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

Recommended Citation

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ACRONYMS

DHIS	District Health Information System
DPS	Department of Pharmacy Services
EWS	early warning system
GDF	Global Drug Facility
MOHCC	Ministry of Health and Child Care
NatPharm	National Pharmaceutical Company
NQTC	National Quantification Technical Committee
NTP	National Tuberculosis Control Program
SIAPS	Systems for Improved Access to Pharmaceuticals and Services
TB	tuberculosis
USAID	US Agency for International Development
WHO	World Health Organization

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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 Zimbabwe.

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 expiries¹. 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.

Zimbabwe is a low-income country in Southern Africa with a 2015 population of approximately 15 million and a life expectancy at birth of 56 years for males and 59 years for females^{2,3}. In 2014, the prevalence of TB was 292 per 100,000 population, and 32,016 TB cases were reported⁴. The health system is organized into central, provincial, and district levels. The public health expenditure comprises approximately 38% of the total health expenditure⁵. The health system is funded by the government with contributions from the private sector, bilateral and multilateral donor agencies, nongovernmental organizations, and patients. Donors include the Global Fund and the multidonor pooled Health Transition Fund supported by UN donor agencies, including the United Nations Children's Fund, the United Nations Population Fund, the World Health Organization (WHO), the United Nations Programme on HIV and AIDS, and the European Civil Protection and Humanitarian Aid Operations, through the Zimbabwe United

¹ 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.

² World Development Indicators. Available at: <http://data.worldbank.org/indicator>.

³ WHO Country Cooperation Strategy. Available at: http://www.who.int/countryfocus/cooperation_strategy/ccsbrief_zwe_en.pdf.

⁴ WHO Global TB Report Zimbabwe Country Profile. Available at: https://extranet.who.int/sree/Reports?op=Replet&name=%2FWHO_HQ_Reports%2FG2%2FFPROD%2FEXT%2FTBCountryProfile&ISO2=ZW&LAN=EN&outtype=html.

⁵ World Development Indicators. Available at: <http://data.worldbank.org/indicator>.

Nations Development Assistance Framework. Other donors include the European Union; the Department for International Development; and the US Government (through USAID, the Centers for Disease Control and Prevention, and others)⁶. The country has one integrated, demand-based (pull) supply chain system for public health commodities. In 2015, the NTP budget was USD 28 million (7% domestic funds, 59% international support, and 34% unfunded⁷).

Key Gaps that Necessitated QuanTB Implementation

- *Mismatch between consumption-based quantification and notification trends:* The use of proxy consumption data (e.g., issues data from stock cards) rather than actual, direct-to-user dispensing data contributed to overestimation. There was a need to base forecasting of first-line medicines on case notification data until reliable consumption data became available.
- *Long procurement lead times* were largely due to delays in completing in-country processes and long supplier lead times, notably for second-line TB medicines procured through the Global Drug Facility (GDF). There was a need to improve procurement, supply planning, and the delivery of TB medicines, especially second-line medicines, and ensure regular monitoring of TB medicine stock status.
- *Overstocks and expiry of TB medicines* were primarily due to the overestimation of requirements, inadequate supply planning, and oversupplying of some health facilities from higher levels.

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

Goal and Objectives

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

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

This brief summarizes key aspects and results of the Zimbabwe review.

⁶ WHO Country Cooperation Strategy 2016-2020 Zimbabwe. Available at: <http://www.stoptb.org/assets/documents/countries/acsm/zimbabwe.pdf>.

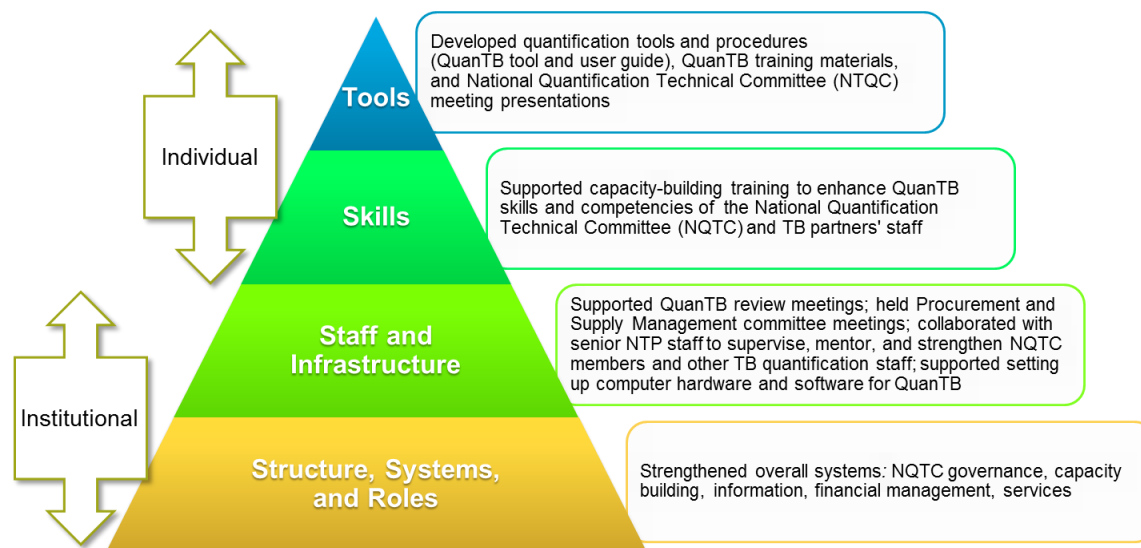
⁷ WHO. 2015. Global Tuberculosis Report 2015. Available at: <http://aidsdatahub.org/global-tuberculosis-report-2015-who-2015>.

