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Senegal

Malaria Operational Plan FY 2024

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This Fiscal Year (FY) 2024 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 2024 appropriation from U.S. Congress. Any updates will be reflected in revised postings.

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ABBREVIATIONS

ACT	Artemisinin-based combination therapy
AI	Active ingredient
ANC	Antenatal care
CCPLP	Cadre de Concertation des Partenaires de Lutte contre le Paludisme
CDC	Centers for Disease Control and Prevention
cDHS	Continuous Demographic and Health Survey
CHWs	Community health workers
CY	Calendar year
DP	Dihydroartemisinin-piperaquine
DHIS2	District Health Information Software 2
DSISS	Division du Système d'Information et des Statistiques Sanitaires
DSDOM	Dispensateur de Soins à Domicile (home caregiver)
FY	Fiscal year
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
HMIS	Health management information system
IDB	Islamic Development Bank
IPTp	Intermittent preventive treatment for pregnant women
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito net
KKT	Kedougou, Kolda and Tambacounda regions
MDA	Mass drug administration
MIP	Malaria in pregnancy
MOH	Ministry of Health
MOP	Malaria Operational Plan
NMCP	National Malaria Control Program
NSP	National Strategic Plan
OR	Operational research
PE	Program evaluation
PECADOM	*Prise en charge à domicile*
PBO	Piperonyl butoxide
PMI	U.S. President's Malaria Initiative
PNA	*Pharmacie Nationale d'Approvisionnement*
RDT	Rapid diagnostic test
RA	Resident Advisor
SBC	Social and behavior change
SMC	Seasonal malaria chemoprevention
SM&E	Surveillance, monitoring, and evaluation

SP	Sulfadoxine-pyrimethamine
SPAQ	Sulfadoxine-pyrimethamine/amodiaquine
TES	Therapeutic efficacy study
UCAD	*Université Cheikh Anta Diop*
USAID	United States Agency for International Development
WHO	World Health Organization

EXECUTIVE SUMMARY

To review specific country context for Senegal, please refer to the country malaria profile located on PMI's country team landing page, which provides an overview of the country's malaria situation, key indicators, the strategic plan of the National Malaria Control Program (NMCP), 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 27 countries in Sub-Saharan Africa and 3 programs across the Greater Mekong Subregion in Southeast Asia to control and eliminate malaria. Senegal began implementation as a PMI partner country in fiscal year (FY) 2008.

Rationale for PMI's Approach in Senegal

Senegal's National Strategic Plan (NSP) was updated in 2021 and covers the period 2021–2025. The NSP focuses on improving malaria control in higher-burden zones and initiating malaria elimination efforts in the very low-burden zones of the country. PMI has adopted a two-pronged approach to support the Senegal NSP: (1) support a comprehensive package of malaria prevention and treatment activities—*prise en charge à domicile* (PECADOM) Plus, seasonal malaria chemoprevention (SMC), social and behavior change (SBC), use of new types of insecticide-treated mosquito nets (ITNs), and health systems strengthening, targeting the high incidence in the southeastern regions of Kedougou, Kolda, and Tambacounda (KKT); and (2) support elimination activities in the northern regions of Louga, Matam, and St. Louis.

Overview of Planned Interventions

The proposed FY 2024 PMI funding for Senegal is $22.5 million. PMI will support the following intervention areas with these funds.

1. Vector Monitoring and Control

PMI will support entomological activities, including insecticide resistance monitoring and strengthening entomological capacity at the regional, district, and community levels. Specifically, this will include:

- Entomological monitoring at 25 sentinel sites in 14 districts and insecticide resistance monitoring in 14 districts.
- Procurement and distribution of dual active ingredient ITNs for continuous distribution channels.

2. Malaria in Pregnancy (MIP)

Protecting pregnant women against malaria remains a key aspect of PMI/Senegal's strategy. With FY 2024 funding, PMI plans to fund training and supportive supervision for antenatal care (ANC) providers on the prevention and treatment of malaria during pregnancy. PMI will also continue supporting the implementation of intermittent preventive treatment for pregnant women (IPTp) delivered at the community level in 20 districts, complementing investments of other stakeholders to collectively meet nationwide needs and increase the proportion of pregnant women who receive the recommended three doses of sulfadoxine-pyrimethamine. Support also includes training for new facility-level health care providers as needed on prevention and treatment of malaria during pregnancy. The training includes topics such as the importance of ITN use in pregnancy, diagnosis and management of MIP, counseling, and interpersonal communication skills.

3. Drug-Based Prevention

With FY 2024 funds, PMI will continue the same approach to SMC as in previous years, covering all of the same districts (aside from Bakel, which will transition to mass drug administration [MDA]) and the same number of cycles. PMI will support NMCP in all stages of the strategy, from planning to evaluation, including the training of operational staff and drug distribution by community health workers (CHWs). PMI will also finance the implementation of MDA in the district of Bakel to complement its implementation in the neighboring districts of Ranerou and Matam, financed through the Islamic Development Bank.

4. Case Management

PMI will support NMCP's strategy by providing case management support at all levels, including training and supportive supervision at the national, health facility, and community levels, including the private sector. PMI will continue to expand *prise en charge à domicile* (PECADOM) and PECADOM Plus, geographically and temporally, to ensure year-round implementation instead of just focusing on high transmission periods. PMI will also support training for laboratory technicians and quality control for malaria diagnosis. PMI will procure and distribute case management commodities and support therapeutic efficacy studies for first-line artemisinin-based combination therapies (ACTs). PMI will also support case management activities in elimination areas through malaria case investigation and response.

5. Health Supply Chain and Pharmaceutical Management

PMI supports NMCP's goal of ensuring the permanent availability of antimalarial medicines and products for all health structures and the country's vision of developing an efficient system of regulation and control that guarantees the entire population's access to quality-assured health products. With FY 2024 funding, PMI will continue to support activities as it has in the recent past, including commodity quantification and procurement, capacity strengthening, coordination with the central medical stores and other partners, improving country capacity for storing and distributing commodities, monitoring product quality, developing supply chain

management policies and documentation, and providing technical assistance to improve governance for medical product quality assurance systems and country and regional regulatory systems.

6. Social and Behavior Change

PMI contributes to NMCP's SBC strategy by supporting efforts to promote the acceptance and correct and consistent use of proven interventions such as SMC, MIP, ITNs, and MDA, as well as reinforcing early care-seeking behavior. PMI supports approaches that tailor SBC activities to reflect the local context and that are specific to the epidemiological profile of different parts of the country. In FY 2024, PMI plans to fund institutional communication and SBC activities focused on:

- MIP, SMC, early care seeking, and proper ITN usage through community-based organizations. The focus is on the KKT region to promote first ANC visits and increased use of ITNs among children under five years of age and pregnant women.
- Communication channels will include broadcasting radio spots, community meetings, home visits, interpersonal communication, posters, banners, T-shirts, and regular home visits by community-based organizations.

7. Surveillance, Monitoring, and Evaluation

PMI will support the implementation of a national Malaria Indicator Survey in 2025 after the planned ITN campaign, and coordinate on any plans or discussions for a continuous Demographic and Health Survey (cDHS). PMI will continue to support the improvement of data collection and quality at the district, facility, and community levels, and provide support through peer supervision and training through the malaria monitoring and evaluation course. Support for elimination activities will cover the operational costs of case investigations and response (reactive focal test and treat or focal drug administration) and training of health workers and CHWs to perform these investigations, and include weekly reporting into the health management information system (HMIS) in districts where incidence is less than 5 per 1,000 population in the regions of Louga, Matam, Saint-Louis, and Ziguinchor.

8. Operational Research and Program Evaluation

PMI supported NMCP to evaluate an MDA study and the development and evaluation of tools for the control of urban malaria vectors, particularly in and around religious schools (*daaras*), where children live and study in high-density environments and sleep outdoors and where Anopheles larval habitats are abundant. No new operational research and program evaluation activities are proposed with FY 2024 funding.

9. Capacity Strengthening

PMI will contribute to strengthening the capacity of NMCP and the Ministry of Health (MOH) through:

- Quarterly meetings with malaria partners to review planned activities, facilitate information sharing, and ensure better coordination of malaria-related activities countrywide.
- Strengthening of the HMIS system, particularly related to governance and management at the central level.
- The annual comprehensive malariology course to increase the cadre of trained staff at the district level capable of leading implementation of malaria control and elimination activities.
- Technical assistance for the management of the fixed amount reimbursement agreement under the government-to-government mechanism, and support for the preparation and monitoring of the agreement between PMI and NMCP.
- Support for the participation of MOH and NMCP staff in international scientific and professional workshops to learn best practices, share experiences, and develop networks.

10. Staffing and Administration

A minimum of three health professionals oversee PMI/Senegal. The single interagency team led by the United States Agency for International Development (USAID) Mission Director or their designee consists of a Resident Advisor representing USAID, a Resident Advisor representing the Centers for Disease Control and Prevention, 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 evaluating outcomes and impact, reporting results, and providing guidance and direction to PMI implementing partners.

I. CONTEXT & STRATEGY

1. Introduction

Senegal began implementation as a PMI partner country in fiscal year (FY) 2008. This FY 2024 Malaria Operational Plan (MOP) presents a detailed implementation plan for Senegal based on the strategies of PMI and the National Malaria Control Program (NMCP). It was developed in consultation with NMCP and with the participation of national and international partners. The activities proposed by PMI build on investments made by partners to improve and expand malaria-related services, including the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund). This document provides an overview of the strategies and interventions in Senegal, describes progress to date, identifies challenges and relevant contextual factors, and provides a description of activities that are planned with FY 2024 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, NMCP's strategic plan, and the partner landscape.

2. U.S. President's Malaria Initiative (PMI)

PMI is led by the United States Agency for International Development (USAID) and implemented with the U.S. Centers for Disease Control and Prevention (CDC). Launched in 2005, PMI supports the implementation of malaria prevention and treatment measures such as insecticide-treated mosquito nets (ITNs), indoor residual spraying (IRS), accurate diagnosis and prompt treatment with artemisinin-based combination therapies (ACTs), intermittent preventive treatment for pregnant women (IPTp), and drug-based prevention, as well as cross-cutting interventions such as surveillance, monitoring, and evaluation; social and behavior change (SBC); and capacity strengthening. PMI's 2021–2026 strategy, *End Malaria Faster*, envisions a world free of malaria in our generation, with the goal of preventing malaria cases, reducing malaria deaths and illness, and eliminating malaria in PMI partner countries. PMI currently supports 27 countries in Sub-Saharan Africa and 3 programs in the Greater Mekong Subregion (GMS) 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 on progress already made in PMI-supported countries, PMI will work with national malaria control programs 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 Senegal

3.1. Malaria Overview for Senegal

Senegal's National Strategic Plan (NSP) aims to reduce malaria incidence by at least 75 percent, reduce malaria mortality by at least 75 percent, and interrupt local transmission in at least 80 percent of eligible districts by 2025. From 2026 to 2028, the country plans to maintain the decreased incidence and transmission levels achieved, effectively eliminating malaria in pre-elimination districts, moving from control to pre-elimination in the remaining control districts, and achieving zero malaria deaths. The goal for 2029–2030 is to eliminate malaria in all districts.

In 2020 and 2021, the country registered 445,313 and 536,850 confirmed cases, 373 and 399 malaria-related deaths, and malaria incidence of 26.7 and 31.2 per 1,000 population, respectively. Compared with previous years, these increases constitute a major threat for the 2030 elimination goal. The NMCP cited the COVID-19 pandemic and a longer-than-normal rainy season as reasons for the increase. Due to a lengthy health worker strike in 2022, malaria data were not promptly recorded in the national health management information system (HMIS), resulting in incomplete data; thus, 2022 data were not used for programmatic decisions.

The southern regions of Kedougou, Kolda, and Tambacounda (KKT) account for 78.5 percent of the total malaria cases registered in 2021 and 46.3 percent of malaria-related deaths. Intervention coverage estimates for the KKT region were collected through the Malaria Indicator Survey in 2020–2021. While the national estimate for ITN ownership was 75 percent, the estimates in Kedougou, Kolda, and Tambacounda were 89, 85, and 79 percent, respectively. ITN use in children was estimated at 47, 58, and 42 percent, respectively. IPTp2 rates were 78, 74, and 67 percent, respectively; and IPTp3 rates were 57, 47, and 48 percent, respectively.[1]

[1] IPTp2 signifies two doses of iPTp; IPTp3 signifies three doses.

In 2021, the Dakar region alone registered 71 malaria deaths (18 percent of all malaria deaths in Senegal), as many severe cases are transferred to Dakar where the majority of the tertiary hospitals are located.

