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Mali

Malaria Operational Plan FY 2023

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

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

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ABBREVIATIONS

ACT	Artemisinin-based Combination Therapy
ANC	Antenatal Care
CDC	Centers for Disease Control and Prevention
CSCom	*Centre de Santé Communautaire* (Community Health Center)
CSRef	*Centre de Santé de Reference* (Referral Health Center)
DHIS2	District Health Information Software 2
DHS	Demographic and Health Survey
FY	Fiscal Year
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
HNQIS	Health Network Quality Improvement System
IG2	Interceptor G2
IPTp	Intermittent Preventive Treatment for Pregnant Women
IRS	Indoor Residual Spraying
ITN	Insecticide-treated Mosquito Net
LBMA	Laboratoire de Biologie Moléculaire Appliquée (Applied Molecular Biology Laboratory)
LMIS	Logistics Management Information System
MIP	Malaria in Pregnancy
MOP	Malaria Operational Plan
NMCP	National Malaria Control Program
OR	Operational Research
OTSS+	Outreach, Training, and Supportive Supervision Plus
PBO	Piperonyl Butoxide
PE	Program Evaluation
PMI	U.S. President's Malaria Initiative
PPM	*Pharmacie Populaire du Mali* (People's Pharmacy of Mali—Central Medical Store)
RDT	Rapid Diagnostic Test
SBC	Social and Behavior Change
SM&E	Surveillance, Monitoring, and Evaluation
SMC	Seasonal Malaria Chemoprevention
SP	Sulfadoxine-pyrimethamine
SPAQ	Sulfadoxine pyrimethamine-amodiaquine
USAID	U.S Agency for International Development
WHO	World Health Organization

EXECUTIVE SUMMARY

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

U.S. President's Malaria Initiative

Launched in 2005, the U.S. President's Malaria Initiative (PMI) supports implementation of malaria prevention and treatment measures as well as cross-cutting interventions. PMI's 2021–2026 strategy, *End Malaria Faster*, envisions a world free of malaria within our generation with the goal of preventing malaria cases, reducing malaria deaths and illness, and eliminating malaria in PMI partner countries. PMI currently supports 24 countries in sub-Saharan Africa and three programs across the Greater Mekong Subregion in Southeast Asia to control and eliminate malaria. Mali began implementation as a PMI partner country in fiscal year (FY) 2007.

Rationale for PMI's Approach in Mali

Malaria remains a major public health concern and priority for Mali's Ministry of Health and Social Development because it is the leading cause of morbidity and mortality. Impressive gains in the past decade include significant decreases in malaria prevalence and all causes of child mortality, but challenges also remain. In recent years, the country has suffered from political instability and insecurity, which hamper the provision of health services, patient access to care, and quality of care. Nevertheless, there are also positive factors that contribute to an enabling environment for malaria interventions, including a long tradition of insecticide-treated mosquito net (ITN) use, a growing network of community health workers (CHWs), a strong research community, and government commitment to defeating malaria. PMI's support in Mali is well aligned with the national strategic plan, contributing to the implementation of the majority of key interventions. PMI's operational support is focused in the southern five regions with both the largest population and the highest malaria burden: Sikasso, Segou, Koulikoro, Mopti, and Kayes, as well as the capital of Bamako.

Overview of Planned Interventions

The proposed FY 2023 PMI funding for Mali is $24 million. PMI will support the following intervention areas with these funds:

1. Vector Monitoring and Control

The Mali National Malaria Strategic Plan recommends different vector control interventions, including continuous and mass distribution of ITNs, indoor residual spraying (IRS), larval source management, as well as management of insecticide resistance and strengthening entomological surveillance capacities. PMI supports all of these interventions, with the exception of larval source management and IRS. With FY 2023 funding PMI will:

- Procure and distribute ITNs through routine channels (antenatal care and vaccinations), matching the type of net to those distributed during the 2023 mass campaign
- Conduct streamlined durability monitoring of dual active ingredient nets distributed in the Sikasso region during the mass campaign
- Support entomological monitoring at 13 sites

2. Malaria in Pregnancy

The National Reproductive Health Policy was updated in 2020, and Mali adopted the World Health Organization's antenatal care (ANC) model that comprises at least eight contacts between a pregnant woman and the health care system. Intermittent preventive treatment of malaria in pregnant women (IPTp) is the main strategy. With FY 2023 funding, PMI will procure the sulfadoxine-pyramethamine (SP) needs for all of Mali and contribute to strengthening the capacity of health care providers on IPTp, ITNs, and case management through training and supportive supervision of ANC providers.

3. Drug-based Prevention

The NMCP's objective is to provide seasonal malaria chemoprevention (SMC) in districts with high seasonal malaria transmission and reach 90 percent of children in eligible age groups during each cycle of SMC. With FY 2023 funding, PMI will support SMC commodity and operational costs to cover children 3 to 59 months of age in 11 districts of the regions of Sikasso, Kayes, and Koulikoro, as well as all children 5 to 10 years of age in three districts of Sikasso.

4. Case Management

PMI works to improve the quality of diagnostics and case management at health facilities and in the communities in five regions and the district of Bamako. With FY 2023 funding, PMI will procure approximately 76 percent of rapid diagnostic tests, 55 percent of artemisinin-based combination therapies, and 27 percent of injectable artesunate, to be distributed through the national supply chain, and support training and supervision on all aspects of case management at the facility and community levels in

PMI-supported regions, with a particular emphasis on reducing the misclassification of severe malaria cases.

5. Health Supply Chain and Pharmaceutical Management

Working closely with Government of Mali counterparts, PMI supports strengthening supply chain management systems to ensure an uninterrupted supply of safe, quality-assured, and life-saving commodities. With FY 2023 funds, PMI will provide technical assistance on quantification and distribution of malaria commodities, including support for an electronic logistics management information system; conduct two end-use verification surveys; extend support for last-mile distribution between health districts and health facilities in two regions; and continue supporting quality control of antimalarials.

6. Social and Behavior Change

To improve the overall quality of malaria control efforts that contribute to reductions in morbidity and mortality, PMI supports social and behavior change activities to address a number of prevention and treatment behaviors for both community members and health care providers. The following three behaviors will be prioritized with FY 2023 funds: prompt care-seeking for fever for children under five years of age, health worker adherence to case management guidelines, particularly related to severe malaria, and acceptance/uptake of the full course of SMC.

7. Surveillance, Monitoring, and Evaluation

In support of the malaria control strategic plan and needs in Mali, PMI and the NMCP have prioritized interventions that address the challenges of underutilization of data and data quality at health facility and community levels. With FY 2023 funding PMI will continue to support the national health information system and platform (District Health Information Software 2), including training, data quality assessments, production of monthly malaria bulletins, and use of data for program improvement.

8. Operational Research and Program Evaluation

No operational research/program evaluation activities are planned with FY 2023 funds.

9. Capacity Strengthening

Capacity strengthening is integral to PMI’s approach in Mali, as demonstrated in the technical sections above, and through support to improve management at the NMCP. With FY 2023 funds, PMI will continue these activities and will fund the participation of NMCP staff (national and field level) in international scientific and professional meetings to provide opportunities to learn best practices, share experiences, and develop networks.

I. CONTEXT AND STRATEGY

1. Introduction

Mali began implementation as a U.S. President's Malaria Initiative (PMI) partner country in fiscal year (FY) 2007. This FY 2023 Malaria Operational Plan (MOP) presents a detailed implementation plan for Mali, 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. PMI is proposing activities that build on partner investments to improve and expand malaria-related services, including investments by the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund). This document provides an overview of the strategies and interventions in Mali, describes progress to date, identifies challenges and relevant contextual factors, and provides a description of activities that are planned with FY 2023 funding. For more detailed information on the country context, please refer to the country malaria profile, which provides an overview of the country's malaria situation, key indicators, the NMCP strategic plan, and the partner landscape.

2. U.S. President's Malaria Initiative

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

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

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

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

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

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

3. Rationale for PMI's Approach in Mali

3.1. Malaria Overview for Mali

Malaria remains a major public health concern and priority for Mali's Ministry of Health and Social Development because it is the leading cause of morbidity and mortality, particularly for children less than five years of age and pregnant women. According to data from the routine health information system (DHIS2), 37 percent of outpatient consultations and 33 percent of deaths at health facilities were due to malaria in 2021.[1]

The Government of Mali, in partnership with funding partners, research institutions, and national and international organizations, has achieved impressive gains in malaria control over the past decade. Malaria prevalence in children under five years of age declined from 47 percent in 2012[2] to 19 percent in 2021,[3] and all-cause child mortality decreased by 28 percent, from 126 deaths per 1,000 live births in 2009 to 101 deaths per 1,000 live births in 2018.[4] Malaria prevalence varies across regions, from less than

[1] DHIS2, Extracted on 4/24/2022 (Percent of death = Number of deaths due to malaria/all-cause of deaths).
[2] DHS 2012.
[3] Malaria Indicator Survey, 2021
[4] DHS 2018.

2 percent in Bamako to 27 percent in Mopti region.[3] However, between 2020 and 2021, Mali experienced a dramatic upsurge in malaria cases. During that period, malaria cases increased from 128 per 1,000 population in 2020 (2,667,070 malaria cases) to 150 per 1,000 population in 2021 (3,204,488 malaria cases).[1]

Programmatic indicators have shown improvement. The proportion of households with at least one ITN increased from 50 percent in 2006 to 91 percent in 2021, according to the 2021 Malaria Indicator Survey. The proportion of pregnant women who received three or more doses of IPTp increased from 28 percent in 2018 to 35 percent in 2021. Care-seeking for children with fever has continued to improve from 56 percent in 2006 to 60 percent in 2021, as well as malaria testing (finger or heel stick), which increased from 14 percent in 2015 to 24 percent in 2021. However, among those children with fever, the proportion receiving an ACT decreased from 29 percent in 2018 to 15 percent in 2021.

