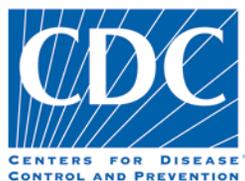


This Malaria Operational Plan has been approved by the U.S. Global Malaria Coordinator and reflects collaborative discussions with the national malaria control programs and partners in country. The final funding available to support the plan outlined here is pending final FY 2019 appropriation. If any further changes are made to this plan it will be reflected in a revised posting.



U.S. PRESIDENT'S MALARIA INITIATIVE



MOP FY 2018/FY 2019 Cameroon

PRESIDENT'S MALARIA INITIATIVE

CAMEROON

**Malaria Operational Plan
FY 2018 and FY 2019**

MOP FY 2018/FY 2019 Cameroon

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ABBREVIATIONS and ACRONYMS

| | |
|-------------|---|
| ACT | Artemisinin-based combination therapy |
| AL | Artemether-lumefantrine |
| ANC | Antenatal care |
| ASAQ | Artesunate-amodiaquine |
| BTCNRU | Biotechnology Center based at the University of Yaounde 1, National Reference Unit |
| CAFETP | Cameroonian Field Epidemiology Training Program |
| CDC | Centers for Disease Control and Prevention |
| CENAME | National Center for the Supply of Medicines and Essential Medical Supplies |
| CHW | Community health worker |
| CRID | Center for Research in Infectious Disease |
| DHS | Demographic and Health Survey |
| DPDL | Directorate of Pharmacies, Drugs, and Laboratories |
| EPI | Expanded Program for Immunization |
| FETP | Field Epidemiology Training Program |
| FY | Fiscal year |
| GHI | Global Health Initiative |
| GHSA | Global Health Security Agenda |
| Global Fund | Global Fund to Fight AIDS, Tuberculosis and Malaria |
| GoC | Government of Cameroon |
| HLC | Human Landing Catch |
| HMIS | Health management information systems |
| IEC | Information, education, communication |
| IPTp | Intermittent preventive treatment for pregnant women |
| IRS | Indoor residual spraying |
| ITN | Insecticide-treated mosquito net |
| kdr | knockdown resistance |
| LANACOME | National Laboratory of Medicine Quality and Expertise |
| 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 |
| PARMA | PMI-supported Antimalarial Resistance Monitoring in Africa |
| PEPFAR | President's Emergency Plan for AIDS Relief |
| PBO | Piperonyl butoxide |
| PBF | Performance-based financing |
| PCR | Polymerase chain reaction |
| PCV | Peace Corps Volunteers |
| PMI | U.S. President's Malaria Initiative |
| PSC | Pyrethrum spray catch |
| QA/QC | Quality assurance/quality control |
| RDT | Rapid diagnostic test |

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| | |
|--------|--|
| 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 + amodiaquine |
| TA | Technical assistance |
| UNFPA | United Nations Population Fund |
| UNICEF | United Nations Children's Fund |
| USAID | United States Agency for International Development |
| WHO | World Health Organization |

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I. EXECUTIVE SUMMARY

Launched in 2005, the initial 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 of 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 remain 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 To End Malaria's second generation global malaria action plan, *Action and Investment to defeat Malaria (AIM) 2016-2030: for a Malaria-Free World* and the World Health Organization's (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.

In 2017, consistent with an increase in annual appropriations, PMI launched additional new country programs in Cameroon, Côte d'Ivoire, Niger, and Sierra Leone, and expanded an existing program in Burkina Faso to PMI focus country status. With the addition of these new focus countries, PMI now has programs in 24 countries in sub-Saharan Africa, in addition to two bilateral programs and targeted support in the Greater Mekong sub-region in Asia.

Cameroon began implementation as a PMI focus country in FY 2018.

This FY 2018 and FY 2019 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 are fully aligned with the National Malaria Control Strategy and the National Malaria Strategic Plan (NSP) and build on investments made by PMI and 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

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achieving the targets of the NMCP and PMI, and provides a description of activities that are planned with FY 2018 and FY 2019 funding.

The proposed PMI budget for Cameroon is \$22.5 million for FY 2018 and \$22.5 million for FY 2019. PMI will support the following intervention areas with these funds:

Entomologic monitoring and insecticide resistance management:

The malaria NSP describes the NMCP's approach to entomology surveillance, monitoring, and evaluation (SM&E) activities to monitor vector behavior and resistance patterns and inform decisions on vector control programs, in particular the implementation of IRS in the two regions of North and Far North where transmission is highly seasonal. PMI will continue support, begun in FY 2018, for entomological and insecticide resistance monitoring in five sentinel sites proposed by the NMCP as best representing Cameroon's five ecological zones. This will include determining species composition, density, behavior, parity, source of blood meal, sporozoite infection rates, insecticide resistance levels, and intensities of malaria vectors in different areas. Training of staff and operational support, including purchasing of equipment and some expendable supplies, will be included.

Insecticide-treated nets (ITNs):

The NMCP's current NSP aimed to have at least 80% of the population sleeping under an ITN by 2018. This national strategy includes universal ITN distribution campaigns every three years as the primary means for distributing ITNs combined with routine free distribution of ITNs to pregnant women through antenatal care (ANC) clinics. Supply chain challenges have limited successful implementation of this routine distribution approach. Using FY 2017 funds, PMI has procured ITNs to fully cover routine distribution during ANC in the North and Far North regions for FY 2018 and initiated support to strengthen commodities management and distribution, including ITNs. With FY 2018 funds, PMI will provide technical assistance and support distribution costs in support of the 2019 national ITN mass distribution campaign in the Far North region as well as procurement and routine distribution of ITNs through ANC clinics to pregnant woman both in the North and Far North regions. Existing data document the presence of pyrethroid resistance phenotypes associated with elevated mixed function oxidases in several vector populations along with restored susceptibility using piperonyl butoxide (PBO). In response, a combination of ITNs treated with synergistic PBO, ITNs with "non-pyrethroid" insecticides, and long-lasting non-pyrethroid insecticides are recommended by the NMCP. PMI will begin procuring PBO ITNs for the routine ANC distribution in the two PMI target regions with FY 2019 funds.

Indoor residual spraying (IRS):

NMCP and PMI have identified the North and Far North regions as promising targets for IRS. Seasonal rainfall in these regions result 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. 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 crucial to this effort and to allow prioritization of districts within the regions. PMI initiated support to entomologic and insecticide resistance monitoring in late FY 2018 with FY 2017 funds. With FY 2018 and FY 2019 funding, PMI will continue supporting entomological monitoring to ensure adequate epidemiological and entomological data for feasibility assessment of a potential IRS program. At this point no IRS activities are planned and these will only be considered once baseline data have been adequately analyzed and the long-term sustainability of an IRS program has been assessed.

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Malaria in pregnancy (MIP):

The NMCP in Cameroon supports WHO's three-pronged approach to controlling malaria in pregnancy: use of ITNs among women of childbearing age, monthly delivery of intermittent preventive treatment in pregnancy (IPTp) with sulfadoxine pyrimethamine (SP) beginning at 13 weeks of pregnancy and continuing at one month intervals, and prompt and effective treatment of malaria in pregnant women. PMI will support health workers and community health workers in the effective delivery of these services in select districts in the North and Far North regions. Support will include procurement and routine distribution of ITNs at antenatal care (ANC), procurement and pharmaceutical management for IPTp and case management commodities as well as service delivery support for MIP. This will include training and supervision of health workers and support for development and implementation of effective social behavior change communication (SBCC) messages.

Seasonal malaria chemoprevention (SMC):

Under the current NSP 2014-2018, the NMCP objective is to have 80% of children under the age of five in the targeted regions (North and Far North) covered by SMC. Cameroon started annual implementation of SMC in 2016 and program data suggest that this is reducing malaria morbidity in these regions. PMI FY 2017 funds supported the 2018 SMC campaign, with four sulfadoxine-pyrimethamine + amodiaquine (SPAQ) cycles implemented in a door-to-door strategy. While the fourth cycle has just occurred in early October and reporting is still ongoing, preliminary results from first two cycles seem very promising. PMI will continue to support the SMC campaign in the 45 health districts of the North and Far North regions, by providing SPAQ to meet the needs for the two regions and support all elements of campaign implementation including sensitization and mobilization of the population, training and supervision of CHWs, SPAQ distribution, data collection, management, and reporting. PMI will continue to work with NMCP to closely monitor malaria data from these regions assuring that adjustments in SMC planning are made as needed (district eligibility, season, etc.) and to monitor drug resistance.

Case management:

PMI will support the revision of national case management guidelines to reflect updates to the new National Strategic Plan. PMI will support procurement of case management commodities including rapid diagnostic tests (RDTs), ACTs, and drugs for severe malaria covering estimated needs for the North and Far North, complementing Global Fund and other donor procurements which support procurements in the remaining eight regions of Cameroon. PMI will also procure microscopes as part of a malaria diagnostics quality assurance/quality control program. PMI will support the Ministry of Health's integrated community case management program by expanding support to CHWs in six of the North and Far North's 45 districts, building on Global Fund- and UNICEF-supported CHW programs. PMI support will train, equip, and provide supportive supervision for 735 CHWs. At the health facility level, PMI will support service delivery in these same six districts plus the 12 districts with Global Fund CHW support (total 18 of 45 districts). This support for effective integrated service delivery (case management, malaria in pregnancy, and routine ITN distribution) will support 300 health facilities with training and supportive supervision. These support activities will include SBCC to target barriers to effective service delivery, as well as ensure health workers are using patient interactions to provide service communication (education and coaching to ensure uptake of key behaviors). A select number of facilities with advanced capacity to manage severe illness will be targeted to serve as reference and training centers for management of severe malaria. With both FY 2018 and FY 2019 funds, PMI will

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also support therapeutic efficacy studies (two sites in each year) for first-line antimalarials using the NMCP's existing surveillance platform and following WHO's 28-day protocol.

Social and behavior change communication (SBCC):

Cameroon's National Malaria Communication Plan is an extension of the NMCP's 2014-2018 National Strategic Plan and articulates objectives to improve uptake of positive malaria behaviors among target audiences including community beneficiaries, health service providers, as well as policymakers and stakeholders. Intervention approaches include mass media to raise awareness and improve knowledge, and interpersonal communication to more directly influence behavior change. 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. At a central level, support will include capacity building for the NMCP to update the national communication plan, to regularly convene meetings of the SBCC coordination group, and to facilitate participation of the NMCP in key global meetings. These efforts will be informed by a stakeholder capacity assessment. With FY 2018 funds, PMI will support formative research in the two northern regions, including qualitative and quantitative data collection. Implementation activities will focus on health workers as service delivery activities get underway. PMI will also support communication efforts for the ITN mass campaign in the Far North and the SMC campaign in both northern regions. With FY 2019 funds, SBCC implementation activities for both beneficiaries and health workers will intensify based on the results of formative research. Data collection for monitoring implementation will be an important focus, and PMI will continue to support NMCP capacity building for coordination and management of partner SBCC activities.

Surveillance, monitoring, and evaluation (SM&E):

The NMCP has a five-year SM&E plan that is designed to monitor and evaluate progress towards achieving the goals of the malaria NSP and includes specific objectives focused on improving timely reporting of routine malaria data, increasing data use for decision making, improved reporting on intervention coverage, and early detection and control of epidemics. PMI will continue to support these objectives by providing targeted technical assistance in the North and Far North regions focused on improving data quality and data use, as well as a health facility survey to assess quality of case management and data reporting practices in these regions. PMI will also support national level activities including a malaria indicator survey and development of a new five-year national M&E plan to accompany the new NSP being developed for 2019-2023.

Operational research (OR):

The NMCP objectives as outlined in the NSP focus on capacity strengthening, therapeutic efficacy studies and entomological resistance monitoring as priorities for operational research. No PMI-supported operational research has been completed, is ongoing, or is planned with FY 2018 or FY 2019 funds.

Other health systems strengthening:

With FY 2018 and FY 2019 funds, PMI plans to continue to support activities to develop leadership, management, and governance capacity of the NMCP. This includes an array of cross-cutting health system strengthening activities, such as training health workers, strengthening supply chain management and health information systems, and drug quality monitoring. Although PMI will not directly fund performance-based financing (PBF), which is largely financed and implemented by the World Bank and Global Fund, PMI will support complementary health system strengthening approaches that improve

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malaria service delivery and provide the malaria information needed for evidence-based decision-making. PMI will also continue to 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.

II. STRATEGY

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 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.

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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 investments made by PMI and 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 2018 and 2019 funding.

2. Malaria situation in Cameroon

All of Cameroon's roughly 25 million inhabitants live in malaria endemic areas, with 71% living in high transmission areas (> 1 case per 1,000 population), and 29% living in low transmission settings (0-1 cases per 1,000 population).¹ According to the 2011 Malaria Indicator Survey, the average prevalence of parasitemia in children under the age of five was 33%. Cameroon has three malaria transmission zones that vary by geographic region and transmission intensity. The equatorial forest zone in the south is a hot and humid climate with abundant precipitation. This zone has perennial malaria transmission of 7 to 12 months and an entomological inoculation rate of 100 infective bites per person per month. The tropical/Sudanian zone includes parts of central and northern Cameroon, particularly the North and Adamawa regions, and has an intense seasonal malaria transmission season of four to six months. This zone has an entomologic inoculation rate of 10 infective bites per person per month. The Sahelian zone is comprised of the Far North region and has a hot and dry tropical climate where malaria transmission lasts only one to three months. The entomologic inoculation rate during this short transmission season is roughly 10 infective bites per person per month.

According to the 2017 NMCP annual report, a total of 2,093,009 cases of malaria were confirmed by diagnostic test. Of these, 49% were classified as severe malaria. These cases represent 24% of all medical consultations at health facilities, and 45% of all hospitalizations. Malaria accounts for the greatest proportion of hospitalizations in the Adamaoua, Far North, and North regions accounting for 60%, 56%, and 56% of all hospitalizations in these regions, respectively. In 2017, there were 3,195 malaria deaths reported in health facilities, which represented 13% of all-cause deaths. The proportion of deaths due to malaria is highest in the Far North (26%) and North (27%) regions, where the malaria season is shortest. Across Cameroon, the overall test positivity rate in 2017 was 58% (55% by RDT and 62% by microscopy).

