

PMI

U.S. PRESIDENT'S MALARIA INITIATIVE

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This Malaria Operational Plan has been approved by the U.S. Global Malaria Coordinator and reflects collaborative discussions with the national malaria control programs and partners in country. The funding available to support the plan outlined here is pending finalization of the FY 2020 appropriation. If any further changes are made to this plan it will be reflected in a revised posting.

U.S. PRESIDENT'S MALARIA INITIATIVE

LIBERIA

Malaria Operational Plan FY 2020

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TABLE OF CONTENTS

ABBREVIATIONS	4
I. INTRODUCTION	6
II. MALARIA SITUATION AND MALARIA CONTROL PROGRESS IN LIBERIA	8
III. OVERVIEW OF PMI'S SUPPORT OF LIBERIA'S MALARIA CONTROL STRATEGY	13
IV. PARTNER FUNDING LANDSCAPE	15
V. ACTIVITIES TO BE SUPPORTED WITH FY 2020 FUNDING	21
ANNEX A: INTERVENTION-SPECIFIC DATA	22
1. VECTOR CONTROL	22
1.A. ENTOMOLOGICAL MONITORING	25
1.B. INSECTICIDE-TREATED NETS (ITNs)	31
2. HUMAN HEALTH	39
2.A CASE MANAGEMENT in health facilities and communities	39
2.B. DRUG-BASED PREVENTION	54
2.B.i MALARIA PREVENTION IN PREGNANCY (MIP)	56
3. CROSS-CUTTING AND OTHER HEALTH SYSTEMS	65
3.A. SUPPLY CHAIN	65
3.B. SURVEILLANCE, MONITORING & EVALUATION (SM&E)	75
3.C. SOCIAL AND BEHAVIORAL CHANGE (SBC)	83
3.D. PROGRAM EVALUATION AND OPERATIONAL RESEARCH	94
3.E. OTHER HEALTH SYSTEMS STRENGTHENING	97

ABBREVIATIONS

ACT	Artemisinin-based combination therapy
AL	Artemether-lumefantrine
ANC	Antenatal care
AS/AQ	Artesunate-amodiaquine
BMGF	Bill and Melinda Gates Foundation
CHIS	Community-based information system
CDC	Centers for Disease Control and Prevention
CDO	County diagnostic officer
CHA	Community health assistant
CHSS	Community health services supervisor
CHT	County health team
CHV	Community health volunteer
CMS	Central medical stores
CY	Calendar year
DHIS2	District Health Information System 2
DHS	Demographic and Health Survey
eLMIS	Electronic logistics management information system
EUV	End-use verification
EVD	Ebola virus disease
FARA	Fixed Amount Reimbursement Agreement
FY	Fiscal year
GHI	Global Health Initiative
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
GOL	Government of Liberia
HFS	Health facility survey
HMIS	Health management information system
iCCM	Integrated community case management
IEC	Information, education, communication
iHRIS	Integrated human resource information system
IPTp	Intermittent preventive treatment for pregnant women
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito net
LIBR	Liberian Institute of Biomedical Research
LMHRA	Liberia Medicines and Health Products Regulatory Authority
LMIS	Logistics management information system
MIP	Malaria in pregnancy
MIS	Malaria indicator survey
MoH	Ministry of Health
MOP	Malaria Operational Plan

NDS	National Drug Service
NDU	National Diagnostics Unit
NGO	Non-governmental organization
NMCP	National Malaria Control Program
NMSP	National Malaria Strategic Plan
NPHIL	National Public Health Institute of Liberia
NPHRL	National Public Health Reference Laboratory
OR	Operational research
PBO	Piperonyl butoxide
PMI	U.S. President's Malaria Initiative
QA/QC	Quality assurance/quality control
RBM	Roll Back Malaria
RDT	Rapid diagnostic test
SBC	Social and behavior change
SCMP	Supply chain master plan
SCMU	Supply Chain Management Unit
SM&E	Surveillance, monitoring, and evaluation
SMEOR	Surveillance, Monitoring and Evaluation and Operational Research
SP	Sulfadoxine-pyrimethamine
STAIP	Strategic Technical Assistance for Improved Health System Performance and Health Outcomes
TA	Technical assistance
TES	Therapeutic efficacy study
TTM	Trained traditional midwife
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

I. INTRODUCTION

The U.S. President's Malaria Initiative (PMI)—led by the U.S. Agency for International Development (USAID) and implemented together with the U.S. Centers for Disease Control and Prevention (CDC)—delivers cost-effective, lifesaving malaria interventions alongside catalytic technical and operational assistance to support Liberia to end malaria. PMI has been a proud partner of Liberia since 2008, helping to decrease child death rates by 18 percent through investments totaling almost \$159.8 million.

The proposed PMI fiscal year (FY) 2020 budget for Liberia is \$14 million. This Malaria Operational Plan (MOP) outlines planned PMI activities in Liberia for FY 2020. Developed in consultation with the National Malaria Control Program (NMCP) and key stakeholders, proposed activities reflect national and PMI strategies, draw on best-available data, and align with the country context and health system. Proposed PMI investments support and build on those made by the Government of Liberia as well as other donors and partners.

Liberia at a glance

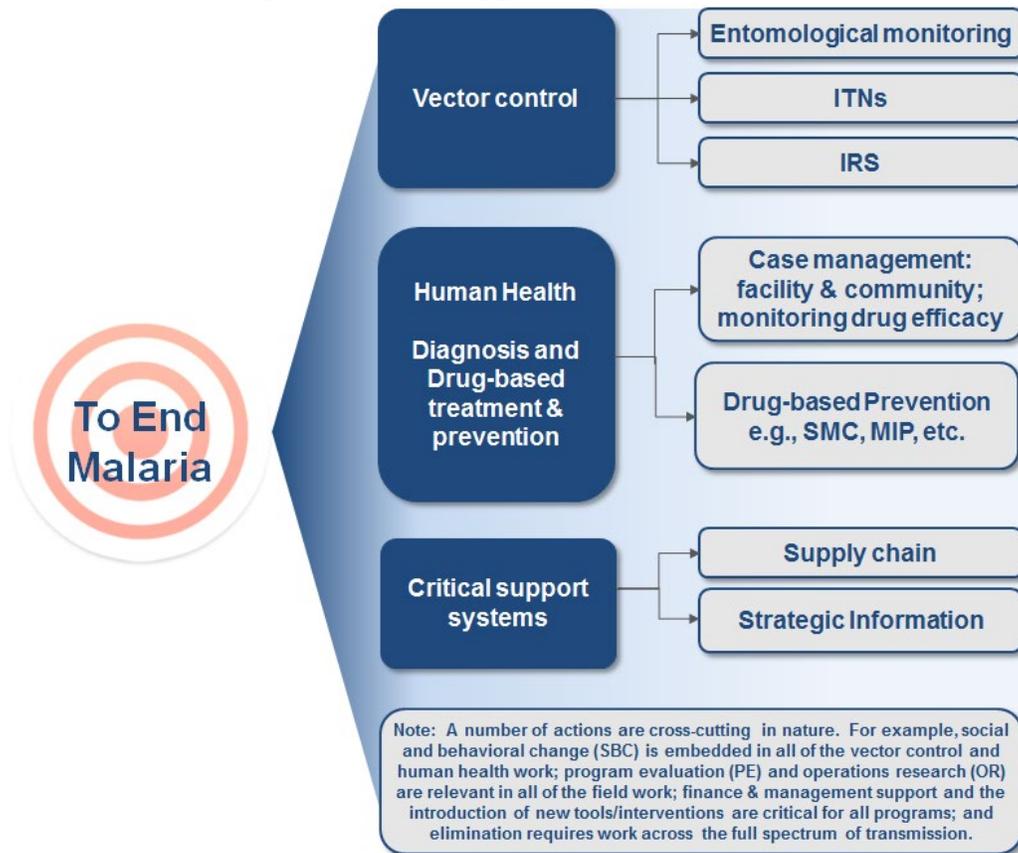
- **Geography:** Liberia covers 43,000 square miles in West Africa, and it is bounded by nearly 350 miles of Atlantic Ocean off the southwest and by the neighboring countries of Sierra Leone (northwest), Guinea (north), and Côte d'Ivoire (east and southeast). Most of the country lies at altitudes below 500 meters.
- **Climate:** The coastal areas are characterized by mangrove swamps, which give way to tropical rain forest that gradually thins out northwards to be replaced by deciduous forest. All geographic areas of Liberia are favorable to malaria transmission.
- **Population in 2019:4,555,021** (projected 2021 population)
- **Population at risk of malaria:** 4,555,021(National Malaria Strategic plan 2016-2020)
- **Malaria incidence per 1000 population: 232** (2018 Liberia HMIS)
- **Under-five mortality rate:** 94/1000 live births (2013 DHS)
- **World Bank Income Classification & GDP:** Liberia is a lower income country with a GDP per capital of \$600 (World Bank National Accounts, 2019)
- **Political system:** Liberia is a republic with an elected president and Senate, through a multi-party democratic process
- **Trafficking in Persons designations, 2016-2018:** USG TIP Tier 2 Watchlist (USAID, Liberia Country Development Cooperation Strategy, 2019-2024)
- **Malaria funding and program support partners include (but are not limited to):**
 - Global Fund to Fight AIDS, Tuberculosis and Malaria (GF)
 - U.S. President's Malaria Initiative (PMI)
 - World Health Organization (WHO)
 - World Bank
- **PMI Support of National Malaria Control Strategy:** PMI supports the three major interventions of the National Malaria Strategic Plan (2015-2020), namely: Case

management, malaria in pregnancy (MIP), and insecticide treated nets (ITNs). PMI supports both the central level with development of policy, strategic, operational, and implementation guidelines, as well as providing technical assistance for service delivery at health facilities and community. PMI support includes procurement and distribution of quality assured malaria commodities. (See III. Overview of PMI’s support of Liberia’s Malaria Control Strategy for additional details)

- **PMI Investments:** Liberia began implementation as a PMI focus country in FY 2008. The proposed FY 2020 PMI budget for Liberia is \$14 million; that brings the total PMI investment to nearly \$173.8 million.

PMI organizes its activities and planning levels around the activities below, in line with the national malaria strategy.

Figure 1. PMI’s Approach to End Malaria



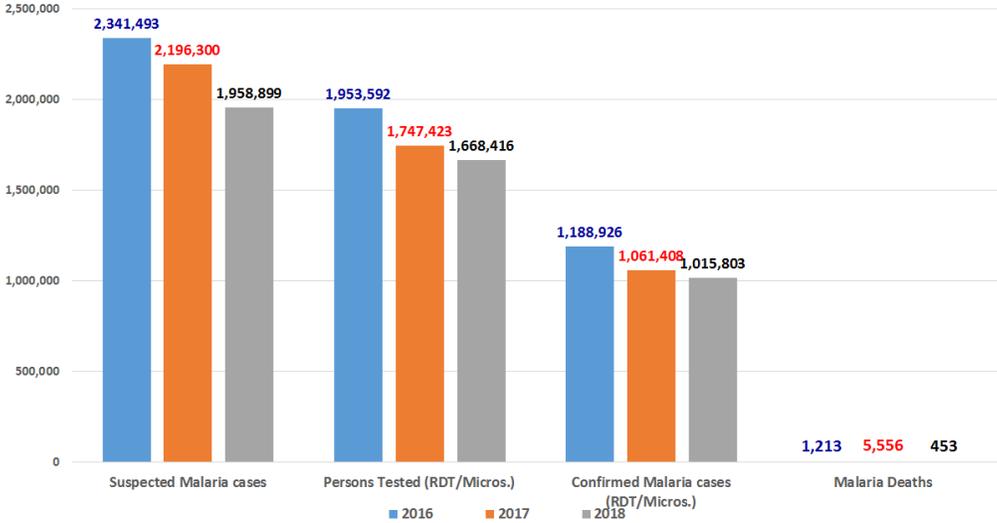
PMI’s approach is both consistent with and contributes to USAID’s Journey to Self-Reliance framework. Building and strengthening the capacity of Liberia’s people and institutions – from the central level to communities – to effectively lead and implement evidence-based malaria control and elimination activities remains paramount to PMI. As denoted in Table 2 (the budget table), nearly all of PMI’s planned support for FY 2020 in the areas of vector control, human

health, supply chain and strategic information contains elements of capacity building and system strengthening. PMI/Liberia will continue to rely on and engage with local partners such as the National Public Health Institute of Liberia, Liberia Institute of Biomedical Research, Last Mile Health, University of Liberia-Pacific Institute of Research and Evaluation (UL-PIRE), Development Education Network– Liberia (DEN-L), Rural Community Empowerment Project (RUCEP), Community Safety Initiative (CSI), Special Emergency Action Restore Children’s Hope (SEARCH), and EQUIP. PMI/Liberia is expanding its local partner base to reach more counties with community malaria and health programs. Finally, PMI/Liberia will continue to rely on private sector partnerships such as the newly formed Private Sector Federation to coordinate the private sector players with Government of Liberia, and contribute towards malaria control interventions in Liberia. Additionally, PMI and the Global Fund are in the process of supporting the MoH and NMCP to conduct an assessment of the private sector to identify areas of private sector investments and service delivery and funding gaps for malaria. The assessment will inform the development of a malaria private sector strategy for Liberia.

II. MALARIA SITUATION AND MALARIA CONTROL PROGRESS IN LIBERIA

The 2013 Health Facility Survey (HFS), the most recent such study, found that malaria remains the leading cause of morbidity and mortality, accounting for about 42 percent of all clinical consultations and 44 percent of all inpatient deaths among children under five years of age. Figure 2 below shows a gradual decrease in the number of suspected and confirmed malaria cases between 2016 and 2018.

Figure 2. Suspected and Confirmed Malaria Cases reported from health facilities, Liberia HMIS 2016-2018



According to results from the Malaria Indicator Surveys (MIS), the prevalence of malaria parasitemia in children under five by rapid diagnostic test (RDT) was 66 percent in 2005, 37

percent in 2009, 45 percent in 2011, and 45 percent in 2016 (Figure 3). The prevalence rate as measured by microscopy was 32 percent in 2009 and 28 percent in 2011. Malaria prevalence by microscopy was not determined in 2016. The geographical prevalence of malaria according to the 2016 MIS is shown in the map below (Figure 5). The proportion of children 6-59 months with moderate anemia (hemoglobin <8g/dl) increased from 5% in 2009 to 8% in 2011 and to 9% in 2016 (Figure 4).

Figure 3. Trends in Malaria Prevalence, MIS 2009-2016, Percent of Children Age 6-59 Month who Tested Positive for Malaria by Microscopy and RDT

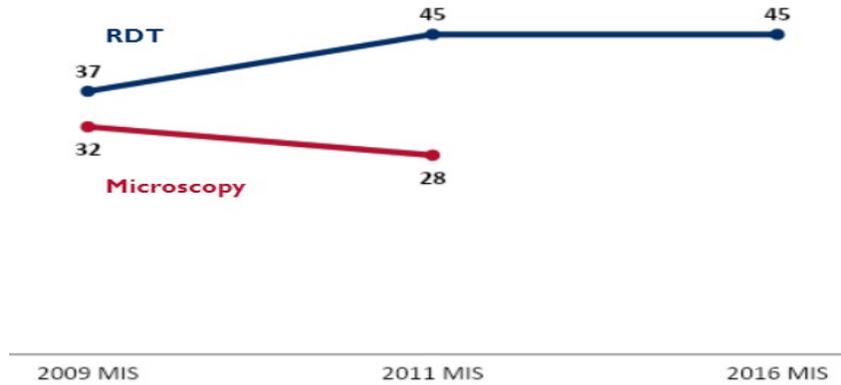


Figure 4. Trends in Prevalence of Low Hemoglobin, MIS 2009-2016, Percent of Children Age 6-59 with Moderate-to-Severe Anemia (Hemoglobin <8.0 g/dl)

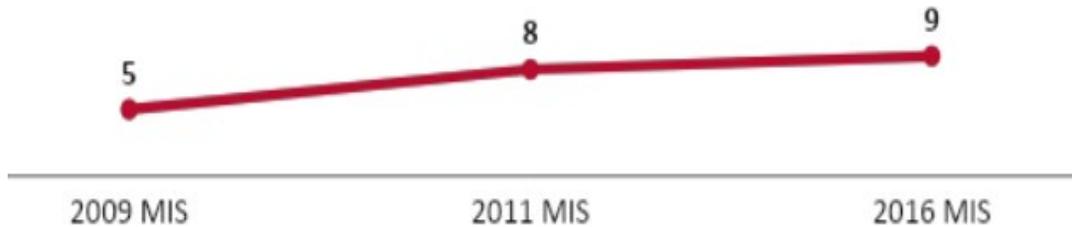
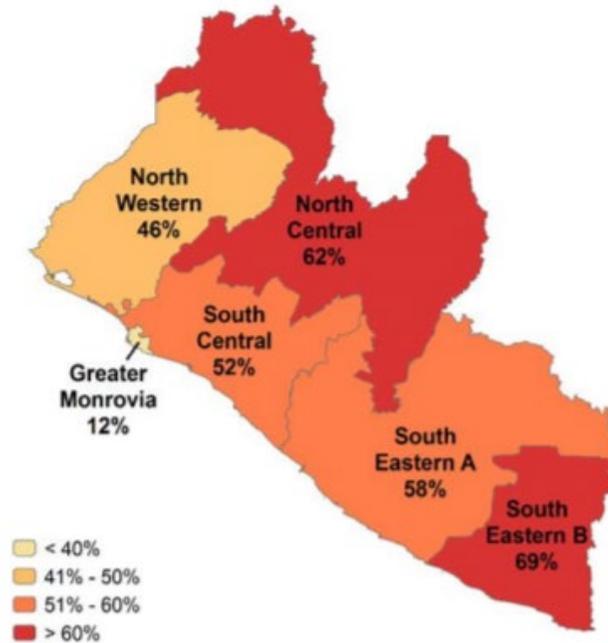


Figure 5. Malaria Parasite Prevalence by Region, 2016

Percentage of children age 6-59 months who tested positive for malaria by RDT



With support from PMI, The Global Fund to fight AIDS, Tuberculosis and Malaria (Global Fund), and World Health Organization (WHO), the NMCP conducted a mid-term review (MTR)¹ of the 2016-2020 NMSP. The purpose of the MTR was to identify achievements in outputs, outcomes and impacts, best practices, lessons learned and critical issues and then make recommendations in the updated strategic plan for more effective delivery.

The main finding of the MTR was that overall, Liberia has made progress in reducing both malaria morbidity and malaria related mortality. Significant progress was noted in improving confirmatory malaria testing and treatment with ACTs. Despite human resource and financial challenges, there has been good progress by NMCP and partners in ensuring implementation of planned activities.

Despite these achievements, the under-five morbidity indicators are off-track in all regions. Funding for malaria in Liberia is insufficient if compared with the current international average that is nearly 2.5 times more. Cumulatively from 2017 to 2019, PMI and Global Fund contributed up to \$71.3 million for malaria control in Liberia. The Government contribution beyond staff and health facilities support is not available. The 2019-2020 contribution of \$29.2 million for a population of 4.6 million people, represents \$6.35 per capita. In absence or with minimum government contribution, this level of funding is insufficient for a country where

¹ Liberia Malaria Strategic Plan 2016-2020 Mid-term Review Report

malaria transmission occurs year round in the whole country. Additionally, the complex financing mechanisms and problematic health supply system with dysfunctional last mile commodity distribution continue to hamper malaria interventions across the country. Poor leadership and governance of malaria activities was a major finding of the MTR that will be addressed in the new proposed structure of the NMCP. The timeline for developing a new NMSP is November 2019 to April 2020.

Figure 6. Key Indicators for Malaria Prevention and Treatment Coverage and Impact Indicators from Demographic Health Surveys (DHS) and Malaria Indicator Surveys (MIS) from 2007-2016.

Indicator	2007 DHS	2009 MIS	2011 MIS	2013 DHS	2016 MIS
% Households with at least one ITN	30 ¹	47	50	55	62
% Households with at least one ITN for every two people	n/a	12	17	22	25
% Population with access to an ITN	n/a	25	31	37	42
% Population that slept under an ITN the previous night*	n/a	23	32	32	39
% Children under five years old who slept under an ITN the previous night*	n/a	26	37	38	44
% Pregnant women who slept under an ITN the previous night*	n/a	33	39	37	40
% Children under five years old with fever in the last two weeks for whom advice or treatment was sought ²	n/a	79	77	79	78
% Children under five with fever in the last two weeks who had a finger or heel stick	n/a	23	33	42	50
% Children receiving an ACT among children under five years old with fever in the last two weeks who received any antimalarial drugs	n/a	45	70	43 ³	81
% Women who received two or more doses of IPTp during their last pregnancy in the last two years ⁴	n/a	47	50	50	56
% Women who received three or more doses of IPTp during their last pregnancy in the last two years ⁴	n/a	n/a	n/a	18	23
Under-five mortality rate per 1,000 live births	110	114	n/a	94	n/a
% Children under five years old with parasitemia (by microscopy , if done)*	n/a	32	28	n/a	n/a
% Children under five years old with parasitemia (by RD T, if done)*	n/a	37	45	n/a	45
% Children under five years old with severe anemia (Hb<8gm/dl)	n/a	5	8	n/a	9

*DHS/MICS surveys are generally fielded during the dry season, whereas MIS surveys are deliberately fielded during the high transmission season, which should be taken into consideration when interpreting these indicators

¹The 2007 DHS only asked about net ownership, not specifically about ITNs, and did not ask about net use.

²Note that this indicator has been recalculated according to the newest definition, care or treatment from any source excluding traditional practitioners wherever possible.

³There is a note in the 2013 DHS regarding some confusion on this question as an additional 42% (compared to only 10% in the 2011 MIS) reported use of amodiaquine, which is how artesunate-amodiaquine is known in Liberia, making it difficult to distinguish between actual use of mono vs. combination therapy.

⁴Note that this indicator has been recalculated according to the newest definition, at least the specified number of doses of SP/Fansidar from any source wherever possible.

Figure 7. Evolution of Key Malaria Indicators Reported through Routine Surveillance Systems, from Health Facilities and Community Health Workers

Indicator	2014	2015	2016	2017	2018
# Suspect malaria cases ¹	2,429,525	1,792,688	2,343,290	2,212,799	1,924,414
# Patients receiving diagnostic test for malaria ²	2,235,517	1,466,840	1,953,014	1,761,100	1,628,353
Total # malaria cases ³ (confirmed and presumed)	1,057,635	1,261,247	1,580,083	1,521,654	1,290,902
# Confirmed cases ⁴	864,204	936,265	1,189,873	1,069,997	994,841
# Presumed cases ⁵	193,431	324,982	390,210	451,657	296,061
% Malaria cases confirmed ⁶	82%	74%	75%	70%	77%
Test positivity rate (TPR) ⁷	39%	64%	61%	61%	61%
Total # <5 malaria cases ⁸	423,140	506,549	628,530	624,301	514,991
% Cases under 5 ⁹	40%	40%	40%	41%	40%
Total # severe cases ¹⁰	No data				
Total # malaria deaths ¹¹	2,288	1,379	1,260	758	565
# Facilities reporting ¹²	489	530	600	610	642
Data form completeness (%) ¹³	67%	73%	82%	84%	88%

Data sources and comments: Liberia Health Management Information System (HMIS)

N/A = not available

Definitions:

¹ Number of patients presenting with signs or symptoms considered to be possibly due to malaria (e.g., this could be the number of patients presenting with fever or history of fever in the previous 24 or 48 hours).

² Number of patients receiving a diagnostic test for malaria (RDT or microscopy). All ages, outpatient, inpatient

³ Total # cases: Total number of reported malaria cases. All ages, outpatient, inpatient, confirmed and unconfirmed cases.

⁴ # confirmed cases: Total diagnostically confirmed cases. All ages, outpatient, inpatient.

⁵ # presumed cases: Total clinical/presumed/unconfirmed cases. All ages, outpatient, inpatient.

⁶ % Malaria Cases confirmed: # confirmed cases (#4 above) / Total # cases (#3 above).

⁷ Test Positivity Rate (TPR): Number of confirmed cases (#4 above)/Number of patients receiving a diagnostic test for malaria (RDT or microscopy) (#2 above).

⁸ Total #<5 cases: Total number of <5 cases. Outpatient, inpatient, confirmed, and unconfirmed.

⁹ Total # <5 cases (#8 above) / Total # of cases (# 3 above).

¹⁰ The severe malaria indicator is not captured in the patient registers.

¹¹ Total # Malaria Deaths Reported: All ages, outpatient, inpatient, confirmed, and unconfirmed.

¹² Total # of health facilities reporting data into the HMIS/DHIS2 system for that year.

¹³ Data completeness: Number of monthly reports received from health facilities/Number of health facility reports expected (i.e., number of facilities expected to report multiplied by the number of months considered).

III. OVERVIEW OF PMI'S SUPPORT OF LIBERIA'S MALARIA CONTROL STRATEGY

The fourth Government of Liberia Ministry of Health National Malaria Strategic Plan (NMSP) for 2016–2020 addresses 1) the need to scale-up malaria control and prevention activities to build on gains made under the Millennium Development Goals; and, 2) the gaps identified in the implementation of the 2010–2015 Strategic Plan.

The vision of the Liberia malaria program is a healthier Liberia with universal access to high quality malaria interventions and no malaria deaths. The program's mission is to achieve the highest requisite capacity for the provision of comprehensive, coordinated, and evidence-based interventions to eliminate malaria in Liberia.

The goal of the 2016–2020 NMSP is to reduce illnesses and deaths caused by malaria by 50 percent by the year 2020 (using the 2011 Malaria Indicator Survey [MIS] as a baseline). The strategic objectives are aligned to PMI priorities, as outlined below:

- **To strengthen and sustain institutional and human resource capacity of the NMCP for effective program management by 2020.** PMI support under this objective focuses on building both institutional and human resource capacities for effective planning, implementation, monitoring, and management of the program.
- **To increase access to prompt diagnosis and effective treatment targeting 85 percent of the population by 2020.** PMI contributes to improving parasite-based diagnosis at all levels of the health care system and strengthening quality assurance/quality control (QA/QC) for malaria diagnostics, scaling-up the management of uncomplicated and severe cases of malaria in public health facilities, scaling-up integrated community case management of malaria, strengthening the QA/QC system for malaria commodities and services, and sustaining MIP services at all antenatal care (ANC) facilities.
- **Ensure that 80 percent of the population is protected by malaria preventive measures by 2020.** In partnership with the Global Fund, PMI contributes to universal access to ITNs, and institutionalization of entomological and insecticide resistance monitoring.
- **Increase the proportion of the population with knowledge and practice of malaria preventive measures to 95 percent and 75 percent by the end of 2020.** PMI contributes to planning and implementation of social and behavior change (SBC) interventions for improving the key behaviors of ITN access, use, and care; IPTp uptake; and improved health facility and community malaria case management at health facilities.
- **Strengthen the supply chain system for effective quantification and prompt distribution of commodities under a universal system by 2020.** PMI contribution ensures availability and access to antimalarial drugs and other commodities at all health

facilities, strengthens warehousing practices, improves commodity distribution, and strengthens the logistics management information system (LMIS).

- **Improve routine data monitoring and program evaluation to ensure quality data management at all levels by 2020.** PMI supports the MOH HMIS, including improving data management at all levels, as well as prioritizing and strengthening the local research agenda.
- **To initiate effective preparedness and timely response during emergencies.** Under this objective, in the event of a malaria outbreak, PMI will support NMCP and NPHIL to assess and respond appropriately to the outbreak.