A new malaria stratification exercise was done in January 2021 using malaria incidence adjusted for health center attendance rate and climatic zones. Four transmission zones were defined:

- Very low transmission: adjusted incidence less than 100 cases per 1,000 person-years (12 districts)
- Low transmission: adjusted incidence between 100 and 250 cases per 1,000 person-years (19 districts)
- Moderate transmission: adjusted incidence between 250 and 450 cases per 1,000 person-years (20 districts)
- High transmission: adjusted incidence above 450 cases per 1,000 person-years (24 districts)

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

3.2. Key Challenges and Contextual Factors

Mali faces a number of challenges to achieving its malaria control objectives, many of which are similar to neighboring countries. In 2020, Mali ranked 184 out of 189 countries on the Human Development Index, reflecting high levels of poverty and food insecurity, low literacy rates, especially for women and rural populations, and an economy that is largely dependent on variable rainfall. These socioeconomic factors impact the government's ability to provide health services and the population's ability to access them. For example, possession and use of ITNs, distributed nationwide through mass campaigns, are higher among rural, less educated, and poorer populations, while indicators that reflect access to health services, such as IPTp and care-seeking for

children with fever, are consistently higher in urban, wealthier, and better educated populations.

In recent years, political instability and insecurity have further complicated the situation. Violence in the northern and central regions of the country have contributed to a significant increase in internally displaced populations, and neighboring countries have imposed sanctions on Mali in response to coups. These have hampered the provision of health services, patient access to care, and quality of care. The presence of multiple armed groups, along with national and international armed forces, creates a complicated landscape.

Nevertheless, there are also positive factors that contribute to an enabling environment for malaria interventions. Mali has a long tradition of ITN use, with ownership and use indicators among the highest in Africa. The network of community health workers (CHWs) has been steadily growing in recent years. In early 2022, the government formalized CHWs' place in the health pyramid, a first step in paying them. Mali also boasts a strong scientific and research community, having contributed to research on malaria vaccines, mosquito genetics, and drug resistance. Finally, the Government of Mali has demonstrated its commitment to defeating malaria through the procurement of some malaria commodities, supporting operational costs for seasonal malaria chemoprevention (SMC), and working closely with local and international partners.

Some of the programmatic challenges the country faces include:

- Non-adherence to case management guidelines related to severe malaria cases, which has significant implications for commodity procurement.
- Inconsistent data quality and poor visibility into commodity consumption data.
- Recurrent stockouts at service delivery points.
- Unreliability of government commitments to fund commodities and activities.

3.3. PMI's Approach for Mali

PMI's support in Mali is well aligned with the national strategic plan, contributing to the implementation of the majority of key interventions. A few activities delineated in the National Malaria Strategic Plan that PMI does not contribute to include: sampling and quality control testing of ITNs upon arrival in the country, IRS (after 2022), larval source management, procurement of rectal artesunate for pre-referral treatment, pharmacovigilance, epidemic preparedness and response in the northern regions, and malaria sentinel surveillance sites. Vector control, case management, and SMC make up the largest share of PMI's FY 2023 budget, at 29 percent, 26 percent, and 22 percent, respectively. Overall, 53 percent of the budget is dedicated to commodity

procurement, with the remaining 47 percent supporting implementation costs and technical assistance.

PMI's approach in Mali seeks to ensure the availability of key prevention and case management products and services, in close collaboration with the Global Fund and the Government of Mali. Commodities procured by different partners are put into a common stock and distributed through the national system. PMI's operational support is focused in the southern five regions with both the largest population and the highest malaria burden: Sikasso, Segou, Koulikoro, Mopti, and Kayes, as well as the capital of Bamako.

PMI/Mali uses data to address the programmatic challenges listed above. This includes end-use verification surveys and the web-based dashboard for managing essential health commodities logistics and patient information (*Outil de Suivi des Produits de Santé*, or OSPSANTE) to understand where stockouts are happening, and HMIS data to identify districts with the highest proportion of severe malaria cases. Starting in 2022, PMI will support the NMCP to create a working group to better understand the behavioral aspects related to the misclassification of severe malaria cases and the overuse of injectable treatments in order to inform appropriate interventions. Data quality is monitored and improved through regular data review meetings and the publication of epidemiological bulletins at both the national and regional levels in PMI focus regions.

One area that remains a challenge is encouraging the Government of Mali to increase and follow through on its funding commitments for malaria. As this issue goes beyond malaria, PMI contributes to the efforts of the USAID Health Office and the national donor coordination group that reviews government and external commitments for malaria and develops advocacy strategies for increasing and following through on government funding.

PMI's approach in Mali is fully aligned with the PMI 2021–2026 strategy, *End Malaria Faster*. In particular, PMI/Mali supports CHWs and other volunteers to reach remote and underserved populations through door-to-door activities like SMC, outreach strategies for antenatal care (ANC) and IPTp, and active detection of malaria cases. PMI is also supporting advocacy efforts to have CHWs fully integrated into the health system, including a transition to having the government pay their salaries. Two local research institutions, the Malaria Research and Training Center and the Applied Molecular Biology Laboratory (*Laboratoire de Biologie Moléculaire Appliquée, or* LBMA), both at the University of Bamako, have prominent roles in PMI's programming, working on therapeutic efficacy studies, operations research, and ITN durability monitoring. Community-based entomological surveillance is also an approach that will allow data

collection to continue when implementing partners may not be able to reach areas due to insecurity or other factors.

3.4. Key Changes in this MOP

PMI is not proposing any significant changes in strategies, activities, or budget levels compared to the FY 2022 MOP.

II. OPERATIONAL PLAN FOR FY 2023

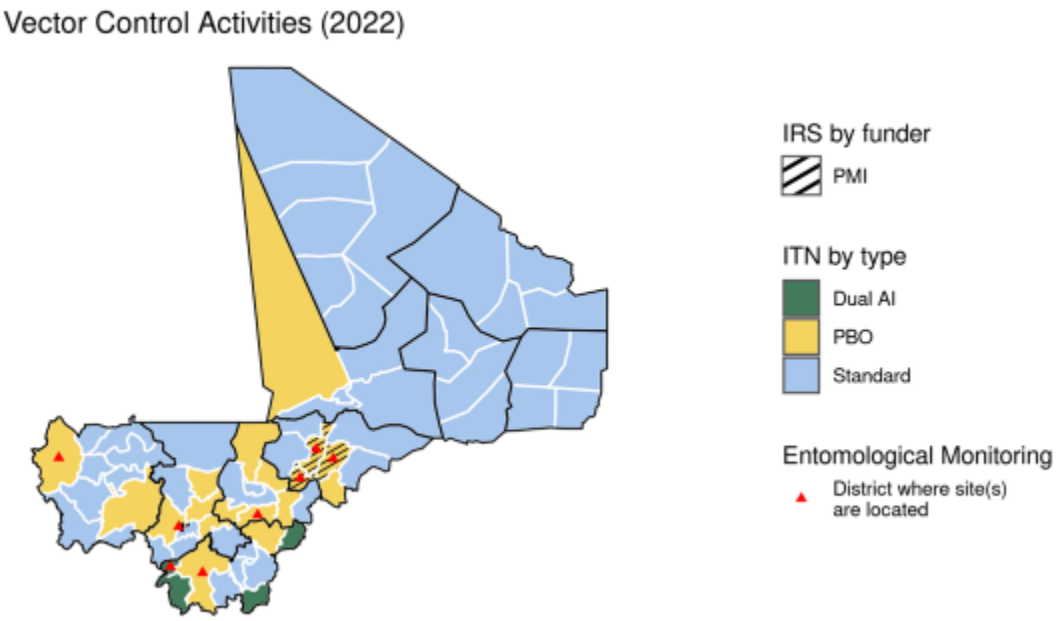
1. Vector Monitoring and Control

1.1. PMI Goal and Strategic Approach

The Mali National Malaria Strategic Plan recommends different vector control interventions including continuous and mass distribution of ITNs, IRS, larval source management, as well as management of insecticide resistance and strengthening entomological surveillance capacities. Currently PMI supports the use of these interventions, with the exception of larval source management and IRS (PMI and the NMCP mutually agreed to stop implementing IRS after 2022). The Global Fund supports mass distribution of ITNs every three years, while PMI supports continuous distribution of ITNs through ANC and vaccination channels.

PMI began supporting annual IRS campaigns in Mali in 2008. Initially implemented in the Koulikoro region, IRS operations were relocated to Mopti in 2017 based on its high malaria prevalence rate. Between 2017 and 2021, five consecutive IRS campaigns were conducted in different districts of the region (Bandiagara, Djenné, Mopti, and Bankass).

Figure 1. Map of Vector Control Activities in Mali



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

During the referenced period PMI:

- Procured and distributed more than 1.8 million ITNs for routine distribution through antenatal consultations and the Expanded Program for Immunization.
- Trained LBMA staff on the use of the C-vue spectrophotometer for analysis of insecticide residue on ITNs.
- Funded the planning, implementation, and evaluation of the 2021 IRS campaign in three health areas in Mopti, Djenné, and Bandiagara districts. Trained and engaged 238 community members and other cadre of staff to support IRS mobilization and spray activities. A total of 61,791 structures were sprayed (96.7 percent coverage), protecting 233,663 people from malaria, including 17,768 pregnant women and 45,249 children under five years of age.
- Supported the monitoring of insecticide durability on wall surfaces in IRS sites.
- Supported entomological monitoring at eight sentinel sites in six districts in collaboration with the NMCP and the LBMA. Monitoring activities included longitudinal vector surveillance and insecticide resistance monitoring at 10 sites. For more information about entomological monitoring, please refer to the 2020 Entomological Report.
- Piloted community-based entomological surveillance using CDC light traps and pyrethrum spray catches at the existing six sites in the three IRS districts: a sprayed site and a control site (unsprayed) for each district.

