TB M&E Capacity Assessment Report
Kyrgyz Republic

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Capacity Assessment Report of specialists involved in the monitoring and evaluation system of the National Tuberculosis Program

Kyrgyz Republic

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Abbreviations

BC	bacteriologically confirmed
CI	confidence interval
DST	drug susceptibility testing
HIV	human immunodeficiency virus
IQR	interquartile range
KII	key informant interview
M&E	monitoring and evaluation
NTC	National Tuberculosis Center
NTP	National Tuberculosis Program
PLHIV	people living with HIV/AIDS
RR-TB	rifampicin resistant tuberculosis
SD	standard deviation
TB	tuberculosis
USAID	United States Agency for International Development
WHO	World Health Organization

Acknowledgments

Photo Caption

TB DIAH regional adviser Arax Hovhannesyan is presenting the results of the report. Photo courtesy of Aibike Artykbaeva.

Executive Summary

Introduction

Accurate data collection, reporting, and analysis are crucial in implementing an effective and efficient tuberculosis (TB) program. Healthcare professionals' knowledge and skills are key to ensuring a high-quality surveillance system. This study aims to evaluate the knowledge, skills, and self-perceived competencies of specialists to perform monitoring and evaluation (M&E) tasks and map current TB recording and reporting practice and associated data quality assurance mechanisms.

Methods

Mixed methods were used to gather information from healthcare providers at all levels involved in TB data collection and processing. Quantitative methodology included a cross-sectional survey using an online self-administered questionnaire. Data were analyzed for each of the questions and domains using percentage of correct answers for each section and overall for all four sections: (1) TB recording and reporting practice, (2) data quality assessment tools and mechanisms, (3) data processing and analysis, and (4) using data for informed planning and decision making. The qualitative assessment included key informant interviews using a semi-structured interview guide.

Results

A total 74 healthcare professionals completed online questionnaires, with an 85.1 percent response rate.

Participants demonstrated sound knowledge regarding TB recording and reporting (61.9% mean score). The knowledge related to data quality (50.3% mean score) and computation of indicators (47.3% mean score) was moderate. However, the skills regarding problem identification and solving were insufficiently low (mean score=33.4%). The overall mean knowledge score was 48.2%. Only five (6.8%) participants had a sufficient overall level of knowledge (>=70%) when assessing all four sections combined.

Self-perception of competency to perform M&E tasks in general was high in all four items investigated (scoring equal to and above 7): checking data accuracy (78.4%), computation of percentages and rates (74.3%), plotting the trend on the chart (70.3%), and explaining the data analysis results (81.1%). Thus, self-perception of competency is not related to the actual level of knowledge.

The TB data collection and reporting system in Kyrgyzstan is well established and functions properly. All facilities report data using standard recording and reporting forms. Respondents were able to describe data quality assurance procedures and mechanisms in place to ensure that data are complete, valid, and accurate.

Kyrgyzstan National Tuberculosis Center (NTC) and oblast TB facilities expressed interest in developing their and subordinate medical personnel skills to visualize routine surveillance data

and to develop a customized surveillance report, which would include interpretation of the results, and share it with partners and the wider public.

Conclusion

While we found that the TB data collection and reporting system in Kyrgyzstan is operational, knowledge of TB M&E and the skills needed to perform M&E tasks were low. The study findings will assist TB DIAH and the NTC to identify and prioritize needs, create learning strategies, and develop curricula to improve the TB surveillance system in Kyrgyzstan.

Introduction

Accurate data collection, reporting, and analysis are crucial in implementing an effective and efficient tuberculosis (TB) program. Healthcare providers at the facility and oblast levels in Kyrgyzstan should be able to have timely, accurate, and complete data and reporting and to use these data locally to improve management of both TB patients and TB programmatic interventions. It is important for national decision makers to have access to reliable information based on quality data to make informed policy decisions.

This assessment, undertaken in close collaboration with the national partners from the National TB Center and TB DIAH, aimed to determine the M&E skills of the TB M&E coordinators working at the facility and oblast level, identify gaps in TB M&E knowledge and skills, and tailor the capacity building curriculum to address the specific needs of these health professionals.

The specific objectives are to:

- assess the knowledge of existing M&E guidance on TB data recording and reporting
- assess clarity of understanding and interpreting TB M&E and surveillance indicators
- assess the knowledge of TB data quality assurance activities
- assess self-efficacy and competency of TB M&E staff at different levels to analyze and interpret TB data
- assess the capacity to identify the issues in TB reporting based on data analysis
- map the current TB recording and reporting practices, existing data quality assurance and feedback mechanisms, as well as the use of data for decision making and dissemination.

Methodology

Design

We employed both qualitative and quantitative methodologies for the M&E skills and capacity assessment. Quantitative methodology included a cross-sectional survey using a self-administered questionnaire. The qualitative assessment included key informant interviews (KIIs) at oblast and national levels using a semi-structured interview guide.

Sample

All healthcare providers involved in TB surveillance, monitoring, and evaluation at all levels were invited to participate in the quantitative assessment. The National TB Center provided the list of healthcare providers involved in TB M&E at all levels in Kyrgyzstan, numbering 98. To ensure high participation, prior to sending out the questionnaires, all respondents were contacted by the National Tuberculosis Program (NTP) central team members, and the purpose of the assessment was explained to them individually. They were told what they as respondents

needed to do and that their participation was voluntary and their responses would be anonymous and only aggregated results would be disseminated.

As for the qualitative study, purposive sampling was conducted to ensure that one representative from each of the reporting units as well as at the central level were invited to participate in the KIIs using a semi-structured questionnaire. Interviews were conducted by TB DIAH team members.

Assessment tool

A proposed tool for the quantitative assessment was developed based on the initially designed outline of the training curriculum used by TB DIAH in other settings. It included multiple choice as well as open-ended questions. The questionnaire was structured to obtain information related to knowledge on recording and reporting TB data, analyzing and validating the data, computing performance and surveillance indicators, and identifying internal inconsistency. There were two versions of the questionnaire, designed for the (1) facility level and (2) oblast level and national level M&E staff. Questionnaires were designed based on expected skills and scope of work of staff at each of the levels of service delivery. The questionnaire for the oblast and national level of M&E staff was piloted among 11 healthcare professionals and further modified to improve question clarity and make corrections. Results from the pilot study were not in the final database and analysis.

The KII has been conducted using the semi-structured interview guide provided in Annex 1. The KII guide was organized by themes to assess the TB recording and reporting practice, current data quality assessment tools, mechanisms, data processing and analysis, and use of data for informed planning and decision making. Questions were formulated based on the international recommendation for TB surveillance and monitoring and expected data flow from the facility to the oblast and national levels.

Data collection

The questionnaires have been administered using the online web-based SurveyMonkey platform. The survey was launched on October28, 2021 and closed on November 30, 2021. The link to the online questionnaire was forwarded to the oblast TB coordinators, and they were asked to distribute it to all their relevant staff via email. The expected time to complete the questionnaire was about 45 minutes. All care providers in Kyrgyzstan involved in TB M&E at all levels were invited to participate in the assessment. Time allocated for the data collection was long enough to ensure that participation in the survey would not interfere with the health professionals' daily duties. Respondents' names and demographic data were not captured to allow for more active participation and avoid bias in the results.

The 10 KIIs were conducted by TB DIAH staff either in a face-to-face meeting or remotely through the Zoom platform, from September 9 to November 4. The interviews were audio-taped with the consent of key informants. Median duration of the KIIs was about 30 minutes, ranging from 25 to 47 minutes.

Data analysis

For the quantitative assessment, the data were analyzed for each of the questions and domains using percentage of correct (or correctly described) answers among all respondents. Data were tabulated and presented in tables and charts and described using percentages, mean, standard deviations (SDs), median, and interquartile ranges (IQRs) where relevant.

Only the correct answer was given a score of 1; all other answers scored 0. A cutoff point of 70 percent was selected to indicate a sufficient score in each section. Distribution of the answers for each domain was visualized using boxplot and bar charts.

Linear regression and scatterplots were used to assess and visualize the correlation between the knowledge score for each domain separately and overall and the self-competence scores.

For the qualitative analysis, audio-taped in-depth interviews were transcribed verbatim and translated into English. Analysis of the data was descriptive. The transcripts were first read and categorized according to the assessment topic: (1) TB recording and reporting practice, (2) data quality assessment tools and mechanisms, (3) data processing and analysis, and (4) using data for the informed planning and decision making. Quotes from respondents were included in the text to illustrate the findings.

Results

Quantitative assessment

Of the 98 eligible healthcare professionals, 74 completed an online questionnaire and 11 participated in pilot testing (not included in the analysis), resulting in an 85.1percent response rate. Median duration to complete the questionnaire was 54 min (IQR: 32 min–1h 40 min), ranging from 11 minutes to 18 days.

For the sake of anonymity and a high response rate, information on respondents' gender and age was not collected. Otherwise, practically everyone may be recognized using gender, age, and location data. The highest number (13) of participants were from Issyk-Kul oblast, followed by Jalal-Abad (12 participants) and Chui (11 participants). Province/oblast disaggregation:

Table 1. Percentage distribution of study participants by oblast

Oblast	Number	%
Batken	9	12.2
Bishkek	9	12.2
Chui	11	14.9
Issyk-Kul	13	17.6
Jalal-Abad	12	16.2
Naryn	6	8.1
Osh	9	12.2
Talas	5	6.8
Total	**74**	**100**

Recording and reporting

The mean score for the TB recording and reporting section was 61.9 (SD=15.5), with only 27/74 (36.5%) of participants having sufficient knowledge at a cutoff point of 70 percent of the total score. Data for each question are summarized in **Table 2**.

The question with the fewest correct responses was regarding the definition of TB relapse, which according to the 2013 revision includes not only the bacteriologically confirmed but also clinically diagnosed forms of TB. The other low-scoring question was on the definition of rifampicin resistant tuberculosis (RR-TB), which refers to resistance to rifampicin with or without resistance to other anti-TB drugs: whether monoresistance, multidrug resistance, polydrug resistance, or extensive drug resistance, with 15/74 (20.3%) answering this question correctly. The respondents had difficulties correctly classifying laryngeal TB as pulmonary TB 17/74 (23.0%). Only 23 (31.1%) correctly identified that the TB patient who never started TB treatment should be included into cohort analysis and assigned "lost to follow-up" for treatment outcome.

Unexpectedly, only one-third (24, 32.4%) of respondents noted that in question RR16 "Which of the following procedures should be followed when a newly diagnosed patient is transferred to RR-TB treatment?" that the correct answer was "none of the above." According to the 2013 revised definition framework, when a newly diagnosed TB patient is transferred to RR-TB treatment, the correct procedure is that these cases should be excluded from the main TB cohort when calculating treatment outcomes and included only in the RR-TB treatment cohort analysis. However, they remain in the main cohort and are included in the TB notification report. Additionally, only 43.2 percent of participants correctly answered the questions on assignment of treatment outcome of a person who died before the start of treatment.

The questions related to assignment of treatment outcome based on bacteriological test results were answered correctly by the majority of participants. The exception was the question about a bacteriologically confirmed (BC) TB patient who completes the treatment with a negative test result at the second and fifth month of treatment. The majority of respondents classified this case as "cured," but according to World Health Organization (WHO) definitions, a "cured" treatment outcome implies a negative test result at the **last month** of treatment and on at least one previous occasion. All other questions related to TB recording and reporting were answered correctly by the majority of participants, as summarized in Table 2.

The highest level of knowledge on TB recording and reporting was observed among the health professionals from Bishkek (77.8% sufficient level), Jalal-Abad (66.7%), and Chui (45.5%).

