Promoting the
QUALITY OF MEDICINES Plus

PQM+ Quarterly Report – Program Year 2, Quarter 2

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About PQM+

The Promoting the Quality of Medicines Plus (PQM+) Program is a five-year cooperative agreement (No. AID-7200AA19CA00025) between the U.S. Agency for International Development (USAID) and the U.S. Pharmacopeial Convention (USP) to sustainably strengthen medical product quality assurance systems in low- and middle-income countries (LMICs). PQM+ works to improve medical product quality through cross-sectoral and systems strengthening approaches and the application of international quality assurance standards across the pharmaceutical system. By sharing scientific expertise and providing technical support and leadership, PQM+ helps to create resilient and sustainable local health systems that ensure access to quality-assured essential medicines for HIV/AIDS, tuberculosis, malaria, neglected tropical diseases, and other infectious diseases as well as for reproductive, maternal, newborn, and child health.

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Contents

Acronyms

ANAB	American National Standards Society National Accreditation Board
API	active pharmaceutical ingredient
CAPA	corrective and preventive action
COVID-19	novel coronavirus of 2019
CRO	clinical research organization
CRP	collaborative registration procedure
CTD, eCTD	common technical document / electronic common technical document
DT	dispersible tablets (amoxicillin)
ELISA	enzyme-linked immunosorbent assay
EUA	emergency use authorization
FP	family planning
FPP	finished pharmaceutical product
GBT	Global Benchmarking Tool
GCP	Good Clinical Practice
GMP	Good Manufacturing Practice
GxP	Good Practice
HR	human resources
ISO	International Organization for Standardization
ISO/IEC	International Organization for Standardization/ International Electrotechnical Commission
LMIC	low- and middle-income countries
MCH	maternal and child health
MedRS	Medicines Risk-based Surveillance
MEL	monitoring, evaluation, and learning
MNCH	maternal, newborn, and child health
MOH	ministry of health
MoU	memorandum of understanding
MQCL	medicines quality control laboratory
MRA	medicines regulatory authority
MTaPS	Medicines, Technologies, and Pharmaceutical Systems program

NCL	National Control Laboratory
NMRA	national medicines regulatory authority
NTD	neglected tropical disease
PIC/S	Pharmaceutical Inspection Co-operation Scheme
PMI	U.S. President's Malaria Initiative
PMS	post-marketing surveillance
PPE	personal protective equipment
PQM+	Promoting the Quality of Medicines Plus program
PY1, etc.	Program Year 1, etc.
Q1, etc.	Quarter 1, etc.
QA	quality assurance
QC	quality control
QMS	quality management system
QRM	quality risk management
RB	risk-based
RBI	risk-based inspection
SATTA	Stepwise Assessment Tool Towards Accreditation
SF	substandard or falsified
SOP	standard operating procedure
TA	technical assistance
TB	tuberculosis
ToR	terms of reference
TWG	technical working group
USAID	U.S. Agency for International Development
USP	U.S. Pharmacopeia
WHO	World Health Organization
WHO-PQ	World Health Organization Prequalification

Executive Summary

The Promoting the Quality of Medicines Plus (PQM+) program sustainably strengthens medical product quality assurance (QA) systems in LMICs. By sharing scientific expertise and providing technical support and leadership, PQM+ helps create resilient local health systems that ensure access to quality-assured essential medicines for HIV/AIDS, tuberculosis (TB), malaria, neglected tropical diseases (NTDs), and other infectious diseases, as well as for reproductive, maternal, newborn, and child health (RMNCH).

The PQM+ program is pleased to present this quarterly report for Program Year 2, Quarter 2 (January 1 – March 31, 2021). This report summarizes the activities undertaken during this period and presents cumulative progress by objective and source of funding (USAID country Missions and USAID/Washington). All activities align with at least one of PQM+'s five program objectives, which the Results Framework details below.

Figure 1. PQM+ Results Framework

GOAL: SUSTAINABLY STRENGTHEN MEDICAL PRODUCT QUALITY ASSURANCE SYSTEMS IN LMICs				
Objective 1: Governance for medical product quality assurance systems improved	**Objective 2: Country and regional regulatory systems to assure the quality of medical products in the public and private sectors improved**	**Objective 3: Financial resources for medical product quality assurance optimized and increased**	**Objective 4: Supply of quality assured essential medical products of public health importance increased**	**Objective 5: Global medical product quality assurance learning and operational agenda advanced**
1.1 – Evidence-based medical product quality assurance legislation, policies, and regulations developed/ updated and/or implemented 1.2 – Systems that facilitate transparency and accountability promoted 1.3 – Fragmentation addressed and coordination across entities (public and private) with medical product quality assurance responsibilities promoted 1.4 – Links among the medical product quality assurance systems and other sectors developed and fortified	2.1 – Sustainable systems for market authorization/ registration, inspection, and licensing functions of medical product regulatory agencies improved 2.2 – Sustainable post-marketing surveillance systems and medical product quality control laboratory capacity strengthened 2.3 – Regional harmonization to strengthen medical product quality assurance regulatory capacity and networks supported 2.4 – Adoption of data standards and integrated information systems to support regulatory medical product quality assurance functions supported 2.5 – Competence, efficiency, and expansion of the medical product quality assurance workforce improved	3.1 – Allocation and use of investments for medical product quality assurance systems strengthening optimized 3.2 – Sustainable resources mobilized	4.1 – Pharmaceutical manufacturers for Good Manufacturing Practices (GMP) and medical product regulatory submissions/ dossiers supported 4.2 – Capacity to conduct bioequivalence studies for dossier submissions strengthened 4.3 – Capacity for market intelligence and analytics of public health pharmaceutical markets increased 4.4 – Health coverage schemes that incorporate medical product quality requirements supported 4.5 – Monograph development and use supported	5.1 – Evidence-based approaches and tools developed and/or applied 5.2 – Research and analysis to support medical product quality assurance systems strengthening conducted 5.3 – Advocacy on the importance of medical product quality assurance for public health, including the link between medical product quality and antimicrobial resistance, supported

This quarter, PQM+ presents its semiannual monitoring, evaluation, and learning (MEL) results across all program indicators. Annex A shows results for all country and technical programs with approved work plans during the first and second quarters of Plan Year 2.

Progress by Objective

Objective 1. Improve governance for medical product QA systems.

Regulatory systems play a critical role in any country, primarily concerned with enabling patient access to quality-assured, safe, and effective medical products, as well as preventing proliferation of poor-quality, unsafe products. When appropriately implemented, regulations

ensure public health benefits and the safety of patients, health care workers, and the community. Since its launch, PQM+ has supported the development or revision of at least 20 policies, laws, regulations, and guidelines on medical product quality assurance. During the second quarter, five measures (four of them new) in four countries (Ethiopia, Kenya, Nepal, and Uzbekistan) were submitted for adoption, and one (in Nepal) was adopted. In addition, PQM+ supported updates to four existing measures in four countries (Mali, Kenya, Senegal, and Uzbekistan).

This quarter, PQM+ supported the Ethiopian Food and Drug Authority (EFDA) and regional regulatory body (RRB) inspectors to review and update a checklist for the inspection of medicine retail outlets. PQM+ also coordinated with EFDA and RRBs to conduct a semiannual performance review meeting, during which more than 100 people reviewed progress in their regions, aligned regulatory practices, and planned future collaboration. EFDA and RRBs also held a joint steering committee meeting and signed a five-year joint plan of action.

This quarter, PQM+ also noted progress in several other countries, including:

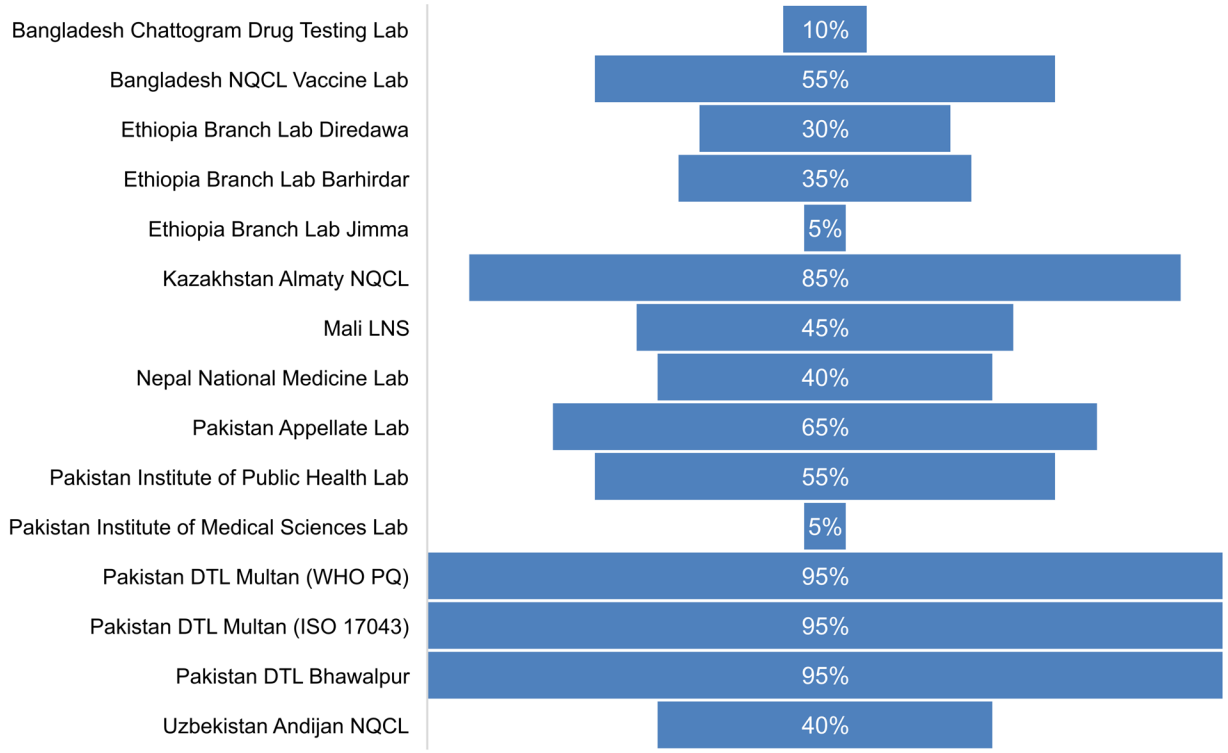
- In **Bangladesh,** the program organized a dissemination workshop with the Directorate General of Drug Administration (DGDA) on the National Quality Assurance Guideline for Medical Products, with 60 people participating.
- PQM+ continued to support **Kenya**'s Division of National Malaria Program with finalizing the malaria products quality assurance QA framework.
- PQM+ is working with **Liberia**'s Medicines and Health Products Regulatory Authority to develop its new five-year strategic plan**.**
- In **Mozambique,** PQM+ continued its activities with the Department of Drug Quality Check (DQC) to develop regulations that promote good laboratory practices.

Objective 2. Improve country and regional regulatory systems to assure the quality of medical products in the public and private sectors.

PQM+ supports countries to improve their regulatory systems, focusing on medical product market authorization, facility inspection, licensing, laboratory testing, and market surveillance. Currently, the program is working with 13 countries to strengthen their national quality control laboratories (NQCLs) to meet international standards. Achievement of international accreditation is a long process with many stages: PQM+ gap assessment of the laboratory and roadmap to accreditation; implementation of a quality management system (QMS) at the lab; readying the lab's equipment and facilities; readying the laboratory to conduct tests with the selected analytic methods; completion of proficiency test (PT)/interlaboratory test (ILT); successful close-out of corrective and preventive actions (CAPAs) from a PQM+ mock audit; and successful close-out of CAPAs from the accreditation body's audit.

PQM+ is starting to systematically report a laboratory's progress toward achievement of these milestones. Figure 2 shows the notable progress made with the majority of supported laboratories.

Figure 2. Percentage of the Milestones toward Accreditation/Prequalification Achieved by PQM+-Supported Labs as of March 2021



In **Pakistan**, PQM+ supported the development of the Antimicrobial Consumption (AMC) dashboard in the new Pakistan Integrated Regulatory Information Management System (PIRIMS) online platform. Access to AMC data is challenging in Pakistan, so PQM+ collaborated with the Drug Regulatory Authority of Pakistan to develop the dashboard to help pharmaceutical industry users submit data relating to production/batch details, sale details, distributors, resellers, and patients details through the PIRIMS portal.

Four countries (Benin, Burkina Faso, Ethiopia, and Nepal) have started to integrate the Stepwise Assessment Tool Towards Accreditation (SATTA) into their operations and train staff to use it. SATTA supports the assessment of different aspects of quality management systems of NQCLs. It incorporates elements of quality control standards from both ISO 17025 and WHO prequalification criteria, and it can be used to assist laboratory staff to identify areas for improvement in their pursuit of accreditation and prequalification.

PQM+ also worked with three Asian countries (Bangladesh, Kazakhstan, and Uzbekistan) to ramp up their use of the Pharmaceutical Inspection Co-operation Scheme (PIC/S) risk-based inspection planning model.

Objective 3. Optimize and increase financial resources for medical product QA.

To enhance financial sustainability, PQM+ promotes risk-based approaches that allow regulatory agencies to focus their resources on the highest-risk challenges. PQM+ technical guidance resulted in measurable financial gains in several countries. In **Nigeria**, for example, the program supported efforts by the National Institute for Pharmaceutical Research and Development (NIPRD) to shift to Nigerian accreditation and thus reduce its annual fee costs by

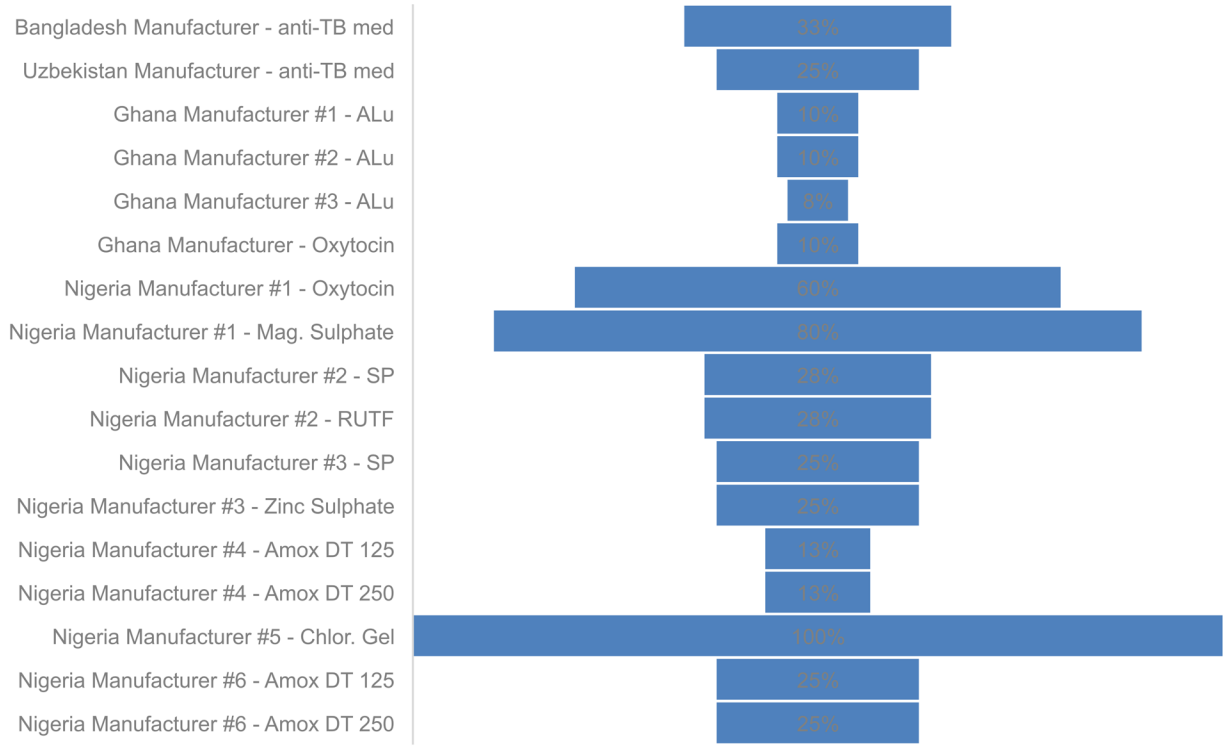
56 percent. In **Mozambique**, PQM+ advised the Department of Drug Quality Check to intensify its advocacy and follow up on the approval of the proposed quality control testing price list, which will enable the department to collect revenue that will support its operation.

Objective 4. Increase supply of quality-assured essential medical products of public health importance.

PQM+ is unique among USAID-funded global health programs in that it provides technical assistance to help manufacturers achieve international quality standards by adopting current Good Manufacturing Practices (GMP) in the production of quality-assured medical products.

PQM+ is unique among USAID-funded global health programs in that it provides technical assistance to help manufacturers achieve international quality standards by adopting current GMP in the production of quality-assured medical products. With PQM+ support, manufacturers are able to obtain marketing authorization or WHO prequalification for quality-assured medicines based on achievement of these standards. PQM+ provides a wide variety of support to manufacturers to help them obtain market authorization, broken down into the following major milestones: PQM+ GMP assessment and gap analysis; product and dossier development; GMP assessment CAPA completion; dossier compilation; dossier acceptance; PQM+ mock audit CAPA completion; WHO or medicines regulatory authority (MRA) audit CAPA completion; and WHO or MRA dossier review. Figure 3 shows the percentage of milestones achieved by many of the manufacturers supported by PQM+ at the end of Quarter 2.

Figure 3. Percentage of the Milestones toward Market Authorization Achieved by PQM+-Supported Manufacturers as of March 2021



In **Ethiopia,** the program helped agencies assess the status of local manufacturers that are implementing the GMP roadmap and assisted EFDA with developing and revising QMS

documentation to adhere to Global Benchmarking Tool (GBT) requirements. In **Ghana,** PQM+ fielded expressions of interest on manufacturing oxytocin injections and ferrous fumarate + folic acid supplements. The program's work in **Nigeria** included a range of assistance to manufacturers of medical products in the areas of maternal, newborn, and child health (MNCH), nutrition, and antimalarial supplies. PQM+ is starting to collect data on manufacturing output from manufacturers that have achieved market authorization with PQM+ support. For instance, in the last six months, manufacturers produced enough quality-assured amoxicillin DT, zinc sulfate, and cotrimoxazole to treat severe pneumonia, manage severe diarrhea, and prevent opportunistic infections in more than 100,000 children for each medicine. Other results are highlighted here.

In **Bangladesh**, PQM+ supported ACI Pharmaceutical with technical guidance and recommendations regarding its manufacture of quality anti-tuberculosis (TB) medicines. Program staff in **Nepal** assisted the Department of Drug Administration (DDA) publish an expression of interest on WHO prequalification technical assistance. It yielded applications from 13 manufacturers. In Uzbekistan, Nobel Pharmaceutical followed PQM+ guidance and took important steps in cross-contamination risk management.

Among its work on **NTDs**, PQM+ continued to support India's Medopharm Pharmaceutical Private Limited to produce quality-assured praziquantel 600 mg film-coated tablets toward achieving WHO-PQ.

Similarly, in Q2, WHO prequalified the clofazimine finished pharmaceutical product (FPP) to treat **tuberculosis**. PQM+'s predecessor program, PQM, provided technical assistance to the manufacturer for WHO prequalification. Finally, PQM+ completed the contractual agreement with a PQM+ **Core-FLEX partner**, Muhimbili University in Tanzania, for work in NTDs and maternal and child health.

Objective 5. Advance a global medical products QA learning and operational agenda.

PQM+ aims to advance a global medical products quality assurance (QA) learning and operational agenda that includes evidence-based approaches, research, and advocacy. In Q2, PQM+ advanced a learning agenda for quality assurance of medical products in **Bangladesh** and in its core tuberculosis health element work. Also in Bangladesh, the program assisted DGDA with onboarding 16 new staff members and developing an induction/orientation training plan to build new staffers' essential job performance competency. In its **tuberculosis** work, PQM+ conferred with USP technical experts about collaborating on the development of a searchable database for product information reports (PIRs). These PIRs, developed under the PQM program, were organized in the database to facilitate the retrieval of specific priority products information by manufacturers and regulators. PQM+ is working with the USP team to explore potential updates to the PQM website in terms of enhanced search functions for the PIRs.

Health Elements

Maternal and Child Health

This quarter, PQM+ finalized the English and French versions of job aids to assist with chlorhexidine gel 7.1% and oxytocin dossier preparation and laboratory testing. PQM+ also translated into French the guidance document on the risk-based categorization of MNCH products. This will facilitate the development of sampling plans using the Medicines Risk-based

Surveillance (MedRS) tool in countries. The Liberia Medicine and Health Product Regulatory Authority is using this manual to develop its PMS sampling protocol for MCH products, which it plans to implement in the coming months for MCH medicine sampling to detect and remove substandard and falsified medicines from its market.

To improve USAID staff understanding of basic regulatory and quality considerations for medical devices used in MCH, PQM+ also drafted a plan on the medical devices regulatory workshop for USAID staff, scheduled for May 25 and 26, 2021.

Neglected Tropical Diseases

PQM+ collaborated closely with its Core-FLEX partner, Muhimbili University in Tanzania, on preliminary work on the NTD market analysis, seeking to identify opportunities for more proximate local manufacturing capacity for active pharmaceutical ingredients (APIs) and FPPs for seven NTD products in the Africa and Asia region. Muhimbili University has commenced the desk review of manufacturers and is drafting survey questions to conduct a market analysis for the Africa region. PQM+ is finalizing contracting agreements with another Core-FLEX partner, Mahidol University in Thailand, that will conduct the NTD market analysis for the Asia region.

Tuberculosis

In August 2020, the U.S. Food and Drug Administration reported that some samples of two anti-TB medicines, rifapentine and rifampicin, contained nitrosamine impurities that were higher than acceptable intake limits. This triggered concerns about the global supply of these medicines. To aid the industry, as well as regulators specifically in LMICs in addressing this challenge, in Q2, PQM+ continued developing analytical methods for the detection of nitrosamines impurities in rifapentine and rifampicin with the goal of making them suitable for laboratories in LMICs. In Q2, PQM+ started validation of the developed analytical methods. Once validation is complete, the analytical methods will become public for interested stakeholders.

COVID-19

This quarter, PQM+ provided extensive technical assistance to the governments of Bangladesh, Pakistan, and Serbia to support their response to the ongoing COVID-19 pandemic. In Serbia, PQM+ is working with the government to explore options for the external evaluation and market entry of the enzyme-linked immunosorbent assay (ELISA) test kit produced by the Institute for the Application of Nuclear Energy (INEP) at the University of Belgrade to regional and/or international markets. INEP and the University of Belgrade are also exploring investing in and expanding manufacturing if sufficient market opportunities exist.

In Pakistan, the team is implementing a broad scope of work to help ensure the quality and supply of medical products related to COVID-19, including: post-marketing surveillance of medical products; building NQCL capacity to test medical products; supporting the Drug Regulatory Authority of Pakistan with Emergency Use Authorization for COVID-19 related medical products, including vaccines; and boosting manufacturer capacity to produce and test medical products.

As a part of PQM+'s support to private sector laboratories for personal protective equipment (PPE) testing, the team joined DRAP officials to compile a document on "Conditions and Accountabilities Criteria" for independent and outsourced PPE testing labs that intend to serve as a third-party lab for PPE manufacturers. This document will help define prerequisites for any

third-party PPE lab to submit its application for the third-party testing license and will assist in setting standards to evaluate license applications based on international best practices.

Partners

PQM+ revised its initial approach to partnership engagement and communication based on lessons learned during partner onboarding. This has resulted in the preparation of internal job aids to facilitate the partner engagement process. Additional mechanisms to facilitate bidirectional communication with partners are undergoing review. The goal is to have feedback mechanisms in place to regularly assess programmatic, technical, and operational elements within the consortium.

In Q2, Core-FLEX partners began participating in routine internal PQM+ technical team meetings. Partners' participation in these meetings has allowed them to have a deeper understanding of PQM+ approaches and this is beginning to transcend into a feedback mechanism to improve technical approaches. This is consistent with the bidirectional communication approach with partners mentioned in Q1. In addition to participation in technical team meetings, next quarter, partners will begin to participate in PY3 work planning processes and the communities of practice where best practices and updates to technical approaches are shared.

Activities and Progress for Cross-Bureau Activities

PQM+ Cross-Bureau-funded activities primarily focused on raising awareness about the importance of medical product quality and developing new approaches to strengthen medicines regulatory functions. PQM+ Cross-Bureau activities funded by the Office of Health Systems (OHS) fall under the following program objectives:

- Improve country and regional regulatory systems to assure the quality of medical products in the public and private sectors;
- Optimize and increase financial resources for medical product QA; and
- Advance a global medical products QA learning and operational agenda.

The PY2 workplan for OHS Cross-Bureau activities was approved in November 2020. During the second quarter, PQM+ completed the following activities.

Risk-Based Inspection Methodology Framework

The risk-based inspection (RBI) methodology framework covers regulatory agencies inspectorate activities in GMP, Good Clinical Practice (GCP) inspections for clinical research organizations (CROs) and bioequivalence centers, and Good Distribution Practice (GDP) inspections. This quarter, PQM+ started developing and testing a standardized risk-based inspection tool (MS Excel-based) which computes the risk level across the GMP systems. The Excel-based tool will be further refined, and the finalized version will be available on a platform with a streamlined user interface to enable broad-based use. The systems include QMS, materials, production, physicochemical properties, microbiology, water, heating, ventilation, and air conditioning (HVAC), and validation documentation. PQM+ also began drafting the guidance document on risk-based inspections to complement the tool for risk-based GMP inspection.

PQM+ risk-based GMP inspection approaches and tools are harmonized with that of PIC/S and WHO.

PQM+ also continued desk reviews of the GDP inspection framework and identified the main reference and related sources from WHO, U.S. Food and Drug Administration (FDA), World Bank, and EU Good Distribution Practice (GDP) guidelines. PQM+ also identified and defined key parameters and associated risks for facilities (wholesale, import/export, Central Medical Stores, health facilities, retail outlets) vis-à- vis their geographical location and complexity of their supply/distribution chains.

PQM+ leverages USP's internal groups, including the Digital and Innovation group and the Pharmaceutical Supply Chain Center, for possible application of certain data on, for example, supply chain facilities, complexity, and risk that the USP Pharmaceutical Supply Chain Center project could apply to the RB inspection framework and tool.

MedRS Tool

This quarter, PQM+ completed the initial application design phase and conducted test runs of the enhanced version of the MedRS tool, and progressed to the development phase with enhanced functionality, features, and capability of the online /web-based application.

PQM+ also finalized necessary changes and corrections and addressed critical limitations, including allowing the tool to accommodate more sampling cities and facilities in the Excel offline version. PQM+ also incorporated these changes to the online MedRS tool version.

PQM+ secured an interim server solution to host test runs of the development phase of the online tool.

Model to Estimate the Economic and Health Impact of SF Medicines

This quarter, PQM+ contractually engaged the University of Washington (UW), the University of North Carolina (UNC), and Harvard University, reaching agreement on their roles and responsibilities as members of an advisory group. The group's members play a critical role in developing and testing the model, reviewing major outputs, identifying relevant resources and data sources, helping resolve methodological challenges, and otherwise advise on the substandard and falsified (SF) model and its application.

UNC shared its first deliverable, a literature review of all the previous models, which PQM+ shared with the advisory group for feedback.

