Implementing QuanTB to Improve Forecasting, Supply Planning, and Early Warning Systems for TB Medicines: Tajikistan Report

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About SIAPS

The goal of the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program is to ensure the availability of quality pharmaceutical products and effective pharmaceutical services to achieve desired health outcomes. Toward this end, the SIAPS result areas include improving governance, building capacity for pharmaceutical management and services, addressing information needed for decision-making in the pharmaceutical sector, strengthening financing strategies and mechanisms to improve access to medicines, and increasing quality pharmaceutical services.

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CONTENTS

ACRONYMS

EWS	early warning system
DM	drug management
GDF	Global Drug Facility
LMIS	logistics management information system
MDR-TB	multidrug-resistant tuberculosis
MOH	Ministry of Health
NTP	National TB Control Program
SIAPS	Systems for Improved Access to Pharmaceuticals and Services
TB	tuberculosis
UNDP	United Nations Development Programme
USAID	US Agency for International Development
VSPMIS	Very simple pharmaceutical management information system
XDR-TB	extensively drug-resistant tuberculosis

ACKNOWLEDGMENTS

The Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program would like to express appreciation to the Tajikistan Ministry of Health (MOH)'s National TB Institute (National TB Control Program (NTP)) for its cooperation and commitment in strengthening the forecasting, supply planning, and the early warning system (EWS) in Tajikistan. We acknowledge the NTP and tuberculosis (TB) stakeholders and partners, including the Global Fund, the United National Development Programme (UNDP), Project Hope, and KNCV, for their collaboration and support in implementing the intervention. In particular, the authors would like to acknowledge the regional drug management (DM) coordinators for collecting and reporting patient and stock data at the central level. We acknowledge National DM Coordinator Mrs. Gulnora Jalinova for preparing QuanTB files and reports and for providing her perspective as a beneficiary of QuanTB and SIAPS technical assistance.

INTRODUCTION

This report summarizes the information gathered as part of a review of the implementation of QuanTB and related technical assistance to strengthen TB pharmaceutical management in Tajikistan

Background

TB is a preventable and curable infectious disease that ranks alongside HIV/AIDS as a leading cause of death worldwide. If untreated, the disease can be debilitating and can kill approximately 50% of those infected. Proper forecasting, supply planning, and stock monitoring are key to ensuring an uninterrupted supply of TB commodities to meet the evolving needs of TB programs as treatment is scaled up and treatment regimens change. The US Agency for International Development (USAID)-funded SIAPS Program has provided technical assistance to NTPs in 12 USAID-focus countries since 2013. SIAPS regional or in-country technical advisors have collaborated with NTPs to address challenges that hamper uninterrupted access to TB medicines, such as the lack of reliable information for effective decision making in TB supply chain management, an EWS to prevent stock-outs or expiries, and supply chain system monitoring mechanisms, as well as limited institutional and human resource capacity in these areas. The support included the use of QuanTB—an electronic forecasting tool and EWS that transforms complicated calculations into a user-friendly dashboard that displays key quantification and supply planning information and alerts on risks of stock-outs or expiries. Implementation of the tool was complemented by other SIAPS TB technical assistance activities, such as quantification capacity-building training and participation in country monitoring missions.

Tajikistan is a low-income country in Central Asia with a 2015 population of approximately 8.48 million and a life expectancy at birth of 66.2 years for males and 73.2 years for females[1,2]. In 2014, the prevalence of TB was 128 per 100,000 population, and 6,260 TB cases were identified[3,4]. Tajikistan is among the 30 high burden multidrug-resistant TB (MDR-TB) countries. Among other factors, inadequate supply planning and related stock-outs of TB medicines contribute to the MDR-TB burden. The public health expenditure comprised approximately 28.8% of the total health expenditure in 2014[5]. The NTP is funded primarily through the MOH and international development partners, including the Global Fund.

[1] World Development Indicators. Available at: http://data.worldbank.org/indicator.
[2] WHO Country Cooperation Strategy. Available at: http://www.who.int/countryfocus/cooperation_strategy/ccsbrief_mmr_en.pdf?ua=1.
[3] WHO Global TB Report Myanmar Country Profile. Available at: https://extranet.who.int/sree/Reports?op=Replet&name=/WHO_HQ_Reports/G2/PROD/EXT/TBCountryProfile&ISO2=MM&outtype=html.
[4] WHO. Available at: http://www.who.int/countries/mmr/en/.
[5] World Development Indicators. Available at: http://data.worldbank.org/indicator.