Table 2. Healthcare professionals' knowledge scores on TB recording and reporting (n=74)

| Question	Correct answer	Responses with correct answer	
		Number	%
RR1. Should a patient diagnosed with TB but who never started TB treatment be notified?	Yes	71	95.9%
RR2. Patient with TB pleurisy should be classified as	Extrapulmonary TB	74	100.0%
RR3. Laryngeal TB is classified as	Pulmonary TB	17	23.0%
RR4. Which of the following results should be assigned as "bacteriologically confirmed TB"?	Smear, GeneXpert, and Culture positive	53	71.6%
RR5. A clinically diagnosed patient on the 2nd month of treatment showed a sputum smear positive result. Will you revise the patient's classification in the TB register?	Yes, changed to "bacteriologically confirmed"	66	89.2%
RR6. A patient newly diagnosed with TB started TB treatment, but after one week taking the TB medicines, he interrupted treatment. Patient was assigned "lost to follow-up" treatment outcome in the TB register. After 8 months, patient returns to continue the treatment. What registration group would you assign the patient?	New TB cases	41	55.4%
RR7. Relapse refers to patients who previously have been treated for TB, were declared cured or treatment completed, and now are diagnosed with a recurrent episode of bacteriologically confirmed tuberculosis.	FALSE	1	1.4%
RR8. Which of the following is RR-TB?	All of the above	15	20.3%
RR9. What is treatment success?	The sum of cured and treatment completed	60	81.1%
RR10. What is the treatment outcome for a new bacteriologically confirmed patient with drug susceptible TB who has completed the course of anti-TB treatment and who had negative sputum smear results taken at the 2nd and 6th month?	Cured	69	93.2%
RR11. What is the treatment outcome for a new bacteriologically confirmed patient with drug susceptible TB who has completed the course of anti-TB treatment and who had negative sputum smear results taken at the 2nd and 5th month?	Treatment completed	35	47.3%
RR12. What is the treatment outcome for a new bacteriologically confirmed patient with drug susceptible TB who has completed the course of anti-TB treatment and who had negative sputum smear results taken only at the 2nd month?	Treatment completed	54	73.0%
RR13. What is the treatment outcome for a new bacteriologically confirmed patient with drug susceptible TB who has completed the course of anti-TB treatment and who had negative sputum smear results taken only at the 6th month?	Treatment completed	50	67.6%

Question	Correct answer	Responses with correct answer	
		Number	%
RR14. Should a patient diagnosed with TB, but who never started TB treatment, be included into treatment outcome cohort analysis?	Yes, and treatment outcome should be assigned "lost to follow-up"	23	31.1%
RR15. A patient transfers out from a clinic in district A to a clinic in district B. Clinic A tries to call clinic B, but there is no response. Clinic A should register the outcome as	Not evaluated	55	74.3%
RR16. Which of the following procedures should be followed when a newly diagnosed patient is transferred to RR-TB treatment?	None of the above	24	32.4%
RR17. A TB patient whose treatment outcome is not known should be	Assigned a "not evaluated" outcome	52	70.3%
RR18. A person with TB, who died before starting treatment should be assigned as "not evaluated" since he/she doesn't have a treatment outcome.	FALSE	32	43.2%
RR19. A clinically diagnosed pulmonary TB patient who completed full course of treatment and has clinical and radiological improvement should be assigned "cured" at the end of treatment.	FALSE	54	73.0%
RR20. A patient who died before the start of treatment should be notified in the quarterly case-finding report.	TRUE	64	86.5%

Table 3. Summary of healthcare professionals' knowledge scores on TB recording and reporting (n=74)

|	
Mean knowledge score (SD)	61.9% (15.5)
Median (IQR)	65% (50–75)
Sufficient knowledge (>=70%)	36.5% (27)
Insufficient knowledge (<70%)	63.5% (47)

Figure 1. Number of participants with percentage of correct answers related to TB recording and reporting
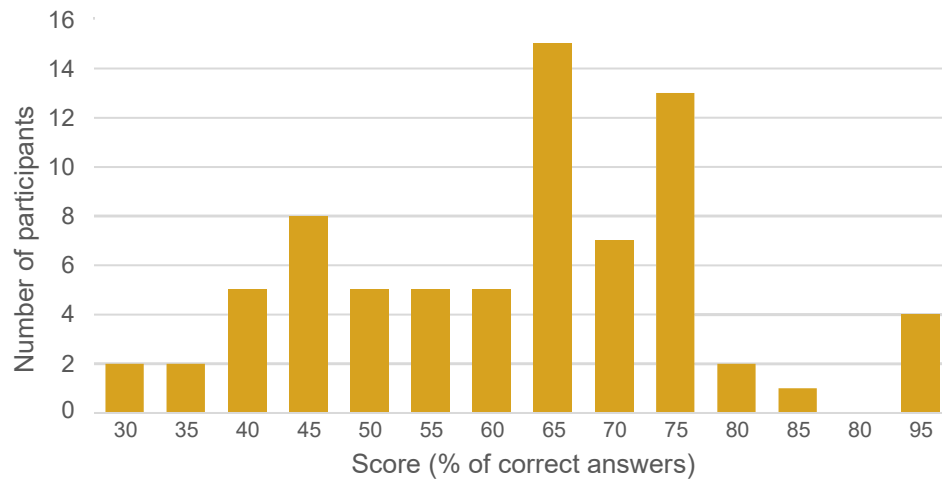
Interestingly, the knowledge score was not associated with the self-perception competency score **(Figure 2):** Overall, participants had high self-perception of their competency vis-à-vis the knowledge score: health professionals with a low knowledge score evaluated as high as those with the highest knowledge. Essentially, they believe they know more than they actually know. There is a mismatch between what they know and what they think they know, which likely impacts the work, mentorship, etc. in the NTP.

Figure 2. Scatterplot of association between self-perception of competency score and knowledge score on TB recording and reporting (RR) (n=74)
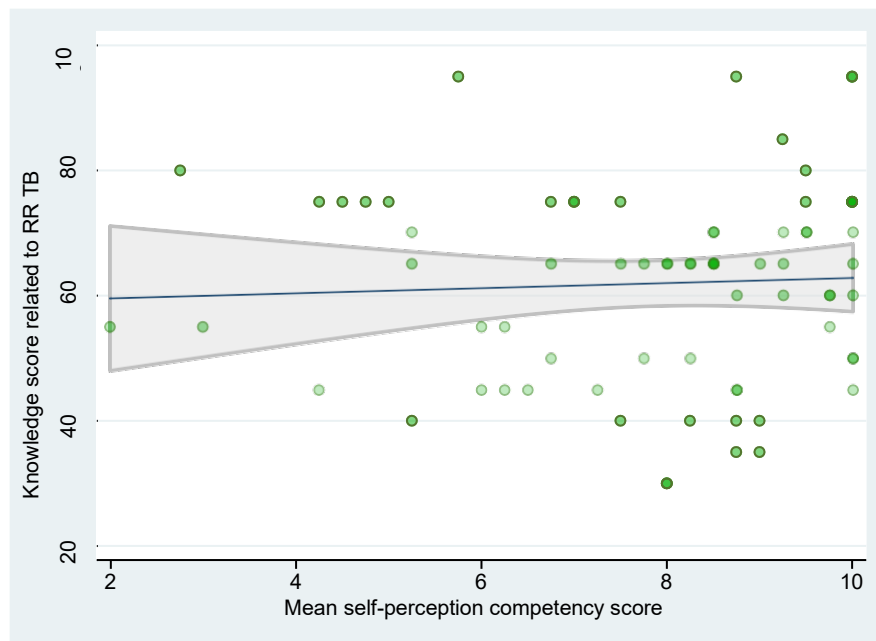
Each circle represents a data point for an individual's level. The x-axis shows mean self-perception competency score and the y-axis mean knowledge score on TB recording and reporting based on the provided answer. The shaded area represents 95 percent confidence interval of fitted linear trend-line. As shown, the linear trend-line is nearly parallel to the x-axis, with perfect overlap of confidence intervals (CIs), indicating that there is no correlation between

Computing indicators

This section contained three questions (Table 4). The first question required comparing TB burden in four different regions based on the number of notified TB patients and population number in each of the regions. It was expected that respondents would compute the notification rates for each region by dividing the number of notified TB cases by population number of region and multiplying by 100,000. Among the 74 respondents, only half (39/74, 52.7%) correctly identified that region "C" had the highest TB burden.

The following questions required respondents to compute HIV testing coverage among the given number of patients, which included the number of patients tested, patients who refused to be tested, and TB patients with known positive HIV status. To correctly compute the indicator, it was expected that the number of patients who refused to be tested would be excluded from the denominator, while the patients with known HIV status would be included both in the numerator and denominator. Of the 74 respondents, only 31 (41.9%) were able to correctly compute HIV testing coverage as described above.

The next question required respondents to compute HIV prevalence in a cohort of notified TB patients, which included patients with and without HIV test results as well as people living with HIV (PLHIV). It was expected that the total number of HIV-positive patients should be computed as the sum of patients with positive HIV test results and those PLHIV, while the denominator should be computed as the sum of TB patients with test results, including those PLHIV. The patients who refused to be tested should not be included in both the numerator and denominator. Computation of this indicator was impossible because this question was modified following piloting, and no correct option was provided for the respondents to select.

Table 4. Healthcare professionals' skills scores on computing indicators (n=74)

Question	Correct answer	Responses with correct answer	
		Number	%
ID1. Which of the following regions is a TB hotspot?	Region C	39	52.7%
ID2. During the reporting quarter, in total 180 new and relapse TB patients were notified. Of them, 145 provided blood samples for HIV testing. Among those tested, 10 were HIV positive and the rest were HIV negative. Of the 35 patients who didn't provide blood tests, 10 refused to be tested and 25 were PLHIV. What is HIV testing coverage in for the reporting quarter?	94.4%	31	41.9%
ID3. What is the TB/HIV prevalence among the notified patients in the above question?	20.6%	N/A	N/A

Of all 74 respondents, only 22 (29.7%) correctly answered both questions (ID1 and ID2), while 31 (35.1%) were unable to correctly compute the indicators in this section. The overall mean score for this section is 47.3 percent. Linear regression showed that there was some borderline association between those two scores, suggesting that those who computed rates correctly have higher self-perception of competency, compared to those with lower knowledge scores (p=0.040, (95%CI, 0.2–8.1)).

Data quality assessment

In Kyrgyzstan, the quarterly notification report is prepared based on the TB register. To ensure that the TB register is complete and that all people diagnosed with TB are included into the surveillance system, the care providers are responsible for the surveillance and should regularly cross-check the TB register against other source registers to make sure that all detected patients in the catchment area of the health facility are accurately notified. The possible source documents include the laboratory register, individual TB card, and electronic TB register (if applicable). It was expected that respondents would indicate that for the completeness of notification, the TB register should be checked against all the registers. Among our respondents, **49 (66.2%)** correctly indicated that all listed procedures should be implemented.

