

This Malaria Operational Plan has been approved by the U.S. Global Malaria Coordinator and reflects collaborative discussions with the national malaria control programs and partners in country. The final funding available to support the plan outlined here is pending final FY 2018 appropriation. If any further changes are made to this plan it will be reflected in a revised posting.



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PRESIDENT'S MALARIA INITIATIVE

CAMEROON

Malaria Operational Plan FY 2017

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ABBREVIATIONS and ACRONYMS

ACT	artemisinin-based combination therapy
AL	artemether-lumefantrine
ANC	antenatal care
AS-ATPG	artesunate-atovaquone proguanly
ASAQ	artesunate-amodiaquine
ASCD	artesunate-chlorproguanil/dapsone
ASMQ	artesunate-mefloquine
ASSP	artesunate-sulfadoxine / pyrimethamine
ASSMP	artesunate-sulfamehoxy piparazine-pyrimethamine
BTCNRU	Biotechnology Center National Reference Unit (based at the University of Yaounde 1)
CDC	Centers for Disease Control and Prevention
CBO/A	community-based organization/association
CENAME	<i>Centrale Nationale d'Approvisionnement en Médicaments Essentiels /</i> National Center for the Supply of Medicines and Essential Medical Supplies
CHA	community health agents
DHAP	dihydro-artemisinin-pyeperaquine
DHS	Demographic and Health Survey
DHIS 2	District Health Information System 2
DLM	Directorate of Disease Control and Prevention of Epidemics
DPDL	Directorate of Pharmacies, Drugs, and Laboratories
FETP	Field Epidemiology and Training Program
FY	fiscal year
GHSA	Global Health Security Agenda
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
GoC	Government of Cameroon
HMIS	health management information system
IDSR	integrated disease surveillance and response system
IPTp	intermittent preventive treatment for pregnant women
IRS	indoor residual spraying
ITN	insecticide-treated mosquito net
LANACOME	<i>Laboratoire national de contrôle de la qualité des médicaments et de l'expertise /</i> National Laboratory for Quality Control of Drugs and Expertise
LMIS	Logistics Management Information System
M&E	monitoring and evaluation
MICS	Multiple Indicator Cluster Survey
MIP	malaria in pregnancy
MIS	Malaria Indicator Survey
MoH	Ministry of Health
MOP	malaria operational plan
NMCP	National Malaria Control Program
NSP	National Strategic Plan
OCEAC	Organization for the Coordination for the Fight against Endemic Disease Control in Central Africa

PBF	performance-based financing
PBO	piperonyl butoxide
PCV	Peace Corps Volunteers
PEPFAR	President's Emergency Plan for AIDS Relief
PMI	President's Malaria Initiative
SIAPS	Systems for Improved Access to Pharmaceutical Services
RBM	Roll Back Malaria
RDT	rapid diagnostic test
RHPF	regional health promotion funds
SBCC	social and behavior change communication
SMC	seasonal malaria chemoprevention
SM&E	surveillance, monitoring, and evaluation
SP	sulfadoxine-pyrimethamine
SPAQ	sulfadoxine-pyrimethamine and amodiaquine
TES	therapeutic efficacy study
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	United States Government
WHO	World Health Organization

I. EXECUTIVE SUMMARY

When it was launched in 2005, the goal of the President's Malaria Initiative (PMI) was to reduce malaria-related mortality by 50% across 15 high-burden countries in sub-Saharan Africa through a rapid scale-up of four proven and highly effective 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); and intermittent preventive treatment of pregnant women (IPTp). With the passage of the Tom Lantos and Henry J. Hyde Global Leadership against HIV/AIDS, Tuberculosis, and Malaria Act in 2008, PMI developed a U.S. Government Malaria Strategy for 2009–2014. This strategy included a long-term vision for malaria control in which sustained high coverage with malaria prevention and treatment interventions would progressively lead to malaria-free zones in Africa, with the ultimate goal of worldwide malaria eradication by 2040-2050. Consistent with this strategy and the increase in annual appropriations supporting PMI, four new sub-Saharan African countries and one regional program in the Greater Mekong Sub-region of Southeast Asia were added in 2011. The contributions of PMI, together with those of other partners, have led to dramatic improvements in the coverage of malaria control interventions in PMI-supported countries, and all 15 original countries have documented substantial declines in all-cause mortality rates among children less than five years of age.

In 2015, PMI launched the next six-year strategy, setting forth a bold and ambitious goal and objectives. The PMI Strategy for 2015-2020 takes into account the progress over the past decade and the new challenges that have arisen. Malaria prevention and control remains a major U.S. foreign assistance objective and PMI's Strategy fully aligns with the U.S. Government's vision of ending preventable child and maternal deaths and ending extreme poverty. It is also in line with the goals articulated in the RBM Partnership's second generation global malaria action plan, *Action and Investment to defeat Malaria (AIM) 2016-2030: for a Malaria-Free World* and WHO's updated *Global Technical Strategy: 2016-2030*. Under the PMI Strategy 2015-2020, the U.S. Government's goal is to work with PMI-supported countries and partners to further reduce malaria deaths and substantially decrease malaria morbidity, towards the long-term goal of elimination.

Cameroon was selected as a PMI focus country in FY 2017.

This first FY 2017 Malaria Operational Plan 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 involved in malaria prevention and control in the country. The activities that PMI is proposing to support fit in well with the National Malaria Control strategy and plan and build on prior investments by other partners to improve and expand malaria-related services, including the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund) malaria grants. This document briefly reviews the current status of malaria control policies and interventions in Cameroon, describes progress to date, identifies challenges and unmet needs to achieving the targets of the NMCP and PMI, and provides a description of activities that are planned with FY 2017 funding.

The proposed FY 2017 PMI budget for Cameroon is \$20 million. PMI will focus efforts as follows:

- **A comprehensive package of malaria interventions targeted to the two northern regions** (North and Far North) where the burden of malaria is highest and the malaria transmission season is short (up to three months). Interventions will include continuation of seasonal malaria chemoprevention for children under 5; strengthening health facility-level service provision; routine net distribution; support for training, supervision, and equipping community health agents;

strengthening pharmaceutical management and supply chain and procurement of ITNs, RDTs, antimalarials and preventive treatments to meet the regional needs.

- **Support for malaria-related pharmaceutical management and supply chain in the four PEPFAR regions**, including, Littoral, Center, Southwest, and Northwest in order to expand the achievements already made in these areas to malaria.
- **Targeted support to the following national-level activities:** entomological monitoring; monitoring & evaluation, including scale-up of the District Health Information System 2 (DHIS 2) reporting platform for Health Management and Information System (HMIS), household surveys, and health facility surveys; support to Field Epidemiology and Training Program (FETP) and Peace Corps; and SBCC for national needs in addition to more targeted SBCC in the regions.

PMI will support the following intervention areas with these funds:

Entomologic monitoring and insecticide resistance management:

The NMCP and its entomology monitoring partners support entomologic monitoring and have published data, including vector-insecticide resistance profiles, vector species (taxonomic) distribution, and *P. falciparum* infection rates. By building on these efforts, PMI can assist the NMCP to strengthen the monitoring strategy by, for example, increasing the number of indicators that are tracked, the frequency of vector collection and testing (to estimate indicators), and the granularity of the monitoring data (based on an increase in monitoring sites across the country). Entomological monitoring activities will be relatively more intensive in the northern regions where a full package of PMI-supported interventions is planned, but will also be implemented on a national scale in order to inform ITN interventions.

Existing data document the presence of pyrethroid resistance phenotypes in several vector populations. Resistance is associated with elevated mixed function oxidases. In response, a combination of ITNs treated with synergistic piperonyl butoxide (PBO), ITNs with ‘non-pyrethroid’ insecticides, and long-lasting non-pyrethroid insecticides are recommended by the National Program.

Insecticide-treated nets (ITNs):

Cameroon just completed their second national universal ITN campaign in 2016 and a post-campaign assessment is currently ongoing to assess coverage rates. The Ministry of Health (MoH) with additional support from the Global Fund has supported the provision of free ITNs to pregnant women at antenatal care (ANC) clinics since 2008, but successful implementation of this approach has been limited. With FY 2017 funds, PMI will support procurement and distribution of approximately 255,749 ITNs for routine distribution to pregnant women at ANC clinics in the North and Far North Regions. PMI will help design and implement a regular distribution channel for the delivery of ITNs as part of routine ANC with an increased emphasis on these activities in the North and Far North Regions.

Indoor residual spraying (IRS):

The National Program and PMI have identified the northern-most regions of the country, North and Far North, as the promising targets for IRS. Seasonal rainfall in the region results in an abbreviated malaria transmission period that should be impacted by one round of IRS, assuming that entomologic factors such as indoor biting and insecticide susceptibility remain constant. Furthermore, the presence of a relatively large proportion of the national population and high estimated malaria burden in the region provide additional arguments for IRS in these areas.

Prioritization of districts based on stratification of burden will be important in order to maximize impact. This prioritization will require good epidemiological data, likely from the routine health information system. Collection of meaningful entomological data (e.g., confirmation that vectors are fully susceptible to the IRS insecticide and that the females bite and rest indoors) is also crucial to this effort. In the first year, PMI will focus on vector resistance profiles and species identification in multiple sites across the target regions, with a more comprehensive package of basic and advanced indicators informed by monthly monitoring to understand the entomology situation. To ensure adequate data for feasibility assessment of a potential IRS program, collection of comprehensive baseline epidemiological and entomological data are planned for the first year. IRS will be considered once baseline data have been adequately analyzed and the long-term sustainability of an IRS program has been assessed. .

Malaria in pregnancy (MIP):

In the Far North and North regions, PMI will support the delivery of effective MIP services in the public and confessional (i.e., faith-based, not-for-profit) sectors and promote IPTp and other MIP interventions at the community level. PMI will support the development of an SBCC strategy on MIP, including community mobilization and interpersonal communication for the promotion of early and monthly ANC visits, consistent with national guidelines, as well as SBCC interventions targeted to ANC health workers. PMI will support the delivery of IPTp, including in-service training and supervision of health providers, and the provision of plastic cups, SBCC materials, and client cards, where needed. PMI will also help establish the routine provision of ITNs to pregnant women at initial ANC visits. To improve the case management of MIP, PMI will support laboratory diagnosis and appropriate treatment of malaria in pregnant women, per national guidelines. On the national level, to promote IPTp uptake and overall reproductive health, PMI will advocate to reduce or eliminate fees related to ANC services, which is a potential barrier to ANC attendance by pregnant women.

Case management:

PMI will support procurement of case management commodities including RDTs, ACTs, severe malaria treatments, and medications for SMC. These commodities will complement Global Fund, GoC, and other donor procurements to contribute to covering the needs of the population in the two northern regions of the country. Training and supervision in the North and Far North regions will also be a focus to ensure appropriate adherence to national guidelines and high quality case management. PMI also plans to support integrated SBCC activities to promote appropriate treatment-seeking behavior among community members, with particular attention to increasing healthcare-seeking rates and utilization of free treatment for children less than five. In addition, SBCC activities will also be targeted to health service providers to address any behavioral barriers to service provision identified through formative research.

Both the Global Fund and the World Bank support CHW programs in Cameroon, and while the pay and incentive structure is different for each organization, they are both based on salaries or cash incentives, as is called for in the national community health strategy. PMI recognizes the critical role that CHWs play, particularly in settings such as Cameroon where utilization of the public sector is low and care seeking often delayed. While PMI does not support formalized payments of CHWs, PMI will support the CHW programs in Cameroon through trainings and procurement of commodities.

Health systems strengthening and capacity building:

With FY 2017 funds, PMI plans to support activities to develop the leadership, management, and government capacity of the NMCP. This includes an array of cross-cutting health system strengthening activities, such as training health workers, supply chain management, health information system

strengthening, drug quality monitoring, and NMCP capacity building. Although PMI will not directly fund Performance-Based Financing (PBF), which is largely financed and implemented by the Global Fund and the World Bank, PMI will support complementary health system strengthening approaches that improve malaria service delivery and provide the malaria information needed for evidence-based decision-making. PMI will also support the Field Epidemiology Training Program (FETP) to strengthen country capacity in surveillance, field epidemiology, and outbreak response for malaria in addition to other diseases of public health importance. Finally, PMI will support Peace Corps Response Volunteers and grant-funded volunteer-led small projects.

Social and behavior change communication (SBCC):

Cameroon has a National Malaria Communication Plan that is an extension of the NMCP's 2014-2018 National Strategic Plan. This communication plan articulates objectives to improve uptake of positive malaria behaviors among primary target audiences (i.e., community beneficiaries), secondary target audiences (i.e., policymakers and stakeholders), and health service providers; it also aims to strengthen the credibility of the NMCP and how it is perceived by these audiences and to implicate the community in malaria prevention through social mobilization. Intervention approaches include mass media to raise awareness and improve knowledge, and interpersonal communication to more directly influence behavior change. The national plan identifies the key elements of effective messaging and has elaborated a matrix describing relevant attitudes, motivations, and appropriate messages for the various target audiences across the key behaviors. Currently, most interpersonal activities are carried out at the local level by CHW with development of messages and materials coordinated at the central level. PMI will support the NMCP's communication plan under the guidance of the NMCP, and in coordination with the Global Fund and other partners to ensure uptake of key interventions in the PMI geographic areas of focus. Because the Global Fund focuses communication efforts on mass media and supports efforts to coordinate and harmonize SBCC activities, PMI will focus resources using appropriate channels at district and local levels in the two northern regions where activities will be concentrated. PMI will also support data collection needs for formative research and M&E in the two northern regions to assess the impact of activities aimed at improving uptake of malaria interventions.

Surveillance, monitoring and evaluation (SM&E):

The NMCP's national M&E plan, complementing the national strategic plan, covers the period 2014-2018. The plan identifies the general objective to reduce malaria morbidity and mortality by 75% from 2000 levels in 2018. The plan also details the specific targets for prevention, case management, program management, epidemiologic surveillance and M&E, communication, and training and operational research. Monitoring activities include community-level reporting; national HMIS, including adoption and rollout of the DHIS 2 platform; therapeutic efficacy; drug quality monitoring; and logistics management information system. For evaluation, the plan identifies surveys and reviews. Surveys are used to assess coverage and impact. Reviews are conducted at central, regional and district levels, as well as malaria program reviews. Data dissemination and use are highlighted as key elements of the strategy. Funded and operational M&E activities and data sources include a monthly malaria reporting system and an integrated epidemic surveillance system. The country is working towards scale up of the DHIS 2 reporting platform for the HMIS, which includes routine reporting from health facilities, epidemiologic surveillance, disease-specific reporting systems, and administration and resource management. Cameroon has implemented a Demographic and Health Survey (DHS) in 2004 and 2011, as well as an MIS in 2011 and a (Multiple Indicator Cluster Survey (MICS) in 2014. In addition to the DHS, MIS, and MICS, post-ITN campaign coverage surveys have been implemented after the last two mass distribution campaigns in Cameroon.

PMI will collaborate with the NMCP, Global Fund, and other malaria partners to support the monitoring and evaluation (M&E) strategy laid out as part of the National Strategic Plan. This will include support to the next DHS (in 2017 or 2018) and routine health information system strengthening, primarily scale up of DHIS 2 and ensuring quality of malaria data under that system. In the two northern districts where PMI will be targeting the majority of its efforts, PMI will support targeted surveillance strengthening in all health districts to ensure high quality health facility and community-level data for epidemiological surveillance, as well as regular monitoring of routine malaria services. These data will inform programmatic decision-making. Also in the northern districts, a health facility assessment will provide formative and baseline data on routine malaria service provision for MIP and case management, and end use verification surveys with national coverage will assess the degree to which commodities are reaching the end user.

Operational research (OR):

No PMI-supported OR has been completed, is ongoing, or planned with FY 2017 funds.

