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Côte d'Ivoire

Malaria Operational Plan FY 2023

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

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

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ABBREVIATIONS

ACT	Artemisinin-based Combination Therapy
AI	Active Ingredient
AL	Artemether-Lumefantrine
ANC	Antenatal Care
ASAQ	Artesunate-Amodiaquine
CDC	Centers for Disease Control and Prevention
CHW	Community Health Workers
CMS	Central Medical Store
CY	Calendar Year
DHIS2	District Health Information System 2
DHS	Demographic and Health Survey
DSC	Directorate of Community Health
eLMIS	Electronic Logistics Management Information System
EPI	Expanded Program Immunization
EUV	End-Use Verification
FY	Fiscal Year
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
HF	Health Facility
iCCM	Integrated Community Case Management
IPC	Interpersonal Communication
IPTp	Intermittent Preventive Treatment for Pregnant Women
IRS	Indoor Residual Spraying
ITN	Insecticide-treated Mosquito Net
LMIS	Logistics Management Information System
MBS	Malaria Behavior Survey
MICS	Multiple Indicator Cluster Survey
MIP	Malaria in Pregnancy
MOH	Ministry of Health
MOP	Malaria Operational Plan
NGO	Non-governmental Organization
NMCP	National Malaria Control Program
NMSP	National Malaria Strategic Plan
OR	Operational Research
OTSS+	On-Site Training and Supportive Supervision
PBO	Piperonyl Butoxide
PE	Program Evaluation
PMI	U.S. President's Malaria Initiative
RASS	*Rapport Annuel de la Situation Sanitaire*

RDT	Rapid Diagnostic Test
RDQA	Routine Data Quality Assessment
SBC	Social and Behavior Change
SM&E	Surveillance, Monitoring, and Evaluation
SMC	Seasonal Malaria Chemoprevention
SP	Sulfadoxine-Pyrimethamine
TA	Technical Assistance
TES	Therapeutic Efficacy Study
TWG	Technical Working Group
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

EXECUTIVE SUMMARY

To review specific country context for Côte d'Ivoire, please refer to the country malaria profile located on the U.S. President's Malaria Initiative's (PMI's) country team landing page, which provides an overview of the country malaria situation, key indicators, the National Malaria Control Program (NMCP) strategic plan, and the partner landscape.

U.S. President's Malaria Initiative

Launched in 2005, PMI supports implementation of malaria prevention and treatment measures as well as cross-cutting interventions. PMI's 2021–2026 strategy, *End Malaria Faster*, envisions a world free of malaria within our generation with the goal of preventing malaria cases, reducing malaria deaths and illness, and eliminating malaria in PMI partner countries. PMI currently supports 24 countries in sub-Saharan Africa and three programs across the Greater Mekong Subregion in Southeast Asia to control and eliminate malaria. Côte d'Ivoire began implementation as a PMI focus country in fiscal year (FY) 2018.

Rationale for PMI's Approach in Côte d'Ivoire

Malaria continues to be a major public health problem in Côte d'Ivoire and is responsible for approximately 4.6 million confirmed cases reported in 2020 in the general population. Fourteen of the country's 113 districts have a high level of endemicity with 300 to 499 cases per 1,000 persons. The national annual incidence rate is 441 cases per 1,000 among children under five years of age and 173 cases per 1,000 persons in the general population.[1] Malaria parasite prevalence among children under five years of age, as measured by rapid diagnostic tests (RDTs), was 48 percent in 2016.[2] Côte d'Ivoire has just completed the 2021 Demographic and Health Survey (DHS). This section will be updated once preliminary or final data become available.

During the next five years, PMI support in Côte d'Ivoire will be based on the focus areas of the 2021–2026 operationalizing roadmap submitted to PMI/Washington in February 2022. The roadmap demonstrates PMI's commitments to use and enhancing distribution of the most efficacious bed nets due to widespread insecticide resistance in the country. PMI support will also focus on strengthening the community health system. Key investments include expanding integrated community case management (iCCM) activities to saturation in the 29 PMI-supported districts where iCCM is currently

[1] MSHPCMU (2020) Rapport annuel sur la situation sanitaire (RASS)
[2] MICS (2016) Malaria Parasite and Anemia Prevalence Survey.

operational and improving diagnostics and case management in the community, including on-site training and supportive supervision (OTSS+).

Overview of Planned Interventions

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

1. Vector Monitoring and Control

PMI has supported priority vector control activities from the National Malaria Strategic Plan (NMSP) since 2018. PMI's support has contributed to the generation of entomological and insecticide resistance data that allowed the NMCP to conduct a stratification of vector control interventions. As a result, PMI contributed 2.9 million piperonyl butoxide (PBO) insecticide-treated mosquito nets (ITNs) that were distributed in 11 districts in April 2021 during the mass distribution campaign. PMI also supported the second indoor residual spraying (IRS) campaign in Côte d'Ivoire, achieving 98 percent coverage and protecting 201,178 people in two districts (Nassian and Sakassou).

With FY 2023 funds, PMI will procure 366,472 PBO nets and 503,899 standard nets for routine distribution, including at the community level and for support of the ITN mass distribution campaign scheduled in 2024. PMI will also continue its support for entomological monitoring activities, including insecticide resistance and net durability studies. With PMI support, social and behavior change (SBC) activities will be intensified to promote and improve the use and care of ITNs, and to prevent their misuse.

2. Malaria in Pregnancy (MIP)

In 2020, the percentage of pregnant women receiving at least three doses of sulfadoxine-pyrimethamine (SP3) nationally was 47.3 percent. This is a small increase from the 2019 figure of 44.8 percent.[3] With FY 2023 funds, PMI will continue to support malaria services delivered during pregnancy (intermittent preventive treatment for pregnant women [IPTp] and ITNs distribution via facility and community outreach) by using a directly-observed-therapy approach. Through an advanced antenatal care (ANC) strategy at fixed posts, together with the implementation of OTSS+ and SBC interventions, many pregnant women initially lost to follow-up were successfully identified and directed to health centers to receive additional doses of SP. As a result, ANC usage and IPTp uptake were significantly increased.

[3] RASS 2020.

