Quality of Tuberculosis Services Assessment in Nigeria

Report

July 2019

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MEASURE Evaluation

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Report

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July 2019

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Cover photo: Health providers in Northern Nigeria speak with a woman at a local health facility. © 2018 Kanika Campbell/JHUCCP, Courtesy of Photoshare

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FOREWORD

The government of Nigeria recognizes that increased facility involvement in the delivery of quality care and services is at the heart of tuberculosis (TB) programming and is an effective way of meeting the rising demand for services in Nigeria. The Quality of Tuberculosis Services Assessment has therefore become imperative to enable evidence-based decision making to improve TB service delivery and reduce the burden of the disease.

The National Tuberculosis and Leprosy Control Program of the Federal Ministry of Health would like to acknowledge the support of USAID to the government of Nigeria in its efforts to reduce the burden of TB in Nigeria through improved, high-quality services to those infected and affected by TB. USAID provided the funds to MEASURE Evaluation to undertake this assessment. We are also grateful to the USAID teams in Washington, DC, and the Nigeria mission office for their guidance during the planning, design, and implementation of the assessment. We appreciate the technical support provided by the MEASURE Evaluation team at John Snow, Inc. for the design, conduct, and technical coordination—including data analysis and report writing for the assessment.

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We are confident that the results of this assessment will go a long way in helping policymakers, program managers, and funding agencies develop policy and program interventions that will enhance quality of care for TB patients and improve the well-being of the general population in Nigeria.

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ABBREVIATIONS

AHEAD	Academy for Health Development
ART	antiretroviral therapy
CHW	community health worker
DOT	directly observed treatment
DOTS	directly observed treatment, short-course
DR	drug-resistant
DS	drug-susceptible
FMOH	Federal Ministry of Health
IPC	infection prevention and control
IRB	institutional review board
JSI	John Snow, Inc.
LGA	local government area
LGTBLS	Local Government Tuberculosis and Leprosy Supervisor
LTFU	lost to follow-up
MDR	multidrug-resistant
MTB	mycobacterium tuberculosis
NHREC	National Health Research Ethics Committee
NTBLCP	National Tuberculosis and Leprosy Control Program (Federal Republic of Nigeria)
PHC	primary healthcare
QTSA	Quality of TB Services Assessment
RIF	rifampicin
RR	rifampicin-resistant
SDGs	Sustainable Development Goals
TB	tuberculosis
USAID	United States Agency for International Development
WHO	World Health Organization
WPR	weekly progress report

EXECUTIVE SUMMARY

Introduction

According to the 2018 Global Tuberculosis Report released by the World Health Organization (WHO), tuberculosis (TB) is the tenth leading cause of death and is the leading cause of death from a single infectious agent (WHO, 2018). Heads of state committed to ambitious targets aimed at eliminating TB during the first-ever United Nations High-Level Meeting on Tuberculosis conducted in September 2018 at the United Nations General Assembly.

WHO has identified 30 countries where the TB burden is high, including Nigeria. TB is one of the leading causes of morbidity and mortality in Nigeria. The 2016 National Health Policy (Federal Ministry of Health, Nigeria [FMOH], 2016) highlights TB as a priority public health challenge and targets "reduction in the tuberculosis prevalence rate and the tuberculosis mortality rate in Nigeria by ensuring universal access to high-quality, client-centered TB/leprosy diagnosis and treatment services." Service quality remains a concern and has received very limited attention in the TB research agenda in Nigeria. Only a few studies, focused on small geographic areas, have been implemented or published, and there has been no prior nationwide study of the quality of TB services in Nigeria.

Studies show that good quality of care in TB services helps patients and their families address their health needs safely and effectively. Therefore, to enhance TB service use, there is a need to assess and improve the quality of TB services. A Quality of TB Services Assessment (QTSA) was conducted by MEASURE Evaluation in Nigeria to assess the quality of TB services in randomly selected health facilities. Its purpose was to identify where services were of high quality and where there were gaps and to ensure that TB patients were receiving the care that they deserve. The study assessed three domains of quality of care: the structure of the health facility, the service delivery process, and the outcomes of service delivery. The results were used to develop programs or interventions to improve TB service delivery. Find more information on QTSAs, including reports and tools related to assessments in other countries, here: https://www.measureevaluation.org/our-work/tuberculosis/quality-of-tb-services-assessments

Methods

The QTSA was a nationally representative cross-sectional study conducted across three levels of the diagnostic and treatment health facilities in Nigeria (primary, secondary, and tertiary care levels). The study was implemented in 12 states spanning Nigeria's six geopolitical zones. One hundred and forty-four health facilities (public and private) from the National Tuberculosis and Leprosy Control Program (NTBLCP) network providing TB and TB-related services, such as diagnosis, care, and treatment, were randomly selected using a multistage sampling procedure. Health facility staff and patients participated in the study to answer questions about the structure, process, and outcomes of TB service delivery. Patients included confirmed drug-susceptible (DS) and drug-resistant (DR) TB patients, ages 15 years and older, who were visiting the health facilities on the day of data collection. For the study, MEASURE Evaluation—a project funded by the United States Agency for International Development (USAID)—developed four tools, with input from the USAID TB Team: Facility Audit, Provider Interview, Patient Interview, and a two-part Record Review. These were adapted to the Nigeria context and are available at the following link: https://www.measureevaluation.org/resources/publications/tl-19-42/

Data collection was spread across three months, from June to August 2018. The main ethics review for the assessment was conducted and approved by the John Snow, Inc. (JSI) Institutional Review Board (IRB), in the United States, and the National Health Research Ethics Committee (NHREC) of the Federal Ministry of Health (FMOH), in Nigeria. Ten state-level Ethical Review Committees also approved the study.

Results

Findings from this assessment provide the Nigeria NTBLCP, donors, policymakers, and other stakeholders with relevant information to identify successes in ongoing programming and areas where greater attention to the provision of service delivery is needed. This section summarizes the findings, which are organized by the components of the assessment framework (TB Quality of Care Framework; Figure 1): structural factors, processes, and outcomes. Areas for improvement are also identified.

Structural Factors

Most facilities provide on-site, bacteriological confirmation of TB diagnosis based on sputum testing (90%) and TB care and treatment (99%). Nearly all facilities (97%) offer follow-up services such as directly observed treatment (DOT) and treatment monitoring. The results revealed gaps and significant limitations in infection prevention and control (IPC), both in terms of availability of basic supplies and equipment and measures across three infection control domains (administrative, environmental, and personal protection). About one-third (35%) of primary healthcare facilities were observed to be implementing cough triage.

The overwhelming majority (92%) of facilities assessed had first-line medicines for treating TB on the day of data collection; 85 percent of drug-resistant TB (DR-TB) patients had started second-line treatment in the past year. About two-thirds (64%) of facilities had adequate drug storage on-site. TB drug-monitoring mechanisms are in place at different levels to ensure an uninterrupted supply of quality-assured TB drugs, which is critical to successful treatment and will help prevent the emergence of DR-TB. Despite these mechanisms, 15 percent of facilities reported stockouts of any required TB drug during the six months prior to the study.

This study assessed the performance of service providers as a critical element of the structural factors in TB treatment and found that just over half (54%) of health workers reported receiving training in the past 24 months and could identify the eight skills for establishing rapport and building trust with TB patients without any prompting (55%). This training seems to have had a positive impact on their practices, and 98 percent of patients interviewed reported that their provider discussed or counseled them on adherence to treatment and treatment completion.

The study also assessed supervisory visits to the facilities as part of the managerial framework for improving and sustaining the quality of TB care. In this study, 81 percent of providers reported being supervised or monitored in the past 12 months, and 83 percent of facilities had records of supervision visits from a Local Government Tuberculosis and Leprosy Supervisor (LGTBLS) during the 12 months prior to the study. Almost all respondents reported that the supervisors' activities included a review of service data (100%) and assessment of medication stocks and expiry dates (95%).

Processes

Patient satisfaction with service provision is an important dimension of the quality of healthcare and has a significant relationship with the uptake of services (Andaleeb, 2001; Rehaman & Husnain, 2018). The study

showed that more than half of facilities (52%) had a private room for individual counseling and consultations in the facility's TB unit, but 84 percent of patients reported that they had privacy during the examination. Most patients (94%) also reported being satisfied with time they spent in the facility in the process of care.

The study showed both high levels of patient knowledge about TB as a disease and high levels of misconception among patients. Nearly all (99%) patients indicated that TB is curable; 94 percent reported knowing the duration of TB treatment; and 58 percent mentioned microbes/germs/bacteria as the cause of TB. However, misconceptions were common, including incorrectly attributing the spread of TB to sharing utensils (47%), sexual contact (25%), food (23%), blood transfusions (21%), touching an infected person (17%), and mosquito bites (11%).

The study found a high level of provider-patient interaction, with more than 98 percent of patients reporting that the provider discussed the curability of TB and how to protect household members from infection (82%). Patients also reported that providers discussed prevention with family members or those living with the TB patient (90%). These findings are consistent with the high level of provider counseling skills mentioned above. The study also showed that approximately 40 percent of patients did not have access to DOT. Among those who did have access to DOT, 42 percent reported that a provider observed them taking their medication one to four days a week, and 18 percent reported observation five days or more per week.

Broadly, the study identified the major barriers to TB treatment as the distance to the TB service facility (22%), financial barriers such as the need to pay for TB tests (21%), and language barriers (19%). TB-related stigma and discrimination is an area that would benefit from deeper exploration in future studies. In this study, 19 percent of TB patients indicated that service providers turned their face away when speaking with them, and 16 percent reported that people within the facility displayed discriminatory attitudes toward them because of their TB diagnosis.

TB Outcomes

The study found that 82 percent of TB patients were bacteriologically confirmed, and a smear conversion rate of 70 percent was obtained among patients with smear results after two months of treatment according to the national guidelines. Of the 9,841 patients registered for treatment in the sampled facilities from January to December 2016, 9 percent had no treatment outcomes recorded in the registers. Of those with treatment outcomes recorded, 80 percent were successfully treated (48% cured and 32% completed treatment), and 20 percent of patients had an unsuccessful outcome, mainly owing to loss to follow-up (10%) or death (7%). One percent had treatment failure and 2 percent were not evaluated.

Key Findings and Recommendations

Findings from the assessment highlighted three main issues: (1) Facilities are not consistently following IPC procedures. (2) Basic equipment and drug supplies are not always available, owing to weaknesses in the logistics management system. (3) Providers lack refresher trainings and frequent supervision. Several recommendations are offered based on the study results, which are categorized by the components of the TB Quality of Care Framework: structure, process, and outcomes.

INTRODUCTION

Background

Tuberculosis continues to be 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 High-Level Meeting on Tuberculosis conducted at the United Nations General Assembly. According to the 2018 Global Tuberculosis Report released by the WHO, TB is the tenth leading cause of death and the leading cause of death from a single infectious agent (WHO, 2018). An estimated 1.3 million deaths among HIV-negative people and 300,000 deaths among HIV-positive people were caused by TB in 2017. The case fatality rate for TB deaths was 16 percent. Moreover, there were an estimated 10 million new cases of TB disease in 2017, which is equivalent to 133 cases per 100,000 population. The WHO also estimates that almost 4 million TB cases were missed in 2017, going undiagnosed, untreated, or unreported to national TB programs. For DR-TB, there were an estimated 558,000 new cases of rifampicin-resistant (RR) TB, 82 percent of which were multidrug-resistant (MDR) TB cases (WHO, 2018). The rapid emergence of MDR-TB could potentially reverse two decades of progress mitigating the impact of TB (Zumla, et al., 2012).

The WHO has identified 30 countries where the TB burden is high, including Nigeria (WHO, 2018). In 2017, Nigeria represented 4 percent of the global TB caseload, ranking sixth globally in terms of percentage contribution. Additionally, treatment coverage in Nigeria is quite low, with only 24 percent of estimated TB cases being correctly diagnosed and treated, so the need for access to high-quality TB care is particularly urgent.

To address the TB burden, the global agenda has been ambitious, creating strategies in line with the Sustainable Development Goals (SDGs) and the WHO's End TB Strategy (WHO, 2015c). SDG 3 ("Ensure healthy lives and promote well-being for all at all ages") specifies that the TB epidemic should be ended by 2030. 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. The End TB Strategy targets by 2030 are: (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. Although the burden of TB disease has been decreasing in most countries, the decline is slow in relation to the 2020 milestones of the End TB Strategy.

Prompt detection and appropriate treatment of patients are central strategies for controlling the disease, and form the centerpiece of most national TB program strategies in high-burden countries. Successful treatment resulting in cure is possible when the correct drug regimen is administered completely. TB programs are therefore increasing their efforts to improve the quality of TB diagnosis, care, and treatment while also seeking to improve access to TB services. Ensuring that patients receive the care that they deserve and that providers offer better services; improve adherence, diagnosis and treatment; and reduce loss to follow-up (LTFU) will attract more patients and ultimately contribute to reducing TB burden.

The International Standards for Tuberculosis Care (TB CARE I., 2014) describe a widely accepted level of care that all practitioners, public and private, should seek to achieve in managing patients who have, are suspected of having, or are at increased risk of developing TB. These standards are intended to promote effective engagement of all providers in delivering high-quality care for patients of all ages, and to empower

patients to evaluate the quality of care they are receiving. The standards provide a reference point for assessing provider or system performance and quality of care, and help to identify current and expected levels of quality in healthcare delivery. Although there are existing frameworks and standards that define quality of care or services and guide TB service provision, there are few implementation guidance documents and tools for routine or periodic assessment of the quality of TB care. Such guidance is crucial because a clear understanding of quality of care will enable policymakers and program implementers to strengthen TB care and prevention by positively influencing timely diagnosis, treatment adherence, and treatment completion.

Tuberculosis Response in Nigeria

The NTBLCP of the Department of Public Health in the FMOH was established in 1989 to coordinate TB and leprosy control activities in Nigeria. Its mandate was further expanded to include Buruli ulcer control in 2006. In June 2006, the Federal Government of Nigeria declared TB a national emergency and continued to raise awareness and advocate for more action by all stakeholders to contain the TB problem in the country.

Nigeria's new National Health Policy (2016) prioritizes reducing TB prevalence and mortality rates by ensuring universal access to high-quality, patient-centered TB diagnosis and treatment services. This study examines the adherence of TB services in Nigeria to international and national standards and guidelines to ensure that TB services are delivered in an accessible, timely, safe, effective, efficient, and equitable manner. Consequently, systematic measurements of the quality of TB care are assuming greater importance both nationally and globally.

The NTBLCP has a vision of a TB-free Nigeria and a mission to ensure effective, equitable, accessible TB prevention, diagnosis, treatment, and care. The program's goal is to reduce morbidity, mortality, and transmission of TB until the disease is no longer a public health problem in Nigeria. To achieve this goal, the program has developed a strategic approach aligned with the global End TB Strategy (FMOH, 2014a; FMOH, 2014b).

The NTBLCP's National Strategic Plan for TB Control (2015–2020) lays out "an ambitious agenda to work towards the goal of providing Nigerians with universal access to high-quality, patient-centered prevention, diagnosis, and treatment services for TB, TB/HIV, and drug-resistant TB by 2020." The plan emphasizes the "rapid scale-up of services to achieve universal access to TB prevention, diagnosis and treatment, with an emphasis on quality, accountability, and linkages between the different levels of the health system and partnerships that leverage the resources and efforts of other disease programs and initiatives to have a greater impact for TB control" (FMOH, 2014a). The strategic plan consists of six strategies:

- First, the national strategic plan focuses on pursuing high-quality directly observed treatment, short-course (DOTS) expansion and enhancement.
- The second strategy is addressing TB/HIV, MDR-TB, and other challenges.
- Third, contribute to health system strengthening.
- Fourth, involve all care providers.
- Fifth, engage people with TB and affected communities.
- The sixth strategy is to enable and promote operational research.

The current NTBLCP TB treatment guidelines call for standardized treatment (using fixed-dose combination tablets) for six months for all new pulmonary cases at all health facilities, whether public or private. The exceptions are TB meningitis and osteoarticular TB, which are treated for 12 months. The NTBLCP network of health facilities, along with several nongovernmental organizations (NGOs), are operating community-based TB control interventions involving volunteers and health workers, who provide important linkages with health facilities.

RR-TB and MDR-TB are also of concern in Nigeria. A recent study estimated that 4.3 percent of new TB cases and 25 percent of retreatment cases have DR-TB unresponsive to the two most potent TB drugs (isoniazid [INH] and rifampicin [RIF]) (WHO, 2016). To address DR-TB, Nigeria introduced programmatic management of DR-TB (PMDT) in 2010 and currently provides ambulatory DR-TB services at the national and state levels through 27 treatment facilities. In addition to these outpatient services, inpatient and long-term nonambulatory services are provided through health facilities with capacity to manage DR-TB for a period of 20–24 months using second-line TB treatment. In Nigeria, the treatment success rate for DR-TB was 78 percent for the 2015 cohort (WHO, 2018), which is higher than the global average of 55 percent (WHO, 2018). The success rate could be a result of the mixed approach of ambulatory and nonambulatory services along with the additional nutritional and psychosocial support packages offered to all DR-TB patients.

Monitoring, evaluation, and operations research are integral components for tracking the performance and impact of all aspects of DOTS. The NTBLCP continues to monitor the progress of program implementation through quarterly and annual reports and reviews at the local government area (LGA), state, and national levels. All confirmed cases, presumptive cases, and TB/HIV coinfected cases are entered into the TB program recording and reporting system through existing data collection tools (forms and registers). The NTBLCP reports treatment outcomes for all forms of TB in line with WHO recommendations. An electronic master register was introduced across the country following training on e-TB Manager, a web-based tool to manage the information NTBLCP needs. Data are entered at the LGA level and reviewed on a monthly basis at the state and national levels.