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

3.2. Key Challenges and Contextual Factors

The key challenges in Senegal that could stall progress toward the country's elimination goals include:

- NMCP's lack of visibility due to its very low level position in the Ministry of Health structure.
- Limited involvement of non health sectors in the malaria elimination process.
- Insufficient ITNs and resources to ensure the next universal coverage mass distribution campaign planned for 2025. Only 5 of 14 regions will be covered.
- Insufficient central and local government budget allocations to health and the fight against malaria.
- Climate change (more frequent and longer periods of rain or drought), potentially hampering activity plans.
- Recurrent health worker strikes impacting activity implementation and the availability of quality data for decision making.
- Limited availability of commodities for transmission interruption (dihydroartemisinin-piperaquine [DP] and low-dose primaquine).
- Need for more cross-border planning, coordination, and implementation of malaria activities to achieve the country's elimination goal.
- Insufficient coordination of partner-funded activities at the operational level, sometimes leading to duplication or gaps.

3.3. PMI's Approach for Senegal

PMI contributes to the country's overall malaria strategy by adopting a two-pronged approach:

1. **Intensify malaria control interventions in higher-burden zones:** PMI supports a comprehensive package of malaria prevention and treatment activities targeting moderate- to high-burden regions, with a strategic focus on the high-incidence southeastern regions of KKT. This package includes active case management (PECADOM Plus) in 35 districts; seasonal malaria chemoprevention (SMC) campaigns (in response to climate patterns, expanding to five cycles in the highest burden districts in KKT while continuing to support three or four cycles in the other KKT districts and the districts of concern Diourbel, Touba, and Kaolack); continuous distribution of dual active ingredient (AI) ITNs; and cross-cutting interventions such as health systems strengthening; capacity strengthening; surveillance, monitoring, and evaluation (SM&E); and SBC.

2. **Initiating malaria elimination efforts in very-low-burden zones:** PMI supports elimination-related activities in eligible districts (fewer than 5 cases per 1,000 population annual incidence) of the regions of Louga, Matam, Saint-Louis, and Zinguinchor. It also supports the implementation of mass drug administration (MDA) in the district of Bakel to complement the implementation of MDA in districts of concern Ranerou and Kanel, supported by the Islamic Development Bank (IDB). PMI supports the national elimination strategy by providing technical and financial support for the development of the Senegal Malaria Elimination Acceleration Plan, strengthening the capacity of NMCP's elimination division, and coordinating elimination partners.

PMI procures the majority of commodities to meet national needs, including ITNs for continuous distribution channels and products for case management, case investigation, SMC, and MDA. PMI also provides significant support for community-based interventions, including:

- The geographic expansion of the PECADOM and PECADOM Plus programs (to include new health districts and health posts) and temporally (to ensure year-round implementation instead of just focusing on periods of high transmission);
- Implementation of the community health strategy by providing equipment and incentives to *dispensateur de soins à domicile* (DSDOMs, or home caregivers) and supporting training and supervision for community health workers (CHWs) and their supervisors; and
- The development and adaptation of malaria interventions to efficiently reach specific vulnerable populations such as children in Koranic schools (*daaras*).

A significant portion of PMI-supported activities are funded through a government-to-government agreement made directly with NMCP, other Ministry of Health (MOH) entities, and university and research institutions, in addition to another local partner supporting the management of this agreement.

3.4 Key Changes in this MOP

Key changes in this year's MOP include:

- PMI will support the implementation of MDA in the Bakel health district in the region of Tambacounda and remove SMC activities from that district. The reasons for this shift are:
    - To accelerate the shift of the Bakel health district from low transmission to elimination status.
    - To reduce the importation of malaria cases from this area to the north. During the dry season, the nomadic communities move with their livestock from the north to the south of the country in search of pasture, returning after the start of the rainy season. When returning, the population can carry malaria parasites to the northern part of the country—a malaria pre-elimination area. Bakel is the principal corridor for this movement. By implementing MDA at the beginning of

the rainy season for three consecutive cycles, the nomadic and local community will be cleared of any malaria parasites and will considerably reduce the risk of bringing malaria back into the elimination areas.

- PMI will support the routine distribution of dual-AI ITNs nationwide instead of focusing solely on the KKT region. This reflects NMCP's plans to utilize Global Fund resources to procure dual-AI ITNs for the 2025 mass campaign.
- PMI will support the implementation of a Malaria Indicator Survey in late calendar year (CY) 2025, following the mass campaign.

The remaining activities and budget levels remain essentially the same. Some cost estimates have been adjusted to account for existing pipeline in projects and shifts in commodity prices.

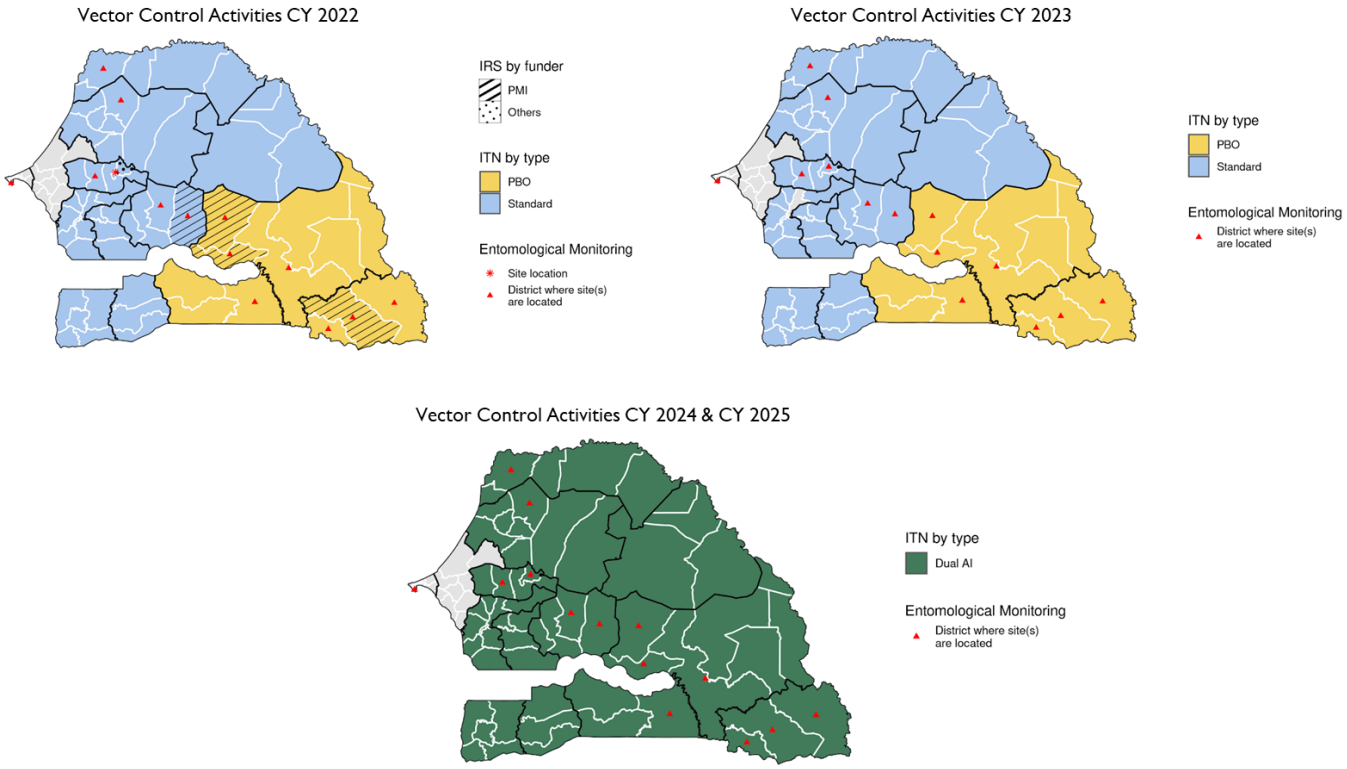
II. OPERATIONAL PLAN FOR FY 2024

1. Vector Monitoring and Control

1.1. PMI Goal and Strategic Approach

The NMCP's Malaria Strategic Plan promotes an integrated vector management strategy, including vector surveillance, enhanced insecticide resistance management and vector resistance reduction, continuous and mass distribution of ITNs, geographically targeted IRS, and larval source management (LSM). While the national strategy includes LSM, PMI does not currently fund these activities. PMI supports NMCP's goals for vector control, including entomological surveillance, distribution of new types of ITNs via mass campaigns and continuous channels, and mitigation of insecticide resistance. PMI continues to fund longitudinal entomological monitoring at sentinel sites around the country, transitioning to support a subset of these sites while expanding insecticide resistance monitoring to include the selection of appropriate vector control tools, launching community-based entomological surveillance, and enhancing surveillance for early detection of *Anopheles stephensi*. PMI supports vector control activities in the Sahelian, Sahelo-Sudanese, Sudano-Sahelian, Sudanese, and Sudano-Guinean zones, with central-level support for planning and supervision. While IRS was supported from 2019 to 2022 in the highest burden regions, PMI no longer supports IRS in Senegal. PMI supports NMCP in achieving ITN coverage with effective nets in high malaria burden areas and areas of concern for elimination to achieve maximum impact. PMI supports the procurement and distribution of piperonyl butoxide (PBO) and dual-AI ITNs. PMI-supported entomological monitoring sites for 2022–2025 are shown in Figure 1.

Figure 1. Maps of Vector Control and Entomological Monitoring Activities in Senegal, 2022–2025



** Maps include ITNs through campaigns only. PMI supports Dual AI net distribution through routine distribution channels.*
*** Grey districts are not covered with ITNs through mass campaigns.*

1.2. Recent Progress (April 2022–March 2023)

Between April 2022 and March 2023, PMI funded the following vector control activities:

- Vector surveillance and monitoring at 27 sentinel sites across five geographic zones in 16 health districts in partnership with NMCP and local research institutions (*Laboratoire d'Écologie Vectorielle et Parasitaire* and Cheikh Anta Diop University [*Université Cheikh Anta Diop*, or UCAD]). These activities included entomological surveillance at eight former IRS sites, six IRS control sites, four PBO ITN distribution sites, and six community-based surveillance sites selected in five different districts. In addition, three sites (one in Touba and two in Dakar) were selected as *Anopheles stephensi* monitoring sites. Districts were pooled by geographic zones for data analysis: (1) the Sahelian zone (Richard Toll and Keur Momar Sarr); (2) the Sahelo-Sudanese zone (Dakar); (3) the Sudano-Sahelian zone (Diourbel, Touba Malem Hodar, and Koungheul); (4) the Sudanese zone (Koumpentoum, Makacolibantang, and Tambacounda); and (5) the Sudano-Guinean zone (Kédougou, Salemata, Saraya, and Velingara).
- Six community-based entomological surveillance sites were supported in 2022–2023 in the Saint-Louis, Louga, Diourbel, and Kolda regions where vector collections were conducted through CDC light traps.

- Larval habitats in seaports and airports in Dakar and around the population-dense transport and human movement hub of Touba were surveyed for *An. stephensi,* and nonamplification of identified *Anopheles* specimens collected through routine monitoring are being retested with Singh et al. 2023 *An. stephensi* PCR primers to determine whether *An. stephensi* is present. Additional coordination with urban larval surveillance programs is ongoing.
- Procured 300,500 PBO and 300,000 dual-AI ITNs for distribution through routine channels.
- Supported the distribution of around 800,000 ITNs, including standard pyrethroid ITNs procured by IDB, to pregnant women, children under five years of age, and others through continuous distribution channels, including antenatal care (ANC), child vaccination, health facilities, and community organizations. The ITNs were distributed in 58 districts, with 45 districts receiving standard pyrethroid ITNs and the 13 districts in the KKT region with high malaria burdens receiving PBO ITNs. Additionally, a social inclusion pilot project distributing ITNs to religious schools (*daaras*) was implemented.
- Supported ITN durability monitoring of two types of ITNs distributed during the 2022 mass campaign: standard permethrin-based ITNs and PBO-permethrin ITNs at the baseline (4.5 month) point of time.
- Provided technical assistance, including supervision of distribution activities, and support for ITN activities in 3 regions, 15 districts, and 56 health facilities. Also, in collaboration with NMCP, the Global Fund, and IDB, organized an ITN routine distribution monitoring committee to review the results of ITN routine distribution in 2022–2023, progress on ITN durability monitoring, and proposed quantification of ITNs for the procurement and distribution of standard, PBO, and dual-AI ITNs in 2024.
- Implemented SBC activities to increase demand and appropriate use of ITNs, promote care, and mitigate against misuse. See the SBC section for more information.
- Supported the planning, implementation, and evaluation of the third and final year of IRS in four districts, using clothianidin-based formulations in Kédougou, Koumpentoum, and Koungheul, and pirimiphos-methyl in Makacolibantang. During the IRS campaign, 138,752 structures were sprayed (97.5 percent coverage rate), protecting 570,283 people (including 14,169 pregnant women and 116,844 children under five years of age). For more information about IRS, refer to the most recent End of Spray Report.