PQM+ also identified countries and medicine classes to use in developing and testing the model and initiated the preliminary process of engaging country Missions. The first kickoff meeting took place February 10 with the intention of briefing the advisory group on the activity, its rationale, and its process. Following the meeting, UW shared its draft conceptual framework. At the first advisory group meeting on March 29, members discussed UNC's literature review and UW's conceptual framework.

PQM+ also engaged WHO's Office of Incidents and SF Products (ISF), Regulation and Safety in this activity to build on their 2017 study aimed at increasing general awareness of the prevalence of SF medicines and their likely costs.

Common Standards for Pharmaceutical Information Management

PQM+ contributed to reviewing and assigning focal point(s) for areas of expertise in the implementation plan and accompanying strategy documents developed by Medicines, Technologies, and Pharmaceutical Systems program (MTaPS). PQM+ also reviewed and provided comments on the "Outline of Regulatory Information Management System" desk review report.

In preparation for the deployment of the information management systems (IMS) common standards, PQM+ presented a demo version of the integrated regulatory management information system, or IRIMS (using the Pakistan version, PIRIMS), to MTaPS in return for their demo on PharmaDex.

Pharmaceutical Systems Strengthening Course

PQM+ updated training materials on quality assurance and shared them with MTaPS, which is leading the activity and is in discussions with USAID to determine a date for the course.

Webinar Series

PQM+ began preparing the second webinar, planned for Q3, and shared a draft scope of content with USAID for review and approval. PQM+ also engaged technical experts to begin preparing the webinar. The proposed topic is strengthening national QC labs.

Priority Activities for Next Quarter

- Risk-based inspection
    - Finalize the structure and content of the guidance document on RBI;
    - Solicit the interest of select MRAs in joining an expert panel/working group to develop the RBI guidance document and an RBI tool for LMICs; and
    - Identify an information technology (IT) application developer to create the RBI tool.
- MedRS
    - Conduct internal test runs and revise the tool as necessary;
    - Field test the enhanced online MedRS in two PQM+ countries; and
    - Launch the final product for full deployment at the country level.
- SF medicines costing model
    - Convene the expert advisory panel to agree on a conceptual framework and further define the parameters, variables, assumptions, and outputs of the SF costing model and
    - Engage PQM+ chiefs of party and USAID Missions in the pilot countries in the early stages of the work in those countries.
- Common Standards for Pharmaceutical Information Management Systems
    - Begin compiling common standards related to medicine quality.
- Webinar Series
    - Develop and deliver the next webinar.

Activities and Progress by Country and Regional Buy-Ins

In Q2, the PQM+ program was working with 18 countries (Bangladesh, Benin, Burkina Faso, Burma, Central Asia Republic/Kazakhstan, Ethiopia, Ghana, Guinea, Kenya, Liberia, Mali, Mozambique, Nepal, Nigeria, Pakistan, Senegal, Serbia, and Uzbekistan) and the Asia Regional Bureau. PQM+ also worked on COVID-19 activities in Bangladesh, Pakistan, and Serbia, and received additional COVID-19 funding from USAID Missions in Bangladesh, Ghana, Pakistan, and Uzbekistan to support vaccine work, as well as finalized the work plan for COVID-19 funding received in September 2020 from the Office of Health Systems for Cross-Bureau COVID-19 work. The program is in various stages of work planning in four additional countries (DRC, Madagascar, Rwanda, and Tajikistan). PQM+ also received core funding for Cross-Bureau, MCH, NTD, and TB activities. The sections that follow summarize progress on country and regional buy-ins.

Africa Region

Benin

As is the case in many French-speaking West African countries, the medicines regulatory system in Benin is fragmented. A single agency does not perform all regulatory functions. Moreover, the laws, ordinances, and decrees that make up the regulatory framework are largely outdated. In some cases, important regulatory functions such as post-marketing surveillance of products are lacking, not well defined, and/or not implemented. This allows falsified medical products to enter the supply chain, exposing unsuspecting consumers to illicit, unauthorized, or poor-quality medicines.

The main regulatory body is the Beninois Agency for Pharmaceutical Regulation, *l'Agence Béninoise de Régulation Pharmaceutique* (ABRP), formerly known as the Directorate of Pharmacy, Medicines, and Diagnostics. ABRP develops and implements national pharmaceutical policy and regulations, registers medicines, approves licenses, inspects pharmaceutical establishments, and controls the advertisement and promotion of medicines, including herbal and traditional medicines. The national quality control laboratory, *l'Agence Nationale de Contrôle de la Qualité des Produits de Santé et de l'Eau* (ANCQ), collects and tests medicines at the points of entry into the country (land, sea, and air) or at the request of any national institution.

PQM+ activities in Benin began in PY2, Q2. PQM+ is helping ANCQ strengthen its QMS to achieve international recognition (ISO/IEC 17025 or WHO prequalification). This would assure the reliability of testing and increase the public's confidence in ANCQ test results.

In PY2, PQM+ is working to:

- Improve country and regional **regulatory systems** to assure the quality of medical products in the public and private sectors.

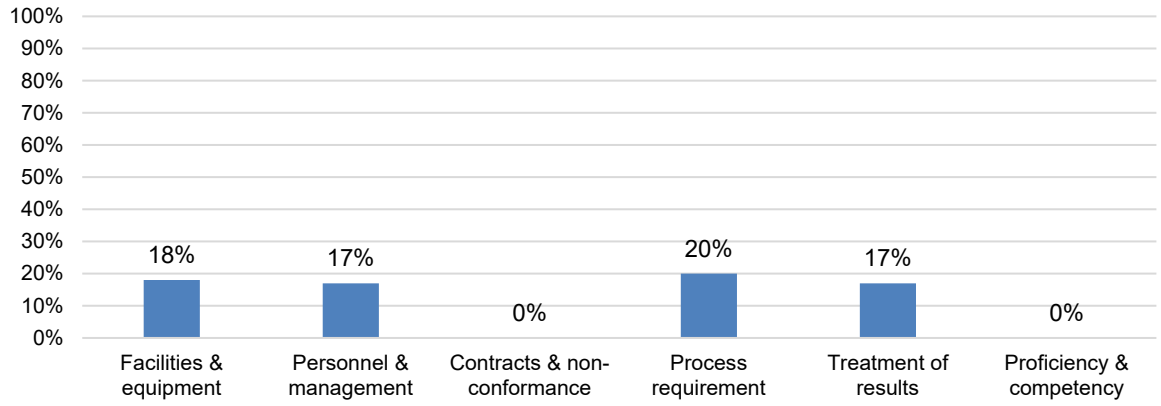
Objective 2: Country and regional regulatory systems to assure the quality of medical products in the public and private sectors improved

In Q2, PQM+ introduced ANCQ management to the SATTA and trained 11 technical personnel (seven men and four women) to use it to conduct internal audits. Using the tool to conduct

routine audits at ANCQ will assist laboratory staff in identifying areas for improvement as they pursue ISO/IEC 17025 accreditation and WHO prequalification. The training centered on corrective and preventive actions to enable ANCQ's quality assurance team to develop corrective action plans after internal audits.

During the quarter, ANCQ management requested that PQM+ conduct a baseline assessment of the laboratory using the SATTA tool per the ISO/IEC 17025 standard. A previous assessment used the WHO standard for prequalification of pharmaceutical quality control laboratories. The baseline assessment of ANCQ revealed significant work needed to move the lab toward ISO/IEC 17025 accreditation. PQM+ and ANCQ will develop and finalize a roadmap to ISO/IEC 17025 accreditation detailing necessary interventions in upcoming quarters, and PQM+ will base its support to ANCQ during subsequent program years on this roadmap.

Figure 4. SATTA Results, Benin NQCL (FY2021 Q2)



Priority Activities for Next Quarter

PQM+ plans to:

- Conduct a baseline assessment of ANCQ to assist the agency's senior managers in developing a roadmap for ISO/IEC 17025:2017 accreditation.
- Establish a Post-Marketing Surveillance Technical Working Group (PMS-TWG) in collaboration with ABRP and ANCQ.

Burkina Faso

Malaria is one of Burkina Faso's primary causes of morbidity and mortality. In 2018, the Ministry of Health (MOH) estimated 12 million confirmed cases and 3,974 deaths. The U.S. President's Malaria Initiative (PMI) supported Burkina Faso's National Malaria Control Program (NMCP) implement its Malaria National Strategic Plan 2016–2020, which aimed for a 40 percent reduction in the incidence of and deaths from malaria by 2020.

The country's Directorate General of Pharmacy and Laboratory (ANRP) is the national pharmaceutical regulatory authority. It coordinates all regulatory actions in the pharmaceutical sector, including post-marketing surveillance of products. The Directorate of Market Surveillance and Quality Control of Health Products is the technical body in charge of QA/QC. A functional PMS program was established in the ANRP in 2018. ANRP is collaborating with the Directorate for the Control of Drugs and Non-Food Products (DCM/PNA), which falls under the *Laboratoire*

National de Santé Publique (LNSP, the National Public Health Laboratory), to sample medical products for post-marketing surveillance.

PQM+ activities kicked off in Q2. PQM+ is working with the main medicines quality stakeholders, ANRP and LNSP, and others to adopt a risk-based, sustainable approach to PMS; strengthening LNSP as it prepares for ISO 17025 accreditation; and assisting ANRP in improving collaboration among key stakeholders to strengthen regulatory systems and improve the quality of medicines on the Burkina Faso market.

In PY2, PQM+ is working to:

- Improve **governance** for medical product quality assurance systems.
- Improve country and regional **regulatory systems** to assure the quality of medical products in the public and private sectors.

Progress by PQM+ Objective

Objective 2: Country and regional regulatory systems to assure the quality of medical products in the public and private sectors improved

To strengthen the QMS of LNSP's Medicine Quality Control Laboratory, PQM+ introduced SATTA to LNSP's management in Q2 and trained 14 technical personnel (seven men and seven women) to use it to conduct internal audits. Using the tool to conduct routine audits at LNSP will help laboratory staff identify areas for improvement in preparation for ISO/IEC 17025 accreditation and, later, WHO prequalification. PQM+ also trained quality assurance staff on corrective and preventive actions and quality risk management to enable them to develop robust corrective action plans after internal audits and better manage risks to the integrity of their QMS.

In Q1, PQM+ initiated work to establish a national PMS-TWG. Implementation and management of risk-based PMS activities benefit from a diverse (multisectoral) approach. PQM+ drew up a list of relevant organizations, which ANRP officially invited to nominate representatives for the group. In Q2, ANRP and LNSP, with assistance from PQM+, inaugurated the new PMS-TWG. The working group comprises representatives from ANRP, LNSP, national disease programs (malaria control, tuberculosis, neglected tropical diseases), the Health Sector Program to Fight AIDS and Sexually Transmitted Infections, the Central Purchasing Center for Generic Essential Drugs and Medical Consumables, the National Order of Pharmacists, the General Directorate for Access to Health Products, universal health coverage administration, and the national medicines wholesalers' organization. At its first meeting, the TWG elected its leadership, with ANRP's director general serving as the overall supervisor, LNSP's director as president, and the head of ANRP's PMS department as vice president. The role of rapporteur will rotate, and the group will designate a member to assume this role for each meeting. PQM+ will continue to support the secretariat in convening meetings, training the group on the use of the MedRS tool to develop the RB-PMS protocol, providing training on medicines samples, and offering supportive supervision to the group to implement risk-based PMS.

During Q1, PQM+ conducted a desk review to assess the extent of collaboration between LNSP and ANRP. Later, at a five-day workshop in Ouagadougou in Q2 (March), PQM+ helped the two agencies develop a memorandum of understanding (MoU). Although LNSP and ANRP work together naturally, no official document in line with GBT RS01.03 is in place to outline what they should collaborate on and how. Unit managers from both agencies attended the workshop. The MoU they drafted addresses planning for the quality control of health products (pre-registration

and post-marketing surveillance as well as one-off investigations), procurement and management of reference standards, terms of use of international and internal pharmacopeias (in-house methods), and financial modalities for quality control in Burkina Faso.

Priority Activities for Next Quarter

PQM+ plans to:

- Review LNSP's draft SOP for using SATTA to conduct internal audits;
- Supervise an internal audit of LNSP using SATTA;
- Train the PMS-TWG on the use of the MedRS tool and organize a workshop to use the tool to develop the RB-PMS protocol;
- Validate the draft MoU between LNSP and ANRP; and
- Collaborate with ANRP and LNSP to organize a national quality assurance/quality control stakeholders' workshop.

Ethiopia

The use of poor-quality medical products can endanger treatment, erode public confidence in health programs, and may contribute to the development of antimicrobial resistance, which results in more expensive treatment with unpredictable outcomes. The global situation at present is putting many lower-and middle-income countries, including Ethiopia, at risk of having SF medical products because of the lack of effective regulatory oversight and product quality assurance/quality control systems. Furthermore, Ethiopia still covers more than 85 percent of its demand for essential medicines through imports. The challenge of increasingly frequent public health emergencies means that overdependence on imports for lifesaving medicines is a substantial and still-growing threat to public health.

In Ethiopia, authorized bodies at the federal and regional levels regulate medicines. At the federal level, the EFDA registers all medical products; licenses and regulates the production, import, storage, and distribution of transregional medical products; and conducts quality control testing and post-marketing surveillance of products circulating in the local market. All other regulatory activities that are not mandated to EFDA fall under the jurisdiction of regional government and city administration regulatory bodies. But the lack of clarity in mandates between EFDA and the regional regulatory bodies (RRBs), the absence of a formal reporting relationship between EFDA and those regulators, and the latter's poor capacity compromise proper regulatory oversight of medical products circulating in Ethiopia.

PQM+ contributes to the achievement of Ethiopia's national health targets and goals by supporting efforts that ensure the availability of quality-assured, safe, and efficacious medicines to address Ethiopians' priority health needs. PQM+ has been working with EFDA and the regional regulatory bodies to build capacity to monitor medical product quality across the supply chain and strengthen their collaborative working relationship to create synergy in executing their respective mandates more efficiently. PQM+ also helps build local manufacturers' capacity to meet international standards, ensuring that locally produced medical products are of good quality and not harmful to end users.

In PY2, PQM+ is working to achieve four objectives:

- Improve governance for medical product quality assurance systems.

- Improve country and regional regulatory systems to assure the quality of medical products in the public and private sectors.
- Increase the supply of quality-assured essential medical products of public health importance.
- Optimize and increase financial resources for medical products quality assurance

This quarter, PQM+ provided technical assistance to EFDA in conducting a semiannual performance review meeting with RRBs, providing training-of-trainers (TOT) to 126 inspectors from the regions; reviewing and validating the directive for medicine GMP inspection procedures; conducting supportive supervisions to three branch laboratories; training 32 laboratory staff on various topics, including RB-PMS and MedRS; conducting GMP inspection of six manufacturers; and developing and/or drafting seven SOPs.

Progress by PQM+ Objective

Objective 1: Governance for medical product quality assurance systems improved

As part of building the capacity of EFDA and regional regulatory body inspectors, PQM+ has provided technical assistance to review/update the checklist for inspection of medicine retail outlets, and preparation is underway to train inspectors, with an actual inspection to follow. PQM+ also supported EFDA and RRBs to conduct a semiannual performance review meeting, which precedes the joint steering committee meeting. Each regulatory body presented its performance against its plan for discussion with all participants. More than 108 regulators (21 female) participated from 12 regions. This platform gave regulators an opportunity to review progress in their regions, align their regulatory practices with others, and learn from one another. The meeting ended with an agreement to collaborate to address future challenges.

In the joint steering committee meeting, EFDA and regional regulators signed a five-year joint plan of action and agreed to work closely to ensure that they align and coordinate activities regarding food and medicine regulation. Overall, these platforms will help clarify roles and responsibilities between EFDA and RRBs, improving uniform implementation of national guidelines and standards, creating consensus on information sharing, and promoting consistent enforcement of regulatory requirements for medical products, which is essential to safeguard the public from the effects of substandard and falsified products and illegal business practices.

In addition, PQM+ provided technical assistance to EFDA in providing TOT for regulators from RRBs and EFDA branch offices on regulatory inspection. The training topic covered by PQM+ was “Medicine and Medical Devices Market Survey Including PMS.” EFDA’s sponsorship of the training signifies the importance of sharing/ optimizing the use of resources to advance good regulatory practices. Participants included 126 people from 11 regions; they are expected to roll out the training in their regions to advance regulatory inspection practices.

PQM+ supports the generation of evidence to help policymakers make informed and timely decisions in reducing importation barriers for local manufacturers. The program gathered the evidence needed as part of the assessment on local manufacturers and final report, which it shared with relevant stakeholders and partners. An initial consultative meeting took place in Q1 with government officials from eight critical stakeholders, including EFDA, Ethiopian Pharmaceuticals Supply Agency, the MOH, the Food, Beverage, and Pharmaceuticals Development Institute (FBPDI), and the Ethiopian Pharmaceutical Manufacturers Association. This quarter, FBPDI presented the findings of the assessment to the national steering

committee responsible for monitoring implementation of the National Strategy and Plan of Action for Local Production of Pharmaceuticals (NSPA-Pharma). The Ministry of Trade and Industry (MOTI) chairs the committee, with the MOH as co-chair. The members acknowledged the challenges that the local pharmaceutical industry faces. The MOTI and MOH indicated that the information will strengthen the ongoing discussion with relevant authorities, including the national bank, to address those issues. In the meantime, participants suggested that the local industries make an extra effort to improve their GMP status and become competitive at both the local and international levels. The evidence generated through the assessment combined with results of different consultations should help policymakers make decisions that enable local manufacturers to produce essential medicines that the local market needs.

Objective 2: Country and regional regulatory systems to assure the quality of medical products in the public and private sectors improved

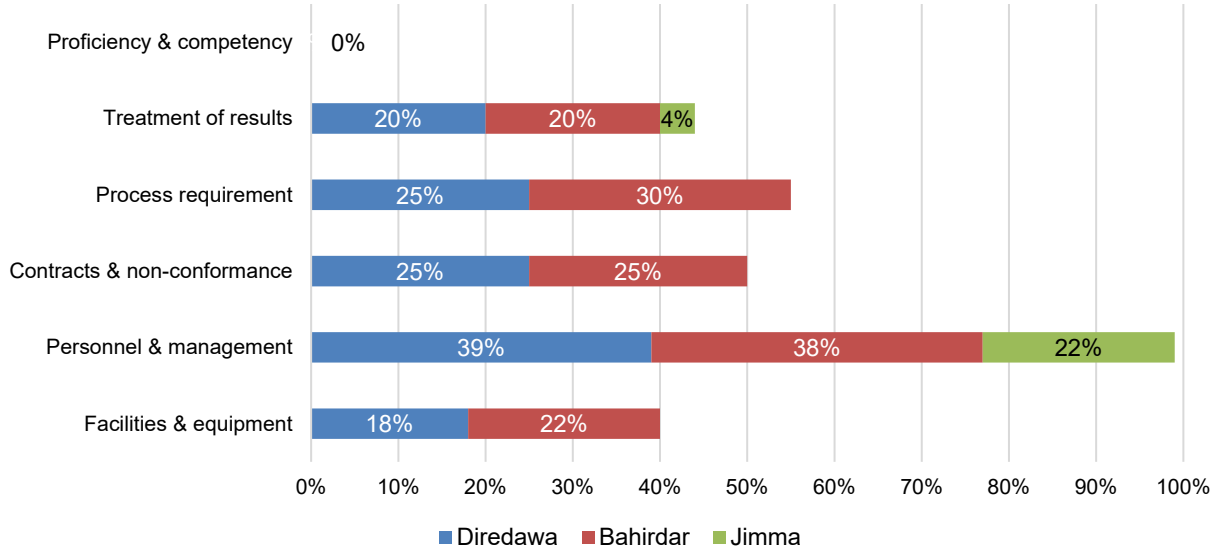
The lack of efficiency and poor-quality inspection of manufacturing facilities could limit access to quality-assured essential medicines. Legislation governing this function should facilitate speedy approval and certification of pharmaceutical manufacturers that comply with the current Good Manufacturing Practice (cGMP) requirements. This quarter, PQM+ supported EFDA in reviewing and validating the directive for medicine GMP inspection procedures. A three-day consultative workshop took place in Adama with 18 regulatory experts participating. The experts reviewed and updated the contents of the directive to align it with international best practices. Their review outlines the detailed requirements for each type of inspection. It also clarifies the conditions for accepting the CAPA program during the pandemic until onsite inspection is possible, as well as the conditions for remote inspection and time allocated for each type of inspection.

After incorporating all inputs from the workshop, the inspection directorate submitted the directive to EFDA management for approval. This directive is expected to improve the practice of GMP inspection, which in turn facilitates the speedy market authorization of medicines and hence access to quality essential medicines.

PQM+ also provided technical assistance to draft a guidance document for facilitating the inspection of cold chain facilities, including those for vaccines. The document details the requirements for cold chain facilities and their operation. The requirements cover broad areas, including equipment, human resources, documentation, and practice. The regulatory inspectors use this requirement to determine the compliance of the cold chain facilities to the minimum standards. This document is critical in helping regulators properly monitor the cold chain systems in the country and ensure the sustained quality of medical products that are sensitive to temperature fluctuations until the products reach the end user.

In Q2, PQM+ collaborated with EFDA to conduct supportive supervisions of three of five EFDA branch laboratories: Bahirdar, Diredawa, and Jimma. The visits provided an opportunity to verify the results of the self-assessment that branch labs conducted using SATTA, as well as to identify additional gaps in the ISO accreditation process. PQM+ used all the inputs obtained from the visits and self-assessment findings to develop a branch-specific road map toward accreditation, which is in progress. A team of experts from PQM+ and EFDA conducted the supportive supervisions in January. The team used this opportunity to mentor and build capacity of staff at the branch laboratories in the proper use of SATTA to enable them to self-audit their facilities and practices.

Figure 5. SATTA Results, Ethiopia Branch Laboratories (FY 2021 Q1)



To prepare the EFDA's branch laboratories for ISO 17025:2017 accreditation, PQM+ provided two trainings to 12 laboratory analysts, including eight technical staff from the four branches and four new technical staff from the main laboratory at EFDA headquarters. Topics included a hands-on training on selected analytical test methods (March 8 to 12) and QMS document preparation and implementation (March 15 to 19). PQM+ conducted pre- and post-tests for the training and measured the knowledge transfer participants achieved. The average score during the pre- and post-tests were 55 percent and 86 percent respectively, indicating an aggregate knowledge gain of 31 percent.

During the quarter, PQM+ trained 20 staff (seven female) from EFDA headquarters and branches on the principles of RB-PMS and the MedRS tool, which took place from March 1 to 5 in Debrezeit. The training will help the regulatory authority select medicines, geographical locations, cities, and facilities based on risk level. The training pre-identified high-risk medicines, geographical locations, cities, and facilities. The input from the MedRS analysis will aid the development of the PMS protocol for the year. PQM+ conducted a pre- and post-test to measure knowledge transfer. The average score during the pre-test was 35 percent, while it was 71 percent in the post-test, indicating an aggregate knowledge gain of 36 percent. As part of the program's support for implementing the annual PMS program for the current year, PQM+ initiated procurement of laboratory supplies required for testing products identified using the risk-based approach.

Objective 4: Supply of quality-assured essential medical products of health importance increased

PQM+ helped the FBPDI and EFDA assess the status of local manufacturing industries implementing the GMP roadmap. As with foreign manufacturers, local pharmaceutical industries must comply with GMP requirements in producing medicines, and their products should fulfill the desired level of quality specifications. A few years ago, EFDA developed a GMP roadmap and started monitoring local manufacturers' progress toward meeting those requirements. Following each assessment, local manufacturers submitted a CAPA to EFDA based on the

inspection findings. The basis of the current assessment was a CAPA submitted during the previous inspection, to determine whether the manufacturers implemented the CAPA based on their promises and to understand the manufacturers' status. Of nine manufacturers that submitted the CAPA, only six companies received an assessment. One manufacturer was shut down, one stopped production, and the final one did not receive an assessment due to security concerns. PQM+ is compiling the findings of this assessment and will deliver the consolidated report next quarter.

Addressing the gaps identified by WHO's GBT is a key priority to help EFDA achieve its goal of becoming a WHO-listed authority (Maturity Level 3 or higher). PQM+ is providing technical assistance to EFDA by developing and revising relevant QMS documentation in compliance with the GBT requirements. This quarter, PQM+ developed one new SOP and updated six others. The program has also provided technical assistance to the Medicine Facility Licensing and Inspection Directorate of EFDA in compiling/preparing QMS documentation for submission to the Ethiopian National Accreditation Office for ISO/IEC 17020 accreditation. Achieving compliance toward GBT requirements and becoming a WHO-listed authority signals that EFDA has the competencies needed to properly regulate medicines from product development and manufacture to patient use, which will ultimately help safeguard public health in Ethiopia.

Priority Activities for Next Quarter

PQM+ plans to:

- Develop and finalize the roadmap for ISO 17025:2017 accreditation of EFDA's branch laboratories.
- Develop a PMS protocol and collect PMS samples.
- Write a consolidated assessment report on the status of local manufacturers implementing the GMP roadmap; and
- Support the joint inspection of medicine retail outlets by EFDA and RRBs.

Ghana

Malaria is endemic in Ghana and a major cause of illness and death in the country, particularly among children and pregnant women. In addition, maternal mortality is a pressing health concern. Postpartum hemorrhage is the leading cause of maternal death in Ghana, one of 25 countries that account for more than 66 percent of the world's maternal and child deaths.[1]

WHO recommends oxytocin as a first-line treatment for postpartum hemorrhage. Through technical assistance from the PQM+ predecessor program, PQM, USAID/Ghana focused on building the capacity of the Ghana Food and Drugs Authority (GFDA) to monitor the quality of maternal and child health commodities such as oxytocin. GFDA, now a WHO Maturity Level 3 medicines regulatory authority, has made great strides in the survey of antimalarials, with a failure rate of less than 10 percent in the last survey. But the challenge of substandard, falsified, and unregistered medicines, including those used to treat postpartum hemorrhage, persists.

Building on PQM's work, PQM+ is working with the GFDA and other stakeholders to: adopt a risk-based sustainable approach to PMS; support a local manufacturer to achieve WHO prequalification for artemether/lumefantrine tablets to treat malaria; collaborate with GFDA to assess progress by the three other manufacturers audited under PQM in 2019; identify potential

[1] https://www.usaid.gov/what-we-do/global-health/maternal-and-child-health/priority-countries

local manufacturers of oxytocin; and collaborate with the Ghana Health Supply Chain-Procurement and Supply Management (GHSC-PSM) to start preparing the local pharmaceutical industry and the GFDA for the adoption of GS1 standards.

In PY2, PQM+ is working to:

- Improve country and regional regulatory systems to assure the quality of medical products in the public and private sectors and
- Increase the supply of quality-assured essential medical products of public health importance.

Progress by PQM+ Objective

Objective 2: Country and regional regulatory systems to assure the quality of medical products in the public and private sectors improved

In Q1, PQM+ began laying the groundwork for a national PMS-TWG by drafting a list of relevant organizations for internal FDA deliberations. The program also shared generic terms of reference with the FDA for it to review and adapt to the Ghana context and to seek input from other TWG members. In Q2, PQM+ worked with GFDA to reach consensus on the format the PMS-TWG would take in Ghana, since the GFDA already operates a Committee for Substandard and Falsified (SF) medicines. The committee's main mandate is to ensure enforcement of regulatory actions against SF medicines; thus, it mostly comprises law enforcement institutions and lacks representation from disease programs, medical stores, or pharmaceutical associations that are critical to planning and implementing routine PMS activities. As a result, GFDA agreed to develop a subcommittee under this SF committee that would play the role of a PMS-TWG. GFDA has written to the institutions that would make up this subcommittee to nominate representatives.