Quality of TB Services Assessment

Conceptual Framework

Under the DOTS strategy, TB programs typically measure their successes by focusing on the number of patients screened, diagnosed, and successfully treated; however, they did not emphasize the quality of care received. Evidence suggests that quality of care (or lack of it) is related to health outcomes and, therefore, addressing quality of care is a critical investment for TB programs. Studies have revealed 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 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.

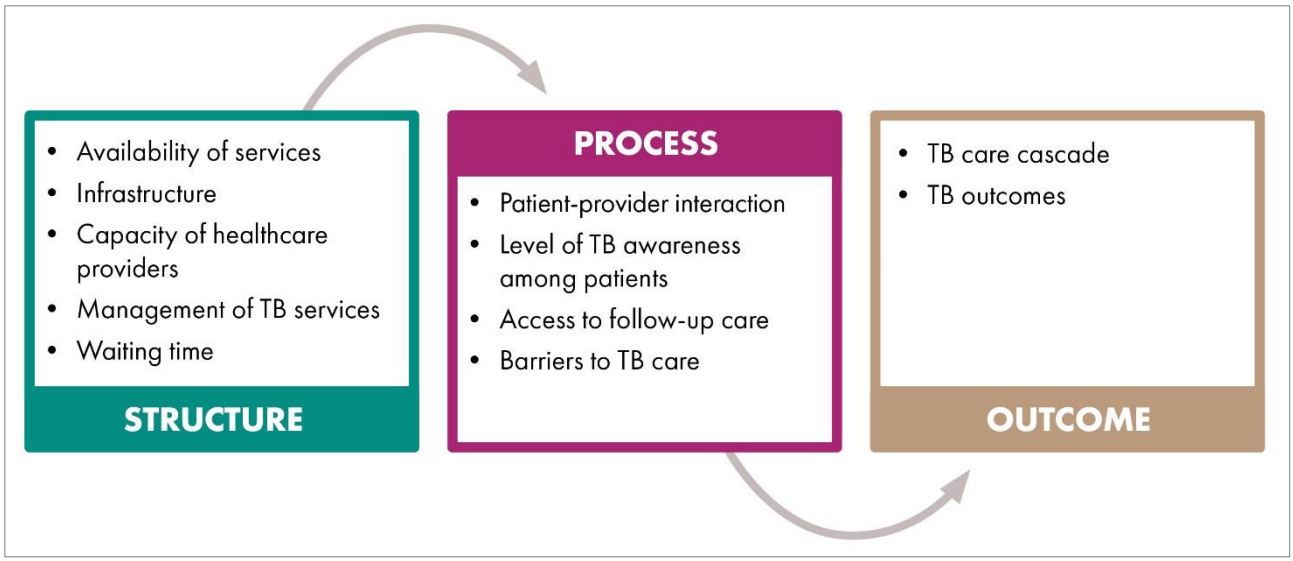
In the global TB community, studies have inspired efforts to develop and promote patient-centered models of care to ensure high-quality TB diagnosis and treatment services. The success of health systems at providing services to improve or maintain good health outcomes depends on the context and influence 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, leading to poor quality of TB care.

The framework presented in Figure 1 was used by this assessment to measure the quality of services offered by the TB program in Nigeria. 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 pathway, linking key components of quality of care, including policy and regulations, infrastructure, providers' competency, service environment, and infection control, which should function well to achieve the desired health outcomes. Using this pathway 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 components and elements of quality care follow:

- Structure: The health facility infrastructure, medical equipment, 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; appropriate treatment; adherence to treatment regimens; treatment outcomes; and ultimately, incidence, prevalence, and death rates.

Study Objectives

The success of TB elimination strategies and universal health coverage at the country level and worldwide depends on (1) the service capacity of facilities to provide TB and comorbid services, and to minimize the risk of transmission that may expose patients to danger; (2) the management systems to support a minimum standard of quality for TB-related services; and (3) the capacity of the TB and/or health sector logistics systems to provide a reliable and uninterrupted supply of the commodities required.

There is no doubt that good quality of care in TB services helps patients and their families address their health needs safely and effectively. Therefore, an assessment and improvement of the quality of TB services can enhance TB service use. This study was conducted to assess the quality of TB services in randomly selected health facilities in Nigeria to identify where services were of high quality, where there were gaps, and ultimately, to ensure that TB patients were receiving the care that they deserved. The purpose of the study was to measure the quality of services of the TB program at selected facilities by assessing the three domains of quality of care—the structure of the health facility, the processes, and the outcomes—and use the results to develop programs or interventions to improve TB service delivery.

The study's objectives were to:

- 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 clinical outcomes of the patients receiving TB care.
- Provide recommendations based on the study's results to address gaps identified in the quality of care.

The two questions that the study sought to answer were:

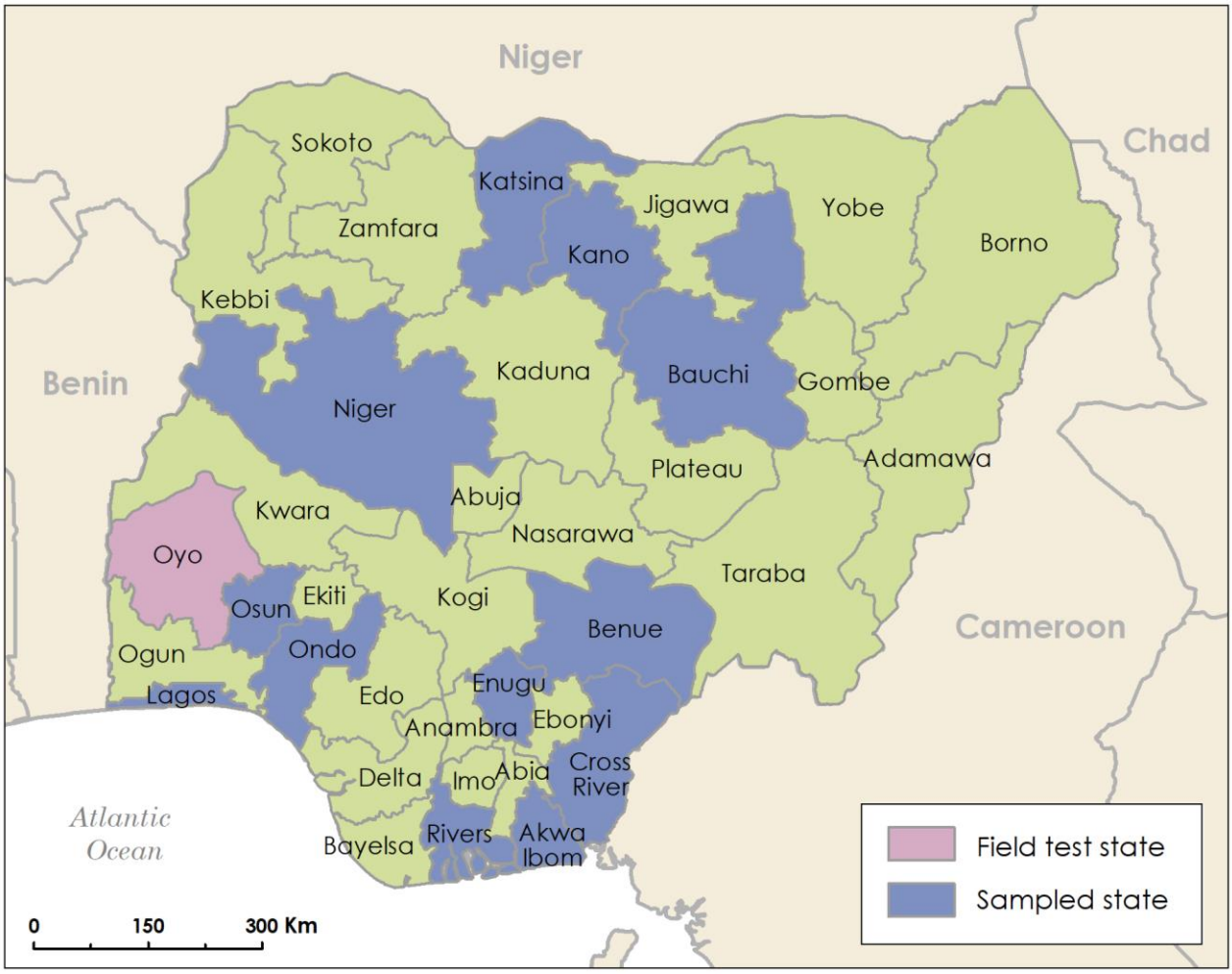
- What are the gaps in TB service delivery and the needs of TB patients?
- What are the perceptions, views, and experiences of TB patients on the services they received?

Study Area

The study took place in 12 states and LGAs supported by the NTBLCP, the Challenge TB project (funded by USAID), and the Global Fund to Fight AIDS, Tuberculosis and Malaria. The states, spanning Nigeria's six

geopolitical zones, follow: Akwa-Ibom, Bauchi, Benue, Cross River, Enugu, Kano, Katsina, Lagos, Niger, Ondo, Osun, and Rivers (Figure 2).

Figure 2. States selected for the QTSA in Nigeria



METHODS

Study Design

This assessment was a nationally representative cross-sectional study conducted at diagnostic and treatment health facilities in 12 states across Nigeria. The overall quality of services offered at the facilities was evaluated by examining the availability and functionality of resources (materials and human) in the facilities; the service providers' competencies and skills, and the interactions between the providers and patients; and the patients' overall perception of the services. The WHO, NTBLCP, and International Standards for Tuberculosis Care (Tuberculosis Coalition for Technical Assistance, 2006) were used to judge the overall quality of services offered at the facilities. A review of records on the outcomes of TB patients who had received or were receiving treatment was also used to evaluate the quality of services offered at the facilities. Quality was measured as the difference between expected and actual performance to identify opportunities for improvement. The analysis will enable the tracking of quality of care performance by the TB program if the study is repeated.

Health facility staff and patients were asked to participate in the assessment to answer questions about the structure, processes, and outcomes of TB service delivery. The patients were confirmed drug-susceptible TB (DS-TB) and DR-TB patients, ages 15 years and older, visiting the health facilities on the day of data collection.

Sampling Procedures

Health Facility

One hundred and forty-four health facilities (public and private) from the NTBLCP network providing TB and TB-related services, such as diagnosis, care, and treatment, were randomly selected using a multistage sampling procedure. The first stage involved obtaining the list of facilities delivering TB diagnosis and treatment services from the NTBLCP's database, determining their caseloads for the second half of 2016 (July–December 2016), and stratifying the facilities on the list based on their level (tertiary, secondary, and primary) and managing authority (public and private). A stratified sampling approach was used to ensure representation of each facility level (and the dynamics of care at each level) because there are more primary-level facilities than secondary- and tertiary-level facilities. Facility selection also considered the linkage and referral expected to occur between different health facilities, especially primary- and secondary-level facilities.

In the second stage, one tertiary-level facility was randomly selected for each of the 12 states. For states where the number of tertiary-level facilities delivering TB-related services was just one, that facility was selected. This resulted in 12 tertiary-level facilities being sampled. In the third stage, three secondary-level facilities were randomly selected for each of the 12 states. This resulted in 36 secondary-level facilities being sampled.

Since primary healthcare (PHC) facilities are expected to refer their patients to the nearest secondary-level facility with a TB program, the list of PHC facilities referring patients to the 36 sampled secondary-level facilities was extracted. In a fourth stage, two PHC facilities were randomly selected for each secondary-level facility already included in the QTSA sample—corresponding to 72 PHC facilities sampled, and 120 primary-, secondary-, and tertiary-level facilities sampled in total, or 10 facilities per state. Last, to meet the required sample size of 12 facilities per state (for a total sample of 144 facilities), two additional facilities were

randomly selected among private health facilities in each of the 12 states (including one mission facility managed by a faith-based organization, if applicable).

Service Providers

The providers interviewed as part of this assessment were health facility in-charges, TB focal persons, and/or providers of TB or TB-related services (particularly those in clinics providing antiretroviral therapy, or ART). The study used a convenience sampling procedure to select an average of three to five providers per facility, depending on the number of staff members providing TB services at the different sites. If the number of providers in the sampled facility did not reach the desired number, all providers available on the day of data collection were interviewed. Thirty-six or more providers were interviewed per state, which implies an average of three providers per facility. All healthcare providers interviewed for the QTSA had worked at their facility for at least three months.

TB Patients

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

The study sampled confirmed TB cases (DS-TB and DR-TB patients) who were on treatment and visited the health facility on the day of the health facility audit. Patients who were too weak to wait for an interview, based on the judgement of the data collector, were excluded from the interviews. The data collector purposively selected a consecutive sample of three to five TB patients who were present on the day of data collection, based on the following inclusion and exclusion criteria.

Inclusion Criteria for Patients

- Ages 15 years or older
- Currently receiving TB treatment at the facility whether or not they were in the intensive or continuation phase
- Pulmonary and extrapulmonary TB patients
- For DS-TB patients, they must have been on treatment for at least two weeks
- For DR-TB patients, they must have been on treatment for at least three months

Exclusion Criteria for Patients

- Under age 15
- Visiting the health facility for the first time
- Had received fewer than two weeks of treatment, if DS-TB, or fewer than three months of treatment, if DR-TB
- Too weak or ill
- Refused to be interviewed

Patient Card Record Review

In addition to reviewing the facilities' registers, five TB patient cards were included in the Record Review at each facility. The five patient cards were randomly selected from the cards of patients who had started TB treatment at least six months prior.

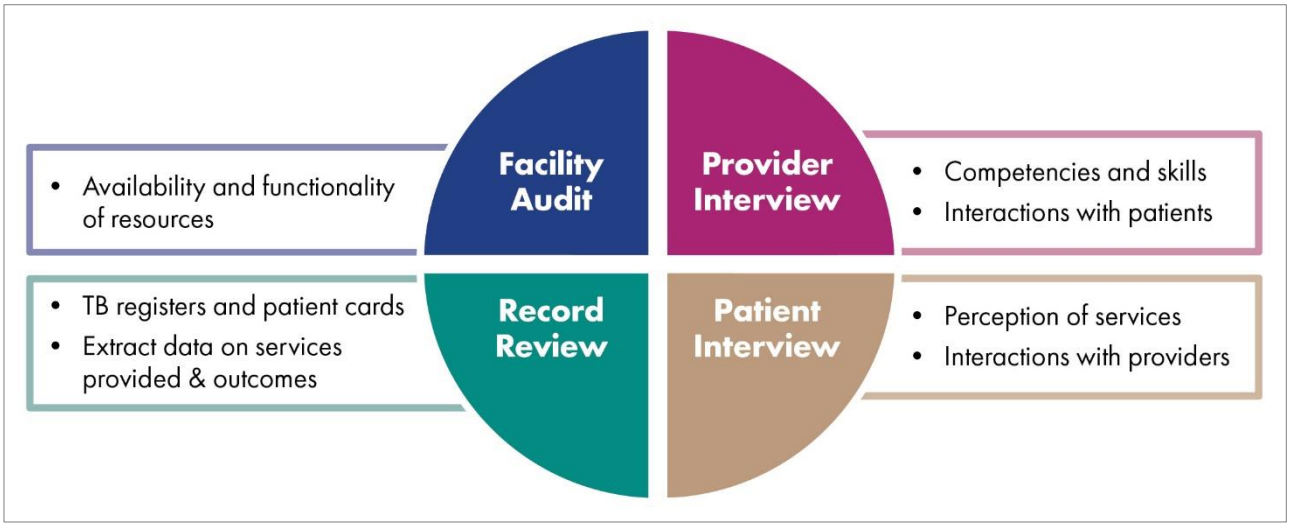
Data Collection and Instruments

Data collection at the 144 facilities sampled in 12 states of Nigeria was led by the Academy for Health Development (AHEAD), a local research organization contracted by MEASURE Evaluation.

Data Collection Tools

The study 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) Record Review consisting of two parts: review of registers at the facility and review of patient cards (Figure 3). With support from AHEAD, the tools were adapted to the context of Nigeria by consolidating input from stakeholders, such as the NTBLCP and USAID. The tools were available in English and in the following local languages: Hausa, Igbo, Yoruba, and pidgin English. The tools were administered electronically on tablets, using an application called SurveyCTO (Version 2.41; Dobility, 2019). The four tools administered as part of this assessment are presented in a compendium to this report.

Figure 3. 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 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 record review was made up of two parts. The first part, a register review, extracted aggregate data on country-specific TB indicators. The indicators included presumptive TB cases, laboratory requests and results,

DS-TB cases, and DR-TB cases. The data collectors extracted data from source documents, such as the presumptive TB register, laboratory register, facility central register, and DR-TB register. The second part, a patient card review, extracted information about five randomly selected clients. Data collected included diagnosis, household member screening, care continuum data, patient classification, drug-susceptibility testing, sputum microscopy (both DS- and DR-TB), TB culture (DR-TB only), treatment regimen, treatment monitoring, clinical monitoring, and HIV testing and management.

Adaptation of the Generic Tools

The QTSA tools were reviewed and adapted by AHEAD, the NTBLCP, representatives from the State Tuberculosis and Leprosy Control Program, and implementing partners working on TB program interventions or activities. The team used the guidelines for clinical management of TB and TB/HIV and related conditions in Nigeria to contextualize the tools. The national TB diagnosis and treatment guidelines are available for use by all providers and implementers of TB programming in Nigeria, and should be used as standard in the provision of TB related services. After the adaptation of the tools and training of research assistants, the tools were pretested before final use in the study.