1.3 Plans and Justification for FY 2024 Funding

The FY 2024 funding tables contain a full list of vector monitoring and control activities that PMI proposes to support in Senegal.

1.3.1. Entomological Monitoring

PMI will continue to support entomological surveillance, including longitudinal monitoring at 25 sites in 14 districts and insecticide resistance monitoring in 14 districts, which is a reduction from 34 sites in 19 districts in CY 2022. Data from the last five years have not shown a

substantial change in vector bionomics at the sites that have been removed. To allow for more intensive, question-driven monthly surveillance, the total number of longitudinal monitoring sites has been limited to those that specifically receive vector control interventions, representative sites of all the different geographic zones, and those where community-based entomological activities have been initiated. A final round of IRS was conducted in 2022 in districts with high malaria burdens, and PMI will continue supporting the transition to dual-AI ITNs in those districts in alignment with insecticide susceptibility data. In addition, activities related to the enhanced surveillance of *An. stephensi* will continue at three sites Dakar and Touba—two major urban areas in Senegal—in accordance with PMI's *An. stephensi* action plan guidance for high-risk countries and molecular monitoring and retesting of routine collected *Anopheles* species that do not amplify through species-identification PCR processing. PMI is also continuing to provide technical assistance to strengthen the capacity of local research institutions at the national, regional, and district levels, and facilitate coordination among research institutions, NMCP, and the national vector control working group to support the localization of entomological activities. PMI is providing support to establish a biobank at UCAD to enhance longitudinal molecular processing and entomological surveillance capacity.

Summary of Distribution and Bionomics of Malaria Vectors in Senegal

As of 2022, the primary vector found in all ecological zones is *Anopheles gambiae s.l.*; *An. arabiensis* is the predominant and most widespread species of the *An. gambiae* complex in four of the five zones, and *An. gambiae s.s.* is the dominant species in the Sudano-Guinean zone. *Anopheles coluzzi* was also noted in all surveyed areas but was most common in the Sudanese zone. Other vectors detected include: *An. funestus s.l.*, *An. pharoensis*, *An. rufipes*, *An. squamosus*, *An. nili*, *An. coustani*, and *An. ziemanni*. Species that have not been identified molecularly are being retested to determine if they are *An. stephensi*.

In Senegal, peak transmission occurs from July to October. More biting *An. gambiae s.l.* were collected outdoors at IRS sites; however, outdoor and indoor biting rates are similar at these sites. The mean indoor resting density of *An. gambiae s.l.* is 1.4 females per room per night, with the highest density in the Sudano-Sahelian zones. Peak biting time is from midnight to 3:00 a.m. The entomological inoculation rate of *An. gambiae s.l.* populations vary according to the 19 geographic zones and are higher in the Sudanese and Sudano-Guinean zones. Infected females were found in *An. arabiensis*, *An. gambiae s.s.*, and *An. coluzzii*.

For further details, see the most recent Annual Entomological Report, found on the PMI website.

Status of Insecticide Resistance in Senegal

Anopheles gambiae s.l. was resistant to all pyrethroids at the sites where the tests were conducted, except deltamethrin in Koungheul where resistance was suspected (91 percent). Resistance intensity was conducted in eight districts, and high resistance intensity was

observed at all sites. PBO synergist assays were conducted in nine districts, including IRS and PBO-ITN distribution sites with deltamethrin, permethrin, and alphacypermethrin. Pre-exposure to PBO reversed the resistance status of *An. gambiae s.l.* populations in Koungheul and Koumpentoum districts with high malaria burdens for all three pyrethroids, and partial susceptibility was restored in Makacolibantang, Tambacounda, Keur Massar, Touba, Velingara, and Kédougou. In Malem Hodar, PBO only restored susceptibility with deltamethrin pre-exposure. Susceptibility to pirimiphos-methyl and bendiocarb was recorded at all monitored sites (seven and nine districts, respectively. Susceptibility of *An. gambiae s.l.* to clothianidin 4 micrograms/bottle was recorded at all sites tested, except at Tambacounda (92.7 percent). Susceptibility of *An. gambiae s.l.* to chlorfenapyr was detected at 100 micrograms/bottle at 48 hours in eight of nine districts surveyed. In Koumpentoum, 100 percent mortality was observed after 72 hours.

1.3.2. Insecticide-Treated Nets

PMI will continue to support the procurement, storage, and distribution of ITNs through routine channels. In response to evidence of pyrethroid resistance at all entomological monitoring sites, PMI/Senegal will continue to transition to dual-AI ITNs in coordination with the Global Fund and NMCP. PMI will also provide technical assistance at the central, regional, and district level for routine distribution of ITNs to strengthen capacity and improve distribution systems. PMI will support SBC activities focused on the introduction of new types of nets with reinforced messaging on net use. See the SBC section for details on challenges and opportunities to improve intervention uptake and maintenance.

ITN Distribution in Senegal

In Senegal, ITNs are distributed via mass campaign every three years and continuous distribution every year. The most recent mass distribution campaign occurred in June 2022. Continuous distribution channels include: (1) distribution to pregnant women at ANC visits, (2) distribution during immunization encounters for children 0–23 months old; (3) distribution through community-based organizations; (4) distribution to children 24–59 months old in outpatient clinics; and (5) distribution at health facilities to the general population. Religious schools (*daaras*) offer another distribution channel via social inclusion efforts. Widespread pyrethroid resistance has been reported throughout the country. To combat this with effective control tools, with FY 2024 funding, PMI will procure dual-AI nets for routine distribution nationwide and will coordinate with NMCP, the Global Fund, and stakeholders to ensure that effective ITNs are procured for the 2025 mass distribution campaign.

Refer to the ITN gap table in the annex for more details on planned quantities and distribution channels.

Table 1. Standard Durability Monitoring in Progress

Campaign Date	Site	Brand	Baseline	12-month	24-month	36-month
June 2022	Koungheul	Olyset (Permethrin)	Nov 2022	July 2023	June 2024	June 2025
June 2022	Koumpentoum	Olyset Plus (Permethrin + PBO)	Nov 2022	July 2023	June 2024	June 2025

1.3.3. Indoor Residual Spraying

PMI will not support IRS in Senegal with FY 2024 funds. PMI's last year of support for IRS in Senegal was in 2022.

Table 2. PMI-Supported IRS Coverage

Calendar Year	District	Structures Sprayed (#)	Coverage Rate (%)	Population Protected (#)	Insecticide
2022	Kédougou, Makacolibantang, Koumpentoum, and Koungheul	138,752	97.5%	570,283	Clothianidin + deltamethrin and pirimiphos-methyl

IRS Insecticide Residual Efficacy in Senegal

IRS spray quality was assessed using susceptible, laboratory reared *An. coluzzi* on cement and mud wall surfaces, and 100 percent mortality was recorded, indicating high-quality spraying. The residual efficacy of insecticides was evaluated every month for eight months in the four IRS districts. Results indicate that all three insecticides used (Fludora Fusion, SumiShield, and Actellic 300CS) had high residual efficacy (over 80 percent mortality) on mud and cement walls for eight months, and Fludora Fusion and Sumishield had average mortality rates above 99 percent on both wall types for the full eight months.

2. Malaria in Pregnancy

2.1. PMI Goal and Strategic Approach

As malaria infection during pregnancy continues to be a public health problem in Senegal, with substantial risks for the mother, the fetus, and the newborn, the protection of pregnant women remains a major intervention in PMI/Senegal's strategy. The NMCP recommends that all pregnant women receive at least three doses of sulfadoxine-pyrimethamine (SP) as IPTp, beginning as early as 13 weeks gestational age and administered one month apart until delivery. Additional doses can be given up to childbirth, respecting the interval of at least one month between doses. NMCP recommendations also include the provision of ITNs at the first ANC visit and effective case management of malaria per World Health Organization (WHO) and NMCP guidelines.

Despite progress over the past five years, disparate levels of IPTp2 and IPTp3 coverage are still observed in some districts of Senegal, as seen in routine health data. To fill gaps in coverage, in 2019, NMCP and the health system piloted a district-driven initiative of IPTp delivery at the community level in 10 districts. Using this approach, CHWs distribute SP to pregnant women starting in the second trimester of pregnancy, after the first dose of SP is provided at a health facility and a census of this target population is completed. Based on NMCP's annual epidemiological report, districts that implemented the pilot showed a 27 percent increase in IPTp3 coverage by the end of 2020. The community IPTp is fully included in NMCP's strategy and is implemented in areas with low IPTp coverage in 60 health districts, including 45 with PMI support.

2.2. Recent Progress (April 2022–March 2023)

- PMI supported the implementation of IPTp through training and supportive supervision at the health-facility level in eight regions (Diourbel, Kaffrine, Kaolack, Kolda, Kedougou, Sedhiou, Tambacounda, and Ziguinchor) to complement the regions covered under the Global Fund. PMI also supported a pilot of community IPTp in 20 health districts across the nation.
- PMI supported the orientation of seven providers in Kedougou health district on IPTp at the community level.
- PMI supported the training of 15 DSDOMs on the importance of IPTp and malaria prevention, and promoted early ANC attendance and uptake of SP to prevent malaria in pregnancy.

2.3. Plans and Justification for FY 2024 Funding

The FY 2024 funding tables contain a full list of malaria in pregnancy activities that PMI proposes to support in Senegal.

Senegal will continue to support malaria in pregnancy (MIP) activities as described in the recent progress section, including the functioning of the MIP subworking group through the case management and drug-based prevention working group of the *Cadre de Concertation des Partenaires de Lutte contre le Paludisme* (CCPLP). PMI will also provide support to NMCP to standardize coordination meetings with the maternal and child health division of the Ministry of Health. It will also continue to support and expand community IPTp in areas with low IPTp coverage in 45 health districts.

Beginning in CY 2024, the Senegalese government will procure the country's needs for SP for pregnant women (see the SP Gap Analysis table in the annex for details). PMI will continue to provide supplies for the uptake of directly observed therapy IPTp where needed.

See the SBC section for details on challenges and opportunities to improve intervention uptake and maintenance.

3. Drug-Based Prevention

3.1. Seasonal Malaria Chemoprevention

3.1.1. PMI Goal and Strategic Approach

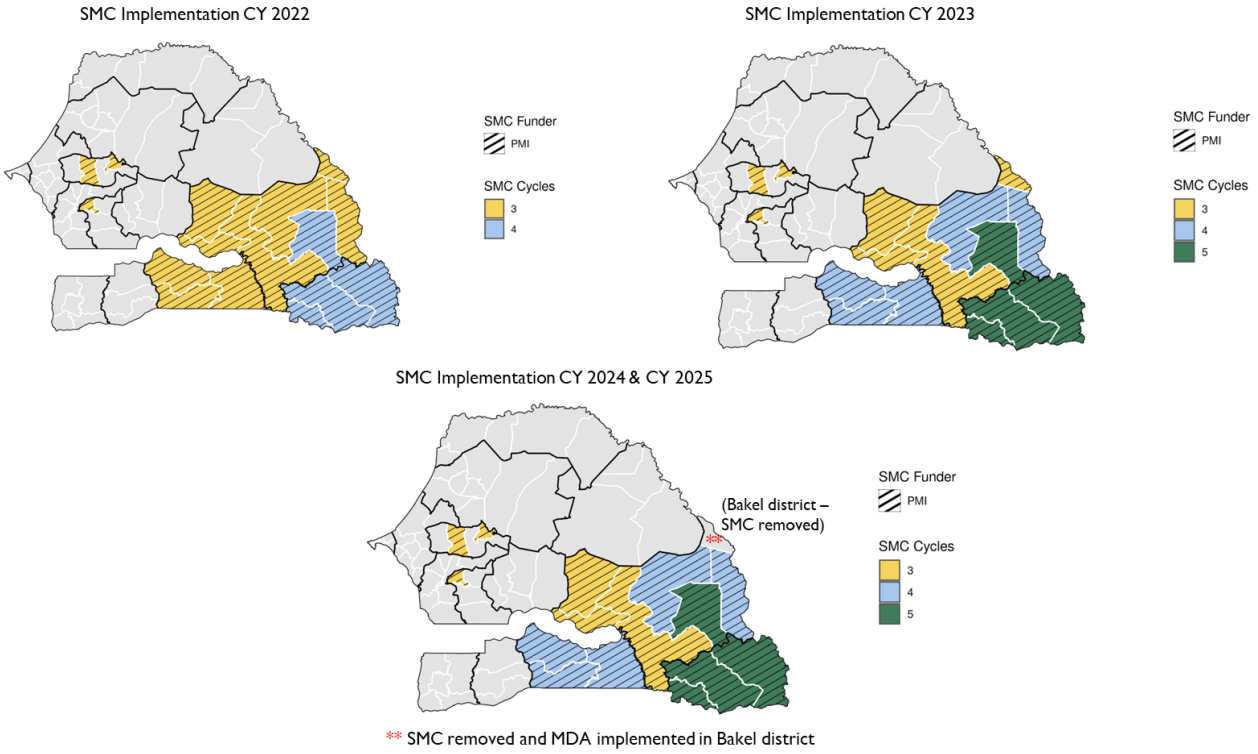
The NMCP's Malaria Strategic Plan promotes SMC as a malaria prevention intervention in areas with highly seasonal malaria transmission. PMI supports the use of SMC as defined in WHO guidance.