In addition, PMI will support the extension of the behavioral economics service provider behavior change at facilities for improving uptake of SP by increasing ANC attendance. The checklist given to service providers appears to have improved provider behavior through positive interactions and communication with pregnant women.

3. Drug-Based Prevention

Côte d'Ivoire does not yet implement SMC; therefore PMI does not support SMC or other drug-based prevention in Côte d'Ivoire. The NMCP has started data collection to assess the feasibility of SMC and to identify eligible districts. Once a decision has been made, PMI will earmark resources through reprogramming to provide support as appropriate.

4. Case Management

PMI has provided technical and financial assistance that has strengthened the national capacity in malaria case management. Under the new bilateral service delivery project, PMI has extended iCCM services from 22 to 29 districts. In addition to supplying commodities needed for malaria diagnosis and treatment, PMI is supporting the development of a skilled domestic work force through various trainings: 2,173 health care providers were trained on the national guidelines for malaria case management; 1,932 community health workers (CHWs) were trained on iCCM; and 67 biotechnologists were trained on microscopic diagnosis of malaria. The preliminary report of the PMI-supported routine therapeutic efficacy studies (TESs) to monitor for potential resistance to currently used artemisinin-based combination therapies (ACTs) is complete and will be disseminated once it is finalized. Through OTSS+, PMI supported the quality improvement of case management (at facility and community levels) and laboratory diagnosis. With FY 2023 funds, PMI will continue expanding OTSS+ as well as iCCM services to increase access to care for the population in the current target districts.

5. Health Supply Chain and Pharmaceutical Management

Through the Central Medical Store (CMS), PMI continues to support the strengthening of the supply chain through technical assistance (TA) for customs clearance, quantification, and stock monitoring, as well as through the implementation of End-Use Verification (EUV) and Malaria Commodities Management Control (ABC) surveys. During the past 12 months, commodity availability has slightly improved, although periodic stockouts, mainly for iCCM supplies, have been noted. For select malaria products, stockout rates were as follows: artemether-lumefantrine (AL) 6x4 2 percent, RDTs 2 percent, and ITNs 61 percent. The 2021 EUV Survey also showed generally high availability; the stockout rate for AL was 3.2 percent (inability to treat with AL). However, all sites participating in the survey had at least one front-line ACT available

(including artesunate amodiaquine [ASAQ]). Nearly half (48 percent) of sites were stocked with all four of the AL products (prepackaged for adults, children, young children, and infants) at the time of the survey. The stockout rates were zero for SP, PBO, and dual active ingredient (AI) nets while for RDTs only 2 percent of sites experienced stockouts. The routine lack of availability of iCCM commodities at the community level remains a major challenge in many districts. This FY 2023 MOP includes resources to continue PMI's support to the supply chain and the pharmaceutical system, using TA from both the central mechanism and the local CMS partner for last-mile distribution.

6. SBC

Based on the findings of the Malaria Behavior Survey (MBS) conducted in 2018, PMI supported the NMCP to implement the National Social and Behavior Change Communication Plan to Fight Malaria in Côte d'Ivoire (2021–2025) to develop materials and the tools for a national malaria SBC media campaign and to support community mobilization and increased IPTp uptake through a women's group–led approach and health care provider behavior change.

PMI supports the NMCP's efforts to expand mass media, community mobilization, and interpersonal communication (IPC) at the community level through formal partnerships with local media agencies, community-based organizations, and traditional and religious leaders' networks, as well as collaboration with women's groups, community action groups, and CHWs. PMI supports the NMCP's efforts to expand mass media, community mobilization and IPC at the community level. With FY 2023 resources, PMI will continue SBC capacity-building at both the national and district levels through planning, design, implementation, and monitoring and evaluation of SBC activities

7. Surveillance, Monitoring, and Evaluation (SM&E)

Routine malaria case data from health facilities (HFs) and CHWs are reported to the NMCP through District Health Information System 2 (DHIS2), and survey data are periodically reported in malaria indicator surveys (DHS and Multiple Indicator Cluster Survey [MICS]). In addition, the NMCP collects parasitological data through regularly occurring TESs to monitor for potential resistance to ACTs and SP. Entomological data are collected regularly at sentinel sites by entomology institutes.

PMI has supported the training of 25 managers on SM&E and district staff on data quality and use. The SM&E plan also covers activities aimed at improving data quality, including supervision, on-site coaching, and malaria Routine Data Quality Assessment (RDQA).

With FY 2023 funds, PMI will continue to assist the NMCP to improve data quality and use through dedicated TA at the national, regional, and district levels to achieve these goals.

8. Operational Research (OR) and Program Evaluation (PE)

PMI has not funded any OR/PE since Côte d'Ivoire became a PMI focus country in 2018, due to funding constraints and programmatic priorities. Previous OR/PE activities conducted by the NMCP were supported by the Global Fund to Fight AIDS, Tuberculosis and Malaria. The NMCP is currently conducting an impact evaluation funded by the Global Fund as part of a multi-country OR activity. This activity is scheduled to be completed in calendar year (CY) 2022.

PMI recently convened a meeting with the NMCP along with academic and local research institutions to discuss potential OR/PE activities in the future. Several topics that will contribute to reducing the burden of malaria in the community and saving lives in Côte d'Ivoire are continuing to be proposed. PMI will continue to support this forum to enable the NMCP to select and prioritize pertinent OR activities to be funded by PMI.

9. Capacity Strengthening

PMI recently supported an assessment of the NMCP's management capacities, which led to the development of a detailed action plan aimed at strengthening the technical and coordination capacities of the NMCP. An additional needs assessment of competencies will be conducted to guide the development of a TA plan to improve NMCP's coordination abilities.

Based on the previous assessment of national entomological research institutes' capacities, PMI provided institutional support to three entomological institutions (*Institut National d'Hygiène Publique*, *Centre d'Entomologie Médicale et Vétérinaire*, and *Institut Pierre Richet).* PMI will continue to provide entomological support through the entomological division.

Additionally, PMI will continue investing in programmatic capacity-building activities through trainings such as a malariology course; SM&E course; and leadership and management training in order to address challenges and achieve the objectives of the NMSP 2021–2025.

