

Follow up on PQM activities in Liberia

Monrovia, Liberia

December 18-24, 2010

Trip Report

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Cooperative Agreement # GHS-A-00-09-00003-00

Sponsoring USAID Missions: USAID/PMI Liberia

Grantee: Promoting the Quality of Medicines (PQM) Program

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Language: English

Date of Publication: January 10, 2011



This report is made possible by the generous support of the American people through the United States Agency for International Development (USAID), under Cooperative Agreement No. GHS-A-00-09-00003-00 [and the President's Malaria Initiative (PMI)]. The contents are the responsibility of the Promoting the Quality of Medicines Program, implemented by the U. S. Pharmacopeia, and do not necessarily reflect the views of USAID, PMI, or the United States Government.

About PQM

The Promoting the Quality of Medicines (PQM) program, funded by the U.S. Agency for International Development (USAID), is the successor of the Drug Quality and Information (DQI) program implemented by the United States Pharmacopeia (USP). PQM is USAID's response to the growing challenge posed by the proliferation of counterfeit and substandard medicines. By providing technical leadership to developing countries, PQM helps build local capacity in medicine quality assurance systems, increase the supply of quality medicines to priority USAID health programs, and ensure the quality and safety of medicines globally. This document does not necessarily represent the views or opinions of USAID or the United States Government. It may be reproduced if credit is given to PQM and USP.

Abstract

Dr. Abdelkrim Smine visited Monrovia, Liberia in December 2010 to meet with USAID/Liberia, the Ministry of Health, the Liberian Medicines Regulatory Authority (LMHRA), and the Malaria Control Program to discuss priorities and needs for this fiscal year. PQM finalized the work plan and agreed with all partners on the activities to be carried out by PQM by September 30, 2011.

Recommended Citation

Smine, Abdelkrim. 2010. *Follow up on PQM activities in Liberia*. Monrovia, Liberia; December 2010. Submitted to the U.S. Agency for International Development by the Promoting the Quality of Medicines Program. Rockville, Maryland: United States Pharmacopeia.

Key Words

Liberia, MCP, PMI, LMHRA, drug legislation, drug regulations, drug registration, quality control, quality assurance policy, drug quality.

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ACKNOWLEDGEMENTS

The author would like to thank:

- Rev. Tijli Tyee, Chief Pharmacist of the Ministry of Health of Liberia
- Mr. J. Enders, Mr. J. J. Janafo, and Mr. P.K. Nyansaiye from the Malaria Control Program
- Mr. B. Johnson from National Drug Services for his valuable effort for clearing the spectrophotometer
- Dr. C. Bright Parker and all her staff for her time and dedication and all effort made in facilitating PQM work with different institutions
- USAID/Liberia team: Mr. Augustin Randolph, Mr. Kaa Williams, Dr. Filiberto Hernandez, Dr. Noe Rakotondrajaona, and Mr. Samuel Pieh for their time, guidance, and valuable recommendations for PQM
- PQM administrative staff and editors for their assistance with logistical arrangements and for editing the trip report.
- Mr. Anthony Boni and Dr. Maria Miralles at USAID/Washington for their guidance and helpful insights

ACRONYMS

GF	Global Fund to Fight AIDS, Tuberculosis and Malaria
HPLC	High Performance Liquid Chromatography
LMHRA	Liberia Medicines and Health Products Regulatory Authority
MCP	Malaria Control Program
MOH	Ministry of Health
NDS	National Drug Services
PMI	President's Malaria Initiative
PQM	Promoting the Quality of Medicines Program
QA	Quality Assurance
QAP	Quality Assurance Policy
QC	Quality Control
TLC	Thin Layer Chromatography
USAID	United States Agency for International Development
USP	United States Pharmacopeia
WHO	World Health Organization

Background

The Promoting the Quality of Medicines (PQM) Program, implemented by the United States Pharmacopeia (USP), is supporting the United States Agency for International Development (USAID) President's Malaria Initiative (PMI) partners strengthening Liberia's quality control capacity, especially for antimalarial medicines.

