



TB Data-to-Action Continuum

In Uzbekistan

Report

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in Uzbekistan

Report

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Cover photo: Participants working in a group at the Uzbekistan TB D2AC workshop in Tashkent in May 2024. Photo taken by Umar Isaev.

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Abbreviations

ARC	Assessment of Reporting Capacity
D2AC	Data-to-Action Continuum
DHIS2	District Health Information Software version 2
DOTS	directly observed treatment short-course
HMIS	health management information system
HR	human resources
ICT	information and communications technology
JSI	JSI Research & Training Institute, Inc.
LEAP	Long-Term Exceptional Technical Assistance Project
M&E	monitoring and evaluation
MDR	multidrug-resistant
MEL	monitoring, evaluation, and learning
MFL	master facility list
MIS	management information system
MOH	Ministry of Health
MS	Microsoft
MSF	Médecins Sans Frontières
NTP	national tuberculosis program
PBMEF	Performance-based Monitoring and Evaluation Framework
PHC	primary health care
RR	rifampicin-resistant
SOP	standard operating procedure
TB	tuberculosis
TB DIAH	TB Data, Impact Assessment and Communications Hub
TCG	Tuberculosis Commitment Grant
TIFA	Tuberculosis Implementation Framework Agreement
USAID	United States Agency for International Development
WHO	World Health Organization
XDR	extensively drug-resistant

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 Uzbekistan D2AC workshop was the second D2AC workshop held in Central Asia and in Russian, but the first to be held conjointly with another workshop. The workshop was held in May 2024 in Tashkent. Twenty-nine participants attended, representing various levels of the Uzbek 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 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 35 (29 individual and 6 group) data collection instruments were manually generated using the Microsoft (MS) Excel version of the D2AC analysis dashboard. The qualitative data—observations, comments, and questions—submitted in the 35 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 2.66 (out of 5), putting Uzbekistan at a “defined” level according to the D2AC. The country performed best in

domain 4 (Capacity Building, score of 3.52) and least well in domain 5 (Information and Communications Technology [ICT], score of 1.50). Domain 1 (Data Collection and Reporting), domain 2 (Data Analysis and Use), and domain 3 (Leadership, Governance, and Accountability) received scores of 2.92, 2.46, and 2.88, respectively. The overall score from the aggregated individual responses was very similar (2.64 out of 5) to the group aggregate score (2.66). Comparison of the individual and group responses revealed an even split between domains and subdomains rated comparatively higher by groups and those rated comparatively higher by individuals.

Discussion

The D2AC assessment in Uzbekistan shed light on the perceived areas of improvement for the Uzbekistan TB information system, namely in the areas of data integration and exchange, organizational structure and function, and all three subdomains related to ICT. That being said, overall Uzbekistan has clear areas in need of strengthening, with five subdomains receiving scores lower than 2 out of 5. The D2AC assessment in Uzbekistan also shed light on the areas that were performing well. The strongest-performing areas were decision making ability and leadership and coordination. Other strong subdomains included data quality, dissemination and communication, data use guidance, data access and sharing, and data interpretation. These seven subdomains, among the eighteen of the D2AC scale, 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 two among those (decision making ability and leadership and coordination) received scores superior to 4 out of 5 (“institutionalized” stage of the continuum).

Recommendations

Priority recommendations were developed in plenary. A joint implementation plan based on the findings of the assessment was validated by the workshop participants. The recommendations can be summarized in four broad categories: standardizing the list of TB institutions, standardizing the use of DHIS2 for electronic reporting on TB indicators, creating a normative document regulating the work of the Central Medical Clinical Commission (TB Concilium), and putting in place a national communications plan and an information bulletin, which would be useful not only for the TB program but for other disease areas as well.

Conclusion

As Uzbekistan appears on the World Health Organization’s global list of high-burden countries for multidrug-resistant (MDR)/rifampicin-resistant (RR)-TB, Uzbekistan’s Ministry of Health (MOH) and its NTP are faced with important challenges in their pursuit of curbing the country’s TB disease burden.

The D2AC assessment in Uzbekistan 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 leadership and coordination, data quality, dissemination and communication, data use guidance, data access and sharing, and data interpretation. However, it also revealed

important gaps, such as data integration and exchange, organizational structure and function, 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 Framework¹ (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.

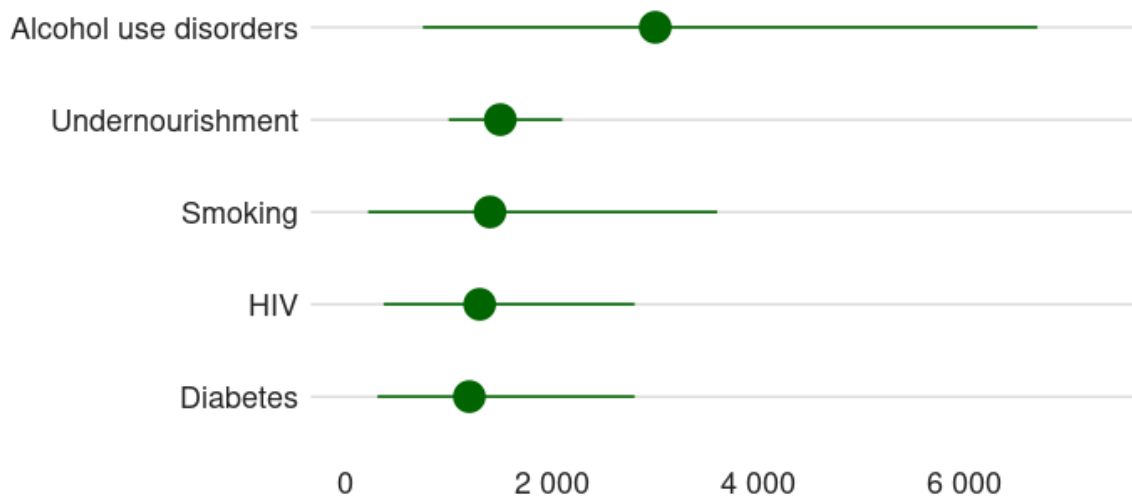
The D2AC framework aims to gauge country and NTP capacity to translate data into action to improve NTP performance. Through a systematic review of existing literature and a phased review by experts to validate the concept and pretest the approach, the D2AC team developed the D2AC Toolkit (Kumar et al.,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

¹ Available at <https://www.tbdiiah.org/resource-library/pbmef/>

TB and Uzbekistan

Uzbekistan has an NTP, called the Republican Specialized Scientific and Practical Medical Center for Phthisiology and Pulmonology, or the RSSPMC for Ph&P, tackling a TB burden of 83 cases per 100,000 people as of 2022, with MDR/RR incidence at 17 per 100,000 people as of 2022 (World Health Organization [WHO], 2022). TB incidence is evenly spread across genders for each age group, with 10 percent of new and relapse TB cases being reported in children ages 0-14 (WHO, 2022). The country's TB treatment coverage was 50 percent in 2022 (WHO, 2022). Uzbekistan reports an 89 percent treatment success rate for new and relapse cases in 2021 and an 82 percent treatment success rate for retreatment cases (excluding relapse) in 2021 (WHO, 2022; World Bank, 2020). One hundred of notified TB patients know their HIV status (WHO, 2022)—three percent of TB patients have HIV, which is down 70% since 2018 (Stop TB Partnership, 2020), and 77 percent of those are on antiretroviral therapy (WHO, 2022). TB is the third cause of death among communicable, maternal, neonatal and nutritional diseases in the country, and missed cases show a 42 percent increase since 2018 (Stop TB Partnership, 2020). Furthermore, previously treated cases account for 31 percent of MDR/RR-TB cases in 2022 in Uzbekistan (WHO, 2022). In Uzbekistan, risk factors for TB include alcohol use, undernourishment, smoking, HIV, and diabetes (WHO, 2022, Figure 1).

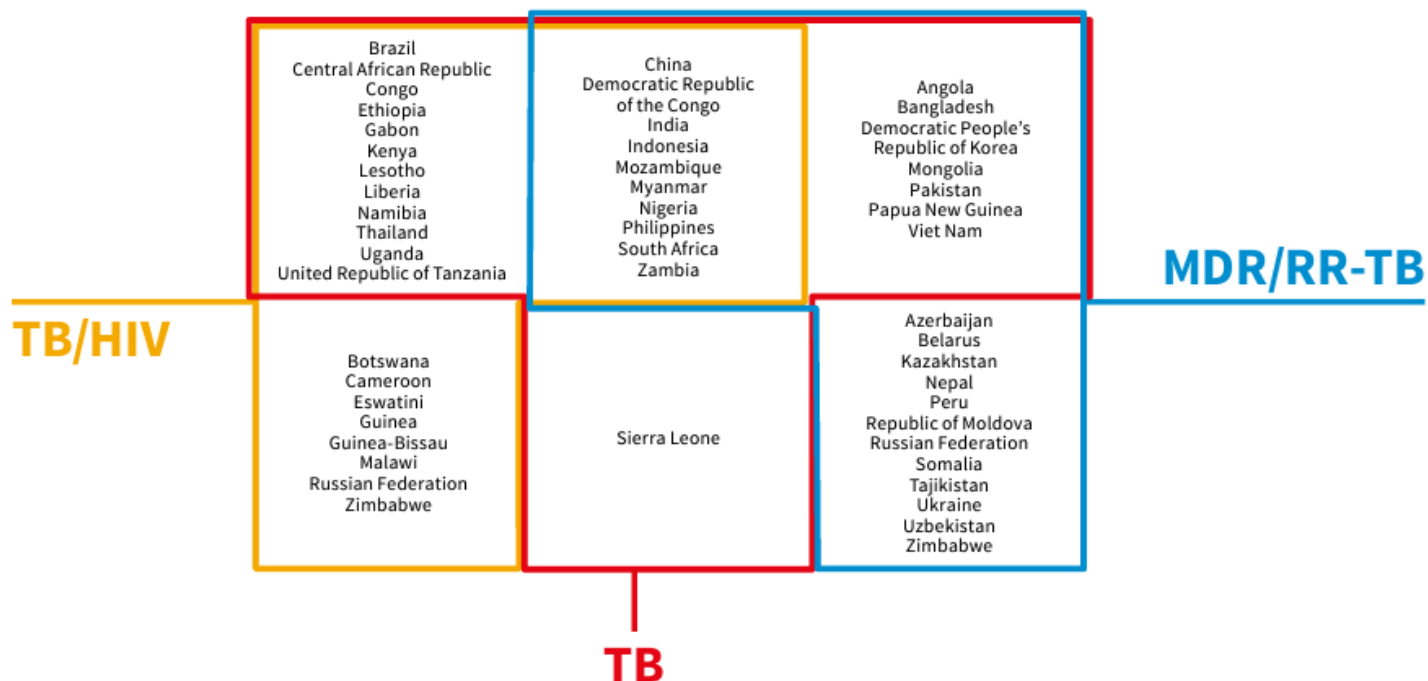
Figure 1. Case attributable to risk factors, 2022 (in total number of cases)



Source: WHO, 2022

Furthermore, Uzbekistan is one of the 26 countries which, in 2023, adopted country-specific dynamic models were used to estimate TB incidence and mortality in the period 2020–2022, as part of countries that reported large absolute reductions in TB notifications in 2020 or 2021 that departed significantly from pre-2020 trends (WHO, 2023). Furthermore, from February to June 2023, the models were further informed by a series of in-depth bilateral discussions with 13 countries, including Uzbekistan (WHO, 2023). Uzbekistan features on the WHO's global list of high-burden countries for MDR/RR-TB (WHO, 2023) (Figure 2).