Since 2008, PMI has been supporting the core interventions of ITNs, diagnosis and treatment, and intermittent preventive treatment in pregnancy (IPTp). In addition, PMI supports the cross cutting interventions of supply chain, surveillance, monitoring and evaluation (SM&E), and SBC. PMI/Liberia phased out support for IRS in FY 2013 due to widespread insecticide resistance and high cost of alternative insecticide for IRS. However, PMI continues to strengthen the vector control and entomological capacity of the NMCP to better understand vector ecology and insecticide resistance.

Historically, support from USAID/Liberia focused implementation of Liberia's Essential Package of Health Services at the facility and community levels on three priority counties (Bong, Lofa, and Nimba) through a government-to-government Fixed Amount Reimbursement Agreement (FARA). PMI expanded support for malaria case management, IPTp, SBC, and SM&E to five additional counties in October 2017, and then the remaining six counties in January 2019.

Currently, both PMI and the World Bank support all 15 counties in Liberia, to include all core interventions except IRS. In addition, the Global Fund malaria grant covers procurement and distribution of ITNs for mass campaigns, as well as some aspects of malaria case management especially iCCM, private-sector ACTs, MIP, SM&E, and supply chain. The Global Fund program is national in nature and overlaps with PMI- and World Bank-supported counties. The World Bank uses performance-based financing to support CHTs in Gbarpolu, River Cess, and Sinoe Counties.

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mechanisms are FARA and the Strategic Technical Assistance for Improved Health System Performance and Health Outcomes (STAIP). FARA provides malaria case management and MIP in six counties (Bong, Lofa, Nimba, Grand Cape Mount, Grand Gedeh, and River Gee) and STAIP provides technical assistance for the remaining six counties of Bomi, Montserrado, Margibi, Grand Bassa, Grand Kru, and Maryland. In addition, through STAIP, PMI provides tailored health systems strengthening technical assistance and SM&E for the 12 PMI focus counties, including the six FARA counties ; and at the direction of PMI and USAID, supports program evaluation and operational research. The FARA and STAIP programs provide other non-malaria health services including maternal, neonatal, child and adolescent health; nutrition; and family planning. Both programs receive PMI, MCH, and population funds. The PMI team worked with the NMCP and partners to map partner and donor activities by county to improve coordination and avoid duplication of efforts (Figure 8).

Figure 8. PMI Intervention Support Map

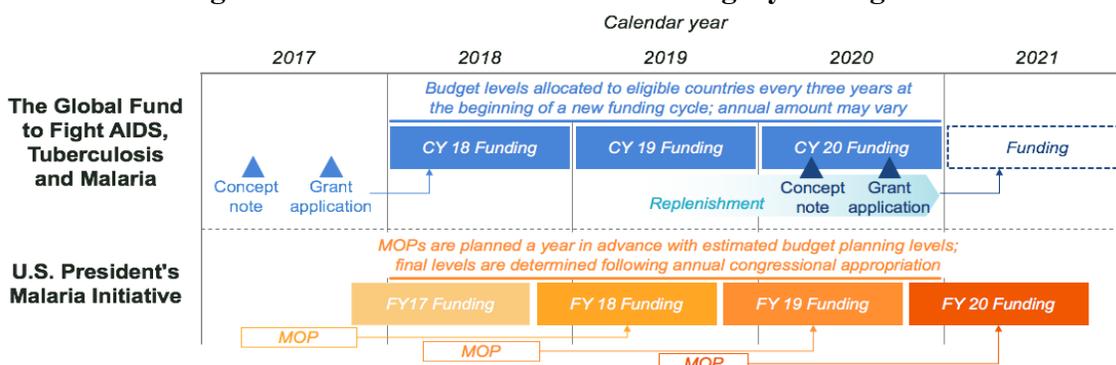


IV. PARTNER FUNDING LANDSCAPE

PMI emphasizes the importance of partner alignment on malaria control. With the recognition that each of the agencies emphasizes complementary funding support for the national malaria control effort in a given country, over the last year, PMI, Global Fund, and the Bill and Melinda Gates Foundation (BMGF) set out to harmonize financial, supply chain, and programmatic data, and this effort remains ongoing as of the time of this MOP. A harmonized financial taxonomy has been developed for PMI and Global Fund (i.e. mapping cost categories across organizations).

Figure 9 visualizes the annual cycle of PMI funding and the MOP implementation year. As the figure illustrates, any given FY MOP funds activities that take place during the next FY. For example, a FY18 MOP funds implementation during FY19. Whereas Global Fund funding (and often, other partners and host country governments) is based on a three-year grant cycle on a calendar year (CY) timeframe during which activities were implemented. Annual PMI country budget allocations depend largely on the U.S. Congress' total overall malaria funding appropriation to USAID in a given fiscal year, as well as other considerations (e.g. previous funding levels, activity and program pipelines, other donor contributions, known commodity needs/gaps, progress on ongoing PMI-supported activities, clear evidence of continued government commitment to malaria control).

Figure 9. PMI and Global Fund Funding Cycle Alignment



Footnote: In some cases, Global Fund's funding may come in partway through the calendar year. Funding levels in "Section IV - Partner Funding Landscape" and commodity procurement amounts listed in "Annex A - Intervention Specific Data" may differ given the lag between the year that funding was planned and the year when procurement orders were placed. Differences may be a reflection of timing and/or based on changes in commodity consumption levels at country level, changes in commodity costs, or other donor orders.

The tables below summarize contributions by external partners and host country government in calendar years 2018– 2020, with the goal of highlighting total country investments. For Liberia, data is available for PMI (FY 2017–19) and Global Fund (CY 2018–20). As the Global Fund 2021–23 grant funding cycle is not yet underway at the time of this PMI FY20 MOP development, Global Fund country investments for the 2021 implementation period and beyond are not yet known. Note that the host country government invests substantial funding into the national-to-local infrastructure and service delivery for malaria and many other programs. However, there has not been a standardized method for attributing those investments to malaria specifically. Thus, it may not yet be possible in the FY 2020 MOP cycle to attribute funding from the host country government. There may be similar challenges for other partners.

Figure 10. Annual Budget by Level 1 Category

Year ¹	Funder	Vector Control	Case Management	Drug-Based prevention ²	Supply Chain ³	Monitoring, Evaluation & Research	Other Cross-Cutting and Health Systems Strengthening	Total
FY17/CY18	PMI	\$2.6M	\$5.3M	\$0.6M	\$1.6M	\$1.2M	\$2.6M	\$14.0M
	Global Fund	\$0.004M	\$1.9M	\$0.2M	\$0.7M	\$0.8M	\$3.2M	\$6.8M
	Host Gov ⁴	-	-	-	-	-	-	-
	Total	\$2.6M	\$7.2M	\$0.8M	\$2.3M	\$2.0M	\$5.8M	\$20.8M
FY18/CY19	PMI	\$2.0M	\$3.9M	\$0.7M	\$2.3M	\$2.8M	\$2.4M	\$14.0M
	Global Fund	\$0.001M	\$1.3M	\$0.2M	\$0.003M	\$1.0M	\$4.9M	\$7.4M
	Host Gov ⁴	-	\$0.1M	-	-	-	-	0.1M
	Total	\$2.0M	\$5.2M	\$0.9M	\$2.3M	\$3.9M	\$7.2M	\$21.4M
FY19/CY20	PMI	\$2.6M	\$5.4M	\$0.8M	\$2.0M	\$0.7M	\$2.5M	\$14.0M
	Global Fund	\$7.5M	\$1.6M	\$0.2M	\$0.1M	\$0.8M	\$4.9M	\$15.2M
	Host Gov ⁴	-	-	-	-	-	-	-
	Total	\$10.1M	\$7.0M	\$1.0M	\$2.1M	\$1.6M	\$7.4M	\$29.2M

Footnotes:

¹ Each year's figures represent the FY for PMI and one CY for GFATM that most closely align

² Drug-based prevention, including SMC and MIP where relevant;

³ Covers management of in-country warehousing & distribution of malaria commodities, except for ITNs which are separately captured under "Vector Control"

⁴ GOL procured \$139,320 worth of ACTs in CY2019 (source: MOH Central Medical Stores Airway bills)

Note: Categories shown reflect the harmonized financial taxonomy (Levels 1-3) developed by BMGF, Global Fund, and PMI in 2019, as part of a broader data harmonization initiative; potential for categories to continue to evolve through FY 2020 MOP process, as well as for additional donors and host country governments to adopt and reflect funding using the same categories.

Figure 11. Annual Budget by Level 3 Category, Detailed Breakdown for PMI and Global Fund

Level 1 Category	Level 3 Category	FY17/CY18 ¹		FY18/CY19 ¹		FY19/CY20 ¹	
		PMI	Global Fund	PMI	Global Fund	PMI	Global Fund
Vector Control	Procure ITNs for Continuous Distribution	\$1.2M	-	\$0.4M	-	\$1.1M	-
	Distribute ITNs via Continuous Distribution	\$0.4M	-	\$0.3M	-	\$0.4M	-
	Procure ITNs for Mass Campaigns	-	-	-	-	-	\$5.9M
	Distribute ITNs via Mass Campaigns	-	-	-	-	-	\$0.1M
	Other ITN Implementation*	\$0.2M	-	\$0.5M	-	\$0.3M	-
	IRS Implementation ⁴	-	-	-	-	-	-
	Procure IRS Insecticide ⁴	-	-	-	-	-	-
	Other IRS*	-	-	-	-	-	-
	Entomological Monitoring	\$0.8M	\$0.0M	\$0.7M	\$0.0M	\$0.7M	\$0.0M
	SBC for Vector Control ⁵	-	-	-	-	-	-
	Other vector control measures	-	-	-	-	-	-
Removing human rights- and gender-related barriers to vector control programs**	-	-	-	-	-	-	
Case Management	Active Case Detection**	-	-	-	-	-	-
	Community-based case management	-	\$0.1M	-	\$0.2M	-	\$0.1M
	Facility-based case management	-	\$0.0M	-	\$0.0M	-	\$0.0M
	Private-sector case management	-	\$0.1M	-	\$0.2M	-	\$0.2M
	Procure ACTs	\$1.2M	\$0.6M	\$0.3M	\$0.1M	\$0.5M	\$0.5M
	Procure Drugs for Severe Malaria	\$0.2M	\$0.6M	\$0.5M	\$0.4M	\$0.5M	\$0.4M
	Procure Other Diagnosis-Related Commodities	\$0.1M	\$0.1M	\$0.2M	\$0.1M	-	\$0.04M
	Procure Other Treatment-Related Commodities	-	-	-	-	-	-
	Procure RDTs	\$1.3M	-	\$1.2M	-	\$1.2M	-
	Therapeutic Efficacy	-	-	-	\$0.2M	\$0.2M	\$0.1M

Level 1 Category	Level 3 Category	FY17/CY18 ¹		FY18/CY19 ¹		FY19/CY20 ¹	
		PMI	Global Fund	PMI	Global Fund	PMI	Global Fund
	SBCC for Case Management ⁵	-	\$0.01M	-	\$0.03M	-	\$0.03M
	Other Case Management	\$2.4M	-	\$1.7M	-	\$3.0M	-
Drug-Based Prevention²	Procure SMC-Related Commodities	-	-	-	-	-	-
	SMC Implementation	-	-	-	-	-	-
	Prevention of Malaria in Pregnancy Implementation	\$0.6M	\$0.2M	\$0.6M	\$0.1M	\$0.7M	\$0.1M
	Procure IPTp-Related Commodities	\$0.03M	-	\$0.1M	-	\$0.1M	-
	IPTi**	-	-	-	-	-	-
	SC for Drug-Based Prevention ⁵	-	\$0.0M	-	\$0.1M	-	\$0.1M
	Other Prevention**	-	-	-	-	-	-
Supply Chain³	In-Country Supply Chain ³	\$0.6M	-	\$1.0M	-	\$0.4M	-
	Supply Chain Infrastructure	-	\$0.003M	-	\$0.003M	-	\$0.1M
	Ensuring Quality	-	-	-	-	-	-
	Pharmaceutical Management Systems Strengthening	\$1.0M	-	\$1.4M	-	\$1.5M	-
	Supply Chain System Strengthening	-	\$0.7M	-	-	-	-
Monitoring, Evaluation & Research	Reporting, Monitoring, and Evaluation	\$0.7M	\$0.03M	\$1.3M	\$0.1M	\$0.6M	\$0.1M
	Program and data quality, analysis and operations research	-	\$0.6M	-	\$0.7M	\$0.1M	\$0.7M
	Surveys	\$0.5M	\$0.1M	\$1.5M	\$0.3M	-	\$0.1M
	Other Data Sources**	-	-	-	-	-	-
	Support for FETP*	-	-	-	-	-	-
Other Cross-Cutting and Health Systems Strengthening	Integrated service delivery, quality improvement, and national health strategies**	-	\$0.1M	-	\$0.3M	-	\$0.3M
	Financial management systems**	-	\$0.6M	-	\$0.7M	-	\$0.7M
	Community responses and systems**	-	\$0.04M	-	\$0.1M	-	\$0.04M

Level 1 Category	Level 3 Category	FY17/CY18 ¹		FY18/CY19 ¹		FY19/CY20 ¹	
		PMI	Global Fund	PMI	Global Fund	PMI	Global Fund
	Support for PCV and SPAs*	\$0.03M	-	\$0.03M	-	\$0.03M	-
	Cross-Cutting Human Resources for Health**	-	\$1.3M	-	\$1.5M	-	\$1.5M
	Central and Regional Program management ⁶	\$0.3M	\$0.0M	\$0.3M	\$0.0M	\$0.2M	\$0.1M
	In-Country Staffing and Administration*	\$1.3M	-	\$1.2M	-	\$1.4M	-
	Other Program Management**	-	\$1.1M	-	\$2.4M	-	\$2.3M
	SBC Unspecified ⁵	\$1.0M	-	\$0.8M	-	\$0.9M	-
Total		\$14.0M	\$6.8M	\$14.0M	\$7.4M	\$14.0M	\$15.2M

Footnotes:

¹ Each year's figures represent the FY for PMI and CY for Global Fund that most closely align;

² Drug-based prevention, including SMC and MIP where relevant;

³ Covers management of in-country warehousing & distribution of malaria commodities, except for ITNs which are separately captured under "Vector Control";

⁴ May include cost of IRS insecticides if full cost of IRS implementation including commodities was bundled within single line in prior year's Table 2;

⁵ SBC was not historically split in the PMI budget across intervention areas, hence the row "SBC (unspecified)" for the FY2020 MOP cycle. Going forward, SBC proposed activities will be categorized across vector control, case management, and prevention (new categories).

⁶ PMI Proposed Activity "National-level support for case management" rolls up under "Case Management" Level 1

Note: Categories shown reflect the harmonized financial taxonomy (Levels 1-3) developed by BMGF, Global Fund, and PMI in 2019, as part of a broader data harmonization initiative; potential for categories to continue to evolve through FY 2020 MOP process, as well as for additional donors and host country governments to adopt and reflect funding using the same categories.

* Category currently funded by PMI only

** Category currently funded by Global Fund only

Figure 12. Annual Budget, Breakdown by Commodity

Year ¹	Funder	ITNs for Continuous Distribution	ITNs for Mass Distribution	IRS Insecticide ⁴	ACTs	RDTs	Severe Malaria	SMC-Related	IPTp-Related	Total
FY17/ CY18	PMI	\$1.2M	-	-	\$1.2M	\$1.3M	\$0.2M	-	\$0.03M	\$3.9M
	Global Fund	-	-	-	\$0.6M	-	\$0.6M	-	-	\$1.2M
	Host Gov ⁵	-	-	-	-	-	-	-	-	-
	Total	\$1.2M	-	-	\$1.8M	\$1.3M	\$0.8M	-	-	\$5.1M
FY18/ CY19	PMI	\$0.4M	-	-	\$0.3M	\$1.2M	\$0.5M	-	\$0.1M	\$2.4M
	Global Fund	-	-	-	\$0.1M	-	\$0.4M	-	-	\$0.5M

Year ¹	Funder	ITNs for Continuous Distribution	ITNs for Mass Distribution	IRS Insecticide ⁴	ACTs	RDTs	Severe Malaria	SMC-Related	IPTp-Related	Total
	Host Gov ⁵	-	-	-	\$0.1M	-	-	-	-	-
	Total	\$0.4M	-	-	\$0.4M	\$1.2M	\$0.9M	-	-	\$2.9M
FY19/ CY20	PMI	\$1.1M	-	-	\$0.5M	\$1.2M	\$0.5M	-	\$0.1M	\$3.3M
	Global Fund	-	\$5.9M	-	\$0.5M	-	\$0.4M	-	-	\$6.8M
	Host Gov ⁵	-	-	-	-	-	-	-	-	-
	Total	\$1.1M	\$5.9M	-	\$1.0M	\$1.2M	\$0.9M	-	-	\$10.1M

Footnotes:

¹ Each year's figures represent the FY for PMI and CY for Global Fund that most closely align.

² PMI commodity costs are fully loaded, including costs for the ex-works price of the commodity, quality control, freight, insurance, and customs.

³ Global Fund commodity costs in figure above only include ex-works commodity value in a given year. Additional costs, including quality control, freight, insurance, and customs totaled \$2.3M over the CY 2018-2020 period;

⁴ IRS insecticide; for PMI, IRS insecticide commodity costs may be inextricable from IRS implementation costs in historical data – field left blank where this is the case.

⁵ GOL procured \$139,320 worth of ACTs in CY2019 (source: MOH Central Medical Stores Airway bills)

Note: Categories shown reflect the harmonized financial taxonomy (Levels 1-3) developed by BMGF, Global Fund, and PMI in 2019, as part of a broader data harmonization initiative; potential for categories to continue to evolve through FY 2020 MOP process, as well as for additional donors and host country governments to adopt and reflect funding using the same categories.

V. ACTIVITIES TO BE SUPPORTED WITH FY 2020 FUNDING

Please see the FY 2020 budget tables (Tables 1 and 2) for a detailed list of activities PMI proposes to support in Liberia with FY 2020 funding. Please refer to www.pmi.gov/resource-library/mops for the latest tables. Key data used for decision-making can be found in Annex A.

ANNEX A: INTERVENTION-SPECIFIC DATA

1. VECTOR CONTROL

NMCP objective
<p>Primary objectives of the National Malaria Control Program (NMCP) and the 2016-2020 National Malaria Strategy Plan (NMSP) are to:</p> <ul style="list-style-type: none">• Ensure that 80% of the population is protected by malaria preventive measures by 2020.• Ensure universal access to ITNs.• Institutionalize an entomological and insecticide resistance monitoring program that is representative of the country’s different regions.• Implement complementary vector control measures such as targeted larviciding and IRS activities.• Expand the use of the NMCP’s insectary as a site for studies on malaria vectors and associated resistance to insecticides. <p>Key goals of the entomological and insecticide resistance monitoring programs are to understand malaria vector prevalence and associated insecticide resistance profiles which highlight vector behavior, location, and susceptibility to insecticides, which ultimately inform vector control decisions throughout the country.</p> <p>Larviciding and IRS are intended to be additive and complementary measures to increase the effectiveness of an integrated vector control program. However, given disease vector ecology in Liberia, year-round transmission of malaria, logistical challenges, and country capacity constraints, these activities are not practical nor sustainable. In addition, effective larviciding as a vector control measure is intended for scenarios where breeding sites are few, fixed, and findable. It is recognized that Liberia does not meet the criteria for an effective larviciding program.</p>
NMCP approach
<p>Liberia aims to ensure that 100 percent of the country’s entire population has access to ITNs by reaching households through mass net distribution campaigns conducted every three years. Liberia adheres to the WHO definition of universal coverage (one net per two people). Net access and distribution is also reinforced by issuance of nets during the first ANC visit and time of delivery in a registered health care institution. The current NMSP also includes other channels for continuous distribution of ITNs to include through the Expanded Program on Immunization (EPI) and schools.</p> <p>Liberia’s NMSP (2016-2020) refers to IRS activities in rural or high malaria burden districts if funding is available. If implemented, IRS would target at least 90 percent of the structures in areas</p>

where sprayed. The insecticide selected for IRS would also be recommended by the WHO Pesticide Evaluation Scheme (now WHO PQ), and informed by insecticide susceptibility testing. However, IRS is not currently funded nor implemented in Liberia.

PMI objective, in support of NMCP

PMI supports all primary vector control objectives of the NMSP with the exception of IRS and larviciding, which are currently not funded or implemented by any internal or external partners to the NMCP. PMI-supported IRS in one to five districts annually from 2009 to 2013, and also provided insecticide and technical assistance to private companies implementing IRS in additional counties in 2010 to 2012. Due to widespread pyrethroid resistance and increased costs of new insecticides, PMI, in collaboration, with the NMCP made the decision to suspend support for IRS in Liberia. Since that time, PMI has increased support for entomological monitoring and concentrated on achieving universal ITN coverage.

PMI-supported recent progress (past ~12-18 months)

- Supported routine, monthly vector bionomics monitoring from October 2018 - September 2019 in four sites in Grand Cape Mount, Lofa, Bong, and Grand Bassa Counties.
- Supported insecticide resistance monitoring at seven sites in seven counties (Bomi, Bong, Grand Bassa, Margibi, Maryland, Montserrado, and Nimba), focusing on measuring susceptibility and, where indicated, intensity of resistance of the main vector, *Anopheles gambiae* s.l., to pyrethroids.
- Initiated susceptibility testing for chlorfenapyr, a new active ingredient, and expanded PBO synergist assays to inform decisions regarding ITN procurement and distribution.
- Continued to support the insectary established at the NMCP.
- Initiated a formal partnership with NPHIL/LIBR for in-country molecular analyses of entomological samples.
- Supported ITN durability monitoring in two sites for the baseline and 12 month time points.
- Procured and distributed ITNs through routine channels, including ANC services and institutional deliveries.
- Increased capacity for vector surveillance and susceptibility testing by training the following personnel: NMCP staff (5), University of Liberia (1), implementing partner (2), and county health volunteers (4).

Challenges to implementation activities:

- Poor roads and lack of transportation infrastructure (particularly during the rainy season) preclude or significantly slow down access to entomological monitoring sites.

- The national power grid of Liberia, including the capital of Monrovia, is not stable and subject to power outages. Therefore, there is the constant risk of compromising the controlled environment of the current insectary which houses the mosquito colony, along with halting certain activities mid-stream, i.e. potential molecular analysis or other power-dependent activities.
- Limited human capacity for entomological monitoring at both the central and county level, especially laboratory capabilities.
- No functional vector control working group.
- Inadequate supply chain to support last mile delivery of ITNs to end users through routine channels.

PMI-supported planned activities (next ~12-18 months, supported by currently available funds)

- Continue to support routine longitudinal vector bionomics monitoring at sites in four counties.
- Support insecticide resistance monitoring at sites in those counties that were not monitored in the previous year.
- Maintain support of the insectary at the current NMCP location while pursuing a relocation more suitable for current and advanced entomological activities. Proximity to collaborating institutes such as National Public Health Institute of Liberia (NPHIL), the Liberian Institute for Biomedical Research (LIBR) would be ideal.
- Initiate baseline entomological and epidemiological data collection ahead of the 2021 nationwide mass distribution of dual active ingredient ITNs (Interceptor G2).
- Conduct molecular entomology laboratory training for NPHIL/LIBR staff, including *Plasmodium* sporozoite detection by enzyme-linked immunosorbent assay (ELISA) and mosquito vector species identification by polymerase chain reaction (PCR).
- Support durability monitoring in two sites for the 24 month time point.
- Continue to support distribution of ITNs through routine channels, including through ANC services and institutional delivery.
- Support phased implementation of school-based ITN distribution in two counties.
- Provide planning and logistics support for ITN distribution in Montserrado County during the upcoming 2021 mass campaign.

1.A. ENTOMOLOGICAL MONITORING

Key Goal

Determine the geographic distribution, bionomics, and insecticide resistance profiles of the main malaria vectors in the country to inform vector control decision-making.

Do you propose to increase, decrease, or maintain funding allocation levels for this activity? Why, and what data did you use to arrive at that conclusion?

Liberia is proposing to increase FY 2019 funding, through a reprogramming request, by \$20,000 to cover one-off procurements of equipment for the lab at LIBR. It is not expected that additional funds will be needed to procure additional equipment for the lab in FY 2020. In FY 2020, PMI will maintain the \$600,000 funding allocation levels for entomological monitoring to continue nationwide insecticide resistance monitoring, routine longitudinal vector bionomics monitoring at sentinel sites representative of different regions in the country, as well as laboratory analysis of entomological samples.

Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

Key Question 1

Where is entomological monitoring taking place, what types of activities are occurring, and what is the source of funding?

Supporting Data

PMI is currently the only donor supporting entomological monitoring activities in Liberia (Figure A1).

Longitudinal vector bionomics monitoring is currently conducted at four sentinel sites, one each in Bong, Lofa, Grand Cape Mount, and Grand Bassa Counties (Figure A1). Monthly adult mosquito sampling consists of pyrethrum spray collections (PSC) and CDC Light Traps (CDC-LT) to estimate indoor resting densities and indoor and outdoor biting rates/densities, respectively, as well as the spatial and temporal distribution of local vector mosquito species.

Insecticide susceptibility of the main malaria vector, *An. gambiae* s.l., is monitored in each county at least once every other year due to resource constraints. Given that ITNs are the primary vector control intervention in Liberia, testing of pyrethroids, synergists, and novel insecticides for ITNs are prioritized. From October 2018 to September 2019, insecticide resistance monitoring was conducted at sites in seven different counties (Figure A1). Over the next 12 months, the other eight counties will be targeted to ensure data is collected nationwide.

Figure A1. PMI-Supported Insecticide Resistance and Vector Bionomics Monitoring Sites in Liberia

County - Site	Total sentinel sites	Activities*	Supported by
Gbarpolu - Bopolu	1	IRM	PMI
Grand Cape Mount - Sinje	1	IRM	PMI
Grand Gedeh - Zwedru	1	IRM	PMI
Grand Kru - Barclayville	1	IRM	PMI
Lofa - Zorzor	1	IRM	PMI
Nimba - Zolowee	1	IRM	PMI
Sinoe - Greenville	1	IRM	PMI
Bong - Koryah	1	VBM	PMI
Lofa - Fissebu	1	VBM	PMI
Grand Cape Mount - Madina	1	VBM	PMI
Grand Bassa - Saint John	1	VBM	PMI

*IRM, Insecticide Resistance Monitoring; VBM, Vector Bionomics Monitoring

Figure A2. Location of Entomological Sentinel Sites and Insecticide Resistance Monitoring Sites, Liberia, October 2018–September 2019



An. gambiae s.l. and *An. funestus* are the major and minor malaria vectors, respectively, in Liberia. While *An. gambiae* s.l. is the predominant mosquito species at most PMI-supported monitoring sites, there are some exceptions where *An. funestus* is most abundant (Figure A3). In all sites, vector mosquito abundance typically peaks from April to June and biting occurs both indoors and outdoors. However, since human landing catches (HLCs) were discontinued in 2018, collections using CDC-LTs have been low due to inadequate bait, precluding any real conclusions to be made regarding biting behavior. Entomological data from the southeastern

region of the country have been lacking due to logistical and environmental constraints linked to poor roads and abundant rainfall, which prohibit travel required for monthly monitoring activities. Molecular mosquito species identifications and advanced entomological indicators, such as blood meal source, sporozoite rate, and entomological inoculation rate (EIR) are not currently available due to limited in-country capacity for laboratory analysis.