I. CONTEXT AND STRATEGY

1. Introduction

Côte d'Ivoire began implementation as a U.S. President's Malaria Initiative (PMI) focus country in fiscal year (FY) 2018. This FY 2023 Malaria Operational Plan (MOP) presents a detailed implementation plan for Côte d'Ivoire based on the strategies of PMI and the National Malaria Control Program (NMCP). It was developed in consultation with the NMCP and with the participation of national and international partners. The activities that PMI are proposing build on investments made by partners to improve and expand malaria-related services, including the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund). This document provides an overview of the strategies and interventions in Côte d'Ivoire, describes progress to date, identifies challenges and relevant contextual factors, and provides a description of activities planned with FY 2023 funding. For more detailed information on the country context, please refer to the Country Malaria Profile, which provides an overview of the country's malaria situation, key indicators, the NMCP strategic plan, and the partner landscape.

2. PMI

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

Under the strategy, and building upon the progress to date in PMI-supported countries, PMI will work with NMCPs and 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 front-line 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 Côte d'Ivoire

3.1. Malaria Overview for Côte d'Ivoire

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

Malaria is endemic in Côte d'Ivoire throughout the entire year, with peak transmission during the rainy seasons, between April and June, in the center of the country and, along its coastline in the north, between July and September. Malaria continues to be a major public health problem in Côte d'Ivoire and is responsible for approximately 2.3 million presumed and confirmed cases reported annually in children under five years of age. Fifty-eight of the country's 113 districts have a high level of endemicity with 300 to 499 cases per 1,000 persons. The national annual incidence rate is 441 cases per 1,000 among children under five years of age and 173 cases per 1,000 persons in the general population. Malaria parasite prevalence among children under five years of age was 48 percent as measured by rapid diagnostic tests (RDTs) in 2016.[4] At the facility level, suspected malaria cases represent the greatest volume of the total number of consultations. The percentage of suspected malaria cases has decreased from 50

[4] Malaria Parasite and Anemia Prevalence Survey 2016.

percent of all cause consultations in 2010 to 33 percent in 2014.[5] Malaria prevention and control activities face major challenges in Côte d'Ivoire, including the use of bed nets and the belief that traditional healers play important roles in case management.

3.2. Key Challenges and Contextual Factors

Recent efforts made by the government to reduce the malaria burden on the population have been associated with a significant reduction in malaria-attributable deaths; however, malaria control and prospects for elimination face major challenges in Côte d'Ivoire.

The most important among these challenges include:

- Lack of commodity availability at the last mile for service delivery. From 2019 through 2021, recurrent commodity stockouts have been noted in many districts.
- Lack of access to malaria prevention measures and quality control tools at the community level, mainly among unreached communities.
- Poor data quality in the public health facilities (HFs) as well as in private HFs.
- Inability to integrate epidemiological, entomological, and logistical data into the District Health Information System 2 (DHIS2) platform.
- Ineffective malaria prevention through the use of bed nets, mainly among the vulnerable populations.

During MOP technical discussions, the PMI team has discussed each of those challenges with the NMCP and other stakeholders, in collaboration with other Ministry of Health (MOH) divisions and other partners such as the Global Fund and United Nations Children's Fund (UNICEF), as well as potential solutions to assist in overcoming them.

PMI and other partners have been supporting the NMCP in efforts to improve data quality since the start of the initiative in Côte d'Ivoire. Efforts to date have focused on strengthening the capacity of health workers responsible for data collection to promote data completeness and accuracy at the time of entry. Despite these efforts, Côte d'Ivoire continues to face challenges submitting quality data to the integrated PMI data platform, Malaria Data Integration and Visualization for Eradication, during the past two years. Data reported in the DHIS2 platform have often been found incoherent. Although progress has recently been made in many districts, challenges for data quality improvement remain in many others. Lack of supervision from the appropriate health system officers and lack of accountability of health workers assigned to enter data have

[5] Plan National de Développement Sanitaire.

often been cited by implementing partners as the main reasons for the persistence of data quality issues.

The lack of accountability and appropriate supervision also extends to case management. Effective systems and governance to ensure that health workers are providing care according to up-to-date guidelines are lacking at both the HF and community levels.

However, the general director of health recently established a high-level monthly strategic meeting with PMI, the NMCP, and other partners such as the Global Fund, UNICEF, and the WHO. This represents an important step toward better oversight from the MOH and could advance the malaria control agenda in the country, at least in part by potentially introducing measures to increase accountability. PMI has also engaged in a closer collaboration with the Global Fund portfolio management team to find the best ways to jointly support the NMCP.

Though certain challenges exist, malaria interventions in Côte d'Ivoire are aided by a number of enabling factors. Côte d'Ivoire currently enjoys a stable political environment. Also, the declining COVID-19 pandemic enables increased access to and use of malaria services at HFs as well as at the community level.

3.3. PMI's Approach for Côte d'Ivoire

PMI's support is largely aligned with the key interventions included in the 2021–2025 National Malaria Strategic Plan (NMSP). Two notable exceptions are the inclusion of larviciding and seasonal malaria chemoprevention (SMC) in the NMSP, neither of which have been supported by PMI in Côte d'Ivoire to date. However, PMI and the NMCP are working to identify one or two eligible districts in Côte d'Ivoire to implement SMC, which is done in several neighboring countries in the region (Burkina Faso, Guinea, and Mali).

During the past two years, PMI has taken a more holistic approach toward its support to the NMCP. This consists of strengthening vector control, particularly supporting entomological monitoring to not only provide better protection from malaria infection but to also promote equity in PMI's investment. However, due to high insecticide resistance in most districts both to IRS and ITNs and given the high cost of IRS operations, which only cover two districts (Sakassou and Nassian) and protect only 200,000 people, PMI and the NMCP decided to stop IRS activities in these two out of 113 districts. Instead, PMI will focus resources to provide additional effective ITNs with the goal of achieving universal ITN coverage nationally with nets that provide effective protection to the population. The decision was also made in anticipation of significant quantities of piperonyl butoxide (PBO) and dual active ingredient (AI) nets being needed, not only for the next distribution campaign scheduled for 2024, but also for routine distribution, consistent with entomological stratification data.