Training Data Collectors

Senior technical advisers from the MEASURE Evaluation team, the NTBLCP, and AHEAD trained the data collectors on the technical and administrative skills needed for fieldwork. Supervisors and assessors were trained to understand the study objectives, enhance their preparation for their roles and responsibilities, and clarify the importance of good data on quality of care. The training sessions included an overview of the study, TB and the TB management guidelines in Nigeria, the study objectives and methods, the use of SurveyCTO, a question-by-question review of the study instruments, and the skills and knowledge required for the supervisors and research assistants to observe equipment, supplies, and infrastructure while assessing each facility.

Field exercises to practice administering the survey tools took place in Oyo state as part of the training for supervisors and provided an opportunity for further pilot-testing of the study instruments and the logistic plan for data collection. Pretests and posttests were conducted for the research assistants to gauge their understanding of the skills and knowledge covered during the training.

Data Collection

AHEAD was responsible for the collection of the data using SurveyCTO. Thirty-six supervisors and 144 data collectors formed 36 data collection teams assigned to cover the 12 states.

Data collection took place in two waves. First, a pilot study was conducted in Osun state in June 2018 to ensure the supervisors understood the content and context of the study, particularly because they were responsible for training the data collection teams in their respective states. Later, data collection occurred simultaneously in the remaining 11 states throughout July and August 2018. Overall, one day was required at each facility to complete data collection. Informed consent was obtained from all participants before administering the tools. Data were captured electronically using SurveyCTO, which allowed for real-time data management through the use of data limits, skip logic, and required responses as the tools were being administered. Field supervisors preformed initial checks for data quality and completion, then submitted the final questionnaire to the SurveyCTO server, where the data were further reviewed and cleaned. More details about the data collection and management processes are provided in Appendix A.

Field Supervision

During the fieldwork, the supervisors reviewed the completed tools immediately after the interview sessions. Identified mistakes or errors were corrected before the respondents or participants left the facility. The completed tools were uploaded to the server for each facility on SurveyCTO. Data were further reviewed by the data management team and observed mistakes and errors were flagged. The AHEAD study coordinators, NTBLCP, and the NHREC supervised the teams in each state to ensure compliance with the study protocol and guidance. The Associate Director of Research and Programs at AHEAD, other coordinators, and NTBLCP's focal person for operations research also supervised the sampling techniques to ensure that the teams adhered to the sampling methods described for providers, patients, and records review.

Quality Assurance/Data Quality Check

The objective of the data quality assurance was to ensure consistency, completeness, reliability, accuracy, and coherency of records from the field. Zonal coordinators, and staff of the NTBLCP and NHREC who participated in the field supervision, and AHEAD conducted random visits to sampled facilities to check the accuracy of the information that research assistants recorded in the instruments, using spot checking and interaction with facility staff. AHEAD also designated six data auditors who worked with key staff responsible for SurveyCTO in each of the study states to review uploaded data to check for internal consistency in the data and flag any errors. This facilitated a faster and more thorough data quality check and prompt feedback to the research assistants.

Data Analysis

The analysis was linked to the key indicators for each domain in the conceptual framework (structure, process, and outcome), which was used to guide the reporting of results to policymakers, donors, program managers, and other relevant stakeholders. Disaggregation of the variables in the four tools is reported in the Results section below.

The initial findings were presented to the organizations and funders working on TB projects in Nigeria through a consultative meeting held in Abuja in September 2018. The preliminary findings were presented in a graphic format, including bar charts and pie charts, which helped illustrate the results. The meeting included a discussion of key insights from the data that were used to draft relevant recommendations for organizations, funders, and policymakers. These are presented in the Key Findings and Recommendations section of this report.

Ethical Review

The main ethics review for this assessment was conducted and approved by the JSI IRB in the United States and the NHREC of the FMOH in Nigeria. Additional IRB submissions were needed for ten of the 12 states visited during the assessment. Country-level IRB approval through NHREC (NHREC/01/01/2007-11/03/2017) was secured by MEASURE Evaluation, and additional IRB approvals for the ten states were secured by AHEAD. IRB approval was received from the ten states' Ethical Review Committees with the following associated protocol numbers: Akwa-Ibom (MH/PRS/99/V.II/952), Bauchi (MOH/GEN/S/1409/I), Benue (MOH/STA/204.VOL.I), Enugu (CON/MHPHD/1772/82), Kano (MOH/Off/797/T.I/373), Katsina (MOH/ADM/SUB/1152/1/144), Lagos (SMH 2695/II/255), Niger (MOH/CHM/115/I), Ondo (AD.4693 Vol. II/111), and Osun (OSHREC/PRS/569T/129).

RESULTS

This section describes findings from the Quality of TB Services Assessment (QTSA) in Nigeria, organized by the assessment framework. After a brief description of the characteristics of the sampled health facilities, TB service providers, and patients, the results are presented on the structural, process-related, and outcome-related indicators. In some instances, the sampling procedure (stratified sampling to select health facilities, and "convenience" sampling to select the providers and patients interviewed) was emphasized to guide interpretation of the findings.

Sample Characteristics

Facility Profiles

One hundred and forty-four facilities providing TB services were selected from the NTBLCP network of facilities in the 12 study states. Over half (58%) are PHC facilities providing basic health services; 33 percent are secondary-level facilities or general hospitals; and 8 percent are tertiary-level facilities or teaching hospitals. The vast majority (83%) belong to the public sector; 9 percent and 8 percent are managed by private for-profit organizations and faith-based or mission entities, respectively. About 58 percent are located in urban centers, 30 percent in rural areas, and 12 percent in peri-urban areas. More than half of the facilities (58%) offer only TB outpatient services; whereas 42 percent offer both inpatient and outpatient TB services (Table 1).

Table 1. Facility characteristics (n=144)

Characteristics	Frequency (n=144)	Percent
Facility Type		
Primary	84	58.3
Secondary	48	33.3
Tertiary	12	8.3
Managing Authority		
Public	120	83.3
Private for profit	13	9.0
Mission (including faith-based organizations)	11	7.6
Locality of facility		
Urban	83	57.6
Peri-urban	18	12.5
Rural	43	29.9
TB Patients Served		
Outpatient only	83	57.6
Inpatient and outpatient	61	42.4

Provider Profiles

A total of 438 service providers were successfully interviewed from the 144 health facilities sampled, with an average of three providers interviewed in each facility (Table 2). About half (51%) of providers have a degree in the field of health (registered nurse, registered midwife, higher national diploma, etc.), and just over one-third (34%) have master's and postgraduate degrees (e.g., MSc, PhD). Thirty percent of providers are community health workers (CHWs), 23 percent are nurses or midwives, and 16 percent are medical doctors.

Providers reported working 28 hours per week on TB-related services (standard deviation 15.8) and seeing and caring for an average of 12 patients per week (standard deviation 15.2).

Table 2. Provider characteristics (n=438)

Characteristics	Frequency (n=438)	Percent
Facility Type		
Primary	168	38.4
Secondary	208	47.5
Tertiary	62	14.2
Highest level of schooling		
Senior school certificate	18	4.1
Health professional certificate	46	10.5
Health diploma certificate (RN, RM, IAMLT, OND, HND)	224	51.1
Bachelor's degree or higher	150	34.3
Occupation		
Medical doctor	69	15.8
Nurse or midwife	103	23.5
Community health worker	132	30.1
Laboratory	56	12.8
Pharmacy	10	2.3
Other	68	15.5
Type of work performed at the facility (multiple responses applied)		
Direct patient care	348	79.5
Record keeping	221	50.5
Dispensing	206	47.0
Administration/supervision	182	41.6
Consultation with agencies/professionals	142	32.4
Teaching and/or research	137	31.3
Laboratory/diagnostics procedures	104	23.7
Not a permanent staff	13	3.0
Performing TB-related services as part of current job schedule		
Yes	417	95.2
No	21	4.8

Table 3 provides further information about the providers interviewed. Secondary- and tertiary-level facilities are more likely than PHC facilities to have nurses/midwives and medical doctors as TB service providers.

Table 3. Occupation of health workers by type of facility

Profession	Primary		Secondary		Tertiary	
	Frequency	%	Frequency	%	Frequency	%
Medical doctor	12	17.1	36	51.4	22	31.4
Nurse or midwife	20	18.9	62	58.5	24	22.6
Community health worker	81	57.9	51	36.4	8	5.7
Laboratory	26	45.6	28	49.1	3	5.3
Pharmacy	3	30.0	6	60.0	1	10.0
Other health worker	18	52.9	15	44.1	1	2.9
Others	8	40.0	10	50.0	2	10.0

Patient Profiles

Table 4 shows selected characteristics of the 711 patients who participated in exit interviews. The majority of patients were male (60%) and the mean age of patients was 36 years (standard deviation 12.66). Medication collection was the most common reason for the patient's visit to the facility on the day of data collection.

Table 4. Patient characteristics (n=711)

Patient Characteristics	Frequency (n=711)	Percent
Sex		
Female	281	39.5
Male	430	60.5
Age*		
15–24	131	19.1
25–34	230	33.5
35–44	176	25.6
45+	150	21.8
Highest level of completed education		
None	113	15.9
Primary/elementary	157	22.0
Secondary/high school	288	40.4
Post-secondary/technical/vocational	155	21.7
Residence		
Urban	387	54.4
Peri-urban	100	14.1
Rural	224	31.5
Work Status		
Working	392	55.0
Not working	321	45.0
Reason for visit on day of interview		
Medication collection	560	78.5
Informative and counseling	187	26.2
Follow-up sputum examination	103	14.5
Screening and diagnosis	73	10.2
Other	52	7.3

***** Mean age 36; SD=13; range 15–80; 24 patients did not give their age

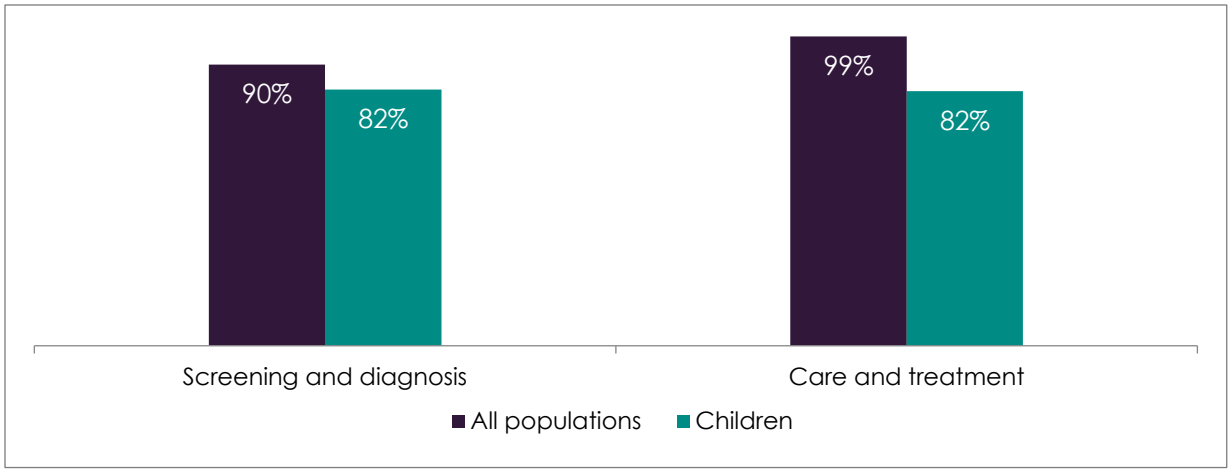
Structural Indicators

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

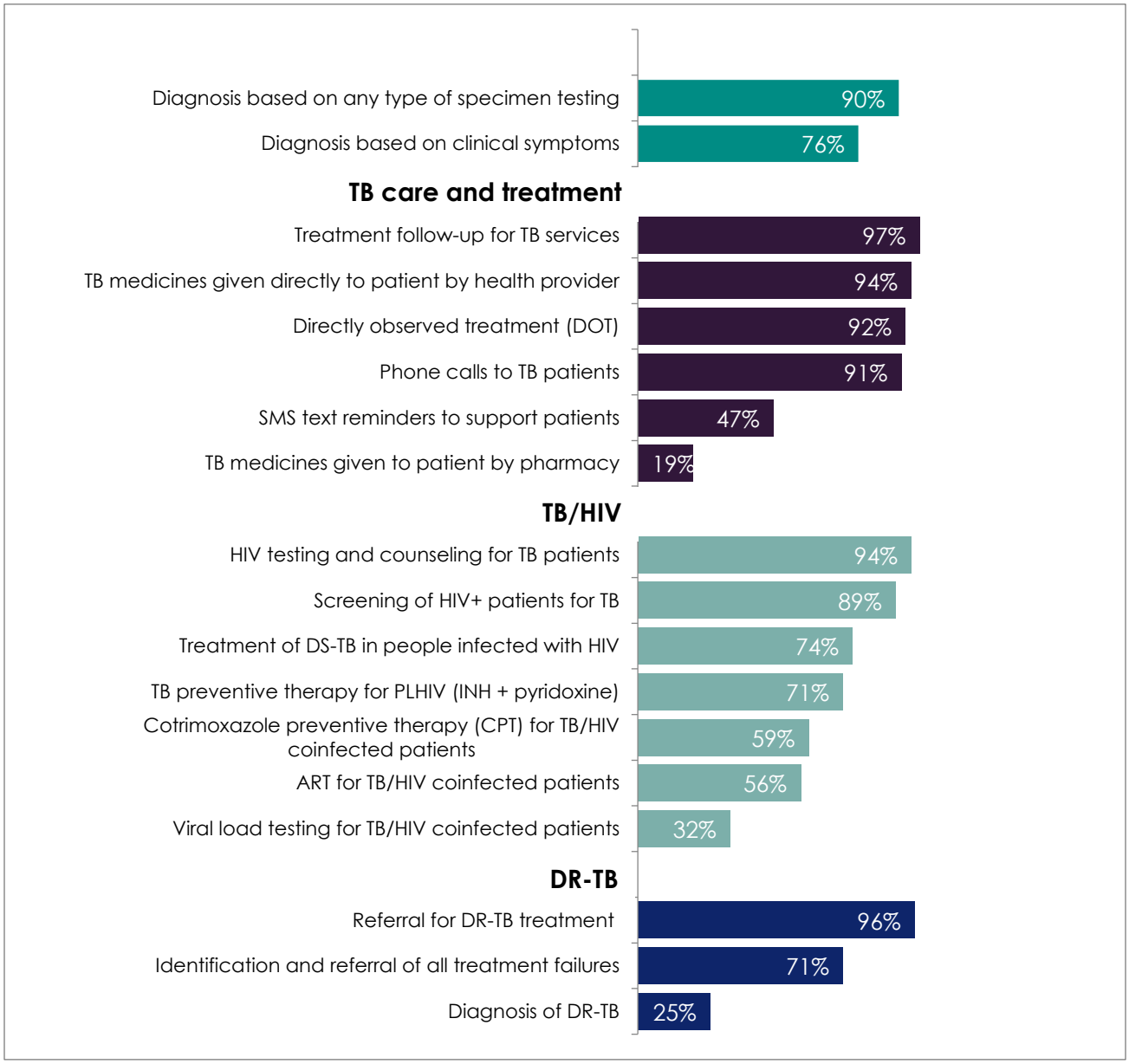
Availability of TB services is critical to service access, uptake, and coverage. Figure 4 provides information on the percentages of all facilities that offered TB screening and diagnosis, and TB care and treatment services to adults and children. This information is important for identifying gaps in TB service provision that can guide policymakers, program managers, and implementing partners to improve access to care for TB patients. The great majority of facilities offer both diagnosis and treatment services, but a somewhat lower proportion also offer pediatric diagnosis and treatment.

Figure 4. Availability of TB screening and diagnosis, and care and treatment services to all populations and children



Most TB facilities (90%) provide TB diagnosis based on specimen testing, and 99 percent provide TB care and treatment. Nearly all facilities providing treatment (97%) also reported providing treatment follow-up, including phone follow-up if a patient misses an appointment (91%) and SMS text reminders (47%) to support patients' adherence to treatment. The majority reported providing HIV screening (89%) and testing and counseling (94%) for TB patients. Almost three-quarters of facilities (71%) reported the need for referral for all treatment failures for further evaluation. Just over one-third of facilities (37%) reported having the capacity to manage DR-TB patients (Figure 5).

Figure 5. Facilities offering specific TB services in the past 12 months



Infrastructure

Infection Prevention and Control

Adherence to IPC measures and constant vigilance are necessary to prevent nosocomial TB transmission. Effective IPC requires both clear guidelines and the availability of basic supplies and equipment at facilities that provide TB services. Figures 6 and 7 show the availability of items and activities that are considered essential for effective TB IPC in primary- and secondary/tertiary-level facilities, respectively. Although 85 percent of facilities reported following TB IPC practices, observation in the sampled facilities showed that

IPC measures were only marginally implemented in terms of WHO-recommended administrative, environmental, and personal protection practices.

Administrative measures are needed to ensure that people with TB symptoms can be rapidly identified and, if infectious, separated into an appropriate environment and treated promptly. The findings from this study indicate that administrative measures are inadequate or unavailable at many facilities, although 79 percent of PHC facilities reported routinely asking patients about coughing when they entered the facility. Interviewers observed that 36 percent of PHC facilities (compared to over 50 percent of secondary/tertiary-level facilities) had supplies available to coughing patients, and 35 percent of PHC facilities implemented cough triage. Only about half (51%) of facilities reportedly offered an HIV test annually and offered ART to HIV-positive facility staff.

Furthermore, administrative IPC activities provide a comprehensive framework that can support and facilitate the implementation, operation, and maintenance of TB IPC in healthcare facilities such as IPC policy and guidelines and on-site surveillance. About one-fifth (19%) of PHC facilities had documented updated and approved IPC plans. Only 14 percent of facilities were implementing risk assessment for TB IPC annually, and 15 percent kept a confidential log for all staff with presumptive or confirmed TB. Almost half (49%) of facilities reported having a designated staff member as a focal point for IPC. In terms of infection control surveillance among staff, 47 percent of facilities reported having a system in place to screen staff for TB.