Objective 4: Supply of quality-assured essential medical products of health importance increased

During Q1, PQM+ worked with GHSC-PSM, Total Family Health Organization, and FDA Ghana to draft a request for expressions of interest (EOIs) from local manufacturers to produce oxytocin and iron + folic acid tablets. To improve the supply of quality-assured essential medicines in Ghana, this quarter PQM+ received EOIs from two local manufacturers to produce ferrous fumarate + folic acid supplements and three EOIs for the local manufacture of oxytocin injection. Due to the novelty of the ferrous fumarate + folic acid supplements, PQM+ set up a virtual meeting with GHSC-PSM, THFO, and the two manufacturers that expressed interest in producing it to provide more information on the project, including context, potential market, required equipment, and expectations of GHSC-PSM and PQM+. The manufacturers responded with their concern that the potential market would not be commensurate with the investments they would have to make to manufacture this formulation; ferrous fumarate will permanently stain materials and its environment during its production. The local manufacturer would be required to invest substantially in technology to contain the manufacturing and clean-up. PQM+ is still in discussions with GHSC-PSM on how to surmount this challenge.

PQM+'s chemistry manufacturing and control (CMC) experts assessed the three manufacturers interested in oxytocin injections and found that capacity exists to manufacture these injections in

Ghana. A technical report, now in progress, will outline the support these manufacturers would require to produce quality-assured oxytocin.

In addition to the potential manufacturers of oxytocin, the PQM+ CMC experts assessed manufacturers of artemisinin combination therapy (ACT), Ernest Chemists and Amponsah Efah, which the PQM program initially assessed in 2017, to evaluate any progress in their implementation of GMP that puts them on a better path to achieve WHO prequalification. A technical report that will outline the progress by these manufacturers is in production.

Priority Activities for Next Quarter

PQM+ plans to:

- Inaugurate the Ghana PMS Technical Working Group;
- Assist the PMS Technical Working Group in developing and finalizing an RB-PMS protocol for antimalarial and MCH medicines;
- Finalize a technical report on the GMP assessments of local manufacturers of oxytocin and ACTs; and
- Conduct a GMP assessment of manufacturers interested in ACTs.

Kenya

The PQM+ program aims to strengthen the quality of medical products in Kenya by improving governance structures and regulatory systems for medical product quality assurance. PQM+ delivers technical assistance to the Pharmacy and Poisons Board (PPB), the NQCL, the Division of National Malaria Program (DNMP), Department of Family Health (DFH), MOH's Division of Health Products and Technologies (HPT), and the counties to further strengthen in-country stakeholders' capacity in ensuing access to quality-assured medical products for the population.

In PY2, PQM+ is working to:

- Improve governance for medical product QA systems;
- Strengthen regulatory systems for assuring quality of medical products;
- Optimize and increase financial resources for medical product QA systems;
- Increase supply of quality-assured essential medical products of public health importance; and
- Advance the global medical product QA learning and operational agenda.

During Q2, PQM+ focused on improving governance for medical product QA systems and strengthening regulatory systems to assure the quality of medical products in Kenya.

Progress by PQM+ Objective

Objective 1: Governance for medical product quality assurance systems improved

Quality assurance framework for malaria commodities: During Q2, PQM+ continued working with Kenya's DNMP to finalize the QA framework for malaria products. This framework outlines the institutional stakeholders involved in quality assurance of essential health

commodities for malaria treatment and prevention in the country, as well as their respective roles. The framework also establishes a coordination mechanism to harmonize quality assurance of malaria commodities and to guide handling and processing of complaints related to the quality of commodities used in the malaria program. Key stakeholders include the PPB, which is the national medicines regulatory agency; the MoH's HPT; Kenya Bureau of Standards; Kenya Medical Research Institute (KEMRI); Kenya Medical Laboratory Technician and Technologist Board; Pest Control Products Board; Kenya Plant Health Inspectorate Service; and others.

Objective 2: Country and regional regulatory systems to assure the quality of medical products in the public and private sectors improved

Developing a PPB online platform for self-directed learning: PQM+'s local consultants began assessing the PPB staff's training needs, which will inform development of a learning curriculum and specific content. In addition to helping PPB assess staff training needs and developing content for learning, PQM+ engaged the services of a second local consultancy firm to customize and implement the online learning platform, based on the industry-recommended open-source Moodle platform. To accomplish this task, the consultants gathered user requirements and learner preferences. These consultants are scheduled to complete the online learning platform over a six-month period that ends in September 2021. When functional, the platform will enable PPB to institutionalize more efficient and cost-effective processes to onboard new staff; to provide refresher training courses for existing staff; and to assist in maintaining PPB's ISO 900 certification by ensuring that staff have substantial familiarity with SOPs that are integral to the PPB quality management system.

Workforce capacity assessment of the National Quality Control Laboratory: At the beginning of Q2, PQM+ conducted a human resources (HR) capacity assessment of the NQCL to identify the strengths and weaknesses of its workforce. A local HR/organizational development consultant assisted with the assessment, which focused on NQCL staffing levels, skills mix, staff motivation, and working conditions. At a feedback and validation meeting on March 5, PQM+ shared the main findings and recommendations of the assessment with NQCL management and staff. NQCL scored 65 percent on staffing level, 62 percent on skills mix, 63 percent on staff motivation, and 60 percent on working conditions. This represented an overall workforce capacity Maturity Level of 2.5 (emergent), on a scale of 1 (foundation) to 4 (advanced). In Quarter 3, PQM+ will facilitate a joint session with NQCL to plan for implementation of the assessment recommendations.

PQM+ is continuing its efforts to procure Karl Fischer titrator equipment for NQCL. The equipment vendor organized a pre-shipment inspection at the country of origin (Germany) and the equipment is now ready for delivery in Q3 after the pre-shipment inspection firm issues a certificate of compliance.

Developing and validating protocol for risk-based post-marketing surveillance of product quality: This quarter, PQM+ provided technical assistance to members of the joint Pharmacovigilance (PV) and PMS-TWG of the PPB to build their capacity to develop and validate a protocol for RB-PMS of quality of pharmaceutical products. The working group thoroughly reviewed and provided input on the draft protocol, which focuses on malaria and reproductive, maternal, neonatal, child, and adolescent health (RMNCAH) products. Although currently focused on malaria and RMNCH products, this RB-PMS protocol is universal and can be adapted easily to cover other medical products. Members of the PV/PMS-TWG include representatives from the National Malaria Program, the NQCL, the PPB, Kenya Medical

Supplies Authority, Mission for Essential Drugs and Supplies, KEMRI, and the University of Nairobi School of Pharmacy. In March 2021, PQM+ facilitated a PV/PMS-TWG workshop to validate the draft protocol, which will guide sample collection, field-based screening, and laboratory testing at NQCL, as well as report writing and dissemination of results. In a related event, PQM+ accepted an invitation by the PPB to be a member of the Kenya Pharmacovigilance Experts Review and Advisory Committee, which PPB launched in March.

Priority Activities for Next Quarter

PQM+ plans to:

- Support the NMCP to disseminate the final QA framework and commence with implementation of the QA framework for malaria commodities.
- Support the PPB in coordinating and harmonizing technical approaches to PMS implementation in the country. This includes helping PPB implement a PMS survey based on the RB-PMS protocol developed in Q2.
- Complete the procurement, delivery, and handover of Karl Fischer titrator equipment to the NQCL.
- Assist PPB to establish an online platform for self-directed learning.
- Support NQCL to implement prioritized recommendations of the HR organizational capacity assessment completed in Q2.
- Strengthen the technical capacity of PPB and local pharmaceutical manufacturers in GMP to increase local supply of quality-assured antimalarial and RMNCAH commodities.
- Advocate for inclusion of a medical product QA framework in select health coverage schemes in Kenya.
- Analyze and synthesize local data from previous PMS activities to inform policy direction for QA of malaria and RMNCAH products.
- Support PPB to integrate their PMS into the PV system to create a medicines safety and quality dashboard.

Liberia

This quarter, PQM+ facilitated the development of a five-year strategic plan for the Liberia Medicines and Health Products Regulatory Authority (LMHRA) and conducted a dossier evaluation training for LMHRA staff. PQM+ also conducted a workshop on the use of the MedRS tool for PMS-TWG members. PQM+, in response to a request from USAID, investigated the allegation that PMI-procured doses of ACT were being sold in private markets in Montserrado County. In March, PQM+ trained staff of the LMHRA laboratory on basic quality control (QC) techniques and began procuring laboratory supplies and equipment.

In PY2, PQM+ is working to:

- Improve governance for medical product QA systems and
- Improve regulatory systems to assure the quality of medical products in the public and private sectors.

Progress by PQM+ Objective

Objective 1: Governance for medical product quality assurance systems improved

This quarter, PQM+ hired a consultant to support LMHRA's development of a five-year strategic plan. In February, the consultant conducted a desk review of key documents and submitted an inception report to set the project's timelines, benchmarks and tools, which PQM+ shared with LMHRA. The consultant also carried out a stakeholder mapping and analysis from within the health sector. In March, the PQM+ consultant traveled to Liberia to meet with LMHRA leadership and board members, the School of Pharmacy, Liberia's chief pharmacist, and the deputy minister of planning at the Ministry of Health. On March 4, during a stakeholders meeting at the Belle Casa Hotel in Monrovia, the consultant presented an overview of the new strategic plan.

Objective 2: Country and regional regulatory systems to assure the quality of medical products in the public and private sectors improved.

Several African countries have reported medicines being diverted from public facilities to private pharmacies, medicines stores, clinics, and open markets,[2] Liberia among them.[3] This practice can lead to stockouts of essential medicines in the public sector. In Liberia, malaria is endemic and stockout of antimalarials in public facilities could have a devastating effect.

On February 26, PQM+ received a request from USAID's Liberia Mission to ascertain the allegation that private markets in Montserrado County are selling ACTs procured by PMI and the Global Fund (GF). PQM+ coordinated with LMHRA, USAID Global Health Supply Chain Program's Procurement and Supply Management project (GHSC-PSM), and the Central Medicines Store to investigate the allegation. LMHRA inspectors inspected 56 private pharmacies, medicines stores, clinics, and open markets in Montserrado (Monrovia and Paynesville) and Nimba (Ganta). The LMHRA inspectors acted as mystery shoppers to purchase ACTs, antiretrovial drugs (ARVs), and mosquito nets from medicines stores and open markets. The PQM+-led investigation found evidence that the open markets in Monrovia and Paynesville are widely selling ACTs and mosquito nets procured by PMI and GF. It also found that 12 percent of medicines stores visited in Monrovia were selling ACTs procured by PMI and GF. PQM+ sent a detailed report to the USAID Mission in Liberia. PQM+ also presented the investigation's findings at the FY 2022 Malaria Operational Plan meeting held from March 22 to March 31.

[2] https://www.dovepress.com/antimalarial-medicine-diversion-stock-outs-and-other-public-health-pro-peer-reviewed-article-RRTM
[3] https://www.liberianobserver.com/news/medical-supplies-stolen-from-nds-shipped-to-guinea/



PQM+ helped with an investigation of medicines and medical products selling at Liberia's open markets, including these in Monrovia and Paynesville.

Table 1. ACTs and ARV Drugs Procured by GF or PMI

#	Photo of Sample	Brand Name/ Dosage form/ Manufacturer/ Exp/Mfg. dates
1		**Name:** Artesuante and amodiaquine **Dosage:** Tablet **Manufacturer:** IPCA Laboratories, India **Batch No:** CYZ910022 **Mfg. Date:** 03/2020 **Exp Date:** 02/2022
2		**Name:** Artesuante and amodiaquine **Dosage:** Tablet **Manufacturer:** IPCA Laboratories, India **Batch No:** CYX460005 **Mfg. Date:** 02/2020 **Exp Date:** 01/2022
3		**Name:** Rapid HIV card test **Manufacturer:** Premier Medical Corporation Private Ltd., India **Batch No:** 38k20195 **Mfg. Date:** 11/2019 **Exp Date:** 10/2021
4		**Name:** Mosquito net **Manufacturer:** YAMEI, China

The LMHRA quality control lab has been a major source of revenue, as the authority collects fees by screening medical products as they enter the country. However, the lab is currently not screening medical products, largely due to the lack of needed laboratory supplies. PQM+ is procuring at least 133 essential reagents, 374 apparatuses, 10 high-performance liquid

chromatography (HPLC) columns, a dissolution tester, and 10 sets of minilab reference tablets and consumables. These items will allow the LMHRA to resume basic QC screening of medical products. This program year, PQM+ is focusing on supporting the LMHRA to develop a procurement plan and policy for lab consumables and reagents to ensure the use of qualified vendors while considering financial value. PQM+ is also working with the lab to develop a costing model for lab tests. The model is expected to help the LMHRA to recover actual testing costs. Additionally, PQM+ sponsored five LMHRA QCL lab staff members to travel to the USP Ghana lab in March, where they participated in basic QC training.

PQM+ conducted a five-day workshop from March 1 to 5 for 23 members of the National Technical Working Group on Post-Marketing Surveillance (TWG-PMS). The training focused on risk-based post-marketing surveillance. Participants joined from the National Malarial Control Program, National AIDS Control Program, TB and Leprosy Control Program, County Health Team, Neglected Tropical Diseases Program, Central Medical Store, and LMHRA. The training workshop introduced the MedRS tool and its applications to participants, who used the MedRS tool to evaluate risk factors associated with medicines, counties, cities, and facilities. At the end of the training, participants successfully developed risk-based PMS protocols for antimalarials and MNCH medicines. The USAID Mission in Liberia visited the training site. USAID's Health Office Director encouraged participants to make the most of the training.

PQM+ also delivered a 10-day intensive training for 13 employees of the LMHRA March 1–10. The training topics included medicines dossier evaluation using the common technical document (CTD) format, API stability, pharmaceutical product development, manufacturing and process validation, bioequivalence, API specification, and more. The USAID Mission in Liberia also visited the dossier evaluation training. Speaking to participants at the training, USAID's supply chain advisor/GHSC-PSM activity manager encouraged participants to take the training seriously. The 13 participants all achieved certification at the end of the training. LMHRA's managing director, speaking at the closing ceremony, lauded USAID and PQM+ for the training. The director also encouraged participants to put into practice what they have learned.

Priority Activities for Next Quarter

PQM+ plans to:

- Support the LMHRA resume laboratory testing activities;
- Finish drafting regulations;
- Conduct training on the RB-PMS protocol and on sampling;
- Complete the Strategic Plan, including the staffing plan and cost structure for regulatory services;
- Conduct a stakeholder forum on deployment of priority regulations;
- Complete sampling and testing of antimalarial and MCH samples; and
- Complete Laboratory QMS Awareness training and development of key documentation, such as the Quality Manual.

Mali

Over the past decade, the Government of Mali has engaged in widespread institutional reform. In 2019, however, the *Cellule de Développement Institutionnelle* (Institutional Development Unit, IDU) rejected regulatory provisions for the creation of a national pharmaceutical regulatory

agency, as proposed by the Directorate of Pharmacy and Medicines (DPM). According to the IDU, the provisions needed major revision. The DPM has yet to submit a revised proposal and is working to mobilize national support for the initiative. DPM hopes to share case studies of successful precedents in francophone Africa to convince the IDU of the need to establish a national pharmaceutical regulatory agency.

In PY1, PQM+ Mali supported *Laboratoire National de la Santé* (LNS, the National Health Laboratory) and DPM to establish a PMS-TWG including representatives from the LNS, DPM, disease programs, *Pharmacie Populaire du Mali* (Popular Pharmacy of Mali), and the private wholesalers' association. This was to address the lack of coordination in PMS activities. The working group adapted the *Guidance for Implementing Risk-Based Post-Marketing Quality Surveillance in Low- and Middle-Income Countries* to the Mali context and developed a risk-based PMS protocol for antimalarial and MCH medicines.

PQM+ Mali also continued strengthening LNS's QC processes so the laboratory could achieve International Organization for Standardization (ISO)/International Electrotechnical Commission 17025 accreditation. To that end, PQM+ implemented SATTA at LNS. This tool will help laboratory staff identify areas for improvement as they pursue accreditation and prequalification. PQM+ Mali trained staff on the techniques for its proposed accreditation scope in preparation for accreditation.

In PY2, PQM+ Mali is building the capacity of DPM's dossier evaluation committee to assess CTD dossiers, establishing a metrology team within LNS, and supporting implementation of PMS activities planned by the PMS-TWG.

In PY2, PQM+ is working to:

- Improve governance for medical product quality assurance systems;
- Improve country and regional regulatory systems to assure the quality of medical products in the public and private sectors; and
- Increase financial resources for medical product QA optimization.

Progress by PQM+ Objective

Objective 2: Country and regional regulatory systems to assure the quality of medical products in the public and private sectors improved

In Q2, PQM+ provided Minilabs™ for screening and laboratory consumables to the medicines quality control laboratory (MQCL) at LNS. This allowed the MQCL to perform compendial testing of MCH and antimalarial PMS samples collected from four regions in Mali (Segou, Sikasso, Koulikoro, and Kayes) in 2020. In-country consultants monitored testing of the samples. A total of 92 MCH and antimalarial samples have been tested, per compendial requirements of the laboratory. LNS is drafting a report on the analytical tests.

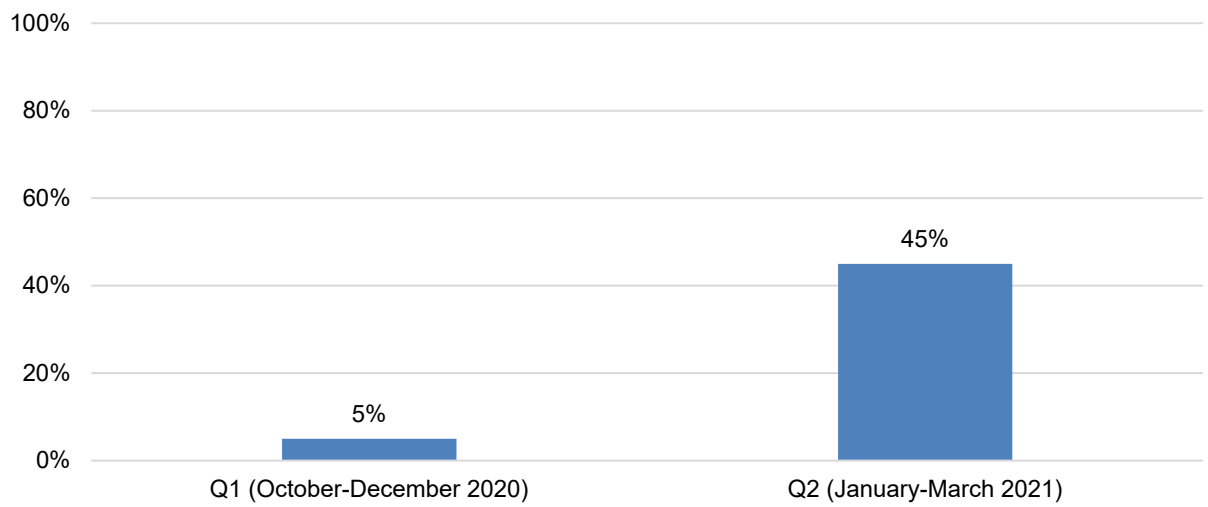
PQM+ also continued preparing the MQCL for ISO/IEC 17025:2017 accreditation. Preparations included a baseline assessment of the laboratory to help management develop a roadmap for an accreditation audit in 2021, assistance to LNS managers in officially designating new quality assurance officers who had been working informally since the quality officer took study leave in 2020, and identification by a PQM+ expert of gaps in the laboratory's quality management system. One major gap requiring substantial funding is the lack of calibrated and qualified

equipment. While PQM+ plans to support calibration of the equipment, another mechanism will support requalification of the analytical equipment. The PQM+ expert supported development of a corrective action plan and is now assisting management to monitor its implementation.

To support the LNS in establishing a functioning metrology unit, a PQM+ consultant will provide technical assistance to the LNS in equipment maintenance. PQM+ also initiated the selection process for a competent metrology services provider that LNS can contract to perform routine calibration of its measurement devices and equipment.

Figure 6 shows the substantial progress of the LNS of Mali in achieving milestones toward ISO 17025:2017 accreditation.

Figure 6. Percentage of the Milestones toward ISO Accreditation Achieved by Mali LNS (FY2021 Q1 & Q2)



Priority Activities for Next Quarter

PQM+ plans to:

- Assist the LNS metrology unit in developing and implementing documentation and tools to manage its analytical equipment;
- Conduct training on equipment preventive maintenance;
- Support the PMS-TWG to organize a workshop to disseminate results from PMS samples collected in 2020;
- Institutionalize a performance management system at LNS; and
- Conduct a training needs assessment for a dossier evaluation training, then provide the training.

Mozambique

Mozambique established its National Directorate of Pharmacy (DNF) in 2017 as a transitional organization, working toward becoming an autonomous National Medicines Regulatory Authority (NMRA). It was created from the Pharmacy Department of the Ministry of Health after the promulgation of the revised pharmaceutical law. Further technical support is required to help

the QC laboratory, known as the Department of Drug Quality Check (DCQ), attain ISO/IEC 17025: 2017 accreditation, and for DNF to attain Maturity Level 3 in the WHO GBT program and ISO/IEC 9001:2015 accreditation.

In PY2, PQM+ is working to:

- Improve governance for medical product QA systems;
- Strengthen regulatory systems for quality medical products; and
- Optimize and increase financial resources for medical product QA systems.

Progress by PQM+ Objective

Objective 1: Governance for medical product quality assurance systems improved

PQM+ followed up to obtain feedback on the draft program implementation framework shared with DNF. PQM+ also participated in several meetings for programming and strengthening of the country's response to MCH and HIV/AIDS,

In Q1, PQM+ reviewed and provided a commentary to the DCQ on the existing regulation for the medicine's quality control laboratory, which is now obsolete. In Q2, PQM+ continued following up for feedback from DCQ in the quest to develop an updated, robust regulation for DCQ that will support and facilitate its implementation of good laboratory practices.

Objective 2: Country and regional regulatory systems to assure the quality of medical products in the public and private sectors improved

PQM+ updated the ISO/IEC 17025: 2017 accreditation roadmap for DCQ with detailed steps and timelines. PQM+ program procured essential reagents to test the quality of medicines and delivered them to DCQ. Additionally, PQM+ supported the department to replace faulty internet switches. PQM+ continued the process of procuring other needed reagents, reference books, proficiency test samples, and internet services, as well as initiated new procurement of equipment calibration for the laboratory and language translation services for written technical materials to support the DCQ. PQM+ will continue in Quarter 3 to follow up with DCQ to provide feedback on a report on the status and condition of critical equipment required for QC testing of medicines, which PQM+ helped compile.

As a step toward building an effective regulatory workforce for the DNF, PQM+ assessed the capacity of personnel in two key DNF departments: Evaluation of Medicines, Vaccines, and Biological Health Products to evaluate product dossiers, and Pharmaceutical Licensing and Inspection to conduct Good Manufacturing Practice inspections. In collaboration with core partner IntraHealth, PQM+ collected more information about current technical capacity of regulatory staff using the training needs assessment tool to identify skills gaps in medical product evaluation and pharmaceutical inspection on Good Manufacturing Practices. Based on the information gathered in the two assessments, PQM+ compiled a findings report that will inform the development of robust training plans to address identified gaps.

Objective 3: Financial resources for medical product quality assurance optimized and increased

Mozambique's DNF does not currently generate enough funds to attain financial self-reliance. The DCQ, a department of DNF, does not receive adequate funds from the government health budget or other supplemental funding streams to maintain its day-to-day operations and fulfill its mandate of testing the quality of medicines in the country. This quarter, PQM+ advised DCQ to intensify advocacy and follow up for the approval of the proposed QC testing price list for the DCQ, so they can start collecting revenue that will support their operation and emergency need. PQM+ will continue in Quarter 3 to follow up with DNF to provide feedback on the draft sustainability framework for DCQ that PQM+ helped compile.

Priority Activities for Next Quarter

PQM+ plans to:

- Continue follow-up with DNF and DCQ for their feedback on the program implementation and sustainability framework and DCQ regulation.
- Calibrate DCQ's lab equipment and performance qualification of instruments by external the vendor; and
- Help with DCQ's participation in proficiency testing for selected test methods under the proposed scope of accreditation.

Nigeria

According to the 2018 Nigeria Demographic and Health Survey, one in eight children die before turning five years old. Maternal mortality caused by prolonged obstructed labor, unsafe abortion, septicemia, hemorrhage, and eclampsia is a serious problem in Nigeria.[4,5] Malaria remains the country's leading public health problem, disproportionately affecting children younger than five years and pregnant women. Nigeria also has a high incidence of communicable and noncommunicable diseases.

PQM+ is focused on helping ensure the quality of medicines and other medical products with an emphasis on USAID and Government of Nigeria priority malaria and MCH medicines and family planning commodities. PQM+ collaborates with stakeholders in the public and private sectors to increase local pharmaceutical manufacturing capacity and to sustainably strengthen regulatory systems at the national and state levels. PQM+ also is strengthening quality management systems and building laboratory capacity in quality control testing in compliance with international standards.

In PY2, PQM+ is working to:

- Improve country and regional regulatory systems to assure the quality of medical products in the public and private sectors;
- Optimize and increase financial resources for medical product QA; and

[4] National Population Commission (NPC) [Nigeria] and ICF. 2019. Nigeria Demographic and Health Survey 2018. Abuja, Nigeria, and Rockville, Maryland, USA: NPC and ICF.
[5] USAID 2015-2020. Nigeria Country Development Cooperation Strategy (https://www.usaid.gov/nigeria/cdcs)

- Increase the supply of quality-assured essential medical products of public health importance.

Progress by PQM+ Objective

Objective 2: Country and regional regulatory systems to assure the quality of medical products in the public and private sectors improved

PQM+ is working with the Pharmacists Council of Nigeria (PCN) to strengthen the quality assurance of medical products, as well as the regulatory systems that govern their distribution and use at the state level to improve access and availability of quality-assured malaria, MCH, and family planning products in Bauchi, Ebonyi, and Sokoto states. The focus of this task is on retail outlets, such as community pharmacies and patent medicines shops, that sell medical products (medicines and consumables). This quarter, PQM+ shared notes from the dissemination and action plan meeting in Nasarawa state with stakeholder representatives to remind them of the discussions and recommendations that will lead to improvement of the state-level regulatory and quality assurance systems in the three focus states of Bauchi, Ebonyi, and Sokoto.

PQM+ is now implementing the action plan recommendations, which are:

- Building the capacity of community pharmacists and patent and proprietary medicines vendors (PPMVs) on selected QA topics; and
- Provision of job aids.

Consequently, PQM+ organized a meeting to review and develop content of the workshop materials and job aids (guidance on sourcing, storage, product quality checks, shelf life, improving the practice of inspection, etc.) for CPs and PPMVs. Participants at the meeting included PCN staff (headquarter and state levels), representatives of the Food and Drugs Services Department of the Federal Ministry of Health, and the National Products Supply Chain Management Program. PQM+ shared the draft reports of the state assessment and state-level action plans with PCN for review and input.

Objective 3: Financial resources for medical product quality assurance optimized and increased

The NIPRD seeks to sustain the momentum of its ISO/IEC 17025:2017 accreditation and reduce the total annual cost to maintain the accreditation. PQM+ helped NIPRD review and develop a cost structure that reflects the demand for testing, as well as the laboratory's operating costs and its existing fees and funding in a one-day workshop in Q1.

