in 2015/16 to 85 percent by 2019/20. This plan is aligned with the Health Sector Development Plan 2015/2016–2019/2020 and WHO's End TB Strategy. It further addresses recommendations from the regional Green Light Committee, the United States Agency for International Development (USAID) mission, the revised Xpert MTB/RIF[1] policy, and the revised urban DOTS model. The plan focuses on enforcing the NTLP's TB care and prevention standards, and valuing clients and patients through the provision of quality care services. The National Strategic Plan's objectives and strategic interventions also support the End TB Strategy's Pillar 1, focusing on early detection, treatment, and prevention for all TB patients, including children. This pillar aims to ensure that all TB patients not only have equal, unhindered access to affordable services, but also engage in their care. During the life cycle of the National Strategic Plan (2015/16–2019/20), significant progress has been recorded.

HIV has been identified as a key driver fueling the TB epidemic in Uganda; nearly one-half of new TB cases identified each year are HIV-positive people. Uganda's MOH, through the NTLP, has implemented a comprehensive TB/HIV collaborative intervention package since 2005. The package includes the provision of HIV testing for confirmed TB cases and referral for ART for those who have tested positive for HIV. It also includes TB screening, diagnosis, treatment, and TPT for PLHIV.

The NTLP has also sought to strengthen private sector participation through an expansion of public-private partnership to provide diagnosis and treatment of TB cases as part of measures to improve TB notifications and treatment outcomes. Evidence showed that only 20 percent of TB notifications came from the private sector, even though about 60 percent of patients began seeking healthcare from the private sector (Nshuti, Neuhauser, Johnson, Adatu, & Whalen, 2001). The NTLP is seeking to accredit and support private health facilities for the delivery of TB diagnosis services by providing microscopes and GeneXpert machines to high-volume private facilities and offering capacity building for health workers.

Quality of TB Services Assessment

Conceptual Framework

Under the End TB strategy, TB programs typically measure their successes by focusing on the number of patients screened, diagnosed, and successfully treated; however, TB programs have not historically emphasized the quality of care provided at different levels of the healthcare system. Evidence suggests that quality of care (or lack of it) is related to health outcomes; therefore, addressing quality of care is a critical investment for TB programs. Studies reveal that deficiencies in quality of care often result from gaps in provider knowledge, the inappropriate use of available technology, or the inability of health institutions to respond to changes in patient health needs (Berwick, 1989; Murray & Frenk, 2000). A recent article by

[1] A test that can confirm the presence of Mycobacterium tuberculosis (MTB) and resistance to rifampicin (RIF) in two hours.

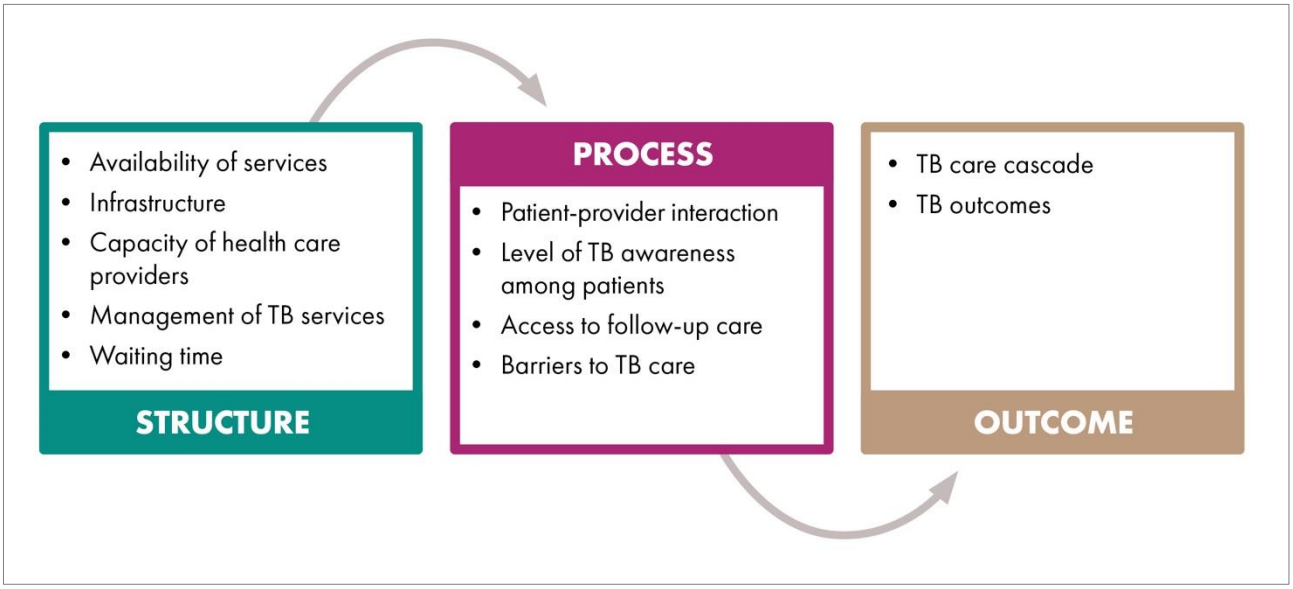
Subbaraman, et al. (2016) links gaps in the cascade of TB services to specific concerns about quality of care in each step, further emphasizing the importance of quality services.

In the global TB community, activism by the affected community and research have inspired efforts to develop and promote patient-centered models of care to ensure high-quality TB diagnosis and treatment services. The success of health systems in providing services to improve or maintain good health outcomes depends on the context and influence of political, cultural, social, and institutional factors. For service delivery that targets healthy outcomes and the well-being of the patient, it is important to include the interaction between the patient and service providers as a key element of quality.

Although access to the healthcare system is needed to maintain or improve health outcomes, it is not enough; once a patient has accessed the system, the services provided need to be available and applied skillfully. Quality can then imply optimizing material inputs (i.e., drugs, equipment) and provider skill to deliver services resulting in positive health outcomes. According to the Institute of Medicine, quality is "the degree to which health services for individuals and populations increase the likelihood of desired health outcomes and are consistent with current professional knowledge" (Institute of Medicine, 2001). Therefore, quality of care can be said to consist of three key elements: structure, or the resources available at a health facility; process, or the interaction between providers and patients; and outcomes, or the consequences of care (Donabedian, 2005). The services that patients receive can be deficient at the structural, process, or outcome levels, with deficiency at any level leading to poor quality of TB care.

The framework presented in Figure 1 was used in this assessment to measure the quality of services offered by the TB program in Uganda. The framework and the analysis of key indicators will inform policymakers and managers about the status of the quality of TB services and highlight pragmatic ways in which services can be improved.

Figure 1. Components of the TB Quality of Care Framework



Source: Adapted from Donabedian, 2005

The framework provides a logical sequence, linking the key components—quality of care, including policy and regulations; infrastructure; providers' competency; the service environment; and infection control—that should function well to achieve the desired health outcomes. Using this model to measure the key data elements for each component provides policymakers and program managers with the information they need to identify problem areas and take action to improve the quality of TB service delivery. The key elements of quality care follow:

- **Structure:** Health facility infrastructure, medical equipment, drugs, and supplies; staff numbers and their characteristics; and other resources, such as funding payment schemes and incentives.
- **Process:** The interaction between service providers and patients, during which structural inputs from the healthcare system are transformed into health outcomes. Process is contextualized as "what is done" and "how it is done" (i.e., the actual delivery and receipt of care).
- **Outcome:** The consequences of care. Outcomes are measured in terms of health status and critical services, such as proper diagnosis and case notification; adherence to treatment regimens; treatment outcomes; and ultimately, incidence, prevalence, and death rates.

More information on QTSAs, including reports on and tools used in the assessments in other countries, may be found at the following link: https://www.measureevaluation.org/our-work/tuberculosis/quality-of-tb-services-assessments

Study Objectives

The purpose of this study was to assess the quality of TB services in randomly selected TB diagnosis and treatment facilities in Uganda to identify areas of strength and weakness in terms of service quality. The results of the assessment will provide information to the NTLP to develop interventions to improve the quality of TB services, and will also provide baseline measurements of key TB service quality indicators to track improvements over time.

The study had the following objectives:

- Assess the condition of TB care in terms of the availability of skilled providers, equipment, and organizational structure.
- Determine the quality of TB services provided by facilities and critical gaps that should be filled to improve quality.
- Assess provider competencies and patient satisfaction.
- Evaluate the treatment outcomes of patients receiving TB care.
- Describe TB stigma among patients and health workers and the perspective of non-TB patients.
- Assess the effect/consequences of TB stigma (delay in seeking care for TB symptoms, concealment of TB disease, poor treatment adherence, etc.) on patients' health-seeking behavior.
- Provide recommendations based on the study's results to address gaps identified in the quality of care.

Through these objectives, the study aimed to answer two overarching research questions:

- What are the gaps in TB service delivery and the needs of TB patients?
- What are the perceptions, views, and experiences of TB patients on the services they received?

METHODS

Study Design

This assessment was a nationally representative cross-sectional study conducted at both public and private TB diagnosis and treatment health facilities in Uganda. The assessment was conducted at TB diagnosis and treatment facilities across nine of the 10 Uganda AIDS Indicator Survey (UAIS) regions and the North-East (Karamoja) region. The overall quality of services offered at the facilities was assessed by examining the availability and functionality of resources (materials and human) at the facilities; service providers' competencies and skills, and the interactions between the providers and patients; and patients' overall perception of the services. Tools to assess the overall quality of services provided were developed based on the International Standards for Tuberculosis Care (Tuberculosis Coalition for Technical Assistance, 2006) and WHO quality of care assessments, with input and contextualization from Uganda's NTLP. A review of records on the treatment outcomes of a cohort of pulmonary DS- and DR-TB patients was also conducted to assess the quality of services offered at the facilities. The analysis will enable the tracking of quality of care performance by the TB program if the study is repeated.

Study Population

The study population included patients and providers from a representative sample of health facilities (public and private) from the NTLP network providing TB-related services, such as diagnosis, care, and treatment. Health facility staff and patients were selected by convenience sampling (their presence at the facility on the day of the survey) and were asked to participate in the study to answer questions about the structure, process, and outcomes of TB services, and to give their perspectives on stigma and discrimination. The study included confirmed DS- and DR-TB patients ages 15 and older[2] who were visiting the health facilities on the day of data collection.

Sampling Procedures

Health Facility

The study used dual-frame sampling to identify study facilities. First, the NTLP facility directory was updated to include additional known large health facilities providing TB-related services, especially private facilities, by the research team. The updated facility list was shared with the NTLP for review. Second, the NTLP and other relevant authorities and stakeholders helped identify other TB service delivery points (SDPs), especially private health facilities, which satisfied the criteria that would be numerated.

Two hundred and sixteen (216) health facilities (public and private) from the NTLP network providing TB and TB-related services, such as diagnosis, care, and treatment, were randomly selected from 1,583 facilities providing TB services using a multistage sampling procedure. The first stage entailed stratifying the UAIS

[2] According to the Uganda National Council for Science and Technology's *National Guidelines for Research Involving Humans as Research Participants* (July 2014), the age of legal majority is 18 in Uganda. Emancipated minors are people under the age of majority who are pregnant, married, have a child, or cater for their own livelihood. Mature and emancipated minors may independently provide informed consent to participate in research (p. 19).

regions into USAID-supported and non-USAID-supported districts,[3] and then randomly selecting eight regions—four from USAID-supported districts and four from non-USAID-supported districts. In the second stage, 20 districts were randomly selected: 10 in the four USAID-supported regions and 10 in the four non-USAID-supported regions. Probability proportional to region size (i.e., the number of facilities in each selected region) was used to select the number of sampled districts per region. Last, a sample of approximately 10 facilities providing TB services per district was selected. The sampling method for facilities was a combination of a total census and sampling through random selection. If the selected district had eight to 10 facilities, all that district's facilities were included in the study, irrespective of the number of TB cases being treated at those facilities. If the district had 11 or more facilities, 10 to 12 facilities were randomly selected. First, the facilities were arranged in descending order of the number of TB cases reported in the 2016–2017 Ugandan fiscal year. Once ranked in descending order, 10 to 12 facilities were randomly selected to ensure that the sample including a mix of high, medium, and low volume sites. This design of selecting an average of 10 facilities per district was meant to accurately compare USAID-supported and non-USAID-supported areas.

Karamoja region (northeast of the UAIS region) was intentionally selected because of challenges with TB services and the overall weak health system in the area. Facilities in this region were purposively selected because difficult traveling conditions limited access to them. Sixteen health facilities were selected from a total of 139 identified in the region according to the NTLP facility list.

An overview of each health facility type and the TB-related services they provide is given in Table 1.

Table 1. Description of TB services, by type of health facility in Uganda

Health Facility Type and Description	TB-Specific Services
Regional Referral Hospital (RRH) have a catchment population of up to 2,000,000; serve as referral facilities for district hospitals; and offer a range of preventive and curative outpatient services, inpatient care, laboratory services, and a subset of specialty services (e.g., psychiatry, pathology, radiology).	• TB diagnosis services • TB treatment services • DS-TB management services • DR-TB management services • Onsite microscopy • Onsite molecular testing (GeneXpert) • Onsite imaging services (chest x-rays)
General Hospitals (GH) are also known as the district hospitals and have a catchment population of about 500,000. They support all referrals from health centers and lower levels of care; and offer a range of preventive and curative outpatient services, inpatient care, laboratory services, and other general services.	• TB diagnosis services • TB treatment services • DS-TB management services • Some offer DR-TB management services • Onsite microscopy • Onsite molecular testing (GeneXpert) • Onsite imaging services (chest x-rays)

[3] Implementing partners received funds to support TB interventions and services at health facilities throughout Uganda from both USAID and other funders (e.g., Centers for Disease Control and Prevention, Department of Defense, Global Fund to Fight AIDS, Tuberculosis, and Malaria, Government of Uganda). However, facilities providing TB services and being supported through the various funding sources were unequally distributed in the regions and districts. Some regions and/or districts had more facilities funded by USAID. The study took this distribution into account in the selection of regions and districts.

Health Facility Type and Description	TB-Specific Services
Health Center IVs (HC IV) serve as the highest non-hospital referral facilities at the subdistrict level, or a catchment population of around 100,000; and offer basic preventive and curative outpatient services, inpatient care, and second-level referral services (e.g., life-saving medical, surgical, and obstetric services).	• TB diagnosis services • TB treatment services • DS-TB management services • Onsite microscopy • Onsite molecular testing (GeneXpert)
Health Center IIIs (HC III) serve catchment areas of up to 20,000 (the sub-county level); provide referral services to HC IIs under their management; and offer basic preventive and curative outpatient services and inpatient care. Many also provide laboratory services.	• TB diagnosis services • TB treatment services • DS-TB management services • Offsite microscopy • Offsite molecular testing (GeneXpert)
Health Center IIs (HC II) are intended to serve as basic health centers and interface with the formal health sector for communities (populations of about 5,000). They typically provide only outpatient care and an additional subset of services in places with poor access to HC III and HC IV facilities.	• TB screening and referral services • DS-TB management services
Clinics are privately owned and managed, largely dispensing medications to people for a fee. Clinics can also provide basic outpatient services.	• Some offer TB diagnosis services • Some offer TB treatment services • Some offer DS-TB management services • Offsite microscopy • Offsite molecular testing (GeneXpert)

Service Providers

In most cases, especially for small public health facilities, TB care is provided in the context of primary healthcare, which includes staff in charge of TB and TB-related services. For the purpose of this study, a TB provider delivering services on the day of data collection was interviewed from each SDP in the study. Staff in charge of TB and TB-related services were also interviewed when there was more than one person delivering TB services. At small facilities, one or two staff delivering TB-related services were asked to participate in the provider interview. At larger sites, three to four providers among those present on the day of data collection were randomly selected for participation in the provider interviews.

TB Patients

It is important to examine the views and perceptions of TB patients about the quality of services because quality is valued not only for its own sake, but also for its perceived influence on service use and adherence to diagnosis processes and treatment regimens. Although studies have not clearly revealed the nexus among service quality, patient use, and outcomes, it is presumed that patients shun what they perceive as poor-quality services despite the proximity of such services (Andaleeb, 2001). Therefore, for this study, interviewing TB patients was critical to gain a comprehensive picture of the quality of services that TB programs offered.

The study sampled any patients with confirmed DS- or DR-TB who were being initiated on treatment, or were already on treatment, and who visited the health facility on the day of data collection. Patients who were too weak to wait for an interview (based on the data collector's assessment) were excluded, and those who had been transferred in, as indicated in the health facility treatment register, were also excluded from both the record review and patient interviews because all their TB care had not taken place at the facility sampled, and therefore, their perspective on the quality of TB care received could not be attributed to the facility sampled alone. It is also important to note that there was no specific consideration to either include or exclude patients who had previously missed appointments or had adherence issues. The data collectors purposely selected a consecutive sample of two to five TB patients who visited the facility on the day of data collection based on the inclusion and exclusion criteria. The facility's TB register (hospital or ambulatory care) was used as an entry point for patient sampling at the facility level.

Inclusion Criteria for Patients

- Currently receiving TB treatment (regardless of whether they were in the intensive or continuation phase or were receiving treatment for DS- or DR-TB; and regardless of whether this was their first TB infection/treatment, or if they were on treatment for at least two weeks and/or deemed not infectious)
- Ages 15 and older
- Pulmonary and extrapulmonary TB patients
- Inclusive of MDR-TB patients when they had been on treatment for four weeks to eight months or if they had a confirmed conversion of their *tubercule bacillus* culture

Exclusion Criteria for Patients

- Having received less than two weeks of TB treatment
- Visiting the health facility for the first time
- Too weak (determined at the discretion of the data collector)
- Refused to be interviewed
- Younger than age 15
- Transferred-in TB cases

Focus Group Discussion Participants

The qualitative component was comprised of small focus group discussions (FGDs) with community members (excluding TB patients) who were present at the health facility on the day of the assessment. The FGDs aimed to get an understanding of the perception of TB stigma in the community among non-TB patients who also used healthcare services. Eight FGD sessions were organized (four for males and four for females), with an average of eight to ten participants per FGD session. Qualitative data collection was limited to two regions because of logistical and resource restraints. This may therefore have implications for the generalization of the results to the multicultural context of Uganda. However, the findings will help shape the context and content of interventions to address stigma related to TB.

Inclusion Criteria for FGD Participants

- Between ages 18 and 50
- Neither currently receiving TB treatment nor having ever received TB treatment

Exclusion Criteria for FGD Participants

- Under age 18 or over age 50
- Having received TB treatment in the past, or currently receiving TB treatment (current or former TB patient)
- Too weak or ill
- Refused to be interviewed

Implementation Process, Data Collection, and Instruments

Pre-Data Collection

Finalization of the Study Protocol

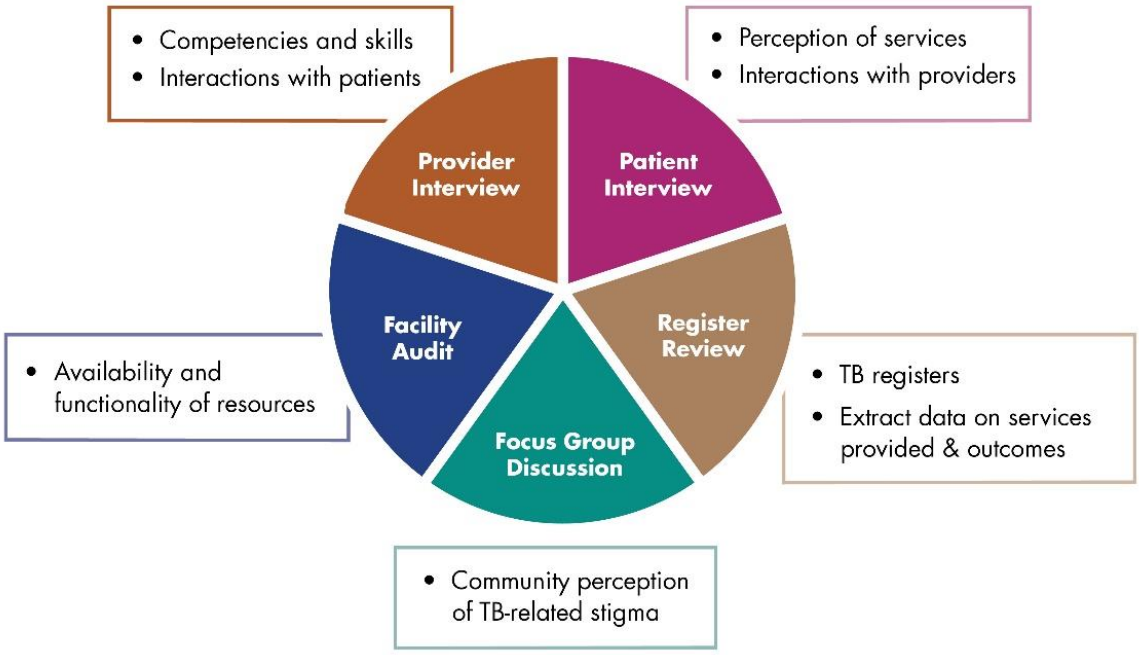
Because this QTSA had already been conducted in Nigeria and in the Philippines, there was an existing protocol that was adapted to the Ugandan context. The adaptation process was collaborative and included participants from the Makerere University Lung Institute (MLI) and the NTLP. First, we identified the skills and resources needed (e.g., WHO documents, NTLP manuals/guidelines, and publications on quality of TB care). Meetings were then conducted at the MLI, where MLI and NTLP members reviewed the protocol and modified it to suit the Ugandan context. The finalized protocol was shared with MEASURE Evaluation, whose team members gave their input.

Data Collection and Instruments

Data Collection Tools

The assessment used four tools developed by MEASURE Evaluation with input from the USAID TB Team (1) Facility Audit; (2) Provider Interview; (3) Patient Interview; and (4) Register Review (Figure 2). Using the same methodology as for the adaptation of the study protocol, the generic data collection tools were adapted using a collaborative process. The patient data collection tool was translated into eight local languages informed by the districts sampled: Acholi, Lugbara, Luganda, Lusoga, Runyannkole-Rukiga, Runyoro-Rutooro, Lugisu, and Ngakarimajong. The other tools were kept in English because they were administered to healthcare workers who were conversant in the language. A Uganda-specific qualitative tool (FGD guide) was added for the purposes of this study. The four quantitative tools and the FGD guide are presented in a compendium to this report.

Figure 2. Overview of the survey tools



The facility audit gathered information about the availability and functionality of facility resources. The tool covered the operational sections of the facility, including the clinic, laboratory, and pharmacy. Multiple providers were interviewed to complete this tool, especially at large facilities, such as hospitals, where different providers manage and operate the different sections of the facility. The provider interview was administered to the people providing TB services on the day of the assessment. The interview collected information about the competencies and skills of the providers and their interactions with patients. The patient interview focused on the perspective of the patients in terms of their experiences at the health facility.

The register review extracted aggregate data on country-specific TB indicators, including presumptive TB cases, laboratory requests and results, DS-TB cases, DR-TB cases, and TPT. The data collectors extracted data from source documents, such as the presumptive TB register, NTLP laboratory register, Unit TB register, and MDR-TB register. At some sites, source documents used by the facilities were not standard, but the data were still extracted from available documents. Data were also extracted from the DHIS2, when available. For this assessment, data extraction on treatment indicators focused on the cohort of July 1, 2018 to December 31, 2018 for facilities below the RRH level, whereas the cohort of October 1, 2018 to December 31, 2018 was the target for the RRH for DS-TB patients. The shorter period was used for the RRHs because of the high volume of registered TB patients at these sites. For the DR-TB treatment outcome indicators, the data review was for the cohort of April 1, 2017 to June 30, 2018.

The FGD guide was used to elicit information from non-TB patients about their knowledge of TB (including myths and misconceptions), the stigma they perceived TB patients to face, and the implications of their knowledge and perceived stigma for TB care seeking, diagnosis, and treatment.

The five tools used for the Uganda QTSA are available at the following link: https://www.measureevaluation.org/resources/publications/tl-20-79/

Obtaining Administrative Approvals from the Study Facilities

Before the field activities began, we established contact with the heads of the district health services and the in-charges at the sampled health facilities, and informed them about the assessment, the time period the teams would be in the districts, and the support that the teams would require. The correspondence was made through emails and a signed letter from the MOH; the in-charges at the facilities sampled were informed about the assessment through the district offices.

Pre-Testing the Study Tools and Revision

The harmonized study tools were pretested in collaboration with the MLI, NTLP, and MEASURE Evaluation staff at five health facilities. All data collection instruments, including the FGD guide, were tested in conditions as similar as possible to the study sites. The pretesting exercise looked at the ease of administration of the questions, understanding of the questions by respondents, time taken to administer the tools, and redundant questions. Tool pretesting took up to 10 days, using an iterative process whereby at the end of each day, the team returned to a central location and updated the tools in preparation for the next day. The pretesting process ended when there were no new changes.

Presentations to the Ministry of Health

The team made several presentations to the MOH, the NTLP, and some TB implementing partners to obtain their views and input on the protocol and instruments. The NTLP team participated in the review of the protocol and the QTSA tools to address the country context. The QTSA team also made a presentation to the communicable disease control technical working group, whose members suggested including Karamoja Region, which had been left out of the original protocol. After seeking an amendment from the Institutional Review Board (IRB), Karamoja was included in the assessment.

Recruitment of Fieldwork Teams

For the quantitative data collection, 40 data collectors were recruited and assigned to eight teams, each headed by a team leader. For the qualitative data collection, four social scientists (two males and two females) were recruited to facilitate the FGDs.

Training of Data Collectors

A centralized training (conducted collaboratively by personnel from the MLI, NTLP, and MEASURE Evaluation) took place at the MLI. The six-day training covered general information on TB, the QTSA protocol, data collection tools, informed consent, and data collection using tablet computers. The data collectors also practiced data abstraction from registers that the team provided. The data collectors did mock data collection among themselves until the team leaders were satisfied with their skills.

The training also incorporated field practice to gauge the data collectors' comprehension of the assessment process. The data collectors visited a few health facilities in the Kampala area to complete a pilot exercise on the data collection processes, including data entry. Each team was allocated a facility, the team leaders introduced them to the head of the facility, and coordinated data collection. This activity was supervised and monitored by the training facilitators. During a debriefing session, team members shared their experiences and suggested feedback that should be integrated to ensure smooth data collection.

Data Collection

Data collection at the 216 facilities was led by the MLI, with monitoring and supervision of fieldwork conducted by the NTLP and MEASURE Evaluation.

Deployment of Fieldwork Teams

Forty data collectors formed the eight data collection teams (32 assessors and eight supervisors) assigned to cover each region. Each team included at least one member who spoke the local language in the districts where the team was deployed. Data collection lasted 12 weeks from September to December 2019. One day was required at each facility to complete data collection. The data collection tools were administered electronically on tablets using the SurveyCTO platform (Version 2.41; Dobility, 2019). More details about the data collection and management processes are provided in Appendix A.

Fieldwork Supervision and Monitoring

Supervision teams observed facility data entry and collection procedures. After data collection in one district, the data management team performed a quick analysis to ensure basic data quality. The next phase of monitoring and supervision took place two weeks into data collection, during which the central team visited each region to supervise data collection. Monitoring and supervision continued through the end of fieldwork.

Data Analysis

MLI and MEASURE Evaluation developed a data analysis plan guided by the needs of the National Strategic Plan development process and the domains of quality of care (structure, process, and outcome) described in the QTSA conceptual framework. After the field data collection was done and cleaning finalized, the dataset was locked and analysis was performed using STATA v14 software.

The eight FGDs were transcribed verbatim in vernacular and later translated into English. All transcripts were read multiple times by the lead social scientist to identify themes and patterns relevant to the study objectives; the patterns were then coded using the ATLAS.ti software. The outputs of this coding process were then reviewed for similarities and differences within and between groups, which were then synthesized and elaborated to illustrate the explanations generated in the form of quotes.

Key results were presented during a data validation and review workshop attended by the teams from the MLI, NTLP, and MEASURE Evaluation. Initial findings were presented in graphic format, including bar charts and pie charts to illustrate the results. Workshop participants made recommendations for follow-up activities based on the findings, including national and scientific dissemination through journal publications. The QTSA results on perceived stigma and services received compared with services considered most helpful for supporting TB patients' treatment were used by the NTLP as evidence to support strategic interventions in the development of the ongoing National Strategic Plan and a proposal to the Global Fund to Fight AIDS, Tuberculosis and Malaria. Disaggregation of the variables in the four quantitative tools appears in the Results section.

Ethical Review

The ethical approvals were secured through the John Snow, Inc. (JSI) IRB in the United States and the MHREC in Uganda. Country-level IRB approval through the MHREC was secured by MEASURE Evaluation and the MLI. Further approval was obtained from the Uganda National Council for Science and Technology and from the President's Office. Administrative clearance was obtained from the district health officers of the districts in which the study would be done, including the directors of the RRHs.

RESULTS

This section describes the QTSA findings and is organized according to the QTSA conceptual framework. After a brief description of the characteristics of the health facilities sampled, TB service providers, and patients, we present findings on the structural, process-related, and outcome-related indicators. The results are stratified according to type of facility, facility location, and region.

Sample Characteristics

Two hundred and sixteen (216) health facilities providing TB services were included in the assessment. Nearly two-thirds (138) were rural, and three-fifths were HC IIIs (Table 2). In the sample, six (3%) were RRHs, 22 (10%) were GHs, and 36 (17%) were HC IVs. Most health facilities (77%) were managed by the government or public sector, and the remaining 23 percent were managed by mission/faith-based, nongovernmental organizations (NGOs), or were nonprofit facilities. Five were private, for-profit facilities (data not shown). Eighty-three percent of the HC IIIs sampled offered both inpatient and outpatient services. All RRHs, GHs, and HC IVs offered both inpatient and outpatient TB services.

