TB Data-to-Action Continuum
in Haiti
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Report

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Cover photo: Participants engage in group work during the D2AC workshop held in Cap-Haïtien in February 2024. Photo taken by Nadjy Joseph.

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Abbreviations

ARC	Assessment of Reporting Capacity
CDC	Centers for Disease Control and Prevention
CMMB	Catholic Medical Mission Board
DSN	North department sanitary division
DSNE	North-East department sanitary division
D2AC	Data-to-Action Continuum
DHIS2	District Health Information Software version 2
DOTS	directly observed treatment short-course
GHESKIO	Groupe Haïtien d'Etude du Sarcome de Kaposi et des Infections Opportunistes (The Haitian Group for the Study of Kaposi's Sarcoma and Opportunistic Infections)
HMIS	health management information system
HR	human resources
HTW	Health Through Walls
HUJ	Hôpital Universitaire Justinien (Justinien University Hospital)
ICC	International Child Care
ICT	information and communications technology
JSI	JSI Research & Training Institute, Inc.
LNSP	Laboratoire national de santé publique (Haiti National Public Health Laboratory)
M&E	monitoring and evaluation
MDR	multidrug-resistant
MEL	monitoring, evaluation, and learning
MESI	monitoring and evaluation and integrated surveillance
MIS	management information system
MSPP	Ministry of Public and Population Health
NTP	national tuberculosis program
PBMEF	Performance-based Monitoring and Evaluation Framework
PIH/ZL	Partners in Health/Zanmi Lasanté
PNLS	Programme national de lutte contre le SIDA (Haiti National HIV/AIDS Program)
PNLT	Programme national de lutte contre la tuberculose (Haiti National TB Program)

RR	rifampicin-resistant
SOP	standard operating procedure
STAR	Sustaining Technical and Analytical Resources
TB	tuberculosis
TB DIAH	TB Data, Impact Assessment and Communications Hub
UEP	Unité d'études et de programmation (Study and Programming Unit, MSPP)
UGP	Unité de gestion des projets (Project Management Unit, MSPP)
USAID	United States Agency for International Development
WHO	World Health Organization

Executive Summary

Background

A strong tuberculosis (TB) monitoring and evaluation (M&E) and surveillance system is vital for countries to reach global goals to end TB. The United States Agency for International Development (USAID) leads the U.S. Government's global efforts to end TB. USAID's Global Accelerator to End TB is the Agency's programmatic approach to fight TB. Under the Accelerator, USAID funds the TB Data, Impact Assessment and Communications Hub (TB DIAH) project, which developed a TB Data-to-Action Continuum (D2AC) Toolkit to measure countries' progress and guide efforts to improve their TB M&E and surveillance systems. The D2AC allows national TB programs (NTPs) to precisely gauge the barriers to data use and assess the decision making capabilities of different actors across their health systems. The purpose of a D2AC workshop is to guide the evaluation of data use capabilities to routinely monitor and improve data use attributes associated with TB program management and service delivery at subnational and national levels. The objective is to use the findings from the application of the D2AC Toolkit to evaluate TB M&E and surveillance systems by (1) assessing decision making capabilities of different actors; (2) precisely gauging the barriers to data use; (3) helping NTPs select appropriate interventions in the context of their health systems; (4) developing an implementation plan to apply in the future; and (5) using implementation recommendations for strategic planning purposes and decision making.

Methods

The Haiti D2AC workshop was the first D2AC workshop held in the Americas and the first one conducted in French and using the French online D2AC tool. The workshop was held in February 2024 in Cap-Haïtien. Twenty participants attended, representing various levels of the Haitian health system and other TB stakeholder groups. The D2AC workshop was conducted in person. The D2AC team applied a mixed methods approach conducted in three parts with the support of the D2AC Toolkit: (1) participants first completed the online D2AC Toolkit's data collection instrument individually and then in groups; (2) individually and then in groups, participants provided evidence and justification in the data collection instrument for the response options selected; and (3) in groups, participants identified priority actions for post-workshop implementation. A semi-structured questionnaire and focus group discussion method were implemented during the assessment. The D2AC team facilitated the workshop with the use of slides and handouts, and there were several break-out group activities and report-backs. Quantitative data from the 23 (19 individual and 4 group) data collection instruments were automatically generated using the online D2AC analysis dashboard. The qualitative data—observations, comments, and questions submitted in the 30 instruments and brought up in group discussions and report-backs—were transcribed and analyzed.

Results

The overall D2AC assessment score from the aggregate group responses was 2.9 (out of 5), putting Haiti at a "defined" level according to the D2AC. The country performed best in domain

1 (Data Collection and Reporting, score of 3.67) and least well in domain 5 (Information and Communications Technology [ICT], score of 2.08). Domain 2 (Data Analysis and Use), domain 3 (Leadership, Governance, and Accountability), and domain 4 (Capacity Building) received scores of 2.67, 3.33, and 3.11, respectively. The overall score from the aggregated individual responses was similar (3.3 out of 5), albeit slightly higher, to the group aggregate score (2.9). Comparison of the individual and group responses revealed that individuals scored higher than groups for all domains but domain 1, with the biggest gap at 0.64 points for domain 5, and the smallest at 0.10 for domain 3. Five subdomains were identified as priorities: D2S3 (Dissemination and communication), D5S2 (Network and connectivity), D4S2 (Skill and knowledge development), D1S3 (Data quality), and D3S2 (Data access and sharing).

Discussion

The D2AC assessment in Haiti shed light on the perceived areas of improvement for the Haiti TB information system, namely in the areas of data integration and exchange, dissemination and communication, data use guidance, financial resources, skill and knowledge development, and all three subdomains related to ICT. That being said, overall, Haiti has clear areas in need of strengthening, with two subdomains receiving scores lower than 2 out of 5. The D2AC assessment in Haiti also shed light on the areas that were performing well. The strongest-performing area was data access and sharing, followed by strong scores in monitoring, evaluation, and learning (MEL), data quality, and decision making ability (based on individual scores). Ten of the eighteen subdomains received scores superior to 3 out of 5, meaning that they were identified as being at least at an "established" stage on the continuum, and four among those (the subdomains listed in the previous sentence) received scores superior to 4 out of 5 ("institutionalized" stage of the continuum).

Recommendations

Priority recommendations were developed in small groups. They were then combined in plenary to develop a joint implementation plan and were validated by the workshop participants. The recommendations can be summarized in four broad categories: *trainings to be designed and held* (a refresher course for service providers specifically aimed at strengthening their skills in completing the data collection tools, as well as designing an initial and ongoing (i.e., refresher) training plan for PNLT managers); *supportive supervisions and data use practices that should be more thoroughly conducted* (further efforts around data analysis and validation, and entry of valid data into DHIS2, as well as providing client care sites with Internet connections for those activities); *increasing public access to data is key to broader data use* (introducing a dashboard system on the MSPP website, giving the general public access to information and data on certain TB indicators, making data from the sharing platform available in real time, increasing data accessibility for stakeholders, and conducting more data-based advocacy to obtain the support of partners in expanding connectivity at healthcare provision sites); and *evaluations or programmatic research to be conducted* (evaluating the impact of the training programs developed, and identifying sites with connectivity problems so as to prioritize equipping them with the necessary hardware and connection).

Conclusion

Despite accounting for a small percentage of the worldwide TB burden, the state of Haiti, its Ministry of Health, and its PNLT are faced with important challenges of various natures (political, economic, human resources, external support) to address the country's important infectious diseases burden.

The D2AC assessment in Haiti highlighted both the high-performing elements of the NTP's data use capabilities and the challenges that should be addressed to improve evidence-based decision making. The assessment revealed good performance in certain dimensions of the D2AC, such as data access and sharing, MEL, data quality, and decision making ability. However, it also revealed important gaps, such as data integration and exchange, dissemination and communication, data use guidance, financial resources, skill and knowledge development, and all three subdomains related to ICT. These findings provide evidence of the areas needing programmatic interventions, and can also inform policy makers, donors, and program managers who want to design and implement responsive programs and interventions to strengthen and improve data use capabilities for evidence-based decision making to provide targeted and informed high-quality services for all TB patients.

Background

A strong tuberculosis (TB) monitoring and evaluation (M&E) and surveillance system is vital for countries to achieve global goals to end TB. By routinely collecting high quality, detailed data and by effectively integrating various components of routine information systems (e.g., service statistics, disease surveillance, and financial and human resource data), national TB programs (NTPs) are better able to meet the many data demands of stakeholders, better target TB program implementation, improve the quality and efficiency of TB services, and effectively plan and advocate for resources.

USAID Leadership in Ending TB

The United States Agency for International Development (USAID) leads the U.S. Government's global efforts to end TB. USAID's Global Accelerator to End TB is the Agency's programmatic approach to fight TB. The Accelerator increases commitment from, and builds the capacity of, governments, civil society, and the private sector to accelerate national progress to reach global TB targets. The Accelerator focuses on countries with high burdens of TB where the Agency can unite with local communities and partners to deliver performance-based results. To ensure the Accelerator's effectiveness and increased transparency, USAID uses standardized data collection and performance-based indicators that align with the targets.

TB DIAH and D2AC

Under the Accelerator, USAID funds the TB Data, Impact Assessment and Communications Hub (TB DIAH). TB DIAH aims to ensure optimal demand for and analysis of TB data, and the appropriate use of that information to measure performance and to inform NTPs and USAID interventions and policies.

TB DIAH developed the TB Data-to-Action Continuum (D2AC) Toolkit to measure countries' progress and guide efforts to improve their TB M&E and surveillance systems. The D2AC builds on the work of the Performance-based Monitoring and Evaluation Framework[1] (PBMEF), the Assessment of Reporting Capacity (ARC), and other existing documentation (i.e., joint program reviews, epidemiological assessments). It allows NTPs to precisely gauge the barriers to data use and assess the decision making capabilities of different actors across their health systems. It also helps NTPs select appropriate interventions in the context of their health systems and develop implementation plans to apply them.

The D2AC framework aims to gauge country and NTP capacity to translate data into action to improve NTP performance. Through a systematic review of existing literature and a phased review by experts to validate the concept and pretest the approach, the D2AC team developed the D2AC Toolkit (Kumar et al., 2021; Kumar et al., 2022). More information on TB DIAH's D2AC Toolkit can be found at https://www.tbdiah.org/assessments/d2ac

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[1] Available at https://www.tbdiah.org/resource-library/pbmef/

TB and Haiti

Haiti has an NTP, called the Programme national de lutte contre la tuberculose, or PNLT, tackling a TB burden of 154 cases per 100,000 people as of 2021 (World Health Organization [WHO], 2022). The country's TB treatment coverage was 63 percent in 2022 (WHO, 2022). Haiti reports an 82 percent treatment success rate (World Bank, 2021). TB is the fifth cause of death among communicable diseases in the country, and missed cases account for 40 percent of the estimated number of people who developed TB and 50 percent among children (Stop TB Partnership, 2020). Furthermore, previously treated cases account for 18 percent of MDR/RR-TB cases in Haiti (WHO, 2022).

Given that Haiti is a small country with a relatively small population on the global scale, Haiti does not appear in any of the global high-burden lists, nor does Haiti contribute a large amount to the global shortfall in TB notifications. A set of challenges that are specific to Haiti, though, are the environmental vulnerabilities, infrastructural deficiencies, and socio-political violence and instability that make the Haitian economy as well as the Haitian healthcare system particularly fragile, weakened, and challenging for many external governments and donors to support in an uninterrupted, safe, and politically neutral way.

Objectives

The purpose of the D2AC workshop was to guide the evaluation of data use capabilities to routinely monitor and improve data use attributes associated with TB program management and service delivery at subnational and national levels.

The D2AC Toolkit was used for both individual and group responses. The objective was to use the findings to evaluate TB M&E and surveillance systems by:

- Assessing decision making capabilities of different actors
- Precisely gauging barriers to data use
- Helping the NTP select appropriate interventions in the context of its health system
- Developing an implementation plan to apply in the future
- Using implementation recommendations for strategic planning purposes and decision making

Beyond the standard objectives of the D2AC assessment, some objectives were also specific to Haiti. The PNLT team expressed that the findings and recommendations from this workshop would be very useful contributions to the National Strategic Plan that was finalized in January 2024, a new M&E plan being developed following the D2AC workshop in February 2024, and identifying new activities USAID/HQ may be interested in undertaking in Haiti. Furthermore, the D2AC workshop in Haiti was the first workshop to use the French language online D2AC Tool, and the first implementation in the Americas. The French D2AC online tool, translated by the D2AC team, can be found at https://d2ac.tbdiah.org/fr.

Concept

The conceptual framework (Figure 1) describes the organizational, human, technology, and process-related factors affecting data use capabilities. The framework highlights an interlinked and cyclical evolution of the health information system involving TB data collection and reporting, analysis, use, and dissemination-related interventions that build on the leadership and governance and capacity building efforts of a given NTP. The framework shows that the interlinked interventions follow a continuous improvement approach to advance along a continuum of increasing maturity (which includes five levels: nascent, defined, established, institutionalized, and optimized), which are associated with an improvement of NTP performance in terms of using data for proactive and responsive clinical, programmatic, managerial, and policy decision making.

Figure 1. D2AC conceptual framework
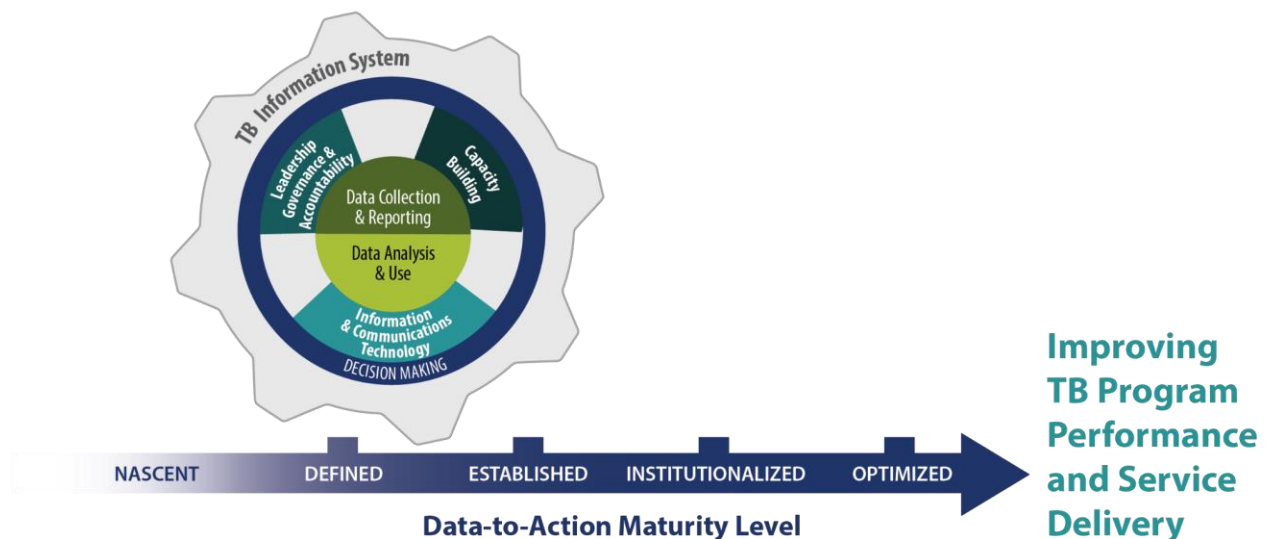
Tool Design

The D2AC Toolkit was developed under the TB DIAH project, funded by USAID's Global Accelerator to End TB. D2AC was initially developed as a framework to gauge country and NTP capacity to translate data into action to improve NTP performance. Informed by a review of peer-reviewed and gray literature, the D2AC Toolkit and process builds on previous experience with maturity models. The D2AC team documented and published a journal article on this systematic review (Kumar et al., 2021). A phased review of the Toolkit was also conducted by the D2AC Advisory group starting in March 2021. The D2AC team documented and published a journal article on the Toolkit validation process as well (Kumar et al., 2022). More information on the Toolkit validation process can be found at https://www.tbdiah.org/assessments/d2ac

The online version of the D2AC Toolkit—available in two languages and used for the first time in French in the context of a country assessment for the workshop in Haiti—includes five defined continuum levels (Table 1); a country profile template to collect socioeconomic, demographic, and epidemiological indicators used to describe the context within which data use capabilities are assessed (Appendix C); a D2AC scale with capability statements organized into five domains

and 18 subdomains (Table 2) for each of the five continuum levels; a data collection instrument with closed-ended capability continuum response options which also features questions around whether the data needs of key TB data users are met (Appendix E); and an analysis dashboard to visualize responses with different aggregation options. The D2AC analysis dashboard on the online tool automatically aggregates responses from all completed data collection instruments and generates data visualizations and recommended priority actions. This enables decision makers to make sense of and apply the findings and to develop an implementation plan using the template provided in the D2AC Toolkit.

The Toolkit measures the status of current and desired TB M&E and surveillance systems data use capabilities across 18 subdomains, grouped in five domains. The domains and subdomains are then measured across five continuum levels: nascent, defined, established, institutionalized, and optimized (Table 1). This method offers a systematic way to show a measurable impact of improvements across processes (e.g., data collection processes); human resources (HR) (e.g., skill and knowledge development); and institutional attributes (e.g., policy, strategy, and governance).