II. STRATEGY & BACKGROUND

1. Introduction

When it was launched in 2005, the goal of PMI was to reduce malaria-related mortality by 50% across 15 high-burden countries in sub-Saharan Africa through a rapid scale-up of four proven and highly effective 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); and intermittent preventive treatment of pregnant women (IPTp). With the passage of the Tom Lantos and Henry J. Hyde Global Leadership against HIV/AIDS, Tuberculosis, and Malaria Act in 2008, PMI developed a U.S. Government Malaria Strategy for 2009–2014. This strategy included a long-term vision for malaria control in which sustained high coverage with malaria prevention and treatment interventions would progressively lead to malaria-free zones in Africa, with the ultimate goal of worldwide malaria eradication by 2040-2050. Consistent with this strategy and the increase in annual appropriations supporting PMI, four new sub-Saharan African countries and one regional program in the Greater Mekong Subregion of Southeast Asia were added in 2011. The contributions of PMI, together with those of other partners, have led to dramatic improvements in the coverage of malaria control interventions in PMI-supported countries, and all 15 original countries have documented substantial declines in all-cause mortality rates among children less than five years of age.

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2. Background on Cameroon

Cameroon is a central African country bordered by the Gulf of Guinea and Nigeria to the east; Chad and the Central African Republic to the west; and Equatorial Guinea, Gabon, and the Republic of the Congo

to the south. With respect to total area, Cameroon is slightly larger than California. It is dominated by a strong central government and a longstanding president. While French is predominantly spoken in the country, 2 out of the 10 regions are Anglophone, so both English and French are national languages; in addition, there are 24 major African language groups. Cameroon is often referred to as “Africa in miniature” due to the broad diversity in ecology, culture, and languages. The climate and terrain are variable across the country with tropical coastland and coastal plains in the southwest, temperate plateau in the center, mountains in the west, and semiarid hot plains in the north. The country has important natural resources including petroleum, bauxite, iron ore, timber, and hydropower; oil is a main export commodity (CIA, World Factbook).

While the World Bank considers Cameroon to be a lower middle-income country, economic success has not sufficiently raised the health status of the population. Life expectancy, under-five mortality, and maternal mortality in Cameroon are worse than the regional average for Central Africa. The population, particularly the northern regions, is vulnerable to food insecurity. The rate of HIV infection is 4.3 percent – among the highest in the West and Central Africa regions.

Cameroon’s estimated population was 21,657,488 in 2014 and is expected to reach 23,794,164 by 2018, based on an estimated growth rate of 2.5%. While the entire Cameroonian population is at risk for malaria, pregnant women and children under the age of five are the most vulnerable. Women of reproductive age represent 24.3% of the population, and children under the age of five represent 17% of the population.¹

3. Malaria Situation in Cameroon

In Cameroon, the estimated mortality rate for malaria (116/1,000) surpasses those of the African region (104/1,000) as well as neighboring countries such as the Central African Republic². According to the 2011 Malaria Indicator Survey, the average prevalence of parasitemia in children under the age of five was 33.3%. National statistics from the NMCP annual report in 2015 report that suspected malaria caused 30% of all medical consultations; 21% of all-cause visits resulted in a diagnosis of laboratory-confirmed malaria. In health facilities, 19% of deaths were attributed to malaria, and 48% of all hospital admissions were due to suspicion of severe malaria. In the North and Far North regions this proportion was much higher at 37% and 39%, respectively.

Cameroon has three malaria transmission seasons that vary by geographic region (see Figure 1). The forest zone in the south has a permanent transmission season of seven to twelve months¹. The North and Adamawa regions have a tropical climate but a shorter transmission season of four to six months. The Far North region has a tropical and Sahelian climate with a short seasonal transmission period of one to three months.

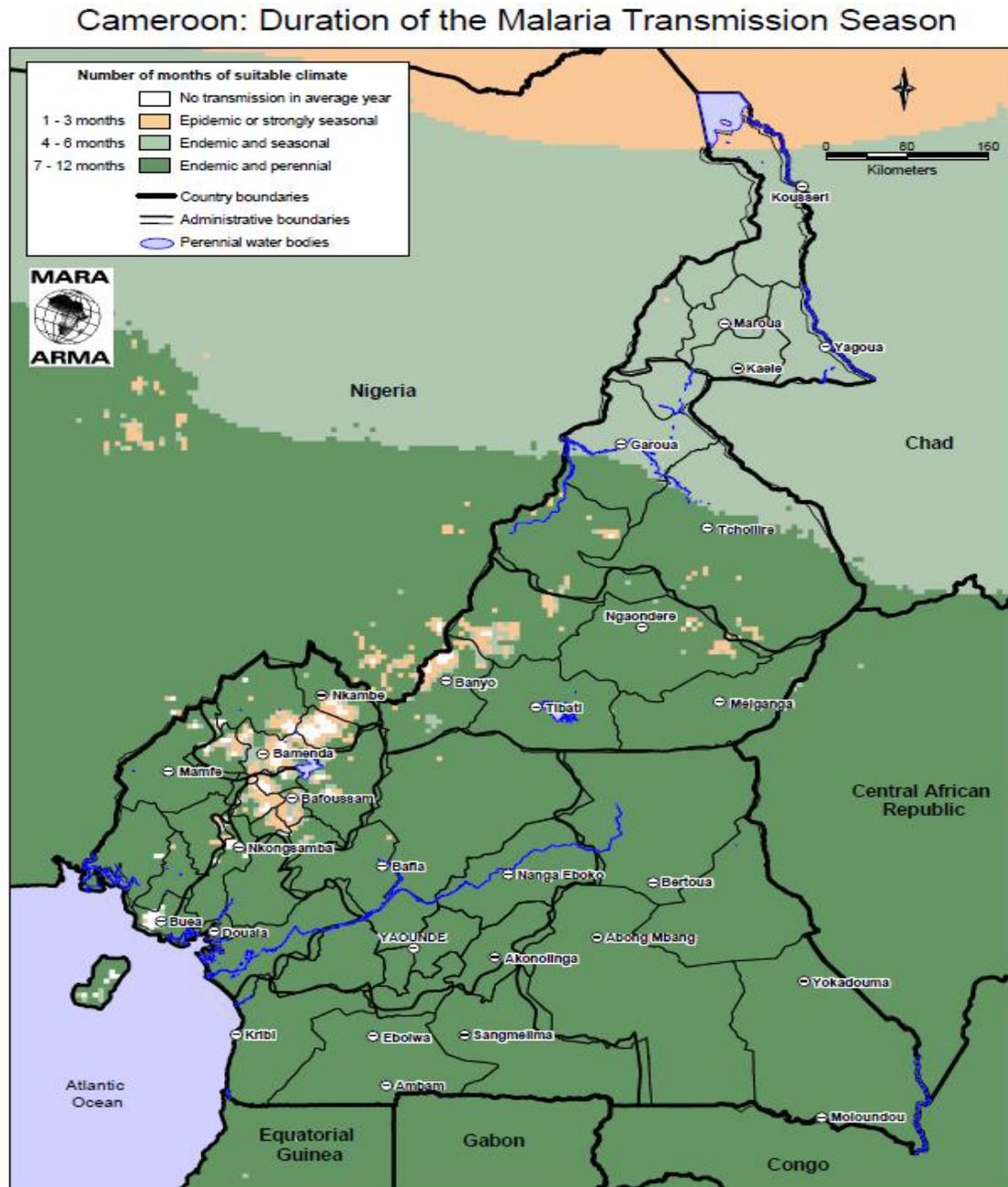
The Far North and North regions of Cameroon have a disproportionately higher number of malaria cases and deaths compared to the other regions. According to the 2015 NMCP Annual report, although less than 30% of the population is concentrated in the North and Far North, over 60% of under-five malaria

¹The Global Fund to Fight AIDs, Tuberculosis, and Malaria. (2014, January 31). *Cameroon Malaria Concept Note*.

² The World Bank. (2016, April 12). *International Development Association Project Appraisal Document on a Proposed Credit in the Amount of \$100 million and a Proposed Grant from the Multi Donor Trust Fund for the Global Financing Facility in the Amount of \$27 million to the Republic of Cameroon for a Health System Performance Reinforcement Project*

deaths were recorded in these two regions. The Far North reported the highest number of malaria cases in 2015 out of all ten regions.

Figure 1: Malaria transmission pattern across Cameroon



This map is a product of the MARA/ARMA collaboration (<http://www.mara.org.za>), July 2001, Medical Research Council, PO Box 17120, Congella, 4013, Durban, South Africa
 CORE FUNDERS of MARA/ARMA: International Development Research Centre, Canada (IDRC); The Wellcome Trust UK; South African Medical Research Council (MRC);
 Swiss Tropical Institute, Multilateral Initiative on Malaria (MIM) / Special Programme for Research & Training in Tropical Diseases (TDR), Roll Back Malaria (RBM).
 Malaria seasonality model: Tanser, F et al. 2001. Paper in preparation. Topographical data: African Data Sampler, WRI, http://www.igc.org/wri/eds/maps/ads/ads_idx.htm.

4. Country health system delivery structure and Ministry of Health (MoH) organization

Cameroon is divided into ten semi-autonomous administrative regions (see Figure 2), each headed by a Governor. The 10 regions are divided into 58 divisions, each headed by a Divisional Officer. Each division is divided into sub-divisions, 360 in total, each made up of a local council and headed by a Mayor. Cameroon's health map is different from the administrative map at the sub-regional level. For health, a regional delegate heads each of the 10 regions, but the 10 regions are subdivided into 189 health districts (in total; regions contain anywhere from 9 to 30 health districts), which are headed by a District Medical Officer. The 189 health districts are further divided into health areas (*aire de santés*), of which there are approximately 1,700 nationally. Ninety health districts also have community components that include health facilities and/or engage community health workers (CHWs). The country's two largest cities are Doula (population of 2.94 million) and Yaoundé (population 3.07 million), located in the Littoral and Central regions, respectively.

Figure 2: Map of Cameroon's ten regions



Cameroon's health system is organized in a pyramidal structure with three levels: central, intermediate, and peripheral.

- The central level includes the MoH, central hospitals, university hospitals, and the national procurement center for essential medicines, *Centrale Nationale d'Approvisionnement en Médicaments Essentiels* (CENAME).
- The intermediate level includes ten regional public health divisions which provide technical support for regional hospitals.
- The peripheral level includes 189 district health services that implement health services for local medical centers (*centres médicaux d'arrondissement*) and integrated health centers (*centres de santé intégrés*). The peripheral level also includes community service providers known as CHWs.

The MoH estimates that Cameroon requires 11,896 CHWs. National directives establish the following criteria for CHWs: residency in the community, a primary source of income, and literacy in French or English. Each CHW typically provides services for 1,000 people in rural areas and 2,500 people in urban areas and is supposed to receive a stipend of about \$10 per month. The Global Fund and UNICEF currently support the training of CHWs. In addition to CHWs, communities are represented by local health committees at health area and health district levels. These committees address the health interests of the communities they represent rather than providing direct services like the CHWs.

The World Health Organization (WHO) reports that health expenditure represents 5.1% of Cameroon's GDP, which remains below the 15% advocated by African heads of state in Abuja in 2000. The ratio of 1.07 doctors and nurses per 1,000 people falls short of the WHO recommended minimum of 2.3 health care personnel per 1,000 people. This ratio reflects disparities in human resources among regions and between rural and urban areas. Human resource disparities are also evident among hospitals at the general, central, regional, and district levels.

In addition to gaps in human resources, Cameroon's health system suffers other constraints, including lack of equipment; poor data quality and integration into the national health system; weak Logistics Management Information Systems (LMIS) to track malaria commodities in the public and private sector; inadequate monitoring of the regions by the central level; and challenges with provision of routine malaria services in health facilities (e.g., diagnostics, treatment).

In addition to the public and community health system, the private sector—including profit and non-profit organizations—represents a significant proportion of health service provision in Cameroon. The private sector represents an estimated 25% of health care facilities in Cameroon and requires further efforts to improve their adoption and implementation of national directives for malaria service provision

5. National malaria control strategy

Cameroon's National Strategic Plan (NSP) for malaria control covers the period 2014-2018 and is the fourth iteration of a national strategy. It was developed based on an external mid-term review conducted in 2013 (at the mid-point of the previous 2011-2015 strategy). The NSP is guided by the Abuja Declaration and achievement of the relevant Millennium Development Goals.

The NSP articulates a vision of a Cameroon free from malaria. The stated mission is to ensure universal access to effective and affordable malaria prevention and treatment interventions for all Cameroonians,

especially the most vulnerable and marginalized. The strategic focus is to accelerate intervention scale-up to reach universal coverage of key interventions and achieve a lasting impact on malaria morbidity and mortality. In addition to prioritizing the most vulnerable, interventions will be targeted to zones with high population density, high endemicity, and intense seasonal transmission.

The **goal** of the NSP 2014-2018 is to contribute to improving the health of Cameroonians by reducing the health and socioeconomic burden of malaria. The **objective** is to reduce malaria morbidity and mortality by 75% from 2000 levels by 2018.

The NSP outlines specific interventions and activities that fall under six strategic areas. These activities are summarized below along with their associated objectives:

I. **Prevention** – includes ITN distribution via mass campaigns and routine channels, promotion of ITN use, IRS, IPTp, and Seasonal Malaria Chemoprevention (SMC) for children aged 3-59 months.

Objectives: Ensure coverage/use by 80% of targeted populations for ITNs, IRS, IPTp, and SMC

II. **Case management** – includes diagnostic confirmation of suspect cases, treatment of confirmed cases at health facility and community level according to national guidelines, scale up of integrated community case management, pharmacovigilance, and supply chain strengthening.

Objectives: Ensure diagnostic testing for 80% of suspect malaria cases seen in health facilities and by CHWs; treat 100% of confirmed cases according to national guidelines; and ensure consistent availability of key malaria commodities in 100% of health facilities and in the community.

III. **Communication** – includes advocacy; behavior change interventions; social mobilization; social marketing and private partnership; and training of health agents, community actors, and journalists.

Objectives: Implicate 80% of leaders/decision-makers/partners/community groups/civil society groups in the fight against malaria; ensure 80% of the population takes up key interventions; ensure 80% of health workers provide subsidized or free malaria services.

IV. **Training and research** (including operational research)

Objectives: Ensure that at least 80% of targeted health professionals and 100% of targeted community actors and media professionals implement malaria activities in accordance with national guidance; inform at least 80% of indicators using evidence-based results from operational research

V. **Surveillance, monitoring, evaluation and epidemic response** – includes monitoring and evaluation (M&E) system strengthening, implementation of M&E, epidemiologic surveillance system strengthening, and epidemic response.

Objectives: Ensure at least 80% of health facilities and CHWs report high-quality malaria data in a timely manner according to national guidance; ensure at least 80% of stakeholders use these data to make informed decisions; regularly report on at least 95% of malaria indicators; detect 100% of malaria epidemics in a timely manner; control 100% of malaria epidemics within two weeks of detection

VI. **Program management** – includes mobilization of funds, financial management, governance, planning, and partnership coordination.

Objectives: Mobilize at least 80% of funds required to implement the NSP; implement activities using at least 80% of resources mobilized at all levels of the health system; carry out at least 80% of planned activities at all levels of the health system

6. Donor funding for malaria control and health systems

In February 2015, the Global Fund and Government of Cameroon signed a malaria grant agreement worth 77 million Euros. The grant has been used to fund distribution of 15.8 million ITNs, including a mass distribution campaign that was conducted in 2016. In addition, the grant supports SMC in the North and Far North regions (co-funded by the Islamic Development Bank); IPT for pregnant women; malaria case management including diagnostic confirmation of suspected cases, either through rapid diagnostic tests (RDTs) or microscopy; social and behavior change communications (SBCC) activities; and M&E activities.

The Clinton Health Access Initiative has funded the procurement of severe malaria drugs consistent with the national malaria control plan.

The World Bank is preparing an investment case for a new health sector program (including credit and grant components) that will focus on maternal, neonatal, child, adolescent, and reproductive health. The Bank's investment will likely exceed \$100 million over 5 years. The program will also include a substantial community health component that will establish a (PBF) system to compensate CHWs and frontline health facility staff for their efforts and motivate them to reach coverage goals.

7. USG health assistance to Cameroon

There is USAID and Centers for Disease Control and Prevention (CDC) presence in Cameroon. Health programs financed through PEPFAR represent the largest sector for health activities in the country. USAID also supports the Global Health Security Agenda (GHSA) which helps the Government of Cameroon (GoC) to prevent, detect, and respond to infectious disease threats. The neglected tropical disease program fights diseases that can be cured or prevented through the mass distribution of drugs. The Food for Peace program partners with the World Food Program and focuses on providing food to refugees and internally displaced persons in the north and east of Cameroon. USAID is also in the midst of preparing activities financed by the Presidential Initiative PowerAfrica.