Table 2. Facility characteristics according to the type of facility (N=216)

Characteristics/Type of Facility	Facility Type				Total	
	Hospital	HC IV	HC III	HC II & Clinic		
	%	%	%	%	#	%
Facility Location						
Urban	30.8	24.4	41.0	3.8	78	100.0
Rural	2.9	12.3	76.1	8.7	138	100.0
Total	13.0	16.7	63.4	6.9	216	100.0
Type of Service Offered						
Outpatient only	0	0	16.8	53.3	31	14.4
Both inpatient and outpatient	100.0	100.0	83.2	46.7	185	85.6
Total	100.0	100.0	100.0	100.0	216	100.0

The assessment included 357 TB service providers, most of whom worked at a HC III facility (59%) and were attached to a rural facility (62%) (Table 3a). The healthcare workers interviewed were nearly equally split between female and male. Nearly one-half (49%) had attained a diploma qualification, and two-fifths (42%) had attained certificates as the highest level of education before starting their careers as service providers. Only two interviewees were medical doctors; 5 percent had a bachelor's degree; and 4 percent had reached the secondary education level or below. The results showed that higher-level facilities were more likely to have staff with a higher level of education, although HC IIs and clinics also reported increased numbers of staff with higher education. Nearly three-fifths (57%) of the providers were registered nurses/midwives and 20 percent were clinical officers. Laboratory officers/technicians and community health workers were more likely to work as service providers in rural areas, compared with clinical officers and medical doctors, who were more often attached to urban facilities. Overall, 69 percent of those interviewed were TB focal persons (heads of TB services) at the facility. Details on the TB focal persons, by selected characteristics, are given in Table 3b.

Table 3a. Characteristics of providers interviewed (N=357)

Characteristics	Overall		Type of Health Facilities					Facility Location	
			RRH (n=17)	GH (n=40)	HC IV (n=64)	HC III (n=212)	HC II and Clinics (n=24)	Urban Facilities (n=136)	Rural Facilities (n=221)
	#	%	%	%	%	%	%	%	%
All Providers	357		4.8	11.2	17.9	59.4	6.7	38.1	61.9
Sex									
Female	168	47.2	64.7	46.2	39.1	49.1	41.7	43.7	49.3
Male	188	52.8	35.3	53.9	60.9	50.9	58.3	56.3	50.7
Average age (median) [range: 20–68 years]	36.9 (34.5)		40.3 (43)	38.4 (35)	37.8 (35)	36.5 (34)	32.3 (31.5)	38.0 (36)	36.2 (34.0)
Highest Level of Schooling									
Secondary and below	14	3.9	0.0	5.1	3.1	4.7	0.0	1.5	5.4
Certificate	149	41.8	35.3	25.6	34.4	48.1	37.5	37.0	44.8
Diploma	175	49.2	52.9	59.0	59.4	43.4	54.2	52.6	47.1
Degree	18	5.1	11.8	10.2	3.1	3.8	8.3	8.9	2.7
Healthcare Worker Cadre									
Lab technician	50	14.0	0.0	2.6	14.1	18.4	4.2	11.9	15.4
Community health worker/other*	32	9.0	0.0	10.3	18.0	7.1	4.2	8.9	9.1
Clinical officer	70	19.7	29.4	30.8	20.3	15.1	33.3	23.7	17.2
Nurse/midwife	202	56.7	64.7	56.4	46.9	58.9	58.3	54.1	58.4
Medical doctor	2	0.6	5.9	0.0	0.0	0.5	0.0	1.5	0.0
Respondent position									
TB focal person	246	69.1	58.8	64.1	67.2	71.2	70.8	71.1	67.9

*Includes physician's assistant

Table 3b. Characteristics of TB focal persons interviewed (n=246)

Characteristics	#	%
Sex		
Female	104	42.3
Male	142	57.7
Average age (median) [range: 23–66 years]	37.3 (35.0)	
Highest Level of Schooling		
Secondary and below	11	4.5
Certificate	101	41.1
Diploma	120	48.8
Degree	14	5.7
Healthcare Worker Cadre		
Community health worker/volunteer/other	23	9.4
Laboratory officer/technician	37	15.0
Clinical officer	52	21.1
Nurse/midwife	133	54.1
Medical doctor	2	0.4

Five hundred and one (501) patients were interviewed as part of the assessment. On average, 2.3 patients were interviewed per facility. Two-thirds (67%) of the patients sampled were male; about three-fourths (73%) lived in rural areas; and 14 percent were smokers. An average of 13 percent were ages 15 to 24 years; the other patients were evenly distributed across the remaining age groups. The average age of the patients was 41.2 years (Table 4).

Patients with the highest level of education were more likely to be seen at the RRHs and GHs, whereas those with primary or no education (60% and 27%, respectively) were more likely to receive care and treatment for TB from HC II facilities and clinics.

Table 4. Characteristics of patients interviewed receiving TB treatment (N=501)

Characteristics/Subgroup	Overall			Type of Health Facility				Facility Location	
			RRH	GH	HC IV	HC III	HC II/ Clinic	Urban	Rural
	#	%	#	%	#	%	%	%	%
All Patients	501		7.2	15.6	19.4	51.9	6.0	45.7	54.3
Sex									
Female	177	35.3	38.9	38.5	25.8	35.8	50.0	37.5	33.5
Male	324	66.7	61.1	61.4	74.2	64.2	50.0	62.5	66.5
Age									
15–24 years	66	13.2	19.4	11.5	12.4	14.3	3.3	14.9	11.8
25–34 years	105	21.0	22.2	26.9	16.5	20.5	23.3	23.6	18.2
35–44 years	142	28.4	38.9	30.8	29.9	25.3	23.3	31.9	25.5

Characteristics/Subgroup	Overall		Type of Health Facility					Facility Location	
			RRH	GH	HC IV	HC III	HC II/ Clinic	Urban	Rural
	#	%	#	%	#	%	%	%	%
45–54 years	96	19.2	5.6	18.0	28.9	17.0	26.7	14.4	23.3
55 years and above	91	18.2	13.9	12.8	12.4	22.0	23.3	15.3	20.7
Average age (range: 15–83)	41.2		37.6	39.8	41.3	41.8	44.4	39.4	42.8
Highest Education Completed									
None	80	16.0	19.4	11.5	13.4	16.6	26.7	12.7	18.8
Primary	292	58.4	61.1	44.9	57.7	62.2	60.0	55.5	60.9
Secondary	105	21.0	13.9	33.3	25.8	17.8	10.0	25.8	17.0
Post-secondary	23	4.6	5.6	10.3	3.1	3.4	3.3	6.1	3.3
Marital Status									
Never married	73	14.6	19.4	11.5	11.3	17.3	3.3	16.6	12.9
Married or cohabiting	258	51.5	41.7	48.7	55.7	51.2	60.0	48.0	54.4
Previously married	170	33.9	38.9	39.7	33.0	31.5	36.7	35.4	32.7
Living Setting									
Urban	133	26.6	47.2	44.9	25.8	19.6	16.7	44.1	11.8
Rural	368	73.4	52.8	55.1	74.2	80.4	83.3	55.9	88.2
Employment Status									
Business	55	11.0	5.6	19.2	15.5	7.3	13.3	14.4	8.1
Civil servant/healthcare worker	27	5.4	11.1	9.0	8.3	2.9	3.3	8.3	2.9
Farmer	241	48.1	38.9	38.5	44.3	55.4	33.3	39.7	55.2
Housewife/husband/other*	40	8.0	8.3	6.4	10.3	6.9	13.3	7.4	8.5
Skilled laborer	45	9.0	13.9	15.4	9.3	6.2	10.0	13.1	5.5
Student	21	4.2	5.6	3.9	3.1	5.0	0.0	3.5	4.8
Unemployed	72	14.4	16.7	7.7	9.3	16.5	26.7	13.5	15.1
Smoking Status									
Yes, smoking	69	13.8	8.3	7.7	17.5	14.2	20.0	10.9	16.2
Not, smoking	432	86.2	91.7	92.3	82.5	85.8	80.0	89.1	83.8

* One interviewee reported as "husband."

Table 5 presents the TB patients interviewed according to the diagnosis, treatment phase, and treatment supporters and by type of facility. Most (91%) patients reported having DS-TB, whereas 6 percent of patients reported not knowing the type of TB they were diagnosed as having. Nearly two-thirds reported being in the continuation phase of treatment. DR-TB was reported by 5 percent of patients at urban facilities compared with only 1 percent of those at rural facilities.

Table 5. Characteristics of TB patients (N=501)

Type of Patients/Facility Type and Living Setting	Total			Type of Health Facility				Facility Location	
			RRH (n=36)	GH (n=78)	HC IV (n=97)	HC III (n=260)	HC II/ Clinic (n=30)	Urban (n=229)	Rural (n=272)
	#	%	%	%	%	%	%	%	%
TB Diagnosis									
Drug-susceptible	455	90.8	80.6	96.2	91.8	91.9	76.7	87.3	93.8
Drug-resistant	14	2.8	19.4	0.0	2.0	1.5	3.3	4.8	1.1
Unknown	32	6.4	0.0	3.9	6.2	6.5	20.0	7.9	5.1
Phase of Treatment									
Intensive	179	35.7	33.3	41.0	51.6	30.0	23.3	40.2	32.0
Continuation	292	58.3	66.7	48.7	43.3	65.0	63.3	54.1	61.8
Unknown	30	6.0	0.0	10.3	5.1	5.0	13.3	6.7	6.2
Treatment Supporters									
None	127	25.3	25.0	29.5	16.5	27.7	23.3	20.5	29.4
Healthcare workers	61	12.2	25.0	10.3	12.4	10.8	13.3	12.7	11.8
Relatives	300	59.9	50.0	56.4	67.0	59.2	63.3	63.8	56.6
Other*	13	2.6	0.0	3.9	4.1	2.3	0	3.0	2.2

* Includes coworker, prison warden, co-tenants, teachers, etc.

Structural Indicators

This section covers the factors that affect the context or enabling environment in which healthcare is delivered. This includes the physical facility, equipment, human resources, and organizational characteristics, such as staff training and supervision. These factors determine how the health system provides services as a measure of the average quality of services rendered. In this study, structure was measured by the availability of services, infrastructure, capacity of TB providers, and management of TB services.

Availability of TB Services

Screening and Diagnosis

All but one (a HC IV facility) of the facilities assessed reported screening TB patients for symptoms and also providing HIV-related services. Details about the screening and diagnosis, treatment, and pediatric services available at the facilities assessed are presented in Table 6 and Figures 3 and 4.

Among the 215 facilities offering TB diagnosis, 98 percent reported having an onsite laboratory. However, 83 percent of facilities sampled reported that they also used offsite laboratory services for diagnosis, meaning that most facilities did not have laboratories equipped to provide all of the tests needed for TB diagnosis. Higher-level facilities were more likely to use only their onsite laboratory for diagnosis, whereas lower-level facilities such as HC IIs, clinics, and rural facilities were more likely to rely on offsite laboratories for TB diagnosis testing.

The facilities implemented several TB screening and diagnosis methods, although they differed by facility type and location (urban versus rural), as shown in Table 6. Nearly all facilities used clinical algorithms to screen for TB and smear microscopy for TB diagnosis. A sizeable percentage reported the use of Xpert (42%) and LAM (39%); 12 percent reported using x-ray as a diagnosis method; and 2 percent used culture. More than one-quarter (27%) of the HC III and HC II reported access to Xpert for diagnosis. This included facilities that had Xpert onsite and other facilities that had access through referral for Xpert. However, the 11 percent of the RRHs and GHs reporting use of culture as a diagnosis method should be interpreted as access though referral rather than availability of services onsite. This is important because there are few laboratories in Uganda that have culture testing services and none of the facilities sampled are part of these culture laboratories.

During the provider interview, participants were asked about what type of TB services they had provided in the past 12 months. Most (95%) reported using clinical symptoms screening, and 14 percent reported screening for TB by x-ray. Figures 3 and 4 show the TB diagnosis services reported and the methods used by the providers in the past 12 months to detect resistance to first- and second-line drugs.

Table 6. Distribution of facilities, by facility type and location, according to the TB screening and diagnosis services available, and the types of diagnosis methods used (N=216*)

Screening Services Provided	Facility Type								Facility Location				Total	
	Hospital		HC IV		HC III		HC II and Clinic		Urban		Rural			
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Provide any form of screening for TB	28	100.0	36	100.0	137	100.0	15	100.0	78	100.0	138	100.0	216	100.0
Provide screening for TB by clinical symptoms and signs	28	100.0	35	97.2	137	100.0	15	100.0	78	100.0	137	99.3	215	99.5
Provide screening for TB by x-ray	19	67.9	1	2.8	3	2.2	1	6.7	17	21.8	7	5.1	24	11.1
Diagnosis Services Provided														
Facility provides TB diagnosis services (either clinical or laboratory)	28	100.0	36	100.0	136	99.3	15	100.0	78	100.0	137	99.3	215	99.5
Facility provides diagnosis services for children	28	100.0	34	94.4	115	84.6	13	86.7	72	92.3	118	86.1	190	88.4
Location of Diagnosis Testing														
Onsite lab only	15	53.6	11	30.6	6	4.4	0	0.0	18	23.1	14	10.2	32	14.9
Offsite lab only	0	0.0	0	0.0	1	0.7	3	20.0	0	0.0	4	2.9	4	1.9
Both onsite and offsite labs	13	46.4	25	69.4	129	94.9	12	80.0	60	76.9	119	86.9	179	83.3
Total	28	100.0	36	100.0	136	100.0	15	100.0	78	100.0	137	100.0	215	100.0
TB Diagnosis Methods														
Clinical symptoms and signs	28	100.0	35	97.2	132	97.1	15	100.0	77	98.7	133	97.1	210	97.7
X-ray	22	78.6	2	5.6	2	1.5	0	0.0	21	26.9	5	3.6	26	12.1
Smear microscopy	28	100.0	35	97.2	132	97.1	12	80	78	100.0	129	94.2	207	96.3
Culture	3	10.7	0	0.0	1	0.7	0	0.0	3	3.8	1	0.7	4	1.9
GeneXpert	25	89.3	25	69.4	36	26.5	4	26.7	47	60.3	43	31.4	90	41.9
LAM (urine test)	23	82.1	31	86.1	26	19.1	3	20.0	47	60.3	36	26.3	83	38.6

* The sample size varied because not all facilities provided the different services.

Figure 3. TB diagnosis services provided by service providers (from provider interview)

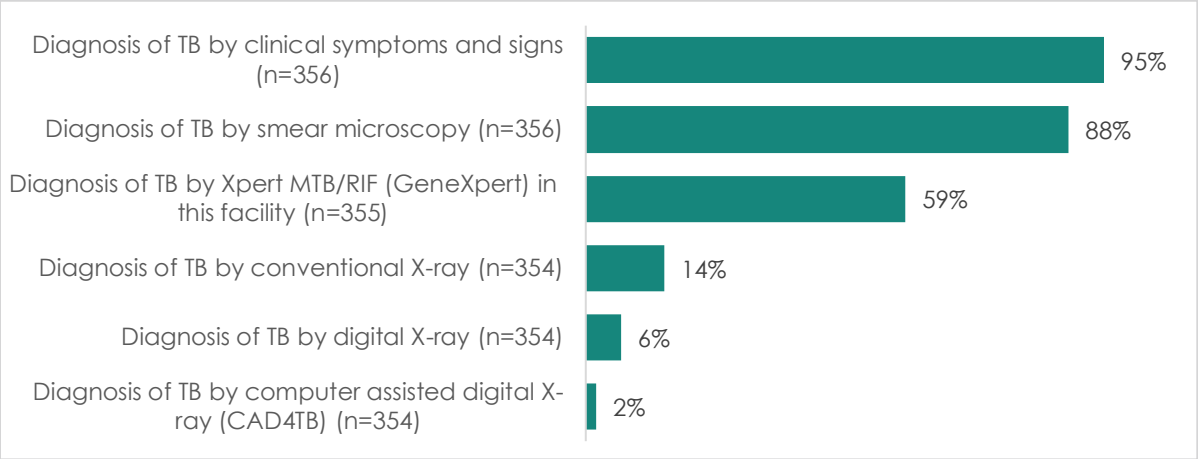
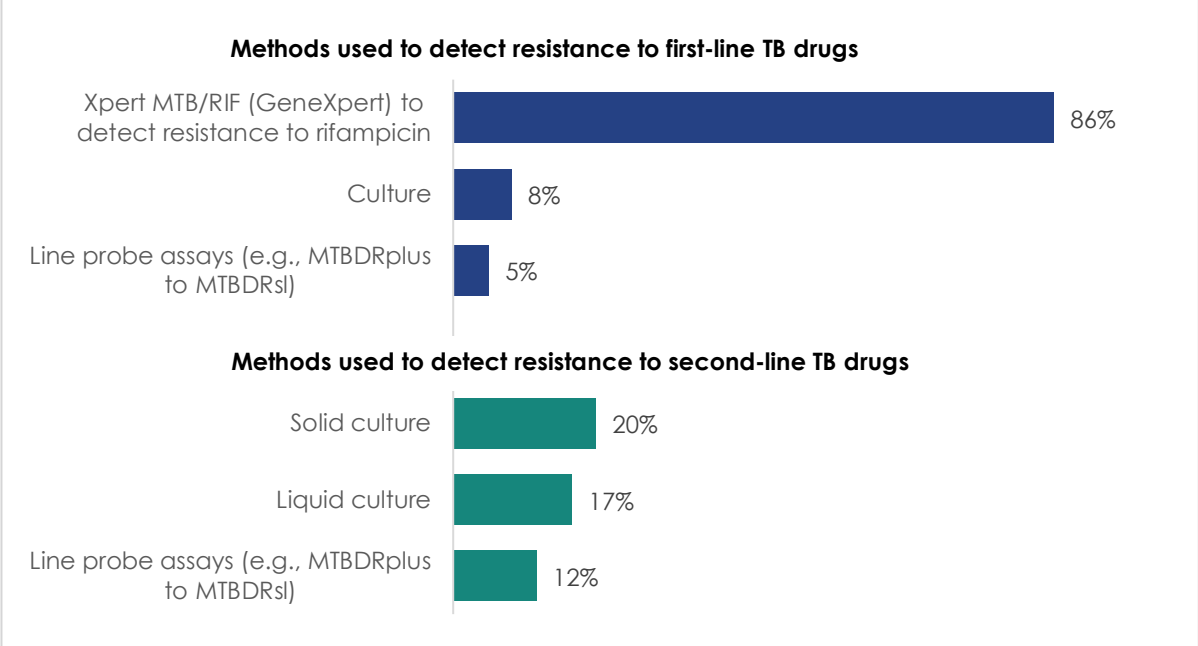


Figure 4. Methods used to detect resistance to first- and second-line TB drugs (facility audit)



Treatment Services

All the facilities assessed managed patients on TB treatment, but only nine managed DR-TB patients (data not shown). As part of the facility audit, the facilities were asked to enumerate the TB treatment-related services they provided. The services varied widely by facility type and location. All facilities prescribed drugs for TB, and the majority provided treatment and follow-up during both the intensive (99%) and continuation (98%) phases of treatment (Table 7).

Most facilities (84%) provided community-based DOTS. Adherence was supported via phone calls or SMS texts (86%), family support (87%), and psychosocial or other adherence support (79%) as part of managing TB patients (Table 7). Nearly three-fifths (56%) provided facility-based DOTS for DS-TB patients.

Less than one-half of the facilities provided other services, such as nutritional support or food baskets (41%), rehabilitative services (28%), and TB patient support groups (14%) in the past 12 months.

Figures 5 and 6 show the TB treatment services offered by providers, revealing some gaps in services. Nearly all (99%) reported onsite HIV counseling and testing for TB patients, but fewer (68%) offered referrals for HIV testing (Figure 6). About one-third of the providers reported providing services for treatment initiation, referral, or follow-up of DR-TB patients in the past 12 months, compared with other treatment services assessed. The overwhelming majority (99%) of service providers interviewed who reported providing ART for TB/HIV coinfected patients highlighted that HIV was a major driver of TB infection in Uganda. In addition, 89 percent and 77 percent of the providers reported providing TPT and viral load service, respectively, to the TB/HIV coinfected patients.

Table 7. TB treatment services provided reported by health facilities, by facility type and location (N=216*)

TB Treatment Services	Facility Type								Location				Total	
	RRH and GH		HC IV		HC III		HC II & Other		Urban		Rural			
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Prescription of drugs for TB treatment	28	100.0	36	100.0	137	100.0	15	100.0	78	100.0	138	100.0	216	100.0
TB treatment and follow-up during the intensive phase	28	100.0	36	100.0	134	97.8	15	100.0	78	100.0	135	97.8	213	98.6
TB treatment and follow-up during the continuation phase	28	100.0	35	97.2	134	97.8	15	100.0	78	100.0	134	97.1	212	98.1
Facility-based DOTS for DS-TB patients	23	82.1	22	61.1	63	46.0	12	80.0	49	62.8	71	51.4	120	55.6
Community-based DOTS	26	92.9	32	88.9	111	81.0	12	80.0	70	89.7	111	80.4	181	83.8
Reminder phone calls or SMS texts made to support patient's adherence	27	96.4	30	83.3	117	85.4	12	80.0	71	91.0	115	83.3	186	86.1
Nutritional support or food baskets	22	78.6	21	58.3	36	26.3	9	60.0	42	53.8	46	33.3	88	40.7
Rehabilitative services	18	64.3	9	25.0	29	21.2	5	33.3	33	42.3	28	20.3	61	28.2
Support group for TB patients	5	17.9	7	19.4	16	11.7	2	13.3	12	15.4	18	13.0	30	13.9
Psychosocial or other adherence support	25	89.3	27	75.0	106	77.4	12	80.0	63	80.8	107	77.5	170	78.7

* The sample size varied because not all facilities provided the different services.

Figure 5. TB treatment services offered reported by service providers

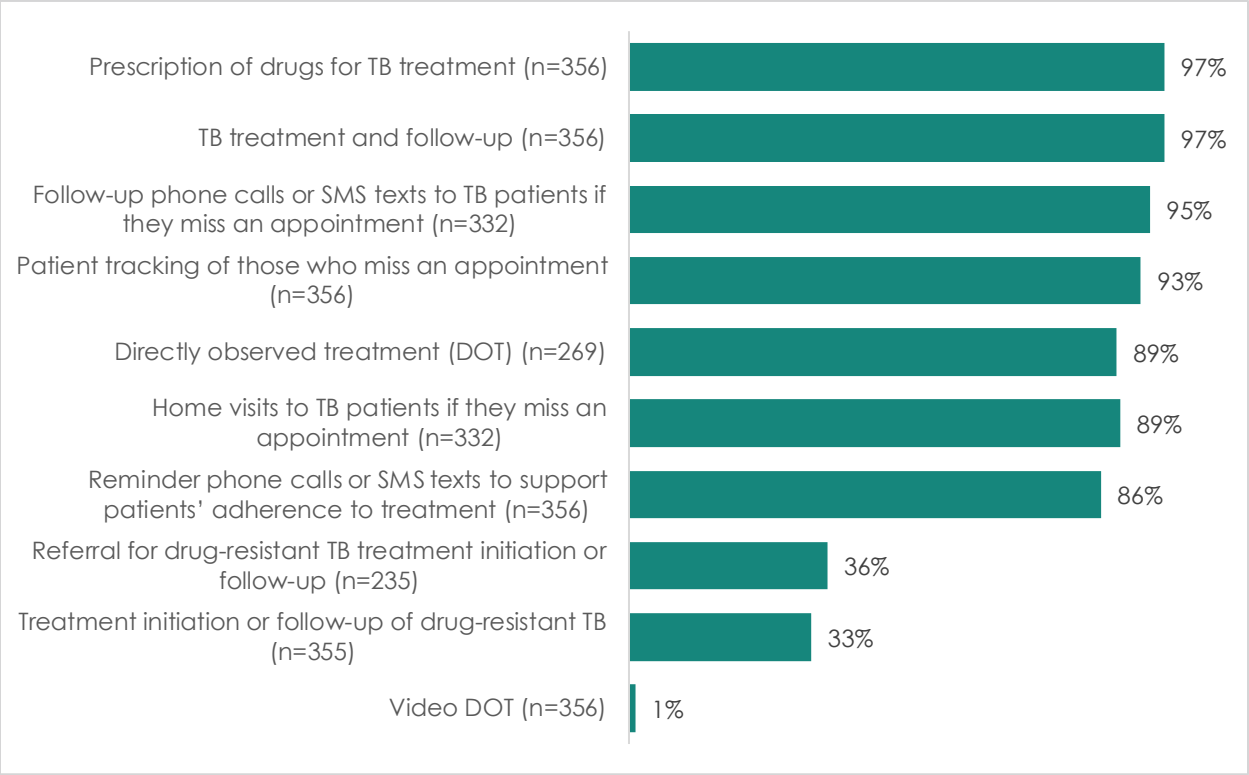
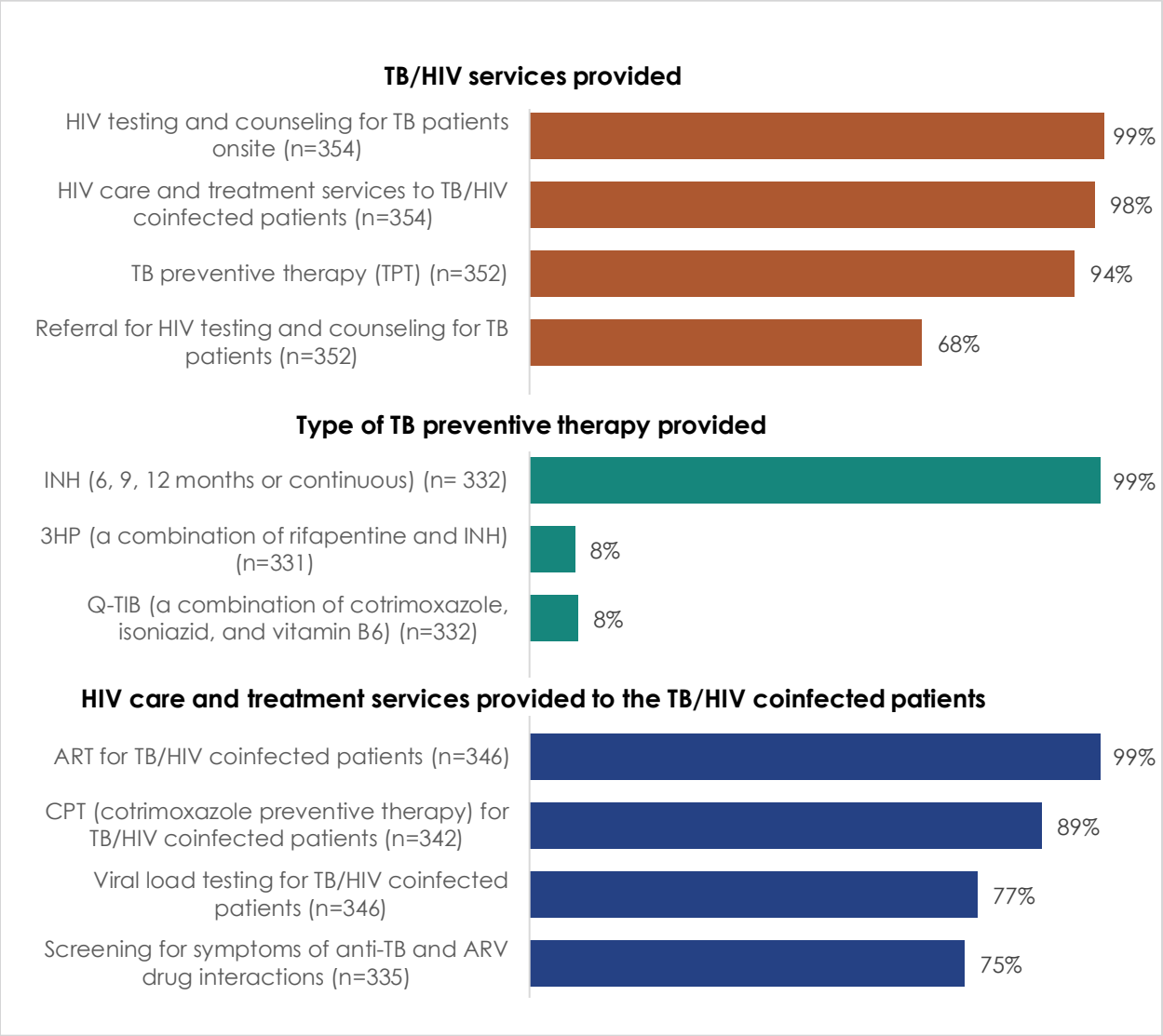


Figure 6. TB/HIV services provided reported by service providers in the past 12 months before the assessment

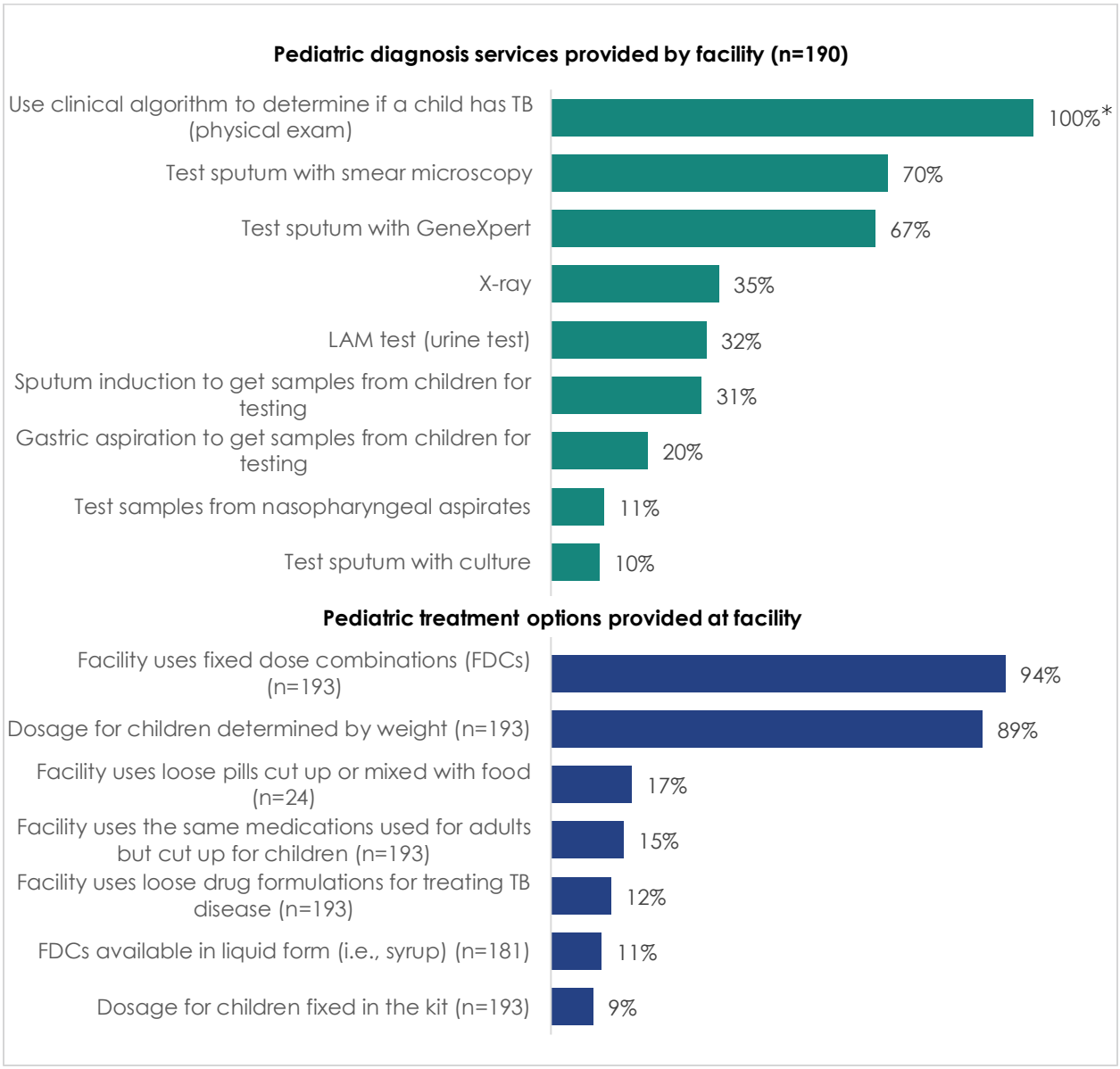


Pediatric Services

Among the facilities assessed, 89 percent provided TB treatment services to children and all those facilities also offered pediatric TB screening services (data not shown). The methods used to diagnose children with TB included clinical algorithm (99%), smear microscopy (70%), and Xpert (67%) (Figure 7), and the methods used varied by facility type and location.