Also, PMI's investment through the FY 2021, FY 2022, and FY 2023 MOPs will focus on strengthening the community health system, including extending malaria services to previously underserved rural communities. In the process of developing this FY 2023 MOP, PMI and the NMCP consulted with stakeholders, such as the civil society's groups (including the network for malaria control non-governmental organizations [NGOs]), the private sector, and academics and research institutions. Through these consultations, PMI plans on supporting increased civil society participation in advocating for accelerating malaria control and elimination, enhanced collaboration between the NMCP and the for-profit private sector, and greater awareness of the importance of operations research in improving malaria programming.

PMI's theory of change assumes that all the current appropriate conditions will continue to prevail, and the Government of Côte d'Ivoire will continue its commitment to support the health system and pursue its investment in malaria control as stated in the 2021–2025 NMSP.

If key interventions selected in the 2021–2025 Côte d'Ivoire NMSP are well implemented and target populations effectively use tools for prevention and control at HFs as well as at community levels,

And NMCP is well coordinated and has the support of all stakeholders (implementing partners, stakeholders, other government institutions, other donors, communities) throughout the health system (central, regional, district, and community levels),

Then Ivorians will better understand the importance of preventing and treating malaria infections, leading to decreased malaria-attributable mortality and morbidity, thereby advancing the country toward malaria elimination as planned in the World Health Organization (WHO) technical strategy, 2016-2030.

3.4. Key Changes in This MOP

During the FY 2022 MOP discussion and given the increased insecticide resistance revealed by resistance monitoring data, PMI and the NMCP agreed to stop IRS operations in the two districts of Sakassou and Nassian, where around $2 million has been invested since FY 2020 to protect only 200,000 people. Therefore, no resources were allocated to the IRS in the FY 2022 MOP and the same decision has been confirmed during FY 2023 MOP discussions.

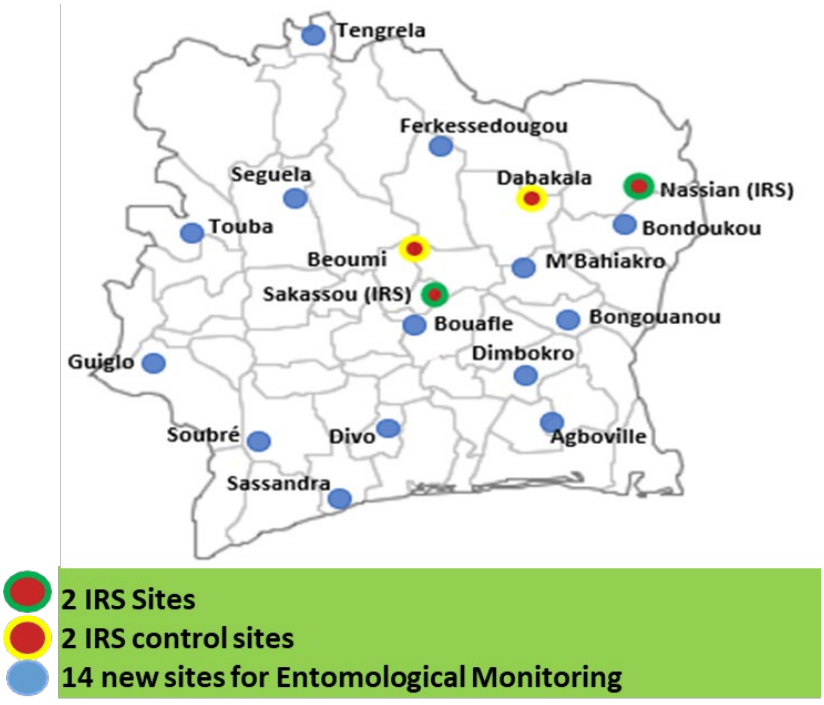
II. OPERATIONAL PLAN FOR FY 2023

1. Vector Monitoring and Control

1.1. PMI Goal and Strategic Approach

Since 2018, PMI has supported the NMCP vector control integrated strategy through insecticide susceptibility testing in 18 sites, vector bionomic studies in four sites, continuous and mass distribution of ITNs, and targeted IRS in two districts. Insecticide resistance continues to be a growing challenge in many regions of Côte d'Ivoire. To address this threat, with PMI's support the NMCP conducted a malaria stratification exercise that led to the selection of the following types of nets by district: a) deltamethrin in 75 districts, b) alpha-cypermethrin in 9 districts, c) PBO in 11 districts, and d) dual AI in 18 districts.

Figure 1. Vector Control Activities in 2022



PMI supports entomological monitoring in 18 sites, IRS implementation in 2 sites, and ITN distribution in 11 districts.

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

- Supported entomological monitoring in 18 sentinel sites in 18 health regions in collaboration with the NMCP. Monitoring activities included insecticide resistance monitoring, vector bionomics monitoring, and insecticide residual

efficacy monitoring. For more information about entomological monitoring, please refer to the 2021 Entomological Report.

- Supported activities collecting data on human-vector behavior in four sites.
- Provided technical assistance (TA) to the NMCP for entomological monitoring by supporting an entomologist/vector control specialist at the NMCP and promoting the creation of a dedicated vector control unit within the NMCP malaria prevention department. This unit will coordinate nationwide entomological monitoring activities, in accordance with WHO standards, to generate data for the NMCP and the MOH.
- Funded insectary and facility rehabilitations and procured equipment for three national entomological research institutes to support the NMCP's vector control unit.
- Supported the procurement and distribution of standard and PBO ITNs to pregnant women and children under five years of age at HFs in 45 districts and 29 communities through continuous routine distribution channels.
- Supported the evaluation of routine distribution of ITNs in two districts.
- Supported prevention of malaria in pregnancy (MIP) by providing ITNs to pregnant women at antenatal care (ANC) visits.
- Provided implementation and TA for planning the May 2021 ITN mass distribution campaign; procured and distributed 2,815,534 PBO ITNs to 5,479,980 people living in 1,017,457 households across 11 districts. The activity was in collaboration with the Global Fund and the NMCP.
- Supported ITN durability monitoring by implementing baseline data collection from October 12 to 20, 2021, and monitoring the PermaNet 3.0 and Interceptor G2 bed nets from the 2021 mass campaign cohort.
- Supported national-, facility-, and community-level SBC activities to improve demand for ITNs, increase their appropriate use, promote care, and prevent their misuse. For more information, please refer to the **SBC section** below.
- Supported the planning, implementation, and evaluation of the third (2021) and last (2022) year of IRS in two districts. The campaign covered 60,496 structures and protected 201,178 people from August 2 to September 4, 2021. For more information about the IRS campaign, please refer to the most recent End of Spray Report.
- Recruited and trained 709 seasonal workers (20 percent were women) and 32 supervisors, and engaged 882 community members in Sakassou and Nassian districts to support IRS mobilization and spray activities.