This quarter, PQM+ supported NIPRD with efforts to reduce its annual accreditation fees by subscribing to the Nigeria National Accreditation System (NiNAS) (a local accreditation body) instead of paying the high fees required by the American National Accreditation Board (ANAB).

Analysts demonstrate UV-VIS competency during the NiNAS migration assessment.

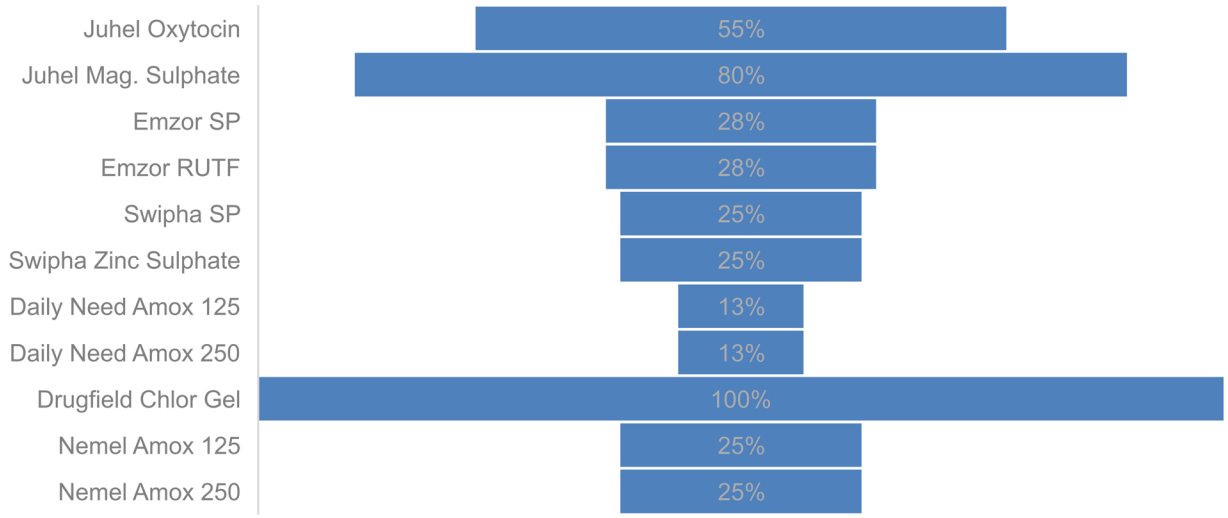
To finalize this migration, PQM+ and NIPRD reached out to the director general of NiNAS and PQM+ guided the completion and review of application forms and accompanying documents. The program prepared the laboratory for the accreditation assessment by NiNAS and observed the accreditation process. Subsequently, PQM+ supported the institute in addressing some of the issues identified during the assessment. NIPRD paid for the full cost of the NiNAS accreditation assessment as well as transfer charges from ANAB.

The migration helped NIPRD achieve about a 56 percent ($4,500) cost savings in its annual accreditation fees, reducing costs by $3,500 compared to approximately $8,000 paid to ANAB previously, which included flight, hotel, and other logistics.

Objective 4: Supply of quality-assured essential medical products of health importance increased.

PQM+ made considerable progress in providing technical assistance to manufacturers of quality-assured MNCH, nutrition, and antimalarial medical products in Q2. Currently, PQM+ Nigeria is supporting seven manufacturers: Daily-Need Group, Drugfield Pharmaceuticals, Emzor Pharmaceuticals, Juhel Nigeria Ltd., May & Baker, Niemel, and Swiss Pharma Nigeria Ltd. (Swipha). Of the seven, three (Emzor, Juhel, and Swipha) have commenced processes for WHO-PQ of their products; of those, Juhel is the closest to achieving this as its magnesium sulfate injection dossier has been submitted and accepted for full evaluation by the WHO-PQ team. Emzor and Swipha are at various stages of compiling their product dossiers.[6] PQM+ is also providing further support to address requests for additional information on the dossier from the WHO-PQ team. Figure 7 shows progress toward achievement of market authorization/ WHO prequalification milestones for several of these manufacturers.

Figure 7. Percentage of the Milestones toward Market Authorization Achieved by Nigerian Manufacturers as of March 2021



[6] May & Baker is close to getting a WHO PQ for an antiretroviral (lamivudine+zidovudine), however, PQM+ is not providing any support on this, as the product is not among the products of interest for USAID and Nigeria.

Some highlights of the support provided this quarter to MNCH medical product manufacturers include:

- A CAPA verification audit of Juhel Nigeria[7] following the mock GMP inspection in PY1.
- Further update of the dossier for magnesium sulfate 50% w/v injection, which had been submitted for full review by the WHO-PQ team. The update followed a request from the WHO-PQ team for additional product data related to the quality part of the dossier and included a review of the analytical report for the risk of ink and adhesive migration into the product.
    - PQM+ Nigeria and Juhel are still working with the USP home office and the WHO-PQ team to resolve this issue.
- Support to Juhel Nigeria Ltd. for the update of its oxytocin injection product dossier. Juhel received oxytocin API from a new WHO-prequalified manufacturer, and in accordance with WHO's requirements, has commenced the update of its oxytocin injection dossier with data from the new API. Subsequently, Juhel supplied 600,000 doses of oxytocin injection 10iu/1mL to the Medical Export Group's public health intervention to treat post-postpartum hemorrhage.
- Continued provision of technical assistance to Emzor Pharmaceuticals[8] in reviewing technology transfer protocols to manufacture laboratory scale samples of ready-to-use therapeutic food (RUTF). Specifically, PQM+ reviewed hard-copy technical protocols from the tech transfer team and made the same available to Emzor to enable production of lab scale samples. The tech transfer team took the lab scale samples for testing in their Indian laboratory[9] and sent back the results. Emzor is working on an initial scale-up of the production of the RUTF.

Lab scale trial of RUTF at the Emzor Plant

- PQM+ recommended that Emzor acquire additional air handling units and dehumidifying systems for the revamped beta lactam antibiotic facility to enhance the HVAC system of the facility. When complete, this upgrade will improve compliance with GMP requirements for manufacturing beta lactam and other sensitizing antibiotics, including amoxicillin. In addition, the upgrade will enable the facility to reduce the effect of moisture on the product by better controlling humidity of the production environment, and ultimately enhance the stability of the amoxicillin dispersible tablets (amox-DT) it produces.
- PQM+ provided technical assistance to Swipha to review its product dossier and the palatability study, as well as perform ongoing review of the reports for zinc sulfate dispersible tablets. Swipha is working toward submission of the updated dossier, with the palatability report, to the WHO-PQ team, obtaining a WHO-PQ will broaden the manufacturer's market by enabling U.N. agencies to procure Swipha's zinc sulfate DT.

[7] JUHEL Nigeria Limited
[8] About Emzor Pharmaceutical Industries Limited - Emzor
[9] Food Analysis and Research Laboratory

Swipha has approval of the Nigerian National Agency for Food and Drug Administration and Control (NAFDAC) for its zinc sulfate DT; in the period under review, the company produced 100,000 doses that it supplied to the local market, the first commercial production since it obtained market authorization in Q4 of Program Year 1.

- The program provided technical assistance to review formulation protocols, formulation reports, stability protocol, and commencement of product dossier compilation for Daily-Need Group[10] following the company's receipt of amoxicillin API and excipients. These are significant support to Daily-Need's progress toward the WHO-PQ of its amoxicillin DT, a move that will enable the manufacturer to access the much larger international market of international NGOs and U.N. agencies.
- PQM+ supported Emzor Pharmaceuticals to manufacture quality-assured malaria medical products through review of the protocol to conduct a bioequivalence study for its brand of sulfadoxine + pyrimethamine (SP) (500+25 mg) tablets, this support is helping Emzor's progress toward WHO-PQ that will enable it to market this product to U.N. agencies. The support included a review of the process validation of the protocol to manufacture SP, which generates product data to compile the product dossier. The company supplied more than 8 million doses of cotrimoxazole tablets for MEG's public health intervention in the country from its Emzor Richfield plant as further confirmation of its strengthened quality systems.

Nigerian manufacturers that received PQM and PQM+ support to achieve market authorization are demonstrating the benefits of this support by producing priority MNCH and malaria medicines on a large scale. Examples of the benefits of MNCH medicine production over the last six months from a sample of these manufacturers are in the box below.

From October 2020 through March 2021, PQM/PQM+-supported manufacturers in Nigeria reported producing:

USP PHOTO

- enough amoxicillin DT to **treat severe pneumonia in 110,000 children** aged 2–12 months
- enough zinc sulfate to help manage **100,000 cases of acute diarrhea** in children aged 6 months–5 years
- enough cotrimoxazole to **treat opportunistic infections in 143,000 children** living with HIV for 6 months
- enough SP (two rounds of treatment) to **prevent malaria in 810,000 pregnant women**
- enough oxytocin injection 10iu/1mL to **prevent or treat postpartum hemorrhage in almost 1 million women**

[10] About – DAILY NEED GROUP

Priority Activities for Next Quarter

PQM+ plans to:

- Conduct a gap assessment of PCN headquarters using the ISO 9001:2015 checklist to institute a QMS. The report from the assessment will feed into an ISO 9001:2015 roadmap for the council. This activity will help PCN address actions recommended in their institutional development plan and facilitate the joint attainment of Maturity Level 3 with Nigeria's NAFDAC. This assessment is necessary due to gaps observed in the regulatory system at PCN, which reflect on pharmaceutical regulation at the state levels. PCN, as the regulatory body responsible for licensing establishment, one of the regulatory functions evaluated by the WHO GBT, does not have a functional QMS and is not ISO 9001:2015 accredited.
- Continue to strengthen the regulatory and quality assurance systems at the state level in Bauchi, Ebonyi, and Sokoto for retail outlets in collaboration with PCN, and conduct workshops in the three states to build capacity of zonal inspectors. Given the importance of the retail outlets as points of care, PQM+ is developing job aids which are guidance for both PCN and retail outlets on quality assurance topics such as sourcing and storage of drugs, physical quality checks for medical products, monitoring of shelf life, etc., to improve the quality of care at these outlets; PQM+ will also update PCN's Inspectors' Manual to improve the practice of inspection at PCN. PQM+ will also drive registration of new premises (CPs and PPMVs) by PCN and make them eligible for support services from other USAID implementing partners.
- Support the response to additional product information requested by WHO-PQ for Juhel's magnesium sulfate product dossier.
- Monitor progress of oxytocin 10iu/1/mL injection dossier compilation.
- Provide support for submission of Swipha's zinc sulfate dispersible tablet product dossier to WHO-PQ.
- Provide support for compilation Daily-Need Group's amox-DT product dossier.
- Review the technology transfer protocol for Swipha's artemether-lumefantrine (AL).
- Update the draft GMP roadmap report with stakeholder inputs and plan dissemination.
- As part of implementing recommendations on the GMP roadmap project, continue capacity building workshops for industry professionals and stakeholders (such as NAIP) on GMP topics identified as knowledge gaps from the outcome of the GMP roadmap.

Senegal

The Government of Senegal has developed a five-year (2019–2023) integrated strategic plan for the DPM and the *Laboratoire National de Contrôle des Medicament* (LNCM, the National Medicines Control Laboratory). The government's vision is to build "an efficient system of regulation and control, which ensures the development and application of quality standards and which guarantees access to medicines and other quality health products that are effective and safe for the entire population."

The plan cites areas of weakness for the DPM and the LNCM that include scarce financial resources, insufficient human resources, poor information systems, and lack of coordination and communication among relevant stakeholders engaged in the medical product QA system. To address these areas, the strategic plan outlines seven general objectives. PQM+ is contributing

to the first, “Establish an appropriate institutional framework for the optimal implementation of pharmaceutical regulatory and control functions,” and the third, “Evaluate and control the quality of drugs.” PQM+ is also addressing two sub-objectives under those general objectives: Meet the conditions for WHO certification and ISO 17025 accreditation of LNCM and ensure PMS of medical products.

During PY1, PQM+ facilitated the establishment of a national PMS unit that includes DPM, LNCM, the health inspectorate, all disease programs, the procurement agency, the pharmaceutical wholesalers’ association, and other allied professional bodies. PQM+ worked with this unit to develop national guidelines and a protocol on RB-PMS for the MedRS tool for antimalarial medicines. During PY2, PQM+ continues to build on this progress.

In PY2, PQM+ is working to:

- Improve country and regional regulatory systems to assure the quality of medical products in the public and private sectors.

Progress by PQM+ Objective

Objective 2: Country and regional regulatory systems to assure the quality of medical products in the public and private sectors improved

During Q1, PQM+ trained the multisectoral PMS Unit on the RB-PMS protocol for antimalarial medicines. The PMS Unit then deployed three sampling teams to two regions each in Senegal. The teams collected 288 antimalarial samples from the six regions (Dakar, Kolda, Djourbel, Kaolack, Kedougou, and Tambacounda) in December 2020. PQM+ also procured External Quality Assurance Assessment Scheme (EQAAS) Phase 10 proficiency testing samples for LNCM. Participation in this proficiency testing scheme will assist LNCM to demonstrate its competence in the techniques used in the PMS protocol. In Q2, PQM+ provided Minilabs™ for screening and laboratory consumables at LNCM’s medicines quality control laboratory. The Minilabs™ were used to screen samples, and laboratory consumables were used for compendial (confirmatory) testing of antimalarial PMS samples from six regions of Senegal collected in 2020. The in-country consultant is monitoring the testing of the samples and expects to complete this by the end of April 2021. The turnaround on these samples was longer than usual because of lab analyst resignations and limited lab equipment at LNCM.

A major weakness within LNCM is its metrology team and management of its equipment to meet international best practices. To help LNCM establish a strong, functioning metrology unit, an equipment maintenance consultant will work with PQM+ to provide technical assistance to LNCM for equipment management. PQM+ has initiated the selection of a competent metrology services provider that LNS can contract for the routine calibration of its measurement devices and equipment.

Priority Activities for Next Quarter

PQM+ plans to:

- Provide supportive assistance to LNCM metrology unit to develop and implement documentation and tools to manage its analytical equipment;
- Conduct training on equipment preventive maintenance; and

- Assist the Senegal PMS Unit to organize a workshop to disseminate results from PMS antimalaria samples collected in 2020.

Asia Region

Asia Bureau

PQM+'s technical assistance funded by USAID's Asia Bureau aims to promote regional regulatory convergence and reliance. PQM+ will work through regional health networks that include the Association of Southeast Asian Nations (ASEAN) Pharmaceutical Product Working Group (PPWG) and the South-East Asia Regulatory Network (SEARN) to strengthen regulatory and quality assurance systems. This work will build on support provided through the PQM program, as well as leverage the current PQM+ work in Southeast and Central Asia. The PY2 workplan was approved in November 2020, except for work on the GMP online training course, which was approved earlier.

Progress by PQM+ Objective

Objective 2: Country and regional regulatory systems to assure the quality of medical products in the public and private sectors improved

The Asia Bureau work builds on harnessing regional collaboration, which is often managed by economic communities' medicines regulatory harmonization program. This quarter, PQM+ identified and engaged members from SEARN to initiate a conversation to identify priorities and introduce the risk-based PMS activity so implementation can begin. PQM+ plans to also engage USP India in this meeting.

PQM+ continued to engage its partner Mahidol University in Thailand to conduct a regulatory landscape analysis of the medical product quality assurance system for SEARN and ASEAN member countries. This analysis aims to understand the situations of SEARN and ASEAN member country MRAs and identify common challenges that can benefit from regional solutions. The parties were unable to sign the agreement earlier due to delays resulting from Mahidol University's closure due to COVID-19. However, the University has reopened, PQM+ has revised timelines, and full ratification of the contract should occur by early April.

PQM+ continued to provide mentorship support to the participants of the GMP online course developed and delivered in collaboration with MTaPS, WHO India, JSS Academy of Higher Education & Research (JSS AHER), Mysuru, Indian Pharmaceutical Alliance, Ministry of Health and Family Welfare, and the Government of India. This virtual course took place between December 1 and 14, 2020, for more than 127 participants working in the pharmaceutical manufacturing sector in India. PQM+ also worked with MTaPS this quarter to develop a final report titled "Capacity Building on Current Good Manufacturing Practices for Pharmaceutical Manufacturers in India – Asia Bureau" for submission to USAID.

PQM+ commenced official discussions with SEARN to review priorities for member states and identify next steps for support.

Priority Activities for Next Quarter

PQM+ plans to:

- Onboard Mahidol University and begin the landscape analysis of medical products quality assurance systems for SEARN and ASEAN member countries;
- Collaborate with SEARN and ASEAN to strengthen PMS systems and improve reliance and information sharing for GMP inspections; and
- Continue discussions with SEARN and ASEAN PPWG to agree on key technical areas of support.

Bangladesh

In Q2, PQM+ focused on implementing activities under four of the five program objectives in the approved work plan for PY2 and completing activities from the last quarter of PY1. PQM+ Bangladesh is helping the Directorate General of Drug Administration (DGDA) institutionalize good governance practices related to transparency, accountability, and communication with stakeholders; the National Control Laboratory (NCL) to strengthen its medicines quality monitoring system focusing on vaccines; and manufacturers to increase production of quality-assured first-line anti-TB medicines.

Progress by PQM+ Objective

Objective 1: Governance for medical product quality assurance systems improved.

PQM+ completed an internal review and helped edit the DGDA's final draft annual report for 2019–2020. The report highlights the DGDA's key achievements and performance and helps DGDA comply with the 2009 Right to Information Act, which requires every authority to report on its decisions and activities yearly. PQM+ is supporting DGDA's annual report committee to develop a preparation procedure to ensure a sustainable annual reporting system.

In March, Bangladesh's DGDA and PQM+ jointly organized a dissemination workshop titled "National Quality Assurance Guideline (NQAG) for Medical Products" at Hotel Agrabad, Chattogram. The workshop brought together 60 leaders, experts, and participants from government and nongovernmental agencies of Chattogram Division, including representatives from DGDA, the divisional director of Directorate General of Health Services, deputy director of family planning for NCL, the deputy commissioner of the Health Engineering Department, the civil surgeon, Central Drug Testing Laboratory, Chittagong, Bangladesh Association of Pharmaceutical Industries, Bangladesh Chemist and Druggist Samiti, customs, police, the Pharmacy Department of Chattogram University, Chittagong Medical University, Chittagong Medical College Hospital, manufacturers, PQM+, and local journalists.

Chattogram NQAG workshop in March.

PQM+ Bangladesh Chief of Party Dr. Syed Umar Khyyam welcomed participants and presented the seminar objectives and details on the guideline. DGDA's director general, Major General Md Mahbubur Rahman, chaired the session. The workshop's objective was dissemination of the NQAG to stakeholders who have a direct or indirect role in ensuring that quality-assured medicines are available to the public. This workshop highlighted quality measures and elements to ensure the manufacture, registry, procurement, storage, and distribution of quality, safe, and efficacious medicines before they reach consumers.

From feedback gathered at the end of the interactive workshop, most participants expressed that it improved their awareness of medicines quality, strengthened their knowledge of QA/QC, reinforced their knowledge of the right tools and equipment for medicine QA/QC, and increased their appreciation for the importance of well-documented procedures and policies. Participants also showed commitment and determination to continue implementation of the NQAG for Bangladesh. Major General Rahman closed the workshop with a speech on the necessity of this guideline and how it will support maintaining quality-assured medicines throughout the supply chain, ultimately helping secure public health from SF medicines. He acknowledged the initiative by PQM+ and said he expects similar workshops at the divisional level.

PQM+ supported DGDA to review the Drug Act of 1940 and the Drug (Control) Ordinance of 1982 to identify provisions of subcontracting a third-party private laboratory to acquire testing services. Based on the review, PQM+ will conduct a landscape assessment of the existing private laboratories and conduct a gap assessment of the selected laboratory to provide technical assistance to achieve ISO IEC 17025:2017 or WHO-PQ, as the lab can support NCL with reliable test results and sustainably strengthen DGDA's regulatory functions.

Objective 2: Country and regional regulatory systems to assure the quality of medical products in the public and private sectors improved.

It is critical for the Bangladeshi government to optimize use by the country's large pharmaceutical market of its regulatory resources to protect public health. To achieve sustainable QA systems, DGDA is moving to achieve WHO Maturity Level 3 of its nine regulatory functions to get international recognition, reliance, and acceptance. PQM+ continues to support DGDA and NCL to improve their capacity. Following are the key accomplishments this quarter.

- In January, PQM+ conducted a training session on RB-PMS at the DGDA conference hall, with 89 DGDA staff members (70 men and 19 women) attending. Legal provisions, visual inspection, sampling, and screening techniques were among topics discussed based on the existing RB-PMS guideline. The training included a Minilab™ demonstration. The training's aim was to build common understanding about RB-PMS systems among all field inspectors so they can support the systems when transferred to RB-PMS implemented sites.

Trainees practice screening in a Minilab during a training in February at NCL Dhaka.

- To implement an RB-PMS system at nine sentinel sites (eight at the division level and one for a district), DGDA selected 18 inspectors as trainees. In February, PQM+ organized a hands-on training titled “RB-PMS and Minilab Operations” for these inspectors. DGDA trainers and PQM+ experts used the metronidazole 400 mg tablet as an example. Trained inspectors reinforced RB-PMS systems at seven sites, and DGDA will soon start RB-PMS at two new sites: Sylhet and Mymensingh.
- PQM+ continued supporting DGDA to achieve WHO Maturity Level 3. On March 1, DGDA organized a Coalition of Interested Partners (CIP) task force meeting in collaboration with PQM+ and WHO at DGDA conference hall. PQM+ facilitated the meeting. DGDA senior officials, relevant stakeholders, and development partners including USAID, MTaPS, the World Bank, UNICEF, UKAID, Japan International Cooperation Agency, and Better Health in Bangladesh attended the meeting in person and online. Dr. Souly Phanouvong, PQM+ senior technical advisor, contributed valuable input from USP’s headquarters and PQM+ provided a 2020-2021 activity update. Director General Rahman requested that attending development partners (DPs) support DGDA’s focus on vaccines to achieve WHO Maturity Level 3. Meeting participants decided to form nine functional teams, including DP representatives, and to conduct a new assessment of the nine functions using WHO GBT.

PQM+ performed the following activities after the CIP meeting:

- Trained DGDA officials on using the computerized WHO GBT tool, version 11.21, to update the institutional development plan (IDP) through self-assessment.
- Supported DGDA’s review and submission of the PIC/s pre-accession audit checklist to PIC/s secretariat.
- Supported the marketing authorization team to review and update the SOP on the complaint-handling and appeal system.

PQM+ continued to help strengthen NCL’s capacity to sustain the achieved international standards. This quarter, PQM+ provided guidance and assistance on the following activities:

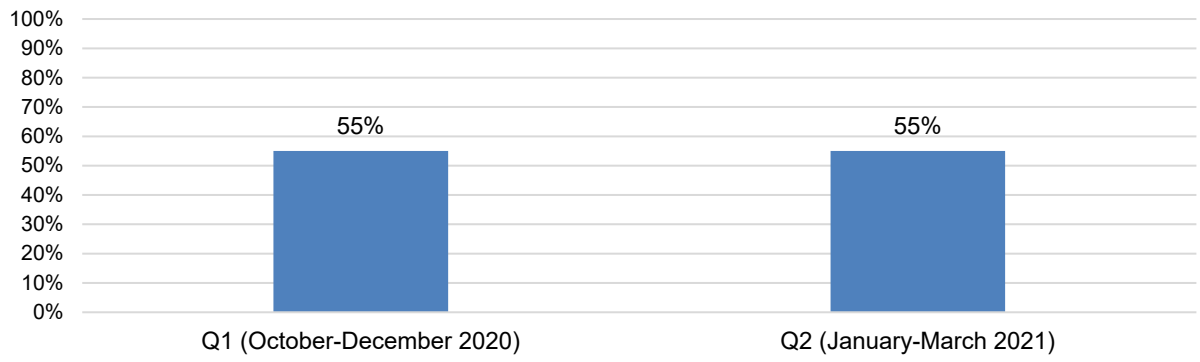
- Assisted NCL analysts to perform 01 Proficiency Test on the Uniformity of Dosage unit.
- Assisted the physicochemical lab’s analyst in analytical method validation using HPLC method through guidance on protocol development and report writing. Also supported development of a standard testing procedure and specification per the validated method.
- Supported preparation of a list of yearly equipment requirements for the physicochemical laboratory and helped prepare a budget and specifications for equipment in 2022.
- Helped assess a new vendor for procurement of NCL’s equipment using a questionnaire from the relevant SOP.
- Collected the MNCH product’s PMS data and compiled a summary report to support the country baseline assessment tool for PMS of MNCH medicines.

As part of capacity building efforts for NCL’s vaccine laboratory, PQM+ provided guidance and training to staff. PQM+ completed the following:

- Conducted training to vaccine lab staff that included the procedures for developing SOPs and Good Laboratory Practice (GLP).
- Conducted a hands-on training on CAPA and out-of-specification processes.

- Facilitated biweekly discussion sessions with the vaccine unit's staff to discuss any problems or issues they face and to find ways to mitigate any problems.
- Supported preparation of specifications for vaccine and microbiology lab equipment.
- Assisted with renewal job description of the staff, per their current vaccine laboratory activities.
- Assisted with an internal audit in the chemical and microbiology laboratories.
- Facilitated daily discussion session with the vaccine unit's staff for understanding the indicators and sub-indicators of the laboratory testing and lot release of the Global Benchmarking Tool.
- Conducted hands-on training on COMBISTAT and UNISTAT software for carrying out the potency and bioassay analysis and report generation.
- Conducted training on compendial testing parameters of vaccines produced in Bangladesh.
- Assisted in the preparation of SOP on PowerPac and Circulator Water Bath.
- Assisted in the preparation of a potency test for the hepatitis B vaccine.
- Supported in the procurement of reference standards.

Figure 8. Percentage of the Milestones toward ISO Accreditation Achieved, Bangladesh NQCL-Vaccine Lab, FY2021 Quarter 1 and Quarter 2



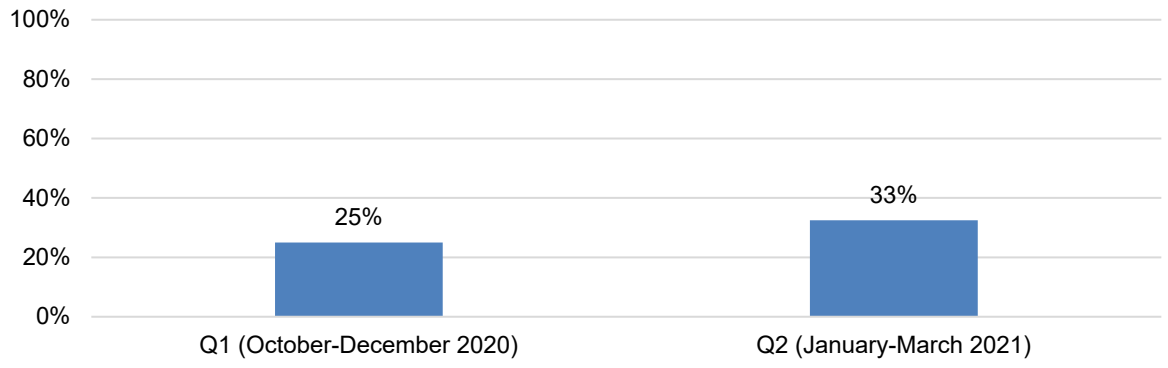
Director General Rahman chaired a March consultative meeting in the Chattogram Drug Testing Laboratory's (CDTL's) meeting room. All CDTL staff, senior DGDA officials, director of the Maa-o-Shishu Hospital, and the PQM+ team attended. DG Rahman requested that the hospital's director hand over the lab portion as soon as possible, as DGDA is going to rearrange the lab building to improve the lab's functionality. Meeting participants agreed to prepare a road map/strategic plan for the lab to achieve ISO 17025:2017 or WHO-PQ as the deputy lab of NCL Dhaka. After the meeting, the Director General conducted an oversight visit with meeting participants to determine the way forward and incorporate their needs in the road map.

