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Cameroon

Malaria Operational Plan FY 2023

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This FY 2023 Malaria Operational Plan has been approved by the U.S. Global Malaria Coordinator and reflects collaborative discussions with national malaria control programs and other partners. Funding available to support outlined plans relies on the final FY 2023 appropriation from the U.S. Congress. Any updates will be reflected in revised postings.

This document was prepared in the early months of 2022 as the COVID-19 pandemic continued to evolve worldwide, including in PMI-partner countries. The effects of the pandemic on malaria control and elimination work in 2023 are difficult to predict. However, because U.S. Congressional appropriations for PMI are specific to work against malaria and any appropriations for work against COVID-19 are specific for that purpose and planned through separate future U.S. Government planning processes, this FY 2023 MOP will not specifically address the malaria-COVID-19 interface and will reassess any complementary work through timely reprogramming in countries.

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ABBREVIATIONS

ACT	Artemisinin-based Combination Therapy
AI	Active Ingredient
AL	Artemether-lumefantrine
ANC	Antenatal Care
CCM	Community-based Case Management
CDC	Centers for Disease Control and Prevention
CHW	Community Health Worker
CSO	Civil Society Organization
DHIS2	District Health Information Software 2
DHS	Demographic and Health Survey
DLMEP	<i>Direction de Lutte contre les Maladies, les Epidémies et les Pandémies</i> /Epidemic and Pandemic Disease Control Division
EPI	Expanded Program for Immunization
EUV	End-Use Verification
FETP	Field Epidemiology Training Program
FY	Fiscal Year
GOC	Government of Cameroon
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
HBHI	High Burden to High Impact
HCD	Human-centered Design
iCCM	Integrated Community-based Case Management
IPTi	Intermittent preventive treatment for infants
IPTp	Intermittent Preventive Treatment for Pregnant Women
IRS	Indoor Residual Spraying
ITN	Insecticide-treated Mosquito Net
M&E	Monitoring and Evaluation
MBS	Malaria Behavior Survey
MIP	Malaria in Pregnancy
MOH	Ministry of Health
MOP	Malaria Operational Plan
MRDQA	Malaria Rapid Data Quality Assessment
NMCP	National Malaria Control Program
NSP	National Strategic Plan
OR	Operational Research
OTSS+	Outreach, Training, and Supportive Supervision Plus
PBO	Piperonyl Butoxide
PE	Program Evaluation
PMI	U.S. President's Malaria Initiative
RDT	Rapid Diagnostic Test
RFHP	Regional Funds for Health Promotion
SBC	Social and Behavior Change
SMC	Seasonal Malaria Chemoprevention
SM&E	Surveillance, Monitoring, and Evaluation
SP	Sulfadoxine-Pyrimethamine
SPAQ	Sulfadoxine-Pyrimethamine and Amodiaquine

TES	Therapeutic Efficacy Study
TWG	Technical Working Group
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
VCC	Vector Control Committee
WHO	World Health Organization

EXECUTIVE SUMMARY

To review specific country context for Cameroon, please refer to the [country malaria profile](#), which provides an overview of the country malaria situation, key indicators, the National Malaria Control Program (NMCP) strategic plan, and the partner landscape.

U.S. President's Malaria Initiative

Launched in 2005, the [U.S. President's Malaria Initiative \(PMI\)](#) supports implementation of malaria prevention and treatment measures as well as cross-cutting interventions. PMI's 2021–2026 strategy, [End Malaria Faster](#), envisions a world free of malaria within our generation with the goal of preventing malaria cases, reducing malaria deaths and illness, and eliminating malaria in PMI partner countries. PMI currently supports 24 countries in sub-Saharan Africa and three programs across the Greater Mekong Subregion in Southeast Asia to control and eliminate malaria. Cameroon began implementation as a PMI partner country in fiscal year (FY) 2017.

Rationale for PMI's Approach in Cameroon

Malaria is the most widespread endemic disease in Cameroon, annually responsible for greater than two million reported cases and absenteeism from school and work. Cameroon is among the 11 countries bearing 70 percent of the global burden of malaria as reported by the World Health Organization (WHO). The transmission of malaria is highest from July to October with high morbidity and mortality in the northern regions. *Plasmodium falciparum* is the predominant species of protozoan parasite responsible for malaria, with *Anopheles gambiae* s.l., the primary mosquito vector for transmission. After being stagnant for a few years after 2011, the number of cases has experienced an upward trend since 2017. However, the number of deaths continues to be on a downward trend since 2000. In response to this burden, the Government of Cameroon (GOC) has made the fight against malaria a priority, with a highlight in the country's Health Sector Strategy (2016–2027).

Overview of Planned Interventions

The proposed FY 2023 PMI funding for Cameroon is \$22 million. PMI will support the following intervention areas primarily in the North and Far North regions with these funds.

1. Vector Monitoring and Control

PMI will support: entomological, insecticide resistance, and insecticide-treated mosquito nets (ITNs) durability monitoring; strengthening of field and laboratory capacity; sustainability at regional, district, and community levels; and facilitation of the national vector control committee (VCC). Specifically, this will include:

- Entomological monitoring in 15 sentinel sites (five for vector bionomics and an additional 10 for insecticide resistance) and streamlined durability monitoring of 2022 ITN campaign.
- Procurement and distribution of 390,000 dual active ingredient (AI) ITNs to address gaps and high pyrethroid resistance for antenatal care (ANC) and Expanded Program for Immunization (EPI) channels

2. Malaria in Pregnancy

PMI will support strengthening of prevention and case management of malaria in pregnancy (MIP) and supportive supervision, including encouraging early and frequent ANC attendance and using ITNs and intermittent preventive treatment for pregnant women (IPTp). Proposed investments will include:

- Training and supportive supervision for ANC and other health service providers at public and private health facilities to effectively deliver IPTp, ITNs, and routine case management services for pregnant women.
- Procurement of 408,000 sulfadoxine-pyrimethamine (SP) doses and support for community health workers (CHWs) to effectively deliver routine case management services and SP to hard-to-reach populations.

3. Seasonal Malaria Chemoprevention

Innovative seasonal malaria chemoprevention (SMC) implementation in the eligible population of children 3 to 59 months of age in a total of 47 districts in the North and Far North regions, including procurement of sulfadoxine-pyrimethamine and amodiaquine (SPAQ) and other implementation costs:

- Procurement and distribution of 9.2 million SPAQ doses.
- Continued support for four cycles of SMC in 38 districts and five cycles in nine districts, covering 2.3 million children 3 to 59 months of age, with independent monitoring to optimize effectiveness.

4. Case Management

Strengthening of community health systems through training and supportive supervision of frontline health personnel at public and non-profit health facilities and CHWs, including:

- Training and supportive supervision of 300 health facility providers and 2,200 CHWs to effectively deliver routine case management services to hard-to-reach populations.
- Procurement and distribution of 1.7 million kits for rapid diagnosis, 1.7 million artemether-lumefantrine (AL) treatments for use in communities and health

- facilities, and 1 million vials of injectable artesunate for the management of severe malaria in public hospitals.
- Therapeutic efficacy studies (TESs) in one region and two sentinel sites.

5. Health Supply Chain and Pharmaceutical Management

Technical assistance to the Regional Funds for Health Promotion (RFHP) to strengthen in-country ownership and capacity for supply chain management as well as activities to increase data quality, availability, and use at all levels of the supply chain, including:

- Forecasting and supply planning capabilities of the NMCP to ensure the sustainable practice of determining malaria commodity needs.
- Providing training, coaching, and support to enable the regional and district levels to make real-time analysis and decisions.

6. Social and Behavior Change

Support the uptake and correct and consistent use of malaria interventions, including proper ITN use, prompt care-seeking for fever, early and regular ANC attendance, and health provider adherence to national case management and ANC guidelines. SBC activities will emphasize a prominent role for engagement of local leaders (municipal, religious, and cultural) as well as civil society organizations (CSOs) to foster stronger interaction between providers and the community. Social and behavior change (SBC) activities will focus largely on implementing interpersonal approaches and leveraging existing platforms of CHWs, health facilities, religious gatherings, and schools. Support will also focus on capacity-building, coordinating SBC actors at central, regional, and community levels, and robust monitoring and evaluation (M&E) of SBC investments.

7. Surveillance, Monitoring, and Evaluation

Technical support to the NMCP at the central, regional, district, and community levels to strengthen capacity and routine surveillance systems. Planned activities include:

- Data review and analysis at all levels to inform decision-making.
- Monitoring data quality and supporting development of malaria bulletins at the regional and central levels.
- Training of health workforce in surveillance through the Field Epidemiology Training Program (FETP).

8. Operational Research and Program Evaluation

No specific operational research or program evaluation activities are proposed with FY 2023 funding.

9. Capacity Strengthening

Support the GOC in the implementation of a phased strategy designed to move the country toward universal health coverage over the next five years. Support will continue to focus on capacity-strengthening activities not just in relation to health service providers but for the NMCP as well, in the implementation of the malaria National Strategic Plan (NSP).

I. CONTEXT AND STRATEGY

1. Introduction

Cameroon began implementation as a U.S. President's Malaria Initiative (PMI) partner country in fiscal year (FY) 2017. This FY 2023 Malaria Operational Plan (MOP) presents a detailed implementation plan for Cameroon based on the strategies of PMI and the National Malaria Control Program (NMCP). It was developed in consultation with the NMCP and with the participation of national and international partners. The activities that PMI is proposing build on investments made by partners to improve and expand malaria-related services, including the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund). This document provides an overview of the strategies and interventions in Cameroon, describes progress to date, identifies challenges and relevant contextual factors, and provides a description of activities planned with FY 2023 funding. For more detailed information on the country context, please refer to the Country Malaria Profile, which provides an overview of the country's malaria situation, key indicators, the NMCP strategic plan, and the partner landscape.

2. U.S. President's Malaria Initiative

PMI is led by the U.S. Agency for International Development (USAID) and implemented together with the U.S. Centers for Disease Control and Prevention (CDC). Launched in 2005, PMI supports implementation of malaria prevention and treatment measures— insecticide-treated mosquito nets (ITNs), indoor residual spraying (IRS), accurate diagnosis and prompt treatment with artemisinin-based combination therapies (ACTs), intermittent preventive treatment for pregnant women (IPTp), and drug-based prevention—as well as cross-cutting interventions such as surveillance, monitoring and evaluation (SM&E); social and behavior change (SBC); and capacity strengthening. PMI's 2021–2026 strategy, [End Malaria Faster](#), envisions a world free of malaria within our generation with the goal of preventing malaria cases, reducing malaria deaths and illness, and eliminating malaria in PMI partner countries. PMI currently supports 24 countries in sub-Saharan Africa and three programs in the Greater Mekong Subregion in Southeast Asia to control and eliminate malaria. Over the next five years, PMI aims to save lives, reduce health inequities, and improve disease surveillance and global health security.