Key Gaps that Necessitated QuanTB Implementation

- *Inadequate forecasting and supply planning capacity:* Second-line TB medicine forecasting, procurement, and in-country supply-related challenges were serious problems. The country lacked a reliable system and tools for forecasting and planning for the rational distribution of the commodities at the national or TB treatment facility level. The lack of quantification technical skills and reliable tools resulted in under or overestimation of TB medicines. With many international partners implementing TB programs, there was poor coordination of procurement of second-line medicines for TB and no consideration of available stock nationwide. In 2014 and 2015, the country had three different sources for second-line medicine procurement: the UNDP, Project Hope, and KNCV, which procured second-line medicines for cohorts of patients they were managing based on their respective work plans.

- *Challenges in stock status monitoring and the lack of a proper EWS*: The NTP had difficulty determining and tracking stock status and in estimating the amount of medicine remaining unused after all enrolled patients had finished their full course of treatment. There was no proper EWS to use to prevent stock-outs, overstocks, or expiry of TB medicines.

- *Data quality and reporting issues:* Although the paper-based TB logistics management information system (LMIS) was well designed, utilization of the data varied among levels and required significant time and effort from the national DM coordinator to ensure quality data collection. The LMIS was not providing sufficient strategic information to inform better decision making for an uninterrupted supply of TB medicines for patients. A TB information management system called the Open Medical Record System, which was promoted by one local partner organization and piloted in seven sites, was not functional at any level, and forecasting of TB medicines was a challenge due to non-availability of patient-related data.

- *Poor coordination of TB control activities:* The NTP had limited capacity to coordinate the efforts of numerous local and international partners implementing TB control programs, including procurement of second-line medicines (three partner organizations had separate pipelines for second-line medicine procurement). The NTP was almost fully depended on donor (partner) assistance for TB control.

The implementation of the QuanTB EWS and related SIAPS TB technical assistance helped to address these gaps.

Goal and Objectives

SIAPS conducted a review of SIAPS TB technical assistance and the QuanTB implementation in Tajikistan. Specific objectives were to determine:

- Key achievements or results of SIAPS QuanTB technical assistance in Tajikistan
- Experiences and perspectives of the beneficiaries from the NTP
- Challenges and lessons learned

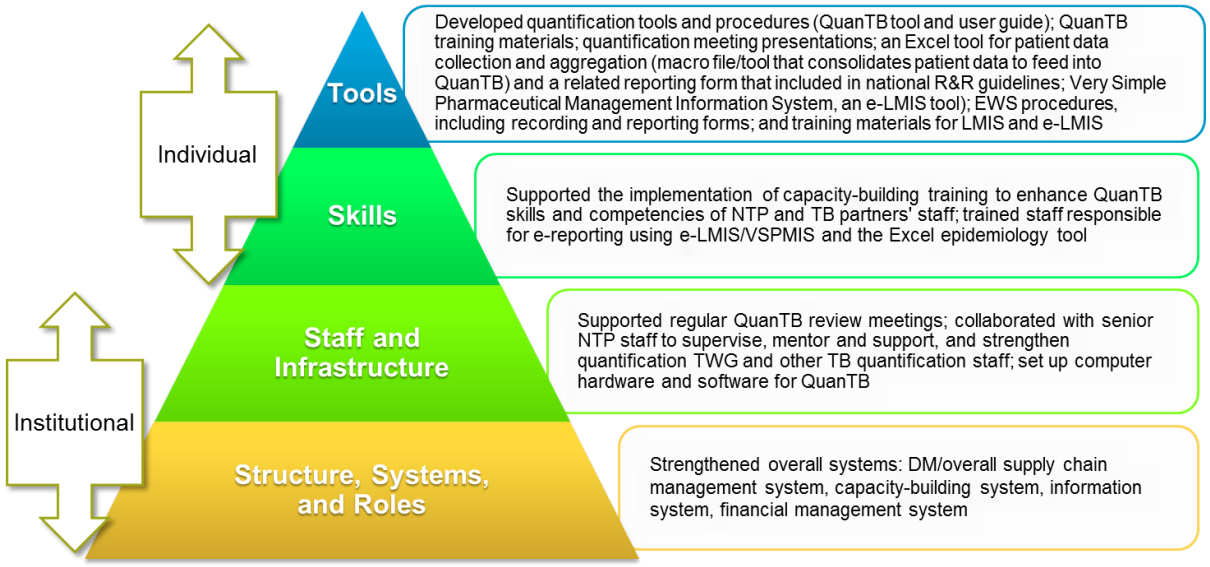
This report summarizes key aspects and results of the Tajikistan review.