Table 1. The five D2AC continuum levels

Continuum Level	Description
1 (Nascent)	- Formal processes, capabilities, experience, or understanding of data use issues/activities are limited or emerging. - Formal processes are not documented, and functional capabilities are at the development stage. - Success depends on individual effort (few committed users). - Predominantly paper-based data management system.
2 (Defined)	- Basic processes are in place, based on previous activities or existing and accessible policies. - The need for standardized processes and automated functional capabilities is known. - There are efforts to document current processes and policies, and capacity building needs.
3 (Established)	- There are approved documented processes and guidelines tailored to data use. - There is increased collaboration and knowledge sharing. - Need for external technical assistance is clearly identified. - Innovative methods and tools can be implemented and used to extend functional capabilities.
4 (Institutionalized)	- Activities are under control using established processes. - Requirements and goals have been developed and a feedback process is in place to ensure that they are met. - Detailed measures for processes and products are being collected.
5 (Optimized)	- Best practices are being applied, and people and the system are capable of learning and adapting. - The system uses experiences and feedback to correct problems and continuously improve processes and capabilities. - Future challenges are anticipated, and a plan is in place to address them through innovation and new technology. - Processes are in place to ensure review and incorporation of relevant innovation.

The D2AC scale is made up of five domains, with 18 corresponding subdomains (Table 2).

Table 2. The five D2AC domains and 18 D2AC subdomains

Domains	Subdomains
1. Data Collection and Reporting	1. Data collection tools and workflow 2. Reporting 3. Data quality
2. Data Analysis and Use	1. Data integration and exchange 2. Analytics and visualization 3. Dissemination and communication
3. Leadership, Governance, and Accountability	1. Data use guidance 2. Data access and sharing 3. Organizational structure and function 4. Leadership and coordination 5. Monitoring, evaluation, and learning (MEL) 6. Financial resources
4. Capacity Building	1. Data interpretation 2. Skill and knowledge development 3. Decision making ability
5. Information and Communications Technology (ICT)	1. Hardware 2. Network and connectivity 3. ICT business infrastructure

Workshop Design

The D2AC Toolkit is designed to be implemented as a facilitator-guided workshop with stakeholders from different aspects of the NTP (e.g., screening, diagnosis, and treatment) and from different levels of the health system. Participants discuss and achieve consensus on where the elements of NTP capacity fall on the continuum. The Toolkit then yields suggested interventions—called priority actions—tailored to stakeholders' assessments of NTP capacities. These priority actions help the NTP improve capacity to translate data into action, targeted to the current continuum level at different levels of the health system. More information about the assessment methods can be found at https://www.tbdiah.org/resources/publications/data-to-action-continuum-toolkit-and-assessment-user-guide/ (TB DIAH, 2023).

D2AC in the Context of TB DIAH Resources

The D2AC Toolkit can be used on its own, or as a complement to other TB DIAH tools and products as part of an assessment of a country's TB M&E and surveillance systems. When used alongside other TB DIAH tools and assessments, such as the PBMEF, ARC, or Quality of TB Services Assessment,[2] the D2AC activity contributes to a holistic view of a country's TB M&E and surveillance systems and its capacity to collect, analyze, and use key indicator data for TB service delivery, performance improvement, and data-based decision making.

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[2] Available at https://www.tbdiah.org/assessments/quality-of-tuberculosis-services-assessments/

Methods

Workshop Process

Planning for the D2AC workshop began in the fall 2023 with the formation of the leadership team. The PNLT, USAID/Haiti and advisors from the Sustaining Technical and Analytical Resources (STAR) program played key roles in working with the D2AC team to secure support, identify the assessment scope, discuss the planning process, and identify participants. During the workshop, participants assessed the current status of the TB M&E and surveillance systems, identified gaps, and prioritized actions in areas that needed strengthening or further development. Once this was completed, the participants designed an implementation plan to present to the PNLT for further discussion (Figure 2).

Figure 2. The D2AC workshop approach and process

Gather the team that will conduct the D2AC assessment	→	**Assess** the current status of the country's TB M&E and surveillance systems	→	**Identify and prioritize gaps** and areas that need strengthening or further development	→	**Collaboratively design an implementation plan** and prioritize next steps to present to the NTP
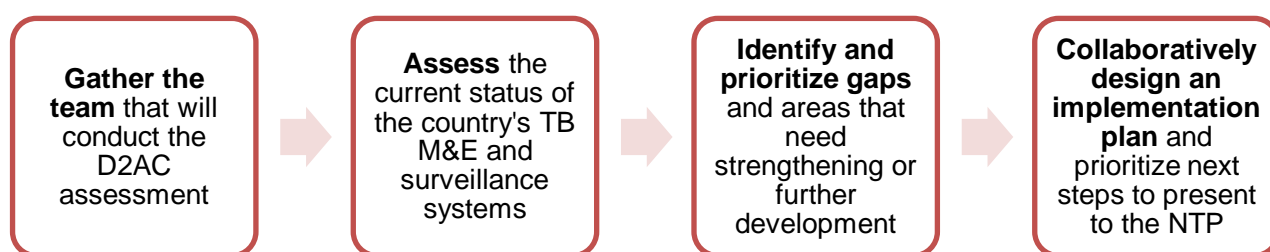
The D2AC assessment can be implemented using a variety of approaches, including individual assessment, group assessments, or a hybrid approach. In Haiti, a hybrid approach was implemented with two in-person facilitators and two remote facilitators. The assessment was conducted in person. The D2AC assessment included 20 key personnel identified and invited by the PNLT and was conducted during two days over the course of a week where TB DIAH had planned two consecutive workshops (note: the third, fourth, and fifth days of the workshop week were dedicated to activities separate from the D2AC, namely the collaborative development of a TB M&E Plan with PNLT staff, so the proceedings and agenda for the last three days are not included in this report).

The assessment took place from February 26–27, 2024, at the Roi Christophe Hotel in Cap-Haïtien, Haiti. The workshop agenda can be found in [Appendix A](#).

Workshop Participants

Twenty people participated in the D2AC workshop in Haiti. Of the 20 participants, 8 (40%) were women. Of the 19 participants who submitted individual responses to the data collection tool, 11 participants came from the national level (58%), 5 participants represented the departmental level (26%), and 3 participants represented the health facility or community level (16%).

When examining the 4 USAID TB pillars of reach, cure, prevent, and sustain, participants had primary responsibilities aligned with these pillars as follows: 10 participants had primary responsibilities related to reach, 7 participants had primary responsibilities related to cure, 8

participants had primary responsibilities related to prevent, and 11 participants had primary responsibilities related to sustain (Figure 3 and Appendix B). The split was also relatively even when examining secondary responsibilities, falling into the 4 USAID TB pillars of reach (5 participants), cure (7 participants), prevent (8 participants), and sustain (7 participants). Four participants were not involved in any reach activities, 3 were not involved in any prevent activities, 5 were not involved in any cure activities, and 1 was not involved in any sustain activities.

Figure 3. Primary and secondary TB work areas of participants, as a count
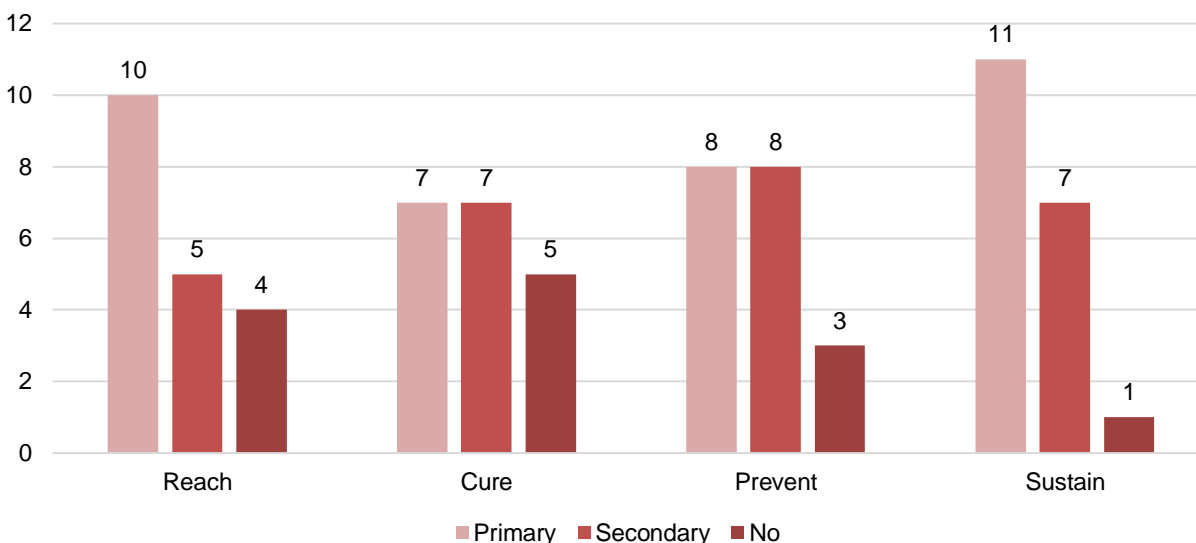
The public sector at the central level was represented by 9 participants from the following offices and institutions: the PNLT (3 participants), the Programme national de lutte contre le SIDA (National AIDS Control Program, or PNLS), Unité d'études et de programmation (Study and Programming Unit, or UEP) (2 participants), Laboratoire national de santé publique (Haiti National Public Health Laboratory, or LNSP), Unité de gestion des projets (Project Management Unit, or UGP), and Hôpital Universitaire Justinien (Justinien University Hospital, or HUJ).

The implementing partners (listed in alphabetical order) represented by 8 participants were the Centers for Disease Control and Prevention (CDC), the Catholic Medical Mission Board (CMMB), Groupe Haïtien d'Etude du Sarcome de Kaposi et des Infections Opportunistes (The Haitian Group for the Study of Kaposi's Sarcoma and Opportunistic Infections, or GHESKIO), Health Through Walls (HTW), International Child Care (ICC), Partners in Health/Zanmi Lasanté (PIH/ZL), USAID, and WHO. One of the co-facilitators was a STAR Advisor (USAID) working at the PNLT.

Two of Haiti's ten administrative departments were represented at the workshop: the departments of the North (DSN) (2 participants) and the North-East (DSNE). Appendix B provides the full list of participants.

Participants reported associating with six types of roles: NTP manager/policy maker (2 participants), national M&E director/manager (2 participants), regional TB

coordinator/manager (4 participants), district TB coordinator/manager/health officer (3 participants), national reference laboratory manager (1 participant), and healthcare provider (1 participant). Six respondents selected "other."

Figure 4. Participant composition, by TB user role

- ■ NTP manager/policy maker
- ■ National M&E director/manager
- ■ Regional TB coordinator/manager
- ■ District TB coordinator/manager/health officer
- ■ National reference laboratory manager
- ■ Healthcare provider
- ■ Other

Five attendees had less than five years of work experience (26%), six had 6–10 years of experience (32%) and five had 11–15 years of experience (26%). Three participants had more than 20 years of work experience (16%).

Figure 5. Years of experience in TB work among workshop participants

- ■ 0-5 years
- ■ 6-10 years
- ■ 11-15 years
- ■ 20+ years
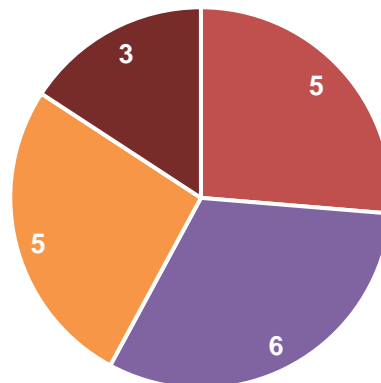
Workshop Proceedings

Workshop Opening

After an opening address, the facilitators presented the workshop overview, including its purpose and how the findings would be used, and the D2AC assessment approach and Toolkit. The D2AC team lead applied a mixed methods approach conducted in three parts: (1) participants completed the D2AC Toolkit's data collection instrument first individually and then in groups; (2) individually and then in groups, participants provided evidence and justification in the data collection instrument for the response options selected; and (3) in groups, participants identified priority actions for post-workshop implementation. A semi-structured questionnaire and focus group discussion method were implemented during the assessment.

The D2AC team lead facilitated the workshop with the use of slides and handouts. There were also several break-out group activities and report-backs. The D2AC team lead introduced the objectives of the workshop; the background of the Toolkit's development and method; the workshop approach; and the Toolkit in detail, tab-by-tab. The Haiti country profile was developed in advance of the workshop by the D2AC team.

Individual Instrument Completion

The participants were invited to fill out the online D2AC data collection instrument individually with the help of the D2AC glossary (Appendix D). This gave each participant the chance to explore the online tool[3], become familiar with the instrument questions and their answer options (Appendix E), and to indicate their views on the Haiti TB program and information system's current status for each of the 48 capability questions associated with the five domains and 18 subdomains (Table 3). The data collection instrument also includes a set of customized questions based on the user category that the respondent associates with. The 19 individual submissions received (of the 19 people in attendance on day one, two people worked together and shared a submission since one of them did not have a computer, and one of the facilitators submitted a response) were automatically aggregated in the D2AC Data Analysis Tool dashboard, integrated into the online tool platform. The findings from the aggregated individual responses were shared in plenary using data visualizations automatically generated by the dashboard. The floor was then opened for comments and questions.

Table 3. Data collection instrument questions, by domain and subdomain

Domain	Subdomain	Questions by subdomain	Questions by domain
Data Collection and Reporting	Data collection tools and workflow	6	
	Reporting	3	11
	Data quality	2	
	Data integration and exchange	4	10

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[3] The French version of the online tool is available at https://d2ac.tbdiah.org/fr.

Data Analysis and Use	Analytics and visualization	4	
	Dissemination and communication	2	
Leadership, Governance, and Accountability	Data use guidance	1	11
	Data access and sharing	1	
	Organizational structure and function	1	
	Leadership and coordination	2	
	Monitoring, evaluation, and learning	4	
	Financial resources	2	
Capacity Building	Data interpretation	3	12
	Skill and knowledge development	5	
	Decision making ability	4	
Information and Communications Technology (ICT)	Hardware	2	4
	Network and connectivity	1	
	ICT business infrastructure	1	
Total number of questions		48	

Group Instrument Completion

The 19 participants in attendance on the first day of the workshop were divided into 4 groups of 4 to 5 people, which were designed to be as homogeneous as possible. Each group had at least one representative from the PNLT and from an implementing partner, and at least one woman per group (Table 4). Other central-level public sector representatives, staff from the health departmental level, and other implementing partners were distributed across the groups.

Table 4. Group composition for the D2AC instrument completion exercise

Group number	Number of central government staff	Number of departmental level staff	Number of partners	Number of facility-level staff	Man-to-woman ratio
1	1 PNLT	1 DSN	1 (GHESKIO)	1 (HUJ)	2:2 (n=4)
2	3 (PNLT, UEP, UGP)	1 DSNE	1 (WHO)	-	5:3 (n=5)
3	2 (PNLT, LNSP)	1 DSN	2 (CMMB, CDC)	-	5:2 (n=5)
4	2 (PNLS, UEP)	-	3 (PIH/ZL, ICC, HTW)	-	4:1 (n=5)

Participants were invited to fill out the D2AC data collection instrument ([Appendix E](#)) as a group. Each group discussed and built consensus on all 44 capability questions before submitting their completed instrument (the four questions on decision making ability [domain 4, subdomain 3], which are subjective questions and not adapted for group consensus, were removed from the group questionnaires and only the aggregate individual score was retained as part of the analysis). The four group submissions were automatically aggregated in the D2AC Data Analysis Tool. Each group presented the scores, findings, and discussion points raised during this group exercise in plenary by selecting a question that had prompted debate or dialogue, and the discussion was open in plenary for all groups to contribute. The findings from the aggregated group responses were then shared in plenary using data visualizations generated by the D2AC dashboard, and the floor was then opened for comments and questions.

Co-Created Priority Actions

Following the groups' completion of the data collection instrument and plenary presentation of results, which was a moment for consensus building around the aggregate group score, the D2AC team facilitated an activity where participants individually identified the five subdomains (out of a total of 18 in the D2AC Toolkit) that were of highest priority for action, according to their experience and results (i.e., personal opinion).

Once the 5 priority subdomains were identified by tallying the individual votes (5 votes per person to assign to 5 subdomains of their choice among the 18), the facilitators asked participants to divide themselves equally across 5 groups (with each group assigned 1 of the 5 priority subdomains) based on their interests and votes. Participants chose what subdomain to work on and created groups of three or four people. The five groups each filled out an implementation plan worksheet. Once submitted, the five worksheets were compiled into a combined implementation plan. The combined implementation plan was projected on the screen, with each group presenting their suggested priority actions and rationale. The combined implementation plan was approved and validated by all attendees in plenary.

Workshop Closing

Representatives from the PNLT and TB DIAH gave closing words. At the end of the workshop, all participants received a certificate of completion.

Data Analysis

Quantitative Data

The quantitative data from the 23 (19 individual and 4 group) data collection instruments were automatically generated using the online D2AC Analysis Tool; these data included the scores by domain, subdomain, user level, etc. The scores were automatically generated and displayed in summary data tables and bar charts. Responses were averaged across subdomain, domain, and overall to derive scores for each. Although subdomains are given an equal weight in the calculation of domain aggregates, domains are weighted by the number of subdomains they include to derive the overall score.

The qualitative data from the assessment workshop consisted of the observations, comments, and questions presented and posed in plenary and in groups; the comments entered in the individual and group data collection instruments; the work entered on the implementation plan worksheets; and the group presentations and report-backs. The group presentation takeaways and the plenary observations, comments, and questions were carefully noted in real time during the workshop. All 23 (19 individual and 4 group) data collection instruments were reviewed manually one-by-one, and all comments were noted. Last, all five group implementation plan worksheets were transcribed and analyzed.

Limitations

There are limitations to the generalizability and applicability of the findings in other contexts, given that all participants were from and were responding to questions about the context of the Haiti system. Furthermore, the workshop was not representative of the diversity and range of experiences across Haiti due to the limited number of participants, despite a good representation of peripheral-level staff. The purposive sampling strategy could have led to some biases, with the most engaged or involved actors in the Haiti system being invited, agreeing to attend, and participating in the two-day workshop, as opposed to other actors who were perhaps less engaged or involved.