Figure A3. Characteristics of Malaria Vectors in Liberia as Determined through Routine Longitudinal monitoring (2017-2019)

County/Site	Major Vector	Minor Vector	Peak Abundance	Preferred Biting Location*	Preferred Resting Location**
Bong/Koryah	<i>An. gambiae s.l.</i>	<i>An. funestus</i>	April-June	Indoor	Indoor
Bong/Tomato Camp***	<i>An. gambiae s.l.</i>	<i>An. funestus</i>	April-June	Indoor/Outdoor	Indoor
Lofa/Fissebu	<i>An. funestus</i>	<i>An. gambiae s.l.</i>	April-June	Indoor	Indoor
Grand Cape Mount/Madina	<i>An. gambiae s.l.</i>	<i>An. funestus</i>	April-June	Indoor	Indoor
Grand Bassa/Saint John	<i>An. gambiae s.l.</i>	NA	April-June	Indoor	Indoor
Margibi/Jeneta***	<i>An. gambiae s.l.</i>	<i>An. funestus</i>	April-June	Outdoor	Indoor

County/Site	Major Vector	Minor Vector	Peak Abundance	Preferred Biting Location*	Preferred Resting Location**
Montserrado/Frank Town***	<i>An. gambiae s.l.</i>	<i>An. funestus</i>	March-June	Outdoor	Indoor

*No information available on Preferred Host, Peak Sporozoite Rate, or Annual EIR

*Human landing catches were discontinued in October 2018, so results for sites in Bong, Grand Bassa, Grand Cape Mount, and Lofa are limited to CDC-LT collections which have largely been unproductive due to lack of a suitable bait for traps placed outdoors.

**No outdoor resting collections performed.

***Discontinued as routine longitudinal monitoring sites in September 2018.

Conclusion

Entomological monitoring will continue and new collection approaches to more effectively measure mosquito biting and mosquito resting behavior will be assessed. In addition, new opportunities to expand longitudinal vector bionomics monitoring to the southeastern region of the country will be explored, most likely through the effectiveness monitoring planned around the large-scale distribution of dual active ingredient ITNs (Interceptor G2 nets) for the 2021 mass campaign. Advanced analysis of mosquito samples will be initiated through a new partnership with NPHIL/LIBR, which will enable estimation of entomological correlates of *Plasmodium* transmission. PMI will further support capacity building for molecular entomology through trainings and technical assistance from PMI entomologists. PMI has previously supported the training of NMCP and LIBR staff on ELISA but currently Liberia does not have in-country capacity for PCR analysis. The NPHIL/LIBR now been contracted to conduct all molecular analysis and training on PCR techniques is expected in 2020.

Key Question 2

What is the current insecticide resistance profile of the primary malaria vectors?

Supporting Data

Insecticide susceptibility testing conducted in Liberia since 2014 indicates significant and widespread nationwide pyrethroid resistance among malaria mosquito vectors (Figure 9). Synergist assays conducted over the past two years show that while PBO improves the killing effect of pyrethroids on mosquitoes, it does not fully restore susceptibility (Figure 10), indicating multiple mechanisms of resistance. Initial tests conducted with chlorfenapyr, the active ingredient in Interceptor G2 ITNs, show complete susceptibility of malaria vector mosquitoes in those sites where testing has been completed (Figure A4). Given that chlorfenapyr is a novel insecticide for public health use, widespread susceptibility is expected throughout the country.

Figure A4. Malaria Vector Mosquito resistance to Two Pyrethroid Insecticides (2014 - 2016)

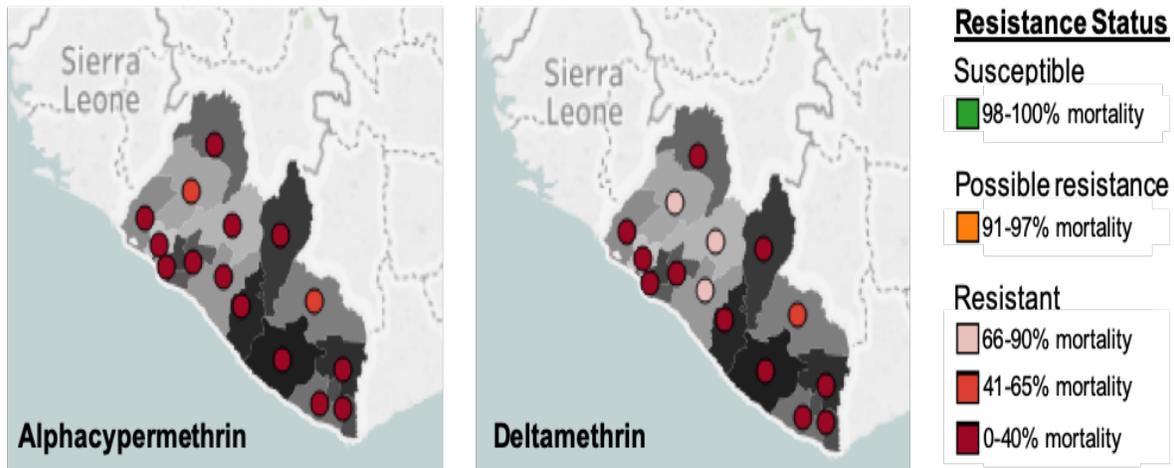


Figure A5: Malaria Vector Mosquito Mortality Following Exposure to Three Pyrethroid Insecticides (Deltamethrin, Alphacypermethrin, and Permethrin), with and Without Pre-Exposure to the Synergist PBO (2017-2019)

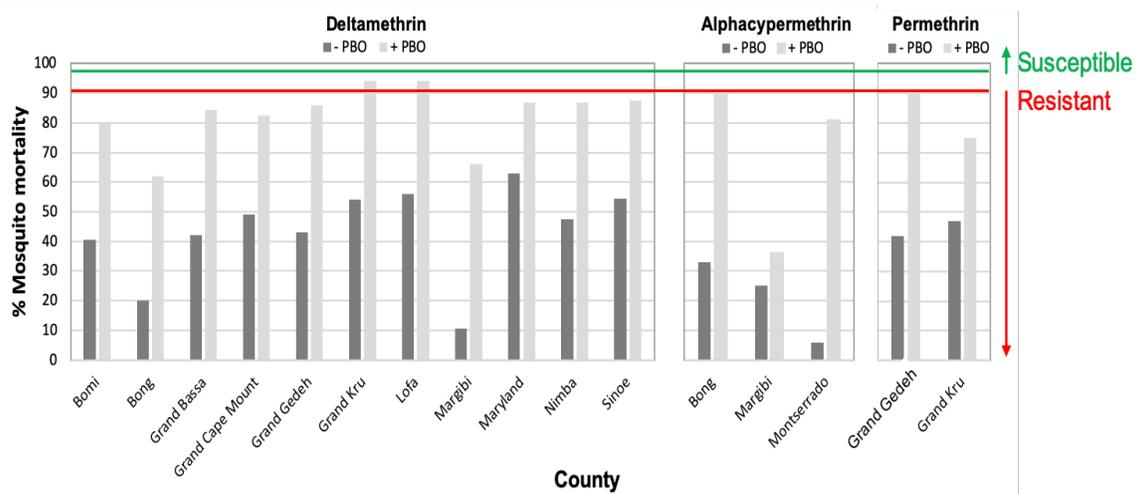
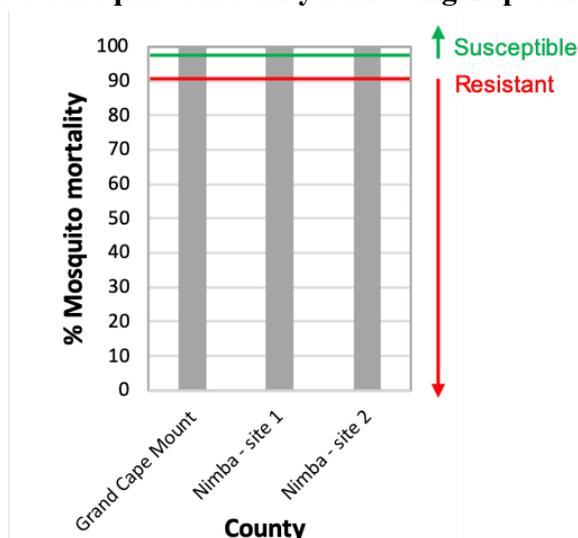


Figure A6. Malaria Vector Mosquito Mortality Following Exposure to Chlorfenapyr (2019)



Conclusion

Malaria mosquito vectors throughout Liberia are highly resistant to pyrethroid insecticides that are used in all WHO recommended ITNs. Evidence suggests that new types of ITNs that contain a pyrethroid plus a synergist (PBO) or a novel active ingredient (e.g., Interceptor G2) would provide improved vector control over standard pyrethroid nets. The MOH has indicated that Liberia will introduce Interceptor G2 ITNs as a Unitaid New Nets Project pilot country in 2021, and both the Global Fund and PMI will support procurement and distribution of these nets through mass campaigns and routine channels, respectively.

Key Question 3

What are the in-country considerations that impact your funding allocation in this category?

Supporting Data

Implementation of entomological monitoring activities in Liberia are negatively affected by unstable electricity and poor road systems throughout the country, particularly during the rainy season in the southeastern counties, which may preclude road access and the ability to conduct routine, particularly monthly vector bionomics monitoring, activities.

There is limited capacity for entomology and vector control at the central level. There are no entomologists on the NMCP staff, which has resulted in the vector control unit serving more in a technical capacity, rather than providing much needed strategic oversight for the country. The MOH is in the process of revising the organizational structure of NMCP that will include five people in the vector control unit. This will be an opportunity for the MOH to recruit entomologists for the NMCP. This gap is currently filled by an implementing partner (entomologist) that is co-located with the NMCP. Further, there is no functional vector control working group in the country. There is a real need to expand existing partnerships with local research institutes, including the National Public Health Institute of Liberia (NPHIL), the

Liberian Institute for Biomedical Research (LIBR), and the University of Liberia to further knowledge and practice of entomology and vector control in Liberia. In addition, such partnerships could offer opportunities for aspiring biologists and entomologists within the country, which would increase entomological capacity. In conjunction, there is also a need to increase the capacity of molecular biology techniques within Liberia in order to fulfill requirements of samples to be processed in-country.

Conclusion

There is effective collaboration with the NMCP and implementing partners, however, the skills of NMCP vector control staff would benefit from increased training and involvement in addressing gaps and operational issues when encountered.

1.B. INSECTICIDE-TREATED NETS (ITNs)

PMI Goal

Achieve high ITN coverage and usage of effective nets in endemic PMI-supported areas (in the context of the current insecticide resistance); and maintain high coverage and use with consistent ITN distribution (via campaigns and/or continuous channels in a combination that is most effective given country context). Determine the geographic distributions, bionomics, and insecticide resistance profiles of the main malaria vectors in the country to inform vector control decision-making.

Are you proposing to increase, decrease, or maintain funding allocation levels for ITN distribution and SBC activities? Why? What data did you use to arrive at that conclusion?

In FY 2020, funding levels for ITN distribution through routine channels will increase to allow for procurement of a larger quantity of nets as compared to FY 2019 (approximately 170,000 more ITNs), and to account for the higher price of dual active ingredient ITNs (Interceptor G2), which are warranted given the insecticide resistance profile of malaria vectors in Liberia. Additional funding is also proposed to monitor the effectiveness of the large-scale distribution of dual active ingredient ITNs through the next mass campaign that is to take place early 2021. Additional funding is also planned to support increased SBC activities for the mass campaign that will start in 2020. SBC activities will promote net access, care, and use.

Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

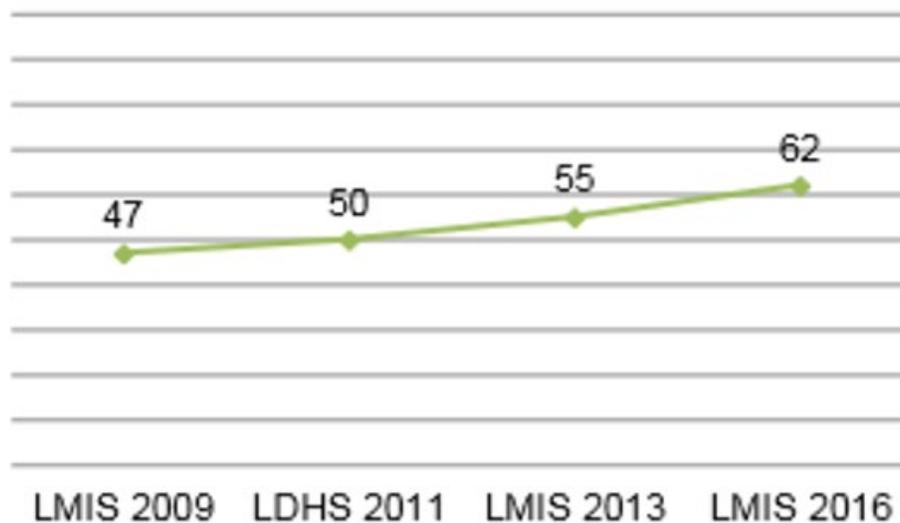
Key Question 1

How has net ownership evolved since the start of PMI in the country? Are households fully covered?

Supporting Data

Since the advent of ITN distribution by PMI, net ownership in Liberia has slowly and steadily increased. Based on MIS results, the percentage of households in 2009 owning at least one net was 47% and increased to 62% by 2016, with rural households more likely than urban households to own at least one ITN. The 2016 MIS indicated that one quarter (25%) of the households in Liberia have at least one ITN for every two people. The majority (>80%) of ITNs are obtained through a mass distribution campaign. The primary reasons that households do not have enough ITNs are that they did not receive any (42%) and that the nets were damaged (33%).

Figure A7. Percentage of Households Owning at Least One Insecticide-Treated Net (ITN)



Conclusion

The scope of ITN distribution in Liberia needs to be refined and expanded to reach the households that do not own any ITNs, and the quantity of ITNs distributed needs to be increased until there is sufficient number per household. To improve access to ITNs, PMI will support direct distribution of ITNs to health facilities nationwide to overcome current challenges with last mile distribution. PMI will also support phased implementation of school-based distribution of ITNs in years in between mass distribution campaigns.

Key Question 2

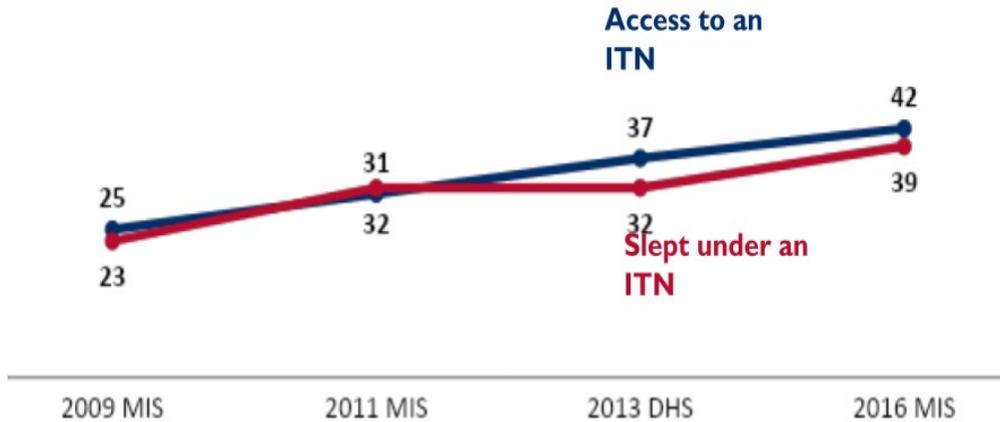
What proportion of the population has access to an ITN? In contrast, what proportion of the population reports using an ITN? What is the ratio between access and use? Does it vary geographically?

Supporting Data

The 2016 MIS indicates that only 42% of Liberians have access to an ITN and 39% report using an ITN the previous night, suggesting that there is no major gap between ITN access and use. ITN use is higher among households in rural areas (43%) than in urban areas (37%), and is

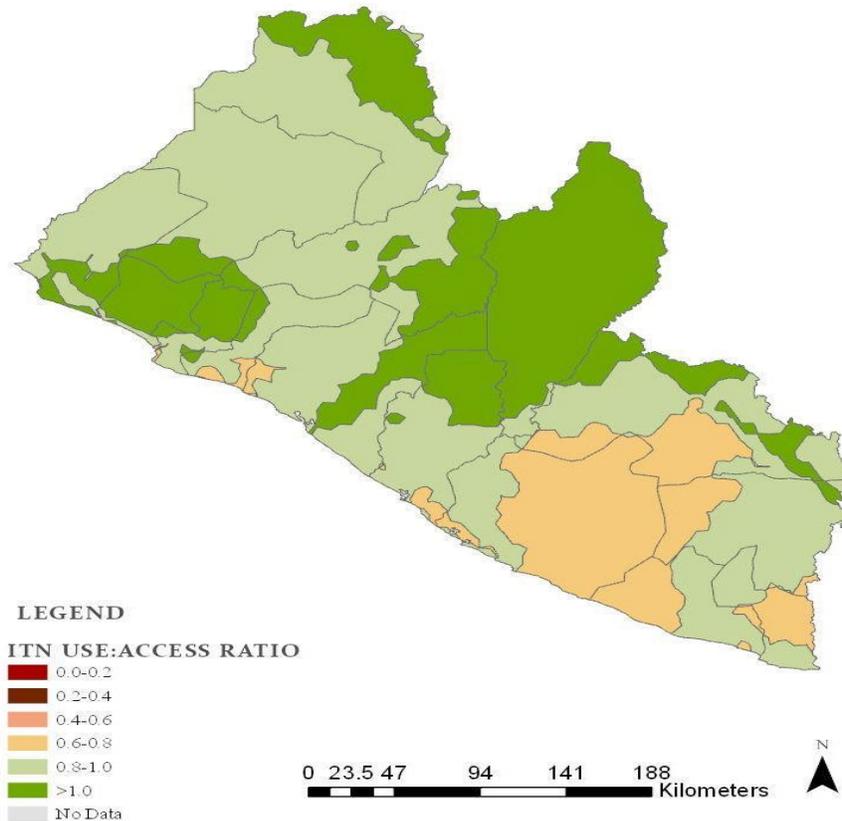
highest among households in the North Central Region (54%) while it is lowest in South Central (29%). In households owning at least one ITN, use was highest in the North Western (69%) and North Central (70%) regions and lowest in South Eastern A (49%).

Figure A8. Trends in ITN Access and Use, Percent of Household Population with Access to an ITN and Who Slept Under an ITN the Night Before the Survey



*DHS Surveys are generally fielded during the dry season, as opposed to MIS surveys, which are deliberately fielded during the high transmission season, which should be taken into consideration when interpreting the ITN use indicator

Figure A9. Liberia ITN Use: Access Ratio, from MIS, 2016



Conclusion

Given that ITN use is fairly high given access, and the main reason for not having sufficient nets for a household is not receiving one, PMI will prioritize improving access through support for direct distribution of ITNs to health facilities nationwide to overcome current challenges with last mile distribution. PMI will also explore additional continuous distribution channels to improve access, namely through schools in years in between mass campaigns. Additionally, PMI will provide SBC support for the 2021 mass ITN distribution campaign to improve community awareness and turnout to receive nets, particularly in Montserrado county, in addition to promoting continued care and use of ITNs.

Key Question 3

In areas where ITN access is high but use is low, what is known about the key barriers and facilitators to use?

Supporting Data

Access to ITNs is low across Liberia though use is generally high given access. Little is known about specific facilitators or barriers to use in the Liberian context, but qualitative assessments suggest that despite a general positive attitude towards nets, a variety of factors likely have had negative consequences for net ownership and use. Access is clearly the main driver of use, but the main reason for not using an ITN is that the net was not hung up or was stored away (2016 MIS). Poor mobilization and communication on registration and voucher processes during the 2018 mass campaign, particularly in Montserrado county, resulted in some communities failing to register and/or receive ITNs. Given these facts, PMI will prioritize SBC activities that primarily focus on ITN access, in addition to continued care and use of ITNs. This will be critical to successful implementation of the first phase of school-based ITN distribution in 2020 and the upcoming mass campaign planned for early 2021. PMI/Liberia will conduct a Malaria Behavior Survey (MBS) to quantify and identify other barriers to ITN access.

Figure A10. Key Facilitators and Barriers to ITN Use in Liberia.

Facilitator	Type of Factor	Data Source	Evidence
Nets highly valued/positive attitude towards nets	Internal/Social	2014 Qualitative Assessment ¹	A study was conducted in 2012 in four communities in Gbarpolu and Grand Cape Mount counties where PMI-supported ITN distribution campaigns. Focus group discussions and interviews with heads of household and key informants indicated most knew malaria was caused by mosquitoes and nearly all mentioned mosquito nets as their preferred prevention method.

Barrier	Type of Factor	Data Source	Evidence
Net durability	Internal	2014 Qualitative Assessment	Focus group discussions and interviews with heads of household and key informants revealed perceptions that nets did not last the projected three-year lifespan and were thus discarded. The most commonly mentioned sign of net damage was the presence of holes or tears big enough for a mosquito to fly through. Nets in which the chemical appeared to have lost its ability to kill mosquitoes or nets that were very dirty were also considered as “old” or “no longer good to use.” Children’s rough play was the most cited cause of net damage; damage from nails, rats, and poor net washing practices were also mentioned.
Low access	Environmental	2016 MIS	42% of Liberians have access to an ITN; 25% of households have at least one ITN for every two people
Not every household received the number of nets eligible to receive	Environmental	2014 Qualitative Assessment	The proportion of sleeping spaces that were covered in the four communities sampled averaged 53%. Main contributors included poor working relationships between the NGO distributors and county and district health teams, inaccurate enumeration of sleeping spaces, incomplete coverage of some communities and/or households, and insufficient availability of nets.
Net not hung up or stored away	Internal	2016 MIS	The major reason why mosquito nets were not used the night before the survey was that the net was not hung up or was stored away (49%).
Side-effects from the net chemicals resulted in some deciding not to use	Internal	2014 Qualitative Assessment	Focus group discussions and interviews with heads of household and key informants revealed that heat discomfort or side effects from net chemicals were the main reasons for net use refusals.
Lack of awareness that nets should be slept under year-round	Internal	2014 Qualitative Assessment	Focus group discussions and interviews with heads of household and key informants indicated some seasonal net use, either during months corresponding to Liberia’s dry season (November-March) or the rainy season (April-October).

Conclusion

PMI will support direct distribution of ITNs to health facilities and explore additional continuous distribution channels, namely through schools, to improve access. Additionally, PMI will provide SBC support for the 2021 mass ITN distribution campaign to improve community awareness and turn up to receive nets, particularly in Montserrado county.

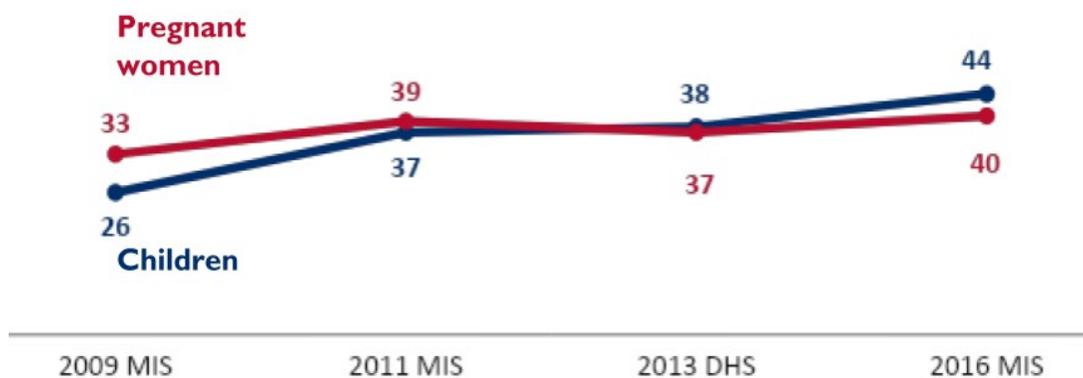
Key Question 4

What percent of pregnant women and children under 5 report sleeping under an ITN?

Supporting Data

ITN use in Liberia has increased from 25% to 44% among children under age 5 and from 33% to 40% among pregnant women between the 2009 MIS and 2016 MIS.

Figure A11. Trends in ITN Use among Children and Pregnant Women, Percent of Children Under 5 and Pregnant Women Age 15-49 Who Slept Under an ITN the Night Before the Survey



*DHS Surveys are generally fielded during the dry season, as opposed to MIS surveys, which are deliberately fielded during the high transmission season, which should be taken into consideration when interpreting the ITN use indicator

Conclusion

There is a clear need to improve access of women and children to ITNs through ANC services. PMI will support direct distribution of ITNs to health facilities nationwide to overcome current challenges with last mile distribution of ITNs, and ensure sufficient availability to women attending ANC.

Key Question 5

What channels are used to distribute ITNs?

Supporting Data

Liberia currently distributes ITNs through mass distribution campaigns and routine channels, including through ANC services and institutional delivery. In addition, a small number of ITNs are distributed to hospitals, orphanages, military barracks, and nursing schools. Funding for procurement of ITNs for mass campaigns comes from the Global Fund while PMI is the only donor that supports continuous distribution of nets.

Liberia conducted its first nationwide mass universal net coverage campaign in 2015, distributing approximately 2.8 million ITNs procured by the Global Fund. Following the campaign, PMI procured and distributed 100,000 ITNs to communities in Monrovia that were missed. A second ITN mass campaign was conducted in 2018 and, approximately 2.4 million nets procured by the Global Fund were distributed. A third ITN mass campaign is planned for early 2021. PMI supports procurement and continuous distribution of nets through routine channels.

To increase net ownership and use, PMI plans to support the MOH, including NMCP, and the Ministry of Education to start a phased implementation of school-based ITN distribution in 2020, starting in two counties of Nimba and Margibi that have low net access, high number of schools, and schools with high gross school enrollment (per current data from the Liberia Education Statistics Report). The MOH, including NMCP, and the Ministry of Education are jointly leading this initiative and are currently engaging in a series of stakeholder meetings with the Service Delivery Department of the MOH, PMI, and the USAID Liberia Education Office to finalize the strategy and details for the first phase of implementation, including the target counties, number of schools, grades, and students. This initial phase will include an evaluation to understand feasibility, cost, and impact in terms of ITN access in the target communities. This evaluation will be used to inform planning for further scale-up in 2022 (noting that school-based distribution will be skipped in 2021 when there will be a mass distribution campaign).

Figure A12. ITN Distribution Channels, 2015-2021

Channel	2015	2016	2017	2018	2019	2020	2021
ANC/EPI/Institutional	305,550	100,000	267,500	302,650	x	X	x
Schools						≥20,000	
Mass Campaign	2,800,000			2,400,000			x

Conclusion

The Global Fund will procure an estimated 2.4 million nets for the 2021 mass distribution campaign. In FY 2020, PMI will support the procurement and distribution of ITNs through established routine channels. No school-based distribution will occur, as this channel will only be utilized in years between mass campaigns.

Key Question 6

What is the estimated need for ITNs over the next three calendar years? What volume of ITNs are available from partners and the public sector for the next three calendar years?