PEPFAR began in 2009-2010 and has since grown to an annual budget of \$26 million. The initiative is administered by several agencies, including the CDC, USAID, Department of Defense, Department of State, and the Peace Corps. The USAID project Systems for Improved Access to Pharmaceutical Services (SIAPS) is working with the (MoH) on a more efficient operation of the national pharmaceutical system and pharmaceutical procurement mechanisms. In 2011, SIAPS identified the need for improved storage capacity, better organization, and a stronger LMIS. The program works to leverage the resources provided by USAID to achieve more impact and to facilitate dialogue and communication among key donors.

There are 130 Peace Corps Volunteers (PCVs) in Cameroon, 35 of which are Community Health Volunteers. All PCVs receive training in malaria prevention, and Community Health Volunteers regard malaria as a primary focus area.

8. Integration, collaboration, and coordination

Coordination within the Government of Cameroon

The NMCP is the government's recognized entity to ensure coordination and quality assurance of the country's malaria policy and programs. It is supported by the National Roll Back Malaria (RBM) Committee whose role includes establishing and monitoring the progress of the national malaria control strategy and ensuring the coordination of malaria control interventions and partners. All malaria commodities are quantified by the NMCP, purchased by National Center for the Supply of Medicines and Essential Medical Supplies (CENAME), and distributed through the national medical supply system. According to an agreement signed in 2013, cost recovery fees for malaria commodities are set through agreement among CENAME, the NMCP, and the MoH.

The Directorate of Disease Control and Prevention of Epidemics (DLM) has oversight over certain aspects of infectious diseases, including the Integrated Disease Surveillance and Response system (IDSR) and outbreak investigation and response through the DLM's Emergency Operations Center. Although there is potential overlap between the DLM and some of the roles of the NMCP and the national AIDS and TB control programs, the division of labor among these entities appears to work. There is excellent collaboration between the MoH and the large faith-based health networks and health facilities in Cameroon. For example, these networks and facilities obtain drugs from both CENAME and the Regional Health Promotion Funds (RHPF) at the same price as do public sector entities. In addition, the faith-based facilities report into the national Health Management Information System (HMIS) in the same fashion as do MoH structures.

Coordination among donors

The MOP team had two in-depth calls with Global Fund managers for Cameroon and met with many of its sub-recipients. Based on these calls and conversations, Global Fund and PMI coordinated a proposed strategy for future malaria support to Cameroon to ensure complementarity and leveraging of resources.

At present, there are two models for support and motivation of CHWs. The Global Fund model calls for their sub-recipients to pay a flat fee of about \$40 a month to CHWs who visit at least ten households a month in their communities, with the possibility of earning an additional \$40 if they meet certain performance goals. The World Bank is promoting a more comprehensive performance-based system that would also reward health facility staff for expanding coverage of priority services. These organizations are now working to reconcile their approaches with the goal of one common framework endorsed by the government. Given its policies, PMI will be unable to pay salaries or supplements to either health workers or CHWs but can support the GoC's community health programs through other means, including training, SBCC support, and provision of work tools.

Coordination within the US Government

Through this MOP, PMI/Cameroon aims to forge strong links with PEPFAR, the Peace Corps, the GHSA, and CDC's FETP program. PMI will utilize the PEPFAR supply chain contract to build on the ongoing USG-funded work to strengthen Cameroon's pharmaceutical management system. PMI will also engage PCVs to work with PMI Resident Advisors to promote malaria knowledge and interventions at the community level. The GHSA's support to strengthen Cameroon's Emergency Operations Center will promote rapid and effective investigation and response to future malaria outbreaks. In addition, PMI's support for the FETP program will strengthen the HMIS and use of these data, as well as increase the MoH's epidemiological capacity; both of these are critical elements to the national malaria control program.

9. PMI goals, objectives, strategic areas, and key indicators

Under the PMI Strategy for 2015-2020, the U.S. Government's goal is to work with PMI-supported countries and partners to further reduce malaria deaths and substantially decrease malaria morbidity, towards the long-term goal of elimination. Building upon the progress to date in PMI-supported countries, PMI will work with NMCPs and partners to accomplish the following objectives by 2020:

- Reduce malaria mortality by one-third from 2015 levels in PMI-supported countries, achieving a greater than 80% reduction from PMI's original 2000 baseline levels;
- Reduce malaria morbidity in PMI-supported countries by 40% from 2015 levels;
- Assist at least five PMI-supported countries to meet WHO's criteria for national or sub-national pre-elimination.³

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

- Achieving and sustaining scale of proven interventions
- Adapting to changing epidemiology and incorporating new tools
- Improving countries' capacity to collect and use information
- Mitigating risk against the current malaria control gains
- Building capacity and health systems towards full country ownership

To track progress toward achieving and sustaining scale of proven interventions (area of strategic focus #1), PMI will continue to track the key indicators recommended by the Roll Back Malaria Monitoring and Evaluation Reference Group (RBM MERG) as listed below:

- Proportion of households with at least one ITN
- Proportion of households with at least one ITN for every two people
- Proportion of children under five years old who slept under an ITN the previous night
- Proportion of pregnant women who slept under an ITN the previous night
- Proportion of households in targeted districts protected by IRS
- Proportion of children under five years old with fever in the last two weeks for whom advice or treatment was sought
- Proportion of children under five with fever in the last two weeks who had a finger or heel stick
- Proportion receiving an ACT among children under five years old with fever in the last two weeks who received any antimalarial drugs
- Proportion of women who received two or more doses of IPTp for malaria during antenatal care (ANC) visits during their last pregnancy

³ http://whqlibdoc.who.int/publications/2007/9789241596084_eng.pdf

10. Progress on coverage/impact indicators to date

Table 1: Evolution of Key Malaria Indicators in Cameroon from 2011 to 2014

Indicator	2011 DHS/ MICS*	2011 MIS**	2014 MICS
% Households with at least one ITN	36.4	36.4	70.9
% Households with at least one ITN for every two people	15.6	Not reported	37.4
% Children under five who slept under an ITN the previous night	21.0	21.0	54.8
% Pregnant women who slept under an ITN the previous night	19.8	19.8	52.3
% Households in targeted districts protected by IRS	N/A	N/A	N/A
% Children under five years old with fever in the last two weeks for whom advice or treatment was sought	55.7	66.7	62.6
% Children under five years old with fever in the last two weeks for whom advice or treatment was sought <i>at a health facility or by a health provider</i>	26.9	39.5	32.9
% Children under five with fever in the last two weeks who had a finger or heel stick	Not reported	Not reported	15.9
% Children receiving an ACT among children under five years old with fever in the last two weeks who received any antimalarial drugs	6.1	12.6	15.1
% Women who received two or more doses of IPTp during their last pregnancy in the last two years	25.6	34.2	53.1
% Children age 6-59 months with parasitemia according to RDT	30.0	33.3	N/A

* Conducted from Jan-Aug 2011

** Conducted from Sep-Nov 2011

III. OPERATIONAL PLAN

PMI will contribute to Cameroon’s overall malaria strategy, but will emphasize specific interventions and geographic areas, in order to maximize impact and complement existing activities. Malaria is a major health problem throughout Cameroon but with respect to the number of malaria cases and malaria deaths recorded in national health statistics in 2015, the burden is disproportionately higher in the two northern regions (North, Far North). All-cause under-five mortality as measured by the 2011 Demographic and Health Survey (DHS) and the 2014 Multiple Indicator Cluster Survey (MICS) is also highest in these regions.

Table 2: All-cause under-five mortality rate (per 1,000 live births) in Cameroon, 2011 and 2014

Regions	2011 DHS	2014 MICS
Adamoua	129	127
Centre (without Yaounde)	121	96
Douala	75	52
East	96	127
Far North	168	154
Littoral (without Douala)	106	84
North	191	173
North West	68	64
West	100	83
South	103	100
Southwest	127	78
Yaounde	76	42
National*	122	103

* The national estimate for the 2011 DHS and 2014 MICS is for the five years preceding the survey, whereas the regional estimates are for the 10 years preceding the survey. The national estimate for six to ten years prior to the 2011 DHS is 136 and for the 2014 MICS was 123.

According to the 2015 NMCP Annual Report, while less than 30% of the population is concentrated in the North and Far North, over 60% of under-five malaria deaths were recorded in these two regions. In addition, the Far North reported the highest number of malaria cases in 2015 out of all ten regions. PMI has the potential to reduce the burden in these regions through targeted efforts while providing broader support for systems strengthening and capacity building throughout the rest of the country.

All interventions and activities will be closely planned and coordinated with the NMCP and Global Fund. In summary, PMI will focus efforts as follows:

- **A comprehensive package of malaria interventions in the two northern regions (North and Far North)** where the burden of malaria is highest and the malaria transmission season is short (up to three months). Interventions will include continuation of seasonal malaria chemoprevention (SMC) for children under five; strengthening health facility-level service provision including diagnostics, treatment, and malaria in pregnancy services; routine ITN distribution; support for training, supervision, and equipping CHWs; strengthening pharmaceutical management and supply chain; and procurement of commodities to meet the national needs for nets, RDTs, antimalarials, and preventive treatments. Supportive supervision visits by regional and central level NMCP staff

will also be facilitated. However, PMI will not fund salaries or cash incentives for CHWs as called for in the national community health strategy and agreed to by the Global Fund. PMI disclosed this restriction to the Global Fund Portfolio Manager who understands that a future Global Fund sub-recipient would likely need to handle this expense in the Far North and North regions.

- **Support for malaria-related pharmaceutical management and supply chain in the four PEPFAR regions: Littoral, Center, Southwest, and Northwest** in order to expand the achievements already made in these areas to malaria. PMI would use the existing PEPFAR contractor for this assistance.
- **Targeted support to the following national-level activities:** entomological monitoring; M&E, including scale-up of the District Health Information System 2 (DHIS 2 reporting platform for HMIS, household surveys, and health facility surveys; support to FETP and Peace Corps; and SBCC for national needs (e.g., partner coordination, message harmonization) in addition to more targeted SBCC in the regions according to identified needs. Support for the development and implementation of a national case management strategy and for standardized data reporting forms (registers) will also be included.

1. Vector Monitoring and Control

NMCP/PMI objectives

The malaria control strategy, outlined in the NSP, describes the NMCP's approach to IRS and ITN interventions as well as entomology M&E activities to inform their effective use. In addition to vector adulticiding (killing adult mosquitoes), the approach also calls for larviciding (killing mosquito larvae), which may be useful in specialized situations (e.g., rice field breeding sites). With respect to ITNs, the recommendations are for universal ITN coverage obtained through mass nationwide distribution, supplemented by routine distribution channels at antenatal care (ANC) clinics as well as the expanded program on immunizations. The NSP also emphasizes the need for a targeted IRS program to eventually achieve malaria elimination in Cameroon. A malaria entomology database, based on investigations (many published) by entomologists from the Organization for the Coordination for the Fight against Endemic Disease Control in Central Africa (OCEAC) and the Biotechnology Center based at the University of Yaounde 1, National Reference Unit (BTCNRU) informs national malaria control planning, particularly for vector control interventions. PMI objectives harmonize fairly well with those of Cameroon.

The National Program and PMI have identified the northern-most regions of the country, North and Far North, as the promising targets for IRS. Seasonal rainfall in the region results in an abbreviated malaria transmission period that should be impacted by one round of IRS, assuming that entomologic factors such as indoor biting and insecticide susceptibility remain constant. Furthermore, the presence of a relatively large proportion of the national population and high estimated malaria burden in the region provide additional arguments for IRS in these areas. To assess the feasibility of a potential IRS program, collection of comprehensive baseline epidemiological and entomological data are planned for the first year. IRS implementation will require reliable epidemiological data, likely from the routine health information system that can be used to monitor and evaluate the intervention. Collection of meaningful entomological data (e.g., confirmation that vectors are fully susceptible to the IRS insecticide and that the females bite and rest indoors) is also crucial to this effort. In the first year, PMI will focus on vector resistance profiles and species identification in multiple sites across the target regions, with a more comprehensive package of basic and advanced indicators informed by monthly monitoring to understand

the entomology situation. IRS will be considered once baseline data have been adequately analyzed and the long-term sustainability of an IRS program has been assessed.

PMI will also contribute to the NSP by supporting routine ITN distribution through ANC and entomological monitoring.

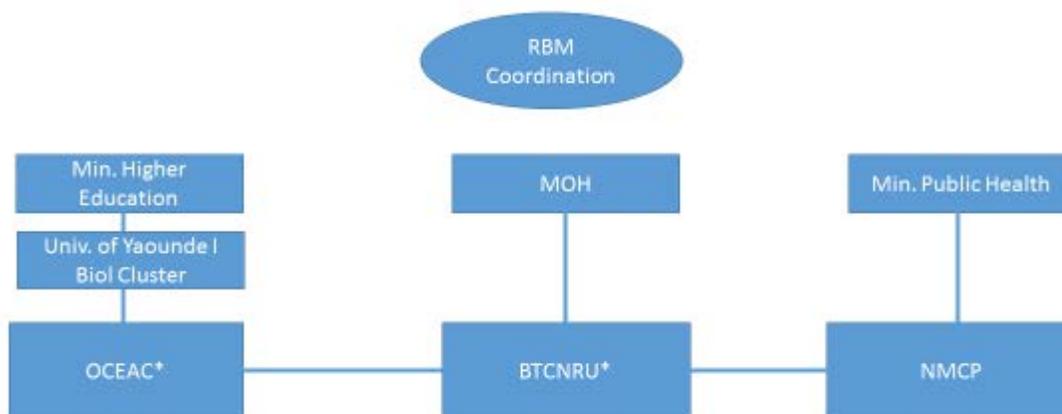
A. Entomologic Monitoring and Insecticide Resistance Management

Intervention overview/Current status

In accordance with RBM’s Global Strategic Plan recommendations regarding vector control, Cameroon has adopted an integrated approach, with ITNs and IRS as the main intervention methods, though IRS has yet to be implemented. Current entomological monitoring informs insecticide-based malaria vector control efforts, especially the ITN-related issue of vector-pyrethroid insecticide resistance. Additionally, there is recognition that Cameroon has a large number of potential malaria vectors; as many as 14 of the 45 known Anopheline species are implicated, a situation requiring continuous assessment. Entomological indicators under assessment include: vector taxonomy, species distribution, transmission efficiency, behavior (feeding and resting), parity and insecticide resistance/susceptibility.

There is good overlap between the existing data collection plans and those recommended by PMI guidance. PMI resources can add continuity and increased granularity to the existing efforts to better inform the programming of future IRS and ongoing ITN interventions. The NMCP and its entomology M&E partners, include the BTCNRU, based at the University of Yaounde I, and the OCEAC (see Figure 3). Both organizations have experience in entomological monitoring, although entomology staffing and opportunities in advanced entomology training within the NMCP are limited and should be supported by PMI.

Figure 3: Cameroon entomology monitoring program partners



The entomology monitoring partnership has collected and published a comprehensive body of entomology monitoring and evaluation data that document a heterogeneous taxonomic picture of the malaria vector population along the north-south transect of Cameroon. While the most common and efficient of vectors are *An. gambiae* s.s., *An. arabensis*, *An. funestus*, *An. nili* and *An. moucheti*, some 14 of 45 known Anophelines are implicated in malaria transmission.

Increasing incidence of DDT and pyrethroid resistance in *Anopheles gambiae* s.l. populations is seen as a threat to malaria vector control. Prior exposure to synergists such as piperonyl butoxide (PBO) has been shown to partially restore insecticidal effect in some populations, suggesting a role for detoxifying enzymes (p450s) in post-insecticide exposure survival.

Based on existing expertise and demonstrated commitment to entomology, PMI can support a comprehensive package of entomology monitoring activities, including annual collection and testing of vectors at multiple surveillance locations to estimate the desired indicators listed in the PMI guidance and outlined in table 3 below.