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

Cameroon is divided into 10 semi-autonomous administrative regions (see Figure 1), 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 then subdivided into 189 health districts. This is the total number, individual regions contain anywhere from 9 to 30 health districts depending on geography and population size. Each health district is headed by a District

¹ http://www.who.int/malaria/publications/country-profiles/profile_cmr_en.pdf

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Medical Officer. The 189 health districts are further divided into health areas, commonly known by their French name as *aires de santé*, 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 (CHW). The country's two largest cities are Douala (population of 2.94 million) and Yaoundé (population of 3.07 million), located in the Littoral and Center regions, respectively.

4. National malaria control strategy

Cameroon's current National Strategic Plan (NSP) for malaria control covers the period 2014-2018 and is the fourth iteration of a national strategy. The NMCP is in the process of elaborating its new NSP covering 2019-2023 and expects that it will be finalized by the end of 2018. Updates in the new strategy will be summarized in the next section. The 2014-2018 strategy was informed by an external mid-term review conducted in 2013. 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 in the North and Far North regions.
- 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.
- III. **Communication** – includes advocacy; behavior change interventions; social mobilization; social marketing and private partnership; and training of health agents, community actors, and journalists.
- IV. **Training and research** - includes 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.

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

5. Updates in the strategy section

The NMCP is in the process of elaborating its new National Strategic Plan for the period 2019-2023. The strategic updates are based on the 2016 mid-term evaluation of the 2014-2018 NSP. Though the document was not available for review at the time this MOP was drafted, the NMCP did provide an update on the key changes that will be reflected in the new strategy.

The general objectives of the new NSP are:

- To reduce malaria mortality from 2015 levels by 60% by 2023;
- To reduce malaria incidence from 2015 levels by 60% by 2023; and
- To reduce malaria transmission to a very low level (pre-elimination threshold) in some health districts in the Sahelian zone of the country (i.e., Far North region) by 2023.

New strategies that will be included in the NSP:

- Certain strategies may be tailored specifically for a given region or regions rather than applied at national level across all regions. Seasonal Malaria Chemoprevention is an obvious example as it is implemented only in the North and Far North regions. Another related example is the switch to artemether-lumefantrine (AL) rather than artesunate-amodiaquine (ASAQ) as the first-line ACT in these same regions due to SMC implementation. The other eight regions will maintain ASAQ as the first-line treatment.
- The NMCP is elaborating a sentinel surveillance model that will focus on ensuring high-quality data from a purposefully selected group of health facilities throughout the country. These sites will also serve as research platforms for therapeutic efficacy studies and other operational research questions prioritized by the NMCP.
- A quality assurance/quality control (QA/QC) system will ensure strengthened diagnostics throughout the country.
- The routine ITN distribution strategy will expand beyond distribution to pregnant women through ANC to include the Expanded Program for Immunization (EPI) platform for children and introduction of piperonyl butoxide (PBO) ITNs in regions with evidence of vector metabolic resistance to insecticides and low efficacy of currently used ITNs.

6. Integration, collaboration, and coordination

PMI works closely with the NMCP and other partners to coordinate support for activities to best support the National Strategy for malaria control. PMI and the Global Fund provide the majority of malaria funding to Cameroon. Other technical development assistance for malaria comes from WHO, UNICEF and United Nations Population Fund (UNFPA) (see Table 1). The Global Fund malaria grant supports community case management with RDTs, antimalarials for treatment at health facilities and in the community, procurement of ITNs, the strengthening of monitoring and evaluation systems, and resources for health communication, health systems strengthening (HSS), health management information systems (HMIS), and program management operating costs. The majority of the support for

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the 2019 national ITN campaign is also provided through this grant. The current Global Fund malaria grant covers 2018–2020 allocation period set at approximately \$75 million. Rather than a common basket approach, PMI is currently procuring malaria commodities including ITNs for routine distribution via ANC, RDTs, ACTs, and injectable artesunate to meet the needs of the population in the North and Far North regions with Global Fund procuring these commodities for the rest of the country, covering for the gap in Government of Cameroon (GoC) funding. PMI procured drugs and funded the implementation of the 2018 SMC campaign and plans to continue this support going forward. The GoC has also requested funding from PMI for implementation of entomological and insecticide resistance monitoring to inform vector control interventions. Net durability monitoring will also be supported by PMI following the 2019 mass campaign. PMI works closely with the NMCP and with the Global Fund to ensure no duplication of activities and maximization of investments.

Table 1: NMCP malaria control partners

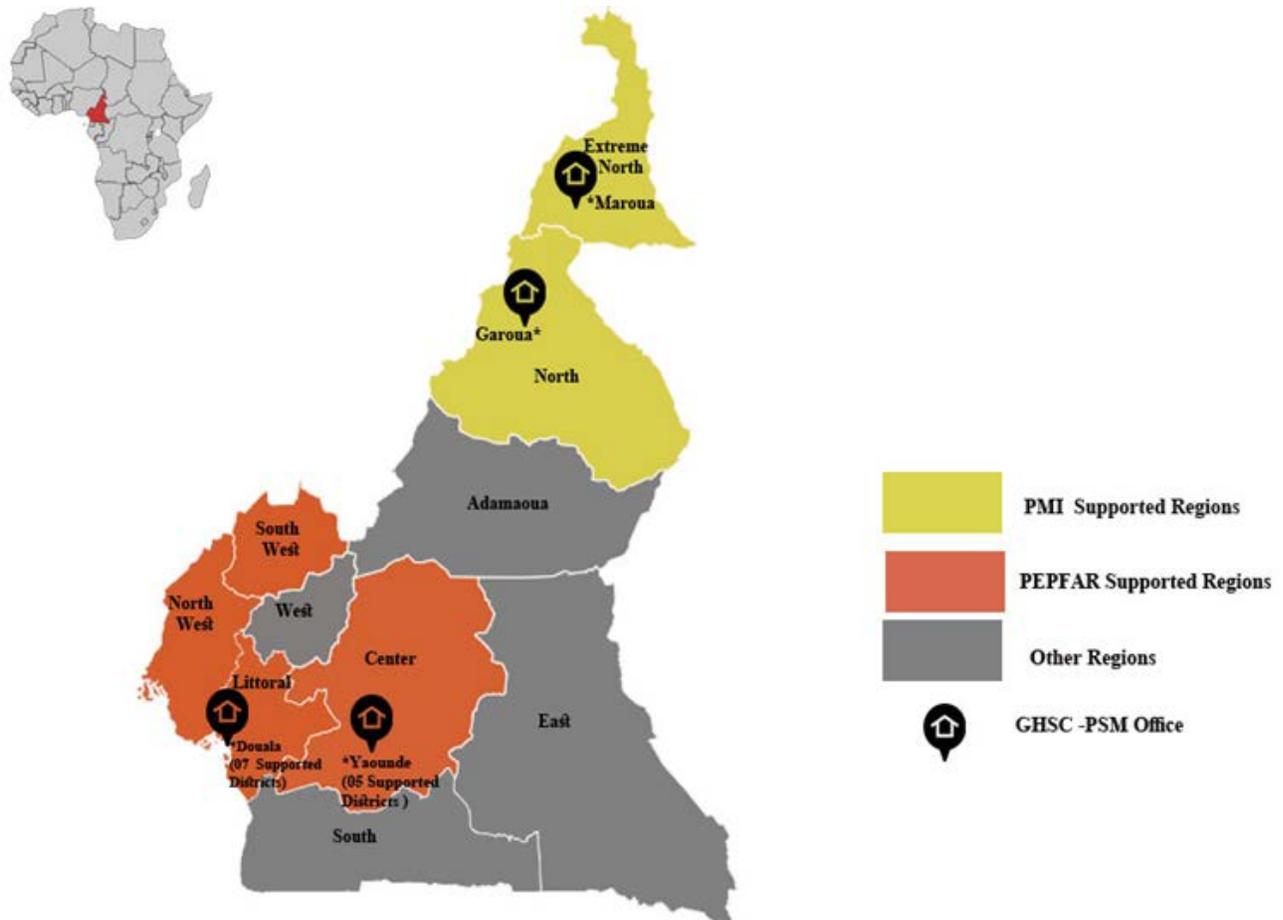
| Major Partners | Implementing Partners | Location | Domain |
|-----------------------------------|--|---|---|
| Multilateral Organizations | WHO, UNICEF, UNFPA | National; East, Adamoua, Far North (UNICEF) | Advocacy, policy and resource mobilization |
| The Global Fund | Plan, IRESCO, MCCAM, 69 Districts NGOs | National | Funding and technical partner |
| PMI | PSM, VectorLink, Impact Malaria, MEASURE Evaluation, Breakthrough Action | North, Far North, plus LMIS in 4 regions (Northwest, Southwest, Centre and Littoral) | Funding and technical partner |
| Exxon Mobil | ACMS (PSI), Jhpiego, CCA-SIDA | Some health districts in South, Adamoua and North | Advocacy, communication and case management |
| Malaria No More | NA | National | Advocacy and resource mobilization |
| Other International Organizations | Croix Rouge (CICR), MSF, IMC | Far North (Kousseri, Goulfey, Makary, Mada, Mora, Kolofata, Mokolo), IMC (Refugees Meiganga, Djohong) | Case management |
| Research Institutions | UNIYA01 (BTC), OCEAC | National | Operational research |

PMI works in collaboration with other U.S. Government initiatives including the President’s Emergency Plan for AIDS Relief (PEPFAR) and the Global Health Security Agenda (GHSa) on cross-cutting programmatic issues related to HIV/AIDS and other health interventions. This has included support for pharmaceutical management strengthening in the four PEPFAR regions (see Figure 1). PMI also supports the Cameroonian Field Epidemiology Training Program (CAFETP) by funding two trainees enrolled in the advanced training module (two years). In addition, PMI supports Peace Corps Volunteers

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(PCV) by providing small grants for activities focused on behavior change communication activities aimed at improving use of ITNs and promotion of early health-seeking behavior.

Figure 1: Regions of PEPFAR and PMI support in Cameroon



PMI communicates with GHSA colleagues to assess potential areas of collaboration. GHSA aims to address global health security risks and assure global preparedness vis-a-vis emergence and spread of new microbes, rapid spread of diseases across borders due to geographic-based integrations, free movement of people, migration patterns of animals and accidental release or theft/illicit use of dangerous microbes. Potential synergies around health system strengthening and surveillance activities may be identified.

7. PMI goal, 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:

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1. 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.
2. Reduce malaria morbidity in PMI-supported countries by 40% from 2015 levels.
3. Assist at least five PMI-supported countries to meet the WHO's criteria for national or sub-national pre-elimination.²

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

1. Achieving and sustaining scale of proven interventions
2. Adapting to changing epidemiology and incorporating new tools
3. Improving countries' capacity to collect and use information
4. Mitigating risk against the current malaria control gains
5. 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 household survey indicators recommended by the Roll Back Malaria Monitoring and Evaluation Reference Group as listed below:

- Proportion of households with at least one ITN
- Proportion of the population with access to an ITN. [Please see <http://www.malariasurveys.org/documents/Household%20Survey%20Indicators%20for%20Malaria%20Control.pdf> for a description of this indicator.]
- 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 the population that slept under an ITN the previous night
- 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 ANC visits during their last pregnancy
- Proportion of women who received three or more doses of IPTp for malaria during ANC visits during their last pregnancy

8. Progress on coverage/impact indicators to date

² http://whqlibdoc.who.int/publications/2007/9789241596084_eng.pdf

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Table 2: Evolution of Key Survey Based Malaria Indicators in Cameroon from 2011 to 2016

| Indicator | [2011, DHS-MICS] | [2011, MIS] | [2013, Post-Campaign Survey] | [2014, MICS] | [2016, Post-Campaign Survey] |
|--|------------------|-------------|------------------------------|--------------|------------------------------|
| % Households with at least one ITN | 36% | 36% | 66% | 71% | 77% |
| % Population with access to an ITN | n/a | n/a | 26% | 17% | 42% |
| % Children under five who slept under an ITN the previous night | 21% | 21% | 46% | 55% | 64% |
| % Pregnant women who slept under an ITN the previous night | 20% | 20% | 41% | 52% | 66% |
| % Population that slept under an ITN the previous night | 15% | 15% | 39% | 48% | 59% |
| | | | | | |
| % Children under five years old with fever in the last two weeks for whom advice or treatment was sought | n/a | 67% | n/a | 66% | n/a |
| | | | | | |
| % Children under five with fever in the last two weeks who had a finger or heel stick | n/a | n/a | n/a | 16% | n/a |
| % Children receiving an ACT among children under five years old with fever in the last two weeks who received any antimalarial drugs | 3% | 13% | n/a | 6% | n/a |
| | | | | | |
| % Women who received two or more doses of IPTp during their last pregnancy in the last two years | 27% | 36% | n/a | 53% | n/a |
| % Women who received three or more doses of IPTp during their last pregnancy in the last two years | n/a | n/a | n/a | 26% | n/a |
| | | | | | |
| Under-five mortality rate per 1,000 live births | 122 | n/a | n/a | 103 | n/a |
| % Children under five with parasitemia (by microscopy, if done) | n/a | n/a | n/a | n/a | n/a |
| % Children under five with parasitemia (by RDT, if done) | 30% | 33% | n/a | n/a | n/a |

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Table 3: Evolution of Key Malaria Indicators Reported through Routine Surveillance Systems in Cameroon from 2012 to 2017

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 |
|--|-----------|-----------|-----------|-----------|-----------|-----------|
| Total # Cases (Confirmed and Presumed) ¹ | 1,589,317 | 1,824,633 | 1,995,038 | 2,115,935 | 2,118,428 | 2,384,079 |
| # Confirmed Cases ² | 1,073,378 | 1,370,136 | 1,620,252 | 1,763,402 | 1,790,891 | 2,093,009 |
| # Presumed Cases ³ | 515,939 | 454,497 | 374,786 | 352,533 | 327,537 | 291,070 |
| Total # <5 Cases ⁴ | 573,804 | 653,492 | 719,559 | 806,266 | 749,174 | 767,376 |
| Total # Malaria Deaths ⁵ | 3,209 | 4,349 | 4,398 | 3,440 | 2,639 | 3,195 |
| Data Completeness (%) ⁶ | 81% | 81% | 79% | 78% | 81% | 87% |
| Test Positivity Rate (TPR) ⁷ | 84% | 72% | 75% | 70% | 57% | 58% |

¹ Total # cases: Total number of reported malaria cases. All ages, outpatient, inpatient, confirmed and unconfirmed cases.