In February 2009, PQM and the Liberian Medicines Regulatory Committee (LMRC) organized a workshop with key Liberian stakeholders, the World Health Organization (WHO), and USAID to finalize a first draft of legislation to create a medicines regulatory authority in the country. In November 2009, LMRC and PQM called key Liberian stakeholders from the public and private sector for a workshop to discuss the legislation and finalize the draft to be submitted to the Minister of Health. The new legislation was signed into law in October 2010.

PQM is also working with local partners to perform medicine quality monitoring (MQM). In March 2010, PQM and local partners collected antimalarial medicine samples and tested them using Global Pharma Health Fund (GPHF) Minilabs[®], portable laboratories used in the field to help assess the quality of medicines. The results showed that a large portion of samples had serious quality issues.

Purpose of Trip

The purpose of this trip was to:

- Meet with USAID/Liberia to discuss the proposed work plan
- Meet with all PQM partners to discuss progress and the Quality Assurance/Quality Control (QA/QC) priorities in the country
- Install the new UV/VIS spectrophotometer and train Liberia Medicines and Health Products Regulatory Authority (LMHRA) staff on how to use and maintain it
- Finalize the work plan with USAID/Liberia during debriefing

Source of Funding

This trip was supported with funds from the President's Malaria Initiative (PMI) for Liberia.

Overview of Activities

Briefing USAID/Liberia

Participants: Mr. Augustin Randolph (Head of Health team)
Dr. Noe H. Rakotondrajaona (PMI Malaria Advisor)
Mr. Samuel H. Pieh (Washington Program Advisor)
Mr. Kaa Williams (USAID-PMI)
Dr. Abdelkrim Smine

Dr. Smine gave an update of PQM activities in the country and shared the draft work plan, discussing the lack of QA/QC capacity in Liberia and its impact on public health. The group talked about how PQM can support LMHRA with drug regulations and why PQM considers drug registration, inspections, and quality control as priority functions to build in the newly established LMHRA.

Important points discussed:

- USAID recommends that PQM focus on all types of medicines, not only antimalarials
- USAID recommends that PQM support the Malaria Control Program (MCP) to establish and implement a sound QA policy to comply with Global Fund (GF) requirements
- USAID agreed to all proposed PQM activities in the draft work plan and suggested including the support to MCP as a priority action
- PQM and USAID recommend that LMHRA should hire a Technical Director to lead the institution and also hire three additional staff to be fully dedicated to the QC lab
- USAID promised to seek more funding for PQM for this year

Meeting with Liberia Medicines and Health Products Regulatory Authority

Dr. Smine met with Mrs. C.B. Parker and her staff three times during this trip. The main discussions focused on PQM support to LMHRA. Dr. Smine suggested that PQM should work together with WHO to support LMHRA in drafting the regulations needed for medicines registration, inspection and quality control.

Important points discussed:

- LMHRA has worked with a Ghanaian consultant to establish a one-year action plan. The draft of this action plan will be shared with PQM and USAID in the coming weeks. PQM agreed to review and comment on the draft.
- LMHRA has fixed the QC lab (roof, painting, entrance, water, electricity). Dr. Smine, on behalf of PQM, was pleased with this new achievement by LMHRA and recommended that they should purchase a small hood, refrigerator, and water distillation system and fix the drawers underneath the benches so that they can be used for storage.
- LMHRA agreed to hire three additional staff to be fully dedicated to the QC laboratory.
- LMHRA is in the process of establishing its Board of Directors (including a Technical Director to manage its activities).
- PQM reviewed all existing lab equipment and listed the small supplies needed to put all equipment to work (pH meters, balances, dissolution testers, disintegration machine, and the recently purchased UV/VIS spectrophotometer).
- PQM agreed to train all LMHRA QC lab analysts as soon as the new staffs are hired.
- LMHRA will receive funds from GF to pay for lab work and possibly additional staff.
- LMHRA will receive some government funds, but is unsure of when.
- LMHRA is doing what is called “products listing” by asking all importers to register the names and all details about each product they introduce to the country. LMHRA plans to enforce this initiative and confiscate any product not listed as a first step toward implementing common drug registration. PQM recommends that this initiative should be limited in time; LMHRA should start slowly implementing drug registration according to regulations in compliance with existing legislation.