1.3. Plans and Justification for FY 2023 Funding

The FY 2023 funding tables contain a full list of vector monitoring and control activities that PMI proposes to support in Côte d'Ivoire with FY 2023 funding. Please visit

www.pmi.gov/resources/malaria-operational-plans-mops for these FY 2023 funding tables.

1.3.1. Entomological Monitoring

Côte d'Ivoire will continue to support entomological monitoring activities as described in the **Recent Progress section** above. PMI will conduct entomological monitoring in districts receiving dual AI and PBO ITNs. The data will feed into the durability monitoring and evaluation activities and will help inform decisions (e.g., to monitor impact of new nets, to better understand vector-human interactions, etc.).

PMI is expanding support of entomological monitoring to 14 new sites in calendar year (CY) 2022 in addition to the two IRS and two control sites. With this planned expansion of 14 new districts, the number of sites from which entomological data will be collected in Côte d'Ivoire will increase from 18 sites in 2021 to 32 sites in 2022 and will represent 72 percent of the country's regions (24 of the 33). PMI will conduct wall bioassays to monitor residual efficacy of the insecticides in the two IRS sites of Nassian and Sakassou in CY 2022. PMI will continue to provide TA to build the capacity of local research institutes to support the NMCP's vector control activities and decision-making.

Summary of Distribution and Bionomics of Malaria Vectors in Côte d'Ivoire

As of 2021, the primary vector in Côte d'Ivoire remains *An. gambiae* s.l. (94 percent of all *Anopheles* collected), with the gambiae complex composed of *An. gambiae* s.s., *An. coluzzii*, and hybrids of the two species. *An. coluzzii* was molecularly identified as the most frequently encountered of the gambiae complex on a national scale (~59 percent), followed by *An. gambiae* s.s. (~40 percent). But there is spatial variation in the species' composition; in southwestern and central districts and some southeastern districts, *An. coluzzi* predominates (~54 percent to 100 percent *An. coluzzi*), while in some central, eastern, and northern districts, *An. gambiae* s.s is more common (~67 percent to 100 percent). A secondary vector of interest due to its high transmission potential in other countries is *An. funestus* s.l. This vector made up 0.9 percent of all *Anopheles* collected nationally.

While overall peak malaria transmission in Côte d'Ivoire has been reported to range from April to July, there is spatial and temporal variability. In PMI entomological monitoring sites, peak *An. gambiae s.l.* biting is also variable. For example, in Nassian (an IRS area) and Beoumi (a control area), peak mosquito biting is unimodal with a single peak occurring around September. Conversely, in Sakassou (an IRS area) and Dabakala (a control area), peak mosquito biting is bimodal with peaks occurring from April to July and September to October.

Based on the overall *An. gambiae* s.l human biting rate from January to December, there was more frequent indoor biting in the entomological sites of Beoumi, Dabakala,

and Sakassou, and higher rates of outdoor biting in Nassian. Overall averages (12 months) of *An. gambiae* s.l. indoor resting density ranged from 2.5 (Nassian) to 7.1 (Sakassou) female mosquitoes per room in 2021; data on outdoor resting are not currently collected in Côte d'Ivoire. Peak biting times for *An. gambiae* s.l. were similar in all sites observed, both indoors and outdoors, between 12:00 am and 4:00 am.

Status of Insecticide Resistance in Cote d'Ivoire

All *An. gambiae* s.l. are resistant to all pyrethroids with moderate-to-high resistance intensity. As of 2021, PBO partially restores susceptibility to pyrethroids in *An. gambiae* s.l. with increases in mortality ranging from 10 percent to 84 percent when comparing PBO pre-exposure + pyrethroid to pyrethroid-only exposure. Even with PBO pre-exposure, nearly all sites remained below the 90 percent mortality threshold; however, three districts (Abidjan, Man, and Nassian) saw complete restoration of vector susceptibility with PBO pre-exposure and deltamethrin. *An. gambiae* s.l. resistance to pirimiphos-methyl has been detected in seven monitoring sites. Reduced *An. gambiae* s.l mortality for chlorfenapyr at 100 µg/bottle in 12 sites and 200µg/bottle in 5 sites was also reported in 2021. *An. gambiae* s.l. resistance to clothianidin has also been observed with 10 of 17 sites tested by CDC bottle bioassay (4 µg/bottle) reporting resistance, and 2 of 17 sites tested by the WHO tube assay (2 percent) reporting resistance.

1.3.2. ITNs

To improve ITN coverage and distribution, mainly at the community level, PMI is supporting the development of a national guide for continuous distribution of bed nets. The guide was one of the recommendations of the continuous distribution assessment carried out in 2021. With 2023 funds, PMI will procure 366,472 PBO nets and 503,899 standard nets for routine distribution including distribution at the community level. PMI will support the operations of the country's 2024 mass campaign and continue to support SBC to improve ITN use and care and to mitigate against misuse. A 24-month standard durability monitoring for the 2021 bed net cohort (PBO and dual AI nets) is planned for the next 12 months.