It is also possible that some courtesy bias may have been introduced, meaning that participants wished to convey an image of quality that was better than reality. This may have occurred for several reasons, including the fact that they were invited by the PNLT's leadership and were participating in the workshop in the presence of their hierarchical superiors and even potentially assigned to the same groups. To minimize this bias, the D2AC team first asked each participant to individually share their responses without discussing or sharing those with anyone else in the room. Subsequently, the group work was organized so that no one person could sway a group's answers or potentially, even unintentionally, inhibit other group members from freely expressing their opinions.

Ultimately, the value of the output of the workshop depended heavily on the expertise and experience of the participants. A potential limitation can arise if insufficient knowledge and experience of the local system are not brought to bear when completing the tool.

Quality is challenging to guarantee, especially when it comes to the individual tool completion exercises. All participants completed the same data collection instrument.

Challenges

Having learned from the challenges of the two field tests, the logistical and technical challenges previously encountered were avoided. Some of the measures taken to circumvent challenges were to have two in-person and native French-speaking facilitators in the room and two remote facilitators (one also a native French speaker). The in-person facilitators had been thoroughly briefed in advance of the workshop during two Zoom meetings, had had the materials shared with them in advance, and a mock workshop was used as a practice exercise. All the workshop

presentation materials were prepared by the remote facilitators in advance of the workshop and shared with the facilitators so they could familiarize themselves with the content they were charged with presenting. The remote facilitators were online and available during the entirety of the workshop.

This workshop was the first of its kind to use the French-language online D2AC tool. No glitches were experienced with the online tool. No participant was unable to submit their responses using the online tool. Overall, the ability to view dashboards and priority actions on their own screens was beneficial to participants for the portion of the workshop where groups develop recommendations. The online interface was more user-friendly and easier to navigate than the Microsoft Excel tool used in previous workshops.

The most important challenges faced during this workshop were related to logistics and safety concerns following the workshop. All participants were eventually able to return home safely after an extended wait period while the Haitian roads and airspace were impracticable and closed, respectively, due to terroristic attacks and dangerous activity from the gangs pressuring the acting President to resign in March 2024.

Ethics

The D2AC team explored the need for institutional review board approval, but it was deemed not necessary by the University of North Carolina and JSI institutional review board committees.

Risks

There were no major risks associated with participating in this workshop. The nonphysical risks included personal information about participants being shared with the D2AC team. This was considered of minimal risk because little or no information of a confidential nature was collected, and all personal information collected during the assessment was treated as confidential; all responses aggregated in the D2AC Data Analysis Tool were anonymized before being shared back with the participants. The primary research burden for participants was the time spent providing information to the D2AC facilitators team.

Advantages

No direct benefits accrued to participants from attending this workshop. Participants were each given a transportation per diem for the two workshop days, and the only participant coming from outside Cap-Haïtien had their flights and accommodation paid for by TB DIAH (all participants also received extended accommodation and per diem coverage during the extended 6-week wait period experienced before being able to travel home safely via the United Nations Humanitarian Air Service [UNHAS] evacuation helicopters, and their UNHAS transportation was also covered by the project). Each participant was awarded a certificate of attendance.

At the national level, there were several important societal benefits from this assessment, namely that the PNLT and its partners will receive feedback on the quality of data use and evidence-based decision making in the TB program and that useful policy and program implications and targeted funding allocation may result from the findings.

Results

Overall Results

The overall D2AC assessment score from aggregate group responses was 2.9 (out of 5), putting Haiti at a "defined" level (on the cusp of an "established" level) according to the D2AC. The country performed best in domain 1 (Data Collection and Reporting, score of 3.67) and least well in domain 5 (ICT, score of 2.08). Domain 2 (Data Analysis and Use), domain 3 (Leadership, Governance, and Accountability), and domain 4 (Capacity Building) received scores of 2.67, 3.33, and 3.11, respectively (Figure 6). Summary tables of results are provided in Appendix F.

The overall score from aggregated individual responses was similar to the group aggregate score (2.9), with a score of 3.3 (out of 5).

**Figure 6. Overall domain scores (aggregate of group responses)**
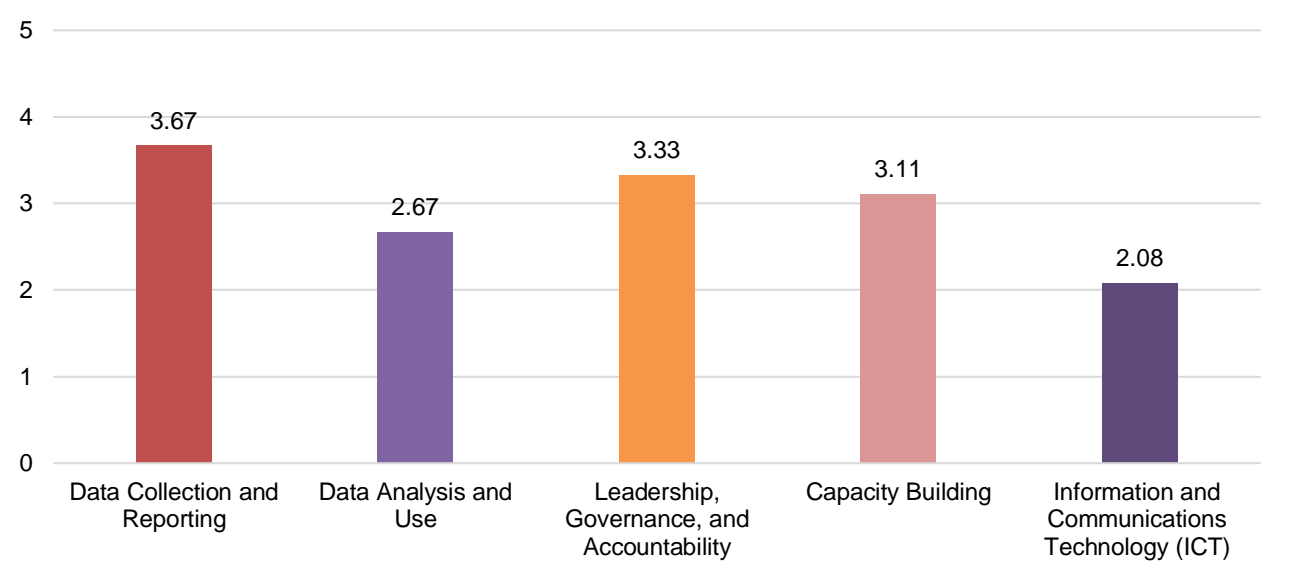
Results by Domain

Domain 1: Data Collection and Reporting

Domain 1, subdomain 1 (Data collection tools and workflow), received an aggregate score of 3.25; subdomain 2 (Reporting) received an aggregate score of 3.75; and subdomain 3 (Data quality) received an aggregate score of 4 (Figure 7). Domain 1 was the highest performing domain.

Figure 7. Domain 1 subdomain scores (aggregate of group responses)
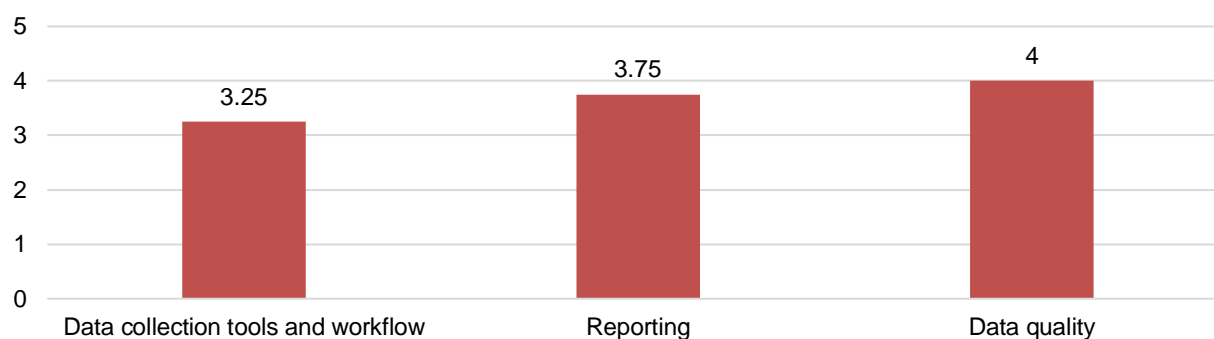
The qualitative findings for domain 1 (11 questions) were that standardized paper-based data collection tools are used and that electronic data collection tools are systematically used at central and departmental levels and at certain health facilities. Thirty-three health facilities have direct access to the electronic data collection system and enter their data into the system, while for others, data entry is managed at the intermediate level by the departmental M&E staff. Data from all treatment centers (*centres de traitement*, or CT) and diagnostic and treatment centers (*centres de diagnostic et de traitement*, or CDT) are entered on a standardized data collection tool, but there is no standard electronic data entry protocol at all levels. Participants argued that standardized electronic data entry (without having to first enter data manually and have the data be entered electronically at another level of the system) would increase decision making based on these data. That said, others said that even with the existing set-up, they are still able to get an idea of the different health facilities' performance levels and whether or not they are meeting the targets set. The electronic tools also help evaluate central-level efficiencies, how well different in-country networks are operating, and inform decision making (**question 1**).

Participants discussed the importance of keeping the inventory of data collection systems (clinical, lab, commodities, training) up to date because when it comes to data entry, as soon as there is a new case notified and patient registered, up until the point where the treatment outcome is declared (cured, treatment completed, treatment failure, lost to follow-up, transferred, or deceased), the provider has to return to the system and definitively close that client's casefile. The importance of system updates is also apparent beyond registering new clients and their outcomes, but also to include clinical and bacteriological testing case notes, update the client file based on the result of HIV testing, and follow-up care visits. The M&E and Integrated Surveillance (MESI) platform[4] is not available everywhere, and for much of the clinical data collection for TB, it is done using the template provided by the PNLT (**question 2**).

Data collection and S&E are part of a workflow including many actors and cannot be completed without the support from health workers, their communication and coordination with the laboratories, and then the monitoring that follows. The alignment of data collection processes with TB service delivery guidance takes place during quarterly meetings and training sessions—the agenda always includes the revision of data and information and their alignment with the

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[4] Available at https://www.mesi.ht/ and https://www.mesi.ht/Home/Home

expectations of the care providers. Participants shared that a data validator visits their site on a quarterly basis to conduct checks and validations for that reporting period (**question 3**).

Unique identifiers are only used in the electronic system or by health facilities and sites equipped with GeneXpert. Participants noted that the use of unique identifiers contributes to the reduction in the spread of TB in that they allow better tracking of people screened for TB and undergoing TB treatment (**question 4**).

The PNLT site list is incomplete. For example, some health facilities that are no longer functional still appear in the list. The PNLT site list should be updated in real time and should also include contact information for the responsible party at each site. Only a paper-based list with the updated contact information exists, but it is not circulated (**question 5**).

Standardized electronic data reporting tools are used, but not systematically or reliably. Some participants stated that returning to the data source (the register) is what allows the best S&E as they are more reliable. Another participant noted that there are frequent delays in electronic data reporting in large part due to late entering/capturing of data in the forms (**question 7**).

Site-level supervisions allow data quality checks and analysis on recorded data before they are reported. This allows for complete reports to be submitted. Data disaggregation efforts during data collection allow for increased availability of real-time data and more accurate reporting (**question 6**). Disaggregated data are reported every 2 to 3 years as a data quality check exercise—more recurrent data disaggregation by sex and age is done by the implementing partners (**question 8**).

The alignment of data reporting processes with TB service delivery guidance was noted as enabling remote report development without the need to physically visit the facility (**question 9**).

Participants shared insights into data quality assurance, stating that the point of data collection should also be doing some data analysis, with support from the departmental level, and that data should be sent to the central level. A complete and coherent process of recording elements in the data collection tools, done in a systematic manner, was stated as very important to guarantee improved data quality (**question 10**).

No individual or group-level qualitative data exist for **question 11**.

A parallel ARC conducted by TB DIAH identified information about the TB program's data flow. Haiti's PNLT is a subunit of the infectious diseases coordination unit (*Unité de coordination des maladies infectieuses et transmissibles*, or UCMIT). The latter is a central directorate of the Ministry of Public Health and Population (*Ministère de la santé publique et de la population*, or MSPP). The PNLT is the entity in charge of overseeing all prevention, treatment, and control activities related to TB throughout the territory. The PNLT manages the program through a network of CTs and CDTs. The PNLT shares the management of the TB lab with the LNSP (Figure 8).

Figure 8. Organizational and administrative structure of Haiti's TB program
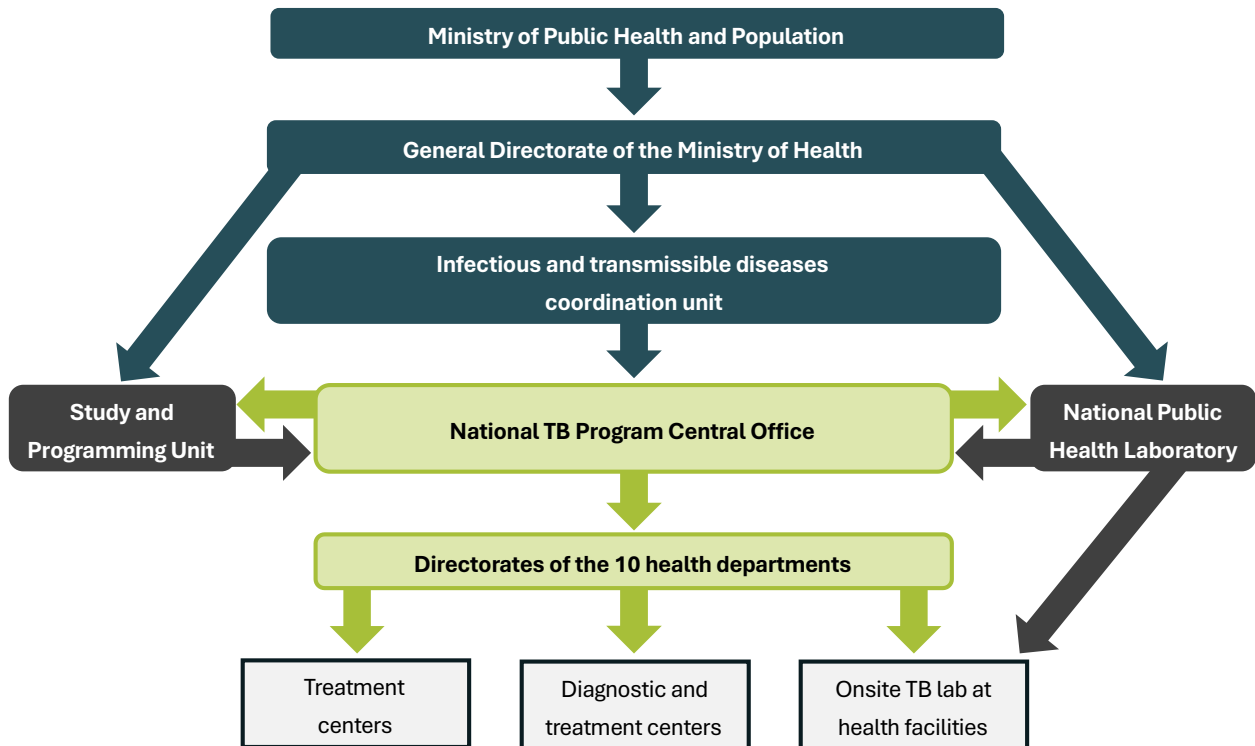
Source: Haiti ARC Report, TB DIAH (2024).

Domain 2: Data Analysis and Use

Domain 2, subdomain 1 (Data integration and exchange), received an aggregate score of 2.56; subdomain 2 (Analytics and visualization) received an aggregate score of 3.06; and subdomain 3 (Dissemination and communication) received an aggregate score of 2.38 (Figure 9).

Figure 9. Domain 2 subdomain scores (aggregate of group responses)
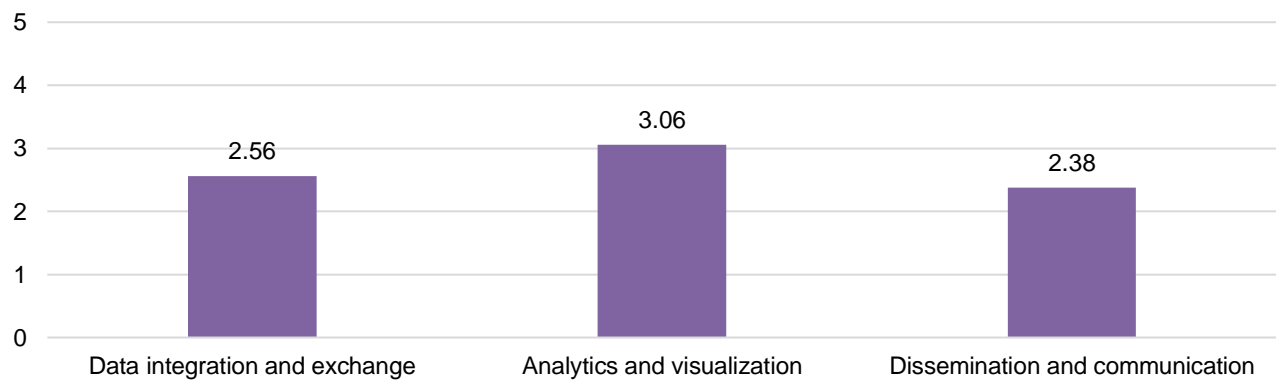
The qualitative findings for domain 2 (10 questions) were that the MSPP uses DHIS2 as a central data repository, which allows for data reporting, analysis, interpretation, and visualization to occur. Data are validated at all levels. The DHIS2 Tracker application is used by the TB program to track TB patients. Interoperability efforts are ongoing with the MESI platform to integrate TB data reported and entered on the HIV information system. The data repository is not available and accessible to most health providers (**question 12**).