Meeting with Malaria Control Program

Participants: Rev. Tijli Tyee (Chief Pharmacist – Ministry of Health)
Mr. Jonathan Enders (Deputy Manager – Malaria Control Program)
Mr. Julius J. Janafo (Malaria Officer – Supply Chain MCP)
Mr. Paye K. Nyansaiye (Officer Technical Services – MCP)
Dr. Abdelkrim Smine

Important points discussed:

- MCP has been approved by GF to receive \$68 million for round 10 for malaria control.
- UNDP has been the principal recipient of GF funding in Liberia. For round 10, the Ministry of Health will be the principal recipient and will be fully responsible for managing the funds.
- Mr. Enders emphasized the importance of PQM support to MCP, asking PQM to support the program with QA/QC of antimalarial medicines.
- The MCP has been pleased with the support received from and the fact that MCP staff has been involved in all PQM activities.
- Following USAID's recommendation, PQM will try to assist the MCP to establish a quality assurance policy (QAP) and make sure that the program will be ready to comply with GF requirements in QA/QC for round 10.
- PQM will work with MCP and other stakeholders to make the QAP ready before the start of round 10 activities.

Installation of new spectrophotometer purchased by PQM

Dr. Smine and LMHRA staff installed the new spectrophotometer according to the manufacturer's guidelines. The performance test was run as described by the supplier, and the spectrophotometer was working well. However, the computer was not able to connect to the spectrophotometer, and although another computer was substituted and the provided connection cable changed, the problem was not resolved. Dr. Smine decided to use the touch screen of the spectrophotometer to show LMHRA staff the basic functions of the machine.

Following the hands-on training, Dr. Smine concluded that LMHRA analysts were able to understand the basic use of the spectrophotometer; however, the analysts will require additional formal training on UV/Vis analytical methods according to pharmacopeial standards. This can be done when PQM returns to Monrovia to train the QC lab of LMHRA.

The spectrophotometer was connected to a back-up system to avoid damage from power shortages during use. The computer purchased by PQM needs a monitor and needs to be checked by using different connection cables and ports to allow proper communication between the spectrophotometer and the computer. It will be better to use a computer with the specific software to run the spectrophotometer to prevent damage of the machine and better management of data. A new printer with 220 volts is needed to print out generated data.

Debriefing of USAID/Liberia

Participants: Mr. Augustin Randolph (Head of Health Team)
Dr. Noe H. Rakotondrajaona (PMI Malaria Advisor)
Mr. Kaa Williams (USAID-PMI)
Dr. Abdelkrim Smine

At the end of the trip, Dr. Smine met with the USAID malaria team for a debriefing. Dr. Smine reported the changes occurring at the QC laboratory, including the work carried out by LMHRA to refurbish the lab.

Important points discussed:

- PQM will support the MCP, following the recommendation made by USAID and the urgent need and request for assistance made by MCP.
- PQM will dedicate 75% of its effort on building the quality control capacity of LMHRA. PQM will organize training for the QC lab on TLC, UV, and dissolution using the existing equipment. The training will take place soon after LMHRA hires three additional analysts.
- To put the lab to work, PQM will provide all small supplies, reagents and reference standards within the limits of PQM financial support from USAID.
- PQM will assist LMHRA (25%) with all drug regulations needed to build the basic functions of a regulatory authority. PQM will collaborate with WHO and local stakeholders to get the drafts of priority regulations.
- LMHRA is in the process of hiring a Technical Director and establishing the Board of Directors according to the newly approved legislation. In addition and following recommendations made by PQM, LMHRA will hire three additional analysts to be fully dedicated to work in QC lab.
- PQM will provide some needed supplies to get the lab working and organize training QC lab analysts on TLC, dissolution and UV/Vis according to pharmacopeial standards.
- PQM and local partners will collect and test selected samples of medicines from all sectors in the market in the third quarter of this fiscal year.
- To allow proper and urgent needed support to help build QC capacities in Liberia, PQM requests additional funds to purchase a new HPLC which will allow proper testing of collected samples according to pharmacopeial standards.
- USAID agreed to try raising additional funds to allow PQM to carry out this year's proposed activities, on the condition that LMHRA hires additional analysts.