Figure 2. WHO global lists of high-burden countries for TB, TB/HIV, and MDR/RR-TB (2021–2025)



Source: WHO, 2023

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:

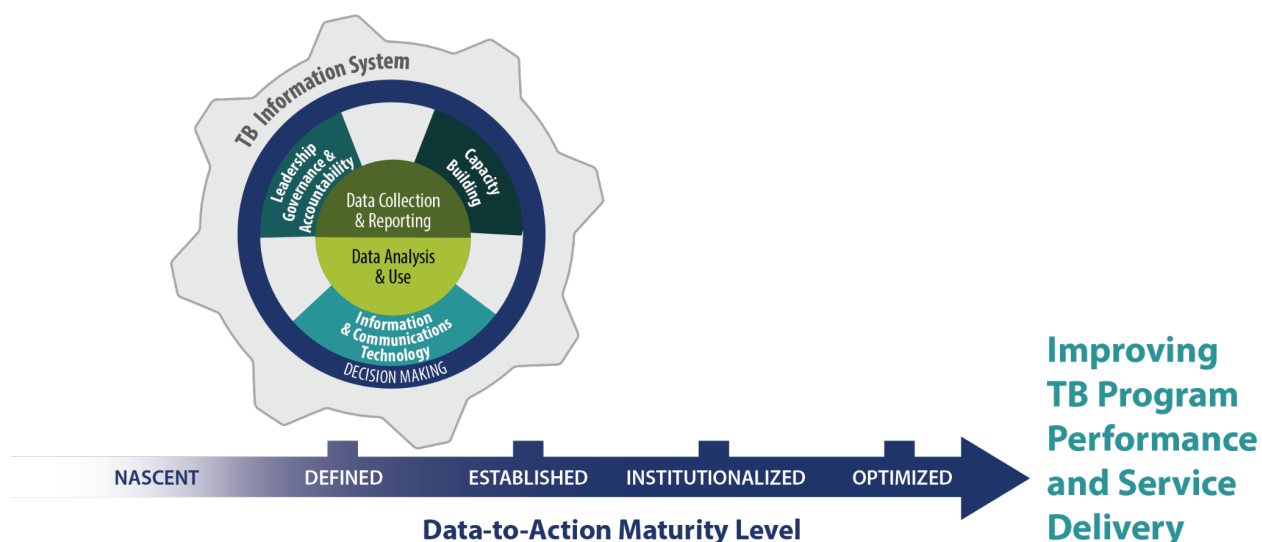
- Assessing decision making capabilities of different actors
- Precisely gauging barriers to data use
- Helping the NTP select appropriate interventions in the context of its health system
- Developing an implementation plan to apply in the future
- Using implementation recommendations for strategic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

Beyond the standard objectives of the D2AC assessment, some objectives were also specific to Uzbekistan. The Uzbekistan NTP team expressed that the findings and recommendations from this workshop would be very useful contributions to partners with ongoing and longer-term technical assistance mandates in Uzbekistan and would nicely complement TB DIAH's other key deliverables as part of their technical support to the NTP in 2023–2024 (TB DIAH, 2024a–e).

Concept

The conceptual framework (Figure 3) 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 3. 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 build 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.tbdiiah.org/assessments/d2ac>.

The D2AC Toolkit—available in three languages and used for the second time in Russian in the context of a country assessment for the workshop in Uzbekistan—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 MS Excel 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)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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)	<ul style="list-style-type: none"> • 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	<ol style="list-style-type: none"> 1. Data collection tools and workflow 2. Reporting 3. Data quality
2. Data Analysis and Use	<ol style="list-style-type: none"> 1. Data integration and exchange 2. Analytics and visualization 3. Dissemination and communication
3. Leadership, Governance, and Accountability	<ol style="list-style-type: none"> 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	<ol style="list-style-type: none"> 1. Data interpretation 2. Skill and knowledge development 3. Decision making ability
5. Information and Communications Technology (ICT)	<ol style="list-style-type: none"> 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.

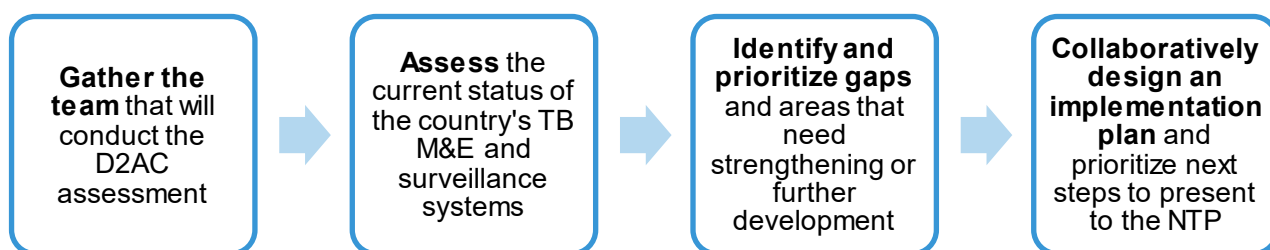
² Available at <https://www.tbdiah.org/assessments/quality-of-tuberculosis-services-assessments/>

Methods

Workshop Process

Planning for the D2AC workshop began in early 2024 with the formation of the leadership team. Advisors from the NTP, USAID/Uzbekistan, and Long-Term Exceptional Technical Assistance Project (LEAP) 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 NTP for further discussion (Figure 4).

Figure 4. The D2AC workshop approach and process



The D2AC assessment can be implemented using a variety of approaches, including individual assessment, group assessments, or a hybrid approach. In Uzbekistan, an in-person approach was implemented, with three in-person facilitators. The workshop was conducted over a three-day period and included 29 key personnel identified and invited by the NTP (note: the third day of the workshop was dedicated to activities separate from the D2AC, so the proceedings and agenda for the third day of the workshop are not included in this report—more about the parallel work conducted at this May 2024 TB M&E and Surveillance System Assessment and M&E Prioritization and Action Planning Workshop Report can be found in references TB DIAH, 2024c and 2024d).

The assessment took place on May 14–15, 2024, at the Shamsan Hotel in Tashkent, Uzbekistan. The workshop agenda can be found in [Appendix A](#).

Workshop Participants

Twenty-nine people participated in the D2AC workshop in Uzbekistan. Of the 29 participants, 14 (48%) were male and 15 (52%) were female. Three of the four facilitators were also male.

In terms of organizational representation, the NTP was represented by 22 participants (76%), and the private sector by seven participants (24%).

The public sector was represented by central-level NTP staff (clinicians and heads of medical departments, M&E specialists, drug management specialists, and statisticians—6 participants), representatives from the Tashkent Region Regional TB Center (4 participants), the Tashkent

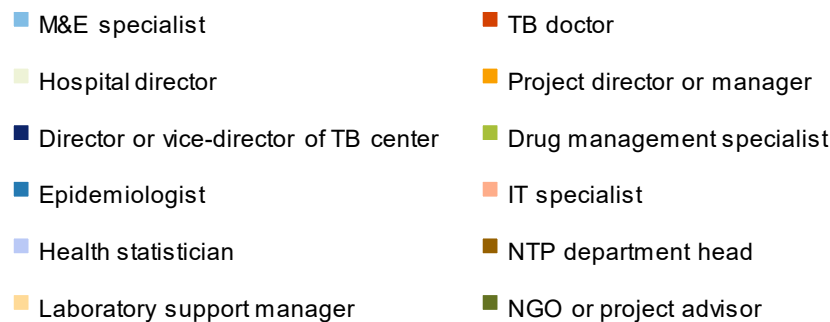
City Regional TB Center (2 participants), the Tashkent city District TB department (4 participants), the sanitary and epidemiological well-being and public health authority (4 participants), the National Reference Laboratory (1 participant), and the Tashkent City Pediatric Hospital (1 participant).

Partners included program managers and M&E experts from the USAID-funded TB Free Uzbekistan (2 participants), LEAP (1 participant), and USAID’s Tuberculosis Implementation Framework Agreement (TIFA) funded Tuberculosis Commitment Grant (TCG) implemented by the Uzbekistan NTP (1 participant). One participant represented the USAID Mission in Uzbekistan. Non-USAID partner representatives were from Médecins Sans Frontières (MSF) (1 participant) and the nongovernmental organization INTILISH (1 participant).

Since this was a non-residential workshop, only Tashkent city and Tashkent region were represented at this workshop. [Appendix B](#) provides the full list of participants.

Participants reported associating with 12 types of roles: M&E specialist (9 participants), project director or manager (3 participants), director or vice-director of TB center (3 participants), epidemiologist (3 participants), hospital director (2 participants), NTP department head (2 participants), and NGO or project advisor (2 participants); and then finally TB doctor (1 participant), drug management specialist (1 participant), IT specialist (1 participant), health statistician (1 participant), and laboratory support manager (1 participant) (Figure 5).

Figure 5. Participant composition, by TB user role



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, section by section. The Uzbekistan country profile was developed in advance of the workshop by the D2AC team.

Individual Instrument Completion

The participants were invited to fill out a paper-based D2AC data collection instrument individually with the help of the D2AC Glossary ([Appendix D](#)). The instrument was split into five packets, corresponding to the questions affiliated with each of the five domains (Table 3), so that participants could complete the instrument in five sessions, such as outlined in the agenda ([Appendix A](#)). During the individual instrument completion phase, a slide deck projected in the meeting room included the question and the five answer options for each question, in order, and the facilitators slowly moved the slides along to answer any questions while participants were selecting their responses. This individual work and process gave each participant the chance to become familiar with the instrument questions and their answer options ([Appendix E](#)) and to indicate their views on the Uzbekistan 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). All participants in attendance on day one submitted a response sheet.

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	11
	Reporting	3	
	Data quality	2	
Data Analysis and Use	Data integration and exchange	4	10
	Analytics and visualization	4	

Domain	Subdomain	Questions by subdomain	Questions by domain
	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	

The data collection instrument also includes a set of customized questions that were distributed on paper to participants based on their role and affiliation. Participant job titles and roles were known in advance of the workshop and had been mapped against the pre-designed user roles included in the D2AC toolkit ([Appendix E](#)). A customized questionnaire, based on the user roles of participants present at the workshop, was handed out to the corresponding participants. Not all participants were matched to a D2AC user role, nor were all D2AC user roles represented in the room. Eighteen participants turned in user role responses affiliated with seven user roles.

The individual submissions received from the domain questionnaires and the user role questionnaires were manually aggregated in the MS Excel version of the D2AC Data Analysis Tool. 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.

Group Instrument Completion

The 29 participants in attendance on the first day of the workshop were divided into 6 groups: 5 groups of 5 people and one group of 4 people, which were designed to be as homogeneous as possible. It was attempted to have an even distribution of central-level NTP staff, regional or city TB center staff, partners, and an even man-to-woman ratio. Each group had at least one

representative from the NTP (central or regional), and all but one group had representatives from partners and the central-level NTP. All groups had at least one regional or city TB center staff and at least two women (Table 4).