Assessment of knowledge of the cohort analysis procedure showed that only about one quarter **(19/74, 25.7%)** of healthcare providers knew the cohort analysis procedure. When asked DQ2, "To ensure that all TB notified TB patients are assigned a treatment outcome, the cohort size of new and relapse TB patients included into the treatment outcome report should match exactly to the total number of new and relapse patients notified 12–15 months ago." The correct answer was "Not exactly, because the patients transferred to second-line treatment should be excluded from the cohort denominator." According to the WHO recording and reporting framework, all notified TB patients regardless of drug-resistance pattern should first be registered in the basic TB register and those that start RR-TB treatment should be moved to the RR-TB register. Thus, RR-TB patients are included in the TB notification; however, they would not be included in the computation of the new and relapse TB treatment outcome cohort denominator. Before 2013, the definition framework stated that RR-TB patients were assigned "Failure" for treatment outcome. Currently, RR-TB cases are just moved to the RR-TB register without assignment of treatment outcome. As a result, the cohort size of notified new and relapse TB patients and the cohort size of new and relapse TB patients included in cohort analysis for treatment outcome differ. In countries with high RR-TB prevalence, there is a difference between notification cohort and treatment cohort as large numbers of RR-TB patients are moved to the RR-TB treatment cohort. Lack of registration of RR-TB patients in the basic management unit (BMU) register results in under-notification of TB patients, while their inclusion in the treatment cohort analysis results in under-estimation of treatment outcomes. In addition, according to the 2013 framework, the treatment outcome of patients transferred to other facilities should be reported by the referring facility.

According to current regulations, reports sent from the facilities to the oblast TB dispensary should be submitted within seven days, three months after the end of the reporting quarter. Of the provided options, the correct answer was identified by **39 (52.7%)** care providers.

The last exercise required participants to identify data quality issues using the example of a completed TB register. Almost all respondents were able to identify multiple errors in completing forms, especially those related to failure to complete fields such as missing names, age, birthdate, and address, site of disease, bacteriological confirmation, follow-up tests, and treatment outcome. Only a few respondents noted incorrect assignment of bacteriological status (positive microscopy, but classified as clinically diagnosed) and incorrect assignment of

treatment outcomes (no follow-up laboratory test results with the cured treatment outcome). Just a single respondent also noted the incorrect computation of age and dates of treatment outcomes.

None of the respondents noted that (i) registration of the patients in the subsequent quarter, i.e., from April onwards, was not started on a new page; (ii) there was no summary of quarterly notification data and the end of the quarter was not marked; (iii) not all BC results were recorded using red ink; and (iv) the dates were implausible. The quantitative summary of this item is not presented in this report as most of the participants listed identical errors.

In the example with the provided register, there were the following errors (numbers in brackets show the consecutive number of patients in the register in the given example):

- Not starting registration of the patients of subsequent quarter on a new page. After the fourth patient, the new patient registered in April was supposed to be recorded on a new page. According to current regulations, after the entry for the last patient of the quarter, a diagonal line should be drawn, and recording for the next quarter should be started on a new page.
- Implausible date of registration (100)
- Missing names (all patients), missing sex (97), missing address (97, 99, 100), missing date of birth and age (97, 99, 100), missing site of disease (100), registration group (98), classification by bacteriological results (95), missing treatment regimen, and missing treatment outcome
- Incorrect calculation of age (95)
- Bacteriologically confirmed patient is classified as clinically diagnosed (92)
- Not all BC results are recorded using red ink
- Treatment outcomes for 92, 98, and 99 are not correct.
- Incorrect recording of GeneXpert result
- Implausible date of treatment outcome (96)

Table 5. Percentage of correct answers related to the tuberculosis surveillance data quality skills

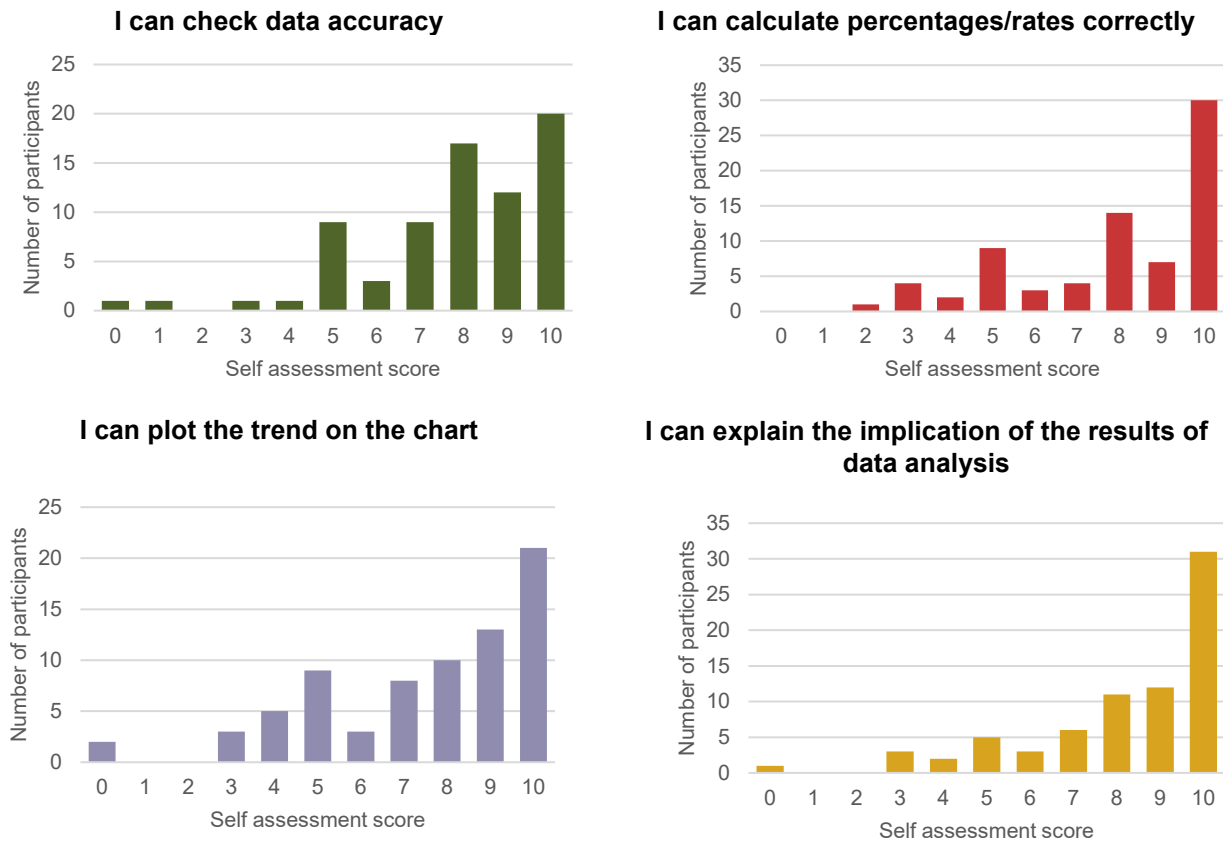| Question	Correct answer	Responses with correct answer	
		Number	**%**
DQ1. How to ensure that all detected TB patients in the region are notified?	All of the above	49	66.2%
DQ2. To ensure that all TB notified TB patients are assigned a treatment outcome, the cohort size of new and relapse TB patients included into the treatment outcome report should match exactly to the total number of new and relapse patients notified 12–15 months ago.	Not exactly, because the patients transferred to second-line treatment should be excluded from the cohort denominator.	19	25.7%
DQ3. The quarterly reports sent from the facility to the oblast should be submitted	Seven days after end of the quarter (following reporting quarter)	39	52.7%
DQ4. List at least 8 data quality issues related to completion of the TB register in the above example of TB register	See details in the body text	42	56.8%

Overall mean score for this section is 50.3 percent (SD=22.1) with only 28 (37.8%) of the respondents who correctly answered at least 70 percent of the questions.

Self-perception of competency to perform M&E tasks

In this section the participants were requested to rate their own competence in accomplishing various M&E activities on a scale from 0–10, where 0 is "no competence" and 10 is "very strong competence."
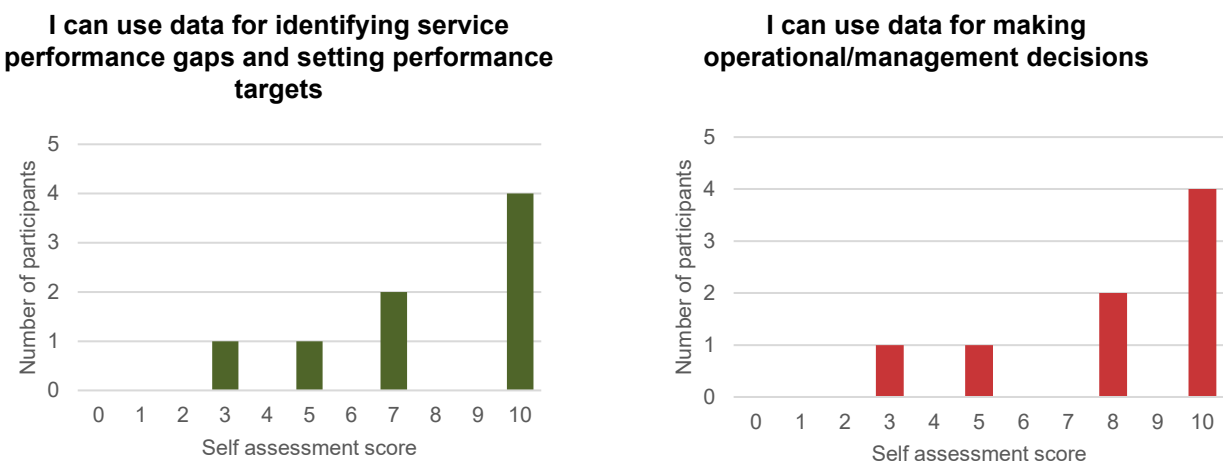
Self-perception of competency to perform M&E tasks in general was high in all four items investigated (scoring equal to and above 7): checking data accuracy (78.4%), computation of percentages and rates (74.3%), plotting the trend on the chart (70.3%), and explaining the results of data analysis (81.1%). (Figure 3)

Figure 3. Self-perception of competency scores to various M&E tasks (n=74)

I can check data accuracy

I can calculate percentages/rates correctly

I can plot the trend on the chart

I can explain the implication of the results of data analysis

In addition, health professionals from the oblast and central-level staff were requested to rate their self-perceived competence in managerial tasks (n=8). Half of respondents selected the highest score to rate their managerial skills (Figure 4).

Figure 4. Self-perception of competency scores to perform M&E managerial tasks (n=8)

I can use data for identifying service performance gaps and setting performance targets

I can use data for making operational/management decisions

Identification of issues and decision making

To the question asking what "Treatment outcome monitoring shows," the vast majority of respondents indicated "all items," which is an incorrect answer. To assess whether TB incidence is decreasing or not, the trend of TB notification data per 100,000 population over time should be analyzed. Likewise, to assess the trend of TB mortality, all TB deaths reported in the country by the vital registration system should be analyzed per 100,000 population, while TB treatment outcomes show the percentage of people with favorable and unfavorable outcomes, which is a strong indication of quality of care provided.

Most respondents correctly identified that all listed reasons, including revision of the TB definition, the care providers strike, and the change in the diagnostic algorithm might result in the inconsistency of TB notification data.

Most of the respondents had difficulties responding to how the RR result would change if the testing coverage would increase. The correct answer is "probably will decrease" because when there is a limited possibility of testing, the resources are directed to those who are most at risk. Until the mid-2010s, almost in all countries, GeneXpert testing was limited to previously treated patients, contacts of RR-TB patients, and HIV/TB patients who usually have much higher RR-TB prevalence. In such situations, the results are not representative and most likely are overestimated. Therefore, with the increase in diagnostic services coverage, the RR-percentage is expected to decrease.

Most of the respondents were able to identify that the reasons for a treatment coverage greater than 100 percent might be all the reasons listed in the questionnaire, including errors in data entry, delays in starting treatment, and assignment of patients to the wrong year.

Most respondents (78.4%) were able to compute the TB notification rates in consecutive years based on the provided number of TB patients and population data and noted that in the provided example there was a declining trend of TB notification rates.