Next Steps

- PQM will finalize the FY10 Work Plan based on recent recommendations of USAID and local partners requests for support (*Annex 1*)
- PQM will finalize a list of all needed basic supplies to get all lab equipment working (*Annex 2*)
- PQM will organize a workshop on drug regulations, in collaboration with WHO, during the second quarter of this year.
- PQM will organize UV, dissolution and TLC training in the second quarter of this year.
- After training the laboratory analysts, quality control tests of selected samples will be undertaken and coordinated by PQM in the third or fourth quarter of this year
- If additional funds become available, PQM will purchase, install, and train QC lab analysts on HPLC.

**Proposed FY10 Work Plan for Strengthening Quality Assurance
and Quality Control Systems of Medicines in Liberia**



Implementing Period: October 1, 2010 – September 31, 2011

Submitted to USAID/Liberia Mission

November 2, 2010

Project Summary

Responsible Staff:

USAID Mission	Liberia
Name of Implementing Partner	Promoting the Quality of Medicines (PQM) Implemented by U.S. Pharmacopeial Convention
Agreement Number	GHS-A-00-09-00003-00
Agreement Officer's Technical Representative	Mr. Anthony Boni, Pharmaceutical Management Specialist Dr. Maria Miralles, Senior Pharmaceutical Management Advisor
USAID/Liberia Mission	Dr. Noe Rakotondrajoana; nrakotondrajoana@usaid.gov , Dr. Filiberto Hernandez; fhernandez@usaid.gov , and Mr. Kaa Williams: kwilliams@usaid.gov
PQM Responsible Staff	Dr. Abdelkrim Smine, PQM Consultant
Funding obligation from USAID/Liberia Mission	Estimated \$ 100,000 Through the President's Malaria Initiative

Acronyms

FDA	Food and Drug Administration
FDC	Fixed Dose Combination
FDRO	Food and Drug Regulation Officer
GPHF	Global Pharma Health Fund
HPLC	High Pressure Liquid Chromatography
LMHRA	Liberian Medicines Regulatory Authority
LMRC	Liberian Medicines Regulatory Committee
MCP	Malaria Control Program
MQM	Medicines Quality Monitoring
NQCL	National Quality Control Laboratory
PMI	Presidential Malaria Initiative
PQM	Promoting the Quality of Medicines Program
SP	Sulfadoxine-pyrimethamine
TB	Tuberculosis
USAID	United States Agency for International Development
USP	United States Pharmacopeia
UV/Vis	Ultra-Violet/Visible
WHO	World Health Organization

1. Background and Rationale

Liberia has been in the process of rebuilding its health care system for the last six years, with the goal of transitioning from an emergency-based to a development-oriented system. Central to this endeavor is reliable access to good-quality, safe, and efficacious essential medicines; without it, other investments in health are negated. Legislation to establish the new Liberian Medicines Regulatory Authority (LMHRA) was recently enacted and approved by the president of Liberia. This legislation was the first step in building a legal framework for a pharmaceutical system in Liberia. The USAID/ Liberia Mission and the Promoting the Quality of Medicines (PQM) program, implemented by the United States Pharmacopeial Convention (USP), have been instrumental in assisting the Liberian Medicines Regulatory Committee (LMRC), the Ministry of Health (MOH) and the Board of Pharmacy to achieve this milestone in regulating the country's pharmaceutical market.

PQM also assisted the LMRC, in collaboration with the Malaria Control Program (MCP) and the Board of Pharmacy (BP), to conduct the first rapid quality screening study of antimalarial medicines. Samples were collected from Monrovia, Ghanta, and their suburbs and analyzed using basic tests; results showed that the quality of medicines in Liberia is still a major issue.