Data exchange processes between systems at points of service for TB cases and reporting and/or central repositories only occur during quarterly monitoring and data validation meetings and meetings between the PNLT and its TB partners (**question 13**). Regarding data exchange processes between systems at points of service for laboratory testing and reporting and/or central repositories, data are collected but the sharing is limited (**question 14**).

Given that the monitoring of TB cases is done on a cohort basis, users' ability to conduct descriptive analysis allows to compare trends and the evolution of the disease burden by visualizing using graphs or histograms (**question 16**).

A communication strategy document exists but has not yet been implemented (**question 20**). Participants stressed the importance of data and information products M&E, which are crucial to improving the surveillance system and are a major pillar in data reporting (**question 21**). No individual or group-level qualitative data exist for **questions 15 and 17–19**.

Domain 3: Leadership, Governance, and Accountability

Domain 3, subdomain 1 (Data use guidance), received an aggregate score of 2.75; subdomain 2 (Data access and sharing) received an aggregate score of 4.25; subdomain 3 (Organizational structure and function) received an aggregate score of 3.25; subdomain 4 (Leadership and coordination) received an aggregate score of 3.13; subdomain 5 (Monitoring, evaluation, and learning—MEL) received an aggregate score of 4.13; and subdomain 6 (Financial resources) received an aggregate score of 2.5 (Figure 10). Since we are considering the individual aggregate score as more accurate for domain 4, subdomain 3, then domain 3, subdomain 2, was the highest performing subdomain among groups.

Figure 10. Domain 3 subdomain scores (aggregate of group responses)
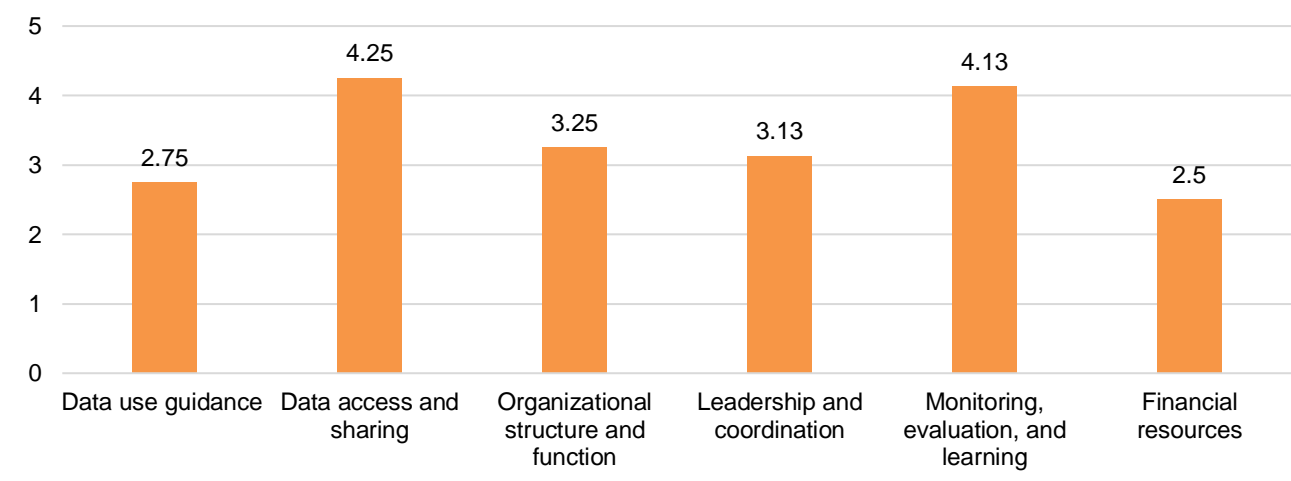
The qualitative findings for domain 3 (11 questions) were that the data use guidelines are not documented and that updates should occur on an annual basis; the current guidance in use is five years old, dating back to 2018 (**question 22**). Health facilities do not systematically have access to the data or do not have established data sharing permissions. While the PNLT decides who communicate data to and which decision makers receive it, data are available for all stakeholders on DHIS2. Data are also presented during meetings with implementing partners (**question 23**). MEL supports program improvement by targeting data quality needs to generate more accurate analysis (**question 30**). Financial resources are insufficient (**question 32**).

No individual or group-level qualitative data exist for **questions 24–29 and 31.**

Domain 4: Capacity Building

Domain 4, subdomain 1 (Data interpretation), received an aggregate score of 3.42 and subdomain 2 (Skill and knowledge development) received an aggregate score of 1.85 (Figure 11). Domain 4, subdomain 3 (Decision making ability), received an aggregate score (from individual responses) of 4.07—making it the highest-performing subdomain among individual respondents.

This third subdomain, from the aggregate of group responses, received a score of 4.38, and was also the highest-performing subdomain for group responses. Since the questions pertain to personal and subjective opinions on job satisfaction, mentorship, training, and incentives/motivation, the aggregate score from individual responses was used for the analysis.

Figure 11. Domain 4 subdomain scores (aggregate of group responses for subdomain 1 and 2 and of individual responses for subdomain 3)
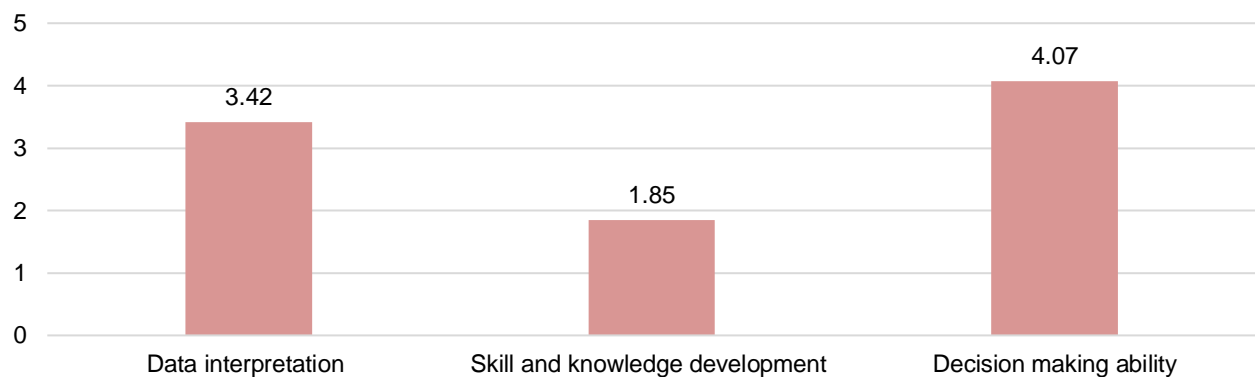
The qualitative findings for domain 4 (12 questions) were that data validation workshops are reliably conducted on a quarterly basis, gathering leaders from the central, departmental, and health facility levels (**question 33**). Also on a quarterly basis, the central level PNLT meets with regional PNLT staff for a data validation exercise and to jointly consider corrective measures for monitored indicators that are not performing well so as to address the identified gaps (**question 34**). Opportunities for supportive supervision and mentorship for data use mostly exist at the institutional level (not offered by a third party), but participants have appreciated the value of supervisions allowing for the improvement of work that was completed while incorporating the recommendations made during supervision visits (**question 35**).

The national pre-service and in-service training program for skill and knowledge development is not currently a part of the training program—any trainings that do occur are not part of a national program (**questions 36 and 38**). A group stressed the importance of training continuity so as to continue to improve program performance, and another mentioned that the effectiveness of staff trained by the PNLT depends on the results obtained after evaluations are conducted on the data that these staff are responsible to oversee (collection, entry, and analysis) (**question 40**).

For the four questions that pertained to individual perceptions of decision making ability, participants shared that in the North departmental health office, they always work as a team and make decisions together with the following goals: favorable outcomes, constructive changes, and increasing the quality of data they can use for analysis later on (**question 41**). Others shared that they wish to continue working with a solid team, that they enjoy their work, and that they feel a calling for analyzing data (which is why they care that the data they receive be accurate and reliable) so as to make the best decisions for the good functioning of the PNLT. Another participant shared that they do not receive financial incentives or rewards for good work, but that when they have performed excellently, they are congratulated by their team (**question 42**). Another participant shared that it has been more than a year since they received a training on data M&E, but that at every quarterly supportive supervision meeting, reminders are given so as to attempt to continue to maintain the level and quality of the work (**question 43**). Finally, one last participant shared that their supervisor is always attentive and available to receive questions, suggestions, or idea sharing so as to improve the work and collaboration. The supervisor and their team have shared objectives when it comes to decision-making about TB (**question 44**).

No individual or group-level qualitative data exist for **questions 37 and 39**.

Domain 5: ICT

Domain 5, subdomain 1 (Hardware) received an aggregate score of 2.5; subdomain 2 (Network and connectivity) received an aggregate score of 2; and subdomain 3 (ICT business infrastructure) received an aggregate score of 1.75 (Figure 12). Domain 5 was the lowest performing domain, and domain 5, subdomain 3, was the lowest performing subdomain.

Figure 12. Domain 5 subdomain scores (aggregate of group responses)
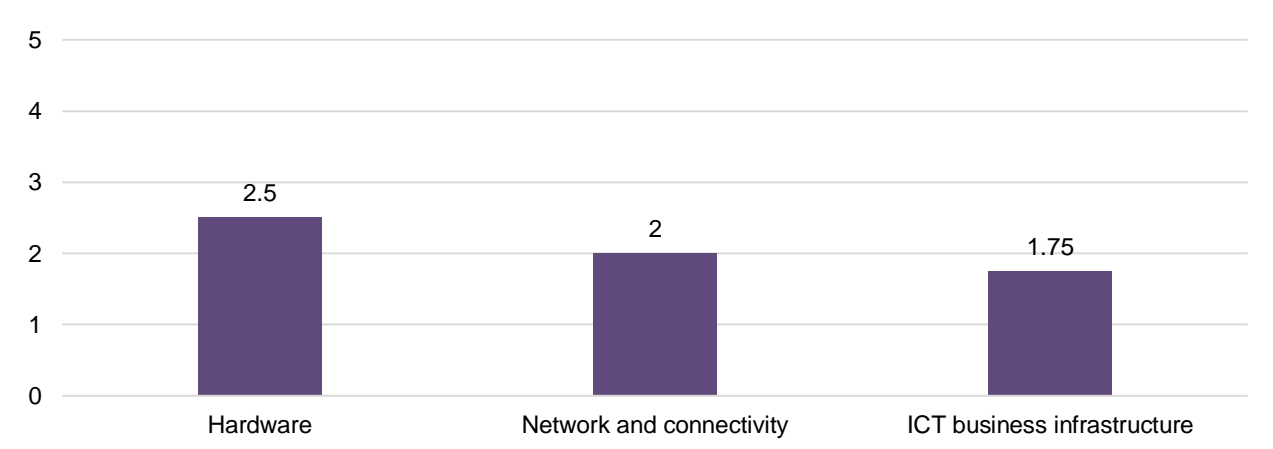
The qualitative findings for domain 5 (four questions) were that despite certain hardware needs being met, unstable Internet connections were still hindering work and productivity (**question 45**). Other participants confirmed that the Internet connection was a recurring challenge and that the network was unreliable, with interruptions sometimes lasting for days (**question 47**).

No individual or group-level qualitative data exist for **questions 46 and 48.**

TB Users' Data Needs

Participants in the workshop identified with five key user roles, and for which they answered the relevant user role questions. These questions can be found at the end of Appendix E.

The range of responses for TB data needs met varied, with participants in healthcare provider roles reporting that only around 19 percent of their TB data needs were being met, while national reference laboratory staff had over 77 percent of their needs met. District TB coordinators/managers/health officers, as well as NTP managers and policy makers had roughly a third of their TB data needs met, and regional TB coordinators/managers and national M&E directors/managers had approximately 50 percent of their TB data needs met (Figure 13).

It should be noted that not all respondents completed the user role section, so these data may not be entirely representative of the opinions of all participants in these roles. All the participants who identified with an "other" role in the questionnaire (including all private sector personnel) had no user roles assigned, resulting in a lack of responses in this part of the instrument in their case.

Figure 13. Participants' perspectives on how well TB data needs are met, by user role, in percentage

User role	Percentage
Healthcare provider	18.75
National reference laboratory manager	77.78
District TB coordinator/manager/health officer	37.04
Regional TB coordinator/manager	52.78
National M&E director/manager	55.56
NTP manager/policy maker	36.84
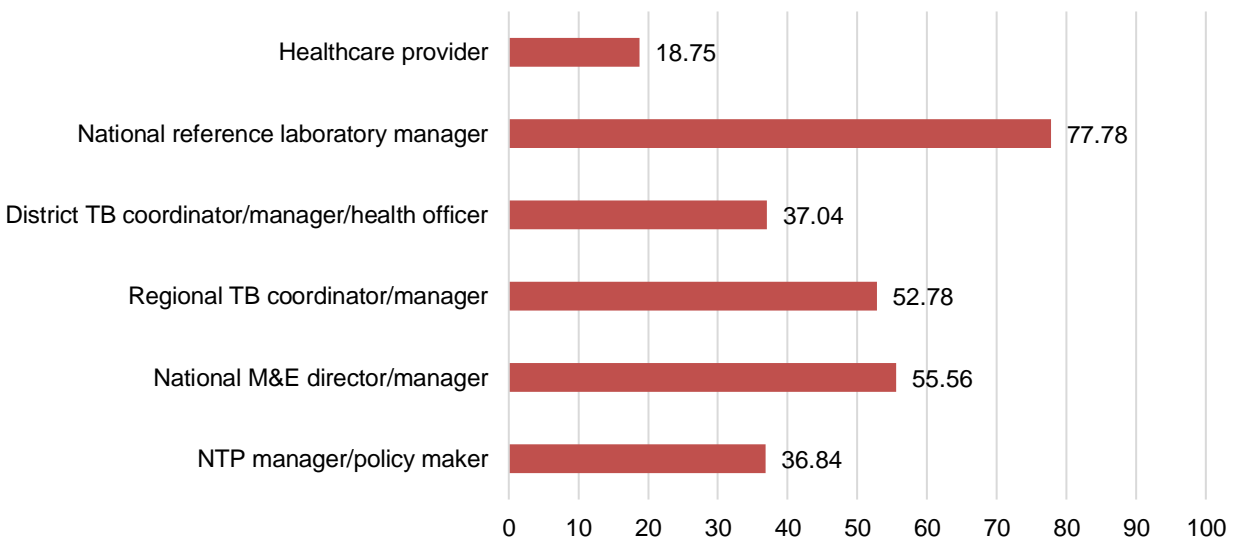
Comparing Individual and Group Results

A comparison of the individual and group responses revealed that individuals scored higher than groups for all domains but domain 1 (Data Collection and Reporting), with the biggest gap

at 0.64 points for domain 5 (ICT), and the smallest at 0.10 for domain 3 (Leadership, Governance, and Accountability), as seen in Figure 14.

Figure 14. Difference between individual and group results, by domain
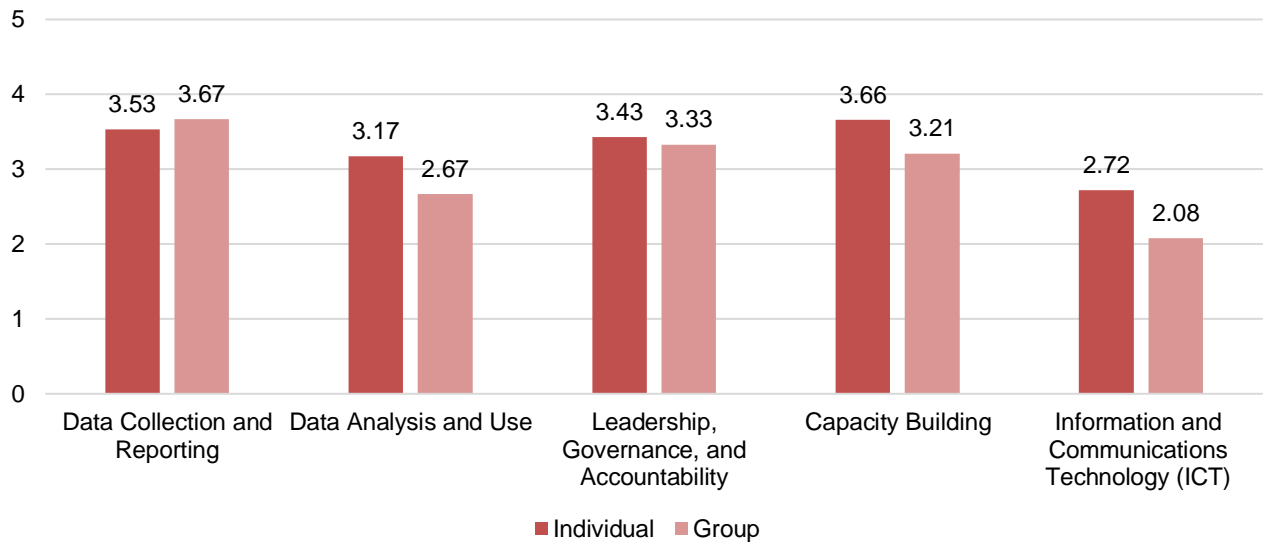
Note: In comparing the scores for domain 4 and the overall score, it is important to note that the same score of 4.07 was used for D4S3 for both group and individual aggregate averages.

When examining individual and group differences at the subdomain level, the trend is also that individual scores were overall higher than group scores for all but four subdomains—D1S3, D3S2, D3S5, and D4S3 (as previously discussed). The largest score gap was in the scoring of D4S2 (1.33) and the smallest gap was for D2S2 (0.01) (Figure 15 and Appendix F).