ITN Distribution in Côte d'Ivoire

In Côte d'Ivoire, ITNs are distributed via mass campaigns every three years. Continuous distribution channels are: distribution to pregnant women at ANC and provision to children under five years of age at expanded program immunization (EPI). There are plans to expand continuous distribution through other channels, such as school-based distribution and community-based distribution to increase ITN coverage in the country. For this reason, a national guide for continuous distribution is being developed and will be validated in 2022 to instruct on this new expansion approach. The NMCP is working

on a contingency plan to protect the populations of the districts of Nassian and Sakassou after the last IRS campaign in 2022 and to mitigate any potential loss of morbidity and mortality momentum gained during the three years of IRS in those areas. The contingency plan will comprise a robust communication/SBC plan and procurement of effective ITNs based on current insecticide resistance data in these two districts. PMI will support the contingency plan for Nassian and Sakassou and will procure appropriate ITNs using the current malaria commodity pipeline funds. Côte d'Ivoire will continue its strategy of providing the most effective ITNs to targeted areas based on the available insecticide resistance data. Therefore, PMI will continue to distribute PBO nets and standard ITNs where they can achieve the greatest impact in continuous distribution channels.

Per the gap analysis conducted by the NMCP, a total of 6,686,518 nets (all-type: standard, PBO, and Dual AI) are needed for continuous distribution during CYs 2022 to 2024. Based on the results of the evaluation of continuous net distribution, PMI will support the reinforcement of the current distribution channels (ANC and EPI) to fill the gaps prior to supporting the expansion of the distribution channels.

Table 1. Standard Durability Monitoring

Campaign Date	Site	Brand	Baseline	12-month	24-month	36-month
April 25–29, 2021	Abengourou	PBO (Permanent 3.0)	October 12–20, 2021	Planned for April 2022	Planned for April 2023	Planned for April 2024
April 25–29, 2021	Aboisso	Dual AI (Interceptor G2)	October 12–20, 2021	Planned for April 2022	Planned for April 2023	Planned for April 2024

At baseline, 5.6 months after the 2021 mass campaign ITN distribution, the PermaNet 3.0, and Interceptor G2 bed nets' survival were high in both districts/sites: over 98 percent of the cohort nets were still present in the households and in serviceable condition.

1.3.3. IRS

PMI will discontinue its support to the IRS activities in Côte d'Ivoire due to funding and priorities constraints. The last IRS funded by PMI was in 2022 (May 16 to June 14, 2022) in the two districts of Nassian and Sakassou. PMI and the NMCP agreed to stop IRS operations in the two districts, where around $2 million has been invested since FY 2020 to annually protect only 200,000 people. Therefore, no resources were allocated to the IRS in the FY 2022 MOP and the same decision has been confirmed during FY 2023 MOP discussions.

Table 2. PMI-supported Indoor Residual Spraying Coverage

Calendar Year	District	Structures Sprayed (#)	Coverage Rate (%)	Population Protected (#)	Insecticide
2021	Sakassou and Nassian	60,496	96.7%	201,178	SumiShield 50WG and Fludora Fusion
2022	Sakassou and Nassian	62,551***	TBD	206,722***	SumiShield 50WG and Fludora Fusion
2023	Not planned	N/A	N/A	N/A	N/A
2024	Not planned	NA	N/A	N/A	N/A

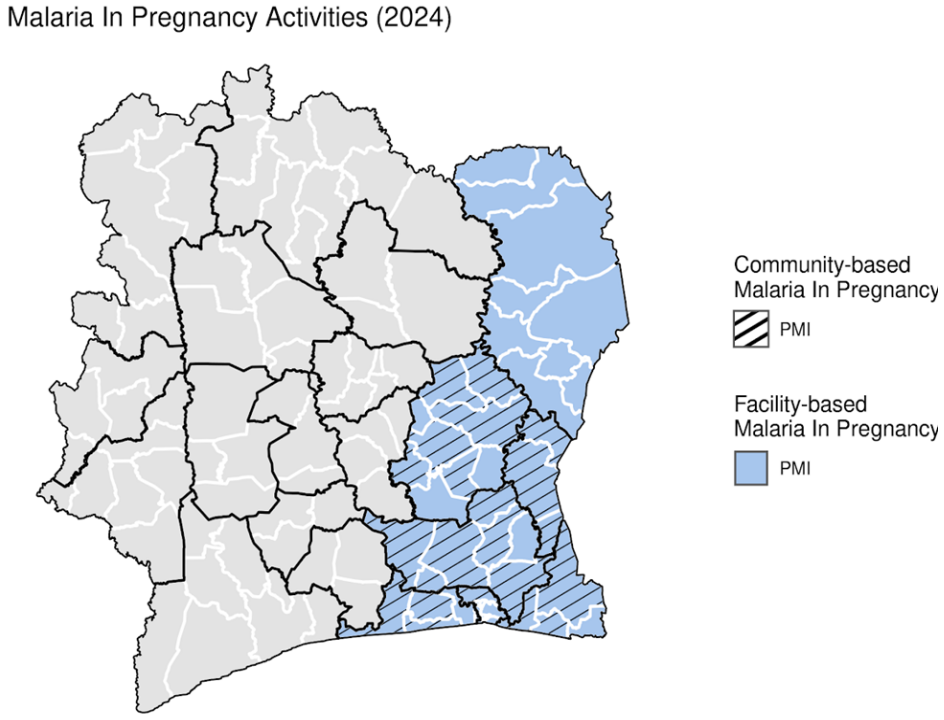
*** Denotes targets for the current year.

IRS Insecticide Residual Efficacy in Côte d'Ivoire

Wall bioassays were conducted monthly following the 2021 IRS campaign at two sites and showed a residual efficacy of SumiShield in Nassian and Fludora Fusion in Sakassou of a minimum of six months with continued five-day mortality of the susceptible and wild strains above 80 percent (efficacy threshold) on both wall concrete and mud walls.

2. MIP

Figure 2. Malaria in Pregnancy Activities in Cote d'Ivoire



2.1. PMI Goal and Strategic Approach

The NMCP national strategic plan 2021–2025 aims at having at least 80 percent of pregnant women sleep under ITNs by 2025 and at least 80 percent of pregnant women receive at least three doses of sulfadoxine-pyrimethamine (SP) during their last pregnancy by 2025.

PMI continues to support the national strategy for MIP, which includes provision of ITNs at the first ANC visit, administration of a minimum of three doses of IPTp to all pregnant women in malaria endemic areas starting at 16 weeks' gestational age, and effective case management of malaria per WHO guidelines. In addition, PMI supports SBC for increasing ANC attendance as well as IPTp uptake. Since July 2021, PMI has taken an integrated approach to enhance MIP activities through the USAID-integrated maternal, child health, and family planning project. This approach helps improve uptake of IPTp and mitigate ANC lost-to-follow-ups.