PMI is the only partner supporting SMC in Senegal, covering 16 health districts, including the procurement of sulfadoxine-pyrimethamine/amodiaquine (SPAQ) to meet the needs of the eligible population as well as all aspects of implementation (e.g., planning, training, paying distributors, and SBC activities). PMI also supports NMCP's SMC activities (e.g., planning and training) at the central level.

The SMC strategy, which began in Senegal in 2013, uses a door-to-door approach, focused on children from 3 months to 10 years of age. Since 2019, to ensure high treatment coverage, directly observed treatment for all three doses was scaled to all target districts. To ensure the strategy's success and improved monitoring of SMC implementation, planning meetings and evaluations are organized after each round. A weekly SMC newsletter is produced during each campaign to disseminate information about this activity.

Following the new WHO recommendations and to better cover the malaria transmission season and increase the protection of children, a progressive increase in the number of monthly cycles in select districts was proposed. This decision was based on a recent analysis of the monthly malaria burden and rainfall data identifying the duration of both the rainy season and the malaria transmission season in select districts. This phased approach began in 2022 with an increase from three to four monthly cycles in the Dianke Makhan in Tambacounda region. Beginning in 2023, the number of monthly cycles will increase from four to five in the Kedougou region and Dianke Makhan district, and from three to four cycles in the Kolda region and in Kidira and Goudiry districts in the Tambacounda region (see Figure 2).

Figure 2. Maps of SMC Implementation in Senegal, 2022–2024



3.1.2. Recent Progress (April 2022–March 2023)

PMI supported SMC for 755,224 children between the ages of 3 to 120 months in 16 districts for three cycles (four cycles in the Kedougou region). A campaign coverage rate (administrative estimate) of 87 percent was achieved during the 2022 campaign. PMI also supported the following activities in Senegal:

- Procured SPAQ blister-packs to meet the needs of the 2022 campaign;
- Conducted site visits and coordinated meetings with local staff;
- Monitored activities, including conducting small household surveys to validate coverage and estimate adherence levels after the second day of each cycle;
- Worked with NMCP to organize and plan post-implementation validation meetings;
- Produced an SMC bulletin; and
- Conducted SBC activities at the community level through collaboration with civil society organizations (CSOs).

Challenges identified in the final evaluation include:

- Refusal cases in some districts (Touba, Diourbel, and Kaolack);
- Lack of institutional communication at the central level;
- Constraint of access to some villages and households during the rainy season; and
- Overlap with some nonmalaria activities, which interfered with implementation plans.

3.1.3. Plans and Justification for FY 2024 Funding

The FY 2024 funding tables contain a full list of SMC activities that PMI proposes to support in Senegal. Refer to the SPAQ gap table in the annex for more details on planned quantities and distribution channels. See the SBC section for details on challenges and opportunities to improve intervention uptake and maintenance.

Senegal will continue to support SMC activities as described in the strategic approach. Minor changes include the replacement of SMC with MDA in one district (Bakel in the Tambacounda region). Overall, FY 2024 funds will support SMC for children aged 3–120 months in 15 target districts, with 5 cycles in 4 districts, 4 cycles in 5 districts, and 3 cycles in 6 districts to better cover the transmission period.

3.2. Other Drug-Based Prevention (as applicable)

3.2.1. PMI Goal and Strategic Approach

NMCP is aiming to reach malaria elimination by 2030, and drug-based interventions remain a key strategy to achieving this goal. To support NMCP's elimination goal, PMI will support the implementation of MDA in the Tambacounda region, specifically in the Bakel health district, to accelerate the shift from low transmission to malaria elimination. This will be the second year of support for MDA in Bakel, with the first year support in CY 2024 through FY 2023 funding. This approach will be complementary, with support from IDB for the neighboring districts of Kanel and Ranerou. There is a malaria transmission corridor maintained in Bakel, Kanel, and Ranerou due to the south–north seasonal migration of nomadic communities. The implementation of MDA, as recommended by WHO, may quickly reduce clinical malaria incidence in this corridor by targeting the entire population with the use of DP and primaquine. MDA implementation will be one of several components of a robust malaria elimination program.

3.2.2. Recent Progress (April 2022–March 2023)

MDA has not yet been implemented as routine intervention. Refer to the operational research (OR) section below regarding the PMI-supported MDA OR study in Tambacounda.

3.2.3. Plans and Justification for FY 2024 Funding

The FY 2024 funding tables contain a full list of activities related to other drug-based prevention that PMI proposes to support in Senegal. Refer to the PMI goal and strategic approach section below for a description of this year's planned activities, and consult the MDA-Specific gap table in the annex for more detail on the planned quantities.

4. Case Management

4.1. PMI Goal and Strategic Approach

Senegal considers artesunate-amodiaquine, artemether-lumefantrine, and dihydroartemisinin-piperaquine as co-first-line ACTs and injectable artesunate for severe malaria with rectal artesunate for prereferral treatment. Universal testing for fevers became policy in Senegal in 2017. HRP2/3-based rapid diagnostic tests (RDTs) are used at the health post and community levels, including PECADOM sites, whereas microscopy is used at higher-volume facilities such as hospitals. Recently, NMCP introduced the use of molecular biology (loop-mediated isothermal amplification, or LAMP) in the diagnosis of malaria in low-incidence settings. PMI does not fund this approach but the Global Fund does.

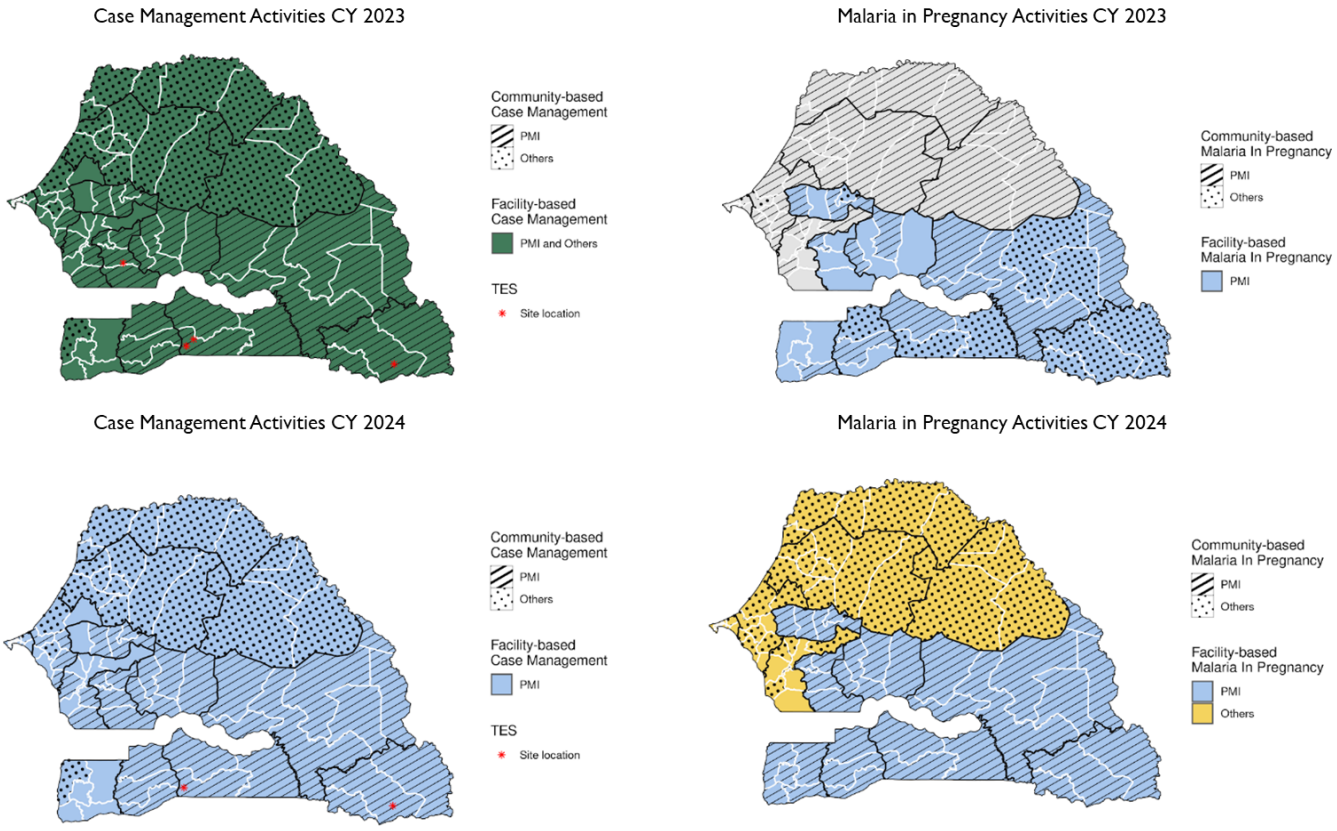
PMI contributes to NMCP's case management strategy nationwide, with more support going to the higher-transmission areas in the southeastern regions of KKT. Other financial partners, including IDB (historically) and the Bill & Melinda Gates Foundation, support molecular surveillance, case investigation, and reactive case detection in pre-elimination zones. PMI provides partial funding for the operational costs for case investigations and response in pre-elimination zones.

PMI provides capacity strengthening through training and supportive supervision to health facilities at all levels, including the private sector. High-level malaria management training is provided to district health officers, while malaria prevention and case management training is provided to health workers at health centers, health posts, and health huts, and to home-based CHWs. PMI and the Global Fund support training and supervision in the KKT region, while the Bill & Melinda Gates Foundation and PMI support the pre-elimination regions.

In the past, PMI ensured the procurement and distribution of all case management commodities (RDTs, ACTs, and injectable and rectal artesunate) for the entire country, with IDB procuring DP for the pre-elimination health zone. However, with the end of IDB support in 2021, PMI contributed to the procurement of the needed DP for 2022 and 2023.

PMI supports the monitoring of antimalarial efficacy by implementing therapeutic efficacy studies (TES) at two sentinel sites each year and conducts postmarketing quality control of antimalarials at all levels of the health system, including the private sector and community.

Figure 3. Maps of Case Management, Community Health, and Malaria in Pregnancy Service Delivery Activities in Senegal for 2023 and 2024



4.2. Recent Progress (April 2022–March 2023)

National-Level Case Management Activities

- PMI supported the development of the National Malaria Elimination Acceleration Plan 2023–2025 with the participation of national and international malaria stakeholders, including malaria donor organizations (Global Fund, WHO, IDB, and PATH/MACEPA), MOH entities (including regional and community representatives and district health officers), other ministries, civil society organizations, research institutions, and universities. The plan was validated by the Ministry of Health in November 2022.
- PMI supported the development of the elimination devolution plan—a roadmap for transfering elimination activities from implementing partners to the routine district health activity package.
- PMI supported the 2022 national evaluation of community case management (PECADOM) and the 2023 planning workshops.

Commodities

- PMI procured and distributed approximately 4 million malaria RDTs to meet the country's total needs.
- PMI procured and distributed approximately 1.2 million ACTs, including 62,412 DP to meet the country's total needs for routine case management and response case management for malaria case investigation in pre-elimination zones.
- PMI procured and distributed 219,926 vials of injectable artesunate to cover the country's total needs for the management of severe malaria.