Table 4. Group composition for the D2AC instrument completion exercise

Group number	Number of central government staff	Number of regional or city level staff	Number of partners	Number of facility-level staff	Man-to-woman ratio
1	3 (including NTP statistics department, epidemiological authority)	1 (Tashkent region)	1 (USAID TB Free)	-	2-3
2	3 (including national reference laboratory, epidemiological authority)	1 (Tashkent city)	-	1 (Tashkent City Pediatric Hospital)	2-3
3	2 (including epidemiological authority)	1 (Tashkent city)	1 (USAID LEAP)	1 (Health facility in Tashkent)	2-3
4	1 (epidemiological authority)	3 (Tashkent city, Tashkent region)	1 (USAID Mission)	-	3-2
5	1 (NTP statistics department)	2 (Tashkent city, Tashkent region)	2 (USAID TB Free, MSF)	-	3-2
6	-	2 (Tashkent city, Tashkent region)	2 (USAID TIFA TCG, INTILISH NGO)	-	2-2

Participants were invited to fill out the D2AC data collection instrument ([Appendix E](#)) as a group. Each group discussed and built consensus on 44 capability questions before submitting their completed instrument (the four questions on decision making ability, 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 six groups shared their responses in plenary, when the results were aggregated into average scores. 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 later 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 in plenary where participants jointly identified areas (inspired by the 18 subdomains featured in the D2AC Toolkit) that were of highest priority for action, according to their experience and results (i.e., personal opinion).

Once the priority areas were identified, the facilitators moderated a plenary session to develop recommended priority actions. The combined implementation plan was approved and validated by all attendees in plenary.

Workshop Closing

Representatives from the NTP, USAID, and TB DIAH gave closing words. At the end of the workshop (end of the third day), all participants received a certificate of completion, and a group photo was taken.



Group photo at the end of the third day of the workshop. Photo credit: Umar Isaev

Data Analysis

Quantitative Data

The quantitative data from the 35 (29 individual and 6 group) data collection instruments were manually entered into the 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.

Qualitative Data

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 35 (29 individual and 6 group) data collection instruments were reviewed manually one-by-one, and all comments were noted.

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 Uzbekistan system. Furthermore, the workshop was not representative of the diversity and range of experiences across Uzbekistan due to the overwhelming majority of participants representing the central level and no regions outside of Tashkent being represented. The purposive sampling strategy could have led to some biases, with the most engaged or involved actors in the Uzbekistan system being invited, agreeing to attend, and participating in the three-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 NTP'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.

Another limitation is the workshop moderators' decision to facilitate the priority actions activity in plenary rather than in groups, which favored group consensus, but led to fewer recommendations being set forward than previous workshops experienced, with small group work generating more numerous suggestions. However, this being a workshop combined with other activities, decisions were made to prioritize certain activities over others, and the work in the D2AC workshop was also crucial in the ideation and development of the Concept Note on Strengthening the Implementation of the Electronic Tuberculosis Surveillance System – Uzbekistan (TB DIAH, 2024a) and the revised ARC report (TB DIAH, 2021, 2024d).

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

Challenges

This workshop did not use the online D2AC tool because it has not yet been set up in Russian. As a result, this D2AC implementation workshop used paper-based versions of the questionnaire in Russian developed for the 2022 Kyrgyz Republic D2AC assessment (Chauffour et al., 2022), and the discussions were held in Uzbek. Respondents experiencing confusion or wishing to receive clarification as they were completing the questionnaire were assisted one-on-one by the facilitators in the room, and if a clarification question was raised that pertained to the larger group, the information was shared with all. No participant was unable to submit their responses using the paper data collection instrument.

However, a MS Excel version of the priority actions (in Russian) was shared with participants for that exercise. Overall, the ability to view the D2AC's priority actions on their own screens was beneficial to participants for the portion of the workshop where groups develop recommendations.

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 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 Tashkent had their transportation and accommodation paid for by TB DIAH. Each participant was awarded a certificate of attendance.

At the national level, there were several important societal benefits from this assessment, namely that the NTP 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.

A particular and unique advantage conferred to this workshop was the fact that 15 participants and 3 facilitators present in this May 2024 TB M&E and Surveillance System Assessment and M&E Prioritization and Action Planning Workshop Report workshop had also attended the Monitoring and Evaluation Plan Workshop organized by TB DIAH a month prior, in April 2024 (TB DIAH, 2024e), and so were therefore already familiar with each other and collaborative work together.

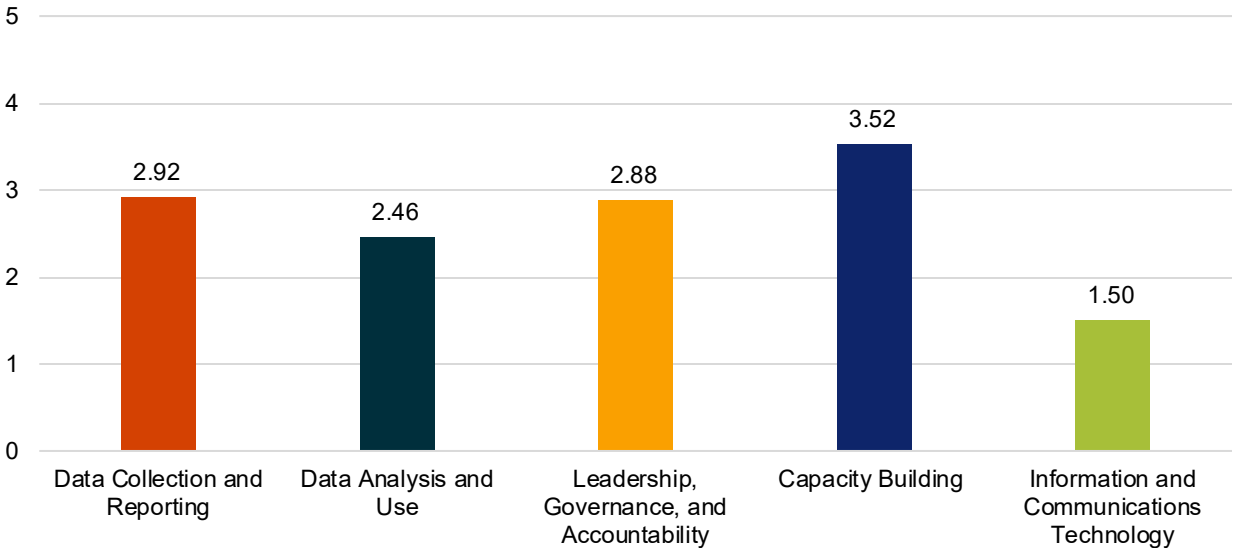
Results

Overall Results

The overall D2AC assessment score from aggregate group responses was 2.66 (out of 5), putting Uzbekistan at a “defined” level according to the D2AC. The country performed best in domain 4 (Capacity Building, score of 3.52), and least well in domain 5 (ICT, score of 1.50). Domain 1 (Data Collection and Reporting), domain 2 (Data Analysis and Use), and domain 3 (Leadership, Governance, and Accountability) received scores of 2.92, 2.46, and 2.88, respectively (Figure 6). Summary tables of results are provided in [Appendix F](#).

The overall score from aggregated individual responses was very similar to the group aggregate score (2.66), with a score of 2.64 (out of 5).

Figure 6. Overall domain scores (aggregate of group responses)



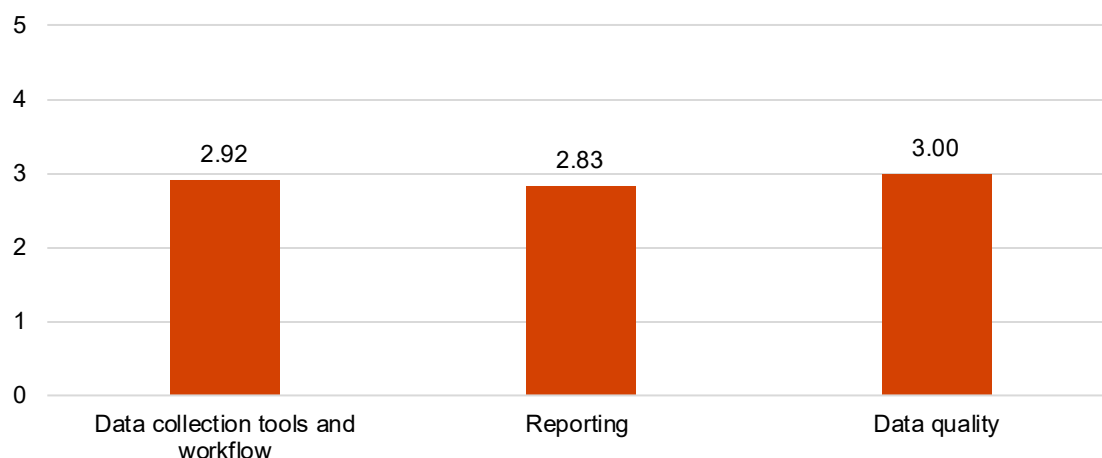
Results by Domain

For each of the following sections, please refer to [Appendix E](#) for the full set of questions and answer options.

Domain 1: Data Collection and Reporting

Domain 1, subdomain 1 (Data collection tools and workflow) received an aggregate score of 2.92; subdomain 2 (Reporting) received an aggregate score of 2.83; and subdomain 3 (Data quality) received an aggregate score of 3.00 (Figure 7).

Figure 7. Domain 1 subdomain scores (aggregate of group responses)



The qualitative findings for domain 1 (11 questions) were that standardized electronic data collection tools are not yet fully widespread. The existing health information system for the TB program is characterized by a combination of electronic and paper-based components. The evaluation of the types of data sources available for TB programming in Uzbekistan reveals a mix of paper-based and electronic systems (most are autonomous and linked to particular medical or paramedical institutions), each with varying degrees of data quality and accessibility.³ There are reporting structures within TB facilities at all levels, where statistical units collect data and create reports based on state-approved paper-based forms. These reports are then transferred to the relevant district or city statistical departments and regional centers for further processing and transmission to the national level. Groups were split between answer 2 and answer 3 for this question. Although Uzbekistan has its own databases, they are not standardized, and they are not common for every medical institution across the country, so

³ The list of electronic systems in place currently in Uzbekistan is:

1. DHIS2
2. LMIS
3. Technomed (history of disease; see below for more details)
4. MIS-2
5. SMART
6. MedRefer (more at <https://dtsj.uz/medrefer-tizimi-amalda/>)
7. O-MED
8. MED-HUB
9. Birth and death registry
10. Civil registry
11. Video supported treatment (video directly observed treatment short-course [DOTS]) registry

Participants also noted that every system in this list is duplicative of the paper records.

Technomed is limited, as it operates only at the level of medical institutions and has genealogical data that are needed by the NTP in the future. It is a difficult platform to upload data from, and e-register is easier to use. Conversations among participants touched on the debate about keeping the two systems separate rather than integrating them. The agreed-upon ideal was that since DHIS2 does not include any patient history data, all data from Technomed should go to DHIS2 and have the fields be auto-populated. Participants also encouraged the wider use of e-signatures to progressively decrease the circulation of paper documents.

Source: TB DIAH, 2024a, 2024c

facilities use autonomous data collection systems, which are sometimes in the form of paper-based data collection systems in addition to electronic data collection (**question 1**).

For **question 2** (whether the country has an inventory of TB data collection systems), participants were torn between answers 1, 2, and 3. Uzbekistan has at the very least information databases that are used at the district and city level, with a more advanced version hosting key and sensitive information available at the national level and NTP. Also, in support of response number 2, participants shared that they have lists that are created on demand by the MOH when there is a request from a specific organization. Those lists are not standardized, so when they need a specific document or table, they are not necessarily available. The existence of inventories vary by system: there is no inventory for equipment; for medication and provision, there is a standardized inventory and database (data are collected reliably); laboratory data are collected on a situational basis/ad hoc; and for clinical/outpatient data, there is a standardized register, both in paper-based and electronic form. Not all systems are at the same level of development, which is what led to some debate in the answer to this second question. Regarding the laboratory register more specifically, participants shared that they collect data at the regional level themselves, and the regional level does not have the lab data always accessible.