Therefore, a women's group approach is implemented for following up with pregnant women. Most pregnant women lost to follow-up for SP, were successfully registered in health centers to receive additional doses of SP based on a list of missed pregnant women given by midwives. This women's group approach and following up with pregnant women is integrated in the most recent national strategic plan, and is now implemented in PMI regions.

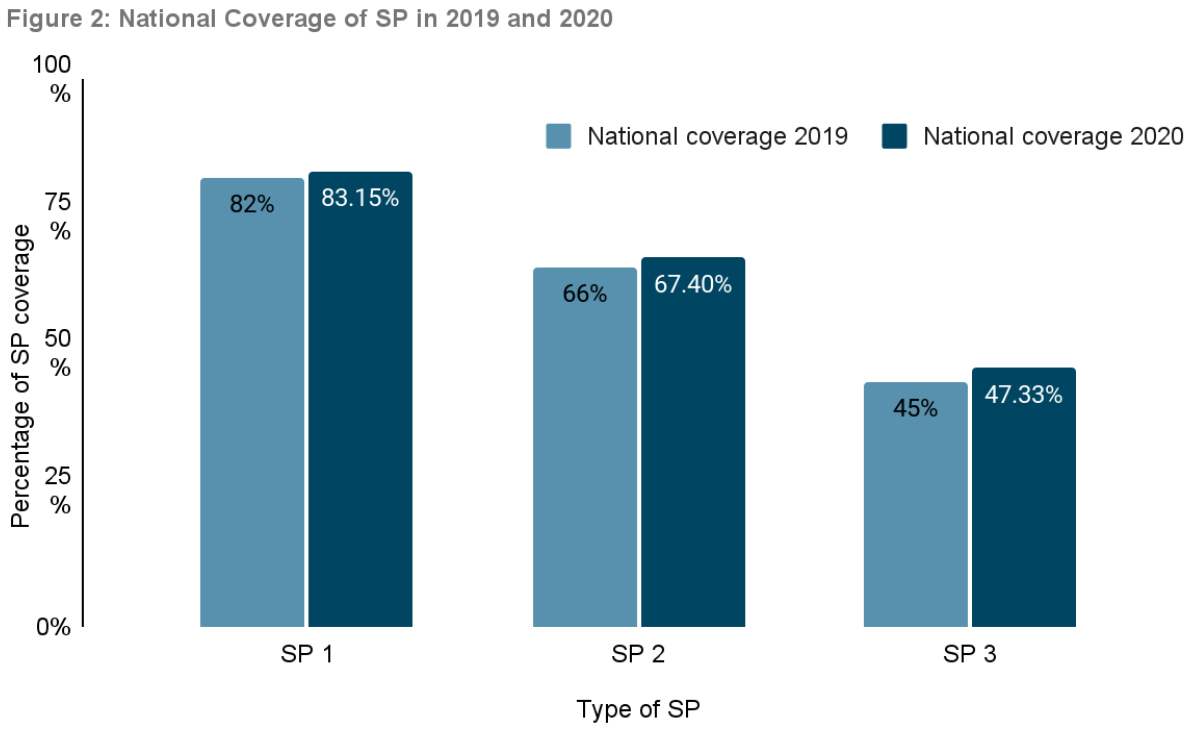
In addition, given the effect of provider behavior on patient experience, ANC attendance and access to SP, PMI supports provider behavior change activity. Please see the **SBC section** below for more details on how the checklist given to service providers appears to have improved interpersonal communication (IPC) with pregnant women, which will hopefully improve the SP3 dose rate.

Recent Progress

In 2020, the national coverage of SP3 is 47.3 percent, up from that of 2019 which was 44.8 percent.[6]

[6] RASS 2020.

Figure 3. National Coverage of Sulfadoxine-Pyrimethamine in 2019 and 2020



The prevention of malaria in pregnant women is done through SP chemoprophylaxis, which consists of giving at least three doses of SP from the second trimester of pregnancy if the pregnant woman is not on cotrimoxazole. In addition, there is distribution of ITNs, which is done from the ANC1.

The NMCP target for coverage for SP3 has been set at 80 percent by 2025. No health region has reached this target but some regions and districts have reached the intermediate target set for 2021 set at 58 percent. The regions of Iffou (63.87 percent), Moronou (62.38 percent), and Mé (60.01 percent) recorded the highest SP3 coverage. However, the Béré (30.36 percent), Folon (33.38 percent), and Kabadougou (35.10 percent) regions have the lowest SP3 coverage.

No health district has reached the 80 percent target. The districts of Tanda, Adiaké, and Bongouanou recorded the highest SP3 coverage with 71.74 percent, 71.33 percent, and 70.68 percent. The districts of Kounahiri (19.76 percent), Koro (30.46 percent), and Minignan (30.50 percent) have the lowest SP3 coverage.

In 2020, Côte d'Ivoire recorded a national coverage of ANC4 at 42.31 percent. This rate is up from that of 2019 which was 40.69 percent. None of the 33 health regions has reached the national target of 90 percent. The health regions of Cavally (76.69 percent), Lôh-Djiboua (63 percent), and Worodougou (59.66 percent) recorded the highest ANC4

coverage. However, the regions of Abidjan 2 with 27.49 percent, Béré with 28.07 percent, and Bagoué with 31.71 percent have the lowest ANC4 coverage.

At district level, the districts of Blolequin (112.74 percent), Jacqueville (75.57 percent), and Tabou (74.02 percent) recorded the highest ANC4 coverage. Only the district of Blolequin has achieved the 90 percent objective. The districts of Yopougon-Est (18.09 percent), Cocody-Bingerville (20.47 percent), and Dianra (21.19 percent) have the lowest ANC4 coverage.