² # confirmed cases: Total diagnostically confirmed cases. All ages, outpatient, inpatient.

³ # presumed cases: Total clinical/presumed/unconfirmed cases. All ages, outpatient, inpatient.

⁴ Total #<5 cases: Total number of <5 cases. Outpatient, inpatient, confirmed, and unconfirmed.

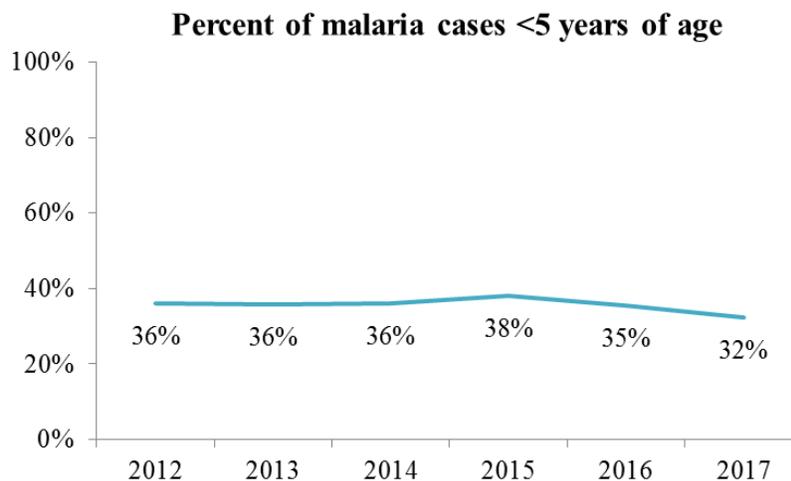
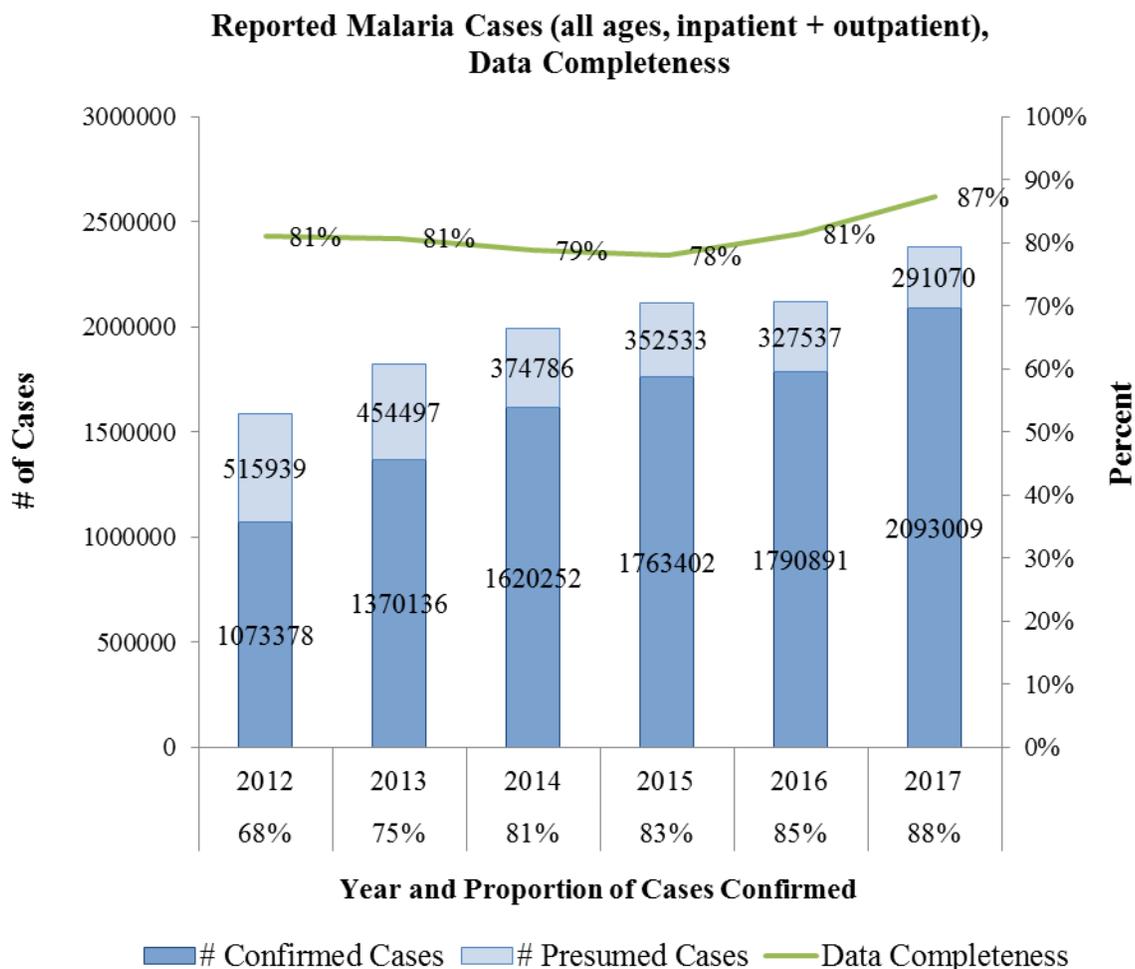
⁵ Total # Malaria Deaths Reported: All ages, outpatient, inpatient, confirmed, and unconfirmed.

⁶ Data completeness: Number of monthly reports received from health facilities/Number of health facility reports expected (i.e., number of facilities expected to report multiplied by the number of months considered).

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

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Figures 2 and 3: Trends in Key Malaria Indicators Reported in Routine Surveillance Systems



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9. Other relevant evidence on progress

Since submission of the FY 2017 MOP, Cameroon implemented a post-campaign survey to assess the impact of the 2016 mass ITN distribution campaign (EPC-MILDA 2016/2017). Results for the key indicators are summarized in the table 2 and section III.1b. Both a Demographic and Health Survey (DHS) and a Health Facility Survey are ongoing in Cameroon, and results are expected in 2019. These will provide additional data for programmatic decisions.

III. OPERATIONAL PLAN

PMI will contribute to Cameroon's current overall malaria strategy, but will emphasize specific interventions and focus in targeted geographic areas in order to maximize impact and complement existing activities and support from other partners. PMI is also working closely with the NMCP and other stakeholders to support the development of the new national strategic plan 2019-2023. Some updates will include the formalization of AL as the first line treatment for uncomplicated malaria in the North and Far North, aligning with PMI investments for SMC campaigns in these regions. Malaria is a major health problem throughout Cameroon but PMI will have a strategic focus in the North and Far North regions based on the following rationale: 1) almost 30% of Cameroon's population is located in these two regions; 2) the population in these regions is more vulnerable due to food insecurity; 3) the opportunity to use seasonal interventions due to the relatively short transmission season; and 4) these two regions report the highest under-5 mortality (2011 DHS and 2014 MICS) and proportion of deaths due to malaria (2017 NMCP report). Routine data from the NMCP 2017 Annual Report suggest that malaria morbidity in children under 5 years of age is decreasing in these two regions, most likely due to the impact of the SMC campaigns, however the proportion of deaths due to malaria in the same age group is still higher than in most other regions, with 36% in the North and 40% in the Far North in 2017. In addition, in 2017 the North and Far North experienced a higher proportion of deaths due to malaria in the general population, with 24% and 28% respectively, as compared to all other eight regions. Overall, the PMI strategic focus aligns with U.S. Government foreign assistance priorities in Cameroon.

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

- **A comprehensive package of malaria interventions in the two northern regions (North and Far North).** Interventions will include continuation of SMC for children under the age of 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 regional 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.
- **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.
- **Targeted support to the following national-level activities:** entomological monitoring; SM&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 Field Epidemiology and Training Program (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 revised national case management and SM&E strategies as well as standardized data reporting forms (registers) following the release of the new National Strategy Plan for Malaria Control will also be included. In addition, PMI will support revision of policies, documents, and training materials related to ANC services and case management of pregnant women and will support improved national-level coordination of NMCP and reproductive health programs.

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1. Vector 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 SM&E activities to inform their effective deployment. In addition to vector adulticiding (killing adult mosquitos), the approach also calls for larviciding. 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 (EPI). 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 Center for Research in Infectious Disease (CRID), 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.

a. Entomologic monitoring and insecticide resistance management

Intervention overview/Current status

PMI support began in late FY 2018 with FY 2017 funds. PMI is and will continue supporting entomological monitoring and insecticide resistance monitoring in five sentinel sites proposed by the NMCP: Bonaberi, Gounougou, Mangoum, Nyabessan, and Simatou. The five sentinel sites were selected by the NMCP as best representing Cameroon's five ecological zones.

Plans and justification for proposed activities with FY 2018 and FY 2019 funding:

Entomological monitoring that began in FY 2018 with FY 2017 funds will continue, in order to generate data that will inform ongoing ITN activities as well as any future implementation of IRS. Routine entomological data will be collected in the five sentinel sites beginning in October 2018, with involvement of technicians from the District Health Management team, who will be trained by the project entomologists. Collections will aim to determine species composition, density, behavior, parity, source of blood meal, sporozoite infection rates, and frequency and intensity of insecticide resistance of malaria vectors in the areas. Monitoring will be conducted once a month for 12 months in the two North and Far North sentinel sites, and once every other month (six months total) in the three sentinel sites in the south using three collection methods: pyrethrum spray catches (PSC), CDC light traps, and human landing catches (HLC). Given the seasonality of malaria transmission in the North and Far North and variability of conditions from month to month, it is necessary to collect data every month, whereas the three regions in the south have perennial malaria transmission and less variability from month to month. Data collected in 2019 (using FY 2017 funds) in the North and Far North will inform whether monthly collections are needed for sampling in the two regions. Monitoring plans for subsequent years can be adjusted based on the findings of year one. For example, if collections are negative for several months during the dry season, only wet season collections could be considered in following year.

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To assess vector susceptibility to insecticides, *Anopheles gambiae* s.l. and, where prevalent, *Anopheles funestus* larvae will be collected from natural breeding sites at each sentinel site. Susceptibility of these malaria vectors to insecticides will be monitored using the WHO tube tests and CDC bottle assays: in 2019 the project will test pirimiphos-methyl, clothianidin, chlorfenapyr, bendiocarb, permethrin, alphacypermethrin, and deltamethrin. Subsamples of dead and surviving mosquitos will be identified to the subspecies level using PCR. The frequency of knockdown resistance (*kdr*) and *Ace-1* resistance will also be determined. Additionally, insecticide resistance intensity and synergist assays will be conducted from sites where high resistance is observed during the 2019 monitoring season.

Support for these activities will include purchase of equipment for conducting entomology monitoring of indicators in the identified surveillance field sites (vector collection, taxonomic identification, bloodmeal host identification, resistance testing, parity dissection) and laboratory equipment for follow up analysis at central laboratory (sporozoite ELISA) as well as expendable supplies and equipment for insecticide resistance tests, ELISA and PCR.

Please see Table 2 (2018) and Table 2 (2019) for a detailed list of proposed activities with FY 2018 and FY 2019 funding.

b. Insecticide-treated nets

Intervention overview/Current status

The NMCP's current National Strategic Plan aimed 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. The last national mass campaign was implemented in 2016 and the next one is in preparation for 2019. With additional support from the Global Fund, the MoH supplements the mass campaigns with routine distribution of ITNs to pregnant women through the ANC clinics. However, supply chain challenges (outlined in the pharmaceutical management section) have limited the successful implementation of this routine distribution approach.

The post-2016 campaign survey (*EPC-MILDA 2016/2017*) reported 58.7% of the population sleeping under an ITN the night before the survey. Of note is an increase in ITN utilization rates as compared to previous years, however only 48% of households have at least one ITN per every two people, demonstrating that Cameroon is still a long way from attaining its target of 80% coverage. Importantly, *EPC-MILDA 2016/2017* reports considerable variation among regions. The North (94%) and the Far North (81%) are among the regions where households are most likely to have at least one ITN. However, the Far North has the lowest percentage of households with at least one ITN for every two people (at 40%), while in the North that percentage is higher (at 63%). The Far North region is the most populous in the country, but has the lowest ITN utilization with only 46% of the available ITN having been utilized the night before the survey (92% for the North region) and just 36% of the population having slept under a ITN the night prior to the survey (83% for the North region). When looking to specific malaria risk groups, the Far North has the lowest utilization rates among children under 5, with only 39% having slept under an ITN the night before the survey, against a national average of 63%. For pregnant woman, the national average is 64% having slept under an ITN the night before the survey, while in the Far North region, coverage is far lower at a mere 28%.

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The ongoing 2018 DHS will be an important measurement on ITN ownership and use in Cameroon, and will provide more clear insight into progress on coverage of this intervention since national universal campaigns have been rolled out and efforts are being implemented to strengthen routine distribution through ANC. Increasing overall ITN use among the Cameroonian population, aligned with NMCP strategy, will be a priority for PMI.