The director general visited CDTL and the divisional Minilab™ on March 25, 2021.

Objective 4: Supply of quality-assured essential medical products of health importance increased.

In Q2, PQM+ experts continued providing technical guidance and recommendations to ACI Pharmaceutical in its manufacture of quality-assured, first-line, fixed-dose combination anti-TB medicines. In January, PQM+ organized an online technical discussion session with ACI technical staff involved in the TB project. PQM+ GMP expert Teferi Bedane conducted the session, which covered various GMP aspects, focusing on product development, completion of dossiers, and WHO-PQ submission (including GMP compliance in producing pilots and biobatches, bioequivalence study design, contract research organization evaluation, etc.). ACI sourced and procured materials and started product development activities at the Sonargaon site and is in the bidding process to select CRO for a bioavailability and bioequivalence study. ACI asked PQM+ to conduct a GMP inspection at its new site in April to confirm its readiness and compliance based on WHO GMP standards. Figure 9 shows ACI's progress in achieving milestones toward prequalification.

Figure 9. Percentage of the Milestones toward Market Authorization Achieved by ACI, FY 2021 Quarter 1 and Quarter 2



Objective 5: Global medical product quality assurance learning and operational agenda advanced

The DGDA recruitment process is ongoing. In March, DGDA recruited 16 new staff members. PQM+ supported the development of an induction/ orientation training plan for the new staff to build their essential job performance competency as the superintendent of drugs and regulatory inspectors. On March 4, a PQM+ expert conducted a training titled "Basic GMP, Risk-Based Regulatory Inspection and Regulatory Inspection Checklist." This will support DGDA to build competency of new staff in regulation and medicine quality monitoring to protect public health.

Priority Activities for Next Quarter

PQM+ plans to:

- Provide support for proficiency testing;
- Offer training on the quality manual, quality policy, WHO lot release guidelines, management review, and more in the vaccine lab;
- Help develop an equipment maintenance implementation record and change request for the vaccine lab;
- Support development of the standard testing procedure (STP) for COVID-19 and cholera vaccines;
- Oversee the analytical method validation protocol and report on the meningococcus, hepatitis B, and oral cholera vaccines;
- Provide training on establishment of analysis of COVID-19 vaccine in physiochemical lab and microbiology lab;
- Conduct training on analysis establishment per compendia for meningococcal, hepatitis B, and cholera vaccines;
- Conduct validation reports of analysts in the microbiology and physiochemical labs;
- Support preparation of SOPs on anaerobic chamber, ELISA washer, and upcoming new equipment;
- Continue support to review and update existing SOPs of the microbiology laboratory;
- Help DGDA prepare terms of reference/SOP for the annual report preparation team and associated office order;
- Support DGDA's development of a product-based inspection guideline with a checklist for at least two medical devices;
- Continue supporting implementation of the RB-PMS;
- Continue supporting ACI for first-line TB medicine manufacturing;
- Review the report on legal provisions regarding laboratory service subcontracting; and
- Support updating the IDP status report.

Burma

The PQM+ Program in Burma is working to build the capacity of Burma's Department of Food and Drug Administration (DFDA) toward a resilient medical product quality monitoring system. PQM+ aims to assure the quality of medicines in the country, with focus on antimalarials, and thereby contribute to the National Malaria Control Program's effort to eliminate malaria by 2030.

In PY2, PQM+ is working to:

- Improve country and regional regulatory systems to assure the quality of medical products in the public and private sectors.

Progress by PQM+ Objective

Objective 2: Country and regional regulatory systems to assure the quality of medical products in the public and private sectors improved

PQM+ began Q2 preparing for supply chain inspection training, GMP inspection training, back-to-back webinars on impurity testing, and piloting RB-PMS on antimalarials in Kayin State and Bago Region. However, the military coup on February 1 and events that followed disrupted PQM+'s program implementation. Following the coup, many DFDA staff had joined the civil disobedience movement (CDM) and were absent from work in protest. As a result, DFDA Nay Pyi Taw headquarters recorded only 40 percent of its workforce reporting by mid-March. DFDA staff at the field offices also participated in CDM, shutting down offices in Kachin, Kayah, Kayin, Chin, Shan, and Mon states, as well as Magway Region. The Nay Pyi Taw Pharmaceutical Chemistry Laboratory had only 11 staff of 33 reporting to work, while only two were present at the Mandalay Pharmaceutical Chemistry Laboratory.

USAID/Burma gave PQM+ permission to continue implementation in late February after the Mission deemed PQM+ to be a lifesaving health care service. Since then, PQM+ has reviewed the approved PY2 work plan to assess the feasibility of implementing individual activities.

PQM+ considered metrology training as the most critical activity to implement in the current situation. The DFDA Nay Pyi Taw laboratory faced challenges in timely calibration and maintenance of its equipment due to the political unrest restricting travel in Burma. After it receives training on metrology, the laboratory can perform preventive maintenance and periodic checks on its equipment, which will ensure across-the-board accurate and reliable results. PQM+ Burma is working closely with IntraHealth and USP Ghana to design the training and prepare appropriate materials for remote training.

Seven members of an eight-person QA team at DFDA Nay Pyi Taw Pharmaceutical Chemistry Laboratory joined the CDM, leaving a gap in its QMS. Hence, PQM+ began preparations to organize a QMS workshop to address the gaps in its system. DFDA will install the new QA team when the laboratory staff who joined CDM fail to return to work or are dismissed from duty by force in the future.

Preparations for webinars on impurity testing continued, and PQM+ will organize the webinars when the violence in the country subsides. However, implementation of supply chain inspection training and Good Manufacturing Practices inspection training will depend on the return of DFDA staff from CDM at field offices.

Before the coup, PQM+ talked with DFDA and USAID/Burma about potential technical assistance to DFDA on the in-country quality assurance of PPE used for COVID-19. PQM+ submitted a concept note on potential TA activities to the Mission on January 22. PQM+ attended and contributed to the stakeholders' roundtable meeting on PPE organized by the USAID Transparency and Inclusive Growth Activity on January 26.

Priority Activities for Next Quarter

PQM+ plans to:

- Organize a remote metrology training;
- Organize a remote QMS workshop;

- Review the in-house training procedures at DFDA laboratory and revise/improve wherever required;
- Oversee relocation of the DFDA Nay Pyi Taw Pharmaceutical Chemistry Laboratory when the equipment manufacturers can travel there; and
- Organize two webinars on impurity testing in collaboration with DFDA, if violence subsides.

Nepal

PQM+ provides technical assistance to Nepal's DDA to strengthen medical product QA and QC systems at the central and branch offices at province levels. In addition, PQM+ is strengthening the capacity of laboratories to conduct quality testing at the National Medicines Laboratory (NML). PQM+ is strengthening private medicines testing laboratories and local medicine manufacturers, including both public and private allopathic and ayurvedic manufacturers. Finally, PQM+ is working across all stakeholders (including the National Health Research Council, the Logistics Management Section of Ministry of Health and Population (MoHP), the Association of Pharmaceutical Producers of Nepal (APPON), and others) to build awareness of the health and economic threats posed by SF medical products and the need for strong regulatory systems.

In PY2, PQM+ is working to:

- Improve country and regional regulatory systems to assure the quality of medical products in the public and private sectors and
- Increase the supply of quality-assured essential medical products of public health importance.

Progress by PQM+ Objective

Objective 2: Country and regional regulatory systems to assure the quality of medical products in the public and private sectors improved

SATTA assessment, National Medicines Laboratory

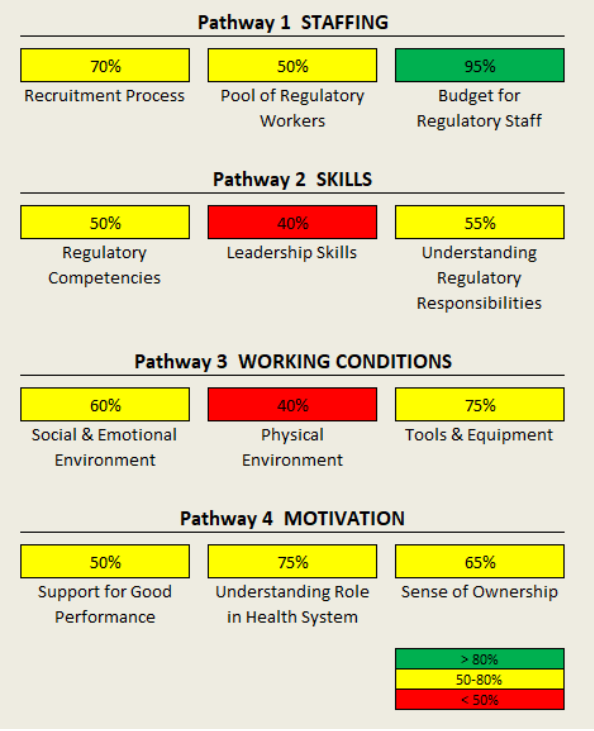
PQM+ continued to work in various areas to strengthen the institutional capacity of the DDA and NML. The program began the quarter conducting a seven-day SATTA assessment at the NML to identify areas for improvement and design a path to ISO 17025 accreditation. The NML has reviewed the SATTA assessment report. PQM+ and NML are hammering out the details of the IDP, which in essence will serve as an accreditation path for NML and PQM+. The program is supporting the lab to develop standard formats and key procedures according to ISO requirements. PQM+ also provided the NML with access to pharmacopeias and reference materials to support the laboratory's testing capacity.

Table 2. Nepal SATTA Assessment Results

Category	% compliance of NML to standards
Premises & Equipment	48%
Organization and Management	52%
QMS Documentation & Training	19%
Incoming samples and Lab safety	49%
Working Procedures	55%
Total weighted score	**37%**

At the DDA, PQM+ implemented various activities to support regulatory functions. PQM+ facilitated the formation of technical working groups including the RB-PMS and inspection TWGs and will help them build their respective components. After the preliminary assessment of PMS activities at DDA and a couple of TWG meetings, PQM+ is working to streamline the RB-PMS approach within DDA's functions. An RB-PMS planning workshop next quarter will examine ways to implement the RB-PMS, along with the roadmap to develop Nepal-specific RB-PMS guidelines, related standard operating procedures, work instructions, and an information management system. PQM+ supported DDA with a comparative analysis of PMS screening technologies and facilitated the translation and review of existing PMS provisions to strengthen PMS systems at the central and provincial levels.

PQM+ closely worked with the DDA's Inspection Division and the Inspection TWG to forward the agenda of risk-based inspection. The program facilitated amending SOPs, such as those covering inspection and recall, that would assist the process of institutionalizing risk-based inspection. PQM+ is focusing on support for manufacturing facilities inspections and will gradually shift toward importers and distributers. Similarly, PQM+ reviewed the complaint-handling process at the DDA's Inspection Division. The review showed areas that the division needs to address and PQM+ is working with DDA to update the complaint-handling SOP to reflect best practices.



Results of workforce assessment at DDA and NML

PQM+ reviewed the Nepali GMP code for inspection of medical product manufacturers, importers, and distributors to determine the gaps and inconsistencies with international standards. DDA, with the support from PQM+, has revised the code and is in the process of submitting it with supplementary annexes to the Drug Advisory Committee for approval.

The workforce development activities cut across the DDA and NML, who both joined PQM+ in holding the long-awaited workforce assessment results validation workshop. PQM+ presented

findings of the assessment, which DDA and NML officials reviewed and gave feedback on. With support from PQM+, the two agencies will disseminate the report and institutional development plan next quarter.

PQM+ participated in the WHO's GBT assessment and gave necessary input and support to DDA and NML in the process. PQM+ continued collaborating with MTaPS on the newly drafted drug law and participated in the reorganization workshop that MTaPS organized.

Objective 4: Supply of quality-assured essential medical products of health importance increased

PQM+ collaborated with the government, nongovernmental, and private sectors to work on the supply of quality-assured essential medicines. PQM+ worked with DDA to publish an expression of interest aimed at pharmaceutical manufacturers on WHO prequalification technical assistance on selected medicines. Thirteen manufacturers submitted materials with required documentation. A committee will now oversee the process to select the manufacturers and medicines that will be eligible to receive the technical assistance.

PQM+ has planned capacity building activities in the form of basic GMP training to private manufacturers in the next quarter to improve their GMP compliance. Similar training will assist the regulatory body to enhance its supervisory abilities. For this task, PQM+ assessed priority training requirements through a training needs assessment for both entities.

PQM+ is also planning for the development of the Nepal Pharmaceutical Strategy and carefully engaging a multitude of stakeholders. These include the DDA, NML, APPON, Chemists and Druggists Association, Nepal Medical Council, Ministry of Health and Population, Ministry of Industry, academia, and USAID. PQM+ has started informal discussions with key people and is planning to form a working group to develop the strategy. PQM+ consortia partner IQVIA will conduct a landscape analysis of the Nepali medicines market to inform the strategy. PQM+ has finalized the necessary technical and financial arrangements for the study.

To assure the quality of medicines in the public medicine supply chain, PQM+ is working on two fronts: 1) holding discussions with entities at the national and subnational levels and 2) reviewing current public procurement practices and policies at the federal, provincial, and local levels. With the federal structure taking shape, public procurement is being increasingly decentralized to local levels, creating a more challenging landscape, and requiring interventions across the procurement process. PQM+ had positive preliminary discussions with the National Health Insurance Board on the supply of quality medicines that health facilities procure through universal health coverage. Similarly, PQM+ continued discussions with the MoHP's Logistics Management Division for quality assurance in the public procurement supply.

PQM+ Nepal and the Nepal Health Research Council (NHRC) reached an informal agreement to jointly work on the common agenda on awareness of SF medicines. Following three NHRC research studies on substandard medicines, both NHRC and PQM+ hope to engage relevant stakeholders on the issue and seek an effective way to raise awareness on SF medicines.

Priority Activities for Next Quarter

PQM+ plans to:

- Support the National Medicines Laboratory with the institutional development plan for ISO accreditation and provide a short-term consultant to complete the lab documentations.
- Finalize a workforce development plan and lay the groundwork for its implementation, with agreement from DDA and NML.
- Hold a workshop on RB-PMS planning and draft Nepal-specific RB-PMS guidelines.
- Finalize and endorse a risk-based inspection framework.
- Finalize and endorse a complaint system handling mechanism.
- Start the first phase of GMP training to industries and the DDA.
- Select industries and medicines for WHO prequalification technical assistance and begin the process of onsite assessments.
- Commence the landscape analysis of the Nepali medicines market.
- Hold a multi-stakeholder seminar on SF medicines.
- Conduct review visits at the provincial and local levels to understand the medical product procurement process.

Pakistan

Pakistan's regulatory system has limited capacity for medicines quality surveillance, contributing to the proliferation of SF medical products. Lack of regulatory enforcement and availability of centers to conduct reliable bioequivalence studies reduces confidence in the efficacy of generic medical products manufactured in the country. Inconsistent government policies for the pharmaceutical sector have undermined the private sector's potential role in improving health outcomes. The PQM+ Pakistan program is addressing these challenges through four areas: improving governance of medical product QA systems; strengthening medical product regulations; enhancing private sector engagement; and reducing the availability of SF medical products. PQM+ works closely with the Drug Regulatory Authority of Pakistan (DRAP).

In terms of specific country objectives, the PQM+ work plan focuses on advancing medicines quality assurance elements to enhance Global Health Security Agenda initiatives; curbing antimicrobial resistance; promoting maternal, neonatal, and child health; addressing communicable diseases; and engaging the private sector in achieving better health outcomes and contributing to economic development.

Progress by PQM+ Objective

In Q2, PQM+ Pakistan's program activities focused on using a holistic approach to improve the quality of medical products and systems through the following areas:

Objective 1: Governance for medical product quality assurance systems improved

Development of ISO 17025:2017 QMS system SOPs of the National Appellate Laboratory, Islamabad: In the previous quarter, PQM+ completed the gap assessment of the Appellate

Laboratory at the National Institute of Health (NIH) in Islamabad against ISO 17025: 2017 standards, followed by the development of a CAPA plan. PQM+ also developed the quality manual, which NIH will sign after the receipt of PT samples. (PT results for pH are already in hand.) As a result of PQM+ assistance during Q2, all QMS documents are in the final stages of printing and signing. Lab staff are conducting final uncertainty measurement calculations for HPLC and pH on their internal control templates, and PQM+ has issued method verification protocol for execution.

Development of risk-based regulations for market authorization of high-risk medical devices: PQM+ completed a detailed gap assessment for the development of medical devices regulations for DRAP, reflecting international regulations on aspects including regulatory structure, device classification, device approval, and post-marketing surveillance. The team used the GBT to conduct the assessment and provided DRAP with a rating of medical devices according to WHO GBT indicators, including legal provisions, regulations, guidelines, policy and strategic planning, quality and risk management system resources, organization and governance, monitoring progress, and assessing impact. PQM+ assistance helped lay out short, medium, and long-term recommendations for DRAP based on the assessment, including HR capacity related to medical devices, development of integrated information management systems, establishment of conformity assessment bodies to evaluate medical devices, planning for high-priority equipment protocols, and protocols for refurbished and remanufactured equipment. PQM+ would disseminate the gap assessment of medical device regulations to the stakeholders, including the Medical Devices and Medicated Cosmetics Board, manufacturers, importers, and others.

The PQM+ team meets with the CEO of DRAP regarding the gap assessment.

Objective 2: Country and regional regulatory systems to assure the quality of medical products in the public and private sectors improved

Improve the laboratory quality system by preparing additional laboratories for international certification: Following last quarter's completion of the gap assessment of the Public Health Laboratory (PHL) at the Institute of Public Health (IPH) in Lahore for the achievement of ISO 15189 accreditation (an international standard for QMS at Medical Diagnostic Laboratories), PQM+ developed a list of procedures and two policy documents on quality and ethical policy, required for the IPH lab for Pakistan National Accreditation Council (PNAC) accreditation.

As a result of PQM+ assistance, PHL's application is ready to submit for accreditation to PNAC, while the procurement of calibration and PT services is in process.

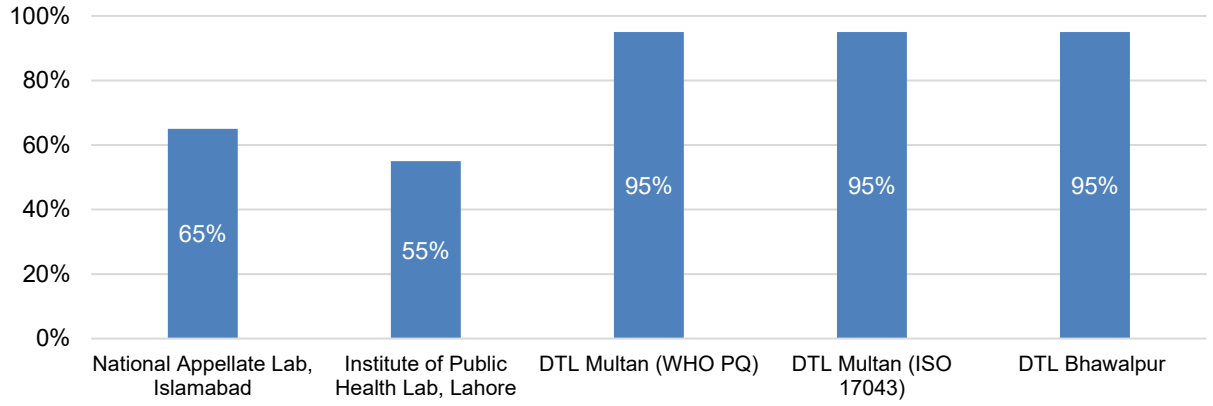
Public Health Lab at IPH, Lahore

PQM+ and the WHO Prequalification Team (PQT) established a partnership for peer audits to strengthen the quality control lab system in Pakistan. For this, the PQM+ team visited the Drug Testing Laboratory in Multan to prepare

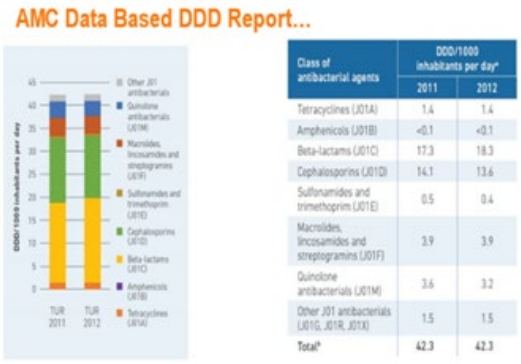
peer audits. PQM+ also assisted in addressing queries on the laboratory information file against the ISO 17043 standard (on PT) from the PNAC.

Figure 10 shows the progress made by selected PQM+-supported laboratories in Pakistan in achieving accreditation in the last two quarters.

Figure 10. Percentage of the Milestones toward Accreditation Achieved by Selected Labs in Pakistan as of March 2021

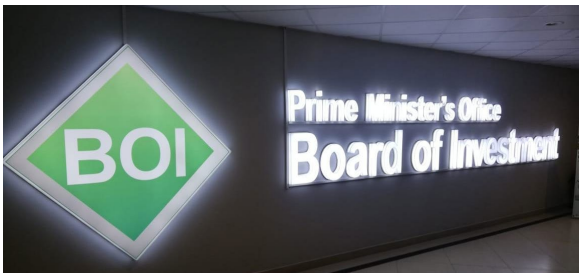


Development of Antimicrobial Consumption (AMC) dashboard in PIRIMS: AMC quantifies the consumption of antimicrobial agents, conducts comparative analysis at the country level, and evaluates the impact of regulatory interventions, therefore it plays a key role in AMR surveillance. Access to AMC data, however, remains challenging in Pakistan. To address this, PQM+ collaborated with DRAP to develop the AMC dashboard, which helps pharmaceutical industry users submit data relating to production/batch details, sale details, distributors, resellers, and patients details through the PIRIMS portal. DRAP provided feedback on the AMC dashboard during the reporting quarter, and PQM+ is working to incorporate those suggestions.



AMC data-based report

Private sector engagement to increase the supply of quality-assured priority medical products: PQM+ developed a concept note to formulate a national pharmaceutical development strategy for Pakistan. In this regard, PQM+ conducted several meetings with the Chairman of the Board of Investment (BOI) and officials from the Prime Minister's Office to discuss ways of attracting new investment, bringing about industrial reforms for realizing greater export potential, diversification into knowledge-based sectors, and a new level of global economic connectivity. Stakeholders also mutually agreed to develop a 10-year national pharmaceutical development strategy.

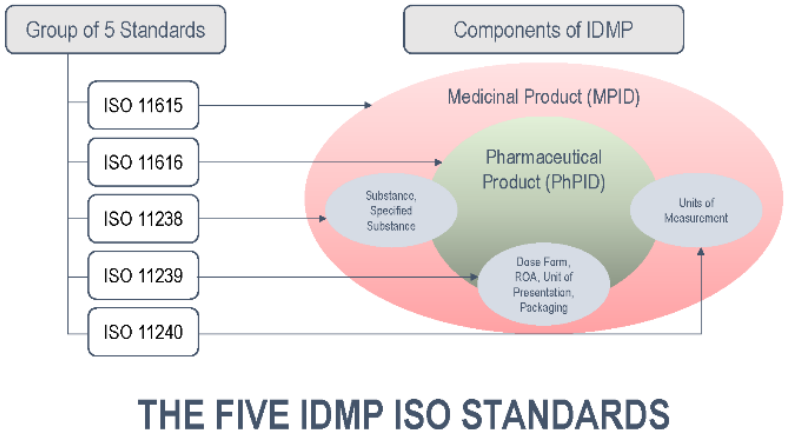


For this purpose, the PQM+ team conducted a high-level virtual meeting on February 17, 2021, with the Prime Minister's Office, Board of Investment Secretary, Executive Director General and team, and PQM+ senior experts from USP's Pakistan office and USP headquarters. Meeting participants agreed to establish a technical working group comprising senior experts from both organizations. PQM+ shared its list of nominated experts and is awaiting BOI's nominations.

Objective 3: Supply of quality-assured essential medical products of health importance increased

Support the adoption of data standards, including the common technical document format, to facilitate dossier review and information management with manufacturers: The ISO Identification of Medicinal Products (IDMP) standards specify the use of standardized definitions to identify and describe medicinal products for human use. The purpose of these standards is to facilitate the reliable and consistent exchange of medicinal product information by providing a common product language for stakeholders to use in their interactions. With PQM+ support, Pakistan is the first country in Asia where an MRA is adopting these ISO IDMP standards.

PQM+ is providing technical assistance to DRAP to adopt and implement IDMP standards. Last quarter, PQM+ shared the five IDMP ISO standards and the draft roadmap with DRAP for the implementation of these standards, including:



1) Drug substances (ISO 11238);
2) Pharmaceutical dose forms, units of presentation, routes of administration, and packaging (ISO 11239);
3) Units of measurement (ISO 11240);
4) Regulated pharmaceutical product information (ISO 11616); and
5) Regulated medicinal product information (ISO 11615).

The PQM+ team has developed the draft guidance document for IDMP (API and Drug Products), which DRAP is reviewing.

Priority Activities for Next Quarter

Governance and Regulation

- Emergency use authorization (EUA) guideline finalization and training for all stakeholders;
- Provision of API and FPP dashboard for DRAP;
- Follow up with DRAP for dissemination of National Action Plan on RB-PMS for provincial implementation;
- Consultative meeting on national PPE standards;

- Virtual trainings for public and private sector labs on new emerging COVID-19 diagnosis by U.S.-based companies;
- Training of DRAP staff on GLP and GCP; and
- Training for capacity building of tertiary care hospitals for in-house manufacturing of alcohol-based hand rub (ABHR)/sanitizer.

Lab Support

- Joint peer audit of drug testing laboratory Multan for WHO-PQ audit preparation and
- Gap assessment of PIMS lab for ISO 15189.

Supply/Manufacturing Support

- Training of PPE manufacturers on ISO 13485 and
- Follow up with BioBiz, Anwar Khawaja Composites (AKC), and Adsells on CAPA points.

Europe and Eurasia Region

Central Asia/Kazakhstan

PQM+ is strengthening the medicines regulatory system in Kazakhstan by providing technical assistance to the National Center for Expertise of Medicines and Medical Devices (NCEM). The main objectives are to improve the medicines registration system; support MQCLs so they can test the quality of medicines reliably and accurately according to international standards; strengthen the GMP inspectorate; and prepare the country for accession to PIC/S. The program also provides technical support to the pharmaceutical manufacturer Nobel Pharmsanoat and Association of Pharmaceutical Manufacturers to increase the supply of locally manufactured quality-assured TB medicines on the local market.

In PY2, PQM+ is working to:

- Improve country regulatory systems to assure the quality of medical products and
- Increase the supply of quality-assured medical products.