Supporting Data

Figure A13. Projected ITN Need 2019 - 2021

Calendar Year	2019	2020	2021
Total Targeted Population ¹	4,369,572	4,461,333	4,555,021
Continuous Distribution Needs			
Channel #1: ANC ²	218,479	223,067	227,751
Channel #2: EPI ³	166,044	178,453	182,201
Channel #3: Institutions (e.g. hospitals, orphanages, boarding schools, military, etc.)	25,000	25,000	25,000
Channel #4: School-based Distribution ⁴	0	20,000	0
<i>Estimated Total Need for Continuous Channels</i>	409,522	446,520	434,952

Mass Campaign Distribution Needs			
2021 mass distribution campaign(s) ⁵	0	0	2,400,000
<i>Estimated Total Need for Campaigns</i>	0	0	2,400,000
Total ITN Need: Routine and Campaign	409,522	446,520	2,834,952
Partner Contributions			
ITNs carried over from previous year ⁶	294,450	0	37,480
ITNs from MOH	0	0	0
ITNs from Global Fund	0	0	2,400,000
ITNs from other donors	0	0	0
ITNs planned with PMI funding ⁷	0	484,000	480,000
Total ITNs Available	294,450	484,000	2,917,480
Total ITN Surplus (Gap)	-115,072	37,480	82,528

¹ National population with a growth rate of 2.1%.

² Five percent of the national population pregnant in a given year with 100 percent ANC coverage.

³ Four percent of the population under one with 95%, 100%, and 100% of pregnant women delivering in an institution for 2019-2021.

⁴ Schools nets for 2019 will be taken from the nets left over from the 2018 mass campaign. School nets will not be distributed in 2021 because of the mass campaign.

⁵ ITN mass campaign distribution is carried out every three years. The last mass campaign distribution was conducted in 2018, the next distribution will be conducted in 2021.

⁶ ITN opening balance as of January 2019 at CMS, does not include remaining campaign nets in the county depots.

⁷ PMI's order for 2019 has been scheduled to arrive in 2020 to avoid an overstock. Left over nets from the 2018 mass campaign in addition to routine nets carried over from 2018 are being used to fill the routine needs in 2019.

Conclusion

The Liberia MOH has indicated that it plans to introduce dual active ingredient ITNs, specifically Interceptor G2 nets, in 2021 through the next mass distribution campaign as a Unitaid New Nets Project Pilot County. As such, the Global Fund plans to procure approximately 2.4 million dual active ingredient ITNs for the mass campaign, while PMI will procure approximately 480,000 for distribution through routine channels to sustain coverage with these new types of nets and further support the country's transition away from pyrethroid-only nets.

Key Question 7

What is the current status of durability monitoring?

Supporting Data

PMI supported durability monitoring of DuraNet ITNs distributed during the 2018 mass distribution campaign in two sites in Grand Gedeh and Lofa Counties. Data collection is ongoing (See Figure A14).

Figure A14. ITN Durability Monitoring Status

Campaign Date	Sites	Brands	Baseline	12-month	24-month	36-month
April 2018	Tchien District, Grand Gedeh County	DuraNet	x	x		
April 2018	Zorzor District, Lofa County	DuraNet	x	x		

Conclusion

Durability monitoring of nets distributed through the 2018 mass distribution campaign is ongoing, and in FY 2020, PMI will support the final 36 month data collection point. Conclusions will be presented at the end of the monitoring activity.

Following the next ITN mass campaign in early 2021, PMI plans to support bio-efficacy monitoring (insecticide efficacy, as measured in cone bioassays, and chemical content), of Interceptor G2 nets at baseline and six months. The IG2 ITN monitoring will also include collection of entomological and epidemiological (routine HMIS) data to assess the impact of IG2 ITN distribution. However, the monitoring will not include full durability monitoring (physical integrity and attrition).

Key Question 8

What are the in-country considerations that impact your funding allocation in this category

Supporting Data

N/A

Conclusion

N/A

2. HUMAN HEALTH

2.A CASE MANAGEMENT in health facilities and communities

NMCP objective
As spelled out in the National Malaria Strategic Plan 2016-2020, the Liberia NMCP aims to promptly test 85% of suspected malaria patients and provide effective treatment with an efficacious anti-malarial drug for 85% of confirmed malaria cases by 2020. This will be achieved by providing quality assured parasite-based diagnosis and treatment of uncomplicated and severe malaria with efficacious antimalarials at all levels of both the public and private sectors, including case management in the community. Liberia has not yet achieved the malaria testing and treatment targets and HMIS shows a high proportion of clinical cases. The main reason for having a high proportion of clinical cases is due to RDT stock out and limited availability of microscopy reagents at health facilities.

NMCP approach

In accordance with WHO guidance, Liberia's malaria case management policy recommends parasite-based testing of all suspected cases and treatment of only test positive cases with an efficacious antimalarial drug. Parasite-based malaria diagnosis has been rolled out nationwide with microscopy recommended for hospitals and RDTs recommended for health centers, clinics and use by Community health assistant (CHA). However, RDTs are used at all levels including hospitals and some health centers have microscopy capacity. Liberia currently does not have any quality assurance activities for malaria diagnostics outside of training and supervision.

The Liberia health care delivery system is organized into three tiers of primary health care that consists of clinics and the community health program; Health centers and county hospitals; and referral hospitals. County Health Officers (CHOs) manage the county health system, while District Health Officers (DHOs) manage the district health systems. The coordination and supervision of case management are organized at different levels. The national level is responsible for policies and guidelines development, training of National and Regional Training of Trainers (TOTs) and supervising the County and District level trainings. At the County level, the County Health Department (CHD), is responsible for county level policy dissemination and enforcement, training and supervision, data compilation and reporting, etc. The District level is responsible for district level supervision, training and policy dissemination at each health facility. This level also supervised community level implementation of malaria case management, which is being done by CHA and Community Health Services Supervisor (CHSS). The MOH has a community health worker program comprising of CHAs and CHSSs. The CHSS supervise CHAs with a target of about 10 CHAs to 1 CHSS. The community health worker program has been rolled out in 14 of the 15 counties in Liberia and there are plans to bring it to Montserrado County soon. CHAs in Liberia provide a minimum package of integrated services targeted at children <5 years that includes testing by RDTs and treating for malaria, ORS and zinc for diarrhea, and treatment for pneumonia. CHAs in PMI supported counties are paid a stipend of \$70.00 a month and CHSS \$90.00 a month. Currently 3,192 CHAs and 361 CHSSs have been trained on the National Community Health Assistant curriculum across 15 counties, but one County has not yet deployed CHAs due to financial constraints. According to mapping done in 2013 by the MOH, approximately 8000 CHAs are needed to cover the proportion of the population that lives >5km from a health facility. The World Bank supports the CHA program in two counties directly through the MOH (Grand Cape Mount and Gbarpolu) and another four counties through UNICEF (Maryland, Grand Kru, River Gee and Sinoe).

Similar to the public sector, the NMCP policy for malaria case management in the private sector emphasizes prompt testing and treatment of positive cases with a quality assured ACT. According to the 2016 Liberia MIS, of caregivers of children <5 who sought care from a health worker, 34% sought care in the private sector including private facilities and private medicine vendors. A majority of private facilities in Liberia are in Montserrado County.

From 2016 to June 2019, a total of 1,158 health workers comprising physician assistants (PAs), nurses, case managers (CMs) and a doctor who practice in public facilities received training on malaria case management. The NMCP target is to train all 4,725 clinical officers (doctors, PAs, nurses and CMs) in public facilities on malaria case management either through didactic training or through on-site supervision activities. In addition, the NMCP plans to train 350 laboratory personnel in the public sector (including teaching institutions) on malaria diagnostics including QA. Under this activity, county diagnostics officers will be trained to conduct on-site training and supervision in their counties.

PMI objective, in support of NMCP

PMI fully supports all the case management activities outlined in the Liberia National Malaria Strategic Plan (2016-2020). This includes support for procurement of RDTs, reagents and supplies for malaria microscopy, ACTs for uncomplicated malaria as well as injectable antimalarials for the management of severe malaria. PMI also procures quinine tablets for treatment of malaria in pregnancy in the first trimester. PMI supports in-service case management training and other care provider capacity strengthening activities at all levels of the health system including technical assistance for development and printing of forms, guidelines and policy documents for malaria case management.

PMI-supported recent progress (past ~12-18 months)

- Starting in July 2018, PMI expanded its service delivery support to CHTs for facility-based case management from three (Bong, Lofa and Nimba) to and additional eleven counties (to include Bomi, Gbarpolu, Montserrado, Margibi, Grand Bassa, Grand Kru, Grand Cape Mount, Grand Gedeh, River Gee, Sinoe and Maryland) and also increased its support for the Liberia MoH at the central level. In these counties, testing rates were increased to >80% although largely influenced by commodity availability. The two counties of Sinoe and Gbapolu later transitioned to World Bank support, leaving 12 counties in total to benefiting from PMI support.
- PMI procured 2.4 million RDTs, which is the entire need for the country, and 400,000 treatments of AS/AQ for uncomplicated malaria and 16,533 vials of injectable artesunate for management of severe malaria. The ACT procurements were to supplement procurements by the Global Fund. With these procurements, malaria case management commodities were available in Liberia for appropriate case management.
- During the last year, PMI continued support for community case management in Bong, Lofa and Nimba to improve test and treat practices for malaria by CHAs. Support included training as well as supportive supervision.
- PMI supported visits to health facilities, community health workers and private medicine vendors to assess the availability and quality of testing during a malaria diagnostics TDY in

October 2018. This visit conducted with the NMCP diagnostics focal person observed inappropriate use of testing as well as deficiencies in the quality of testing that need to be addressed.

PMI-supported planned activities (next ~12-18 months, supported by currently available funds)

With FY18 and FY19 funding for malaria case management in Liberia, PMI will support the following:

- Procure 2.1 million single species (*P. falciparum*) RDTs for use in public health facilities and by community health workers. This amount of RDTs represents all the country's RDT needs consumed in the public sector and community program since the Global Fund and GoL are not procuring any RDTs during this period.
- Procure 1 million AS/AQ treatments. This represents a partial need of ACTs for Liberia. The remaining ACT need (660,000 treatments) is being met with Global Fund support.
- Procure 100,000 vials of injectable artesunate for treatment of severe malaria in facilities and 10,000 capsules of rectal artesunate to be used in the initial roll out of pre-referral treatment of severe malaria in children <5 year in the community by CHAs.
- Strengthen prompt and appropriate malaria case management in health facilities nationwide by providing technical assistance to CHTs and the central ministry for training and supportive supervision.
- Improve malaria diagnostic services nationwide including provision of supplies and reagents for testing as well as instituting a robust QA system for malaria diagnostics.
- Capacity development including training and supportive supervision as well as oversight for community-based health workers to enhance iCCM and expand the CHA reach.
- Conduct therapeutic efficacy studies at two sites for first-line antimalarials.

PMI Goal

Improve access to and utilization of timely, quality, and well-documented malaria testing and treatment by providing facility- and community-based health workers with training, supervision, and malaria commodities to be able to provide high quality, effective care.

Do you propose to increase, decrease, or maintain funding allocation levels for this activity? Why, and what data did you use to arrive at that conclusion?

PMI support for malaria case management for FY 2020 will be similar to funding levels for FY 2019. For both periods the funding will be about 50% higher than in FY 2018. Before 2018, PMI's direct

technical support for malaria case management was focused on three counties and therefore has not achieved a national comprehensive malaria control. In 2018, PMI started scaling up malaria case management technical support to reach 12 out of the 15 counties of Liberia. PMI will continue supporting the 12 of Liberia 15 counties for malaria case management and will procure RDTs, ACTs, and severe malaria medicines for all 15 counties. Increased funds in this investment area will allow PMI to continue providing direct technical support to 12 of Liberia’s 15 countries

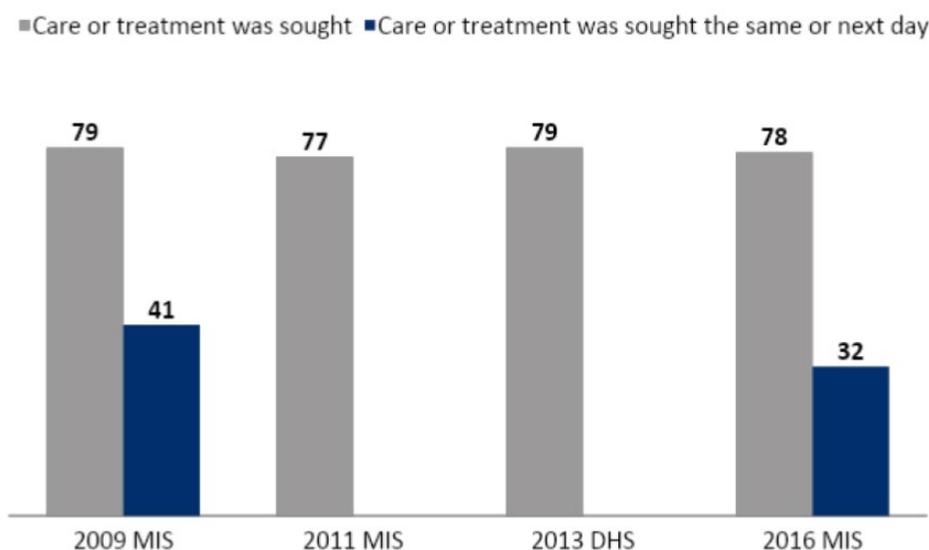
Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

Key Question 1

What is the status of care-seeking?

Supporting Data

Figure A15. Trends in Care-Seeking for Fever Among Children Under 5 with Fever in the 2 Weeks before the Survey



*Note that this indicator has been recalculated according to the newest definition, care or treatment from any source, excluding traditional practitioners

Care-seeking in Liberia is generally high. According to 2016 MIS of the 29% of the population and 38% of children under age 5 years had a fever at the time of the survey, 76% of the general population and 78% of children under the age of 5 years sought treatment the same or next day of onset of fever. Health seeking for the general population remained the same as in 2011 MIS (77%) but improved for children under the age of five years (78% compared to 60% in 2011 MIS and 71% in 2013 DHS). Of the 78% who sought care for children <5yrs, 59% and 34% sought care in the public and private sectors respectively. In communities where PMI supports CHAs program, the proportion of children treated within 24 hours has steadily increased, from 54.4% (CI: 51.2% - 57.6%) in October 2017 to 75.7% (CI: 74.3% - 77.1%) in September 2018

($p < 0.001$). Health-seeking and service provision gap increases with the frequent stock out of malaria commodities and high cost of transport to referral health facilities. PMI will pilot last mile delivery of commodities to select counties to alleviate stockout of malaria commodities and service delivery points.

Conclusion

Available data shows increasing health seeking within the first 24 hours, especially for children under the age of five years. The MIS data over time suggest that the majority of caregivers sought care for children at public and private sector. PMI will continue to support health care workers to use such opportunity to provide needed malaria services without additional delay.

Key Question 2

What is known about the major barriers and facilitators to care-seeking?

Supporting Data

Liberia has limited information on health care seeking. The 2016 MIS shows that health seeking behavior was higher in urban areas, high wealth quintiles, and associated with women who have secondary or higher education. The survey did not show any gender differences in seeking care. Of the women aged 15-49 years, 99% have heard of malaria, 95% know that malaria can be prevented, but only half (49%) perceive that people do not take actions to prevent malaria because they do not take malaria seriously or perceive that there is no risk.

In 2016, Tarr-Attia et al. conducted a qualitative inquiry in Monrovia to explore the community and health workers' perceptions on the utility of malaria research for pregnant women. After in-depth interviews and focus group discussions with pregnant women, traditional community representatives and hospital staff, they found that poverty, insufficient education on malaria, corruption, and poor trust in healthcare establishment are structural factors that may play a greater role than local traditional beliefs in deterring Liberians from seeking, accessing and using government-endorsed malaria control strategies. (Tarr-Attia et al. *Malar J.* (2018) 17:382, <https://doi.org/10.1186/s12936-018-2529-5>).

The 2019 DHS and the planned 2020 malaria behavioral survey will provide more information on health seeking behaviors and practices.

Figure A16. Barriers and Facilitators for Care Seeking

Facilitator	Type of Factor	Data Source	Evidence
Availability of commodities, especially at the beginning of the distribution cycle	Environmental	Implementing partner reports, EUV reports, anecdotal report during site visits	Implementing partner reports show increased workload at the beginning of commodity distribution cycles.

Access to finances and health facilities	Environmental, social	2016 MIS	The 2016 MIS shows that of the 29% of Liberia's that had fever at the time of survey, 76% sought treatment. Health seeking was higher in the higher wealth quintile and those living in urban areas that have a higher concentration of health facilities.
Availability of trained CHA at community level	Environmental	IPs reports and Community-based health information system	IP reports show that the proportion of children seen within 24 hours increased from 54% in 2017 to 76% in 2018.
Barrier	Type of Factor	Data Source	Evidence
Frequent reports of malaria commodity stock-outs at service delivery points	Environmental	Implementing partner reports and presentations, EUV survey reports, 2018 Service Availability and Readiness Assessment (SARA) study	<ul style="list-style-type: none"> • Several IP presentations during MOP meetings mention stock-outs of ACTs and RDTs at service delivery points; • EUV survey data presented in Section 3A "Supply Chain" shows inconsistent availability of ACTs in the first three quarters of FY2019. Stockout of the different weight bands of AL ranged from 20-40%, AS/AQ 30-50%, and RDT stockout averaged 18%. • The 2018 SARA study of 714 health facilities assessed 70% had malaria diagnostic capacity and 80% had the first line antimalarial in-stock, and no facility had all malaria items they needed at the time of the survey
Community attitude and perception of malaria as "common/ordinary" malaria	Internal	2016 MIS	<ul style="list-style-type: none"> • The 2016 MIS shows that of the women aged 15-49 years, 99% have heard of malaria, 95% know that malaria can be prevented, but only half (49%) perceive that people do not take actions to prevent malaria because they do not take malaria seriously or perceive that there is no risk. • The 2020 planned malaria behavioral survey will quantify the problem and identify other barriers to health seeking behavior.

The 2020 planned malaria behavioral survey will quantify the problem and identify other barriers to health seeking behavior.

Conclusion

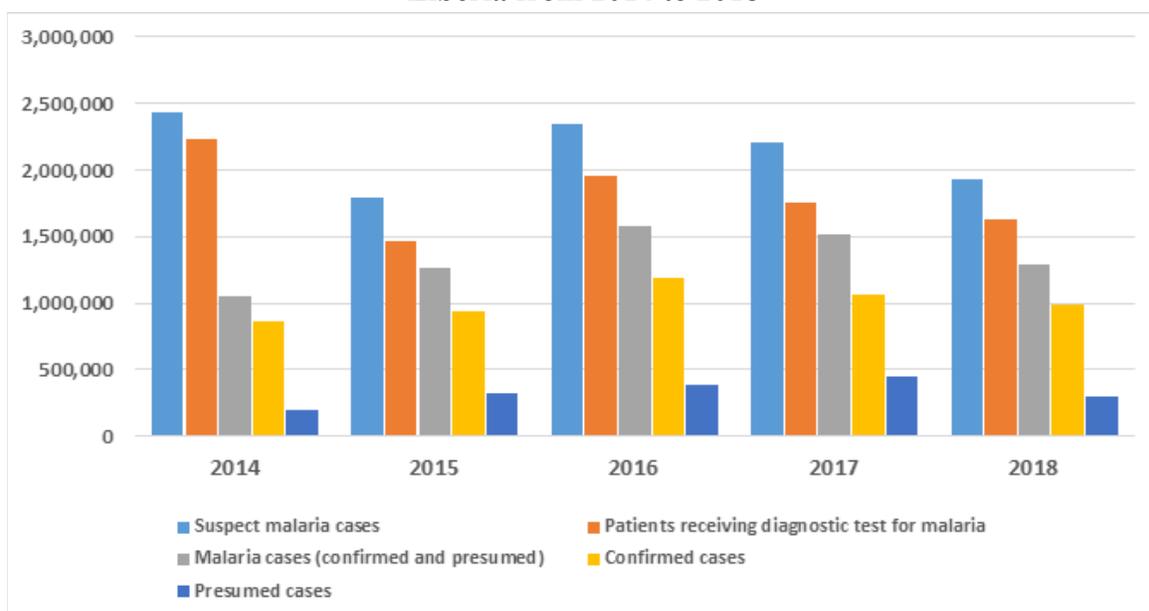
Available data shows that health seeking is enforced with availability of malaria commodities, trained and facilitated service providers at health facilities and in the community, and access to finances. PMI, in consultation with the MOH and Global Fund, is exploring piloting last mile distribution of commodities to select counties including the southeastern counties of Liberia (Grand Gedeh, Maryland, River Gee, and Grand Kru), Margibi County, and 36 hospitals nationwide to improve health product availability at service delivery points. PMI will support the NMCP to develop an SBC strategy that will improve coordination and collaboration between SBC activities with service providers for case management. PMI will scale up training/retraining of health care workers, print and distribute SOPs, job aids to health facilities. PMI will use 2019/2020 DHS data to further analyze the barriers to health seeking and will conduct a malaria behavioral survey early 2020 to further quantify the problem and identify other barriers to health seeking.

Key Question 3

How have malaria testing and treatment practices evolved over time?

Supporting Data

Figure A17. Testing of Suspected Malaria cases and Parasitological Confirmation Rates in Liberia from 2014 to 2018



Over the years, the malaria testing rate has remained almost stable.

Conclusion

The number of suspected malaria cases has decreased slightly from 2016 to 2018. The test positivity rate has increased from 39% in 2014 to 64% in 2015 and then remained almost stable at around 60%. Training clinicians to improve their clinical skills, and laboratory technicians and

CHAs to improve their testing skills will help to reduce the number of patients in suspected malaria category and influence the test positivity rate. Ensuring commodity availability at the facilities will improve case management. In addition, PMI will use an SBC partner to address SBC needs at national, health facility, and community level.

Key Question 4

What is known about provider behavior in relation to testing and treatment practices?

Supporting Data

With FY 2019 funding, PMI supported the training of 575 facility-based health workers in malaria diagnosis and case management, and also supported the training of 99 district and country supervisors on the revised joint integrated supportive supervision (JISS) tools. However, this number falls short of the expected 1,200 health workers to be trained annually nationwide. Information on malaria services availability and staff salary payment challenges all are impacting health care providers behavior. The 2018 SARA conducted by the MOH found that out of 714 health facilities assessed only 9% had a least one trained staff in malaria diagnosis and treatment, 56% had IPTp guidelines, 70% had malaria diagnostic capacity and 80% had the first line antimalarial in-stock, and no facility had all malaria items they needed at the time of the survey. The overall malaria service readiness by county (including staff and guidelines, diagnostic, medicines and commodities) varied from 40% to 74%.

Figure A18. Provider Behaviors and Barriers/Facilitators to Provision of Malaria Case Management

Facilitator	Type of Factor	Data Source	Evidence
Trained health workers provided with resources most often adhere to case management guidelines	Internal/ Environmental	IP reports, EUVs	HMIS reporting shows high adherence to case management guidelines when tools and commodities are available
Availability of commodities, especially during the first two months of the distribution cycle	Environmental	HMIS, EUV surveys	The 2018 SARA study showed that 80% had the first line antimalarial in-stock Although EUV data shows stockouts of individual weight bands of AL or AS/AQ, 95% of facilities in FY19 Q1 and 93% of facilities in FY19 Q3 had the ability to treat malaria (i.e., at least one weight band of AL or AS/AQ)

Barrier	Type of Factor	Data Source	Evidence
Substantial staff training gaps exist resulting in suboptimal service delivery	Internal/ Environmental	IP reports, 2018 SARA study	Observations during site visits; The 2018 SARA Report shows a health service readiness index of 56% (a 3% increase since 2016), meaning that approximately one in two health facilities are equipped to provide health care The 2018 SARA study that out of 714 health facilities assessed only 9% had a least one trained staff in malaria diagnosis and treatment
Limited access to ack of SOPs and manuals to guide service delivery.		2019 KAP study in three counties of Bong, Lofa, Nimba	The 2019 KAP study shows that overall, 55% of the 1,422 cases of fever in a child under 5 in the previous two weeks were treated or referred by a CHA according to national guidelines
High rate of health care workers turnover and staff demotivation due to long delay in salary payment	Internal and environmental	MOH national Health Review conferences, NMCP Annual Program review, IPs reports	The different MOH and NMCP review meetings as well as IP presentations mention the infrequent payment of salary to the Govt of Liberia employees that have resulted in frequent strikes
Health worker attitudes and behaviors leading to presumptive treatment of malaria and prescription of SP to treat uncomplicated malaria	Environmental	OPD registers, HMIS forms	OPD registers how clinical diagnosis of malaria that cannot be explained by RDT stockouts OPDs show dispensing of SP for treatment of uncomplicated malaria. This information cannot be quantified because it is not captured in the summary HMIS forms. The 2020 planned malaria behavioral survey will quantify the problem and identify other barriers to health seeking behavior.

Conclusion

There is no supportive data available on health care workers behavior. The proxy information from the 2018 SARA study identified training needs and lack of updated guidelines at health facilities. Data on training gaps and service availability can at least help to understand the challenges faced by health care workers and how this impacts on health worker behaviors to provide quality services and meet patients' needs. Additionally, in the last couple years health workers have not been paid their salaries consistently which has resulted in frequent strikes and interrupted delivery of services.

PMI plans to scale up staff training, and currently is working with MOH to update HMIS registers, develop and update standard operating procedures and job aids as well as provide

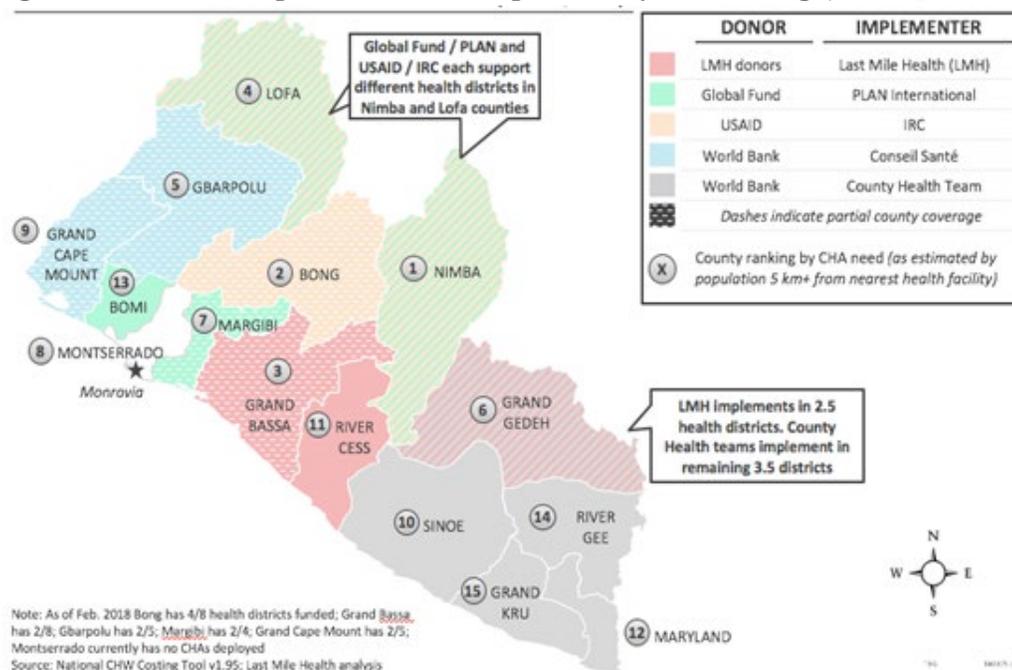
support for printing and distribution to all health facilities. Liberia will conduct a Malaria Behavior Survey (MBS) in 2020 that will form a basis for designing interventions to address health worker behaviors and practices.

Key Question 5

What is the current and planned support for case management at health facilities and in the communities by CHWs?