Environmental and personal protection measures at the facility level support IPC by providing clean and safe patient waiting rooms and treatment areas. The majority (81%) of PHC facilities had adequately ventilated waiting areas, and 61 percent of the facilities had well-ventilated areas where specimens were being collected. It should be noted that the IPC measures do not include the waste disposal process. Although administrative controls and environmental controls are expected to be most effective in controlling the spread of TB, they do not entirely eliminate the risk of transmission. The assessment indicates that less than one-fourth of the facilities had an N-95 and filtering faceplate (FFP) respirators available as part of personal protection.

Figure 6. PHC facilities with IPC practices at TB service delivery points (SDPs)

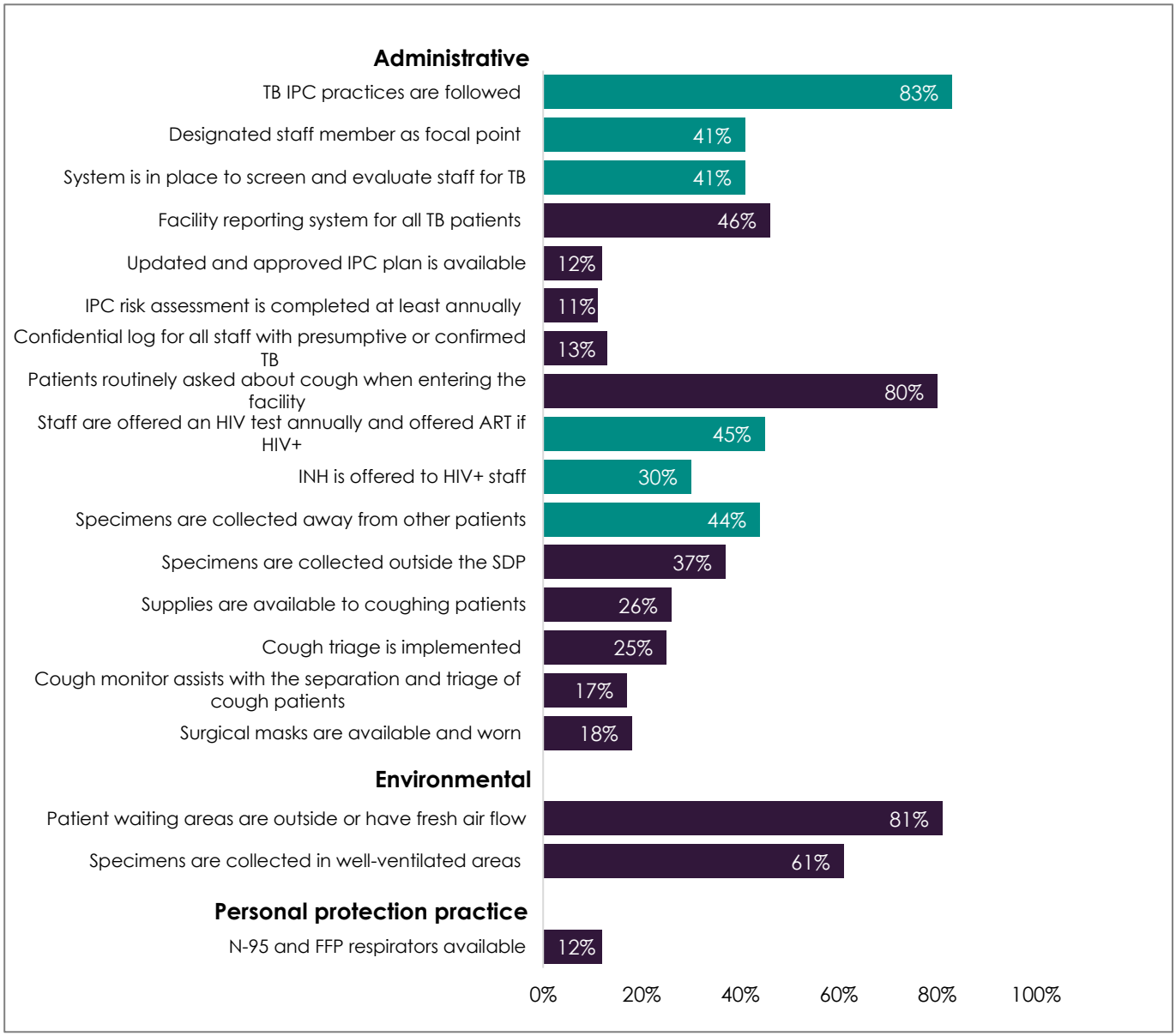
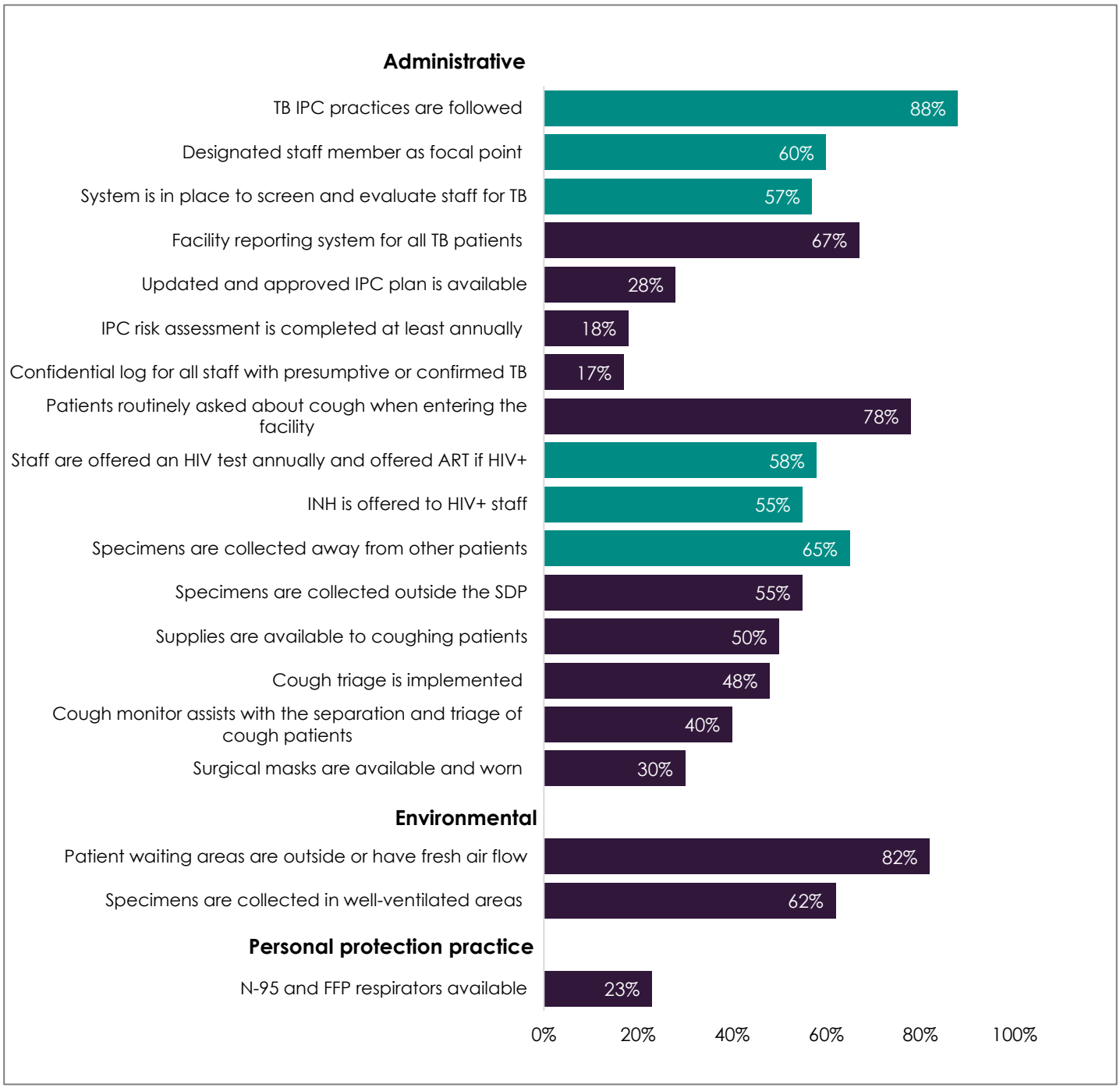


Figure 7. Tertiary and secondary hospitals with IPC practices at TB SDPs



Laboratory Network

Laboratory services are critical to the success or failure of TB programs, and quality-assured diagnostic testing is the most important element in the diagnosis of active disease. Any assessment must therefore include examination of key requirements for good laboratory networks, including algorithm-based selection of presumptive TB patients, reliable specimen transport, infrastructure development and maintenance, staff training and retention plans, integrated internal quality control and external quality assurance, and rapid and effective communication of results.

The findings from this study reveal that most facilities perform well with respect to TB laboratory services. A high proportion of facilities reported following guidelines for specimen transportation. Most facilities (88%) have the contact details of their laboratory, and 94 percent had approved laboratory request forms available when the assessment team visited the facility. About two-thirds (67%) reported having an up-to-date specimen dispatch list available. Of the 144 facilities sampled, 39 reported transportation of specimens to another location for testing, and 69 percent of those facilities reported specimen transport occurs within 48 hours. However, it takes an average of four days for a facility to receive test results performed at the off-site laboratory. This important metric will affect the delay in treatment initiation among those who test positive.

Additional key requirements of good laboratory practices are internal quality control and external quality assurance. Study findings show a high level of quality control of specimens at the facilities assessed—with 76 percent of facilities that have on-site lab services also having a system for quality control.

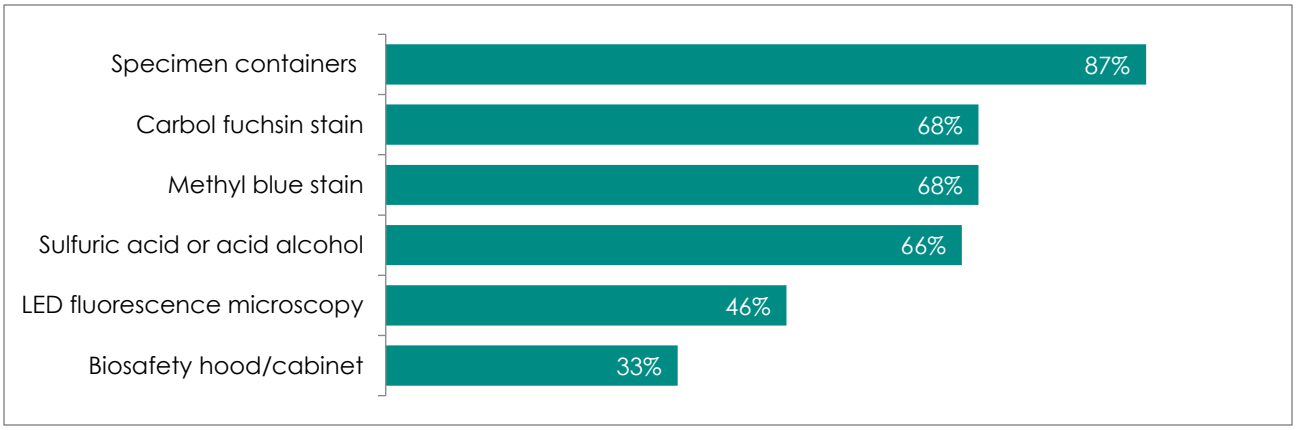
Medical Equipment and Drug Supplies

The availability of basic items that should be in stock at a health facility to guarantee its readiness to deliver basic health services (WHO, 2015b) was assessed. Over half of the facilities had some equipment, including adult weighing scales (92%), stethoscopes (74%), blood pressure apparatuses (70%), thermometers (62%), and light sources (58%), but fewer than half have infant (44%) and child (40%) weighing scales. Only 23 percent of facilities assessed have all the equipment considered necessary for providing basic quality care.

The study also assessed the availability of TB diagnostic capacity in the 105 facilities that provide diagnostic services. The findings reveal that 94 percent use Ziehl-Neelsen staining for TB and 36 percent of facilities have the capacity to carry out rapid diagnostic tests using Xpert mycobacterium tuberculosis (MTB)/RIF (Gene Xpert).

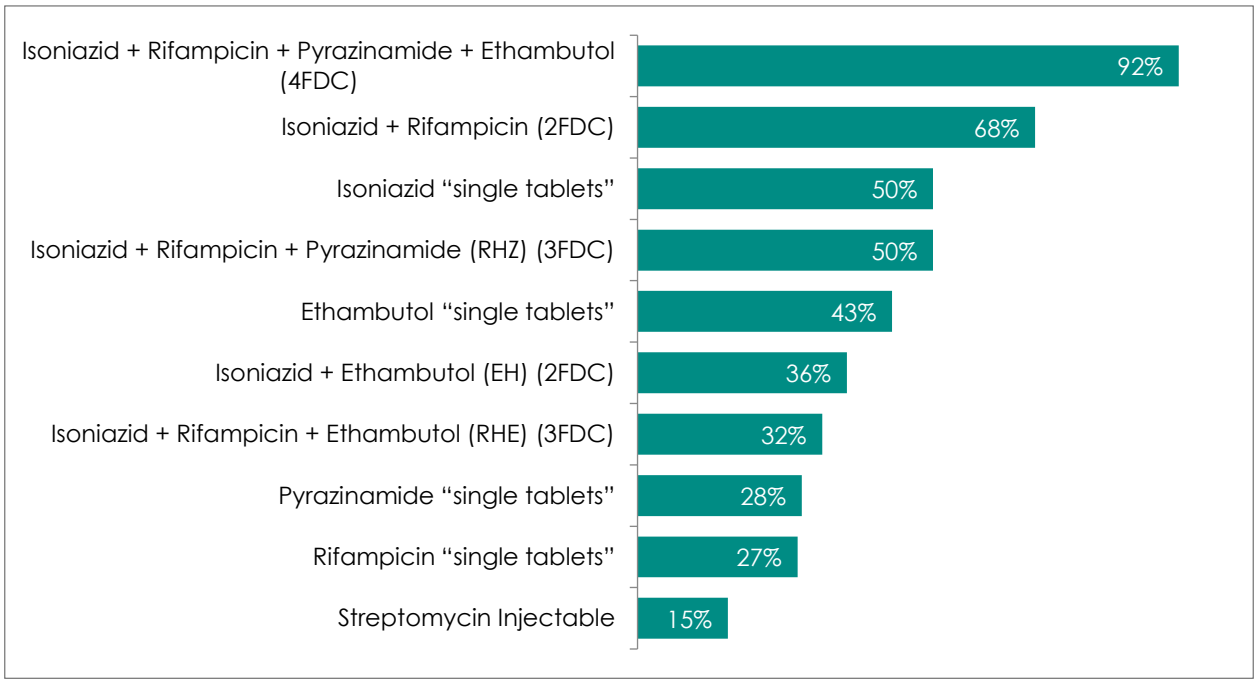
Accurate TB diagnosis requires adequate TB testing equipment and supplies. The survey team observed availability of specimen containers in 91 (87%) of the 105 facilities offering diagnostic services, and varying availability of other equipment in these facilities: LED fluorescence microscopy (46%), carbol fuchsin stain (68%), sulfuric acid or acid alcohol (66%), methyl blue stain (68%), and biosafety hood/cabinet (33%). Interviewers observed availability of an Xpert MTB/RIF machine with cartridge in 85 percent and Xpert MTB/RIF machine with valid calibration in 81 percent of the 52 facilities that have the capacity to conduct rapid diagnostic tests using Xpert MTB/RIF (Figure 8).

Figure 8. Availability of supplies and equipment for TB diagnosis



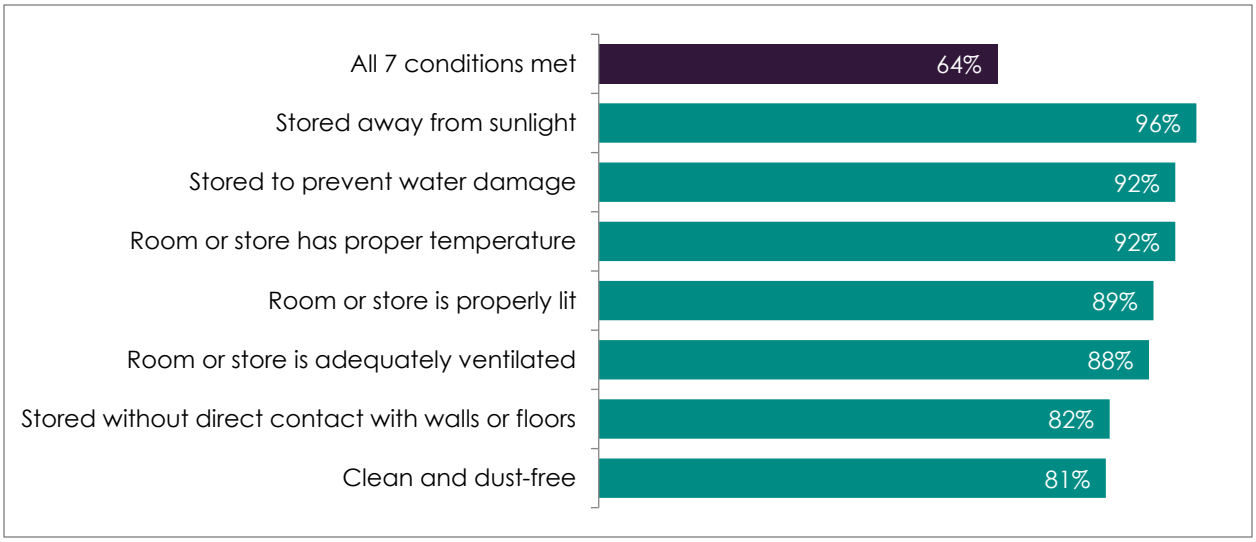
The NTBLCP continues to address challenges to the maintenance of an uninterrupted supply of TB drugs by working to improve stock status at the state and LGA levels, train staff on proper TB drug stock management, and advocate at the Federal and State Ministries of Health to improve and expand storage conditions for TB drugs at all levels. TB drug-monitoring mechanisms are in place at different levels to ensure an uninterrupted supply of quality-assured TB drugs, which will help prevent the emergence of DR-TB. On the day of the assessment team visit, 92 percent of all facilities that offer TB services had first-line medicines for treating TB (4FDC, i.e., any combination of isoniazid [INH], rifampicin [RIF], pyrazinamide, and ethambutol) (Figure 9). The study indicated limited availability of single-tablet TB drug in a number of facilities sampled, possibly because the NTBLCP recommends the use of a fixed-dose combination of TB medicines. The assessment result shows that 22 facilities (15%) reported a stockout of any TB drug within the last six months.