Under the strategy, and building upon the progress to date in PMI-supported countries, PMI will work with NMCPs and implementing partners to accomplish the following objectives by 2026:

1. Reduce malaria mortality by 33 percent from 2015 levels in high-burden PMI partner countries, achieving a greater than 80 percent reduction from 2000.

2. Reduce malaria morbidity by 40 percent from 2015 levels in PMI partner countries with high and moderate malaria burden.
3. Bring at least 10 PMI partner countries toward national or subnational elimination and assist at least one country in the Greater Mekong Subregion to eliminate malaria.

These objectives will be accomplished by emphasizing five core areas of strategic focus:

1. **Reach the unreached:** Achieve, sustain, and tailor deployment and uptake of high-quality, proven interventions with a focus on hard-to-reach populations.
2. **Strengthen community health systems:** Transform and extend community and frontline health systems to end malaria.
3. **Keep malaria services resilient:** Adapt malaria services to increase resilience against shocks, including COVID-19 and emerging biological threats, conflict, and climate change.
4. **Invest locally:** Partner with countries and communities to lead, implement, and fund malaria programs.
5. **Innovate and lead:** Leverage new tools, optimize existing tools, and shape global priorities to end malaria faster.

3. Rationale for PMI's Approach in Cameroon

3.1. Malaria Overview for Cameroon

Malaria is the most widespread endemic disease in Cameroon, annually responsible for greater than two million reported cases as well as absenteeism from school and work. The country has three epidemiological zones: the Sahelian, Sudano-Sahelian and the equatorial. Transmission of malaria is highest from July to October. Cameroon is among the 11 countries bearing 70 percent of the global burden of malaria as reported by the World Health Organization (WHO). At the national level, malaria is responsible for 50 percent of hospitalizations in health facilities (NMCP Annual Report, 2021) with 65 percent of cases being children under five years of age. The incidence of malaria is highest in the East region, while malaria mortality remains highest in the North and Far North regions. *Plasmodium falciparum* is the predominant species of parasite responsible for the disease, with *Anopheles gambiae* s.l., the primary vector. The number of cases recorded in health facilities, stagnant since 2011, has shown an increasing trend since 2017. The number of deaths is on a downward trend since 2000, although stagnant between 2017 and 2019. In response to this increasing burden, the Government of Cameroon (GOC) has made the fight against malaria a priority, highlighted in the country's Health Sector Strategy (2016–2027). Cameroon is implementing the WHO-led “High Burden High Impact” (HBHI) approach as reflected by its malaria National Strategic Plan (NSP) 2019–2023. Within this framework, a micro-

stratification of the burden of malaria on the basis of parasite prevalence, incidence, and all-cause mortality in children under five years of age shows the southern parts of the country with the largest number of health districts with the highest malaria burden.

For more detailed information on malaria indicators, please refer to the Country Malaria Profile.

3.2. Key Challenges and Contextual Factors

The burden of malaria has been on a steady rise since 2017, with children under five years of age and pregnant women most affected. The coverage of key interventions such as preventive treatment of malaria in pregnancy (MIP) and community case management remains low. Vector insecticide resistance, limited access to quality health services in many parts of the country, and limited multisectoral collaboration are contributing factors. Overdiagnosis of severe malaria and irrational use of injectable artesunate are a recognized ongoing problem in Cameroon. The preference for injectable treatments by both patients and health providers likely contributes to this. This issue is complex as the cost recovery structure of the health system is an important driving factor.

Cameroon faces an unprecedented humanitarian crisis in the Far North, East, North West and South West regions, caused by armed and ethnic and intercommunal conflicts. According to the Organization for Coordination of Humanitarian Activities, 3.9 million people are in need of humanitarian assistance in Cameroon, including about 933,000 internally displaced persons (IDPs), 531,000 returnees, 486,000 refugees, and about 1.6 million people in host communities. Malaria is one of the most common public health problems among these affected populations. In the Far North, over 30 health areas are insecure zones due to the conflicts. The main challenge there is to ensure implementation and coverage of high-impact interventions. PMI is working in collaboration with the Bureau of Humanitarian Assistance to identify opportunities to fill the gaps in those communities.

3.3. PMI's Approach for Cameroon

Cameroon's current NSP for malaria control covers the period 2019–2023 and is the fifth iteration of a national strategy. The NSP articulates a vision of a Cameroon free from malaria with a strategic focus on accelerating intervention scale-up to reach universal coverage of key interventions and achieve a lasting impact on malaria morbidity and mortality. As recommended by the HBHI initiative of the WHO, interventions prioritize the most vulnerable and target zones with high population density, high endemicity, and intense seasonal transmission. The objectives are to reduce malaria morbidity and mortality by 60 percent from 2015 levels by 2023, to reduce malaria incidence from 2015 levels by 60 percent by 2023, and to reduce

malaria transmission to a very low level (pre-elimination threshold) in some health districts in the Sahelian zone of the country (i.e., Far North region) by 2023.

PMI contributes to the NSP through the following six strategic areas:

1. Prevention—ITN distribution via mass campaigns (when gaps are identified) and routine channels; and promotion of: ITN use, IPTp, and seasonal malaria chemoprevention (SMC) for children 3 to 59 months of age in the North and Far North regions. The routine ITN distribution strategy is expanding in 2022 beyond distribution to pregnant women through antenatal care (ANC) to include the Expanded Program for Immunization (EPI) platform for children and introducing new types of nets (piperonyl butoxide [PBO]) and dual active ingredient (AI; i.e., Interceptor G2) in regions with evidence of vector metabolic resistance to insecticides and low efficacy of currently used ITNs. PMI also supports vector bionomics and insecticide resistance in 15 sites to influence allocation of ITNs during mass campaigns and routine distribution of nets. Additional entomological monitoring including *An. stephensi* and ITN durability monitoring studies will be supported by PMI in 2022. PMI is also supporting innovative approaches, including a pilot for routine sulfadoxine-pyrimethamine and amodiaquine (SPAQ) distribution during SMC, and sulfadoxine-pyrimethamine (SP) distribution in the community during IPTp as from the second dose. Although PMI is not currently funding IRS in Cameroon, it will continue to encourage local resource mobilization for cost-effective implementation in the future.
2. Case management—Bridging the gap and reaching vulnerable and hard-to-reach populations through universal diagnostic confirmation of suspect cases and treatment of confirmed cases at health facility and community levels according to national guidelines. PMI supports and promotes the rational use of injectable artesunate in health facilities to improve the management of severe malaria, pre-referral treatment of severe malaria with rectal artesunate at the community level, scale-up of integrated community-based case management (iCCM), and supply chain strengthening, especially at the last mile to service delivery points. Quality assurance/quality control system is also ongoing to ensure strengthened diagnostics throughout the country.
3. Communication—Support for advocacy; behavior change interventions; social mobilization; social marketing and private partnership; and training of health agents, community actors, and journalists. PMI also supports innovative SBC approaches such as human-centered design (HCD) to develop prototypes for SBC interventions. SBC addresses case management in health facilities targeting health care providers for compliance of treatment guidelines, and in communities to enhance and promote uptake of interventions.

4. Training and research—Training and creation of a critical mass of epidemiologists in frontline care and entomologists conducting vector bionomics and insecticide-resistance testing. PMI also supports the pursuit of therapeutic efficacy studies (TESs) in some sites with focus on the SP-resistance profile in Cameroon as well as operational research (OR) with a focus on human behavior assessment during entomological monitoring.
5. SM&E and epidemic response—Monitoring and evaluation (M&E) system strengthening, epidemiologic surveillance system strengthening, and epidemic response. PMI supports data quality improvement and capacity strengthening of frontline care providers in data analysis, interpretation, presentation, and use for decision-making down to community level through frontline Field Epidemiology Training Program (FETP).
6. Program management—Mobilization of funds through local government and the private sector, civil society engagement and oversight, financial management, governance, planning, and partnership coordination. PMI works closely with the NMCP and other partners such as the Global Fund, WHO, and United Nations Children’s Fund (UNICEF) to coordinate activities and support the national strategy for malaria control.

PMI is focusing on strengthening community health systems for more impact and resilience through expansion of community health workers (CHWs) and intensification of their coordination and supervision. Increasing capacity-building of civil society organizations (CSOs) and inclusion of local councils and health committees aim at ensuring ownership and sustainability of this intervention. Innovative approaches are aimed at reducing the cost of SMC by providing routine delivery instead of campaign-style delivery and empowering local authorities to lead the fight against malaria through community dialogues. Leveraging the private sector and civil society to contribute to resource mobilization is another focus area for PMI in Cameroon. Since PMI support to Cameroon began, the North and Far North regions have been designated PMI focus areas. This focused support will continue.

3.4. Key Changes in This MOP

This MOP is supporting an innovative approach in the implementation of SMC using existing community programs to progressively transition from campaign-style to routine SPAQ distribution in line with WHO field guidance (see the **SMC section** below). Expansion of the CHW network to a third region is being considered for the future to fill the gaps in iCCM in some districts, if resources permit. Strengthening community-based interventions is a particular focus of this MOP with continued emphasis on access to malarial commodities for CHWs and data quality strengthening. Collaboration with the civil society to mobilize resources for the fight against malaria and engagement of the private sector and community structures to enhance community health systems will

remain a priority. Community-led monitoring has also been prioritized to monitor the effectiveness of user fee elimination schemes for malaria in children under five years of age and pregnant women.