Table 3: Entomologic monitoring sites, indicators and methods

Proposed entomology monitoring and evaluation sites	
Entomology monitoring and evaluation sites	<ul style="list-style-type: none"> • Four sites in the North and Far North to inform vector control activities • Four sites in the South (three forest + one coastal) • Two sites in the West
Entomology monitoring and evaluation indicators and methods	
Indicator 1: Vector-insecticide resistance	<ul style="list-style-type: none"> • Full panel of WHO approved IRS/ITN insecticides • Synergists • Resistance intensity • Mechanisms (kdr, esterases)
Indicator 2: Taxonomy	<ul style="list-style-type: none"> • Morphological species • Sibling species (molecular forms)
Indicator 3: Density	<ul style="list-style-type: none"> • Various collections to estimate relative density
Indicator 4: Behavior	<ul style="list-style-type: none"> • Indoor / outdoor biting (HLC, light trap, resting collections)
Indicator 5: Parity	<ul style="list-style-type: none"> • Dissection
<i>P. falciparum</i> infection rate	<ul style="list-style-type: none"> • Sporozoite ELISA
ITN durability	<ul style="list-style-type: none"> • Coverage • Fabric integrity • Bio-efficacy

Plans and justification

With FY 2017 funds, PMI will support the development of an entomology M&E work plan for vector collection and testing at all sites so that these data can be used to inform operational questions such as: (1) What is the national vector-insecticide resistance profile and how does it change; (2) Does the indoor/outdoor vector biting patterns shift as insecticide-based control measures (ITNs) are introduced; and (3) Do ITN population longevity (observed versus assumed) estimates mirror program assumptions about how long nets last?

Proposed activities with FY 2017 funding: (\$525,000)

1. *Entomological monitoring*: PMI will support the full package of entomological monitoring activities, including: vector-insecticide susceptibility, resistance intensity, vector density, vector population taxonomic status (microscopic, molecular), and vector biting behavior (indoor/outdoor biting) in ten sentinel sites. (\$450,000)
2. *Training for entomologists*: PMI will support up to five Cameroonian entomologists, including some from the NMCP, to receive advanced entomologic training at the *Centre de Recherche Entomologique de Cotonou*. (\$50,000)
3. *Technical assistance for entomological support (2 visits)*: The CDC will participate in two technical assistance visits to help develop entomological capacity at the national and regional levels. (\$25,000)

B. ITNs

NMCP/PMI objectives

The NMCP's current NSP aims to have at least 80% of the population sleeping under an ITN by 2018. The NMCP uses national universal campaigns every three years as the primary means for distributing ITNs, supplemented by the provision of ITNs at ANC clinics.

Intervention overview/Current status

In Cameroon, the MoH has collaborated with donors to support two national universal ITN coverage campaigns, largely with support from the Global Fund. The first campaign was conducted at the end of 2011, reaching a coverage rate of 89%. The second campaign was carried out in 2016. A post-campaign assessment is currently ongoing to assess coverage rates of the campaign, and an official report has yet to be released. The next mass distribution campaign is planned for 2019. In addition, the MoH with additional support from the Global Fund, has supported the provision of free ITNs to pregnant women at ANC clinics since 2008, but given supply chain challenges (these are outlined in the pharmaceutical management section), successful implementation of this approach has been limited.

The 2011 DHS and 2014 MICS reported that the percentage of households with at least one ITN was 36% and 71%, respectively, and the proportion of households with at least one ITN for every two people was 16% and 37%, respectively. While the 2011 DHS measurements preceded the first national universal ITN campaign, it is clear from the 2014 MICS that universal coverage, defined as one ITN for every two people, remains a challenge. In 2014, 55% of children under five, 52% of pregnant women, and 48% of the overall population slept under an ITN the previous night.

The next DHS, anticipated for 2017/2018, will be an important measurement on ITN ownership and use in Cameroon, and will provide insight into progress on coverage of this intervention since national universal campaigns have been rolled out. Increasing overall ITN use among the Cameroonian population will be a priority for PMI, and PMI will support a concentrated effort to improving routine distribution of ITNs at ANC clinics in the two northern regions (Far North and North). The NMCP and PMI will also seek ways to synergize existing activities that provide opportunities for measuring ITN access and messaging appropriate ITN use.

Commodity gap analysis

Table 4: ITN Gap Analysis

Calendar Year	2016	2017	2018
Total Population ⁽¹⁾	22,709,892	23,248,044	23,794,164
Total Population targeted for routine distribution ⁽²⁾	1,135,495	1,162,402	1,189,708
Continuous Distribution Needs			
Channel #1: ANC ⁽³⁾	931,106	953,170	975,561
<i>Estimated Total Need for Continuous</i>	931,106	953,170	975,561
Mass Distribution Needs			
2016 mass distribution campaign	12,616,607	0	0
<i>Estimated Total Need for Campaigns</i>	12,616,607		
Total ITN Need: Routine and Campaign	13,547,712	953,170	975,561
Partner Contributions			
ITNs carried over from previous year	0	0	244,104
ITNs from MoH	584,780	598,637	612,825
ITNs from Global Fund Round 9	12,906,839	598,637	0
ITNs from Other Donors	0	0	0
ITNs planned with PMI funding	0	0	331,050
Total ITNs Available	13,491,619	1,197,274	1,187,979
Total ITN Surplus (Gap)	(56,093)	244,104	212,418

(1) Population from the National Health Development Plan

(2) Pregnant women estimated as 5% of the total population

(3) 82% of pregnant women attend at least one ANC clinic

Plans and justification

PMI will support procurement and routine distribution of ITNs for pregnant women through ANC services in the two northern regions (Far North and North). PMI will continue to work with the NMCP to improve access to free ITNs distributed via routine ANC services in these two high-risk regions. In subsequent years, once ANC distribution is functional, support will focus on expanding routine distribution to EPI services as well. In addition, PMI resources will be used for communication activities that support improved compliance for year-round ITN usage; SBCC activities surrounding ITNs will be more fully described in the SBCC section. Focused technical assistance will help to strengthen routine distribution channels and plan for the next mass distribution campaign, including coordination with other donors.

Proposed activities with FY 2017 funding: (\$2,258,000)

1. *Procure routine ITNs for ANC:* PMI will procure approximately 255,749 ITNs for routine distribution through ANC services ensuring that the North and Far North Regions are covered. (\$868,000)

2. *Procure routine ITNs for 2019 national mass distribution campaign:* PMI will procure approximately 75,301 ITNs for distribution through a national mass campaign planned for 2019. (\$250,000)
3. *Distribution of routine ITNs for ANC:* Delivery of the approximately 255,749 ITNs to health facilities in the two northern regions for routine distribution to ANC clients. (\$640,000)
4. *Technical assistance for ITN distribution (routine channels and mass campaigns):* Support appropriate technical assistance to ensure regular and appropriate distribution of ITNs at ANC clinics in the two northern regions, provide guidance on nationwide routine ITN distribution strategies, and support planning for the next mass distribution campaign. (\$500,000)

C. IRS

Intervention overview/Current status

Implementation of IRS and the related logistical elements of a spray campaign are limited in Cameroon. For example, short-term aerosol spraying of 3,000 households by the foundation Exxon Mobile in the vicinity of Douala (2012-2015) is referred to as “*pulverization interdomicile*” with IRS, which incorrectly implies that there is a residual effect. However, there is still some experience with standing up house spraying. The MICS (2011) shows that a small number (2% of households) reported “spraying” during the 12 months preceding the survey, but little detail is known about these sprayings.

Cameroon has significant experience with entomological surveillance. The NMCP and its entomology partners have used existing results to develop an IRS entomology M&E plan that provides clear baseline results for informing an IRS program in the North (described below). Additionally, they have developed and updated a national scale vector resistance/susceptibility profile. Broadly, this plan would include ten entomological surveillance sites, four sites in the North and Far North where PMI interventions will be targeted, four sites in the South (three in the forested areas and one coastal) and two sites in the West. There is existing capacity to evaluate all PMI entomology indicators, given modest support from CDC, thereby establishing an entomological monitoring system capable of informing PMI planning and assessing impact of existing PMI insecticide-based vector control efforts.

A feasibility assessment will be required before planning for IRS implementation can begin. This assessment will look at the availability and quality of data from routine health facility-based reporting systems which are required for monitoring and evaluation of IRS programs. Entomological data, such as the vector resistance profile and the vector infection rate, as well as ITN coverage data will also be factored into the feasibility study.

Plans and justification

The PMI strategy, developed with NMCP input, is to target the two northern regions of the country (Far North, North) with a comprehensive package of malaria interventions that may eventually include IRS. Available resources would largely drive the scale of IRS implementation, and site selection would be based on prioritizing the highest burden districts within these two regions. Four steps are involved in implementing this approach: (1) assess the feasibility of an IRS program in this region based on availability and quality of routine health facility data and available financing (2) map and enumerate potential IRS districts; (3) develop a methodology to define target areas, ranking areas based on population and malaria incidence; and (4) operationalize IRS based on the strategy. Investment in the tools to develop this strategy prior to conducting IRS operations can be done using a specialized partner with experience in malaria surveillance systems and also using global positioning systems and available

satellite imagery to assist in enumerating all households, and assessing other relevant factors such as entomological and population density.

Based on this plan, the timeline for PMI-supported IRS would be as follows:

2018, PMI Year One: Establish IRS feasibility in the North and Far North Regions

2019, PMI Year 2: Establish IRS targeting approach covering the North and Far North Regions

- Define IRS targeting approach; this could include: (1) satellite imagery to inform a spatial location, mapping, and enumeration of structures in IRS target areas; (2) IT platform capable of integrating epidemiological and entomological data with spatial results to define the size and distribution of geographical IRS target units; and (3) a geographic information system mapping activity to inform operationalization of IRS.
- Use epidemiological data routinely collected by health facilities (and potentially community-based) to rank districts according to malaria burden.
- Use entomological data to assess suitability of IRS based on vector parameters.

2020-2022, PMI Years 3-5: IRS implementation based on targeting, monitoring and evaluation.

2023, PMI Year 6: Possible shift of IRS to new target areas, reinforcing all other interventions and activities in the areas receiving IRS in PMI years three to five.

Proposed activities with FY 2017 funding: (Costs included under entomological monitoring and SM&E)

2. Malaria in pregnancy

NMCP/PMI objectives

Consistent with WHO guidelines, the NMCP has the following objectives for malaria in pregnancy (MIP):

- By the end of 2017, at least 80% of pregnant women sleep under an ITN.
- By the end of 2017, 80% of pregnant women have access to ANC and those eligible for IPTp receive at least four doses of sulfadoxine-pyrimethamine (SP) beginning in the second trimester.

The 2014-18 National Strategic Malaria Control Plan includes the following guidance: (a) free distribution of SP for IPTp; (b) free distribution of ITNs during initial contact with ANC; (c) all cases of malaria in pregnancy treated as severe malaria; (d) avoid administration of more than five mg per day of folic acid concomitantly with the administration of SP; and (e) avoid administration of SP in pregnant women undergoing cotrimoxazole prophylaxis.

Intervention overview/Current status

IPTp

According to the 2014 MICS, the IPTp2 rate (proportion of pregnant women receiving at least two doses of IPT during their pregnancy) was 53% despite attendance of at least two ANC visits of 79%. Coverage with three doses of IPTp was even lower at 26% even though the percent of pregnant women with at least three ANC visits was 74%. The low coverage of IPTp (and the general lack of inclusion of this intervention in ANC services) was reportedly due to the following: frequent stock-outs of SP at the

health facility level (caused by delays in procurement and inventory management problems); lack of compliance by health workers; poor supervision of health facilities overall, particularly in regards to ANC services; delayed start of ANC services by pregnant women (reportedly as late as seven months); and financial accessibility issues despite the fact that SP is supposed to be provided free of charge.

The MoH's cost recovery system allows providers to collect and allocate fees for a wide range of services and to sell drugs to replenish its pharmacy stocks. However, health providers have little incentive to deliver IPTp even when SP is available due to the extra work involved and the fact that no income is generated from delivering this mandated free service. Moreover, despite SP being free of charge, there are costs incurred for ANC visits, including a \$0.50 consultation fee, a one-time ANC card (\$1), and charges for laboratory tests and iron-folate.

Although recommended by the MoH, there are reportedly no cups or clean water available to promote directly observed treatment with SP even when available. Also, there are very limited ANC outreach services to the communities.

To promote IPTp services, the present Global Fund malaria program includes funding for 50% of the SP needs (for IPTp) for the period 2016-17, with the GoC committed to covering the remaining half. In addition, the Global Fund is launching an integrated community component that will provide financial incentives for CHWs to identify pregnant women and promote their participation in ANC services and IPTp. An alternative PBF model proposed by the World Bank would include not only CHWs but also health providers at health facilities who would financially benefit from higher attendance at ANC and provision of IPT services. In 2017, the Global Fund and NMCP will undertake a barrier assessment to identify barriers to IPT uptake in the public and private sectors.

ITNs

Distribution of ITNs during ANC visits does not systematically occur due to: limited storage space at health facilities; lack of a robust supply chain system for routine ITNs; few incentives to health workers to distribute these free nets, even if available since there is no compensation for the health facility and staff; and the sense that everyone already has received ITNs through mass campaigns. The Global Fund wants to reinvigorate this intervention and has procured sufficient ITNs to support routine net distribution as part of ANC services for 2017, the final year of the current malaria grant program.

Case Management

The GoC follows WHO guidelines on the case management of malaria in pregnancy, including banning ACTs during the first trimester. All cases of MIP are considered as severe malaria and are treated as such. In the first trimester, intravenous quinine is to be prescribed for at least the first 24 hours, followed by oral quinine for up to seven days. Beginning in the second trimester, the first-line treatment is injectable artesunate with a second line of injectable quinine or intramuscular artemether. One issue is that malaria treatment for pregnant women costs about \$4. Although this is half the price of a standard adult treatment for severe malaria, this still represents a steep fee and possible barrier to treatment for many pregnant women.

Table 5: Status of IPTp policy in Cameroon

WHO policy updated to reflect 2012 guidance	Partially; the national guidance for malaria treatment in 2 nd and 3 rd trimesters is not consistent with WHO guidance
Status of training on updated IPTp policy	Unknown, but funded in Cameroon Global Fund round 9 malaria grant
Number of health care workers trained on new policy in the last year	Unknown
Are the revised guidelines available at the facility level?	Yes
ANC registers updated to capture 3 doses of IPTp-SP?	Yes
HMIS/ DHIS 2 updated to capture 3 doses of IPTp-SP?	Yes

Commodity gap analysis**Table 6: SP Gap analysis for malaria in pregnancy**

Calendar Year	2016	2017	2018
Total Population (1)	22,709,892	23,248,044	23,794,164
Targeted population (2)	1,135,495	1,162,402	1,189,708
SP Needs			
Total number of ANC visits by pregnant - national (3)	3,372,419	3,452,335	3,533,433
Total SP Need (in treatments) (4)	2,866,556	2,934,484	3,003,418
Partner Contributions (in treatments)			
SP carried over from previous year	0	408,211	826,094
SP from MoH	1,637,383	1,676,184	1,746,194
SP from Global Fund	1,637,383	1,676,184	0
SP planned with PMI funding	0	0	846,000
Total SP Available	3,274,767	3,760,579	3,418,288
Total SP Surplus (Gap)	408,211	826,094	414,870

(1) Population from the National Health Development Plan

(2) Pregnant women estimated as 5% of the total population

(3) 82% of pregnant women attend ANC1, 79% of women attend ANC 2, 74% of pregnant women attend ANC 3, 62% of pregnant women attend ANC 4+ (MICS '14)

(4) Assuming 85% coverage for IPTp and 3 doses per treatment

Plans and justification

In the Far North and North regions, PMI will support the delivery of effective MIP services in the public and confessional (i.e., faith-based, not-for-profit) sectors and promote IPTp and other MIP interventions at the community level. PMI will support the development of an SBCC strategy for MIP, including community mobilization and interpersonal communication for the promotion of early and monthly ANC visits, consistent with national guidelines. Additionally, interventions targeted to ANC health workers will be carried out if the planned barrier assessment (mentioned above) identifies health worker issues that can be addressed by behavioral interventions. PMI will support the delivery of IPTp, including in-

service training and supervision of health providers, along with the provision of plastic cups, SBCC materials, and client cards, where needed. PMI will also help establish the routine provision of ITNs to pregnant women at initial ANC visits. To improve the case management of MIP, PMI will support laboratory diagnosis and appropriate treatment of malaria in pregnant women, per national guidelines. To promote IPTp uptake and overall reproductive health at the national level, PMI will advocate reducing or eliminating the fees related to ANC services. PMI will also promote the establishment of a functional MIP working group inclusive of the malaria and reproductive health units.