Supporting Data

Figure A19. CHA Implementation Responsibility & Funding (as of Q1 2018)



Conclusion

Numerous donors and partners are supporting the CHA program in Liberia, covering at least portions of 14 of the 15 counties. Only Montserrado County does not have CHAs.

Key Question 6

What is the estimated need for RDTs for FY 2020?

Supporting Data

Figure A20. Projected RDT Needs for FY 2020

Calendar Year	2019	2020	2021
RDT Needs			
Total country population	4,369,572	4,461,333	4,555,021
Population at risk for malaria ¹	4,369,572	4,461,333	4,555,021

Calendar Year	2019	2020	2021
PMI-targeted at-risk population	4,369,572	4,461,333	4,555,021
Total number of projected fever cases ²	2,714,286	2,714,286	2,714,286
Percent of fever cases tested with an RDT	90%	90%	90%
Total RDT Needs ³	2,442,857	2,442,857	2,442,857
Partner Contributions (to PMI target population if not entire area at risk)*			
RDTs carried over from previous year	1,362,500	1,319,643	976,786
RDTs from Government	0	0	0
RDTs from Global Fund	0	0	0
RDTs from other donors	0	0	0
RDTs planned with PMI funding	2,400,000	2,100,000	2,100,000
Total RDTs Available	3,762,500	3,419,643	3,076,786
Total RDT Surplus (Gap)	1,319,643	976,786	633,929

¹ Total population at risk as assumed during the 2018 National Quantification.

² Data Source: Revised July 2019 National Malaria Commodities Quantification by the National Malaria Control Program (NMCP). The quantification assumptions will be reviewed and adjusted accordingly in the next quantification exercise for 2020 and 2021.

³ 90% of total malaria cases tested with RDT over three years. This includes testing at health facilities and at the community level.

Conclusion

PMI is currently the only partner procuring RDTs and will procure 2.1 million RDTs with FY 2020 funding to fill the complete need.

Key Question 7

What is the estimated need for ACTs for FY 2020?

Supporting Data

Figure A21. Projected ACT Needs for FY 2020

Calendar Year	2019	2020	2021
ACT Needs			
Total country population	4,369,572	4,461,333	4,555,021
Population at risk for malaria ¹	4,369,572	4,461,333	4,555,021
PMI-targeted at-risk population	4,369,572	4,461,333	4,555,021
Total projected number of malaria cases ²	1,900,000	1,900,000	1,900,000
Projected malaria cases received ACTs ³	1,710,000	1,710,000	1,710,000
Total ACT Needs ^{4,5,6}	1,710,000	1,710,000	1,710,000
Partner Contributions (to PMI target population if not entire area at risk)			
ACTs carried over from previous year	2,304,160	1,203,835	1,157,315
ACTs from Government	0	0	0
ACTs from Global Fund ⁷	56,000	663,480	663,480
ACTs from other donors	0	0	0

ACTs planned with PMI funding ⁸	553,675	1,000,000	995,220
Total ACTs Available	2,913,835	2,867,315	2,816,015
Total ACT Surplus (Gap)	1,203,835	1,157,315	1,106,015

¹Total population at risk for malaria, 2008 population census, 2.1% population growth rate, 100% at risk.

² The number of malaria cases was determined from the HMIS data for 2018. During the quantification, the team reviewed HMIS data for total malaria cases; and added total malaria cases from the Community Based Information System (CBIS) for cases that were treated at the community level. It was noted that malaria cases may have been underreported in 2015 due a focus on the Ebola epidemic. This suggested a total of 1.6M reported cases each in 2016 and 2017. After discussion, it was noted that HMIS data may underreport total cases, and the consensus was to forecast for commodities assuming a constant 1.9M malaria cases for the next three years. The quantification assumptions will be reviewed and adjusted accordingly in the next quantification exercise for 2020 and 2021.

³ Assumed 90% of the malaria cases receive treatment with ACT.

⁴ ALu (all presentations) forecasted by proportion for uncomplicated malaria treatment. 15% (2019), 40% (2020) and 40% (2021).

⁵ ASAQ (all presentation) forecasted by proportion for uncomplicated malaria treatment. 85% (2019), 60% (2020) and 60% (2021).

⁶ Data Source: Revised July 2019 National Malaria Commodities Quantification by the National Malaria Control Program (NMCP).

⁷ Data sources: 2019: Global Fund shipment record; 2020-2021: National quantification (NMCP). ALu all presentations (assumed GF commitment).

⁸ Data sources: 2019: GHSC-PSM Automated Requisition Tracking Management Information System (ARTMIS). ASAQ all presentations (assumed PMI commitment).

Conclusion

The PMI will be procuring 60% and Global Fund 40% of the nationwide ACT need for the coming two years. The Liberia national treatment guidelines currently recommend using two first-line ACTs of AL 40% and AS/AQ 60%. Discussions with the NMCP and Global Fund have suggested that PMI procure 60% (AS/AQ) and Global Fund 40% (AL) of the nationwide ACT need for the coming two years. However, Liberia is aware that there is insufficient evidence to support multiple first-line therapies of AL and ASAQ. The current National Malaria Strategic plan is ending in 2020 and the timeline for developing the new strategy is November 2019 to April 2020. Decisions on the first-line ACTs for treatment of uncomplicated malaria will take place during the strategy discussions. PMI/Liberia will revisit the procurement plans for FY2020 once the decisions are made.

Key Question 8

What is the projected need for severe malaria treatment and any other treatments as applicable?

Supporting Data

Figure A22. Projected Needs for Malaria Treatment

Calendar Year	2019	2020	2021
Injectable Artesunate Needs			
Projected Number of Severe Cases ¹	136,800	119,700	119,700
Projected # of severe cases among children ¹	95,760	83,790	83,790
Projected # of severe cases among adults ¹	41,040	35,910	35,910
Total Injectable Artesunate Vials Needs ²	103,626	187,390	211,570

Calendar Year	2019	2020	2021
Partner Contributions			
Injectable artesunate vials carried over from previous year	465	117,251	29,861
Injectable artesunate vials from Government	100,679	0	0
Injectable artesunate vials from Global Fund ³	103,200	0	0
Injectable artesunate vials from other donors	0	0	0
Injectable artesunate vials planned with PMI funding ⁴	16,533	100,000	182,000
Total Injectable Artesunate vials Available	220,877	217,251	211,861
Total Injectable Artesunate vials Surplus (Gap)	117,251	29,861	291

¹ NMCP quantification proportion of severe malaria cases reported 8% (2019), 7% (2020), and 7% (2021) of the total malaria cases reported treated (1,710,000). 40% of severe malaria cases <10kg, 30% are 11-25kg, 15% are 26-60kg, and 15% are 61+kg. Therefore, 70% included in the line for children.

² Number of vials needed based on the national quantification (NMCP). 15% (2019), 31% (2020) and 35% (2021) of projected severe malaria cases will be treated with artesunate injectable (NMCP Quantification). Dosage: 5-10kg: 4 vials (40%); 11-25kg: 4 vials (30%); 26-60kg: 6 vials (15%); 61kg+: 9 vials (15%).

³ Data source: Global Fund procurement pipeline document.

⁴ PMI reduced its 2019 order given the planned Global Fund shipments.

Data Source: Revised July 2019 National Malaria Commodities Quantification by the National Malaria Control Program (NMCP).

Conclusion

The country is increasing the use of injectable artesunate compared to previous years, although injectable artemether is also used for treating severe malaria in Liberia. Efforts are being made to phase out injectable quinine and it was not included in the most recent quantification. During 2019, PMI, Global Fund and the Government of Liberia all procured injectable artesunate. The surplus will be used in 2020. Currently, PMI is the only partner planning to procure injectable artesunate.

Key Question 9

Are the first-line ACTs effective and monitored regularly?

Supporting Data

In a therapeutic efficacy study of AL and ASAQ in patients with uncomplicated malaria from December 2017 to May 2018, high PCR-corrected adequate clinical and parasitological response to ASAQ (95.3%) and AL (100%) were reported.

Figure A23. Most Recently Completed and Ongoing Antimalarial Therapeutic Efficacy Studies

Year	Sites	Treatment arms	PCR-corrected ACPR>90%?	Where molecular resistance work was completed or the plan, if any, for molecular resistance work
2018	Saclepea-Mahn, Rennie Hospital, Sinje Health Center, Bensonville hospital	AL, ASAQ	Yes	NA

Source: Efficacy and safety of Artesunate+Amodiaquine and Artemether+Lumefantrine for the treatment of uncomplicated *Plasmodium falciparum* malaria in Saclepea-Mahn Comprehensive Health Center (Saclepea-Mahn District, Nimba County), Rennie Hospital (Kakata District, Margibi County) and Sinje Health Center (Garwula District, Cape Mount County, and Bensonville Hospital-Montserrado County) in Liberia.

Footnotes - ACPR: adequate clinical and parasitological response; AL: artemether-lumefantrine; ASAQ: amodiaquine-artesunate;

Conclusion

As of 2018, AL and ASAQ remain efficacious in Liberia.

Key Question 10

Are there other key items, such as lab strengthening, private sector support, etc. that should be considered?

Supporting Data

The following additional case management activities will be supported:

- Strengthening of malaria diagnostics capacity for county diagnostics officers who conduct supervision at health facilities.
- Improve supervision of CHAs for case management.
- Formalizing engagement with and support to private sector for improving quality of services and reporting of malaria indicators.
- Support an assessment of malaria case management practices in the private sector (pharmacies, medicines stores, and private health facilities).
- Develop an OTSS activity to improve facility level case management and diagnosis.

Conclusion

There is evidence that malaria case management services are used when available. However, the quality of these services is unknown. The activities mentioned above are meant to enhance the quality of malaria case management services.

Key Question 11

What are the in-country considerations that impact your funding allocation in this category

Supporting Data

The NMCP capacity to oversee malaria diagnostics activities needs to be improved. However, units within the MoH such as the CDOs, NDU and NPHRL are available to collaborate with the NMCP to carry out malaria diagnostics capacity improvement activities. With PMI support, NMCP in collaboration with NDU, is finalizing a training plan for lab technicians in the country and to prepare the lab staff for the next MIS survey.

Conclusion

PMI will support technical assistance to the central MoH for coordination of such activities.

2.B. DRUG-BASED PREVENTION

NMCP objective
<p>IPTp is part of the NMCP MIP strategy. The NMCP objectives for IPTp are:</p> <ul style="list-style-type: none">• At least 80 percent of pregnant women attending ANC receive three or more doses of SP for IPTp according to the national MIP protocol;• All health facilities (100 percent) have SP available, with no stockout lasting more than one week.
NMCP approach
<p>The NMCP adopted the WHO 2012 IPTp policy in 2013 and implementation of the updated IPTp guidelines started in 2014. The current guidelines encourage pregnant women to seek IPTp at 13 weeks of gestation and continue every month throughout their pregnancy. These new guidelines were harmonized across all MIP and case management related documents, including national pre-service curriculum, in-service community training materials, SBC module materials, and SM&E tools, and were revised for nationwide use. Revision of HMIS forms and tools delayed the recording and reporting of IPTp3+ in ANC registers and HMIS forms. In 2015, the MOH revised the HMIS forms and registers, and currently, the ANC register has a column for IPTp1, IPTp2, IPTp3, and IPTp3+.</p>
PMI objective, in support of NMCP
<ul style="list-style-type: none">• PMI supports IPTp implementation in 12 of the 15 counties in Liberia with The World Bank providing support for the remaining three counties.• PMI procures SP for all 15 counties.• PMI supported the roll out of the new IPTp policy and guidelines, training of health workers, supportive supervision and mentoring, and data recording in the ANC register.

- In 2015, PMI, USAID, and the Global Fund supported the MoH to revise the HMIS tools, including ANC and postnatal registers. The revised ANC registers and HMIS reporting form include a column to capture IPTp3, and IPTp3+.
- In 2016, PMI supported the NMCP, Reproductive Health Division of the MoH, instructors from midwife training institutions, and heads of ANC in different counties in an update of training manuals and protocols used for ANC and MIP. In 2017, PMI supported the printing and distribution of the new registers to all clinics providing ANC services in all 15 counties.

PMI-supported recent progress (past ~12-18 months)

- In late 2017 and 2018, PMI geographically scaled up the MIP program. With PMI and Global Fund funding, the NMCP and the Reproductive Health Division of the MoH conducted MIP training in all 15 counties for all ANC service providers and County Reproductive Health Supervisors on the use of the revised registers, new IPTp policy, SP ordering, and data capture and reporting.
- In 2019, PMI supported mentoring and refresher training in counties, covering 359 health facilities. In total, 575 health workers, including country and district supervisors, were trained in MIP.
- In 2019, the FARA was revised to include the following malaria output deliverable for fund reimbursement: “number of pregnant women that receive three or more doses of Sulfadoxine-pyrimethamine (SP) during pregnancy.”
- PMI procured 675,000 treatments (2,025,000 tablets) with FY2018 funding that will arrive in December 2019. PMI also supported the distribution of 372,333 SP treatments.
- The NMSP MTR identified two challenges of slow implementation of the new IPTp policy with low IPTp3+ coverage of 22 % (2016 MIS). Challenges to implementation include:
 - Stock out of SP at health facility for at least four months in 2018.
 - High staff turnover, especially in the South East counties. The new staff require training in IPTp as well as mentoring in data capture and reporting.
 - Low awareness of benefits of IPTp, which contribute to the pregnant women not demanding SP during ANC.
 - Health workers are frequently not giving SP when it is needed, and not practicing directly observed therapy (DOT); these issues are exacerbated by lack of standard operating procedures and job aids in most health facilities.

PMI-supported planned activities (next ~12-18 months, supported by currently available funds)

- Previous trainings have focused on the primary health care level, namely health centers and clinics. Plans are underway to train service providers in hospitals.
- Development, printing, and distribution of standard operating procedures and job aids for IPTp, including standardizing IPTp3 and IPTp3+ recording and reporting.
- Training new staff in IPTp as an integrated MIP training.
- Supportive supervision and mentoring of poor performing counties, districts, and health facilities.

2.B.i MALARIA PREVENTION IN PREGNANCY (MIP)

PMI Goal

Support the national strategy for MIP, which includes provision of ITNs at first antenatal care (ANC) visit, intermittent preventive treatment for pregnant women (IPTp) to all pregnant women in malaria endemic areas starting at 13 weeks gestational age, for a minimum of 3 doses, and effective case management of malaria, in accordance with the WHO recommendations.

Do you propose to increase, decrease, or maintain funding allocation levels for this activity? Why, and what data did you use to arrive at that conclusion?

FY 2020 funding for MIP activities is \$701,250. This is the same funding level for FY2019 after reprogramming. FY 2020 funds will be used to address gaps identified in the NMSP MTR and operational challenges that relate to SP stockouts, knowledge and skill gaps as well as service provider attitudes, IPTp data gaps, and lack of standard operating procedures (SOPs) and job aids.

The allocation of funds for training take into account: (1) that most of the training on the new IPTp policy and guidelines will be supported with FY 2018 and FY 2019 PMI funds; (2) that additional funds will come from the Global Fund grant for MIP; (3) the MIP training is integrated with malaria case management (additional funding for training and supervision included in the Case Management section); and, (4) the World Bank performance-based financing will scale up similar interventions in Gbarpolu, River Cess, and Sinoe counties.

FY 2020 funds will be used to:

- Procure approximately 675,000 SP treatments to ensure an adequate supply for pregnant women to receive three doses throughout their pregnancy.
- Improve quality of care and adherence to standards for MIP in 12 PMI-supported counties. This includes strengthening CHTs capacity to deliver quality MIP services through effective in service training, supportive supervision, and mentoring at the county and facility level, targeting especially low performing health facilities with high missed opportunities and dropout rates for IPTp; support for health worker interpersonal communication; provide technical assistance to MOH Reproductive Health Division and NMCP to plan for MIP nationwide; support the coordination structures at central and county levels; and provide support for training to fill out the new HMIS forms and revised registers to enter data on IPTp3 and IPTp3+ doses of SP.

Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

Key Question 1

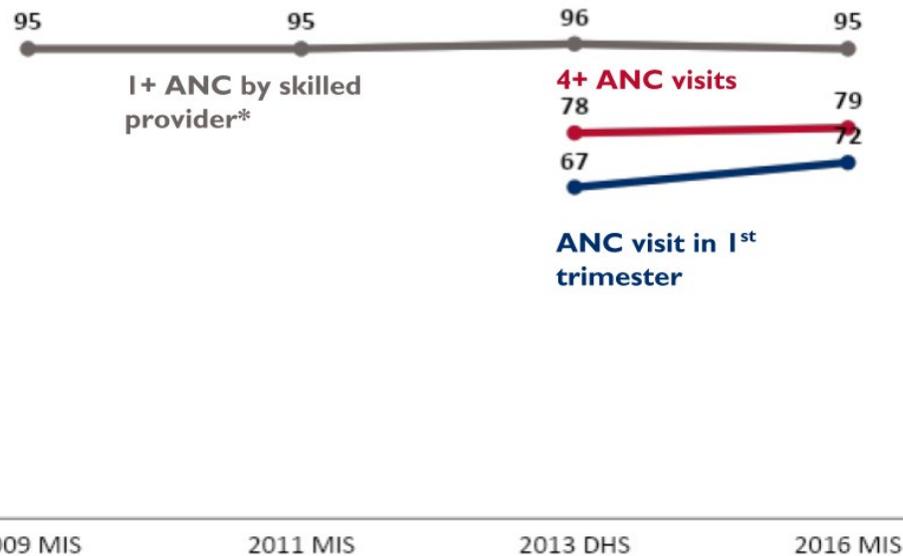
What proportion of pregnant women are receiving ANC early and frequently (as recommended by national and/or WHO strategies) during their pregnancy?

Supporting Data

The 2007 and 2013 Liberia DHS and the 2016 Malaria Indicator Survey (MIS) found that between 2007 and 2016, the ANC visits increased from 71% in 2007 to 98% in 2016 and the 2016 MIS shows that 79% had the recommended four or more antenatal visits. The median months of pregnancy at first visit is three months. Attending at least four ANC visits and formal institutional delivery were low among women residing in rural areas, and high among women with higher education, using electronic media, and living in high wealth index households.

The Yaya et al. study found that women attending ANC at least four times increased the odds of facility-based delivery by almost threefold. The findings suggest that key maternal healthcare utilization indicators have improved substantially, especially facility-based delivery. However, a large proportion of women remain deprived of these life-saving health services in the post-war era. Greater healthcare efforts are needed to improve the quality and coverage of maternal healthcare in order to enhance maternal survival in Liberia. (Source: Yaya et al. BMC Public Health (2019) 19:28, <https://doi.org/10.1186/s12889-018-6365-x>).

Figure A24. Trends in ANC Coverage, Percent of Women Age 15-49 with a Live Birth in the 5 Years Before the Survey for Most Recent Birth



*Skilled Provider includes doctor, nurse, midwife, or physician assistant

Conclusion

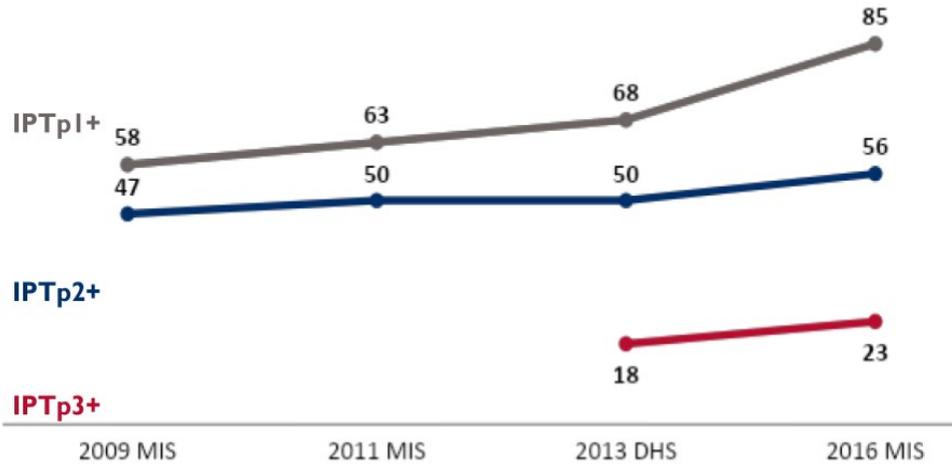
The 2016 Liberia MIS shows that 98% of women had ANC attended to by a skilled worker; over 72% of women attend ANC in the first trimester; and 79% attend at least four ANC visits. Data in the above graph shows sustained high coverage of ANC1 as well as high but stable four or more ANC visits. The data also shows that a high percentage of pregnant women are increasingly attending ANC in the first trimester. The data demonstrates that Liberia has a great opportunity to improve both IPTp 3+ coverage as well as ITNs given to pregnant women during the first trimester if service delivery gaps and missed opportunities are addressed. The training needs to capitalize on the fact that almost three quarters of pregnant women attend ANC during the first trimester and should not be given SP for IPTp and if they have confirmed malaria, they should be given quinine instead of ACTs.

Key Question 2

What proportion of pregnant women are receiving the recommended doses of IPTp?

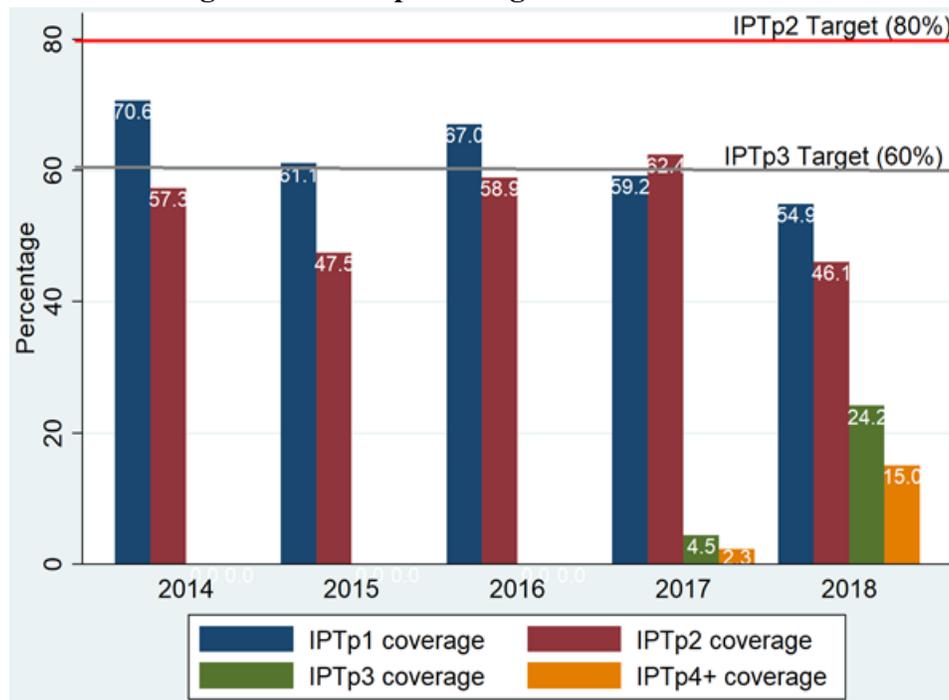
Supporting Data

Figure A25. Trends in IPTp, Percent of Women age 15-49 with a Live Birth in the Two Years Before the Survey who Received the Specified Number of Doses of SP/Fansidar During Their Last Pregnancy



*Note that this indicator has been recalculated according to the newest definition, the specified number of doses of SP/Fansidar from any source.

Figure A26. IPTp coverage for CY 2014–2018



Source: Liberia HMIS

Conclusion

The IPTp coverage data from DHS and MIS is showing an upward trend on IPT1, IPTp2, and IPTp3+, but IPTp 2 and IPTp3+ is far below the target of 80% and 60%, respectively.

Data from the routine HMIS shows a declining trend in IPTp1 coverage with lower coverage in 2018 for both IPTp1 and IPTp2 compared with prior years. This period coincides with the nationwide stockout of SP due to a long lead time for procurement. IPTp2 and IPTp3 coverage are below the national targets of 80% and 60%, respectively. The IPTp3 and IPTp4+(four or more doses of IPTp) reporting started in 2017 and HMIS data shows an increasing trend in both indicators. Data show a high IPTp1-IPTp3 gap that needs urgent attention.

Key Question 3

What is the gap between ANC attendance and IPTp uptake? What barriers and facilitators exist, especially among providers?

Supporting Data

Figure A27. Trends in Missed Opportunities for IPTp, Percent of Women Age 15-49

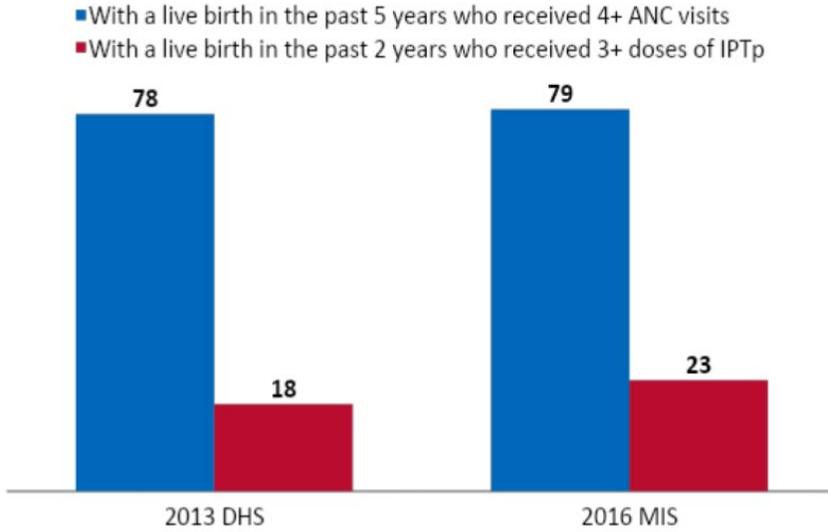


Figure A28. Provider Facilitators and Barriers Related to IPTp

Facilitator	Type of Factor	Data Source	Evidence
Trained health workers are providing IPTp at ANC clinics and using the updated MiP guidelines for reference	Internal	Supervision reports, Integrated human resource information system (iHRIS)/ training database	<ul style="list-style-type: none"> Implementing partner and PMI Team site visits show that IPTp guidelines are being used and health workers are adhering to IPTp protocols HMIS data shows increasing trend in IPTp3 and IPTp3+

Facilitator	Type of Factor	Data Source	Evidence
Trained health workers are providing IPTp/ANC focused awareness creation for pregnant women at health facilities	Internal/ Environmental	Health talk schedules at health facilities	<ul style="list-style-type: none"> Health Talk shows on ANC and IPTp are posted on the walls of the health facilities The 2016 MIS shows that 62% of women age 15-49 in Liberia (99%) have heard malaria messages from health worker/ traditional birth attendant/health promoters PMI, NMCP, and Implementing partner site visits demonstrate that pregnant women interviewed are able to mention the benefits of completing ANC visits at health facilities and the importance of taking SP
Barrier	Type of Factor	Data Source	Evidence
Use of SP to treat uncomplicated malaria	Internal	Health Facility Daily consumption book and Stock ledgers, Supervision reports	OPD registers indicate use of SP to treat uncomplicated malaria. This data is not captured on the HMIS report to quantify the problem
Not providing SP as DOT	Internal	ANC ledger, implementing partner reports	Site visits demonstrate that ANC clinics have no drinking water facility at most health facilities. This information is not captured on the HMIS to quantify the problem.
Lack of integration of services at health facilities	Internal/ structural	Health facility ledgers	Supervision visits demonstrate that only midwives providing MIP services, MIP services only provided at ANC clinic
Low community awareness on the benefits of MIP services like ITNs at first ANC visit and IPTp	Social	Partner supervision reports, ANC registers, Institutional Delivery register, DHS, MIS, KAP studies	<ul style="list-style-type: none"> High missed opportunity for IPTp, and ITNs at ANC and at Delivery The 2016 MIS shows that among the 95% of women who have heard of malaria and know that it can be avoided, almost half (49%) perceive that people do not take actions to prevent malaria because they don't take malaria seriously or perceive that there is no risk. Among women who know SP is used to prevent malaria in pregnant women, 45% perceive that pregnant women do not use SP because they are worried about the side effects.