Previous leadership has been following service delivery guidance since 2014, but Uzbekistan is now using new terminology and new modes of treatment (**question 3**). Regarding the process of using unique identification for TB clients (**question 4**), it is a process that began in Tashkent city—the system reference numbers are used to track clients. Participants shared that they would like the DHIS2 system to be introduced to other regions, which would allow for easier tracing of patients.⁴ In the Tashkent region, the NRL/patient personal identification number of an individual (PINFL) is being used, and if all the experts started using it as well, it would be very useful for the TB-3 register (register of TB patients notified and who started treatment). Data entered are fairly complete (participants shared that 80% of data for patients are complete, which oftentimes include their domestic passport details). Because there is no unified database, tracking patients is often done using a paper-based system that is submitted to the district level. However, when electronic registers are used or available, every case is registered under a separate number that is not repeated. In DHIS2, there will be an electronic ID. This ID will be a unique number. It can be found in any database. Uzbekistan's NTP is planning that there will be a trained specialist at the district level to input this data, and the transfer to the DHIS2 ID system will occur in two stages: first, when data entry staff will be entering unique taxpayer numbers or domestic passport data, any existing case file will appear on the screen, and clients will be able to be tracked with either number; second, at the central

⁴ When discussing potential improvements to the system, participants suggested that the new modules in DHIS2 or other electronic HIS should include the following data points:

- Contact
- Medical diagnostic equipment
- Pharmacy, including stock of TB medicines and lab reagents
- HR
- M&E
- X-ray images
- TB medical continuum of care

level and at the district level, the client will be able to be tracked even if they move. However, the challenge of how to account for TB clients who are migrants and foreign nationals (without a taxpayer ID or an Uzbek domestic passport ID) remains a challenge.

For **question 5**, which evaluates the extent to which the NTP site list is standardized and in what format it exists in, participants shared that there is a master facility list (MFL) that includes the full list of TB facilities, their location, and information on TB cases for reporting purposes. There was some debate as to the completeness of this MFL. Participants shared that a census of all TB facilities in Uzbekistan was carried out in 2022 to record or update not only the facility's location information, but also the contact details of those in charge. There are 22 institutions in 22 major cities of Uzbekistan (districts). Participants shared that there is inconsistent ability to access this information from the 22 district TB center websites. However, the full MFL is available on the MIS-2 website. The TB Free Uzbekistan project has studied this question and have come across the problem that although the full list of stakeholders exists, it is difficult to find exact data because data from different years from different institutions do not match up.

The first obstacle to a reliable MFL is that there must be a set of parameters guiding which service delivery points are to be included. This streamlining needs to first occur at the national level, and then it needs to be clearly determined which departments of hospitals/clinics the TB patients are being treated at and which sub-units should be included in the MFL. There are also different clinical departments treating TB—TB, pulmonology, pediatrics, etc. Categorization and inclusion of these subunits should be consistent across lists. There are also clinics/hospitals called rehabilitation houses or sanatoria; there are prophylaxis-only health centers; there are outpatient clinics and different hospital branches that treat TB patients—their inclusion in the MFL should be consistent. Currently, the MFL does not reflect the true situation of the ground.

A second important challenge is that the names of facilities are inconsistent. Facilities need to be attributed to legal addresses and named differently from the commonly used names and addresses. There is a need for a unified list to streamline the names of these facilities (clinic vs. dispensary vs. hospital). The present state of the electronic system does not allow for the creation of a common/unified list of institutions, so efforts continue toward standardization. Further complicating this task, every medical institution is unique and is not just subordinate to the MOH but is also linked to medical insurance funds, other institutions, or self-governing bodies of citizens (mahalla committees) based on the territory in which the institution is situated. Before the advent of UZMED Infocom, it was the responsibility of the local municipality (*hokimiat*, a regional or district government administration) to name health facilities. Since some medical institutions had long names, and due to the limitation in space in administrative paperwork, municipalities could not enter the full juridical name of each institution. Previously, this was not a problem because for a long period there was just one provincial hospital; however, now there are multiple, which is introducing a new problem. The UZMED Infocom should allow for MFL data to be downloadable and available under the same name and same ID number.

Recently in Karakalpakstan, more than 300 TB patients were affiliated with the department of cardiovascular health. This was because the specialists treating TB were working in the cardio-

vascular health department, so they were seeing clients for TB services out of that same outpatient unit. Participants stressed the need to streamline not just the names of medical institutions but of departments treating people affected by TB because in certain provincial hospitals, there are no specialized TB departments, so patients are treated in adjacent departments or wherever doctors can see them. Finally, participants recommended also including laboratories as well as hospital departments and sanatoria in the MFL so as to better trace the route of the patient.

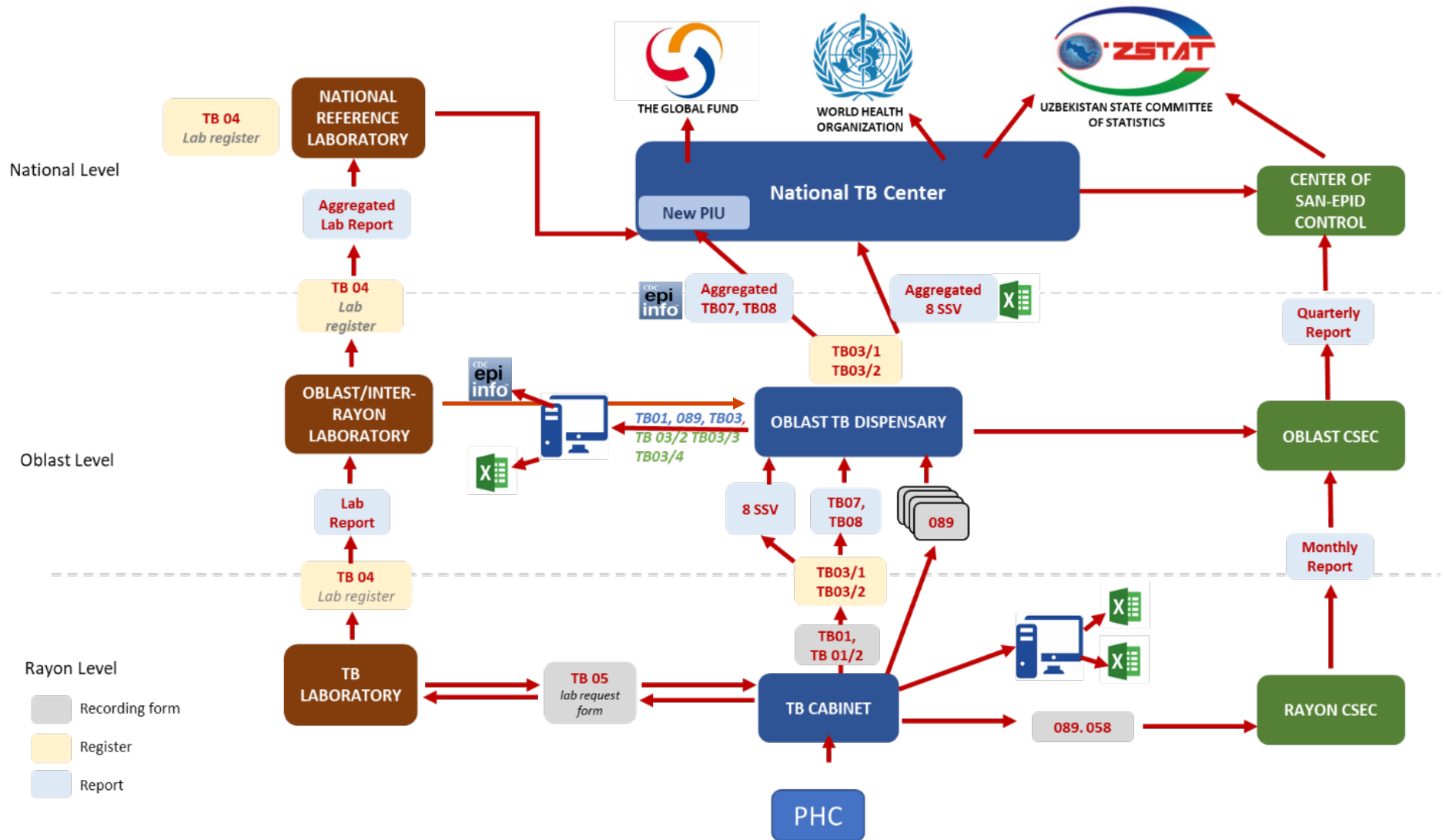
When asked how data disaggregation (e.g., by sex or age, treatment/retreatment, drug-resistant/drug susceptible) is addressed in data collection (**question 6**), participants gravitated toward answer 3, stating that the data are verified at the NTP and sent back to be processed later. Data are disaggregated by sex, age, category of patient, and drug resistance. Participants said there may be new requirements for data collection and there have been discussions on the integration of WHO indicators. For example, when considering the number of new migrants registered in 2022, those types of disaggregation are not always readily accessible. The fact that the WHO and partners have strict requirements for different data disaggregation in reports has led to a more widespread adoption of that habit in data collection. For example, when reporting a client as having MDR, this sometimes includes extensively drug-resistant (XDR) and pre-XDR TB, and there needs to be a way to determine that at the country level or standardize how the labs share diagnosis and report their own data, so we need to agree on the terms and allow for more accurate disaggregation.

On the topic of the extent to which standardized electronic data reporting tools are used (**question 7**), groups were torn between answers 2 and 3. A standardized paper data reporting tool is used at all levels, and standardized electronic data reporting tools are used at the regional level for data disaggregation (not available at other levels). The paper tools have been proofed, and they are either printed or used on MS Excel—all data are first entered into a spreadsheet since there is no direct data imputing into DHIS2. One of the challenges raised by participants is that the tools do not communicate with each other (e.g., MedRefer), and this poses a challenge in terms of what information is needed in the future and what data need to be transmitted. Participants expressed wanting tools to be developed not just for data collection and processing but also for final reports to see the monitoring can be conducted properly and not keep paper versions (which take up a lot of physical space in health offices and facilities). Specifically discussing access to the DHIS2, it can be granted at any level. Personnel at the Republican level can cut off access to the district level. Only specific people have these privileges and can decide who will have access to the data.

Participants shared that the NTP guidance requires reporting of disaggregate data, with some truth in response options 4 and 5 as well (**question 8**). For **question 9**, groups were torn between answers 3 and 4. While some argued that epidemiological data inform data guideline updates every 3 years, others argued that producing reports based on current, updated data should allow them to select answer number 5.

As an iconographic representation of the data collection and reporting systems discussed by the participants and covered in questions 1–9 of the D2AC data collection instrument, Figure 8 presents the different data collection and reporting systems in place for TB in Uzbekistan, also illustrating the flow of information.