Progress by PQM+ Objective

Objective 2: Country and regional regulatory systems to assure the quality of medical products in the public and private sectors improved

In Q2, NCEM informed PQM+ that, starting July 1, 2021, registration of medicines in Kazakhstan will have to comply with regulations of the Eurasian Economic Union (EAEU). PQM+ met several times with NCEM to understand the impact of those changes on the medicines registration system in Kazakhstan. NCEM confirmed that EAEU harmonization will not impact plans to address gaps pinpointed in the WHO GBT assessment. PQM+ will continue discussions with NCEM to identify areas in which the program can help NCEM achieve GBT Maturity Level 3 in medicines registration.

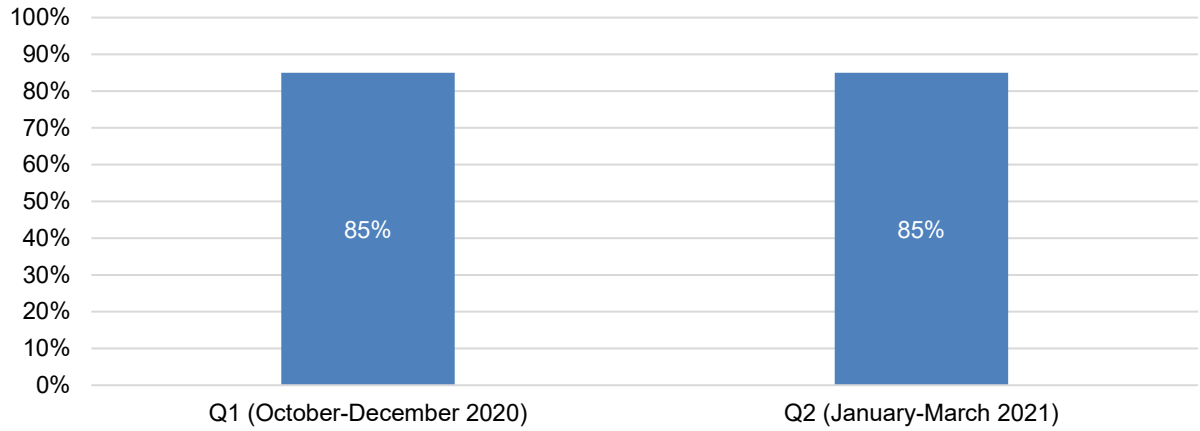
The WHO collaborative procedure for accelerated registration of prequalified finished pharmaceutical products is a fast-track process for registering quality-assured medicines. Although Kazakhstan is a member of the WHO collaborative registration procedure (CRP), it

does not use this mechanism to register medicines. In Q1, NCEM developed a final version of the SOP for review and registration of WHO-prequalified medicines. In Q2, however, NCEM informed PQM+ that application of CRP under EAEU regulations will require additional discussion with EAEU members. As such, PQM+ continues to engage with the NCEM to understand the implications of the EAEU regulations and to continue to advocate for the CRP as a means of fast-tracking the registration process for quality medicines.

The WHO GBT assessment of Kazakhstan identified gaps in market surveillance and control. In PY1, PQM+ developed a customized RB-PMS guideline for NCEM. In Q1 PY2, NCEM developed rules for market sampling, which incorporated some of the PQM+ recommendations. In Q2, PQM+ introduced the concept of RB-PMS and the MedRS tool to NCEM. The meetings included 30 representatives from the NCEM and MQCLs—the units involved in PMS. RB-PMS is new to NCEM, so PQM+'s introduction of the concept and tool generated significant interest from NCEM. PQM+ will continue working with NCEM to develop a system for RB-PMS, including adoption of the corresponding guideline. In the short term, NCEM hopes to establish procedures for sample collection from the market, while PQM+ will provide the corresponding technical assistance.

In Q2, PQM+ continued technical assistance to the Almaty and Karaganda MQCLs to help them achieve and maintain WHO-PQ. WHO's peer audit of the Almaty MQCL was scheduled for November 2020 but had to be postponed due to COVID-19 travel restrictions. PQM+ coordinated with the Almaty laboratory and WHO to conduct a virtual assessment of the laboratory in April. PQM+ will submit the assessment report to WHO for consideration as a peer audit report. Based on the findings of the assessment and review of the peer audit report, WHO will decide a date for the audit of the lab for WHO prequalification. Meanwhile, PQM+ continued to provide technical assistance on the implementation of CAPAs following a virtual internal audit in Q1 of the Almaty laboratory to verify compliance with ISO 17025:2017 standards and WHO's GLP guidelines. PQM+ assisted the laboratory in revising its quality manual and several SOPs to comply with WHO and ISO requirements. The program also began translating into English key revised documents such as the quality manual and SOPs for submission to WHO and started procuring safety showers for the laboratory. These showers are part of WHO's safety requirements for pharmaceutical quality control laboratories.

Figure 11. Percentage of the Milestones toward WHO Lab Prequalification, Almaty NQCL, FY 2021 Quarter 1 and Quarter 2



The Karaganda MQCL received WHO prequalification in March 2020. This March, the laboratory submitted its WHO-Prequalified Quality Control Laboratory annual activity report, which PQM+ helped develop. PQM+ also assisted the laboratory in revising (and translating into English) its quality manual, SOPs, and laboratory information file to remain compliant with recent changes in the laboratory. In Q2, the program began procuring three analytical instruments (pH-meter, conductometer, and Karl Fischer titrator) to improve the laboratory's compliance with WHO guidelines. Given COVID-19 restrictions and a reduced workload, NCEM temporarily closed the Nur-Sultan MQCL.

PQM+ is supporting Kazakhstan in strengthening the pharmaceutical inspectorate and preparing for ascension to PIC/S membership. This will facilitate reliance and open access to the GMP inspection mechanism with other PIC/S member countries, resources for further capacity development, and eventually quality-assured medicines in-country. Kazakhstan's membership of PIC/S and the application of the PIC/S GMP guidelines in the inspection of the local industry will also facilitate export.

In Q2, PQM+ continued extensive assistance to the working group, which consists of representatives from the Committee for Medical and Pharmaceutical Control and NCEM. Joint work included organizational structure, QMS, training procedures, and legislation for the inspectorate. Specific areas of support included establishing a system of cooperation between the inspectorate and licensing and registration departments of the Committee and NCEM. Also in Q2, PQM+ led a three-session virtual training on inspection program preparation and tools for the inspectorate. The training, which 51 participants from the Committee and NCEM attended, covered preparation for inspection, key sources of information, an inspection program overview, adjustment of the program to meet inspection needs, and inspection tools. In addition, PQM+ developed a road map highlighting key areas of preparation for PIC/S application. A detailed discussion of the road map with NCEM senior management will take place in Q3.

In Q2, PQM+ met with the management of NCEM's scientific-educational center. This new entity trains NCEM staff and external stakeholders. Establishing the center is important to ensure the sustainability of PQM+'s efforts to build the capacity of the medicines regulatory workforce in Kazakhstan. In Q2, PQM+ worked on an approach for extensive support to ensure that the center is well equipped from a technical and methodological standpoint to support continuous capacity building of its colleagues at NCEM, as well as other stakeholders in the country. In Q3, PQM+ will propose this technical assistance to the center and begin implementation.

Objective 4: Supply of quality-assured essential medical products of health importance increased

In Q2, Nobel Almaty Pharmaceutical factory notified PQM+ of the suspension of its WHO-PQ project as it works on other priorities. PQM+ is redefining the activity to support a wider range of manufacturers in strengthening their quality assurance systems.

Priority Activities for Next Quarter

PQM+ plans to:

- Address findings related to good regulatory practices from the GBT assessment in collaboration with NCEM;

- Assist NCEM in transitioning from national regulations pertaining to the registration of medicines to EAEU's regulations. This should help ensure the quality of medicines on the market;
- Continue technical assistance to the NCEM on developing approaches and procedures for RB-PMS;
- Conduct a virtual audit of the Almaty MQCL to assess its compliance with WHO-PQ requirements;
- Continue technical assistance to the PIC/S working group in the areas outlined in the PIC/S accession roadmap; and
- Initiate technical assistance to the scientific-educational center to ensure it becomes a main element of the system for continuous education of NCEM staff.

Uzbekistan

Uzbekistan is graduating from Global Fund-supported procurement of TB medicines to domestically funded procurement and plans to gradually increase the allocation of funding to procure second-line TB medicines. The government's strategy is to ensure that domestically produced, quality-assured medicines are available for procurement. In recent years, the Government of Uzbekistan introduced several initiatives to strengthen the local production of quality-assured medicines in the country.

In support of this strategy and generally to ensure quality of medicines on the local market, PQM+ is assisting the Agency on Development of the Pharmaceutical Industry ("the agency") around medicines regulatory systems strengthening. This includes improving the medicines review and registration system, supporting MQCLs to test the quality of medicines reliably and accurately, and preparing the GMP inspectorate for PIC/S accession. The program also focuses on increasing the supply of locally manufactured, quality-assured TB medicines by providing technical assistance to pharmaceutical manufacturers.

In PY2, PQM+ is working to:

- Improve country regulatory systems to assure the quality of medical products and
- Increase the supply of quality-assured medical products

Progress by PQM+ Objective

Objective 2: Country and regional regulatory systems to assure the quality of medical products in the public and private sectors improved

In Q2, the agency drafted a new version of the Cabinet of Ministers decree No. 213, which regulates the procedure for registration of medicines, medical devices, and medical equipment. A major update in this new decree is the agency's plan to eventually make the CTD obligatory in submission of the product dossiers for approval. This will require manufacturers, both local and foreign, to submit their dossiers in the standardized internationally acceptable CTD format. PQM+ conducted a technical review of the decree and provided detailed recommendations for improvement. In addition, PQM+ organized meetings with the agency to provide additional clarifications and guidance on the decree, which is now final and ready to submit for Cabinet of Ministers approval.

In Q2, PQM+ continued technical assistance to the agency in updating SOPs for dossier review. Agency staff are working on updating 47 SOPs. In Q2, PQM+ reviewed two SOPs. PQM+ will review and finalize the remaining SOPs in Q3.

PQM+ continued to facilitate coordination between the agency, the Global Fund /National TB Program (GF/NTP), and the Global Drug Facility (GDF) on the registration of WHO-prequalified medicines in Uzbekistan through the WHO CRP. Daily coordination meetings between PQM+, GDF, and NTP address preparation of the document to submit it for registration through the WHO CRP mechanism. One barrier to registration is that approval for a reduced registration fee through WHO CRP is pending with the Ministry. PQM+ is supporting the agency in advocating for the reduced fee approval. PQM+ also facilitated a meeting between the directors of NTP and the agency on the state purchase of TB medicines. The parties agreed that they will collaborate on ensuring the timely registration of the medicines procured with the state funding through the GDF.

The agency is developing an integrated information management system to register medicines. This activity complements the current PQM+ support for the implementation of decree no. 123 that requires CTD. PQM+ offered to provide technical assistance, leveraging similar experiences from other PQM+ supported countries. PQM+ met with the agency to understand its need and to share lessons learned from Pakistan and other PQM+ countries and demonstrated a model of the integrated management system. In addition, PQM+ developed a demo version specifically for Uzbekistan and provided the agency access to review it. As a next step, the agency and PQM+ will develop a scope for PQM+ technical assistance in this area. The scope will include development and use of data standards and identification of critical user specifications for an integrated regulatory information management system.

PQM+ organized a virtual meeting with the deputy director and director of the agency on Pharmaceutical Inspection Co-operation Scheme (PIC/S) accession, specifically around the organizational structure of the National Pharmaceutical Good Practice (GxP) Inspectorate. PQM+ proposed transforming the current system to align with the PIC/S requirements. With PQM+ technical assistance, the agency's PIC/S working group finalized the SOP for internal audits, inspector's annual plan, annual work plan for the GxP inspectorate, and the matrix of inspectors. PQM+ also supported the agency in preparing updated versions of the SOP for inspections, reviewing the legislation, and considering changes needed in the organizational structure of the GxP inspectorate.

In January, PQM+ conducted a three-day online Good Distribution Practices training for the agency's entire GMP inspectorate staff, comprising 39 GMP inspectors and experts. They learned about key principles of the GDP, key responsibilities of the pharmaceutical inspectorate in GDP-related inspections, how to organize a GDP inspection process, and the follow-up. The training also included practical tasks for the participants. In March, PQM+ conducted a two-day online training titled "Quality Risk Management (QRM): Application by Inspectors and Inspectorate" for the GMP inspectorate staff. Attending were 43 GMP inspectors and experts, who learned about the basic principles of QRM, the risk-based approach by inspectors and the inspectorate, how to organize an QRM inspection process, and the follow-up activities.

At the agency's request, PQM+ developed guidelines and recommendations for the laboratory design and layout and submitted them for the agency's consideration as it works with local vendors to design a laboratory building at the new pharmaceutical cluster, Pharma Park. In Q2, PQM+ continued assisting the Tashkent and Andijan MQCLs and three regional laboratories as they prepared for local accreditation. In March, PQM+ organized a training on the verification of analytical methods" for all laboratories (Tashkent, Samarkand, Andijan, Karshi, and Urgench). During the two-day online training, 22 MQCL staff and experts learned about the differences

between validation and verification, basic principles to verify the new methods and the structure of the verification SOP. The training also included practical tasks for participants.

In addition, PQM+ continued technical assistance to Tashkent and Andijan laboratories in strengthening their QMS for WHO prequalification. In Q2, PQM+ updated the implementation plan for Tashkent and Andijan MQCLs, which the counterparts discussed and agreed to. Correspondingly, PQM+ recorded the following progress on its recommendations:

- The Andijan laboratory is establishing a QA department consisting of two quality assurance managers and developing corresponding job descriptions. PQM+ also reviewed the Andijan laboratory's quality manual and provided recommendations for improvement; the lab staff will update it accordingly.
- The Tashkent laboratory reviewed and updated the implementation plan and the catalog of reference standards; PQM+ is reviewing these documents.

Objective 4: Supply of quality-assured essential medical products of health importance increased

In Q2, per PQM+ recommendations, Nobel Pharmaceutical took important steps in cross-contamination risk management, testing air samples by using the analytical method developed earlier. Nobel is preparing the corresponding report and will submit it to PQM+ for review.

Priority Activities for Next Quarter

PQM+ plans to:

- Review the newly developed SOPs for strengthening the medicines registration system;
- Provide technical assistance to develop the integrated information management system for medicines registration;
- Facilitate registration of WHO-prequalified TB medicines through the WHO CRP mechanism;
- Conduct an assessment of the three additional regional MQCLs (Samarkand, Karshi, and Urgench);
- Continue technical assistance to the PIC/S working group in its preparation for the PIC/S accession, including strengthening QMS and building the GxP inspectorate staff's capacity;
- Complete delivery of HPLCs to Andijan MQCL;
- Provide technical assistance to MQCLs as they prepare for local ISO17025 accreditation;
- Start technical assistance on strengthening the post-marketing surveillance system; and
- Continue technical assistance to Nobel Pharmaceutical in its preparation for WHO-PQ for levofloxacin production.

COVID-19 Response Activities

Bangladesh

Based on the job aid for DGDA reviewers and inspectors, PQM+ developed technical briefs and a short summary on each COVID-19 medical product for manufacturers applying for emergency use authorization / no objection certificate (EUA/NOC). Understanding the requirements will help manufacturers seek and DGDA reviewers provide first-track NOC for manufacturing or importation of these products. The technical briefs provide information on regulatory requirements to import medical devices, medicines, the RT-PCR test kit for COVID-19, antibody test kits (rapid and laboratory ELISA method), and other class C and class D medical devices.

PQM+ disseminated the guidelines, job aid, and technical briefs to manufacturers' regulatory affairs personnel in a webinar on January 21, 2021, to improve their understanding of the EUA/NOC process. The regulatory affairs personnel expressed gratitude for the webinar and documents and requested additional sessions for the continuous development of their regulatory knowledge.

Pakistan

The PQM+ COVID-19 program supported DRAP and the pharmaceutical industry through the following major activities:

Consultative meeting to develop an RB-PMS plan on the existing RB-PMS framework: During the COVID-19 pandemic, regulatory authorities and the pharmaceutical industry are operating under immense pressure, leading to weak monitoring and regulatory oversight. To ensure effective post-marketing surveillance of medical supplies related to COVID-19 and an effective response to public health risks, as well as to alert and protect the public from the threats posed by SF medical products, an RB-PMS plan for COVID-19 medical supplies will help to monitor the safety, quality, and use of COVID-19-related medical products in the market.

Dr. Khalid Syed Bukhari, chief of party of PQM+ Pakistan, addresses provincial health stakeholders.

Participants attend a consultative meeting on RB-PMS for COVID19 products, March 9-11, 2021.

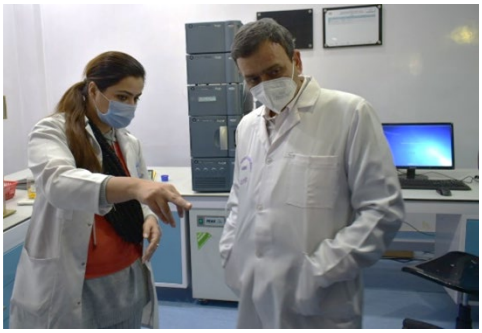
For this purpose, PQM+ organized a three-day March consultative meeting in Islamabad to develop a RB-PMS plan on the existing RB-PMS framework. Senior management of health departments from all provinces and the Azad Jammu and Kashmir (AJK) region participated. At the end, all provincial and regional health authorities unanimously endorsed two declarations and an action plan:

1) Declarations on a national action plan for RB-PMS;

2) A declaration to establish a NQCLs technical forum; and
3) A national action plan for RB-PMS of COVID-19 supplies.

Building NQCLs' Capacity to Test Medical Products Related to COVID-19: National quality control labs play an important role in post-marketing surveillance and in ensuring the quality of medical products. The COVID-19 pandemic situation further highlights the importance of these QC labs. To reduce the impact of COVID-19 and to ensure the quality of COVID-19-related medical products, the PQM+ program plans to build staff capacity for quality control labs for COVID-19 related medical products testing.

PQM+ collaborated with DRAP and provincial health authorities to organize a three-day technical training for NQCL staff on lab techniques for testing medical products related to COVID-19. Twenty participants (five female and 15 male) from all provinces attended the January training in Lahore.



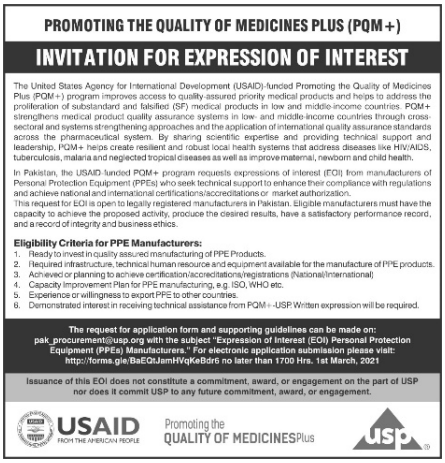
An NQC training on medical products related to COVID-19.

Emergency use authorization (EUA) Regulatory Approvals from DRAP: PQM+ supported DRAP in addressing the challenges arising from COVID-19-related EUA of medical devices from DRAP reference authorities (e.g., the U.S. Food and Drug Administration, etc.), medical devices from nonreference countries, or indigenously designed local medical devices. In this regard, the PQM+ medical device consultant developed and shared draft EUA procedures, which DRAP and stakeholders are now reviewing.

EUA for COVID-19 Vaccines: On February 12, DRAP granted EUA for China's CanSino Biologics vaccine, which is expected to be commercially available to the private sector. Other vaccines with EUA are primarily for the public supply. The Pakistani government has deregulated the price of vaccines commercially available in the private sector for six months to ensure their availability for the public.

Engaging Local Private Sector to Manufacture Quality-Assured PPE: PQM+ supported PPE manufacturer AKC to organize a successful virtual exhibition. More than 1,000 business clients and buyers visited a virtual PPE stall. AKC received several queries from national and international buyers for their products, which comply with international standards, and confirmed its first order of KN 95 and surgical masks (100,000 of each type) from the U.S. market. The manufacturer is aiming for in-country PPE procurement from the private and public sectors.

After receiving USAID approval, PQM+ published an EOI in the leading national daily newspapers for PPE manufacturers to apply for technical assistance from PQM+ to become compliant with international standards.



PROMOTING THE QUALITY OF MEDICINES PLUS (PQM+)

INVITATION FOR EXPRESSION OF INTEREST

The United States Agency for International Development (USAID)-funded Promoting the Quality of Medicines Plus (PQM+) program improves access to quality-assured priority medical products and helps to address the proliferation of substandard and falsified (SF) medical products in low and middle-income countries. PQM+ strengthens medical product quality assurance systems in low- and middle-income countries through cross-sectoral and systems strengthening approaches and the application of international quality assurance standards across the pharmaceutical system. By sharing scientific expertise and providing technical support and leadership, PQM+ helps create resilient and robust local health systems that address diseases like HIV/AIDS, tuberculosis, malaria and neglected tropical diseases as well as improve maternal, newborn and child health.

In Pakistan, the USAID-funded PQM+ program requests expressions of interest (EOI) from manufacturers of Personal Protection Equipment (PPEs) who seek technical support to enhance their compliance with regulations and achieve national and international certifications/accreditations or market authorization.
This request for EOI is open to legally registered manufacturers in Pakistan. Eligible manufacturers must have the capacity to achieve the proposed activity, produce the desired results, have a satisfactory performance record, and a record of integrity and business ethics.

Eligibility Criteria for PPE Manufacturers:

1. Ready to invest in quality assured manufacturing of PPE Products.
2. Required infrastructure, technical human resource and equipment available for the manufacture of PPE products.
3. Achieved or planning to achieve certification/accreditations/registrations (National/International)
4. Capacity Improvement Plan for PPE manufacturing, e.g. ISO, WHO etc.
5. Experience or willingness to export PPE to other countries.
6. Demonstrated interest in receiving technical assistance from PQM+-USP. Written expression will be required.

The request for application form and supporting guidelines can be made on: pak_procurement@usp.org with the subject "Expression of Interest (EOI) Personal Protection Equipment (PPEs) Manufacturers." For electronic application submission please visit: http://forms.gle/BaEQtJamHVqKeBdr6 no later than 1700 Hrs. 1st March, 2021

Issuance of this EOI does not constitute a commitment, award, or engagement on the part of USP nor does it commit USP to any future commitment, award, or engagement.

USAID FROM THE AMERICAN PEOPLE Promoting the QUALITY OF MEDICINES Plus USP

EOI shared for PPE manufacturers

Engaging Local Private Sector to Manufacture Quality-Assured Remdesivir: PQM+ technical assistance enabled BF BioSciences Limited (a subsidiary of Ferozsons Group) to complete its six-month stability data on trial batches and apply for a shelf-life extension of up to 24 months from the Indonesian Food and Drug

Administration. BioSciences is awaiting the response. In addition, Ferozsons Group completed its media fill and HVAC filter integrity trials. PQM+ initiated a risk assessment of each step in manufacturing and analytical testing to prepare for inspection by the Pharmaceutical Inspection Co-operation Scheme (PIC/S). Subsequently, PQM+ is providing technical support on the expected GMP inspection for a PIC/S member country.

PPE Testing Equipment: The PQM+ team finalized the list of PPE testing equipment along with its testing specifications, and associated costs and shared with USP headquarters (HQ). The USP HQ will issue a request for quotation (RFQ) in this regard.

Engaging Local Private Sector Laboratories to Test PPE: As a part of PQM+'s support to private sector laboratories for PPE testing, the program's experts joined DRAP officials in compiling a document titled "Conditions and Accountabilities Criteria" for independent and outsourced PPE testing labs that intend to serve as a third-party lab for PPE manufacturers. This document will also help to define prerequisites for any third-party PPE lab to submit its application for the third-party testing license and will assist in setting standards to evaluate license applications based on international best practices.

The PQM+ team meets with DRAP's chief executive officer and director of the medical devices and medicated cosmetics division.

DRAP's Medical Devices and Medicated Cosmetics Board (MDMCB) reviewed the conditions and accountability criteria and will share its recommendations at the next MDMCB meeting.

Furthermore, PQM+ technical support enabled the Tti lab to procure new equipment to improve its technical capability for bacterial efficiency testing.

Serbia

In August 2020, PQM+ began working with the Government of Serbia (GOS) to respond to the COVID-19 pandemic. The program is helping the GOS explore options for external evaluation and market entry of the enzyme-linked immunosorbent assay (ELISA) test kit produced by the Institute for the Application of Nuclear Energy (INEP) at the University of Belgrade to regional and/or international markets and investing in and expanding manufacturing if sufficient market opportunities exist. Specifically, PQM+ was tasked with:

- Assisting INEP with third-party performance validation/evaluation of the ELISA COVID-19 test and
- Implementing a market demand/competitiveness assessment of the ELISA kit.

This quarter, PQM+ worked with its partners to find and contract a third-party lab to evaluate INEP's ELISA test kit. In January, PQM+ partner the Global Health Impact Group (GHIG) received a response to its request for available labs from *Institut Pasteur Dakar* Lab (IPD) in Senegal. IPD is one of the main labs working on COVID-19 testing for the African Center for Disease Control (CDC). The lab was available, interested, and had the necessary equipment (including samples) and expertise to evaluate the ELISA test. IPD has more than 500 well-characterized consecutive COVID specimens from polymerase chain reaction (PCR) positive hospital patients and contacts, plus surveillance specimens against which it can test INEP's

ELISA test. IPD is also performing other COVID-19 test evaluations, which will allow a comparison of INEP's ELISA test to other diagnostic tests.

On January 15, PQM+ and GHIG facilitated a call between INEP and IPD to discuss the timeline, operations, and any other questions between the two parties. The team decided that INEP would ship six plates (with 500 assays per plate) of its ELISA test from two separate batches so IPD can evaluate the tests' performance, reproducibility, and user-friendliness. IPD will also facilitate the shipment through Senegal customs; and upon receipt, the evaluation should take about three weeks. After the call, INEP reached out to FedEx and DHL for shipment cost estimates. A challenge for INEP in shipping its ELISA kits is that one component needs to stay frozen. While INEP was setting up shipment of the ELISA kits, PQM+ worked to procure IPD's services so the lab would be ready in mid-February, at the time of the plates' shipment.

In February, INEP finalized shipping details with FedEx and the export and customs documents needed to facilitate shipment of the ELISA test kit samples to IPD. During this time, PQM+ procured IPD's services as a third-party evaluator, setting IPD up as a new vendor in USP's systems and drafting a lab services contract. PQM+ sent the contract to IPD in early March. INEP shipped the ELISA kits on February 26, and they arrived in Dakar five days later. Upon receipt of the tests, IPD created an analysis schedule and is working on the evaluation. The evaluation should be finalized by the end of March, with the first draft of the evaluation report ready in the first week of April.

In addition to supporting the evaluation of INEP's test kits, PQM+ and its partners are preparing a market demand and competitiveness assessment of the ELISA kit. GHIG completed the first draft of the market demand/competitiveness assessment in January, with PQM+ completing the internal review in February. PQM+ will review the draft internally. In the report, PQM+ suggests potential pricing strategies, the importance of WHO prequalification, potential market entrances, and ways to market ELISA to the most relevant audiences. The final version of the assessment should be ready for dissemination in late March or early April.