Several studies have shown the widespread resistance of malaria vectors to pyrethroid insecticides in Cameroon (Antonio et al., 2016) and mechanisms of metabolic resistance by these vectors in the North and Far North regions has been well established (Chouibou et al., 2008; Etang et al., 2002). In addition, NMCP has implemented ITN efficacy evaluations in different entomological sentinel sites of Cameroon (technical report, March 2018: “*Synthèse des rapports d'enquêtes de l'efficacité des moustiquaires imprégnées d'insecticides à longue durée d'action (MILDA) au Cameroun de 2016 à 2017*”). These evaluations, performed with support of Global Fund, have shown that ITNs used in the mass campaign 2015-2016 had reduced or no insecticide efficacy against wild strains of *Anopheles gambiae* s.l. collected from different sentinel sites. Results were most significant for the East, North and Far North regions. As of November 2018 initial surveillance data has shown that insecticide susceptibility is effectively restored by PBO. In Gounougou (North Region), 24 hour *Anopheles gambiae* s.l. mortality with Deltamethrin 1X was 39% and PBO restored susceptibility to 89%. The other pyrethroid tested was Alpha-Cypermethrin, which had mortality at 1X of 78% and this was brought to 94% with PBO. In Simatou (Far North), 1X Permethrin led to 16% mortality and 48% with PBO. For Deltamethrin 1X had 51% mortality and Deltamethrin 1X with PBO had 91% mortality. Together, these data support the use of PBO ITNs. Global Fund, informed on existing data, has procured PBO ITNs for the 2019 mass campaign distribution in the East region. Budget limitations did not allow procurement of PBO ITNs for the North and Far North regions (but a sufficient number of standard nets are available to cover overall needs for the 2019 campaign).

Progress since PMI was launched

PMI has engaged in multiple coordination meetings to ensure rational use of available resources to help the NMCP operationalize the vector control components of its National Strategic Plan. Using FY 2017 funds, PMI has procured 255,749 ITNs to fully cover the needs for ANC routine distribution in the North and Far North regions in the calendar year of 2019. PMI has also engaged in planning activities for the upcoming national ITN distribution campaign scheduled to take place in 2019.

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Commodity gap analysis

Table 4. ITN Gap Analysis

| Calendar Year | 2018 | 2019 | 2020 |
|--|----------------|------------------|----------------|
| Total Population in Far North Region* | 4,460,046 | 4,595,669 | 4,734,875 |
| Total Targeted Population for 2019 LLIN Mass Campaign in Far North Region* | 4,460,046 | 4,595,669 | 4,734,875 |
| Total Pregnant Woman Population (projected # pregnant woman in the 10 Regions)* | 912,408 | 933,071 | 938,556 |
| Total PMI Pregnant Woman Population (projected # pregnant woman in the North and Far North)* | 340,152 | 356,087 | 358,676 |
| Continuous Distribution Needs | | | |
| Channel #1: ANC (# pregnant woman projected to be seen in ANC1 and receive an ITN in North and Far North) | 210,378 | 230,916 | 243,355 |
| Security Stock for routine ANC distribution | 3% | 3% | 3% |
| <i>Estimated Total Need for ANC Continuous Channels</i> | 216,689 | 237,843 | 250,656 |
| Mass Campaign Distribution Needs | | | |
| <i>Estimated Total Need for Campaigns (Far North - PMI targeted region for 2019 mass campaign support)**</i> | 0 | 2,680,807 | 0 |
| Total ITN Need: Routine and Campaign | 216,689 | 2,918,650 | 250,656 |
| Partner Contributions | | | |
| ITNs carried over from previous year | 303,000 | 0 | 17,906 |
| ITNs from MOH | 0 | 0 | 0 |
| ITNs from Global Fund | 0 | 2,680,807 | 0 |
| ITNs from other donors | 0 | 0 | 0 |
| ITNs planned with PMI funding (routine distribution through ANC) | 0 | 255,749 | 250,656 |
| Total ITNs Available | 303,000 | 2,936,556 | 268,562 |
| Total ITN Surplus (Gap) | 86,311 | 17,906 | 17,906 |
| <p>* "PROJECTIONS DEMOGRAPHIQUES ET ESTIMATIONS DES CIBLES DES PROGRAMMES", National Institute of Statistics, 2016.</p> <p>- Target for percentage of pregnant women attending ANC1 per year in North and Far North: 61.85% (2018), 64.85 (2019) and 67.85% (2020), based on current quantification exercise taking into consideration the historic program data per region.</p> <p>- Target for percentage of pregnant women attending ANC1 per year in remaining 8 regions: 72% (2018), 75% (2019) and 78% (2020), based on current quantification exercise taking into consideration the historic program data per region.</p> <p>- Projection is that 100% pregnant woman attending ANC1 will receive an ITN.</p> <p>- For 2020 (FY 2019 funds): requesting to introduce PBO ITNs (based on supporting data).</p> <p>- In FY18 no ITNs arrived in the country. PMI has procured for North and Far North but they are only arriving in November 2018 and thus will contribute to FY19 (255,749 ITNs indicated in the table for 2019).</p> <p>** Total Far North population divided by 2 (one LLIN per every 2 people) plus a 5% buffer - same calculation was used for all regions. LLINs were procured by Global Fund.</p> | | | |

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Plans and justification for proposed activities with FY 2018 and FY 2019 funding:

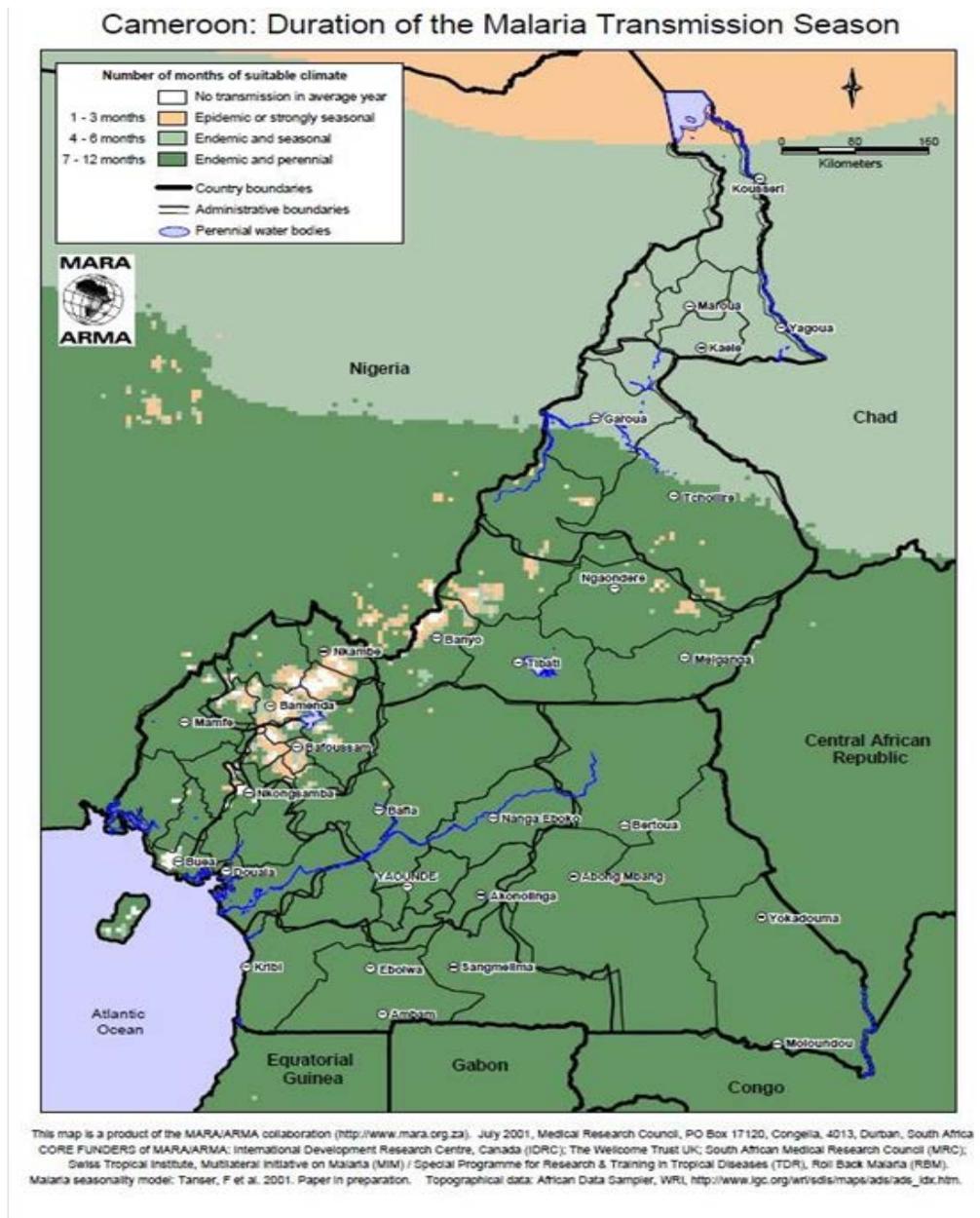
With FY 2018 funds, PMI will contribute to the next ITNs Mass Distribution Campaign in 2019 by supporting all distribution costs and technical assistance, down to the end user, for the Far North region, which is one of the most populated in the country but generally has low ITN ownership and use.

According to 2017 NMCP annual report, the percentage of pregnant women attending ANC that receive an ITN is still low both in the North (37%) and in the Far North (57%) and in need of significant efforts to improve routine distribution systems. With FY 2018 and FY 2019 funds, PMI will continue to support improving access in these two high-risk regions by supporting routine distribution through ANC services. PMI and NMCP will also seek ways to synergize existing activities that provide opportunities for measuring ITN access and messaging appropriate ITN use. With FY 2019 funds, PMI will procure PBO ITNs to meet the needs for pregnant women attending ANC services in the North and Far North Regions in the calendar year of 2020. In addition, concerned by confirmed pyrethroid resistance in Cameroon, combined with shorter than expected physical integrity of nets reported in some African countries, the NMCP has prioritized monitoring of ITN durability in its strategic plan. Such monitoring encompasses estimating ITN loss rates associated with: survivorship (reduced coverage), net integrity (physical damage) and bio-efficacy (insecticidal effects). As such, PMI will support a three-year ITN monitoring activity to be implemented in two locations in Cameroon. The sites and types of nets to be monitored remain to be determined, although the possibility of including PBO nets that will be distributed in the East Region as part of the upcoming net campaign has been raised. The information will help inform both net procurement policies along with social and behavioral communication strategies to promote practices to extend the effective life of ITNs in Cameroon.

In subsequent years, if funding allows, PMI will support expanding routine distribution to EPI services in addition to ANC services. PMI resources will also be used for communication activities that support improved compliance for year-round ITN usage; SBCC activities surrounding ITNs are fully described in the SBCC section below. Focused technical assistance will help to strengthen routine distribution channels, planning activities, and coordination with other donors.

Please see Table 2 (2018) and Table 2 (2019) for a detailed list of proposed activities with both FY 2018 and FY 2019 funding.

Figure 4: Malaria transmission pattern across Cameroon



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c. Indoor residual spraying

The NMCP Program and PMI have identified the North and Far North regions as the most 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 regions 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 is ongoing. 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. As such, in the coming 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.

The NMCP and PMI have agreed to continue with present interventions until an IRS feasibility study is completed. As such, no funds have been obligated for IRS.

Plans and justification for proposed activities with FY 2018 and FY 2019 funding:

No IRS activities will be supported with FY 2018 or FY 2019 funds.

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 three 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 beginning in the second trimester with doses administered at least one month apart; (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 5mg per day of folic acid concomitantly with the administration of SP; and (e) avoid administration of SP in pregnant women undergoing cotrimoxazole prophylaxis.

IPTp with SP administered at ANC was adopted as a malaria control intervention in Cameroon in 2007. The policy was updated following the release of recommendations by WHO in 2012 to increase the number of doses of SP administered during pregnancy from at least two doses total to at least three doses total, one dose at each ANC beginning in the second trimester and continuing until birth. The current National Strategic Malaria Control Plan does not account for the newest WHO recommendations

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to move from focused antenatal care (FANC) which called for pregnant women to attend at least four ANC visits to a new schedule of eight ANC contacts throughout her pregnancy. This ANC schedule requires some modification in malaria endemic settings in order to accommodate IPTp delivery recommendations. Currently the NMCP does not engage in regular meetings with the Reproductive Health Program; however representatives from both programs participate in a multi-sectoral program (*Programme National Multisectoriel de Lutte contre la Mortalité Maternelle et Infanto-Juvénile - PLMI*) tasked with reducing maternal mortality.

The NMCP capitalizes on national campaigns such as bed net distribution campaigns and MCH weeks (*Semaines d'Actions de Santé et Nutrition Infantile et Maternelle - SASNIM*) to provide messaging to pregnant women encouraging ANC attendance and stressing the importance of ITN use and IPTp. In addition, the current strategy encourages use of a “*strategie avancée*” (advanced strategy) in which trained midwives go to communities to provide ANC services, including IPTp; however, financial support for this approach has been insufficient for implementation. Data on IPTp doses are recorded in updated ANC registers and the HMIS reporting forms track the number of pregnant women seen at ANC who received the first IPT dose and those who received the third IPT dose. While information on IPTp2 coverage (proportion of pregnant women receiving at least two doses of IPT during their pregnancy) would be ideal, the current HMIS reporting forms do not include this data element. Numbers of ITNs distributed to pregnant women are tracked routinely and malaria case management indicators are disaggregated by pregnancy status.

Intervention overview/Current status

IPTp

According to the 2014 MICS, the IPTp2 coverage 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 percentage of pregnant women with at least three ANC visits was 74%. According to routine data from the malaria information system, in 2017 81% of pregnant women attending ANC received at least one dose, 62% received at least two doses and 40% received at least three doses of IPTp. The low coverage of IPTp (and the general lack of inclusion of this intervention in ANC services) was reportedly due to the following: frequent stockouts 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. The ANC visit costs about \$10³.

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 although the NMCP supports an “advanced strategy” by which trained

³ <http://plmi.cm/index.php/fr/sante/sante-maternelle/14-racine/programmes>

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midwives would provide ANC services including administration of IPTp through community outreach days.

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 IPTp services.

Routine distribution of ITNs through ANC

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. According to the 2017 Annual NMCP Report, more than 300,000 ITNs were distributed via ANC visits in 2017 covering 59% of the women who attended ANC. Only 65% of the expected number of pregnant women was recorded as having attended ANC. In the Far North and in the North, 57% and 37%, respectively, of women who attended ANC were given an ITN.