In addition to TB diagnosis methods, the facilities sampled were asked about the pediatric treatment options provided by the facility. Of the 190 treatment facilities that provided pediatric TB services, the most frequent approach (used by 94% of the facilities) was to give fixed-dosage drug formulations or kits to children with DS-TB. Most facilities (89%) used weight to determine the dosage (Figure 7).

Figure 7. Pediatric TB diagnosis and treatment services provided reported by the health facilities



*100 percent as a result of rounding

Tuberculosis in Children: Providers' Knowledge and Care

Symptoms of TB in children are often less specific than symptoms in adults, and high-quality sputum samples are often challenging to obtain. Children are often unable to produce sputum, making diagnosis of TB difficult and contributing to underdiagnosis and/or leading to inappropriate treatment. Interviewees' answers about aspects of pediatric TB showed good basic knowledge. For example, 99 percent of providers knew that children with TB and HIV were at greater risk of complications of TB than children with TB but without HIV (Figure 8). However, the levels of knowledge varied; for example, 46 percent of providers said that children with TB would always have a cough, whereas 56 percent disagreed with that statement. Figure 9 presents the data on providers' ability to recognize presumptive TB in children.

When asked about TB diagnosis methods used routinely to evaluate pediatric TB, the majority of providers cited using clinical signs and symptoms (98%), a history of contact with an individual with TB (97%), and HIV testing (88%) (Figure 10). Fewer than two-fifths mentioned other tests, such as chest x-rays (37%) and sputum specimens (17%). Figure 11 shows the types of pediatric TB patients referred for HIV testing and counseling, primarily those whose mothers were HIV-positive (86%).

Figure 8. Providers' knowledge of TB in pediatric patients (n=356)

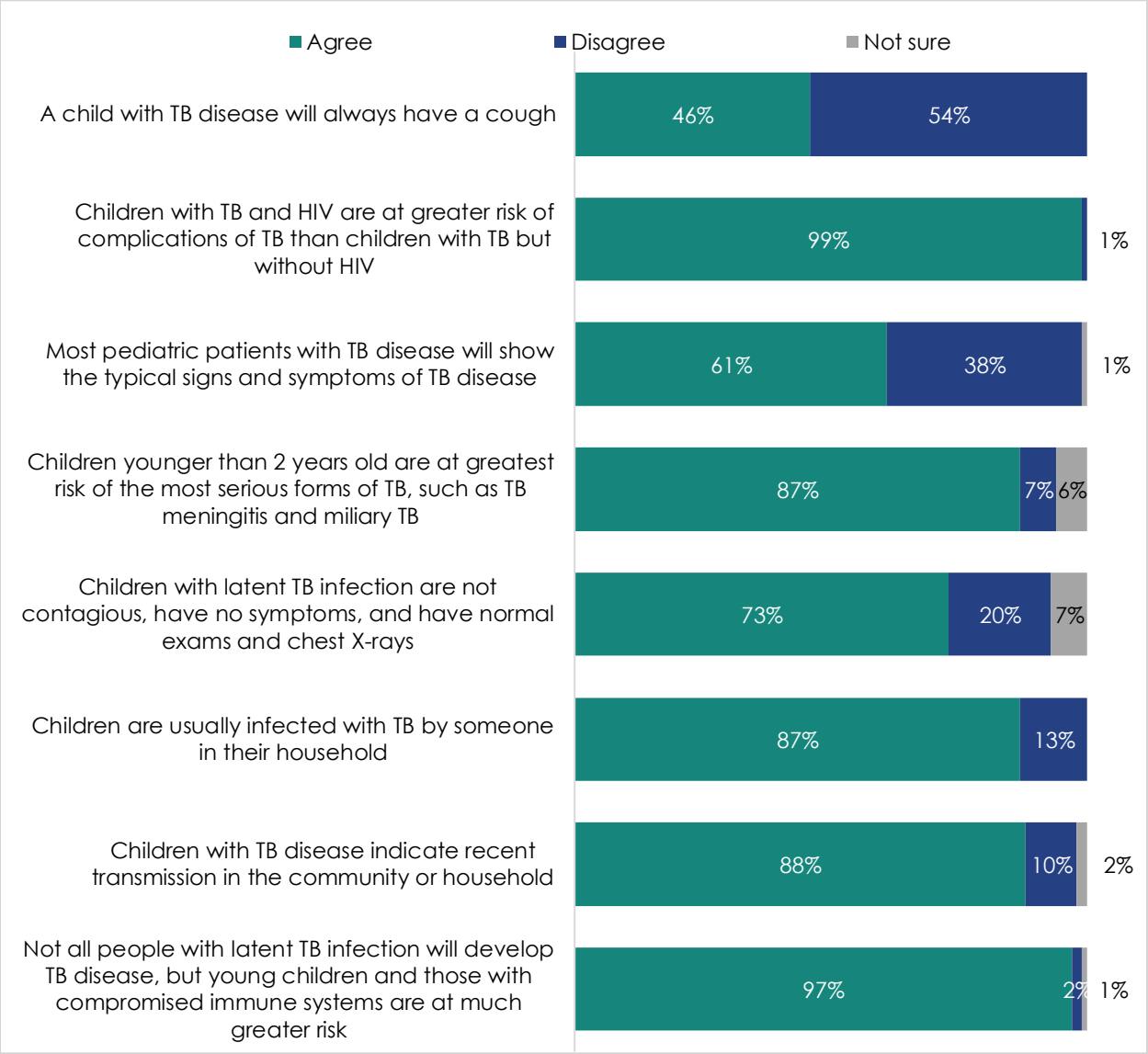
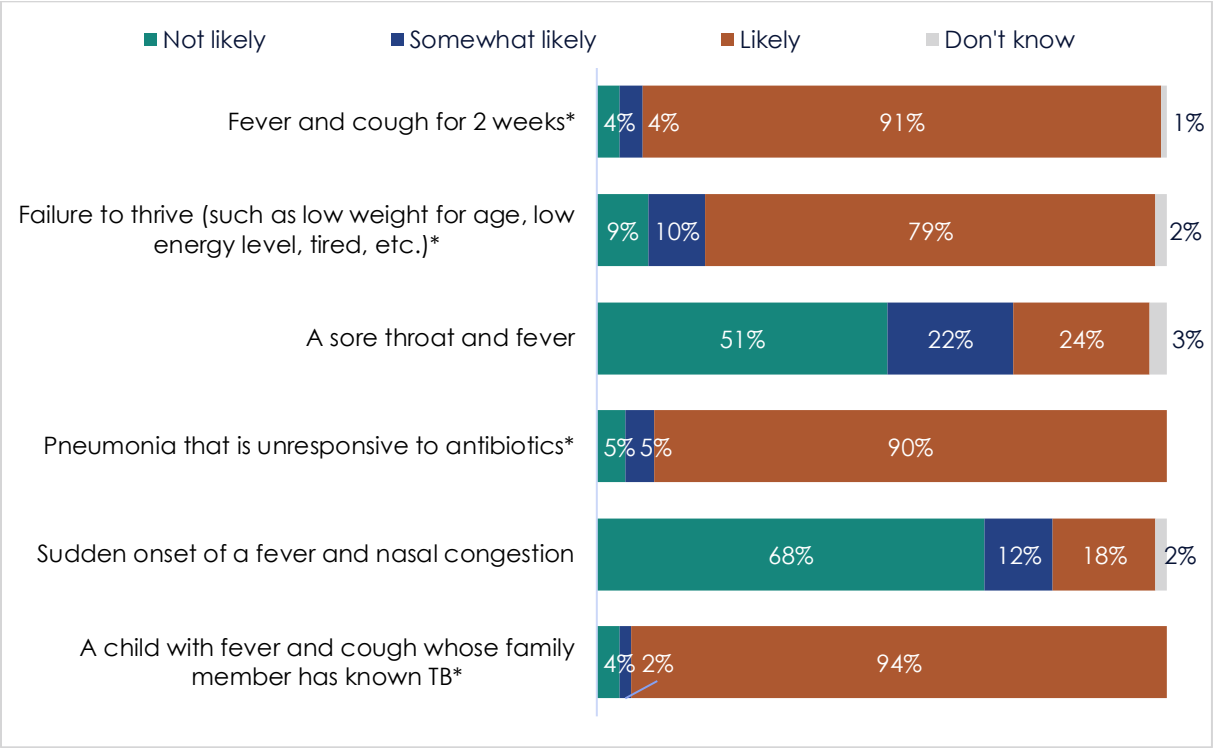


Figure 9. Providers' ability to recognize TB in children (n=356)



*denotes correct answer

Figure 10. TB diagnosis methods used in routine evaluation of a child for TB (n=356)

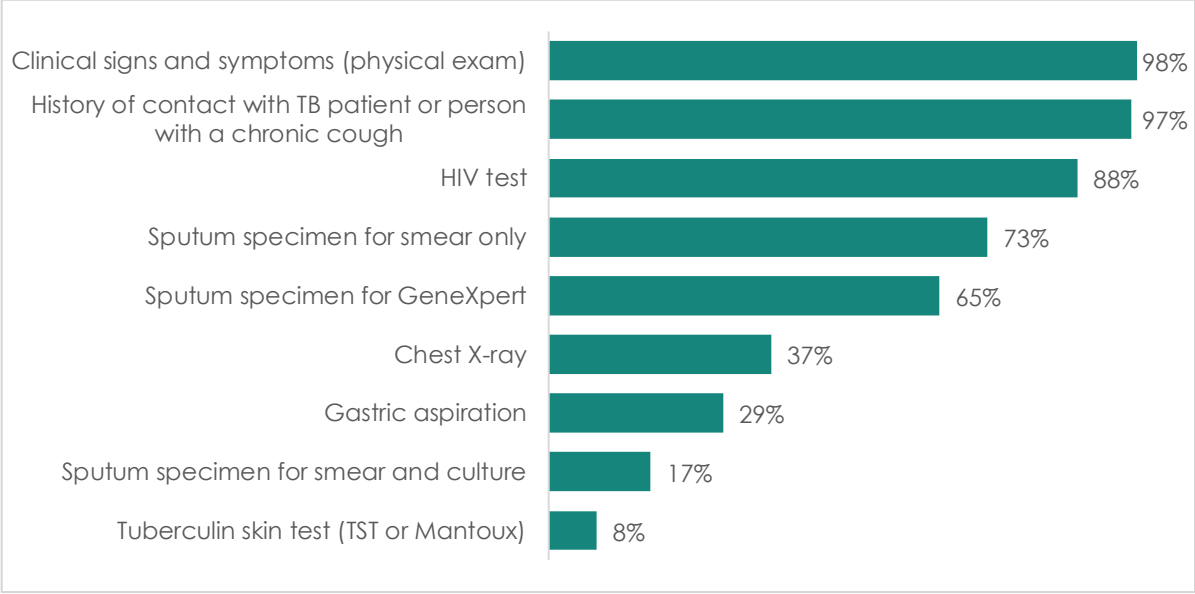
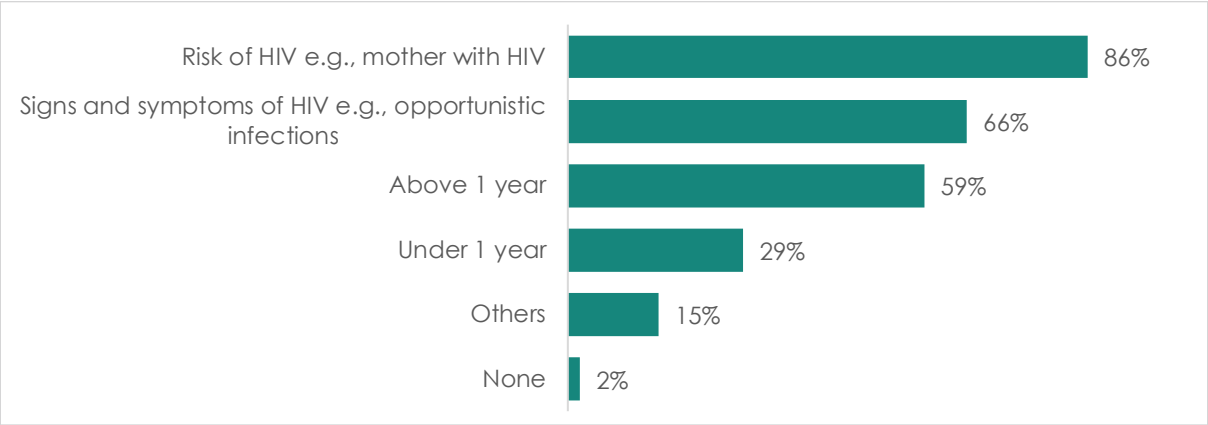


Figure 11. Type of pediatric TB patients referred for HIV testing and counseling services (n= 356)

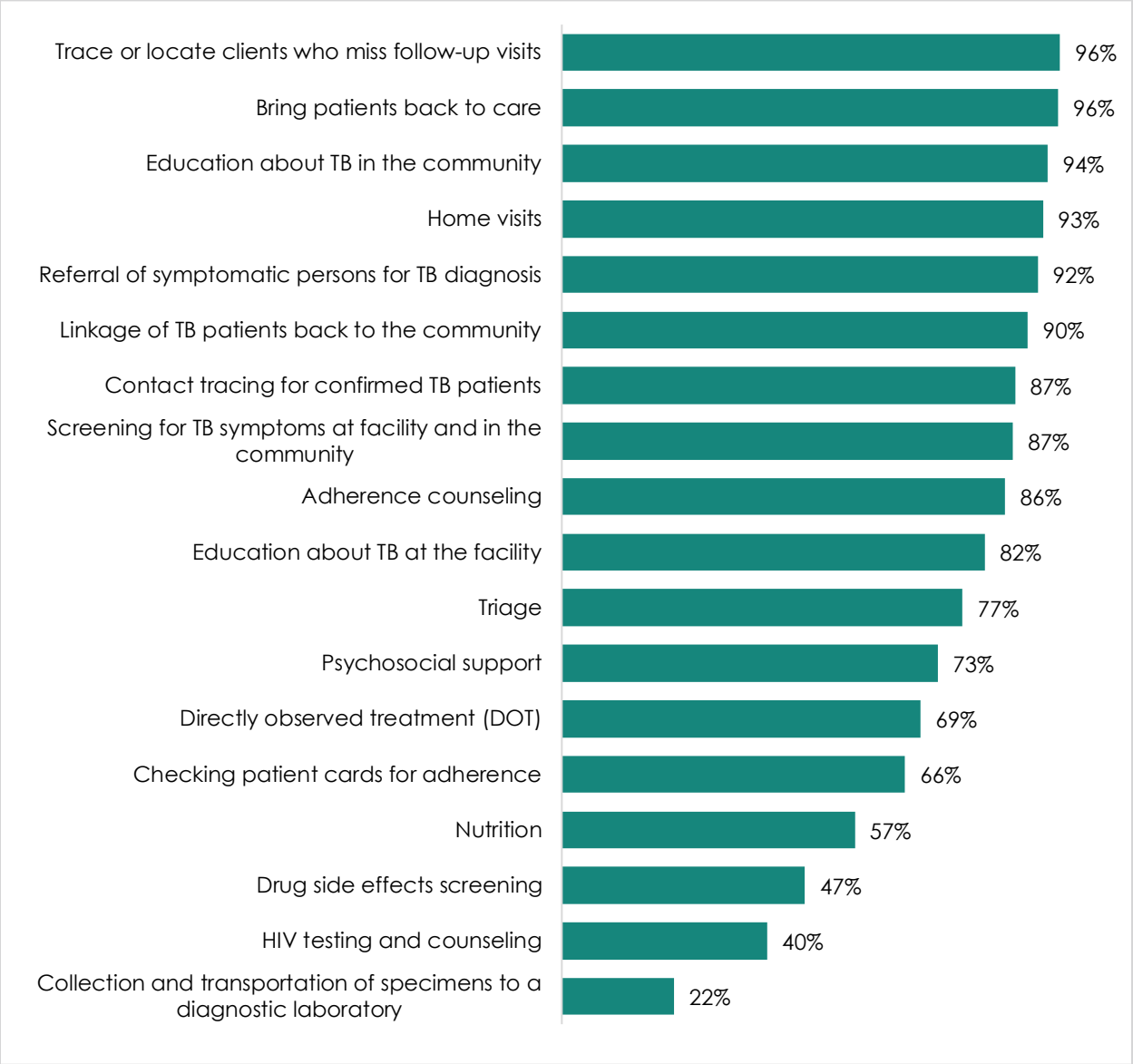


Community Linkages

The role of village health teams (VHTs) and/or community health workers and volunteers (CHWVs) is crucial in TB care. Uganda's MOH has institutionalized the use of VHTs and CHWVs in healthcare delivery at the community level to ensure a linkage between patients and their facility, and in the case of TB care and management, to ensure that patients strictly adhere to their treatment plan. The VHTs and CHWVs are affiliated with facilities, and carry out such tasks as TB awareness, identification, and referral of presumptive TB patients, reaching out to high risk populations, and contact tracing of those who had contact with TB patients. VHTs and CHWVs include community volunteers, non-professional health workers, faith-based volunteers, NGO volunteers. To capture such services, the assessment had questions about the types of services that VHTs and/or CHWVs provided to TB patients.

Figure 12 shows the general health and TB services provided by VHTs and/or CHWVs as reported by the health facilities, including an array of services to support TB patients. Almost all (96%) of the facilities had the VHTs trace or locate patients who missed follow-up visits, bring patients back to care (96%), provide community-based education about TB (94%), and conduct home visits (93%). Other services included screening for TB symptoms, linking TB patients back to the community, and offering psychosocial support and triage. A smaller proportion of these cadres provided HIV services or collected specimens for transport to a laboratory.

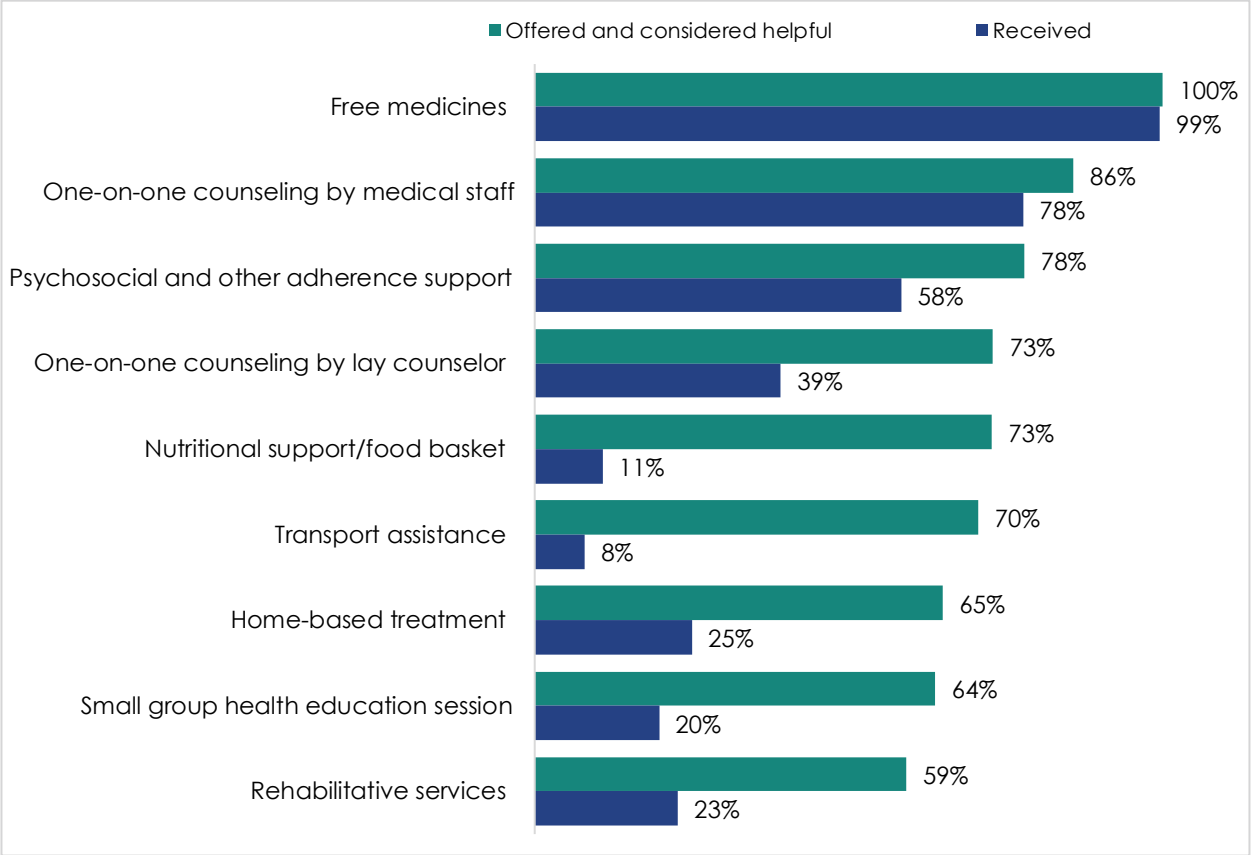
Figure 12. General health and TB services provided by VHTs and/or CHWVs (n=216)



Patients' Perspectives about Treatment Support Provided by Health Facilities

Facilities may offer several services to support TB patients and help them complete their treatment. The TB patients interviewed were asked about which supportive services they had received from the facility and which services they felt should be offered. Other than the provision of free medicines for TB patients and one-on-one counseling by medical staff, there were substantial differences in the services that patients considered helpful compared with the services they had received (Figure 13). For example, 73 percent of patients thought that nutritional support/food baskets would be helpful for their treatment, but only 11 percent reported receiving such services. A similar pattern was observed for such services as transport assistance, small group health education sessions, and home-based treatment.

Figure 13. Support services that TB patients received versus services that TB patients found to be most helpful for their treatment (N=501)



Infrastructure

The assessment of facility infrastructure yielded critical information about the ability of the facilities to provide necessary services and follow required procedures for TB patients.

Specimen Management

The assessment results showed an overall poor performance in specimen management among the facilities sampled, with similar performance at the urban and rural facilities. For example, nearly 30 percent of facilities reported experiencing stockouts of any specimen management supplies, and only three-fifths of the facilities had the approved laboratory request forms available on the day of the assessment (data not shown). Approximately two-thirds of the facilities had the standard operating procedures for specimen collection on hand. RRHs and GHs were more likely to have standard operating procedures for specimen collection and approved NTLP laboratory request forms available on the day of the survey than lower-level facilities (data not shown).

The turnaround time for receiving specimen results varied by the type of TB test. The average reported turnaround time reported by health facilities for specimen results was eight and one-half hours for smear microscopy and nearly four and one-half days (106 hours) for Xpert (Table 8).

Table 8. Average turnaround time for offsite laboratories, by facility type and location (in hours)

	Facility Type					Facility Location		Total
	RRH	GH	HC IV	HC III	HC II	Urban	Rural	
Mean turnaround time for smear microscopy in hours (n=210)	7.7	7.8	6.8	8.3	13.5	5.9	10.1	8.5
Mean turnaround time for GeneXpert in hours (n=208)	21.8	38.6	57	135	104	86	118	106

TB Laboratory Procedures

Additional key requirements of good laboratory practices are internal quality control (QC) and external QA. The study findings showed a high level of QC of specimens at the facilities assessed; 99 percent of facilities that had onsite laboratory services also had a system for QC. Facilities with TB diagnosis capabilities were asked about QC and QA procedures used in their laboratories (Table 9). About two-thirds (65%) of the facilities offering TB diagnosis services used both internal and external QC/QA procedures for sputum tests, whereas 24 percent of the facilities relied on external QC/QA only, and just 5 percent of the facilities used internal QC/QA only. Overall, about 5 percent of the facilities had not used any QC/QA procedures at their facility.

Table 9. Type of QC and QA used by TB diagnosis facilities, according to type and location of the facility (n=211)

	Facility Type								Location				Total	
	Hospital		HC IV		HC III		HC II		Urban		Rural			
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Internal QC/QA only	1	3.6	2	5.6	6	4.4	1	8.3	5	6.4	5	3.8	10	4.7
External QC/QA only	7	25.0	4	11.1	35	25.9	5	41.7	19	24.4	32	24.1	51	24.2
Both internal and external QC/QA	18	64.3	30	83.3	83	61.5	6	50.0	51	65.4	86	64.7	137	64.9
None	2	7.1	0	0.0	8	5.9	0	0.0	3	3.8	7	5.3	10	4.7
Don't Know	0	0.0	0	0.0	3	2.2	0	0.0	0	0.0	3	2.3	3	1.4
Total	28	100.0	36	100.0	135	100.0	12	100.0	78	100.0	133	100.0	211	100.0

Medical Equipment and Drug Supplies

The assessment team asked and observed the availability of basic items that should be in stock at a health facility to guarantee its readiness to deliver basic health services and TB-related services (WHO, 2015b). As shown in Figure 14, 80 percent or more of the facilities assessed had most of the basic equipment for physical

exams, such as adult weighing scales, blood pressure cuff, etc. However, only about one-quarter had a scale for weighing children and fewer than one-third had equipment for oxygen delivery. The assessment showed variations in the availability of functional medical equipment when sub-classified by facility type and region. Higher-level facilities were more likely to have functional equipment, especially resuscitation medical equipment or supplies, compared with lower-level facilities (data not shown). Table 10 presents the availability of equipment at facilities offering services for treating DR-TB. It shows good availability of functional electrocardiogram and audiometry equipment (except for one urban hospital), but mixed results for other equipment.