To the question specifically for the oblast and central staff to compute the percentage of change of TB notification in 2020 compared to 2019, of the eight respondents only one answered correctly. None were able to compute average annual decline between 2016 and 2020 (data not presented).

Of the eight central and regional respondents, only two responded correctly that there is inconsistent data observed in 2020: as compared to 2019 when annual percent of change was -17.7 percent, while in the remaining years, the annual percent of change was consistently below 10 percent.

Only 25 (33.8%) respondents listed at least one correct reason for the data inconsistency. The most commonly mentioned reasons were:

- COVID-19 pandemic and possible errors in TB registration (15/74, 20.3%)
- Reduction/repurposing/disruption of diagnostic services (12/74, 16.4%)
- Change of diagnostic algorithm (5/75, 6.8%)
- Possible errors in reporting (4/74, 5.4%)

Responses like "outmigration of patients," "decline of TB burden," "change of population size," "improved services," and "performance of health services" were common but considered as incorrect responses. Listing at least one reason for inconsistency was considered to be sufficient knowledge.

To the open-ended question asking respondents to recommend interventions aimed at understanding possible reasons of increased treatment failure, all respondents either proposed interventions aimed at increasing treatment effectiveness (such us increasing GeneXpert testing coverage, patient education, or DOT), or provided other reasons of treatment failure such as: stigma, alcoholism, difficulty taking large numbers of medications, adverse events, etc.

Table 6. Percentage of correct answers related to the identification of issues and decision making

Question	Correct answer/examples of expected answer for open-ended questions	Responses with correct answer	
		Number	%
PS1. Treatment outcome monitoring shows	How well TB program can manage its patients	6	8.1%
PS2. Which of the following can cause inconsistency in TB data?	All of the above	26	35.1%
PS3. If the proportion of patients tested with GeneXpert increases from 25% (focused on high-risk groups) to 90%, the proportion found with RR-TB will	Probably go down	6	8.1%
PS4. This chart of % MDR-TB patients started on treatment shows>100% in 2013. This is because of	Any of the above	49	66.2%
PS5. How would you describe the trend of TB in the region over the past five years based on the provided data?	Declining trend	58	78.4%
PS6. Is there any inconsistency of notification?	Yes, data are inconsistent because there is sharp year-to-year variation, indicating that some patients failed to be detected by health systems.	32	43.2%
PS7. If yes, in which year(s) do data look inconsistent?	2020	28	37.8%
PS8. List 5 possible explanations of observed data inconsistency, if any (open ended)	1. COVID- pandemic 2. Errors in reporting 3. Errors in registration 4. Disruption of laboratory services (no supply, human resources) 5. Change of diagnostic algorithm (such as discontinuation of active case-findings)	25	33.8%
PS9. The most recent cohort analysis in oblast indicated that there was a sharp increase in the proportion failure among new and relapse TB patients receiving first-	1. Low GeneXpert testing coverage among notified patients 2. Improvement of the follow-up laboratory monitoring	N/A	N/A

Question	Correct answer/examples of expected answer for open-ended questions	Responses with correct answer	
		Number	%
line treatment. What are possible explanations of the high failure rate?	3. Patients are not taking medications as prescribed		
PS10. Recommend three key interventions aimed at understanding possible reasons of increased treatment failure (open ended)	1. Check DST coverage among patients 2. Check DST results among patients with treatment failure 3. External quality control of laboratory services and data transmission, if there were any changes in laboratory services. Checking results of external data quality control. 4. Evaluation of treatment adherence 5. Correctness of treatment regimen prescribed 6. Checking the drug management (expiration date, storage conditions)	0	0.0%
PS11. The most recent cohort analysis indicated that there was a sharp increase in the proportion of deaths in new and relapse TB patients receiving first-line treatment. What are possible explanations for the increase of death rate?	1. Low coverage of HIV testing among notified patients 2. Low ART coverage among the patients identified with TB/HIV 3. Delay in start of TB treatment due to poor awareness and fear of stigma	N/A	N/A
PS12. What are the possible explanations of high rate lost to follow-up?	1. Health staff do not monitor TB patients' attendance and do not react in time with attempts to bring patients back to treatment 2. Health staff do not explain to patients and their family members the importance of taking the treatment as prescribed. 3. TB treatments, especially DOT, are not implemented in a patient-friendly way	N/A	N/A

Overall mean score for this section is 33.4 percent (SD=14.6) with only one participant (1.5%) having sufficient skills in identification of issues and problem solving (correctly answered at least 70% of the questions).

Table 7. Summary of healthcare professionals' scores on identification of issues and decision making (n=74)

Mean (SD)	33.4% (14.6)
Median (IQR)	28.6% [28.6–42.9]
Sufficient knowledge/skills (>=70%)	1.5% (1)
Insufficient knowledge (<70%)	98.7% (73)

Overall assessment

The mean overall score for all four sections assessing knowledge and skills was 48.2 percent (SD=16.1), with only five (6.8%) participants having sufficient knowledge at a cutoff point of 70 percent for all four sections. Participants had better knowledge on the TB recording, reporting, and definition framework, while the skills and knowledge on identification of problems were quite low compared to the rest of the sections.

Figure 5. Distribution of scores (percentage of correct answers) for each section and all four sections combined (n=74)
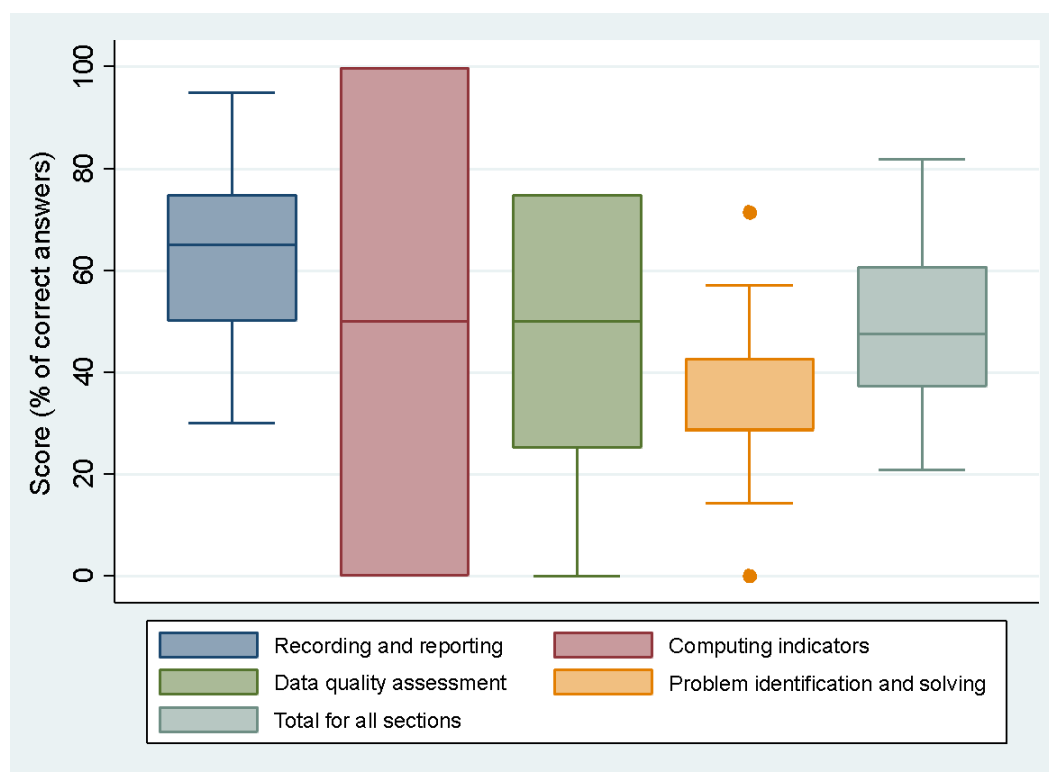
Box plots indicate the 25th, 50th (median), and 75th percentiles of knowledge scores (% of correct answers) for each section and for all four sections combined; whiskers extend to maximum and minimum values, and the markers indicate outliers—respondents with greater than 1.5 IQR away from the 25th and 75th percentile.

Table 8. Summary of healthcare professionals' scores on all four sections assessed (n=74)

Mean knowledge/skills score (SD)	48.2% (16.1)
Median (IQR)	47.6% (37.1–60.9)
Sufficient knowledge (>=70%)	6.8% (5)
Insufficient knowledge (<70%)	93.2% (69)

The linear regression analysis showed no association between the overall knowledge and skills score and self-perception of competency to perform M&E tasks (p=0.61, (95%CI: -0.84; 3.67)).

Figure 6. Distribution of scores (percentage of correct answers) for each section and total questionnaire (n=74)
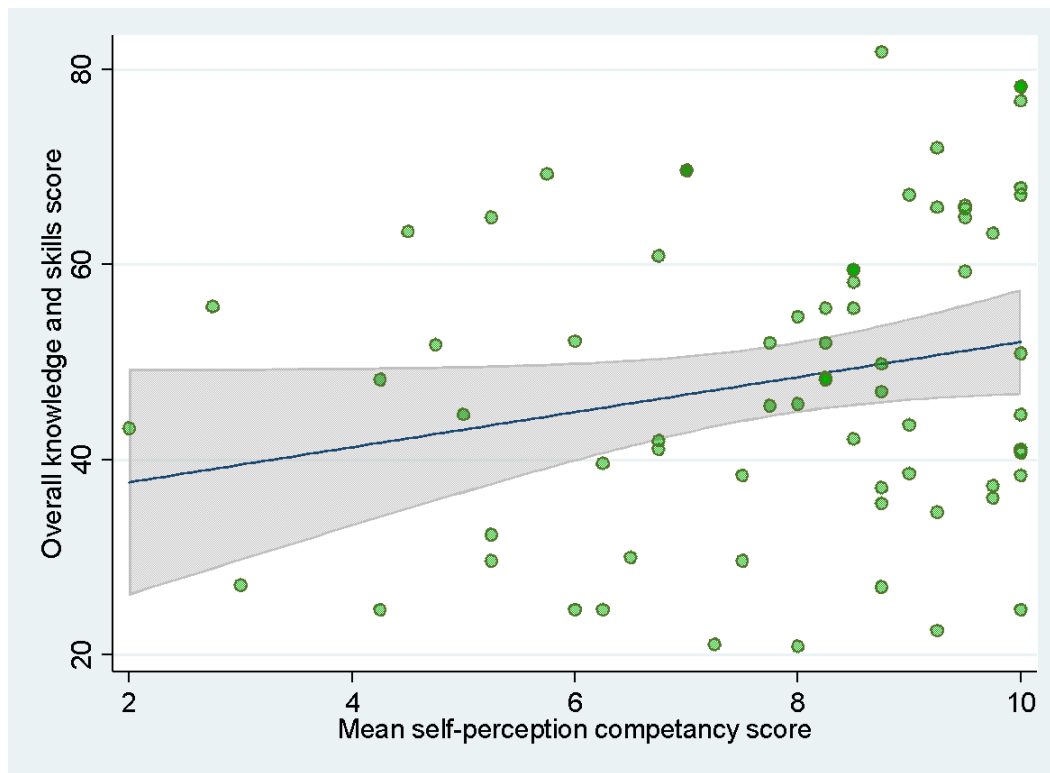
Each circle represents a data point for an individual respondent's level. The x-axis shows mean self-perception competency score, and the y-axis shows mean knowledge/skills score on the total questionnaire based on provided answers. The shaded area represents 95 percent confidence interval of fitted linear trend-line. As shown, although the mean self-perception competency score increases with increases in knowledge, confidence intervals largely overlap, indicating no correlation.