Proposed activities with FY 2017 funding: (\$127,000)

1. *Procurement of SP*: Procurement of approximately 846,000 treatments of SP for pregnant women to contribute to covering needs in the North and Far North. (\$127,000)
2. *Training and supervision for MIP services provided at health facilities*: Training and supervision for ANC providers at public and non-profit health facilities in the North and Far North regions to effectively deliver IPTp and ITNs as part of routine ANC services. Activities will include on-the-job training, in-service training, and supportive supervision; they will be part of an integrated training and supervision package. (Costs included under Case Management)
3. *SBCC targeted to health workers providing MIP services*: Implementation of SBCC activities targeted to ANC providers to address barriers to routine MIP service provision. This will be combined with training and supervision activities for both MIP services and case management. (Costs included under SBCC)

3. Case management

A. Diagnosis and Treatment

NMCP/PMI objectives

The NMCP's objectives related to case management as outlined in the National Malaria Control Strategy are:

- Ensure at least 80% of people have a means of effective diagnosis and treatment within 24 hours of the onset of fever
- Guarantee that at least 80% of health districts with epidemic potential have received an adequate response

Intervention overview/Current status

The current malaria policy promotes the systematic confirmation of suspected malaria cases by a diagnostic test. This policy was adopted in 2013, but the regularity of access and adherence to RDTs and microscopy is unclear, particularly at the peripheral level. The national malaria case management guidelines follow WHO guidelines and standards. The first-line treatment for uncomplicated malaria is artesunate amodiaquine (ASAQ). In case of (i) non-availability of ASAQ, (ii) intolerance to ASAQ, or (iii) treatment of children under five years of age who are receiving seasonal malaria chemoprevention (SMC) in the North and Far North regions, artemether lumefantrine (AL) is the recommended treatment. For treatment of children under five years of age, ASAQ is provided free of charge, but treatment with AL incurs a cost.

Treatment of severe malaria should be administered parenterally for at least 24 hours, followed by oral treatment when the patient is able to drink fluids. The first-line treatment for severe malaria is injectable artesunate, and the second-line treatment is either injectable quinine or artemether. Severe cases identified in peripheral sites should be referred to a facility with inpatient capacity and it is

recommended that injectable artesunate be given intravenously or an intramuscular administration of quinine or artemether be given for pre-referral treatment. Pregnant women in their first trimester will receive quinine for uncomplicated malaria. For pregnant women in their second trimester and beyond, treatment of severe malaria will be carried out as described above.

In 2011, the GoC introduced free treatment of uncomplicated malaria in children less than five, followed by the addition of free treatment for severe malaria in children less than five in 2014. Testing for malaria by RDT has been free of charge for children less than five since 2015 and is subsidized for the rest of the population. According to the 2015 NMCP report, in 2014 there were 1,995,038 suspect cases of malaria, and 2,315,390 tests (RDT or microscopy) performed. The greater number of tests performed than suspect cases suggests that clinicians may lack confidence in the RDT results, and may also be a result of the fact that microscopy incurs a fee and is income-generating, thus sometimes both types of tests are performed for a suspect case.

The introduction of SMC in 2016 prompted some adjustments to case management practices for children under five with uncomplicated malaria during the three-month SMC campaign in the North and Far North Regions. One month prior to the beginning of the SMC campaign, ASAQ for children under five was removed from these areas and replaced with AL; treatment of uncomplicated malaria with AL for these children continued throughout and up to one month after completion of the SMC campaign. This was done to ensure that ASAQ was not prescribed during the SMC campaign, which uses sulfadoxine-pyrimethamine + amodiaquine (SP-AQ), amodiaquine being the common drug in both treatments).

Coinciding with the first edition of the WHO Guidelines for the treatment of malaria (2006), Cameroon began investigating the efficacy and safety of ACTs at four sentinel sites: Garoua, Bamenda, Nkongsamba, and Ebolowa. Eight generic ACTs have been investigated and documented for the past 12 years (2005 – 2016), including: ASAQ, AL, Artesunate-Sulfadoxine / Pyrimethamine (ASSP), Artesunate-Mefloquine (ASMQ), Artesunate-Chlorproguanil/Dapsone (ASCD), Dihydro-artemisinin-Pyberaquine (DHAP), Artesunate-Sulfamehoxy Piparazine-Pyrimethamine (ASSMP), and Artesunate-Atovaquone Proguanil (AS-ATPG). The evolution of ACT efficacy in Cameroon from 2005-2016 is displayed in Table 7. The most researched ACT was ASAQ, either as a co-blister or as a fixed-dose combination. Despite a decline in ACT efficacy from 97% in 2006 to 90% in 2016, efficacy has consistently remained above 90%, and ACTs in Cameroon are efficacious and well-tolerated. Therapeutic efficacy studies (TES) found that both fever and parasites generally cleared rapidly; however, parasite clearance varied by region. There was a high occurrence of parasitemia in Buea and Mutengene, which are both sites of high-levels of chloroquine resistance. Buea, Mutengene, and Limbe have the most chloroquine-resistant parasites and continue to show strange behavior to antimalarial drugs.

Table 7: Cameroon TES results by year, 2005-2016

	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
ASAQ	98.15	96.50	92.05	96.80	/	100.0	93.70	96.70	/	91.8	91.8	90.2
	99.40	98.50	/	/	/	/	/	/	/	/	/	/
ASSP	94.74	93.70	/		/	92.53*	/	/	/	/	/	85.9
ASMQ	/	100.0	/	96.60	/	/	/	/	/	/	/	/
AL	/	100.0	/	/	/	100.0	96.90	98.10	/	91.4	/	/
	/	95.50	/	/	/	99.70	/	/	/	/	/	/
ASCD	/	85.70	/	/	/	/	/	/	/	/	/	/
DHAP	/	/	97.67	/	/	/	/	96.3	/	/	/	/
ASSMP	/	/	/	/	/	99.40	/	/	/	/	/	/
DHAP+T	/	/	/	/	/	100.0	/	/	/	/	/	/
AS-ATPG	/	/	/	/	100.0	/	/	/	/	/	/	/

* Malartin was the trademark of the drug

Several ACTs other than ASAQ, ASMQ, ASSP, DHAP, and AL were only tested once in clinical trials, the majority of which were conducted in Yaoundé. Many investigators used different primary or secondary endpoints making some analysis difficult or incomparable. As of 2007, few studies on ASAQ efficacy were conducted following the 28-day protocol. Consequently, they have the potential to underestimate treatment effects although they show high efficacy rates. Despite the efficacy of ACTs, improving their regular use needs to be improved. According to the 2011 DHS and 2014 MICS, only 25% and 15%, respectively, took an ACT among children under five who had a fever in the previous two weeks and took any antimalarial.

Commodity gap analysis

Table 8: RDT gap analysis

Calendar Year	2016	2017	2018
RDT Needs			
Total population (1)	22,709,892	23,248,044	23,794,164
Total Population at risk for malaria	22,709,892	23,248,044	23,794,164
Total number of projected fever cases (2)	7,504,659	7,684,771	7,869,205
Total number of fever cases seeking care (3)	4,502,795	4,610,862	4,721,523
Total number of fever cases tested with an RDT (4)	3,602,236	3,688,690	3,777,218
Total RDT Needs - National	3,602,236	3,688,690	3,777,218
Partner Contributions			
RDTs carried over from previous year	0	1,538	0
RDTs from Government (5)	1,801,887	1,795,264	1,800,000
RDTs from Global Fund (6)	1,801,887	1,795,264	1,000,000
RDTs planned with PMI funding	0	0	1,350,000
Total RDTs Available	3,603,774	3,592,065	4,150,000
Total RDT Surplus (Gap)	1,538	-96,625	372,782
<p>(1) Population from the National Health Development Plan</p> <p>(2) Projected fever cases based on data from the HMIS systems, adjust for reporting rate and coverage. Give these are confirmed cases only, reporting, case management and services should improve, this has been quantified at 145%</p> <p>(3) 60% (30% public, 30% confessional and community) fever cases seek care in supported sectors</p> <p>(4) 80% of cases are tested using RDTs and 20% with microscopy</p> <p>(5) Government contributes 50% of projected need based on agreed upon gap analysis used to project number of fever cases; 2018 contribution is estimated as a rough average of the previous two years since no Global Fund grant has been agreed upon</p> <p>(6) The current Global Fund grant ends in December 2017. Funding for commodities in 2018 is unknown at this time but assumed to be the same as previous</p>			

Table 9: ACT gap analysis

Calendar Year	2016	2017	2018
ACT Needs			
Total country population (1)	22,709,892	23,248,044	23,794,164
Total Population at risk for malaria	22,709,892	23,248,044	23,794,164
Total number of projected fever cases (2)	7,504,659	7,684,771	7,869,205
Total number of fever cases seeking care (3)	4,502,795	4,610,862	4,721,523
Total number of fever cases tested positive (4)	2,926,817	2,997,061	3,068,990
Total ACT Needs - National	2,926,817	2,997,061	3,068,990
Partner Contributions			
ACTs carried over from previous year	0	0	0
ACTs from Government (5)	1,375,182	1,427,307	1,400,000
ACTs from Global Fund (6)	1,375,182	1,427,307	1,000,000
ACTs from Other Donors	0	0	0
ACTs planned with PMI funding	0	0	635,000
Total ACTs Available	2,750,364	2,854,614	3,035,000
Total ACT Surplus (Gap)	-176,453	-142,447	-33,990
<p>(1) Population from the National Health Development Plan</p> <p>(2) Projected fever cases based on data from the HMIS systems, adjust for reporting rate and coverage. Give these are confirmed cases only, reporting, case management and services should improve, this has been quantified at 145%</p> <p>(3) 60% (30% public, 30% confessional and community) fever cases seek care in supported sectors</p> <p>(4) 65% of cases estimated to be positive</p> <p>(5) Government contributes 50% of projected need based on agreed upon gap analysis used to project number of fever cases; 2018 contribution is estimated as a rough average of the previous two years since no Global Fund grant has been agreed upon</p> <p>(6) The current Global Fund grant ends in December 2017. Funding for commodities in 2018 is unknown at this time but assumed to be the same as previous</p>			

Plans and justification

PMI will support procurement of case management commodities including RDTs, ACTs, severe malaria treatments, and medications for SMC. These commodities will complement Global Fund, GoC, and other donor procurements and will cover the needs of the population in the North and Far North regions.

Training and supervision in the North and Far North regions will also be a focus to ensure appropriate adherence to national guidelines and high quality case management. This will include support to strengthen diagnostic services at all levels of the health care system, providing on-site feedback and technical advice, and support to the front-line clinicians and laboratory staff in peripheral health facilities and at community levels. One specific component of diagnostic strengthening will be investment in the development of a comprehensive quality assurance and quality control system for microscopy. This will ensure sustainable gains and build country capacity in diagnostic practices. In addition to diagnostics, PMI will also support training and supervision for routine case management services in public and confessional health facilities.

Both the Global Fund and the World Bank support CHW programs in Cameroon, and while the pay and incentive structure is different for each organization, they are both based on salaries or cash incentives, as is called for in the national community health strategy. PMI recognizes the critical role that CHWs play, particularly in settings such as Cameroon where utilization of the public sector is low and care seeking often delayed. While PMI does not support formalized payments of CHWs, PMI will seek to support the CHW programs in Cameroon to the extent possible, through trainings and procurement of commodities. The CHW program is only partially rolled-out in the North and Far North regions. PMI funding will permit the expansion of the CHW program to include an additional 2 districts to cover a total of 12 of the 45 districts in the North and Far North. PMI will support training, and supervision of 1415 CHW in these regions.

PMI plans to support integrated SBCC activities to promote appropriate treatment-seeking behavior among community members, with particular attention to increasing healthcare-seeking rates and utilization of free treatment for children less than five. In addition, SBCC activities will also be targeted to health service providers to address any behavioral barriers to service provision identified through formative research.

Proposed activities with FY 2017 funding: (\$10,285,000)

1. *Procure RDTs:* Procurement of approximately 1,320,000 RDTs to contribute to covering nationwide needs. (\$700,000)
2. *Procure ACTs:* Procurement of approximately 635,000 ACTs to contribute to covering nationwide needs. (\$600,000)
3. *Procurement of injectable artesunate for treatment of severe malaria:* Procure 316,000 vials of injectable artesunate to meet the need for severe malaria treatments in children less than five years of age and in older children and adults. For planning purposes, a treatment was estimated as 240 mg of artesunate (6 ampules @ \$2.52 per 60mg ampule for children under five and 12 ampules for older children and adults). (\$800,000)
4. *Procurement of medications for SMC:* Procurement of approximately 7,500,000 doses of AQ+SP, representing four monthly doses for approximately 1,700,000 children ages 3-59 months during the high transmission season of the North and Far North Regions. Upon review of eligible districts and outcomes of the first year of SMC (2016), this number will be further refined and adjusted as appropriate. (\$3,800,000)
5. *Implementation of SMC:* Implement SMC in eligible health districts in the North and Far North Regions, including four dose administrations from July to September, with costs covering planning, training, implementation, supervision, monitoring, SBCC, and advocacy. (\$2,800,000)
6. *Strengthen malaria diagnostics:* Work with the NMCP and National Laboratory to develop and support a comprehensive quality assurance and quality control plan for malaria diagnostics, primarily microscopy, to strengthen the health system in the two northern most regions. This will include refresher training for laboratory technicians (and training on malaria microscopy for new laboratory technicians) and regular supervision of microscopy performance in health facilities, including systematic review of a predetermined number of positive and negative blood smears. (\$50,000).
7. *Training and supervision of case management and MIP services:* Training and supervision for health service providers at public and non-profit health facilities in the North and Far North regions to effectively deliver routine case management services. Activities will include on-the-job training, in-service training, and supportive supervision; they will be part of an integrated training and supervision package. (\$800,000)
8. *Training and supervision of case management services provided by community health workers:* Training and supervision for 1,415 community health workers affiliated with public health

facilities in the North and Far North regions to effectively deliver routine case management services in hard-to-reach populations. Activities will be part of an integrated training and supervision package. (\$500,000)

9. *Support for regional and central level supervision activities:* To effectively reinforce case management policies and to facilitate data collection and reporting practices support NMCP staff from the central and regional levels in the North and Far North to conduct supportive supervision visits. Field visit logistics and communication support will be included (\$100,000).
10. *Development of guidelines and data collection tools:* Support for development, production and dissemination of case management guidelines and data collection tools (registers) at the national level (\$125,000).
11. *Technical assistance for case management:* One technical assistance visit from CDC to support diagnostics and case management strengthening activities. (\$10,000)

B. Pharmaceutical management

NMCP/PMI objectives

The NMCP has the following objectives related to pharmaceutical management:

- Prevent stockouts of ACTs, SP, ITNs, RDTs, and severe malaria drugs
- Ensure sustainable distribution of essential products
- Ensure the quality and efficacy of essential products and their proper use
- Monitor the process and outcomes of the pharmaceutical system

Current status

Structure of Pharmaceutical Management System: Drugs and other pharmaceutical products are supplied and distributed to public and private non-profit health units by the National Center for the Supply of Medicines and Essential Medical Supplies (CENAME) established in 1997 and subsequently converted into an autonomous agency. Medical supplies are then distributed to the relatively new Regional Health Promotion Funds (RHPFs) which are co-managed by health committees composed of representatives of the government, civil society, and the international community, and funded through management fees and cost recovery. The Directorate of Pharmacies, Drugs, and Laboratories (DPDL) serves as the pharmaceutical regulatory body for Cameroon performing tasks such as product registration and post-marketing surveillance. The National Laboratory of Medicine Quality and Expertise (LANACOME) is the official drug laboratory in Cameroon, responsible for controlling the quality of all pharmaceutical products that are imported or manufactured locally. In addition, the Inspectorate of Pharmaceutical and Laboratory Service oversees and regulates pharmacies and laboratories. Procurements for the GoC are handled by CENAME, using international open tender processes when resources are available. The Global Fund procures its commodities through its Pooled Procurement Mechanism. UNICEF procures some products for the Global Fund and the Islamic Fund. Private pharmacies procure commodities using their own channels. All products have to be registered before being introduced to the market.