Conclusion

Compared to ANC visits of four or more, 2016 MIS data shows a 23% and 56% missed opportunity gap for IPTp2 and IPTp3+ respectively. The gap can be reduced if the operational SBC and service delivery barriers and service delivery gaps to accessing and providing quality

MIP services are addressed. Available data does not show that financial barriers play a role in low coverage ANC attendance. Liberia will conduct a malaria behavior survey to get more information on behaviors and practices associated with ANC attendance and IPTp uptake.

Key Question 4

What proportion of pregnant women with fever and malaria infection are getting diagnosed and treated? What barriers and facilitators exist?

Supporting Data

Liberia HMIS shows that 61% of pregnant women with fever are getting confirmatory testing with RDTs or microscopy and getting appropriate treatment.

Figure A29. Barriers and Facilitators for Diagnosis and Treatment of Pregnant Women with Fever and Malaria

Facilitator	Type of Factor	Data Source	Evidence
Health Workers adhere to guidelines for malaria case management for pregnant women	Internal	Implementing partner training database; laboratory registers, OPD registers	ANC registers show that trained health workers are following the national MIP guidelines
Available mRDT kits and malaria drugs	Environmental/Internal	Health facility ledgers, Partner supervision reports	<ul style="list-style-type: none"> • EUVs shows that more than 80% of health facilities have RDTs in stock all year. • The pregnant women that get tested and treated are easily identifiable in the laboratory registers and OPD registers
Health facility staff and system able to fast track care for pregnant women	Environmental	Health facility records	Integration between outpatient and MCH departments to care for pregnant women
Strong CHA system able to refer women for care	Environmental	CHIS, Health facility ledgers	Data from CHA program demonstrate referral of pregnant women to health facilities for proper care
Barrier	Type of Factor	Data Source	Evidence
Periodic stock outs of mRDT kits and malaria drugs	Environmental	Health facility ledgers	<ul style="list-style-type: none"> • EUVs show an average stock out of RDTs of 20% but is worse in some remotely accessible health facilities • Evidence of clinical diagnosis of malaria in OPD registers

Delay in seeking care for fever among pregnant women	Social	Health Facility ledgers	Complicated malaria among pregnant women
Lack of Standard operating procedures at ANC clinics and job aids	Internal/Environmental	Implementing partner reports	Data shows that there is no standard practice of management of malaria in pregnancy. Some midwives have been trained in RDT testing but they refer the women to the lab for testing.
Not fully rolled out updated HMIS ledgers to track pregnant women treatment at ANC	Environmental/Internal	HMIS ledgers/ Summary HMIS reports	<ul style="list-style-type: none"> • Treatment of malaria in pregnancy not properly tracked. • The OPD registers just record malaria in pregnancy but do not state the trimesters.

Conclusion

Data from health facility ledgers and implementing partner reports indicate that when health workers are trained, they correctly manage malaria in pregnancy according to the national diagnostic and treatment guidelines. However, because of lack of SOPs and job aids, testing and treatment of pregnant women is not uniform in all health facilities. Data capture, especially of malaria in the first trimester, is lacking. The planned 2020 MBS and revised KAP studies will provide more information on the community-level barriers influencing pregnant women to seek early for treatment. FY 2019 reprogrammed and FY2020 funds will be used to address these challenges.

Key Question 5

What is the estimated need for IPTp commodities over the next three years and what proportion of this need will PMI support?

Supporting Data

Figure A30. Estimated IPTp Commodities Need 2019 - 2021

Calendar Year	2019	2020	2021
Total Population at Risk	4,369,572	4,461,333	4,555,021
SP Needs			
Total number of pregnant women ¹	218,479	223,067	227,751
Total SP Need (in treatments)²	498,131	613,433	660,478
Partner Contributions			
SP carried over from previous years	0	176,869	238,436
SP from Government	0	0	0

Calendar Year	2019	2020	2021
SP from Global Fund	0	0	0
SP from Other Donors	0	0	0
SP planned with PMI funding ³	675,000	675,000	675,000
Total SP Available	675,000	851,869	913,436
Total SP Surplus (Gap)	176,869	238,436	252,957

¹ The total number of pregnant women is estimated at 5.0% of the total population with a population growth rate of 2.1%.

² 83% of the total pregnant women attend ANC1, 61% attend ANC2 and 47% attend ANC3, and 37% attend ANC4 based on HMIS 2018. Targets were adjusted upwards for 2020 and 2021.

³ Data Source: Revised July 2019 National Malaria Commodities Quantification by the National Malaria Control Program (NMCP).

Conclusion

The total SP need for calendar year 2021 is 660,478 treatments, of which 238,436 is a carry-over from previous years. Currently, only PMI procures SP for the entire country. If PMI procures 675,000 SP treatments with FY 2020 funding, that will be enough to cover the total SP need in calendar year 2021 and remain with a buffer stock of 314,132 to cover any increase in IPTp uptake.

Key Question 6

What are the in-country considerations that impact your funding allocation in this category?

Supporting Data

The Liberia supply chain system is complex, and the last mile distribution of commodities is problematic, resulting in some health facilities being overstocked or understocked. This affects the availability of SP for IPTp and ITNs at ANC and institutional delivery. These challenges are addressed in section “3A. Supply Chain”.

Funding for SBC barriers to MIP, including IPTp, ITNs, and malaria case management for pregnant women is further addressed in Section “3C. SBC”.

Conclusion

Liberia has made significant progress in adopting and rolling out the new WHO policy and guidelines on IPTp and ANC. However, the implementation is affected by a number of health system and operational service delivery internal, social, and environmental factors as well as health worker attitude and practice. Combined, these challenges result in high missed opportunities for IPTp, ITNs, and poor case management for pregnant women. These challenges will be addressed with FY 2019 reprogramming and FY2020 funding as well as working with other partners to implement a comprehensive MIP strategy for the whole country.

3. CROSS-CUTTING AND OTHER HEALTH SYSTEMS

3.A. SUPPLY CHAIN

NMCP objective
The NMCP objective in the 2016–2020 NMSP is to strengthen the pharmaceutical supply chain system for effective quantification and prompt distribution of commodities under a universal system by 2020.
NMCP approach
<ul style="list-style-type: none">• The Government of Liberia revised the Supply Chain Master Plan (2015) with a focus on increasing access to quality-assured malaria commodities for service delivery. The implementation of the revised plan under the leadership of the MOH has resulted in establishment of the Supply Chain Technical Oversight Committee (TOC) led by the Deputy Minister for Health Services/Chief Medical Officer. The TOC provides strategic direction to the Supply Chain Technical Working Group led by the Supply Chain Management Unit (SCMU). The SCMU coordinates the overall supply chain activities in the country with support from PMI, the Global Fund, UNFPA, and other donors.• The SCMU coordinates supply chain data collection from the service delivery points by the County Health Team, which is used to inform first and last mile distribution of malaria commodities to the counties’ depots and health facilities. The teams under the leadership of SCMU provide supply chain information in collaboration with the Central Medical Stores (CMS) on the status of malaria products in Liberia and requirements at the various counties to inform resupply decisions.• The SCMU also oversees the National Quantification Technical Committee for forecasting, supply planning and procurement monitoring of malaria commodities; the National Distribution Committee for malaria commodities distribution planning and monitoring through the quarterly distribution; and the National Supply Chain Data Verification Committee that guides the review of the data for decision making in collaboration with different arms of the Ministry of Health.• The CMS is responsible for inventory management at the Caldwell warehouse and quarterly distribution of commodities to the 14 county depots and last mile distribution to health facilities in Montserrado County.• At the county level, the county pharmacist and supply chain focal person work together with the CHT to plan and implement distribution of health products to the service delivery points. The CHT through the District Health Officers and M&E Officers collect supply chain data that is submitted to SCMU and CMS for resupply decisions.

- The Ministry of Health has continued to strengthen its collaboration with PMI, Global Fund and other partners to implement and maintain an effective and functional supply chain system for the procurement and distribution of malaria commodities.

PMI objective, in support of NMCP

- PMI provides support in the implementation of the national supply chain strategy through supporting the national quantification technical committee to develop national malaria commodity requirements and funding needs.
- PMI supports the procurement of malaria commodities and monitoring of the national pipeline to inform joint donor decisions on procurement of commodities with Global Fund to meet national malaria product requirements.
- PMI supports the CMS in Caldwell, Monrovia, in providing operational support and capacity building for integrated management of health commodities at the central warehouse. Furthermore, PMI supports distribution of the malaria commodities to the 14 county depots and public health facilities in Montserrado County.
- PMI is also supporting the revitalization of the electronic logistics management information system (eLMIS) to guide supply chain data collection for decision making on health product requirements.

PMI-supported recent progress (past ~12-18 months)

- PMI supported the final movement of health commodities from the rented Freeport warehouse to the newly constructed CMS in Caldwell, Monrovia in December 2018. This movement consolidated storage and distribution of health commodities across the country in alignment with the MOH vision of harmonizing and strengthening the health supply chain system in Liberia.
- PMI supported the deployment of a warehouse management software (WMS), mSupply, to improve the commodity operations of the warehouse. As part of the WMS deployment, PMI supported capacity building for 17 CMS employees on the use of the system and deployed short term technical assistance providers to assist the team in the implementation of standard operating procedures for the management of the new facility. In addition, PMI provided operational support for the running of the warehouse through financial and technical support to the CMS. PMI also supported a full inventory count in June-August 2019, which was migrated into mSupply, enabling future rounds of distribution to be managed out of mSupply. The MOH will look into expanding mSupply to the county depots.
- To improve malaria product availability in line with the MOH quarterly distribution strategy, PMI supported the distribution of malaria commodities to 14 county depots and 114 public health facilities in Montserrado County.

- PMI supported capacity building of MOH staff on forecasting and supply planning for malaria commodities and also supported the procurement of malaria commodities that will support service delivery across the 800+ health facilities in the 15 counties in Liberia.
- PMI, with inputs from other donors, supported the revitalization of the electronic logistics management information system (eLMIS). USAID and PMI supported the eLMIS training in nine counties (reaching over 130 MOH personnel at the subnational level) and UNFPA supported the training in the remaining six counties. Data has been entered for Q1 and Q2 in 2019. However, the reporting rate has not been optimal necessitating the need for further capacity building and mentoring on the data collection, review, collation and use for decision making. This will be followed by hands-on mentoring to further improve the quality of data generated from the health facilities and the supply chain data management practices at the facilities.
- PMI has also continued implementation of End Use Verification survey in Liberia with surveys conducted in December 2018 and April 2019 to understand availability of malaria commodities and case management practices at the health facilities.
- PMI supported LMHRA and the NMCP to hold a 9-day joint post-marketing surveillance exercise in two counties. As a result, approximately \$3,000,000 worth of stolen public sector products and over 200 packs of falsified medications were confiscated from private commercial shops. In 2018, LMHRA confiscated substandard/unregistered/ falsified health products worth over \$68,000. The results from post market surveillance prompted LMHRA to implement over 100 regulatory and legal actions that included confiscation, incineration, warning letters, deregistration, prosecution, and fines.

PMI-supported planned activities (next ~12-18 months, supported by currently available funds)

In addition to the activities listed above which will continue to be supported, PMI will further expand support in the next 12 to 18 months to include:

- Last mile distribution of malaria commodities to health facilities in a few selected counties. Currently USAID and PMI are funding commodity distribution from the Central Medical Store (CMS) to county depots, which is functioning well. Global Fund is funding the distribution from county depots to health facilities by providing funding to the county health teams, this is not working well because the funding is not adequate for some counties with a high volume of health facilities, and funding is sent to the counties late, long after the commodities have arrived in the county. USAID and PMI had extensive discussions with Global Fund, and they are open to other approaches to addressing the last mile challenges. With MOH approval, USAID and PMI are proposing to support last mile distribution in several counties including the South Eastern counties of Liberia (Grand Gedeh, Maryland, River Gee, and Grand Kru), Margibi County, and 36 hospitals nationwide to improve health product availability. The last mile distribution will utilize available MOH assets as well as

existing county and USAID/other donor implementing partner resources. PMI's supply chain implementing partner will contract with the private sector for this distribution as needed if the CMS and county vehicles are not enough. For the counties that are particularly difficult to reach in the rainy season, the team will look into various approaches to address this including providing additional commodities prior to the rainy season and water transport. The other counties will continue to receive funding from the Global Fund to support last mile distribution from the county depots to the health facilities. The results from the pilot will be shared with the MOH and Global Fund to inform improvements in last mile distribution throughout the country.

- Deployment of logistics management advisors to the counties to support capacity building of the CHTs and mentoring of the health facility staff on supply chain data management and distribution planning.
- Support the development of a roadmap for transition of CMS operations to a sustainable model.
- Support the Government of Liberia to develop a global standard strategy using GS1 for tracking and tracing of malaria products to improve visibility within the supply chain.
- Support pilot implementation of the global standard strategy at the CMS with selected malaria commodities to improve supply chain data visibility.
- Support direct distribution of ITNs to county depots, and to health facilities as needed, to overcome current challenges with last mile distribution of ITNs.
- Support capacity building of MOH staff on supply chain data use for decision making through appropriate data analysis and interpretation.
- Support capacity building of the county depots and hospitals on warehouse standard operating procedures to improve malaria commodities management.
- Improve warehousing conditions in county depots, including warehousing for ITNs.
- Support post-market surveillance for antimalarial drugs. Strengthen LMHRA, Pharmacy Board, and MOH systems for pharmaceutical regulation, including antimalarial quality testing and sampling.

PMI Goal

Ensure continual availability of quality products needed for malaria control and elimination (ACTs, RDTs, SP, injectable artesunate, and ITNs) at health facilities and community level.

Do you propose to increase, decrease, or maintain funding allocation levels for this activity? Why, and what data did you use to arrive at that conclusion?

PMI Liberia proposes to maintain significant funding levels for commodity distribution and supply chain technical assistance activities because of persistent and complex challenges in the supply chain in Liberia, as demonstrated by continued under and overstocking of commodities in health facilities. PMI will continue to support the SCMU for quantification of malaria commodities and oversight of the supply chain and CMS for warehousing and distribution of commodities. PMI, along with the other health elements at USAID, will explore other approaches for last mile distribution to the health facilities and PMI will focus on strengthening ITN distribution because the current system is functioning poorly. Results of these pilot approaches will be reviewed with SCMU, CMS, NMCP and the Global Fund to decide on an approach going forward. PMI will continue to strengthen the quality and reporting of data in eLMIS.

Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

Key Question 1

Has the central level been stocked according to plan for ACTs, RDTs, SP and Art. Inj over the last year? If not stocked according to plan, have they been under, over or stocked out?

Supporting Data

Figure A31. Central Stock Levels for AL

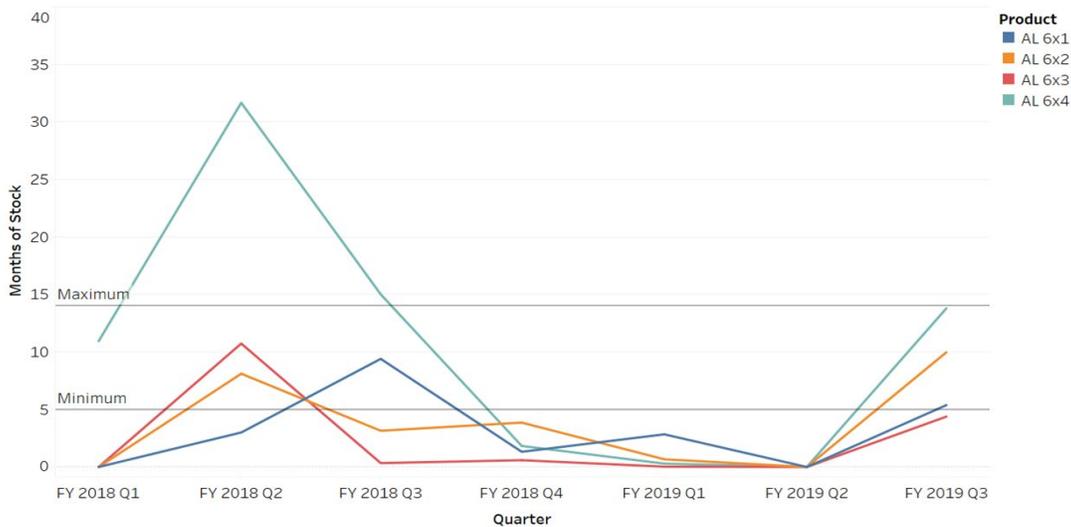


Figure A32. Central Stock Levels for AS/AQ

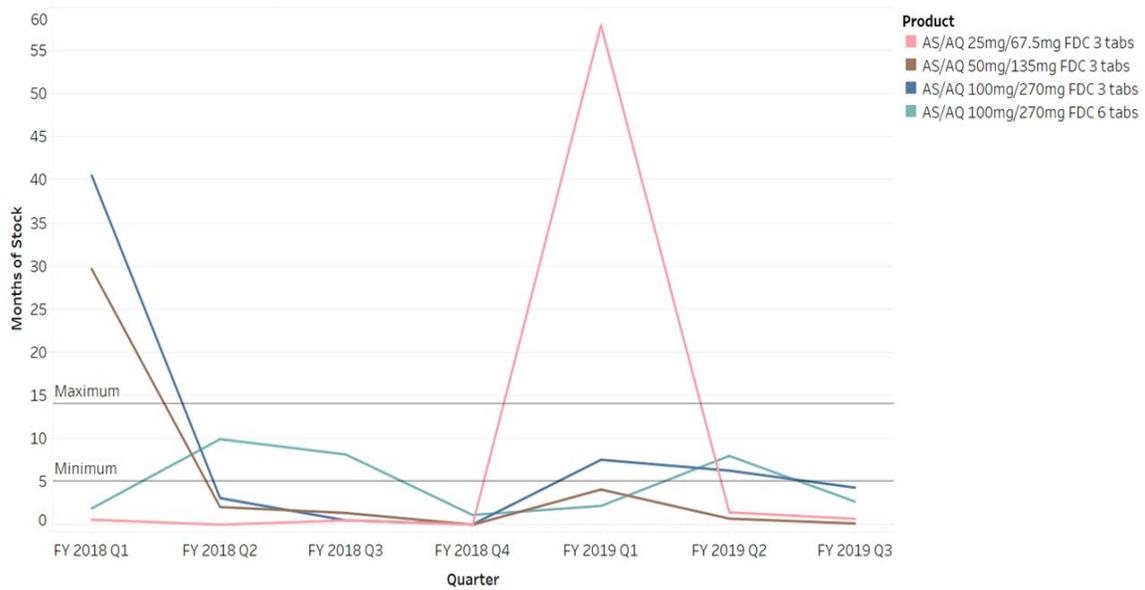
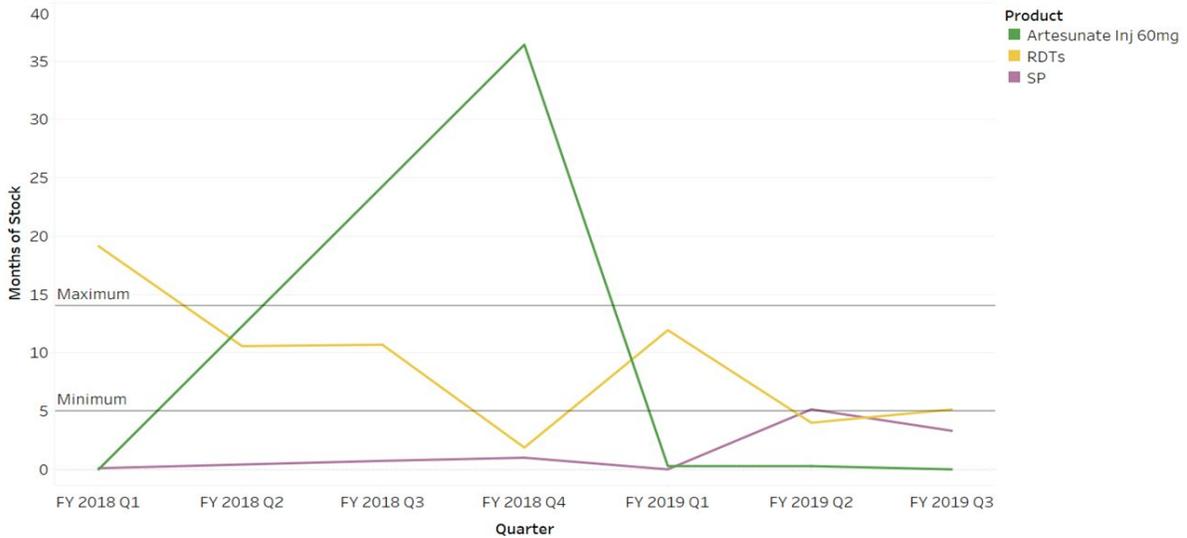


Figure A33. Central Stock Levels for RDTs, SP, and Injectable Artesunate, 60mg



Conclusion

The Liberia national treatment guidelines currently recommend using two first-line ACTs, with Global Fund procuring AL (40%) and PMI procuring AS/AQ (60%). AL was understocked for most of the past year until FY 2019 Q3. AS/AQ recently fell below the minimum stock level, but orders for all four weight bands, along with RDTs and SP are arriving in the next 1-2 months. PMI will continue to coordinate with the NMCP and Global Fund to avoid future understock or stockout situations. Injectable artesunate has recently arrived in country procured by Global Fund, PMI, and GOL causing this commodity to be overstocked in FY2019 Q4 (not shown above). The SCMU, CMS and NMCP are working out a distribution plan for this commodity to avoid expiries, and 2020 orders will be adjusted accordingly.

Key Question 2

What are the trends in facility- and community health worker-level stock out rates for ACTs RDTs, and SP over the last year (if tracked)? Is there a seasonal or geographic difference in stock out rates?

Supporting Data

Figure A34. AL Stockout Rates (EUV Data)

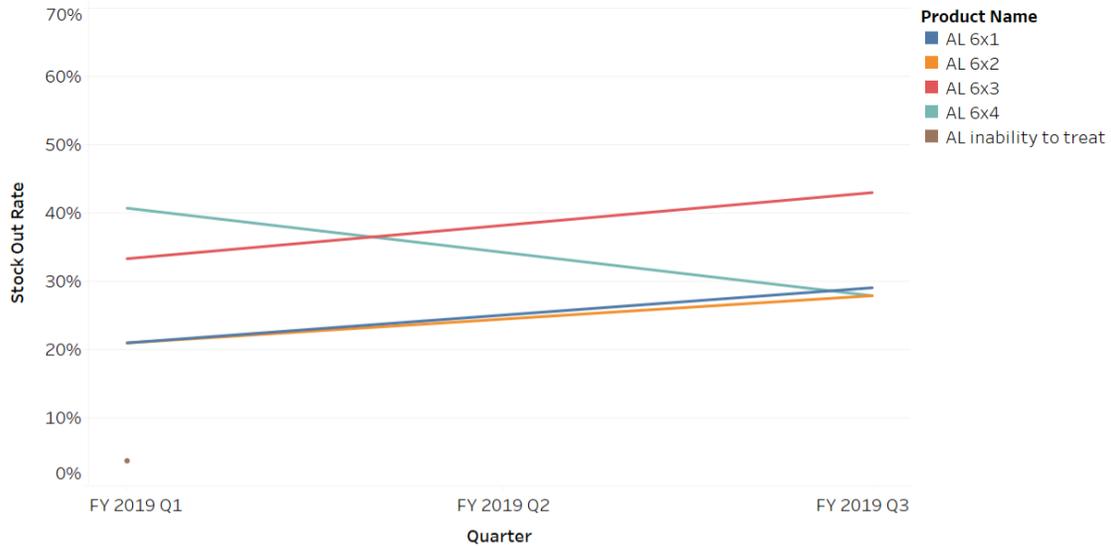


Figure A35. AS/AQ Stockout Rates (EUV Data)

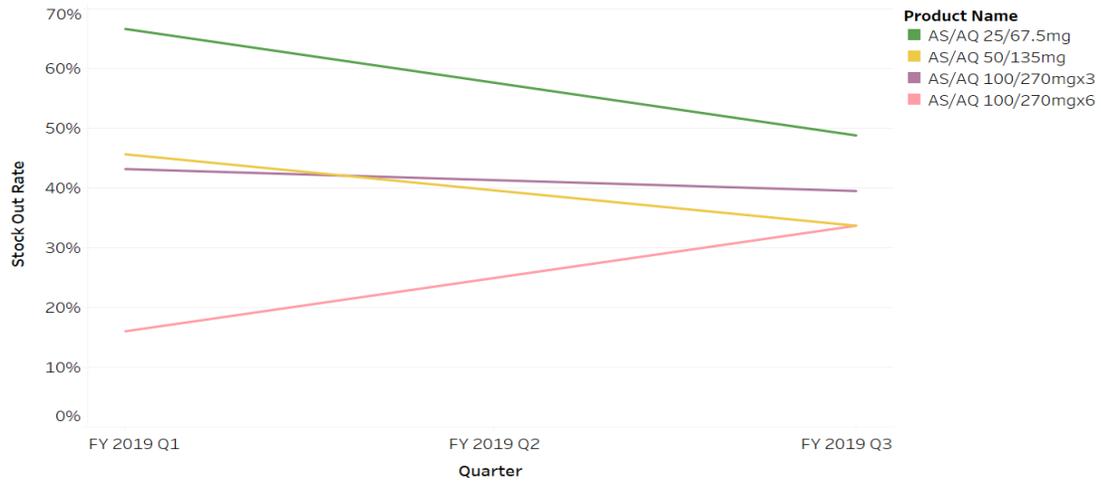
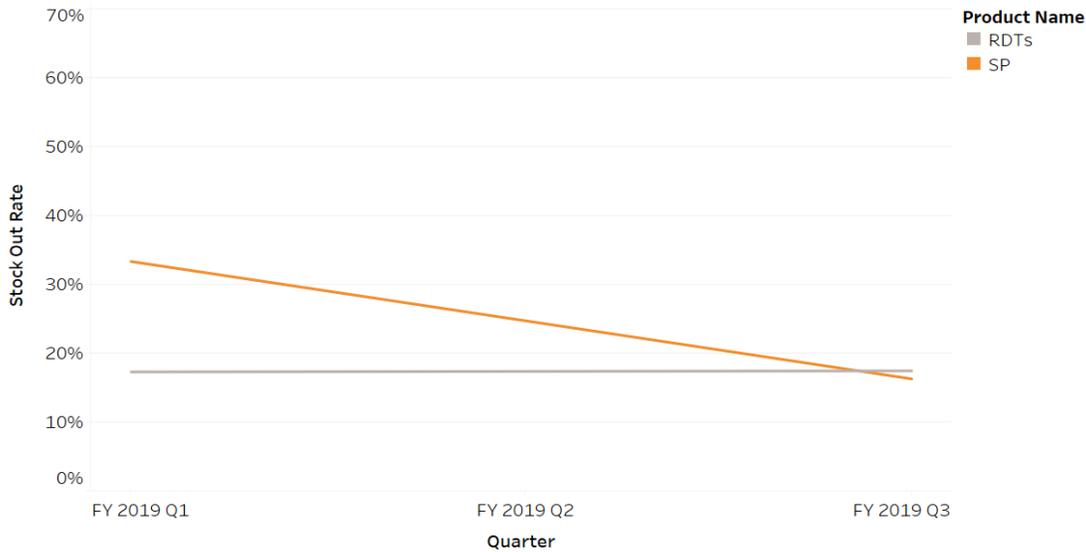


Figure A36. SP and RDT Stockout Rates (EUV Data)



Conclusion

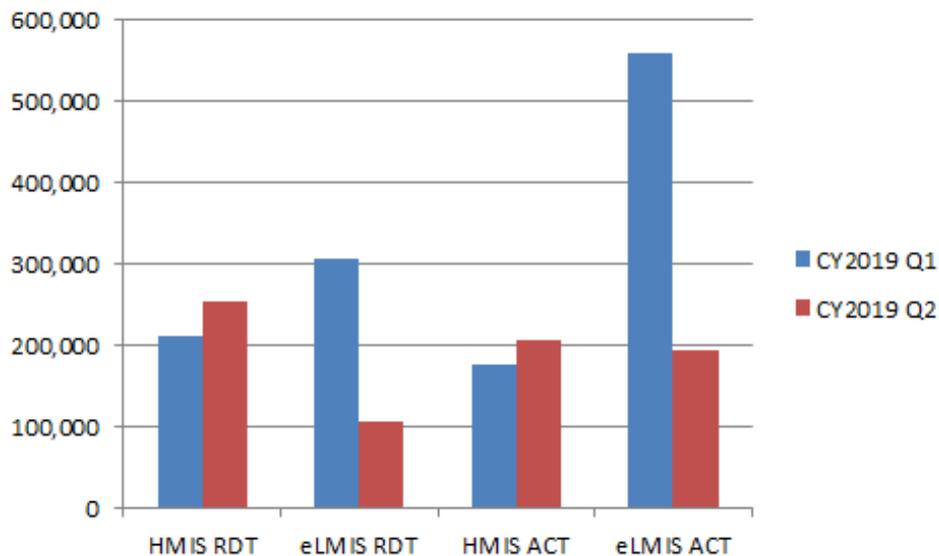
Data is only available for FY2019 Q1 and Q3 from the EUV surveys, because the eLMIS was still being rolled out at this time. As the data shows, there have been challenges with malaria commodity availability at the health facilities despite PMI supporting distribution to the county depots. Last mile distribution to health facilities is supported by Global Fund through their grant to the MOH, which has not been implemented as expected to improve the availability of malaria commodities at the health facilities. Discussions have commenced with the MOH and Global Fund to address this gap through the review of the distribution mechanism with a planned pilot supported by PMI for last mile delivery to health facilities in a selected counties including the southeastern counties of Liberia (Grand Gedeh, Maryland, River Gee, and Grand Kru), Margibi County, and 36 hospitals nationwide to improve health product availability. Further refinements to the distribution process will be decided with the MOH and Global Fund based on the results of the pilot. Although the graphs show stockouts of individual weight bands of AL or AS/AQ, 95% of facilities in FY19 Q1 and 93% of facilities in FY19 Q3 had the ability to treat malaria (i.e., at least one weight band of AL), and this is even higher when AS/AQ is factored in.