As shown in **Figure 7**, a higher level of knowledge on TB recording and reporting was observed in Bishkek, Jalal-Abad, and Chui oblasts, while the lowest scores were observed in Issyk-Kul, Talas, and Osh oblasts. Regions with a sufficient level of knowledge on computing indicators are Bishkek and Jalal-Abad; the lowest scores were observed in Naryn, Osh, and Talas. Jalal-Abad and Batken oblasts had the lowest results on data quality. Overall, problem solving is an issue in all of the regions.

Figure 7. Mean skills assessment scores by area
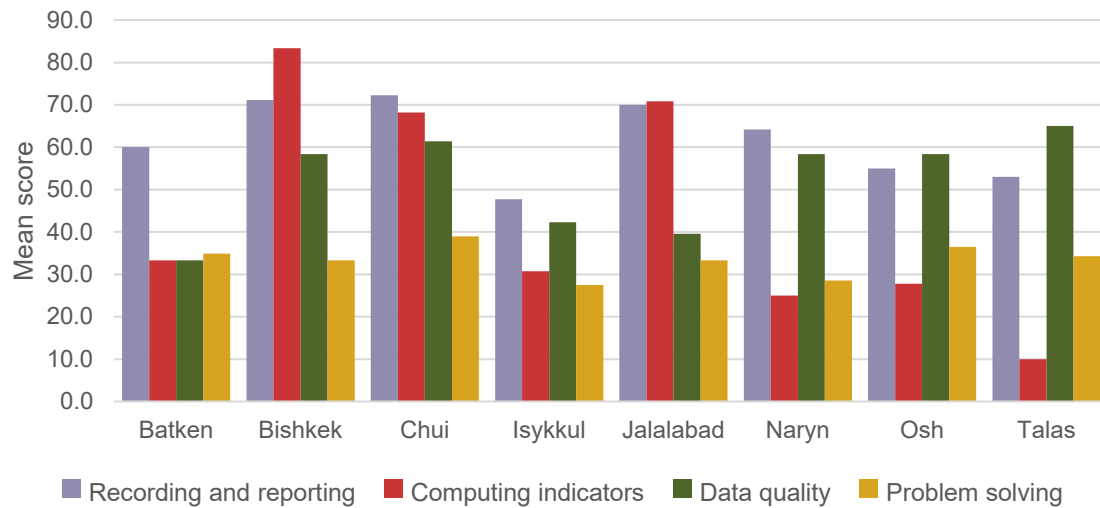
The mean overall scores by area showed that Bishkek, Chui, and Jalal-Abad are the three regions with the highest mean overall scores. Issyk-Kul, Batken, and Talas are those with the lowest mean overall scores, as summarized in **Figure 8.**

Figure 8. Mean overall scores by area
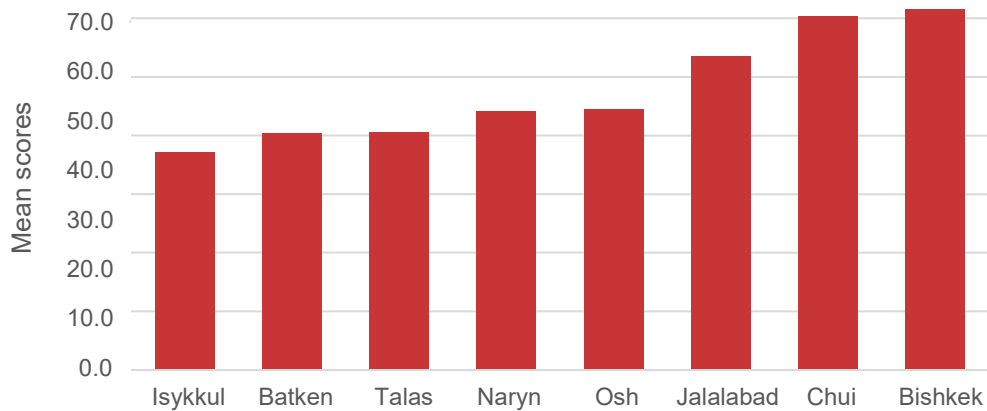
Qualitative assessment

The qualitative assessment included 10 key informant interviews (KIIs). One key informant was interviewed from each administrative oblast and national levels.

Table 9. Percentage distribution of study participants of qualitative study

Variable	Number	%
Sex		
Male	2	20
Female	8	80
Level		
Oblast level	9	90
National level	1	10
Province/Oblast disaggregation		
NCPh	1	10
Batken oblast	1	10
Osh oblast	1	10
Osh city	1	10
Jalal-Abad oblast	1	10
Naryn oblast	1	10
Talas oblast	1	10
Issyk-Kul oblast	1	10
Chuy oblast	1	10
Bishkek city	1	10
Total	**10**	**100**

Tb recording and reporting practice

According to the description provided by KIIs, the implementation of TB recording and reporting practice in Kyrgyzstan is well standardized, without major differences across the oblasts. Currently, Kyrgyzstan's tuberculosis surveillance system relies on the aggregation paper-based system. The primary sources of information are patient cards (TB01, TB01y), TB registers (TB02, TB02y), and laboratory registers (TB04, TB04y). Standard reporting tools include TB05 (Risk group detection report), TB06 (TB notification report), TB06y (RR enrollment report), TB07, TB07y (Sputum conversion report), TB08, and TB08y (Treatment outcome report). In addition, there are monthly reports that are submitted to Oblast Sanitary Epidemiological Services and to the municipality (Form 1), which include data on morbidity, disease incidence, mortality, TB diagnostic activity, fluoroscopy, active case-finding in a specified contingent population, and Bacille Calmette-Guérin (BCG).

It is worth noting that in Kyrgyzstan, the flow of data across various levels of the system is not a

straightforward process. Quarterly report submission is scheduled in advance for health facilities by the oblast TB center and for oblast TB centers by the NTC in a stepwise manner. On designated days, the corresponding reporting unit meets the supervising unit, and quarterly reports are prepared together and checked for accuracy; correctness and validity are then cross-checked with other source documents.

> *"I myself send an order to medical organizations and a schedule for submitting reports. The schedule also tells them when they need to come. Together with them here, we review all the databases. After that I prepare reports and take them to the National Center for Phthisiology in Bishkek."*

> *"We make a schedule for them, and according to this schedule they submit reports, the same at the district level, or rather at the oblast level there is a specific schedule for district coordinators to submit reports."*

Moreover, at the oblast level, individual data are entered into an electronic web-based database; however, as of 2021 the reporting is carried out using standard aggregated forms. The electronic system is used intensively for data transmission and information sharing, which respondents found very helpful:

> *"Also at the moment, we are using the electronic version of TB01, which is very convenient, as it thoroughly describes all the data about the patient. So, sitting in the region, we can know how many patients are being treated in what district. This is also very helpful because now we can get information about TB samples that were sent to the national reference laboratory of the Phthisiology Center and now we can get it from the computer within several days. It is very comfortable, so we can get information about patients that are not coming to us, where they are being treated, and in which hospitals they are treated."*

> *"We had an operator before when there was an ES/TB.KG database. We had to enter everything ourselves from beginning to end. Now with the new electronic database, the first data entry is started by district TB doctors. If they have problems with data entry, then they contact our operator. However, the new electronic database does not generate reports, though we were told that in the future it will."*

All respondents stated that there are designated personnel at all levels to prepare reports and check for consistency between the various sources.

Respondents also stated that there is written guidance on data compilation: The MoH prikaz (decree) to approve the recording and reporting forms, which comes with instructions on how to fill them out. However, the more informed respondents mentioned that it is outdated and requires revision. More specifically, reporting forms were revised, and one page on adverse events was added in the TB01. The revised forms are currently being approved by MoH, and this will be a new prikaz.[1] Once they are approved, they will become part of the new M&E plan.

Data quality assessment tools and mechanisms

All respondents confirmed that reporting facilities maintain the copies of the quarterly TB reports. Because report submission in Kyrgyzstan is a routinely scheduled and participatory process, and not just sending the data, non-reporting or delayed reporting of data are excluded. Although deadlines have been set in the national instructions for the submission of reports, according to the respondents' descriptions, the report deadline is set by the supervisory facility for each reporting unit separately.

Mechanisms to ensure data quality mentioned by respondents were (1) monitoring visits and (2) quarterly review meetings at the time of report preparation and submission. According to the national M&E plan, the monitoring visits are supposed to be carried out on a quarterly basis; however, due to the COVID-19 pandemic, monitoring visits from the national level to oblast could not be done, while the monitoring visits from oblasts to districts are being carried out. However, currently no standard checklist is used for the monitoring visits as the existing checklist(s) are too complicated to complete.

> *"We used to have checklists. Now we do not apply checklists. The main purpose of our visits is to solve this or that problem related to various indicators. Of course, our monitoring visit is focused more on giving assistance. To give some advice or recommendations. ...We stopped completing checklists during monitoring visits. But now, I hope we will if we develop a good checklist that is more understandable and not so complicated."*

> *"Now for the time being we are writing a summary of the monitoring visit after our visit. We write a report; this report is sent back to the monitored organization where we write in the recommendation part what should be rectified and how. .... And*

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[1] At the time of report development, the forms were approved by a new decree, prikaz, #1739, on December 29, 2021.

when we come back for the next monitoring, we have to look at our previous report to see if issues were eliminated."

All respondents mentioned that written feedback is provided first to inform the facility head, and those forms are used in the subsequent visit to see if all recommendations have been fulfilled.

"After the completion of the monitoring visit, we write a note, which we send to the director so that he is familiar with the recommendations that were made during the visit, after which they report to us whether the recommendations have been implemented."

"We conduct monitoring and check on the spot whether the report is consistent with all the logs. I do the monitoring, with the director, the TB coordinator, the drug coordinator, and the head of the laboratory; there are 4–5 of us. We check everyone, all districts. We conduct monitoring in the field. We write a note on the monitoring visit, and this note from the district that we visited, I fill it out and give it to the director to sign. We give a deadline to fix the problems, for example 10 days, in 10 days to answer us in writing that they have eliminated this or that."

As described above, quarterly reviews remain key interventions to ensure data quality. However, there is currently no standard guide on how to carry out data quality checks. Data quality checks are done intuitively, rather than in line with a specific standard procedure.

"We check the data quality when we receive the reports. We do not only rely on this register. We also check the data with the laboratory register. If the patient was an inpatient, we also look at the inpatient database. Only after we have checked the data, do we enter the data into the report."

"We assess data quality during monitoring visits, but sometimes problems with the reports may occur more often. So every time districts come to submit reports, we allocate a whole day to one district to check the quality of data."

"As of today, we have paper forms, and coordinators come to submit quarterly reports with their paper register. And we just double-check and manually recalculate to make sure that the data are correct."

Respondents mentioned that before starting a new position, all new employees should be trained by their supervisor, although the experience of planned training on recording and reporting varied from site to site. The last planned training on recording and reporting was in 2015. Opinions differed on the need for refresher training:

"We had a lot of training in 2015. There is no need for refresher training because we use the learnings t every day, every quarter, this routine goes on. It makes no sense for us to update the training."

Data processing and analysis

Almost all respondents declared that their reporting units can generate information related to a time-series trend on the aggregated summary of quarterly reports, number of population in the catchment area, programmatic indicators (e.g., TB notification rates, TB treatment success rates), comparison of indicators by sub-reporting units, etc., and data disaggregated by sex. However, the practice of analyzing and visualizing routine surveillance data widely varied across the sites. Only one respondent mentioned that they do visualizations themselves, while others receive it from National Centre of Phthisiology (NCP). The majority of respondents expressed interest in being capacitated to produce visuals and make slides using PowerPoint.