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 local beneficiaries of the technical assistance (using one questionnaire for active users of QuanTB and another for senior NTP officials/decision makers). 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 separately⁸.

Strategic Approach

SIAPS developed QuanTB to promote a systems strengthening approach to TB medicines management⁹. 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 hierarchy 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 development and implementation of remedial actions through a technical working group or partner coordination forum.



⁸ 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.

⁹ 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 HR capacity building in quantification¹⁰

Interventions

Key interventions that were implemented in Zimbabwe included:

- *Capacity building:* Key National Quantification Technical Committee (NQTC) members and partner staff have been trained on the quantification of TB medicines using QuanTB.
- *Ongoing implementation of QuanTB in quantification and stock status monitoring, and as an EWS:* The country is using QuanTB to quantify and monitor stock status of first- and second-line medicines; generate early warning signals; and take actions to mitigate stock-related challenges, such as overstocking and expiry of medicines.
- *Provision of technical assistance through GDF monitoring missions and program review:* A SIAPS regional field advisor has collaborated with GDF consultants and the Zimbabwe Ministry of Health and Child Care (MOHCC)/NTP to conduct GDF monitoring missions. During the missions, the visiting team provided technical assistance to the NTP in forecasting and supply planning for upcoming rounds of TB medicine procurement, reviewed the accuracy of data sources, addressed issues raised by the technical review committee on previous GDF missions, assessed key challenges that affect TB medicine availability, and recommended solutions to help improve TB supply chain management. This has strengthened quantification and the TB supply chain system.

¹⁰ *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 in Zimbabwe since January 2014 through a regional senior technical advisor for TB pharmaceutical supply management. The country started using QuanTB for national-level forecasting of second-line TB medicines in 2014 and for first-line TB medicines in 2015. The MOHCC's NTP implements the tool with SIAPS technical assistance and in collaboration with key local TB partners and stakeholders, including the DPS and NatPharm. The country is using QuanTB specifically for forecasting, procurement, supply planning, cost analysis, introduction of new drugs or regimens, and as an EWS. At the time of this evaluation, the NTP used manual tools to collect patient data, which was fed into QuanTB. However, a process was under way to integrate with the electronic District Health Information System (DHIS2), which was launched in 2014¹¹. NatPharm used an Excel spreadsheet to share raw stock on hand data from computer records. The NTP then extracted relevant raw data from the NatPharm spreadsheet to update QuanTB. Stock on hand data are collected at the facility level. One challenge is that currently stock on hand data do not have expiry dates, which is a requirement when using QuanTB.

Beneficiary Experiences and Perspectives

Respondents rated key attributes of the tool favorably. They consider it a simple, user friendly, reliable, useful, fairly accurate, and cost-effective tool that has improved the speed and timeliness of forecasting and informed supply chain decision making for TB medicines. Before QuanTB, morbidity-based forecasts of first-line medicines were generated using Quantimed and took notified cases into consideration. However, WHO estimates from that time overestimated TB cases. Consumption-based forecasting improved the situation after QuanTB was adopted in 2014. However, the consumption-based forecasting data were higher than the case notification data, leading to overstocks and expiries. After the 2014 national TB prevalence survey yielded more accurate and reliable case data, the quantification assumptions have been revised and the NTP is now more confident in the validity of its forecasts. Case and outcome data are reported quarterly from the health facility to the district, the provincial, and finally the national level, where they are fed into QuanTB biannually. The NTP conducts quarterly visits to peripheral facilities for onsite monitoring and verification of reported case data. However, a functional stock management system is in place that uses both a computerized warehouse management system with manual backup at all medical store branches and manual stock records with established minimum and maximum stock levels for TB medicines and related commodities at all levels of the supply chain. Logistics data are collected during medicine distribution, shared with the DPS/NTP for analysis, and used for TB supply chain decision making. The country is currently integrating six existing distribution systems into a new pull distribution system—the Zimbabwe Assisted Pull System—and efforts are under way to transition to an electronic logistics management information system. A well-defined system of quarterly supportive supervision and mentoring to strengthen pharmaceutical management in health facilities is in place but is not always followed¹². However, the NTP feels that the reported consumption data are still not accurate and reliable enough, and more needs to be done to strengthen this area.