Figure 15. Difference between individual and group results, by subdomain
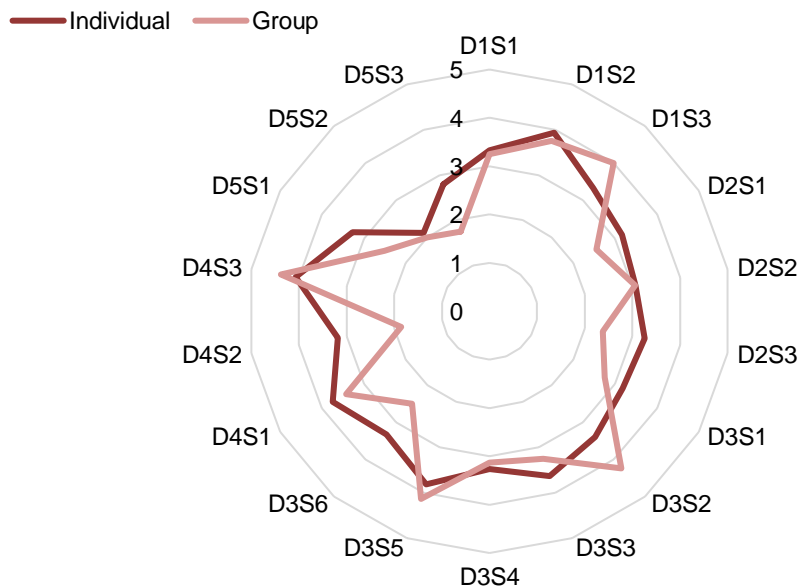
Co-created Priority Actions

The count of individual votes resulted in five subdomains being identified as priority subdomains (receiving between 8 and 11 votes each). Eight other subdomains received between 4 and 6 votes each, four subdomains received between 1 and 3 votes each, and finally, one subdomain received no votes at all (Table 5). The five priority subdomains were D2S3 (Dissemination and communication), D5S2 (Network and connectivity), D4S2 (Skill and knowledge development), D1S3 (Data quality), and D3S2 (Data access and sharing).

Table 5. Number of votes by subdomain

Subdomain		Votes
D2S3	Dissemination and communication	11
D5S2	Network and connectivity	11
D4S2	Skill and knowledge development	10
D1S3	Data quality	8
D3S2	Data access and sharing	8
D1S1	Data collection tools and workflow	6
D2S2	Analytics and visualization	5
D3S5	Monitoring, evaluation, and learning	5
D1S2	Reporting	4
D3S6	Financial resources	4
D4S3	Decision making ability	4
D5S1	Hardware	4
D5S3	ICT business infrastructure	4
D2S1	Data integration and exchange	3
D3S1	Data use guidance	2
D3S3	Organizational structure and function	1
D3S4	Leadership and coordination	1
D4S1	Data interpretation	0

For the five subdomains evaluated, 18 participants split up in groups and came up with 14 priority actions in a combined implementation plan ([Appendix G](#)).

For D1S3 (Data quality), the group of four suggested that the priority actions should be to organize a refresher course for service providers specifically aimed at strengthening their skills in completing the data collection tools, followed by further efforts around data analysis and validation, and entry of valid data into DHIS2.

For D2S3 (Dissemination and communication), the group of four suggested that the priority action should be to set up a dashboard system on the MSPP website, giving the general public access to information and data on certain TB indicators.

For D3S2 (Data access and sharing), the group of four suggested that the priority actions should be to make data from the sharing platform available in real time, and increase data accessibility for stakeholders.

For D4S2 (Skill and knowledge development), the group of three suggested that the priority actions should be to design an initial and ongoing training plan for PNLT managers, subsequently implement the initial training, followed by ongoing training and refresher courses for managers, and finally evaluate the impact of the training program.

For D5S2 (Network and connectivity), the group of three suggested that the priority actions should be to identify sites with connectivity problems, provide those client care sites with Internet connections, and conduct more advocacy with support from partners.

Discussion

The February 2024 D2AC assessment in Haiti shed light on the perceived areas of improvement of the Haiti TB information system, namely in the areas of data integration and exchange, dissemination and communication, data use guidance, financial resources, skill and knowledge development, and all three subdomains related to ICT. That being said, overall Haiti has clear areas in need of strengthening, with two subdomains receiving scores lower than 2 out of 5. Participants selected a number of these weaker-performing subdomains as areas to focus on for the priority action exercise.

The D2AC assessment in Haiti also shed light on the areas that were performing well. The strongest-performing area was data access and sharing, followed by strong scores in MEL, data quality, and decision making ability (based on individual scores). Ten of the eighteen subdomains received scores superior to 3 out of 5, meaning that they were identified as being at least at an "established" stage on the continuum, and four among those (the subdomains listed in the previous sentence) received scores superior to 4 out of 5 ("institutionalized" stage of the continuum). Interestingly, some of these strongest categories, like data quality, were among the ones selected by participants for priority actions.

The D2AC records data in two ways: individual and group responses. The individual responses provided an opportunity for workshop participants to orient themselves to the content of the tool and engage in forethought on the maturity of the various capabilities, subdomains, and domains. The group-level exercise provided an opportunity for participants to derive a consensus view following discussion among themselves. The group-level results should be considered the more reasoned responses (which is therefore why we reference these as the "assessment scores"), given that a post hoc analysis of group constitution yielded reassurance that the appropriate background and experience were present in the groups. The individual responses could be used to validate the group responses if they were not substantially different (that is, if they were similar, it could be reasonably assumed that the group responses reflected the actual maturity of the system). If individual and group responses differed significantly, a comparison of individual and group responses at the capability and subdomain level could provide insight on the disparity. For example, the comparison may reveal that individual respondents lacked significant background or experience, or it could bring to light an overly influential group member. Differences in individual versus group responses are unlikely to indicate bias given the coherence in results between individual and group responses. Low variance was noticed between individual and group responses (see Figures 14 and 15), and the overall aggregate assessment scores between groups and individuals varied by only 0.4 points (see table F1 in Appendix F).

Recommendations

This section presents the priority recommendations developed in small groups, combined in a joint implementation plan in plenary, and validated by the workshop participants. They are described in detail in the implementation plan (Appendix G). The recommendations can be summarized in four broad categories:

First, participants recommended developing and implementing the following **trainings to be designed and held**: a refresher course for service providers specifically aimed at strengthening their skills in completing the data collection tools, as well as designing an initial and ongoing (i.e., refresher) training plan for PNLT managers.

Second, participants also compiled a list of **supportive supervisions and data use practices they wish to see more thoroughly conducted**: further efforts around data analysis and validation, and entry of valid data into DHIS2, as well as providing client care sites with Internet connections for those activities.

Third, participants reflected on areas where **increasing public access to data is key to broader data use**: introducing a dashboard system on the MSPP website, giving the general public access to information and data on certain TB indicators, making data from the sharing platform available in real time, increasing data accessibility for stakeholders, and conducting more data-based advocacy to obtain the support of partners in expanding connectivity at healthcare provision sites.

Last, participants suggested various types of **evaluations or programmatic research to be conducted**: evaluating the impact of the training programs developed and identifying sites with connectivity problems so as to prioritize equipping them with the necessary hardware and connection.

The 14 detailed priority recommendations can be found in Appendix G.

Conclusion

Despite accounting for a small percentage of the worldwide TB burden, the state of Haiti, its Ministry of Health, and its PNLT are faced with important challenges of various natures (political, economic, human resources, external support) to address the country's important infectious disease burden.

The D2AC assessment in Haiti highlighted both the high-performing elements of the NTP's data use capabilities and the challenges that should be addressed to improve evidence-based decision making. The assessment revealed good performance in certain dimensions of the D2AC, such as data access and sharing, MEL, data quality, and decision making ability. However, it also revealed important gaps, such as data integration and exchange, dissemination and communication, data use guidance, financial resources, skill and knowledge development, and all three subdomains related to ICT. These findings provide evidence of the areas needing programmatic interventions and can also inform policy makers, donors, and program managers who want to design and implement responsive programs and interventions to strengthen and improve data use capabilities for evidence-based decision making to provide targeted and informed high-quality services for all TB patients.

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Appendix A. D2AC Haiti Workshop Agenda

Monday, February 26, 2024 D2AC Assessment Workshop Day 1 Location: Roi Christophe Hotel, Cap-Haïtien	
Time	**Activity**
8:30–9:00	Registration, participant welcome
9:00–9:30	Welcome address by PNLT Director, introduction of all participants and facilitators
9:30–9:45	Presentation of workshop objectives and steps
9:45–10:30	Introducing the D2AC assessment approach, process, and toolkit
10:30–10:45	Coffee/tea break
10:45–13:00	Step 1: Individual instrument submission using online D2AC Toolkit
13:00–14:00	Lunch
14:00–16:30	Step 2: Group instrument submission using online D2AC Toolkit (assigned)
16:30–17:00	Day 1 wrap-up and closing
Tuesday, February 27, 2024 D2AC Assessment Workshop Day 2 Location: Roi Christophe Hotel, Cap-Haïtien	
Time	**Activity**
8:30–8:45	Registration, participant welcome, day one recap and overview of day two
8:45–9:15	Finalization of group work (4 groups prepare a short 10-minute presentation)
9:15–10:00	Step 3: Plenary discussion on group work (group presentations and Q&A)
10:00–10:45	Step 4: Presentation of individual and aggregate group assessment data (in plenary)
10:45–11:15	Coffee/tea break
11:15–11:30	Step 5: Identification of priority action items by vote and creation of five groups (unassigned)
11:30–13:00	Step 6: Start of group work on draft implementation plan for priority action items
13:00–14:00	Lunch
14:00–15:00	Step 6 (continued): Draft implementation plan for priority action items
15:00–16:30	Step 7: Presentations on group work and consolidation of implementation plan
16:30–17:00	Presentation of next steps and closing words by the PNLT Director Acknowledgments, certificate ceremony, and group photo

Appendix B. D2AC Haiti Workshop Participants

Names of IPs appear in alphabetical order by name.

Name	Affiliation
Milo Richard	PNLT
Franceline Clerger	PNLT
Jeanne Sendy Malachie	PNLT
Christy Joanne Saint Vil	UEP
Eud Paris	UEP
Alande Samedi	PNLS
Roodnyk Dupuy	LNSP
Monise François	HUJ
Kerlande Michel	DSN
Rose Nadia Noel Metellus	DSN
Marilene Maxime	DSNE
Ronald Thiersaint	CDC
Valdir Cassagnol	CMMB
Stalz Vilbrun	GHESKIO
Olivier Rosene	HTW
Ferquet Lorvilon	ICC/Grace Children's Hospital
Wisny Docteur	PIH/ZL
Claudinette Lyscharde Pierre	UGP
Marc Edwin Casseus	USAID
Harry Geffrard	WHO

Appendix C. D2AC Toolkit Haiti Country Profile

Demographic, Geographic, and Socioeconomic Features		Response	Year	Source
Demographic				
	Area/size of the country (km^2)	27,750		N/A
	Notable borders	Dominican Republic, the Caribbean		N/A
	Estimation of population size	11.58 million	2022	The World Bank[1]
Administrative structure				
	Regions/provinces/states (#)	10	2024	N/A
	Districts/councils/counties (#)	42 districts; 146 municipalities; 48 quartiers; 572 municipal sections	2018	The OECD Library[2]
	Service delivery sites — Facility-based (#)	Not available		
	Service delivery sites — Community-based (#)	Not available		
Socioeconomic features				
	United Nations classification	Lower-middle income		N/A
	Population below the poverty line	2.5 milion	2020	The World Bank[3]
	Rural (%)	56.40	2022	Encyclopaedia Britannica[4]
	Urban (%)	44	2022	Encyclopaedia Britannica[4]
	Major revenue sources	textiles, sugar refining, flour milling, cement, light assembly using imported parts	2024	The World Factbook, Central Intelligence Agency[5]
TB Epidemiologic Burden and Trends		Response	Year	Source
TB mortality rate		91 cas per 100,000	2021	Pan-American Health Organization[6]
TB incidence		116 cas per 100,000	2023	World Health Organization (WHO)[7]
TB case notification rate		63%	2022	The World Bank[8]
TB treatment coverage		63%	2022	WHO[9]
TB treatment success rate		82%	2022	WHO[9]
MDR/RR-TB incidence		7.4 pe 100,000 population (860)	2022	WHO[9]
MDR/RR-TB treatment enrollment rate		84%	2022	WHO[9]
XDR-TB incidence		5.1 pe 100,000 population	2018	PubMed[10]
HIV coinfection rate		1,507 er 100,000 populaion	2020	STOP TB Partnership Country Dashboard[11]
TPT coverage *(number of people started on TPT)*		625 pe 100,000 populaion	2021	TB DIAH Data Hub[12]
WHO impact indicators				

Demographic, Geographic, and Socioeconomic Features	Response	Year	Source
Reduction in TB incidence rate (compared with 2015)	40 per 100,000 population	2022	The World Bank[13]
Reduction in TB deaths (compared with 2015)	1 per 10,000 population. (2015: 7 per 100,00 populaion) (2022: 18 per 100,00 population)	2022	WHO TB Global Report 2023[14]
TB-affected families facing catastrophic costs dues to TB (%)	Not ailable		

NTP Laboratory and Workforce Capacity	Response	Year	Source
Laboratory centers (#)			
Total number of laboratories conducting TB diagnosis (#)	235	2022	WHO TB Global Report 2023[14]
Microscopy centers	221	2022	WHO TB Global Report 2023[14]
GeneXpert sites	25	2022	WHO TB Global Report 2023[14]
Culture laboratories	2	2022	WHO TB Global Report 2023[14]
Reference laboratories	1	2014	WHO TB Global Report 2023[14]
Does a laboratory referral network exist? (Yes/No)	Unknon		
Human resources			
NTP staff supported by government (#)	Not ailable		
NTP M&E staff supported by government (#)	Not ailable		
Resources allocated toward M&E or TB M&E ($)	Not ailable		
TB/HIV officers recruited under partner's support absorbed into payroll (%)	Not ailable		

TB Health Financing	Response	Year	Source
WHO recommended level for the country	Low Inme	2020	STOP TB Partnership[11]
TB treatment is free (Yes/No)	Yes		N/A
People eligible for exemptions who receive those exemptions (%)	Not ailable		
Proportion of population with TB who received social protection under the national health insurance scheme (%)	63	2022	WHO[9]
Proportion of health budget allocated to TB services (%)	3.4 million USD (proportion unknown)	2022	WHO[9]
Proportion of annual TB budget funded by donors (%)	94	2020	STOP TB Partnership[11]
Proportion of domestic TB financing (%)	2	2020	STOP TB Partnership[11]
Proportion of cases that led to catastrophic costs due to TB (%)	Not ailable		

Research and Development	Response	Year	Source
Proportion of national TB budget allocated to research	$53,28 out of total $10,09,744	2020	STOP TB Partnership[11]

Demographic, Geographic, and Socioeconomic Features	Response	Year	Source
Surveys and research being conducted (e.g., prevalence surveys). Please provide name, year, and implementing/financing entity.			

[1] https://data.worldbank.org/indicator/SP.POP.TOTL?locations=HT

[2] https://www.oecd-ilibrary.org/sites/c7e6f6f2-en/index.html?itemId=/content/component/c7e6f6f2 en#:~:text=Haiti%20is%20a%20heterogeneous%20country,quartiers%20and%20572%20municipal%20sections

[3] https://www.worldbank.org/en/results/2020/01/08/haiti-providing-opportunities-for-all-haitians

[4] https://www.britannica.com/facts/Haiti

[5] https://www.cia.gov/the-world-factbook/countries/haiti/summaries

[6] https://hia.paho.org/en/countries-22/haiti-country-profile#

[7] https://data.who.int/indicators/i/C288D13

[8] https://data.worldbank.org/indicator/SH.TBS.DTEC.ZS?locations=HT

[9] https://worldhealthorg.shinyapps.io/tb_profiles/?_inputs_&entity_type=%22country%22&iso2=%22HT%22&lan=%22EN%22

[10] doi: 10.1371/journal.pone.0248707. PMID: 33735224; PMCID: PMC7971505.

[11] https://www.stoptb.org/static_pages/HTI_Dashboard.html

[12] https://hub.tbdiah.org/pbmef/indicators/tb-preventive-treatment-coverage?country=184

[13] https://data.worldbank.org/indicator/SH.TBS.INCD?locations=HT

[14] https://www.who.int/teams/global-tuberculosis-programme/data

Appendix D. D2AC Toolkit Glossary

Term	Definition
ad hoc	Arranged or happening when necessary and not planned in advance.
aggregate data	Compilation of individual data systems and data that could result in the totality of the information being classified and stratified at a higher level.
algorithm	A process or a set of rules to be followed in calculations or other problem-solving operations, especially by a computer; a common term used to show decision trees for diagnostic or treatment procedures (e.g., treatment algorithm; diagnostic algorithm).
aligned	The fit between the data flow and data collection or program goals and data analysis and data collection.
analytics	The process of discovering, interpreting, and communicating significant patterns in data.
capacity building	Capacity building focuses on strengthening the skills and knowledge of personnel, the management and governance of a program or project, and organizational infrastructure.
cascade analysis	Cascades are frameworks for monitoring gaps in program services needed to achieve goals and health outcomes.
case-based data	Patient-level data for a series of key or sentinel (reportable) events, used to measure and monitor the incidence, progression, and outcome of a disease.
central data repository	A centralized place to store and maintain data *(see standards-based central data repository for more information).*
client	An individual who is a potential or current user of health services; may also be referred to as a patient or beneficiary.
commodities	A raw material that can be bought and sold.
communication strategy	An outlined method used for exchanging information that can be visual, verbal, or in written form. A plan to achieve communications objectives internal or external.
data	A reinterpretable representation of information in a formalized manner suitable for communication, interpretation, or processing (e.g., a sequence of bits, a table of numbers, the characters on a page, and the recording of sounds made by a person speaking).
data analysis	The examination of acquired data for its significance and probative value to the case.
data audit	A guided inspection of an organization's health data registries and forms, typically by an independent body.
data collection system	A computer application that facilitates the process of data collection, allowing specific, structured information to be gathered in a systematic fashion, subsequently enabling data analysis to be performed on the information.
data element	A basic unit of information that has a unique meaning and subcategories (data items) of distinct value (e.g., gender, race, and geographic location).
data exchange	The process of taking data structured under a source schema and transforming it into a target schema, so that the target data are an accurate representation of the source data. Data exchange allows data to be shared between different computer programs.
data governance	A set of processes that ensures that data assets are formally managed throughout the healthcare system. A data governance model establishes authority, management, and decision-making parameters related to the data produced or managed by the healthcare system.