METHODOLOGY

Data were collected through a review of relevant background documents and reports; interviews with SIAPS TB staff; and remote data-collection through telecommunication with SIAPS TB field advisors (using a questionnaire for SIAPS field advisors) and with the national DM coordinator, who was a key beneficiary and active user of QuanTB (using a questionnaire for active users of QuanTB). Additional senior NTP officials were not available for interview using a questionnaire for senior NTP officials/decision makers due to competing commitments. Data were analyzed by content (mostly qualitatively) and by prevalent themes around key achievements or success areas. In addition, online experience and satisfaction surveys were completed by country beneficiaries and global partners. Results of the online surveys have been reported separately[6].

Strategic Approach

SIAPS developed QuanTB to promote a systems-strengthening approach to TB medicines management[7]. As shown in figure 1, implementation of the tool is expected to strengthen the country quantification system through systemic institutional and individual capacity building. Optimum capacity in all levels of the capacity-building pyramid is key to ensuring timely reporting of valid data; timely updating of QuanTB files; and the generation of accurate forecasts, supply planning information, and EWS alerts. The information informs proper decision making and the development and implementation of remedial actions through a technical working group or partner coordination forum.



[6] Goredema W, Sawyer K, Mwatawala S, Owuna C. 2017. *Implementing an Early Warning System for TB Medicines: Global Report.* Submitted to the US Agency for International Development by the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program. Arlington, VA: Management Sciences for Health.
[7] SIAPS Program. 2013. *QuanTB User's Guide.* Submitted to the US Agency for International Development by the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program. Arlington, VA: Management Sciences for Health.

Figure 1: Systemic institutional and human resource capacity building in quantification.[8]

Interventions

Key interventions in Tajikistan:

- Enhanced the NTP's quantification capacity and skills and improved national forecasting and supply planning systems
- Established and implemented an EWS to prevent stock-out and wastage of TB medicines
- Strengthened information systems and improved case and stock data quality and reporting for informed decision making
- Participated in Global Drug Facility (GDF) monitoring missions and program reviews and strengthened quantification and the overall TB supply chain system in the process

[8] *Adapted from:* Potter C, Brough R. Systemic capacity Building: A Hierarchy of needs. Health Policy and Planning 2004; 19(5): 336–345.

RESULTS AND DISCUSSION

Process

SIAPS has provided TB technical assistance to Tajikistan since November 2013. The support was provided through a regional senior technical advisor for TB pharmaceutical supply management based in Tbilisi, Georgia. The country has been using QuanTB regularly for ordering second-line medicines for the regional and national levels since January 2015. Prior to using QuanTB, the NTP used a GDF Excel sheet for quantification of TB commodities (the respondent was not familiar with a second Excel tool that was reportedly used by another TB partner). At the time of this review, NTP staff were using QuanTB version 3 for forecasting, procurement, supply planning, and as an EWS. The MOH/NTP implements the tool with SIAPS technical assistance and in collaboration with key local TB partners and stakeholders, including the National TB Institute; Project Hope, which is implementing a USAID-funded TB program and is the principal recipient of the Global Fund New Funding Model grant for TB; and KNCV, which is implementing USAID-funded TB programs.