The 2022 spray campaign will begin in early June in the same health areas as 2021. This will be the last year that PMI supports IRS in Mali, as PMI and the NMCP jointly decided to redirect resources to covering a larger population with new generation ITNs.

1.3. Plans and Justification for FY 2023 Funding

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

1.3.1. Entomological Monitoring

PMI will continue to support entomological monitoring activities in Mali as described in the Recent Progress section above. There is a plan to expand from the original eight vector bionomic sites if funding permits. Activities will include insecticide resistance monitoring and vector bionomics. Longitudinal entomological surveys will be carried out in at least eight sites and insecticide resistance monitoring at 10 sites (including Selingue where Interceptor G2 [IG2] ITNs have been distributed and the three sites where IRS will be withdrawn after the 2022 campaign). New generation ITNs will be distributed as part of the IRS exit strategy as well as increased entomological

monitoring and strengthened community-based entomological surveillance. The ongoing ento-surveillance at the IRS sites will continue after IRS withdrawal. In addition, community-based surveillance will be introduced in the three sites to increase ento-monitoring.

These data will assist the NMCP to make evidence-based decisions on malaria vector control. PMI will also provide technical support to strengthen the entomological capacity of the NMCP and the LBMA to better understand vector–human interactions.

Summary of Distribution and Bionomics of Malaria Vectors in Mali
Anopheles gambiae s.l. is the primary malaria vector in Mali, representing 98 percent of *Anopheles* collected at all sites in 2021. Other species recorded include *An. pharoensis*, *An. Rufipes,* and *An. funestus* s.l. Similar vector species compositions were found using community-based entomological surveillance. The peak of indoor resting densities and biting rates is in August/September in all sites. The overall density of *An. gambiae* s.l. remained very low in the IRS sprayed sites compared with other districts. The mean indoor density was lowest in the spray area of Djenné and highest in the unsprayed district of Tominian. Peak biting times were between 1 a.m. and 3 a.m. The highest entomological inoculation rate (EIR) was recorded in Bougouni with 44.37 infective bites per person, followed by Selengue with 29.7 infective bites per person over the six months of peak transmission. Overall EIR was significantly lower over the eight months of the survey in the sprayed districts compared to unsprayed sites.

Status of Insecticide Resistance in Mali
Anopheles gambiae s.l. was resistant to the three pyrethroid insecticides (permethrin, deltamethrin, and alpha-cypermethrin) tested at all the sites in 2021. High pyrethroid resistance intensity was recorded at all sites, except in Mopti and Selingue, where deltamethrin resistance was moderate. As of 2021, piperonyl butoxide (PBO) partially restores susceptibility to pyrethroids in *An. gambiae* s.l. at all the sites. There is emerging resistance to pirimiphos-methyl in two sites (Bougouni and Kadiolo), while the vector population was fully susceptible to clothianidin and to chlorfenapyr where tested.

1.3.2. Insecticide-Treated Mosquito Nets

PMI will continue to support procurement and distribution of ITNs for pregnant women and children less than one year of age through routine distribution (ANC visits and vaccination programs). With FY 2023 funds, PMI will procure enough ITNs to maintain 12 months of stock availability to avoid stockouts. PMI will purchase PBO nets for 14 targeted districts that will receive PBO nets during the 2023 mass campaigns; dual active ingredient nets for three districts that will no longer be covered by IRS after 2022 (Mopti, Djenne, and Bandiagara); and four health districts in Sikasso that will receive

them during the 2023 mass campaign (Kadiolo, Selingue, Yanfolila, and Yorosso); and single-pyrethroid ITNs for the rest of the country.

PMI will maintain support for ITN SBC interventions in targeted districts to increase demand for ITN ownership, increase appropriate use, and mitigate against misuse. Please see the Social and Behavior Change section for details on challenges and opportunities to improve intervention uptake or maintenance.

ITN Distribution in Mali

In Mali, ITNs are distributed via mass distribution campaigns every three years and through ANC and Expanded Program for Immunization continuous distribution channels. Though Mali currently does not use community outlets, CHWs play an important role to increase the demand and appropriate use of ITNs in the community.

PMI will continue discussions with the Government of Mali and Global Fund to ensure districts are covered with the same types of ITNs during the 2023 mass distribution campaign and routine distribution.

PMI will procure the majority of ITNs required for 2024, with the Government of Mali also contributing approximately 500,000 nets. No gaps are anticipated. Please refer to the **ITN Gap Analysis Table** in the annex for more detail on planned quantities and distribution channels.

Table 1. Streamlined Durability Monitoring

Campaign Date	Site	Brand	Baseline	12-month	24-month	36-month
Dec. 2017	Kenieba	Yorkool	March–May 2018	December 2018	Nov.–Dec. 2019	Nov.-Dec. 2020
Dec. 2017	Kita	Pemanet 2.0	March–May 2018	December 2018	Nov.–Dec. 2019	Nov.-Dec. 2020
May 2023	Kadiolo, Selingue, Yanfolila, Yorosso	IG2 nets PBO nets	Planned	Planned	Planned	Planned

A three-year full durability monitoring study was completed in 2021. It compared two ITN brands (Yorkool and PermaNet 2.0) in two locations from the Kayes region with similar malaria epidemiology, climatic, and socio-ecological profiles. At the 36-month follow-up period, the proportion of Yorkool nets surviving in serviceable condition was lower than PermaNet 2.0 nets, mostly because of high attrition due to wear and tear and lower physical integrity. With FY 2023 funds, PMI will support streamlined durability monitoring of dual active ingredient (IG2) and PBO-based ITNs to be distributed in the mass campaign in Sikasso region.

1.3.3. Indoor Residual Spraying

Table 2. PMI-supported IRS Coverage

Calendar Year	District	Structures Sprayed (#)	Coverage Rate (%)	Population Protected (#)	Insecticide
2021	Mopti Djenné Bandiagara	61,791	96.7	233,663	Mopti: Actellic® 300CS (organophosphate) Djenné: SumiShield 50 WG (clothianidin) Bandiagara: Fludora® Fusion (clothianidin + deltamethrin)
2022	Mopti Djenné Bandiagara	Planned	Planned	Planned	Mopti: SumiShield 50 WG (clothianidin) Djenné: Fludora® Fusion (clothianidin + deltamethrin) Bandiagara: Actellic® 300CS (organophosphate)

IRS Insecticide Residual Efficacy in Mali

Wall bioassays were conducted monthly following the 2021 IRS campaign at the three sites (Mopti, Djenné, and Bandiagara) where IRS was implemented. The results demonstrated sufficient strength of the insecticide, with 100 percent mortality recorded on all types of walls and for all insecticide formulations sprayed within the first week of spray. The residual efficacy of Actellic 300CS was up to six months, while SumiShield 50WG and Fludora Fusion WP-SB formulations remained efficacious for at least eight months.

PMI will not support IRS in Mali with FY 2023 funds.

2. Malaria in Pregnancy

2.1. PMI Goal and Strategic Approach

The NMCP NSP 2022–2024 objectives are to achieve a minimum of 80 percent coverage of three doses of IPTp and use of ITNs, and 100 percent prompt case management of malaria infection in pregnancy. PMI supports the delivery of a comprehensive package of malaria in pregnancy (MIP) integrated interventions through ANC.

The National Reproductive Health Policy was updated in 2020, and Mali adopted the World Health Organization's (WHO) ANC model that comprises at least eight contacts between a pregnant woman and the health care system. IPTp is one of the strategies for the prevention of malaria in pregnant women, and the policy states that pregnant women should receive at least three doses of IPTp. The first dose can be given as early as the 13th week of pregnancy, and subsequent doses should be given at monthly intervals after that.

PMI supports the NCMP to promote the provision of a minimum of three doses of IPTp, ITN use among pregnant women, and prompt care-seeking for pregnant women who have fever. Specific activities include sustained communication for women of childbearing age through women's associations with mass media and new local information and the use of modern communication technologies.

To increase IPTp uptake, Mali is in the early stages of developing a pilot for the distribution of sulfadoxine-pyrimethamine (SP) by CHWs, with support from the Global Fund, focusing on districts with high malaria burden and low IPTp3 uptake (below the national average of 42.5 percent, per 2021 DHIS2 data). In addition, the offer of free IPTp services has been extended to the level of private health facilities. Particular attention is being paid to the availability of the SP at all levels to limit the risks of stockouts through the monitoring of the stock management. PMI meets SP procurement needs for all of Mali, while both PMI and the Global Fund contribute to the capacity strengthening of providers on IPTp through support for training and supportive supervision of ANC providers.

Malaria case management for pregnant women is an NMCP priority intervention. Treatment of uncomplicated malaria in pregnancy follows WHO recommendations with regard to testing of fevers, medications utilized. and prompt treatment. In order to improve adherence to guidelines, MIP is a component of integrated supervision. PMI’s supportive supervision and training efforts aim to reach health workers from all health facilities in supported districts.

Please see the Insecticide-treated Mosquito Net section (1.3.2) for further details on how PMI supports routine distribution through ANC channels.