Term	Definition
data quality parameters	Dimensions used to examine, evaluate, and improve data quality— they include accuracy (are the data collected and reported in a manner by which the data are to be trusted because they are a reflection of the reality, [i.e., there are no omissions or duplicates]?), timeliness (are the data collected, cleaned, reviewed, or reported according to issued protocol and guidance?), completeness (are the data submitted complete, and are all the variables and indicator data fields properly filled out?), among others.
data quality reviews	A process whereby data and associated data files are assessed and required actions are taken to ensure that files are independently understandable for informed reuse. This is an active process involving a review of the files, documentation, the data, and the code.
data reporting tools	The paper and electronic tools used to transfer collected or received data to a higher level in an organized, streamlined, and consistent manner.
data source	The location from which the data being used originates and can include primary, secondary, and tertiary data sources.
data use	Instances where data are currently reviewed, updated, processed, erased, accessed, or ready to inform a recommendation for action in strategic planning, policymaking, program planning and management, advocacy, or delivering services.
data use forum	An event, series of events, or space (physical or virtual) dedicated to and gathering multiple actors in data use activities, practices, and exercises (e.g., quarterly data review and use meetings; online discussion groups/listservs).
decision making	The selection of a course of action from among two or more possible alternatives in order to arrive at a solution for a given problem.
decision support tools	Electronic applications to assist decision makers by providing evidence-based knowledge in the context of clinical decision making (e.g., decision tree, drug interaction alerts at the time medication is prescribed or reminders for specific guideline-based interventions during the care of patients with chronic disease) or policy/program decision making (e.g., dashboards or scorecards to help guide policy/program decisions).
descriptive analysis	Statistical techniques used to summarize and describe a data set, and also the statistics measures used in such summaries.
disaggregate data	Breaking down of data into smaller groupings, often based on such characteristics as sex, income, or racial/ethnic group.
exchange standards	Refers to the exchange of information according to a set of standards. Standards are agreed on methods for connecting systems together and may pertain to security, data transport, data format or structure, or the meaning of codes or terms.
evaluation	The systematic assessment of an ongoing or completed intervention to determine whether the intervention is fulfilling its objectives and to demonstrate an effect on health outcomes.
function	The functionality of a system is how well the system works when examining it against relevant documents that describe the conceptual design of the system(s).
guideline	A general rule, principal, or piece of advice.
health information system (HIS)	The HIS provides the underpinnings for decision making and has four key functions: data generation, compilation, analysis and synthesis, and communication and use. The HIS collects data from the health sector and other relevant sectors, analyzes the data, ensures their overall quality, relevance, and timeliness, and converts data into information for health-related decision making.
indicator	A quantitative or qualitative factor or variable that provides a simple and reliable means to measure achievement.

Term	Definition
information and communications technology (ICT)	The means employed to provide access to information through Internet, wireless networks, cell phones, and other communication media.
information products	Data that has been compiled, managed, and analyzed becoming evidence that can be used by decision makers.
in-service training program	Training concurrent to official responsibilities for improving professional qualifications or skills. Can be compulsory related to official professional development activities to maintain or upgrade professional qualifications or it can be optional for the sole purpose of improving skills.
in source documents	Documents from which data were originally collected (i.e., facility registers and tally sheets).
integration	The inter-connectivity requirements needed for two applications to securely communicate data to and receive data from another.
inventory	An itemized list of current information system/digital assets.
master facility list	A standard mechanism for uniquely identifying health facilities, which allows for information to be compared across time and across data sources for individual facilities.
mandate	An official order or commission to do something.
monitoring	The process of collecting and analyzing routinely collected data to compare how well an intervention is being implemented against expected results and measure changes in performance over time.
monitoring and evaluation plan	Describes and manages the process of assessing and reporting progress toward achieving project outputs and outcomes, and to identify what evaluation questions will be addressed through evaluation.
national health management system (HMIS)	A system whereby health data are recorded, stored, retrieved, and processed to improve decision making.
operational/ operationalized	In use or ready for use/put into use.
points of service	Of, relating to, or being a healthcare insurance plan that allows enrollees to seek care from a physician affiliated with the service provider at a fixed co-payment or to choose a nonaffiliated physician and pay more.
policy	A course or principal of action adopted or proposed by a government, party, business, or individual/a definite course or method of action selected from among alternatives and in light of given conditions to guide and determine present and future decisions.
pre-service training program	Recognized and organized programs designed to train future professionals to formally enter the profession at a specified level of education.
procedures	An established or official way of doing something.
process	Services that the program provides to accomplish its objectives, such as outreach activities, curriculum development, materials developed, counseling sessions, workshops, and training events.
real-time data entry	Data that are not kept or stored, but are passed along/delivered to the end user immediately after being collected.

Term	Definition
requirements (for data analysis and visualization)	Necessary components for bringing order and structure to collected data and putting data into a chart, graph, or other visual format that helps inform analysis and interpretation.
retrospective (data entry)	Data recorded, or the process of recording data, later than the period or moment at which they should have been recorded (e.g., updating patient charts or registers days after the patient visit, when guidance instructs to update the charts and registers immediately following the patient visit).
scenario	A set of simple statements that summarize what the end-user needs the digital health intervention to do.
standard operating procedures (SOPs)	A set of descriptive directions that ensure the correct development of specific activities and processes.
stakeholder	Any person or party with an interest in the financing, implementation, or outcome of a service, practice, process, or decision made by another (e.g., healthcare, health policies).
standardize	Standardized measures are nationally recognized criteria for evaluating the quality of healthcare provided to patients. These measures are endorsed or developed by organizations, specialty medical boards, national accreditors, or government agencies.
standardized electronic data collection tools	A streamlined ensemble of digital data collection tools meant to be used in a consistent manner across a territory or system, as opposed to ad hoc or misaligned systems that make data difficult to compare or combine.
standards	Accepted methods or models of practice; they may be formally approved or de facto standards.
standards-based central data repository	A data bank or data warehouse, centrally managed, which stores and merges data with standardized definitions and terminology from existing databases so that these data can be accessed, shared, integrated, analyzed, reported, or updated as required.
supportive supervision	A process of helping staff improve their own work performance continuously, carried out in a respectful and non-authoritarian way with a focus on using supervisory visits as an opportunity to improve knowledge and skills of health staff and provide feedback.
synthesize (data)	A process of combining data into a coherent whole with the aim of drawing conclusions.
TB service delivery workflows (or just workflows)	A repeatable pattern of activity that can be organized with adequate resources, defined roles, and information and feed into a process that can be documented and learned.
unique identification	An identifier that is guaranteed to be unique among all identifiers; a long-lasting reference that allows for continued access to a digital object for a specific purpose.
visualization (data)	The representation of data in charts, infographics, video graphics, and dashboards or other images.

Appendix E. D2AC Data Collection Instrument

All questions of the data collection instrument appear in both the individual and group questionnaire, with the exception of questions 41–44 which are only included in the individual assessment due to their subjective nature. The User Roles questionnaire can be found at the end.

Domain 1		Data collection and reporting
Subdomain (D1S1)		**Data collection tools and workflows**
Definition		The tools/devices/instruments and processes used for the ongoing systematic data collection to support analysis, interpretation, and sharing of data according to the National TB Program (NTP) guidelines for TB treatment, prevention, and control.
1. To what extent are standardized electronic data collection tools used?		
	1	Non-standardized paper-based tools are the primary tools for data collection at all levels.
	2	Standardized paper-based data collection tools are the primary tools for data collection at all levels.
	3	Standalone standardized electronic data collection tools are often used, including for retrospective data entry, at higher levels.
	4	Standardized electronic data collection tools are used at all levels and integrated with the national health management information system (HMIS) data collection system.
	5	National HMIS data collection system is used for real-time data entry.
2. Do you have an inventory of TB data collection systems (clinical, lab, commodities, training)?		
	1	There is an ad hoc list of TB data collection system.
	2	A list of all the TB data collection systems exists but information about its data and users is limited to the national level.
	3	A complete inventory of all the TB data collection systems, its data, and target users is available with the NTP.
	4	The inventory information is used to inform the need for a new TB data collection system.
	5	TB data collection system inventory is routinely updated to add information about a new TB data collection system.
3. To what extent are data collection processes aligned with TB service delivery guidance?		
	1	Data collection is ad hoc or mainly driven by donor or external stakeholder mandate for data collection.
	2	Some data collection processes align with service delivery guidance.
	3	Data collection processes are aligned with the TB service delivery guidance.
	4	Data collection processes are monitored and assessed to check alignment with the service delivery guidance.
	5	Data collection process monitoring and assessment findings guide revisions and updates.
4. To what extent is unique identification used for TB cases?		
	1	Unique identification is absent or rarely used to identify TB cases.
	2	Some TB program sites use their own unique identifiers to identify TB cases.

3	The NTP uses unique identifiers for TB cases across program sites.
4	Unique identifiers for TB cases are aligned with the national unique (person or patient) identifiers.
5	The NTP ensures use of unique identifiers to track and treat TB cases across all TB sites (program, testing, pharmacy).

5. To what extent is the NTP site list standardized and in what format is it?

1	The NTP site list is absent or only includes site names.
2	The NTP has an electronic site list but it is incomplete.
3	The NTP has a web-based site list (similar to a master facility list) that is complete.
4	The NTP web-based site list is integrated into the master facility list.
5	The NTP web-based site list is routinely reviewed and updated together with the national master facility list.

6. How is data disaggregation (e.g., by sex or age, treatment/retreatment, drug-resistant/drug susceptible) addressed in data collection?

1	Data are rarely or inadequately disaggregated in the site level data collection.
2	Data collection tools (paper or digital) and processes allow disaggregation of data but disaggregate data are not collected.
3	NTP guidance require collection of disaggregate data.
4	NTP monitoring and review assesses quality of disaggregated data collection.
5	The NTP routinely reviews and updates disaggregate data collection requirement in the monitoring and evaluation (M&E) plan.

Domain 1	Data collection and reporting
Subdomain (D1S2)	**Reporting**
Definition	The tools/devices/instruments and processes used for the ongoing systematic data reporting to support analysis, interpretation, and sharing of data according to the NTP guidelines for TB treatment, prevention, and control.

7. To what extent are standardized electronic data reporting tools used?

1	Non-standardized paper-based tools are the primary tools for reporting at all levels.
2	Standardized paper-based reporting tools are used at all levels.
3	Standalone standardized electronic data reporting tools are used at national and district levels for aggregate data reporting, at higher levels.
4	Standardized electronic data reporting tools for aggregate data (i.e., not real time) are used at all levels and integrated into the national HMIS.
5	Standardized real time (e.g., case-based or point of service data entry) electronic data reporting tools are used.

8. How is data disaggregation (e.g., by sex or age, treatment/retreatment, drug-resistant/drug susceptible) addressed in reporting?

1	Data are rarely or inadequately disaggregated in the site level reporting.
2	Data reporting tools (paper or digital) and processes allow disaggregation of data but data are incomplete or rarely collected.
3	NTP guidance require reporting of disaggregate data.
4	NTP monitoring and review assesses quality of disaggregated data reporting.

	5	The NTP routinely reviews and updates disaggregate data reporting requirement in the M&E plan.
9. To what extent are data reporting processes aligned with TB service delivery guidance?		
	1	Data reporting is ad hoc or mainly driven by donor or external stakeholder mandate for reporting.
	2	Some data reporting processes align with TB service delivery guidance.
	3	Data reporting processes are aligned with the TB service delivery guidance.
	4	Data reporting processes are monitored and assessed to check alignment with TB service delivery guidance.
	5	Data reporting processes are routinely updated based on NTP service delivery guidance revisions.

Domain 1	Data collection and reporting	
Subdomain (D1S3)	**Data quality**	
Definition	The accuracy, completeness, timeliness, consistency, reliability, and integrity of data.	
10. To what extent is data quality assurance defined and applied in NTP data systems?		
	1	Data quality is defined and measured in an ad hoc manner.
	2	Data quality parameters are clearly defined and documented by NTP.
	3	Data quality assessments are routinely conducted for priority indicators.
	4	Data quality problems are documented and factored in data analysis to be comparable across sources and time.
	5	High quality data (complete, consistent, and accurate) are available for at least the priority indicators for the last two years or more.
11. To what extent has the NTP integrated data quality assurance into standard practice?		
	1	Data quality is not checked or ad hoc and non-standardized data quality assessments are conducted.
	2	Data quality assessments are limited to donor-funded programs.
	3	The NTP conducts routine standardized data quality assessments for both in-source documents at the facility and for the reported data.
	4	The NTP uses data quality assessment findings to improve the data and capacity to collect and report good quality data.
	5	Data quality limitations identified in data quality assessments are routinely factored in the evaluation of program performance and management (e.g., program review).

Domain 2	Data analysis and use	
Subdomain (D2S1)	**Data integration and exchange**	
Definition	The mechanism for transforming and integrating data from multiple sources into a target destination environment; can also refer to the activities of matching, merging, and deleting records within a single data store.	
12. To what extent has a central data repository been developed?		
	1	The NTP lacks central data repository(ies) (e.g., a national reporting system, a TB case report repository) where TB case report data are analyzed/reported to (at case or aggregate level).

	2	The system requirements for a central data repository are documented but not implemented.
	3	An electronic central data repository collates aggregate program data only at national level.
	4	A standard-based central data repository collates data from all the TB data collection systems.
	5	The central data repository is routinely used by NTP stakeholders to address program data analytics and visualization needs.

13. To what extent are there data exchange processes between systems at points of service for TB cases and reporting and/or central repositories currently in place?

	1	Data exchange processes are missing or are limited and require manual intervention.
	2	There is some data exchange at the national level but limited automated exchange.
	3	Data exchange occurs extensively on a national level and is mostly automated.
	4	All data exchange is automated with adequate budgetary resources in the program to meet custom requirements.
	5	All data exchanges are automated, resourced, and no specialized engineering efforts or expertise is needed to meet new requirements.

14. To what extent are there data exchange processes between systems at points of service for laboratory testing and reporting and/or central repositories currently in place?

	1	Data exchange processes are missing or are limited and require manual intervention.
	2	There is some data exchange at the national level but limited automated exchange.
	3	Data exchange occurs extensively on a national level and is mostly automated.
	4	All data exchange is automated and integrated with the national health data exchange (if it exists).
	5	All data exchanges are automated, integrated, and no specialized engineering efforts or expertise are needed to meet new requirements.

15. To what extent are exchange standards (interoperability and/or health data standards, e.g., XML, JSON, LOINC, FHIR) integrated into the data exchange implementation?

	1	No defined technical standards exist for use in the TB data management and exchange but may exist for other diseases or HIS activities.
	2	The country has adopted and/or developed standards for TB data management and exchange, but standards may be localized to specific projects.
	3	Standards for TB data management and exchange are approved and require certification of new exchange partners for compliance.
	4	The national TB data management and exchange standards are integrated in the national HIS and/or health plan.
	5	TB data management and exchange standards are tracked, monitored, and reviewed through a standardized process.

Domain 2	Data analysis and use
Subdomain (D2S2)	**Analytics and visualization**
Definition	The use of analytics and visualization techniques/tools to provide new insights and patterns from data analysis to stakeholders at different levels to enhance health and healthcare decision making.

16. To what extent are users able to conduct analysis and develop visualization?

	1	Basic or no knowledge/skill exists to conduct analysis and develop visualization.

	2	NTP staff can conduct descriptive analysis and generate some visualization (tables, graphs, charts, etc.) to make comparisons and evaluate trends.
	3	NTP staff are able to conduct advanced analysis (e.g., cascade analysis) and develop visualization in real-time mostly at the national level.
	4	NTP staff at national, subnational, and facility levels are able to conduct advanced analysis (e.g., cascade analysis) and develop visualization in real-time (e.g., for identifying causes of poor performance, implementation problems, and monitor and forecast services/commodities demand) as part of the M&E activities.
	5	NTP staff can develop customized analytics and visualization using the central data repository (e.g., to monitor stock availability and forecast demand at all levels).
17. To what extent are analytics and visualization requirements documented?		
	1	Data analysis and visualization requirements/needs are missing or ad hoc.
	2	Data analysis and visualization requirements/needs are documented to support NTP decision making.
	3	The NTP has identified and documented a minimum set of standard data analyses and visualizations requirements/needs at all levels.
	4	The NTP's analytics and visualization requirements are monitored and budgeted in the NTP plan.
	5	The NTP routinely updates analytic and visualization needs using monitoring data.
18. To what extent are data sources used?		
	1	Decision making is informal or only one data source is used for decision making.
	2	Some guidance is available that explains how multiple data sources support decision making.
	3	Decision making is focused only on program resources and/or patient data reports and summaries. Some decision support tools exist locally or for specific implementations.
	4	Program staff routinely make decisions with data incorporated from multiple sources (e.g., to provide scenario-based, health-system level specific decision making support, and predict the impact of decisions and policy).
	5	Advanced models, used for decision making, incorporate multiple data sources (including the central data repository) to optimize and influence TB health outcomes.
19. To what extent are decision support tools used?		
	1	The need for decision support tools has yet to be identified.
	2	Decision support tools need is documented and exist locally or for specific implementations.
	3	Decision support tools are automated to use the knowledge base for contextually-relevant reference information.
	4	Assessments to ensure the knowledge relevance, value, and accuracy of decision support algorithms are conducted on a regular schedule.
	5	Assessment findings are used for continuous improvement of decision support algorithms (in terms of relevance of information and accuracy).