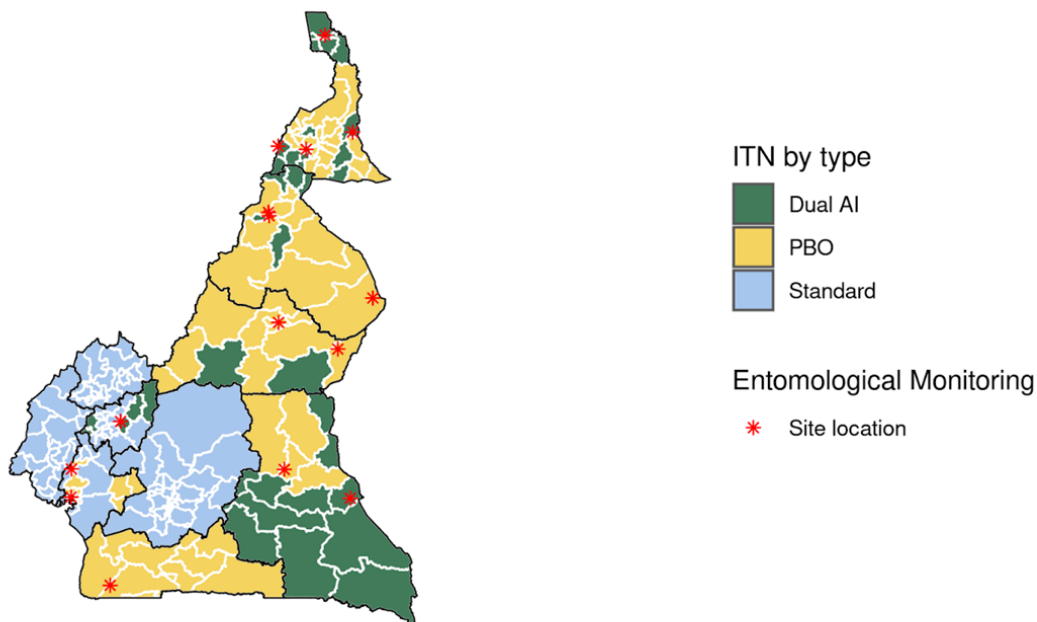
II. OPERATIONAL PLAN FOR FY 2023

1. Vector Monitoring and Control

1.1. PMI Goal and Strategic Approach

The NMCP strategic plan promotes an integrated vector management strategy, including vector surveillance, enhanced insecticide resistance management and vector resistance reduction, continuous and mass distribution of ITNs, geographically targeted IRS, and larval source management. While the national strategy includes IRS and larval source management approaches, PMI does not currently support these activities and IRS is not currently being conducted. PMI supports NMCP's HBHI goals for vector control, including entomological surveillance, distribution of new types of ITNs via mass campaigns and continuous channels, and combatting insecticide resistance. PMI has supported entomological monitoring at sentinel sites around the country and has also expanded insecticide resistance monitoring to support the selection of appropriate ITN tools. PMI supports vector control activities in the North and Far North regions specifically, with some central-level support for planning and supervision. PMI supports the NMCP in achieving ITN coverage of one ITN per 1.8 persons and in distributing new types of nets in high-malaria risk areas to reach maximum impact in accordance with the HBHI stratification approach. PMI supports the procurement and/or distribution of dual AI ITNs as needed to fill gaps. ITN mass distributions and PMI-supported entomological monitoring sites for 2022 are shown in Figure 1.

Figure 1. Map of Vector Control Activities in Cameroon (2022)



* All entomological monitoring sites on this map are funded by PMI

1.2. Recent Progress (between April 2021 and April 2022)

PMI supported the following vector control activities:

- Vector monitoring in five longitudinal sentinel sites and insecticide resistance monitoring in 10 additional sites in partnership with the NMCP and local research institutions (i.e., Biotechnology Center), Center for Research in Infectious Diseases, and the Central African Organization for Endemic Diseases Control.
- Collecting data on human-vector behavior in all five sentinel sites from July to November 2021 to better understand biting behavior trends.
- Procuring and distributing 262,957 PBO ITNs and 347,042 dual AI ITNs for ANC and EPI distribution channels in the North and Far North regions.
- Developing and validating the national communication plan for the 2022–2023 mass ITN campaign.
- Developing and distributing tools for interpersonal communication and training for the 2022–2023 mass ITN campaign for use in the North, Far North, and Adamawa by SMC mobilizer/distributors (mobidis) and town criers.
- Supporting NMCP in increasing entomological capacity by facilitating trainings for community-based health personnel from Adamawa and East regions on basic entomology, including identification of larvae and adult mosquitoes.
- Supporting NMCP to coordinate the national vector control committee (VCC) quarterly meetings to interpret entomological data across stakeholder groups to inform decision-making.
- Planning regional entomology M&E District Health Information Software 2 (DHIS2) training using VectorLink Collect for technical managers and entomology database managers regionally to expand capacity of data use and interpretation in NMCP and other stakeholder groups. Meeting held June 2022.
- Implementing SBC activities to improve demand for ITNs, increase appropriate use, promote care, and mitigate against misuse. For more information, please refer to the **SBC section** below.
- For more information about entomological monitoring, please refer to the [2021 Entomological Report](#).

1.3. Plans and Justification for FY 2023 Funding

The FY 2023 funding tables contain a full list of vector monitoring and control activities that PMI proposes to support in Cameroon with FY 2023 funding. Please visit www.pmi.gov/resources/malaria-operational-plans-mops for these FY 2023 funding tables.

1.3.1. Entomological Monitoring

PMI will continue to support entomological surveillance including longitudinal monitoring at the five sentinel sites and insecticide resistance monitoring at 10 additional sites. Following the 2022–2023 mass ITN campaign, streamlined durability monitoring will be conducted to determine the useful life of new types of nets since ITNs are Cameroon’s primary malaria vector control intervention. In addition, activities for enhanced surveillance of *An. stephensi* will be included in accordance with the PMI *An. stephensi* action plan guidance for high-risk countries. PMI is also continuing to provide technical assistance to build the capacity of local research institutions and facilitate coordination between research institutions, NMCP, and the national VCC to support localization of entomological activities.

Summary of Distribution and Bionomics of Malaria Vectors in Cameroon

Malaria vectors in Cameroon are diverse, and as of 2021, *Anopheles* mosquitoes from 21 species were collected across five longitudinal entomological monitoring sites (Gounougou, Simatou, Mangoum, Nyabessang, and Bonabéri) and 10 additional insecticide-resistance monitoring sites (Bertoua, Djohong, Garoua, Gazawa, Mada, Mogode, Ndelele, Ngaoundere, Njombe, and Touboro). Of the *Anopheles* collected, 11 species have been found with *P. falciparum* sporozoites (*An. gambiae* s.l., *An. funestus* s.l., *An. nili*, *An. moucheti*, *An. paludis*, *An. demeilloni*, *An. pharoensis*, *An. ziemanni*, *An. multincinctus*, *An. rufipes*, and *An. marshallii*). *Anopheles gambiae* s.l. remains the major malaria vector and represented about 71 percent of the total *Anopheles* collected across all sites, although *An. moucheti* and *An. paludis* had higher sporozoite rates than *An. gambiae* s.l. in Nyabessang. Indoors, the mean human biting rate of *An. gambiae* s.l. ranged from 11 bites per person per night in Bonabéri to 104 bites per person per night in Simatou. Outdoors, the human biting rate ranged from 24.2 bites per person per night in Mangoum to 98.7 bites per person per night in Simatou. *An. gambiae* s.l. peak biting was observed between 11:00 p.m. and 5:00 a.m., although the species was actively biting until at least 8:00 a.m. at all sites. The same late morning biting trends were also found among *An. moucheti* in Nyabessang. *An. gambiae* s.l. bites occur almost equally indoors and outdoors in Gounougou and Simatou, bites occur predominantly indoors in Nyabessang, and occur predominantly outdoors in Mangoum and Bonabéri.

Status of Insecticide Resistance in Cameroon

In 2021, PMI supported insecticide-resistance monitoring at 10 sites using pyrethroid (alpha-cypermethrin, deltamethrin, and permethrin), organophosphate (pirimiphos-methyl), carbamate (bendiocarb), neonicotinoid (clothianidin), and pyrrole (chlorfenapyr) insecticides. In addition to pyrethroid resistance testing, intensity of pyrethroid resistance and synergist assays with PBO were conducted. Resistance of *An. gambiae* s.l. to the diagnostic dose of all pyrethroids was recorded in all 10 sites. High pyrethroid resistance was observed at all sites and across the three pyrethroids tested except at

Bertoua, where moderate permethrin resistance was found. Pre-exposure of mosquitoes to PBO substantially increased the mortality of *An. gambiae* s.l. but did not restore full susceptibility, except in Bertoua and Mogode with deltamethrin. Resistance to bendiocarb was observed in six sites (Bertoua, Djohong, Garoua, Ndelele, Ngaoundere, and Njombe). Susceptibility to pirimiphos-methyl was not observed in any of the sites. In all 10 sites, *An. gambiae* s.l. was susceptible to clothianidin, and susceptibility to chlorfenapyr (200 µg/bottle) was recorded at all sites except Ngaoundere.

1.3.2. ITNs

PMI will continue to support procurement and distribution of ITNs through continuous distribution via ANC and EPI. PMI will also support SBC to improve use and care of ITNs and to mitigate against misuse. PMI will support streamlined durability monitoring of PBO and dual AI nets to be distributed in the 2022–2023 mass campaign.

Please see the **SBC section** below for details on challenges and opportunities to improve intervention uptake or maintenance.

ITN Distribution in Cameroon

In Cameroon, ITNs are distributed via mass campaigns every three years. Continuous distribution channels are: to pregnant women at ANC and to children via EPI, which began roll-out in 2022. The country transitioned from standard to PBO nets in certain priority districts during its 2019 mass campaign. There are plans to distribute PBOs and dual AI nets in select districts, based on resistance data, during the 2022–2023 mass campaign, which will be implemented in a phased approach (see Figure 1). Distribution will begin in June/July 2022 in the Far North, North, and Adamawa regions to be followed by distribution in September 2022 in the East, Littoral, West, and South regions and in October 2023, in the Center, Northwest, and Southwest regions. Procurement and distribution of the nationwide campaign is funded primarily by Global Fund and GOC with 178,250 dual AI nets procured by PMI for distribution in one district in the North. Based on results of insecticide-resistance monitoring, PMI plans to procure and distribute dual AI nets for routine distribution in the North and Far North following the 2022–2023 mass campaign.

The current FY 2023 budget does contain some gaps in planned ITN procurement that will hopefully be filled by other partners or by additional PMI funding should it become available in the future.

Please refer to the **ITN Gap Analysis Table** in the [annex](#) for more detail on planned quantities and distribution channels.

Table 1. Streamlined Durability Monitoring

Campaign Date	Site	Brand	Baseline	12-month	24-month	36-month
2022	2–4 in North and/or Far North*	Interceptor G2 and PBO (DuraNet Plus©)	Planned	Planned	Planned	Planned

*Still under discussion if additional sites will be included outside of the PMI-supported regions (phased campaign means the dates will differ in these other regions)

1.3.3. IRS

PMI does not support IRS in Cameroon.

2. MIP

2.1. PMI Goal and Strategic Approach

The NMCP objective for MIP according to its 2019–2023 NSP is to have comprehensive coverage of interventions to prevent MIP including:

- At least 80 percent of pregnant women receiving at least three doses of SP (IPTp3).
- At least 80 percent of pregnant women attending ANC in health facilities receive an ITN.
- Prompt diagnosis of at least 80 percent of malaria infections in pregnant women, and 100 percent treatment of confirmed cases according to national treatment guidelines.

PMI supports the government to achieve these objectives through capacity-building of service providers in prevention and case management of MIP. PMI also procures and supports the distribution of SP in the North and Far North and supports CHWs to raise awareness for early ANC attendance and IPTp and ITN uptake at educational talks conducted during home visits. SBC prototypes are being piloted to promote ANC attendance, IPTp uptake, and ITN use during community dialogues in the premises of the traditional authorities coordinated by CHWs.