Facility Level

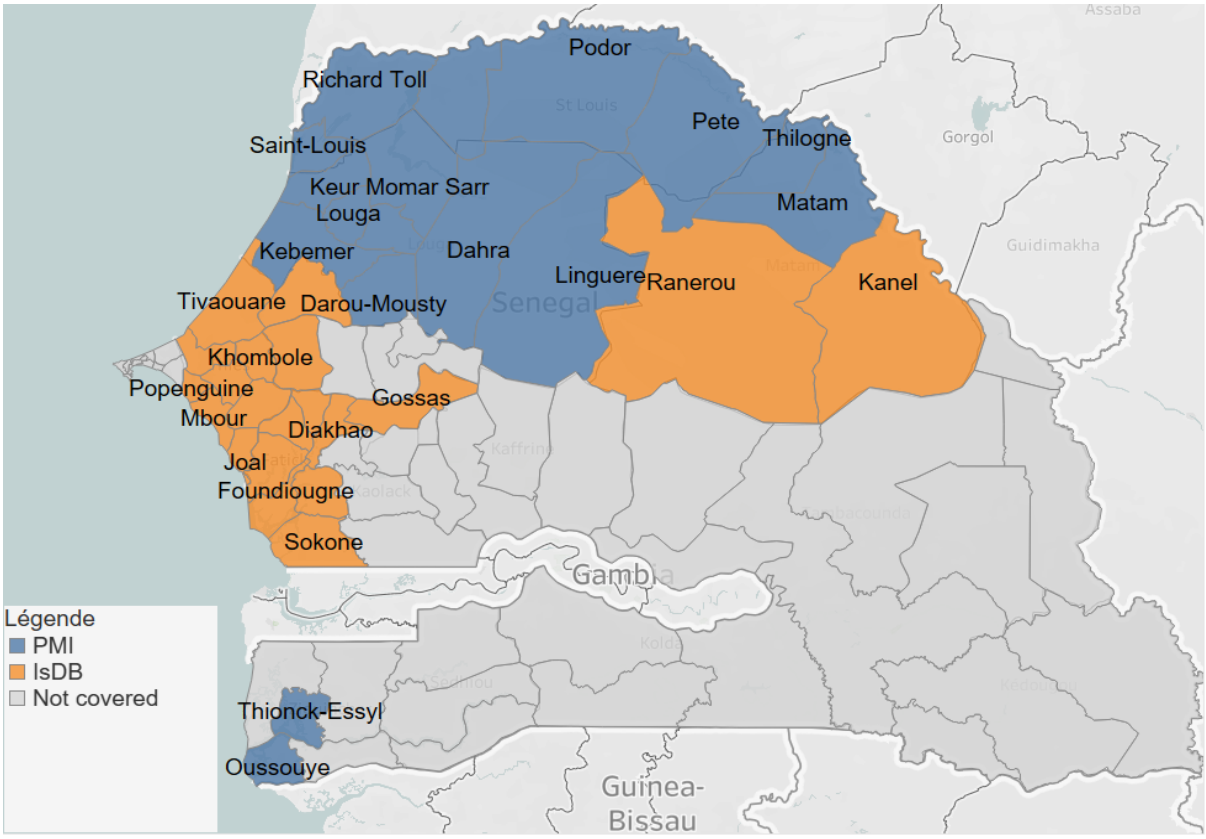
- PMI supported training and supportive supervision for 310 health providers on malaria treatment guidelines. These trainings were conducted in the health districts and health posts of the regions of Kolda, Sedhiou, and Ziguinchor. PMI conducted supportive supervision in 106 health health facilities (district health facilities and health posts in Diourbel, Kedougou, and Kolda regions). These supervisions focused on adherence to malaria case management guidelines, including testing before treatment, case classification, and administration of appropriate treatment. The supervisors also monitored the case management indicators. At the end of the supervision, recommendations and action plans are developed for each facility as well as for district- and regional-level managers.
- PMI supported the supervision of 140 laboratories for quality malaria microscopy at 35 hospitals, 95 district health centers, 2 regional hospitals, and 8 military hospitals.
- PMI provided advanced malaria diagnostic refresher training for 16 laboratory technicians.

Community Level

- PMI supported onsite training and supportive supervision and mentorship visits reaching 1,922 DSDOMs, including 1,400 in the KKT and Sedhiou regions and 522 in the central and western regions.
- PMI trained 535 supervisors in onsite training and supportive supervision of CHWs and DSDOMs.
- PMI supported the monthly supervision of all DSDOMs, particularly during the high transmission period between June and December.
- PMI procured equipment for CHWs, including 2,000 bicycles for DSDOMs to more easily access community members in the KKT and Sedhiou regions. PMI procured and distributed bags and T-shirts, and produced and distributed registers and reporting tools to all DSDOMs, supervisors, and health-hut CHWs.
- PMI funded incentives for DSDOMs implementing PECADOM Plus.

PMI supported Senegal's elimination efforts through coordination, capacity strengthening, and malaria case investigation activities in 17 malaria elimination districts with an annual malaria incidence of less than five per thousand (<5/1,000) (see Figure 4).

Figure 4. Map of Districts Implementing Elimination Activities, by Partner



Elimination activities included the following:

- PMI provided capacity strengthening and support for coordination at the regional and district level.
- PMI support facilitated the detection and prompt response to 16 malaria outbreaks or case increases in Louga, Matam, and Saint-Louis regions. As part of the routine case detection, 6,014 malaria cases were registered, 4,993 of which were investigated. During the investigations, 61,924 people were found in the index cases' households, 45,483 of which were treated using a focal drug administration approach.
- PMI supported incentive payments for malaria case investigation by NMCP of 17 of 37 health districts.
- PMI supported supervision to the regions, districts, and health posts in Matam, Louga, and Saint-Louis regions to ensure adherence to elimination guidelines and data quality.

Recent progress in monitoring antimalarial efficacy and the TES approach is presented in the plans and justification for FY 2024 funding section below.

4.3. Plans and Justification for FY 2024 Funding

The FY 2024 funding tables contain a full list of case management activities that PMI proposes to support in Senegal.

PMI will continue to support most case management activities as described in the recent progress section. Some specific activities are detailed below.

National-Level Case Management Activities

- Support the annual implementation of External Competency Assessment of Malaria Microscopists course, implemented by UCAD in partnership with NMCP, WHO, WHO's Regional Office for Africa, and Amref Health Africa.
- Support annual maintenance of microscopes and the implementation of quality control programs for both microscopy and RDTs in conjunction with NMCP and UCAD at all levels of the health system, including the private sector, district-level health facilities, military medical centers, and hospitals.
- Continue to support regional and district health managers in the northern regions on the devolution of malaria case investigation.

Commodities

PMI will procure ACTs, RDTs, injectable artesunate, and primaquine as described in the recent Progress section, including ACTs and primaquine for reactive case detection in the elimination districts. PMI will also procure a limited quantity of rectal artesunate suppositories for the pretransfer of severe malaria cases from community and health posts to higher-level health facilities.

Refer to the ACT, RDT, injectable artesunate, and artesunate suppository gap tables in the annex for more details on planned quantities and distribution channels.

Facility Level

PMI will support training and supervision for malaria case management at the facility level in eight regions, including the KKT region, as described in the recent progress section. Regional and district malaria experts trained during the malariology course will conduct the training and supervision with NMCP oversight. Facilities will include health posts, regional hospitals, district-level health facilities, and military and private health centers.

PMI will support training and supervision for health providers at private health facilities to ensure they have access to malaria case management tools and commodities and that the private sector adheres to the national guidelines for case management.

Funding will also help train 16 laboratory technicians and provide annual supportive supervision to 140 laboratories in district-level health facilities, military medical centers, and hospitals. Trainees will be selected based on personnel needs and/or diagnostic performance recorded in previous supervisory reports. Regional workshops will be held with laboratory technicians to read thick smear slides from health facilities, and a slide bank will ensure quality and improve performance of diagnosis with microscopy.

Community Level

PMI will continue to support community-level training and supervision for malaria case management in eight regions: the KKT regions, Diourbel, Sedhiou, Kaffrine, Kaolack, and Ziguinchor. The remaining eligible districts will be supported through a Global Fund grant. PMI will continue to expand PECADOM and PECADOM Plus in the southeastern regions of the country. In 2025, 150–200 new DSDOMs are expected to be recruited. PMI will procure and distribute tools (registers, reporting tools, SBC materials) and equipment such as bicycles and waterproof vests. PMI will continue to support the payment of incentives for DSDOMs implementing PECADOM Plus in PMI-supported health districts.

Case Management Elimination Activities

PMI will continue case investigation and response in the elimination regions of Saint-Louis and Louga and the eligible districts of the Matam region, as well as in Oussouye and Thionck Essyl districts in the Ziguinchor region. This will include training, supervision, and support to investigation operations. Each facility-level index case will be treated with a combination of ACT and single low-dose of primaquine, as recommended by WHO. The remaining eligible districts will be covered with support from IDB.

See the social and behavior change section for details on challenges and opportunities to improving case management uptake and maintenance.

Monitoring Antimalarial Efficacy

Table 3. Ongoing and Planned Therapeutic Efficacy Studies

Year	Site Name	Treatment Arm(s)	Plan for Laboratory Testing of Samples
2022	Kedougou and Bagadadji	Artemether-lumefantrine and artesunate-amodiaquine	CIGASS
2023	TBD	Artemether-lumefantrine, artesunate-amodiaquine, and DP	CIGASS

TBD: to be determined; CIGASS: Centre International de Recherche, de Formation en Génomique Appliquée, et de Surveillance Sanitaire.

PMI will continue to support TES in Senegal to ensure first-line antimalarial drugs remain efficacious.

5. Health Supply Chain and Pharmaceutical Management

5.1. PMI Goal and Strategic Approach

Under NMCP's NSP 2021–2025, Senegal aims to ensure permanent availability (no stockouts) of medicines and other antimalarial products for at least 99 percent of structures. Interventions that will facilitate continuous improvement of the health supply chain and quality of medicines include commodity quantification, capacity strengthening, improvement and monitoring of the logistics management information system, coordination with the central medical stores (the *Pharmacie Nationale d'Approvisionnement*, PNA) and other partners, improving the country's capacity to store and distribute commodities, monitor the quality of antimalarial drugs and products, and develop supply chain management policies and relevant documentation. PMI/Senegal's efforts align with NMCP's supply chain strategy.

In addition, Senegal's 2019–2023 Integrated Strategic Plan for the Directorate of Pharmacy and Medicines (*Direction de la Pharmacie et des Médicaments*) and the National Medicines Control Laboratory (*Laboratoire Nationale de Contrôle des Médicaments*) envisions for the country "an efficient system of regulation and control which ensures the development and application of quality standards, and which guarantees access to medicines and other quality health products that are effective and safe for the entire population." The plan recognizes that, despite progress over the past decade, areas of weakness persist, including scarce financial resources, insufficient human resources, relatively weak information systems, and inadequate coordination and communication among relevant stakeholders. PMI supports the Integrated Strategic Plan through activities around two objectives: (1) improving the governance for medical product quality assurance systems; and (2) improving the country and regional regulatory systems to assure the quality of products in the public and private sectors. For more information on the health supply chain system in Senegal, see the Country Malaria Profile.

5.2. Recent Progress (April 2022–March 2023)

Between April 2022 and March 2023, PMI supported the following investments in health supply chain and pharmaceutical management systems strengthening:

- Supported the NMCP to coordinate and collaborate with the PNA and other health supply chain stakeholders by assisting with quarterly stock status meetings, where participants discuss supply chain coordination issues, update the stock status of key commodities, and modify supply plans as needed to mitigate any stockouts.
- Supported NMCP to develop annual quantification of malaria commodities and address emergency stock needs at the end of 2022 and in early 2023.

- Continued to provide technical assistance to the PNA to relaunch *Yeksi naa* (Senegal's push model, informed by a public private partnership, to bring health products to the last mile, defunct since 2019), specifically working to ensure a strong governance structure, a well-defined resource mobilization strategy, the involvement of all territorial administrations in distribution model implementation, and the re-enrollment of district-level health facilities.
- Supported training for 28 people, including 10 women, in Tambacounda district on malaria commodity inventory management.
- Supported the national postmarketing surveillance unit to develop and deploy their third risk-based surveillance protocol for antimalarials. PMI supported the collection of 224 samples of antimalarial medicines (artemether-lumefantrine, injectable artesunate, artesunate-amodiaquine, SP, and SPAQ) in eight regions, quality testing of the samples, and a workshop to disseminate the sampling results and discuss regulatory measures.
- Reinforced the capacity of the National Medicines Control Laboratory and the *Direction de la Pharmacie et des Médicaments* in the area of quality risk management.
- Supported the *Agence Sénégalaise de Réglementation Pharmaceutique* to implement its roadmaps toward achieving two different ISO certifications, demonstrating that their labs meet international operational and quality management standards.
- Strengthened the capacity of the quality control department of the *Agence Sénégalaise de Réglementation Pharmaceutique* in terms of quality control of medicines, including metrology, qualification and maintenance of equipment, commodity purchases, and training of personnel in quality control and management.

5.3. Plans and Justification with FY 2024 Funding

The FY 2024 funding tables contain a full list strengthening activities for the health supply chain and pharmaceutical management systems that PMI proposes in Senegal.

Senegal will continue to support health supply chain strengthening and pharmaceutical management activities as described above, with no major shifts from the activities noted in the recent progress section.

6. Malaria Vaccine

The Ministry of Health has not applied for the malaria vaccine and has no current plans to do so.