Case Management

The GoC follows WHO guidelines on the case management of malaria in pregnancy, including banning ACTs during the first trimester. Diverging from WHO guidelines, 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. This treatment is not free of charge or subsidized. 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 service fees for diagnosing and treating malaria for in pregnant women costs about \$4 (4,000FCFA). Although this is half the price of a service fees standard for standard adult treatment for cases of severe malaria, this still represents a steep fee and possible barrier to treatment for many pregnant women.

Progress since PMI was launched

PMI has engaged in multiple coordination meetings to ensure rational use of available resources to help the NMCP operationalize the MIP components of its National Strategic Plan. Using FY 2017 funds, PMI has procured 255,749 ITNs to fully cover the needs for ANC routine distribution in the North and Far North regions for 2019. Quantification meetings were conducted in partnership with the NMCP and the Global Fund to estimate commodity needs for 2019 and to plan procurements.

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Table 5: Status of IPTp policy in Cameroon

| Status of training on updated IPTp policy | | Number and proportion of HCW trained on new policy in the last year if training on new policy is not yet completed | Are the updated IPTp guidelines available at the facility level? | ANC register updated to capture three doses of IPTp-SP | HMIS/DHIS2 updated to capture three doses of IPTp-SP |
|---|---|--|--|--|--|
| Completed/Not Completed | Date (If training completed, when, if not completed, when expected) | | | | |
| Partially; the national guidance for malaria treatment in second and third trimesters is not consistent with WHO guidance | Unknown, but funded in Cameroon Global Fund round 9 malaria grant | Unknown | Yes | Yes | Yes |

Table 6. Status of ANC guidelines in Cameroon

| Status of 2016 WHO ANC guidelines adoption | | Number and proportion of HCWs trained in new ANC guidelines in the last year | Are the updated adopted ANC Guidelines available at the facility level? | Additional IPTp contact added to ANC schedule at 13 weeks? | ANC register updated to capture 8-9 ANC contacts? | HMIS/DHIS2 updated to capture 8-9 ANC contacts |
|--|--|--|---|--|---|--|
| Started/Completed/Not completed | Date completed (or expected to be completed) | | | | | |
| Not Started | Unknown | NA | NA | NA | NA | NA |

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Commodity gap analysis

Table 7. SP Gap Analysis for Malaria in Pregnancy

| Calendar Year | 2018 | 2019 | 2020 |
|---|------------------|----------------|----------------|
| Total Targeted Population (projected # pregnant woman in the 10 Cameroonian Regions)* | 912,408 | 933,071 | 938,556 |
| Total PMI Targeted Population (projected # pregnant woman in the North and Far North)* | 340,152 | 356,087 | 358,676 |
| SP Needs for North and Far North Regions (PMI targeted Regions) | | | |
| Total number of pregnant women receiving IPT1 in ANC ¹ (North and Far North) | 170,602 | 189,277 | 218,792 |
| Total number of pregnant women receiving IPT2 in ANC ¹ (North and Far North) | 135,082 | 182,849 | 200,859 |
| Total number of pregnant women receiving IPT3 in ANC ¹ (North and Far North) | 133,095 | 164,256 | 190,557 |
| Total number of pregnant women receiving IPT4 in ANC ¹ (North and Far North) | 51,023 | 71,217 | 107,603 |
| Total SP Need (#treatments - blister of three pills)² | 489,801 | 607,599 | 717,811 |
| Partner Contributions | | | |
| SP carried over from previous years** | 1,097,400 | 607,599 | 0 |
| SP from Government | 0 | 0 | 0 |
| SP from Global Fund | 92,000 | 0 | 0 |
| SP from Other Donors | 0 | 0 | 0 |
| SP planned with PMI funding (North and Far North) | 0 | 0 | 717,811 |
| Total SP Available (treatments - blisters of 3 pills) | 1,189,400 | 607,599 | 717,811 |
| Total SP Surplus (Gap) | 699,599 | 0 | 0 |

*"PROJECTIONS DEMOGRAPHIQUES ET ESTIMATIONS DES CIBLES DES PROGRAMMES", National Institute of Statistics, 2016.

1 Calculated based on projected number of pregnant woman attending ANC and receiving IPTp: Some women do refuse IPTp and some health professionals do not comply with national guidelines. Projections adjusted based on historical program data. Projections are to improve coverage considering programmatic activities being implemented.

- Global Fund and the Government of Cameroon are supporting the other eight regions.

** SP carried from 2018 to 2019 (cell C11) - the remaining SP from 2018 will expire and won't contribute for 2019 stock.

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Plans and justification for proposed activities with FY 2018 and FY 2019 funding:

In selected districts 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. The health facility-level support for case management and IPTp activities will be limited to 18 priority districts in these two regions. These include Figuil, Garoua II, Gaschiga, Guider, Mayo-Oulo, Ngong and Rey Bouba in the North and Kaele, Mada, Maga, Makary, Meri, Mindif, Mokolo, Mora, Pette, Roua and Yagoua in the Far North. Community-level support for training community health workers to promote early ANC attendance and encourage IPTp uptake and LLIN use will be restricted to 6 of these 18 priority districts: Guider and Ngong in the North and Kaele, Mada, Mokolo, and Roua in the Extreme North. 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 procurement and 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 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. This could have the added benefit of increasing the proportion of pregnant women receiving ITNs at ANC. PMI will also promote the establishment of a functional MIP working group inclusive of the malaria and reproductive health units.

Please see Table 2 (2018) and Table 2 (2019) for a detailed list of proposed activities with both FY 2018 and FY 2019 funding.

3. Drug-based prevention

a. Seasonal malaria chemoprevention (SMC)

NMCP/PMI objectives

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). Selection of those regions was based primarily on WHO guidelines for SMC, including meeting criteria for the majority of malaria cases occurring during the four-month transmission season.

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 of the North and Far North regions, a coverage of 86% (Table 8). The distribution was conducted over three days, for the months July through September, three cycles of SPAQ administered. Implementation was 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 an enumeration 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 and demonstrate how to properly

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administer the SPAQ dose. The mother of each child administered the second and third doses of each cycle, on days two and three respectively. 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. Children were then assessed for SPAQ eligibility and, upon confirmation, were given the first dose of SPAQ, with the second and third dose administered by the mother as outlined above.

In 2017, SMC campaign provided four cycles of SPAQ to 1,505,372 children 3-59 months old, a coverage of 94.5%. There were several challenges, mainly related to the absence of micro-planning, delays of funds and logistical matters.

Progress since PMI was launched

It was agreed that PMI would carry on the support of the annual SMC in the North and Far North regions, and FY 2017 funds supported the 2018 SMC, with 4 SPAQ cycles implemented from July to October. More than 1,000 training sessions were organized and 10,764 SPAQ distributors were trained for the campaign. The door-to-door strategy was implemented by teams of two community health workers, one to administer the drug and one to record the data. Some of the key challenges were the difficult access to households in certain health areas during rainy season and the work schedule of parents working in agriculture fields, which required the introduction of two daily shifts for CHWs working in rural areas (5-9 a.m. and 4-6 p.m.) and included visits to the agricultural fields to reach eligible children. Coordination amongst different stakeholders from the different levels (central, regional, district) was also a challenge in the beginning as were the negotiations with CHWs on a reduction in their fees, as compared to previous year's campaign. PMI procured 7,621,150 SPAQ doses which, despite a very tight timeline, arrived and were distributed to the regions on time. There were no shortages of stock. Cycle 1 reached 98% of the targeted children (1,611,831 children 3-59 months of age), cycle 2 reached 102% and cycle 3 (September 2018) reached 102.9% of targeted children. The main difference between cycles corresponds to additional children becoming eligible between cycles (completed 3 months), while those who completed 60 months in between cycles have still received SPAQ on cycle 2 and 3 (and remaining), as per WHO recommendations. Preliminary data from the two first SMC cycles in the North region (data available earlier for analysis) and the number of malaria cases within this age group over seven weeks, suggest that SMC contributed to preventing malaria in more than 99% of children of 3-59 months of age living in the North region.

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Table 8: SMC activities

| Calendar Year | Number of districts ¹ targeted for SMC | Number of children <5 targeted | Coverage Rate (from program records) |
|--------------------|---|--------------------------------|--------------------------------------|
| 2016 | 45 | 1,267,044 | 86% |
| 2017 ² | 45 | 1,336,274 | 95% |
| 2018 ^{2*} | 45 | 1,641,743 | 99% |
| 2019 ^{2*} | 45 | 1,684,428 | |
| 2020 ^{2*} | 45 | 1,728,223 | |

¹ Health Districts.

² Represents targets based on the SMC work plan and projected targets based discussions with the NMCP.

- Coverage rate represents the percentage of children within the age group that received the four cycles of SPAQ, except for 2018, which corresponds to the first three cycles. Waiting for data from the fourth cycle.

* PMI-supported SMC activities.

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Commodity gap analysis

Table 9: SP+AQ Gap Analysis

| Calendar Year | 2018 | 2019 | 2020 |
|--|------------------|------------------|------------------|
| SMC drug (SP+AQ) Needs | | | |
| Population targeted for SMC in Cameroon (North and Far North regions) | 1,641,743 | 1,684,428 | 1,728,223 |
| PMI-targeted population for SMC ¹ | 1,641,743 | 1,684,428 | 1,728,223 |
| Total SP+AQ Needs | 6,566,972 | 6,737,713 | 6,912,894 |
| Total SP+AQ Needs + 10% buffer | 7,223,669 | 7,411,485 | 7,604,183 |
| Total SP+AQ 1 (75mg) Needs | 1,395,919 | 1,334,067 | 1,368,753 |
| Total SP+AQ 2 (150mg) Needs | 6,222,852 | 6,077,417 | 6,235,430 |
| Partner Contributions (to PMI target population if not entire area at risk) | | | |
| SP+AQ 1 carried over from previous year | 368,862 | 421,493 | 2,425 |
| SP+AQ 2 carried over from previous year | 759,800 | 961,423 | 2,006 |
| SP+AQ from Government | 0 | 0 | 0 |
| SP+AQ from Global Fund | 0 | 0 | 0 |
| SP+AQ from Other Donors | 0 | 0 | 0 |
| SP+AQ 1 planned with PMI funding (blister of 4 tablets) | 1,448,550 | 915,000 | 1,370,000 |
| SP+AQ 2 planned with PMI funding (blister of 4 tablets) | 6,424,475 | 5,118,000 | 6,240,000 |
| Total SP+AQ 1 Available (blister 4 tablets each) | 1,817,412 | 1,336,493 | 1,372,425 |
| Total SP+AQ 2 Available (blister 4 tablets each) | 7,184,275 | 6,079,423 | 6,242,006 |
| Total SP+AQ 1 Surplus (Gap) | 421,493 | 2,425 | 3,672 |
| Total SP+AQ 2 Surplus (Gap) | 961,423 | 2,006 | 6,576 |

Targets 2018, 2019 and 2020 are calculated based on actual number of children mobilized during the 2018 SMC campaign. The "PROJECTIONS DEMOGRAPHIQUES ET ESTIMATIONS DES CIBLES DES PROGRAMMES", National Institute of Statistics, 2016, were applied to calculate the progression for 2019 and 2020.

¹ Geographic coverage: PMI is covering (starting 2018) all needs for SMC in Cameroon. Only the North and the Far North regions (45 health districts) are eligible for SMC and these are the PMI focus regions.

Plans and justification for proposed activities with FY 2018 and 2019 funding:

PMI will continue to support the SMC campaign in the 45 health districts of the North and Far North regions. PMI will procure SPAQ to meet the needs for all children 3-59 months of age in the North and Far North regions, and will support all elements of campaign implementation including sensitization of the population, training and supervision of CHW, and SBCC activities. PMI will continue to work with

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the NMCP to closely monitor malaria data from these regions to assure adjustments in SMC planning if needed (eligibility of districts, season of the campaign, number of cycles, etc.) and to monitor drug resistance. PMI will support four monthly cycles (July-October) of three daily doses of SPAQ administered to children between 3 and 59 months of age that do not present contraindications to this treatment. PMI plans to use the same door-to-door strategy for mobilization and first dose administration by teams of two CHWs, as in 2018. The team will teach the caregivers how to administer the second and third doses.

Please see Table 2 (2018) and Table 2 (2019) for a detailed list of proposed activities with FY 2018 and FY 2019 funding.

4. Case management

NMCP/PMI objectives

The NMCP's current policy, adopted in 2013, is to test all suspect cases of malaria at both health facility and community levels using either microscopy or RDTs, and to treat all confirmed cases according to national treatment guidelines; this overall policy is in line with global guidance. The national case management guidelines (2013) do not specify when to perform microscopy versus an RDT, but the national malaria diagnostic guidelines (also 2013) do highlight when each are more beneficial:

- RDTs are beneficial in resource-limited settings where quick results are needed; resource-limited could be time constraints, personnel constraints, or lack of materials.
- Microscopy is beneficial when the clinician wants to know the parasite count or when the patient has already taken an initial dose of antimalarials.

Quality assurance of diagnostics is a priority that PMI plans to support but is not currently implemented in a systematic or formal way beyond routine supervision activities.

The first-line treatment for uncomplicated malaria is artesunate amodiaquine (ASAQ) with artemether lumefantrine (AL) to be used in case of non-availability or intolerance to ASAQ. However, children under 5 years of age who are receiving SMC in the North and Far North regions are to be treated with AL. In the next NSP, the national policy will be updated to indicate AL as the first-line treatment in the North and Far North regions. Per national policy, malaria treatment for children under 5 is provided free of charge, treatment for pregnant women is subsidized, and treatment is provided with an associated cost for the rest of the population. The details are summarized below:

Malaria case management services costs:

- Treatment is free for children under 5 for both uncomplicated and severe cases (includes RDTs and treatment prescription); the exception to this is AL which incurs a cost in all regions except the North and Far North where it is currently the first-line treatment.
- Treatment for pregnant women is subsidized; all positive cases in pregnant women are treated as severe malaria.
- Treatment incurs a charge for all other age groups.
- RDTs are free for children under 5 at health facilities and in the community; microscopy services incur a charge for all ages.