Currently, 50 percent of pregnant women seen during ANC in PMI-supported regions receive at least three doses of SP (60 percent in the North and 46 percent in the Far North). An important barrier to IPTp coverage in these regions is poor ANC attendance (only 65 percent of pregnant women attend at least four ANC visits, with only 41 percent attending ANC in the first trimester according to the Demographic and Health Survey [DHS], 2018), and stockouts of SP in health facilities due to the late distribution of SP and limited stock management capacity at service delivery points. Access to ANC is driven by armed conflict in some regions including the Far North. The presence of CHWs presents a great opportunity to pilot provision of IPTp from the second dose onward at the community level in conflict zones where access to health care is limited, starting in 2021 (this pilot will occur in Global Fund–supported regions in the Northwest and Southwest and will be considered for PMI-supported regions pending results). About 87 percent of pregnant women receive an ITN during ANC. PMI is supporting SBC activities to promote effective use of these ITNs.

2.2. Recent Progress (between April 2021 and April 2022)

Cameroon Ministry of Health (MOH), together with PMI, launched a technical working group (TWG) in 2020 to monitor malaria prevention and case management including MIP. However, quarterly meetings of this TWG are infrequent due to conflicts of calendars. There is a need for more engagement with the MOH to prioritize these TWG meetings.

The main outcomes of these TWG meetings included several technical considerations and decisions to align MIP prevention and case management in Cameroon to international standards. These included:

- Changing the national IPTp guideline for initiating SP administration in pregnant women from 16 weeks of gestational age to 13 weeks, as recommended by WHO.
- Adopting the quality assurance tool for malaria case management that integrates the outreach, training, and supportive supervision plus (OTSS+) framework.

PMI supported the NMCP at the central level on the development, review, and adoption of key normative malaria control documents, including the NSP, the diagnostic quality assurance guidelines, the training modules, and the validation of OTSS+ as a national supervision tool. PMI strengthened the capacity of 250 health providers, including 100 midwives, in case management and MIP, including training on eight ANC contacts, through integrated training and refreshers for staff that provide both malaria and ANC services. The greatest challenge to this progress is poor routine ANC attendance (77 percent), availability of SP, and vector resistance to insecticides on ITNs.

PMI also procured 747,050 doses of SP for delivery to pregnant women, meeting 100 percent of the needs of the North and Far North regions.

2.3. Plans and Justification for FY2023 Funding

The FY 2023 funding tables contain a full list of MIP activities that PMI proposes to support in Cameroon with FY 2023 funding. Please visit www.pmi.gov/resources/malaria-operational-plans-mops for these FY 2023 funding tables.

PMI will continue strengthening the capacity of the NMCP in prevention and case management of MIP as well as supportive supervision, including encouraging early and frequent ANC attendance and use of ITNs and IPTp. PMI will also continue its support of the case management/MIP-integrated TWG to hold meetings and develop normative documents. Finally, PMI will continue to procure SP in quantities sufficient to meet the needs of the population in the North and Far North regions of the country.

ANC attendance has remained relatively steady in Cameroon from 2011 to 2018. Fewer women attend any routine ANC in the Far North compared to the national average (70 percent in the Far North; national average of 77 percent). Data from the 2019 Malaria Behavior Survey (MBS) showed that only 47 percent of women in the North Region and 51 percent in the Far North Region were aware that they should start ANC as soon as

they get pregnant. OTSS+ data generated during supportive supervision visits to facilities indicate that lack of adequate MIP training and supervision for providers may be an important factor influencing provider behaviors. During the last outreach visit, only 11.5 percent of providers demonstrated skills in MIP (i.e., achieved a performance of 90 percent or above; most providers performed at a 60 percent to 90 percent level). A specific observed deficiency was that providers did not educate pregnant women about the consequences of MIP or the benefits of preventing malaria with SP. PMI is supporting the implementation of a coordinated SBC campaign targeted to community members and health workers to increase ANC attendance in these regions. Early and regular ANC attendance is a priority behavior.

Please refer to the **SBC section** below for information on how SBC interventions will be directed to address challenges and improve these behaviors.

PMI and the NMCP are working together to address the serious ANC provider behavior gap and improve IPTp uptake. Priorities will be put on training and supportive supervision aimed at building capacity at health facilities for malaria case management during pregnancy and provision of IPTp and ITNs. PMI support to CHW-integrated training and supervision will also contribute to improving household sensitization of pregnant women on early and frequent ANC attendance and use of ITNs.

Please refer to the **SP Gap Analysis Table** in the [annex](#) for more detail on planned quantities and distribution channels.

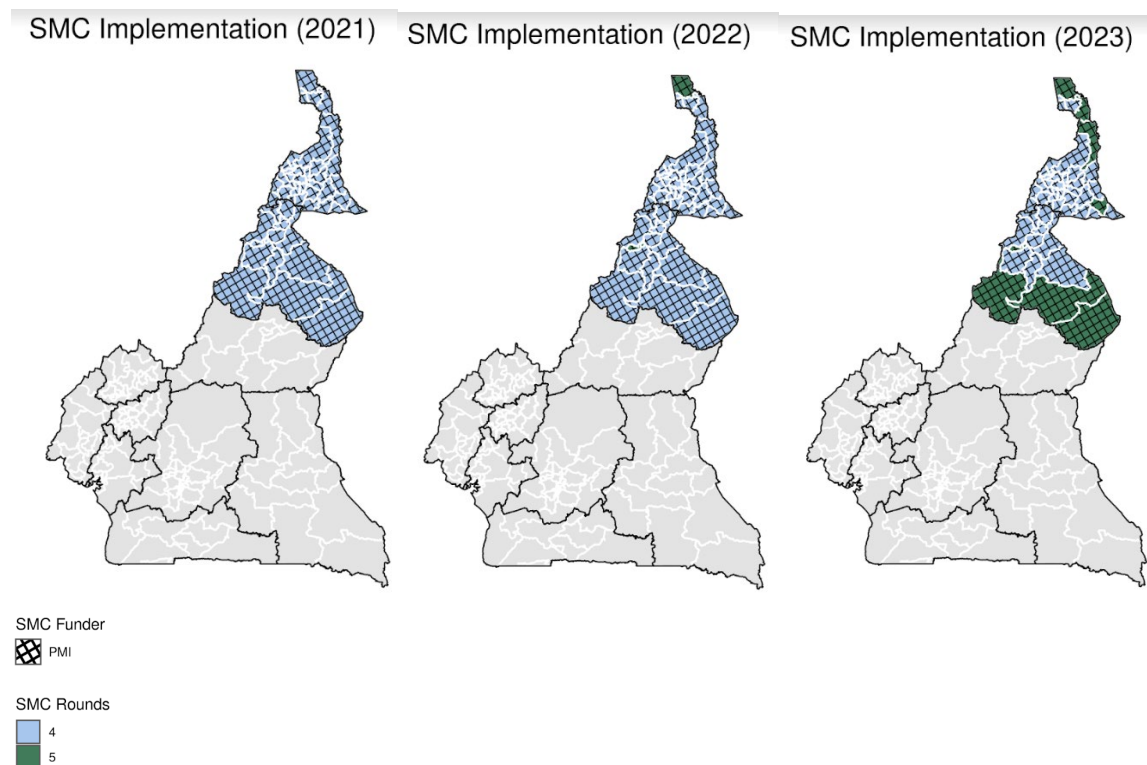
3. Drug-based Prevention

3.1. Seasonal Malaria Chemoprevention

PMI Goal and Strategic Approach

The NMCP's malaria Strategic Plan promotes SMC as a malaria prevention intervention in areas with highly seasonal malaria transmission. PMI supports SMC in all 47 eligible districts in the North and Far North regions, including procurement of SPAQ to meet the needs of the eligible population as well as all aspects of implementation (planning, training, paying distributors, SBC activities, and independent monitoring). PMI is currently the only partner supporting SMC in Cameroon, and also supports the NMCP SMC activities (planning, training, and evaluation) at the central level. Starting in 2018, PMI provided full support for SMC planning and implementation, with activities covering the North and Far North and implementation covering children 3 to 59 months of age with four SPAQ cycles during the rainy season (July to October) using a door-to-door strategy. The approach requires community distributors to directly observe administration of the first dose of SPAQ and leave treatment doses for administration by the caregiver on days two and three for all cycles.

Figure 2: Maps of Seasonal Malaria Chemoprevention Implementation, 2021–2023



3.2. Recent Progress (between April 2021 and April 2022)

PMI supported SMC in 2021, covering 2,130,712 children in 47 districts between 3 to 59 months of age in collaboration/partnership with the NMCP and CSOs. An average campaign coverage of 97 percent was achieved with four distribution cycles. Supported activities included the following:

- Procurement of 9.2 million SPAQ co-blisters, and delivery of four cycles of door-to-door distribution.
- Training of 18,000 SMC mobilizers/distributors and 2,000 supervisors.
- Updating to the SMC’s SM&E tools as well as the training and logistical support for 46 data managers at the district level and 450 at the health area level.
- Supporting of the NMCP to convene internal SMC evaluation workshops, including a workshop at the end of each SMC cycle at the regional level and every other cycle at the district level to assess SMC implementation/campaign processes and outputs and identify bottlenecks.
- Implementing an SMC data quality assessment using the malaria rapid data quality assessment (MRDQA) tool to assess the quality of data reported through DHIS2 compared to data in registers and forms in 308 villages, which led to improving surveillance data quality to better measure the campaign’s intended effect.

- Implementing of four rounds of SMC external monitoring that assessed the SMC quality and verified coverage and adherence measures by conducting community surveys in selected sites.

3.3. Plans and Justification for FY 2023 Funding

The FY 2023 funding tables contain a full list of SMC activities that PMI proposes to support in Cameroon with FY 2023 funding. Please visit www.pmi.gov/resources/malaria-operational-plans-mops for these FY 2023 funding tables.

Starting in 2022, PMI will implement SMC using established CHWs from health areas in 12 of the 47 eligible districts in a pilot aiming to make the intervention routine, shifting from campaign-style implementation to a routine CHW activity. This innovative approach has the potential of reducing cost and promoting community ownership while integrating the activity in the iCCM package, according to WHO guidance "Where possible, SMC should be integrated into existing programs (e.g. community-based case management, other community health worker programs)." Three of these 12 health districts, Guider, Kaele and Mokolo, were pre-selected in a pilot for iCCM-strengthening in line with the new national community health strategy currently being rolled out. Additional supervision from the health areas in the 12 districts will be scheduled to provide support to CHWs, including for data collection and reporting. This approach will be evaluated and recommendations made on its effectiveness and possible scale-up.

With FY 2023 funding, Cameroon will continue to procure SPAQ and support SMC activities as described in the **Recent Progress section** above, with door-to-door mobilization and distribution by CHWs already implementing iCCM activities in health areas. Based on results of recent HBHI stratification modeling exercises, the NMCP has requested support to expand the number of SMC cycles from four to five, in nine of the 47 SMC-eligible districts (Goulfey, Kousseri, Mada, Yagoua [Far North], Garoua 1, Garoua 2, Poli, Touboro and Tcholliré [North]) based on rainfall and malaria case patterns. The expansion will start with three districts (Mada, Garoua I, and Garoua II) in 2022 before progressively adding the other six districts, as funding allows. In addition, FY 2023 funding will be used to support independent monitoring to optimize uptake of SPAQ. New SBC investments will focus on maintaining high levels of acceptance and adherence to days two and three doses by working with women's groups and CSOs on community demand generation for SMC:

- SMC 2024 campaign planning and implementation, including: review and modification of the strategy; procurement and distribution of SPAQ, materials and tools; and training of all actors.
- Continued support of women's network, CSOs, and neighborhood advocates or champions to increase uptake of second and third doses of SPAQ.
- Focus on increased collaboration among partners implicated in SM&E and SBC, and increased focus on epidemiological surveillance and data quality assurance.