Based upon requests from its partners in Liberia, PQM has formulated plans to assist the new LMHRA on several fronts:

- ▶ The medicines market has not been regulated until this time; consequently, substandard and counterfeit medicines are widely available in the private and informal sectors at all levels of the distribution chain. PQM will help LMHRA to establish priority policies and procedures to regulate its medicine registration system and build quality control capacity.
- ▶ So far, the malaria control program has contributed a lot in developing and building quality control capacities in Liberia. Recently Liberia has been approved to receive \$ 68 million from GFATM grant round 10. It is crucial that MCP is fully prepared when the ministry of health will become the principal recipient. PQM will assist MCP establishing a quality assurance policy to comply with GFATM requirements
- ▶ As allocated PMI funding is sufficient to conduct only the most urgently needed work, PQM will prepare the LMHRA to raise additional funding for other priority activities by presenting to donors on the importance of medicine quality and the challenges of quality assurance and quality control that the new authority faces.
- ▶ PQM has already trained eight staff from LMRC, MCP, and BP. PQM will build on the first medicine quality study and training workshop, by training the selected staff in other analytical methods. This training will be complemented by a study of the quality of essential medicines to increase quality control capacities.

With the support of the USAID/Liberia Mission and funding from the President's Malaria Initiative (PMI), PQM proposes the activities listed below.

2. Technical Objectives

Objective 1: Assist LMHRA establish regulations to start implementing the drug legislation

Objective 2: Assist LMHRA to build its quality control capacities

Objective 3: Assist Malaria Control Program establishing a quality assurance policy to comply with GFATM requirements and be prepared to manage round-10 grant.

3. Planned Activities

For Objective 1&2: Build Medicines regulatory and quality control capacities

1. Support LMRC in establishing priority medicine regulations.

- As requested by LMRC, PQM will assist LMHRA staff to draft the mission statement, vision, and main objectives and targets for LMHRA first year of existence.
- PQM will provide models for major regulations and guidelines that will needed to be developed to start implementing the new legislation and make the LMHRA operational.
- PQM will support the LMHRA staff in drafting and implementing priority policies and regulations related to start regulating the medicines market in Liberia.
- PQM will recommend appropriate actions to be taken by LMHRA based on medicine quality data produced during FY11.

2. Strengthen the quality control of antimalarial medicines.

At the present time, Liberia has no medicines quality control (QC) capacity; however, the last antimalarial medicine QC study was very successful in demonstrating that the first level of quality control could easily be accomplished by Liberia and at a very low cost. The study also showed to what extent the Liberian market is wide open to substandard, fake, and counterfeit medicines from various sources. PQM would provide the LMHRA National QC lab (NQCL) with a new Ultraviolet/visible (UV/Vis) spectrophotometer to be used for all UV testing according to pharmacopeial standards. LMHRA NQCL has both dissolution and disintegration testers; if these two instruments are put to work, they will need a UV/Vis spectrophotometer. PQM will train selected staff from LMHRA, MCP, and BP on UV and dissolution testing to increase the scope of analytical capacities in Liberia.

- PQM will train NQCL on UV/Vis, TLC and Dissolution
- PQM and LMHRA will collect essential medicines samples in agreement with the USAID/ Liberia Mission and Liberian partners, and test the collected medicines using basic tests and some compendial tests.

3. Conduct additional necessary activities as able.

PQM would like to provide the LMHRA NQCL with a new High Pressure Liquid Chromatography (HPLC) machine and train LMHRA staff on this major analytical method; however, the PMI funds allocated would not cover the cost of this activity.

With the support of USAID and other donors, PQM would work with LMHRA to raise the \$100,000 needed to purchase and install the HPLC, and to train LMHRA staff on the use and maintenance of this key instrument. Without an HPLC, LMHRA will always need to send samples to an outside laboratory for confirmatory testing.