The TB network in Tajikistan includes the central, regional, and district levels, and the regional TB facilities represent the intermediate level of the NTP. Four regional DM coordinators collect patient-related data (e.g., treatment start date, treatment regimen/medicines use) and stock data (e.g., stock status, expiry dates) from the district level and report to the national DM coordinator at the central level on a quarterly basis. The central-level national DM coordinator then updates the QuanTB files with the district and region data and executes, prepares, and analyzes the QuanTB forecasts, supply plans and EWS red flag alerts for use in decision making and for adjusting medicine distribution plans. The DM coordinators are all TB doctors who volunteer in the DM role. They are not paid for this extra task and therefore have no incentive to prioritize DM work. The district level (TB facilities) has a small number of patients and does not use QuanTB. Instead, these facilities complete a simple LMIS request form. The NTP uses single medicines regimens in QuanTB, because it had problems collecting reliable data on the number of cases per treatment regimen in the country. Therefore, it collects data per number of patients enrolled per month and number/percentage of cases per medicine.

Beneficiary Experiences and Perspectives

The national DM coordinator felt that establishing a system for data collection and aggregation of patient and stock data and using it to update QuanTB to generate forecasting and supply planning information was critical for the NTP. While the GDF Excel tool may have been user friendly, QuanTB is a universal tool that the NTP can use for any TB medicines. The national DM coordinator rated key attributes of QuanTB favorably. She considered the tool to be simple, user-friendly, timely, reliable, and useful compared to the Excel spreadsheets used previously. As an active user of the tool, she noted that, "If you enter correct data, QuanTB provides correct and reliable answers." However, she expressed concern that the tool was slow. If a high volume of information needs to be processed, it takes a long time to generate the forecast. QuanTB appears to have improved the accuracy and efficiency of NTP forecasting. The NTP feels it can

sustain the use of QuanTB because key staff have been trained and the tool does not require an internet connection. However, funds may be needed for ongoing training of new staff. Regarding whether users were receiving the required support for using QuanTB from the MOH, SIAPS, or any other TB partners, the national DM coordinator noted that SIAPS had provided support since QuanTB was implemented and was available for technical guidance, advice, and assistance as needed. At the time of this review, SIAPS had assisted the NTP in developing forecasts for the next procurement of second-line medicines for the entire country. Other local partners were expected to support the regional coordinators with resources, including financial motivation to ensure regular and quality reporting from the lower to the upper levels.

Accomplishments

Key accomplishments and results of the QuanTB implementation in Tajikistan included:

- *Adopted and institutionalized QuanTB:* With ongoing SIAPS technical assistance, the NTP has adopted and fully institutionalized QuanTB as the national quantification tool for second-line TB medicines at the regional and national levels based on stock and case data reported from the regions.

- *Enhanced local quantification capacity and skills*: SIAPS provided technical assistance to enhance the country's TB medicine quantification capacity and skills. Two trainings on quantification using QuanTB were conducted in 2014 and 2015, and nine key staff were trained. SIAPS also provided technical assistance and on-the-job training to the National DM Coordinator on QuanTB and different aspects of TB pharmaceutical management. As a result, the NTP, the national DM coordinator, and her assistant are not only trained on the use of QuanTB and general forecasting/quantification of TB medicines but also capable and competent to coordinate all related TB pharmaceutical management activities, including forecasting and procurement. Prior to the SIAPS technical assistance, the NTP could not independently coordinate, lead, and steer the implementation of TB program activities in collaboration with multiple stakeholders and partners.

- *Improved forecasting and supply planning*: A system for implementing QuanTB was designed and executed, including processes and procedures for recording patient and stock information and data flow. QuanTB forecasts and supply plans are reviewed quarterly to adjust for updated enrolled patient numbers, stock on hand, and expiry dates. SIAPS also assisted with conducting actual forecasting and supply planning of TB and related medicines[9]. As mentioned above, the results are more timely, accurate, and reliable than quantification results before QuanTB. Quantities for procurement are easily determined, and orders are placed to ensure an uninterrupted supply of TB medicines. Implementation of the tool also helps to review trends in actual enrollment of TB cases and to take necessary steps to minimize the risk of stock-outs or overstock of certain medicines when the number of TB cases increases or decreases. At the end of 2014/early 2015, after a six-month QuanTB pilot, the NTP quantified second-line medicines for the entire country using QuanTB by considering the quantities (i.e., stock on

[9] Tajikistan NTP. March 2015. Quantification of anti-TB medicines.

hand and stock on order) of the three partner organizations that procured TB medicines for three patient cohorts at that time. Quantification of second-line medicines for the entire country is done quarterly using QuanTB and based on information reported from the regions. QuanTB is also used for quarterly ordering at the regional level. The use of QuanTB has improved the projection of expected TB cases by comparing the actual number of enrolled cases with expected cases for each quarter.