Please refer to the **SPAQ Gap Analysis Table** in the [annex](#) for more detail on the planned quantities and distribution channels.

3.4. Other Drug-based Prevention

Recent HBHI subnational tailoring exercises have recommended intermittent preventive treatment for infants under two years of age in areas of Cameroon not implementing SMC for this population. When seen during vaccination sessions in health facilities, these infants will receive five doses of SP at specific intervals corresponding to their vaccination schedule (10 weeks, 14 weeks, 6 months, 9 months, and 15 months). At the same time, a pilot implementation of eight doses will be done in six health districts (Bafia, Nkolbisson, Ngoumou, Soa, Obala, and Ntui) in the Center region with support from PSI Cameroon and the Association Camerounaise pour le Marketing Social (ACMS)/Cameroon Association for Social Marketing. In this pilot, there will be an assessment of the impact of eight doses (10 weeks, 14 weeks, 6 months, 9 months, 12 months, 15 months, 18 months, and 23 months) instead of five doses as in the other health districts. This intervention is expected to reduce the incidence of malaria by an additional 20 percent.

4. Case Management

4.1. PMI Goal and Strategic Approach

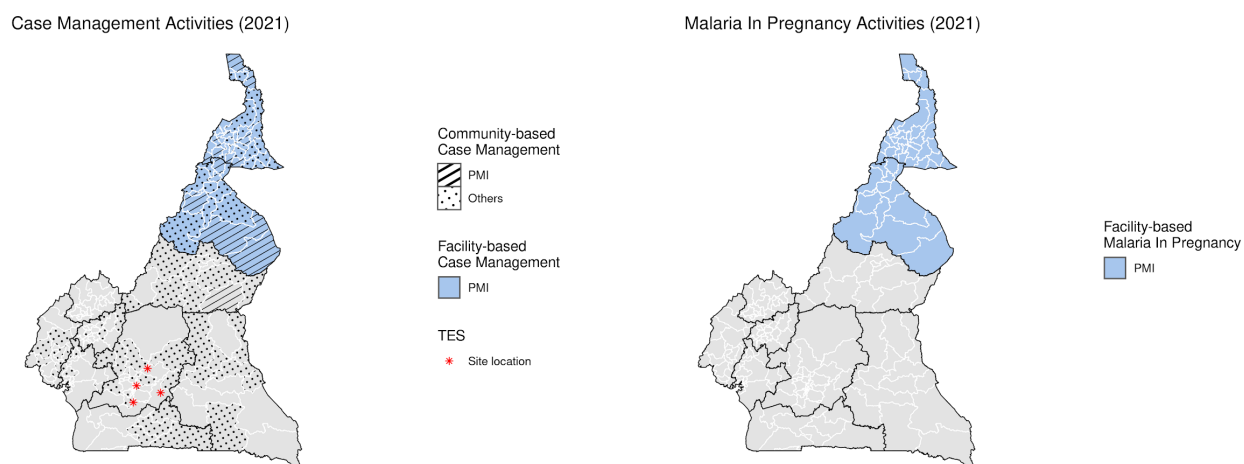
The NMCP's strategic plan 2019–2023 promotes a comprehensive case management strategy including: universal, quality-assured parasitological testing of all suspected cases of malaria; prompt and effective treatment with ACT of all cases of parasitologically confirmed uncomplicated malaria; and pre-referral and/or definitive management of severe febrile illness and severe malaria in line with national treatment guidelines for malaria. PMI supports all aspects of this approach through national-level policy and programmatic activities, commodity procurement, and improvement of facility- and community-level health worker performance. PMI supports the procurement of 100 percent of malaria rapid diagnostic tests (RDTs), ACTs, and injectable and rectal artesunate suppository needs for the North and Far North regions. The support for rectal artesunate procurement is in alignment with the 2022 WHO rectal artesunate "Information Note on RAS," since it is the maintenance of current plans and level of contribution as expressed and approved in previous MOPs. PMI also supports OTSS+ activities in 31 of the 47 districts in these two regions; the Global Fund in Cameroon supports only community-based case management (CCM) in 27 health districts in the North and Far North and focuses the rest of their case management support on the eight other regions.

PMI supports (through equipment, training, and supervision) 1,335 CHWs to deliver CCM services that include iCCM and malaria CCM to all ages and pre-referral rectal artesunate suppositories in 16 health districts. Within the National Community Health Strategy, iCCM is planned to expand (as is malaria CCM for all ages) to four new districts in the Far North to reach a total of 20 health districts covered by PMI (six in the

North and 14 in the Far North). Within that planned expansion, PMI will support 774 additional CHWs. PMI funds do not currently support salaries for CHWs as they do not yet have an official professional status recognized by the GOC, but there are plans to increase transport stipends with FY 2022 funds to account for the travel distances required for CHWs to do their work, and to reimburse transportation costs at a rate in line with what is paid by other partners. Additionally, PMI is working with the Ministry of Public Health to develop the community health policy as well as the legal framework for CHWs that would allow salary payments in the future. The biggest challenge currently faced by the community health system is lack of non-malaria commodities at the community level and frequent stockout of antimalarial commodities. To address this, PMI is strengthening supply chain management at the last mile and engaging with other partners to advocate for the provision of non-malaria commodities to all CHWs.

PMI is also supporting a pilot of a nearly finalized community health strategy that relies heavily on local health committees to support CHWs in three districts and plans a gradual expansion of that model to all districts in the North and Far North.

Figure 3. Maps of Case Management, Community Health, and Malaria in Pregnancy Service Delivery Activities in Cameroon



4.2. Recent Progress (between April 2021 and April 2022)

National-level Case Management Activities

- Developed or updated central-level policy (e.g., national malaria diagnostic or treatment guidelines, national malaria microscopy quality assurance manual).
- Developed or updated national training and supervision capacity (e.g., developed or maintained the national slide bank, developed and planned national training courses, developed or updated on-site training and supportive supervision materials/checklists).
- Developed or planned program implementation (e.g., developed or maintained national malaria diagnostic quality assurance/quality control program, designed or planned OTSS+ program, designed job aids).

- Strengthened quality assurance of malaria diagnostics in private health facilities and laboratories through training and professional development and laboratory supervision.
- Collaborated and coordinated with other relevant country government officials, partners, and stakeholders in program implementation (e.g., Maternal and Child Health, Ministry of Population, Surveillance and Data Systems, Community Health).
- Convened and led five national-level coordination meetings (e.g., TWGs, advisory board).
- Conducted the training of 135 laboratory technicians in basic malaria diagnostic refresher training.
- Supported TES in six sites in the Center region.

Commodities

- **Supported the procurement and distribution of 1,719,700 malaria RDTs** for the North and Far North regions accounting for approximately 100 percent of needs in these regions.
- Supported the procurement and distribution of 1,424,100 treatments of artemether-lumefantrine (AL) for the North and Far North regions accounting for approximately 100 percent of needs.
- Supported the procurement and distribution of 1,499,862 vials of parenteral artesunate for the North and Far North regions accounting for approximately 100 percent of needs.
- Supported the procurement and distribution of 20,754 rectal artesunate suppositories for the North and the Far North regions accounting for approximately 100 percent of needs.

Facility-level Case Management Activities

- Trained 30 supervisors in OTSS+.
- Conducted four OTSS+ visits in 441 health facilities. ([U.S. President's Malaria Initiative Impact Malaria Project Annual Performance Report](#)).
- Supported quarterly one-day technical meetings on the management of severe malaria in 10 target hospitals in both regions. The main objective of these technical meetings was to improve the management of severe malaria cases and reduce malaria-related mortality in the target hospitals. In addition, these meetings perpetuate the mentoring program on the management of severe malaria that started with the training of 30 health care providers selected from health facilities with high malaria mortality.
- Implemented successive rounds of supportive supervision including competency in the use of diagnostic testing prior to treatment, adherence to diagnostic test results, and correctly classifying cases; saw progress in key case management indicators observed ([PMI Impact Malaria Project Annual Performance Report, FY 2021](#)).

Community-level Case Management Activities

- Supported the capacity strengthening of 1,335 CHWs, supervised quarterly by the chief of health facilities and trained in iCCM for children under five years of age and malaria CCM for all ages, .
- Supported the elaboration of a legal framework for community participation in hopes of giving CHW a legal status and defining modalities for their salary. This work may lead to the review of the national policy for community health.
- Developed and piloted a community-level supportive supervision checklist. A total of 100 CHWs were supervised by six chief nurses of health facilities trained in using the supportive supervision checklist tool.

Please note that recent progress with monitoring antimalarial efficacy and the TES approach is presented in the **Plans and Justification for FY 2023 Funding section** below.

4.3. Plans and Justification for FY 2023 Funding

The FY 2023 funding tables contain a full list of case management activities that PMI proposes to support in Cameroon with FY 2023 funding. Please visit www.pmi.gov/resources/malaria-operational-plans-mops for these FY 2023 funding tables.

National-level Case Management Activities

Cameroon will continue to support capacity-building of frontline health care providers and CHWs and procure antimalarial commodities as described in the **Recent Progress section** through quarterly one-day technical meetings on the management of severe malaria in 10 hospitals in both regions. These include HD Mayo Oulo, HD Fiquil, HD Pitoa, HR Garoua, HD Kaélé, HD Mindif, HRA Mokolo, HRA Yagoua, HD Bourha, and HR Maroua. The main objective of these technical meetings is to improve the management of severe malaria cases and reduce malaria-related mortality in the target hospitals. In addition, these meetings perpetuate the mentoring program that started with the training of 30 health care providers on the management of severe malaria selected from health facilities with high malaria mortality.

Commodities

Cameroon will continue to procure antimalarial commodities as described in the **Recent Progress section**. However, due to evidence of irrational use of this commodity, PMI intends to reduce the quantity of injectable artesunate and cover the need for the most vulnerable groups that include children under five years of age and pregnant women, while supporting the capacity-building for health care providers for appropriate classification of malaria cases.

Please refer to the **ACT, RDT, Injectable Artesunate, and Artesunate Suppository Gap Analysis Tables** in the [annex](#) for more detail on planned quantities and distribution channels.

Facility-level Case Management Activities

Cameroon will continue to support training and supervision for service providers at public and non-profit health facilities in districts in the North and Far North regions to

effectively deliver malaria case management services. Activities will include refresher training for new staff, in-service training, and supportive supervision, and will be integrated with the MIP training and supervision package. This will include supportive supervision to targeted health facilities by mentors trained in management of severe malaria.