Figure 14. Equipment observed on the day of the assessment (N=216)

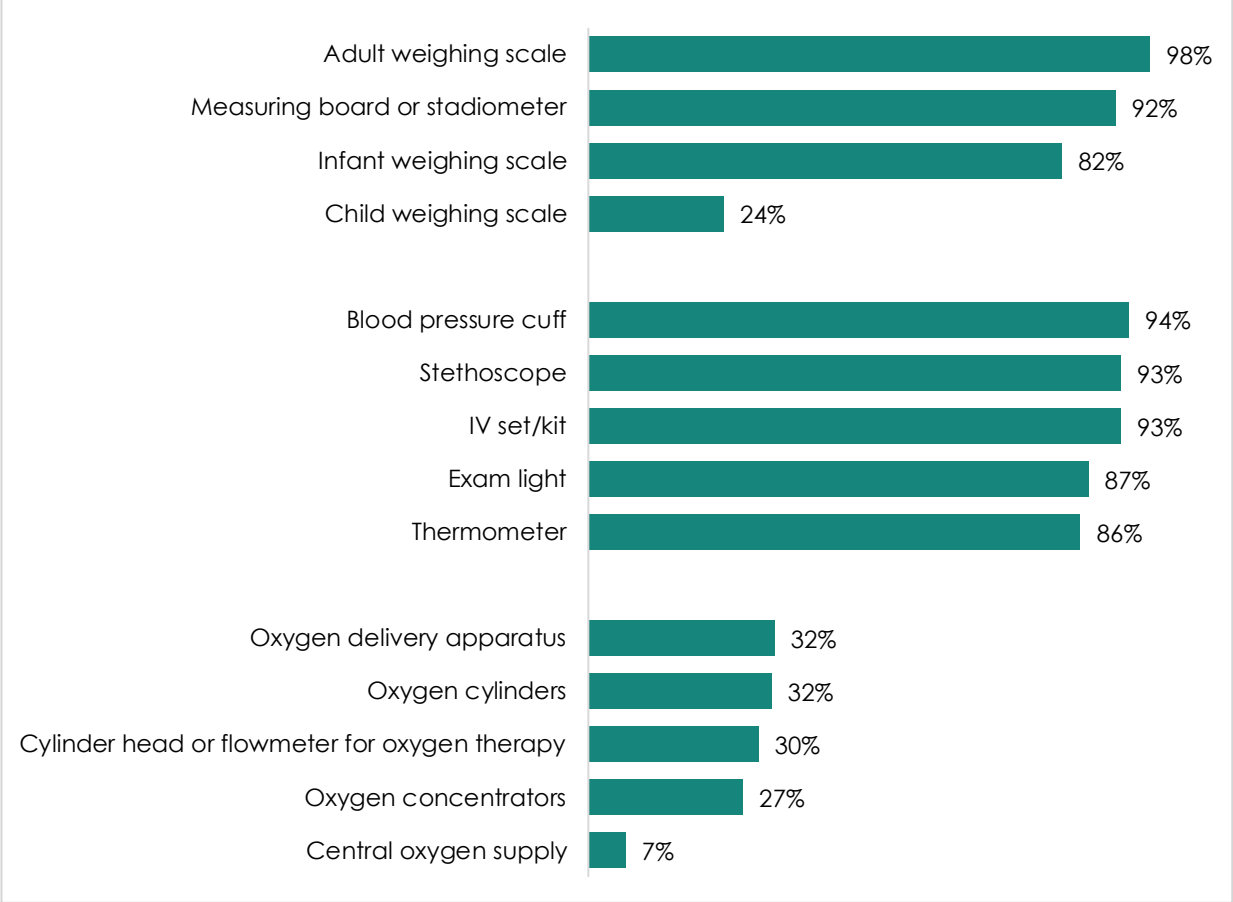


Table 10. Availability of DR-TB specific equipment

	Facility Type				Facility Location				Total	
	RRH		GH		Urban		Rural			
	##	%	##	%	##	%	##	%	##	%
Facility had at least one functional electrocardiogram machine available (n=8)	6	100.0	2	100.0	7	100.0	1	100.0	8	100.0
Facility had audiometry equipment (n=9)	6	100.0	1	50.0	7	87.5	0	0.0	7	77.8
Type of audiometry equipment available (n=8)										
Shoebox	1	16.7	0	0.0	1	14.3	0	0.0	1	12.5
Standard machine	4	66.7	1	50.0	5	71.4	0	0.0	5	62.5
Don't know	1	16.7	1	50.0	1	14.3	1	100.0	2	25.0

An uninterrupted supply of TB drugs is critical to a facility's ability to provide high-quality care to TB patients. The assessment team asked and observed the availability of both first- and second-line TB drugs, including expired drugs. First-line TB drugs were observed at all 216 facilities assessed, whereas second-line drugs were observed only at the nine facilities treating DR-TB cases. As Figure 15 shows, at least 72 percent of the facilities had available doses of isoniazid and isoniazid combinations among the first-line medicines for treating TB. A lower proportion had other first-line drugs, such as ethambutol 100 mg (55%), isoniazid and rifampicin (2FDC) 75/50 mg (58%), and isoniazid, rifampicin, pyrazinamide (3FDC) 75/50/150 mg (62%). About one-quarter had ethambutol 400 mg (26%) and other drugs.

Fewer facilities are delivering DR-TB services, but the majority had most of the recommended second-line DR-TB drugs on the day of data collection (Figure 16). Overall, the facilities treating DR-TB had better availability of the appropriate TB treatment drugs than those treating DS-TB. The availability of these drugs varied significantly by facility type and region. The first-line TB drugs were more likely to be available at the RRHs and GHs compared with the HC III facilities and below (data not shown).

Figure 15. First-line TB drug availability at treatment facilities on the day of the assessment (N=216)

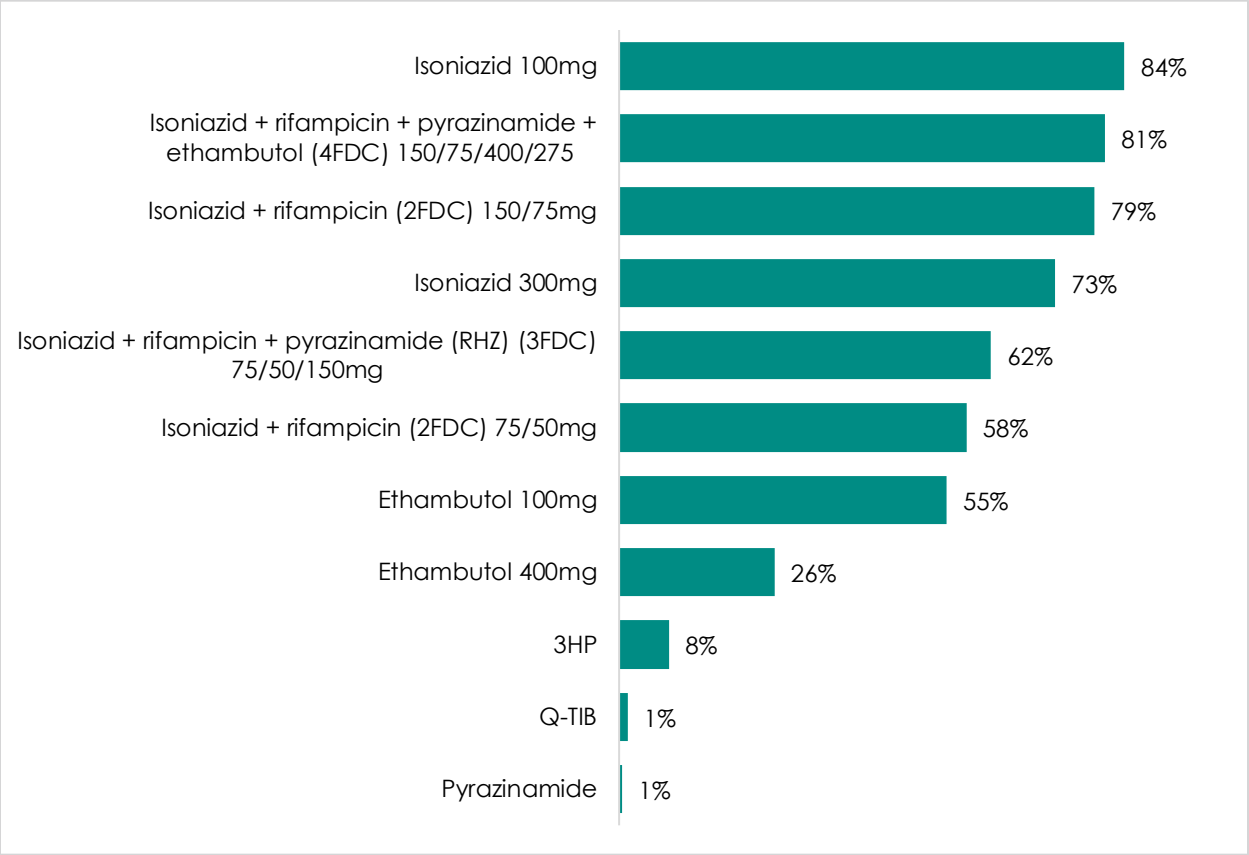
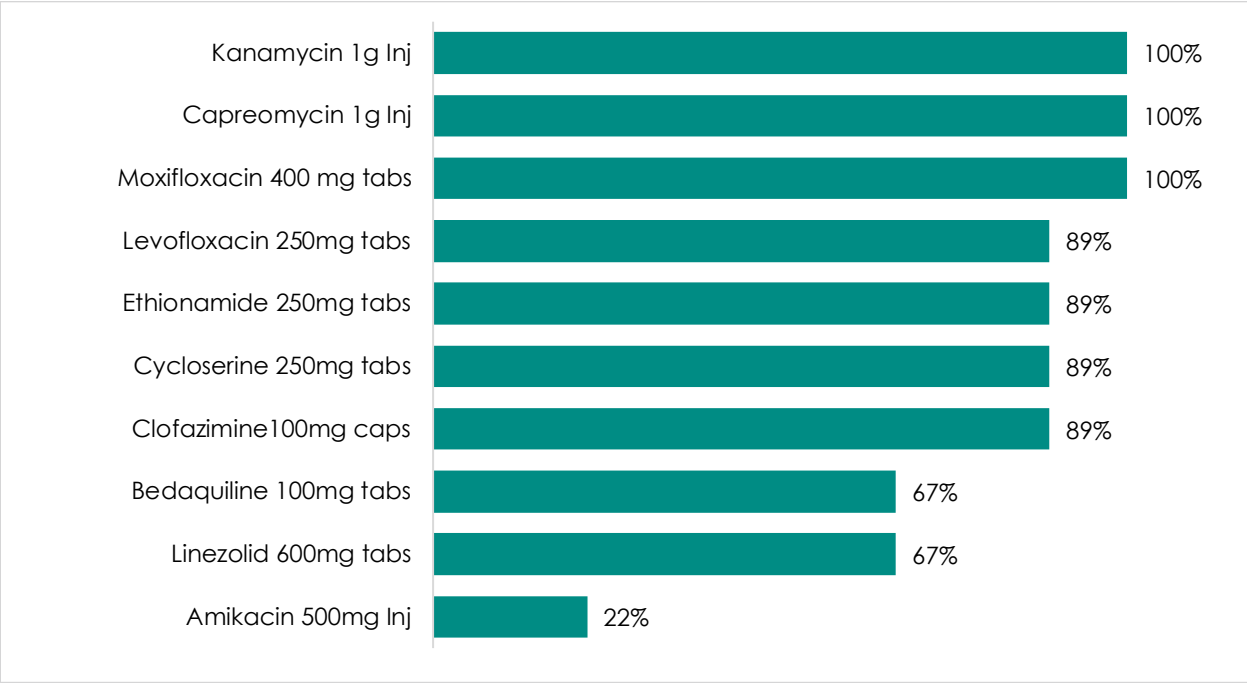


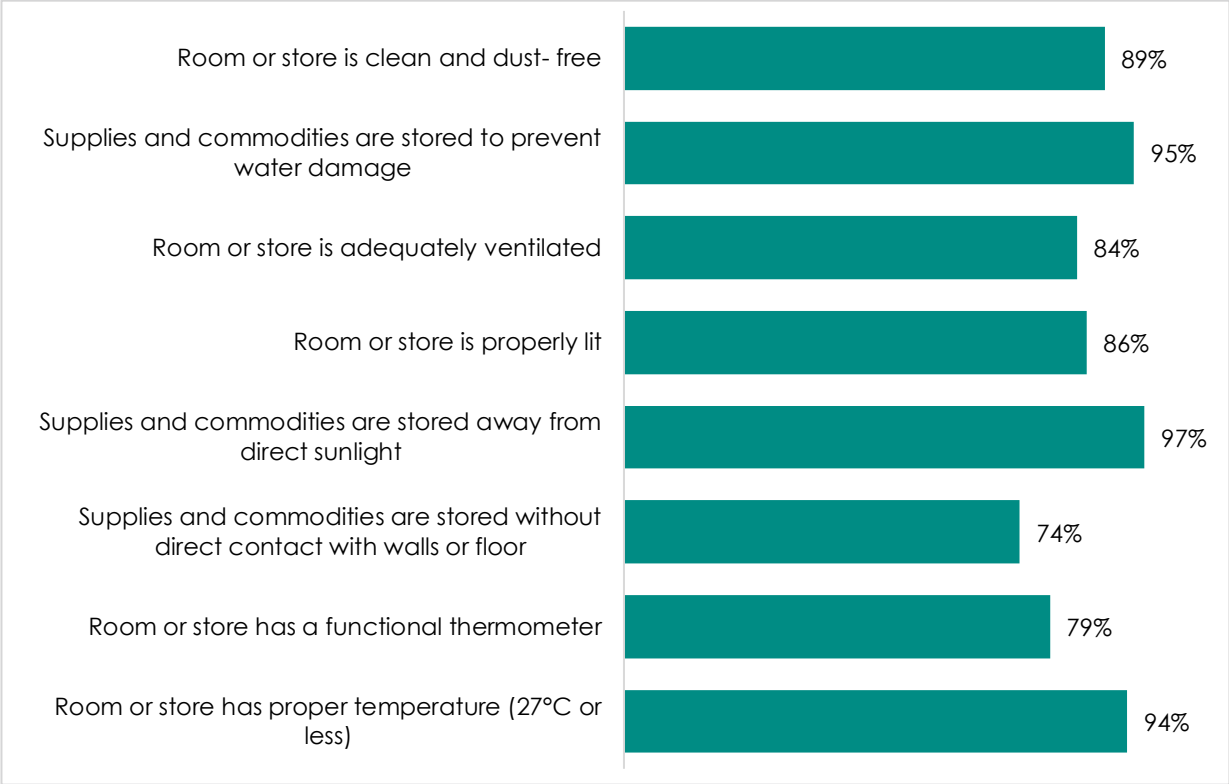
Figure 16. Second-line TB drug availability on the day of the assessment (n=9)



Storage Conditions

Effective treatment requires the safe, protected storage of TB drugs to help prevent damage and ensure that medicines are handled properly so that they can maintain their potency. The assessment team reviewed compliance with the NTLP storage protocol and guidelines at each facility. The findings showed good storage and organization of supplies overall (Figure 17). At least 80 percent of the facilities complied with the NTLP storage guidelines, except for a gap in the requirement to store commodities away from the walls and floor (74%). Storage conditions were better at higher-level facilities than at lower-level facilities. For example, all RRHs had adequately ventilated storage facilities with a functional thermometer, compared with lower-level facilities (73% of HC II facilities had adequate ventilation, and only 80% of HC III and 67% of HC II facilities had working thermometers) (data not shown). Storage area temperatures were at the mandated 27°C or less at 100 percent of the lower-level facilities, compared with 80 percent of the RRHs.

Figure 17. Storage conditions at the facilities keeping commodities/supplies in relation to NTLP guidelines (n=205)



Infection Prevention and Control

Healthcare settings providing TB services are at high risk for nosocomial TB transmission. It is therefore essential to adhere to infection prevention and control (IPC) procedures, with constant vigilance needed to limit the transmission of airborne diseases and infection. Effective IPC requires both clear guidelines and the availability of basic supplies and equipment at the facilities to enable the provision of quality TB services. The study assessed IPC knowledge and practices from the facilities' and providers' perspectives.

Facility IPC practices are presented in Table 11. Overall, the facilities performed better on general IPC measures and supplies in examination areas than on measures related to resources, with a mixed picture of IPC practices by facility type. The RRHs followed more general IPC measures than did the GHs and HCs; however, the GHs performed better in terms of IPC resources. The GHs and HCs performed better than the RRHs on the availability of IPC supplies in examination areas, possibly because of the high patient volume at RRHs.

In terms of general IPC measures, the majority of facilities asked patients about coughing (93%), had a designated person to assist with cough triage (87%), and provided masks and separate waiting facilities for potentially infectious patients. However, fewer than one-half (47%) had a system in place to screen and evaluate staff for TB disease.

All types of facilities performed poorly overall in terms of IPC resources, an important finding, given that these resources provide a comprehensive framework and enabling environment that can support and facilitate the implementation, operation, and maintenance of TB IPC. Some resources, such as IPC plans and risk assessments, were inadequate, although more than one-half of patient waiting areas had access to continuous

fresh air (90%) and supplies for coughing patients (67%). It was observed that less than 60 percent of the facilities had IPC supplies for patient and provider protection (e.g., methylated spirit and injection safety precaution guidelines). A little more than one-quarter of the facilities had eye protection.

Table 11. Infection prevention and control practices (N=216)

IPC Practices/Type of Facility	Facility Type										Total	
	RRH		GH		HC IV		HC III		HC II			
	#	%	#	%	#	%	#	%	#	%	#	%
General IPC Measures												
Staff member designated as an IPC focal point	6	100.0	17	77.3	30	83.3	93	67.9	8	53.3	154	71.3
Patients routinely asked about cough in triage	5	83.3	19	86.4	34	94.4	128	93.4	15	100.0	201	93.1
Cough triage implemented	6	100.0	22	100.0	34	94.4	125	91.2	14	93.3	201	93.1
Separate waiting area available to isolate potentially infectious patients	5	83.3	20	90.9	26	72.2	97	70.8	13	86.7	161	74.5
Designated cough monitor assists with triage/separation	6	100.0	21	95.5	32	88.9	116	84.7	13	86.7	188	87.0
Surgical masks available for presumptive and confirmed TB patients	6	100.0	17	77.3	26	72.2	108	78.8	11	73.3	168	77.8
System in place to screen and evaluate staff for TB disease	4	66.7	14	63.6	21	58.3	56	40.9	7	46.7	102	47.2
Observed IPC Resources												
Facility has an updated and approved IPC plan*	4	66.7	16	72.7	23	63.9	52	38.0	4	26.7	99	45.8
Facility has an annual TB IPC risk assessment*	2	33.3	9	40.9	9	25.0	26	19.0	2	13.3	48	22.2
Supplies are available to coughing patients (tissues, N-95 masks, etc.)*	6	100.0	19	86.4	24	66.7	86	62.8	10	66.7	145	67.1
Facility keeps a confidential log of all staff with presumptive or confirmed TB*	1	16.7	8	36.4	5	13.9	15	10.9	2	13.3	31	14.4
Patient waiting areas are either outdoors or indoors with access to continuous fresh air*	6	100.0	21	95.5	34	94.4	121	88.3	13	86.7	195	90.3

IPC Practices/Type of Facility	Facility Type										Total	
	RRH		GH		HC IV		HC III		HC II			
	#	%	#	%	#	%	#	%	#	%	#	%
IPC Supplies in Examination Areas*												
Medical waste receptacle (pedal bin) with lid and plastic bin liners	6	100.0	21	95.5	36	100.0	136	99.3	14	93.3	214	99.1
Gowns, scrubs, or clinical coats	6	100.0	21	95.5	33	91.7	118	86.1	13	86.7	191	88.4
Eye protection/goggles or face protection	1	16.7	8	36.4	15	41.7	30	21.9	5	33.3	59	27.3
Injection safety precaution guidelines for standard precautions	3	50.0	16	72.7	19	52.8	73	53.3	4	26.7	115	53.2
Needles destroyer or sharp box	5	83.3	21	95.5	33	91.7	119	86.9	13	86.7	191	88.4
Methylated spirit	3	50.0	17	77.3	22	61.1	75	54.7	10	66.7	127	58.8

*Verified through observation

Providers' IPC Knowledge and Practices

In addition to evaluating facilities on the availability of IPC-related materials, providers were assessed on their IPC knowledge and practices (Figure 18). Most providers (>90%) had good overall knowledge about IPC with TB patients, but there were gaps. For example, only three-fifths of providers said that using ventilator fans in TB wards would reduce transmission; and fewer than one-half (646%) mentioned using masks to protect themselves.

In terms of behavior and strategies, more than 80 percent of providers interviewed reported proper behavior, stating, for example, that they educated TB patients on cough etiquette, prioritized coughing patients, screened all family members of confirmed TB patients for TB symptoms, and requested TB diagnosis testing if a patient was symptomatic.

However, providers' practices did not match their knowledge of the use of personal respiratory protection. Although 97 percent knew that using respiratory protection, such as N-95 particulate respirators, could protect them from inhaling the TB bacteria, only 67 percent said that they used a mask or respirator when treating presumptive or confirmed TB patients, and only 41 percent reported that they turned on fans to exhaust air outside the room or blew air in the direction away from others when treating TB presumptive or confirmed cases. The percentage of service providers who reported use of PPE, especially N-95 masks is most likely a reflection of the percentage of facilities with PPE. This implies a higher likelihood that service providers would use PPE when it was available at the facility. Seventy-two percent of providers reported that they had received training on TB infection control (Table 12).

Figure 18. Practices and knowledge of IPC among providers interviewed (n=356)

*100 percent as a result of rounding

TB Screening of Staff

Nearly one-half (47%) of facilities assessed were found to have a system in place to screen staff for TB. Of the 102 facilities that had a staff screening system in place, 19 percent (19 facilities) had at least one staff member who had been diagnosed and treated for active TB disease in the past two years, and 22 staff members (16 full-time and six part-time) had active TB disease: seven at the HC IV, six at GHs, five at the HC III level, three at the RRHs, and one at an HC II center had active disease (data not shown).

Capacity of TB Providers

Training is essential to keep health workers updated with knowledge and technical competencies to maintain high-quality TB care and services. The assessment used both facility audits and provider interviews to assess provider training on specific TB topics received in the 24 months before the survey (Table 12). TB focal persons at the facilities were asked about training (both new and refresher) received by any providers in the past two years, and providers were asked whether they had received such training either in the past two years or more than two years ago. The findings from the facility audit (with the health facility unit in-charges as the main respondents) differed from the results of provider interviews. Facility respondents typically reported a higher level of provider training on all topics in the past two years compared with that reported by the providers themselves. Except for training on Xpert, DR-TB treatment, and diagnosis of TB based on x-ray, at least 70 percent of facility respondents and more than 50 percent of providers had received training in one area or another that would enable them to deliver TB-related services.

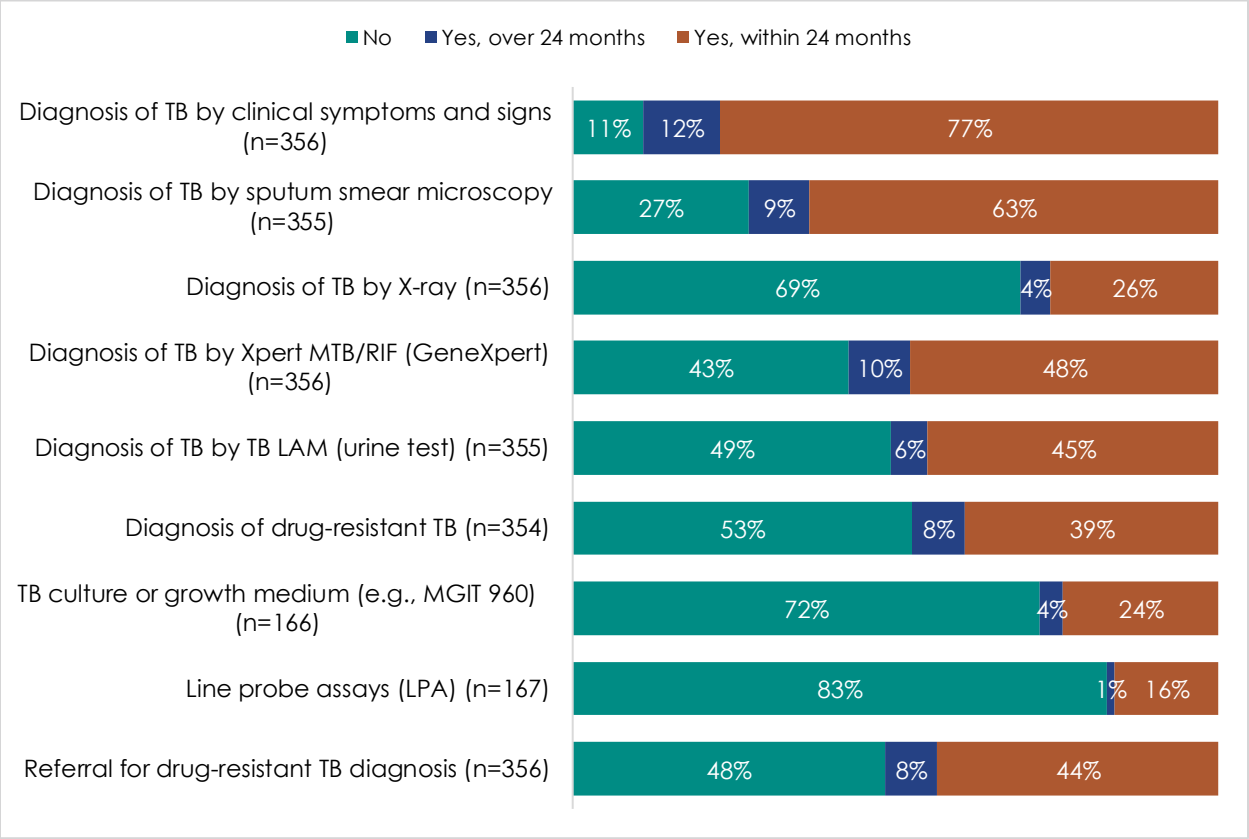
Providers were also asked about the training they had received on managing TB and HIV coinfection. Figure 19 shows that more than 50 percent of the providers had recently received training (except for training on immune reconstitution inflammatory syndrome); however, only 44 percent reported being trained in the past two years (data not shown).

Table 12. Provider training on specific TB-related topics: Facility perspective versus provider perspective

New or Refresher Training Received by Providers	Facilities reporting that TB providers were trained in the past 2 years (per facility audit)* (N=216)	TB providers that reported receiving training (per provider interviewed) (N=356)	
		In the past 2 years	More than 2 years ago
	%	%	%
Screening or diagnosis of TB based on x-rays	37	26	4
Diagnosis of TB based on clinical symptoms or examination for adults	86	77	12
Diagnosis of TB based on sputum tests using smear microscopy	82	63	9
Diagnosis of TB using GeneXpert	73	48	10
Prescription of drugs for TB treatment	82	73	10
Management of DR-TB treatment	40	31	8
Management of TB/HIV coinfection	87	64	16
TB infection control	82	53	19

* Percentage of facilities that reported having any TB providers at their facility trained in the past two years.

Figure 19. Percentage of providers who reported training on general TB management services



Management of TB Services

TB policies and guidelines, protocols, and educational materials are believed to help providers adhere to protocols, and are therefore expected to be available at all TB diagnosis and treatment sites. Table 13 shows the availability of the most recent NTLP guidelines and protocols at the facilities on the day of the assessment. RRHs and GHs were more likely to have policies and guidelines available, compared with lower-level facilities. Similarly, rural-based facilities were more likely to have policies and guidelines available than their counterparts in urban areas.

Table 13. Observed TB protocols and guidelines at health facilities (N=216)

Observed Protocols and Guidelines	Facility Type								Location				Total	
	Hospital		HC IV		HC III		HC II		Urban		Rural			
	#	%	#	%	#	%	#	%	#	%	#	%	#	%
Uganda NTLP Manual for Management and Control of Tuberculosis and Leprosy	23	82.1	22	61.1	90	65.7	10	66.7	44	56.4	101	73.2	145	67.1
Flowcharts or algorithms on TB screening	28	100.0	32	88.9	117	85.4	13	86.7	67	85.9	123	89.1	190	88.0
Guidelines for diagnosis and treatment of TB in adults (desk guide)	22	78.6	30	83.3	114	83.2	12	80.0	57	73.1	121	87.7	178	82.4
TB posters on walls, leaflets, brochures, and/or pamphlets for distribution	23	82.1	23	63.9	71	51.8	7	46.7	47	60.3	77	55.8	124	57.4

Privacy and Waiting Times

An enabling environment affects not only service quality but also uptake of services and treatment success because of its relation to patient satisfaction with services. Environment includes the physical infrastructure and other basic requirements for delivering quality services. This study defined an enabling environment as having at least one area where privacy could be maintained for TB counseling and consultations. This was observed in the TB units at 86 percent of the facilities, more often at rural facilities than at urban facilities.

The time patients spend waiting for service is one of the indicators for measuring patient satisfaction and quality of care. It is often mentioned as a concern among patients using health facilities. The assessment results showed that 90 percent of the patients considered the waiting times before speaking to the healthcare workers at the facility generally acceptable. About one-fourth (26%) of the patients waited 15 minutes or less (Figure 20). The largest proportion (39%) waited between 16 and 30 minutes; 16 percent waited more than one hour to see a healthcare worker on the day of data collection. The largest proportion of patients (37%) spent between 15 and 30 minutes with a provider; 11 percent spent more than 60 minutes (Figure 21). The mean reported waiting time was 48 minutes and the mean consultation time was 36 minutes. HC IV facilities had the longest waiting time; HC III facilities had the shortest. Time for consultation was shortest at the RRHs (26 minutes) and longest at the HC IV facilities (48 minutes) (data not shown). Overall, the assessment results revealed that patients spent more time waiting to speak with a provider than actually speaking with a provider during the consultation and/or counseling session.