Objective 3. Assist Malaria Control Program establishing a Quality Assurance Policy

PQM will work with MCP to collect all data needed to establish a quality assurance policy for antimalarial medicines which will be purchased by the resources of GFATM round-10. Data will cover the systems and measures that are in place to assure the quality of medicines from the selection to the use by patient.

PQM will review existing quality assurance measures, identify the gaps and propose better alternatives based on the country existing capacities.

For quality control of antimalarial medicines in the market, PQM will establish a sampling plan and guidelines based on the country distribution chains and mechanisms. PQM will assist MCP in finding a QC lab where confirmatory testing of samples could be done in compliance with GFATM requirements.

Follow up on PQM activities in Liberia

Implementing Partner: Promoting the Quality of Medicines (PQM) Implemented by US Pharmacopeial Convention

Agreement Number: GHS-A-00-09-00003-00

Strategic Intervention Areas: Treatment

Intervention Areas: The Quality of Medicines in Liberia

Implementer	Activities	Intervention Site	Start	End	Budget	Expenditure	Balance	Indicator/Target	Progress	Observation/ Responsible PQM
PQM & WHO	Support LMRC in establishing priority medicine regulations	Monrovia	Q1	Q4	25,000	0	25,000	At least three new major policies and/or regulations issued		Smine & Eshetu
PQM & MCP	Support MCP establishing a quality Assurance policy (QAP) to comply with GFATM Round-10	Monrovia and districts	Q1	Q3	10,000	0	10,000	QAP draft made and shared with stakeholders		Smine & El Hadri
PQM	Procure, deliver and install a new UV/VIS Spectrophotometer to LMHRA lab	Monrovia	Q1	Q1	20,000	0	20,000	A new & functional Spectrophotometer is installed in LMHRA laboratory	ongoing	Smine & Yanga
PQM, MOH, MCP, LMHRA	Train LMHRA staff on dissolution, TLC and UV/Vis	Monrovia	Q2	Q3	10,000	0	10,000	At least five staff from LMHRA/MOH are trained on TLC, UV and Dissolution		Smine, Bempong and El Hadri
PQM, MOH, LMHRA, MCP	Collect selected medicines from targeted areas	Monrovia and other areas	Q3	Q4	10,000	0	10,000	At least 200 samples collected from all sectors.		Smine, El Hadri
PQM, LMHRA	Test all samples using basic tests and confirm using compendia methods	Monrovia	Q2	Q3	20,000	0	20,000	All samples collected are tested		PQM and ISO17025 QC lab
LMHRA, PQM	Draft and share drug quality report	Monrovia	Q3	Q4	4,000	0	4,000	Drug Quality Report issued		LMHRA and PQM

Follow up on PQM Activities in Liberia

PQM, LMHRA	Promote enforcement action by LMHRA based on data	Liberia	Q2	Q4	1,000	0	1,000	Recommendations about enforcement made by PQM		PQM and LMHRA	
Total MOP 10 Budget \$ 100,000							1000,000				

Request for additional funding:

With additional funds of **\$ 100,000**, PQM will purchase a new HPLC, install it and train LMHRA analysts on HPLC methods according to compendia standards. HPLC is by far the most needed piece of equipment in a QC laboratory and without it the testing of medicines will always be basic and will need to be confirmed in an outside laboratory.

PQM	Purchase a new HPLC with all its accessories and maintenance kit	Monrovia	Q2	Q4	0	0	80,000	QC lab will be fully functional and most of the tests could be run in country.		Smine & Yanga	
PQM	Install the HPLC and train QC lab on its use and maintenance	Monrovia	Q2	Q4	0	0	20,000	HPLC is the most used analytical method and HPLC is required for testing over 80% of all type of medicines		Smine & Yanga	
Total additional fund required to build the basic of quality control capacity in Liberia							100,000				

Inventory of Lab equipment, reagent, glassware and minilab supplies
Identification of Lab equipment, supplies and reagent to be provided by PQM