Figure 9. Availability of TB drugs and commodities on assessment day



Effective treatment requires safe, protected storage of TB drugs to help prevent damage and ensure that medicines are handled properly and maintain their potency. Auditors examined facilities' compliance with the seven standard guidelines for proper storage (USAID | DELIVER Project, 2014). Generally, storage conditions appeared favorable when each requirement was analyzed individually, but overall, fewer than two-thirds (64%) of facilities satisfied all seven conditions for adequate drug storage (Figure 10).

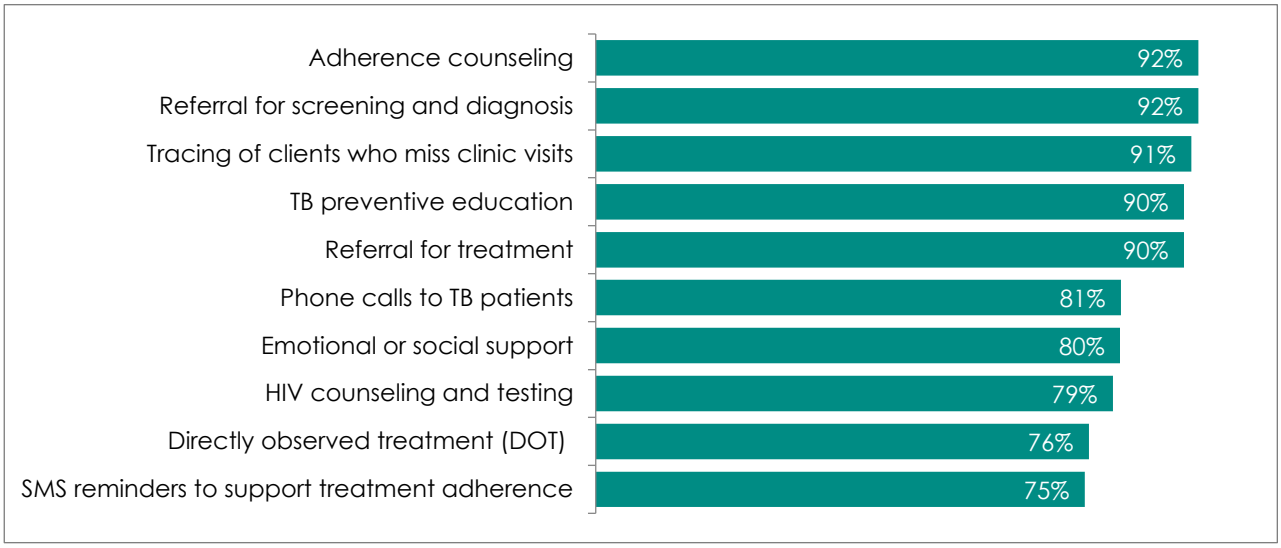
Figure 10. Facilities with adequate storage conditions for TB drugs



Community Linkages

Often individuals first seek care from a CHW or volunteer health extension worker. Thus, community linkages with formal health facilities are a critical part of TB control and prevention. This study assessed whether CHWs deliver TB services and, if so, what type of services they offer. Almost two-thirds (65%) of facilities reported providing TB services at the community level through their CHWs. The different TB services offered by the CHWs are shown in Figure 11.

Figure 11. Types of TB services offered by CHWs



Tracking Patients Lost to Follow-Up

High rates of LTFU undermine successful treatment of TB. Patients who interrupt treatment and are LTFU are more likely to relapse with infectious TB and, if treatment has been sporadic, are at risk for developing DR-TB (Alipanah, et al., 2018). Thus, identifying and tracking patients who are potentially LTFU is essential to maintain quality of care. The assessment found that the vast majority (97%) of facilities providing TB care and treatment services reported having the capacity to trace patients who are LTFU.

Management of TB/HIV patients

Reducing the burden of TB/HIV coinfection requires a combination of measures to diagnose and manage TB/HIV patients correctly. TB is the most common opportunistic infection in people living with HIV (PLHIV) worldwide (WHO, 2004). It is also the most common cause of death in PLHIV in low- and middle-income countries (WHO, 2004), though TB is a treatable disease. Results of the records review conducted during this study show that the majority of TB patients (91%) were tested for HIV and had their status documented on their patient card (this was corroborated by data from the TB register). Seven out of 10 TB patients who tested positive for HIV were started on ART, and 75 percent of TB/HIV coinfected patients were receiving cotrimoxazole preventive therapy, according to their patient cards.

Management of DR-TB patients

RR- or MDR-TB results from improper patient treatment, poor management of the supply and quality of TB drugs, ongoing transmission in communities, and transmission of DR-TB strains in healthcare settings owing to inadequate IPC. The records review showed that management of DR-TB was of mixed quality. Overall, 85 percent of confirmed DR-TB patients had started second-line treatment in the past year, but only 44 percent of patients recommended for drug-resistance testing received the test; fewer than 30 percent were successfully treated.

Analysis by type of facility revealed variations in the management of DR-TB patients. In PHC facilities and tertiary-level facilities, all confirmed DR-TB patients were started on second-line treatment in the past year,

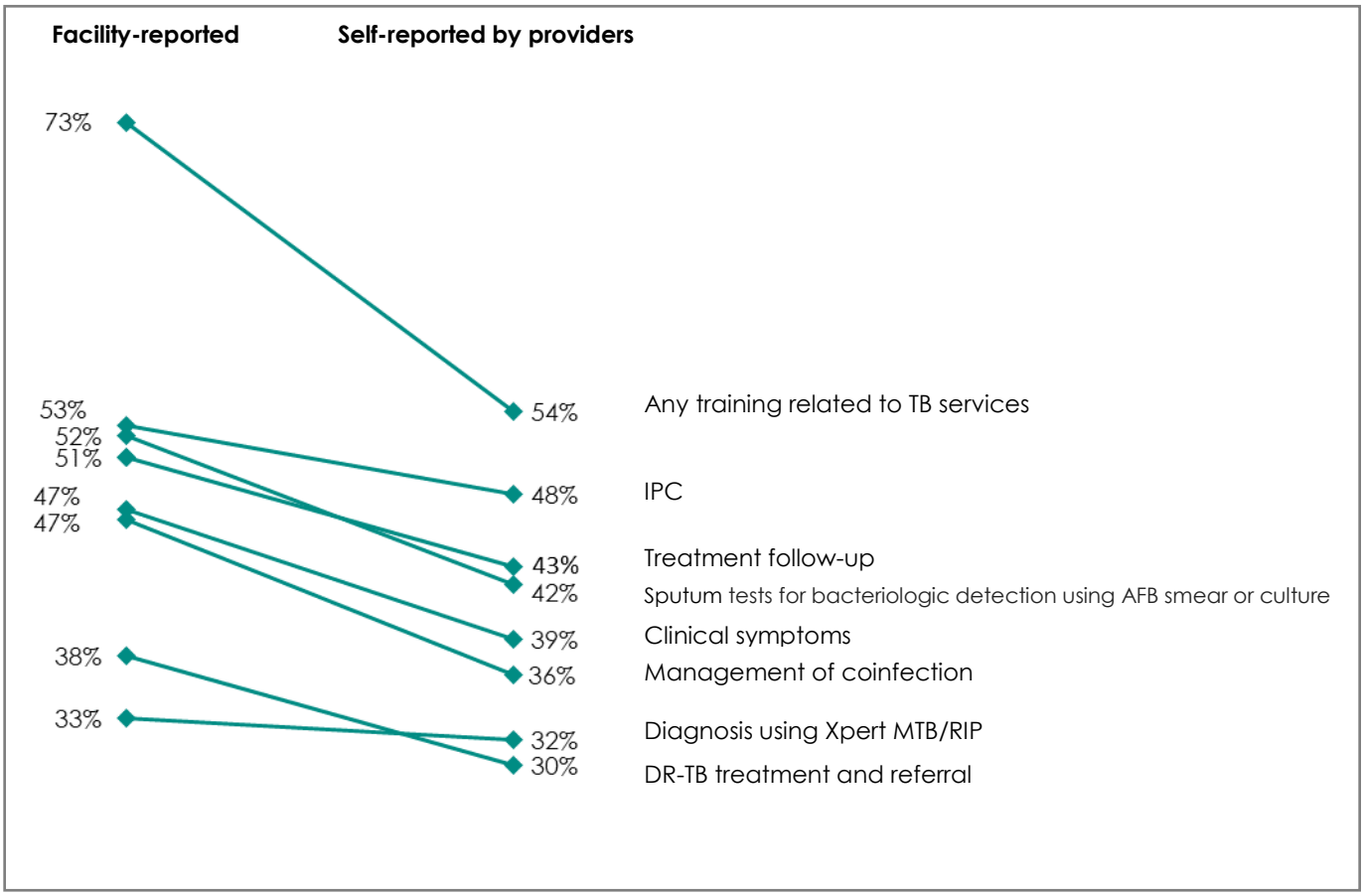
compared to only 75 percent in secondary-level facilities. Just over half of patients (57%) recommended for DR-TB testing at tertiary-level facilities received the test, compared to a lower proportion at secondary- and primary-level facilities (46% and 33%, respectively). Treatment success rates were low and varied significantly by type of facility (46%, 22%, and 38% at the tertiary, secondary, and primary levels, respectively).

Capacity of TB Providers

Trained TB Care Providers

Staff training is essential for keeping health workers updated with knowledge, skills, and technical competence to maintain high quality or improve the quality of TB care services. This study used both audits and interviews to assess provider training in the 24 months preceding the survey (Figure 12). The findings from the facility audit (with the health facility unit in-charges as respondents) differed from the results of provider interviews. For example, the facility audit showed most staff (73%) had received in-service or training updates on TB care and treatment, but just over half of providers (54%) reported they had received training in the past 24 months. The figure shows the most commonly cited topics and responses from facilities (on the left) and providers (on the right).

Figure 12. Providers trained on TB services in the past 24 months



Patient Counseling about TB

Effective interactions between healthcare providers and patients play a key role in improving patient satisfaction, adherence to treatment plans, and health outcomes, and are key elements for assessing service quality in the family planning context, according to Bruce (1990). When patients understand the nature of their illness and their treatment, and believe the provider is concerned about their well-being, they will show greater satisfaction with the care received and be more likely to adhere to treatment regimens.

The NTBLCP trains all providers on a standard set of skills related to counseling and communication. Training is provided via pre-service, in-service, continuing education, and on-the-job mentoring. This study assessed providers' counseling skills through a series of questions on (1) establishing rapport and building trust with patients, (2) counseling during the initial assessment, and (3) counseling on diagnosis and treatment of TB. About half (55%) of providers mentioned the eight skills for establishing rapport and building trust (Tuberculosis Coalition for Technical Assistance, 2007) unprompted (Figure 13). About one-third (37%) knew the eight topics to cover for counseling during an initial TB assessment (Figure 14), and just over half (58%) listed all six topics to address regarding diagnosis and treatment of TB (Figure 15). Because adherence to TB treatment is critical to being cured, controlling the spread of the infection, and minimizing the development of drug resistance, it is crucial for CHWs to educate their patients on the importance of consistently taking their medicines as prescribed. This study found that 89 percent of the healthcare workers

reported counseling patients on the importance of adhering to and completing their treatment, while 98 percent of the patients reported that their provider counseled them on these matters.

Figure 13. Providers who correctly identified skills for establishing rapport and building trust with TB patients

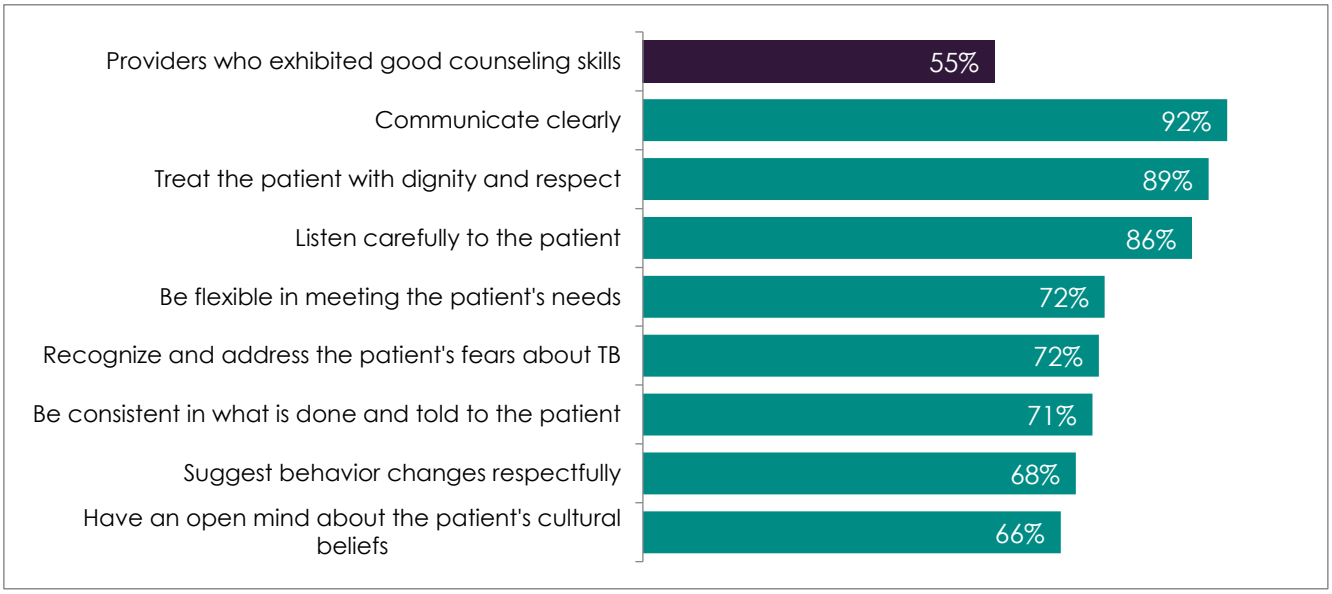


Figure 14. Providers who correctly identified skills for counseling TB patients during initial assessment