Domain 2	Data analysis and use
Subdomain (D2S3)	**Dissemination and communication**
Definition	The analyzed data are synthesized and can be shared in appropriate visualizations, understood, and used by the target audience.

20. To what extent is a communication strategy in place?

1	Communication is informal and lacks documented communication strategy.
2	A documented national communications strategy is in place but not operationalized.
3	An approved communication strategy is being implemented but confined to the national level.
4	Implementation monitoring and assessment are routinely conducted to gauge the effectiveness of the communication strategy as part of the NTP review.
5	A communication strategy and its implementation are adjusted based on the assessment findings.

21. To what extent are information products developed and subsequently disseminated?

1	Development and sharing of information products are ad hoc or driven by specific program needs.
2	Dissemination of information products is typically limited to senior-level decision makers.
3	Targeted information products are disseminated in multiple formats (print, digital) using electronic and web-based platforms at higher levels.
4	Information products are routinely produced and distributed to stakeholders at all levels of the health system is monitored and evaluated.
5	Information product dissemination is improved using monitoring and evaluation data.

Domain 3	Leadership, Governance, and Accountability
Subdomain (D3S1)	**Data use guidance**
Definition	The process, procedures, and actions of an organization associated with collection and sharing of their data.

22. Does the NTP have a data use guidance?

1	The need for policies that govern data use at health system levels has been identified but no such guidance exists.
2	The NTP uses data use guidance to manage its data use activities at various levels.
3	The NTP has an approved and comprehensive data use guidance implemented at all health system levels to support data use for decision making.
4	Implementation of data use guidance is monitored and assessed by the national governing/leadership body.
5	The NTP's data use guidance is annually reviewed and updated using the monitoring data.

Domain 3	Leadership, Governance, and Accountability
Subdomain (D3S2)	Data access and sharing
Definition	The disclosure of data from one or more organizations to another organization(s), or the sending of data between different parts of a single organization. This can take the form of routine data sharing, where the same data sets are shared between the same organizations for an on-going established purpose and exceptional, one-off decisions to share data for a specific purpose or shared with external stakeholders.

23. What is the data access and sharing status within NTP and with external stakeholders?	
1	The NTP lacks a data sharing mechanism.
2	Data access and sharing processes and methods are mostly documented but data are shared mainly through email.
3	Access-based control and data sharing agreements are established to allow access to and sharing of NTP data within and outside the NTP.
4	Access-based control and data sharing agreement implementation is monitored to ensure compliance with data use guidance/policy.
5	The NTP uses monitoring data to support access to and sharing of data with all relevant stakeholders (e.g., NTP, external stakeholders).

Domain 3	Leadership, Governance, and Accountability
Subdomain (D3S3)	Organizational structure and function
Definition	The organizational structures and processes, including job titles and clear descriptions of duties and responsibilities with a focus on data management, data quality, data governance, data analytics, data integration, and exchange.

24. To what extent are data use roles and responsibilities documented for NTP staff?	
1	Job descriptions are absent or lack data use roles and responsibilities.
2	Job descriptions clearly document data use roles and responsibilities but only at the national level.
3	NTP staff at all levels have access to their written role and responsibilities related to data use.
4	Supervisor(s) regularly review staff data use roles using the job description to offer constructive feedback.
5	Supervisor(s) follow NTP guidelines to review and update data use roles and responsibilities of staff.

Domain 3	Leadership, Governance, and Accountability
Subdomain (D3S4)	Leadership and coordination
Definition	The exercise of technical, political, and administrative authority to manage the NTP at all levels of a country's health system. The leadership and coordination structure consists of the mechanisms, processes, and institutions through which actors and stakeholders (both internal and external) articulate their interests, exercise their rights, meet their obligations, mediate their differences, and oversee the performance of the NTP.

25. To what extent is the interagency leadership and coordination team (including internal and external stakeholders) structure developed?	
1	The leadership and coordination team structure is informal or ad hoc.
2	Some formal leadership and coordination team structure with a clearly-defined scope of work exists.

3	A formal leadership and coordination team is managing implementation of the data use policy and data access and sharing guidance with attention to gender and equity.	
4	A formal leadership and coordination team is an integral part of the NTP review and assessment process.	
5	The formal leadership and coordination team facilitates an annual review of TB data use activities at all levels of the health system and decisions are evident in the updated program/guidance documents.	

26. To what extent is the leadership and coordination team effective?

1	An informal leadership and coordination team meets at the national level.
2	Meetings are held periodically among individual health system levels, but there is no standard operating procedure (SOP) related to meeting management.
3	Leadership and coordination team meetings occur on a periodic, regular schedule across the health system levels with SOPs to follow related to meeting management.
4	The monitoring, evaluation, and learning (MEL) team monitors and assesses ability of leadership and coordination team to lead and coordinate regularly scheduled meetings.
5	Assessment findings are used to improve leadership and coordination team meeting outcomes.

Domain 3	Leadership, Governance, and Accountability
Subdomain (D3S5)	**Monitoring, evaluation, and learning (MEL)**
Definition	A plan supporting management of program activities and informing the organization about what activities to implement, timeline, resources, responsible party, and whether and how an activity is contributing toward stated NTP goals including equity and inclusion.

27. To what extent is the MEL plan implemented?

1	MEL activities are informal or ad hoc.
2	An MEL guidance document exists but is only accessible at the national level.
3	An approved MEL plan with adequate budget allocation is being implemented at the national level.
4	The MEL plan implementation is monitored and reviewed as part of the program/strategy review.
5	Monitoring data are used to inform the annual review/update of the MEL plan.

28. To what extent does MEL contribute to improved health outcomes?

1	Health outcomes are yet to be defined or lack standardized outcome parameters.
2	Some health outcomes are defined and monitored at the national level.
3	Health outcome parameters are documented and monitored at all the levels.
4	Routine health outcome assessment and evaluation is conducted to measure improvement in individual and population level health outcomes.
5	Health outcome measurement data are used to revise and prioritize program interventions.

29. To what extent are MEL processes developed?

1	MEL processes are ad hoc.
2	MEL processes are documented but project- or intervention-focused.

	3	MEL processes are documented and aligned with the data collection and reporting at all levels.
	4	MEL processes are routinely reviewed as part of the NTP performance review.
	5	Program performance review findings are used to routinely revise/update MEL processes.
30. To what extent does MEL support program improvement?		
	1	MEL is informal and relies on individual experiences.
	2	MEL data are sometimes used to monitor implementation and program performance.
	3	Leadership and coordination team(s) uses MEL data at the national level for program review and course correction.
	4	The MEL data are used to monitor, measure, and improve program data use at all levels.
	5	The MEL data are used to continuously improve the MEL plan for achieving better program goals.

Domain 3	Leadership, Governance, and Accountability
Subdomain (D3S6)	**Financial resources**
Definition	The legal and administrative systems and procedures in place that permit a government ministry and its agencies and organizations to conduct activities that ensure the correct use of public funds and that meet defined standards of probity and regularity. Activities include management and control of public expenditures, financial accounting, reporting, and asset management (in some cases).

31. To what extent are data use activities funded in the NTP budget?		
	1	Budget for data use activities is absent or ad hoc.
	2	Budget for data use activities is allocated but tied with specific interventions/projects.
	3	Operations of data use activities have been secured with annual budgets.
	4	Budget for data use activities is monitored and reviewed during the program review process.
	5	Monitoring and review findings are used to revise/update the budget allocated to data use activities.
32. How are financial resources mobilized?		
	1	Availability of financial resources is ad hoc or specific to interventions.
	2	Financial resource needs are documented for national level data use activities.
	3	The NTP has a comprehensive financial plan that diversifies funding (resources from NTP, donors, and private sector) in place.
	4	Availability and utilization of financial resources is monitored and measured by the MEL team.
	5	The leadership and coordination team revises financial plan using the monitoring data to align with the national TB goals.

Domain 4	Capacity building
Subdomain (D4S1)	Data interpretation
Definition	The organizational structure and individual ability that enables reading, writing, and communicating data in context, including an understanding of data sources and constructs, analytical methods, and techniques applied — and the ability to describe the use case, application, and resulting value.

33. To what extent are data use forums (e.g., monthly or quarterly program review meetings) developed?

1	Data use forums are missing or ad hoc.
2	Data use forums with terms of reference are convened, but only at the national level.
3	Data use forums with approved terms of reference are operational at all levels.
4	Performance of data use forums is monitored and assessed as part of the program performance review.
5	Monitoring and assessment findings are used to improve performance of data use forums.

34. How often are data reviewed and by whom?

1	Data review by program staff are rare or ad hoc.
2	Program staff review data at the national level for specific program implementation.
3	Program staff routinely conduct data review at all levels using the data use forums to identify corrective action.
4	MEL staff routinely monitor and assess implementation of actions identified in the data review.
5	Monitoring and assessment data are used to continuously improve implementation of actions identified in the data review.

35. Is NTP staff receiving supportive supervision for practicing data use?

1	NTP staff receive ad hoc supervision support for data use.
2	NTP staff receive program specific supervision and mentoring to take action on reported findings from indicators.
3	NTP staff receive supportive supervision for data use at the national level.
4	Supportive supervision is monitored to help identify technical resources NTP staff can access to meet supportive supervision needs.
5	NTP staff can mentor/coach peers on data use.

Domain 4	Capacity building
Subdomain (D4S2)	Skill and knowledge development
Definition	The availability of adequate personnel with characteristics, attributes, and capabilities to perform a task(s) pertaining to data system, data quality, data analytics, and data use to achieve clearly defined results.

36. To what extent has the NTP developed a national pre-service training program for skill and knowledge development?

1	A national pre-service training program to impart knowledge and skills is ad hoc.
2	A national pre-service training program for imparting knowledge and skills exist but only for clinical staff.
3	A national pre-service training program for all cadres of the NTP is being implemented.
4	Pre-service training programs are monitored and assessed for their effectiveness and relevance.

	5	The pre-service training program is routinely updated using the monitoring and assessment data.

37. To what extent are institutions offering pre-service training established in the NTP guidance?

	1	Institutions offering pre-service training are identified in an ad hoc manner.
	2	Pre-service training is conducted by government and/or private training institutions.
	3	A designated NTP authority oversees pre-service training programs.
	4	The NTP offers opportunities and incentives to promote pre-service training of potential staff.
	5	Institutions and their pre-service training offerings are identified based on the NTP strategic goals.

38. To what extent has the NTP developed an in-service training program for skill and knowledge development?

	1	A national in-service training program to impart knowledge and skills is ad hoc.
	2	A national in-service training program for imparting knowledge and skills exist but only for clinical staff.
	3	A national in-service training program for all cadres of the NTP is being implemented.
	4	In-service training programs are monitored and assessed for their effectiveness and relevance.
	5	The in-service training program is routinely updated using the monitoring and assessment data.

39. To what extent are institutions (both public and private) offering in-service training established in the NTP guidance?

	1	Opportunities for in-service training offered by institutions other than the NTP are limited.
	2	In-service training is conducted by government and/or private training institutions.
	3	A designated NTP authority oversees in-service training programs.
	4	Training institutions offer opportunities and incentives to promote continuous education of staff at all levels.
	5	Institutions and their offerings are identified based on the program review findings.

40. How effective are the in-service training programs?

	1	In-service training offerings are not effective.
	2	In-service training offerings are aligned with training needs but only at the national level.
	3	Training needs assessment data are used for identification and recommending appropriate trainings.
	4	Assessment of training programs is routinely conducted as part of the MEL activities to gauge skill and knowledge of trainees.
	5	Training assessment data are used to improve design and delivery of targeted in-service training programs.

Domain 4	**Capacity building**
Subdomain (D4S3)	**Decision making ability**
Definition	Individual stakeholder's autonomy, capabilities, and motivation to use data for action.

41. Do you feel your use of data for decision making inputs are valued?

	1	My responsibilities do not include using data for decision making.

2	My responsibilities include using data for decision making, however I do not have access to data.
3	I have access to data but I do not feel empowered or encouraged to use the data for decision making.
4	I feel like my input to my colleagues around decision making is often taken into consideration and valued, but I am not often encouraged to make decisions myself.
5	I feel like my input is often taken into consideration and valued, and that I am almost always able and encouraged to make decisions based on the available data.

42. How satisfied do you feel by your job?

1	I feel discouraged because my job often does not seem to matter.
2	I feel my job is important but the work environment is unsatisfactory.
3	I enjoy and find interest in my work and I feel valued in my team but I do not feel I have many opportunities for growth.
4	I feel that I work in an encouraging environment that promotes growth and the development of skills I need to perform well.
5	I feel that I work in an encouraging environment that promotes growth and learning, and I am rewarded for strong performance (e.g., incentives).

43. How adequately have you been trained to use data for action?

1	I have never received training specific to data use.
2	I have only received informal training on data use (e.g., on-the-job training from a colleague).
3	I have received formal training on data use but it was neither pertinent nor recent.
4	I have received formal training that was pertinent to data use at my level, but over two years ago.
5	I have received formal training that was pertinent to data use at my level, and within the last two years.

44. Is there a person you go to for support and mentorship?

1	I do not have a colleague (e.g., knowledgeable peer or mentor) to whom I can go to for support for data use.
2	I have identified a colleague whom I would like to work with more closely for data use support, but I have not reached out for support yet.
3	I have a colleague knowledgeable about my responsibilities and skills but I cannot regularly turn to them for support for questions related to data use (e.g., due to their unavailability).
4	I have a colleague knowledgeable about my responsibilities and skills with whom I am increasingly collaborating and sharing knowledge about data use.
5	I have a colleague knowledgeable about my responsibilities and skills whom I can regularly turn to for support and who provides feedback based on best practices in data use.

Domain 5	Information and communications technology (ICT)
Subdomain (D5S1)	**Hardware**
Definition	An assembly of tangible physical parts of a system of computers, including servers and virtual private networks (VPN), that provide services to a user in the health information ecosystem. E.g., computers, printers, connecting devices.

45. To what extent does the NTP have adequate hardware?

1	The NTP has few computers to support it or hardware is dedicated to specific TB HIS activities.

	2	Less than half of the NTP's central and subnational offices have adequate hardware.
	3	Hardware needs are documented national offices have adequate hardware, including backup services.
	4	Hardware needs are monitored and assessed at all levels and is conducted annually as part of the program performance review.
	5	Hardware needs for the program are updated and addressed routinely through annual program planning.
46. To what extent are hardware specifications developed and budgeted?		
	1	No guidance exists on the minimum hardware specifications for TB data system.
	2	Hardware specifications are documented at the national and subnational levels.
	3	Hardware specifications are documented and followed in procurement at all levels.
	4	Hardware specifications are supported by adequate budget in the program plan.
	5	Hardware specifications are routinely updated based on the program data analytics, visualization, and data exchange needs.

Domain 5	Information and communications technology (ICT)	
Subdomain (D5S2)	**Network and connectivity**	
Definition	Network is the disparate elements of a system connected in a way that data and information can be shared among all elements. Connectivity is the ability to access the data in the system.	
47. To what extent does Internet and Internet connectivity exist at NTP sites?		
	1	No network and Internet connectivity exists or is limited to the national level.
	2	Network and Internet connection exist at the national level and about half of subnational offices have a reliable network and Internet connection.
	3	Adequate dedicated network and Internet connectivity exist at the national and subnational level sites.
	4	Network and Internet connectivity needs are routinely monitored and assessed to identify and address gaps to support programmatic data collection, reporting, and analysis.
	5	All or almost all of the NTP national and subnational sites have reliable network and Internet connections supported by a dedicated technology support team.

Domain 5	Information and communications technology (ICT)	
Subdomain (D5S3)	**ICT business infrastructure**	
Definition	Design and planning, operations management, and technical support for information and communications technology (ICT) infrastructure maintenance.	
48. To what extent has ICT infrastructure been developed?		
	1	There is basic or no support for ICT or electronic systems equipment installation and maintenance related to the TB HIS.
	2	There is a recognized need to standardize processes to oversee and support ICT infrastructure, but no established or harmonized process exists specific to HIS needs.
	3	An ICT operations and maintenance plan is being implemented at the national level.

	4	Data are collected and regularly reviewed on the ICT infrastructure operations and maintenance plan as mandated by the NTP strategic plan.
	5	The ICT operations and maintenance plan is continuously reviewed and adapted based on the review data.