Figure 8. Flow of information on TB case detection and treatment outcomes in Uzbekistan



Source: Uzbekistan updated ARC Report, TB DIAH, 2024c & 2024d

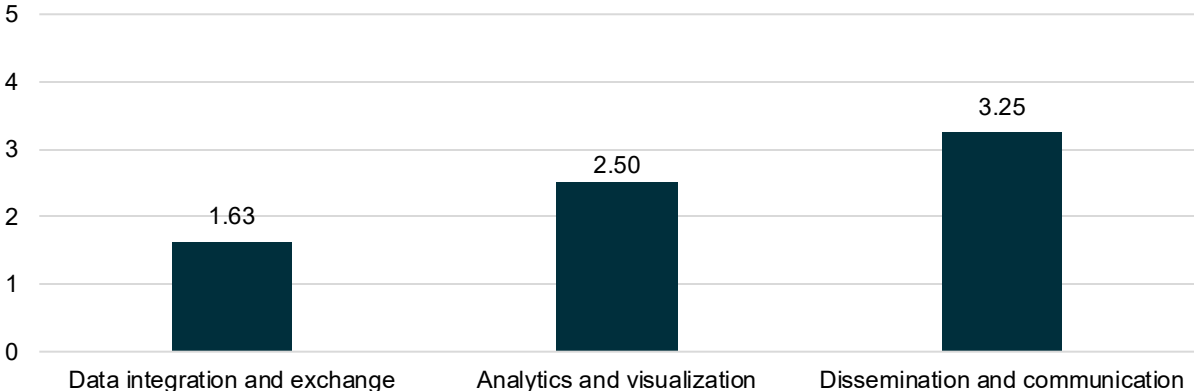
On the theme of data quality, respondents shared that they receive a report once a month and conduct data verification, and then proceed to producing an aggregate report. However, reports have not been produced for the past two years. The dynamics of the epidemiological situation are a different type of report, but data quality can be verified on a monthly basis on an aggregate level. Data are reported to institutions once per quarter. In every district, such as the TB hospital, there is a certain day on which they provide reports from children hospitals to enter as electronic data. This type of activity is crucial to allow providers to link to and access the medical history of patients. Three staff at the NTP conduct verification of entered data, but that does not seem to be filling the gap. There is a lack of uniform documentation for drug and medication provision. When the regional TB concilium doctors assign medication, there is no procedure or guidance document to provide instructions from the central concilium. This leads to issues with patient prescriptions and their medication history being incompletely or incorrectly recorded in the registers. This can lead certain patients to not receive the medication they should be receiving. For example, early treatment clinics at the regional level have data on inpatient care that provides an overview of diagnostic history and prescribed treatments. At the regional level, the TB doctors do not treat people—there is a lot of turnover and their duties are not carefully reviewed, which has become an important issue. The NTP is working on developing the functional duties for each TB doctor, and the next step is ensuring compliance (**question 10**). There were no comments shared about **question 11**, but some stated that responses 1 through 4 were correct, so several groups selected answer 4.

More information on specific data collection and reporting forms, registers, and systems can be found in the Uzbekistan TB M&E and Surveillance Systems Landscape Analysis (TB DIAH, 2024b).

Domain 2: Data Analysis and Use

Domain 2, subdomain 1 (Data integration and exchange) received an aggregate score of 1.63; subdomain 2 (Analytics and visualization) received an aggregate score of 2.50; and subdomain 3 (Dissemination and communication) received an aggregate score of 3.25 (Figure 9).

Figure 9. Domain 2 subdomain scores (aggregate of group responses)



The qualitative findings for domain 2 (10 questions) were that there is no central data repository in place. Data are collected only at the national level, and there are state standards, guidelines, and databases unified for Uzbekistan. There is no unified approach to data storage, and currently,

data are collected and stored on computers (**question 12**). Participants suggested that DHIS2 be used in the future as a system to conduct the data storage automatically (**question 13**).

Data exchange processes between systems at points of service for laboratory testing and reporting and/or central repositories are limited but implemented at the national level. There is no automatic data exchange, which is an obstacle. Data on the results of TB tests are only received by request of the institution (**question 14**). For **question 15** about the extent to which there are exchange standards (interoperability and/or health data standards, e.g., XML, JSON, LOINC, FHIR) integrated into the data exchange implementation, participants shared that the resolution 14-15 of the President were evidence toward answering 1 or 2 on this question.

Regarding conducting analysis and developing visualization (**question 16**), participants shared that users are not really able to do so in real time, as there are no data available. At the district level, the TB doctor will have access to the local data only. In the past, participants shared that they had to submit reports to TB doctors about how the diseases were spreading and how they were evolving.

Regarding the extent to which analytics and visualization requirements are documented (**question 17**), participants shared that data are reviewed at the regional health department (e.g., endocrinologists). Moreover, specialists from the public health department at the provincial and municipal levels meet with the chief TB officers, who conduct the X-rays, to review this report. Participants expressed that circulating information about people affected by TB would hinder stigma reduction efforts, and that the information, which is classified, cannot be divulged. Experts external to the TB system are invited to assist with analysis and analytics, with the hope that someone external may be able to notice trends or patterns in the data that could help with TB reduction efforts. Staff in director roles do not directly engage in these activities. Participants also shared that internal audits are important but that they also often have external peer reviews done, which they deem equally valuable. Participants believe that although some data visualizations are conducted, they are not visible enough in the published reports.

There were no comments on **questions 18 and 19**. For **question 20**, participants shared that communication services exist between different departments/services.

Finally, on the topic of the extent to which information products are developed and subsequently disseminated (**question 21**), participants responded that they have such products in place and that products are being developed in the context of the program and subsequently disseminated, hence why several groups chose answer option 4. Others chose answer number 2 when thinking about epidemiological data. Participants shared that statistical data are not being developed and are just calculated on an as-needed basis. Still, others argued that the correct answer was response 1—explaining that the DHI2S began rollout in early 2024, a process that the entire country was engaged in, and the products that came out of it were good and are going to be helpful to the NTP in the future. Participants shared that materials are submitted to medical institutions only after they have been approved by the NTP.

Furthermore, participants shared that each of the stakeholders is interested in analytics and visualizations at the primary level. TB staff at the district level can produce reports on the areas where they faced problems and challenges, and there used to be statistical reviews. These reviews used to be published, and the doctors used the tables printed in them. Participants

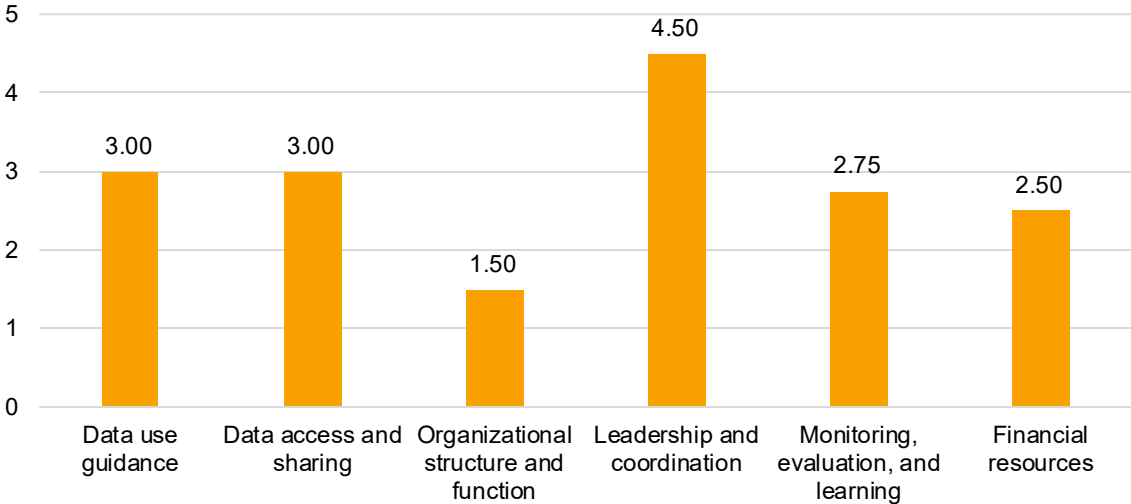
shared that those reviews included better infographics that were widely understandable and intuitive. These reports were also able to show specific data instead of the full data set that is sometimes difficult to parse through. Participants shared that they could examine dynamics by year, by district, or by rural vs. urban filters, etc. They shared that during monitoring visits, supervisors and assessors should track the usage of these materials as part of the data use analysis—and not just informational materials and SOPs, but also training materials.

Participants shared that the information materials they mentioned were generated and processed at the central level and shared in a top-down manner. They expressed the desire to have more opportunities for competitive analysis. Furthermore, at the primary level of public health, practitioners are responsible for people living in their community, but they have limited resources. Data are collected at the primary level, and districts are referred to the Organizational and methodological department (OMD) at the regional TB centers, where data are recorded. They are not able to conduct full data analysis reviews but can only use existing sources to report to a certain extent. It was expressed that certain villages and districts are requesting assistance with data access, analysis, interpretation, and visualization (e.g., pediatric TB services). Finally, participants shared that AI may be a future solution—they referred to having access to a webinar shared by the NTP about how AI can be used in public health care.

Domain 3: Leadership, Governance, and Accountability

Domain 3, subdomain 1 (Data use guidance) received an aggregate score of 3; subdomain 2 (Data access and sharing) received an aggregate score of 3; subdomain 3 (Organizational structure and function) received an aggregate score of 1.5; subdomain 4 (Leadership and coordination) received an aggregate score of 4.5; subdomain 5 (Monitoring, evaluation, and learning—MEL) received an aggregate score of 2.75; and subdomain 6 (Financial resources) received an aggregate score of 2.5 (Figure 10). Domain 3, subdomain 4 was the highest performing subdomain among groups, and domain 3, subdomain 3 was among the lowest performing subdomains, along with all subdomains under domain 5 (ICT).

Figure 10. Domain 3 subdomain scores (aggregate of group responses)



The qualitative findings for domain 3 (11 questions) were that the NTP has a data use guidance at the national level, but it is unclear if it is approved (**question 22**). M&E is conducted on a quarterly basis. There is a semiannual M&E report and an annual M&E report. Every year, the data are updated. Participants shared that Uzbekistan should develop separate guidance for data use for monitoring and a separate guideline for data governance. In the past, every TB dispensary had to collect data and analyze it (e.g., data on disease spreading). At the district level, data use is not practiced as consistently as it should be, but it is part of the job descriptions at that level (data collection and analysis jointly with primary health care [PHC] level doctors). Participants testified to submitting reports on a monthly, quarterly, and annual basis to the national TB center and epidemiologists. Participants shared that they have sometimes been fined if the national TB center discovered someone infected with TB that had not been reported/notified. Participants shared that some current challenges are that the indicators are not clearly defined, which is why the guideline is challenging to use and not all doctors use it—indeed, the TB mortality rate is rising and we have to know clearly what indicators we can use so that we can analyze them, but the PHC levels are limited to the data that they collect themselves, without clear guidance on data use. More information on M&E, governance, and parallel systems to the NTP can be found in the Uzbekistan TB M&E and Surveillance Systems Landscape Analysis (TB DIAH, 2024b).

The data access and sharing status within the NTP and with external stakeholders is that TB data are often requested but that there is no data sharing guideline document that exists, nor is it outlined anywhere (**question 23**). The HIV program and the prosecutor's office request data from the NTP. They use a legal document to request to be granted data access. Participants shared that they would like to be able to compare the TB data they collect at the peripheral levels themselves with external data without needing to apply to supervising board/superiors to access them. Participants expressed wishing there was a more streamlined process for information exchange. Currently, there is also a resolution of the president on the exchange of information within the country and a resolution of the cabinet of ministers that also stipulates this exchange of information to help in resolving this challenge.

There appear to be challenges regarding the extent to which the MEL plan is implemented (**question 27**). Participants shared that, similarly to what was discussed in previous questions, there is a discrepancy between actions that are taken at the PHC level and the existence of a governing document that outlines and regulates the process and expectations. Participants expressed the desire for a MEL plan that would be a useful reference document, not just something looked at once a year, and that it should outline the objectives to be achieved by the NTP as well as by projects and should distribute the objectives across projects based on their focus, scope, and expertise. A central document should be shared with all partners to avoid redundancies, and each new MEL plan should be informed by previous versions and plans. Participants considered the development of this document helpful and that it could assist them in achieving further analyses and identifying their achievements and be a step toward MEL standardization.