7. Social and Behavior Change

7.1. PMI Goal and Strategic Approach

PMI's support to NMCP's Malaria Communication Strategy fully aligns with and contributes to NMCP's objectives. PMI contributes to NMCP's communication strategy by supporting efforts to design and implement SBC activities, including SBC materials tailored to the local context. PMI works to promote acceptance and correct and consistent use of proven interventions such as SMC, ITNs, ANC attendance, IPTp, and IRS, and to reinforce early care-seeking behavior for prompt case management. At the regional level, PMI supports strategic SBC interventions in areas with high malaria burdens and regions with low malaria burdens. At the central level, PMI supports SBC operational research, analysis, and development of a new national malaria SBC strategy with a pre-elimination component, including relevant tools for effective implementation. PMI continues to strengthen capacity by training community actors and service providers, developing contextually tailored SBC work plans, and implementing mass media activities (e.g., local theater and community radio) and interpersonal communication activities. Community-level activities include home visits and social mobilization efforts, including speeches, music performances, skits, and the use of banners and t-shirts to reinforce key SBC messages.

Senegal's national malaria communication goal, as described in the 2021–2025 NSP, has two specific objectives:

- To bring 80 percent of the population to adopt healthy behaviors in regard to malaria prevention measures and case management by 2025.
- To increase NMCP institutional communication activities from 33 to 80 percent, thereby improving visibility and recognition of NMCP-led progress in the fight against malaria.

PMI supports SBC activities to achieve two behavioral objectives: (1) increase the proportion of the population sleeping under ITNs to over 80 percent; and (2) increase the proportion of people who seek care at health facilities within 24 hours of the onset of fever to over 80 percent.

6.2. Recent Progress (April 2022–March 2023)

PMI has supported various SBC activities in Senegal, including ongoing SBC activities through mass media and interpersonal communication and targeted activities promoting specific interventions, such as ITN distribution and SMC campaigns.

Between April 2022 and March 2023, PMI, in partnership with NMCP, implemented the following SBC activities in the KKT region and the regions of Sedhiou and Diourbel.

ITNs and IPTp: To increase proper use of ITNs, especially among pregnant women and children under five years of age, PMI supported SBC activities through community-based organizations and radio stations to promote the use of ITNs and IPTp uptake, with the following results:

- Sensitized 1,738 people on the correct use of ITNs;
- Reached 1,221 pregnant or breastfeeding women on the promotion of SP and the use of ITNs with 4,009 home visits conducted by community-based organizations;
- Sensitized 2,598 people with 115 health talks on IPTp and the use of ITNs;
- Produced 380 radio spots and broadcasts on community IPTp and 26 on ITN use;
- Conducted 15,119 home visits, raising awareness of 5,842 people, 3,624 of whom received messaging on IPTp and the use of ITNs; and
- Conducted visits to 15,119 homes, resulting in 13,537 doses of SP administered to pregnant women in the five regions (5,370 of which were SP2 and 8,167 of which were SP3 and above).

MIP: Preventing malaria in pregnancy continues to be of high priority to PMI programing and NMCP. Although the overall coverage of IPTp3 has increased since 2019, many health districts continue to report uptake below the 80 percent national target of all three recommended doses. Since pregnant women and children under five years of age are prime beneficiaries of continuous ITN distribution, PMI-supported SBC interventions strategically integrate MIP and ITN SBC activities. The above MIP and ITN results have been achieved through integrated SBC efforts.

SMC: High refusal rate by parents and children in some districts due to rumors about SMC and concerns of secondary effects, such as the taste of the medication, remains a challenge. Other barriers to follow-up impact continuous acceptance of all cycles of SMC to complete the treatment, which reduces the efficacy of the campaign.To effectively implement SMC and improve community acceptance, PMI supported a specific communication strategy aimed at reducing recurrent refusal cases in the health districts of Diourbel, Touba, Tambacounda, Kédougou, Kolda, and Vélingara. PMI coordinates with Catholic Relief Services to conduct SMC-related SBC activities, particularly in the health districts of Diourbel and Kaolack where the highest refusal rates and low SMC coverage rates have been registered. This strategy made it possible to settle 1,198 out of 2,263 refusals (53 percent) and to improve the coverage rate, particularly in Touba and Diourbel. PMI also supported 19 communication plans in 15 health districts and 4 regions (Kedougou, Kolda, Tambacounda, and Diourbel), achieving the following results:

- Conducted two launching ceremonies of the SMC campaign in Kédougou and Kolda and 568 community members oriented on the benefits of SMC;
- Produced 1,680 communication broadcasts in the local languages and 61 radio spots reaching approximately 937,000 people;
- Conducted 9,226 home visits, reaching 15,496 people, including 8,924 women;

- Conducted 83 sensitization caravans, reaching approximately 80,012 people, as well as 52 community dialogues, reaching 648 people, including 181 women;
- Engaged 356 criers (neighborhood mobilizers) to raise awareness about SMC;
- Promoted advocacy with authorities and leaders; and
- Procured and delivered SMC management and communication tools: 17,878 bags; 430 banners; 3,900 posters; 61,363 t-shirts; 61,363 caps; 1,348 polo shirts; 4,550 scarfs; 2,452 *relais* (relay) training guides; 2,091 methodological guides; 16,454 aide memoires of the relais; and 1,170,991 SMC cards)

IRS: PMI supported IRS SBC activities, including advocacy, community meetings, focus group discussions, home visits, social mobilization efforts, and radio broadcasts. With PMI support, community mobilizers reached 217,505 people through door-to-door visits during and after the IRS campaign with communication messaging in the four IRS-targeted districts.

Case management: Prompt and early care-seeking continue to be affected by sociocultural behaviors. Additionally, limited access to health facilities in rural areas often causes people to seek traditional methods of treatment first. Trained malaria workers at the health-facility and community level represent a priority SBC intervention for improved case management. PMI supports the training of community health relais and the reorientation of health workers on proper case management and attitudes toward prompt care seeking and treatment.

Additionally, PMI supports NMCP in the development of Senegal's National Malaria SBC Strategy, which promotes the successful implementation of the 2021–2025 National Strategic Plan and the new Malaria Elimination Acceleration Plan 2023–2025.

6.3. Plans and Justification with FY 2024 Funding

The FY 2024 funding tables contain a full list of SBC activities that PMI proposes to support in Senegal.

Malaria in Senegal remains unequally distributed among regions, with pronounced disparities among districts, particularly in the three regions of particular concern: Kolda, Kédougou, and Tambacounda, which carry the bulk of the country's malaria burden. With FY 2024 funds, PMI support for SBC will continue to focus mainly on regions with high malaria burdens, with an integrated package of activities aimed at increasing uptake and utilization of core malaria interventions (ITN, SMC, and MIP) and treatment services (early care seeking and access to RDTs and ACTs).

Additionally, with the implementation of PBO and dual-AI nets, SBC activities to strengthen the use of ITNs and highlight the added value of PBO/dual-AI nets will be reinforced in districts where these new ITNs will be distributed. Channels of communication will include mass media through radio and television and interpersonal communication through community-based organizations working with CHWs.

Priorities

While PMI supports SBC activities that promote the uptake and maintenance of all key malaria interventions, the following three behaviors will be prioritized with FY 2024 funds: (1) low uptake of IPTp3; (2) low ITN use and poor care of ITNs; and (3) delayed care seeking (see table 4).

Table 4. Priority Behaviors to Address

Behavior	Target Population	Geographic Focus	Programming to Address Behavior
Low uptake of IPTp3	Pregnant women and heads of households	Kolda, Diourbel, Kédougou, Tambacound, and Sédhiou	PMI plans to target regions experiencing high malaria burdens with SBC combined with mobile outreach at the community level to increase IPTp3 coverage to the national target of 80 percent.
Low ITN use and poor care of ITNs	Entire population but with a particular emphasis on pregnant women and caregivers of children under five years of age	All regions	Specific communication will include information about the new types of nets, and use of nets will be reinforced to ensure optimal impact of PMI's investment. SBC messages will focus on proper usage and care.
Delayed care seeking	Entire population	All regions	PMI plans to intensify support to promote early care-seeking behavior to avert severe cases in both elimination and control settings. The type of SBC activities around care seeking will be context-specific for elimination and control settings.

Additional Support Activities

PMI also plans to provide additional SBC support activities at the community and operational level, including:

- Coordinating at the national level with the mapping of SBC activities in collaboration with the Global Fund and other stakeholders;
- Supporting NMCP at the regional and district level for SBC messaging and advocacy during special events such as SMC campaigns, ITN distribution campaigns, and World Malaria Day;
- Increasing in district-specific technical assistance for SBC activities; and
- Procuring communication tools and technical support for the design of SBC materials.

8. Surveillance, Monitoring, and Evaluation

8.1. PMI Goal and Strategic Approach

In Senegal, PMI collaborates with NMCP, the Global Fund, and partners supported by the Bill & Melinda Gates Foundation to provide technical assistance and resources for SM&E activities. The NMCP objective for SM&E is to ensure 100 percent prompt and complete routine reporting at all levels and use of data for SM&E of the 2021–2025 Strategic Plan. To achieve this objective, NMCP will focus on strengthening SM&E capacity and continue to focus on strengthening the routine information system at the national, regional, district, facility, and community level. Progress was made in 2021 with an improvement in data completeness from 95.7 to 97.8 percent, representing an increase of 2 percentage points. The NMCP will continue to work closely with the Division of Social and Health Information Systems (*Division du Système d'Information et des Statistiques Sanitaires*, DSISS) to ensure rapid data transmission and update to the HMIS as soon as the ongoing strike, which started in 2022, is lifted. Additionally, NMCP and the DSISS will continue to fully integrate NMCP's parallel malaria reporting system into the national HMIS that uses the District Health Information Software 2 (DHIS2) platform, and work with the MOH to improve the quality of the malaria data.

As Senegal pushes toward elimination, the stated objectives of NMCP regarding surveillance are to: (1) detect 100 percent of epidemics and emergencies within one week with an early warning system; (2) control 100 percent of epidemics and emergencies within one week of detection; and (3) monitor vector resistance to insecticides.

Senegal's approach to achieving these objectives is to continue to strengthen its surveillance system as it works toward elimination; PMI supports 17 of the selected 37 health districts for case-based surveillance by NMCP. Senegal's strategy is to support the following:

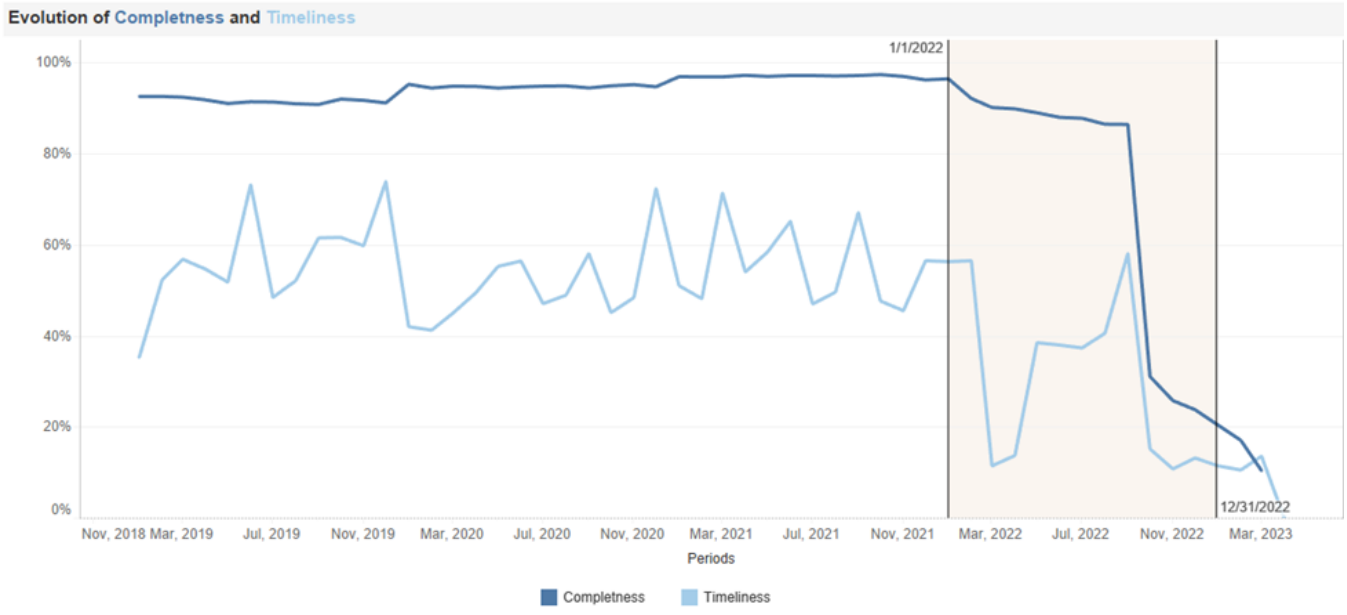
- Reporting from epidemic surveillance sites of all data on a weekly basis and an analysis of data to identify areas of concern;
- Introduction of mobile health system to facilitate data reporting at the community level and reporting of weekly case counts;
- Supervision of health facilities and CHWs, using tablet computers to streamline analysis and feedback;
- Strengthening epidemic prediction and detection and community-based surveillance.
- Strengthening the documentation of index cases and the investigation of cases and epidemic situations; and
- Strengthening entomological surveillance and monitoring the effectiveness of insecticides.