Key Question 3

What is the difference between quantities for ACTs consumed and malaria cases, and RDTs consumed and numbers tested? What is driving any differences seen?

Supporting Data

Figure A37. Differences between RDT and ACT Consumption



Conclusion

Comparison between RDT consumption from the eLMIS and numbers tested from HMIS (and ACT consumption and malaria cases treated), were only possible for CY2019 Q1 and Q2 because that is the only eLMIS data available. In Q1 the number of RDTs consumed was greater than the number tested, but in Q2 the reverse was true. The HMIS and eLMIS data for Q2 are similar for ACTs used. We are investigating the discrepancy in the Q1 eLMIS data for ACT consumption. There are known data quality challenges as the eLMIS is being rolled out. As eLMIS reporting becomes more routine we will continue to triangulate the information from the eLMIS and HMIS, and investigate discrepancies.

Key Question 4

What are the trends in LMIS reporting rates?

Supporting Data

The Logistics Management Information System (LMIS) in Liberia has been dormant since it was first rolled out in 2018. However, with support from donors and partners, including PMI, the LMIS system was reactivated in May 2019 with capacity building for the CHTs and DHTs on the eLMIS and LMIS tools. The eLMIS system achieved 50% (422/835) reporting rate for the first cycle of data entry in June 2019 (covering January-March 2019) but dropped to 24% (200/835) reporting rate by September 2019 (for April-June 2019). The poor performance was mostly because 41% (344) of the national health facilities are in Montserrado County and most of these are private health facilities that do not provide supply chain reports to the MOH. This is further compounded by a recent decision by the MOH and donors to stop supply of malaria

commodities to these private health facilities in Montserrado County until MOUs are signed and the private facilities are able to provide the donated malaria commodities free of charge.

Conclusion

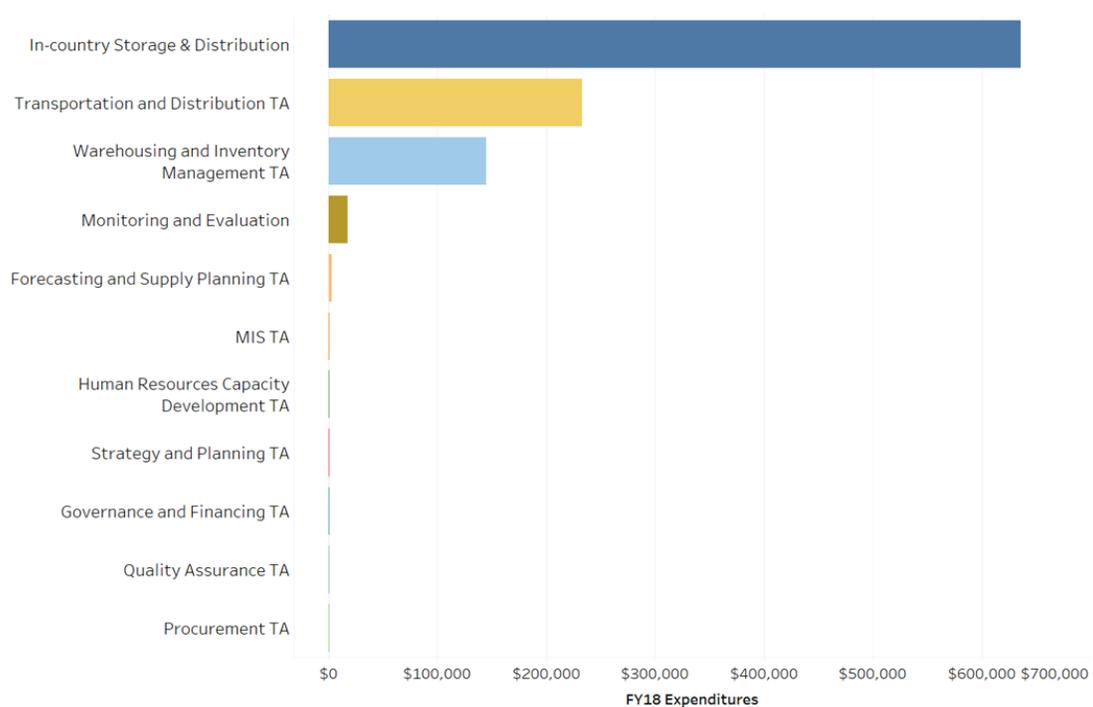
The above data indicates the LMIS reporting rate denominator will need to be reviewed to ensure facilities are only expected to report on the commodities they carry, especially for the private health facilities in Montserrado County that are not receiving malaria commodities from CMS and hence are not reporting on the eLMIS. The expectation is that eLMIS reporting will continue on a monthly basis and reporting rates will improve. PMI is supporting capacity building on eLMIS and LMIS data entry for the CHTs and DHTs.

Key Question 5

What are the main supply chain functions supported by PMI? For areas that are not as strong is there additional investment that PMI should? In areas performing well, is it dependent on PMI/donor funding and so should be maintained?

Supporting Data

Figure A38. PMI Supply Chain Investments in FY 2018



Conclusion

In recent years, PMI has largely been supporting the operations of the Freeport warehouse and then from December 2018 onwards the Caldwell warehouse. The CMS, USAID and PMI have agreed to shift focus from operations to capacity building of the CMS staff to manage and

operate the warehouse. Support will include mentoring and targeted supervision. We have already transferred operational costs for fuel and maintenance to the MOH, but are maintaining support right now for security and security systems, fuel for distribution, mSupply software requirements, and the electricity bill, all of which PMI is contributing to. PMI will continue to support the use of WMS and eLMIS.

Key Question 6

What are the in-country considerations that impact your funding allocation in this category?

Supporting Data

The Liberia health supply chain is challenged by the road conditions, especially in the Southeastern counties during the rainy season, which lasts for up to eight months of the year. This makes supply of malaria commodities to these counties very challenging. In addition, the unavailability of an equipped warehouse facility in these counties makes bulk supply during the dry season difficult necessitating frequent visits to mitigate short supply of malaria products.

An additional challenge is the lack of electricity at the Caldwell warehouse, which is completely dependent on generators. The cost of fuel is contributing to the high operating costs of the warehouse.

Conclusion

PMI is looking into improvements and equipment for county depots, particularly in the Southeastern Counties that will minimize the need for long distance travel from Monrovia to provide commodities to these counties especially during the rainy season when the roads are nearly impassable. The Ministry of Health is exploring options for supplying these counties during the rainy season either by alternate routes or supplying additional commodities in advance of the rainy season.

The Mission has been advocating with the Liberia Electrical Company (LEC) and the World Bank to connect the Caldwell warehouse to the electricity grid, which will allow the generators to serve as backup and not the main source of power. We anticipate this will be complete by the end of 2019.

3.B. SURVEILLANCE, MONITORING & EVALUATION (SM&E)

NMCP objective
<ul style="list-style-type: none">The goal of the NMCP Surveillance, Monitoring and Evaluation and Operational Research Unit (SMEOR) is to provide reliable information on the performance, progress, effectiveness, and efficiency of the national response to control malaria.

<p>NMCP approach</p>
<ul style="list-style-type: none"> • The SMEOR Unit is the technical arm of the NMCP that designs, coordinates and implements SMEOR activities aimed at tracking progress on implementation of the National Malaria Strategic Plan (2016-2020). • The NMCP SMEOR Unit conducts monitoring and evaluation activities in collaboration with the HMIS Monitoring and Evaluation and Research (HMER) Department at the MOH. • Lead most of the malaria operational and assessment activities, mainly funded by Global Fund and other sources. • Support and ensure quality data management at all levels of the health care system. • At sub-national level, SMEOR works with County M&E Officers, County Data Managers, County Registrars, District Health Teams, Officers in Charge of health facilities and Health Facility Registrars.
<p>PMI objective, in support of NMCP</p>
<ul style="list-style-type: none"> • PMI’s objective is to support the NMCP to build their capacity to conduct surveillance as a core malaria intervention using high quality data from both surveys and routine health information systems and to support SM&E to align its activities with the NMCP’s NMSP 2016–2020. • PMI and the Global Fund have provided the majority of funding for SM&E activities in Liberia over the past eleven years, with some additional funding from WHO. • PMI has supported three MIS surveys (MIS 2009, MIS 2011, and MIS 2016) and contributed to two DHS surveys (DHS 2013, DHS 2019) to track the progress of malaria control core interventions and malaria parasitemia in the general population. • Support EUV surveys to assess the availability of malaria commodities at health facilities. • PMI supports County, Districts and Health facilities to improve data collection, aggregation, review, and reporting in DHIS2. • In order to strengthen the NMCP’s capacity for data analysis and use, PMI is supporting a long-term technical assistance advisor focusing on monitoring and evaluation at the NMCP office.
<p>PMI-supported recent progress (past ~12-18 months)</p>
<p>PMI supported the following activities:</p> <ul style="list-style-type: none"> • Trained 51 M&E staff at national and county level in DHIS2/HMIS data management. • Supported the NMCP’s capacity, by embedding a long-term technical assistance advisor focusing on monitoring and evaluation at the NMCP.

- Conducted net durability monitoring at baseline, six months and 12 months following the 2018 mass campaign net distribution.
- Conducted malaria vector population surveillance, and insecticide resistance monitoring at supported sentinel sites, and trained Community Health Volunteers on larva collection and basic mosquito identification and insecticide resistance tests.
- Supporting EUV surveys to assess the availability of malaria commodities at ~80 health facilities and nine county depots three times per year.
- Figure A39 summarizes available data sources and assessments since 2015, as well as planned activities through 2021.

PMI-supported planned activities (next ~12-18 months, supported by currently available funds)

PMI will continue to support:

- Ongoing monitoring and routine surveillance activities (e.g. net durability monitoring at 24th and 36th month, End-Use Verification (EUV) across the country, routine data reporting through HMIS).
- Data quality assurance and supportive supervision with the MOH to improve HMIS data reporting and use. This activity will be addressed jointly with the Global Fund.
- Promotion of analysis of malaria data and use for decision-making and problem-solving at each level of the national health care system.
- Given that the NMCP staff are stretched thin with all of the data collection and analysis activities in Liberia, PMI Liberia will continue to support the NMCP in the form of a long-term technical advisor for monitoring and evaluation that is embedded with the NMCP.
- PMI in collaboration with other donors will provide technical and financial support to review, update, print and distribute registers to collect key malaria indicators at all health facilities.
- PMI will support secondary analysis of 2019 DHS to assess the status of malaria burden in the country, and measure the progress made from 2016 to 2020.

PMI Goal

To support the NMCP to build their capacity to conduct surveillance as a core malaria intervention using high quality data from both surveys and routine health information systems.

Are you proposing to increase, decrease, or maintain funding allocation levels for this activity? Why? What data did you use to arrive at that conclusion?

PMI is proposing to increase funding levels in FY 2020 to support the development of the new national malaria strategic plan development 2021-2025 and the 2022 MIS.

The following key new/ongoing activities listed above (net durability monitoring, updating, printing and distribution of registers) will be supported with FY 2019 funding.

Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

Key Question 1

Which sources of data are available to inform estimates of intervention coverage, service availability and readiness, and morbidity and mortality?

Supporting Data

Figure A39. SM&E Data Collection Activities, 2015–2023

Data Source	Data Collection Activities	Year								
		2015	2016	2017	2018	2019	2020	2021	2022	2023
Household Surveys	Demographic Health Survey (DHS)					x				
	Malaria Indicator Survey (MIS)		x						(x)	
	Multiple Indicator Cluster Survey (MICS)									
	EPI survey									
Health Facility Surveys	Service Provision Assessment (SPA)									
	Service Availability Readiness Assessment (SARA) survey		x*		x*					
	Other Health Facility Survey				x*					
Other Surveys	EUV	x	x	x	x	x	(x)	(x)		
	School-based Malaria Survey									
	Other (KPA Survey)	x		x	x	x	(x)	(x)		

Data Source	Data Collection Activities	Year								
		2015	2016	2017	2018	2019	2020	2021	2022	2023
	Other (Malaria Impact Evaluation)	x	x							
Malaria Surveillance and Routine System Support	Support to Parallel Malaria Surveillance System		x*	x*	x*	x*	(x*)	(x*)		
	Support to HMIS	x	x	x	x	x	(x)	(x)		
	Support to Integrated Disease Surveillance and Response (IDSR)									
	Other (Electronic Logistics Management Information System (eLMIS))				x	x	(x)	(x)		
	Other (Malaria Rapid Reporting System)									

*Asterisk denotes non-PMI funded activities; x denotes completed activities and (x) denotes planned activities.

Conclusion

- The MIS data is used to monitor the progress of the national malaria control activities. The prevalence of malaria parasitemia in children under five by rapid diagnostic test (RDT) was 66% in 2005, 37% in 2009, 45% in 2011, and 45% in 2016.
- Routine surveillance through HMIS informs the NMCP and stakeholders on malaria burden by geographic area in the country.
- Routine HMIS data is used to routinely monitor patients access to malaria diagnostic tests. The proportion of suspected malaria cases tested by RDT/microscopy increased from 83% in 2016 to 90% in 2019. During the same time period, malaria test positivity rate increased from 61% to 68% respectively.
- PMI has been using HMIS data to populate the PMI Quarterly report templates. The information is used to advise the NMCP and the implementing partners.
- HMIS data was used to identify counties with high malaria mortality to select study sites for the severe malaria program evaluation in 2019.
- PMI rolled out eLMIS in nine counties to document and monitor the status of malaria commodities and to inform health workers and program managers at different levels of the health care system. UNFPA supported the remaining six counties.
- Conducted the End-User Verification at ~80 health facilities and nine drug depots three times per year. This activity provides quick actionable information on malaria supply

chain, and a snapshot of malaria diagnosis and treatment at lower level health facilities. The findings are used by the NMCP to guide commodity distribution and allocations.

Key Question 2

What HMIS activities have been supported in your country? What current priorities will be supported with this MOP funding?

Supporting Data

Figure A40. SM&E Activities in Liberia, FY 2018–2020

Intervention	PMI-Funded? (X)			Does Global Fund plan to fund this? (X)	Does another donor plan to fund this? (X)
	FY 18	FY 19	FY 20		
Central Level					
Register, tools (e.g. checklists, indicator glossary), job aids (design, indicators, definition of data elements, data dictionary, system support)		x		(x)	
Data quality assessments (separate from supervision – funding for travel to lower levels)			(x)	(x)	
Program monitoring and technical assistance (funding for travel to lower levels)		x	(x)	(x)	
Training (funding for central level to conduct training at lower levels, capacity building, i.e. on the job training for central level staff)	x	x	(x)	(x)	
Human Resources (secondment of person in NMCP for SM&E, office/team for SM&E)	x	x	(x)	(x)	
Data Use (analysis, interpretation, visualization (dashboards, bulletins, dissemination/feedback to lower levels, decision-making)	x	x	(x)	(x)	
Policy guidelines and coordination (updating policies, guidelines, supporting sub-committee meetings, supporting participation in sub-committee meetings)		x	(x)		
External relations/Communications/Outreach (support travel to international meetings and publications)	x	x	(x)	(x)	
Support to annual operational plans for national malaria program	x	x	(x)	(x)	
Desk review to catch “logic errors system” (provide TA to catch logic errors)		x	(x)	(x)	

Intervention	PMI-Funded? (X)			Does Global Fund plan to fund this? (X)	Does another donor plan to fund this? (X)
	FY 18	FY 19	FY 20		
Admin 1 Level (County). PMI supports activities in 12 counties, while World Bank supports activities in three counties, and Global Fund provides nationwide support.					
Registers (warehousing, printing, distribution)	x	x	(x)		
Data quality assessments (separate from supervision – funding for travel to lower levels)	x	x	(x)		
Program monitoring and technical assistance (funding for travel to lower levels)	x	x	(x)		
Training (funding for County staff to conduct training at lower levels, capacity building (i.e. on the job training for County level staff))	x	x	(x)		
Human Resources (secondment of person for malaria SM&E, office/team for SM&E)					
Data Use (analysis, interpretation, visualization (dashboards, bulletins), dissemination/feedback to lower levels, decision-making)	x	x	(x)	(x)	
Adaptation of national policy guidelines and coordination (adapting policies, guidelines, supporting sub-committee meetings, supporting participation in sub-committee meetings)	x	x	(x)		
Adaptation of checklists and job-aides		(x)	(x)		
Participation in national meetings (support for travel costs)					
Support to Annual Operational Plans for County Malaria Program					
Admin 2 Level (District)					
Data entry, summary, and transmission (training, re-training, computers, internet, tools)		x	(x)	(x)	
Supervision (training, traveling, supervision tools/checklists, create/design system for organized/methodical supervision)	x	x	(x)	(x)	
Data validation (data validation activities before monthly data submission - organize health facilities)	x	x	(x)	(x)	
Monthly/Quarterly data quality review meetings (venue, meeting support)	x	x	(x)	(x)	
Data Use (analysis, interpretation, visualization (i.e. dashboards), dissemination/feedback to facilities, decision-making)	x	x	(x)	(x)	

Intervention	PMI-Funded? (X)			Does Global Fund plan to fund this? (X)	Does another donor plan to fund this? (X)
	FY 18	FY 19	FY 20		
Human Resources (secondment of person for malaria SM&E, office/team for SM&E)					
Annual planning with County (support travel)					
Facility Level					
Data collection/entry, summary, and transmission (training, re-training, computers, internet, tools)					
Supervision of CHWs (training, traveling, administering supervision tools/checklists of community health workers)					
Data use (analysis, interpretation, visualization (dashboards), dissemination/feedback to CHWs, decision-making)					
Monthly/Quarterly data quality review meetings(support for travel)					
Community Level					
Data collection/entry and transmission (training, re-training, tools)	x	x	(x)	(x)	
Data use (analysis, interpretation, decision-making)	x	x	(x)	(x)	
Monthly/quarterly data quality review meetings (support for travel)	x	x	(x)	(x)	

Conclusion

- Based on country needs and what has been funded by PMI and other donors, the priorities for PMI investments are to strengthen and improve the quality of routine surveillance activities (HMIS, eLMIS, EUV, routine data quality assessment, training/retraining and on-site mentoring of M&E Officers and Data Clerks at County, District and Health facilities).
- The data from repeated national surveys demonstrated that there has not been a major change in malaria burden. PMI will continue to provide technical support to scale up and strengthen the routine surveillance activities and information systems (DHIS2/HMIS and eLMIS) to inform and guide the NMCP, PMI, GF and all stakeholders for the malaria control activities and resources allocations in the country.
- PMI will support secondary analysis of 2019 DHS to assess the status of malaria burden in the country, and measure the progress made from 2016 to 2020. These findings will help to better align resources with disease burden and target geographic areas with higher malaria burden.

Key Question 3

What are the outcomes of HMIS strengthening efforts?

Supporting Data

Figure A41. HMIS Strengthening Efforts 2017 - 2018

		2017	2018
Timeliness	% of reports received on time	79%	69%
Completeness	"Confirmed malaria cases for children under 5 years of age" was reported in X% of facility-months	100%	100%
Accuracy	Populate with most recent DQA data	No data	No data

Conclusion

- PMI will continue to support the NMCP to collaborate more with the MOH HMER Division to start gathering and analyze the timeliness, completeness of malaria data from public health facilities.
- The HMER at MOH is currently developing a DQA protocol to review data from a number of health conditions including malaria. PMI will support DQAs in the coming years so we will be able to report on data accuracy in the future.

Key Question 4

What are the in-country considerations that impact your funding allocation in this category?

Supporting Data

N/A

Conclusion

N/A

3.C. SOCIAL AND BEHAVIORAL CHANGE (SBC)

NMCP Objective
The purpose of the NMCP Malaria Communication Strategy 2016–2020 is to contribute to targets laid out in the NMSP 2016–2020 by intensifying social and behavior change activities at all levels of society. The Malaria Communication Strategy contributes to the achievement of the following National Malaria Strategic Plan 2016–2020 objectives:

- To increase access to prompt diagnosis and effective treatment targeting 85% of the population by 2020.
- To ensure that 80% of the population are protected by malaria preventive measures by 2020.
- To increase the proportion of the population who practice malaria preventive measures from 40% to 85% and sustain knowledge at 98% by the end of 2020.

NMCP Approach

Liberia is currently implementing the second Malaria Communication Strategy for 2016–2020. Liberia’s 2016–2020 Malaria Communication Strategy focuses on the dissemination of malaria-related messaging through mass media, interpersonal communication, and community engagement activities to help ensure that: (1) everyone presenting with fever is tested and receives an ACT within 24 hours if positive for malaria, (2) pregnant women receive two or more doses of IPTp, and (3) community members are aware of the benefits of, and are using ITNs to prevent malaria. The national SBC targets are:

- 90% of the population has heard a malaria message through multimedia channels;
- 80% of community health committees and local leaders are reached with advocacy activities;
- 100% of legislators and county superintendents are provided with information on malaria prevention, control, and treatment strategies according to MoH guidelines;
- All training for malaria control and prevention includes an interpersonal counseling and communication component;
- All teachers and instructors in primary and secondary schools are trained for child-to-child communication of malaria messages; and
- All schools receive SBC materials on malaria control and prevention and include this information in the science curriculum.

Figure A42 provides the baseline and targets for the NMCP Malaria Communication Strategy. The 2016 MIS provides the baseline for most of the behavioral and communication objectives. PMI Liberia will obtain the rest of the baseline information from the ongoing 2019 DHS and a revised KAP study.

The 2016 MIS shows that while many caretakers of children do not perceive their children to be in danger if they do not seek treatment after onset of fever, they nonetheless take their children for treatment after onset. PMI Liberia will further explore the reasons behind this finding and refocus SBC activities to increase health-seeking behavior. The Malaria Behavior Survey will collect information on caretaker perceptions.

Figure A42. Behavioral and Communication Objectives for Key Malaria-Related Behaviors

Behavioral Objective: Vector Control	Baseline	Target
Increase the proportion of pregnant women and children under five who receive an ITN at ANC and at institutional delivery.	<ul style="list-style-type: none"> • 40% (PW) • 44% children under five years 	80%
Communication Objectives	Baseline	Target
1. Increase the proportion of pregnant women who are aware they are entitled to one free ITN at their first ANC visit and one free ITN at institutional delivery.	To be determined	90%
2. Increase the proportion of pregnant women and caregivers of children under five who perceive themselves and their children to be at risk if they do not sleep under an ITN year-round.	To be determined	90%
3. Increase the proportion of pregnant women and caregivers who believe that using an ITN will reduce their risk of malaria.	To be determined	90%
4. Increase the proportion of providers who believe that issuing ITNs during ANC and institutional delivery will reduce the risk of malaria for pregnant women and children under five.	To be determined	90%
5. Increase the proportion of providers who feel confident that they can distribute ITNs to pregnant women at ANC clinics and during delivery when ITNs are available at the facility.	To be determined	90%
Behavioral Objective: Malaria Case Management	Baseline	Target
1. Increase the proportion of caretakers of children under five with recent fever who seek treatment for malaria.	78% (2016 MIS)	90%
2. Increase the proportion of caregivers of children under five who have accurate knowledge of malaria transmission.	90% (2016 MIS)	90%
3. Increase the proportion of individuals who seek treatment within 24 hours when they suspect they have malaria.	To be determined	80%
Communication Objectives	Baseline	Target
1. Increase the proportion of caretakers of children under five who perceive their children to be in danger if they do not promptly seek treatment for malaria after the onset of fever.	32% (2016 MIS)	90%
2. Increase the proportion of caretakers of children under five who perceive	To be determined	90%

prompt treatment seeking to be the norm in their community.		
<p>One of the 2018 NMSP MTR findings was poor staffing for SBC at the NMCP and poor coordination of SBC activities. The NMCP has only one staff responsible for all SBC activities. The NMCP has no SBC technical working group but the MoH has a Health Promotion Division that has a coordinating committee for messages. However, this committee does not coordinate other SBC interventions. The MTR recommended increased staffing for SBC for the NMCP with two additional people, one to focus on the community SBC activities and another on national level SBC activities like advocacy and mass media. The new NMCP structure has just been approved and will be operational early 2020.</p>		
<p>PMI Objective in Support of NMCP</p>		
<p>PMI supports SBC at the national, health facility, and community level. However, SBC support is limited to the counties receiving PMI support. In 2016, PMI supported the NMCP and MoH to revise its Malaria Communication Strategy for 2016–2020 and developed a Malaria Communication Implementation Plan for 2016–2020. The SBC strategy addresses knowledge, practice, and perception gaps in malaria prevention and treatment, including use of IPTp for pregnant women. PMI supported the development of the SBC strategy, materials, and tools, provided training to facility-based staff and CHAs, and supported the media to broadcast radio messages on ITN use, IPTp, test and treat, and the use of ACTs. The collective effort of the NMCP and its partners has successfully raised the population’s awareness of malaria. PMI support for health facilities has historically been limited to the three FARA counties of Bong, Lofa, and Nimba. Starting in October 2017, PMI began scaling up health facility IPC activities to 12 counties. PMI support for community IPC through CHAs has been limited to the three original FARA counties of Bong, Lofa, and Nimba, but will expand to 12 counties starting in calendar year 2020 with FY2019 funding. PMI also contributed to the SBC activities of ITN mass campaigns.</p>		
<p>PMI-Supported Recent Progress <i>(Past 12-18 Months)</i></p>		
<p>Only PMI and Global Fund support some SBC activities. Global Fund support for SBC is through the ITN mass campaign that happens every three years and interpersonal communication (IPC) through the CHAs in four counties of Lofa, Bomi, Nimba, and Margibi. PMI supports CHA IPC in two of Global Fund counties (Lofa, Nimba) but PMI operates in different districts that are not supported by the Global Fund. PMI also contributed to the SBC activities for the 2018 ITN mass campaign. PMI supported mass campaign community mobilization activities in six of the 15 counties and aired campaign ITN messages in those counties before, during, and up to three months after the campaign.</p>		

PMI support focused on IPC for health workers and CHAs. In 2018, PMI supported training of 359 health workers in IPC. The training focused on reducing missed opportunities for IPTp and ITNs and testing all fevers for malaria before treatment.