Key barriers that affect delivery of MIP services include knowledge gaps of prevention, case management, and IPTp guidelines among health care providers, limited IPTp content during ANC on-site training and supervision, delayed ANC attendance, long distance to health facilities, and stock-outs of malaria commodities.

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

During the referenced period, PMI:

- In collaboration with NMCP and Sub-Directorate of Reproductive Health, strengthened the capacity of 698 health providers in prevention and treatment of MIP and provision of ANC services in the regions of Kayes, Koulikoro, Sikasso, Segou, Mopti, and the district of Bamako.
- Provided technical and financial support to the NMCP for MIP and ANC technical working groups for effective collaboration and implementation of reproductive, maternal, newborn, and child health guidelines.

- Supported the NMCP to implement Outreach, Training, and Supportive Supervision Plus (OTSS+) with ANC healthcare providers across PMI-supported districts. Significant improvement was seen between the first and second rounds in the health facilities visited: the proportion of service providers demonstrating competency in the prevention of MIP increased from 38 percent to 55 percent, and provider competency in the treatment of MIP increased from 27 percent to 43 percent.[5]
- Supported procurement of 2,126,667 SP doses and distribution of 2,000,000 SP doses.
- Supported implementation of SBC interventions targeting pregnant women to generate awareness and uptake of ANC services and IPTp. For more information, please refer to the Social and Behavior Change section.
- Supported two MIP studies (see Operational Research section for more information).

2.3. Plans and Justification for FY2023 Funding

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

PMI/Mali will continue to support MIP activities as described in the Recent Progress section. Particular focus will be given to collaborating with the USAID health program that is supporting broader maternal health activities. PMI will continue to procure the full quantity of SP needed for the country. Please refer to the **SP Gap Analysis Table** in the annex for more detail on planned quantities and distribution channels.

Finally, PMI will support SBC to increase ANC attendance, IPTp uptake, use of ITNs, and malaria care-seeking for pregnant women in supported districts. Please see the Social and Behavior Change section for details on challenges and opportunities to improve intervention uptake or maintenance.

3. Drug-based Prevention

3.1 Seasonal Malaria Chemoprevention

PMI Goal and Strategic Approach

The NMCP objective is to provide SMC in districts with high seasonal malaria transmission and reach 90 percent of children in eligible age groups during each cycle of SMC (three to five cycles, depending on the district). SMC is implemented nationwide, except in the district of Bamako. The revised NMCP Strategic Plan 2022–

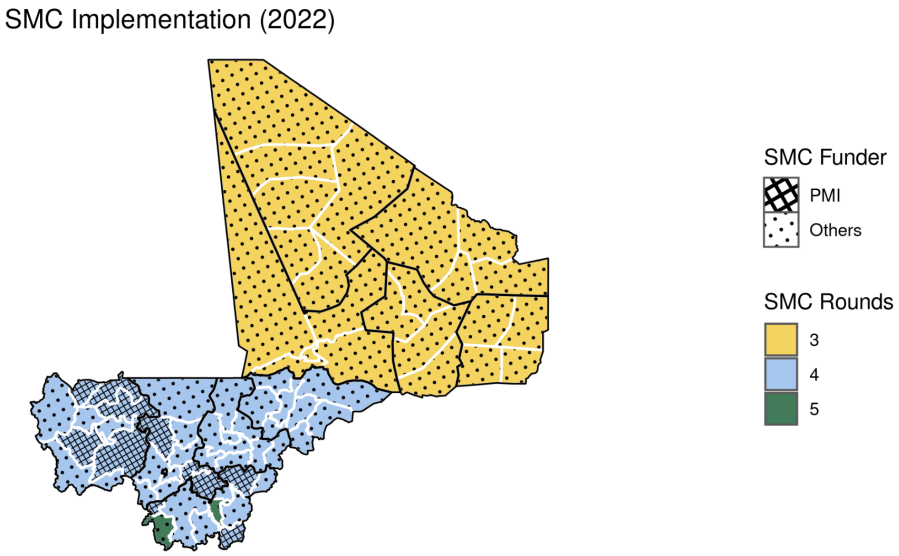
[5] Impact Malaria Project Annual Performance Report, FY 2021.

2024 recommends including children from 3 months to 10 years of age; however, due to resource constraints, the intervention only covers children 3 to 59 months of age in most of the country.

PMI procures sulfadoxine pyrimethamine-amodiaquine (SPAQ) and funds operational costs to cover children 3 to 59 months of age in 11 districts of the regions of Sikasso, Kayes, and Koulikoro, as well as all children 5 to 10 years of age in three of these districts. The Government of Mali, United Nations Children's Fund (UNICEF), and the Global Fund support the remaining eligible districts.

Mali's approach to SMC includes screening all children targeted for SMC for fever, and malnutrition screening for all children under five years of age. Children with fever are tested for malaria, and those who are positive are treated with an ACT. Children severely malnourished are referred to health facilities for proper management. In addition, pregnant women are screened for fever during SMC campaigns, and those who are febrile are referred for care.

Figure 2. Map of SMC Implementation in Mali



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

During the referenced period, PMI:

- Procured more than 7.2 million SPAQ blister packs for 11 PMI-supported districts.
- Supported the NMCP to implement this strategy, covering a total of 1,035,879 children 3 to 120 months of age, including 811,339 children 3 to 59 months of

age and 224,540 children 5–10 years of age in 11 districts of the highest malaria prevalence regions. For the 2021 campaign, the national coverage rates in the fourth SMC cycle reached 96 percent for children 3 to 59 months of age and 93 percent for children 5 to 10 years of age. This coverage is above the national target, which is 90 percent.

- Trained 600 health providers as trainers, who subsequently trained 6,122 community distributors.
- Conducted monitoring of the SMC campaign, which involved a survey in 48 villages in six districts whereby caregivers were interviewed on the administration of the drugs and SMC cards were checked. The rapid monitoring survey was organized one week after the first cycle of the 2021 campaign to measure household coverage. The SMC coverage rate was 98 percent based on parent declarations and 68 percent based on the presentation of a proof document. The proportion of parents who were happy and had a good knowledge of SMC treatment was 87 percent.
- Initiated daily submission of SMC data from districts by KoboCollection by district officers. The initiative included training of one SMS data entry officer for DHIS2 per supported district.
- Supported a series of SBC activities focused on improving uptake and adherence to the full treatment regimen. SBC was implemented in collaborations with the NMCP, regional and district health managers, CHWs, and community leader groups.

While community buy-in for SMC in Mali is relatively adequate, there are challenges with compliance with the last two doses of medication (day 2 and 3). This may be due to administration agents not stressing the importance of completing the dosage and a lack of understanding on the part of parents/caregivers. Another reason is that parents or caregivers may forget or lose the SMC drugs.

3.3. Plans and Justification for FY 2023 Funding

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

PMI/Mali will continue to support SMC activities as described in the Recent Progress section.

SBC investments will continue to focus on maintaining high levels of acceptance and adherence to full dosage regimen by working with CHWs and community leaders. Based on forecasting information available, Mali does not anticipate an SPAQ gap for

the 2024 SMC campaign. Please refer to the **SPAQ Gap Analysis Table** in the annex for more detail on the planned quantities and distribution channels.

4. Case Management

4.1. PMI Goal and Strategic Approach

The NMCP objective is to provide parasitological testing (by microscopy or rapid diagnostic test [RDT]) to 100 percent of suspected malaria cases encountered in all health facilities (public and private), or seen by CHWs in the community, and to ensure proper management of 100 percent of confirmed cases. Confirmed uncomplicated cases are treated with ACT. The NMCP recommends injectable artemisinin derivatives (artesunate or artemether) or quinine for patients with severe malaria and calls for referral to the facilities with capabilities of managing severe cases using pre-referral treatment with rectal artesunate. Malaria treatment is free for children under five years of age and pregnant women, while older children and adults pay for both services and drugs.

To prevent re-establishment in the districts with low malaria prevalence, the new National Malaria Strategic Plan recommends active case detection, which consists of screening for fever at both community and household levels that are considered high risk. These health districts with low malaria incidence are in the northern regions of Mali.

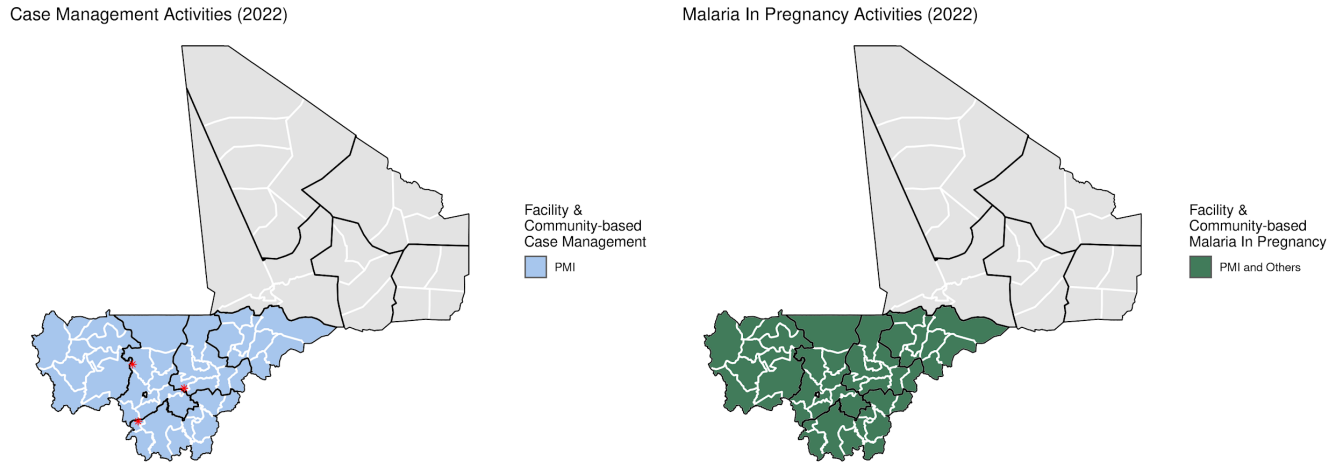
PMI coordinates through meetings and technical working groups with the NMCP, Global Fund, and other malaria stakeholders to ensure complementarity and consistent implementation of malaria management activities, and avoid duplication of efforts.