Assessment: At central level, the roles of the Directorate of Pharmacy, the Inspectorate of Pharmacies and Laboratories, and CENAME are often disconnected and overlapping. It is expected that the results of a comprehensive audit of CENAME, mandated by the GoC and at the request from the French Cooperation Agency and the Global Fund partners, will be available by the end of 2016, and will offer an opportunity for improvement. Most of the RHPFs have not received technical assistance and financial support to properly implement their mandate, and therefore each fund has a different operational capacity. A national quantification committee has been created for HIV/AIDS products but does not yet

address other commodities. In 2017, the Global Fund is planning to conduct an assessment of the national pharmaceutical system, followed by GoC and partners working together to develop a strategic plan to improve the overall system.

Due to high cost recovery fees, utilization rates of public health facilities are low (estimated from service statistics as no more than 30 new case visits per 100 population per year). Instead, many people buy drugs in pharmacies or off the street from unauthorized drug sellers. Due to the weak regulatory system, some anti-malarial drugs are imported illegally into Cameroon from dubious sources and commercialized through unauthorized outlets, leading to very high risk of substandard and counterfeit products.

In July 2016, the Global Fund conducted an audit of the procurement and supply system that found “partially effective” procurement controls and “ineffective” supply chain controls. In particular, storage space was found to be inadequate, and temperatures and humidity levels were found to be too high in CENAME, as well as in four of the five RHPFs visited by the auditors. The records systems and related controls were deemed ineffective at CENAME and the monitoring of stocks inadequate at all levels. Of the five regional stores visited by the auditors, four had significant stock-outs of HIV or malaria drugs spanning a few days to two months, during which deliveries could not be made to health districts and facilities. Of the 18 health facilities visited by the audit team, six had stock-outs of malaria drugs between several weeks and six months. Malaria commodity consumption data (from 2015) showed discrepancies with client numbers. A severe malaria drug and a frontline malaria drug were consumed at 70% and 100% higher than the rate expected for the number of patients recorded, respectively. Additionally, pharmaceutical products worth \$261,602 could not be located during or after the audit.

Other Constraints of the Pharmaceutical Management System:

- Quantification is based solely on population and morbidity data due to the paucity of consumption data; the LMIS needs considerable strengthening.
- There is a complex requisition process for malaria commodities by health facilities, including frequent lengthy approvals by district and regional authorities before resupply.
- Lack of transport for some health facilities that are responsible for picking up drugs from the RHPFs through their own means.
- No national system to store and distribute ITNs.
- Stock-outs experienced by 40% of health facilities (SIAPS).
- No pharmacovigilance system for adverse medical reaction reporting.

PEPFAR assistance in pharmaceutical management: PEPFAR implementing partners -- the Systems for Improved Access to Pharmaceuticals and Services (SIAPS) and the Procurement and Supply Management (PSM) projects – provided technical assistance to CENAME at the national level and deployed a technical advisor to each RFHP in the four PEPFAR regions to promote supportive supervision and active stock monitoring. Upon arrival in Cameroon, PEPFAR-funded HIV/AIDS products are shipped directly to the regions. As a result, PEPFAR focuses capacity building and supervision activities at the regional level in close collaboration with the regional health authorities.

Due to the PEPFAR assistance, the availability of antiretroviral therapy (ARVs) has significantly improved, and the frequency and length of stock-outs at PEPFAR-supported health facilities have been significantly reduced by more than 50%.

Plans and justification

PMI will expand PEPFAR's assistance in pharmaceutical management to include malaria products in the four existing PEPFAR regions: Littoral, Centre, Northwest, and Southwest. Upon arrival in Cameroon, PMI will support the transport of USG-funded anti-malarial medicines and diagnostics directly to the regions. PMI will implement a similar pharmaceutical management program focused on malaria in the Far North and North Regions. In addition, on the national level, PMI will help design and implement a regular distribution channel for the delivery of ITNs as part of routine ANC.

Specifically, PMI will provide the following support to the six regions mentioned above:

- Deploy a regional pharmaceutical advisor in each region.
- Improve patient and logistic data quality and completeness through an improved LMIS.
- Promote the monitoring of consumption, distribution, and use of malaria products at the health facility level to aid decision making and quantification.
- Train pharmacy managers, storekeepers, and data managers from health facilities in basic pharmaceutical management and LMIS reporting.
- Support the MoH's quarterly supervision visits of health facilities and regular stock monitoring to improve pharmaceutical management of malaria commodities and collection of data related to patients and commodity stock status. Help develop maximum and minimum stock levels for each malaria product at health facilities.
- Provide stock cards and registers, as needed.

PMI will also provide limited pharmaceutical management support to the national level:

- Based on the external assessment of the national pharmaceutical system, provide technical assistance to the GoC to design a sustainable supply system that includes the specific needs of malaria control.
- Train members of the NMCP and the National Quantification Committee on malaria forecasting and supply planning for malaria products.
- Building upon prior work with LANACOME and the DPDL, strengthen national medicine regulatory systems (registration, inspection, quality control, pharmacovigilance) and begin development of a post-marketing surveillance program.
- Support the development of standard operating procedures for the management of malaria products.

Proposed activities with FY 2017 funding: (\$2,800,000)

1. *Supply chain strengthening*: Strengthen the pharmaceutical management system in the northern regions and PEPFAR funded regions by: deploying regional advisors, training staff, upgrading the LMIS, improving the distribution and stock management of malaria products, promoting supportive supervision, and providing technical assistance at the national level. (\$2,150,000)
2. *Distribution and management of commodities*: Support to manage distribution of commodities in six regions from the port of entry to the regional warehouses. The distribution channel will be based on the existing PEPFAR model and will include SP, RDTs, ACTs, and severe malaria treatments (\$500,000)
3. *Drug quality monitoring*: Provide technical support to address regulation and medicines policy development, drug quality assurance and control, and post-marketing surveillance. (\$150,000)

C. Other Interventions

Seasonal Malaria Chemoprevention (SMC)

The NMCP's objective for SMC is that 80% of children under five have access to chemoprevention in the targeted regions (North and Far North). In 2016, Cameroon introduced SMC, providing three rounds of sulfadoxine-pyrimethamine and amodiaquine (SPAQ) to roughly 1,147,194 children of eligible age (children 3-59 months old) that live in the 45 health districts in the targeted regions (North and Far North). The distribution was conducted over three days, for the months July through September. Implementation is door-to-door, with a fixed point as follow-up for households that were absent during the first attempted visit. Initially, mobilisers moved door-to-door to do a head count of all children between 3 and 59 months. On the day of distribution, agents went to the same households (door-to-door) to administer the first dose of SPAQ. The mother of each child administered the second and third doses on days two and three respectively, after demonstration by the agents on how to properly administer the dose. The mothers in homes with children that were absent during the door-to-door visits (either during the head count or during distribution), were asked to take their children to the nearest clinic in their health catchment area. Upon arrival at the clinic, a head count for the respective households of these mothers was conducted, the children were assessed for SPAQ eligibility and, upon confirmation, and children were given the first dose of SPAQ, with the second and third dose administered by the mother as outlined above.

The Far North Region has a short, roughly three month, transmission season, and is an ideal candidate for SMC (short transmission season and high malaria morbidity and mortality). The North Region has a range in transmission duration; with the northern most area having a short defined roughly three month transmission period, and the southern part of the region having a longer roughly six month transmission period. In order to appropriately adhere to WHO guidelines on SMC, PMI will use the most currently available epidemiologic data to identify areas with the appropriate transmission duration to determine eligibility in the North Region. For 2018, it has been determined that all districts require four rounds of SMC as opposed to only three.

4. Health system strengthening and capacity building

PMI supports an array of health system strengthening activities that cut across intervention areas, such as training health worker cadres, supply chain management, health information systems strengthening, drug quality monitoring, and NCMP capacity building.

NMCP/PMI objectives

The NSP aims to improve the health of the Cameroonian population and promote sustainable social and economic development. The Cameroon MoH has tasked the NMCP with a goal to provide the Cameroonian population with increased access to quality malaria care in accordance with the national health policy.

The 2014-2018 National Strategic Malaria Control Plan identifies the following key objectives for health system strengthening:

- Ensure protection of at least 80% of the population with effective malaria prevention measures
- Protect at least 80% of children under-five located in target zones with SMC
- Ensure biological confirmation of at least 80% of suspected malaria cases
- Provide treatment for 100% of confirmed malaria cases

Current Status

The FETP program in Cameroon (CA-FETP) is focused on strengthening country capacity in surveillance, field epidemiology and outbreak response, and has been operating since 2010 with participation from the Democratic Republic of Congo, Central African Republic, and Chad. The CA-FETP program supports the Advanced training program, a two-year intensive training program conducted at the national level, and has more recently launched the Frontline program, a three-month in-service program focused on building surveillance and epidemiology capacity at regional and district levels.

The Advanced program has hosted 3 cohorts with 52 health professionals trained; the fourth and fifth cohorts (28 trainees) are ongoing. Residents have participated in several malaria-related projects including district-level malaria surveillance evaluations and evaluation of community-based and hospital-based malaria case management practices.

The Frontline program has been established in response to a recognized need to create a network of health professionals throughout the country at lower levels of the health service delivery system who are trained to collect, analyze, use, and respond to data effectively. This is a critical need in a country the size of Cameroon with distinct cultural, language, and ethnic divisions. This program targets district medical officers, regional disease focal points (e.g., for malaria), nurses, and health center directors, among others. The first Frontline cohort was launched in March 2016 with three cohorts of 25 people each covering the East region. Year Two will follow a similar model covering the Adamawa, North and Far North regions; Year Three will cover the Center, Littoral, and South regions; and Year Four will finish with the West, North West, and South West.

Plans and justification

With FY2017 funding, PMI will focus on improving capacity within the MoH in the areas of leadership, management, and governance. Additionally, PMI will communicate with the MoH to identify key staff necessary to collaborate with the NMCP to improve leadership across NMCP function including: coordination of information systems, supply chain management, communications, case management, and program development. In partnership with the WHO, UNICEF, and other major malaria donors, PMI will provide technical assistance for the development of the next national malaria control strategic plan.

PMI proposes to support surveillance and field epidemiology capacity building through support to the FETP Advanced program. PMI support for this activity is expected to address existing human resource deficiencies in data use by strengthening participants' ability to conduct basic analyses of surveillance data, use those data as the basis of evidence-based public health actions, and build a network and culture of data use throughout the country. Specific trainee projects will include malaria but because these public health skills are transferable across disease areas, malaria benefits from any and all surveillance capacity building efforts. Cameroon and the broader region have experienced disease outbreaks in the past and will undoubtedly confront them in the future. It is essential that those at the first level of detection and reporting are prepared to deal with public health emergencies, in addition to routine disease monitoring.

Peace Corps: PMI will partner with Peace Corps Cameroon to support malaria interventions in volunteers' communities. PMI benefits from the committed community presence of 130 volunteers, all of whom receive training on malaria prevention. Thirty-five of these volunteers focus specifically on community health issues including: mother and child morbidity and mortality; HIV/ AIDs prevention among adolescent girls and young women; and malaria prevention and treatment. PMI funds will strengthen the malaria-specific portion of PCVs' training as well as establish malaria-specific community health volunteer(s). PMI will also support small projects approved by the Small Project Assistance committee for approval.

Proposed activities with FY 2017 funding: (\$290,000)

1. *Support for FETP:* PMI will support residents participating in the Advanced training programs. Advanced FETP residents will be engaged in malaria-specific projects. (\$150,000)
2. *Support for specific malaria-related PCV projects:* Funds will support three PCVs as well as small projects. (\$40,000)
3. *Support capacity building of the NMCP:* PMI will assist the NMCP in team building, logistics and supervision, office management, including communication capacity/ connectivity. PMI will also provide support for NMCP staff field supervision and production of the HMIS data collection tools and LMIS reports. (\$100,000)

Table 10: Health systems strengthening activities

HSS Building Block	Technical Area	Description of Activity
Health Services	Case management	Training in case management for health facility staff and CHWs. Supervision of health facility workers and CHWs to ensure quality health services are provided.
	Health systems strengthening	Quality assurance and quality control systems to monitor the quality of laboratory diagnostic services. Support for PCVs to coordinate malaria activities throughout the country; support small project grants for which volunteers can submit applications.
Health Workforce	Health systems strengthening	PMI will support the FETP that CDC has initiated in Cameroon.
Health Information	Surveillance, monitoring and evaluation	Strengthen disease surveillance systems to improve decision-making, planning, forecasting and program management
	Operational research	Support efforts from the Liverpool School of Tropical Medicine and OCEAC to study the impact of insecticide resistance on insecticide-based intervention measures.
	Entomological monitoring	
Essential Medical Products, Vaccines, and Technologies	Case management	PMI will support improved forecasting, procurement, quality control, storage and distribution of malaria commodities, such as insecticide-treated nets, artemisinin-based combination therapies and rapid diagnostic tests.
Leadership and Governance	Health systems strengthening	PMI will continue to work with the Leadership, Management, and Governance project that is currently funded under PEPFAR.

5. Social and behavior change communication

NMCP/PMI objectives

According to the NSP 2014-2018, behavior change communications are an essential part of ensuring that the Cameroonian population, including reticent community members, adopts behaviors that will prevent and treat malaria. The National Communication Plan, an extension of the 2014-2018 NSP, specifies four objectives:

1. Ensure at least 80% of health workers adopt behaviors that facilitate the population's use of malaria services;
2. Engage 80% of primary target audiences to adopt positive malaria behaviors;
3. Engage 80% of secondary target audiences to support malaria initiatives in Cameroon; and
4. Strengthen the reputation and perception of the NMCP by primary and secondary target audiences to instill confidence and encourage adherence to NMCP initiatives.

The primary target audience is identified as heads of households, pregnant women, caretakers of children under five years of age, adolescents (aged 12-24 years), NMCP staff, health workers, community health agents, and traditional practitioners. The secondary target audience includes policy makers, donors, technical partners, state government budget decision-makers, public and private sector enterprises, opinion leaders (e.g., artists, sports stars), community leaders, and the media.

Intervention approaches include mass media and interpersonal communications. Mass media includes traditional channels such as community and national radio, local and national print media, national television, and billboards, as well as social media and mobile phone networks. The purpose of mass media is to raise the public's awareness of key malaria interventions, increase knowledge about transmission, and enhance the image of the NMCP. The role of interpersonal communications, through home visits, educational discussions and counseling, is to actually influence behavior change. These activities will be carried out by designated community-based organizations (at least one per community) with frequent supervision and capacity building. Per the NSP, community based organizations (CBOs) are charged with conducting one home visit per quarter and educational discussions covering at least 30% of their target population based on an agreed-upon workplan.

According to the communication plan, effective messaging must identify the behavior change expected, the benefit of such a change to the audience, and what is required to perform the behavior; in addition the message needs to establish credibility. The NMCP has developed a matrix describing attitudes, motivations, and appropriate messages for the various target audiences across the four objectives listed above.

In addition to SBCC activities, the NSP includes social mobilization to involve community groups in malaria activities in order to encourage community ownership and accountability. The objective is for these community groups to plan, implement, and evaluate malaria activities in their own communities, including identification and mapping of reticent populations (e.g., farmers, fishermen).

Current status

The stakeholders and actors involved in malaria SBCC activities in Cameroon are diverse. In addition to international organizations like WHO and UNICEF, the private sector (e.g., ExxonMobil), NGOs (e.g., Malaria No More), and community- and faith-based organizations carry out the majority of communication interventions and are generally funded under the Global Fund grant. Malaria No More focuses support at the national level, and the other several sub-recipients focus at regional and district

levels; community-level interventions are implemented by CBOs and community health agents (CHAs) in each district. Under the current grant, 90 out of 189 total districts in Cameroon are covered (48%).

There is a national technical working group for malaria communications lead by the NMCP and made up of partners. One task of this group is to validate standard messages on behalf of the national program so that communication efforts are harmonized. At the local level, community animators, based with CBOs, work with the CHAs to further refine and tailor the messages for the local population and the time of year.

Malaria No More has been responsible for leading message and materials development, conducting mass communication (e.g., for the recent mass ITN distribution campaign), and engaging with the private sector. The *KnockOut Palu* campaign was developed for the 2011 mass ITN campaign and adopted by all partners as the national campaign for Cameroon. The *Nightwatch* component of this campaign included television, radio, and SMS messages that were aired/sent at bedtime each night reminding people to sleep under their nets, as well as billboards, community events, and public service announcements. An evaluation in 2012 demonstrated that exposure to this campaign resulted in higher net use compared to those unexposed.⁴ For the most recent campaign, radio and television spots focused on several themes: registration and distribution for mass campaign; hang-up, care and use of ITNs; malaria transmission; prevention of MIP through IPTp and net use; RDTs and associated costs; and promotion of community health agents. These efforts were informed by regional-level workshops that included community focus groups to understand barriers to net use, and other key behaviors. These were facilitated by the NMCP with participation from the national maternal and child health program and partners.