Community-level Case Management Activities

Cameroon will continue to support the supervision and expansion of the CHW program in 20 health districts in the North and Far North regions to effectively deliver routine case management services to hard-to-reach populations. This training and supervision package will be incrementally expanded to complete and optimize coverage of the CHW program in all health districts in the two regions, to meet the national policy recommendation of 1 CHW per 1,000 habitants in rural settings. It is planned to have expanded to support 2,300 CHWs with FY 2023 funds.

Cameroon does not currently have any policy on the nature of remuneration of CHWs. PMI provides transportation stipends to CHWs to attend monthly meetings in the leading health facility of the health area. A regulatory framework for community participation is under elaboration and will hopefully institutionalize a CHW payment scheme with which partners can align. PMI is planning to increase the amount of transportation stipends for CHWs due to long distances they have to cover to reach the health facility. This will also aim to bring their payment levels to a similar amount to what is specified in the national policy and to what is given by other donors like Global Fund.

PMI also plans to support local health committees in all districts in alignment with the near final national community health strategy to facilitate their support for CHWs.

Monitoring Antimalarial Efficacy

Table 2. Ongoing and Planned Therapeutic Efficacy Studies

Ongoing and Planned Therapeutic Efficacy Studies			
Year	Site Name	Treatment Arm(s)	Plan for Laboratory Testing of Samples
2022	Northern region: District Hospital Guider, District Hospital Figuil	AL, DP	Senegal

AL=artemether-lumefantrine; DP=dihydroartemisinin-piperaquine

In addition to the standard analyses, samples will also be assessed for molecular markers of SP resistance as the TES sites are located in districts implementing SMC.

5. Health Supply Chain and Pharmaceutical Management

5.1. PMI Goal and Strategic Approach

Pillar 3 of the NMCP’s strategic plan states, “By 2023, 80 percent of health structures and CHWs have the antimalarials inputs on a permanent basis.” PMI supports NMCP’s approach to achieving this objective through reinforcement of supply chain logistics, including regular updates of guidelines and data collection tools for monitoring the

supply chain and collaboration across various supply chain stakeholders, as well as training in stock management at the regional through the facility levels. Most of PMI's supply chain support is focused in the North and Far North regions, where PMI is focusing the Stockout Reduction Strategy to reduce stockouts to a target of <10 percent. PMI also provides limited central-level support, mainly in the areas of forecasting and supply planning as well as coordination across stakeholders. As needed, due to collaboration across stakeholders, PMI will swap commodity stocks across all regions when certain regions are faced with regional stockouts and there are enough commodities in the PMI supported regions.

5.2. Recent Progress (between April 2021 and April 2022)

PMI's principal supply chain investments aimed at improving malaria commodity availability includes technical assistance for forecasting and supply planning, management information systems, warehousing and inventory management, transportation and distribution, M&E, human resource capacity development, and strategy and planning. Although high stockouts continue to be an area of concern, visibility into stock levels at facility levels has significantly increased over the last few years from the only visibility coming from End-Use Verification (EUV) surveys to now receiving monthly stock information through DHIS2. This is largely attributable to PMI's support in emphasizing the importance of routine reporting at all levels of the supply chain as well as collaboration with partners to ensure DHIS2 had the capabilities to appropriately report stock information. Specific recent progress includes:

- Coached and improved skills of the logistics management unit personnel to improve supply chain coordination and communication and to advance the national supply chain governance and transformation.
- Procured commodities in coordination with monitoring of the Regional Funds for Health Promotion (RFHP) stock levels and adjusted orders as needed to keep the two regions as close to stock according to planned as possible.
- Coordinated with the regional technical group to develop allocation plans and supported the RFHP to conduct quarterly distribution of malaria commodities.
- Supported the RFHP in monthly inventory and reconciliation exercises.
- Contributed to evolving the current forecasting and supply planning capabilities of the NMCP and Office of Pharmacies, Medicines, and Laboratories to ensure the sustainable practice of determining malaria commodity needs, including the introduction of the Quantification and Analytics Tool for supply planning.
- Provided trainings, coaching, and support to enable the regional and district levels to make real-time analysis and decisions to help them become more responsive and proactive to shifting facility supply chain needs, including organizing regional data validation meetings.

- Supported districts to carry out routine facility supervisions.
- Refined the FY 2020 stockout root cause identification with expanded evidence base of refined solution set and built a longer-term investment portfolio aimed at continued and accelerated stockout reduction.
- Implemented two EUVs in the North and Far North regions, providing more in-depth insights into stock levels and reasons for stockouts.
- Managed the distribution of ITNs and SPAQ and the reverse logistics for SPAQ at the end of the SMC cycles.

5.3. Plans and Justification with FY 2023 Funding

The FY 2023 funding tables contain a full list of health supply chain and pharmaceutical management systems strengthening that PMI proposes to support in Cameroon with FY 2023 funding. Please visit www.pmi.gov/resources/malaria-operational-plans-mops for these FY 2023 funding tables.

Cameroon will continue to support the activities as described in the **Recent Progress section** with emphasis on the technical assistance to the RFHPs to strengthen the in-country ownership and capabilities of the supply chain as well as the activities to increase data quality, availability, and use at all levels of the supply chain. In addition, PMI will also provide support for pharmaceutical management issues, focusing on improving the national registration processes.

6. Social and Behavior Change

6.1. PMI Goal and Strategic Approach

PMI's SBC support is in full alignment with the NMCP's national strategy. The NSP puts particular emphasis on communication in the fight against malaria, particularly on the role that political and religious leaders, civil servants, and CHWs can play in sensitizing communities to adhere to interventions. To this end, the strategy highlights the importance of using diverse distribution platforms for communications—including traditional media (radio, television), new media (social media), existing networks for interpersonal and group communication (educators, CHWs, traditional artists)—as well as better leveraging local leaders/opinion leaders and educational entertainment (movies, songs). PMI's support of the country's new community health strategy, particularly with its emphasis on community mobilization and the role of CHWs in conducting community dialogues, will strengthen uptake of key malaria behaviors while supporting community ownership and engagement of municipal councils in supporting CHWs.

While the NSP recognizes the importance of communication to reduce malaria burden, an updated National Malaria Communication Plan, currently being finalized, will further elaborate communication objectives, behavioral determinants, and approaches

reflecting MBS results, other formative data, and alignment with the overall NSP goals and objectives. PMI is supporting the finalization of this document to ensure it is in line with the Roll Back Malaria SBC working group's guidelines and tools for national SBC plan development. The prioritized behaviors relevant to the North and Far North regions will continue to focus on uptake of key behaviors including: consistent and correct use of ITNs year-round; prompt care-seeking for fever; early and regular ANC attendance and IPTp uptake; awareness and acceptance of SMC; and provider adherence to case management and MIP guidelines for quality service delivery.

In addition to implementation of SBC activities in the North and Far North regions, PMI supports capacity strengthening of SBC focal points at national and regional (North and Far North) levels, including for SBC coordination meetings. Global Fund, the other principal malaria donor in Cameroon, provides minimal support for SBC implementation, mainly focused on communications for ITN campaigns. Global Fund is supporting implementation of the MBS in the remaining eight regions of the country to provide a more complete picture of behaviors and their determinants; PMI is supporting technical assistance for MBS implementation in these regions.

6.2. Recent Progress (between April 2021 and April 2022)

PMI supported the following SBC activities over the past 12 months:

- Technical assistance to the NMCP to develop the draft protocol for the MBS in the eight non-PMI regions of the country.
- 54 community radio stations in the North and Far North regions. A monitoring system is in place to ensure broadcasts air as scheduled and plans are under development to assess the impact of the community radio intervention.
- Continuation of SBC flowchart process, an HCD to gather insights on key behaviors and design and to test prototypes to address, adapt, and scale them. In Cameroon, the process has focused on fever care-seeking and service provision. Three prototypes are being piloted in three health districts starting in May 2022. SBC and service delivery partners have collaborated on these efforts. The prototypes include community dialogues, quarterly community engagement meetings, and follow-up meetings with health area chiefs, and quick reference guide tools for service providers.
- Supported a more streamlined and rapid version of the flowchart process to develop prototype approaches to address the problem of overuse of injectable treatments for uncomplicated malaria cases. Co-creation sessions and some user testing has been completed.
- Development of the SMC Communication Strategy and tools, including a pilot to engage women's associations in social mobilization efforts. PMI also supported monitoring of SMC communication activities during the campaign.

- Development of the first draft of an SBC Knowledge Management Strategy.
- Capacity strengthening and coordination efforts through engagement with the global SBC community through participation in the Roll Back Malaria SBC working group calls, submission of abstracts to the SBC Coordination Summit, SBC Coordination Summit calls at the central and regional levels, and assistance to develop and finalize the National Malaria Communication Plan.

In recently conducted surveys some key challenges were identified:

- **ITNs:** ITN use given access, based on 2018 DHS data, indicates a strong culture of net use in the North and Far North regions with a use:access ratio of 0.8 to >1.0. However, MBS data from 2019 indicate that there may be lower net use during low transmission (i.e., dry) months. In addition, we are also cautious about assuming that self-reported net-use from household surveys is an accurate reflection of consistent net-use all night long and are looking to the incorporation of human behavior monitoring with entomological monitoring for additional insights.
- **MIP:** ANC attendance has remained relatively steady in Cameroon from 2011 to 2018. Fewer women attend any ANC in the North and Far North than the national average, and fewer women in those regions also attend ANC in their first trimester according to the last household data point in 2014. Data from the 2019 MBS showed that only 47 percent of women in the North region and 51 percent in the Far North region were aware that they should start ANC as soon as they get pregnant.
- **SMC:** According to results from the 2021 campaign, neither refusal of nor adherence to full dosing is a significant problem. In 2021, independent monitoring surveys showed high coverage for all cycles according to parental declaration (94 to 95 percent for each cycle). Adherence was also high: Of all eligible children, 92 to 94 percent received the days two and three doses at each cycle according to parental declaration.
- **Case Management:** Insights generated from the SBC flowchart process (described above) and the MBS indicate a number of factors influencing care-seeking practices. Briefly, women, who are responsible for the majority of care-taking but often have limited financial resources, often delay taking a child for treatment. Men often do not become involved (i.e., providing funds for health care) until the child's condition has worsened. There are also strong preferences for self-medication and relatively low perceived community norms related to prompt care-seeking. Perceptions of low commodity availability and an expectation of having to pay for treatment also influence care-seeking.

Data from both the MBS and HCD work suggest that communities favor CHWs over facility providers.