PMI supports nationwide procurement of approximately 76 percent of RDTs, 55 percent of ACTs, and 27 percent of injectable artesunate. In addition, PMI works to improve the quality of diagnostics and case management at health facilities and in communities through outreach training and supportive supervision in the regions of Kayes, Mopti, Sikasso, Segou, and Koulikoro and the district of Bamako. The Global Fund and the Government of Mali provide commodities, training of health workers, and supervision for the remaining districts, primarily in the northern regions.

The Global Fund currently pays salaries for approximately 1,800 CHWs in the country and plans to enroll about 1,300 more before the end of 2022. Gavi, the Vaccine Alliance (Gavi) supports another 500 CHWs. PMI currently does not provide monetary payments to CHWs but is involved in advocating for the Government of Mali to take over salary payments for CHWs from Global Fund and Gavi. The government's goal is to have approximately 4,000 CHWs operational by the end of 2023. In recognition of the country's more ambitious goal of 14,000 CHWs by 2025, PMI will coordinate with the

Global Fund, other partners, and the NMCP to support the supervision and training needs of any additional CHWs in PMI focus regions as they come on board.

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



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

During this period, PMI provided technical assistance to the NMCP for the implementation of malaria case management policy in the southern and central regions of the country where more than 90 percent of the population live; procured malaria case management commodities; supported training and supervision; and conducted drug efficacy monitoring at three sentinel sites including molecular testing of antimalarial resistance markers for first- and second-line ACTs.

National-Level Case Management Activities

- In collaboration with other malaria stakeholders, PMI supported the NMCP to finalize the national Malaria Diagnostic and Treatment Guidelines.
- Disseminated the revised guidelines in the regions of Kayes, Sikasso, and Koulikoro and the district of Bamako.

Commodities

- Procured 5.5 million malaria RDTs for nationwide distribution.
- Procured 4 million and distributed about 1.6 million ACTs.
- Procured 1,565,000 and distributed 320,000 vials of injectable artesunate.

Facility Level

- Supported the NMCP and the National Institute of Public Health (*Institut National de Santé Publique*) to implement a basic malaria diagnostic training of 109 laboratory technicians from regional hospitals, reference health centers

(*Centre de santé de reference*, or CSRef), and community health centers (*Centres de santé communautaire, or* CSComs) in PMI-supported regions.

- Trained 25 laboratory technicians in advanced biological diagnostics from the regions of Kayes, Koulikoro, Sikasso, Segou, and Mopti and the district of Bamako.
- Conducted two on-site training and supportive supervision visits in laboratories that reached 96 laboratory technicians at CRef and CSCom in the regions of Kayes and Koulikoro and the district of Bamako.
- Trained 21 health providers from CSRef and hospitals in the management of severe malaria.
- Trained 22 trainers from the NMCP on Health Network Quality Improvement System (HNQIS) to strengthen the competency of OTSS+ supervisors, who in turn trained 85 district supervisors.
- Supported the NMCP to conduct supportive supervision in the form of OTSS+, covering 529 health facilities (37 CSRef and 492 CSCom) who received at least two supervisions in the period. A total of 16 NMCP and Impact Malaria trainers at the central level were trained, and 85 district supervisors (39 women and 46 men) at the regional and CSRef level.
- Supported the NMCP to hold lessons learned workshops after two rounds of OTSS+ on malaria prevention and case management in the health facilities of the region of Kayes, Koulikoro, and the district of Bamako. During the workshop, it was revealed that application of the free malaria treatment policy was not in place in most of health facilities; lack or inconsistency of supportive supervision of health providers has had a negative impact on their skills; and supervision teams at national, regional, and CSRef levels did not have access to HNQIS data.
- PMI trained 21 supervisors/trainers from the central level in the HNQIS technology. These trainers will in their turn train surveillance, monitoring, and evaluation (SM&E) agents at the regional and district levels throughout the country.

Progress in key case management indicators observed from 261 supervised health facilities during the second round of OTSS+ is presented in Table 3 below.

Table 3. Results from Two Rounds of OTSS+

Indicator	Round 1	Round 1
Management of uncomplicated malaria	35%	41%
Management of severe cases	16%	82%
Use of diagnostic testing prior to treatment and adherence to diagnostic test results	91%	95%
Use of RDTs	57%	71%

Community Level

- Conducted CHW mapping in the PMI-supported regions and the semi-annual review for essential care in the community strategy.
- Conducted 11 on-site training and supportive supervision visits. In addition, the teams met with local leaders, including 22 presidents of community health associations, heads of health centers, and village chiefs in Kayes and Koulikoro to further advocate for CHW activities.
- Supported the supervision of 443 CHW sites on the prevention and treatment of malaria in the regions of Kayes (42), Koulikoro (96), Sikasso (106), Ségou (82), and Mopti (97).
- Supported active case detection at the household level with 6,984 children identified for treatment by CHWs.
- Supported implementation of SBC interventions targeting caregivers of children under five years of age to generate awareness and uptake of malaria-related health interventions, such as early care-seeking for febrile illness. For more information, please refer to the Social and Behavior Change section.

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

4.3. Plans and Justification for FY 2023 Funding

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

National-Level Case Management Activities

With FY 2023 funding, PMI/Mali will continue to support national-level case management activities as described in the Recent Progress section.

Commodities

PMI will collaborate with the NMCP and Global Fund to coordinate procurement and delivery of malaria commodities to ensure appropriate stock levels. These quantities reflect enough stock to stay between the recommended minimum and maximum months of stock, except for injectable artesunate. Please refer to the **ACT, RDT, injectable artesunate, and artesunate suppository Gap Analysis Tables** in the annex for more detail on planned quantities and distribution channels.

Facility Level

In the PMI-supported districts, PMI aims to maintain the gains achieved through prior investments. With FY 2023 funding, PMI will continue the training of health providers, on-site training and supervision for management of malaria cases, and laboratory testing.

Defining the true burden of severe malaria cases has been challenging in Mali. Mali continues to report a high proportion of severe malaria cases compared to neighboring countries (more than 30 percent of malaria cases reported compared to less than 10 percent), resulting in significant overuse of injectable drugs. Hypotheses about the causes include provider preference for a fast acting treatment, patient perceptions that injections are more effective than oral medications, lack of sufficient knowledge by health workers of differential diagnosis of uncomplicated and severe malaria cases, and the financial benefit to the facility of treating severe cases resulting from the sale of the drugs (for children over five and adults) and ancillary products/services. In Mali, the CSComs operate on a cost recovery system, and their main source of income lies in the sale of health commodities and services. This may explain in part the tendency to classify cases as severe and prescribe injectable treatments, as this type of drug is more expensive than the oral medication. Beginning in 2022, PMI, the NMCP and other partners will work together to identify the root causes of this problem and identify appropriate ways to address it. This work will continue with FY 2023 funds.

Community Level

With FY 2023 funding PMI/Mali will continue to support community-level case management activities in the five PMI focus regions as described in the Recent Progress section. PMI/Mali is prepared to revisit the level of support if the number of CHWs increases in PMI focus regions.

Monitoring Antimalarial Efficacy

Table 4. Ongoing and Planned Therapeutic Efficacy Studies (TES)

Ongoing Therapeutic Efficacy Studies			
Year	**Site name**	**Treatment arm(s)**	**Plan for laboratory testing of samples**
2019	Selingue Missira Dioro	Artemether-Lumefantrine (AL) Piperaquine/dihydroartemisinin (DHA/PPQ)	Laboratory testing of samples is ongoing at Laboratory of Applied Molecular Biology
Planned TESs (funded with previous or current MOP)			
Year	**Site name**	**Treatment arm(s)**	**Plan for laboratory testing of samples**
2023	TBD	TBD	TBD

5. Health Supply Chain and Pharmaceutical Management

5.1. PMI Goal and Strategic Approach

PMI's objective is to ensure an uninterrupted supply of quality health commodities in the country (see description of Mali's supply chain system and strategy in the Mali Country Malaria Profile). This includes procurement and supply chain management support to the Ministry of Health to improve the availability and quality of malaria commodities as well as providing related systems strengthening technical assistance for comprehensive supply chain management. PMI's Stockout Reduction Strategy for Mali includes a stockout target of less than 10 percent.

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

PMI's principal supply chain investments during this period aimed to improve malaria commodity availability at service delivery sites. Activities included support for regulation, forecasting and supply planning, logistics management information systems (LMIS), warehousing and distribution technical assistance, direct warehousing and delivery of commodities to health sites, as well as supervision and monitoring.