Support for interpersonal communications is not explicitly included under the Global Fund grant, just mass media; but CHAs and animators from CBOs do conduct educational discussions and home visits as part of the integrated community-based platform. A CHA toolkit, including a flipchart, includes modules for over ten health issues, including malaria.

SBCC gaps identified by partners include interventions targeted to health workers and overall M&E of SBCC activities, including mass media monitoring, formative research, and intervention evaluations. Malaria No More conducted annual knowledge attitudes and practices surveys from 2011-2014 with funding from ExxonMobil, but when that funding ended, there haven't been any SBCC data collections. Because the Global Fund only covers 90/189 districts, over half of Cameroon's districts are not funded for regional-level and community-based SBCC activities. In addition there is a concern that with the focus on integration, there are too many health activities for one CHA to cover during a community discussion, much less for an audience to absorb, retain, and then act upon.

Plans and justification

Besides IRS, all key malaria interventions, and the appropriate policies are in place in Cameroon. The main challenge is in achieving national scale-up and ensuring uptake by target populations for: net use; ANC attendance; prompt care-seeking for fever; awareness of and demand for testing, treatment, and IPTp; health worker adherence to national case management and MIP guidelines; and beneficiary adherence to SMC (and IRS when introduced). Appropriate and consistent net use as well as timely ANC attendance, are common behavioral challenges in malaria control. In addition, malaria service provision seems to be another area that warrants further behavioral intervention investigation.

⁴ Bowen, H. Impact of a mass media campaign on bed net use in Cameroon. *Malar J.* 2013 Jan 25;12:36.

PMI will support the NMCP's communication plan under the guidance of the NMCP, and in coordination with the Global Fund and other partners to ensure uptake of these key interventions in the PMI geographic focus areas. Given the Global Fund focuses communication efforts on mass media and supports efforts to coordinate and harmonize SBCC activities, PMI will focus resources at district and local levels in the two northern regions where other activities will be concentrated. These activities will be directed to improve:

- Awareness/adherence for SMC
- Awareness and participation in ANC services
- Awareness of routine ITN distribution channels as these are strengthened
- Awareness of and demand for free services (RDTs and treatment for children under five years; IPTp)
- Net use and net care by community members
- Care-seeking for routine malaria services
- Health worker adherence to case management and MIP guidelines as well as patient-provider communication

Activities to raise awareness will rely on community media channels (radio, billboards, print), small group communications, and health facility-based communication campaigns with local leaders and community groups implicated in these efforts.

Net use, care-seeking, and health worker adherence will rely more on interpersonal communications and utilize existing platforms of CHAs and CBOs. Additionally, PMI-funded supportive supervision for case management and MIP at health facilities with a focus on the public and confessional sectors (future focus may expand to private sector) will also be leveraged.

Intervention design and messaging will be informed by data collection activities, including the ongoing post-campaign evaluation to assess net use behaviors, as well as a health facility survey included in this MOP to understand gaps in malaria service provision (if they are found to be behavioral in nature). Additional data collection needs for formative research and M&E will also be supported in the two northern regions to assess the impact of activities aimed at improving uptake of malaria interventions.

Proposed activities with FY 2017 funding: (\$900,000)

1. *SBCC for IRS: SBCC focused on raising awareness of IRS implementation and encouraging adherence to spray operator instructions. (No associated cost in Year 1).*
2. *SBCC for net use, care-seeking, and to generate demand for routine malaria services: Implementation of a coordinated SBCC campaign targeted to the community to raise awareness of and demand for routine malaria services provided in health facilities and at the community-level. Awareness-raising will primarily be accomplished through local media, or one-way communication channels (e.g., radio, billboards, signage in facilities). Efforts to change individual behaviors for net use and care-seeking will rely more heavily on interpersonal communications. (\$300,000)*
3. *SBCC targeted to health workers providing case management and MIP services: Implementation of a coordinated SBCC campaign targeted at health workers to ensure adherence to national case management guidelines and MIP policies and generate overall high-quality service provision. These efforts will be combined with training and supportive supervision activities. (\$300,000)*
4. *Support formative research, monitoring, and evaluation to inform SBCC interventions: Support for data collection to identify behavioral barriers to intervention uptake by both community*

members and service providers, to design interventions, and to evaluate efforts to change behaviors as a result of SBCC interventions. (\$300,000)

6. Surveillance, monitoring, and evaluation

NMCP/PMI objectives

The NMCP's national M&E plan complements the NSP 2014-2018. The plan identifies the general objective of the overall strategic plan: By 2018 reduce malaria morbidity and mortality by 75% from 2000 levels. The plan also details the specific targets for prevention, case management, program management, epidemiologic surveillance, communication, training, and operational research. The specific objective of the M&E Plan itself is to evaluate the progress of implementation of the NSP. Specific M&E objectives include:

- Monitor implementation of activities laid out in the NSP 2014-2018
- Evaluate progress made in improving coverage with key malaria interventions
- Measure the epidemiologic impact of malaria interventions
- Direct allocation and use of material, financial, and human resources
- Support the planning process at all levels of the health system

The M&E plan lists and defines specific impact and coverage indicators and aligns them with performance targets through 2018. This includes data sources, methods, and persons responsible identified (indicator reference sheets are also included). The plan itself differentiates between monitoring and evaluation. Monitoring includes community-level reporting; national HMIS, including adoption and rollout of the DHIS 2 platform; a sentinel surveillance system (primarily for therapeutic efficacy monitoring and research); antimalarial pharmacovigilance; and LMIS. For evaluation, the plan identifies surveys and reviews. Surveys are used to assess coverage and impact. Reviews are conducted at central, regional and district levels, as well as malaria program reviews at the mid-point and end of each 5-year strategic plan period. Data dissemination and use are highlighted as key elements of the strategy. The NMCP's annual report is a core component of this, but other reviews, workshops, reports, and meetings are also identified. The three principle ways data are meant to be used, are for advocacy for the government and donors, planning of interventions, and decision-making. Finally, capacity building through training and technical assistance for actors at all levels of the health pyramid is emphasized.

In the M&E Plan, the HMIS (or SNIS in French) is described in a more global sense as made up of all sub-systems including routine reporting from health facilities, epidemiologic surveillance, disease-specific reporting systems, and administration and resource management. It also includes health data derived from surveys, not just from routine reporting systems.

Current status

Although the M&E Plan identifies specific M&E activities, not all of them are currently funded and/or operational. The following sources currently collect malaria data in Cameroon:

Routine malaria reporting: The malaria program has been using a vertical malaria reporting system since 2011. At health facilities, data are entered into a standardized form to collect malaria data elements. Data collected include IPTp and ITNs distributed; communication activities; epidemiologic and case management (reported separately for children under 5 years, those 5 years and older and pregnant women); and malaria commodity data. These forms are sent to the district where they are

entered into a database. Each district sends the database up to the region, and the region sends it to the NMCP.

Each district convenes quarterly data review meetings with all health areas in their jurisdiction to present data and discuss data quality issues. The NMCP identified district-level data use and interpretation as a primary gap for routine reporting. Routine analyses are run on a quarterly basis at both regional and national levels. Pre-set analyses are run on the database by the NMCP for specific indicators reported to the MoH, as well as the Disease Control Directorate (confirmed cases and deaths) for regular surveillance reviews.

The Disease Control Directorate, which also contains a malaria unit within (separate from the NMCP) maintains the epidemiologic surveillance system for notifiable diseases. Globally, this is commonly known as the IDSR system (or SIMR in French). This system is primarily a weekly reporting system, though some diseases, like malaria, are only reported on monthly. In theory, this system will report the same data as those reported to the monthly malaria system, but in practice, discrepancies have been noted.

The District Health Information System 2 (DHIS 2) has been adopted in Cameroon as the reporting platform for the HMIS to streamline data collection from parallel disease reporting systems. It is still in relatively early stages of scale-up. As of Oct 2016, approximately 300 hospitals out of roughly 5,000 health facilities throughout the country had been trained (in July 2016) and were reporting into the system. The strategy for DHIS 2 scale up is to begin with hospitals and then expand to lower-level health facilities, though there is currently no written plan or strategy for scale up. National, regional, and district-level focal points across health areas will all be trained and have access to data in the system. The system is currently designed for reporting with smartphones, tablets, or computers; there are no plans to roll this out using paper-based tools.

Next steps include assessing progress of hospitals that are currently reporting and to pilot the system in 100 lower level health facilities with the use of tablets. Anecdotal information shared by the HMIS and NMCP is that many health facility staff, particularly in the peripheral areas, have no experience using computers, so the learning curve with smartphone or computer-based reporting will likely be quite high. Currently, the needs for scale up include equipping health facilities with reporting tools (smartphones, tablets, laptops), training them in the reporting procedures, and ensuring adequate supervision. Global Fund will be supporting DHIS 2 scale up with roughly \$2.2 million focused on data use and analysis.

The NMCP has been actively involved in planning for the DHIS 2 roll out. They are very open to having routine malaria data collected in this integrated system rather than maintaining a separate parallel system. As yet, there is no concrete plan for when and how the NMCP will transition from collecting data via the malaria reporting system in favor of the HMIS/DHIS 2.

Household surveys: Cameroon implemented a DHS in 2004 and 2011, an MIS in 2011, and a MICS in 2014. Both the 2011 DHS and MIS included malaria biomarkers using RDTs, though the surveys were implemented in different seasons, with the MIS implemented during peak transmission (particularly in the northern regions where there is only one short transmission season). The next large household survey is a DHS planned for 2017-2018. This will include parasitemia biomarkers, and the pretest is planned for October, 2017.

In addition to the DHS, MIS, and MICS, post-ITN campaign coverage surveys have been implemented after the last two mass distribution campaigns in Cameroon. There was a 2013 survey after the 2011 campaign (roughly 18 months after the distribution), and there is another survey currently being implemented (as of October 2016) to assess coverage as a result of the 2016 campaign that was completed in July 2016. The ongoing survey, with results expected by the end of the year 2016, will provide important data points to assess access to and use of ITNs. It will provide an indication of remaining gaps with respect to ensuring that households have enough ITNs and that they appropriately use the ITNs that they have.

No health facility surveys were noted or shared with the MOP team during the assessment visit. Though sentinel surveillance, LMIS, and pharmacovigilance are mentioned in the M&E plan, they do not seem to be currently funded or operational.

Table 11: Surveillance, Monitoring, and Evaluation Data Sources

Data Source	Survey Activities	Year								
		2010	2011	2012	2013	2014	2015	2016	2017	2018
Household surveys	Demographic Health Survey (DHS)		X*						(X)	
	Malaria Indicator Survey (MIS)		X*							
	MICS					X*				
	Post-ITN campaign survey				X*			X*		
Health Facility and Other Surveys	Health facility survey									(X)
	EUV survey									(X)
Malaria Surveillance and Routine System Support	Support to malaria surveillance system		X*	X*	X*	X*	X*	X*	?*	?*
	Support to HMIS						X*	X*	X*	(X)
Therapeutic efficacy monitoring	In vivo efficacy testing	X*								
Entomology	Entomological surveillance and resistance monitoring									(X)

Table 12: Routine Surveillance Indicators, 2015

Indicators	Value	Comments
1. Total number of reported malaria cases Data source for all: Monthly malaria reporting system (as reported in the NMCP's 2015 Annual Activity Report)	1,369,512	Clinical/presumed cases are not indicated in the report; only suspect and confirmed. This number represents confirmed cases
Total suspect cases	1,995,038	Uncomplicated and severe
Total diagnostically confirmed cases	1,369,512	Uncomplicated and severe
Total clinical/ presumed/ unconfirmed cases	[625,526]	<i>[Not specifically indicated in annual report; this number is derived from suspect-confirmed cases, but is not included in total number of cases above]</i>
<i>If available, report separately for outpatients and inpatients</i>		
Outpatient number of reported malaria cases	898,303	Uncomplicated, not "outpatient" Clinical/presumed cases are not indicated in the report; only suspect and confirmed. This number represents confirmed cases
Suspect cases	1,463,840	
Diagnostically confirmed	898,303	
Clinical/presumed/unconfirmed	[565,537]	<i>[Not specifically indicated in annual report; this number is derived from suspect-confirmed cases but is not included in total number of cases above]</i>
Inpatient number of reported malaria cases	471,209	Severe, not "inpatient" Clinical/presumed cases are not indicated in the report; only suspect and confirmed. This number represents confirmed cases
Suspect cases	531,198	
Diagnostically confirmed	471,209	
Clinical/presumed/unconfirmed	[59,989]	<i>[Not specifically indicated in annual report; this number is derived from suspect-confirmed cases but is not included in total number of cases above]</i>
2. Total number of reported malaria deaths	3,440	
Diagnostically confirmed	3,440	Not specified whether they were confirmed or not.
Clinical/presumed/unconfirmed	.	
3. Malaria test positivity rate (outpatients)	Not reported	Data not available. It is fairly common practice to test with both RDT and microscopy, though this varies by region.
Numerator: Number of outpatient confirmed malaria cases	898,303	Uncomplicated, not "outpatient"
Denominator: Number of outpatients receiving a diagnostic test for malaria (RDT or microscopy)	.	The total number of RDTs done is 1,573,992; number of microscopy tests is 1,253,263. If we took total confirmed cases (1,369,512), TPR by

Indicators	Value	Comments
		RDT appears to be 87%.
4. Completeness of monthly health facility reporting	78%	
Numerator: Number of monthly reports received from health facilities	33,880	
Denominator: Number of health facility reports expected (i.e., number of facilities expected to report multiplied by the number of months considered)	43,164	

Plans and justification

PMI will collaborate with the NMCP, Global Fund, and other malaria partners to support the M&E strategy outlined as part of the NSP. The next DHS will be important to understand the current state of intervention coverage on a national scale in Cameroon. The DHS pre-test is scheduled to take place in October, 2017. As the survey is close to implementation phase most of the funding has been committed. PMI will fill a small gap in funding that was not met by other partners.

PMI will support routine health information system strengthening, primarily scale up of DHIS 2 and ensuring quality of malaria data under that system. This support will be provided at the national level to assist the NMCP in developing a strategy to transition the parallel malaria reporting system to the DHIS 2 platform. This will address data quality monitoring, supportive supervision, and technical assistance for data use, including development and dissemination of a monthly malaria bulletin.

In the two northern regions where PMI will be targeting the majority of its efforts, PMI will support targeted surveillance strengthening in all 45 health districts to ensure high quality health facility and community-level data for epidemiological surveillance, as well as regular monitoring of routine malaria services (routine ITN distribution, provision of IPTp, and case management). These data will inform programmatic decision-making including feasibility studies for IRS. This support will be in line with the national scale up of the DHIS 2 platform and may include equipment, training, intensive supervision, and data quality monitoring. Also in the northern regions, a health facility assessment will provide formative and baseline data on routine malaria service provision for MIP and case management. Finally, the end use verification survey (EUV) will assess the degree to which commodities are reaching the end user.

Proposed activities with FY 2017 funding: (\$1,460,000)

1. *Support for DHS 2017/2018:* Support for the next DHS, including malaria parasitemia biomarker collection. The survey is scheduled to take place in 2017, but may be delayed to 2018. The PMI contribution will be combined with other partner contributions. (\$100,000)
2. *Routine health information system strengthening:* Support to the NMCP to develop a strategy to transition the parallel malaria reporting system to the DHIS 2 platform, including data quality monitoring, supportive supervision, and technical assistance for data use. (\$150,000)
3. *Targeted surveillance strengthening in northern districts:* Support to the district level in the North and Far North regions to ensure high-quality data to monitor routine malaria service provision and epidemiological impact of the comprehensive package of interventions. Data will also be used to inform selection of IRS districts. (\$850,000)

4. *Health facility assessment*: Implement a health facility survey in public and non-profit facilities in the North and Far North regions to assess provision of routine malaria services, including health facility readiness, training/supervision, and health worker performance. Data will be used to inform health facility-based training, supervision, and SBCC interventions, and can also be used as a baseline for a later data point. If possible, PMI will collaborate with other partners to make this a national-level survey. (\$200,000)
5. *End Use Verification Survey (EUV)*: Implement a semi-annual EUV survey at the national level to monitor the availability of key malaria control commodities at health facilities and regional warehouses on a national scale. (\$150,000)
6. *TA for SM&E*: One technical assistance visit from CDC to support surveillance, monitoring, and evaluation activities. (\$10,000)

7. Operational research

No PMI-supported OR has been completed, is ongoing, or planned with FY 2017 funds. PMI will support efforts to strengthen NMCP capacity for identifying operational research needs, conceptualizing appropriate approaches to operational research questions, and prioritizing studies with the most potential to influence uptake or implementation of key malaria interventions in Cameroon. PMI will consider supporting specific OR studies in the future.