Figure 20. Waiting time before talking to healthcare workers during the last visit (n=489)

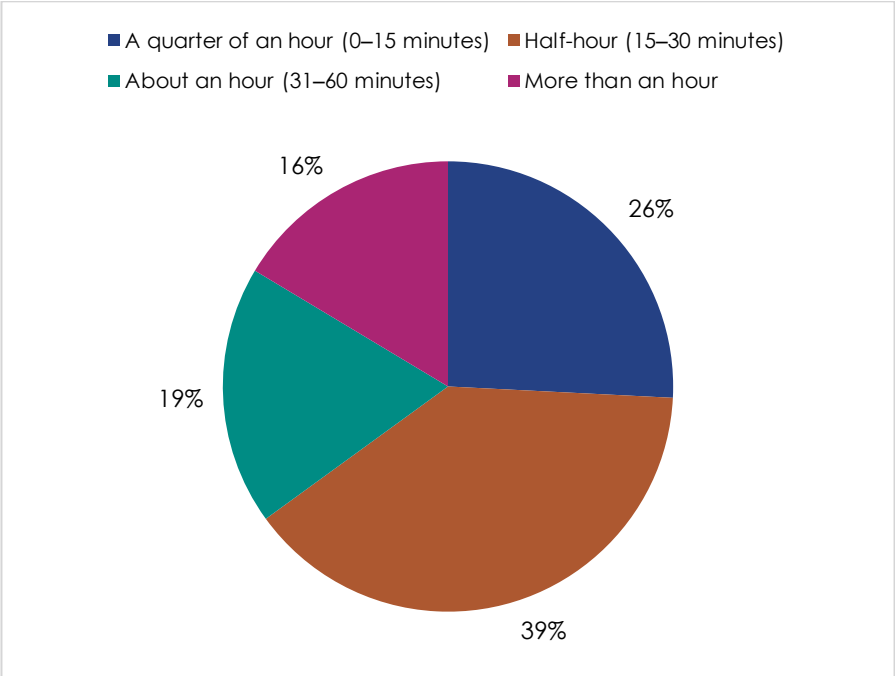
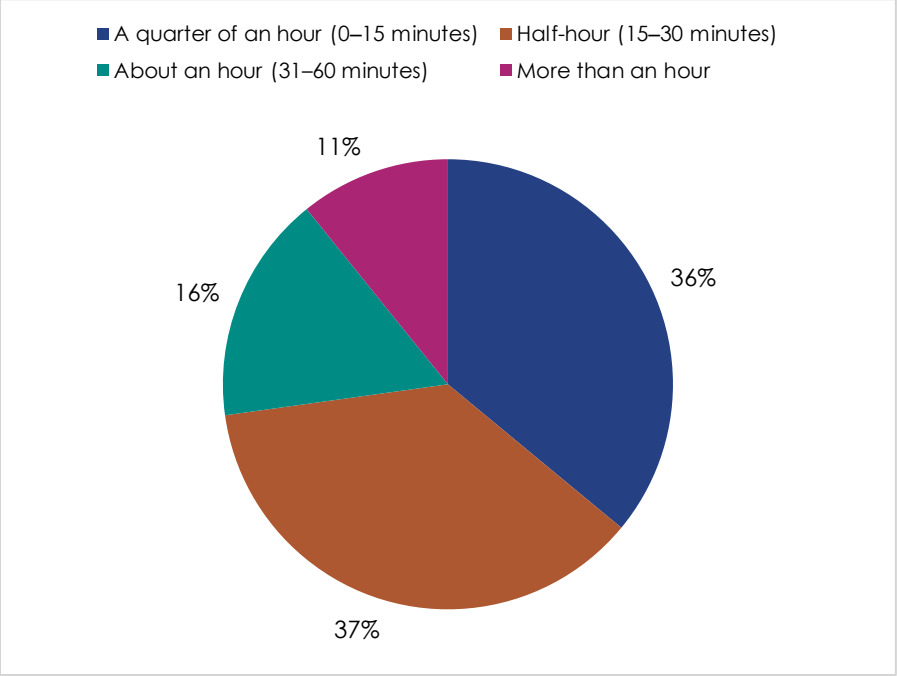


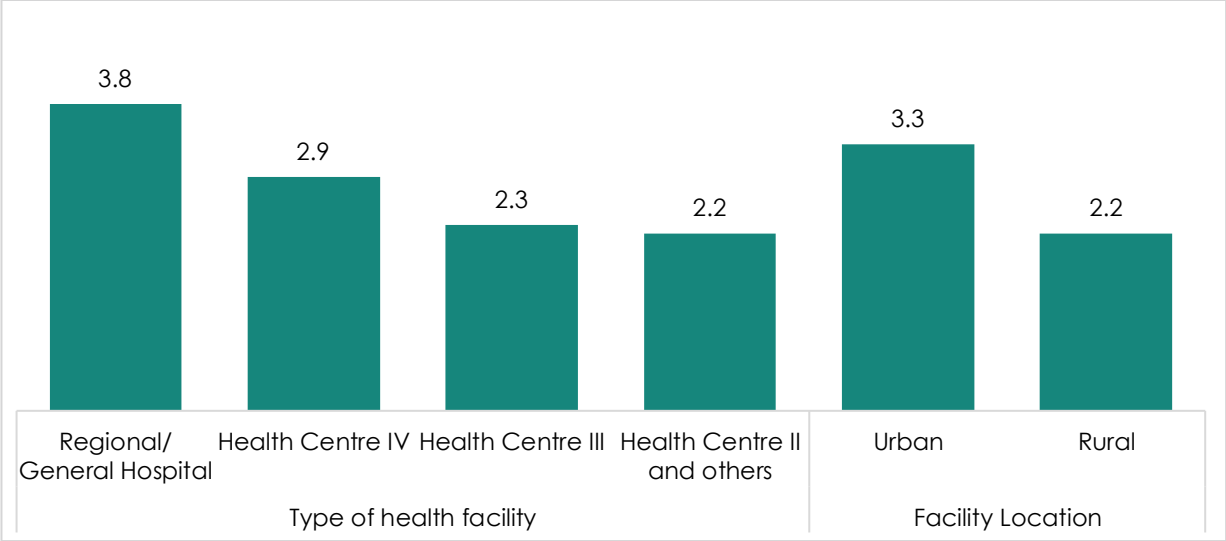
Figure 21. Time patients spent with all healthcare workers during the last visit (n=489)



Supervision of Facilities and Providers

Supervision contributes to quality of care because it helps improve individual and system performance, and can alert managers to such problems as poor adherence to treatment, high LTFU rates, and poor record keeping and medicines management. Frequent routine supervision through the review of reports, face-to-face meetings, or visits to a facility is a useful indicator to assess the quality of system management and its effect on system performance. In this study, 79 percent of the facilities assessed had received supervision from a higher-level office in the past three months, as per NTLP guidelines (data not shown). When providers were asked about supervision, an overwhelming majority (98%) reported receiving a programmatic monitoring and supportive supervision visit from someone from a higher-level office. Of the 347 providers who reported that they had received a supervisory visit, 84 percent reported that the last visit had occurred in the past three months compared with 16 percent who had had their last supervision visit more than three months before the assessment (data not shown). The average number of supervisory visits received by the providers from a higher-level office varied by facility type and location (Figure 22).

Figure 22. Average number of supervisory visits received by the provider in the past 3 months, by facility type and location (N=357)



Virtually all facilities who had received a supervision visit in the quarter preceding the assessment reported that supervisors reviewed their service delivery data and pharmacy stock, and provided feedback on their service performance, with no significant differences by facility location. Providers reported on the activities performed during the higher-level supervisory visit. Their reports tallied with the results of the facility audit (Figures 23 and 24).

Figure 23. Activities conducted during supervisory and monitoring visits as reported by the providers who received supervisory visits (N=357)

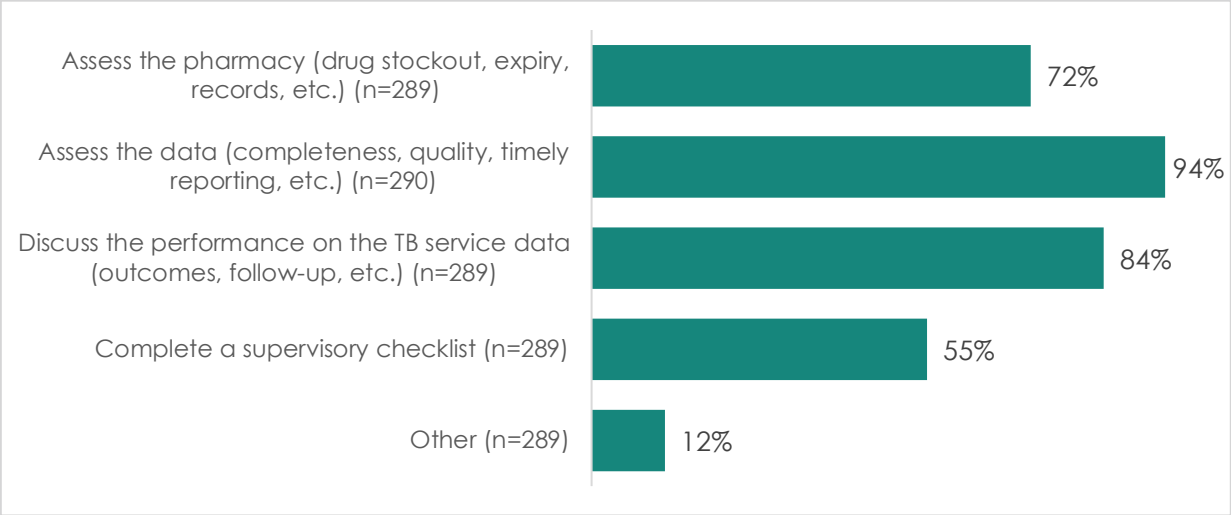
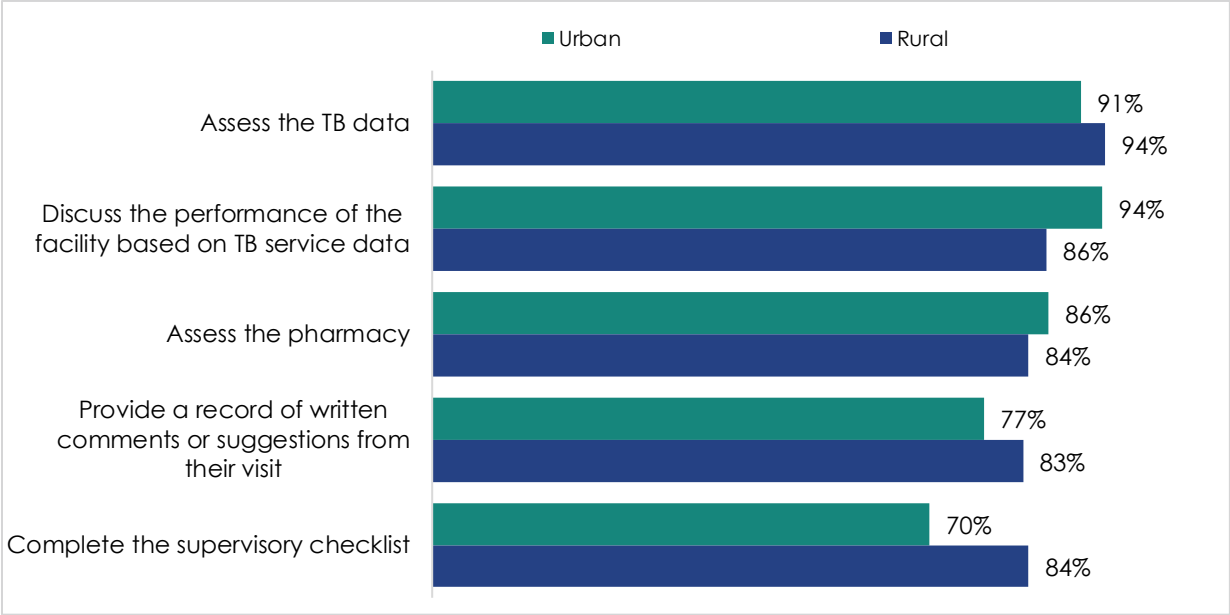


Figure 24. Areas of supervision received (based on interview with health facility), by facility location (n=188)



Providers' Suggestions for Improved Quality of TB Services

TB service providers were asked about the three most important things that could be done to improve their ability to provide high-quality TB care to their patients. Suggestions included improving health facility infrastructure, equipment, and supplies; enhancing service conditions for providers (training, facilitation of contact tracing, motivation and incentives for staff, etc.); providing social protection to enable patients to adhere to treatment (nutritional support for patients), and providing additional staff. Other suggestions were to improve case management and to ensure a sufficient supply of TB medicines for patients.

Process Indicators

Per the assessment framework, the process indicators capture the interaction between service providers and patients during the caregiving process. In combination with the structural factors associated with the health system, process factors help determine the health outcomes of TB patients. In this section, we present findings on the process of delivering TB care and treatment by measuring patient-provider interaction and communication, level of TB knowledge and awareness among TB patients, barriers to TB care, stigma encountered, affordability, and overall patient satisfaction with the services they received.

TB Case Management

To understand TB case management practices, providers were asked about the techniques they used to help establish trust and rapport with their patients and the topics they covered during their initial TB diagnosis assessment. All responses were unprompted (i.e., answer options were not read aloud).

When asked to discuss the process through which they counsel and provide care to TB patients, most providers (81%) mentioned that they counsel their patients to show that they care about them, and 74 percent reported that they encouraged and interacted with their patients in a friendly manner and communicated clearly (Figure 25). More than one-half mentioned carefully listening and contacting patients who missed appointments. Approximately 40 percent of providers mentioned other practices, such as being consistent in what was done and told to the patient, and having an open mind about the patient's cultural beliefs.

Figure 25. Establishing rapport and building trust between the provider and TB patient (n=356)

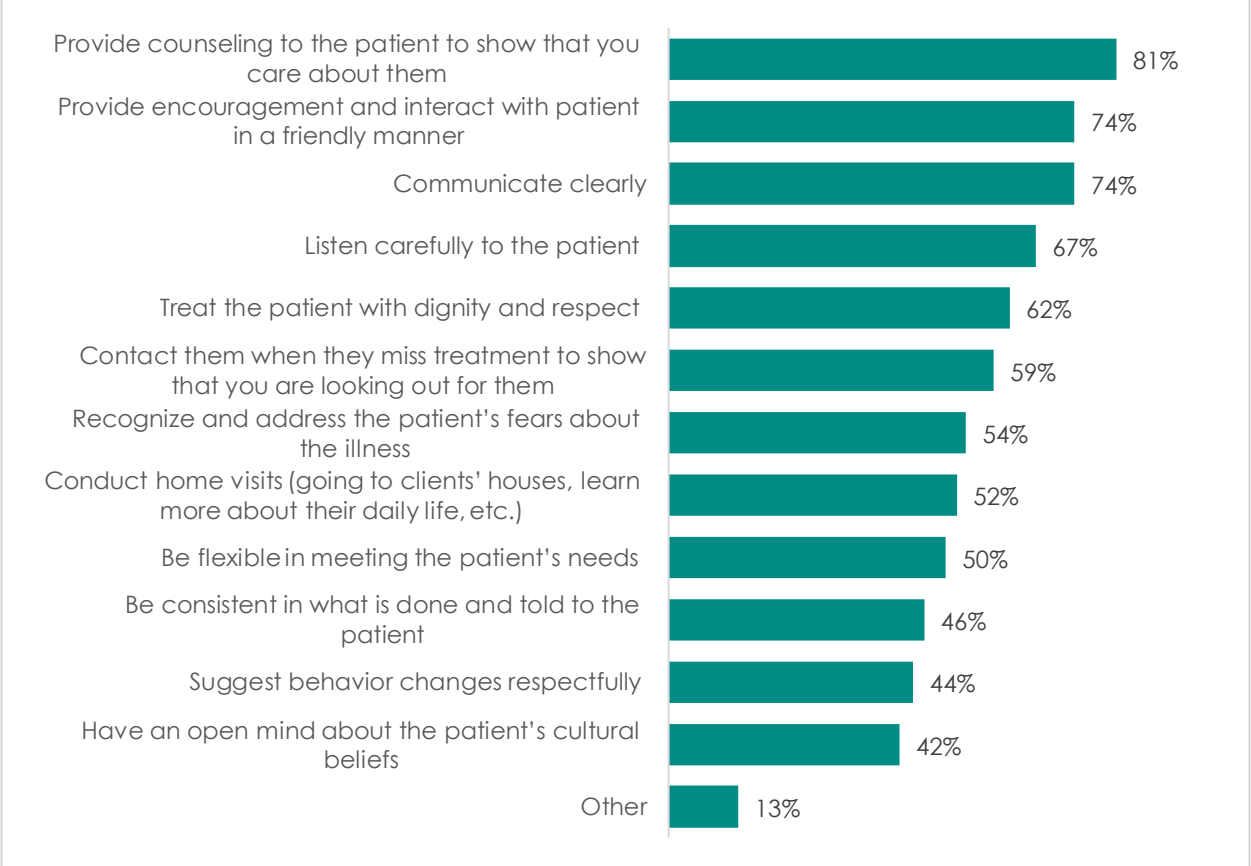
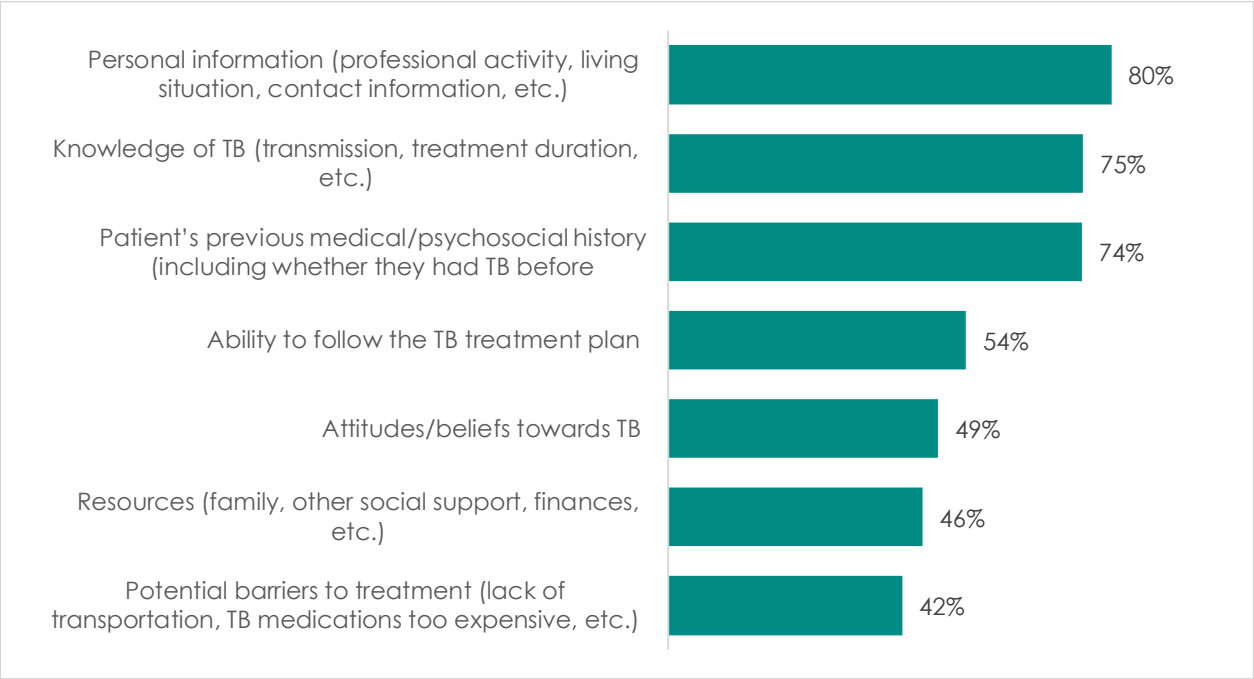


Figure 26 shows the topics that providers covered with patients during the initial patient assessment. Most (80%) providers interviewed said that they discussed personal information (professional activity, living situation, contact information etc.), knowledge of TB (75%), and previous medical/psychosocial history (74%). However, only about one-half (54%) discussed the patient's ability to follow the TB treatment plan, and fewer than one-half mentioned discussing attitudes and beliefs about TB and resources for support or barriers to treatment.

Figure 26. Topics assessed by providers during the initial patient assessment (n=356)



Patient Counseling

Communication between provider and patient is essential to build a beneficial provider-patient relationship. Patient dissatisfaction and complaints are often caused by a breakdown in this relationship and can lead to severe consequences for patient adherence to the treatment plan. As part of the assessment, both patients and providers reported on the type of TB counseling provided. Providers were asked what types of information or topics they discussed with their patients during TB diagnosis and treatment visits. Their responses were recorded unprompted. Patients were asked what information about the disease was shared with them. After the patients finished giving unprompted responses, they were asked/prompted for each statement that was not mentioned.

Figure 27 shows that at least 70 percent of the providers reported that they discussed how TB is spread, that TB can be cured, the importance of taking medications regularly, and the signs and symptoms of TB. Other topics were mentioned much less frequently, such as what to do about the side effects from the medications, treatment status or program, what to do if they run out of their medications, and the options available for treatment support, such as DOTS.

Patient reports on the information shared by providers are given in Figure 28. When prompted, more than one-half of the patients said that they received information on cough hygiene, how the disease is spread to

others, the duration of treatment, the importance of taking the medicines regularly, and the fact that the disease can be cured. However, a lower proportion mentioned receiving information on healthy behavior to follow, the importance of completing treatment, and when to come back for the next visit. Unprompted responses from patients on several topics, such as side effects from the TB medicines, the need for sputum tests at a given time, the danger signs of the disease, and what to do about side effects were quite low; however, when they were prompted, a high percentage of patients reported that the providers had discussed these topics.

Overall, Figures 27 and 28 show that the responses of providers and patients on the information discussed during the counseling sessions differed, especially without counting the prompted responses. Providers were also asked about their counseling process for certain topics, such as what to do if patients experience TB/HIV drug interactions, TB/HIV coinfection, HIV testing, and TB/HIV drug interaction/side effects, etc. Most providers reported that counseling sessions were conducted verbally; a few combined both verbal and written approaches.

When asked about their actions when their patients missed follow-up treatment, providers most commonly advised them to get tested for HIV and offered general information about TB/HIV coinfection, emphasizing that TB is curable, but HIV is not, so treatment should be continued (Figure 29).

Figure 27. Unprompted information given by providers to patients (N=357)

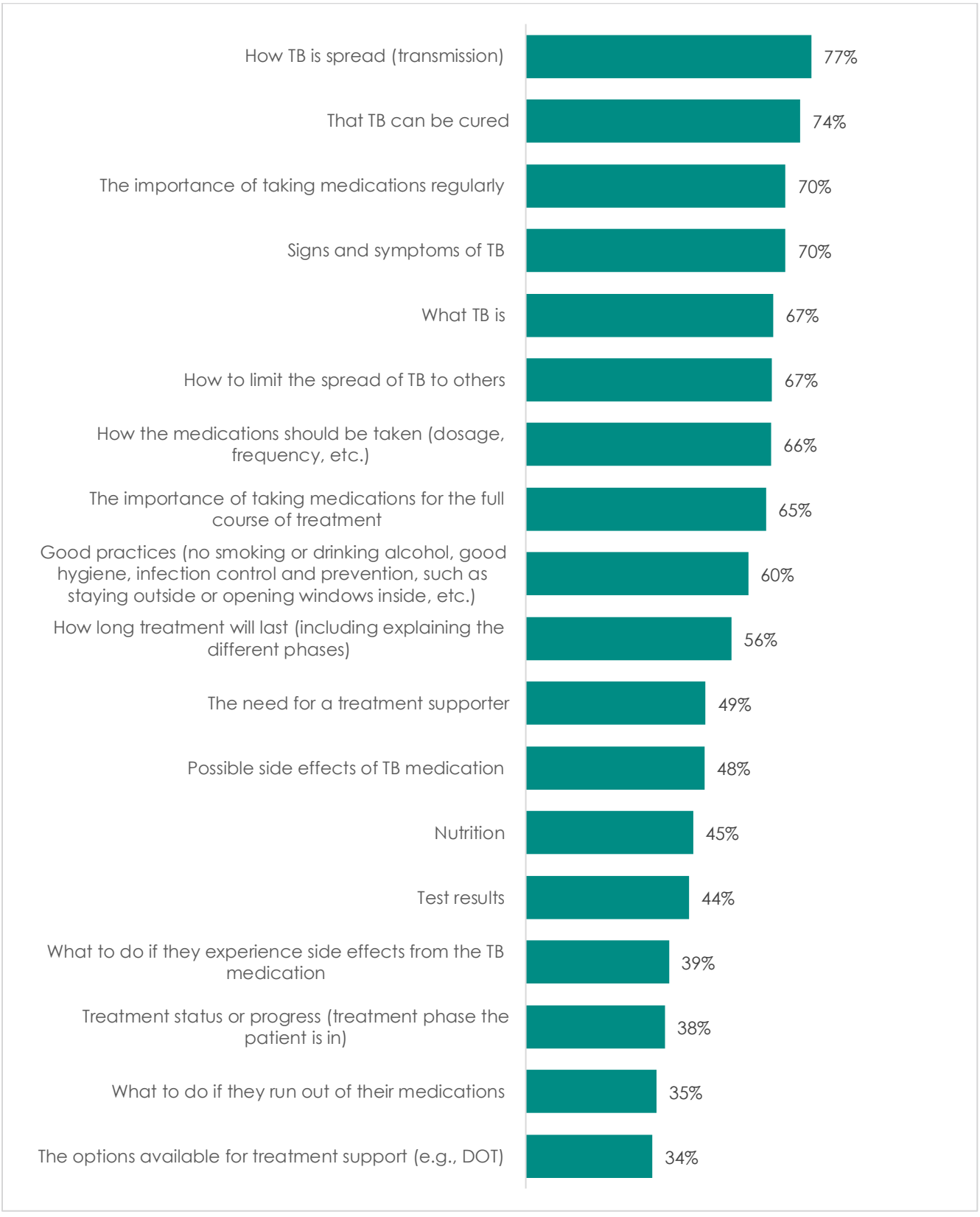


Figure 28. Patient reports on information given by providers (N=501)

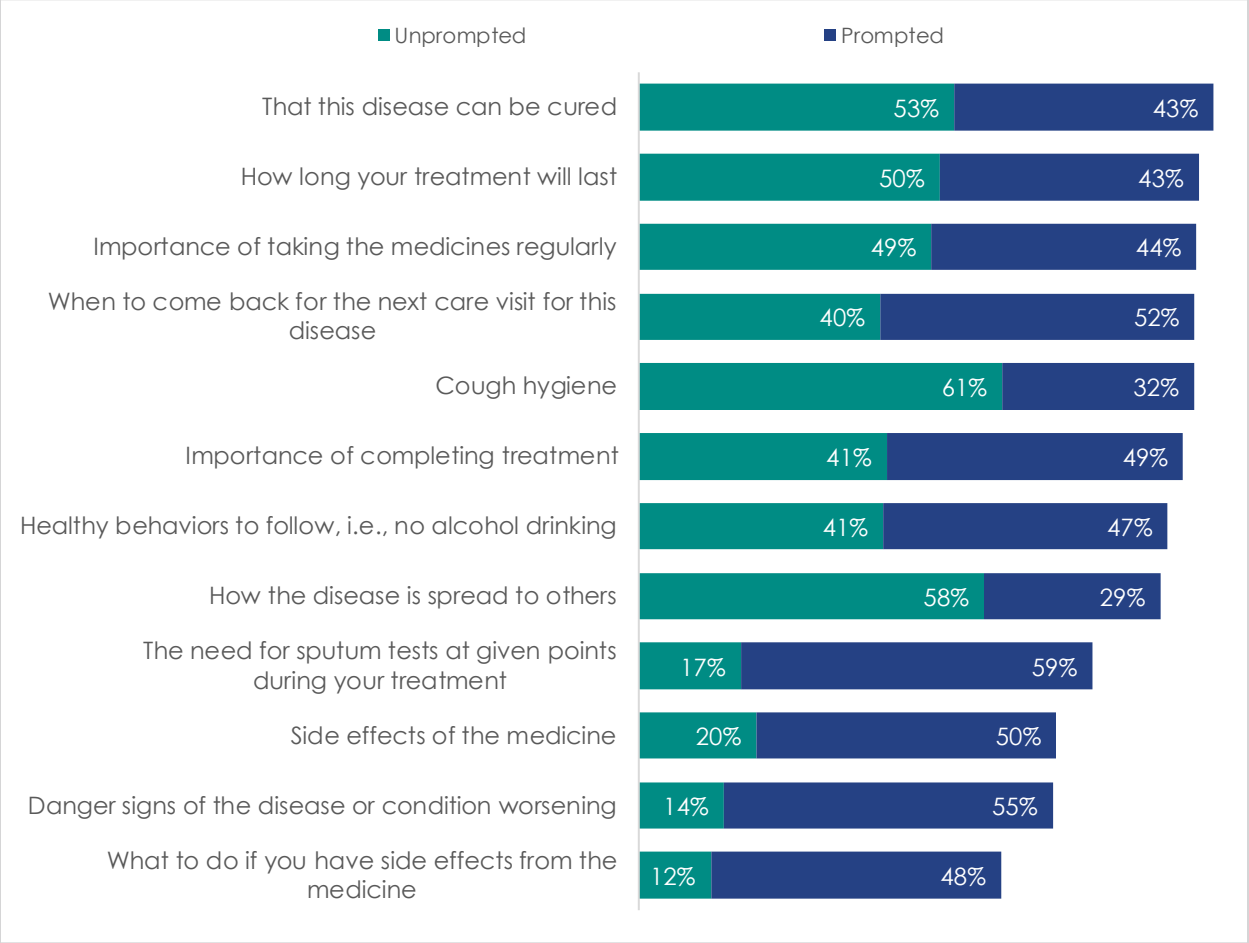
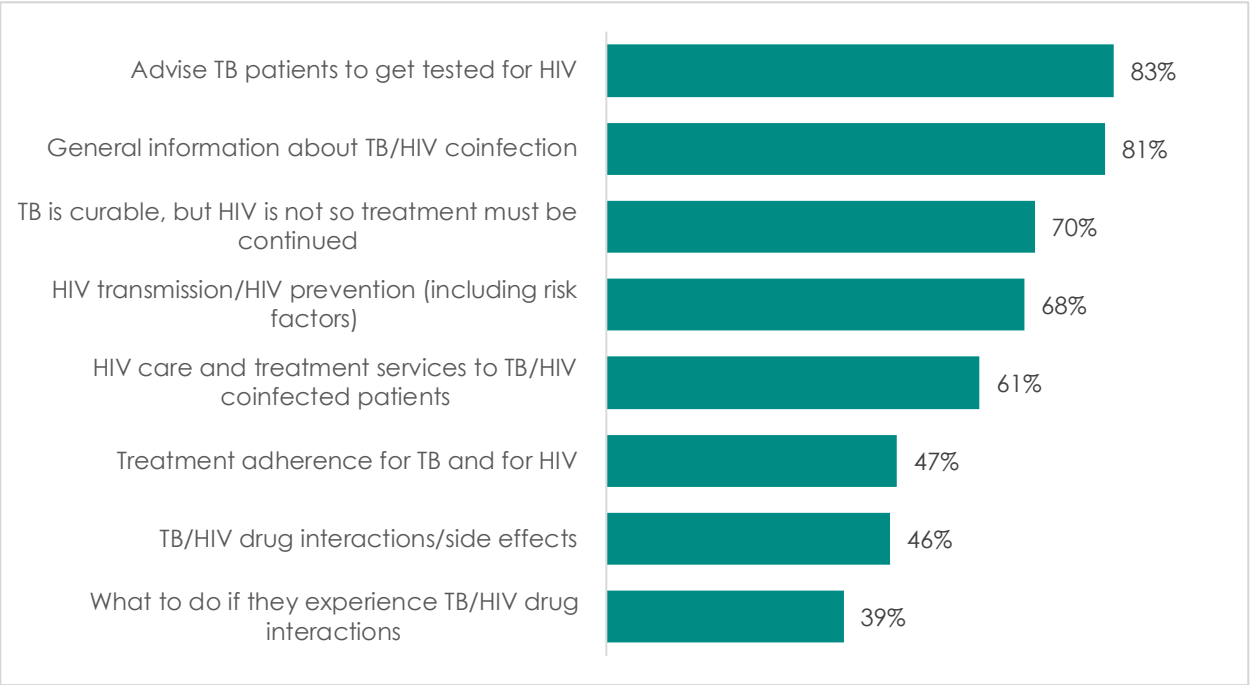