New Buy-Ins

Table 3. Summary Discussions with USAID for Priority Activities for Future Funding

USAID Team	Summary and Next Steps
Bangladesh COVID-19 Vaccine Activity	This quarter, PQM+ received funding to continue its COVID-19 work in Bangladesh. For this funding, PQM+ will focus its activities supporting the NMRA with EUA and developing/implementing a plan to monitor the quality of COVID-19 vaccines. USAID approved the work plan in late March.
COVID-19 Vaccine Activities	Late this quarter, PQM+ received news that it would receive funding to support Pakistan, Uzbekistan, and Ghana with monitoring the quality of COVID-19 vaccines. (Work planning for these activities started in early April.)
Cross-Bureau COVID-19	The Cross-Bureau COVID-19 work plan was approved in late March.
DRC	PQM+ received feedback on the work plan draft submitted in late January. The team has since reviewed the feedback and incorporated changes in the revised version submitted for USAID approval.

USAID Team	Summary and Next Steps
Guinea	USAID approved the Guinea work plan in late January. Due to delays in funding, activities did not start until late March, after PQM+ held a kickoff call with USAID/Guinea.
Madagascar	This quarter, PQM+ worked on drafting the work plan. PQM+ also held calls with the USAID Mission and staff on the USAID-funded Improving Market Partnerships and the Access to Commodities Together (IMPACT) Program. PQM+ submitted a work plan draft to USAID in February, received feedback, submitted the revised work plan in March, and is waiting for approval.
Rwanda	This quarter, PQM+ continued to wait for further guidance on work plan timing. The team started drafting the work plan in PY2 Q3.

Progress by Health Elements

Maternal and Child Health (MCH)

PQM+'s support to USAID's directed core MCH work focuses on assisting medicine regulatory authorities and manufacturers to improve their systems. PQM+ also supports global leadership efforts in collaboration with other MCH partners to continue to advance USAID's, global, and country MCH agendas and to increase access to quality-assured lifesaving medicines for women and children in LMICs.

PQM+'s activities fall under PQM+ objectives 2 and 4. During this quarter, the program:

- Finalized the English and French versions of the chlorhexidine gel 7.1% and oxytocin job aids to assist with dossier preparation and the amoxicillin job aid to assist with laboratory testing.
- Began mentoring and collaboration with Muhimbili University in Tanzania to carry out the manufacturer market analysis for amoxicillin dispersible tablets to identify manufacturer capacity in the Africa region.

Progress by PQM+ Objective

Objective 2: Country and regional regulatory systems to assure the quality of medical products in public and private sectors improved

This quarter, PQM+ completed the French translation of the guidance document on the risk-based categorization of MNCH products. The English and French versions will assist countries in identifying MCH product-specific risks through facilitating the development of sampling plans using the MedRS tool.

PQM+ also finalized the English and French versions of the job aids to assist with chlorhexidine gel 7.1% and oxytocin dossier preparation and job aids to assist with their laboratory testing. The team derived the job aids from their PIRs developed under the PQM program. The program shared the finalized English and French versions with USAID. PQM+ will work with its countries that receive MCH funding to adopt and integrate them into their work processes.

Objective 4: Supply of quality-assured essential medical products of health importance increased

This quarter, PQM+ and UNICEF held a quarterly virtual check-in to share information and boost collaboration in efforts to increase the supply of and access to quality-assured MNCH medical products. The meeting covered an update on the amoxicillin dispersible tablet (amox-DT) landscape analysis led by PQM+, discussions on potential indicators to monitor collaboration, platforms to support information sharing and related collaboration, and joint UNICEF/PQM+ workplan activities for the next year. After the meeting, PQM+ shared detailed meeting notes and action items as well as a draft amox-DT landscape analysis survey questionnaire and the potential joint work plan activities.

PQM+ also completed the contracting package for a PQM+ Core-FLEX partner, Muhimbili University in Tanzania, to carry out the manufacturer market analysis for amox-DT to identify manufacturer capacity in the Africa region. PQM+ held a kickoff meeting to onboard the university on contractual, technical, and programmatic requirements. PQM+ closely collaborated with Muhimbili University to begin a desktop review of manufacturers in the region and drafting the survey research questions.

One activity planned for this workplan year, to conduct a consultative meeting on medical quality assurance in LMICs with key MCH partners, could not occur due to COVID-19. PQM+ reprogrammed this activity's funds to support a technical discussion forum on medical devices. The program is working on a plan to develop and deliver a technical discussion forum on May 25 and 26 for USAID's team on medical device regulations.

Priority Activities for Next Quarter

PQM+ plans to:

- Continue researching content to prepare the technical discussion forum on medical device regulation;
- Continue, via Muhimbili University, the amox-DT landscape analysis in Africa region and compile preliminary results; and
- Continue technical engagements with UNICEF's supply department for MNCH products.

Neglected Tropical Diseases (NTDs)

The November 2020 WHO NTD global roadmap, Ending the Neglect to Attain the Sustainable Development Goals: A Roadmap for Neglected Tropical Diseases 2021 – 2030, sets goals for an integrated approach across all NTD diseases and sets targets to reduce the number of people requiring treatments for NTDs by 90 percent. WHO has been instrumental in coordinating NTD medicine donations from manufacturers for use in affected populations globally. However, shortfalls remain compared to the demand for some medicines. The USAID NTD program targets the most prevalent NTDs that also have proven, cost-effective health interventions: lymphatic filariasis, blinding trachoma, onchocerciasis, schistosomiasis, and soil-transmitted helminths. The overall goal of the PQM+ NTD work is to ensure the availability of affordable, quality-assured NTD medicines for the patients in need.

PQM+'s NTD activities fall under the program's Objective 4. PQM+ uses a systems strengthening approach to build the local organizational and individual capacity of

pharmaceutical manufacturers. This quarter, PQM+ continued to work with two manufacturers for albendazole and praziquantel FPP toward the achievement of WHO-PQ; commenced planning to conduct a market analysis of NTD medical products in Africa and Asia and began efforts to disseminate and socialize the GMP eLearning training course developed under the PQM program.

Progress by PQM+ Objective

Objective 4: Supply of quality-assured essential medical products of health importance increased

This quarter, PQM+ held virtual meetings to review, provide feedback, and finalize the polymorph study report of the five batches for albendazole tablets 400 mg to Mepro Pharmaceutical Private Limited, based in India. Mepro and PQM+ are in the process of updating the polymorph study report, which is the last section to finalize in the dossier modules prior to WHO-PQ submission.

PQM+ also continued to support Medopharm Pharmaceutical Private Limited, based in India, to produce quality-assured praziquantel 600 mg film-coated tablets toward WHO-PQ. This quarter, PQM+ reviewed and provided feedback to Medopharm on the stability studies for up to 24 months along with revisions requested by WHO for WHO-PQ. The manufacturer is waiting to hear from the WHO-PQ team on the GMP audit of the facility. The WHO-PQ team has had delays with in-person site inspections due to COVID-19 restrictions and has depended on desk reviews, which has limitations and takes longer. WHO is exploring tools and new technologies for remote inspections to reduce delays with onsite inspections.

PQM+ completed the contractual agreement with Muhimbili University in Tanzania for the NTD products market analysis for manufacturers. PQM+ and Muhimbili University held kickoff meetings on the contractual, technical, and programmatic requirements. Through Muhimbili, PQM+ requested and received agreement from the Federation of African Pharmaceutical Manufacturers Associations to provide a full list of African manufacturers' contacts in preparation of the API and FPP market analysis in Africa. PQM+ is also in the final stages of the contract agreement process with Mahidol University in Thailand for the NTD API and FFP market analysis in the Asia region.

This quarter, PQM+ redesigned the GMP eLearning training course, based on user and PQM country feedback. PQM+ is working with USP Education to incorporate these changes within the Learning Management System; once completed, the course will be user-tested. PQM+ also developed a draft communication and dissemination plan for the redesigned course.

Priority Activities for Next Quarter

PQM+ plans to:

- Continue to support the manufacturers of albendazole and praziquantel tablets toward achieving WHO-PQ;
- Commence the NTD product market analysis landscape activity; and
- Continue efforts to improve the user experience and uptake of the GMP eLearning training course.

Tuberculosis

PQM+ is working to ensure the uninterrupted supply of lifesaving quality-assured TB medicines by providing direct support to the manufacturers of priority TB products. In addition, the program offers technical leadership by exploring innovative manufacturing processes for priority TB medicines, develops technical documents such as product information reports, and works with partners to ensure the medicines registration processes does not create hurdles for the introduction and scale-up of the new TB medicines.

In Q2 of PY2, following progress was made:

Objective 2. Country and regional regulatory systems to ensure access to quality-assured TB products improved

In Q1, PQM+ initiated discussions with the U.S. FDA to collaborate on an online workshop for medicines regulatory agencies in LMICs to share the FDA's experience with review and approval of new TB medicines (e.g., pretomanid). This quarter, FDA assigned a focal person to continue discussing the feasibility of a virtual workshop.

Objective 4: Supply of quality-assured essential medical products of public health importance increased

In Q2, WHO prequalified the clofazimine FPP from a South Korean manufacturer. PQM+'s predecessor program, PQM, provided technical assistance to the manufacturer for WHO prequalification. As a result of that support, in 2019 the Global Fund Expert Review Panel approved this product and since then it has been supplied through the GDF mechanism. WHO-PQ approval confirmed the quality of the product and now it is included on the list of WHO-prequalified medicines. Clofazimine is an important medicine for treatment of multi-drug resistant TB (MDR-TB) as part of both the shorter and longer regimens.

In Q2, PQM+ continued support to two pharmaceutical manufacturers of first-line, four-drug fixed-dose combination (4FDC) TB medicines in Pakistan. One manufacturer planned to start a stability study under zone IVb conditions in January but had to delay for various reasons. The study began in March. The manufacturer will share the one-month stability data with PQM+ when it is available in April. After PQM+ review, the manufacturer will submit the data to WHO to schedule a pre-submission meeting with the WHO-PQ team. The bioequivalence (BE) study, which PQM supported, is planned for discussion at the WHO meeting.

The second manufacturer completed its six-month stability study for the first-line TB drug 4FDC during the week of March 18. Results were submitted to PQM+ for review. After implementing corrections recommended by PQM+, the manufacturer plans to submit the dossier to WHO by April 2.

In 2020, manufacturers identified, and reported to regulatory authorities, the presence of nitrosamine impurities in two key anti-TB medicines, rifapentine and rifampicin, triggering concerns about the global supply. To help the industry and regulators specifically in LMICs address this challenge, PQM+ continued developing analytical methods to detect nitrosamines impurities in rifapentine and rifampicin during Q2. The goal is to develop analytical methods suitable for the laboratories in LMICs. As sourcing of key materials (specific impurities) became problematic, USP developed the corresponding impurity, which allowed the team to start

activities as described in the analytical methods validation protocol. USP evaluated a gas chromatography-mass spectroscopy/mass spectroscopy method for the quantification of six nitrosamines in sartan drug substances. PQM+ is now evaluating this technology for the two nitrosamines in the TB medicines of interest. The program should complete the validation of the analytical methods to detect nitrosamine impurities in rifapentine in Q3, followed by work on rifampicin. Once completed, the analytical methods will become public for interested stakeholders.

This quarter, PQM+ finalized the subaward with Virginia Commonwealth University (VCU) for the laboratory phase of the subaward (milestones 3 and 4) on optimization of the manufacturing process for rifapentine API. PQM+ also held a kickoff meeting for VCU to review the program and technical scope and regulations to ensure compliance. VCU started implementing the subaward. The PQM+ technical and operations team established regular communication with the VCU team to follow and support the implementation of the project.

In Q2, PQM+ finalized the desk review on the cost drivers for bedaquiline based on information obtained from a proprietary database. PQM+ also completed a preliminary desk review on cost drivers for pretomanid. PQM+ plans to present the findings to USAID in Q3 for further discussion. As a next step, PQM+ is exploring potential optimization of manufacturing some compounds of these products, which can help reduce the medicines' cost.

In recent years, pharmaceutical supply chain disruptions have increasingly been an issue, which the COVID-19 pandemic exacerbated in 2020. Being able to predict such disruptions can be a powerful tool for manufacturers, procurers, and disease programs. To identify supply chain disruptions, PQM+ began to access the potential of using availability and supply chain data for key raw materials, impurities, and APIs as markers for the production and subsequent supply of FPP. In Q2, PQM+ developed a concept note that proposes to identify, characterize, and quantify the risk from raw materials for key TB APIs, as part of broader efforts of the USP Pharmaceutical Supply Chain Center and the Medicine Supply Map. These insights are useful for: a) identifying risks to procurement to avoid stockouts; b) managing risk in the upstream supply chain by identifying alternate raw material suppliers or routes of synthesis; and c) conducting advocacy about the need for increased transparency in the upstream supply chain. PQM+ shared the revised concept note with USAID for further discussion and concurrence.

Objective 5: Global medical product quality assurance learning agenda and operational agenda advanced

This quarter, PQM+ conferred with USP staff about collaborating on the development of a searchable database for PIRs. These PIRs, developed under the PQM program, were organized in the database to facilitate the retrieval of specific priority products information by manufacturers and regulators. PQM+ is working with the USP team to explore potential updates to the PQM website in terms of enhanced search functions for the PIRs.

Priority Activities for Next Quarter

PQM+ plans to:

- Follow up with manufacturers in Pakistan to ensure the finalization of the stability study reports and their submission to WHO;

- Continue work with VCU to optimize the manufacturing process for rifapentine API for milestones 3 and 4 of the laboratory phase;
- Consider opportunities to work on optimization of some compounds of new TB medicines that may reduce cost of these medicines; and
- Continue discussion with the U.S. FDA to plan an online workshop with pharmaceutical regulatory authorities on sharing FDA's experience on review and registration of new TB medicines.

Program Support

Communications

This quarter, PQM+'s communications activities grew as program implementation continued to expand. Highlights include:

- Newsletter: In January, PQM+ sent out the second issue of its newsletter. The newsletter's performance far exceeded industry standards[11] with an open rate of 42 percent (vs. 22 percent) and a click rate of 14 percent (vs. 2 percent.) It featured the PIRIMS launch.
- Pakistan: The senior communications manager began attending the monthly four corners meeting to get a clear picture of Mission priorities and interests. This quarter, she worked closely with the field team to identify content for social media, develop success story ideas, and build their communications skills to better meet Mission expectations.
- Webinar series: This spring, PQM+ planned its second global webinar on Strengthening National Quality Control Labs. In concert with the AOR team, the program developed the technical scope and key points to include in the presentations.
- Social media: PQM+ continued to share program activities, milestones, and achievements via Twitter, Facebook, and LinkedIn. This quarter, PQM+ developed 33 posts highlighting a variety of countries, including the TWG launch in Burkina Faso, Bangladesh and Pakistan's PPE work, and World TB Day celebrations in Uzbekistan.
- Fact sheets: This quarter, USAID reviewed and shared feedback on the MNCH factsheet. PQM+ will finalize and post the factsheet next quarter, then turn to other topics, including TB, drug quality control labs TA, and regulatory systems strengthening for product quality assurance.

[11] Industry standards are reported by Constant Contact, the email marketing tool that PQM+ uses to distribute its newsletter.

Annex A: Monitoring, Evaluation, and Learning Update

PQM+ reports on its performance monitoring indicators twice a year. The table that follows shows results from the first half of FY2021 for PQM+ country and directed core buy-ins. Results are organized by objective and sub-objective. Note that country and directed core buy-ins select indicators that reflect the focus of their programs, so no buy-in reports on all indicators in the PQM+ program monitoring, education, and learning (MEL) plan.

PQM+ has worked to fine-tune some indicators and add new ones that provide more meaningful data on our work. Major changes reflected in the results reported below include:

Refinements to existing indicators. To improve the quality and utility of our reporting and to better align indicators with our work, we have made these changes:

- **Institutionalization indicators**. PQM+ works to "institutionalize" the use of medical product quality assurance approaches and tools. "Institutionalization" means that counterparts (i.e., MRAs or QC laboratories) have adopted and will be able to implement the approach/tool even after the project ends. This year, PQM+ refined the list of factors that indicate whether the counterpart has institutionalized the approach/tool. For evidence, PQM+ tracks whether the counterpart: (1) has adopted SOPs that require use of the approach/tool or detail how to use it; (2) is able to train its own staff on the approach or tool; and (3) uses an information system to track use and/or outcomes of the approach/tool. To each of these three factors, a score of 0 is given if it is not being developed for adoption; 1 if it is; and 2 if it has been instituted. A total score of 6 (100%) means the tool/approach has been fully incorporated into national and/or counterpart practices, thereby increasing the likelihood of its sustainability.
- **Workforce development**. PQM+ seeks to help counterparts develop, support, and retain high-performing workforces. The project's workforce development approach is built around strengthening four pathways: staffing, skills, workplace environment, and motivation. This year, PQM+ has revised its workforce development indicators to align with those four pathways.
- **Training**. PQM+ conducts many training activities for counterparts and even broader audiences. To reduce potential duplication when counting the number of individuals trained, PQM+ now counts trainees from each identifiable segment of the workforce (e.g., lab staff) only once each quarter even if those staff benefit from multiple trainings.
- **Policy status**. PQM+ also works closely with counterparts to develop new or improved regulatory and medicines policies. The program now will capture the status of these policies each quarter to track progress toward adoption and implementation.

New indicators. This year, PQM+ is able to report on several important new indicators:

- **Milestone indicators.** Some of PQM+'s activities have outcomes that can only be achieved in the long term. For example, generally, it takes years for a quality control laboratory to achieve ISO accreditation or WHO prequalification or for a manufacturer to achieve market authorization or WHO prequalification. Each of these outcomes requires completion of a progression of activities. As mentioned above, laboratories undergo a gap assessment and a roadmap toward accreditation/prequalification is developed for them; laboratories must put in place a QMS; lab equipment and facilities and analytical methods must be ready in the laboratory; the laboratory must complete proficiency tests; and the laboratory must undergo and complete CAPAs from mock and official audits.

Manufacturers must undergo a gap assessment, develop products/dossiers, close out GMP CAPAs, compile dossiers and have them accepted by the MRA or WHO, undergo mock and WHO/NMRA audits (and close out all outstanding CAPAs), and have their dossiers reviewed successfully by the MRA/WHO.

This year, to help summarize and systematically report progress on these long-term efforts, PQM+ has introduced milestone indicators that correspond with the each of these major activities and stages that laboratories and manufacturers must complete to achieve accreditation, market authorization, or prequalification. For laboratories seeking accreditation or prequalification, PQM+ is reporting "percentage of milestones toward ISO accreditation or WHO prequalification achieved by the laboratory." For manufacturers, PQM+ is reporting "percentage of milestones toward market authorization or WHO prequalification achieved by the manufacturer." The manufacturer milestones are reported for each medical product for which the manufacturer is seeking authorization with PQM+ support. For each of the laboratory and manufacturer milestones outlined above, a score of "0" is given if no work has begun, a "1" if work has begun and is still underway, and a "2" if work is completed. As the milestones vary in the length of time they take to complete, some (QMS development/ implementation at labs, and product/dossier development, CAPA close-out, and dossier compilation for manufacturers) are weighted differently than the other milestones. Scores and weights are used to calculate the overall percentage of milestones achieved. Those percentages are shown in the Indicator Table that follows.

- **Number of treatments manufactured**. Work under Objective 4 is designed to increase the supply of quality-assured medicines. To help measure the benefit of these new sources of quality-assured medical products, PQM+ seeks to collect data on the number of units of authorized/ prequalified product manufactured by these manufacturers. PQM+ then translates the number of units produced into the number of treatments based on standard treatment guidelines. In this reporting period, PQM+ piloted this indicator in Nigeria, one of the countries where USAID is investing in increasing the supply of medical products.

PQM+ FY2021 Q1 & Q2 M&E Indicator Results

INDICATOR		Baseline	FY21 Q1	FY21 Q2
Objective 1: Governance for medical product quality assurance systems strengthened				
1.1. Evidence-based medical product quality assurance legislation, policies, and regulations developed, updated, and/or implemented				
1.1a. Number of policies, laws, regulations, and guidelines on medical product quality assurance developed or revised with PQM+ support and their status				
Bangladesh	Legislation for Laboratory Service Sub-Contracting in Bangladesh	0	-	Drafting or revising
Ethiopia	Directive for Medicines GMP Inspection Procedures	0	-	Submitted for adoption
Ethiopia	Guidance Document for Cold Supply Chain	0	-	Drafting or revising
Ethiopia	Medicines & Medical Devices Import, Export, and Wholesale Directive	0	Submitted for adoption	-
Kazakhstan	Rules for sampling from the market, including from medical organizations, of medicines, and medical devices subject to quality control, taking into account risk-based	0	Adopted	-
Kenya	QA Framework for Malaria Commodities	0	Stakeholder consultation	Submitted for adoption
Mali	National Guidance for RB-PMS	0	Adopted	-
Nepal	EUA of COVID vaccines	0	-	Adopted
Nepal	GMP code (revised)	0	-	Submitted for adoption
Pakistan	RB-PMS Plan on the Existing RB-PMS Framework	0	Drafted	-
Pakistan	Guidance document for identification of medicinal products (IDMP) (API and Drug Products)	0	-	Drafting or revising
Pakistan	PPE Standards	0	Stakeholder consultation	-
Pakistan	Guideline for Thermodynamic Equivalence/Surrogate Test for Bioequivalence	0	-	Drafting or revising
Pakistan	Conditions & Accountabilities Criteria for Use of Independent Third-Party PPE Testing Laboratories	0	-	Drafting or revising
Pakistan	Emergency use authorization procedures/guidelines for medical devices	0	Drafting or revising	-

INDICATOR		Baseline	FY21 Q1	FY21 Q2
Senegal	National Guidance for RB-PMS	0	Submitted for adoption	-
Uzbekistan	Regulations related to inspections	0	Analysis	Drafting or revising
Uzbekistan	Resolution of Cabinet Ministers #213. This regulates the registration of medical products. Major revisions include the phased-in requirement to submit dossiers using the common technical document.	0	-	Submitted for adoption
Uzbekistan	Guideline on WHO Collaborative Procedure in accelerated registration of WHO prequalified pharmaceutical products	0	Adopted	-
A national policy and regulatory framework is essential to ensuring the quality of medical products in countries. PQM+ is helping 11 countries (Bangladesh, Ethiopia, Guinea, Kazakhstan, Kenya, Liberia, Mali, Nepal, Pakistan, Senegal, and Uzbekistan) develop, revise, or submit for adoption medical product quality assurance legislation, policies, and regulations. Through Q2, the program has supported a total of 28 policies, laws, regulations, and guidelines in nine of the countries. In the first two quarters of PY2 alone, 19 new guidelines or policies were either in the process of being developed, submitted for adoption, or adopted. Two additional guidelines, work on which began in PY1 in Mali and Senegal, were finally adopted or submitted for adoption in Q1. In quarters 1 and 2, the total number of policies adopted with PQM+ support is six. QA work during the two quarters took place mostly in Pakistan and Nepal. Pakistan has been in the forefront of Covid-19 guidance.				
1.2. Systems that facilitate transparency and accountability promoted				
1.2c.1 PQM+-supported MRA disseminated inspection results				
Kazakhstan			100%	100%
1.2c.2. PQM+-supported MRA disseminated registration results				
Kazakhstan			100%	100%
Uzbekistan			100%	100%
1.2c.3. PQM+-supported MRA disseminated licensing results				
Kazakhstan			100%	100%
Uzbekistan			100%	100%
1.2c.4. PQM+-supported MRA disseminated PMS results				
Bangladesh			-	100%
PQM+ promotes transparent and accountable systems within countries to increase public trust. Thus, the program encourages MRAs to disseminate the results of its regulatory activities (inspection, registration, licensing, and post-marketing surveillance). In both Kazakhstan and Uzbekistan, PQM+ is supporting the MRAs in disseminating the results of their inspection, registration, and licensing activities. In the reporting period, Kazakhstan disseminated the results of all three activities, and Uzbekistan of its registration and licensing activities. Complementing PQM+'s extensive support for post-marketing surveillance, the program is supporting dissemination of PMS results in 10 countries (Bangladesh, Burkina Faso, Burma, Ethiopia, Ghana, Kazakhstan, Kenya, Liberia, Mali, and Senegal). Most of these countries have not yet completed their annual PMS, thus,				

INDICATOR	Baseline	FY21 Q1	FY21 Q2
did not have results to disseminate. In Bangladesh, the DGDA took a major step in developing and releasing its annual report for 2019 and 2020, which included regulatory results for PMS as well as other regulatory functions.			
1.4. Links among the medical product quality assurance systems and other sectors developed and fortified			
1.4a Percentage of core functional components in place for a multisectoral group supported by PQM+ to advance medical product quality assurance			
Burkina Faso	0%	-	70%
Ghana	0%	-	10%
Kenya	0%	70%	70%
Liberia	0%	70%	70%
Mali	0%	100%	-
PQM+ promotes links among the various sectors (e.g., health programs, regulatory agency, industry) that must collaborate effectively to ensure medical product quality. In many countries, PQM+ supports the development of Technical Working Groups to establish priorities for and review results of risk-based post-marketing surveillance (TWG RB-PMS). To ascertain these groups' ability to function independently, PQM+ tracks whether the groups have: (1) a coordination framework, (2) a chairperson, (3) regular meetings per the planned schedule, (4) meeting minutes distributed, and (5) the majority of participating agencies in attendance at the majority of meetings. In the first two quarters of PY2, the TWG in Mali was fully functional with all five components in place. Burkina Faso made quick progress in establishing a framework, naming a chairperson, and starting to meet in its first quarter (which was Q2). Two other African countries (Kenya and Liberia) have most of the core functional components in place. Ghana started to develop a framework for its TWG.			
1a. Number of enforcement actions taken			
Ethiopia	0	6	-
Nepal	64*	8	13
Regulatory activities aim to keep substandard and falsified medical products off the market and then to remove any that have leaked onto the market. In Q1 and Q2, the EFDA of Ethiopia identified and recalled six substandard hand sanitizers that were identified in PMS of those products. In its PMS, the regulatory authority in Nepal identified and recalled a total of 21 substandard products, classified as "other" products (i.e., not a USAID health program priority). *The baseline of enforcement actions for Nepal includes data from the Government of Nepal's annual report. The 64 enforcement actions include product recalls and filing of legal cases based on violations of the Drug Act 2035. The period covered by that baseline is July 2019 – July 2020, which overlaps somewhat with the start of PQM+. Because the fiscal years of the Governments of Nepal and the United States do not align, there will be either an overlap or a gap in the reporting periods for this baseline.			
Objective 2: Country and regional regulatory systems to assure the quality of medical products in the public and private sectors improved			
2.1. Sustainable systems for market authorization/registration, inspection, and licensing functions of medical product regulatory agencies improved			
2.1a Number of IDP recommendations addressed			
Ethiopia	0	4	-
The regulatory functions of many LMIC regulatory authorities have been benchmarked against global standards per the WHO Global Benchmarking Tool. Following this, institutional development plans (IDPs) are developed with recommendations on how to improve the score for each regulatory function. In several countries, PQM+ is assisting			