- *Establishment and implementation of EWS to prevent stock-outs and wastage of TB medicines:* SIAPS capacitated the NTP to implement the QuanTB EWS and use it to monitor TB stock status. The support included reviewing and analyzing QuanTB outputs and using QuanTB dashboard alerts to propose appropriate corrective actions. The implementation of QuanTB and TB stock status monitoring activities informed several TB supply chain decisions and was used to monitor TB program performance and take corrective actions to mitigate stock-outs, such as alerting the GDF when stock reaches a critical level. Actions to prevent wastage and expiration were also initiated. For example, by monitoring stock levels and impending expiries based on the quantification that was done using QuanTB in 2015 and by considering information from partners that procure second-line medicines, the country identified the risk of a significant overstock that could lead to wastage due to expiry before full consumption. Remedial action was taken by coordinating the supply planning of the NTP and its partners and collaboration with the GDF to either supply products with longer expiry dates, revise or cancel pending orders for some items, or redistribute some stock to other countries. The measures resulted in savings from the prevented expiry and wastage of medicines of approximately USD 1,165,000 [10,11,12,13.]

[10] SIAPS. May. 2014. Maia Kavtaradze—Tajikistan Trip Report.
[11] SIAPS. Sept. 2015. SIAPS TB Quarterly Report: QuanTB and Early Warning System Roll-out and Implementation. Submitted to the US Agency for International Development by the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program. Arlington, VA: Management Sciences for Health.
[12] SIAPS. May 2016. SIAPS TB Quarterly Report: QuanTB and Early Warning System Roll-out and Implementation. Submitted to the US Agency for International Development by the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) Program. Arlington, VA: Management Sciences for Health.
[13] SIAPS. September. 2015. Monitoring TB Medicine Availability: Quarterly Report—Tajikistan

Sample QuanTB Dashboards[14]

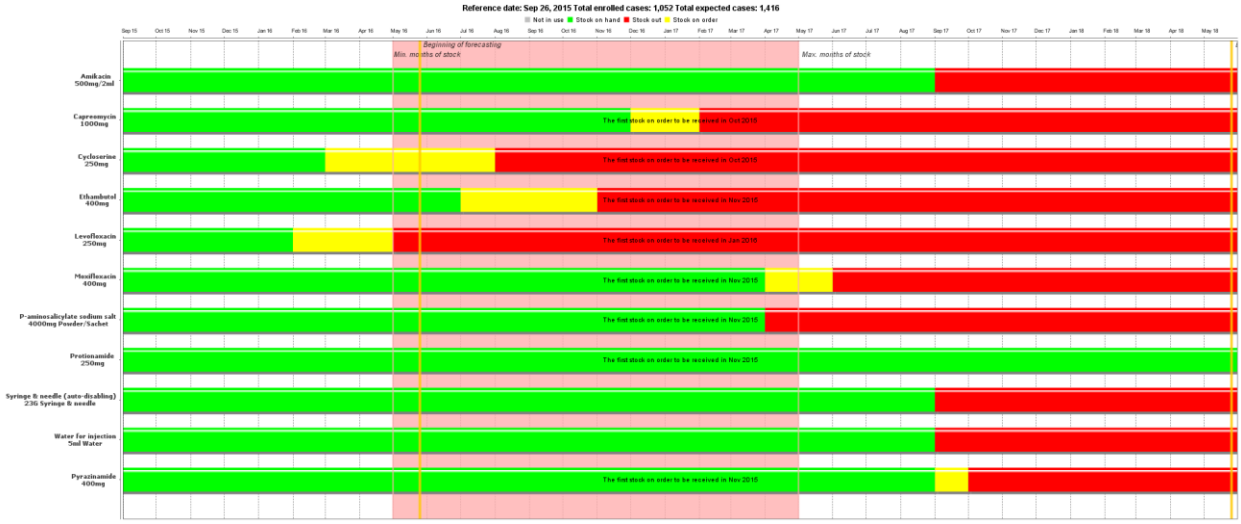


Figure 2. Second-line medicines*

*The dashboard excludes group five TB medicines for treating extensively drug-resistant TB (XDR-TB) cases. The country started treating XDR-TB in early 2015. For precise calculation purposes, group five TB medicines were quantified separately.