Figure 29. Unprompted information given by providers to patients about TB/HIV coinfection (n=356)



Contact Investigations

Provider Perspectives

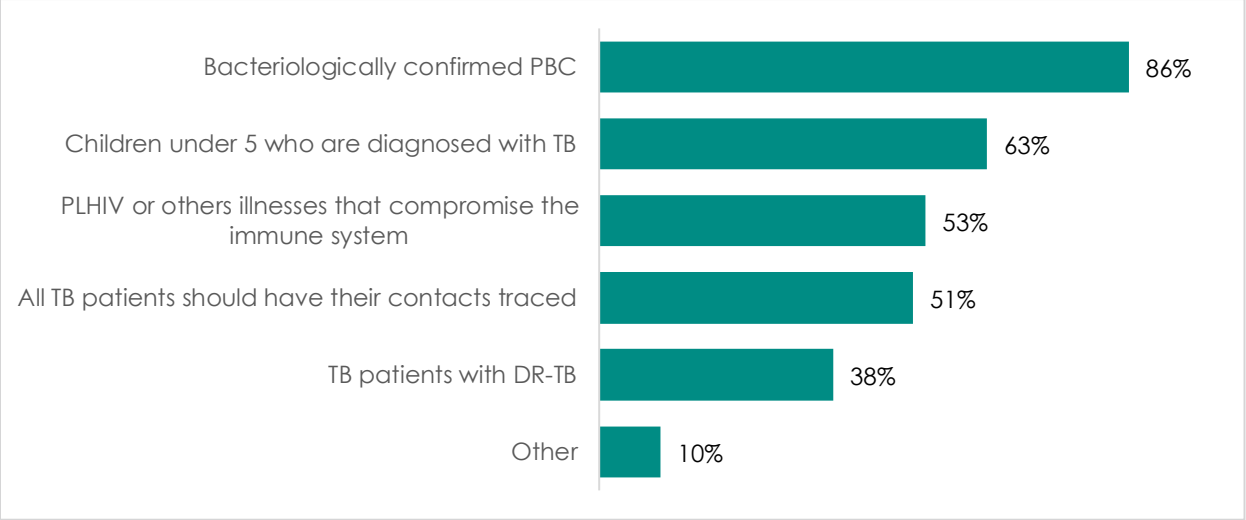
Most (87%) of the providers interviewed indicated that their facility carried out contact investigations for identified TB patients (Table 14). No major difference was seen in this trend between providers who worked for urban and rural facilities, or between providers working at public facilities compared with private facilities. However, when looking at the type of facility, providers at HC II facilities were less likely to carry out contact investigations, compared with those at hospitals, HC IVs, and HC IIIs.

Among the providers who indicated carrying out contact investigations, most (86%) prioritized bacteriologically confirmed pulmonary TB patients; and 63 percent indicated that they prioritized the contacts of children under five years of age with confirmed TB (Figure 30). More than one-half of the providers (53%) also prioritized HIV/TB coinfected patients; and 51 percent felt that all confirmed TB patients should have their contacts traced.

Table 14. Percentage of providers who reported that their facilities carried out contact investigation for TB patients (n=356)

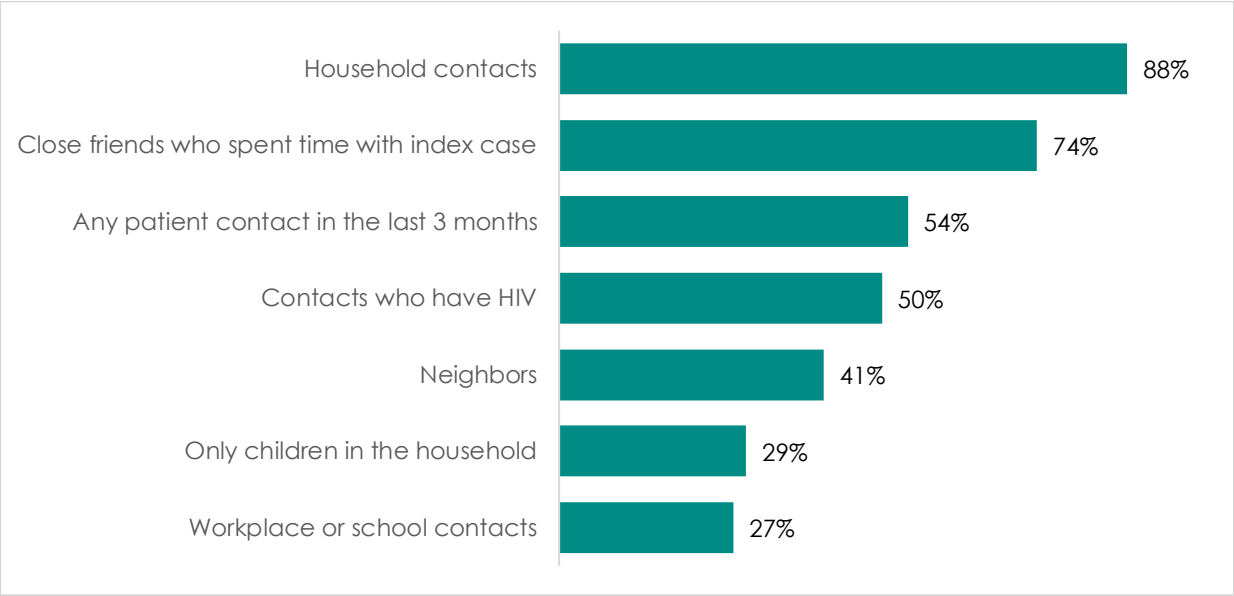
	Frequency	%
Contact Investigation for TB Patients		
Yes	310	87.1
No	46	12.9
Type of Facility		
RRHs and GHs	56	85.7
HC IV	64	92.2
HC III	212	88.7
HC II and other	24	62.5
Managing Authority		
Government/public	285	87.7
Others	71	84.5
Location of Facility		
Urban	135	85.9
Rural	221	87.8

Figure 30. Types of TB patients prioritized for contact investigations (n=310)



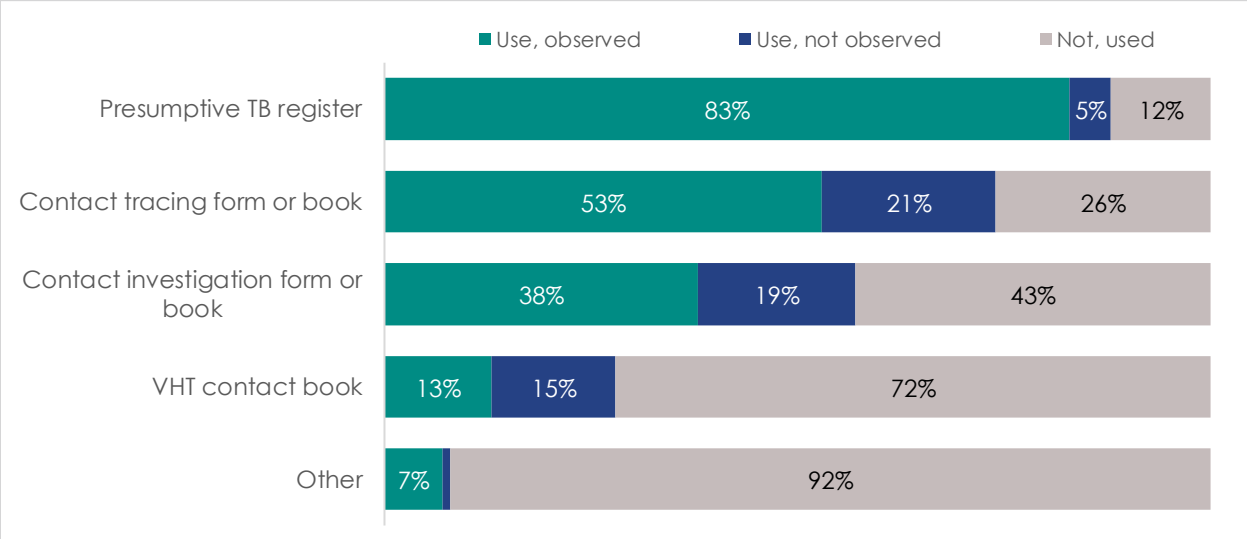
When discussing how contact investigations were undertaken, the providers' responses varied (Figure 31). The majority of providers felt that household contacts and close friends (88% and 74%, respectively) who spent time with the index case should be screened as part of the contact investigation process. Smaller proportions of providers mentioned other types of contacts, such as neighbors or only children in the household.

Figure 31. Contacts included in contact investigation (n=310)



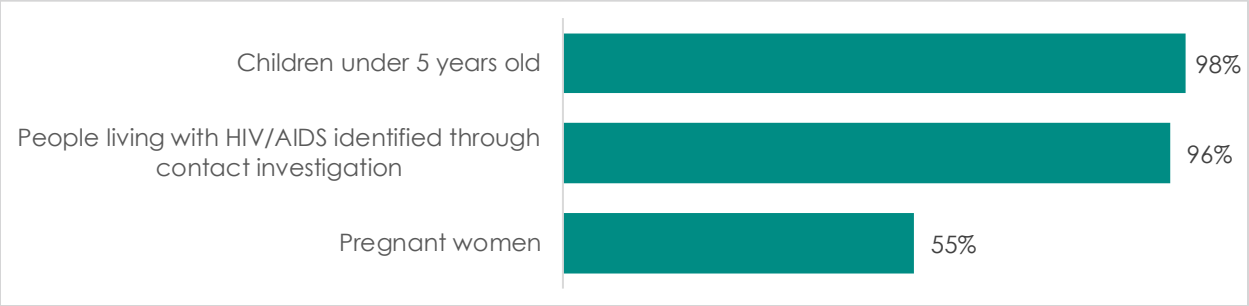
To find the appropriate patient contacts during the contact investigation process, 85 percent of providers reported having the patients make a list of all their contacts. Some providers stated that they visited households and communities of TB patients (65%), used VHTs or CHWVs (64%), or had TB patients bring contacts to the health facility for evaluation (63%) (data not shown). The providers mentioned using multiple tools to identify contacts, including examining the presumptive TB register (83%) and reporting data on contact investigations (Figure 32).

Figure 32. Tools used to collect and report data for the contact investigation (n=269)



Most (90%) providers indicated that their facilities provided TPT to eligible TB patient contacts, including children under age five (98%) and PLHIV (96%); however, only one-half (55%) mentioned providing TPT to pregnant women (Figure 33).

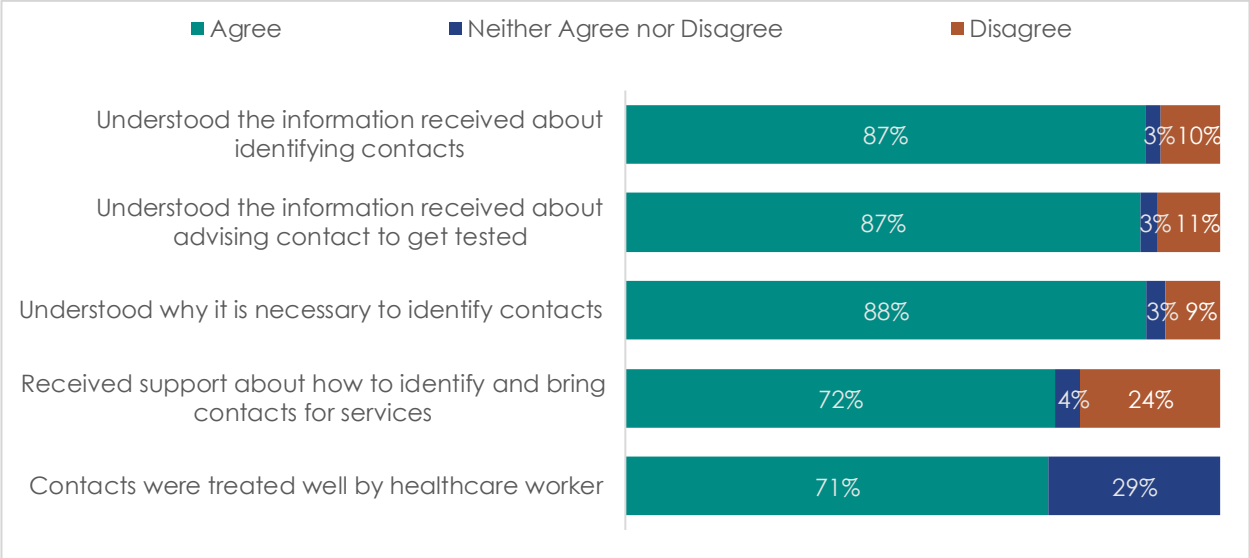
Figure 33. Types of TB patient contacts for which TPT was provided during the contact investigation process (n=280)



Patient Perspectives

The majority of patients interviewed had a good understanding of contact investigation (Figure 34). About three-fourths (77%) indicated that they had received such information, mainly from health workers at the facility, and 72 percent said that they had received support on how to identify contacts and bring them in for screening. A small number of patients received contact investigation counseling from other sources, including the VHT, healthcare worker in their community, TB treatment supporter in their community, a health extension worker, an expert patient, or a worker from an NGO (data not shown).

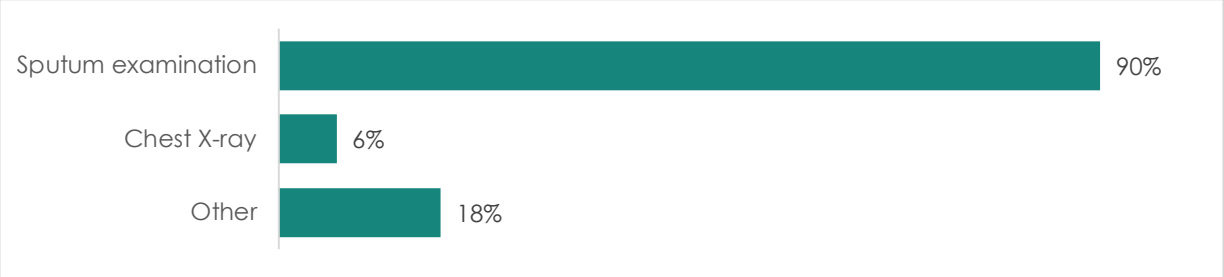
Figure 34. Patient understanding of information about the contact investigation (n=379)



Patients reported being visited at home to help determine contacts (42%), and a small proportion were visited at their school/workplace (14%) or some other location (data not shown). Most (83%) reported being asked about all contacts living in their households; but only one-third were asked about all contacts at their workplaces and/or schools. Overall, 70 percent of patients were asked to bring their contacts to the facility for TB diagnosis testing.

For the contacts identified, 47 percent of patients reported that their contacts received some sort of testing to determine their TB status, mainly sputum testing (90%), and other tests (blood or urine tests, clinical exams, etc.) for a smaller proportion of contacts (Figure 35.).

Figure 35. Type of testing conducted by identified TB contacts as reported by patients (n=175)



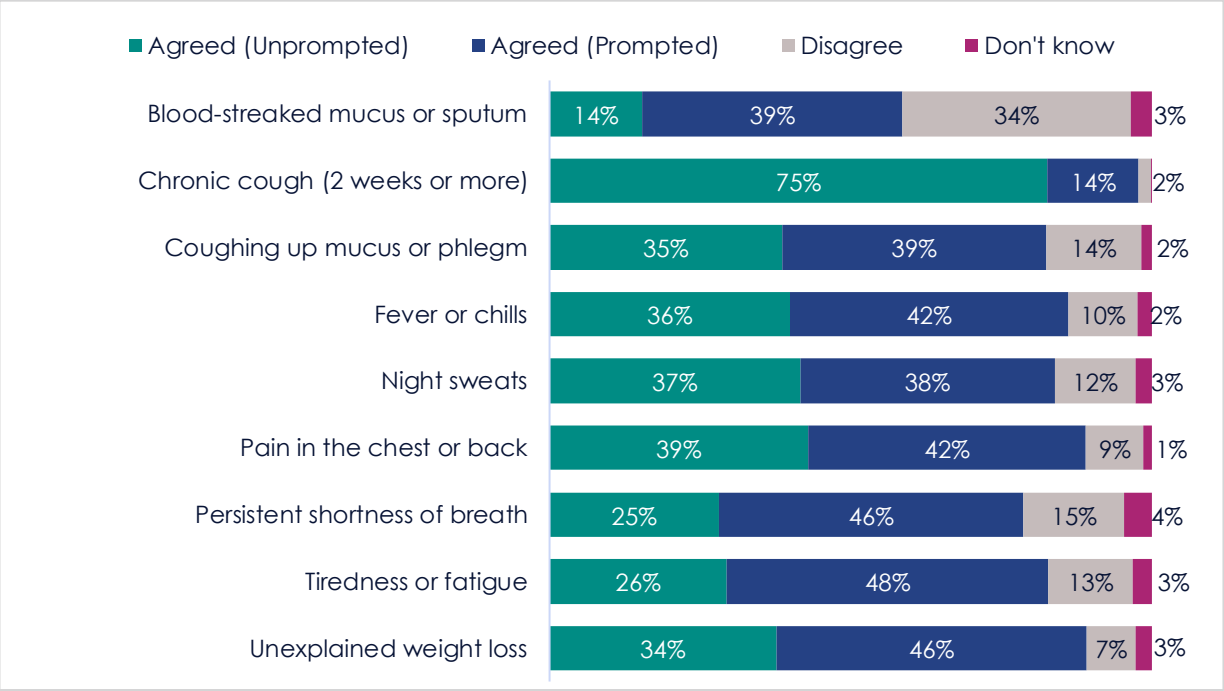
Patients' Knowledge about TB

TB patients provided unprompted and prompted responses to several sets of questions about their knowledge of the disease to get a sense of their understanding and the effectiveness of their interactions with providers.

TB Symptoms

Providers are expected to give their patients information about the symptoms and signs associated with their infection during one-on-one counseling and/or small group counseling and education sessions. The patients' understanding of TB was gauged by asking them a set of questions about their knowledge of symptoms that a person with TB would have. The results in Figure 36 showed that patients had good knowledge about symptoms when unprompted and prompted responses were combined. However, fewer than one-half gave unprompted responses mentioning symptoms, other than chronic cough. Although more than two-fifths of the patients responded positively on several other symptoms when prompted (coughing up phlegm, fatigue, or chest or back pain), fewer than one-third did so unprompted.

Figure 36. Patients' knowledge of TB symptoms (N=501)



Causes, Modes of Transmission, and Risk Factors for TB

When asked how TB is transmitted and the factors that increase risk, most patients correctly mentioned (unprompted and prompted) coughing or sneezing (86%), crowded living conditions (80%), smoking (76%), lack of adherence to provider instruction (67%), and germs/bacteria (62%) as causative factors (Figure 37). However, their answers also revealed numerous misconceptions about how TB spreads. For example, 68 percent and 44 percent of the respondents said that TB can be spread through "sharing of utensils" and "food," respectively. Some misconceptions may explain mentions of self-stigma during FGDs with non-TB patients.

Figure 37. Patients' knowledge of the cause/modes of transmission of TB (N=501)

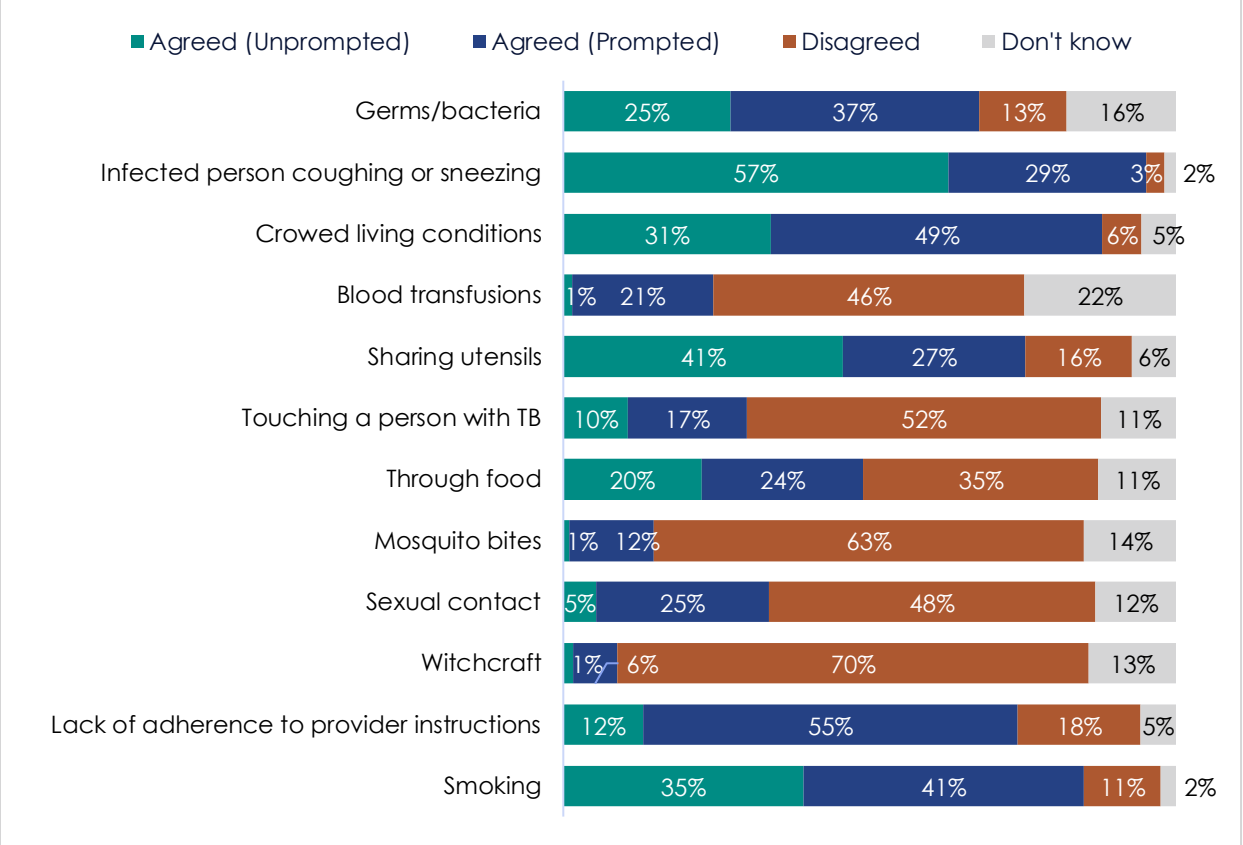
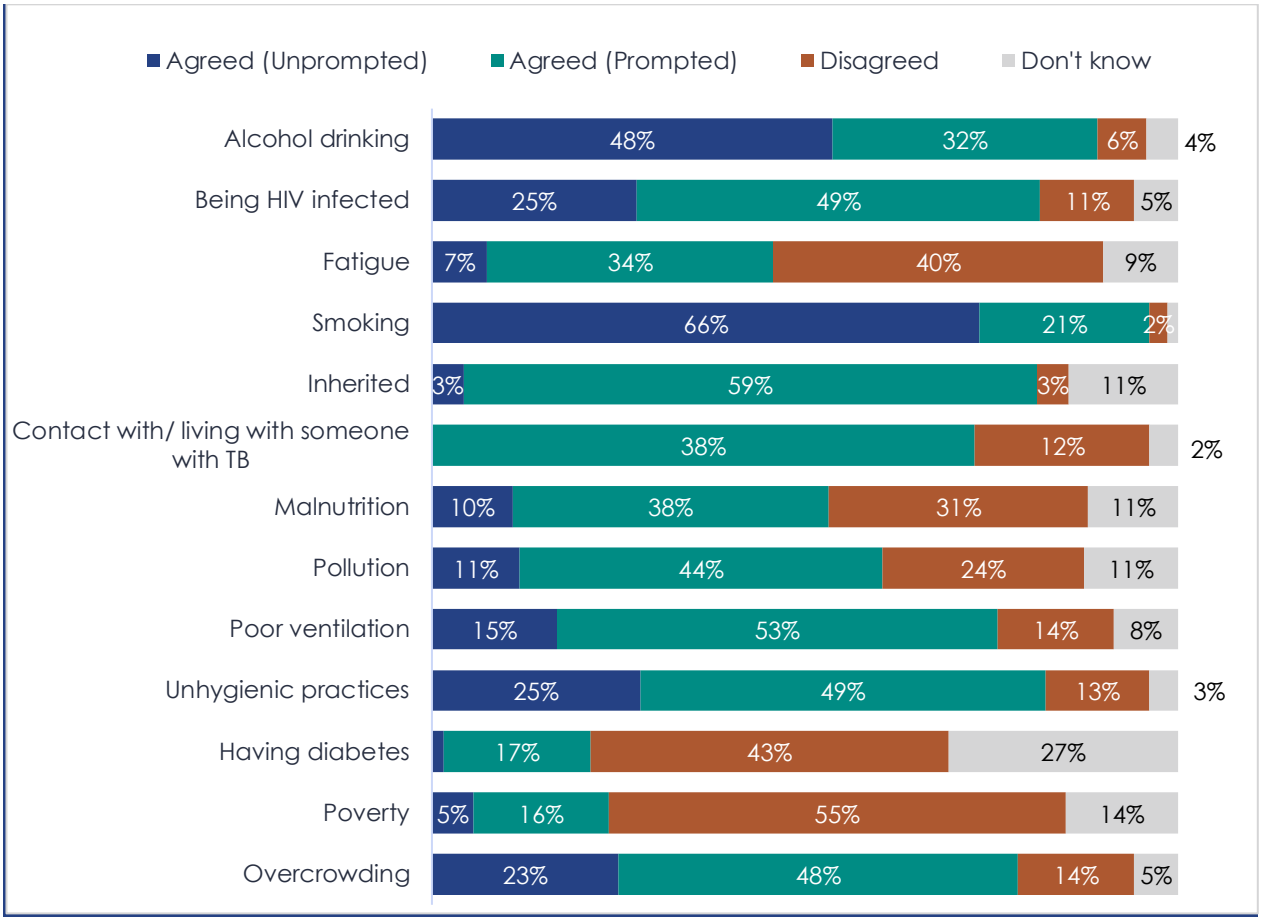


Figure 38 shows the full range of patients' knowledge of the risk factors for TB infection, with the combination of unprompted and prompted responses revealing a good understanding of risk factors among the patients. One-quarter or more gave unprompted responses mentioning smoking, drinking alcohol, being HIV infected, contact/living with someone with TB, and unhygienic practices as risk factors; and interviewees recognized other factors with prompting. However, a high percentage (62%, including prompted responses) also believed that TB could be inherited.

Figure 38. Patients' knowledge of TB risk factors (N=501)



TB Drug Side Effects

TB patients were asked to give unprompted and prompted responses to questions about their knowledge of possible side effects of TB drugs. The answers were stratified by diagnosis of DS-TB or DR-TB (Figures 39 and 40, respectively). Several differences were apparent between DS-TB and DR-TB patients, with DR-TB patients identifying more side effects overall. Discolored urine or tears was reported the most by DS-TB patients, whereas nausea or vomiting, loss of appetite, problems with eyesight, rash, and fever were most commonly reported by DR-TB patients. An almost equal proportion of DS-TB and DR-TB patients mentioned joint pain as a side effect.