- **Service Delivery:** The SBC flowchart work also highlighted a competition and tension between facility-based providers and CHWs, particularly when there is income to be generated from the provision of services. Some respondents indicated that facility providers will withhold supplying CHWs in order to maintain their income-generating stock of medicines at the facility. Cameroon’s cost recovery model also seems to impact availability of commodities at health facilities as they tend to place orders for medicines that generate income or use stockouts as a justification to prescribe other medicines they can charge for. Assessment also indicated that many providers lack basic knowledge of national malaria case management guidelines.

6.3. Plans and Justification with FY 2023 Funding

The FY 2023 funding tables contain a full list of SBC activities that PMI proposes to support in Cameroon with FY 2023 funding. Please visit www.pmi.gov/resources/malaria-operational-plans-mops for these FY 2023 funding tables.

Priorities

While PMI supports SBC activities that promote the uptake and maintenance of all key malaria interventions, Table 3 outlines three behaviors that will be prioritized with FY 2023 funds:

[Note that early/regular ANC attendance and IPTp uptake messaging will be integrated into activities like community dialogues, community radio, and service communication. While not listed as one of the three priority behaviors, promoting early and regular ANC/IPTp uptake is a program priority supported by PMI.]

Table 3. Priority Behaviors to Address

Behavior	Target Population	Geographic Focus	Programming to Address Behavior
Consistent use of ITNs throughout the year and proper net care	All household members, particularly children 5 to 17 years of age	North and Far North regions	<ul style="list-style-type: none"> • Community dialogues delivered by CHWs • Community radio • Service communication provided by facility-based ANC and EPI providers
Prompt care-seeking for fever for children under 5 years of age and appropriate demand for services	Caregivers of children under 5 years of age	North and Far North regions	<ul style="list-style-type: none"> • Community dialogues delivered by CHWs • Community radio • Service communication provided by facility-based providers

Behavior	Target Population	Geographic Focus	Programming to Address Behavior
Adherence to case management guidelines	Health facility-based providers (across cadres)	North and Far North regions	<ul style="list-style-type: none"> • Continue to refine and scale prototypes for development of “Quick Reference” tools for facility-based service providers that communicate national malaria directives. Formative research shows many providers lack knowledge and understanding of malaria guidelines. • Continue to support training for training supervisor and quality assurance for strategies for improved provider adherence to national guidelines, service communication, and relationships and communication skills to strengthen patient/provider relations. • Continue to support a more participatory and active role for community leaders to improve interactions between providers and communities they serve by refining and scaling the pilot prototypes of quarterly meetings for community leaders, health area chiefs, and CHWs. • Additional activities will be focused on addressing overtreatment with injectables, particularly through community-based interventions to address demand issues. • Service communication provided by facility-based providers with a focus on awareness of free services and emphasizing the “right treatment for the right diagnosis” to address preference for injectables.

Additional Support Activities

The first several years of PMI SBC support in Cameroon have focused on formative research including MBS and qualitative HCD work to understand factors influencing poor malaria case management practices at both health facility and community levels. Activities based on the insights generated from this work are now being piloted and implemented. A robust M&E strategy will be supported by PMI to ensure these activities are having the desired impact on behaviors, to inform whether and how these activities should be scaled and to guide changes and adjustments to activities that might be needed.

There is a need for continued SBC capacity strengthening at both the national and regional levels. Since PMI implementation support is focused at the North and Far North regional levels, and SBC coordination in the regions has historically been a challenge, efforts will focus on regional capacity-building. To bolster the NMCP, regional programs, and the community-based organizations that will support local SBC implementation, PMI will continue to support:

- National-level coordination of the SBC TWG.
- Regional-level coordination of the SBC TWGs in the North and Far North regions.
- Capacity-building of central- and regional-level SBC focal points in evidence-based design and M&E for SBC.
- Capacity-building for community-based organizations in implementation and monitoring of SBC activities.

7. Surveillance, Monitoring, and Evaluation

7.1. PMI Goal and Strategic Approach

PMI supports the NMCP's SM&E objectives through periodic support of household surveys and continuous support of routine surveillance systems (both at the national level and with focused support at the district level in the North and Far North regions), and through support to the FETP program (focused on the North and Far North regions).

7.2. Recent Progress (FY 2021)

PMI supported the following activities at the central level:

- The *Direction de Lutte contre les Maladies, les Epidémies et les Pandémies*/Epidemic and Pandemic Disease Control Division (DLMEP) to finalize and disseminate the M&E plan for the FETP trainings.
- The NMCP to develop a semi-annual bulletin at the national level, as well as quarterly bulletins at the regional level.
- The NMCP to convene national- and regional-level SM&E TWG meetings with key partners.
- The NMCP to organize the malaria data annual review meeting at the central level.

PMI supported the following activities in the North and Far North regions:

- Provided technical and logistical support to district teams to organize bi-monthly data validation meetings.
- Regularly reviewed malaria data from the DHIS2 with NMCP at the regional level and sent feedback to districts to facilitate improved data quality and use.
- Supported the DLMEP to organize frontline FETP trainings in the North (24 participants) and Far North regions (48 participants).
- Provided technical and logistical support to national- and regional-level mentors to support participants remotely and onsite with their fieldwork following the one-week onsite FETP trainings.
- Trained 47 health district teams on MRDQA and provided technical and logistical support to these teams to conduct data quality assessments visits in 106 health facilities in the North and 125 in the Far North region.

7.3. Plans and Justification with FY 2023 Funding

The FY 2023 funding tables contain a full list of SM&E activities that PMI proposes to support in Cameroon with FY 2023 funding. Please visit www.pmi.gov/resources/malaria-operational-plans-mops for these FY 2023 funding tables.

Through the recently developed community health strategy, partners including PMI, UNICEF, and the Global Fund have begun to support CHWs with training, incentives, and commodities to increase malaria case management at the community level in targeted health districts. PMI will continue to provide SM&E support (see the **Recent Progress section**) and will also support CHWs' data quality and integration of all stakeholders' data in a centralized repository.

PMI-supported Planned Activities include:

- Continue central-level support for DHIS2: PMI will continue to support routine health information system strengthening and scale-up of DHIS2 and ensure quality of malaria data under that system in partnership with NMCP and the MOH Health Information Unit.
- Support NMCP to collect, analyze, and use routine malaria data: PMI will continue to support the Cameroon NMCP to streamline data collection, reporting, analysis, and use at the central, regional, and district levels. This will include support for: the SM&E TWG activities; data quality assessments; district-, regional-, and central -level data reviews and validation meetings; and production of regional and national malaria bulletins.
- Continue the support of FETP malaria-specific advanced and frontline training programs: The frontline training will include support for at least two additional cohorts of trainees, one each in the North and Far North. Training will be targeted to chiefs of health areas, health facility staff, and malaria surveillance focal points in the districts.
- Support NMCP to strengthen CHW mapping and community health reporting system: In PMI focus districts, PMI will support CHWs in the use of the currently piloted electronic reporting system and provide capacity strengthening to their supervisors for improved data review and consolidation at the regional, district, and health area levels. This will include training, internet connection, standardization of CHW data review and consolidation guidelines, and coordination of multiple CHW-supporting partners to centralize their data in DHIS2. At the central level, PMI will support the mapping to provide baseline and updates on CHWs coverage that will allow the NMCP to better coordinate partners supporting the CHWs strategy.
- Support of OR topics as relevant to provide local scientific evidence to support decision-making.

Table 4. Available Malaria Surveillance Sources

Source	Data Collection Activity	2020	2021	2022	2023	2024	2025
Household Surveys	Demographic and Health Survey						
Household Surveys	Malaria Indicator Survey			P			
Household Surveys	Multiple Indicator Cluster Survey						
Household Surveys	Expanded Program for Immunization Survey						
Health Facility Surveys	Service Provision Assessment						
Health Facility Surveys	Service Availability Readiness Assessment survey						
Health Facility Surveys	Other Health Facility Survey						
Malaria Surveillance and Routine System Support	Therapeutic Efficacy Studies		X	X	P	P	P
Malaria Surveillance and Routine System Support	Support to Parallel Malaria Surveillance System						
Malaria Surveillance and Routine System Support	Support to Health Management Information System	X	X	P	P	P	P
Malaria Surveillance and Routine System Support	Support to Integrated Disease Surveillance and Response						
Malaria Surveillance and Routine System Support	Electronic Logistics Management Information System						
Malaria Surveillance and Routine System Support	Malaria Rapid Reporting System						
Other	End-Use Verification Survey	X	X	P	P	P	P
Other	School-based Malaria Survey						
Other	Knowledge, Attitudes and Practices Survey, Malaria Behavior Survey			*			
Other	Malaria Impact Evaluation						
Other	Entomologic Monitoring Surveys	X	X	P	P	P	P

*Asterisk denotes non-PMI funded activities; X denotes completed activities; P denotes planned activities.

8. Operational Research and Program Evaluation

8.1. PMI Goal and Strategic Approach

Training and Research is one of the six strategic areas of the NMCP's NSP. The NMCP has an interest in expanding capacity and funding for research, however PMI has had limited resources available to support this priority.

8.2. Recent Progress (between April 2021 and April 2022)

No specific OR/PE activities are proposed with FY 2023 funding.

Table 5. Non-PMI funded Operational Research/Program Evaluation Studies Planned/Ongoing in Cameroon

Source of Funding	Implementing institution	Research Question/Topic	Current status/timeline
Wellcome Trust	Center for Research in Infectious Diseases, Cameroon	PIIVeC OR Project: investigating the efficacy of PBO nets and new types of nets in the context of pyrethroid resistance	Ongoing
Wellcome Trust	Center for Research in Infectious Diseases, Cameroon	Impact of metabolic resistance to pyrethroids on the vectorial competence of the major African malaria vector <i>An. funestus</i>	Ongoing
BMGF	Center for Research in Infectious Diseases, Cameroon	Molecular markers for metabolic resistance to insecticides	Ongoing
Global Fund	National Malaria Control Program (NMCP)	Community IPTp distribution by CHWs	Ongoing

8.3. Plans and Justification with FY 2023 Funding

The FY 2023 funding tables contain a full list of OR/PE activities that PMI proposes to support in Cameroon with FY 2023 funding. Please visit www.pmi.gov/resources/malaria-operational-plans-mops for these FY 2023 funding tables.

No OR/PE activities are proposed with FY 2023 funding.

9. Capacity Strengthening

9.1. PMI Goal and Strategic Approach

The GOC is working to implement a phased strategy designed to move the country toward universal health coverage over the next five years. PMI's goal is to continue to support capacity-building activities to strengthen not just health service providers, but also NMCP staff and regional and district technical teams in the implementation of the NSP. PMI investments, including SMC, IPT, and clinical and community service delivery strengthening directly contribute to this effort. PMI is contributing efforts to strengthen central and regional staff capacity in SM&E, SBC, and diagnostics nationwide. An important challenge is the diversity of funding mechanisms, such as performance-based financing, with unintended incentives that may create interference with PMI interventions and reduce their expected impact. To address this, PMI will continue to support increased coordination and harmonization efforts by the NMCP.