Participants shared positive feedback on data triangulation using different methods as something they had put into practice with good results. Participants also suggested creating

monitoring teams to be comprised not just of doctors but of other experts as well. Some participants shared that their project had approved one unified budget for monitoring but that supporting the e-database remains a challenge due to understaffing. Representatives from the peripheral NTP level shared that twice a year they receive monitoring visits approved by the MOH, which also engage other partners. Participants shared that all teams should know what central place to go to access relevant information at the NTP—somewhere where all MEL documentation, including reports of monitoring visits, can be found. This database would be for internal use only, so when NTP staff have monitoring visits and want to review results (gaps and recommendations) from previous monitoring visits, they could do so and evaluate their progress. Recommendations included creating a cloud-based database (e.g., Access) with synchronization and interoperability capabilities so as not to interrupt TB providers for whom constant monitoring can feel redundant.

In the second half of 2024, TB facilities will receive a monitoring visit. The MEL plan needs to be able to reflect Uzbekistan's NTP's ability to make amendments in its procedures. By the end of the year, every TB department head at the district and province levels should be able to prepare such an annual MEL plan. Participants shared that the use of dashboards is very helpful for administrative decision making. All in all, participants agreed that improvements in the quality of monitoring, even if no more additional funds are dedicated to the endeavor, will increase the quality of medical service. More information about MEL priorities in Uzbekistan can be found in the M&E Plan co-developed by TB DIAH (Ministry of Health and National Tuberculosis Program of the Republic of Uzbekistan 2024; TB DIAH 2024e).

On the topic of the extent to which data use activities are funded in the NTP budget (**question 31**), per capita financing is used for the coordinating role of the NTP and provincial Ph&P centers (for example, if there is a wide area to cover, the funds are distributed according to the square of the area, but it is not densely populated). Laboratory services cannot be compared to TB treatment services because labs support a broad range of clients and need to be functioning independently/autonomously, to a certain extent.

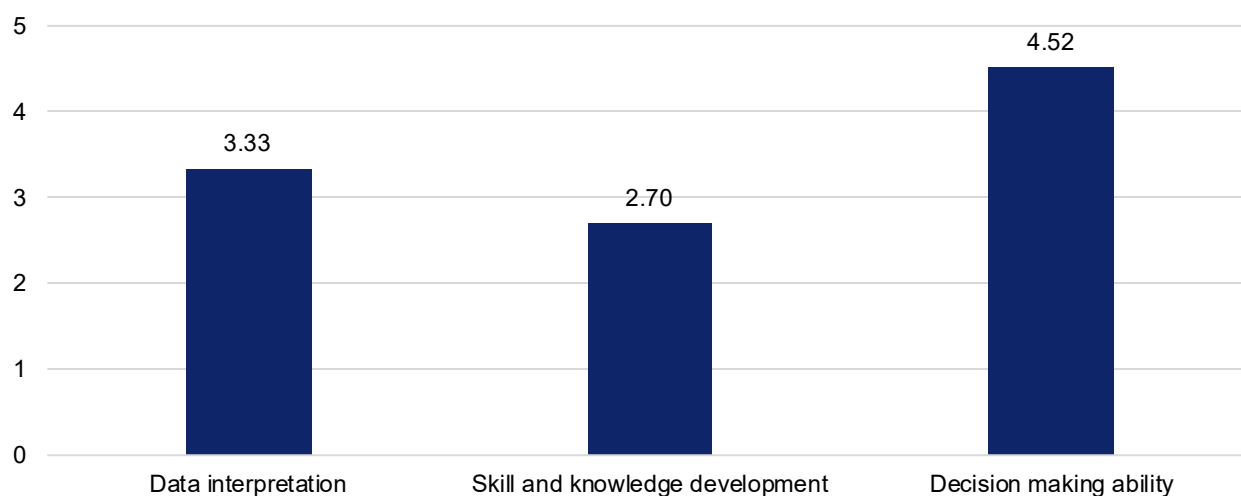
There were no comments on questions 24–26, 28–30, and 32.

Domain 4: Capacity Building

Domain 4, subdomain 1 (Data interpretation), received an aggregate score of 3.33, and subdomain 2 (Skill and knowledge development) received an aggregate score of 2.70 (Figure 11). Domain 4, subdomain 3 (Decision making ability), received an aggregate score of 4.52—it was the overall highest-performing subdomain (but was measured by only considering aggregate individual responses). Domain 4 was the highest performing domain.

Since the questions in the third subdomain 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, and groups were not asked to answer those four questions.

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) included no comments for **question 33**. For **question 34** on how often data are reviewed and by whom, participants shared that it is more likely to be the program employees who are engaged in this process. The answers varied between 2 and 5, with most groups gravitating towards response options 2 and 3 for this question.

For **questions 35 to 38** on supportive supervisions, pre-service training, and in-service training, respondents shared that trainings vary, with wide differences in the quality of mentorship and training. The WHO has organized trainings for TB nurses specifically. On-the-job training is not practiced—trainings are always conducted externally. There exist options to follow online training and skill improvement on the job.

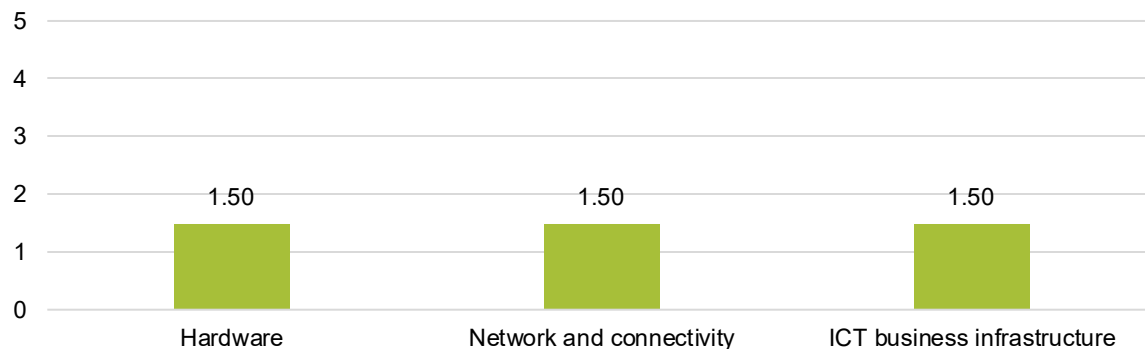
There were no comments for **questions 39 and 40**. More information on capacity building in the Uzbekistan NTP can be found in the Uzbekistan TB M&E and Surveillance Systems Landscape Analysis (TB DIAH, 2024b).

No comments were provided for **questions 41–44**.

Domain 5: ICT

Domain 5, subdomain 1 (Hardware), subdomain 2 (Network and connectivity), and subdomain 3 (ICT business infrastructure) all received an aggregate score of 1.50 (Figure 12). Domain 5 was the lowest performing domain, and all three subdomains were among the lowest performing subdomains, along with domain 3, subdomain 3 (Organizational structure and function).

Figure 12. Domain 5 subdomain scores (aggregate of group responses)



The qualitative findings for domain 5 (four questions) were that hardware exists but is out of date and new software cannot be added. Available funds are not used to re-equip facilities (**question 45**). Uzbekistan furthermore has no established ICT infrastructure to send or receive data. There exists no strategy on digitization and no specific document outlining it, so the hardware specifications will be dependent on what is outlined in that document. The Executive Order 415 exists and provides some general guidance, but no detailed description of the equipment and supplies is included (**question 46**).

Regarding internet connectivity, there is access to strong connection in all regions of the country. All TB facilities have good connectivity and are wired for the internet. Power outages are very frequent. At this current time, power supply stability and reliability are crucial factors for online work at the peripheral levels (**question 47**).

There were no comments for **question 48**. More information on the Uzbekistan NTP’s ICT can be found in the Uzbekistan TB M&E and Surveillance Systems Landscape Analysis (TB DIAH, 2024b).

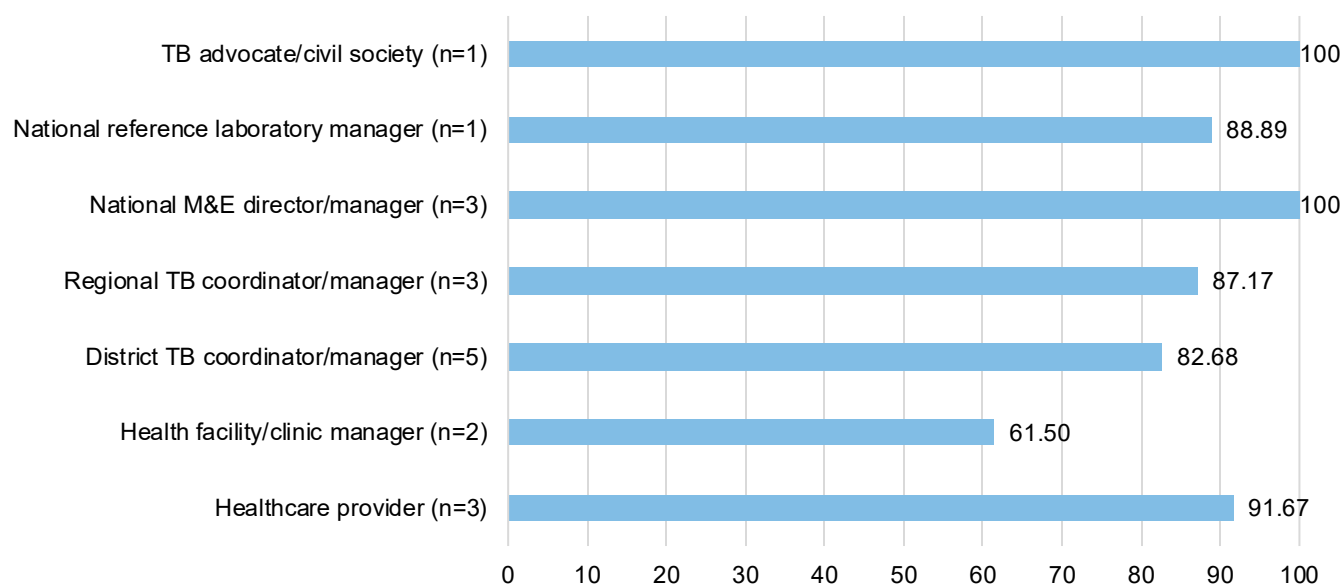
TB Users’ Data Needs

Eighteen participants in the workshop were matched with seven 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 seven D2AC user roles represented at this workshop were healthcare provider (3 participants), health facility/clinic manager (2 participants), District TB coordinator/manager (5 participants), Regional TB coordinator/manager (3 participants), National M&E director/manager (3 participants), National reference laboratory manager (1 participant), and TB advocate/civil society (1 participant). All user roles represented had at least 61.5 percent of their TB data needs met (as defined by the D2AC), with health facility/clinic managers representing the lower part of the spread, and the TB advocate/civil society and national M&E directors/managers sharing that 100 percent of their TB data needs, as defined by the D2AC, were met (Figure 13).

All the participants who identified with an “other” role according to the categories delineated by the D2AC 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.