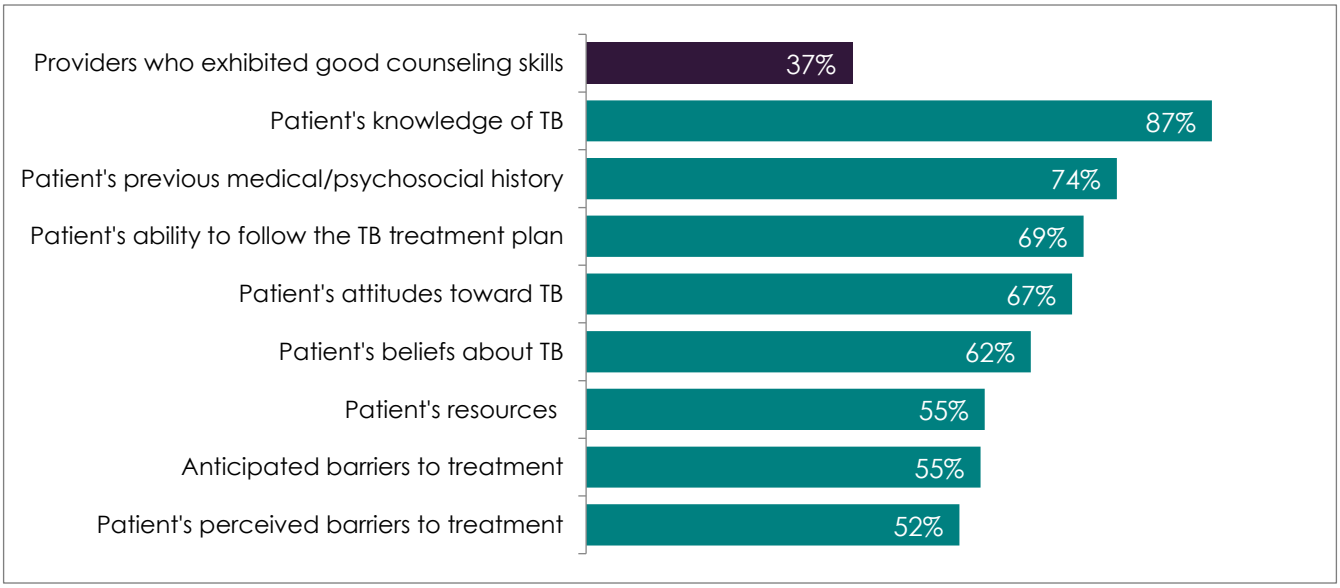
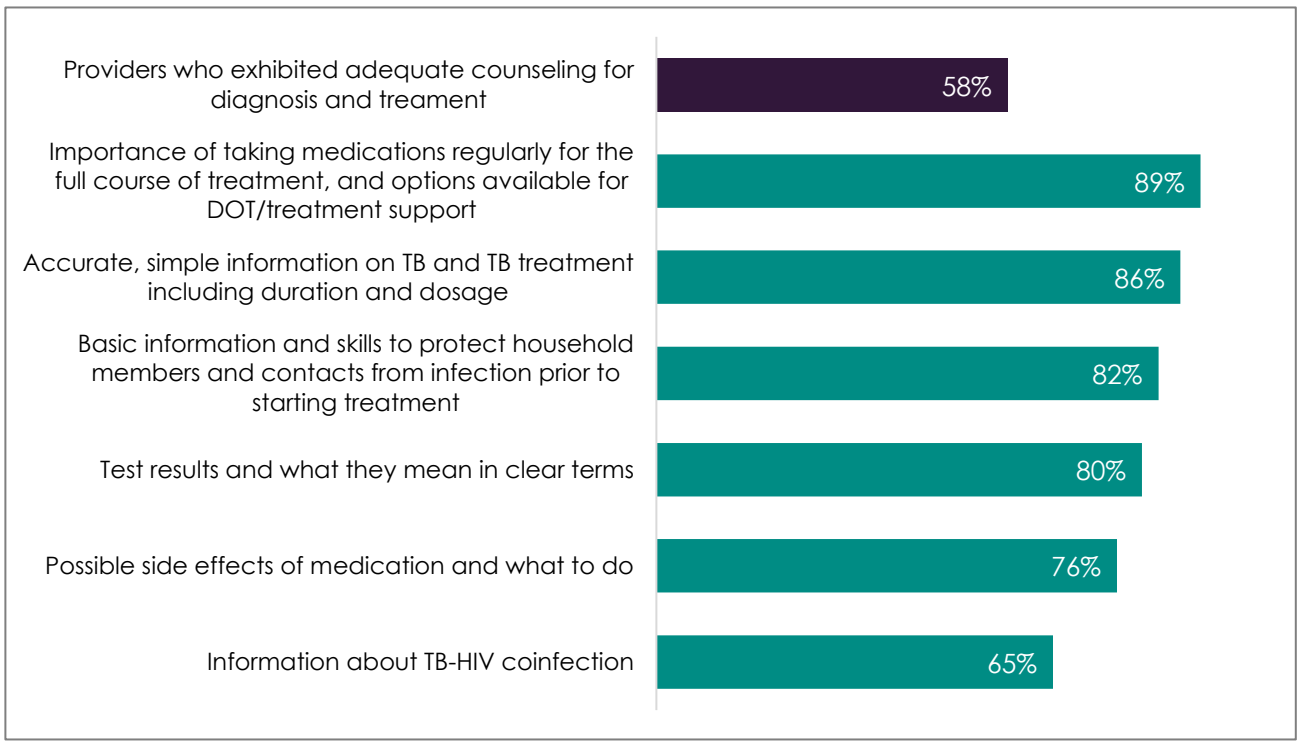


Figure 15. Providers who correctly identified skills for counseling TB patients about diagnosis and treatment



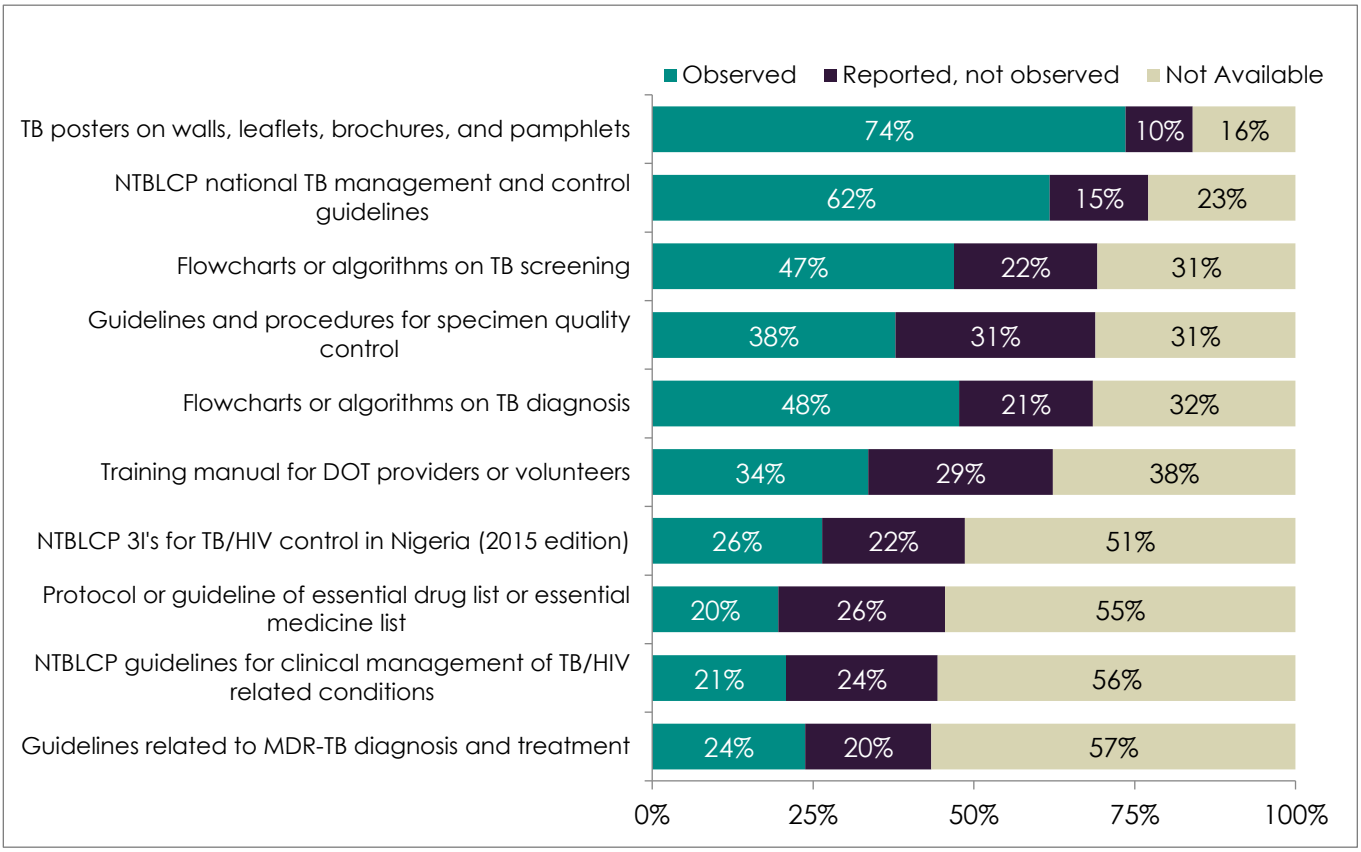
Management of TB Services

TB Policies and Guidelines

TB policies, protocols, guidelines, and educational materials are expected to be available at all diagnostic and treatment sites. However, study findings show that many facilities offering TB services did not have policies and guidelines available on the day of data collection (Figure 16). Over 70 percent of facilities had educational materials, such as TB posters on walls, leaflets, brochures, and pamphlets. Just under two-thirds of facilities offering TB services were observed to have the 2015 National TB Management and Control Guidelines (62%). Approximately one-fourth (26%) had the 2015 edition of NTBLCP's 3I's for TB/HIV control for managing HIV and TB coinfection[1]; and fewer than half of facilities had flowcharts or algorithms on TB diagnosis and screening on the day of data collection.

[1] The three I's for HIV and TB coinfection are intensified case finding (ICF), isoniazid preventive therapy (IPT), and infection control for tuberculosis (IC): https://www.who.int/hiv/topics/tb/3is/en/

Figure 16. Facilities with required TB policies, protocols, and guidelines

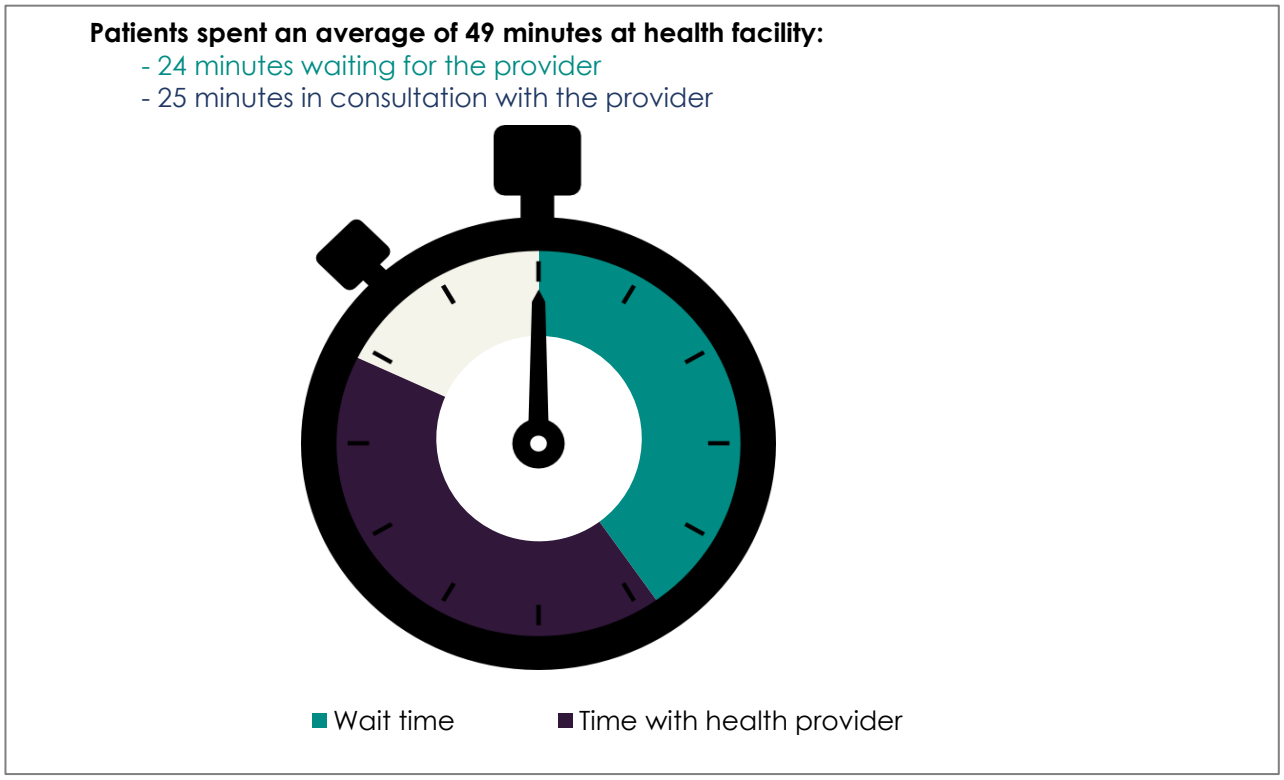


Privacy and Waiting Times

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. Such an 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 visual and auditory privacy can be maintained for TB counseling and consultations, which was observed in the TB units at 52 percent of facilities. Patient exit interviews showed that although 84 percent of patients reported having privacy during the examination, about one-fourth still worried that other patients could hear their conversations with providers.

The time patients spend waiting for service is a commonly measured indicator of patient satisfaction and quality of care, often mentioned as a concern among patients using health facilities. The assessment found that 54 percent of patients waited 15 minutes or less, 30 percent waited between 16 and 30 minutes, and 9 percent waited between 31 and 60 minutes to see a healthcare worker on the day of data collection; 8 percent waited more than an hour. Forty-seven percent of patients spent 10 minutes or less with any healthcare providers. One-fifth of patients spent between 11 and 20 minutes with a healthcare worker, on the day of data collection 15 percent spent between 21 and 30 minutes, and 18 percent spent more than 30 minutes . The mean reported wait time was 24 minutes and the mean consultation time was 25 minutes, for an overall average of 49 minutes spent at the facility during the visit on the data collection day (Figure 17). Overall, 94 percent of patients found this an acceptable amount of time spent.

Figure 17. Average time spent at facilities



Supervision and Monitoring and Evaluation

Supervision supports quality assurance in that it helps to improve individual and system performance and can alert managers to problems such as poor adherence to treatment, high LTFU rates, and poor record keeping and medicine management. Frequent and routine supervision, by means of review of reports, face-to-face meetings, or visits to the facility, is a useful indicator in assessing the quality of system management and its effect on system performance. Supervision also presents an opportunity to reinforce new systems and approaches. In this study, 83 percent of facilities had received supervision visits from an LGTBLS in the past 12 months (Figure 18), as per national guidelines. Virtually all facilities reported that supervisors reviewed their service delivery data and pharmacy stock, but only 58 percent reported receiving feedback on their service performance in the past three months. Among providers, 81 percent reported a supervisory or monitoring visit the past 12 months, with varying reports of the tasks performed during the visit (Figure 19).

Figure 18. Facilities reporting visits by LGTBLS, by type of supervision

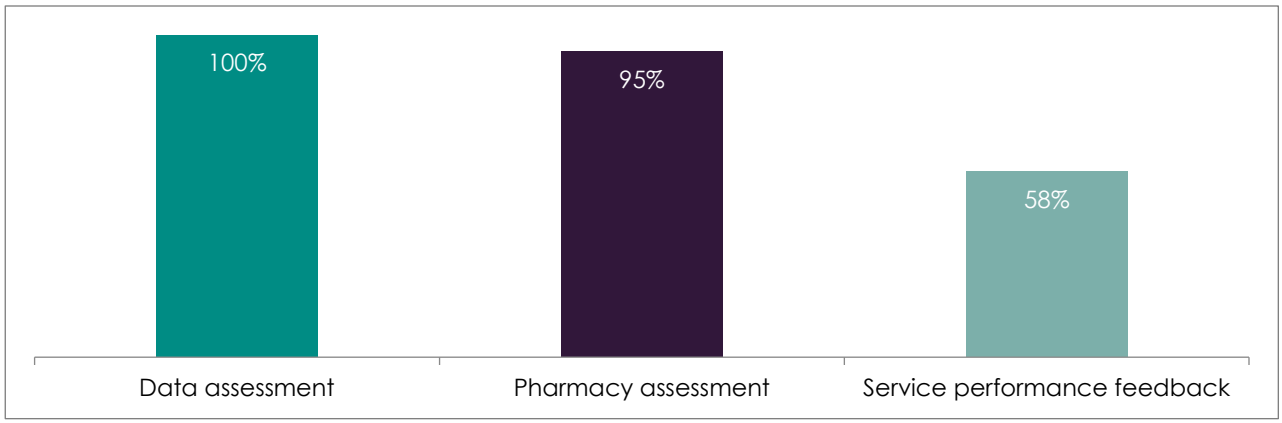
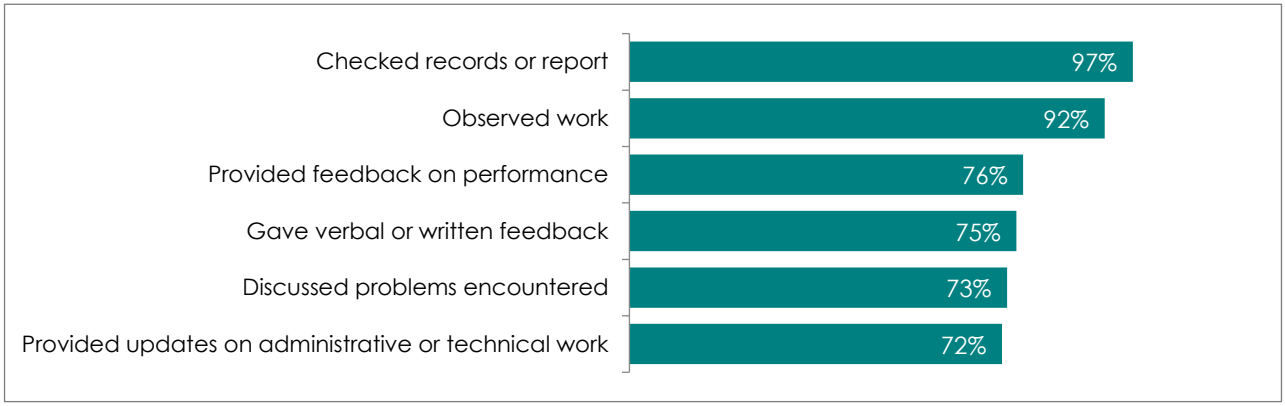


Figure 19. Providers reporting supervision in the past 12 months, by activity



Process Indicators

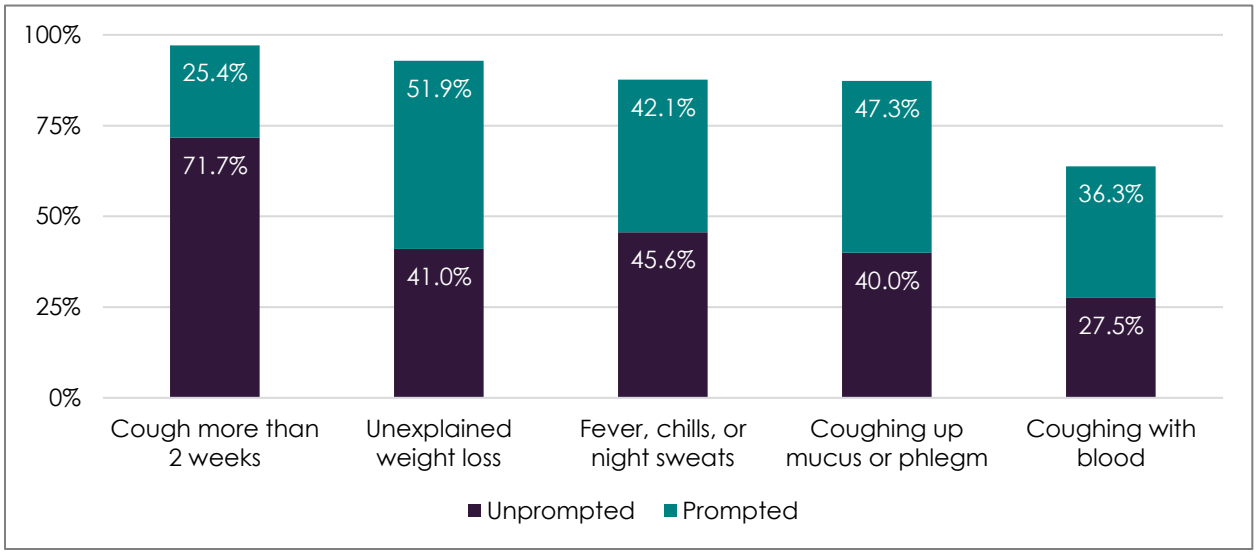
Per the assessment framework, the process indicators capture the interaction between service providers and patients during the caregiving process. In combination with the structural factors associated with the health system, they help determine the health outcomes of TB patients. In this section, we present the findings on the process of delivering TB care and treatment by measuring patient-provider interaction and communication, the 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.