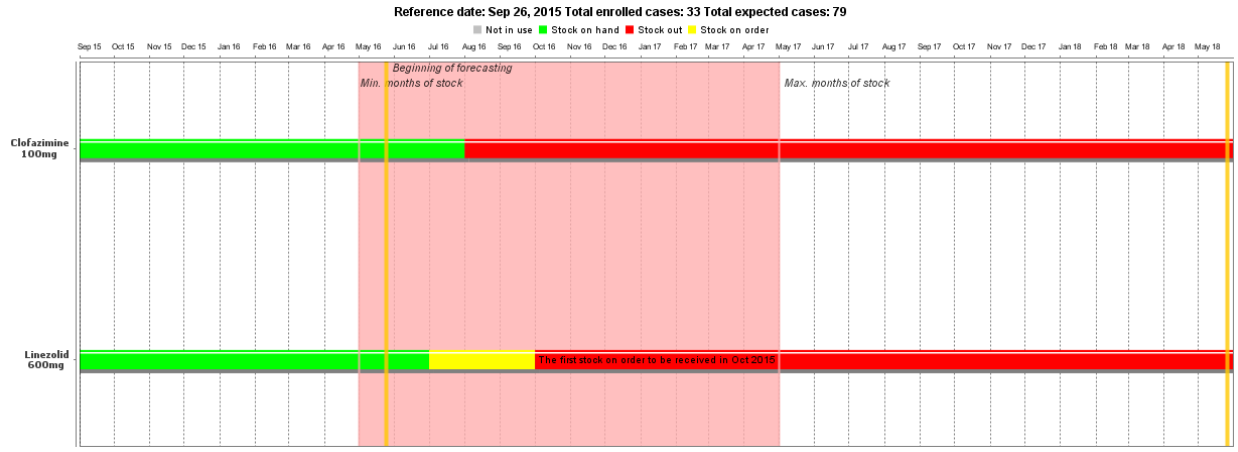


Figure 3. Medicines for treating XDR-TB

No stock-outs were reported during the quarter July to September 2015.

- *Strengthened information systems and improved case and stock data quality and reporting for informed decision making:* In response to an NTP request, SIAPS developed an Excel-based macro file for the NTP at the central level to use for collecting and aggregating patient data. The tool aggregates data and provides tables (in the same format as QuanTB tables) to

[14] ibid

copy and paste into QuanTB. A related reporting form was developed, approved by the MOH in March 2014, and included in national recording and reporting guidelines. The tool enables the NTP to have a clear picture of patient-related data (i.e., number of cases according to enrollment date and per medicine) that was not possible at any level before QuanTB. In 2015, in response to another NTP request, SIAPS developed the very simple pharmaceutical management information system (VSPMIS)–a downloadable desktop e-LMIS tool that consolidates and analyzes logistics data, monitors metrics such as reporting rates and average monthly consumption, and manages stock levels to minimize expiries and stock-outs. The tool was pilot tested intensively for six months in sampled oblasts. An accompanying user guide/job aid was also developed, and the system was adjusted and customized to NTP requirements during the pilot phase. At the time of the evaluation, there were plans to implement the tool in six districts in Tajikistan where staff had already been trained with assistance from SIAPS. Partner organizations were expected to collaborate and support the NTP to roll out the system by providing IT equipment and internet access first for pilot sites at the regional and district levels and then countrywide. Responsible staff at the TB facilities had been trained in LMIS recording and reporting. Some had also been trained in e-LMIS reporting as well (regions where the e-LMIS tool, VSPMIS, would be piloted), leading to improved inventory reporting. SIAPS developed training material for the TB LMIS in country and facilitated trainings for TB network staff responsible for TB LMIS recording and reporting, resulting in improved inventory reporting. SIAPS collaborated and supported the NTP's national DM coordinator in conducting supportive supervision visits to regions that needed help improving data quality for QuanTB use. There was a functioning system for patient-related data recording and reporting, which is necessary for TB medicine forecasting. However, as mentioned above, there were some gaps in reporting related to the lack of incentives for regional DM staff to prioritize DM work.