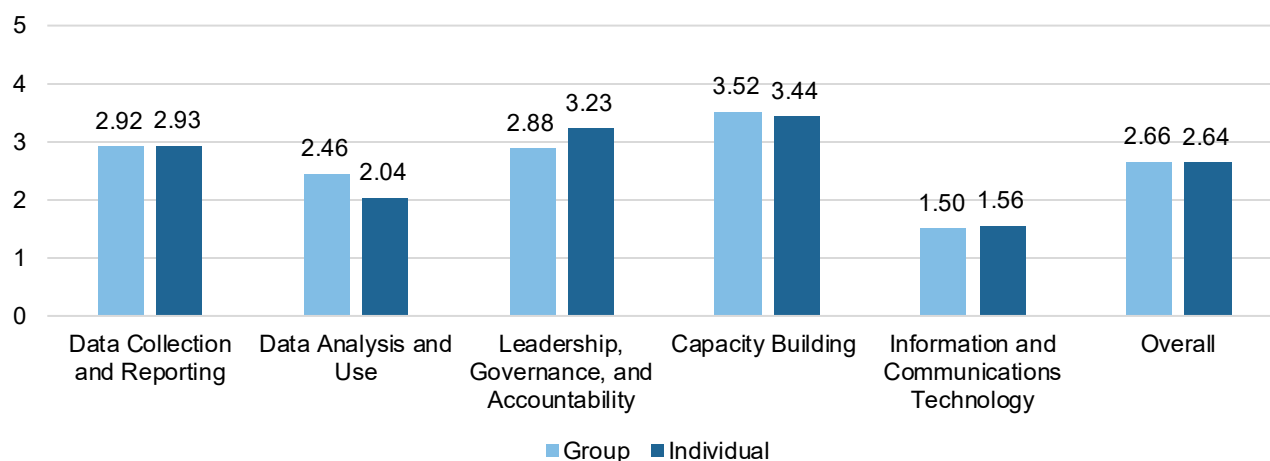
Figure 13. Participants' perspectives on how well TB data needs are met, by user role, in percentage



Comparing Individual and Group Results

A comparison of the individual and group responses revealed an even split: individuals scored higher than groups for domains 1, 3, and 5, and groups scored higher on domains 2 and 4, with the biggest gap at 0.42 points for domain 2 (groups scoring higher than individuals) and the smallest at 0.01 for domain 1 (individuals scoring higher than groups). Average responses to domains 1, 4, and 5 were all within 0.08 points of each other. (Figure 14). In comparing the scores for domain 4 and the overall score, it is important to note that the same score of 4.52 was used for D4S3 for both group and individual aggregate results.

Figure 14. Difference between individual and group results, by domain



When examining individual and group differences at the subdomain level, the trend is similar – there was an even split between individual scores being higher than group scores and vice-versa. D4S3 is not included in this analysis, as previously mentioned. The largest score gap was in the

scoring of D3S3 (1.83 difference), and the smallest gap was for D3S1 (0.04 difference) (Figure 15 and [Appendix F](#)).

Figure 15. Difference between individual and group results, by subdomain

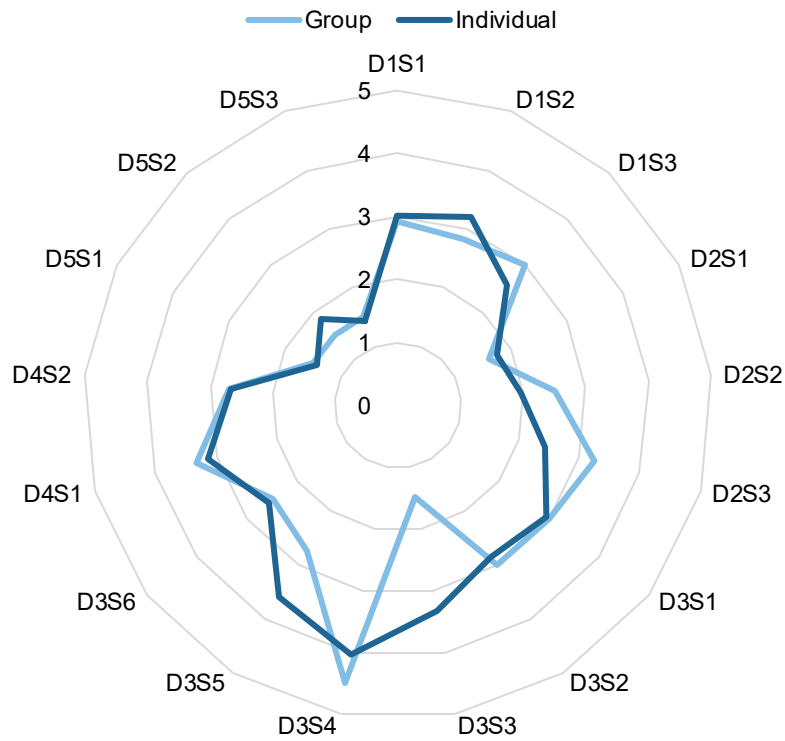


Figure 15 does not include a score comparison for D4S3 since no aggregate group score was considered for this subdomain in the analysis, given that the questions pertain to personal and subjective opinions on job satisfaction, mentorship, training, and incentives/motivation. Instead, the aggregate score from individual responses (4.52) was used in both group and individual aggregate overall scores.

Discussion

The May 2024 D2AC assessment in Uzbekistan shed light on the perceived areas of improvement of the Uzbekistan TB information system, namely in the areas of data integration and exchange, organizational structure and function, and all three subdomains related to ICT. That being said, overall Uzbekistan has clear areas in need of strengthening, with five subdomains receiving scores lower than 2 out of 5. Participants selected a number of these weaker-performing areas to focus on for the priority action exercise.

The D2AC assessment in Uzbekistan also shed light on the areas that were performing well. The strongest-performing areas were decision making ability (aggregate from individual responses only) and leadership and coordination (strongest performing for aggregate group responses and second-strongest for aggregate individual responses). Other strong subdomains included data quality, dissemination and communication, data use guidance, data access and sharing, and data interpretation. These seven subdomains, among the eighteen of the D2AC scale, 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 two among those (decision making ability and leadership and coordination) received scores superior to 4 out of 5 (“institutionalized” stage of the continuum).

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 Figure 14), and the overall aggregate assessment scores between groups and individuals varied by only 0.02 points (see table F1 in [Appendix F](#)), so the introduction of bias was not a concern in this assessment.

Other discussion topics, in addition to the recommendations promulgated by the group and featured in the next section of this report, could be the source of future focus groups and workshops. Key additional discussion points included modifications to the MFL, a more widespread, consistent, and effective use of client unique IDs, interoperability between various HIS in Uzbekistan (see more at TB DIAH, 2024a), implementing a more standardized procedure in place for prescription drugs, and strengthening overall data use.

Recommendations

The recommendations presented were developed in plenary and by consensus by all workshop participants. They are described in detail in the implementation plan ([Appendix G](#)). After plenary discussion, the recommendations were combined in a joint implementation plan and validated by the workshop participants.

The recommendations can be summarized in four broad categories.

First, participants recommended standardizing the list of TB institutions, which should include addresses, name and contact details of the healthcare facility and the in-charge. The regulatory document, once approved, should feature a regularly updated list of facilities. This work should be conducted in close collaboration with UZ Infocom, NTP staff and advisors, and donor-funded TB project advisors.

Second, participants expressed wishing to see a standardization of the DHIS2, which would include the launch of a unified electronic TB system on DHIS2 and legitimize electronic reporting for TB and other diseases as a conventional data entry method at the point of data collection. This work would have to be conducted in collaboration with UZ Infocom, the NTP, USAID projects including USAID's TB Free Uzbekistan and TIFA-funded TCGs implemented by the Uzbekistan NTP, and the Global Fund grant project implementation unit. Participants expressed hoping to see a pilot DHIS2 launched in four regions within the year, and a more widespread adoption of DHIS2 as the electronic reporting software and a democratization of electronic data entry practices.

Third, participants suggested creating a normative document regulating the work of the Central Medical Clinical Commission (TB Concilium), which would include objectives, roles, and duties. The regulatory document should be approved by the MOH and involve specialists and regional departments in its development.

Last, participants encouraged that the MOH develop a national communications plan and an information bulletin, which would be useful not only for the TB program, but for other disease areas as well.

The priority recommendations can be found in [Appendix G](#).

Conclusion

As Uzbekistan appears on the World Health Organization's global list of high-burden countries for MDR/RR-TB, Uzbekistan's MOH and its NTP are faced with important challenges in their pursuit of curbing the country's TB disease burden.

The D2AC assessment in Uzbekistan 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 leadership and coordination, data quality, dissemination and communication, data use guidance, data access and sharing, and data interpretation. However, it also revealed important gaps, such as data integration and exchange, organizational structure and function, 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 Uzbekistan Workshop Agenda

Tuesday, May 14, 2024 D2AC Assessment Workshop Day 1 Location: Shamsan Hotel, Tashkent	
Time	Activity
8:30 – 9:00 AM	Registration
9:00 – 9:30 AM	Opening remarks and welcome Welcome by TB DIAH team & introductions in the room
9:30 – 10:00 AM	Setting objectives of the meeting
10:00 – 10:30 AM	Introduction to the D2AC toolkit, method, and process (Jeanne)
10:30 – 11:00 AM	Coffee Break
11:00 – 11:45 AM	Small group discussion and consensus around the first theme: data collection and reporting (11 questions)
11:45 AM – 12:30 PM	Plenary discussion around data collection and reporting
12:30 – 1:45 PM	Lunch
1:45 – 2:30 PM	Small group discussion and consensus around the second theme: data analysis and use (10 questions)
2:30 – 3:15 PM	Plenary discussion around data analysis and use
3:15 – 3:45 PM	Coffee Break
3:45 – 4:30 PM	Small group discussion and consensus around the third theme: leadership, governance, and accountability (11 questions)
4:30 – 5:00 PM	Plenary discussion around leadership, governance, and accountability
5:00 PM	Closing of Day 1
Wednesday, May 15, 2024 D2AC Assessment Workshop Day 2 Location: Shamsan Hotel, Tashkent	
Time	Activity
8:30 – 9:00 AM	Registration
9:00 – 9:15 AM	Summary of Day 1 and overview of Day 2
9:15 – 10:00 AM	Small group discussion and consensus around the fourth theme: capacity building (8 questions)
10:00 – 10:30 AM	Plenary discussion around capacity building

10:30 – 10:45 AM	Individual completion of the decision making ability section (4 questions), and the user role questions (according to each person's role/function)
10:45 – 11:15 AM	Coffee Break
11:15 – 11:30 AM	Plenary discussion around the individual questions (any general trends or comments)
11:30 – 11:45 AM	Small group discussion and consensus around the fifth theme: ICT (4 questions)
11:45 AM – 12:30 PM	Plenary discussion around ICT
12:30 – 1:45 PM	Lunch
1:45 – 2:30 PM	Presentation of aggregate results from groups (agreed in plenary) and aggregate average for individual questions
2:30 – 3:15 PM	Small group work on priority actions related to the weaker subdomains identified
3:15 – 3:45 PM	Coffee Break
3:45 – 4:30 PM	Small group work on priority actions related to the weaker subdomains identified (continued)
4:30 – 5:00 PM	Plenary on small group work and consolidation of priority actions into a larger recommended implementation plan
5:00 PM	Closing of Day 2