Patients' Knowledge about TB

TB Symptoms

Patient interviews about TB symptoms and risk factors revealed a high level of awareness of TB. Nearly all patients (99%) knew that TB is curable and said that their provider had informed them of this (98%). The most commonly mentioned symptoms were cough lasting more than two weeks, followed by weight loss, fever/chills, coughing with mucus, and coughing with blood (Figure 20).

Figure 20. Patient knowledge and awareness of TB signs and symptoms



Cause, Modes of Transmission, and Risk Factors of TB

When asked how TB is transmitted, the majority of patients correctly mentioned coughing or sneezing (84%), crowded living conditions (63%), and microorganisms (58%) as causative factors. However, their answers also revealed numerous misconceptions about how TB spreads, as shown in Figure 21. For example, one-quarter of the respondents said that TB can be spread through sexual contact.

Figure 21. Patients' knowledge of TB causes and transmission

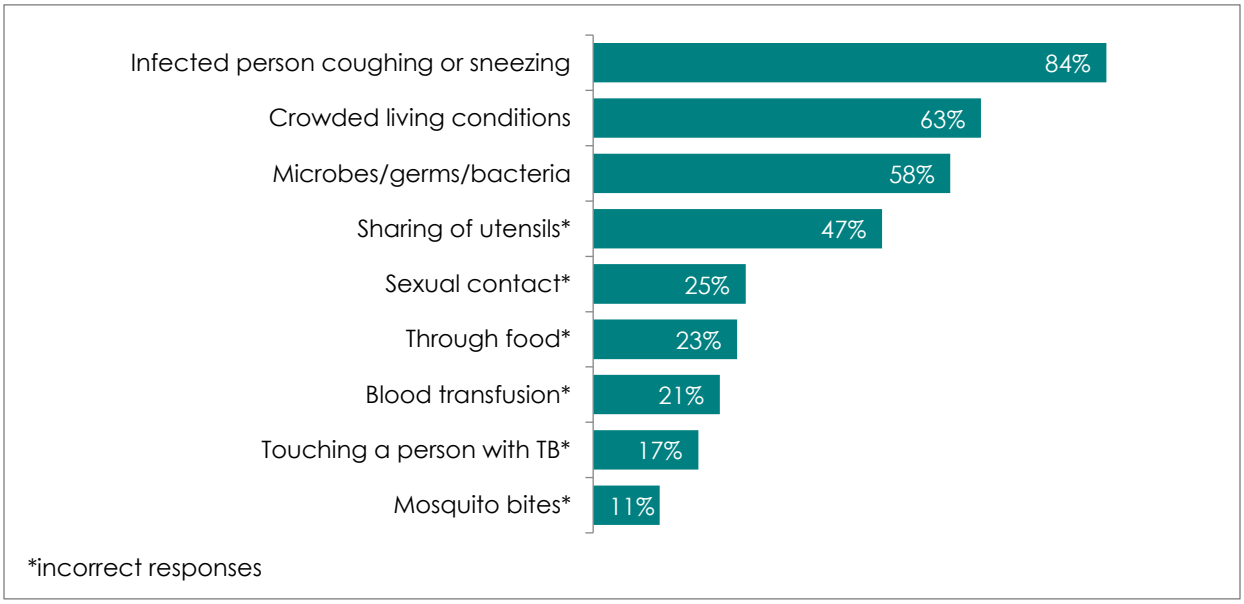
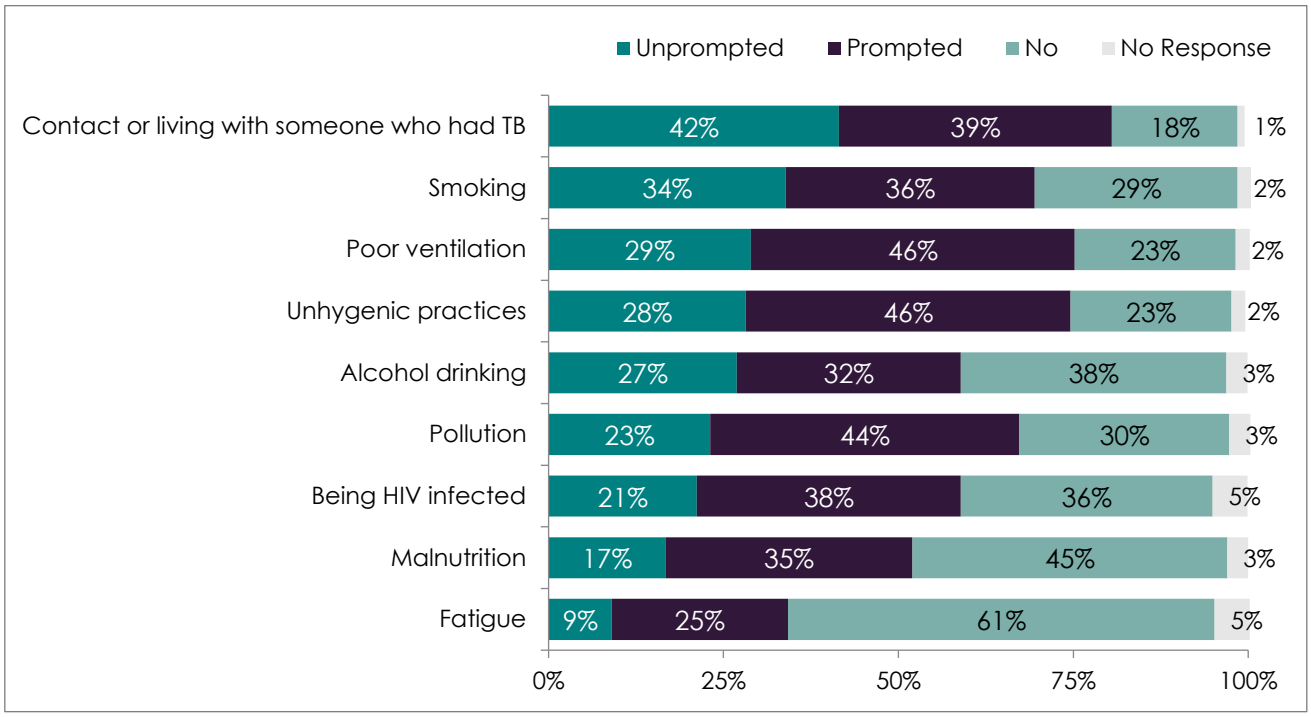


Figure 22 shows the full range of patients' knowledge of risk factors for TB infection, revealing that less than half of the patients interviewed firmly understood the range of risk factors.

Figure 22. Patient responses to TB risk factors (prompted, unprompted, no, and no response)

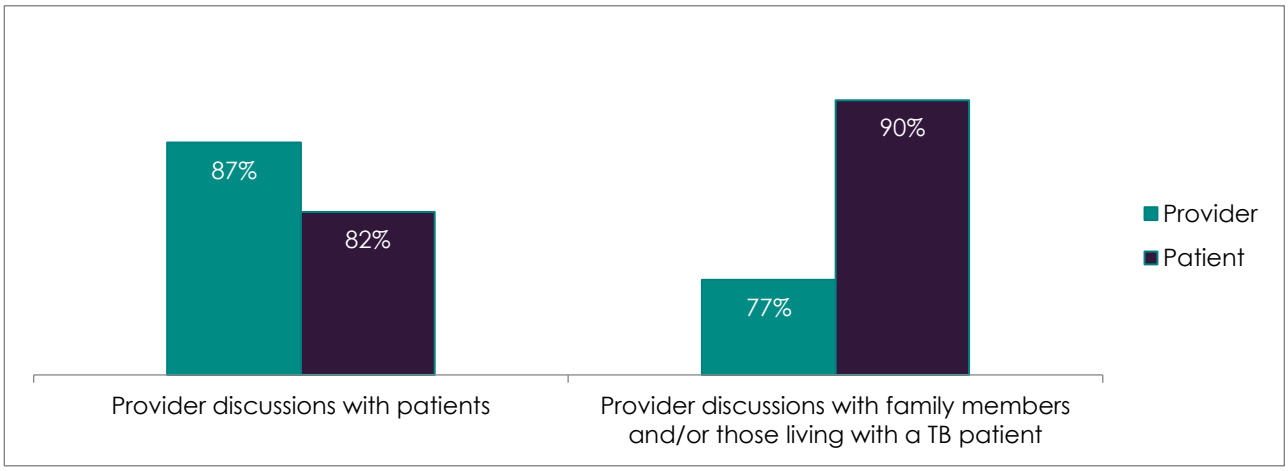


Patient-Provider Interaction

Communication between provider and patient is critical to building a beneficial provider-patient relationship. Patient dissatisfaction and complaints are often caused by a breakdown in the provider-patient relationship and can lead to severe consequences for patient adherence to the treatment plan. This study assessed provider and patient reports on communication about preventing TB transmission, with the patients themselves and with their families. As Figure 22 shows, their reports differed somewhat, with relatively fewer patients recalling a discussion of protecting family members, and far more patients than providers reporting discussions about the importance of TB prevention with family members.

Figure 23 shows that 87 percent of the providers reported that they discussed how to protect household members from infection with patients. A slightly lower proportion of patients (82%) reported that their providers discussed this with them. In terms of prevention with family members or those living with a TB patient, 77 percent of providers, and 90 percent of patients reported that these discussions took place.

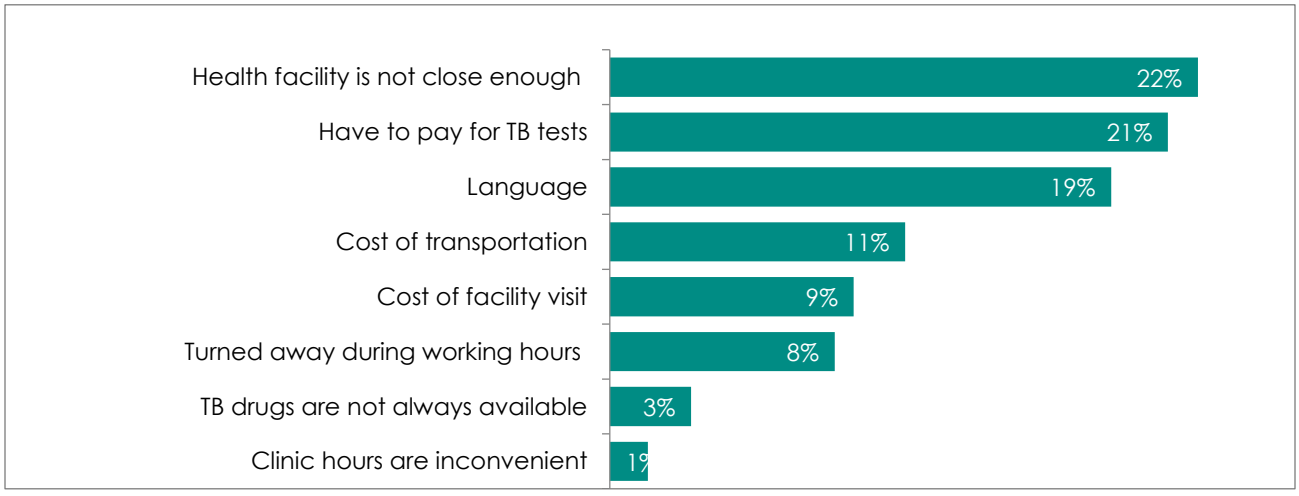
Figure 23. Providers and patients reporting provider discussion of preventing TB transmission



Barriers to TB Care

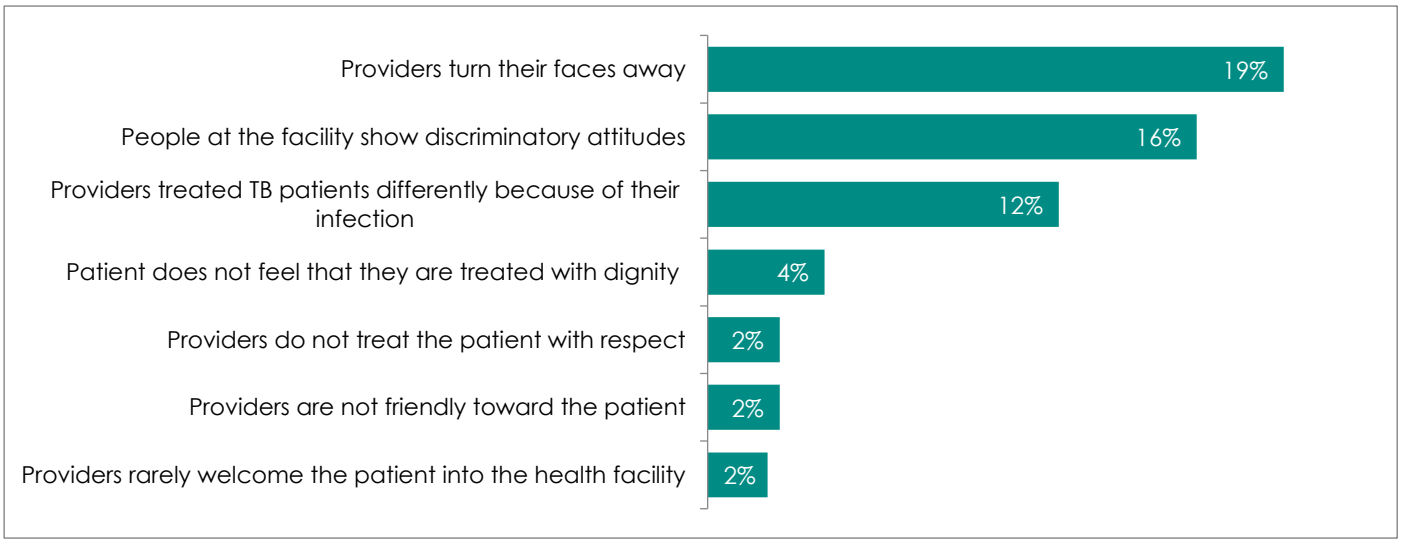
Eliminating TB requires early detection and effective treatment of infectious cases. Therefore, it is critical that TB-presumptive and TB-confirmed patients have unhindered access to medical care. This study examined patients' views on barriers to care and found that the most significant barriers were distance to the facility, the cost of testing, and language barriers, mentioned by about one-fifth of patients interviewed (Figure 24).

Figure 24. Patients reporting barriers to TB care



Patients also reported experiencing stigma related to TB (Figure 25) while in the health facility. For instance, 19 percent reported that healthcare workers turned their face away when speaking with them, and 16 percent reported that people in the facility displayed discriminatory attitudes against them because they have TB.

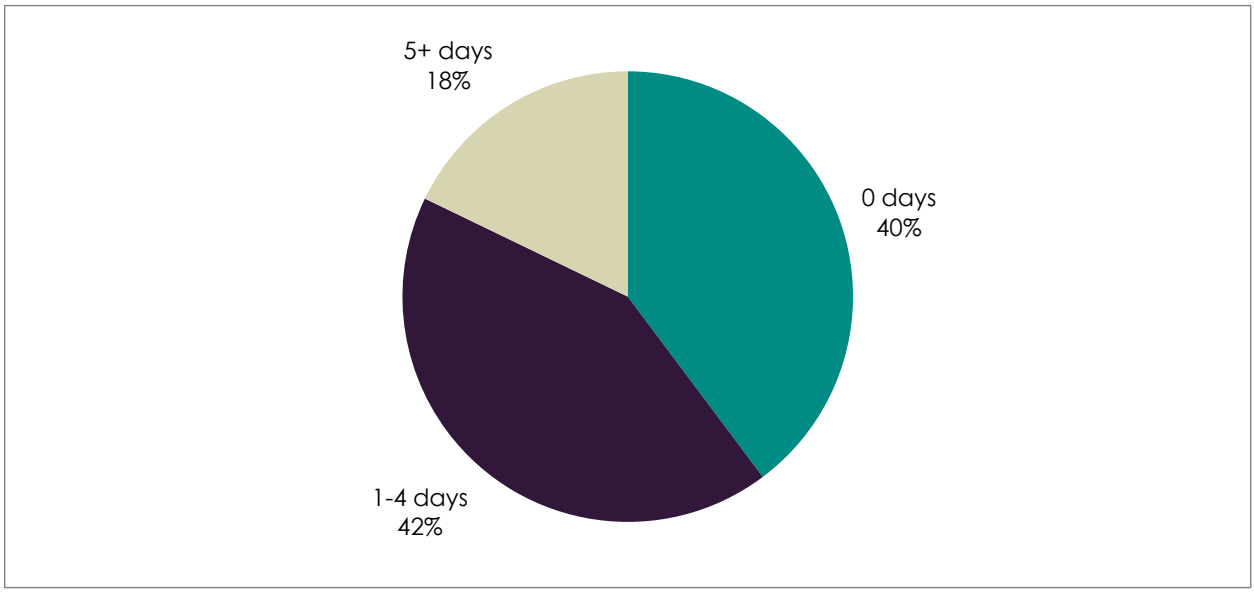
Figure 25. Patients reporting experiences of stigma in healthcare settings



Access to Follow-Up Care

Patients' inability to adhere to the TB treatment plan, can result in prolonged infectivity, poor treatment outcomes, and development of drug resistance. Follow-up care through DOT can improve adherence. This study found that that about 60 percent of patients had access to DOT, meaning approximately 40 percent of patients did not receive TB treatment under DOT (Figure 26). This indicates that the program must improve monitoring of adherence to treatment to ensure successful completion using DOT or innovations such as video DOT and other options that are currently being studied in high-burden countries.