> *"It would be very helpful [to have training]. Just yesterday I was giving lectures to cadets from the police school, and I wish I could have that kind of data and that I could show it. But I just described them in my own words as a lecturer….. I personally find it difficult to do on the computer because I'm not good at computers. It would be good to show all the data graphically, where there is growth, where there is a decline."*

> *"Well, this part [visualization] suffers a little…. We do try; well, sometimes we succeed, sometimes not. Our work on PowerPoint also suffers. Well, we do not work at a proper level. If we would be trained a little bit on PowerPoint, it would help strengthen our potential."*

> *"We are all the same age. We used to not work on the computer at all, and we got computers 2–3 years ago and at first when we got them, we could not even touch them. We did not know how to work with a computer. We are just learning now."*

Participants also mentioned that there is no written specific guide on how to display TB M&E data and information.

Use of data for informed planning and decision making

The discussion of facility performance by the management team (including the facility head) during the regular meetings was described as a common routine activity by all participants; however, there was no practice to document and circulate the discussions in the form of meeting minutes.

Comprehensive annual planning at each service level was also reported as a routine practice. However, a comprehensive plan is more focused on the timeline of the routine activities, rather than achieving some of the targets. Furthermore, development of an annual plan is not based on problem identification and setting targets.

> *"We have a national TB program. Each oblast level and all facilities prepare their own comprehensive plan, which is approved at the beginning of the year, and in this comprehensive plan they have all the activities that they must perform. And how they are implemented or not implemented is another matter."*

Submission of the report to oblast administration was mentioned as a compulsory activity, but in all cases, reports for the administration include only a completed table, with no narrative component including interpretation of the achievement. Most participants mentioned that data sharing with the general public is usually happening during March as a part of World TB Day interventions. Only NTP has a dedicated website with support from the USAID-funded Cure-TB project, accessible at tbcenter.kg, while oblast-level facilities maintain a Facebook page or site for public education, information sharing, and awareness.

> *"Recently we were trained and supported to open a Facebook page, where we published our events that we held in the area, such as our lectures in schools."*

> *"We also publish articles in newspapers. For example, we prepare an article about TB being curable, and at the bottom of the article we give statistical data on TB in the region."*

> *"No, we don't have a website. I tried to set up a website. It was $1000 minimum and then monthly maintenance; we cannot afford it."*

> *"Now we have received an order from the Ministry of Health. In a few days we will have a training session to open a Facebook page. We have already identified three specialists in our oblast who will be trained in the media. They will be trained, and then we will open our page. MoH asked us to publish statistical data, problems, and achievements, and so on on our page."*

> *"We publish information on Facebook and Instagram. We cover the work done, Facebook has been working for two years and Instagram three months."*

Discussion and conclusion

This assessment highlights several gaps in the capacity of healthcare professionals engaged in TB data processing in Kyrgyzstan. First, the knowledge gap is quite vast, with only 6.8 percent scoring sufficient knowledge. Our respondents scored high in the questions related to the activities they do routinely, on a daily basis, such as TB recording and reporting and data quality check. This was an expected finding, since a training series on TB data recording and reporting was held in Kyrgyzstan, and there is a good mechanism in place to train new employees, supervise the performance of subordinate facilities, and provide feedback. All those resulted in an observed overall good level of knowledge on TB recording and reporting. However, the knowledge gap was wide related to the area of interpretation of the data, identification of the causes of problems, and decision making. This is alarming, since the weaker their knowledge in problem identification and solving, the less likely they will be able to, for example, detect outbreaks, explore the causes of outbreaks, increase unfavorable treatment outcomes, and propose appropriate solutions. Those skills become essential especially in the context of the COVID-19 pandemic, which resulted in a devastating impact on TB case detection around the world, including in Kyrgyzstan. In 2020 Kyrgyzstan reported a 32 percent decline in TB

notification compared to 2019 data. Average annual decline in TB notification in the four years preceding the COVID-19 pandemic was around 6.1 percent annually. This indicates that a considerable number of people with TB in Kyrgyzstan were missing out from being detected by health systems. If this pool of patients remains undetected, this might result in increased transmission, outbreak, and mortality. All this underlines the importance of the care providers' skills to promptly detect unusual patterns of notifications, identify the causes of problems, and undertake corrective actions.

Interestingly, among the respondents, there was a high level of confidence in performing the M&E tasks, which was not related to the knowledge and skills measured. This might be explained by the fact that care providers are tasked to just collect and submit the data and are not required to identify the problems and explore the possible causes of detected problems.

Study advantages and limitations

Our assessment had important advantages. We employed a mixed method, including both qualitative and quantitative methods. The high rate of participants in the survey and country-wide coverage at all levels of the healthcare system make the assessment results representative for the Republic of Kyrgyzstan. There was no time limit to complete the self-administered questionnaire, and respondents could take their time to complete the questionnaire at their leisure. This was convenient for the respondents and less time consuming and costly for survey administrators.

Nevertheless, we recognize that the assessment had also some limitations and challenges. As the completion of the questionnaire was not controlled, the respondents could share the correct answers among themselves or look for the answers in other relevant printed materials and guides. Therefore, there is a risk that results might be biased toward overestimation. However, the diversity of answers received in response to open-ended questions and the very small number of respondents needing an extremely long or short amount of time to complete the questionnaire indicate that the likelihood of response bias is low. Another important limitation was that some of the questions were not clear for the participants, and there was no possibility of interaction with survey administrators to provide additional clarifications. This is a limitation common to self-administered questionnaires. We also had problems with the version control of the assessment tool. Following the pilot phase, some of the questions were modified; however, in the SurveyMonkey version, previous versions of answers were displayed without the option to select correct answer(s). For similar reasons, four questions could not be assessed. Another limitation was that most of the oblast-level M&E specialists mistakenly completed the questionnaire for the regional staff, and it was not possible to reliably assess the additional questions designed for the oblast and central staff, which were related specifically to managerial skills and knowledge assessment. An initial challenge was ensuring the questions were easy for respondents to understand.

Recommendations

Findings from the survey and KIIs will assist TB DIAH and the National Tuberculosis Center to identify and prioritize needs, create learning strategies, and develop curricula to improve TB surveillance in Kyrgyzstan. The following recommendations have been developed based on the results of this assessment.

- **Develop training workshops or other interactive training opportunities for M&E staff focused mainly on TB data interpretation, identification of problems, investigation of causes of problems, identification of solutions, and implementation of solutions.** However, considering that WHO updated TB definitions and reporting,[2] the changes in TB definitions, particularly the definition of pre-XDR and XDR-TB, changes in the definitions of treatment outcomes of RR-TB patients should be covered during the training. The design of the training curriculum and the delivery of training should be well adapted to the Kyrgyzstan context, considering that the majority of the participants perceive that they have quite high knowledge and skills to perform their duties. Thus, there is some risk that formal capacity building might not be prioritized or deemed relevant by the front-line care providers. Skills to visualize and present the data should be enhanced at all levels.

- **Use the assessment findings for design of capacity building workshop planned in July.** More specifically the capacity building workshop should be focused on data analysis, interpretation and use, with demonstration of real-life examples from Kyrgyzstan and other countries with similar epi-profile, case-studies, and most importantly hands on exercises followed by the demonstration of results of analysis attempt to interpret the data and use of for decision making using Kyrgyzstan historical data at national and regional level For this purpose, the annual TB surveillance data for previous 10 years dis-aggregated at oblast level should be available to be used as a data source for the exercise.

- **Support NTP to move from aggregated paper-based to real-time web-based reporting.** The current electronic system is not yet used for developing report and data visualization. The electronic system should be enhanced with automated reports, dashboards, as well customized reports to facilitate data analysis, interpretation, and informed decision making.

- **Support NTC to develop written guidance on TB data quality assessment.** Although there is a functional system to check the data quality and provide feedback, there is not a written standard procedure on how it should be performed. Important aspects of data quality, especially at national level, needs to be improved, including assessment of internal consistency, external consistency, and examination for outliers. This is especially essential in the context of the COVID-19 pandemic, which emphasizes the importance of close follow-up of the TB notification trend, for timely identification of issues of case finding.

- **Support NTC Kyrgyzstan to develop and disseminate an annual surveillance report.** In addition to the presentation of statistical data, the national-level annual surveillance report should have a narrative part with the interpretation of the results, comparison against the targets, reasons of under-achievement if any, and activities to improve performance. A report should be posted on the website and accessible for the wider public, civil society, partners, and the media to ensure transparency and efficient use of resources and to enhance collaboration.

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[2] Meeting report of the WHO expert consultation on drug-resistant tuberculosis treatment outcome definitions, 17–19 November 2020. Geneva: World Health Organization; 2021. License: CC BY-NC-SA 3.0 IGO. https://www.who.int/publications/i/item/97892400221

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Appendix 1: Self-administered questionnaire for the facility level M&E staff

A	Recording, reporting and case definition
RR.1.	**Should a patient diagnosed with TB, but who never started TB treatment be notified?** ☐ Yes ☐ No
RR.2	**Patient with TB pleurisy should be assigned as** ☐ Pulmonary TB ☐ Extrapulmonary TB
RR.3	**Laringeal TB is classified as** ☐ Pulmonary TB ☐ Extrapulmonary TB
RR. 4	**Which of the following results should be assigned as bacteriologically confirmed TB, indicate all possible answers** ☐ Smear microscopy + ☐ Chest Xray suggestive for TB ☐ Xpert MTB detected RR indeterminate ☐ Culture positive
RR. 5	**Initial test result of microscopy, Gene Xpert and culture are negative and the patient was notified as clinically diagnosed. But on the 2rd month of treatment, the sputum smear examination was positive. Will you revise the classification of the patient in the TB register?** ☐ Yes, the classification of patient should be changed as bacteriologically confirmed ☐ No, the patient should remain as clinically diagnosed, as at the start of the treatment all three test results were negative
RR.6	**A patient was diagnosed with TB, started TB treatment but after one week after taking the TB medicines he interrupted treatment and moved to another region. Patient was assigned "lost to follow-up" treatment outcome in the TB register. After 8 months patient return to continue the treatment. What registration group would you assign the patient?** ☐ New TB cases ☐ Return after lost to follow-up
RR.7	**Relapse refers to patients who previously have been treated for TB, were declared cured or treatment completed and now are diagnosed with a recurrent episode of bacteriologically confirmed tuberculosis** ☐ True ☐ False

A	Recording, reporting and case definition
RR.8	**Which of the following is RR-TB?** ☐ Rifampicin mono-resistance ☐ Multidrug-resistance ☐ Resistance to R and Z ☐ All above
RR.9	**What is treatment success?** ☐ Cured ☐ Treatment completed ☐ The sum of cured and treatment completed ☐ The sum of cured, treatment completed and transferred out
RR.10	**What is the treatment outcome for a new bacteriologically confirmed patient with drug susceptible TB who has completed the course of anti-TB treatment and who had negative sputum smear results taken at 2-3rd and 6-8th month?** ☐ Cured ☐ Treatment completed ☐ Failed ☐ Not evaluated
RR.11	**What is the treatment outcome for a new smear positive patient with drug susceptible TB who has completed the course of anti-TB treatment and who had negative sputum smear results taken at 2nd and 5th month?** ☐ Cured ☐ Treatment completed ☐ Failed ☐ Not evaluated
RR.12	**What is the treatment outcome for a new bacteriologically confirmed patient with drug susceptible TB who has completed the course of anti-TB treatment and who had negative sputum smear results taken at only 2nd month?** ☐ Cured ☐ Treatment completed ☐ Failed ☐ Not evaluated
RR.13	**What is the treatment outcome for a new bacteriologically confirmed patient with drug susceptible TB who has completed the course of anti-TB treatment and who had negative sputum smear results taken at only 6th month?** ☐ Cured ☐ Treatment completed ☐ Failed ☐ Not evaluated