PMI continues to support key data collection and analysis activities, including continued collaboration with the DSISS and NMCP to increase the use of the HMIS in DHIS2. The NMCP continues to evaluate the completeness and timeliness of data and to perform data quality checks through quarterly reviews at the district level and onsite verification with supervision by the DSISS and the MOH. In the KKT areas and two districts in Diourbel region, PMI is strengthening support at the operational and central levels and prioritizes the districts with the most deficiencies and inconsistencies based on quarterly regional reviews. PMI will continue to support capacity strengthening through the malariology and SM&E courses and through continued supervision and data quality improvement at the central, regional, and district level.

8.2. Recent Progress (April 2022–March 2023)

The progress in data quality, completion, and ultimately the malaria program cannot be properly measured over the past year due to the health worker strike in 2022 and the resulting interruption of data transmission into the national HMIS. Since the last quarter of CY 2022, the health worker strike, accompanied by the discontinuation of data reporting, caused malaria data completeness to drop to 74.3 percent, representing a decrease of 23.5 percentage points compared with 2021. While data are currently being collected by health workers in facility registers, they have not been submitted to the national HMIS system.

Figure 5. Data Completeness and Timeliness in Senegal, 2019–2023



Due to the current interruption in data reporting, 2021 data were used to develop the FY 2024 MOP rather than the 2022 figures. While the support for SM&E activities will continue, discussions are underway between NMCP and the DSISS to effectively and efficiently support the update and data transmission into the national HMIS once the health worker strike is resolved.

Central Level

- Continued discussions and follow up between NMCP and DSISS on the transmission of data into the HMIS as soon as the health worker strike is lifted.
- Continued support for weekly reporting from sentinel sites until the data strike began in late 2022 as well as routine HMIS data collection. Continued efforts to improve data completeness at the national level until the data strike began.

Regional/District/Community Level

- Continued support for the inclusion of data from the private sector, resulting in an increase in private sector data completeness of the structures currently in the HMIS from 95.7 to 97.8 percent.
- Supported case investigations/response and training of health staff in investigation procedures in pre-elimination zones with incidence of fewer than 5 cases per 1,000 people.
- Improved the completeness of community-level data from 86.1 to 99.0 percent.

8.3. Plans and Justification with FY 2024 Funding

The FY 2024 funding tables contain a full list of SM&E activities that PMI proposes to support in Senegal.

With FY 2024 funding, PMI will contribute to the implementation of the Malaria Indicator Survey in 2025. As there may also be a continuous Demographic and Health Survey (cDHS) planned for that year, NMCP will be in close discussions with PMI to consider the possibility of combining the two surveys if the timing overlaps. The cDHS is an annual survey implemented by the National Statistics and Demographic Agency since 2012. The current plan is to perform the cDHS every two years. PMI will continue to support the improvement of data collection and quality at the district, facility, and community level, and will support peer supervision and training through the malaria surveillance, monitoring, and evaluation course.

Historically, IDB was a major funding partner for elimination activities implemented in Senegal, with PMI providing strategic and focused support in select northern regions. With the return of IDB funding in Senegal and the intent to use those funds for elimination activities, PMI will refocus its support for case investigations and response in four regions: Louga, Matam, Saint-Louis, and Ziguinchor. IDB will support the other districts that have been selected by NMCP for pre-elimination activities in Diourbel, Fatick, and Thies regions. PMI support includes the operational costs of case investigations and the retraining (or initial training) of

health workers and CHWs to perform these investigations, including weekly reporting into the HMIS. Senegal is withdrawing focal test-and-treat as a response to malaria cases investigated in elimination zones and, beginning in August 2022, only focal drug administration has been used as drug-based response.

Table 5. Available Malaria Surveillance Sources

Source	Data Collection Activity	2020	2021	2022	2023	2024	2025
Household surveys	Demographic Health Survey				P		P
Household surveys	Malaria Indicator Survey	X[2]	X[2]				P
Health facility surveys	Service provision assessment				P		P
Malaria surveillance and routine system support	Therapeutic efficacy studies	X	X	X	X	P	P
Malaria surveillance and routine system support	Support to HMIS	X	X	X	X	P	P
Malaria surveillance and routine system support	Support to integrated disease surveillance and response	X[1]	X[1]	X[1]	X[1]	P[1]	P[1]
Malaria surveillance and routine system support	Electronic Logistics Management Information System (eLMIS)						
Malaria surveillance and routine system support	Malaria Rapid Reporting System	X	X	X	X	P	P
Other	Malaria Case-based Surveillance and Response System (DHIS2 Tracker)	X[1]	X[1]	X[1]	X[1]	P[1]	P[1]
Other	End-user verification	X	X	X	X	P	P
Other	School-Based Malaria Survey						
Other	Knowledge, Attitudes and Practices Survey, Malaria Behavior Survey						
Other	Malaria Impact Evaluation						
Other	Entomologic monitoring surveys	X	X	X	X	P	P

[1] Non-PMI funded activities; [2] The single Malaria Indicator Survey survey was implemented in winter 2020–2021;
X: completed activities; P: planned activities..

9. Operational Research and Program Evaluation

9.1. PMI Goal and Strategic Approach

There is one OR-related objective in the updated Senegal National Malaria Strategic Plan 2021–2025:

- Increase from 26 to 60 percent (execution of planned activities) the promotion and implementation of OR activities.

The NSP states that the OR objective is to guide the implementation of the strategic plan and provide evidence for innovative initiatives. Three interventions are related to this specific objective: (1) promotion of operational research; (2) development of OR topics of national interest; and (3) implementation of OR topics of national interest.

As described in the NSP, to promote operational research at all levels, NMCP, in collaboration with the Research and Training Committee of the CCPLP, will identify OR needs on an annual basis. Proposals for the various OR projects will be developed by local research partners and submitted to the CCPLP Committee for Research and Training for validation. The priorities outlined in the OR will form the basis for resource mobilization. The implementation of such projects will ensure efficiency in decision making. A framework for sharing malaria research results will be used to improve coordination, including organizing annual workshops to share research results on malaria. The Global Fund and PMI are supporting the operational costs for the CCPLP and annual scientific workshops.

In Senegal, PMI funds program- and policy-relevant OR and program evaluation (PE) activities proposed by NMCP. In-country or headquarters-based PMI staff participate as co-investigators in specific OR/PE activities (usually those funded by PMI), and the PMI in-country team participates actively in the CCPLP. In addition, PMI resident advisors and malaria specialists participate as lecturers in training modules on operational research as part of the malariology training course organized by NMCP and as guest lecturers at national universities when requested.

9.2. Recent Progress (April 2022–March 2023)

Study: Mass drug administration with DP and low-dose primaquine to reduce malaria in a moderate-low transmission setting in Senegal: A cluster randomized controlled trial (core-funded).

Objective: To determine the effect of three rounds of MDA with DP and low-dose primaquine on village-level-confirmed malaria case incidence compared with standard of care SMC when provided in the context of optimized control (proactive community case management + PBO nets).

- Completion of data collection of 2022 village-level malaria incidence data to analyze primary outcome.
    - MDA was associated with a 53 percent [95 percent CI: 29 percent, 69 percent] greater reduction in malaria incidence in all ages compared with standard of care, which included SMC.
    - Although a substantial incidence reduction was seen in the intervention year, it was not sustained in the year after MDA.
- Ongoing serological and molecular characterization of parasite prevalence, drug resistance, and parasite diversity.
- Ongoing costing exercise to evaluate the cost-effectiveness of MDA compared with SMC.
- One abstract submitted to the American Society of Tropical Medicine and Hygiene 2023 (sustained impact of time-limited MDA one year after implementation).
- Dissemination workshop held at the central level with participation of the research consortium, NMCP, and PMI (February 2023).

Study: Framework to assess and remediate barriers to care seeking for febrile illness in Senegal.

Objective: To assess the care-seeking behavior and management of febrile illness as they relate to malaria case management in four prioritized districts in the northern, central, and southeastern regions of Senegal and in the Dakar region.

- The study is being implemented by PMI Insights and the local research group UCAD.
- The study has been approved by PATH's institutional review board in April 2023 to begin data collection.
- PMI Insights provided feedback to UCAD on training materials, data collection tools, and standard operating procedures.
- The UCAD team met with PMI Insights to review the data analysis plan and prepare an outline.
- The first round data collection (during the low transmission season) was completed at the end of May 2023.
- UCAD will meet with PMI and NMCP in July to present key findings and analyses ahead of preparations for their second round of data collection in November (during the high transmission period).

Study: Evaluation of an integrated package of interventions to reduce the burden of malaria among children in urban *daaras* in Senegal.

Objective: To evaluate the effectiveness of tailored vector control, strengthened case management, extended chemoprevention, and SBC to reduce malaria compared with standard of care among students in *daaras* in Touba, Senegal.

- Co-creation workshop with research consortia, NMCP, and PMI to define the challenge of urban malaria and identify research priorities (preliminary discussions in September 2022, with workshop in June 2023) to be addressed with this study.
    - Identification of target population (students in *daaras*) and site (Touba).
    - Discussion of possible vector control interventions to be included.
- Expression of interest from the research consortia members (November 2022).
- Concept note development (February 2023) and submission to PMI for approval.

Table 6. PMI-Funded Operational Research/Program Evaluation Studies in Senegal

Recently Completed OR/PE Studies	**Status of Dissemination**	**Start Date**	**End Date**
Mass drug administration with DP and low-dose primaquine to reduce malaria in a moderate to low transmission setting in Senegal: A cluster randomized controlled trial (core-funded)	Results shared with stakeholders at the central level in February 2023; district level dissemination planned for June 2023; manuscripts and final report under development	October 2020	June 2023
Ongoing or Planned OR/PE Studies	**Status**	**Start Date**	**End Date**
Framework to assess and remediate barriers to care-seeking for febrile illness in Senegal (formative research)	Protocol approved by institutional review boards; site data collection initiated in May 2023	March 2023	January 2024
Evaluation of an integrated package of interventions to reduce the burden of malaria among children in urban Daaras in Senegal	Concept note submitted to PMI for approval; protocol design workshop planned for June 2023	Spring 2023	Fall 2024
Evaluation of the Malariology and Malaria SM&E courses	Concept note under development	Fall 2023	Spring 2024

OR: operational research; PE: program evaluation; SM&E: surveillance, monitoring, and evaluation.

Table 7. Non-PMI-Funded Operational Research/Program Evaluation Studies Planned/Ongoing in Senegal

Source of Funding	Implementing institution	Research Question/Topic	Status/ Timeline
Ministry of Higher Education, Research and Innovation	UCAD/Department Medical Parasitology	Factors associated with anemia among pregnant women living in areas with reduced malaria transmission in Senegal	2022–2023
UCAD	UCAD/Department Medical Parasitology	Malaria burden among adolescents living in areas with persistent transmission in Senegal	2020–2023
Bill & Melinda Gates Foundation	UCAD/CIGASS, Harvard University, Broad Institute, IDM, MOH/NMCP	Integrating genomic data into surveillance and decision making strategy; malaria molecular surveillance in Senegal	2023–2026
World Health Organization	MOH/NMCP, PATH/MACEPA	Project 1.7 in Saraya District: Community-based testing and treatment response to malaria	2022–2023
UK Research and Innovation	Thies University, MOH/NMCP, MOH/NTD, London School of Hygiene & Tropical Medicine	Investigating the feasibility and effectiveness of integrating helminth control with SMC in Senegalese children (Kedougou)	Initiated in January 2021 Completed in May 2023
Sanofi	Thies University, MOH/NMCP	Identification of strategies for a significant, rapid, and sustainable reduction of the malaria burden in the regions of Kolda, Kédougou, and Tambacounda (red zone)	Initiated in 2022
Bill & Melinda Gates Foundation	MOH/NMCP, University of Ghana, UCAD	Opportunity cost analysis of SMC in Burkina Faso, Mali, and Senegal. (SMCplus)	Initiated in 2022
Organisation pour la Mise en Valeur du Fleuve Sénégal (OMVS)	UCAD/Department of Medical Parasitology	Malaria Indicator Surveys in the Senegal River Bassin: Senegal, Mali, Guinea, and Mauritania	2023
IRD	IRD and UCAD	Malaria longitudinal surveillance in Dielmo and Ndiop villages (Sine Saloum)	Ongoing in 2023
IRD	IRD and Institut Pasteur de Dakar	*Plasmodium vivax* surveillance in Kedougou	Ongoing in 2023

Source of Funding	Implementing institution	Research Question/Topic	Status/ Timeline
European and Developing Countries Clinical Trials Partnership (EDCTP)	Thies University, Medicines for Malaria Venture, WHO/The Special Programme for Research and Training in Tropical Diseases, London School of Hygiene & Tropical Medicine	OPT SMC: Optimizing SMC in west and central Africa	Initiated May 2020
Bill & Melinda Gates Foundation	Thies University, University of Ghana	West African Mathematical Modelling Capacity Development Consortium	2022–2025

MOH: Ministry of Health; UCAD: *Université Cheikh Anta Diop*; WHO: World Health Organization.