In 2018 and 2019, PMI provided operational support to CHTs in Bong, Lofa and Nimba counties to conduct community radio talk shows on selected malaria prevention and treatment themes (up to eight radio shows per county per month). Specific malaria themes covered this year included “the importance of sleeping under mosquito nets” and “malaria in pregnancy.” Each county conducted between two and three radio talk shows per month. The radio talk shows were aimed at promoting healthy lifestyles and prompt treatment-seeking behavior among the general population.

PMI-Supported Planned Activities *(Next 12-18 Months Supported by Currently Available Funds)*

PMI and USAID SBC activities have limited scope and geographical coverage. The focus has been on communication aspects of SBC and limited to health facilities and the three USAID-focus counties that have a community health assistant program PMI/Liberia and the Mission are conducting an SBC assessment of all SBC activities funded through PMI, USAID, and other partners. The two-week assessment started in September 2019. A preliminary report is expected at the end of October to inform the design of the new USAID and PMI SBC strategy. PMI and the Mission will use FY2019 reprogrammed funds to contribute to the design of a new integrated SBC strategy for the Health Office that will address malaria, maternal and child health, and reproductive health SBC gaps. The PMI HQ SBC technical team will participate in the design of the new strategy. PMI/Liberia will use FY2019 and FY 2020 funds to disseminate and implement the identified interventions in the new strategy.

The next ITN mass campaign is planned to take place early 2021. The planning for the campaign will commence mid-2020. PMI funding will be used to contribute to the SBC activities for the campaign, especially in the highly populated Montserrado County that had the lowest coverage in the 2015 and 2018 ITN mass distribution campaigns.

In addition, PMI will work with the MoH, NMCP, and partners to scale up SBC community activities through the CHA program.

PMI Goal

Through the use of social and behavior change interventions and in alignment with the country’s national malaria control communication strategy, PMI supports the uptake and correct and consistent use of malaria interventions, thereby improving the overall quality of malaria control efforts that will contribute to reductions in malaria morbidity and mortality.

Are you proposing to increase, decrease, or maintain funding allocation levels for this activity? Why? What data did you use to arrive at that conclusion?

FY 2020 funding for SBC is \$1,100,000, an increase from FY2019 funding level of \$850,000. Increased SBC funding is required to support the new Liberia SBC strategy and address gaps identified in the ongoing USAID internal SBC assessment, MTR of NMCP NMSP, and 2016 MIS. For ITNs, SBC activities will focus on improving access, care and sustained use of ITNs for the routine health facility-based and school-based ITN programs and the upcoming 2021 mass distribution campaign. For MIP, SBC activities will focus on addressing health worker attitude, practice, and missed opportunities for IPTp and ITNs for pregnant women. For case management, SBC activities will focus on addressing health worker adherence to malaria test results and rational use of ACTs as well as addressing community early health seeking behaviors and presumptive treatment of malaria. Central level SBC activities include providing TA to the NMCP to revise the malaria communication strategy, support NMCP, MOH, and county SBC coordination, and developing strategies and plans for monitoring SBC activities. One KAP survey will be supported per year to monitor. Various communication channels will be used depending on the target audience. Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

Key Question 1

What behaviors is PMI proposing to prioritize through its SBC programming? Will support be geographically targeted or at national scale? What data support this prioritization?

Supporting Data

With FY 2020 funding, PMI will prioritize the following behaviors:

- Community demand, access, care, and sustained use of ITNs during the routine net distribution through ANC and institutional delivery, the new school net distribution, and 2021 mass campaign. The 2016 MIS shows that in Liberia, people use nets if they have them. The 2016 MIS shows a net access of 42% and net use of 39% in the general population. SBC activities will focus on: increasing awareness of the benefits of ITNs, including during pregnancy; increasing demand for ITNs during first ANC visit and at delivery; increasing the proportion of individuals who perceive themselves to be in danger if they do access and use a net properly all year round; increasing community prioritization, dialog, and actions for improved ITN access and use.
- Health worker attitude and practice: Missed opportunities for IPTp and ITNs in health facilities. The 2016 MIS data shows a 23% and 56% missed opportunity gap for IPTp2 and IPTp3+ respectively. Data from the routine HMIS shows a declining trend in IPTp1 coverage with lower coverage for both IPTp1 and IPTp2 in 2018 compared with prior years. The IPTp2 and IPTp3 coverage are below the national targets of 85% and 60%, respectively. The 2018 HMIS demonstrates a high dropout between IPTp1 and IPTp3,

and IPTp1 and IPTp3+ of 30% and 39%, respectively. The SBC activities will focus on reducing missed opportunities and dropout rate for IPTp by increasing pregnant women’s confidence and ability to ask for SP during ANC; improving health worker attitude and practice for IPTp; and advocating for structural, organizational, and system changes that affect IPTp uptake.

- Community and Health worker adherence to malaria case management guidelines and test results: Presumptive treatment of malaria as a result of low community awareness and self-medication as well as health worker non-adherence to malaria diagnostic guidelines and test results is a major problem for effective malaria management in Liberia. Available data from demographic surveys and HMIS show low malaria testing and clinical management of malaria is common in health facilities. Data from 2016 demonstrate low testing of fevers for malaria. Only half (50%) of children with a recent fever received a finger or heel prick for testing. Liberia HMIS data in Table 2 shows a low and declining trend in confirmatory malaria testing. In 2017 and 2018, only 70% and 61% of malaria cases were confirmed, respectively.
- The primary audience for this SBC activity are 1) the community, including parents, grandparents, and other caregivers of children under five years; and 2) Service providers mainly health facility workers and CHAs. SBC activities will focus on: increasing the proportion of fever cases tested for malaria; increasing the proportion of confirmed malaria cases that receive the correct treatment according to the national treatment guidelines; reducing clinical diagnosis of malaria, reducing the proportion of malaria negative cases that receive ACTs (irrational use of ACTs), reducing the use of SP for treatment of uncomplicated malaria; reducing the practice of self-medication. PMI support will reinforce collaboration between SBC activities that target service providers with service delivery activities to ensure adherence to guidelines and appropriate service communication to promote positive malaria prevention behaviors.

Conclusion

The available data from various surveys and HMIS has been used to identify the three behaviors for FY2020 funding.

Figure A43. Key Priority Behaviors for FY2020 MOP

Behavior	Target Population	Geographic Focus	Justification
Increase the proportion of individuals, including pregnant women and children under five who	Caregivers, heads of household, pregnant women, community	12 counties (Bomi, Bong, Grand Bassa, Grand Cape Mount, Grand Gedeh, Grand Kru, Lofa, Margibi,	The net access of 42% is low and below the required target of 80%. FY2020 funds will support community mobilization for the FY 2021 mass campaign (before, during, and after)

Behavior	Target Population	Geographic Focus	Justification
obtain, care, and use ITNs properly, every night	leaders, service providers	Maryland, Montserrado, Nimba, River Gee)	and SBC activities for the alternate routine distribution channels like the school net distribution.
Increase the proportion of pregnant women who demand IPTp, access, and benefit from IPTp every month after the first trimester (at 13 weeks of gestation) throughout the pregnancy up to delivery	Pregnant women, spouses, in-laws, service providers	12 counties (Bomi, Bong, Grand Bassa, Grand Cape Mount, Grand Gedeh, Grand Kru, Lofa, Margibi, Maryland, Montserrado, Nimba, River Gee)	A combination of a high missed opportunity for IPTp and pregnant women coming for the first dose of IPTp and not completing the subsequent doses during pregnancy require a focused SBC approach to address the attitude and practice of health workers and increasing awareness and demand for IPTp.
Community and Health worker adherence to malaria case management guidelines and test results	Caregivers, head of household, service providers, community leaders	12 counties (Bomi, Bong, Grand Bassa, Grand Cape Mount, Grand Gedeh, Grand Kru, Lofa, Margibi, Maryland, Montserrado, Nimba, River Gee)	FY2020 funds will be used to design and focus SBC interventions to promote health workers attitude and practice for testing before treatment and adhering to both negative and positive malaria test results. FY 2020 funds will also be used to create awareness on the dangers of self-medication, presence of counterfeit and substandard medicines in the market.

Key Question 2

Given the priority behaviors identified, what data are available to better understand the factors influencing low uptake? What are the behavioral determinants of the prioritized behaviors? Are there gaps in understanding the barriers to uptake?

Supporting Data

Figure A44. Behavioral Determinants for ITN Access, Care, and Use

Facilitator	Type of Factor	Data Source	Evidence
High net use practices	Internal/Social	<ul style="list-style-type: none"> • 2013 DHS • 2016 MIS • ITN Access and Use Report - 2018¹. 	Data from 2013 DHS and 2016 MIS demonstrate that people use the nets if they have them. The 2013 DHS shows a net access of 37% and net use among the population with a net was 32%. The 2016 MIS shows net access of 42% and net use of 39%. The 2008 ITN Access and Use report states that Liberia has had a consistently high net use: access ratio of 0.90 in 2009 MIS, 1.04 in 2011 MIS, 0.86 in 2013 DHS, and 0.94 in 2016 MIS.
High knowledge on malaria and ITNs	Social	2016 MIS	The 2016 MIS shows that 99% of women of reproductive age have heard of malaria and nearly all (98%) heard about bed nets, such as “use your mosquito net” or “everywhere, every night, sleep under the net.”
Barrier	Type of Factor	Data Source	Evidence
Low confidence in protective effect of ITNs			<ul style="list-style-type: none"> • A 2013 Attitudes, Beliefs and Practice² study showed that the majority (85%) of the respondents believed that sleeping under a bed net was the best way to avoid malaria but almost three-quarters (73%) agreed that the chances of getting malaria were the same whether or not they slept under a bed net. • The 2016 MIS shows that approximately half (49%) of women in the reproductive age did not take action to prevent malaria because they think malaria does not pose a risk.

¹ Koenker H, Ricotta E, Olapeju B, Choiriyyah I. September 2018. Insecticide-Treated Nets (ITN) Access and Use Report. Baltimore, MD. PMI | VectorWorks Project, Johns Hopkins Center for Communication Programs.

² Attitudes, beliefs and practices relevant to malaria prevention and treatment in Liberia final report. 2013.

Figure A45. Behavioral Determinants for Improving Case Management

Facilitator	Type of Factor	Data Source	Evidence
Availability of trained service providers at health facilities	Internal	Training data	PMI and Implementing partner site visits demonstrate availability and use of standard diagnostic and treatment guidelines
Nationwide CHA program for iCCM	Environmental	CHIS	MOH CHIS shows that CHAs are testing fevers for malaria with RDTs

Barrier	Type of Factor	Data Source	Evidence
Health worker attitude and practices	Internal	HMIS	HMIS shows high and increasing clinical treatment for malaria. The data shows that clinical diagnosis of 30% and 39% in 2017 and 2018, respectively (Table 2)
Substantial staff capacity gaps exist resulting in suboptimal service delivery	Internal/Environmental	IP reports, 2018 Health Facility Survey	Observations during site visits
Availability of substandard and counterfeit malaria medicines on the market	Internal/Environmental	LMHRA	Reports from Implementing partners and LMHRA (regulatory authority) shows a lot of counterfeit and substandard malaria medicines that point to self-medication and treatment without testing

Figure A46. Behavioral Determinants for Improving Service Delivery and Coverage

Facilitator	Type of Factor	Data Source	Evidence
Trained health workers are providing IPTp at ANC clinics and using the updated MIP guidelines for reference	Internal	<ul style="list-style-type: none"> Supervision reports Integrated human resource information system (iHRIS)/ training database 2018 Preliminary Health Facility Survey (HFS) results 	<ul style="list-style-type: none"> 2018 preliminary HFS results show that 92% of health facilities surveyed provide IPTp at ANC Implementing partner and PMI Team site visits show that IPTp guidelines are being used and health workers are adhering to IPTp protocols HMIS data shows increasing trend in IPTp3 and IPTp3+
Trained health workers are providing IPTp/ANC focused awareness creation for pregnant women at health facilities	Internal/Environmental	Health talk schedules at health facilities	<ul style="list-style-type: none"> Health Talk shows on ANC and IPTp are posted on the walls of the health facilities PMI, NMCP, and implementing partner site visits demonstrate that pregnant women interviewed are able to mention the benefits of completing ANC visits at health facilities and the importance of taking SP
Barrier	Type of Factor	Data Source	Evidence
Use of SP to treat uncomplicated malaria	Internal	Health Facility Daily consumption book and Stock ledgers, Supervision reports	<ul style="list-style-type: none"> Patient registers demonstrate clinical diagnosis of malaria in pregnancy OPD registers indicate use of SP to treat uncomplicated malaria

Not providing SP as DOT	Internal	ANC ledger, Implementing partner reports	Site visits demonstrate that ANC clinics have no drinking water facility at most health facilities
Lack of integration of services at health facilities	Internal/structural	Health facility ledgers	Supervision visits demonstrate that only midwives providing MIP services, MIP services only provided at ANC clinic
Low community awareness on the benefits of MIP services like ITNs at first ANC visit and IPTp	Social	Partner supervision reports, ANC registers, Institutional Delivery register, DHS, MIS, KAP studies	High missed opportunity for IPTp, and ITNs at ANC and at Delivery

Conclusion

The data on behavior factors provided the basis for prioritizing these three behavior factors to address with FY2020 funding and reprogrammed FY2019 funds. Communication messages and audience segmentation will further inform the specific SBC interventions for each prioritized behavior. Because of the impact these behaviors have on performance of the Liberia program, the SBC budget in FY 2020 will be increased from \$850,000 in FY2019 to \$1,100,000. FY2019 funding will be used to provide more information around barriers to net access, individual, community, and social barriers for net access, missed opportunities for IPTp, and service provider attitudes and practices regarding adherence to malaria test results. Further research will be needed to identify factors that contribute to the existence and use of falsified/substandard medicines.

Key Question 3

What activities are needed to bolster the country’s capacity for SBC? Are these activities needed at the national or sub-national level?

Supporting Data

The NMCP Program has a Malaria Communication Strategy (2016–2020). However, implementation of the strategy was hampered by low staffing at the NMCP and funding. The NMCP will be developing the next NMSP November 2019-April 2020. Once the new strategy is in place, Liberia will need support to develop a new Malaria SBC strategy to align with the new NMSP. The MoH has committed to improving staffing for SBC at the NMCP. PMI support will be needed to provide technical assistance for a detailed analysis of the SBC landscape and developing the new national Malaria SBC strategy. Additional support will be required for developing implementation guidelines, messages, and high level advocacy for the three prioritized behaviors. PMI will provide additional support for developing the capacity of NMCP and county SBC staff, strengthening SBC coordination structures and quarterly coordination meetings at NMCP and MoH. partner programs

Liberia’s next ITN campaign is scheduled for the first quarter of 2021. Planning for the mass campaign will start mid-2020. PMI funding for FY2019 and FY2020 will be required to support the SBC component of the mass campaign as well as the phased implementation of school ITN distribution program.

Conclusion

Currently, PMI is the main funding source for SBC for malaria, followed by the Global Fund. PMI funding for FY2020 will focus on the prioritized three behaviors of ITN access, care and use; missed opportunities for IPTp; and adhering to malaria case management guidelines. With FY2019 funding, PMI will develop the capacity of the NMCP to plan, implement, and monitor SBC activities at national and subnational level. This includes providing technical assistance for developing new malaria SBC strategy, training of the new NMCP and County SBC staff, and supporting the SBC coordinating structures at national and county level.

Key Question 4

What are the in-country considerations that impact your funding allocation in this category

Supporting Data

SBC in Liberia is donor dependent. PMI will develop a strategy for advocating to the GoL and other partners to contribute to the SBC agenda in Liberia

Conclusion

PMI is expected to support the TA needs for SBC at central and subnational levels.

3.D. PROGRAM EVALUATION AND OPERATIONAL RESEARCH

NMCP objective
An overarching strategic objective for the NMCP is to contribute to the knowledge of malaria epidemiology and control through operational research.
NMCP approach
<ul style="list-style-type: none"> • The NMCP under the round 10 GFATM grant, established an operational research unit, the technical arm of the NMCP responsible for planning and conducting operational research studies in collaboration with the Central MOH and other partners. • On an annual basis, the NMCP works in collaboration with the HMER Department of the MoH, PMI, and other partners to discuss and prioritize research needs and inform resource mobilization.

PMI objective, in support of NMCP
PMI will support the NMCP to identify and address priority operational research.
PMI-supported recent progress (past ~12-18 months)
No PMI PE/OR was conducted during the above period.
PMI-supported planned activities (next ~12-18 months, supported by currently available funds)
<p>With FY 2019 funding, PMI will support operational research to:</p> <ul style="list-style-type: none"> • Assess barriers to IPTp services uptake at ANC settings. A protocol has been developed and will be submitted to Liberia IRB in October and then to CDC IRB, and data collection will begin in early 2020. • Assess the quality of malaria rapid diagnostic test use by community health assistants and rural health workers in Liberia. The protocol is under development and will be submitted to Liberia IRB and CDC IRB by November 2019. • PE/OR currently conducted and or planned in country with PMI, GF, multilaterals or other major donors are listed in Figure A47.

PMI Goal
PMI has not planned to conduct a new PE/OR activity with FY 2020 funding.

Are you proposing to increase, decrease, or maintain funding allocation levels for this activity? Why? What data did you use to arrive at that conclusion?
<p>We are not planning funding allocation with FY 2020.</p> <p>Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.</p>

Key Question 1
Have technical challenges or operational bottlenecks that require operations research or program evaluation been identified in consultation with the NMCP? How have they been prioritized?

Supporting Data
During MOP FY 2020 planning, no new PE/OR activities were identified for MOP funding.

Figure A47. PE/OR Currently Conducted in Country with USG, GF, Multilaterals or Other Major Donors.

Source of Funding	Implementing institution	Research Question/Topic	Current status/ timeline
PMI MOP FY 2019	TBD	Assessment of barriers to the uptake of Intermittent Preventive Treatment in pregnancy (IPTp) services in Antenatal Care settings in Liberia	Final protocol draft under review and will be submitted for IRB review in Liberia and at CDC in October 2019, data collection expected to start in early 2020
PMI MOP FY 2019 (cross-cutting funding)	STAIP	Assessing the quality of malaria rapid diagnostic test use by rural health workers in Liberia, 2019	Protocol under development, and will be submitted for IRB review in Liberia and at CDC in 2019, data collection expected for early 2020
PMI MOP	TBD	Support the financial and programmatic evaluation of the FARA II project (January 1, 2016-June 30, 2021). Assess completion of malaria deliverables and meeting malaria objectives.	No activity started yet
Medicines for Malaria Ventures (MMV)	NMCP/MMV	A rapid assessment of severe malaria in Liberia	Study completed in 2019

Conclusion

- The protocol of the “Assessment of barriers to uptake of IPTp services in ANC clinics in Liberia” will be submitted for IRB review in Liberia and to CDC for review. The data collection is expected to start in 2020.
- The protocol of “Assessing the quality of malaria rapid diagnostic test use by rural health workers in Liberia” will be submitted for IRB review in Liberia and to CDC for review. The data collection is expected to start in 2020.

Key Question 2

In the technical areas covered above, are there specific issues in any of the intervention areas that merit further exploration, in anticipation of establishing intervention strategies that are or could become available in the future that could be applied?

Supporting Data

At this stage of the protocol development, we have not anticipated specific issues yet.

Conclusion

In calendar year 2020, PMI in collaboration with NMCP will continue and/or conduct the PE/OR funded in MOP FY 2019 (IPTp uptake, quality of malaria diagnostic).

Key Question 3

What are the in-country considerations that impact your funding allocation in this category?

Supporting Data

PMI will continue to provide technical assistance to support NMCP staff in their effort to address the PE/OR funded activities.

Conclusion

N/A

3.E. OTHER HEALTH SYSTEMS STRENGTHENING

NMCP objective
Objective 1 in the Liberia National Malaria Strategic Plan 2016–2020 is to strengthen and sustain the institutional and human resources capacity of the National Malaria Control Program for effective program management by 2020.
NMCP approach
<ul style="list-style-type: none">• A high priority of the NMCP is to increase the qualifications of its staff, particularly in terms of their managerial and supervisory capacity.• The Liberia MoH has made a commitment to decentralize services to the county and district levels and to integrate health services at both the health facility and community level in order to improve access to health care. Strengthening the capacity of lower levels of the healthcare system, particularly at the level of county and district health teams, to manage, supervise, and improve the quality of malaria services and program implementation is also a key priority.• Finally, the NMCP is prioritizing the strengthening of core MoH-wide management systems that are essential for effective delivery and management of malaria services, such as in-service training, supervision, and strengthening of the HMIS and eLMIS.
PMI objective, in support of NMCP Infrastructure
<ul style="list-style-type: none">• PMI's objectives align with those of the MoH and NMCP. PMI plans to support the decentralization of services by providing support and technical assistance at the central level, as well as to the 15 counties through support to the CHTs.• PMI supports a broad array of health system strengthening activities which cut across intervention areas, such as strengthening in-service training of health workers, supply chain

management, health information systems, regulation of health services and pharmaceuticals, and capacity-building of the NMCP and other relevant MoH departments, as well as that of CHTs and supervisors to monitor and improve the quality of malaria interventions in the health system.

- PMI supports strengthening NMCP relationships with various MoH units and agencies like the National Public Health Institute of Liberia (NPHIL) and Liberia Medicines and Health Products Regulatory Authority (LMHRA).
- PMI provides a portion of its support for malaria service delivery and quality improvement directly to the GOL through USAID's FARA with the MoH, while supporting technical assistance and capacity building of MoH systems to utilize FARA and other resources to improve the delivery of malaria services.

PMI-supported recent progress (past ~12-18 months)

- PMI has been supporting the MOH directly through a FARA in three counties (Bong, Lofa, and Nimba). In July 2019, the FARA support was expanded to three additional counties (Grand Cape Mount, River Gee and Grand Gedeh).
- With the new FARA amendment, the malaria milestones now include 1) % of pregnant women who took 3rd dose of IPT for malaria and 2) % of women that receive ITNs after delivery at health facility. There is an increased focus on quality of care and the relevant malaria milestones are 1) % of health workers conducting an RDT correctly, and 2) % of clients that received treatment based on National Treatment Guidelines for malaria. Additional milestones of interest to PMI are 1) % of health facilities submitting complete and timely data in LMIS and 2) availability of essential medicines and supplies (tracer commodities include ACTs, RDTs, and SP). The milestones are used for the reimbursements to the MOH, but additional indicators are also collected to monitor progress.
- PMI contributed to an assessment of the 15 CHTs that assessed the seven domains of health systems strengthening:
 - Finance
 - Human Resources
 - Leadership, Governance & Management
- Monitoring & Evaluation
- Operations
- Quality Service Delivery
- Supply Chain Management

- The assessment took place at the CHT, DHT, facility and community level. The field work has been completed and the data analysis and report writing are ongoing. The results will be used by USAID and PMI to guide system strengthening activities in each county.

PMI-supported planned activities (next ~12-18 months, supported by currently available funds)

- PMI will continue to expand support for strengthening malaria service delivery nationwide through its implementing partners in six counties (Bomi, Margibi, Grand Bassa, Grand Kru, Maryland and Montserrado) and wrap around technical assistance in the six FARA counties (Bong, Nimba, Lofa, Grand Cape Mount, River Gee and Grand Gedeh). The remaining three counties (Gbarpolu, River Cess, and Sinoe) will be supported by the World Bank.
- Health systems strengthening activities will be tailored for each county based on the results of the CHT assessment.
- As discussed in other sections, PMI will continue to support training and mentoring on the use of eLMIS and support improvements in DHIS2, with support to the NMCP to modify the registers and support the printing of the new registers to better capture malaria data in DHIS2.

PMI Goal

The goal of PMI for health systems strengthening is to ensure that countries acquire the necessary capacities to enable them to plan and monitor the progress of their malaria control activities. This is made possible when a country has a skilled workforce and an infrastructure to work within.

Key Question 1

Malaria support that engages Peace Corps.

Supporting Data

- Peace Corps volunteers are incorporating malaria messaging into the various classroom and extracurricular activities, including a malaria unit in science classes, malaria statistics in math lectures, and adding malaria activities to health clubs at schools. The health volunteers will support the CHSSs who support CHAs and will focus on maternal and child health, including malaria.
- Peace Corps conducted a Malaria Bootcamp In-Service Training where each Peace Corps volunteer came for a week with a teacher and a health worker from their community (total of 28 health care workers and teachers). They developed teaching materials for malaria prevention and treatment and piloted them in a mock school session with 78 local students.

- The NMCP SBC focal point has been working closely with Peace Corps on malaria messaging, including updating the school syllabus to contain more malaria information.
- Some volunteers will be helping to distribute nets to those missed by the 2018 mass campaign (e.g. an orphanage, communities, a boarding school).
- The malaria coordinator (a returning Peace Corps volunteer) based in Monrovia works closely with the NMCP and PMI's implementing partners, which will further the collaboration.

Conclusion

- Peace Corps/Liberia is planning to expand its volunteer base beyond education volunteers and will be increasing the number of health volunteers in 2020. PMI will then support three malaria volunteers.
- PMI will continue to support joint in-service trainings where a Peace Corps volunteer attends with a teacher and health care worker from their community. The team will then prepare malaria lessons for the classroom.
- PMI will continue to support Peace Corps volunteers to conduct malaria projects in the communities where they reside.

Key Question 2

What are the in-country considerations that impact your funding allocation in this category?

Supporting Data

In addition to the support for specific technical areas as discussed in the MOP, PMI also provides funding to cover general strengthening of NMCP technical capacity, which includes support for training and attendance at international meetings. Identification of appropriate trainings and meetings are agreed to by PMI and the NMCP Program Manager. Support is also provided to assist with coordination with other units in the MOH and other agencies in Liberia.

Conclusion

N/A