Specific activities included:

- Setting up a logistics management unit to increase country ownership and accountability.
- Supporting the central medical stores (*Pharmacie Populaire du Mali*, or PPM) to develop a five-year (2021–2025) strategic and M&E plan.
- Supporting the NMCP to organize a workshop to identify the root causes of commodity stockouts and related solutions across the different domains of the supply chain: governance, human resources, financing of operations, data and their use, supply forecasting and planning, product purchasing, and storage and transport. At the end of the workshop, a three-year operational plan (2021–2023) was drawn up with a timetable and responsible persons for the execution of activities.
- Supporting the national quantification committee to perform long-term forecasting and quarterly supply plan updates.
- Strengthening data management and coordination at the central, regional and district levels:
    - Central level: PMI supported the Ministry of Health to organize the quarterly meeting of the technical committee for the coordination and monitoring of the management of essential medicines, including malaria products. This committee is a high-level supply chain coordination mechanism established by the Ministry of Health to 1)

validate quantification assumptions, findings and recommendations, 2) validate the updated supply plans; 3) discuss and find solutions to supply chain bottlenecks such as procurement, storage, and distribution issues, and 4) generate and discuss the LMIS national feedback report.
    - Regional level: PMI provided similar support to the regional directorate of health to 1) review, analyze, and validate the LMIS data, and triangulate the LMIS data with the HMIS, and 2) organize regional quarterly meetings of supply chain partners.
    - District level: PMI supported districts in the preparation of the district monthly meeting (review of LMIS data, triangulation with HMIS data, preparation of slides, etc.) where the monthly LMIS feedback is reported to partners working at the local level.
- Improving coordination on supply chains with other health programs.
- Strengthening warehouse management.
- Supporting distribution of malaria products from the central to the district warehouses. At the central level, PMI provided support to review orders, develop distribution plans, and coordinate the implementation of these plans with PPM. At the regional level, PMI supported regional PPM warehouses to distribute malaria products to the district warehouses.
- Strengthening the LMIS by improving the functionalities of OSPSANTE and improving its interoperability with DHIS2.
- Providing training in LMIS. This included data entry in DHIS2, data transfer to OSPSANTE, and use of OSPSANTE for decision-making.
- Improving supportive supervision and coaching at health facilities through targeted supportive supervision/coaching, particularly in underperforming districts and CSComs and measuring progress to assess the impact.
- Supporting last-mile distribution to health facilities by contracting with third party logistics providers and monitoring weekly stock, providing emergency resupply as needed, and sharing relevant information.
- Supporting the existing technical working group for post-marketing surveillance of antimalarial drugs. Support included evaluating and developing an action plan to increase the scope of tests that can be carried out for antimalarials. In addition, PMI supported the finalization of a plan for drug quality control laboratory accreditation and contributed to the development of a five-year strategic plan for the National Health Laboratory.
- Supporting surveys in 2020 and 2021, which found that 74 percent of the drugs sampled were not registered.

PMI support to CSComs has resulted in improved availability of malaria commodities from an average of 83.6 percent in November 2021 to 93.6 percent in February 2022.[6] The stockout rates of four key commodities (including two ACT dosage forms) was reduced to less than five percent, in line with the PMI investment plan for stockout reduction.

5.3. Plans and Justification with FY 2023 Funding

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

With FY 2023 funds, PMI/Mali will continue to support the health supply chain and pharmaceutical management activities as described in the Recent Progress section. Specific activities include improving logistics management of malaria commodities by providing technical assistance to develop and implement an integrated electronic LMIS. In addition, last-mile delivery between health districts and health facilities in two regions will be extended via outsourced transportation contracts with third-party logistics. Both these investments will help to accelerate progress toward the stockout reduction goals.

PMI also plans to continue its support to improving the quality of malaria products circulating in Mali by supporting the *Direction de la Pharmacie et du Médicament* to improve its drug registration process. In addition, PMI will support the *Laboratoire National de la Santé* to conduct quality control of antimalarials circulating in the country and provide technical assistance for laboratory accreditation.

6. Social and Behavior Change

6.1. PMI Goal and Strategic Approach

PMI/Mali supports the NMCP's Malaria Control Communication and Advocacy Plan, which includes the promotion of:

- Correct and consistent ITN use
- Early and frequent ANC attendance
- Acceptance of IPTp
- Prompt care-seeking for fever
- Adherence to national guidelines by health workers

SBC activities in support of these objectives are being implemented nationally with support from donors including PMI and the Global Fund through the 2021–2024 grant.

[6] GHSC-PSM report to PMI Mali.

Activities include the use of interpersonal communication, mass media, and the use of new technologies. PMI/Mali contributed significantly to the writing of the 2019–2023 Malaria Control Communication and Advocacy Plan and to the establishment of the SBC Technical Working Group headed by the NMCP.

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

During this period, the following activities were conducted with PMI support:

- A national message design and validation workshop was held in August 2021 in partnership with the National Center for Health Information, Education and Communication and other technical services of the government. At the end of this workshop, 120 messages, four spots, and two radio messages were reviewed, adapted, developed, tested, and validated, including 20 new messages.
- SBC training modules were developed on malaria for social mobilization and CHWs.
- An Android platform data collection tool for the registration of pregnant women was designed and adapted. Viamo uses this platform for broadcasting SBC messages and sharing data in an interactive voice response system.
- The community health platform members conducted SBC activities to promote small, doable actions in malaria. These messages reached 474,524 people (283,587 adults, 190,637 youth, and 300 people with disabilities).

Mali has a strong culture of ITN use, evidenced by its strong use to access ratio. According to the 2018 Demographic and Health Survey (DHS), 97 percent of those who had access to a net slept under it the night before the survey. ITN use is however, highly seasonal, peaking during transmission season and declining in the hot dry season.

While community buy-in for SMC in Mali is relatively adequate, there are challenges with compliance with the last two doses of medication (day 2 and 3). This may be due to administration agents not stressing the importance of completing the dosage and a lack of understanding on the part of parents/caregivers.

In Mali, prompt care-seeking for malaria is a challenge. People often self-medicate by purchasing medicines at pharmacies or in the market. The reasons for this are multifold and include high consultation fees, a perception that providers in health facilities will prescribe multiple unnecessary medicines, and preference for traditional medicines among the general population. According to the 2018 DHS, 39.5 percent of people first go to shops, markets, and traditional healers to seek treatment for malaria.

Other challenges include health workers' poor communication, heavy workload, and lack of time for in-depth counseling, as well as an irrational use of injectables due to misclassification of severe malaria and high demand for injectables in the community.

6.3. Plans and Justification with FY 2023 Funding

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

PMI/Mali will provide support for SBC activities at the facility and community levels to address key population and service provider behaviors, including the behaviors related to the use and proper care of ITNs; early and consistent ANC visits, uptake of IPTp, and care-seeking for malaria in pregnancy; early care-seeking for fever; acceptance/uptake of the full course of SMC; and adherence to case management guidelines. Particular emphasis will be given to the acceptability of oral medications for uncomplicated malaria in lieu of injectables at both the service provider and community levels. Various media and communications activities will be utilized. An assessment of the determinants of behavior will be conducted as needed.

While PMI supports SBC activities that promote the uptake and maintenance of all key malaria interventions, PMI will prioritize three behaviors with FY 2023 funds: see Table 5.

Table 5. Priority Behaviors to Address

Behavior	Target Population	Geographic Focus	Programming to Address Behavior
Prompt and appropriate care-seeking for fever for children under five years of age	Caregivers of children under five years of age	PMI focus regions	• SBC messages will be disseminated through radio, TV spots, and town criers to sensitize communities on the importance of prompt care-seeking for early diagnosis and to avoid severe malaria. • Self-medication and use of substandard or counterfeit medicines sold in the streets will be discouraged by sensitizing the population through radio and TV spots, and during visits at health centers.
Adherence to case management guidelines, particularly related to the classification of severe malaria cases	Patients / Health workers	PMI focus regions	• Train, supervise, and coach health workers (OTSS+) at all levels to increase their knowledge of differential diagnosis of uncomplicated and severe malaria. Use of supervision visits to encourage service providers to adhere to treatment protocols despite patient pressure. • Messaging to patients and health care providers on the use of oral medications for simple malaria cases and injectables only for severe malaria cases. • Media campaigns on local radios.
Acceptance/uptake of the full course of SMC	Patients / Caregivers	PMI focus regions	Messages will focus on: • The acceptance/uptake of the full course of SMC drugs • Keeping the second and third doses in a secure place out of the reach of children

Part of the FY 2023 funding will also be used to help the NMCP to address the following:

- Monitoring and supervision of communication activities;
- Regular convening functioning of the Communication Technical Working Group on Malaria; and
- Engagement and involvement of all relevant communication stakeholders in SBC activities.

7. Surveillance, Monitoring, and Evaluation

7.1. PMI Goal and Strategic Approach

The NMCP's objectives for SM&E are to ensure 100 percent prompt and complete data reporting at all levels; to provide timely information for decision-making; and to use data to improve health systems in Mali. PMI collaborates with the NMCP, the Global Fund, and other partners in providing technical assistance and resources for SM&E activities. In support of the malaria control strategic plan and needs in Mali, PMI and the NMCP have prioritized interventions that address the challenges of underutilization of data and data quality at health facility and community levels.

7.2. Recent Progress (between June 2021 and June 2022)

During the reference period, PMI supported the following activities at the central level:

- Worked with the NMCP to conduct four quarterly meetings for malaria-related data management and analysis, and routine review and monitoring of data reported in the DHIS2 to address any anomalies.
- Supported the NMCP to develop monthly malaria bulletins.
- Supported an annual meeting organized by the General Directorate of Health and Public Hygiene to review malaria data and indicators in DHIS2.
- Supported the NMCP to revise the malaria surveillance guide.
- Supported Field Epidemiology Training Program Frontline training (13 Basic and two advanced) of Malian participants in the Burkina Faso program.