User Roles Questionnaire

User group	#	Data Need	Need met by TB information system?
Community health worker	1	Is TB screening in the community effective (i.e., finding the expected number of cases)?	Yes/No
	2	Are case contacts being traced and investigated effectively for all index TB cases?	Yes/No
	3	Are people with presumptive TB being referred effectively to the nearest health facility (for laboratory test and further evaluation for TB)?	Yes/No
	4	Is TB treatment being administered effectively to TB patients according to established treatment protocols?	Yes/No
	5	Are patients being educated about TB prevention?	Yes/No
	6	Is awareness of TB being raised in the community (i.e., are we conducting health education effectively)?	Yes/No
Healthcare provider	1	Are TB patients being screened appropriately for HIV (according to the TB diagnostic algorithm)?	Yes/No
	2	Are presumptive cases being referred appropriately for diagnostic testing?	Yes/No
	3	Are confirmed TB cases being treated according to established treatment protocols?	Yes/No
	4	Is treatment being accurately recorded using the recommended procedures and tools?	Yes/No
	5	Is TB preventative therapy (TPT) being appropriately prescribed in the facility?	Yes/No
	6	Are patients being educated about TB prevention?	Yes/No
	7	Is good infection control and prevention (ICP) being practiced in the facility?	Yes/No
	8	Are contacts of cases being traced effectively?	Yes/No
Health facility/ clinic manager	1	Are all TB cases being detected (based on the estimated prevalence)?	Yes/No
	2	Are patients being screened and diagnosed efficiently?	Yes/No
	3	Are staff levels sufficient to address needs for TB screening and diagnosis in the facility?	Yes/No
	4	Are quality control mechanisms in place for screening and diagnosis?	Yes/No

User group	#	Data Need	Need met by TB information system?
	5	Are the required supplies available for screening and diagnosis (tests, reagents, specimen containers, referral forms, etc.)?	Yes/No
	6	Are TB patients treated effectively and their outcomes monitored/recorded accurately?	Yes/No
	7	Are patients being adequately educated for TB prevention?	Yes/No
	8	Are sufficient supplies available for preventing infection at the facility (e.g., personal protective equipment [PPE])?	Yes/No
	9	Are the necessary (or government-required) tools available for data collection and reporting?	Yes/No
Laboratory manager/ technician	1	Does the laboratory have sufficient capacity (e.g., staffing, equipment, supplies, power, maintenance) to perform the expected number of tests based on estimated prevalence?	Yes/No
	2	Are the right tests available in the right quantities and in the right places (according to the country diagnostic algorithm)?	Yes/No
	3	Is testing efficient (turn-around-time) and up to standard (quality assurance), and always available when needed (no stockout of testing materials)?	Yes/No
	4	Is treatment effectively monitored to ensure the best treatment outcomes (e.g., re-test at 2 and 5 months)?	Yes/No
	5	Is the laboratory practicing good infection prevention and control (e.g., PPE)?	Yes/No
	6	Is there a laboratory referral network?	Yes/No
District TB coordinator/ manager/ health officer	1	Are all TB cases being found (based on estimated prevalence and within relevant population sub-groups)?	Yes/No
	2	Are the screening and diagnosis (e.g., coverage) targets being achieved?	Yes/No
	3	Is there sufficient capacity for TB screening and diagnosis (e.g., staff, finances, logistics, recording and reporting forms, Internet connectivity, etc.) for facilities in the district?	Yes/No
	4	Are TB treatment outcomes monitored adequately?	Yes/No
	5	Are TB treatment targets being achieved in the district?	Yes/No
	6	Is treatment of high quality in the district (e.g., DOTS coverage)?	Yes/No
	7	Are there sufficient supplies for treating the expected number of cases in the district (medications, diagnostics, etc.)?	Yes/No
	8	Is coverage for TB preventive therapy (TPT) adequate in the district (including among subpopulations)?	Yes/No

User group	#	Data Need	Need met by TB information system?
	9	Are sufficient supplies available for infection prevention and control in the district (e.g., PPE)?	Yes/No
Regional TB coordinator/ manager	1	Are all TB cases in the region being detected (based on the estimated prevalence)?	Yes/No
	2	Are all TB cases in the region disaggregated by age, gender, TB condition (disease vs LTBI), TB site (pulmonary, extra-pulmonary), HIV status, drug susceptibility, etc.?	Yes/No
	3	Are TB treatment target(s) being achieved in the region?	Yes/No
	4	Is coverage of TB diagnostic services in the region adequate?	Yes/No
	5	Are sufficient resources for TB screening and diagnosis available in the region (e.g., staff, finances, logistics, diagnostics, medications, recording and reporting forms, Internet connectivity, etc.)?	Yes/No
	6	Is monitoring and supervision of diagnosis and treatment being conducted adequately in the region?	Yes/No
	7	Are TB treatment outcomes meeting targets for the region?	Yes/No
	8	Are sufficient resources available for treating the expected number of cases in the region (supplies, human and financial resources)?	Yes/No
	9	Are the resources required for TB prevention in the region available (supplies, human and financial resources)?	Yes/No
Regional laboratory manager	1	Is the quality of TB screening and diagnosis at facilities and districts in the region being adequately monitored?	Yes/No
	2	Do facilities and districts in the region have all the supplies they need for effective TB screening and diagnosis?	Yes/No
	3	Do facilities and districts in the region have adequate human and financial resources to conduct TB screening and diagnosis?	Yes/No
	4	Is adequate monitoring and oversight of TB screening and diagnosis being conducted in the region?	Yes/No
	5	Are TB laboratory services adequately supporting TB treatment in the region?	Yes/No
	6	Do the laboratories in the region have sufficient resources for TB prevention?	Yes/No
NTP manager/ policymaker	1	Is the NSP and national guidelines for screening and diagnosis up to date?	Yes/No
	2	Is the TB diagnostic algorithm still appropriate for the country's need?	Yes/No

User group	#	Data Need	Need met by TB information system?
	3	Is coverage of TB diagnosis and treatment adequate in the country?	Yes/No
	4	Is the distribution of drug-resistant TB in the country adequately monitored?	Yes/No
	5	Is there sufficient laboratory capacity in the TB program?	Yes/No
	6	Is the quality of TB screening and diagnosis adequate?	Yes/No
	7	Are there sufficient resources for TB screening and diagnosis in the program (staff, finances, logistics, referral systems, and recording and reporting forms, Internet connectivity, etc.)?	Yes/No
	8	Is the TB treatment success rate in the country acceptable (i.e., meets the target)?	Yes/No
	9	Is the coverage of TB treatment services in the country adequate (i.e., meets the target)?	Yes/No
	10	Are sufficient supplies (drugs, other commodities) needed to treat TB patients in the country available?	Yes/No
	11	Is the coverage of TPT adequate nationally?	Yes/No
	12	Are there sufficient resources needed for TB prevention in the country (supplies, human and financial resources)?	Yes/No
	13	Are good infection control and prevention measures practiced in the country?	Yes/No
	14	Are there adequate funds dedicated to TB M&E?	Yes/No
	15	Is domestic funding for TB treatment and control adequate?	Yes/No
	16	Are there adequate governance structures for TB M&E (e.g., M&E technical working groups)?	Yes/No
	17	Is the program performance being appropriately monitored (e.g., review and oversight of completeness and timeliness of reporting from facilities)?	Yes/No
	18	Are there sufficient healthcare workers for the expected number of TB cases?	Yes/No
	19	Is the performance of the healthcare workers assigned to TB high quality?	Yes/No
National M&E director/ manager		Does the NTP conduct assessments to understand capacity and quality in the TB program? Please indicate whether the following assessments are conducted:	
	1	service availability and readiness (e.g., SARA)	Yes/No
	2	quality of care (e.g., QTSA)	Yes/No
	3	diagnostic system readiness (e.g., diagnostic network assessment)	Yes/No

User group	#	Data Need	Need met by TB information system?
	4	data quality (e.g., data quality review)	Yes/No
	5	progress towards targets (e.g., program review)	Yes/No
	6	Is the performance of the recording and reporting systems (e.g., paper-based, electronic, mixed) ever assessed?	Yes/No
		Do routine assessment and monitoring mechanisms exist for program performance in terms of:	
	7	progress towards targets?	Yes/No
	8	quality?	Yes/No
	9	coverage?	Yes/No
	10	equity?	Yes/No
	11	efficiency?	Yes/No
	12	Does program management include the practice of using routine data to inform and improve program implementation?	Yes/No
National reference laboratory manager	1	Is the laboratory section of the national guideline up to date?	Yes/No
	2	Is the national quality assurance guideline up to date?	Yes/No
	3	Do we have the right tests available in the right places?	Yes/No
	4	Do we have sufficient laboratory capacity (i.e., staffing, equipment, supply, power, maintenance)?	Yes/No
	5	Is the turn-around time for testing efficient and responsive to the needs?	Yes/No
	6	Do we have enough testing material (test kits, reagents, cartridges, slides, microscopes, media, etc.) in the labs?	Yes/No
	7	Is there a quality control mechanism in place (i.e., EQA or IQC)? Is it active (e.g., supervisory visits producing written reports)?	Yes/No
	8	If a quality control mechanism is in place (i.e., EQA or IQC), is it active (e.g., supervisory visits producing written reports)?	Yes/No/NA
		Does the TB information system provide information on:	
	9	TB diagnosis?	Yes/No
	10	presumptive RR-TB/MDR-TB?	Yes/No

User group	#	Data Need	Need met by TB information system?
	11	whether the patient received follow-up, and at what month?	Yes/No
	12	microscopy results?	Yes/No
	13	culture results?	Yes/No
	14	Xpert MTB/RIF results?	Yes/No
	15	drug susceptibility test (DST) results?	Yes/No
	16	line probe assay (LPA) results?	Yes/No
	17	HIV status?	Yes/No
	18	Is the NTP monitoring the performance of the diagnosis network?	Yes/No
TB advocates, civil society, and media	1	Is there improved awareness on TB so that people are able to recognize symptoms and seek timely healthcare?	Yes/No
	2	Is there advocacy for improved quality of service at health facilities, to improve capacity for diagnosis of TB?	Yes/No
	3	Is there improved awareness on TB so that people understand the need to take TB treatment exactly as it is prescribed by healthcare workers?	Yes/No
	4	Is there advocacy for improved quality of service at health facilities, to improve uninterrupted availability of TB medicines?	Yes/No
	5	Is there improved awareness on TB so that people understand how TB is transmitted from person to person, and take the necessary precaution to prevent it?	Yes/No
	6	Is there advocacy for improved quality of services at health facilities, to improve capacity for TB preventive therapy?	Yes/No

Appendix F. D2AC Haiti Summary Findings (Group and Individual Responses Aggregation)

Table F1. Continuum score from aggregate responses, by domain

Domain number	Domain name	Average group score (N=4)	Average individual score (N=19)	D2AC level
D1	Data Collection and Reporting	3.67	3.53	Established
D2	Data Analysis and Use	2.67	3.17	Defined/Established
D3	Leadership, Governance, and Accountability	3.33	3.43	Established
D4	Capacity Building	3.21 *(3.11 if we adopt the individual aggregate score for D4S2)*	3.66	Established
D5	Information and Communications Technology	2.08	2.72	Defined
	Overall	**2.99** *(2.97 if we adopt the individual aggregate score for D4S2)*	**3.30**	**Defined/Established**

Table F2. Continuum score from aggregate responses, by subdomain

Subdomain number	Subdomain name	Average group score (N=4)	Average individual score (N=19)	D2AC level
D1S1	Data collection tools and workflow	3.25	3.33	Established
D1S2	Reporting	3.75	3.93	Established
D1S3	Data quality	4.00	3.33	Institutionalized/Established
D2S1	Data integration and exchange	2.56	3.17	Defined/Established

Subdomain number	Subdomain name	Average group score (N=4)	Average individual score (N=19)	D2AC level
D2S2	Analytics and visualization	3.06	3.07	Established
D2S3	Dissemination and communication	2.38	3.26	Defined/Established
D3S1	Data use guidance	2.75	3.18	Defined/Established
D3S2	Data access and sharing	4.25	3.39	Institutionalized/Established
D3S3	Organizational structure and function	3.25	3.63	Established
D3S4	Leadership and coordination	3.13	3.26	Established
D3S5	Monitoring, evaluation, and learning	4.13	3.81	Institutionalized/Established
D3S6	Financial resources	2.5	3.32	Defined/Established
D4S1	Data interpretation	3.42	3.74	Established
D4S2	Skill and knowledge development	1.85	3.18	Nascent/Established
D4S3	Decision making ability	4.38 *	4.07	Institutionalized
D5S1	Hardware	2.5	3.27	Defined/Established
D5S2	Network and connectivity	2.00	2.12	Defined
D5S3	ICT business infrastructure	1.75	2.79	Nascent/Defined

* The average group score was not considered for this subdomain in the analysis, given that the questions pertain to personal and subjective opinions on job satisfaction, mentorship, training, and incentives/motivation. Instead, the aggregate score from individual responses (4.07) was used.

Appendix G. D2AC Toolkit Haiti Implementation Plan

Domain and subdomain	Priority action	Specific gap addressed	Responsible party	Resources needed	Expected deliverable	Timeline
Domain 1, subdomain 3: Data quality	Refresher course for service providers on filling in data collection tools	This action targets omissions of certain parameters in data collection and reporting	The PNLT at the central level	• Manager (central and regional) • Cost of recycling (production of orientation materials, accommodation) • Vehicles (travel)	Complete and correct completion of tools (registers, record sheets, paper and/or electronic)	Twice a year starting in fiscal year 2023-2024
	Data analysis	This action is aimed at the reliability and verification of accurate and concise data	Coordination and M&E staff at central and departmental levels	• Travel for data collection activities • Data collection equipment (laptop/tablet/Internet) • Logistics (accommodation, per diem, vehicle)	Reliable data	Monthly
	Data validation	This data validation action is aimed at decision-making at a given level			Data ready for reporting and use	Monthly
	Entering valid data into DHIS2	This action targets issues of data availability for departmental M&E officers	Departmental M&E personnel	• Computers • Internet • Tablet	• Achieving TB program performance • Data availability for patient follow-up	Quarterly
Domain 2, subdomain 3: Dissemination and communication	Set up a dashboard system on the MSPP website, giving the general public access to information and data on certain TB indicators	This action targets gaps in access to the information system at all levels and to the public	MSPP/PNLT	• Human resources (One team for recruitment and training on information systems) • Financial resources (salaries, equipment purchases, training)	Improved access to the information system	By 2025, all levels will have access to the information system By 2026, the public will have access to the information system
Domain 3, subdomain 2: Data access and sharing	Make data from the sharing platform available in real time	• Delayed data entry on DHIS2 • Internet connection problem • Limited assignment of health facilities for DHIS2 input	PNLT and its partners Central and departmental level	• Programmatic (implementation of a training program and retraining of additional staff for data entry on the DHIS2 platform and TB tracker,	• Many more providers trained to enter data on DHIS2 and TB tracker • Reliable, real-time data availability	Third quarter 2024 Quarterly validation

Domain and subdomain	Priority action	Specific gap addressed	Responsible party	Resources needed	Expected deliverable	Timeline
		• Very few staff are properly trained to enter data into DHIS2		supervision and validation schedule) • Human resources (recruitment and training of additional staff for DHIS2 data entry) following an inventory of available personnel • Equipment (computers, reliable Internet connection) • Financial (funds to purchase computer equipment, reliable Internet subscription, costs for training sessions)	• Quarterly data validation	
	Data accessibility for stakeholders	• Limited access to the DHIS2 platform for health facilities and other stakeholders (donors, associations, universities, other ministry departments, etc.). • Lack of defined DHIS2 access processes and methods	PNLT and central level staff	• Programmatic (implementation of mechanisms, processes and methods for accessing and sharing data, access control and sharing agreements with stakeholders) • Financial (cost of maintaining the platform, purchase of equipment to increase storage capacity (server, cloud) and rapid accessibility of the WiFi band platform) • Hardware (server, fast and reliable Internet connection, cloud subscription, etc.)	Well-maintained platform much more accessible to stakeholders	Fourth quarter 2024

Domain and subdomain	Priority action	Specific gap addressed	Responsible party	Resources needed	Expected deliverable	Timeline
				• Human resources (inventory of existing human resources, technical staff to manage and maintain the platform)		
Domain 4, subdomain 2: Skill and knowledge development	Design of an initial and ongoing training plan for PNLT managers	This plan will be used to strengthen the skills of PNLT managers	The PNLT, at central and departmental levels	• Human resources (depending on area of expertise - internal managers [PNLT] and external managers [university consultancies, NGOs]) • Financial (funds for consultations)	Availability of suitable staff with the necessary skills to carry out the various program tasks	Training plan to be conceptualized by April 2024
	Implementation of initial training	Capacity-building for managers to analyze and interpret data and use it in decision-making		• Human resources (depending on area of expertise - internal managers [PNLT] and external managers [university consultancies, NGOs]) • Financial (funds for consultations, room rental, printing and reproduction of manuals) • Materials (vehicles, flip charts, notepads, pens)	• Acquire knowledge • For the PNLT to have a national initial training program designed to impart knowledge and strengthen the skills of its managers	By January 2025/ every 2 years
	Implementation of ongoing training and refresher courses for managers					By January 2026
	Evaluation of the impact of training on the program	Ability to use data to make decisions		• Human resources required (PNLT internal managers)	Significant improvement in program performance indicators	From the quarter following initial training
Domain 5, subdomain 2: Network and connectivity	Identify sites with connectivity problems		PNLT	• Programmatic or strategic (PNLT) • Human resources (PNLT manager for	Number of sites with Internet problems identified	March 2024

Domain and subdomain	Priority action	Specific gap addressed	Responsible party	Resources needed	Expected deliverable	Timeline
				follow-up with departments) • Hardware (telephone cards)		
	Advocacy with support partners	This action aims to find the necessary funds		Programmatic or strategic (PNLT)	Availability of funds	March-April 2024
	Providing care sites with Internet connections	This action aims to solve the internet connection problem faced by institutions and the availability of TB data on the DHIS2 Tracker platform		• Programmatic or strategic (PNLT) • Human resources (network or IT technicians) • Financial (Internet subscription costs, technician travel expenses) • Hardware (network equipment: routers, SIM cards, etc.)	• All TB care sites have a good internet connection • On-time data availability on the DHIS2 Tracker platform	April 2024 (comment: the NLTP will have to ensure that Internet subscriptions are paid on time and that the chosen network is suitable for the area)

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