8.3. Plans and Justification with FY 2024 Funding

The FY 2024 funding tables contain a full list of OR/PE activities that PMI proposes to support in Senegal.

No OR/PE activities are proposed with FY 2024 funding.

10. Capacity Strengthening

9.1. PMI Goal and Strategic Approach

PMI supports many of the priority areas presented in the Senegal 2021–2025 NSP and the 2023–2025 Elimination Acceleration Plan, with a particular focus on capacity strengthening for NMCP and operational-level actors, promoting stronger coordination among partners, and decentralization. PMI also supports the elimination devolution plan for the northern regions of Louga, Matam, and Saint-Louis.

9.2. Recent Progress (April 2022–March 2023)

PMI supported the following activities:

- Organized the first-ever team-building workshop for 50 NMCP staff, covering key topics such as work environment, conflict management, leadership, management, and collaboration. Through this exercise, NMCP staff identified their team's strengths and areas for improvement. They developed actionable recommendations at the end of the workshop to improve the working environment of NMCP.
- Provided the following capacity strengthening support to NMCP:
    - Supported two CCPLP meetings, which brought together NMCP staff, in-country partners, the Global Fund, PMI, WHO, and other partners to discuss and guide NMCP, as well as a subcommittee communication meeting.
    - Supported NMCP and other MOH entities in the management of the Fixed Amount Reimbursement Agreement.

    - Supported the participation of NMCP central and field level staff in international scientific and professional workshops to provide opportunities to learn best practices, share experiences, and develop networks, including the American Society of Tropical Medicine and Hygiene and the Pan African Malaria conferences.
- Continued support of local governments to include malaria and other health priorities in their development plans and increased participation of communities in decision making regarding health issues, including participatory budgeting, training of local elected officials of the health technical commissions, and promoting synergy and multisectoriality of interventions by actors in the fight against malaria at the institutional and territorial level. Conducted 12 workshops (3 per region) focused on local elected authorities in the regions of Kolda, Kedougou, Sedhiou and Ziguinchor, resulting in 12 engagements from mayors to include malaria activities in their local development plans.

9.3. Plans and Justification with FY 2024 Funding

The FY 2024 funding tables contain a full list of capacity strengthening activities that PMI proposes to support in Senegal.

Senegal will continue to support capacity strengthening activities as described in the recent progress section, with no major shifts.

11. Staffing and Administration

A minimum of three health professionals oversee PMI in Senegal. The single interagency team led by the USAID Mission Director or their designee consists of a Resident Advisor representing USAID, an 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	2023	2024	2025
Total country population	18,275,743	18,818,198	19,390,727
Total population at risk for malaria	18,275,743	18,818,198	19,390,727
PMI-targeted at-risk population	18,275,743	18,818,198	19,390,727
Population targeted for ITNs	18,275,743	18,818,198	19,390,727
Continuous distribution needs			
Channel 1: ANC	533,652	583,835	636,985
Channel 1: ANC type of ITN	Dual AI	Dual AI	Dual AI
Channel 2: EPI	223,476	233,634	243,792
Channel 2: EPI type of ITN	Dual AI	Dual AI	Dual AI
Channel 3: School (modern and *daaras*)	17,873	18,743	29,953
Channel 3: School type of ITN	Dual AI	Dual AI	Dual AI
Channel 4: Community	257,186	268,876	280,566
Channel 4: Community type of ITN	Dual AI	Dual AI	Dual AI
Channel 5: Health facility	595,986	623,076	650,166
Channel 5: Type of ITN	Dual AI	Dual AI	Dual AI
Estimated total need for continuous channels	1,628,172	1,728,163	1,841,462
Mass campaign distribution needs			
Mass distribution campaigns			2,744,693
Mass distribution ITN type			Dual AI
Estimated total need for campaigns	0	0	2,744,693
Total ITN need: Continuous and campaign	**1,628,172**	**1,728,163**	**4,586,155**
Partner contributions			
ITNs carried over from previous year	644,000	548,815	0
ITNs from government	0	0	0
Type of ITNs from government			
ITNs from Global Fund			2,744,700
Type of ITNs from Global Fund			Dual AI

ITNs from other donors (BID)		200,000	1,000,000
Type of ITNs from other donors		Dual AI	Dual AI
ITNs planned with PMI funding	1,532,987	979,348	676,925
Type of ITNs with PMI funding	Dual AI	Dual AI	Dual AI
Total ITNs contribution per calendar year	**2,176,987**	**1,728,163**	**4,421,625**
Total ITN surplus (gap)	**548,815**	**0**	**(164,529)**

Table A-2. RDT Gap Analysis Table

Calendar Year	2023	2024	2025
Total country population	18,275,743	18,818,198	19,390,727
Population at risk for malaria	18,275,743	18,818,198	19,390,727
PMI-targeted at-risk population	18,275,743	18,818,198	19,390,727
RDT needs			
Total number of projected suspected malaria cases	2,860,000	2,920,000	2,980,000
Percent of suspected malaria cases tested with an RDT	100%	100%	100%
RDT needs (tests)	4,184,180	4,143,480	4,064,720
Needs estimated based on a combination of HMIS and consumption data			
Partner contributions (tests)			
RDTs from government	0	0	0
RDTs from Global Fund	0	0	0
RDTs from other donors	0	0	0
RDTs planned with PMI funding	4,092,500	5,020,000	4,039,535
Total RDT contributions per calendar year	**4,092,500**	**5,020,000**	**4,039,535**
Stock balance (tests)			
Beginning balance	256,525	164,845	1,041,365
- Product need	4,184,180	4,143,480	4,064,720
+ Total contributions (received/expected)	4,092,500	5,020,000	4,039,535
Ending balance	**164,845**	**1,041,365**	**1,016,180**
Desired end of year stock (months of stock)	3	3	3
Desired end of year stock (quantities)	1,046,045	1,035,870	1,016,180
Total surplus (gap)	**(881,200)**	**5,495**	**(0)**

Table A-3. ACT Gap Analysis Table

Calendar Year	2023	2024	2025
Total country population	18,275,743	18,818,198	19,390,727
Population at risk for malaria	18,275,743	18,818,198	19,390,727
PMI-targeted at-risk population	18,275,743	18,818,198	19,390,727
ACT needs			
Total projected number of malaria cases	836,836	787,261	731,650
Total ACT needs (treatments)	**836,836**	**787,261**	**731,650**
Needs estimated based on a combination of HMIS and consumption data			
Partner contributions (treatments)			
ACTs from government	0	0	0
ACTs from Global Fund	0	0	0
ACTs from other donors	0	0	0
ACTs planned with PMI funding	1,193,677	630,000	690,355
Total ACTs contributions per calendar year	**1,193,677**	**630,000**	**690,355**
Stock balance (treatments)			
Beginning balance	38,106	394,947	237,686
- Product need	836,836	787,261	731,650
+ Total contributions (received/expected)	1,193,677	630,000	690,355
Ending balance	**394,947**	**237,686**	**196,391**
Desired end of year stock (months of stock)	3	3	3
Desired end of year stock (quantities)	209,209	196,815	182,912
Total surplus (gap)	**185,738**	**40,870**	**13,479**

Table A-4. Inj. Artesunate Gap Analysis Table

Calendar Year	2023	2024	2025
Injectable artesunate needs			
Projected number of severe cases	12,648	12,548	12,448
Projected number of severe cases among children	2,760	2,710	2,660
Average number of vials required for severe cases among children	6.60	6.60	6.60
Projected number of severe cases among adults	9,838	9,788	9,738
Average number of vials required for severe cases among adults	13.20	13.20	13.20
Total injectable artesunate needs (vials)	**148,078**	**161,796**	**160,707**
Needs estimated based on HMIS data			
Partner contributions (vials)			
Injectable artesunate from government	0	0	0
Injectable artesunate from Global Fund	0	0	0
Injectable artesunate from other donors	0	0	0
Injectable artesunate planned with PMI funding	219,926	155,360	133,000
Total injectable artesunate contributions per calendar year	**219,926**	**155,360**	**133,000**
Stock balance (vials)			
Beginning balance	2,472	74,320	67,884
- Product need	148,078	161,796	160,707
+ Total contributions (received/expected)	219,926	155,360	133,000
Ending balance	**74,320**	**67,884**	**40,177**
Desired end of year stock (months of stock)	3	3	3
Desired end of year stock (quantities)	37,019	40,449	40,177
Total surplus (gap)	**37,301**	**27,435**	**(0)**

Table A-5. RAS Gap Analysis Table

Calendar Year	2023	2024	2025
Artesunate suppository needs			
Number of severe cases expected to require prereferral dose (or expected to require prereferral dose based on number of providers for the service)	8,400	8,700	9,000
Total artesunate suppository needs (suppositories)	**27,720**	**28,710**	**29,700**
Needs estimated based on number of providers offering prereferral services			
Partner contributions (suppositories)			
Artesunate suppositories from government			
Artesunate suppositories from Global Fund			
Artesunate suppositories from other donors			
Artesunate suppositories planned with PMI funding		28,710	29,700
Total artesunate suppositories available	**0**	**28,710**	**29,700**
Stock balance (suppositories)			
Beginning balance	30,000	2,280	2,280
- Product need	27,720	28,710	29,700
+ Total contributions (received/expected)	0	28,710	29,700
Ending balance	**2,280**	**2,280**	**2,280**
Desired end of year stock (months of stock)	3	3	3
Desired End of year stock (quantities)	6,930	7,178	7,425
Total surplus (gap)	**(4,650)**	**(4,898)**	**(5,145)**

Table A-6. SP Gap Analysis Table

Calendar Year	2023	2024	2025
Total country population	18,275,743	18,818,198	19,390,727
Total population at risk for malaria	18,275,743	18,818,198	19,390,727
PMI targeted at risk population	18,275,743	18,818,198	19,390,727
SP needs			
Total number of pregnant women	667,065	686,864	707,762
Percent of pregnant women expected to receive IPTp1	92%	97%	99%
Percent of pregnant women expected to receive IPTp2	85%	90%	92%
Percent of pregnant women expected to receive IPTp3	70%	75%	80%
Percent of pregnant women expected to receive IPTp4	34%	39%	40%
Total SP needs (doses)	**1,874,452**	**2,067,461**	**2,201,138**
Needs estimated based on HMIS data			
Partner contributions (doses)			
SP from government	0	2,067,461	2,201,138
SP from Global Fund	1,540,950	0	0
SP from other donors	0	0	0
SP planned with PMI funding	0	0	0
Total SP contributions per calendar year	**1,540,950**	**2,067,461**	**2,201,138**
Stock balance (doses)			
Beginning balance	404,207	70,705	70,705
- Product need	1,874,452	2,067,461	2,201,138
+ Total contributions (received/expected)	1,540,950	2,067,461	2,201,138
Ending balance	**70,705**	**70,705**	**70,705**
Desired end of year stock (months of stock)	3	3	3
Desired end of year stock (quantities)	468,613	516,865	550,285
Total surplus (gap)	**(397,907)**	**(446,160)**	**(479,580)**

Table A-7. Primaquine Gap Analysis Table

Calendar Year	2023	2024	2025
Total country population	18,275,743	18,818,198	19,390,727
Total population at risk for malaria	18,275,743	18,818,198	19,390,727
PMI-targeted at-risk population	18,275,743	18,818,198	19,390,727
Primaquine needs			
Total projected number of malaria cases	836,836	787,261	731,650
Total projected number of Pf cases (in relevant districts—see to the right)	63,000	65,100	67,200
Total projected number of Pv cases	0	0	0
Total projected number of mixed cases (Pf + Pv)	63,000	65,100	67,200
Total primaquine needs (tablets)	**119,700**	**123,690**	**127,680**
Needs estimated based on a combination of HMIS and consumption data			
Partner contributions (tablets)			
Primaquine from government	0		
Primaquine from Global Fund	0		
Primaquine from other donors (BID)	200,000	30,000	30,000
Primaquine planned with PMI funding	0	15,000	95,000
Total primaquine contributions per calendar year	200,000	45,000	125,000
Stock balance (tablets)			
Beginning balance	119,800	200,100	121,410
- Product need	119,700	123,690	127,680
+ Total contributions (received/expected)	200,000	45,000	125,000
Ending balance	**200,100**	**121,410**	**118,730**
Desired end of year stock (months of stock)	3	3	3
Desired end of year stock (quantities)	29,925	30,923	31,920
Total surplus (gap)	**170,175**	**90,488**	**86,810**