A	Recording, reporting and case definition
RR.14	**Should a patient diagnosed with TB, but who never started TB treatment be included into treatment outcome cohort analysis?** ☐ No, because in cohort analysis are included only patients who start the TB treatment ☐ Yes, should be included and treatment outcome should be assigned "lost to follow-up" ☐ Yes, should be included and treatment outcome should be assigned "not evaluated"
RR. 15	**Patient Asanov transfers out from a clinic in district A to a clinic district B. Clinic A tries to call clinic B to find out the outcome of patient Asanov's treatment, but there is no response. Clinic A should register the outcome of patient Asanov's treatment as** ☐ Treatment completed ☐ Lost to follow-up ☐ Treatment failed ☐ Not evaluated
RR. 16	**Which of the following procedures should be followed when a patient is transferred to RR-TB treatment?** ☐ This person should be removed from the TB-02 register and presented separately as a case of RR/MDR-TB in the TB-02u register ☐ This person should be kept in the cohort denominator and recorded as transfer-out ☐ This person should be kept in the cohort denominator and recorded as "failed" ☐ None of above
RR. 17	**TB patient whose treatment outcome is not known should be..** ☐ Excluded from the treatment outcome cohort analysis ☐ Assigned an outcome "not evaluated" ☐ Assigned an outcome "lost to follow-up" ☐ Assigned an outcome "transferred out"
RR. 18	**A person, who died before starting treatment is considered "not evaluated" since he/she doesn't have a treatment outcome** ☐ True ☐ False
RR. 19	**A clinically diagnosed pulmonary TB patients who completed full course of treatment and has clinical and radiological improvement should be assigned "cured" at the end of treatment.** ☐ True ☐ False
RR. 20	**A patient who died before the start of should be notified in quarterly case-finding report.** ☐ True ☐ False

B	Computing and interpreting indicators

ID.1. **Which of the following regions is a TB hotspot?**
- ☐   Region A
- ☐   Region B
- ☐   Region C
- ☐   Region D

Region	Number of TB cases	Population
A	14,000	10,000,000
B	10,000	10,000,000
C	3,000	1,000,000
D	150	100,000

During the reporting quarter in total 180 new and relapse TB patients were notified. Of them 145 provided blood samples for HIV testing .Of the 145 TB patients who provided blood samples for testing, 10 were HIV-positive and 135 were HIV-negative. Of the remaining 35 patients who did not provide blood samples for testing, 10 refused testing and 25 were people living with HIV.

ID.2. **What is HIV testing coverage in for the reporting quarter?**
- ☐   80.6%
- ☐   91.7%
- ☐   94.4%
- ☐   24.1.%

ID.3. **What is the percentage of cases of TB/HIV among the notified patients in above question?**
- ☐   20.6%
- ☐   6.9%
- ☐   17.2%
- ☐   19.4%

C	Data quality assurance
DQ.1.	**How to ensure that all detected TB patients in the region are notified?** ☐ TB register should be checked against the individual treatment cards ☐ TB register should be checked against the laboratory registers in the region ☐ TB register should be checked against presumptive TB register ☐ TB register should be checked against electronic register ☐ All of above
DQ.2.	**The cohort size of new and relapse TB patients included into treatment outcome report should match exactly to the total number of new and relapse patients notified 12-15 months ago.** ☐ Yes, because all patients should be assigned treatment outcome after 12-15 months of reporting quarter, therefore notified number should match exactly to the treatment cohort. ☐ No exactly, because the patients transferred to other treatment facilities should be extracted from the treatment cohort denominator. ☐ Not exactly, because the patients transferred to second-line treatment should be excluded from the cohort denominator. ☐ Not exactly, because the patient found not having TB should be exclude from the treatment outcome cohort denominator
DQ.3.	**The quarterly reports from the facility to oblast should be submitted** ☐ Three days after end of the quarter ☐ Seven days after end of the quarter ☐ Fourteen days after end of the quarter ☐ Twenty-one days after end of the quarter

Abridged example extract of facility TB register

Рег. номер	Дата рег-ии	Ф.И.О.	Пол (М/Ж)	Возраст / Дата рождения	Адрес	Форма ТБ (Л/ВЛ)	Определение случая (НС;Р;НЛ;ПН;Д;ИН)	Случай Тб/Вич код	Случай Тб/Вич уст	Схема лечения и дата начала лечения	Микроскопия мазка (Дата / рез-т)	Xpert MTB/RIF (Дата / рез-т)	Посев (Дата / рез-т)	Лекарственная уст-ть (Моно/ПЛУ/РУ/МЛУ/ШЛУ/нет/неизвест)	2 или 3 мес: мазок / посев / ТЛЧ	5 месяц: мазок / посев / ТЛЧ	Конец лечения: мазок / посев / ТЛЧ	Исходы лечения / Дата установления результата	Диагноз Тб снят	Перевод на схему ЛВР
91	#####	Асанова	Ж	54 / #####	Бишкек ул. Койчуева 34	Л	НС	✓	✓	2HREZ/4HR 11.03.2018	отр 01.03.2018	отр 01.03.2018		нет	2+ / 01.06.2018		отр / отр / ##### #####	21.09.2018 Излечение		
92	#####	Акматов	М	33 / #####	Ош ул. Пишпек 32	Л	Р		✓	2HREZ/4HR 19.03.2018	2+ 13.03.2018	MTB-S 13.03.2018		неизвест				19.09.2018 Излечение		
93	#####	Иванов	М	60 / #####	Талас ул. Колпаева 23	Н	НС		✓	2HREZ/4HR 24.03.2018	отр 21.03.2018	отр 21.03.2018		нет	отр / 01.06.2018			21.09.2018 Не оценен		
94	#####	Кубатов	М	44 / #####	Бишкек ул. Панова	ВЛ	НС		✓	2HREZ/4HR 29.03.2018								19.09.2018 Лечение завер.		
95	#####	Болотов	М	65 / #####	село Байтик Фарсиева	Л	НС			2HREZ/4HR 02.04.2018	3+ 28.03.2018	X 28.03.2018		нет	30.06.2018	отр / #####	отр / #####	13.09.2018 Излечение		
96	#####	Исмаилова	Ж	19 / #####	Нарын ул. Кайнарова	Л	ПН	✓		2HREZ/4HR 12.04.2018	04.04.2018							13.04.2018 потеряна		
97	#####	Жоомартов				Л	НС		✓	2HREZ/4HR 15.04.2018	отр 12.04.2018			нет	отр / 01.06.2018					
98	#####	Касеев	М	17 / #####	Дж-Абад ул. Мартова	Л			✓	2HREZ/4HR 29.04.2018	3+ 13.04.2018							Умер 15.04.2018		
99	31/04/18	Салиев	М			ВЛ	НС		✓	2HREZ/4HR 01.03.2018	отр 01.03.2018	X 01.03.2018			отр	отр	отр / #####	23.09.2018 Излечение		
100	33/05/18	Саламатова	Ж	#####			ПТН		✓	01.03.2018	1+ 01.03.2018	R 01.03.2018		МЛУ						Перев

DQ.4.	**List 8 data quality issues of completion of TB register in the above example of TB register**
	1.…………………………………………………………………………………
	2. ………………………………………………………………………………….
	3. ………………………………………………………………………………….
	4.……………………………………………………………………………………
	5.……………………………………………………………………………………
	6.……………………………………………………………………………………
	7.……………………………………………………………………………………
	8……………………………………………………………………………………..
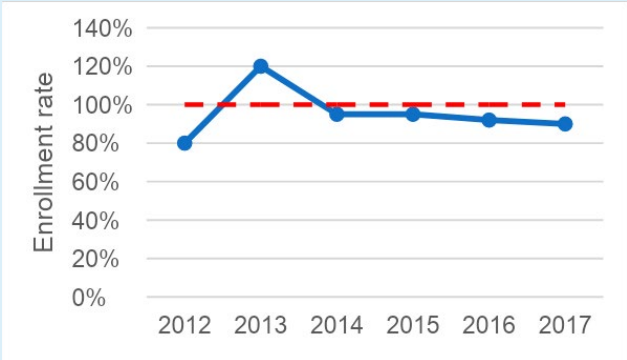
D. SELF-PERCEPTION OF COMPETENCY TO PERFORM TB M&E TASKS

Please rate your competence in accomplishing various M&E activities on a scale from 0–10, where 0 is "no competence" and 10 is "very strong competence".

Rate your competence in accomplishing the following M&E activities/tasks on a scale from 0 to 10:

SE1	I can check data accuracy	0	1	2	3	4	5	6	7	8	9	10
SE2	I can calculate percentages/rates correctly	0	1	2	3	4	5	6	7	8	9	10
SE3	I can plot a trend on a chart	0	1	2	3	4	5	6	7	8	9	10
SE4	I can explain the implication of the results of data analysis	0	1	2	3	4	5	6	7	8	9	10

E	Identification of issues and decision making
PS.1.	**Treatment outcome monitoring shows** ☐ How well TB program can manage its patients ☐ How TB incidence is falling ☐ How TB mortality is falling ☐ All of above
PS.2.	**Which of the following can cause inconsistency in TB data** ☐ Revision of definitions and reporting system ☐ Strike by health care providers ☐ A change in diagnostic algorithm ☐ All of above
PS.3.	**If the proportion of patients tested with Xpert goes up from 25% to 90%, the proportion found with RR-TB will** ☐ Always go up ☐ Always go down ☐ Not change ☐ Probably will go down
PS.4	**This chart of % MDR-TB patients started on treatment show>100% in 2013.** **This is because of** ☐ Data entry error ☐ Delay in starting treatment ☐ Assignment patients to wrong year ☐ Any of above

E	Identification of issues and decision making

Table below shows the number of population in the region at the end of the years and number new and relapse TB patients notified.

Year	Population (number)	New and relapse TB cases (number)
2016	221,000	430
2017	225,000	411
2018	231,000	388
2019	232,000	393
2020	233,000	325

PS.5

How would you describe the trend of TB in the region over the past five years? (decreased,/increased, remains the same)

TB notification in region …………………………………………………………………………………

PS.6

Is there any inconsistency of notification?
☐ No, data are consistent as they show only decline
☐ Yes, data are inconsistent, because there is sharp year-to-year variation, indicating that some patients were failed to be detected by health systems.