PMI supported the following activities at the regional level:

- Assisted three PMI-supported regions and the district of Bamako to develop quarterly malaria bulletins (16 total for the year).
- Supported the regions of Sikasso and Kayes to conduct annual review of malaria performance indicators.
- Trained 35 health information system focal points in the region of Segou and the district of Bamako in the use of the Malaria Routine Data Quality Assessment (mRDQA) for data quality audit.

- Supported the implementation of mRDQA in 170 health facilities in the regions of Sikasso, Segou, and Koulikoro, and the district of Bamako.

7.3. Plans and Justification with FY 2023 Funding

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

In coordination with other partners supporting routine surveillance in Mali, PMI funds will continue to support improving data quality in the HMIS, and support the NMCP to hold regular meetings to review and analyze data, DQA activities, and production of monthly malaria bulletins. PMI will also provide technical assistance through technical working groups and support M&E training of NMCP/Ministry of Health and Social Development staff at both national and subnational levels.

Table 6. Available Malaria Surveillance Sources

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

Source	Data Collection Activity	2020	2021	2022	2023	2024	2025
Other	Knowledge, Attitudes, and Practices Survey, Malaria Behavior Survey				P		
Other	Malaria Impact Evaluation						
Other	Entomologic Monitoring Surveys	X	X	P	P	P	P

*Non-PMI funded activities
X denotes completed activities and P denotes planned activities.

8. Operational Research and Program Evaluation

8.1. PMI Goal and Strategic Approach

The NMCP malaria operational research (OR) strategy is to collaborate with research institutions to address specific research questions or hypotheses through the National Malaria Strategic Plan.

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

PMI funded three operational research studies:

- Two studies of MIP since 2020: one to increase IPTp uptake through enhanced ANC service delivery to improve maternal and child health; and one assessing ANC data for routine monitoring in Mali, and
- One study on SP resistance.

From October 2021 to March 2022, the MIP-OR field team has conducted three integrated supervisions covering all 30 health centers and their catchment areas that constitute the study clusters randomized in three study arms. District-level supervisions were conducted on a quarterly basis and factored into the integrated supervision scheduled by the district.

The interventions that were tested included training and supervision of CHWs, and strengthening communication on outreach ANC service delivery in communities (community mobilization) and five kilometers outside the communities. Focus group interviews with community leaders were organized in both control and intervention arms. The overall goal of this intervention is to increase the uptake of SP (reaching at least three doses) through early ANC attendance.

Based on the baseline survey, preliminary results are presented below on the coverage of IPTp3+ and ANC first visit by study arm. The impact of study strategy is expected after the endline survey from May–June 2022.

Table 7. Preliminary Results of IPTp3+ coverage at baseline by study arm

IPTp-SP doses	Control N=679		Arm 2 N=839		Arm 3 N=677		Total N=2,195	
	n	%	n	%	n	%	n	%
>=1	470	69.2	547	65.2	409	60.4	1,426	65.0
>=3	199	29.3	227	27.1	151	22.3	577	26.3

P-values for >/=3(training of health workers) = 0.3316
Control versus Arm 3 (training + community mobilization) = 0.0032

For the second study, the protocol was approved by the Institutional Review Board and the baseline survey was conducted in August–September 2021. The report is in preparation.

Regarding the 2020 SP-resistance study which included molecular monitoring of SP resistance for SMC and MIP, out of 461 screened patients, 265 were enrolled for molecular characterization of *pfdhfr* and *pfdhps* genes associated with SP resistance to malaria parasites in Sélingué, Missira, and Dioro.

Table 8. PMI-funded Operational Research/Program Evaluation Studies in Mali

Recently Completed OR/PE Studies	Status of Dissemination	Start date	End date
2020 SP resistance study: Molecular monitoring of SP resistance for SMC and MIP.	Report under development	2020	2021
Ongoing or Planned OR/PE Studies	**Status**	**Start date**	**End date**
MIP study 1: Increasing intermittent preventive treatment uptake through enhanced antenatal clinic service delivery to improve maternal and child health	Field data collection	2020	2022
MIP study 2: Increasing intermittent preventive treatment uptake through enhanced antenatal clinic service delivery to improve maternal and child health & assessing ANC data for routine monitoring in Mali	Field data collection	2020	2023
2022 SP resistance study: Assessment of SP resistance associated with use of SP for IPT and during SMC	Protocol development	2022	2022

Table 9. Non-PMI funded Operational Research/Program Evaluation Studies Planned/Ongoing in Mali

Source of Funding	Implementing institution	Research Question/Topic	Current status/ timeline
Global Fund	NMCP	Evaluation of the Malaria Control Surveillance and Data Management System	Completed

8.3. Plans and Justification with FY 2023 Funding

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

9. Capacity Strengthening

9.1. PMI Goal and Strategic Approach

The Mali National Malaria Strategic Plan includes an objective to strengthen NMCP capacity, with a focus on leadership, management, coordination, and planning. Capacity strengthening is integral to PMI's approach in Mali, as demonstrated in the technical sections above, and through support to improve management at the NMCP.

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

PMI supported the following capacity strengthening activities for the NMCP during the past year:

- Updating the NMCP website to allow for improved access to information by all stakeholders
- Training for the NMCP secretary on electronic records management
- Training of the NMCP director on strategic project management, including leadership, communication, and conflict resolutions skills; planning and risk management methodologies; and evaluating and monitoring performance

9.3. Plans and Justification with FY 2023 Funding

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

PMI/Mali will continue to support capacity strengthening activities as described in the Recent Progress section. In addition, PMI will fund the participation of NMCP staff (national and field level) in international scientific and professional meetings to provide opportunities to learn best practices, share experiences, and develop networks. Potential meetings include the American Society of Tropical Medicine and Hygiene and the Pan African Malaria conferences.

10. Staffing and Administration

A minimum of three health professionals oversee PMI in Mali. The single interagency team led by the USAID Mission Director or their designee consists of a Resident Advisor representing USAID, a Resident Advisor representing CDC, and one or more locally hired experts known as Foreign Service Nationals. The PMI interagency team works together to oversee all technical and administrative aspects of PMI, including finalizing details of the project design, implementing malaria prevention and treatment

activities, monitoring and evaluation of outcomes and impact, reporting of results, and providing guidance and direction to PMI implementing partners.

ANNEX: GAP ANALYSIS TABLES

Table A-1. ITN Gap Analysis Table

Calendar Year	2022	2023	2024
Total country population	21,913,585	22,520,592	23,144,412
Total population at risk for malaria	21,913,585	22,520,592	23,144,412
PMI-targeted at-risk population	21,913,585	22,520,592	23,144,412
Population targeted for ITNs	21,913,585	22,520,592	23,144,412
Continuous Distribution Needs			
Channel 1: ANC	959,815	1,013,427	1,041,499
Channel 1: ANC Type of ITN	Dual AI and Single Pyrethroid	Dual AI and Single Pyrethroid	Dual AI and Single Pyrethroid
Channel 2: EPI	873,695	897,896	922,768
Channel 2: EPI Type of ITN	Dual AI and Single Pyrethroid	Dual AI and Single Pyrethroid	Dual AI and Single Pyrethroid
Channel 3: School			
Channel 3: School Type of ITN			
Channel 4: Community			
Channel 4: Community Type of ITN			
Channel 5:			
Channel 5: Type of ITN			
Estimated Total Need for Continuous Channels	1,833,510	1,911,323	1,964,266
Mass Campaign Distribution Needs			
Mass distribution campaigns		12,054,723	
Mass distribution ITN type		Dual AI and Single Pyrethroid	
Estimated Total Need for Campaigns	0	12,054,723	0
Total ITN Need: Continuous and Campaign	**1,833,510**	**13,966,046**	**1,964,266**
Partner Contributions			
ITNs carried over from previous year	1,725,970	1,956,332	1,678,592
ITNs from Government	199,872	273,672	322,600
Type of ITNs from Government		Single Pyrethroid	Single Pyrethroid
ITNs from Global Fund	0	11,514,633	0
Type of ITNs from Global Fund		Dual AI and Single Pyrethroid	
ITNs from other donors	0	0	0
Type of ITNs from other donors			
ITNs planned with PMI funding	1,864,000	1,900,000	1,590,000
Type of ITNs with PMI funding	Dual AI and Single Pyrethroid	Dual AI and Single Pyrethroid	Dual AI and Single Pyrethroid
Total ITNs Contribution Per Calendar Year	**3,789,842**	**15,644,637**	**3,591,192**
Total ITN Surplus (Gap)	**1,956,332**	**1,678,592**	**1,626,925**

Table A-2. RDT Gap Analysis Table

Calendar Year	2022	2023	2024
Total country population	21,913,585	22,520,592	23,144,412
Population at risk for malaria	21,913,585	22,520,592	23,144,412
PMI-targeted at-risk population	21,913,585	22,520,592	23,144,412
RDT Needs			
Total number of projected suspected malaria cases	6,092,351	6,521,988	6,702,647
Percent of suspected malaria cases tested with an RDT	85%	85%	85%
RDT Needs (tests)	**5,178,498**	**5,543,690**	**5,697,250**
Needs Estimated based on HMIS Data			
Partner Contributions (tests)			
RDTs from Government			
RDTs from Global Fund	1,886,775	2,035,975	1,213,425
RDTs from other donors	0	0	0
RDTs planned with PMI funding	5,500,000	2,500,000	2,500,000
Total RDT Contributions per Calendar Year	**7,386,775**	**4,535,975**	**3,713,425**
Stock Balance (tests)			
Beginning Balance	**7,536,891**	9,745,168	8,737,453
- Product Need	5,178,498	5,543,690	5,697,250
+ Total Contributions (received/expected)	7,386,775	4,535,975	3,713,425
Ending Balance	**9,745,168**	**8,737,453**	**6,753,628**
Desired End of Year Stock (months of stock)	12	12	12
Desired End of Year Stock (quantities)	5,178,498	5,543,690	5,697,250
Total Surplus (Gap)	**4,566,670**	**3,193,763**	**1,056,377**