- *Provided technical assistance to the DOH in strengthening the NTB:* SIAPS supported the NTP in leading TB pharmaceutical management activities in collaboration with partners. The NTP also facilitated and led regular TB pharmaceutical thematic working group meetings.

- *Strengthened systems:* The implementation of QuanTB and SIAPS TB technical assistance activities have strengthened key functional areas of supply chain systems for TB control, including:

    - Capacity building: The NTP's institutional and human resource capacity for quantification and stock status monitoring has improved.

    - Information systems: EWS reports inform NTP decision making on TB supply chain management. QuanTB has also strengthened information systems by linking patient- and stock-related data, thereby facilitating the early detection of potential stock-outs, overstocks, or expiries of TB commodities.

    - Financial management systems: Cost analysis, budgeting, and overall financial management systems have been enhanced through better estimation of national needs and less wastage.

  - Services: Quantification is done easily and more efficiently. Staff can use QuanTB to execute accurate quantification and generate stock status reports as needed.

  - Procurement and supply planning: Regular EWS reports inform decisions on when to place orders and schedule and receive shipments of supplies. All this has led to improved availability of TB medicines and improved TB control services.

- *Improved collaboration:* Strong collaboration has been established among the DOH/NTP, SIAPS, and other partners in Tajikistan. Good coordination and collaboration was also established among the NTP, GDF, and other local and global TB stakeholders in the process. SIAPS support has helped to connect NTP pharmacy staff with pharmacy staff in other countries, thereby facilitating the exchange of stock.

Overall, SIAPS TB technical assistance and the QuanTB implementation have contributed to the reduction of TB medicine stock-outs in Tajikistan.

Key Challenges and Lessons Learned

Challenges

- Data quality and reporting issues*:* This is being addressed by implementing the Excel-based tool for reporting patient data and VSPMIS.

- Human resources and capacity: Very few regional staff are capable of using QuanTB, partly because of low IT literacy. They only collect data and submit to the central level, where the national DM coordinator enters all data for all regions into QuanTB. To address the capacity gap, the NTP is working with partner organizations to implement a capacity-building plan to train additional staff.

- The country distribution plan prepared according to QuanTB forecast is not always followed due to distribution and storage capacity challenges.

- Staff at the regional level do not always prioritize to report patient-related data regularly, which is key for QuanTB.

- The NTP still needs external support from partner organizations to roll out e-reporting and implement VSPMIS (i.e., IT equipment and internet access at the regional and district levels).

- With the help of the skilled national DM coordinator, the NTP is able to coordinate all activities related to TB pharmaceutical management. However, there is need to train more people to increase capacity.

Lessons Learned

- QuanTB has greatly improved quantification and pipeline monitoring. The introduction of version 3.0 has been a major improvement in supply planning.

- Strong partnerships with in-country partners are key, particularly in countries where there is no in-country SIAPS technical advisor or SIAPS office who can leverage resources and coordinate support to the MOH.

- Regular monitoring of TB stock levels against patient enrollment is key to ensuring the early identification of potential wastage or stock-outs of TB medicines.

- Capacity-building refresher trainings on QuanTB and on improving data quality and reporting issues are needed on an ongoing basis. They help to address human resource issues and the adverse impact of ongoing attrition of staff.

- For the best coordination, collaboration, and results, TB partners supporting the implementation of QuanTB should consider embedding in-country field advisors within the NTP.

- There is a need to include budgets for ongoing human resource capacity building in routine MOH plans and in grant application proposals such as the Global Fund.

Gaps for Future Consideration

- Continue to build in-country capacity and experience to implement QuanTB. Implement ongoing staff capacity-building refresher trainings to mitigate the impact of staff attrition.

- Build in-country IT capacity to address QuanTB software problems as they arise.

- Continue to improve reporting of quality data from the periphery and include lower-level data when updating QuanTB.

CONCLUSION

With USAID/SIAPS technical assistance, the Tajikistan DOH NTP has successfully enhanced its quantification capacity by implementing QuanTB for national-level forecasting, supply planning, stock status monitoring, and as an EWS. Forecasting of and budgeting for TB medicines is now easier. The NTP and local stakeholders and partners should continue to collaborate to sustain the use of the tool.