Cameroon elaborated a *2016-2017 National Strategy for Integrated Community-based Activities* focused on malaria, acute respiratory infections, diarrhea, tuberculosis, HIV/AIDS, malnutrition, family

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planning, onchocerciasis, and other vaccine-preventable diseases. The strategy lays out the objective of 1 CHW for every 1,000 people in rural zones and for every 2,500 people in urban zones, requiring roughly 12,000 CHWs to cover the country, though the strategy calls for gradual roll-out. The proposed package of services is comprehensive including health promotion/education, behavior change communication, screening, treatment, outreach, patient monitoring, stock management, and reporting. The catchment population is all ages. With the exception of RDTs and ACTs for children under 5 (provided for free), the CHWs are incentivized to provide services through an income-generating cost-recovery model where tests and treatment are provided at the same cost as in health facilities and CHWs are meant to purchase the commodities they will sell in the community from the nearest health facility.

For malaria, CHWs perform RDTs, treat uncomplicated cases, and refer cases with signs of severity to the nearest health facility; there is currently no policy of pre-referral treatment by CHW; however, NMCP is planning to introduce, with the new NSP and treatment guidelines, the use of RAS as pre-referral treatment by CHW. Presently, CHWs only cover 69 out of 189 health districts in Cameroon.

Both the Global Fund and the World Bank support PBF but their models differ in that the World Bank model incentivizes CHWs to refer people to nearby health facilities in an effort to strengthen linkages between communities and facilities. The Global Fund model, developed in line with the Ministry of Health (and NMCP), supports community-level treatment provided directly by CHWs. The World Bank reports that their PBF scheme should be fully scaled up in all health districts by the end of 2018. Global Fund supports CHWs in 69 districts. UNICEF also supports CHWs in the Far North region, covering 10 out of 30 health districts but without PBF; instead they provide training, bikes, and other supplies that support their activities.

For the entire country, the Ministry of Health has estimated a total need of 11,896 CHWs to cover all 189 health districts. The 2016-2017 Integrated Strategy for the Implementation of Community-Based Activities, lays out an initial operationalization plan to deploy 4,892 CHWs across the ten regions by the end of 2017. Currently 4,400 CHWs are supported in 69 districts in 3 regions, primarily by the Global Fund. In the North and Far North regions, Global Fund currently supports 1,364 CHWs in 12 districts (out of 45), and has no plans for CHW expansion in these regions. Per the NMCP, the remaining need in the North and Far North is 4,500 CHWs.

Provisions have also been included for incorporating CHWs in the Universal Health Coverage System currently under development. The proposed minimum package covers both services delivered within the health facility and those delivered at community level. The package includes preventive as well as curative interventions. In principle, CHWs accredited within the system would submit documentation of services delivered for reimbursement similar to any other health care provider.

The private sector, including both for-profit and non-profit, represents a significant portion of health service provision in Cameroon. The NMCP estimates that the private sector makes up over 40% of all health facilities, of which two-thirds are for-profit institutions. According to the NMCP, in general, private sector facilities do not adequately adhere to national case management policies, particularly the for-profit facilities.

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Table 10. Status of Case Management Policy and Implementation in Cameroon

| Status of Case Management Policy in Cameroon according to <i>Guide de Prise en Charge du Paludisme au Cameroun à l'usage du Personnel de Santé, May 2013</i> | | Currently being implemented (yes/no)? Are there plans to modify the recommendations? |
|---|---|---|
| What is the first-line treatment for uncomplicated <i>P. falciparum</i> malaria? | AS-AQ in eight regions; AL in two regions (North and Far North, SMC regions) | Yes; there are plans to formalize this practice in the new national strategy |
| What is the second-line treatment for uncomplicated <i>P. falciparum</i> malaria*? | AL; but AL was not previously subsidized except in the two northern SMC regions | Yes; no |
| What is the first-line treatment for severe malaria? | Injectable artesunate | Yes; no |
| In pregnancy, what is the first-line treatment for uncomplicated <i>P. falciparum</i> malaria in the first trimester*? | Injectable quinine; guidelines specify to treat all malaria in pregnancy as severe | Yes; yes |
| In pregnancy, what is the first-line treatment for uncomplicated <i>P. falciparum</i> malaria in the second and third trimesters*? | Injectable artesunate | Yes; no |
| In pregnancy, what is the first-line treatment for severe malaria? | Same as for uncomplicated; National treatment guidelines consider malaria in pregnancy as severe malaria and recommend treatment accordingly; | Yes; no |
| Is pre-referral treatment of severe disease recommended at peripheral health facilities? If so, with what drug(s)? | First line: dose of injectable artesunate, preferably i.v.; Second line: i.m. artemether or quinine drips | Yes; no |
| Is pre-referral treatment of severe disease recommended for community health workers? If so, with what drug(s)? | NA | No; yes - upcoming treatment guidelines and NSP plan to include the use of RAS as pre-referral treatment to be provided by CHWs |
| If pre-referral rectal artesunate is recommended, for what age group? (note: current international guidelines do not recommend administering to those ≥ 6 years) | N/A | |

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Progress since PMI was launched

PMI-supported implementing partners focused on case management activities have completed their initial scoping visits, established connections with the NMCP and other relevant partners, and are securing offices and staffing. Current workplans reflect NMCP and PMI priorities to strengthen health worker delivery of malaria services at facility and community levels through training and supportive supervision, to expand diagnostic capacity, to ensure commodities are in place, and to support behavior change activities focused on both patients and providers. One key aspect of this work planning process has been to coordinate carefully with the Global Fund to ensure complementary activities with rational geographic coverage. No direct implementation activities have been initiated at the time of MOP writing.

Because the procurement partner was already in place in Cameroon supporting PEPFAR, there has been more tangible progress in pharmaceutical strengthening (see relevant section for details) and commodity procurement. The following malaria commodities have been procured to date by PMI for distribution in the North and Far North regions:

- 255,749 ITNs for routine distribution
- 541,890 treatments of AL (147,510 distributed with 394,380 arriving by the end of 2018)
- 316,000 vials of injectable artesunate
- 8,431,300 doses of SP-AQ for SMC

PMI has not directly supported any TES in Cameroon but plans to do so with FY 2018 funding. There are currently four “sentinel regions” identified in Cameroon to serve as research sites for epidemiological and entomological research activities, including TES: Garoua (North Region); Bamenda (North West Region); Buea (South West Region); and Yaounde (Centre Region). Each sentinel region has six satellite sites. The PMI-supported TES sites will be selected from among these sites based on further consultation with the NMCP.

There has been considerable research conducted in the last 13 years on ACT efficacy in Cameroon. The details of these studies are summarized in the report, *A decade (2006-2016) of clinical efficacy and safety of artemisinin-based combination therapy in Cameroon* (Wilfred et al). According to this report, 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. TES found that both fever and parasites generally cleared rapidly; however, parasite clearance varied by region. 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 WHO 28-day protocol. There have been no TES since 2016.

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Table 11. PMI-funded TESS

| Completed TESS | | | |
|---|--------------------|-------------------------|---------------------------------|
| Year | Site name | Treatment arm(s) | Plans for k13 genotyping |
| N/A | | | |
| Ongoing TESS | | | |
| Year | Site name | Treatment arm(s) | |
| N/A | | | |
| Planned TESS (funded with previous or current MOP) | | | |
| Year | Site name | Treatment arm(s) | |
| 2019 | Yaounde, Bonassama | ASAQ, AL | PARMA Network |
| 2020 | Ngaoundere | ASAQ, AL | In-country institution TBD |

PARMA: PMI-supported Antimalarial Resistance Monitoring in Africa

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Commodity gap analysis

Table 12: RDT Gap Analysis

| Calendar Year | 2018 | 2019 | 2020 |
|--|------------------|----------------|------------|
| RDT Needs (North and Far North Regions, PMI targeted Regions) | | | |
| Total country population | 24,863,337 | 25,492,353 | 26,133,035 |
| Population at risk for malaria ¹ | 24,863,337 | 25,492,353 | 26,133,035 |
| PMI-targeted population at-risk for malaria (North and Far North) *** | 7,212,294 | 7,452,541 | 7,699,643 |
| Total number of projected fever cases (projected to be tested for malaria at health facility) North and Far North ** | 972,530 | 1,001,273 | 962,358 |
| Total number of projected fever cases (projected to be tested for malaria in the community) North and Far North ** | 36,653 | 200,255 | 185,069 |
| Percent of fever cases tested with an RDT in health facilities (versus microscopy) | 64% | 70% | 75% |
| RDT Needs | 660,283 | 901,145 | 906,837 |
| Security Stock % | 0 | 50% | 0 |
| Total RDT Needs | 660,283 | 1,351,718 | 906,837 |
| Partner Contributions (to PMI target population if not entire area at risk)* | | | |
| RDTs carried over from previous year | 725 | 0 | 0 |
| RDTs from Government | 0 | 0 | 0 |
| RDTs from Global Fund (to North and Far North) | 167,375 | 0 | 0 |
| RDTs from other donors | 0 | 0 | 0 |
| RDTs planned with PMI funding | 0 | 1,350,000 | 906,837 |
| Total RDTs Available | 168,100 | 1,350,000 | 906,837 |
| Total RDT Surplus (Gap) | (492,183) | (1,718) | 0 |

Estimations on the population of Cameroon and of the North and Far North regions are based on "PROJECTIONS DEMOGRAPHIQUES ET ESTIMATIONS DES CIBLES DES PROGRAMMES", National Institute of Statistics, 2016.

** Cameroon calculated total number of projected fever cases by applying a factor of 1.06 for number of fever episodes per year for children under 5 years of age, and a factor of 0.2974 fever episodes per year for people over 5 years of age. Cameroon applied a reduction factor to number of estimated fever cases assuming prevention achieved the annual increase of some high impact malaria interventions (vector control interventions and SMC).

PMI targeted regions in Cameroon are North and Far North (2/10 Regions representing approximately 29% of the country's population).

Quantification for these 2 PMI regions was made as part of the National Quantification, for all Country Regions.

2 Needs to fill the pipeline are included in the security stock

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Table 13: ACT Gap Analysis

| Calendar Year | 2018 | 2019 | 2020 |
|---|-----------------|------------|------------|
| ACT Needs for the North and Far North (AL) | | | |
| Total country population | 24,863,337 | 25,492,353 | 26,133,035 |
| Population at risk for malaria | 24,863,337 | 25,492,353 | 26,133,035 |
| PMI-targeted at-risk population (North and Far North Regions) ¹ | 7,212,294 | 7,452,541 | 7,699,643 |
| Total projected number of simple malaria cases treated according the national guidelines (public and private health facilities plus community) with 1st line ACT | 303,229 | 403,713 | 401,969 |
| Additional 10% accounting for presumptive cases treated | 10% | 10% | 10% |
| Security Stock | 0% | 50% | 0% |
| % population 2-11 mths | 15% | 15% | 15% |
| % population 1-5 years | 25% | 25% | 25% |
| % population 6-13 years | 15% | 15% | 15% |
| % population 14 years and more | 45% | 45% | 45% |
| # blisters AL 20/120mg 6x1cp | 50,033 | 96,891 | 66,325 |
| # blisters AL 20/120mg 6x2cp | 83,388 | 161,485 | 110,542 |
| # blisters AL 20/120mg 6x3cp | 50,033 | 96,891 | 66,325 |
| # blisters AL 20/120mg 6x4cp | 150,098 | 290,673 | 198,975 |
| Partner Contributions (to PMI target population if not entire area at risk)¹ | | | |
| AL carried over from previous year (all PMI) | | | |
| # blisters AL 20/120mg 6x1cp | 0 | 74,760 | 0 |
| # blisters AL 20/120mg 6x2cp | 0 | 114,270 | 0 |
| # blisters AL 20/120mg 6x3cp | 0 | 65,070 | 0 |
| # blisters AL 20/120mg 6x4cp | 0 | 140,280 | 0 |
| ACTs from Government | 0 | 0 | 0 |
| AL from Global Fund | 132,125 | 0 | 0 |
| ACTs from other donors | 0 | 0 | 0 |
| AL planned with PMI funding | | | |
| # blisters AL 20/120mg 6x1cp | 6,510 | 22,131 | 66,325 |
| # blisters AL 20/120mg 6x2cp | 21,210 | 47,215 | 110,542 |
| # blisters AL 20/120mg 6x3cp | 43,320 | 31,821 | 66,325 |
| # blisters AL 20/120mg 6x4cp | 76,470 | 150,393 | 198,975 |
| Total ACTs Available | 279,635 | 645,941 | 442,166 |
| Total ACT Surplus (Gap) | (53,916) | 0 | 0 |
| <p>Estimations on the population of Cameroon and of the North and Far North regions are based on "PROJECTIONS DEMOGRAPHIQUES ET ESTIMATIONS DES CIBLES DES PROGRAMMES", National Institute of Statistics, 2016.</p> <p>IPMI targeted regions in Cameroon are North and Far North (2/10 Regions representing approximately 29% of the country's population). Quantification for these 2 PMI regions was made as part of the National Quantification, for all Country Regions.</p> <p>2 Needs to fill the pipeline are included in the security stock.</p> <p>North and Far North regions are the only ones in Cameroon switching (from 2018) to AL as first line of treatment for uncomplicated malaria, due to SMC implementation in these regions.</p> | | | |

Quantification of microscopes

PMI will procure halogen microscopes for six Regional Hospitals (two in the North and four in the Far North) and LED microscopes for 26 district hospitals (10 in the North and 16 in the Far North region) to support diagnosis and the implementation of quality assurance.