Figure 39. DS-TB patients' knowledge of TB drugs' side effects (n=455)

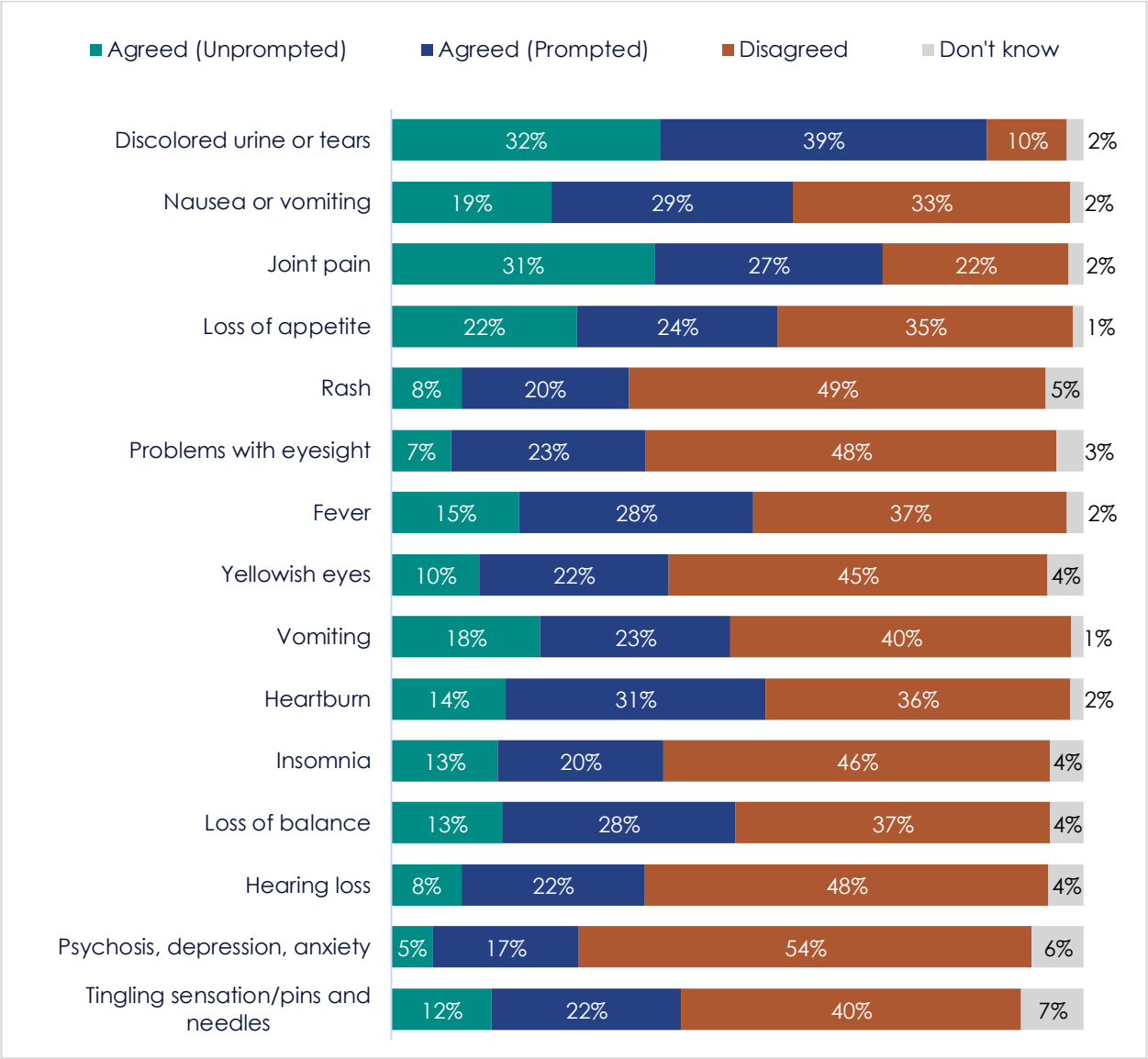
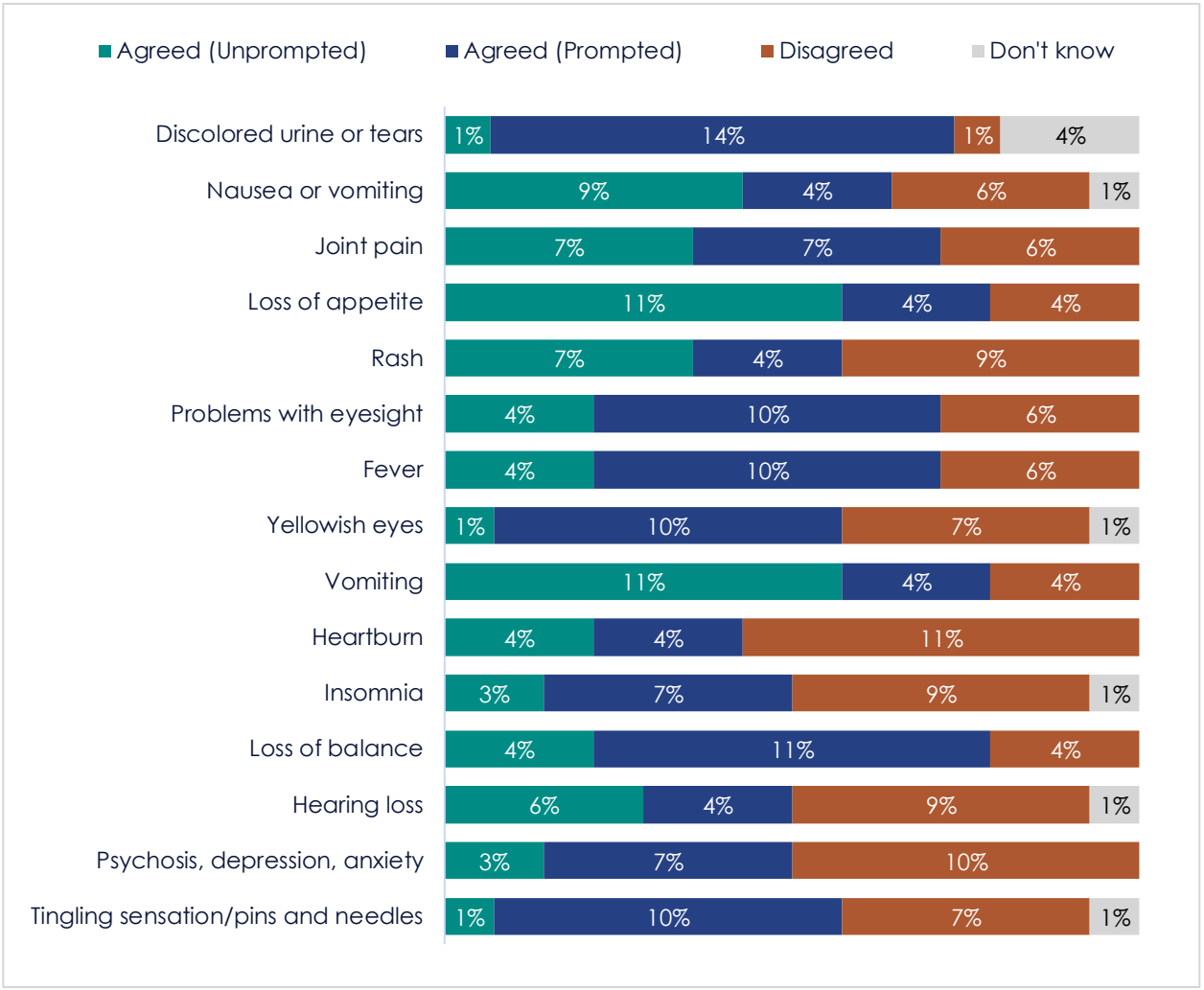


Figure 40. DR-TB patients' knowledge of TB drugs' side effects (n=14)



Duration of TB Treatment

The last knowledge questions asked of patients was whether their disease could be cured and what the usual timeframe was for treating DS-TB and DR-TB. Almost all TB patients, irrespective of the type of TB they had, reported that their disease could be cured. The NTLP guidelines on treatment state an expected duration of between six to nine months for DS-TB treatment, whereas the treatment duration for DR-TB is expected to last 24 months, although short course and oral treatment regimens have since been introduced.

The results showed that 86 percent of DS-TB patients reported that the usual time to treat DS-TB was six months, and 7 percent did not know how long treatment would take. Surprisingly, 61 percent of the 49 DR-TB patients also reported that they did not know the treatment duration for DR-TB. Unlike most other questions, not all TB patients responded to this question; 2 percent and 4 percent of DS-TB and DR-TB patients, respectively, did not respond to this question (data not shown).

Barriers to TB Care

It is critical to ensure that all TB patients have easy access to the care that they need. The assessment addressed barriers to care as reported by patients. Although most did not find it challenging to access their health facility for the care they needed, 30 percent reported that the facility was not close enough to allow easy access (data not shown). Rural patients were more likely than urban patients to have challenges in accessing their health facility (34% versus 20%, respectively). Approximately 71 percent of patients could get to their health facility in 60 minutes, and 46 percent in 30 minutes. The median time for patients to get to their health facility was 40 minutes. However, rural patients needed approximately three hours, versus 40 minutes for urban residents. Patients primarily used *boda-boda* (motorcycle taxis) as the means of transport to get to their facilities. A substantial proportion reportedly walked; respondents also mentioned using bicycles, taxis, cars, and buses.

Almost all patients found that medicines were always available and clinic hours were convenient. Only 21 patients (4%) reported being turned away at the health facility that they attended during official work hours. Among the reasons given for being turned away were no drugs, late arrival, forgetting patient cards, and the unavailability of healthcare workers. Nearly all (99%) reported being well instructed on how to take their medicines; 78 percent were given written instructions, with little difference based on their TB diagnosis. Only 2 percent reported that the clinic hours were inconvenient, citing such reasons as the facility opening late, more attention being given to HIV patients, clinic hours or clinic day coinciding with school or work time, and the waiting period.

Affordability of TB Care

The patients' financial barriers to care are presented in Table 15. Affordability was measured in terms of the financial factors that limited patients' ability to come to a health facility and the need to pay for healthcare services. All patients reported on whether they were able to come to the facility and whether they had to pay to see a provider. Those who received other services, such as sputum tests, blood tests, or x-rays, were asked whether they had to pay for those services.

Although the patients received free medicines, 55 percent paid for x-rays, 9 percent paid for blood tests, and 8 percent paid for sputum tests (Table 15). Rural residents were slightly more likely than urban patients to pay for the tests. DS-TB patients were more likely than DR-TB patients to pay for these health services (58% compared with 43%), and 33 percent of patients who did not know the type of TB diagnosis they had reported paying for x-rays (data not shown).

Table 15. Affordability of TB services

	Living Setting		Total	
	Urban	Rural		
	%	%	No.	%
Type of Test Paid for by Patients*				
Paid for X rays (n=80)	50.0	57.0	44	55.0
Paid for blood tests (n=302)	8.0	10.0	28	9.0
Paid for sputum tests (n=410)	6.0	8.0	31	8.0

*Limited to those patients who received the specific services.

Stigma and Discrimination

Stigma, compounded by other factors, limits TB control interventions by negatively affecting or delaying healthcare seeking behavior and treatment adherence (Cremers, de Laat, Kapata,, Gerrets, Klipstein-Grobusch, & Grobusch, 2015; Craig, Daftary, Engel, O'Driscoll, & Ioannaki, 2017). Scholars have documented negative attitudes toward TB patients and/or described the subsequent consequences of stigma. To help understand the existence and impact of stigma, the assessment captured information on TB-related stigma/discrimination from both provider and patient perspectives, using a Likert scale (a five-point scale with responses ranging from "strongly disagree" to "strongly agree") to rate and score questions about their perceptions of TB-related stigma. All questions were rephrased to follow the same direction of interpretation because some of the questions were stated positively and others negatively. This was done during analysis to determine the final score for each respondent.

Questions pertaining to specific categories to measure stigma about a facility, community-family and close friends, and self-stigma were pooled to produce a mean score and score range. These scores were then adjusted based on the number of questions that were pooled to calculate the initial mean score, with higher adjusted scores indicating a higher level of perceived stigma and/or discrimination.

Providers' Perspectives on Stigma and Discrimination

Providers were asked questions about stigmatizing and/or discriminating attitudes toward patients and healthcare workers infected with TB that they have observed, and how these attitudes may differ between the two groups. The mean scores and the final adjusted mean scores were calculated, and the perceived stigma toward both groups was found to be about the same. There was a slightly higher score of perceived stigma toward healthcare workers with TB (3.11 on a scale of 1 to 5), compared with patients with TB (3.01 on a scale of 1 to 5) (Table 16).

Table 16. Attitudes of providers toward health care workers and patients with TB

Domain	Mean Score	Score Range	95% CI		Adjusted Mean*
			Lower	Upper	
Attitudes toward healthcare workers with TB (n=352)	15.04	5–25	14.55	15.53	3.01
Attitudes toward TB patients by healthcare workers (n=356)	12.44	4–20	12.15	12.72	3.11

*Note: Higher score indicates higher levels of perceived stigma

Patients' Perspectives on Stigma and Discrimination

Understanding perceived stigma/discrimination about TB is key to assessing the quality of care that patients receive. As part of the assessment, patients were asked a series of questions about the sources of perceived stigma and/or discrimination. Responses to questions in each category were scored and adjusted for consistency across the domains of stigma measured. Higher scores indicated higher levels of perceived stigma/discrimination by the patients interviewed (Table 17).

The highest levels of perceived stigma/discrimination were reported to come from the community level (score of 2.85 out of 5), followed by self-stigma, which had an adjusted score of 2.67 out of 5. The perceived stigma from healthcare workers was rated the lowest, with an adjusted score of 1.9 out of 5.

Table 17. Stigma scores based on assessment across four domains by TB patients

Domain	Mean Score (raw)	Score Range	Adjusted Score (%)	Adjusted Score* (on a scale of 1 to 5)
Facility/health worker (n=500)	15.5	8–40	38.8	1.9
Community (n=481)	11.4	4–20	57.0	2.85
Family/friends (n=332)	6.9	3–15	46.0	2.3
Self (n=498)	32	12–60	53.3	2.67

*Note: Higher score indicates higher levels of perceived stigma

Community (Non-TB Patients) Perceptions about Stigma and Discrimination

TB is a historically stigmatized disease in which stigma is mostly associated with social factors that influence institutional, community, and interpersonal interactions (Duko, Bedaso, Ayano, & Yohannis, 2019; Dias, de Oliveira, Turato, & de Figueiredo, 2013). To improve quality of care and services for TB patients, it is important to understand the perceived TB-related stigma from the non-TB patients who are visiting the health facility for other illnesses, as members of the same community as TB patients. To that end, the assessment team conducted eight FGD sessions with non-TB patients as part of larger QTSA data collection activities. Extracts from the qualitative data collected follow. The separate detailed report on the qualitative data is available at the following link: https://www.measureevaluation.org/resources/publications/tr-20-417/

The qualitative findings show that stigma is a common phenomenon across the focus groups conducted in Uganda. FGD participants revealed mixed knowledge and understanding of TB. TB was described with biomedical phrases, local terminologies, and idioms that illustrated negative attitudes, prejudices, and stereotyped meanings attached to the disease. TB was also closely associated with HIV infection and the perceived immoral behavior associated with HIV. TB was also associated with specific economic activities.

Respondents reported believing TB was hereditary, incurable, and connected to different blood types, and stereotypes about TB were often associated with its perceived etiology. These perceived associations fuel the stigma and discrimination experienced by people with TB (PWTB).

Stigma appears in many forms and affects both individuals and the community around them. It often manifests as insults, ridicule, discrimination, social exclusion, and isolation. For PWTB, this experience can lead to low self-esteem, decreased quality of life and social status, nondisclosure, and/or difficulties adhering to treatment. The following extracts from the FGDs illustrate participants' misconceptions related to the causes of TB.

The belief that TB is a hereditary disease

> *What I know is that TB "walks"* [passes on] *through blood, as is the case with cancer. If someone says that he/she has cancer, people will start saying that the children of that person will also have cancer. This may be the same with TB, if the parents have the disease, the children also will get it. … Some people bear children when they are infected; therefore, TB can be transmitted from mother to child through blood.* [Male FGD, Northern Region hospital]

The belief that TB is caused by cold weather

> *Most of the TB patients I have seen were once boda-boda drivers. ... They also swallow lots of things including insects* [germs] *that cause TB in the process of riding a boda-boda, which can cause TB. TB patients usually feel cold even when it's hot and for that reason they are always putting on jackets, which most boda-boda drivers do.* [Male FGD, Central Region hospital]

The belief that TB is a result of consuming polluted water or food

> *Drinking water from the roof of the house with colored or rusted iron sheets, or with a lot of dust, may cause endless coughing that may result in TB. Water from such iron sheets is contaminated, not clean, and not safe for human consumption.* [Male FGD, Northern Region HC IV]

Participants also described discrimination towards PWTB through the communities and families attempting to isolate or separate them from others. Health providers were also said to contribute to such discrimination and stigma by asking caretakers to separate the TB patient from the other family members.

> *We are told to separate everything … separate room, separate utensils, separate basins, clothes.… But there are things we cannot separate … like the bathrooms, the latrines, … and we can still get it through these.* [Female FGD, Central Region hospital]

In addition to the community and the health system contributing to TB-related stigma and the resulting discrimination toward PWTB, FGD participants also discussed how stigma and discrimination was the result of the behaviors of TB patients themselves. Some TB patients were perceived as isolating themselves from others, but other TB patients were perceived by the community as actively attempting to spread their disease to others.

> *If you are coughing, you do not have to cough among people. You are supposed to get a handkerchief or a piece of paper, and you cough when you have covered your mouth so that you do not spread it to the people around. Secondly, you are not supposed to cough in places where there are many people or public places. You are supposed to go somewhere* [where] *you are alone or find a private place so that you can cough from there and not spread the TB germs to others. But some TB patients behave as if they want to transmit their disease to others, … which makes it difficult to help them. I know one who used to mix his sputum in edible stuff like porridge and other foods and then shared with children. Sometimes, he would cough while among other people deliberately to spread TB.* [Male FGD, Central Region hospital]

Despite much evidence of both real and perceived stigma and discrimination, families and community members in Uganda still observe the moral obligation to care for PWTB. FGD participants confirmed this willingness for families to care for PWTB and discussed some ways in which the isolation of PWTB contradicts sociocultural norms, noting that families adapt as needed.

> *A* [PWTB] *is given his/her own room/space to stay alone. They will tell the patient to remain in the room. They instruct him/her not to come out because he/she may infect others in the family and community at large. In some cases, they build another house* [for the PWTB] *behind the main house to keep him/her there, far from others, and materials like towels are burnt or thrown in latrines.* [Male FGD, Northern Region HC IV]

The tight-knit social networks in Uganda make it difficult to identify a particular group responsible for stigma or a group of patients as being stigmatized. Findings elucidate that stigma is widespread at all levels of a PWTB's environment, presenting many barriers that must be overcome in order for PWTB to seek care, access testing, and successfully completed treatment for TB.

Patient Satisfaction

Patients' satisfaction with the treatment services they had received was measured using a Likert scale, with questions from "very dissatisfied," with a score of one, to "very satisfied," with a score of five. The results showed a high level of patient satisfaction, "satisfied" (59%) or "very satisfied" (34%), with both the care they had received and the service providers. Patients receiving treatment at RRHs were more likely to report satisfaction with services, compared with those receiving care from other facilities. The results showed little or no variation associated with the patients' type of TB diagnosis, ownership of the health facility, or location of the facility (data not shown). The assessment did not probe into the underlying factors or reasons for the rating of their encounter with health care providers, TB diagnosis and treatment services, or the multidimensional elements of patient satisfaction. Further analysis of the patient data could be explored to provide additional insights.

Patients were also asked about whether there was anything they would like to see changed at their facility to improve the quality of care that they had received. Some responses given by the patients were improving the facility environment (e.g., building more shelters or wards for TB patients or improving facility infrastructure); ensuring sufficient supply of drugs; enacting social protection interventions (transportation support or nutritional support/food basket); strengthening contact investigation to ensure that all contacts were tested; paying more attention to comorbidity illnesses; and adding staff dedicated to TB services.

Outcome Indicators

The structural and process indicators determine the quality of services provided to TB patients. The outcome indicators show the results of the quality of the services for TB patients. This section presents information on the TB cascade of care and TB outcome indicators. The TB outcome indicators are based on information taken from the TB registers.

Care Seeking, Diagnosis, and Treatment Behavior

The assessment examined delays in care seeking, diagnosis, and treatment initiation after diagnosis. The results showed that three of 10 patients sought care within two weeks of experiencing TB symptoms and signs, such as a chronic cough of more than two weeks. Overall, 85 percent indicated receiving test results confirming TB within one week of testing; 15 percent received their positive test result more than one week after being tested. The results showed that 87 percent of patients indicated initiating treatment within two days of diagnosis. Figure 41 depicts the delay when a test result was given and treatment was initiated according to when patients sought care with suggestive TB symptoms. The delay between the onset of symptoms suggestive of TB and first contact with any health care provider (care seeking) was recorded based on patient self-reporting. Their responses were divided into two categories based on number of weeks: less than two weeks and more than two weeks. Responses related to delay between first contact with a healthcare worker and receiving diagnosis results (diagnosis) were divided into the following two categories: one week and more than one week. The delay between diagnosis of TB and the initiation of anti-TB treatment (treatment initiation) was measured based on whether treatment was initiated within two days of diagnosis or more than two days after. Patients with a delay in one step were more likely to experience delays in the other steps of care seeking and diagnosis, e.g., patients who came to the facility after more than two weeks were more likely to start treatment more than one week later compared with patients who came to the facility in less than two weeks. Moreover, this group was more likely to start treatment more than two days later, compared with all other groups.

The assessment explored the availability of treatment supporters as part of determining the practices associated with the DOTS strategy. One-fourth of patients reported not having any treatment supporter. Among those who reported having treatment supporters, eight of 10 mentioned a family member/relative, and 16 percent were supported by a health care worker. The rest were supported by others, such as coworkers, teachers, and prison wardens (Figure 42).

Figure 41. Patient's pathway from the onset of symptoms suggestive of TB to initiation of TB treatment

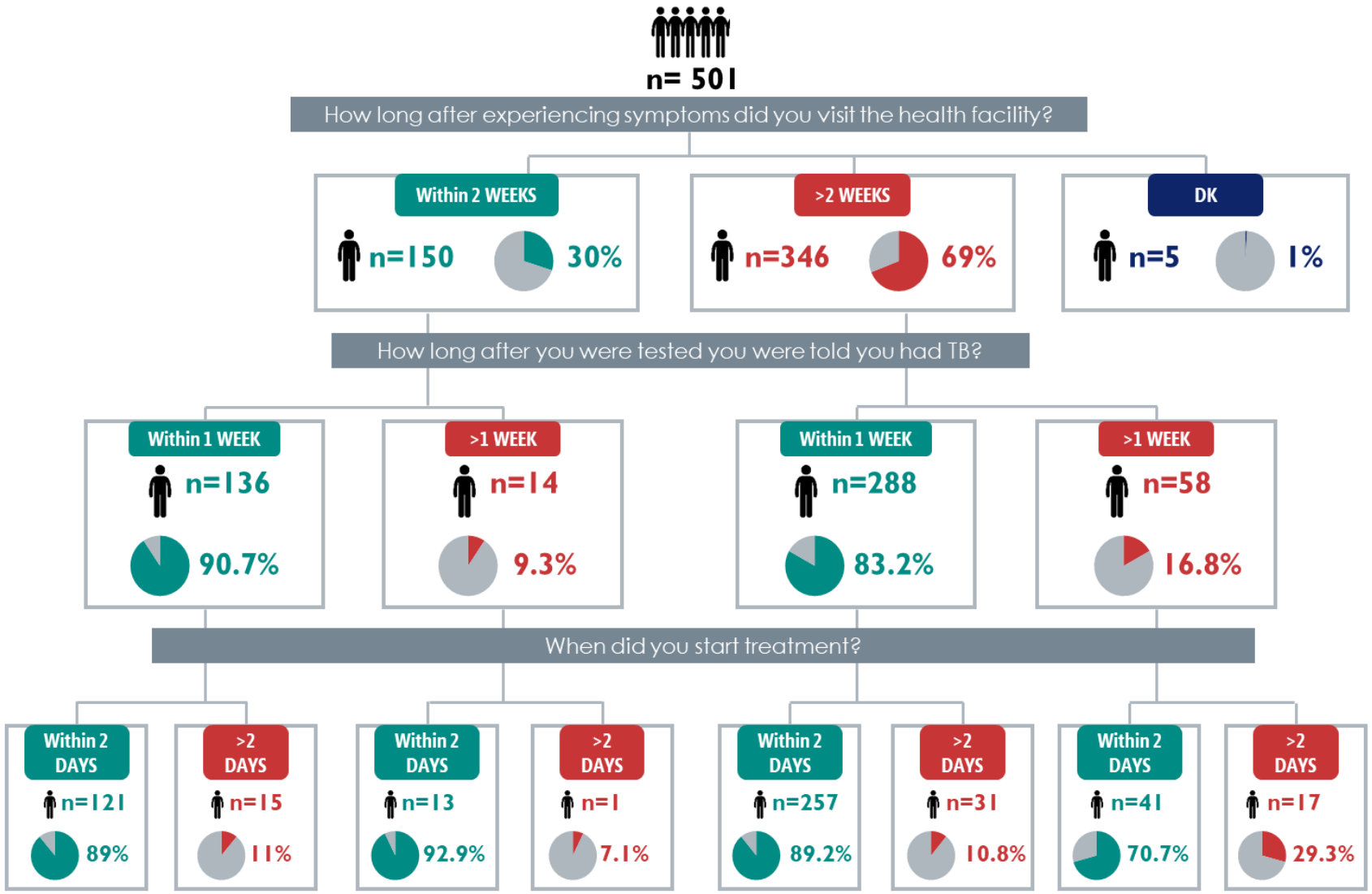
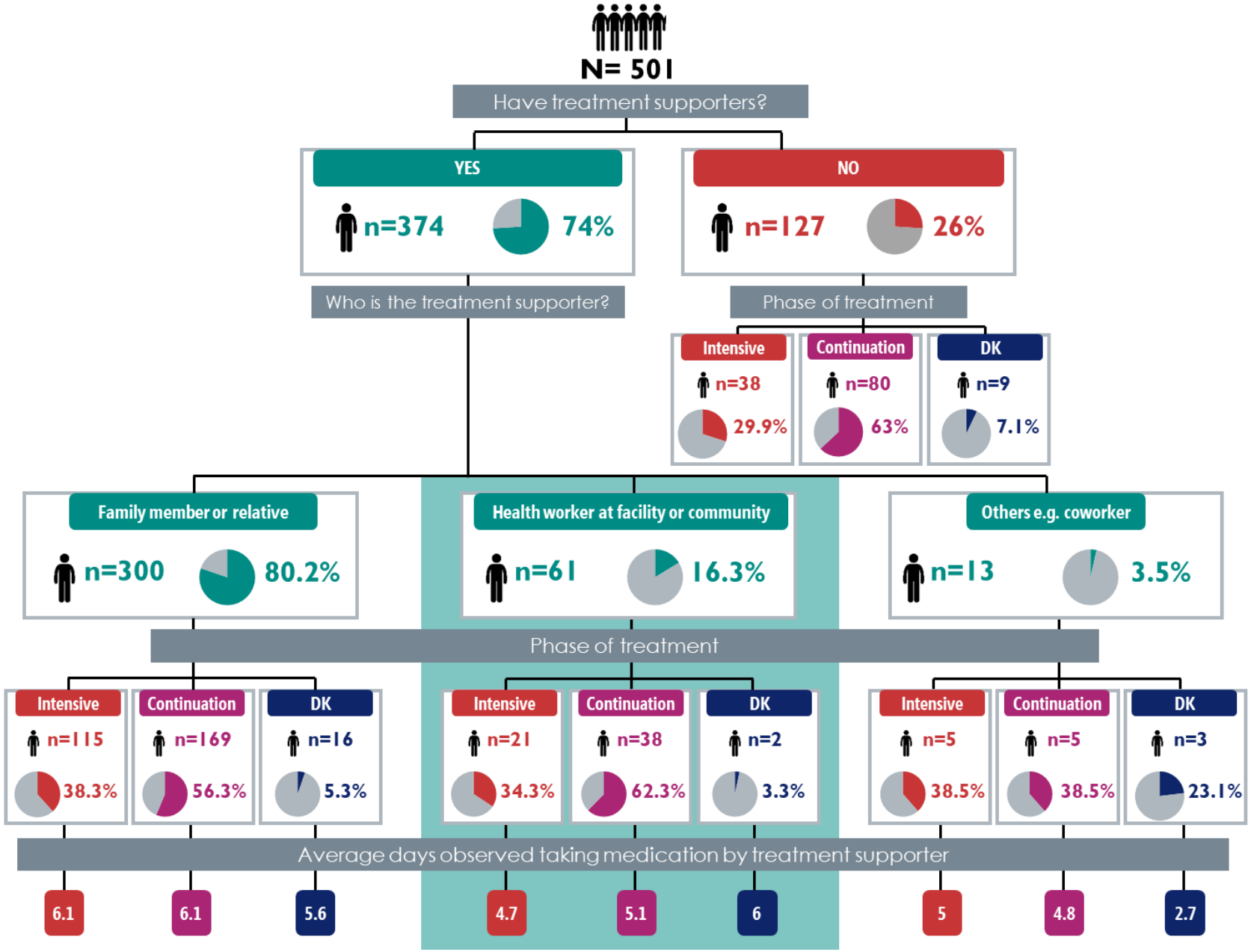


Figure 42. Types of treatment supporters and the average number of days TB patients were observed taking their medications



TB Service Outcomes

Tuberculosis Preventive Therapy among PLHIV

TB remains a major cause of illness and death among PLHIV, even by those taking ART. However, TB is preventable in people infected with both HIV and TB through the use of TPT to prevent latent TB infections from progressing to clinically apparent disease. However, TPT coverage among PLHIV has not been widely implemented. To obtain information on the implementation and coverage of TPT, the research teams reviewed facility registers. Records from 2018 were abstracted from the TPT register and the contact tracing register to assess the outcome of the PLHIV initiated on TPT during the period July 1 to December 31, 2018. The data abstracted from the 216 health facilities sampled showed that there were 4,361 PLHIV initiated on TPT during that period, but the outcome status was recorded for 4,309 PLHIV, representing 99 percent of those enrolled on TPT.