Table A-3. ACT Gap Analysis Table

Calendar Year	2022	2023	2024
Total country population	21,913,585	22,520,592	23,144,412
Population at risk for malaria	21,913,585	22,520,592	23,144,412
PMI-targeted at-risk population	21,913,585	22,520,592	23,144,412
ACT Needs			
Total projected number of malaria cases	3,217,142	3,270,597	3,155,405
Total ACT Needs (treatments)	3,217,142	3,270,597	3,155,405
Needs Estimated based on HMIS Data			
Partner Contributions (treatments)			
ACTs from Government	0	0	0
ACTs from Global Fund	726,780	1,069,580	810,870
ACTs from other donors	0	0	0
ACTs planned with PMI funding	2,962,500	2,076,171	2,500,000
Total ACTs Contributions per Calendar Year	**3,689,280**	**3,145,751**	**3,310,870**
Stock Balance (treatments)			
Beginning Balance	3,063,275	3,535,413	3,410,567
- Product Need	3,217,142	3,270,597	3,155,405
+ Total Contributions (received/expected)	3,689,280	3,145,751	3,310,870
Ending Balance	**3,535,413**	**3,410,567**	**3,566,032**
Desired End of Year Stock (months of stock)	12	12	12
Desired End of Year Stock (quantities)	3,217,142	3,270,597	3,155,405
Total Surplus (Gap)	**318,271**	**139,970**	**410,627**

Table A-4. Inj. Artesunate Gap Analysis Table

Calendar Year	2022	2023	2024
Injectable Artesunate Needs			
Projected number of severe cases	756,028	629,590	473,311
Projected number of severe cases among children	347,773	289,611	217,723
Average number of vials required for severe cases among children	6	6	6
Projected number of severe cases among adults	408,255	339,979	255,588
Average number of vials required for severe cases among adults	10	10	10
Total Injectable Artesunate Needs (vials)	**6,169,191**	**5,137,454**	**3,862,216**
Needs Estimated based on HMIS Data			
Partner Contributions (vials)			
Injectable artesunate from Government	1,496,191	3,900,000	2,800,000
Injectable artesunate from Global Fund	1,373,822	657,188	657,278
Injectable artesunate from other donors	0	0	0
Injectable artesunate planned with PMI funding	1,245,000	340,800	386,222
Total Injectable Artesunate Contributions per Calendar Year	**4,115,013**	**4,897,988**	**3,843,500**
Stock Balance (vials)			
Beginning Balance	720,261	0	0
- Product Need	6,169,191	5,137,454	3,862,216
+ Total Contributions (received/expected)	4,115,013	4,897,988	3,843,500
Ending Balance	**(1,333,917)**	**(239,466)**	**(18,716)**
Desired End of Year Stock (months of stock)	12	12	12
Desired End of Year Stock (quantities)	6,169,191	5,137,454	3,862,216
Total Surplus (Gap)	**(7,503,109)**	**(5,376,919)**	**(3,880,932)**

Table A-5. RAS Gap Analysis Table

Calendar Year	2022	2023	2024
Artesunate Suppository Needs			
Number of severe cases expected to require pre-referral dose (or expected to require pre-referral dose based on number of providers for the service)	83,163	69,255	52,064
Total Artesunate Suppository Needs (suppositories)	**166,326**	**138,510**	**104,128**
Needs Estimated based on HMIS Data			
Partner Contributions (suppositories)			
Artesunate suppositories from Government	0	130,000	100,000
Artesunate suppositories from Global Fund	1,613	8,755	9,738
Artesunate suppositories from other donors	0	0	0
Artesunate suppositories planned with PMI funding	0	0	0
Total Artesunate Suppositories Available	**1,613**	**138,755**	**109,738**
Stock Balance (suppositories)			
Beginning Balance	659	0	245
- Product Need	166,326	138,510	104,128
+ Total Contributions (received/expected)	1,613	138,755	109,738
Ending Balance	**(164,054)**	**245**	**5,855**
Desired End of Year Stock (months of stock)	12	12	12
Desired End of Year Stock (quantities)	166,326	138,510	104,128
Total Surplus (Gap)	**(330,380)**	**(138,265)**	**(98,274)**

Table A-6. SP Gap Analysis Table

Calendar Year	2022	2023	2024
Total Country Population	21,913,585	22,520,592	23,144,412
Total Population at Risk for Malaria	21,913,585	22,520,592	23,144,412
PMI Targeted at Risk Population	21,913,585	22,520,592	23,144,412
SP Needs			
Total Number of Pregnant Women	1095679	1126030	1157221
Percent of pregnant women expected to receive IPTp1	80%	80%	80%
Percent of pregnant women expected to receive IPTp2	80%	80%	80%
Percent of pregnant women expected to receive IPTp3	80%	80%	80%
Percent of pregnant women expected to receive IPTp4	0.00%	0.00%	0.00%
Total SP Needs (doses)	**2,629,630**	**2,702,471**	**2,777,329**
Needs Estimated based on HMIS Data			
Partner Contributions (doses)			
SP from Government	0	0	0
SP from Global Fund	0	0	0
SP from other donors	0	0	0
SP planned with PMI funding	1,426,666	3,994,901	3,780,000
Total SP Contributions per Calendar Year	**1,426,666**	**3,994,901**	**3,780,000**
Stock Balance (doses)			
Beginning balance	1,692,211	489,247	1,781,677
- Product Need	2,629,630	2,702,471	2,777,329
+ Total Contributions (Received/expected)	1,426,666	3,994,901	3,780,000
Ending Balance	**489,247**	**1,781,677**	**2,784,347**
Desired End of Year Stock (months of stock)	12	12	12
Desired End of Year Stock (quantities)	2,629,630	2,702,471	2,777,329
Total Surplus (Gap)	**(2,140,384)**	**(920,794)**	**7,018**

Table A-7. SMC Gap Analysis Table

Calendar Year	2022	2023	2024
Total population in the SMC targeted age range	4,297,439	4,395,455	4,517,209
SMC Drug (SP+AQ) Needs			
National population 3-11 months targeted for SMC	613,478	630,471	647,936
National population 12-59 months targeted for SMC	2,892,111	2,972,223	3,054,553
Total national population targeted for SMC	**3,505,589**	**3,602,694**	**3,702,489**
PMI population 3-11 months targeted for SMC	160,125	138,326	142,158
PMI population 12-59 months targeted for SMC	754,875	652,111	670,174
PMI population 5-7 years targeted for SMC	125,000	117,951	121,218
PMI population 8-10 years targeted for SMC	125,000	117,951	121,218
Total PMI population targeted for SMC	**1,165,000**	**1,026,339**	**1,054,769**
Total SP+AQ Needs (co-blisters) - Only at PMI supported districts	**6,776,000**	**6,072,845**	**6,241,063**
Total SP+AQ Needs (co-blisters)	**18,174,592**	**18,446,776**	**18,957,751**
Partner Contributions (co-blisters, national)			
SP+AQ carried over from previous year	5,566,434	3,918,599	0
SP+AQ from Government	0	1,184,280	5,244,239
SP+AQ from Global Fund	7,761,643	7,271,051	7,472,450
SP+AQ from other donors	0	0	0
SP+AQ planned with PMI funding	8,765,114	6,072,846	6,241,063
Total SP+AQ Contributions per Calendar Year	22,093,191	18,446,776	18,957,751
Total SP+AQ Surplus (Gap)	**3,918,599**	**0**	**0**

Table A-8. Quinine Gap Analysis Table

Calendar Year	2022	2023	2024
Quinine Needs			
Total Number of Pregnant Women	1,095,679	1,126,030	1,157,221
projection total number of malaria cases treated	3,217,142	3,270,597	3,155,405
number of simple malaria cases	2,461,114	2,641,007	2,682,094
number of severe malaria cases	756,028	629,590	473,311
Quinine Sulfate 300 mg FC Tab, simple malaria	1,722,780	1,848,705	1,877,466
Quinine Sulfate 300 mg FC Tab, severe malaria	529,220	440,713	331,318
Total Quinine Sulfate 300 mg FC Tab, Tabs 100	2,251,999	2,289,418	2,208,784
Needs Estimated based on Other (specify in comments)			
Partner Contributions (vials)			
Quinine Sulfate 300 mg FC Tab, from Government	5,000,000	5,000,000	5,000,000
Quinine Sulfate 300 mg FC Tab, from Global Fund	0	0	0
Quinine Sulfate 300 mg FC Tab, from other donors [specify donor]	0	0	0
Quinine Sulfate 300 mg FC Tab, planned with PMI funding			
Total Quinine Sulfate 300 mg FC Tab, Contributions per Calendar Year	**5,000,000**	**5,000,000**	**5,000,000**
Stock Balance (vials)			
Beginning Balance	3,146,356		
- Product Need	1,722,780	1,848,705	1,877,466
+ Total Contributions (received/expected)	5,000,000	5,000,000	5,000,000
Ending Balance	6,423,576	3,151,295	3,122,534
Desired End of Year Stock (months of stock)	12	12	12
Desired End of Year Stock (quantities)	1,722,780	1,848,705	1,877,466
Total Surplus (Gap)	**4,700,797**	**1,302,590**	**1,245,068**