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Table 14: Quantification of IV Artesunate

| Calendar Year | North and Far North | | |
|--|---------------------|------------------|------------------|
| | 2018 | 2019 | 2020 |
| Number of malaria cases confirmed in all health facilities (public, religious and private) | 400,224 | 400,509 | 384,943 |
| % severe malaria cases (within all malaria cases, reports PNLP) | 46% | 30% | 25% |
| Number of severe malaria cases (within all malaria cases, reports PNLP) | 184,688 | 120,153 | 96,236 |
| Number of severe cases estimated to be treated with injectable artesunate (2018 report very low due to stock-outs, estimation is that if artesunate is available, it will be used - thus the progression) | 18% | 60% | 80% |
| Number of malaria cases treated with injectable artesunate | 32,813 | 72,092 | 76,989 |
| Distribution of Severe malaria cases by age groups | | | |
| % of ≤5 years old severe malaria cases (within all severe malaria cases) | 18% | 18% | 18% |
| % of 6-14 years old (25-50 kg) severe malaria cases (within all severe malaria cases) | 23% | 23% | 23% |
| % of ≥15 years old (over 50 kg) severe malaria cases (within all severe malaria cases) | 59% | 59% | 59% |
| Number of severe malaria cases in children under age of 5 years old | 5,906 | 12,976 | 13,858 |
| Number of severe malaria cases in 6-14 years old | 7,534 | 16,552 | 17,677 |
| Number of severe malaria cases in 15 years old and over | 19,373 | 42,563 | 45,454 |
| Number of vials needed to treat a severe malaria case in children under 5 | 4 | 4 | 4 |
| Number of vials needed to treat a severe malaria case in children 6-14 years old | 8 | 8 | 8 |
| Number of vials needed to treat a severe malaria case in over 15 years old | 12 | 12 | 12 |
| Number of vials needed for children under 5 | 23,625 | 51,906 | 55,432 |
| Number of vials needed for children 6-14 years | 60,271 | 132,418 | 141,413 |
| Number of vials needed for over 15 years old | 232,473 | 510,755 | 545,449 |
| Total number of injectable artesunate vials (without security stock) | 316,369 | 695,079 | 742,293 |
| Security Stock | 0% | 40% | 0% |
| Total number of injectable artesunate vials needed | 316,369 | 973,110 | 742,293 |
| Number of vials currently available (about to be delivered) | 0 | 0 | 0 |
| Contribution PMI (proposes to cover needs considering that 15% of the total malaria cases would be severe malaria, country estimation is 30% (2019) and 25% (2020)) | 0 | 486,555 | 445,376 |
| Contribution GoC | 0 | 0 | 0 |
| Contribution GF (GF covers needs for the other 8 regions of Cameroon) | 0 | 0 | 0 |
| Total Artesunate Surplus (Gap) | | (486,555) | (296,917) |
| Population estimations and age disaggregation based on "PROJECTIONS DEMOGRAPHIQUES ET ESTIMATIONS DES CIBLES DES PROGRAMMES", National Institute of Statistics, 2016. Estimation of number of severe malaria cases and number of severe malaria cases that will be treated with IV artesunate were adjusted based on historic programmatic data. IPMI regions are North and Far North (representing approximately 29% of the country's population). Quantification was part of National Quantification exercise. 2 Needs to fill the pipeline are included in the security stock. | | | |

Quantification of rectal artesunate

N/A. Cameroon does not currently have a policy for use of rectal artesunate as a pre-referral treatment. NMCP does plan to introduce it in the upcoming NSP and treatment guidelines.

Plans and justification for proposed activities with FY 2018 and 2019 funding:

PMI will procure case management commodities including RDTs, ACTs, and injectable artesunate for severe malaria treatment to cover projected needs in the North and Far North regions. The FY 2018 and

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FY 2019 projected commodity needs are based on a detailed and comprehensive quantification exercise led by the NMCP with participation from the PMI procurement partner, Global Fund, and other relevant stakeholders. The projected needs take into account existing stocks (see gap analyses).

FY 2018 funds will also be used to procure microscopes in the North and Far North in support of a comprehensive QA/QC program that will be supported by PMI. With FY 2017 MOP funds, up to 50 lab technicians will be trained in expert microscopy, the most successful of which will be selected to serve as laboratory supervisors for a training and outreach program to strengthen microscopy capacity. With FY 2018 funds, those lab experts/supervisors will train additional lab technicians, primarily at district and health facility level with a target of 100 lab technicians. Training will focus on parasite detection, species identification, parasite counting, and use of RDTs. Training will be reinforced through the implementation of supportive outreach and supervision by laboratory supervision teams using malaria slide proficiency testing panels. This microscopy QA/QC program, including supportive supervision, will be continued with FY 2019 funding.

PMI will support TES with FY 2018 and FY 2019 funds to conduct studies in two sites in 2019 and an additional two sites in 2020. Study sites will be chosen from among the NMCP's existing 24 sentinel sites clustered in the four regional hubs of Garoua, Bamenda, Buea, and Yaounde (not all currently functional) and will follow the WHO 28-day protocol. PMI will also support laboratory capacity building for antimalarial resistance testing and expansion of the PARMA network by supporting Atlanta-based training for a laboratory expert involved in the TES from Cameroon.

While PMI's strategy is to focus support in the North and Far North regions, resource constraints require prioritization among the 45 health districts for activities related to service delivery, namely training and supervision. At the community-level, PMI will complement existing donor support to expand coverage of the CHW program in the North and Far North. The Global Fund currently covers 12 districts using the PBF approach described previously in this section; UNICEF covers 10. PMI has worked with the NMCP to identify six priority districts (based on malaria mortality estimates) where it will support approximately 735 CHWs. This support will include equipping CHWs with necessary materials, training them on the integrated package of community-based services, providing regular supportive supervision, as well as monthly check-ins where CHWs travel to their nearest health facility to resupply, review/report data, and discuss relevant issues.

At the health facility level, PMI will focus in these same 6 districts to ensure strong linkages between CHWs and their linked health facility, as well as the 12 districts in which Global Fund is supporting CHWs (18 districts total out of 45). In these 18 districts, approximately 300 public and non-profit facilities will be prioritized for training and supportive supervision to ensure adherence to national guidelines and delivery of high quality malaria case management. A subset of these health facilities with more advanced capacity to manage complicated or severe disease will be identified as referral and training centers for the management of severe malaria. PMI intends to achieve this geographic coverage of CHW and health facility support with FY 2018 funds, and to maintain and potentially expand that support using FY 2019 funds.

At both community and health facility levels, training and supervision will include prevention of malaria in pregnancy (IPTp), case management for pregnant women, and routine net distribution via ANC. Pending results of an ongoing Health Facility Survey, training content and focus may be adjusted to best address identified needs. As the survey tools for this survey have been difficult to obtain, PMI has

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planned funding for a malaria-specific Health Facility Survey should the ongoing survey not provide sufficient data to inform malaria programs on gaps in service delivery. Particularly, improper diagnosis of severe malaria and/or overuse of severe malaria medications, both from the perspective of the health provider and demand from patients will be assessed.

Behavioral factors of patients, providers, and even supervisors that may influence service delivery and care-seeking will be considered and integrated into all aspects of training and supervision. Training will be adjusted as needed following implementation of a Malaria Behavior Survey, which will collect data pertinent to SBCC of malaria. Service communication (i.e., health providers delivering SBCC to patients to encourage uptake of healthy behaviors) will also be a focus of training and supervision. PMI partners will work collaboratively to achieve this integration of service delivery interventions. PMI will also support the NMCP from central and regional levels to conduct supportive supervision visits in the North and Far North.

As the foundation of this community and facility level service delivery support, with FY 2018 funds, PMI will support the NMCP to finalize the revisions to the national case management guidelines and data collection tools. Of note, the planned revisions include changes to the current policy for case management of malaria in pregnant women (from the existing policy of treating all cases in pregnancy as severe cases to a policy in line with WHO recommendations). This support will include production and dissemination of these tools, as well as strategy workshops to ensure effective rollout and communication support.

Please see Table 2 (2018) and Table 2 (2019) for a detailed list of proposed activities with FY 2018 and FY 2019 funding.

5. Cross-cutting and other health systems strengthening

In order to successfully implement the aforementioned activities, PMI Cameroon supports a suite of activities that cut across and benefit insecticide- and drug-based prevention and case management activities. For example, availability of high-quality commodities is necessary to ensure high ITN coverage and effective case management, and health-seeking behavior of individuals and communities is necessary to improve coverage of all interventions. In addition, the gains achieved in malaria control in Cameroon can only be sustained if there are strong health systems and local capacity. Hence, systems strengthening and capacity building are intrinsic in all PMI intervention-specific activities previously mentioned (e.g., training and supervision of health workers, technical assistance for planning and monitoring interventions, etc.). Non-intervention specific or cross-cutting health systems strengthening activities are described below.

a. 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

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Background

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 donor 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 DPDL and CENAME are often disconnected and overlapping. 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 conducted an assessment of the national pharmaceutical system. The resulting report called for the creation of a national logistics management unit in the MoH to coordinate all of the national supply chain systems.

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 antimalarial 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, 6 had stock-outs of malaria drugs between several weeks and 6 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.

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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.
- There is no national system to store and distribute ITNs.
- Stock-outs are experienced by 40% of health facilities (SIAPS).
- There is no pharmacovigilance system for adverse medical reaction reporting.

An end-use verification (EUV) study conducted in 112 facilities in 6 regions in August 2018 revealed:

- Over 50% of the malaria cases were diagnosed with RDT or microscopy but clinical diagnosis was still high (21.6%)
- The updated malaria standard treatment guidelines (STGs) was available in most of the sites but was not used by all the staff
- Low use of stock cards especially for SP used in IPTp and LLINs
- Stockouts due to delays in delivery
- Overall insufficiency in health personnel

Progress since PMI was launched

PMI has provided central level support to the NMCP for a number of activities. PMI supported training in quantification and in the use of demand forecasting (Quantimed) and supply planning (Pipeline) tools to conduct quantification updates for malaria commodities (July 2018). PMI partners conducted the first end use verification survey in August 2018 in the six regions (North, Far North, East, Centre, Littoral and South) using the new methodology and tablet-based questionnaires. PMI partners coordinated with NMCP to submit the PPMR-m for Cameroon that helps stakeholders to monitor stock status for antimalarial commodities in all the 10 regions and to follow up the incoming shipments from all the sources of funds. PMI Cameroon assisted the NMCP in realization of a gap analysis for all antimalarial commodities covering a period of three years. PMI participated in the development of the new national malaria control strategic plan 2019-2023. Finally, PMI supported NMCP in revising warehousing and distribution contracts with the 10 regional funds for health promotion by incorporating key performance indicators and agreeing on roles and responsibilities.

At the regional level, achievements to date have included the on-time delivery and distribution of SPAQ to cover the 4 cycles of the SMC campaign in all 45 health districts in the Far North and North regions. In addition, AL was distributed to be used as first line treatment during SMC campaign and beyond. Two temporary warehouses were rented and 3PL contracted for distribution of SPAQ and AL. A delivery-tracking tool was developed to monitor deliveries of SMC products to 297 health areas. In addition, a data aggregation tool was developed to monitor consumption of SPAQ vs targets cycle-by-cycle and adjusted as necessary, and refilling those with over consumption. A GPS tracking system was introduced to ensure SMC commodities are delivered as required to the last mile distribution points. MoUs and sub-contracts were signed with the Regional Funds for Health Promotion for North and Far North to manage and distribute PMI commodities in future to avoid parallel distribution at the health facility level. Trainings in supply chain management and supportive supervisions were conducted for 24

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districts in Centre region and 18 districts in Littoral and a training of trainers in the two PMI regions (North and Far North). Finally, PMI partners assisted the revitalization of the Regional Supply Chain Coordination platforms in the two PMI regions that bring together all supply chain actors by organizing their first meeting.

Plans and justification for proposed activities with FY 2018 and FY 2019 funding:

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 manage and distribution of commodities in six regions from the port of entry to the regional warehouses, transporting USG-funded anti-malarial medicines and diagnostics directly to the regional funds (regional warehousing). PMI will implement a similar pharmaceutical management program focused on malaria in the Far North and North Regions, but with distribution of commodities, including ITNs, down to the health facility level. 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 services.

PMI will support implementation of a semi-annual EUV survey at to monitor the availability of key malaria control commodities at health facilities and regional warehouses on a national scale. With FY 2018 funds, PMI will support distribution of ITNs procured by GF for the 2019 mass campaign in the Far North region, to complement efforts of the GoC and GF supporting the national 2019 ITN mass campaign. PMI will cover all distribution costs from the regional funds to the point of distribution.

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:

- Conduct a roadmapping activity to document the current state of the existing national pharmaceutical systems (LMIS)
- 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.
- Support the development of standard operating procedures for the management of malaria products.

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Please see Table 2 (2018) and Table 2 (2019) for a detailed list of proposed activities with FY 2018 and FY 2019 funding.

b. Social and behavior change communication

NMCP/PMI objectives

According to the NSP 2014-2018, behavior change communication is 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.

There is a national technical working group for malaria communication led by the NMCP and made up of various partners (e.g., Malaria No More, IRESCO, ACMS, UNICEF, and UNFPA). 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 community-based organizations (CBOs), work with the CHWs to further refine and tailor the messages for the local population, time of year, and target behavior of interest. For example, the organization Malaria No More has historically been responsible for leading message and materials development centrally, conducting mass communication (e.g., for the last mass ITN distribution campaign), and engaging with the private sector. At the more peripheral levels (e.g., district, community), interpersonal communication and local media campaigns are adapted and implemented by CBOs.

The SBCC unit within the NMCP embraces the "Communication for Development" (C4D) approach, a social process based on dialogue, debate and open exchange among stakeholders that involves applying a wide range of tools and methods. Specifically in Cameroon, there are five specific C4D strategies:

1. Advocacy (e.g., for political support at multiple levels, resource mobilization)
2. Social mobilization targeted to civil society organizations (to encourage community ownership and accountability)
3. SBCC through mass media and interpersonal communication
4. Capacity building (e.g., targeted to journalists, CHWs, and health promotion agents)
5. Social marketing (not currently planned or implemented)

Focusing on SBCC, intervention approaches include mass media and interpersonal communication. Mass media includes traditional channels such as community and national radio, local and national print

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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 or events (e.g., launch of ITN mass distribution campaign), increase knowledge about transmission, and enhance the image of the NMCP. The role of interpersonal communication, through home visits, educational discussions and counseling, is to go beyond knowledge and influence behavior change. Per the NSP, CBOs (there should be one per community) 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 work-plan; additionally, they should conduct regular supervision and provide capacity building.