¹¹ Zimbabwe Launches New Health Information System.

¹² Mwatawala. S. SIAPS June 2016 Zimbabwe trip report.

Accomplishments

Key accomplishments and results of SIAPS TB technical assistance and the QuanTB implementation in Zimbabwe include:

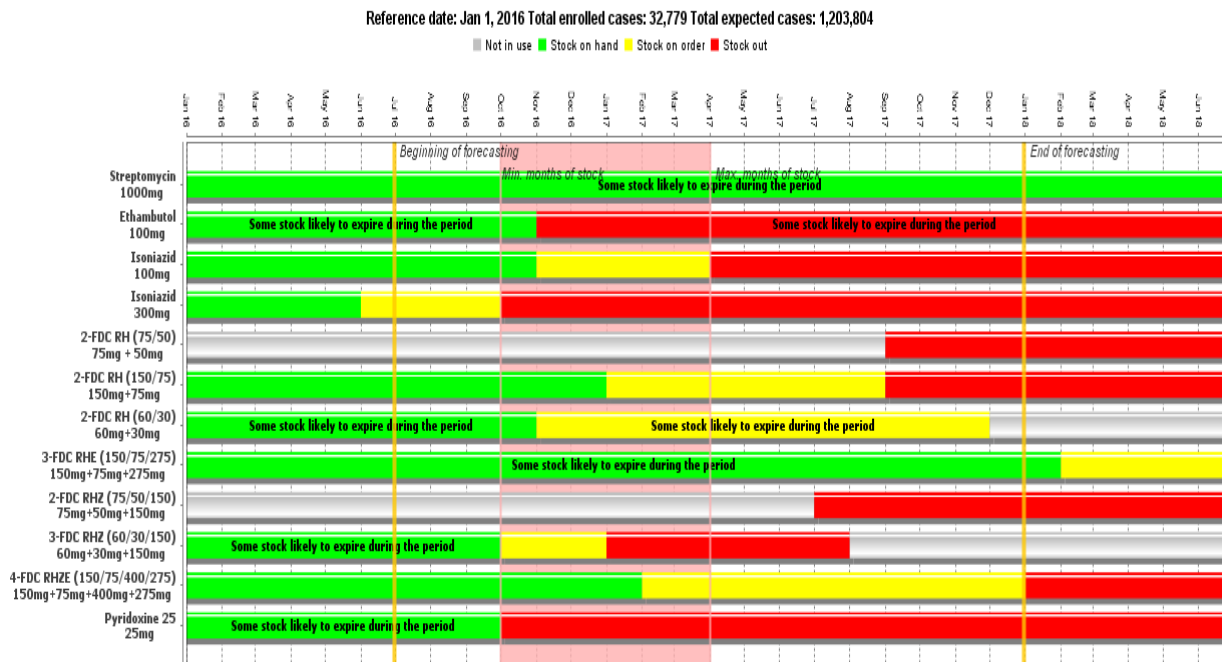
- *Adopted and institutionalized QuanTB:* The tool was adopted and institutionalized as the national quantification tool, and data are regularly generated and made available.
- *Enhanced NTP quantification capacity and skills:* Zimbabwe was among the first countries to receive SIAPS technical support for the implementation of QuanTB. Two technical staff from the Zimbabwe MOHCC were trained at a regional quantification technical meeting in Dar es Salaam, Tanzania, in February 2014. In response to the NTP's request, SIAPS then trained members of the NQTC in quantification of TB medicines in Harare in May 2015. The country has adequate capacity for quantification of TB medicines and related commodities. NTP and supply chain staff have been trained on TB medicine quantification using QuanTB^{13,14}. A well-trained Procurement and Supply Management Committee comprising multiple stakeholders, including the MOHCC (health programs, DPS and Directorate of Laboratory Services); the Zimbabwe National Family Planning Council; the National AIDS Council; the Medicines Control Authority of Zimbabwe; and NatPharm is in place. The NTP now routinely uses QuanTB for forecasting and regular monitoring of TB medicine stock levels¹⁵ for informed supply chain decision making.
- *Improved forecasting and supply planning:* More reliable quantification data are now generated using the morbidity-based method, while in the past, the country relied on the consumption-based method, which led to variations in and overstocks of TB medicines, inadequate supply planning, and oversupplying of some health facilities from higher levels. QuanTB has helped address the problem. The implementation of QuanTB and the above-mentioned improvements in logistics management and related information systems have contributed to an uninterrupted supply of TB medicines. Between January 2014 and December 2015, the TB medicine stock-out rate decreased from 13% to 0% for second-line medicines and from 6% to 0% for first-line medicines.
- *Implemented an EWS to prevent stock-outs and wastage of TB medicines:* QuanTB dashboard alerts enable the NTP to predict and promptly take action to mitigate risks of stock-out or expiry of TB medicines. For example, the country identified overstocks of streptomycin and RHE and the need for a plan to avoid wastage of the medicines when the country phased out the retreatment regimen. The country communicated with the GDF to postpone pending shipments, identified countries in immediate need of the medicines, and coordinated cross-border transfers. The country has now completely phased out the two medicines