8. Staffing and administration

Two health professionals serve as Resident Advisors (RAs) to oversee PMI in Cameroon, one representing CDC and one representing USAID. In addition, one or more Foreign Service Nationals (FSNs) work as part of the PMI team. All PMI staff members are part of a single interagency team led by the USAID Mission Director or his/her designee in country. The PMI team shares responsibility for development and implementation of PMI strategies and work plans, coordination with national authorities, managing collaborating agencies and supervising day-to-day activities. Candidates for RA positions (whether initial hires or replacements) will be evaluated and/or interviewed jointly by USAID and CDC, and both agencies will be involved in hiring decisions, with the final decision made by the individual agency.

The PMI interagency professional staff work together to oversee all technical and administrative aspects of PMI, including finalizing details of the project design, implementing malaria prevention and treatment activities, monitoring and evaluation of outcomes and impact, reporting of results, and providing guidance and direction to PMI implementing partners.

The PMI lead in country is the USAID Mission Director. The day-to-day lead for PMI is delegated to the USAID Health Office Director and thus the two PMI RAs, report to the USAID Health Office Director for day-to-day leadership, and work together as a part of a single interagency team. Technical expertise housed in Atlanta and Washington D.C. complements PMI programmatic efforts.

The two PMI RAs are physically based within the USAID health office but are expected to spend approximately half of their time with and providing TA to the NMCPs and implementing partners, including time in the field monitoring program implementation and impact.

The number of locally-hired staff and necessary qualifications to successfully support PMI activities either in Ministries or in USAID will be approved by the USAID Mission Director. Because of the need

to adhere to specific country policies and USAID accounting regulations, any transfer of PMI funds directly to Ministries or host governments will need to be approved by the USAID Mission Director and Controller, in addition to the U.S. Global Malaria Coordinator.

Proposed activities with FY 2017 funding: (\$1,355,000)

1. *USAID staff and other in-country administrative expenses:* Support for one USAID PMI resident advisor, foreign national malaria dedicated and cross-cutting staff, temporary staff for program start-up until permanent staff are in place, and other administrative local costs to USAID/Cameroon, including International Cooperative Administrative Support Services costs. (\$850,000)
2. *CDC technical staff:* Support one resident advisor. (\$505,000)

**Table 1: Budget Breakdown by Mechanism
President's Malaria Initiative – Cameroon
Planned Malaria Obligations for FY 2017**

Mechanism	Geographic Area	Activity	Budget (\$)
CDC/IAA	National	FETP and technical assistance for entomological monitoring, case management and M&E	700,000
GHSC/PSM	National with focus on North and Far North Regions	Procurement of ITNs, SP, RDTs, ACTs, and severe malaria drugs	10,585,000
TBD - new central case management mechanism	North and Far North Regions	Training and supervision for health service providers to effectively deliver routine case management services. Support to implement SMC in the North and Far North Regions	4,675,000
Breakthrough Action	North and Far North Regions	SBC activities related to net use, care-seeking, and to generate demand for routine malaria services; SBC targeted to health workers providing case management and MIP services and support for formative research, monitoring, and evaluation to inform SBC interventions.	900,000
MEASURE Evaluation	National with focus on North and Far North Regions	Support to the NMCP and district level in North and Far North regions in DHIS2 implementation, data quality monitoring, supportive supervision, and technical assistance for data use.	1,000,000
The DHS Program	National	Support for the next DHS, including malaria parasitemia biomarker collection.	100,000
PMI VectorLink Project	National / North and Far Nother Regions	Support for vector surveillance and insecticide resistance monitoring and preparation for potential IRS campaign in 2020	500,000
Peace Corps IAA	National	Support for three malaria volunteers and small project grants for which volunteers can submit applications.	40,000
USP	National	Support to the National Laboratory of Medicine Quality and Expertise	150,000
VectorWorks	North and Far North Regions	Technical assistance and training to support NMCP and implementing partners with routine ITN distribution	500,000
USAID	National	In-country staffing and administration	850,000
Total			20,000,000

**Table 2: Budget Breakdown by Activity
President's Malaria Initiative – Cameroon
Planned Malaria Obligations for FY 2017**

Proposed Activity	Mechanism	Budget		Geographic Area	Description
		Total \$	Commodity \$		
PREVENTIVE ACTIVITIES					
VECTOR MONITORING AND CONTROL					
Entomologic monitoring and insecticide resistance management					
Entomologic monitoring and insecticide resistance management	PMI VectorLink Project	450,000	0	Nationwide	Support for vector surveillance and insecticide resistance monitoring, including vector-insecticide susceptibility, resistance intensity, vector density, vector population taxonomic status (microscopic, molecular), and vector biting behavior in ten entomological sites throughout the country.
Training for entomologists	PMI VectorLink Project	50,000	0	Nationwide	Training of up to five Cameroonian entomologists, including from the NMCP, at the Centre de Recherche Entomologique de Cotonou (CREC).
Technical assistance for entomological support (2 visits)	CDC IAA	25,000	0	Nationwide	Two technical assistance visits from CDC to help develop entomological capacity at the national and regional levels.
Subtotal Ento monitoring		525,000	0		
Insecticide-treated Nets					

Procurement of routine ITNs for ANC	GHSC - PSM	868,000	868,000	North & Far North	Procurement of approximately 255,749 ITNs for routine distribution in ANC clinics to pregnant women in the North and Far North Regions.
Procurement of ITNs to contribute to the 2019 mass distribution campaign	GHSC - PSM	250,000	250,000	National	Procurement of approximately 75,301 ITNs to help meet the need for the planned 2019 national distribution campaign
Distribution of routine ITNs for ANC	GHSC - PSM	640,000	0	North & Far North	Distribution costs associated with routine ANC distribution.
TA for routine ITN distribution	VectorWorks	500,000	0	North & Far North	Technical assistance and training to the NMCP and implementing partners to ensure routine ITN distribution is strategically planned and executed.
Subtotal ITNs		2,258,000	1,118,000		
Indoor Residual Spraying					
IRS in North and Far North regions	PMI VectorLink Project	0	0	North & Far North	Activities to prepare for selection of spray districts based on epidemiological and entomological data will be considered for Year 2, with anticipated implementation of spraying in Year 3.
Subtotal IRS		0	0		
SUBTOTAL VECTOR MONITORING AND CONTROL		2,783,000	1,118,000		
Malaria in Pregnancy					
Procurement of SP	GHSC - PSM	127,000	127,000	North & Far North	Procurement of approximately 846,000 treatments of SP for pregnant women to contribute to covering needs in North and Far North.

Training and supervision for MIP services provided at health facilities	TBD - new central service delivery mechanism	Costs included under Case Management	0	North & Far North	Training and supervision for ANC providers at public and non-profit health facilities in the North and Far North regions to effectively deliver IPTp and ITNs as part of routine ANC services. Activities will include on-the-job training, in-service training, and supportive supervision; they will be part of an integrated training and supervision package.
SBCC targeted to health workers providing MIP services	Breakthrough Action	Costs included under SBCC	0	North & Far North	Implementation of SBCC activities targeted to ANC providers to address barriers to routine MIP service provision. This will be combined with training and supervision activities for both MIP services and case management.
Subtotal Malaria in Pregnancy		127,000	127,000		
SUBTOTAL PREVENTIVE		2,910,000	1,245,000		
CASE MANAGEMENT					
Diagnosis and Treatment					
Procurement of RDTs	GHSC - PSM	700,000	700,000	North & Far North	Procurement of approximately 1.35 million RDTs to meet the needs in the North and Far North.
Procurement of ACTs	GHSC - PSM	600,000	600,000	North & Far North	Procurement of approximately 635,000 ACTs to meet the need in the North and Far North.

Procurement of injectable artesunate for treatment of severe malaria	GHSC - PSM	800,000	800,000	North & Far North	Procure approximately 316,000 vials of injectable artesunate to meet the need for severe malaria treatments in the North and Far North (in both children less than 5 and in 5+).
Procurement of medications for SMC	GHSC - PSM	3,800,000	3,800,000	North & Far North	Procurement of ~7.5 million doses of AQ+SP, representing four monthly doses for approximately 1.7 million children ages 3-59 months during the high transmission season of the North and Far North Regions. Upon review of eligible districts and outcomes of the first year of SMC (2016), this number will be further refined and adjusted as appropriate.
Implementation of SMC	TBD - new central service delivery mechanism	2,800,000	0	North & Far North	Implementation of SMC in eligible health districts in the North and Far North regions covering four monthly doses from July-October using door-to-door distribution approach for the first dose. Costs include planning, training, implementation, supervision, monitoring, SBCC, and advocacy.
Strengthen malaria diagnostics	TBD - new central service delivery mechanism	50,000	0	North & Far North	Support to work with the NMCP to strengthen malaria diagnostics through training and supervision, including a comprehensive quality assurance/quality control plan for malaria diagnostics including RDTs and microscopy. These activities will be carried out in public and non-profit health facilities in the North and Far North regions.

Training and supervision for case management and MIP services provided at health facilities	TBD - new central service delivery mechanism	800,000	0	North & Far North	Training and supervision for health service providers at public and non-profit health facilities in the North and Far North regions to effectively deliver routine case management services. Activities will include on-the-job training, in-service training, and supportive supervision; they will be part of an integrated training and supervision package.
Training and supervision for case management services provided by community health workers	TBD - new central service delivery mechanism	500,000	0	North & Far North	Support for the community health worker program in 12 of 45 districts in the North and Far North regions to effectively deliver routine case management services to hard-to-reach populations. Activities will be part of an integrated training and supervision package targeting 1415 Community Health Workers.
Support for supportive supervision activities	TBD - new central service delivery mechanism	100,000	0	North & Far North	Support for NMCP supportive supervision activities (from central level and regional level) including field visit logistics and communication support.
Development of guidelines and data collection tools	TBD - new central service delivery mechanism	125,000	0	Nationwide	Support for development, production and dissemination of case management guidelines and data collection tools (registers).
Technical assistance for case management (1 visit)	CDC IAA	10,000	0	Nationwide	One technical assistance visit from CDC to support diagnostics and case management strengthening activities.

Subtotal Diagnosis and Treatment		10,285,000	5,900,000		
Pharmaceutical Management					
Supply chain strengthening	GHSC - PSM	2,150,000	0	North, Far North, Littoral, Center, Southwest, Northwest	Strengthening of the pharmaceutical management system in the North and Far North regions, as well as the four PEPFAR-supported regions in order to leverage existing resources. Specific activities will include support for six regional pharmaceutical advisors, training of warehouse staff, upgrades to the LMIS as needed, and supportive supervision.
Distribution and management of commodities (SP, RDTs, ACTs, severe malaria treatments)	GHSC - PSM	500,000	0	North, Far North, Littoral, Center, Southwest, Northwest	Support to manage distribution of commodities in six regions from the port of entry to the regional warehouses. The distribution channel will be based on the existing PEPFAR model and will include SP, RDTs, ACTs, and severe malaria treatments.
Drug quality monitoring	PQM	150,000	0	Nationwide	Support to the National Laboratory of Medicine Quality and Expertise (LANACOME) to address regulation and medicines policy development, drug quality assurance and control, and post-marketing surveillance.
Subtotal Pharmaceutical Management		2,800,000	0		
SUBTOTAL CASE MANAGEMENT		13,085,000	5,900,000		
HEALTH SYSTEM STRENGTHENING / CAPACITY BUILDING					

FETP	CDC IAA	150,000	0	Nationwide	Support for FETP residents participating in the Advanced training programs to be engaged in malaria-specific projects.
Peace Corps	Peace Corps IAA	40,000	0	Nationwide	Support for three Malaria Volunteers: one based in Yaounde and two others in regional hubs to coordinate and support volunteers' malaria activities throughout the country; one-two volunteers may be embedded with a PMI implementing partner at national or regional levels. Support small project grants for which volunteers can submit applications.
Training and management support for NMCP staff	TBD - new central service delivery mechanism	100,000	0	Nationwide	Support to the NMCP to assist them in their role of coordinating technical and implementation partners, as well as opportunities to build capacity via conference and workshop attendance (national or international) to improve program management. Office management support is included.
SUBTOTAL HSS & CAPACITY BUILDING		290,000	0		
SOCIAL AND BEHAVIOR CHANGE COMMUNICATION					

SBCC for net use, care-seeking, and to generate demand for routine malaria services	Breakthrough Action	300,000	0	North & Far North	Implementation of a coordinated SBCC campaign targeted to the community to raise awareness of and demand for routine malaria services provided in health facilities and at the community-level. Awareness-raising will primarily be accomplished through local media, or one-way communication channels (e.g., radio, billboards, signage in facilities). Efforts to change individual behaviors for net use and care-seeking will rely more heavily on interpersonal communications.
SBCC targeted to health workers providing case management and MIP services	Breakthrough Action	300,000	0	North & Far North	Implementation of a coordinated SBCC campaign targeted to health workers ensure adherence to national case management and MIP policies and high-quality service provision. These efforts will be combined with training and supportive supervision activities.
Support formative research, monitoring, and evaluation to inform SBCC interventions.	Breakthrough Action	300,000	0	North & Far North	Support for data collection to identify behavioral barriers to intervention uptake by both community members and service providers, to design interventions, and to evaluate efforts to change behaviors as a result of SBCC interventions.
SUBTOTAL SBCC		900,000	0		
SURVEILLANCE, MONITORING, AND EVALUATION					
Support for DHS 2017/2018	The Demographic and Health Surveys Program (DHS-7)	100,000	0	Nationwide	Support for the next DHS, including malaria parasitemia biomarker collection. The pretest is scheduled for October 2017. The PMI contribution will be combined with other partner contributions.

Routine health information system strengthening	MEASURE Evaluation	150,000	0	Nationwide	Support to the NMCP to develop a strategy to transition the parallel malaria reporting system to the DHIS2 platform, including data quality monitoring, supportive supervision, and technical assistance for data use.
Targeted surveillance strengthening in northern districts	MEASURE Evaluation	850,000	0	North & Far North	Support to the district level in the North and Far North regions to ensure high-quality data to monitor routine malaria service provision and epidemiological impact of the comprehensive package of interventions. Data will also be used for feasibility assessment of IRS.
Health facility assessment	TBD - new central service delivery mechanism	200,000	0	North & Far North	Implement a health facility survey in public and non-profit facilities in the North and Far North regions to assess provision of routine malaria services, including health facility readiness, training/supervision, and health worker performance. Data will be used to inform health facility-based training, supervision, and SBCC interventions, and can also be used as a baseline for a later data point. If possible, PMI will collaborate with other partners to make this a national-level survey.
EUV	GHSC - PSM	150,000		Nationwide	Implement a semi-annual EUV survey at the national level to monitor the availability of key malaria control commodities at health facilities and regional warehouses on a national scale.
TA for SM&E	CDC IAA	10,000	0	Nationwide	One technical assistance visit from CDC to support surveillance, monitoring, and evaluation activities.
SUBTOTAL SM&E		1,460,000	0		

OPERATIONAL RESEARCH					
		0	0		
SUBTOTAL OR		0	0		
IN-COUNTRY STAFFING AND ADMINISTRATION					
CDC	CDC IAA	505,000	0		Support for one USAID PMI Advisor, one USAID locally-engaged senior malaria specialist, support for temporary staff for program start up (until permanent staff are in place), one CDC PMI Advisor, and all other related local costs to sitting in the USAID Mission.
USAID	USAID	850,000	0		
SUBTOTAL IN-COUNTRY STAFFING		1,355,000	0		
GRAND TOTAL		20,000,000	7,145,000		