Appendix B. D2AC Uzbekistan Workshop Participants

Name	Affiliation	Role
Usmanova Ruzilya	NTP	TB doctor
Ismatov Bakhtiyor	NTP	M&E specialist
Khalimzoda Lochinbek	NTP	Drug management specialist
Belotserkovets Vera	NTP	Head of the 1st treatment department
Selkina Ekaterina	Tashkent city, Regional TB center	M&E specialist
Togaeva Mashkhura	Tashkent city, District TB department	M&E specialist
Gafforov Bakhodir	Tashkent region, Regional TB center	Vice director
Abdukhaliilov Jakhongir	Tashkent region, Regional TB center	M&E specialist
Radjabbayeva Gulara	Sanitary and epidemiological well-being and public health authority	Lead specialist
Izimbetov Alibek	MSF	M&E specialist
Babamuradov Bakhtiyar	USAID TB Free Uzbekistan project	Director
Alimjanova Shokhsanam	USAID TIFA-funded TCG implemented by the Uzbekistan NTP	Project manager
Subotin Dmitrii	NGO INTILISH	Senior consultant
Xapizova Mastura	Sanitary and epidemiological well-being and public health authority	Epidemiologist of the Chilanzar district department
Baytursunova Gulzoda	Tashkent city, District TB department	M&E specialist
Rasulova Dilfuza	Sanitary and epidemiological well-being and public health authority	Deputy Head of Department for Tashkent City
Kurbangeldiyeva Yelena	Tashkent city, District TB department	M&E specialist
Marat Kaliev	USAID LEAP project	Senior TB financing technical advisor
Sabirov Makhmud	Tashkent city, District TB department	M&E specialist
Ziyayev Tulkin	Tashkent region, Regional TB center	Director
Kalandarova Lola	Tashkent city, Regional TB center	Director
Tukhtabaev Timur	USAID TB Free project	IT specialist
Normurodova Nodira	Tashkent region, Regional TB center	M&E specialist
Turayev Laziz	NTP, National reference laboratory	Laboratory support manager
Usmanova Shakhnoza	NTP, Statistics department	Lead specialist, responsible for reports
Flora Salikhova	USAID Country Mission, Uzbekistan	Health project management specialist
Abbasova Dildora	Tashkent city Pediatric Hospital	Director
Matchanov Ikram	Sanitary and epidemiological well-being and public health authority	Lead specialist of the Epidemiological department (Republican level)
Alimov Solih	NTP, Statistics department	Department head

Appendix C. D2AC Toolkit Uzbekistan Country Profile

Demographic, Geographic, and Socioeconomic Features		Response	Year	Source
Demographic				
Area/size of the country (km ²)		448,978		N/A
Notable borders		Kazakhstan, Kyrgyzstan and Tajikistan, Afghanistan and Turkmenistan		N/A
Estimation of population size		35,648,100	2022	The World Bank ¹
Administrative structure				
Regions/provinces/states (#)		12 regions (provinces), secular state	2022	N/A
Districts/councils/counties (#)		175 districts	2022	N/A
Service delivery sites	Facility-based (#)	Not available		
	Community-based (#)	Not available		
Socioeconomic features				
United Nations classification		Lower-middle income		N/A
Population below the poverty line		5.4 million	2024	The World Bank ²
	Rural (%)	23.20	2024	United Nations Development Programme (UNDP) ³
	Urban (%)	14	2024	UNDP ³
Major revenue sources		Cotton, natural gas, oil, coal, silk, fruit, karakul pelts	2024	Encyclopædia Britannica ⁴
TB Epidemiologic Burden and Trends		Response	Year	Source
TB mortality rate		1,100	2020	STOP TB Partnership Dashboard ⁵
TB incidence		29,000 (83 per 100,000 pop)	2022	World Health Organization (WHO) ⁶
TB case notification rate (%)		50	2022	The World Bank ⁷
TB treatment coverage (%)		50	2022	WHO ⁸
TB treatment success rate (%)		89	2022	WHO ⁸
MDR/RR-TB incidence		5,800 (17 per 100,000 pop)	2022	WHO ⁸
MDR/RR-TB treatment enrollment rate (%)		72	2022	WHO ⁸
XDR-TB incidence (%)		2	2021	PubMed ⁹
HIV coinfection rate		950 (2.7 per 100,000 pop)	2022	STOP TB Partnership Country Dashboard ⁵
TPT coverage (number of people started on TPT)		12,340	2021	TB DIAH Data Hub ¹⁰

WHO impact indicators				
Reduction in TB incidence rate (compared with 2015)	2015 (79 per 100,000 pop); 2022 (83 per 100,000 pop) = 4 per 100,000 pop	2022	The World Bank ¹¹	
Reduction in TB deaths (compared with 2015)	2015 (8.2 per 100,000 pop); 2022 (9.2 per 100,000) = 1 per 100,000 pop	2022	WHO TB Global Report 2023 ¹²	
TB-affected families facing catastrophic costs dues to TB (%)	35	2020	International Journal of Environmental Research ¹³	
NTP Laboratory and Workforce Capacity		Response	Year	Source
Laboratory centers (#)				
Total number of laboratories conducting TB diagnosis (#)	289	2022	WHO TB Global Report 2023 ¹²	
	Microscopy centers	325	2014	WHO TB Global Report 2023 ¹²
	GeneXpert sites	51	2019	WHO TB Global Report 2023 ¹²
	Culture laboratories	8	2022	WHO TB Global Report 2023 ¹²
	Reference laboratories	1	2014	WHO TB Global Report 2023 ¹²
Does a laboratory referral network exist? (Yes/No)	Yes	2014	WHO TB Global Report 2023 ¹²	
Human resources				
NTP staff supported by government (#)	Not available			
NTP M&E staff supported by government (#)	Not available			
Resources allocated toward M&E or TB M&E (\$)	Not available			
TB/HIV officers recruited under partner's support absorbed into payroll (%)	Not available			
TB Health Financing		Response	Year	Source
WHO recommended level for the country	Low Income	2020	STOP TB Partnership Country Dashboard ⁵	
TB treatment is free (Yes/No)	Yes		N/A	
People eligible for exemptions who receive those exemptions (%)	Not available			
Proportion of population with TB who received social protection under the national health insurance scheme (%)	50	2022	WHO ⁸	
Proportion of health budget allocated to TB services (%)	Not available			
Proportion of annual TB budget funded by donors (%)	Not available			
Proportion of domestic TB financing (%)	Not available			
Proportion of cases that led to catastrophic costs due to TB (%)	Not available			
Research and Development		Response	Year	Source
Proportion of national TB budget allocated to research	Not available			

Surveys and research being conducted (e.g., prevalence surveys). Please provide name, year, and implementing/financing entity.	Not available
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¹ <https://data.worldbank.org/indicator/SP.POP.TOTL?locations=UZ>

² <https://blogs.worldbank.org/en/opendata/charting-uzbekistan-s-path-to-poverty-reduction--insights-from-i>

³ https://www.undp.org/sites/g/files/zskgke326/files/2024-03/en_Pilot%20MPI%20report%202023.pdf

⁴ <https://www.britannica.com/place/Uzbekistan/Economy>

⁵ https://www.stoptb.org/static_pages/UZB_Dashboard.html

⁶ <https://data.who.int/indicators/i/C288D13>

⁷ <https://data.worldbank.org/indicator/SH.TBS.DTEC.ZS?locations=UZ>

⁸ https://worldhealthorg.shinyapps.io/tb_profiles/?_inputs_&entity_type=%22country%22&iso2=%22UZ%22&lan=%22EN%22

⁹ doi: 10.3390/ijerph 18094663

¹⁰ <https://hub.tbdi.ah.org/pbmef/indicators/tb-preventive-treatment-coverage?country=24>

¹¹ <https://data.worldbank.org/indicator/SH.TBS.INCD?locations=UZ>

¹² <https://www.who.int/teams/global-tuberculosis-programme/data>

¹³ <https://doi.org/10.3390/ijerph 17207483>

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 (<i>see standards-based central data repository for more information</i>).
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 Uzbekistan Summary Findings (Group and Individual Responses Aggregation)

Table F1. Continuum score from aggregate responses, by domain

Domain number	Domain name	Average group score (N=6)	Average individual score (N=29)	D2AC level
D1	Data Collection and Reporting	2.92	2.93	Defined
D2	Data Analysis and Use	2.46	2.04	Defined
D3	Leadership, Governance, and Accountability	2.88	3.23	Defined/Established
D4	Capacity Building	3.02 (average of only D4S1 and D4S2) 3.52 (average including D4S3)	3.44	Established
D5	Information and Communications Technology	1.50	1.56	Nascent
	Overall	2.55 (average of only D4S1 and D4S2) 2.66 (average including D4S3)	2.64	Defined

Table F2. Continuum score from aggregate responses, by subdomain

Subdomain number	Subdomain name	Average group score (N=6)	Average individual score (N=29)	D2AC level
D1S1	Data collection tools and workflow	2.92	3.01	Defined/Established
D1S2	Reporting	2.83	3.19	Defined/Established
D1S3	Data quality	3.00	2.58	Established/Defined
D2S1	Data integration and exchange	1.63	1.75	Nascent

Subdomain number	Subdomain name	Average group score (N=6)	Average individual score (N=29)	D2AC level
D2S2	Analytics and visualization	2.50	1.96	Defined/Nascent
D2S3	Dissemination and communication	3.25	2.42	Established/Defined
D3S1	Data use guidance	3.00	2.96	Established/Defined
D3S2	Data access and sharing	3.00	2.83	Established/Defined
D3S3	Organizational structure and function	1.50	3.33	Nascent/Established
D3S4	Leadership and coordination	4.50	4.04	Institutionalized
D3S5	Monitoring, evaluation, and learning	2.75	3.60	Defined/Established
D3S6	Financial resources	2.50	2.58	Defined
D4S1	Data interpretation	3.33	3.14	Established
D4S2	Skill and knowledge development	2.70	2.65	Defined
D4S3	Decision making ability	N/A*	4.52	Institutionalized
D5S1	Hardware	1.50	1.42	Nascent
D5S2	Network and connectivity	1.50	1.83	Nascent
D5S3	ICT business infrastructure	1.50	1.42	Nascent

* 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 (4.52) was used.

Appendix G. D2AC Toolkit Uzbekistan Implementation Plan

Priority action	Specific gap addressed	Responsible party	Resources needed	Expected deliverable	Timeline
Standardize the list of TB institutions	A standardized list of institutions has not yet been created (including addresses, structure, contact details)	UzInfocom - NTP, Advisors, TB Free Uzbekistan project	<ol style="list-style-type: none"> 1. Meeting to develop a list of suggestions 2. Circulate request to agencies 3. Supervise the execution 	<ol style="list-style-type: none"> 1. Procedure created as part of a regulatory document 2. Approved procedure for regularly updated (dynamic) list of institutions 3. Established contact with UzInfocom on this guideline 	<ol style="list-style-type: none"> 1) 2 months (until 15-07-2024) 2) 7 months (until 1-1-2025)
Standardize the DHIS-2	Launch a unified electronic TB system on DHIS2	UzInfocom - NTP, Global Fund grant project implementation unit, TB Free Uzbekistan and TIFA funded TCGs implemented by the Uzbekistan NTP	<ol style="list-style-type: none"> 1. Involved specialists from responsible persons 2. Budgets for trainings and monitoring 3. Continuation of the work of the working group according to the action plan, which needs to be updated 	DHIS2 pilot launched in 4 regions	7 months (prior to 1-1-2025)
	Electronic reporting as a legitimate source of data is not accepted yet	UzInfocom - NTP	<ol style="list-style-type: none"> 1. Study of national reporting forms 2. Development of action plan 3. Development of parameters and types of reporting 4. Generation of standard reports, conclusions, analysis results 	Adoption of electronic reporting as a legitimate data source	7 months (prior to 1-1-2025)
Create a normative document regulating the work of the Central Medical Clinical Commission (TB Concilium)	A standardized normative document regulating the work of (TB Concilium) has not yet been created (objectives, roles, duties)	NTP and its regional departments	<ol style="list-style-type: none"> 1. Involved specialists from Responsible persons 2. Develop the document 	<ol style="list-style-type: none"> 1. Create regulatory document 2. Document approved by MOH 	6 months
Introduce a nationwide TB data communications platform	Lack of existing and recurring communications methods	NTP and partners		<ol style="list-style-type: none"> 1. Develop a national communications plan 2. Develop an information bulletin 	



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