Of the 4,361 PLHIV initiated on TPT, 3,516 (81%) completed TPT, and 12 (0.3%) developed active TB while on TPT. Overall, 3 percent had an adverse outcome and 14 percent had unknown status (Table 18).

Tuberculosis Preventive Therapy for Child Contacts of Adults with TB

Globally, about 15 million children are household contacts of adults with TB disease. It is evident that TB positive adults are the source case for a large percentage of pediatric TB cases, but few contacts of adult cases are screened. Although children's risk of developing TB can be reduced with the use of TPT for those under five years old, uptake of TPT is low and delivery is problematic in resource–limited, high TB burden settings such as Uganda. As part of the assessment, the teams reviewed routinely collected program data to examine coverage and outcomes of TPT among child contacts at the 216 facilities, revealing that 228 children were initiated on TPT between July and December 2018. Sixty-seven percent (153 children) successfully completed TPT and one child developed active TB while on TPT; 29 percent had unknown TPT outcomes (Table 18).

Table 18. TPT for PLHIV and child contacts: Outcomes

TPT Outcome for PLHIV				TPT Outcomes for Children		
PLHIV initiated on TPT	4,309			Child contacts initiated on TPT	228	
	#	%			#	%
PLHIV TPT completed	3,516	80.62		Child contacts TPT completed	153	67.0
PLHIV on TPT died	17	0.39		Child contacts on TPT died	1	0.0
PLHIV on TPT LTFU	55	1.26		Child contacts on TPT LTFU	2	1.0
PLHIV on TPT stopped	31	0.71		Child contacts on TPT stopped	0	0.0
PLHIV on TPT active TB	12	0.28		Child contacts on TPT active TB	1	0.0
PLHIV on TPT transferred out	51	1.17		Child contacts on TPT transferred out	5	2.0
PLHIV on TPT unknown status	627	14.38		Child contacts on TPT unknown outcome	66	29.0

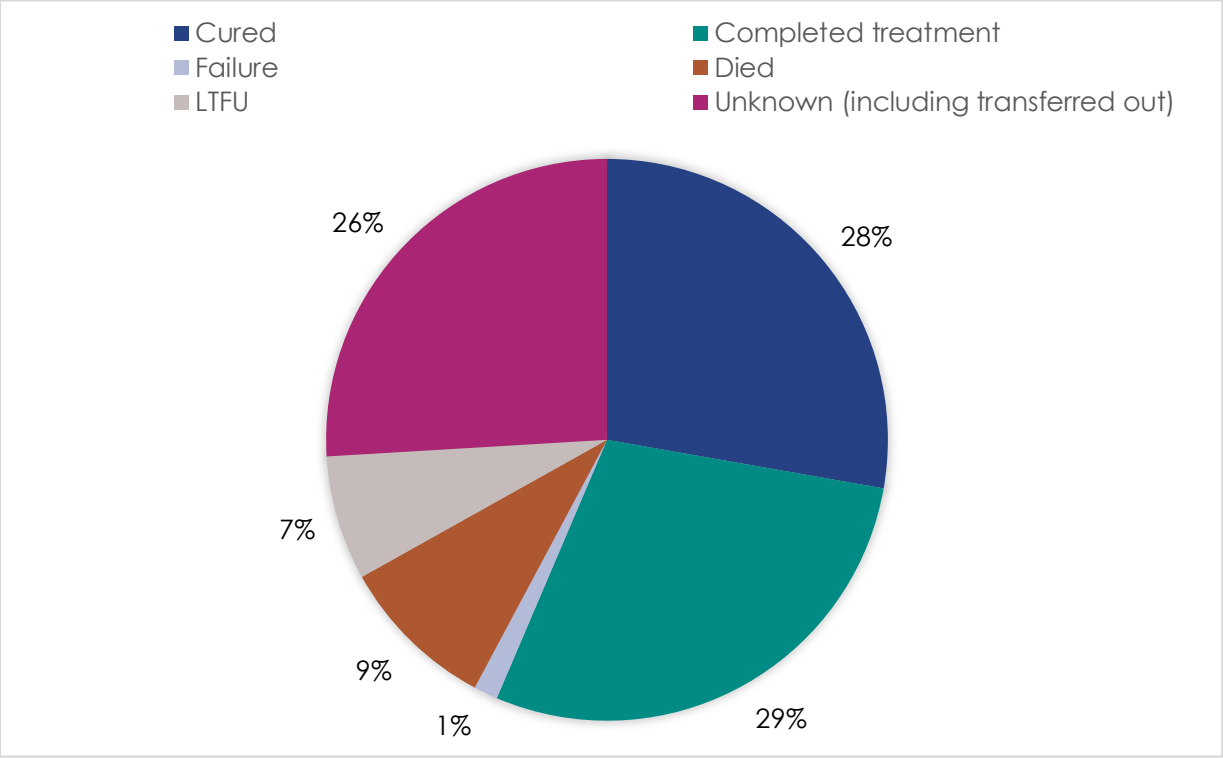
Treatment Outcomes

Treatment outcomes for July to December 2018 and October to December 2018 cohorts of patients enrolled at 210 GHs and lower-level facilities and six RRHs were analyzed using service statistics extracted from the TB registers.

All bacteriologically confirmed and clinically diagnosed TB cases were assigned a treatment outcome using the definitions adapted from the 2013 revision of WHO's *Definitions and Reporting Framework for Tuberculosis* (WHO, 2013). The treatment outcomes identified in these guidelines are *cured*, *treatment completed*, *treatment failed*, *died*, *lost to follow-up*, and *not evaluated* (more details are provided in Appendix B). These definitions and classifications aligned with the treatment outcomes outlined in the NTLP's *Manual for Management and Control of Tbuerculosis and Leprosy* (NTLP, 2017b).

The assessment found that there were 3,749 TB patients initiated on treatment. The data were abstracted from the DS-TB register at 211 facilities. Five of the study facilities were excluded because of missing data. Overall, the treatment success rate was 57 percent, which comprises 28 percent of the patients cured and 29 percent who had completed treatment (Figure 43). It should be noted that the treatment success rates obtained in this survey were lower than the average treatment outcomes across Uganda reported by the NTLP during the same period. The reason could be that the cohort evaluated had only recently completed their recommended treatment period and the outcomes had not yet been recorded or updated. This could also explain the higher percentage of patients of unknown status or those not evaluated. The key message here is for the NTLP and other stakeholders to explore how patients' status can be updated promptly to avoid situations where the data show a high percentage of patients as not evaluated.

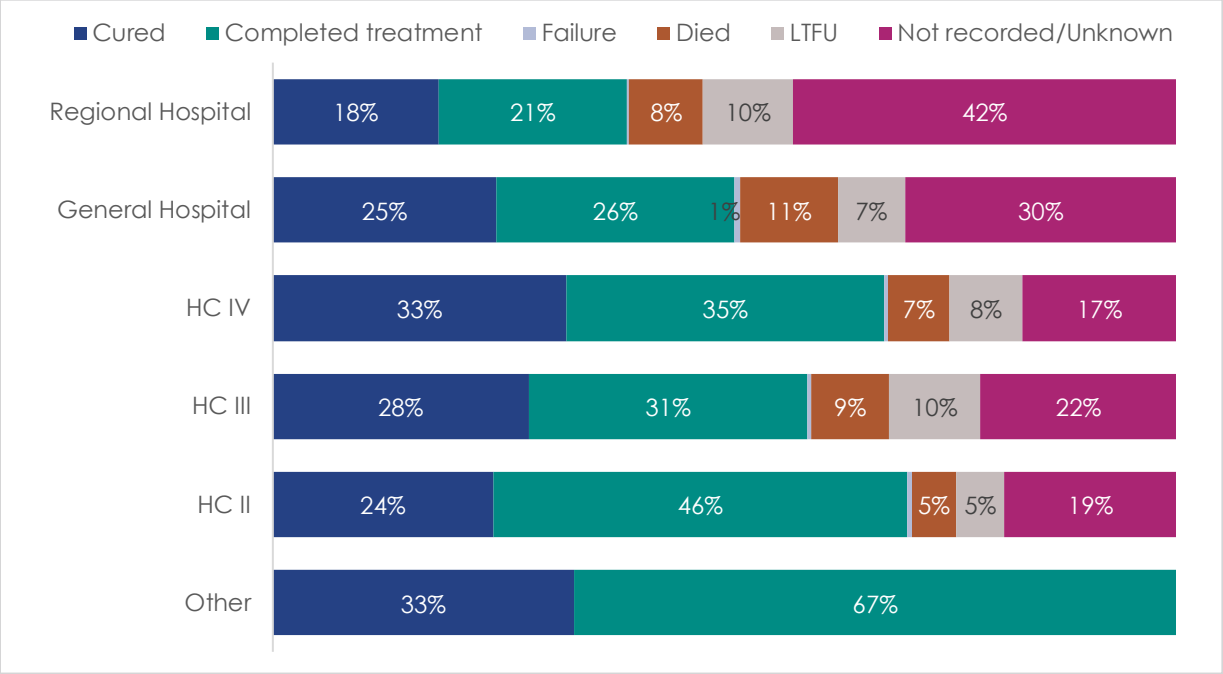
Figure 43. DS-TB treatment outcomes



The assessment revealed disparities in treatment outcomes by facility type and regions. For example, the treatment success rate was 39 percent at the RRHs, compared with 51 percent, 68 percent, 59 percent, and 71 percent at the GHs, HC IV, HC III, and HC II facilities, respectively (Figure 44). The successful outcomes ranged from a high of 67 percent for mid-eastern region to a low of 46 percent for the West Nile region.

The assessment identified 43 cases of DR-TB patients at nine facilities providing DR-TB treatment. The treatment outcomes showed that 21 patients were cured and seven completed treatment. One patient's treatment failed; four patients died; two were LTFU, and 14 were not evaluated (data not shown).

Figure 44. DS-TB treatment outcomes for 2018: New and relapse cases by facility type



STUDY LIMITATIONS

This study had several limitations related to the overall design that should be considered when interpreting the findings.

Originally, patients targeted for interviews were limited to only those who came to a facility on the day of the assessment. This was done to remove the bias created by having providers recruit patients. Nevertheless, the method introduced potential selection bias because it eliminated the potential to interview patients who did not frequent health facilities, such as those who received DOTS or medication dispensing at the community level, those who had stopped their treatment, or those considered LTFU. Moreover, patients who were at the facility on the day of the assessment may have had different characteristics than the full cohort of all current TB patients, and also different health-seeking behaviors, perceptions, and beliefs.

Because of the patient sampling protocol, it was often difficult for the assessment teams to reach the quota of patient interviews needed per facility. Revisits were made in an attempt to reach the quota per facility. However, in some areas, the quota could not be reached, potentially limiting the breadth of information that could be gleaned from patient interviews.

This study explored both quantitative and qualitative data to understand perceived stigma. The quantitative data illustrated the magnitude of perceived stigma and discriminatory attitudes from providers' and patients' perspectives toward TB patients. Subsequently, a qualitative data analysis was conducted to supplement the quantitative data, but with a focus on community members using the health facility for other healthcare services. The use of data from non-TB patients to triangulate perspectives of those infected by TB does not represent the actual experience of an infected person. Therefore, the FGDs provide artificial opinions that corroborate the perception to the etiology of TB. In addition, for logistical reasons, the FGDs were conducted in only two regions, which limited the generalizability of the findings.

KEY FINDINGS, RECOMMENDATIONS, AND CONCLUSION

On completion of the assessment, MEASURE Evaluation and MLI organized a consultative meeting in Kampala in January 2020 to review, validate, and share the preliminary findings with key stakeholders, and to obtain the stakeholders' feedback. This section presents key findings, categorized by the components of the TB Quality of Care Framework (structure, process, and outcomes), and recommendations based on the discussions at the consultative meeting. The most salient findings are in bold at the top of each section.

Structure

- **The availability of key TB-related services was generally high at most types of health facilities sampled, with almost all facilities offering screening, diagnosis, and treatment services. A high proportion of facilities also reported offering TB/HIV services and TB pediatric services.**
- **Accessibility to laboratory services was high, but over 80 percent of the facilities reported that they used offsite labs for TB testing services. When assessing the turnaround time for bacteriological TB testing, the average reported turnaround for a specimen sent for Xpert testing was nearly four and one-half days (106 hours), which is longer than the standard set by the NTLP.**
- **The availability of key supplies and medicines varied. For TB-related equipment, the availability was high overall for basic medical equipment; however, the availability of equipment related to oxygen delivery was low across the facilities sampled. Similarly, the availability of some TB drugs was high, whereas others were found in only a small proportion of health facilities sampled.**
- About one-fourth of HC III and HC II facilities had access to Xpert for rapid TB diagnosis testing.
- As a key tool for quickly diagnosing TB, the NTLP should consider expanding the number of Xpert sites to improve accessibility and address the poor turnaround times at lower levels of the healthcare system.
- The facilities' readiness to deliver qualitative services for TB care can be improved by ensuring the availability and functionality of medical equipment and supplies, especially functional resuscitation equipment. In addition, facilities should be equipped with the necessary resources and materials to promote good IPC practices.
- TB management can be improved through continuous and expanded training for providers, especially strengthening providers' skills in diagnosing and managing TB in children, IPC practices, patient counseling, and health education.
- Fewer than one-half of the facilities have mechanisms and systems in place to screen their staff. The nosocomial transmission of TB can be reduced by implementing infection control measures. In addition, strengthening health facilities' capacity to screen their staff for TB would help the NLTP and Ministry of Health ease the burden of TB among the health care workforce.

- The assessment shows that some health facilities have staff members who have been diagnosed with TB in the past two years, indicating the need for facilities to follow IPC guidelines, including the use of personal protective equipment for patients and providers, when necessary.

Process

- **There are considerable differences in the services patients considered helpful to their treatment and the services that they actually received. The biggest discrepancy between desired and received services is the availability of social protection services, such as nutritional support, transportation, etc. The NTLP and stakeholders should strengthen the social protection and support services to ensure that TB patients receive comprehensive support services as part of the patient TB care package.**
- **Patients reported considerable levels of perceived stigma and discriminatory attitudes, signaling the need for additional education and sensitization, both among TB patients and the communities in which they reside.**
- Only three-fifths of providers talked to patients about how their medications should be taken and the importance of taking medications for the full course of treatment, and fewer than one-half discussed possible side effects of TB medications. This implies the need for continuous training and updating of providers' skills and knowledge to improve their ability to manage and communicate with their patients.
- Knowledge of TB was good overall; most patients knew that TB is transmissible and that crowded conditions increase the risk of TB infection. However, a sizeable number of patients incorrectly assumed that TB can also be transmitted by sharing utensils and food. This highlights the need for continuous counseling and health education to strengthen knowledge and promote sound TB knowledge and attitudes among patients.
- Although 87 percent of providers reported that their facilities carry out contact investigation, only one-half of patients believed that all confirmed TB patients should have their contacts traced, and only 38 percent of providers said that they prioritize contact investigations for DR-TB patients. These findings highlight the need for providers to expand contact investigation to increase case detection. The NTLP should also provide financial support to the VHTs/CHWVs for transportation of both household contacts and non-household contacts, such as those in the workplace.

Outcomes

- **Three of 10 people suffering from symptoms suggestive of TB that reported to a health facility for care did so within two weeks of symptom onset, suggesting the need for community-level intervention to improve general understanding about TB and care and treatment services available. This is especially important in a situation where large numbers of people visit a qualified healthcare facility only after prolonged self-medication in the community.**
- **Findings on TPT for PLHIV show that 80 percent completed their TPT dosage and fewer than 1 percent developed active TB while on TPT. Similar results are seen for children**

initiated on TPT; 67 percent of children completed TPT, and fewer than 1 percent developed active TB. However, 145 (14%) of the PLHIV on TPT and 66 (29%) of the children on TPT had an unknown status. This may be a result of health workers failing to update their records, which could signal a need for the TB program to examine options for real-time updating of the treatment outcomes, including TPT.

- **There were marked differences in the treatment outcomes by type of facility, suggesting the need to examine factors that may contribute to these differences and develop strategies and activities to improve care and treatment at all facilities.**
- One-fourth of patients did not have treatment supporters to monitor their adherence to their TB treatment regimen. For those who did report having treatment supporters, the findings show that patients with a family member or relative as the treatment supporter were observed taking their TB drugs nearly daily. This indicates that having treatment supporters promotes adherence to the treatment plan. Patients should be encouraged to get a treatment supporter to improve their treatment outcomes.
- Analysis of TB treatment outcomes from 2018 for bacteriologically confirmed and clinically diagnosed new and relapse patients found that 57 percent of patients have a successful outcome (28 percent cured and 29 percent documented as completing treatment). However, it should be noted that the treatment success rates obtained in this survey are lower than those reported by the NTLP. The reason could be that the cohort evaluated has only recently completed the recommended treatment period, and it is possible that many of the facilities sampled had not updated their TB registers for the outcomes.

Key Recommendations

- **Ensure the availability of all basic clinical equipment, laboratory equipment, and medications for optimal TB service delivery at all relevant facilities.** It is urgent to ensure that all facilities providing TB diagnosis and treatment services have all the equipment considered necessary for providing basic quality care, especially resuscitation equipment and associated supplies, and to ensure that all equipment is functioning optimally.
- **Ensure continuous education for service providers.** There is a need to address gaps in knowledge and introduce and sustain good practices. The study identifies several gaps in providers' knowledge and practices, such as stigmatizing behavior by providers and inconsistent use of algorithms for TB diagnosis. These areas should be targeted through continuous education, including formal training programs, on-the-job-training, and supportive supervision.
- **Sustain supervisory activities and improve oversight to ensure the continuous updating of treatment outcomes**. The supervisory system shows good results in terms of frequency and activities, but there were missing data on treatment outcomes in the treatment register, indicating a need to sustain the supervisory system and strengthen the oversight of these specific data. Data quality mechanisms or guidelines should also be developed to check the quality of reported data at the facility level. One recommendation is that the NTLP develop a simple guidance tool or checklist and provide it to supervisors to strengthen their review of treatment outcome data during routine

supervisory and monitoring visits, and ensure that patients who are transferred also have their treatment outcomes updated.

- **Address stigma and discriminatory attitudes at all levels of the health system.** There was a high level of stigma and discrimination associated with TB in Uganda, among providers, patients, and community members. Patients' apparent failure to act on symptoms and signs suggestive of TB may be a result of that stigma and the discriminatory attitudes toward the disease in society. This may contribute to delayed care seeking and, consequently, increased mortality from the disease. Stigma may also make it difficult for patients to adhere to TB treatment. The NTLP should tailor health education messages and interventions on TB to increase the community's understanding of the disease and increase collaboration between the community and the healthcare system. Moreover, community deliberations on TB should be encouraged, because open discussions about the disease will encourage those with symptoms suggestive of TB to recognize it and seek care at the health facility.
- **Support and strategize for future studies to build on the result of the current work.** It is important to continuously monitor the quality of TB care to address emerging problems and maintain care standards. This will require further TB service assessments that build on the findings of the current study. It is also important to develop studies and actions to address the gaps identified in this study, such as delays in care seeking, stigma, and discrimination; the cascade of care; TPT; and to address emerging quality of care issues. This assessment was not designed to derive a regional estimate; instead, managers and decision makers should explore further analysis of the data to provide comprehensive descriptive statistics for regional interventions.
- **Consider actions to improve care where needed.** Review of the data in this study shows disparities in the quality of care indicators by type and location of facilities. Because perceived quality is a dimension of the patients' use of and adherence to treatment services, all facilities should be able to offer care at consistently high standards.

CONCLUSION

Despite progress toward TB control worldwide, Uganda continues to remain a high-TB-burden country with a large number of new TB cases and suboptimal treatment outcomes. The QTSA in Uganda highlights both the high-performing elements of the NTLP's system for providing TB care to patients and challenges that should be addressed to improve quality of care. The assessment reveals good performance on program indicators, such as the availability of drugs/medicines, laboratory services, and provider training. However, it also highlights gaps, such as the availability of rapid diagnosis tests and turnaround times, patient knowledge and understanding of TB, the health-seeking behavior of patients symptomatic of TB, supportive services for TB patients on treatment, continuing stigma and discrimination, and uncertainties about treatment outcomes (an indication of poor data quality). These findings provide evidence of the areas needing programmatic interventions, and can also inform policymakers and program managers who want to design and implement responsive programs and interventions to improve the availability of high-quality services for all TB patients and their families.

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APPENDIX A. DATA COLLECTION AND DATA MANAGEMENT

Data Collection

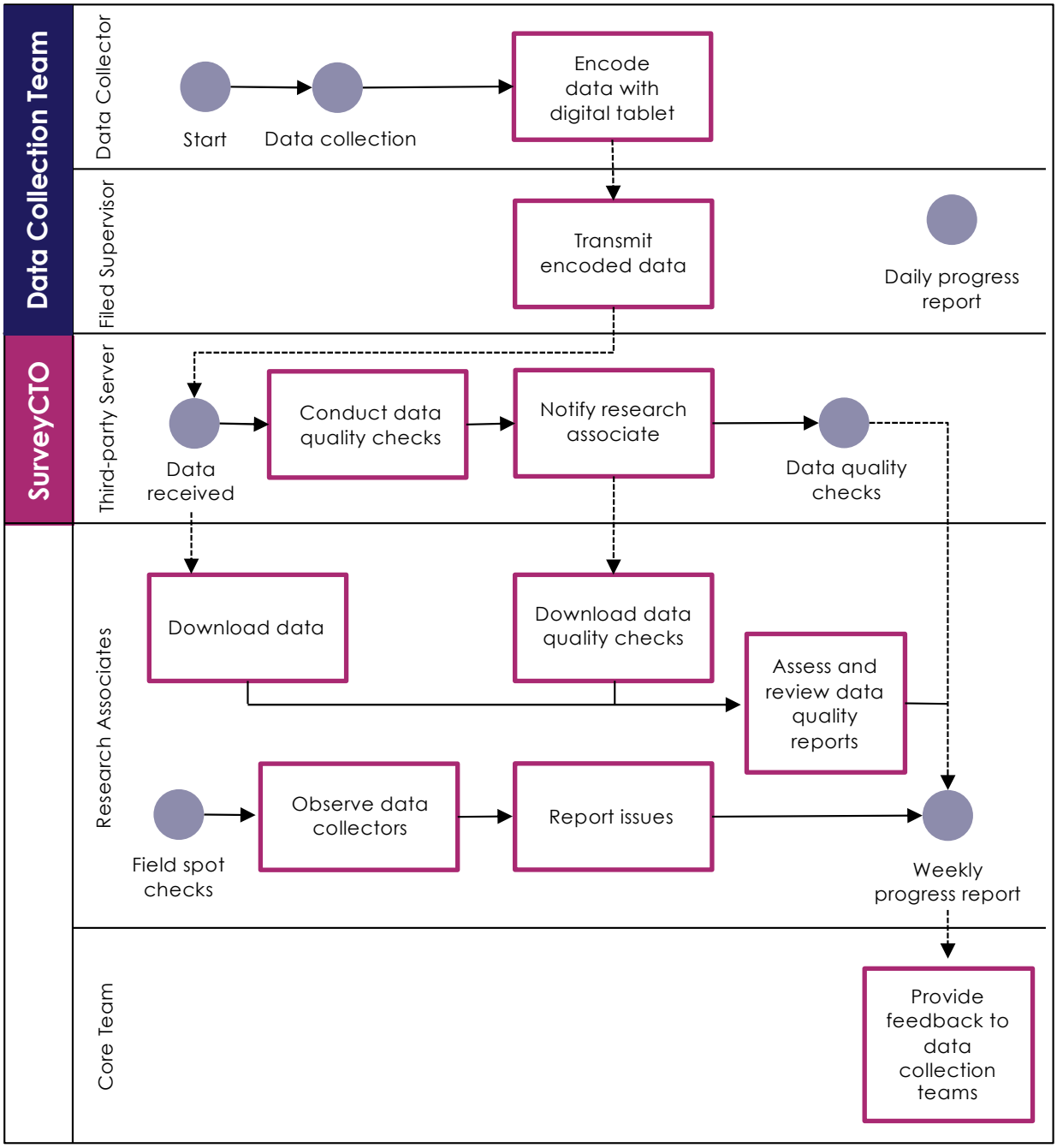
Makerere University Lung Institute (MLI) was responsible for the recruitment, training, and supervision of data collectors, and the collection of the data using SurveyCTO. Thirty-two data collectors and eight supervisors formed eight data collection teams assigned to cover the nine regions. Senior technical advisers from the MEASURE Evaluation team and MLI conducted training to equip the data collectors with the technical and administrative skills needed for the fieldwork. Technical training covered the data collection tools, informed consent, SurveyCTO, and basic knowledge of TB. Administrative training included coordination and finance protocols. A dry run of the fieldwork was done in selected TB DOTS centers in Marikina City. A significant effort made during the fieldwork was the direct translation of the English tools into the local language by the data collectors. To maintain the integrity of the original English questions and at the same time keep the interviews conversational, a conversational translation of the tools based on the language required in the six regions was conducted before the start of data collection. After tool finalization, data collectors pretested the revised and translated tools.

Data collection started the week after the training. Courtesy calls were done by the data collection teams to regional directors and regional NTLP coordinators during the first day of data collection. A separate project briefing was done at each facility. Data collection took place over a twelve-week period between September and December 2019.

Data Management

Data quality was ensured through the following mechanisms: in the tools, daily progress reports, field spot checks, weekly progress reports (WPRs), and data quality checks (Figure A1).

Figure A1. Data management flowchart



SurveyCTO allowed for real-time data management as the tools were being administered. Data quality was assured by data limits, skip logic, and required responses in the tools. The data collectors were not allowed to enter anything that was lower or higher than the set limit. If there were any exceptions to the limits, they were reported to the research associates so that the dataset could be changed, and when appropriate, the tool could be adjusted. Skip instructions were important to determine the right questions to ask the respondents. For example, if a service was not available at a facility, questions pertaining to that service were automatically

skipped by SurveyCTO. The mechanism for required responses meant that SurveyCTO would not allow the data collectors to move on to the next question until a response was entered.

Data quality was ensured at the level of the field supervisors through the daily progress reports, which were submitted per facility visited. They were used to track the progress, challenges, and best practices of the data collection teams. Each member of the data collection team was assigned to a specific tool. Once a tool was completed, the field supervisor checked for data quality and completion. When they were satisfied, field supervisors transmitted the data to the server. Then, they reported the number of tools completed on the day of their visit, and the status of the interviews (e.g., completed interviews, patient refusals, and ineligible patients). This was also a way for the data collectors to report any schedule changes that were necessary. Schedule changes varied, but most of the time they were attributable to the lack of patients, facility refusals, and difficult weather conditions.

To ensure that the data collection protocol was followed and that good data quality was obtained, the research associates conducted spot checks during the data collection period. One spot check was done per data collection team. Each spot check lasted three to five days, depending on the need and travel time. During the spot checks, the implementation of protocols and the administration of the tools were assessed. The research associates had a checklist to assess the implementation of protocols and observed the data collectors individually as they administered the tools. The spot checks were also a means through which the research associates could understand the contexts in the regions, provinces, and cities that made their processes unique or similar in comparison with other areas. Feedback sessions with the data collection teams were done after each spot check to provide comments and recommendations about the data collection. These sessions were vital to relay the issues and comments observed by the research associates. The data collectors were also able to give comments and pose questions that they had about the protocols and tools. The data collection teams that needed more training to improve data quality were prioritized.

The WPR was the mechanism for updating MEASURE Evaluation and the MLI team on the progress of data collection. It contained the number of interviews completed, a summary of the challenges encountered in the field, best practices and lessons from the data collection teams, action points for the data collectors, and data quality checks per tool. An important section of the WPR was the challenges encountered in the field. This allowed MEASURE Evaluation to make necessary changes to the tool(s), and to clarify the protocols for certain questions to ensure clean data. Such changes included adjusting the data limits and skip logic.

Data quality checks were also featured in the WPR. The data quality checks were coded in SurveyCTO to report high frequencies of "No Response" or "Don't Know" responses and outliers. SurveyCTO produced daily warnings about the data quality. To investigate these warnings, a research associate contacted the data collectors and documented the source of the issue. Some issues were owing to the contexts of health facilities, data collector entry errors, or values that exceeded limits. When necessary, changes were made to a tool, such as increasing the limits. The data quality checks were compiled weekly and reported in the WPR. Data in the SurveyCTO server were further cleaned for any inconsistencies.

APPENDIX B. TB OUTCOME DEFINITIONS

TB Outcome Definitions

Cured: A patient with bacteriologically-confirmed TB at the beginning of treatment and who was smear- or culture-negative in the last month of treatment and on at least one previous occasion in the continuation phase.

Treatment completed: A patient who completes treatment without evidence of failure but with no record to show that sputum smear or culture results in the last month of treatment and on at least one previous occasion were negative, either because tests were not done or because results are unavailable.

This group includes:

- A bacteriologically-confirmed patient who has completed treatment but without direct sputum smear microscopy follow-up in the last month of treatment and on at least one previous occasion.
- A clinically diagnosed patient who has completed treatment.

Treatment failed: A patient whose sputum smear or culture is positive at five months or later during treatment.
OR
A clinically diagnosed patient (child or extrapulmonary TB) for whom sputum examination cannot be done and who does not show clinical improvement anytime during treatment.

Died: A patient who dies for any reason during the course of treatment.

Lost to follow-up: A patient whose treatment was interrupted for two consecutive months or more.

Unknown: A patient whose treatment outcome is unknown because no outcome has been assigned in the register. This also includes cases transferred to another DOTS facility and their treatment outcomes have not been assigned/and who do not have a treatment outcome assigned.

Source: Adapted from the WHO's *Definitions and Reporting Framework for Tuberculosis* (WHO, 2013)

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