INDICATOR		Baseline	FY21 Q1	FY21 Q2
the MRA in addressing recommendations in its IDP. In Q1 and Q2, PQM+ helped complete 4 such recommendations for the Ethiopian MRA. PQM+ also has ongoing work helping the MRA in Pakistan complete 10 recommendations in its IDP.				
2.1b.1 Score on institutionalization of dossier quality checklist at PQM+-supported MRA				
Uzbekistan		16.7%	16.7%	33.3%
In Uzbekistan, PQM+ is helping the regulatory authority institutionalize use of a dossier quality checklist to ensure consistent and high-quality assessment of dossiers submitted by manufacturers for market authorization. By the end of Q2, the Uzbek MRA had finalized SOPs for use of the dossier checklist, improving its score to 33.3%.				
2.1i % PIC/S milestones completed				
Kazakhstan		10%	27%	27%
Uzbekistan		0%	10%	14%
Both Kazakhstan and Uzbekistan seek to accede to PIC/S. This will signal that their inspectorates meet PIC/S' harmonized GMP standards and quality systems. PQM+ tracks progress along the protracted journey toward meeting all accession requirements. Both countries improved their scores for PQM+'s internal milestones toward PIC/S accession.				
2.1k Number of SOPs/quality manuals adopted by MRA				
Bangladesh		0	-	1
Ethiopia		0	-	19
Kazakhstan		0	-	19
Uzbekistan		0	3	1
Total: 2.1k Number of SOPs/quality manuals adopted by MRA		**0**	**3**	**40**
PQM+ is tracking progress in helping MRAs develop or update and adopt standard operating procedures to carry out regulatory functions in eight countries (Bangladesh, Burkina Faso, Ethiopia, Kazakhstan, Liberia, Mali, Nepal, and Uzbekistan). SOPs help MRAs achieve efficiency, quality output, and uniformity of performance, while reducing miscommunication and noncompliance with regulations or requirements. In the first half of PY2, MRAs in 4 countries adopted 43 SOPs. Ethiopia and Kazakhstan account for the majority of the new SOPs, with each MRA adopting 19 SOPs.				
2.2. Sustainable post-marketing surveillance systems and medical product quality control laboratory capacity				
2.2a QC lab SATTA score				
Benin	Benin NQCL	12%	-	12%
Ethiopia	Ethiopia EFDA Branch Lab - Diredawa	22%	22%	-
Ethiopia	Ethiopia EFDA Branch Lab - Bahirdar	23%	23%	-
Ethiopia	Ethiopia EFDA Branch Lab - Jimma	5%	5%	-
Mali	Mali LNS	21%	-	21%

INDICATOR		Baseline	FY21 Q1	FY21 Q2
Nepal	Nepal National Medicine Lab	37%	-	37%
PQM+ strengthens quality control laboratories so they can generate accurate and consistent medical product test results. The PQM program developed the Stepwise Assessment Tool towards Accreditation (SATTA) to use in assessing quality control laboratories against the major relevant international standards (i.e., WHO prequalification and ISO 17025:2017). PQM+ generally starts its support for a laboratory by using SATTA to identify areas that require strengthening. In the last six months, PQM+ completed SATTAs for six new laboratories: in Benin, Ethiopia (three branch laboratories), Mali, and Nepal. Those labs' baseline scores ranged from 5% (Jimma laboratory in Ethiopia) to 37% (the Nepal National Medicine Laboratory). Based on these SATTA results, PQM+ is developing roadmaps to address gaps.				
2.2b.1 Number of labs accredited/PQ'd				
Nigeria	ISO 17025:2017 re-accreditation of the NAFDAC Zonal lab, Agulu (16 methods)	1	1	-
Nigeria	ISO 17025:2017 re-accreditation of the NAFDAC Zonal lab, Kaduna (16 methods)	1	1	-
Nigeria	ISO 17025:2017 re-accreditation of the NAFDAC Zonal lab, Yaba (17 methods)	1	1	-
Nigeria	ISO 17025:2017 re-accreditation of the NIPRID NQCL (6 methods)	1	1	-
Nigeria	NAFDAC National Control Laboratory for Vaccines and Biologics, Yaba (14 methods)	1	1	-
PQM+ is helping laboratories in Bangladesh, Burma, Ethiopia, Kazakhstan, Nigeria, Pakistan, and Uzbekistan achieve international accreditation or WHO prequalification as evidence of their quality and competence. The (re)accreditation process is long and involves multiple steps (see p. 70-71). Figure 2 in the body of this report shows the notable progress made toward accreditation by the majority of PQM+-supported laboratories. In the last six months, five quality control laboratories in Nigeria received ISO 17025:2017 re-accreditation.				
2.2c.1 Score (percentage) on institutionalization of new training program at PQM+-supported QC laboratories				
Kazakhstan		77.8%	83.3%	83.3%
2.2c.2 Score (percentage) on institutionalization of new preventive maintenance program at PQM+-supported QC laboratories				
Kazakhstan		77.8%	83.3%	83.3%
Uzbekistan		18.8%	25%	25%
2.2c.3 Score (percentage) on institutionalization of new calibration program at PQM+-supported QC laboratories				
Kazakhstan		77.8%	83.3%	83.3%
Uzbekistan		31.3%	33.3%	33.3%
2.2c.4 Score (percentage) on institutionalization of new competency assessment program at PQM+-supported QC laboratories				
Kazakhstan		77.8%	83.3%	83.3%
Uzbekistan		37.5%	33.3%	33.3%
2.2c.5 Score (percentage) on institutionalization of new internal performance review at PQM+-supported QC laboratories				
Kazakhstan		77.8%	83.3%	83.3%

INDICATOR		Baseline	FY21 Q1	FY21 Q2
Uzbekistan		25%	25%	16.7%
2.2c.6 Score (percentage) on institutionalization of new QMS at PQM+-supported QC laboratories				
Kazakhstan		77.8%	83.3%	83.3%
Uzbekistan		25%	16.7%	16.7%
PQM+ is helping laboratories institutionalize new approaches/tools to strengthen their quality and reduce costs (refer to p. 69-70). Percentages reported above are cumulative for all labs in the country. For example, Kazakhstan's Karaganda laboratory has fully institutionalized all the approaches/tools presented above (training, preventive maintenance, calibration, and competency assessment programs, as well as internal performance review and quality management systems). However, PQM+ is still assisting the Almaty laboratory in Kazakhstan (whose scores increased) in developing many of these programs and systems. For this reason, Kazakhstan's overall percentage score is less than 100%.				
2.2g Number of PT/ILT completed				
Bangladesh		0	-	2
Kazakhstan		0	8	-
PQM+ tracks the number of proficiency or inter-laboratory tests (PTs/ILTs) completed by PQM+-supported QC laboratories in six countries (Bangladesh, Burma, Ethiopia, Kazakhstan, Nepal, and Nigeria). Proficiency/inter-laboratory testing offers an external assessment of a QA laboratory's testing or measurement capabilities. It supplements the internal quality control system of a laboratory, allows laboratories to compare their performance with that of others in the same program, and indicates whether the laboratory is performing to acceptable standards. In Q1, Kazakhstan's Almaty and Karaganda NQCLs each completed 4 ILTs, while, in Q2, Bangladesh's vaccines and physicochemical laboratories each completed 1 PT. Since PQM+ began, 35 such tests have been completed by labs in five of the countries. PQM+ is now tracking progress in achieving each of these milestones for laboratories pursuing their first accreditations or WHO prequalification.				
2.2h Percentage of lab accreditation milestones achieved with project support				
Bangladesh	NQCL for vaccines	0%	55%	55%
Bangladesh	Chattogram QC lab	0%	5%	10%
Ethiopia	Branch Lab Bahirdar	0%	-	35%
Ethiopia	Branch Lab Diredawa	0%	-	30%
Ethiopia	Branch Lab Jimma	0%	-	5%
Kazakhstan	NQCL Almaty	0%	85%	85%
Mali	LNS	0%	5%	45%
Nepal	National Medicine Lab	0%	-	40%
Pakistan	Appellate Lab	10%	10%	65%
Pakistan	Institute of Public Health Lab	0%	-	55%

INDICATOR		Baseline	FY21 Q1	FY21 Q2
Pakistan	Institute of Medical Sciences Lab	0%	-	5%
Pakistan	Drug Testing Lab - Multan (for WHO PQ)	95%	-	95%
Pakistan	Drug Testing Lab - Multan (for ISO 17043)	0%	-	95%
Pakistan	Drug Testing Lab - Bhawalpur	95%	-	95%
Uzbekistan	Andijan NQCL	0%	-	40%
Achievement of international accreditation is a long process with support from PQM+ at many stages (refer to p. 70-71). Notable progress was made with the majority of the PQM+-supported laboratories (see Figure 2 in the body of the report).				
2.2i Number of lab SOPs/quality manuals adopted				
Bangladesh		0	4	2
SOPs help ensure that accepted procedures are followed consistently so as to ensure consistent performance and results. SOPs underpin many efforts to strengthen laboratories and are essential for accreditation. PQM+ is tracking the number of SOPs that it helps laboratories in nine countries (Bangladesh, Benin, Burkina Faso, Ethiopia, Guinea, Liberia, Mali, Nepal, Senegal, and Uzbekistan) draft or update and adopt. In Q1 and Q2, Bangladesh's vaccines laboratory adopted six SOPs with PQM+ support.				
2.3. Regional harmonization to strengthen medical product quality assurance regulatory capacity and networks supported				
2.3c.1 Score (percentage) on institutionalization of WHO collaborative procedure for accelerated registration (CPAR) at PQM+-supported MRA				
Uzbekistan		0%	50%	66.7%
PQM+ is helping the MRA of Uzbekistan institutionalize use of the WHO collaborative procedure for registration. This will enable the MRA to use assessment and inspection outputs from the WHO prequalification process to reduce duplicative regulatory work and save time. The Uzbek MRA improved its score from Q1 and Q2 by starting to develop an information system to track use and results of the CRP.				
2.5. Competence, efficiency, and expansion of the medical product quality assurance workforce improved				
2.5a Number of training programs delivered				
Bangladesh		0	5	13
Benin		0	-	1
Burkina Faso		0	-	3
Burma		0	1	-
Ethiopia		0	1	3
Kazakhstan		0	4	1
Kenya		0	1	1
Liberia		0	-	3

INDICATOR	Baseline	FY21 Q1	FY21 Q2
Mali	0	1	-
Nigeria	0	2	-
Pakistan	0	-	1
Uzbekistan	0	2	3
Total: 2.5a # training programs delivered	**0**	**17**	**29**
PQM+ delivered a total of 46 trainings during the two quarters to MRA, laboratory, and manufacturer staff and others.			
2.5b Number of people who completed training		**Female Q1 / Q2**	**Male Q1 / Q2**
Bangladesh	0	30 / 6	97 / 18
Benin	0	0 / 4	0 / 7
Burkina Faso	0	0 / 7	0 / 8
Burma	0	93 / 33	12 / 2
Ethiopia	0	6 / 6	27 / 14
Kazakhstan	0	94 / 35	37 / 16
Kenya	0	7 / 6	11 / 9
Liberia	0	0 / 10	0 / 31
Mali	0	8 / 0	6 / 0
Nigeria	0	34 / 0	40 / 0
Pakistan	0	0 / 5	0 / 15
Uzbekistan	0	33 / 27	46 / 38
Total: 2.5b Number of people who completed training	0	305 / 139	276 / 158
Program-wide percentage of trainees who were female	**0**	**52/5%/ 47.5%**	**46.8% / 53.2%**
Number of people who completed training by topic	**Q1**	**Q2**	**Total**
Good Manufacturing Practices	34	0	34
Registration	36	13	49

INDICATOR	Baseline	FY21 Q1	FY21 Q2
Inspection	124	104	228
Quality management system	160	82	242
Post-marketing surveillance	18	58	76
Lab testing	127	83	210
Good Laboratory Practices	9	0	9
Other	52	0	52
Across Q1 and Q2, the training topics with the highest numbers of trainees were quality management systems (242 trainees total), inspections (228 trainees total), and lab testing (210 trainees total).			
2.5d.1 Score on institutionalization of staffing program at PQM+-supported MRA			
Nepal	0%	33.3%	-
2.5d.2 Score on institutionalization of skills program at PQM+-supported MRA			
Nepal	0%	33.3%	-
2.5d.3 Score on institutionalization of working conditions program at PQM+-supported MRA			
Nepal	0%	33.3%	-
2.5d.4 Score on institutionalization of staff motivation program at PQM+-supported MRA			
Nepal	0%	33.3%	-
2.5e.1 Score on institutionalization of staffing program at PQM+-supported QC laboratory			
Kenya	0%	-	33.3%
2.5e.2 Score on institutionalization of skills program at PQM+-supported QC laboratory			
Kenya	0%	-	33.3%
2.5e.3 Score on institutionalization of working conditions program at PQM+-supported QC laboratory			
Kenya	0%	-	33.3%
2.5e.4 Score on institutionalization of staff motivation program at PQM+-supported QC laboratory			
Kenya	0%	-	33.3%
To improve the long-term sustainability of PQM+ interventions, PQM+ seeks not just to train the current cadre of staff in MRA and laboratory counterparts, but also to promote workforce development approaches that help counterparts build, retain, and adequately support and motivate their workforces over the long run. PQM+ starts by conducting comprehensive human resource assessments of counterparts who are interested in developing their workforces. Counterparts are assessed across four pathways: staffing, skills, working conditions, and staff motivation. From this initial assessment, PQM+ works with the counterpart to design interventions to strengthen areas prioritized for support.			

INDICATOR	Baseline	FY21 Q1	FY21 Q2
PQM+ also helps the counterpart develop and utilize a centralized tracking system to monitor implementation of or results from the intervention. PQM+ scores each of these components of workforce development institutionalization -- initial assessment, intervention implementation, tracking system - to determine how far the counterpart is in institutionalizing work along that pathway. In Q1, PQM+ conducted an HR assessment of the MRA in Nepal, which earned a score of 33.3% on each of the various pathways (for conducting the initial assessment). In Q2, PQM+ conducted an HR assessment of the QC lab in Kenya; the lab earned a score of 33.3% on each of the various pathways (for conducting the initial assessment).			
2.5f Number of membership organizations strengthened			
Uzbekistan	0	1	-
In Q1, PQM+ trained members of the Pharm Association on the common technical document, which is used for dossiers/applications for market authorization.			
2a % PMS samples that failed			
Bangladesh		0%	-
PQM+ supported the DGDA of Bangladesh in completing post-marketing surveillance work in Q1. In Bangladesh, 12 samples of MNCH and other medicines were assessed; none failed.			
Objective 3: Financial resources for medical product quality assurance optimized and increased			
3.1. Allocation and use of investments for medical product quality assurance systems strengthening optimized			
3.1a.2 Score (percentage) on institutionalization of risk-based inspection at PQM+-supported MRA			
Kazakhstan	0%	50%	50%
Nepal	0%	16.7%	16.7%
Uzbekistan	0%	-	16.7%
3.1a.3 Score (percentage) on institutionalization of risk-based post-marketing surveillance at PQM+-supported MRA			
Bangladesh	0%	-	33.3%
Kenya	0%	-	67%
Nepal	0%	16.7%	16.7%
To optimize financial resources, PQM+ promotes the use of risk-based approaches to regulatory activities. Risk-based approaches focus regulatory activities on the facilities, products, or locations that pose the greatest risk to public health. PQM+ is helping launch and institutionalize risk-based inspections in Kazakhstan, Nepal, and Uzbekistan. Of these three, the MRA of Kazakhstan has made the most progress in institutionalizing risk-based inspections. PQM+ is also working to institutionalize risk-based post-marketing surveillance in 11 countries (Bangladesh, Burkina Faso, Burma, Ethiopia, Ghana, Kazakhstan, Kenya, Liberia, Mali, Nepal, and Senegal). Bangladesh, Kenya, and Nepal reported progress in Q1 or Q2. Notably, while PQM+ is still helping the PPB of Kenya develop its own training programs and set up an information system/tracker for RB-PMS, the PPB has made enormous strides toward financial independence. The Government of Kenya is funding the full cost of the latest round of the survey, signaling its appreciation for the value of survey results.			
Objective 4: Supply of quality-assured essential medical products of public health importance increased			

INDICATOR		Baseline	FY21 Q1	FY21 Q2
4a. Number of treatments manufactured by PQM+-supported manufacturers			**Treatment type**	
			MNCH	**Malaria**
Nigeria	Amoxicillin DT to treat severe pneumonia in children aged 2-12 mos.		110,000	-
Nigeria	Zinc Sulphate to help manage cases of acute diarrhea in children aged 6 mos. – 5 yrs.		100,000	-
Nigeria	Cotrimoxazole to treat OIs in children living with HIV for 6 mos.		143,000	-
Nigeria	SP to prevent malaria in pregnant women (2 rounds of treatment)		-	810,000
Nigeria	Oxytocin injection 10iu/1mL to prevent or treat post-partum hemorrhage in women who are delivering		990,000	-
4c. Number of new product registrations by PQM+-supported manufacturers			**COVID-19**	**TB**
Global	Clofazamine API (WHO Prequalification)	0	-	1
Global	Clofazamine FPP (WHO Prequalification)	0	-	1
Pakistan	Remdesivir FPP (Pakistani EUA)	0	1	-
A PQM+-supported manufacturer of Clofazimine, used to treat drug-resistant TB achieved WHO prequalification for both the API and FPP. Also, a manufacturer of Remdesivir in Pakistan obtained Emergency Use Authorization from DRAP and also has started exporting Remdesivir to Indonesia.				
4.1. Pharmaceutical manufacturers for Good Manufacturing Practices (GMP) and medical product regulatory submissions/dossiers supported				
4.1c Percentage of milestones toward market authorization/prequalification achieved by PQM+-supported manufacturers				
Bangladesh	TB medicine manufacturer	0	25%	32.5%
Ghana	ALu manufacturer	0	-	10%
Ghana	ALu manufacturer	0	-	10%
Ghana	ALu manufacturer	0	-	10%
Ghana	Oxytocin manufacturer	0	-	10%
Uzbekistan	TB medicine manufacturer	0	25%	25%
Nigeria	Amoxicillin 125 manufacturer #1	0%		25%
Nigeria	Amoxicillin 250 manufacturer #1	0%		25%
Nigeria	SP manufacturer #1	5%		25%
Nigeria	Zinc sulfate manufacturer	5%		25%
Nigeria	RUTF manufacturer	10%		27.5%
Nigeria	SP manufacturer #2	10%		27.5%

INDICATOR		Baseline	FY21 Q1	FY21 Q2
Nigeria	Amoxicillin 125 manufacturer #2	10%		20%
Nigeria	Amoxicillin 250 manufacturer #2	10%		20%
Nigeria	Magnesium Sulphate manufacturer	0%	-	80%
Nigeria	Oxytocin manufacturer	0%	-	55%
Products		**MNCH 9**	**TB 2**	**Malaria 5**
PQM+ is now tracking progress on the manufacturer milestones outlined above (see p. 70-71). In Bangladesh, the PQM+-supported manufacturer advanced to achieving 32.5% of the milestones for its anti-TB medicines. In Ghana, PQM+ just started supporting manufacturers in Q2, and completed the gap analysis for four manufacturers (three that will produce the anti-malarial ALu and one that will produce oxytocin injection). In Uzbekistan, the PQM+-supported manufacturer of anti-TB medicines has achieved 25% of the milestones toward market authorization or PQ. In Nigeria, PQM+ supported five manufacturers, each of which was at different stages in achieving milestones towards market authorization or PQ (from 20% to 80%). In the four countries, PQM+ is supporting development of nine new sources of MNCH products, two TB products, and five malaria products.				
4.4a Number of medicines policies with QA requirements developed or revised with PQM+ support				
		Baseline	Q1	Q2
Kenya	Health Products and Technologies Supply Chain Strategy	0	Submitted	Adopted
PQM+ is helping Kenya develop medicine public policies that incorporate QA requirements. In Q4 of PY1, PQM+ contributed to the development of Kenya's Health Products and Technologies Supply Chain Strategy. This framework was submitted for adoption in Q1 and adopted in Q2.				
Objective 5: Global medical product quality assurance learning and operational agenda advanced				
5.1. Evidence-based approaches and tools developed and/or applied				
5.1a Number of new medical product QA or regulatory tools supported by PQM+				
Bangladesh	Checklist for inspecting PPE manufacturing facilities (for MRA)	0	1	-
	Specifications and QC parameters for N95 and KN95 masks (for MRA)	0	1	-
	COVID-19 medical product information sheets (for manufacturer)	0	1	-
Pakistan	Shortage monitoring mechanism for API and FPP (Dashboard connected to PIRIMS)	0	-	1
Total: 5.1a Number of new QA or regulatory tools		**0**	**3**	**1**
5.1a-g # Number of new medical product QA or regulatory tools-global				
Core MNCH	Amoxicillin Lab Aid - English & French	0	1	-
Core MNCH	Amoxicillin Dossier Aid - English & French	0	1	-
Core MNCH	Chlorhexidine Gel 7.1% Gel Lab Aid - English & French	0	-	1

INDICATOR		Baseline	FY21 Q1	FY21 Q2
Core MNCH	Chlorhexidine Gel 7.1% Gel Dossier Aid - English & French	0	-	1
Core MNCH	Oxytocin Injection Lab Aid - English & French	0	-	1
Core MNCH	Oxytocin Injection Dossier Aid - English & French	0	-	1
Core MNCH	Guidance Document for Developing and Implementing a Risk-based PMS Program for Maternal, Neonatal, and Child Health Products	0	-	1
PQM+ works to develop new approaches and tools that can improve medical product quality, enhance efficiency, or improve sustainability. During the two quarters, five new approaches/tools were rolled out and adopted in Bangladesh and Pakistan. In the core MNCH project, 7 new tools were rolled out. Of note, one of the core MNCH tools, the Guidance Document for Developing and Implementing a Risk-based PMS Program for Maternal, Neonatal, and Child Health Products, was immediately used by the LMHRA in Liberia to inform development of its plan for risk-based PMS of MNCH products.				
5.2a Number of technical publications/presentations authored by PQM+				
Bangladesh		0	-	3
Ethiopia		0	2	2
Kazakhstan		0	-	1
Kenya		0	2	-
Liberia		0	-	1
Pakistan		0	1	-
Uzbekistan		0	1	1
Total: 5.2a Number of PQM+-authored technical publications/presentations		**0**	**6**	**8**
PQM+ held 8 new conference and workshop presentations and produced 6 new technical reports during the two quarters. Of note were technical publications on RB-PMS and the MedRS tool in Kazakhstan, as well as a survey of alcohol-based hand sanitizers in Addis Ababa and surrounding areas as well as an assessment of the capacity and barriers to the local production of pharmaceuticals in Ethiopia.				
5.2a-g # Number of global technical publications/presentations authored by PQM+				
Core MNCH	Guidance Document for Developing and Implementing a Risk-based PMS for Maternal, Neonatal, and Child Health Products (English and French)	0	-	1
Core TB	Bedaquiline Fumarate Manufacturing Cost Report	0	-	1
Two core-funded projects produced publications of global utility in the last six months. The Core MNCH program delivered the Guidance Document for Developing and Implementing a Risk-based PMS for Maternal, Neonatal, and Child Health Products (English and French versions), to be used by MRAs in planning their PMS (also listed as a tool under indicator 5.1a-g). The Core TB project delivered the Bedaquiline fumarate manufacturing cost report, to be used by manufacturers of this drug that is part of combination therapy for the treatment of multi-drug resistant TB.				
5.2e Number of modules in the Foundations of GMP eLearning course that were completed				

INDICATOR		Baseline	FY21 Q1	FY21 Q2
Global	GMP eLearning module completions	0	760	1,043
			# of countries using modules	
Global	Number of countries with learners who have completed GMP eLearning module	0	34	38
Between Q1 and Q2, 1,803 modules in the online GMP training were completed. Use of this important training program continues to be high and diverse, with specialists from 34 countries and 38 countries completing one or more modules in Q1 and Q2, respectively. The PQM+-supported countries with the most instances of module completion were: Pakistan, Bangladesh, and Kenya.				
5.3a Number of awareness raising/advocacy events around medical product quality supported by PQM+				
Bangladesh	Dissemination of NQAG Guideline	0	-	1
Uzbekistan	World TB Day	0	-	1
Total: 5.3a Number of awareness raising/advocacy events supported by PQM+		**0**	**0**	**2**
5.3a-g Number of global awareness raising/advocacy events				
Global	Webinar: What Are Regulatory and Quality Assurance Systems and How Do They Impact Health Programs?	0	1	
5.3b Number of instances of media coverage of PQM+-supported medical product QA-related events or topics				
Bangladesh	Digital, print, social media	0	-	6
Burkina Faso	Social media, event	0	-	6
Burma	Social media, webinar, brief for mission	0	6	-
Ethiopia	Newsletter, webinar	0	1	1
Kenya	Webinar	0	1	-
Liberia	Print	0	1	-
Mali	Newsletter	0	-	1
Nepal	Newsletter	0	-	1
Nigeria	Webinar	0	1	-
Pakistan	Social media, newsletter, webinar, event (PIRIMS)	0	6	7
Uzbekistan	Digital, social media	0	2	3
Total: 5.3b Media coverage		**0**	**18**	**25**
During the first half of PY2, several important events were promoted on social media--the rollout of Pakistan's Integrated Regulatory Information Management System (PIRIMS), adoption of IDMP, and local manufacturing of PPE with PQM+ support; Uzbekistan's manufacturing of TB medicine; Burma's lab strengthening and the Nay Pi Taw's				

INDICATOR		Baseline	FY21 Q1	FY21 Q2
efforts to achieve ISO 17025 accreditation; and the launch of both the PQM+ project in Burkina Faso and the RB-PMS. There was major newspaper coverage in Liberia for the inauguration of the country's new PMS-TWG.				
5.3b-g Number of instances of global media coverage of PQM+-supported medical product QA-related events/topics				
PQM+ Global	Social media post/factsheet on malaria and USAID campaign	0	2	3
Public-Private Partnerships				
CC.PPP.a and b: Number of PPPs established with PQM+ support and PPP outcomes				
			New Partners	
			Q1	**Q2**
Pakistan	Pfizer Pakistan - pharmaceutical manufacturer. This private sector engagement expanded sources for ongoing training, as Pfizer Pakistan trained NQCL staff on standards and analytical techniques for Azithromicin.	0	-	1
Pakistan	Ferozsons - manufacturer of Remdesivir. PQM+ support leveraged private sector investment (Ferozsons ordered a large-capacity lyophilizer); expanded sources for ongoing training (Ferozsons trained NQCL staff on standards and analytical techniques for remdesivir); and started earning foreign exchange for Pakistan (through Ferozsons export of remdesivir to Indonesia).	0	-	1
Pakistan	AKC - manufacturer of PPE. Through engagement with PQM+, AKC is now earning foreign exchange for Pakistan by exporting KN95 and surgical masks to the United States and Spain.	0	-	1
Pakistan	Adsell - manufacturer of PPE. This private sector engagement leveraged private investment in HVAC and other changes to the facility so it could manufacture PPE.	0	-	1
Pakistan	Titi lab -- private testing lab. The Titi lab purchased equipment for PPE testing contract (leverage of private investment) and created new jobs in Pakistan from the testing contract; the lab was able to secure a contract with Honeywell. Also, PQM+ policy work that allowed manufacturers to outsource testing of their product in Pakistan opened the way for Titi to provide those services, which opened the way for Pakistani manufacturers to start producing quality-assured PPE for sale in Pakistan, Spain, the United States, and other markets.	0	-	1
Ethiopia	Ethiopia Pharmaceutical Manufacturers Association (partnership established in FY2020). In collaboration with this and other stakeholders, PQM+ completed the assessment of challenges facing pharmaceutical manufacturers. The assessment was shared with association members for feedback.	0	-	-
Country-specific Custom Indicators				

INDICATOR	Baseline	FY21 Q1	FY21 Q2
CUST2 Number of policies/regulations/administrative procedures developed as a result of USG assistance			
Nepal	0	-	10
In Q2, Nepal submitted seven of eight PQM+-supported SOPs for review. Two of them are new. The SOPs dealt with inspection, management, lab personnel, lab safety, recall of medical products, testing of medicine products, and others.			