Existing Lab Equipment	Equipment/parts needed	Observation/other equipment
pH Metter (2) New never been used	<ul style="list-style-type: none"> • Calibrating buffers • Electrodes storage solution 	
Precision Balances (2)	<ul style="list-style-type: none"> • Weighing tools (spatulas, brushes, plastic weighing scopes) 	The lab needs a balance for weighing 10g to 2kg
Dissolution testers (2) New never been used	<ul style="list-style-type: none"> • Extra vessels (6 pcs) • Thermometers, glass, mercury (4 pcs) • Stop watch (4 pcs) • Centering gauge (1 pc.) • Depth gauge (1 pc) • Carpenter levels (2 pcs) • Glass syringes with needles (20 units) • Millipore syringe filters, 0.22 (2 boxes) • Small Vacuum pump (1 set) • USP filtration system (dissolution) with large size bottles • Prednisone tablet and RS • Set of new baskets 	<p>Please purchase all chemicals used for dissolution of prednisone tablets and SP tablets (for training)</p> <p>Please get NIST certified items when applicable</p>
Disintegration Machine (Copley Scientific serial #68728) New been used few times	<ul style="list-style-type: none"> • Needs vessels 	
Magnetic stirring platform (1) Small size	<ul style="list-style-type: none"> • Need magnetic bares (different sizes) 	Need a big magnetic stirring platform with heat (dissolution)
Working Oven (up to 500	<ul style="list-style-type: none"> • Need thermometer up to high temperature 	

degree)	<ul style="list-style-type: none"> • LOD vessels • API Drying small tools 	
10 log books for equipment		Hard cover
10 lab notebooks for analysts		USP lab type
Glassware present in the LMHRA QC laboratory <p style="text-align: center;"><u>Beakers</u></p> 2000 ml 12 pc 600 “ 4 “ 400 “ 8 “ 250 “ 2 “ 100 0 50 “ 2 “ <p style="text-align: center;"><u>Erlenmeyer flasks</u></p> 1000 ml 2 500 “ 4 250 “ 9 200 “ 1 125 “ 1 50 0 25 0 10 0 <p style="text-align: center;"><u>Conical flasks</u></p> 1000 “ 3 500 “ 3 250 “ 3 50 “ 2 <u>Funnels</u> 2	Please purchase additional glassware to complete what the laboratory has already (please get plastic and glass beakers, Erlenmeyers flasks, conical flask and funnels)	Most of lab glassware is in good condition
	Paper pH, Parafilm, aluminum paper, tape,	

The lab lack small supplies	markers, stickers, Pasteur pipettes, pipettes aide (rubbers), plastic dispensing bottles (500 ml) for distilled water and alcohol solution, paper wipe	
The Lab has TLC supplies of the minilabs only	Two Large size TLC sets <ul style="list-style-type: none"> - Tanks, TLC plates - Spotting tips - Eppendorff pipette 250 ml with tips (long ends for TLC) 	
New Spectrophotometer	<ul style="list-style-type: none"> • Screen monitor for computer • Printer (220V) • Connection cables (2 female ends 9 wholes) (one female end 9 wholes and USB port on the other end) 	
		Please consider basic solid reagents at least to carry full monograph tests for selected medicines to be collected in the future.

Reagent Inventory (most are minilab reagents)

Description	Unit	Qty
Sodium Hydroxide pellets	500 g	4
Sulfuric Acid	1 L	1
Formaldehyde	1 L	2
Ethyl acetate	1 L	2
Acetic acid	1 L	3
Phenol crystal	500 g	3
Formaldehyde assays	500 ml	2
Hydrochloric acid	1 L	2
Magnesium Chloride Hexahydrate	500 g	3
Copper III Acetate	250 g	2
Tripotassium Edeate	100 g	4
Ammonia Solution	1 L	2
Ferric III chloride	2.5 L	2
4-Dimethylaminobenzaldehyde	250 ml	3
Ethyl Alcohol Spirit	1 L	2
Methanol	1 L	20
Toluene	1 L	2
Ethanol Absolute	2.5 L	18
Acetic acid glacial	1 L	3
Hydrogen peroxide Solution 30%	500 ml	4
Ammonia solution	500 ml	1
Iodine Pellets	0.10 kg	2
Potassium dichromate	0.08 kg	3
Ferric chloride	0.25 L	2
EDTA	50 g	3
Copper III Acetate Monohydrate	100 g	3
Iron III Chloride	250 g	2
Magnesium chloride	250 g	2