Cameroon is currently piloting a school-based program in one district, with funding from SANOFI. *Students against Malaria* is being piloted in 58 primary schools, with a 3-tier training approach, that involves teachers and students. Students in turn return to communities (families and peers) to share messages on malaria prevention using Moski kits, a combination of flipcharts, posters, board games and manuals. The program, coordinated and implemented through the NMCP, is being evaluated with baseline data collection in 2016 and endline data collection currently underway (Oct 2018). Preliminary data suggest an increase in knowledge about malaria and prevention among households visited by students involved in the program. The endline evaluation will also assess changes in care-seeking and net use. Pending the outcome of the evaluation, the NMCP is interested in considering scale-up of this school-based approach to behavior change.

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.

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Table 15. Behavioral and Communication Objectives for Key Malaria-Related Behaviors

| Behavioral Objective | Baseline | Target |
|--|--------------------|---------------|
| Ensure at least 80% of health workers adopt behaviors that facilitate the population’s use of malaria services (objective 1): <ul style="list-style-type: none"> • Satisfactory welcome and service to patients (i.e., patients treated with respect and dignity) • Respect for professional ethics and morality • Strong motivation to perform job functions • Responsible and honest administration of treatment | Not specified (NS) | 80% |
| Communication Objectives | Baseline | Target |
| 1. It is the responsibility of health workers to provide quality medical services for their community. | (NS) | (NS) |
| 2. Health workers should take pride in their role as a medical professional; their community depends on them for high-quality health care. | (NS) | (NS) |
| Behavioral Objective | Baseline | Target |
| Use ITNs in the household when they are available | 84%* | 80% |
| Communication Objective | Baseline | Target |
| 1. ITNs are effective | (NS) | (NS) |
| 2. There are no negative secondary effects from ITNs (they are safe to use) | (NS) | (NS) |
| Behavioral Objective | Baseline | Target |
| Seek care early from qualified medical professionals | 66%** | 80% |
| Communication Objective | Baseline | Target |
| 1. Self-medicating or seeking care from unqualified providers is risky; it is safer to seek care from qualified providers | (NS) | (NS) |
| 2. Actions that are less expensive usually end up “costing” more later | (NS) | (NS) |
| 3. Malaria tests and treatments are scientifically proven to be safe and effective | (NS) | (NS) |
| 4. Malaria treatment is free for children under 5 | (NS) | (NS) |
| Behavioral objective | Baseline | Target |
| Attend ANC routinely throughout pregnancy to get IPTp | 26%*** | 80% |
| Communication objective | Baseline | Target |
| 1. Use of IPTp during pregnancy ensures the safety of the pregnant woman and her future baby | (NS) | (NS) |
| NOTES: * Use of available ITNs is from the 2018 VectorWorks ITN use: access report with data drawn from the 2014 MICS. ** % Children under 5 years old with fever in the last two weeks for whom advice or treatment was sought (2014 MICS) *** % Women who received three or more doses of IPTp during their last pregnancy in the last two years (2014 MICS) | | |

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Note on Table 15: These behavioral and communication objectives, along with the baseline and target figures will be refined based on the next iteration of the National Communication Plan, 2019-2023; PMI will be supporting development of the new plan.

Progress since PMI was launched

The PMI-supported implementing partner focused on SBCC has completed an initial scoping visit, established connections with the NMCP and other relevant partners, and are securing offices and staffing. Work plan development reflects the overall objective of PMI-supported SBCC to improve adoption and uptake of malaria interventions among individuals, families, communities, and health workers through evidence-based and contextually appropriate SBCC activities, primarily focused in the North and Far North regions. Capacity-building, particularly for design, monitoring, and evaluation of malaria SBCC at both national and sub-national levels is an additional focus. No direct implementation activities for SBCC have been initiated at the time of MOP writing.

Plans and justification for proposed activities with FY 2019 funding:

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 focus areas. Given the Global Fund focuses communication efforts on mass media and supports efforts to coordinate and harmonize SBCC activities, PMI will primarily focus resources at district and local levels in the two northern regions where other PMI-supported activities will be concentrated. These activities will be directed to improve:

- Awareness/adherence for SMC
- Awareness of and participation in ANC services
- Awareness of and participation in the 2019 ITN mass distribution campaign
- Awareness of and demand for 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 and generate demand will rely on community media channels (radio, billboards, and print), small group communication, 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 communication and utilize existing (and planned) platforms of CHWs 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.

Activity design and SBCC approaches will be informed by review of existing data. Potential formative data sources include household survey data (e.g., 2014 MICS, 2018 DHS), including the ITN use: access analysis; the 2016 post-campaign ITN evaluation survey; and two health facility surveys currently being fielded with support from Global Fund and World Bank. The most recent data available on community behavior in Cameroon is from a qualitative study in 2015 conducted by the Institute for Research, Socio-

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Economic Development and Communication (IRESCO) and funded by the Global Fund. Data on behavioral determinants from that study however is not sufficient to inform program planning. With FY 2018 MOP funds, additional data collection needs for formative research will be supported in the two northern regions to focus on both qualitative and quantitative data collection to explore determinants of both community and health worker behaviors in the PMI focus areas for key malaria behaviors. The Malaria Behavioral Survey (MBS) will assess household malaria-related behaviors and determinants quantitatively in both regions, and it will be followed by a qualitative research the following year to adequately segment target groups. In parallel with the community research, a coordinated SBCC campaign targeted to health workers to ensure adherence to national case management and MIP policies, and high-quality service provision will be implemented and combined with training, including service communication, and supportive supervision. With this approach, health workers will be both a target audience for SBCC, as well as a communication channel for SBCC delivered to patients during patient-provider interactions. This activity will be conducted following a literature review on the determinants of facility-based providers behavior. Additionally, a desk review to analyze existing training, job aids, and supportive supervision tools and processes, including any documentation relevant to the continuum of care from the community to the facility will be conducted. This activity will help identify improvements to these materials that are likely to positively impact health facility provider performance. A particular accent during the formative research at both the community and health worker levels will be put on the determinants of the overuse of injectable artesunate. Communication activities for the ITN mass campaign and SMC campaign will also be supported by PMI. In FY 2019, there will be relatively less emphasis on data collection as implementation based on formative research findings is intensified for beneficiaries (i.e., community members) and health workers. Monitoring of SBCC activities will continue to be a critical activity. Monitoring of health facility-based SBCC activities will be coordinated with service delivery activities to leverage data collection opportunities through supportive supervision. Community-level SBCC monitoring will likely include approaches such as media monitoring, rapid surveys, and even omnibus surveys. These approaches will be specified when implementation activities are more concretely defined after formative research. In both FY 2018 and FY 2019, PMI will also support SBCC capacity strengthening of the NMCP, including support to attend the *Leadership in Strategic Communication Workshop* to develop SBCC research and monitoring and evaluation skills. Additional support will also be provided to convene quarterly meetings of the SBCC coordination group integrated to quarterly data review meetings, NMCP representation at other key global meetings, and development of the new national malaria communication plan derived from the new NSP. These efforts will be informed by an SBCC stakeholder capacity assessment that PMI will also support.

Please see Table 2 (2018) and Table 2 (2019) for a detailed list of proposed activities with FY 2018 and FY 2019 funding.

c. Surveillance, monitoring, and evaluation

NMCP/PMI objectives

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

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- Monitor implementation of activities 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

Specific goals include:

- 80% of Health Facilities and CHW transmitting quality data on time
- 80% of health workers use routine data for decision making
- 95% of interventions are measured
- 100% of epidemics are detected early
- 100% of epidemics are controlled within 2 weeks of detection

Background

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 midpoint and end of each five-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 subsystems 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.

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-related data in Cameroon:

Routine malaria reporting: The malaria program has been using a vertical malaria reporting system (RMIS) 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 data (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 to the region, and the region sends it to the central NMCP office.

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

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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. In December 2017, a memo from the Minister of Health was sent to all health districts directing the use of the HMIS as the national reporting system. A grace period of one year was granted for parallel systems to continue operating to ensure adequate quality control. As of 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. Although a lot of progress has been made since late 2016, the use of the DHIS2 platform for HMIS is in relatively early stages in Cameroon. A recent assessment estimated 75% reporting completeness in the RMIS while the HMIS had 59% completeness. Eighty percent completeness is necessary before the NMCP will feel comfortable transitioning to the integrated system.

HMIS reporting rates are affected by the percent of registered facilities that are private as there are few incentives for private sector facilities to consistently submit reports. In the North and Far North regions, over 90% of registered health facilities are public so reporting rates are relatively high. As of September 2018, approximately 2000 health facilities throughout the country had staff trained in DHIS-2 data entry with another 1,000 to be trained before the end of the year. Current training plans are ongoing and training should be complete by December 2018, including in the North and Far North. The system is currently designed for reporting with smartphones, tablets, or computers; there are no plans to roll this out using paper-based tools. Currently, the needs for scale-up include equipping health facilities with reporting tools, continued training on reporting procedures, and ensuring adequate supervision. All of these have been challenges, and impact the quality of the data currently reported through the system.

Global Fund grant 2018-2020 will be supporting DHIS-2 scale up with roughly \$2.1 million focused on data use and analysis.

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). A DHS including malaria parasitemia testing was fielded in 2018. Results are forthcoming.

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 a 2016/2017 survey to assess coverage as a result of the 2016 mass campaign. Results from this last survey (*EPC-MILDA 2016/2017*) have shown Cameroon is still a long way from attending its target of 80% of universal coverage and that ITN

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utilization is still low. The results also present the Far North region as the poorest performing for ITNs indicators, including the lowest utilization rates amongst children under 5 and pregnant woman. In addition, there is an ongoing health facility survey. Though sentinel surveillance, LMIS, and pharmacovigilance are mentioned in the M&E plan, they do not seem to be currently funded or operational.

As a new National Strategic Plan for Malaria Control is currently under finalization for 2019-2023, the NMCP anticipates updates to the M&E Plan in the near future.

Table 16. Surveillance, Monitoring, and Evaluation Data Sources

| Data Source | Survey Activities | Year | | | | | | | | |
|---|---|------|------|------|------|------|------|------|------|------|
| | | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 |
| Household surveys | Demographic Health Survey (DHS) | | | | | | | X# | | |
| | Malaria Indicator Survey (MIS) | | | | | | | | | (X) |
| | Multiple Indicator Cluster Survey (MICS) | | | X* | | | | | | |
| | EPI survey | | | | | | | | | |
| Health Facility surveys | Service Provision Assessment (SPA) | | | | | | | | | |
| | Service Availability Readiness Assessment (SARA) survey | | | | | | | | | |
| | Service Delivery Indicator (SDI, World Bank) Health Facility Assessment (WHO) | | | | | | | X*# | | |
| Malaria Surveillance and Routine System Support | Support to parallel malaria surveillance system | X* | (X) | |
| | Support to HMIS | | | | X* | X* | X* | X* | (X) | (X) |
| | Support to Integrated Disease Surveillance and Response (IDSR) | | | | | | | | | |
| Other Surveys | EUV | | | | | | | X | (X) | (X) |
| | Durability monitoring | | | | | | | | (X) | (X) |
| | Therapeutic efficacy monitoring (In vivo efficacy testing) | X* | X* | X* | X* | X* | | | (X) | (X) |
| | Post-ITN campaign survey | | X* | | | | X* | | | (X)* |
| | Entomological surveillance and resistance monitoring | | | | | | | X | (X) | (X) |

* Non-PMI supported

(X) Planned

Ongoing

Plans and justification for proposed activities with FY2018 and FY 2019 funding:

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PMI will collaborate with the NMCP, Global Fund, and other malaria partners to support the M&E strategy outlined as part of the NSP and will support to develop a new M&E plan, to monitor progress of new NSP.

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.

PMI will support district-level activities in the North and Far North regions to ensure high-quality data to monitor routine malaria service provision and epidemiological impact of PMI-supported comprehensive package of interventions. This will include health facility level training and support for ~300 staff on the use of DHIS-2, as well as creation of a manual on standard operating principles for data management. PMI will support targeted surveillance strengthening in these two regions to assure 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). 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 these regions, a health facility assessment will provide formative and baseline data on routine malaria service provision for MIP and case management.

Please see Table 2 (2018) and Table 2 (2019) for a detailed list of proposed activities with FY 2018 and FY 2019 funding.

d. Operational research

Current priorities for the NMCP as outlined in the NSP are to support partners' capacity strengthening for operational research, including therapeutic efficacy studies and entomological resistance monitoring. 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.

e. Other health systems strengthening

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

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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-5 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

Progress since PMI was launched

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 includes the Advanced training program, a two-year intensive training program conducted at the national level, and 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 6 cohorts with 80 health professionals trained. The seventh cohort of 16 trainees was launched in October 2018; PMI is supporting two residents in this cohort. 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 3 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 for proposed activities with FY 2018 and FY 2019 funding:

With FY 2018 and FY 2019 funding, PMI will focus on improving capacity within the MoH in the areas of leadership, management, and governance. Support will focus on assisting the NMCP in their role to coordinate technical partners, and to facilitate their participation in global and regional workshops and conferences where they can learn from other programs and share their own successes.

CA-FETP: PMI proposes to support surveillance and field epidemiology capacity building through support to the FETP Advanced program. Both with FY 2018 and FY 2019 funds, PMI will support two residents in each Advanced cohort for their duration of their two-year training. 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

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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.

Please see Table 2 (2018) and Table 2 (2019) for a detailed list of proposed activities with FY 2018 and FY 2019 funding.

6. 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 Foreign Service National (FSN) works 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 in the case of Cameroon, where the Health Office Director sits at the West Africa Regional Mission in Accra, that authority is delegated to the Senior Health Advisor/Team Lead in country. Thus the two PMI RAs, one from USAID and one from CDC, report to the USAID Senior Health Advisor for day-to-day leadership, and work together as a part of a single interagency team. Technical expertise housed in Atlanta and Washington 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

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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.

Please see Table 2 (2018) and Table 2 (2019) for a detailed list of proposed activities with FY 2018 and 2019 funding.