¹³ Mwatawala. S. SIAPS 2015 Zimbabwe trip report.

¹⁴ Mwatawala. S. SIAPS 2014 Zimbabwe trip report.

¹⁵ Mwatawala. S. SIAPS June 2016 Zimbabwe trip report.

Sample QuanTB Dashboards¹⁶



¹⁶ SIAPS. May. 2016. Monitoring TB Medicine Availability: Quarterly Report - Zimbabwe

Trend of Stock-outs of TB Medicines¹⁷

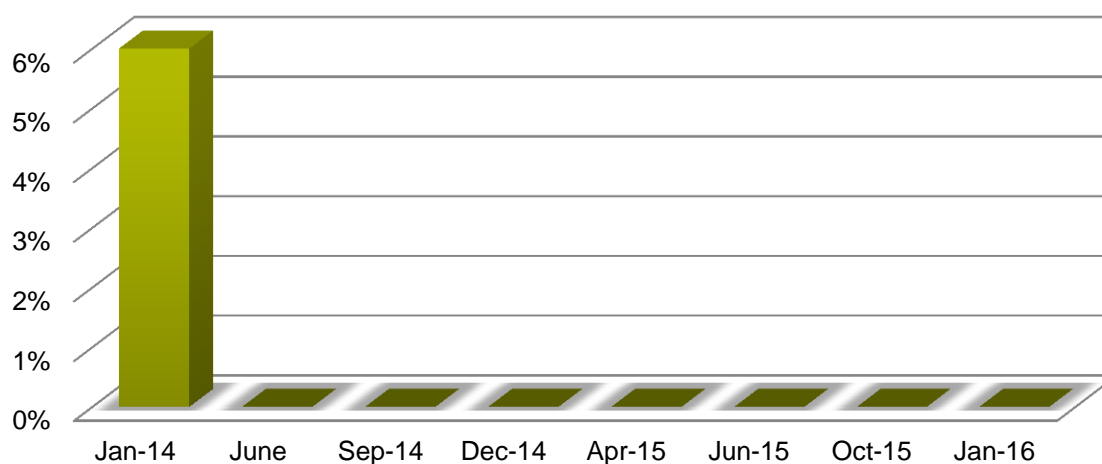


Figure 4. Percentage of stock-outs of first-line TB medicines

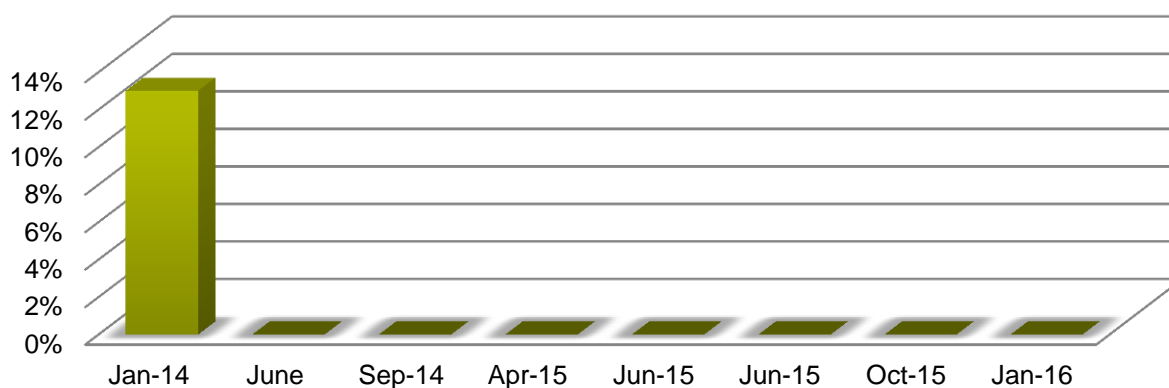


Figure 5. Percentage of stock-outs of second-line TB medicines

At the time of the evaluation, there had been no stock-outs of TB medicines since May 2015 and no alerts of medicines with less than three months of stock since September 2015^{18,19}. QuanTB forecasts have been used in pharmaceutical supply management plans for Global Fund applications²⁰.

- *Increased frequency of TB stock status monitoring:* Stock analysis was initially done biannually with no consideration of expiry dates; now it is done quarterly.

¹⁷ ibid

¹⁸ 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

¹⁹ 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.

²⁰ SIAPS May 2016 quarterly report.

- *Strengthened information systems and improved data quality and reporting for informed decision making*
- *Strengthened systems:* The QuanTB EWS has strengthened the information system, improved data quality and reporting, and improved decision making. The tool links patient and stock data to facilitate the early detection of potential over- and understocks. Stock status monitoring has helped to inform the redistribution of commodities within and between countries in the event of under- or overstocks. Capacity building has been strengthened through training and supportive supervision, and financial management systems have been improved through better estimation of national needs and less wastage.
- *Identified and addressed TB pharmaceutical supply management challenges through GDF monitoring missions and external TB program review:* GDF monitoring missions identified several TB supply chain challenges and recommended interventions to address them. SIAPS participated in and led the assessment of pharmaceutical supply management-related issues. Annual actions plans were developed and implemented based on the findings and recommendations.
- *Improved collaboration* among the MOH/NTP and other TB partners and stakeholders.
- *Improved services:* SIAPS TB technical assistance and QuanTB have contributed to improved TB medicines availability and TB control services.

Key Challenges and Lessons Learned

Challenges

- **Staff attrition:** Two people who were trained in 2014 were shifted to other responsibilities, which adversely affected the implementation of QuanTB.
- **Delays in getting case data on time:** Case data are reported quarterly from the peripheral to the national level, where they are fed into QuanTB biannually.