Magnesium chloride hexahydrate	250 g	3
Ninhydrin	10 g	3
4-Dimethylaminobenzaldehyde	250 g	2
Sodium hydroxide solid	0.5 kg	2
Fast Red salt	50 g	2
Sulfuric Acid assay	1 L	1
Nitric acid	500 ml	1
Phenol solid	0.10 kg	2
Acetone	1 L	3

List of Minilab Reference Standards available

Reference Standard	Qty	Expiry Date
Exetil thambutol HCl 400mg	40 tabs	March 31, 2012
Chloramphenicol 250mg	40 tabs	June 30, 2011
Cloxacillin 250 mg	40 tabs	December 31, 2011
Indinavir 200mg	20 tabs	January 31, 2011
Amoxicillin 500mg	40 tabs	November 30, 2013
Praziquantel 600mg	40 tabs	March 31, 2011
Cefuroxime axetil	20 tabs	February 29, 2012
Prenisolone 5mg	200 tabs	April 30, 2011
Prothionamide 250 mg	20 tabs	April 30, 2011
Mebendazole 100 mg	40 tabs	June 30, 2011
Zidovudine 300 mg	20 tabs	January 31, 2012
Rifampicin 150 mg	40 tabs	November 30, 2012
Ciprofloxacin 250 mg	40 tabs	August 31, 2013
Cefixime 200 mg	20 tabs	July 31, 2012
Glibenclamide 5 mg	80 tabs	July 31, 2012
Paracetamol 500 mg	40 tabs	August 31, 2012
Proquanil HCl 100 mg	40 tabs	May 31, 2012
Salbutamol 4 mg	80 tabs	February 29, 2012

Follow up on PQM Activities in Liberia

Metronidazole 250 mg	40 tabs	October 31, 2011
Isoniazid 100 mg	40 tabs	February 28, 2011
Levofloxacin 250 mg	20 tabs	July 31, 2014
Griseofulvin 125 mg	40 tabs	June 30, 2011
Oseltamivir 75 mg	20 tabs	September 30, 2011
Aminophylline 100 mg	40 tabs	February 28, 2012
Albendazole 400 mg	40 tabs	July 31, 2012
Erythromycin 250 mg	40 tabs	September 30, 2011
Lamivudine 150 mg	20 tabs	June 30, 2014
Cephalexine 150 mg	40 tabs	January 31, 2012
Pyrazinamide 500 mg	40 tabs	November 30, 2012
Atovaquone/Proguanil HCl 62.5/25 mg	20 tabs	October 31, 2013
Ampicillin 500 mg	40 tabs	August 30, 2012
Furosemide 40 mg	40 tabs	December 31, 2011
Moxifloxacin 400 mg	20 tabs	August 31, 2014
Nevirapine 200 mg	20 tabs	April 30, 2011
Mefloquin 250 mg	40 tabs	February 2011
Sulfadoxine/Trimethoprim	100 tabs.	Sept. 30, 2011
Chloroquine diphosphate 250 tabs.	20 tabs.	Sept. 30, 2011
Quinine Sulfate 300 mg	40 tabs.	Nov. 30, 2012
Primaquine 15 mg	40 tabs.	June 30, 2011
Artemether 50 mg	40 tabs.	July 31, 2011
Artesunate 50 mg	20 tabs.	March 30, 2012
Phenoxymethylpenicillin 250 mg	20 tabs.	Sept. 30, 2011
Pyrazinamide 500 mg	20 tabs.	Nov. 30, 2011
Lumefantrine/ Artemether 120/ 20	10 tabs.	Aug. 31, 2011
Amodiaquine HCL 200mg	20 tabs.	March 31, 2012
Primaquine 15 mg	20 tabs.	June 30, 2011
Tetracycline HCL 250 mg	20 tabs.	June 30, 2011