PS.7

If yes, which year(s) data looks inconsistent?
☐ 2017
☐ 2018
☐ 2019
☐ 2020

List 5 possible explanations of observed data inconsistency if any

PS.8

1……………………………………………………………………………………………

2……………………………………………………………………………………………

3……………………………………………………………………………………………

4……………………………………………………………………………………………

5……………………………………………………………………………………………

E	Identification of issues and decision making
PS.9.	**Most recent cohort analysis in oblast indicated that there was sharp increase in proportion failure among new and relapse TB patients receiving first-line treatment. What are possible explanations of high failure rate?** ☐ Low coverage of HIV testing among notified patients ☐ Low GeneXpert testing coverage among notified patients ☐ Delay in start of TB treatment due to poor awareness and faire of stigma ☐ Improvement of the follow-up laboratory monitoring ☐ Patients are not taking medications regularly, as prescribed.
PS.10	**Recommend three key interventions aimed to understand possible reasons of increased treatment failure** 1.……………………………………………………………………………………… 2.……………………………………………………………………………………… 3.………………………………………………………………………………………
PS.11.	**Most recent cohort analysis indicated that there was sharp increase in proportion of deaths in new and relapse TB patients receiving first-line treatment. What are possible explanations of increase of death rate?** ☐ Delay in start of TB treatment due to poor awareness and faire of stigma ☐ Low coverage of HIV testing among notified patients ☐ Low GeneXpert testing coverage among notified patients ☐ Low ART coverage among the patients identified with TB/HIV
PS.12	**What are the possible explanations of high rate of lost to follow-up?** ☐ Low GeneXpert testing coverage among notified patients ☐ Low ART coverage among the patients identified with TB/HIV ☐ Health staff do not monitor TB patients attendance and do not react in time with attempts to bring patients back to treatment ☐ Health staff do not explain to patients and their family members importance of taking the treatment as prescribed. ☐ TB, especially DOT are not implemented in patient-friendly way

PS.13	Here are TB notifications from two regions. Which one needs further investigation
	☐ Region A ☐ Region B ☐ Neither of them
PS.14 PS.15	**Below tables shows the outcome of TB case finding activities in the PHCs of the country.** **A. List issues of active case-finding interventions in the country based on the results** 1…………………………………………………………………………………………….. 2……………………………………………………………………………………………. 3……………………………………………………………………………………………. 4……………………………………………………………………………………………. **B. Provide recommendations to improve the active case-findings based on issues you described in question A.** 1……………………………………………………………………………………………. 2……………………………………………………………………………………………. 3……………………………………………………………………………………………. 4…………………………………………………………………………………………….

PHC	Population number	Presumptive TB cases among population		All forms of TB among population		% of TB all forms in presumptive TB case
		Number	Percent	Number	Percent	
PHC 1	11,500	488	4%	176	1.5%	36%
PHC 2	5,500	177	3%	41	0.7%	23%
PHC 3	2,000	423	21%	16	0.8%	4%
PHC 4	770	373	48%	28	3.6%	8%
PHC 5	582	148	25%	6	1.0%	4%
PHC 6	465	341	73%	20	4.3%	6%
PHC 7	1,500	124	8%	9	0.6%	7%
PHC 8	2,251	256	11%	6	0.3%	2%
Total	24,568	2,330	9.5%	302	1.2%	13%

PS 16

Below plots show times series trend of TB notifications per 100,000 population in the country A and Country B disaggregated by sub-national area.
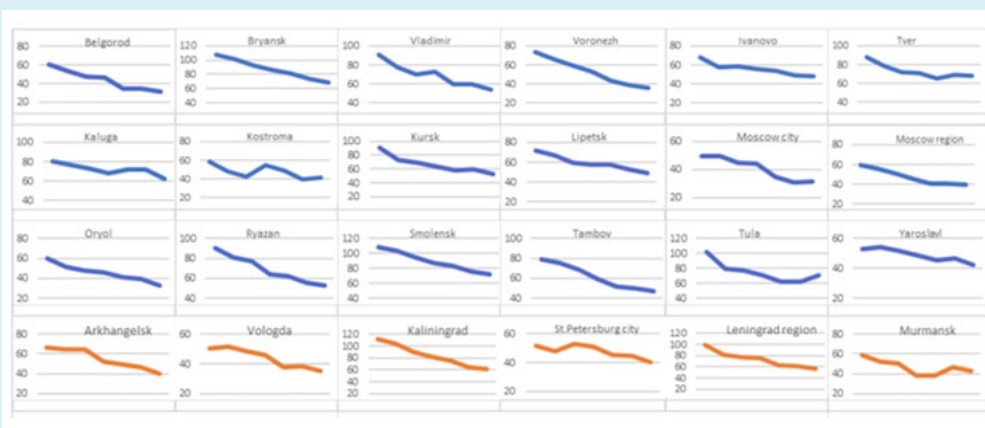
Which of two counties has higher quality of TB surveillance system?

1 Country A
2 Country B
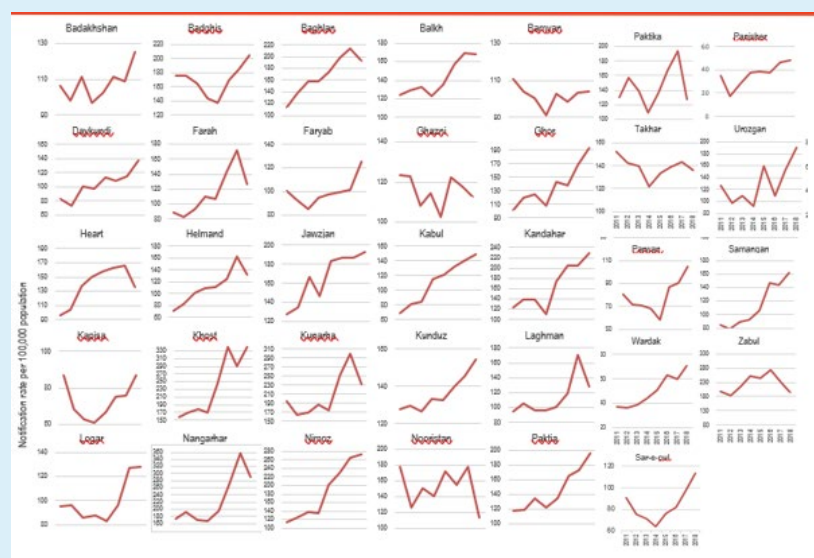3. Data are not sufficient

List three characteristics of plots, to support your conclusion.

1………………………………………………………………………………………………………..

2…….

3…….

Country A

Country B

Appendix 2: Guide for the Key Informant Interview

Date of Interview: _____ **Start Time:** _____
Name of Interviewer: _____
Sex: Male Female
Job title: _____
Length of time in current position: _____

TB M&E recording and reporting practice

Will you please describe what type of the forms, registers do you use for routine TB surveillance and what are the purpose of those forms?

Will you please describe that type of reports facilities generate?

Where the reports are sent to?

Resources for the data quality assessment

Does the oblast TB center have a designated person responsible for entering TB data/compiling reports from health facilities and for reviewing the quality of compiled TB data prior to submission to the next level,(e.g., to city /oblast/ central level)?

Does the city/oblast/central TB center have written guidelines for data entry/compilation and for data review and quality control?
Probe: *will you show please the guidelines? How often to you use them? Is there any need to update those guidelines?*

Are designated staff trained on data entry/compilation and data review/quality control?
Probe: *When they were trained last time? How many were trained? Can you show a certificate of training or meeting minutes with the list of participants, please?*

Completeness of health facilities reporting to city/oblast/national TB center

Does the city/oblast/national TB center keep copies of quarterly TB reports (paper-based or electronic) sent by the health facilities?

Do you keep track to ensure that all facilities submit the quarterly report?

Are all facilities submitting quarterly reports due?
Probe: *If health facilities are not submitting quarterly reports, what are the possible reasons for this?*

Report timeliness

Is there a deadline for submitting quarterly TB reports by health facilities?
Probe: *If yes, what is the reporting deadline?*

Does the city/oblast/national TB center record the receipt dates of quarterly reports?

Does the city/oblast/national TB center keep a record of its submission of quarterly aggregated TB reports to oblast and/or national offices?

If any quarterly TB reports were not complete, what are the possible reasons for the missing data?

Data quality assurance mechanisms

Does the city/oblast/national TB center conduct TB data quality assessments at health facilities?
Probe: Will you please describe, what it involves? Who are conducing, how often is conducted? How it is documented?

Does the city/oblast/national TB center maintain a record of health facility TB data quality assessments conducted in the past 12 months?

Does the city/oblast/national TB center maintain a record of feedback to health facilities on TB data quality assessment findings?

Data processing and analysis

Can TB M&E staff in the city/oblast/national TB center generate up-to-date (more than one year) reports that contain the following information

- Aggregated summary of quarterly TB reports
- Demographic data on oblast population for the calculation of coverage, or rates
- TB program indicators (e.g. TB notification rate, TB treatment success rates) calculated for the each facility in the oblast?
- Comparison among facilities in the oblast
- Comparison with oblast/national TB program performance targets
- Comparison of sex-disaggregated data
- Comparisons among different TB performance indicators (e.g. comparison between TB cases notified, number of TB cases successfully treated)

Information use guidelines and strategic documents

Are there any guidelines on how to analyze surveillance data, how to visualize it, how to use it for planning, how to comment on data received from facilities if you find any inconsistencies in the data?
Probe: Do you have a copy? Can you show it please? How useful it is? Do you use it? Do you find that such document would be useful?

Does the city/oblast/national TB center have copies of the national strategic plans for TB, oblast/national annual plans for TB, and/or oblast/national TB performance targets?
Probe: Do you have a copy? Can you show it please? How useful it is?

Data visualization

Does the city/oblast/national TB center prepare data visuals (graphs, tables, maps, etc.) showing achievements toward key TB performance targets (indicators, geographic and/or temporal trends)?

If no, what is the reason that you do not produce? If no, do you think would it be useful to enhance the capacity at city/oblast/national level so that you produce visuals to track your performance?

If yes, what type of information is captured in the data visuals
Probe: TB notification and treatment success, DR-TB notification and treatment success, contact investigation, other. If yes, can you show them?

Performance analytic and report production

Does the city/oblast/national TB center have access to analyzed TB data (e.g., summary tables, charts, maps)?
Probe: where from do you receive? Paper based? Electronic?

Does the city/oblast/national TB center produce any report or bulletin (annual, quarterly, etc) based on an analysis of TB data? This is different from the quarterly TB data reports and contain discussions and decisions/recommendations based on key performance targets.
Probe: If yes, can you show them? How often do you prepare them? How do you disseminate? Who are the target for such reports?

Feedback to health facilities

During the past three months, were there any situations where you noticed any inconsistencies or gaps or unexpected data in reports you received from health facilities, and did you contact the health facility to point out the problem or to clarify or correct (or did you prepare a report on the quality of the data you received).
Probe: if yes, please indicate what type of feedback report is it
- *Feedback/supervision report on data quality: including data accuracy, reporting timeliness, report completeness,*
- *Feedback/supervision report on TB program performance based on reported quarterly TB reports (e.g. appreciated/acknowledgement of good performance; resource allocation, mobilization)*

Routine decision-making meeting and process at the city/oblast/national TB center?

Does the city/oblast/national TB center has a M&E team?

If yes, does the city/oblast/national TB center have routine team meetings to discuss TB performance monitoring and management? Please show the meeting minutes.

If yes, are discussions held to review key performance targets (tracking progress against targets) based on TB data? E.g. TB notification, diagnostic services, contact investigations, drug stockout, TB/HIV services.

If yes, are TB performance review/management meeting minutes are circulated to all members?

Does the head of the TB center attend any of the TB performance review/management meetings?

Annual planning

Does that annual plan use TB data for problem identification and/or target setting?
Probe: can you please share the AOP? What activities contain AOP (eg. Addressing TB case notification, TB diagnostic services, TB screening, Contact investigation, TB drug stockout, human resource management, gender disparity). Is the plan based on the identified problems during the M&E visits being compiled? Does it have specific deadlines and specific responsible people?

Data dissemination outside the health sector

Dose the city/oblast/national TB center have to submit/present TB program performance reports to a city/oblast/state administration?
Probe: if yes, did you submit any report during the past one year? Can you show the copy of the report? Could you describe about the report?

Is there a website updated at least annually for accessing oblast TB M&E data by general public? If yes, what is the address of the web-page?

Are city/oblast/national TB performance data shared with general public, other partners, civil society organizations via bulletin board, chalkboards and/or local publications?

End time _____

USAID
FROM THE AMERICAN PEOPLE

TB
DIAH
Tuberculosis Data, Impact Assessment
and Communications Hub

НЦФ
National Center
of Phthisiology