Figure 26. Number of days patients reported receiving DOT per week



Outcome Indicators

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

In the context of our conceptual framework, outcome refers to the effects of healthcare on patients, including changes in their health status. National TB programs routinely assess TB treatment outcomes based on data from the TB register and quarterly reports on TB case registration, smear conversion, and final treatment outcomes assigned after the treatment is completed. These data are used to monitor progress toward achievement of national targets for treatment outcomes, and to monitor program quality and effectiveness. Each patient should have a treatment outcome recorded somewhere between 12 and 15 months after they start treatment. It should be noted that the results described here are based on the record review from 144 health facilities in the 12 priority states, and are not necessarily representative of TB treatment outcomes for the whole country.

Screening and Diagnosis and Patient Monitoring

Patient data extracted from the Presumptive TB Register reveal that 82 percent of TB patients were bacteriologically confirmed. One treatment monitoring indicator collected is the smear conversion rate among the patients on treatment. The study found a smear conversion rate of 70 percent among those with smear results after two months of treatment according to the national guidelines.

Program Performance Outcomes for Drug-Susceptible TB

Treatment outcomes for a January–December 2016 cohort of individuals enrolled in the 144 health facilities included in the survey were analyzed using data service statistics extracted from the TB register.

All bacteriologically confirmed and clinically diagnosed TB cases are assigned a treatment outcome using the definitions adapted from those listed in the 2013 revision of the 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 (see Appendix B).

Of the 9,841 patients registered for treatment in the sampled facilities, 8,953 had treatment outcomes documented, leaving 888 patients (9%) without a treatment outcome recorded in the registers. Of these patients, 229 had transferred out, and 16 had their documentation removed from the registers. The remaining 643 patients, representing nearly 7 percent of the total enrolled in 2016, had no outcome recorded in the register. Of the 9,841 patients in the register, 59 cases were pediatric cases (under 15 years of age).

Table 5 details WHO treatment status categories based on data extracted from facility registers. The assessment findings showed that 80 percent of patients were successfully treated, and 20 percent had unsuccessful treatment.

Table 5. Selected performance monitoring indicators and categories for TB treatment outcomes

Screening and Diagnostic Outcomes	Percent
TB Screening and diagnosis, and treatment monitoring	
Notified who were bacteriologically confirmed	82
Bacteriologically positive pulmonary tuberculosis patients who became sputum converted at month 2 of treatment among cases registered in past 12 months	70
Program performance outcome	
Successfully treated (patient from 2016 treatment cohort who completed treatment and was cured)	80
Cured	48
Treatment completed	32
Treatment failures	1
Lost to follow-up	10
Died	7
Not evaluated	2

DISCUSSION

This section highlights the challenges and limitations faced by the assessment both for data collection and the interpretation of the findings.

TB is one of the leading causes of morbidity and mortality in Nigeria. The Nigerian FMOH has designated the disease as a priority public health challenge and seeks to scale up access to high-quality, client-centered TB services and, as a consequence, reduce TB prevalence and mortality. Because few studies have examined the quality of care in Nigeria's TB services, this study used an extant quality-of-care framework to assess quality of care at all levels within 144 facilities in 12 states. The study aimed to measure the quality of TB services and highlight areas for the NTBLCP to strengthen activities and interventions to improve TB service delivery.

Structural Factors

The findings show that appropriate services are generally available in facilities designated for TB care in Nigeria. However, the study also revealed significant **gaps in all domains of infection control**, though it demonstrated an improvement over previous findings reported from an assessment of 12 southern-based facilities (Ogbonnaya, Chukwu, Uwakwe, Oyibo, & Ndukwe, 2011) and those from a study of 20 public and private facilities in Lagos (Kuyinu, et al., 2016). Given that ineffective infection control increases the risk of nosocomial TB transmission, this finding points to a strong need for effective actions to improve health facilities' performance in infection control.

On the positive side, the majority of facilities sampled had first-line medicines for treating TB on the day the survey teams visited, and the majority of confirmed DR-TB patients had started second-line treatment in the past year. However, drug availability is a concern, and 15 percent of facilities reported stockouts. **Drug storage** was also inadequate: nearly two-thirds of facilities satisfied all seven required conditions for adequate drug storage, though this is an improvement over the 2017 World Bank survey, which showed that only 46 percent of PHC facilities had essential drugs. Offsetting the stockout and storage findings is the observation that TB **drug-monitoring mechanisms** are in place at different levels to ensure an uninterrupted supply of quality-assured TB drugs, which will help guarantee successful treatment outcomes and prevent the emergence of DR-TB. This is likely a result of the NTBLCP's dedication to supporting effective logistic management system for TB drugs. NTBLCP has invested significantly to improve the stock status of relevant drugs at all levels of care, building human capacity on drug-stock management, and advocating for improved and expanded storage conditions for TB drugs at all levels.

Sufficient human resources, both in terms of the number of staff and their capacity to provide services, are essential to achieving the best health outcomes possible (WHO, 2007). This study found that more than 50 percent of health workers **reported receiving training** in the past 24 months and were able to identify the eight skills for establishing rapport and building trust without any prompting. Nearly all patients interviewed reported that their provider discussed or counseled them on the issues of adherence to treatment and treatment completion. On the other hand, observations showed that fewer than half of providers used the **NTBLCP algorithms for TB diagnosis and screening**, suggesting a need for greater focus on these specific issues during training and supervision.

Processes

Patients' satisfaction with the services they receive has a significant relationship with the uptake of services. Visual and auditory privacy are two elements of patient satisfaction, but only about half of the facilities were observed to have a private room for individual counseling in the TB unit. Despite this observation, 84 percent of patients reported that they had privacy during the examination. Most patients (94%) also reported being satisfied with time they spent in the facility in the process of care, which averaged 49 minutes.

The study also assessed supervisory visits as part of the managerial framework for improving and sustaining the quality of TB care. According to the guidelines, an LGTBLS is responsible for supervising CHWs' work and ensuring adherence to national guidelines. This study found that the **majority of facility in-charges and providers reported being supervised or monitored** in the past 12 months and 83 percent of facilities had at least one recorded supervision visit from the LGTBLS in the 12 months prior to the study. Almost all respondents reported that the visits included a review of service data and assessment of medication stocks and expiry dates. However, only 58 percent of service providers reported receiving feedback on their performance in the last three months.

This study shows a high level of patient **awareness of TB as a disease, coexisting with frequent misconceptions.** A large majority of patients indicated that TB is curable and knew the duration of TB treatment, and 58 percent mentioned microbes/germs/bacteria as the cause of TB. Compared to previous national studies, this finding represents an improvement in TB patients' knowledge. For example, in the 2017 National TB Knowledge, Attitudes and Behavior (KAB) survey, only 22.9 percent of patients across 12 states knew that TB is caused by a germ (AHEAD, 2018). Other studies in Nigeria (Tobin, Okojie, & Isah, 2013; Hassan, et al., 2017) have also found a high level of misconceptions about TB transmission, such as believing that sharing utensils transmits the disease (47%), which is consistent with the findings of this study.

The study found a **high quality of provider-patient interaction**, with more than four-fifths of patients reporting that the service provider discussed the curability of TB and how to protect household members from being infected. These findings are impressive and consistent with the high level of counseling skills demonstrated by service providers.

However, **actions to strengthen adherence need improvement**. About 40 percent of patients did not have access to DOT, which has significant implications for treatment adherence. However, this finding must be interpreted in the context of the national guidelines, which state that DOT does not necessarily need to be facility-based, but can be administered via the provider or a treatment supporter, preferably a close relation of the patient (family or non-family) who lives in or within walking distance of the patient's home. This study, however, did not investigate the use of treatment supporters in any detail; this is an area that merits further investigation in future studies.

TB-related stigma and discrimination also merit deeper exploration. In this study, 19 percent of TB patients indicated that service providers turned their face away when speaking with them, and 16 percent reported discriminatory attitudes within the facility. Stigma and discrimination are long-standing concerns in TB treatment, with documented impacts on treatment-seeking and treatment adherence (Craig, Daftary, Engel, O'Driscoll, & Ioannaki, 2016; Daftary, Mitchell, Reid, Fekadu, & Goosby, 2018). There is a need to explore the nature of TB-related stigma and associated factors in Nigeria to inform appropriate interventions.

Broadly, the study identified **distance, the cost of TB tests, and language barriers** as the major impediments to TB treatment. This finding has implications for TB programming and policies and requires exploration of potential solutions such as further expansion of service sites and elimination of TB-related

testing fees, particularly in view of the rising poverty level in Nigeria and the nature of TB as a disease with higher impacts on lower socioeconomic classes.

TB Outcomes

With respect to program performance monitoring outcomes, the results showed that about eight out of ten TB patients were bacteriologically confirmed and a smear conversion rate of 70 percent was obtained among patients with smear results after two months of treatment according to the national guidelines. Of the 9,841 patients registered for treatment in participating facilities, 80 percent were successfully treated and 20 percent had an unsuccessful outcome. These findings broadly align with the national data compiled by the national TB control program. However, a high proportion (9%) of patients with no indicated treatment outcome should be a matter of concern, particularly given the high level of supervision activities reported.

Limitations

This study has several limitations because of its design and the study protocols, which should be considered when interpreting the findings.

First, the study protocol stated that only patients who came to a facility were to be interviewed. This was done to remove the bias created when providers recruit patients. It meant that there was no community-level data collection of patients.

Despite the limited geographical focus, these findings provide a good insight and an excellent overview of the quality of TB services in Nigeria. This study was carried out in 12 states where the Global Fund and USAID/Nigeria have made substantial investments in TB prevention and treatment. In addition, the sampling approach, though scientifically rigorous and valid, was not altogether based on the probability approach across all the sampling levels. Nevertheless, the study documents specific strengths as well as shortfalls in quality of TB care (such as safety, effectiveness, and patient care) that could lead to avoidable risks and underuse of available health resources (WHO and International Bank for Reconstruction and Development/The World Bank, 2017). This report provides an evidence-based platform for action to further improve TB diagnosis in Nigeria, improve treatment outcomes, and ensure optimal return on the national investments in TB control.

KEY FINDINGS AND RECOMMENDATIONS

On completion of the assessment, MEASURE Evaluation and AHEAD organized a consultative meeting in Abuja in September 2018 to share the preliminary findings with key stakeholders and to obtain stakeholders' feedback on those findings. This section presents key findings and recommendations based on the discussion at the consultative meeting.

- **Strengthen infection prevention and control:** There is a need to strengthen the implementation of administrative and environmental IPC measures, as well as personal protection measures to prevent staff members and other patients at the facility from contracting TB.

- **Ensure the availability of all basic equipment for optimal TB service delivery in all 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, and that this equipment is maintained in an optimal functioning state.

- **Strengthen the logistics management system for TB drugs and related supplies:** To eliminate stockouts of TB drugs (and other essential supplies) at all levels, it is critical to further strengthen the logistics management system nationwide.

- **Ensure continuous education for service providers**: There is a need to address gaps in knowledge and introduce and sustain good practices. The study identified several gaps in providers' knowledge and practices, such as stigmatizing behavior by providers and inconsistent use of algorithms for TB diagnosis. These should be targeted through continuous education, including formal training programs, on-the-job-training, and supportive supervision.

- **Sustain supervisory activities and improve oversight of the patient register:** The supervisory system has shown good results in terms of frequency and activities, but missing data on treatment outcomes in the treatment register indicate a need to sustain the supervisory system and strengthen the oversight of these data specifically. In addition, data quality-assurance mechanisms or guidelines should be developed to check the quality of reported data at the facility level. One recommendation is that the NTBLCP develop a simple guidance tool or checklist and provide it to supervisors to strengthen their review of service data during routine supervisory and monitoring visits.

- **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 problems and maintain care standards. This will require further TB service assessments that build upon 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 treatment supporters for DOT, stigma and discrimination, and contact investigation; and to address emerging quality-of-care issues.

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APPENDIX A. DATA COLLECTION AND DATA MANAGEMENT

Data Collection

AHEAD was responsible for the recruitment, training, and supervision of data collectors, and the collection of the data using SurveyCTO. Thirty-six data collectors formed thirty-six data collection teams of 144 assessors assigned to cover the 12 states. Senior technical advisers from the MEASURE Evaluation team, AHEAD, and the NTBLCP 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. After tool finalization, data collectors pretested the revised and translated tools in selected TB facilities in Oyo state.

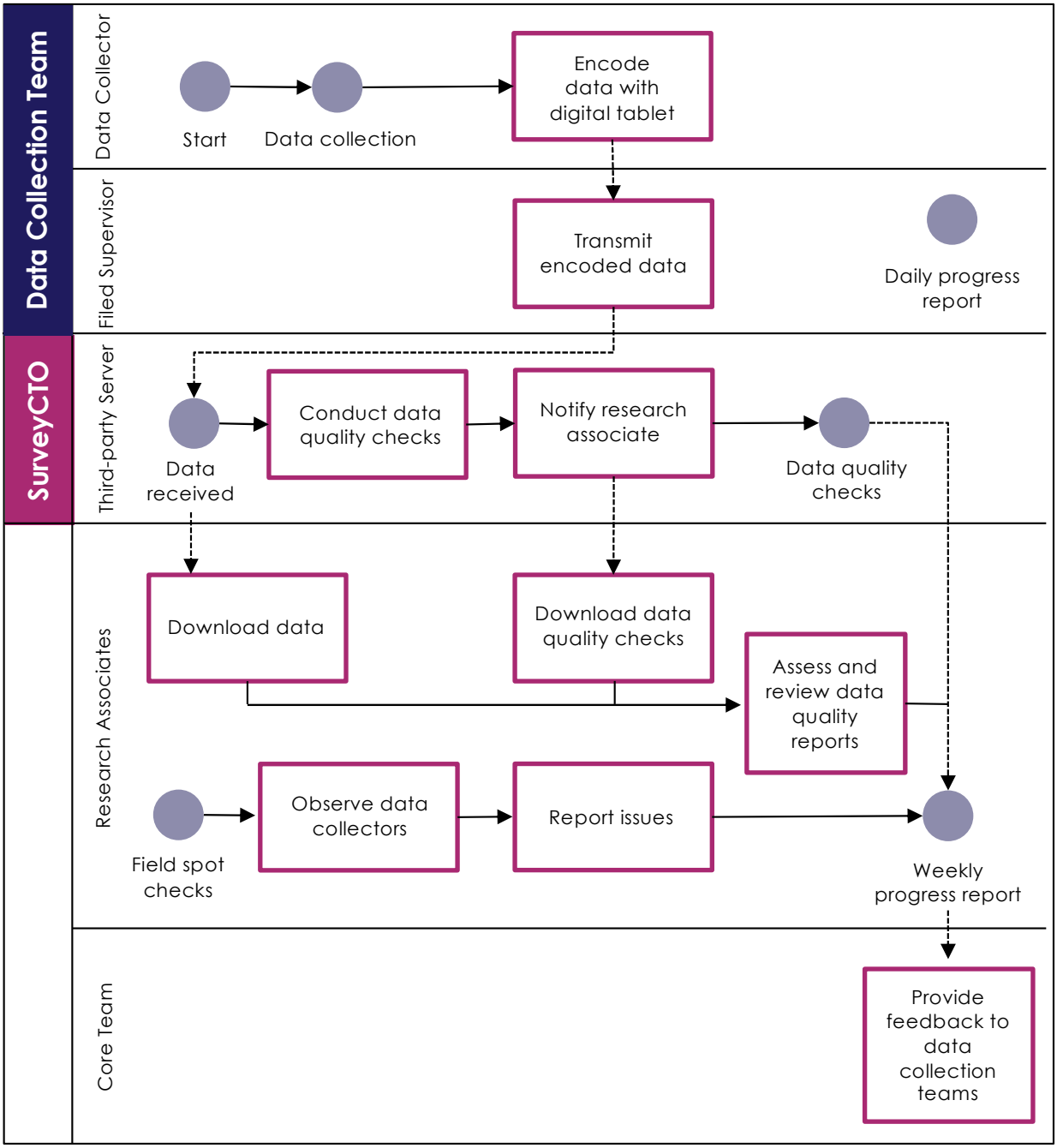
Data collection started the week after the training. Schedules were communicated to regional offices and courtesy calls were done by the data collection teams to regional directors and regional NTBLCP coordinators during the first day of data collection. A separate project briefing was done at each facility. Data collection ran from June to August 2018.

Once on site, facility information was entered in the electronic tool. Overall, data collection took place during one day at each facility. To avoid interruption in daily operations, the availability of the patients and the providers was considered. The informed consent form was read to each interviewee before signing.

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 were 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 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, states, 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 to update MEASURE Evaluation and the AHEAD 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 DSSM 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 (5) 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 (2) consecutive months or more.

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

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