- **Overstocks and expiry of some TB medicines, mostly pediatric TB medicines, in some health facilities and lower-level medical store branches:** This is due mainly to the overestimation of TB patient targets in forecasting assumptions, deficiencies in the medical store distribution system, and a lack of redistribution mechanisms.
- **Inconsistencies in stock data from the central level from one quarter to the next indicate data quality issues.**
- **Although the EWS for TB medicines has been established, a well-structured mechanism to facilitate stock exchanges in cases of stock-outs or overstock needs to be in place at the regional level.** The country was able to identify potential expiries ahead of time. However, it was not easy to find countries in immediate need of the commodities, which led to some expiries.

- While QuanTB has helped mitigate the expiry of TB medicines, the problem still exists on a smaller scale.
- Although the availability of TB medicines has improved at the national level, there are still challenges in distributing commodities to the last mile.
- There are still issues with the quality and reliability of the medicine stock data that are fed into the system.

Lessons Learned

- Strong partnerships with in-country partners are key, particularly in countries without a SIAPS TB technical advisor, to 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. However, more effort is needed to address other factors contributing to overstock or stock-outs of TB medicines.
- Capacity-building refresher trainings on QuanTB and on improving data quality and reporting issues are needed. They help to address human resource issues and the adverse impact of ongoing staff attrition.
- For better coordination, collaboration, and results, TB partners supporting the implementation of QuanTB or related activities should consider embedding in-country field advisors within the NTP.

Gaps for Future Consideration

- Improve reliability/validity of medicine stock data
- Build in-country IT capacity to address QuanTB software problems as they arise. Conduct capacity-building refresher trainings on QuanTB and on improving the data quality and reporting issues.

CONCLUSION

With USAID/SIAPS technical assistance, Zimbabwe has successfully institutionalized and implemented the QuanTB EWS using a locally led, effective, and sustainable approach to improve forecasting, monitor stock, track expiries and stock-outs, make informed decisions, and take appropriate actions to close underlying pharmaceutical supply management gaps. Other key disease programs (e.g., HIV/AIDS, malaria) use their own tools. However, continued investment is needed to address the remaining gaps. The NTP and local stakeholders and partners should continue to collaborate to sustain the use of the tool.