9.2. Recent Progress (between April 2021 and April 2022)

PMI supported the NMCP to coordinate technical and implementation partners, as well as to improve program management. PMI also supported FETP malaria-specific frontline programs and residents participating in the advanced training cohort. The frontline training supported one cohort of trainees in the North region and another in the Far North. Some challenges with the profiles of participants may warrant a revision of training modules to adapt them to the level of understanding of all participants. Advanced training support was provided to two residents engaged in malaria projects and mentored by NMCP staff (see the **SM&E section** above).

9.3. Plans and Justification with FY 2023 Funding

The FY 2023 funding tables contain a full list of capacity strengthening activities that PMI proposes to support in Cameroon with FY 2023 funding. Please visit www.pmi.gov/resources/malaria-operational-plans-mops for these FY 2023 funding tables.

Cameroon will continue to support capacity-strengthening activities as described in the **Recent Progress section**.

10. Staffing and Administration

A minimum of three health professionals oversee PMI in Cameroon. The single interagency team led by the USAID mission director or their designee consists of a resident advisor representing USAID, a resident advisor representing CDC, and one or more locally hired experts known as foreign service nationals. The PMI interagency team works together to oversee all technical and administrative aspects of PMI, including finalizing details of the project design, implementing malaria prevention and treatment activities, M&E of outcomes and impact, reporting of results, and providing guidance and direction to PMI implementing partners.

ANNEX: GAP ANALYSIS TABLES

Table A-1. ITN Gap Analysis Table

Calendar Year	2022	2023	2024
Total country population	27,419,137	28,088,845	28,578,503
Total population at risk for malaria	27,419,137	28,088,845	28,578,503
PMI-targeted at-risk population	8,197,461	8,455,701	8,717,886
Population targeted for ITNs	8,197,461	8,455,701	8,717,886
Continuous Distribution Needs			
Channel 1: ANC	331,357	378,540	432,441
Channel 1: ANC Type of ITN	Dual AI	Dual AI	Dual AI
Channel 2: EPI	279,156	292,186	305,773
Channel 2: EPI Type of ITN	Dual AI	Dual AI	Dual AI
Channel 3: School			
Channel 3: School Type of ITN			
Channel 4: Community			
Channel 4: Community Type of ITN			
Channel 5:			
Channel 5: Type of ITN			
Estimated Total Need for Continuous Channels	610,513	670,726	738,215
Mass Campaign Distribution Needs			
Mass distribution campaigns	5,009,560	0	0
Mass distribution ITN type	All three (Dual AI, PBO and Single Pyrethroid)		
Estimated Total Need for Campaigns	5,009,560	0	0
Total ITN Need: Continuous and Campaign	5,620,073	670,726	738,215
Partner Contributions			
ITNs carried over from previous year	538,067	0	167,312
ITNs from Government	0	0	0
Type of ITNs from Government			
ITNs from Global Fund	4,898,600	0	0
Type of ITNs from Global Fund	All three (Dual AI, PBO and Single Pyrethroid)		
ITNs from other donors	0	0	0
Type of ITNs from other donors			
ITNs planned with PMI funding	153,552	838,038	389,336
Type of ITNs with PMI funding	Dual AI	Dual AI	Dual AI
Total ITNs Contribution Per Calendar Year	5,590,219	838,038	556,648
Total ITN Surplus (Gap)	(29,854)	167,312	(181,567)

Table A-2. RDT Gap Analysis Table

Calendar Year	2022	2023	2024
Total country population	27,419,137	28,088,845	28,578,503
Population at risk for malaria	27,419,137	28,088,845	28,578,503
PMI-targeted at-risk population	8,197,461	8,455,701	8,717,886
RDT Needs			
Total number of projected suspected malaria cases	1,991,851	2,163,084	2,371,750
Percent of suspected malaria cases tested with an RDT	87%	89%	91%
RDT Needs (tests)	1,559,719	1,578,436	1,597,377
Needs Estimated based on Consumption Data			
Partner Contributions (tests)			
RDTs from Government			
RDTs from Global Fund			
RDTs from other donors			
RDTs planned with PMI funding	1,157,050	1,525,376	1,768,920
Total RDT Contributions per Calendar Year	1,157,050	1,525,376	1,768,920
Stock Balance (tests)			
Beginning Balance	1,082,875	680,206	627,146
- Product Need	1,559,719	1,578,436	1,597,377
+ Total Contributions (received/expected)	1,157,050	1,525,376	1,768,920
Ending Balance	680,206	627,146	798,689
Desired End of Year Stock (months of stock)	6	6	6
Desired End of Year Stock (quantities)	779,860	789,218	798,689
Total Surplus (Gap)	(99,654)	(162,072)	1

Table A-3. ACT Gap Analysis Table

Calendar Year	2022	2023	2024
Total country population	27,419,137	28,088,845	28,578,503
Population at risk for malaria	27,419,137	28,088,845	28,578,503
PMI-targeted at-risk population	8,197,461	8,455,701	8,717,886
ACT Needs			
Total projected number of malaria cases	1,339,915	1,405,802	1,495,657
Total ACT Needs (treatments)	1,428,029	1,445,165	1,462,508
Needs Estimated based on Consumption Data			
Partner Contributions (treatments)			
ACTs from Government			
ACTs from Global Fund			
ACTs from other donors			
ACTs planned with PMI funding	1,561,260	1,027,819	1,712,040
Total ACTs Contributions per Calendar Year	1,561,260	1,027,819	1,712,040
Stock Balance (treatments)			
Beginning Balance	765,837	899,068	481,722
- Product Need	1,428,029	1,445,165	1,462,508
+ Total Contributions (received/expected)	1,561,260	1,027,819	1,712,040
Ending Balance	899,068	481,722	731,254
Desired End of Year Stock (months of stock)	6	6	6
Desired End of Year Stock (quantities)	714,015	722,583	731,254
Total Surplus (Gap)	185,054	(240,861)	0

Table A-4. Inj. Artesunate Gap Analysis Table

Calendar Year	2022	2023	2024
Injectable Artesunate Needs			
Projected number of severe cases	279,323	168,104	165,108
Projected number of severe cases among children	150,965	90,566	88,678
Average number of vials required for severe cases among children	5	5	5
Projected number of severe cases among adults	128,358	77,538	76,429
Average number of vials required for severe cases among adults	12	12	12
Total Injectable Artesunate Needs (vials)	1,358,963	1,375,271	1,391,774
Needs Estimated based on Consumption Data			
Partner Contributions (vials)			
Injectable artesunate from Government			
Injectable artesunate from Global Fund			
Injectable artesunate from other donors			
Injectable artesunate planned with PMI funding	1,400,597	1,000,000	1,000,000
Total Injectable Artesunate Contributions per Calendar Year	1,400,597	1,000,000	1,000,000
Stock Balance (vials)			
Beginning Balance	385,344	426,978	51,707
- Product Need	1,358,963	1,375,271	1,391,774
+ Total Contributions (received/expected)	1,400,597	1,000,000	1,000,000
Ending Balance	426,978	51,707	(340,067)
Desired End of Year Stock (months of stock)	6	6	6
Desired End of Year Stock (quantities)	679,482	687,636	695,887
Total Surplus (Gap)	(252,504)	(635,929)	(1,035,954)

Table A-5. RAS Gap Analysis Table

Calendar Year	2022	2023	2024
Artesunate Suppository Needs			
Number of severe cases expected to require pre-referral dose (or expected to require pre-referral dose based on number of providers for the service)	17,449	9,475	10,548
Total Artesunate Suppository Needs (suppositories)	29,119	15,812	17,604
Needs Estimated based on HMIS Data			
Partner Contributions (suppositories)			
Artesunate suppositories from Government			
Artesunate suppositories from Global Fund			
Artesunate suppositories from other donors			
Artesunate suppositories planned with PMI funding	40,000	6,790	0
Total Artesunate Suppositories Available	40,000	6,790	0
Stock Balance (suppositories)			
Beginning Balance	36,114	46,995	37,973
- Product Need	29,119	15,812	17,604
+ Total Contributions (received/expected)	40,000	6,790	0
Ending Balance	46,995	37,973	20,369
Desired End of Year Stock (months of stock)	6	6	6
Desired End of Year Stock (quantities)	14,560	7,906	8,802
Total Surplus (Gap)	32,435	30,067	11,567

Table A-6. SP Gap Analysis Table

Calendar Year	2022	2023	2024
Total Country Population	27,419,137	28,088,845	28,578,503
Total Population at Risk for Malaria	27,419,137	28,088,845	28,578,503
PMI Targeted at Risk Population	8,197,461	8,455,701	8,717,886
SP Needs			
Total Number of Pregnant Women	387,038	398,898	414,375
Percent of pregnant women expected to receive IPTp1	68%	70%	72%
Percent of pregnant women expected to receive IPTp2	54%	56%	58%
Percent of pregnant women expected to receive IPTp3	43%	47%	51%
Percent of pregnant women expected to receive IPTp4	26%	28%	26%
Total SP Needs (doses)	766,898	853,246	953,792
Needs Estimated based on Household Survey Data (e.g. DHS)			
Partner Contributions (doses)			
SP from Government			
SP from Global Fund			
SP from other donors			
SP planned with PMI funding	1,571,750	830,687	408,000
Total SP Contributions per Calendar Year	1,571,750	830,687	408,000
Stock Balance (doses)			
Beginning balance	241,183	1,046,035	1,023,477
- Product Need	766,898	853,246	953,792
+ Total Contributions (Received/expected)	1,571,750	830,687	408,000
Ending Balance	1,046,035	1,023,477	477,684
Desired End of Year Stock (months of stock)	6	6	6
Desired End of Year Stock (quantities)	383,449	426,623	476,896
Total Surplus (Gap)	662,586	596,854	788

Table A-7. SMC Gap Analysis Table

Calendar Year	2022	2023	2024
Total population in the SMC targeted age range	4,187,861	4,265,114	4,347,751
SMC Drug (SP+AQ) Needs			
National population 3-11 months targeted for SMC	367,311	377,851	390,055
National population 12-59 months targeted for SMC	1,232,411	1,271,760	1,307,570
Total national population targeted for SMC	1,599,722	1,649,611	1,697,625
PMI population 3-11 months targeted for SMC	367,311	377,851	390,055
PMI population 12-59 months targeted for SMC	1,232,411	1,271,760	1,307,570
Total PMI population targeted for SMC	1,599,722	1,649,611	1,697,625
Total SP+AQ Needs (co-blisters)	8,946,552	9,053,910	9,162,557
Partner Contributions (co-blisters, national)			
SP+AQ carried over from previous year	707,000	446,648	116,677
SP+AQ from Government			
SP+AQ from Global Fund			
SP+AQ from other donors			
SP+AQ planned with PMI funding	8,686,200	8,723,939	9,045,880
Total SP+AQ Contributions per Calendar Year	9,393,200	9,170,587	9,162,557
Total SP+AQ Surplus (Gap)	446,648	116,677	0