Therefore, the key challenge is the ANC drop-out rate (with many pregnant women who don't complete the ANC4 minimum before delivery) which is important to measure the continued use of ANC services by pregnant women against the four ANC standard. The national drop-out rate in 2020 was 57.29 percent. This rate is slightly lower than that of 2019 which was 58 percent. The regions of Béré (76.41 percent), Folon (74.53 percent), and Worodougou (70.75 percent) recorded the highest ANC drop-out rates. The lowest ANC drop-out rates are observed in the health regions of Abidjan 1 with 46.24 percent, Abidjan 2 with 47.11 percent and Grands-Ponts with 49.16 percent. The districts of Kani (79.02 percent), Ouaninou (77.92 percent), and Madinani (77.57 percent) record the highest ANC drop-out rates. The districts of Abobo-Est (35.88 percent), Adjamé-Plateau-Attécoubé (39.14 percent), and M'bahiakro (41.67 percent) have the lowest ANC drop-out rates.

Thus, PMI supported NMCP to decrease the ANC drop-out rate by implementing an innovative approach which designed and implemented a behavioral economics-based intervention to improve IPC between providers and clients and strengthen the sense of accountability among providers and ownership among clients. See the **SBC section** below for more details.

Plans and Justification for FY2023 Funding

PMI will continue to support MIP activities with intensification of interventions at the facility and community levels through the USAID-integrated maternal, child health, and family planning project launched in July 2021.

At the community level, PMI will support the women's group approach for finding ANC loss-to-follow-up pregnant women and connecting them back to the health services to increase ANC visits and uptake of SP. PMI will also provide training to the women's groups in collaboration with the health care providers.

At the facility level, PMI will support the extension of the provider behavior change activity to improve SP3 rate among pregnant women. PMI will continue to support training and supervision based on on-site training and supportive supervision (OTSS+) for the health care providers on IPTp.

In coordination with the National Program for Child and Maternal Health, the NMCP, the MIP technical working group (TWG) and other stakeholders, PMI will support the update of supervision tools (OTSS+) based on the findings of behavioral economics service provider behavior change approach. PMI will also support MIP supervisions and TWG meetings at regional and district levels to speed the implementation of strategic recommendations from the TWG central-level meetings.

The Government of Côte d'Ivoire is planning to procure 2.12 million SP doses in 2023 and 2.384 million doses in 2024. This fills most of the demand; however, there is a small gap of about 275,000 doses in 2024 and 298,000 doses in 2024 to account for desired stock levels. The NMCP say they will undertake resource mobilization to fill this gap. PMI and the Global Fund will not support SP procurement. The central pharmacy will use the national supply chain channel for distribution from central level to the district level. Afterward, district pharmacies will distribute SP to HFs including ANC facilities.

3. Drug-based Prevention

3.1. PMI Goal and Strategic Approach

Côte d'Ivoire does not yet implement SMC; therefore PMI does not support SMC or other drug-based prevention in Côte d'Ivoire. The NMCP has started data collection to assess the feasibility of SMC and to identify eligible districts. Once a decision has been made, PMI will earmark resources through reprogramming to provide support as appropriate.

4. Case Management

4.1. PMI Goal and Strategic Approach

Côte d'Ivoire's malaria diagnostic guidelines are in line with WHO recommendations and require every suspected malaria case, defined as the presence of fever (axillary temperature≥37 °C) or history of fever within the last 24 hours, to be confirmed by an RDT or microscopy before administering ACTs. Per national guidelines, microscopy is used to confirm malaria diagnosis in the public and private not-for-profit (faith-based) sectors at all regional and district reference hospitals. RDTs are used to confirm malaria diagnosis at peripheral health centers and at the community level. RDTs are also used in district and regional health facilities whenever microscopy is unavailable, which includes during off hours and/or on weekends when there is no laboratory technician available. As per national directives, there is no patient fee for RDTs or ACTs for children under five years of age and pregnant women at public and private not-for-profit HFs. Public facilities also provide all RDTs and ACTs for free to older children and adults. RDTs and ACTs are to be provided for free in private for-profit facilities for children under five years of age and pregnant women per national guidelines, although

this may not always occur in practice. PMI does not provide commodities to private facilities. Emergency diagnosis and treatment (which includes severe malaria) are free for patients of all ages in the public sector. A significant proportion of the population of Côte d'Ivoire seeks care in the private sector. According to the 2016 Multiple Indicator Cluster Survey (MICS), 31.1 percent of children under five years of age with fever sought care in public facilities compared with 13.5 percent in private facilities; 38.5 percent did not seek care at all. However, of those who received an antimalarial treatment, only 12.8 percent received it from public facilities compared with 19.2 percent from private facilities.

PMI supports Cote d'Ivoire case management strategy by supporting procurement of RDTs for biological case confirmation and treatment drugs based on the country's needs. PMI and the Global Fund cover 100 percent of case management commodities based on the national quantification and the data provided in the commodities **Gap Analysis Table** in the annex. While PMI procures 68 percent of artemether-lumefantrine (AL) for first line treatment, Global Fund supports the procurement of 32 percent of AL and 100 percent of artesunate amodiaquine (ASAQ), the second -line treatment.

To ensure the quality of case management, PMI supports training as well as supervision of health workers and laboratory technicians in the 45 of the 113 districts it covers. The total number of health care providers trained on the national guidelines for malaria case management is 2,173. Additionally, 381 health worker supervisors, 29 community activities coordinators, and 57 laboratory technicians were trained. Community activities coordinators are a cadre of personnel designed to coordinate integrated community case management (iCCM) activities and coach CHWs. They are district-based staff who receive logistics support from donor partners, including PMI.

PMI has supported iCCM in Côte d'Ivoire for the last four years, mainly focusing in districts where a significant proportion of the population lives five kilometers or more from HFs. The number of districts in which PMI supports iCCM has increased from 22 in 2018 to 29 in 2022, consistent with the strategy outlined by the NMCP to extend services to the unreached population. To date, PMI has supported the recruitment and training of 1,932 CHWs who provide iCCM services to their communities under the supervision of the HF nurses.

PMI worked with the NMCP and the directorate of community health (DSC) to initiate iCCM activities in two health districts within the city of Abidjan. These districts were Cocody-Bingerville and Yopougon Ouest Songon, which have rural localities with populations living more than five kilometers from health centers. Ninety-six CHWs were identified within these districts by their communities and trained on the basic community activity package during a three-day training of trainers session facilitated by the NMCP,

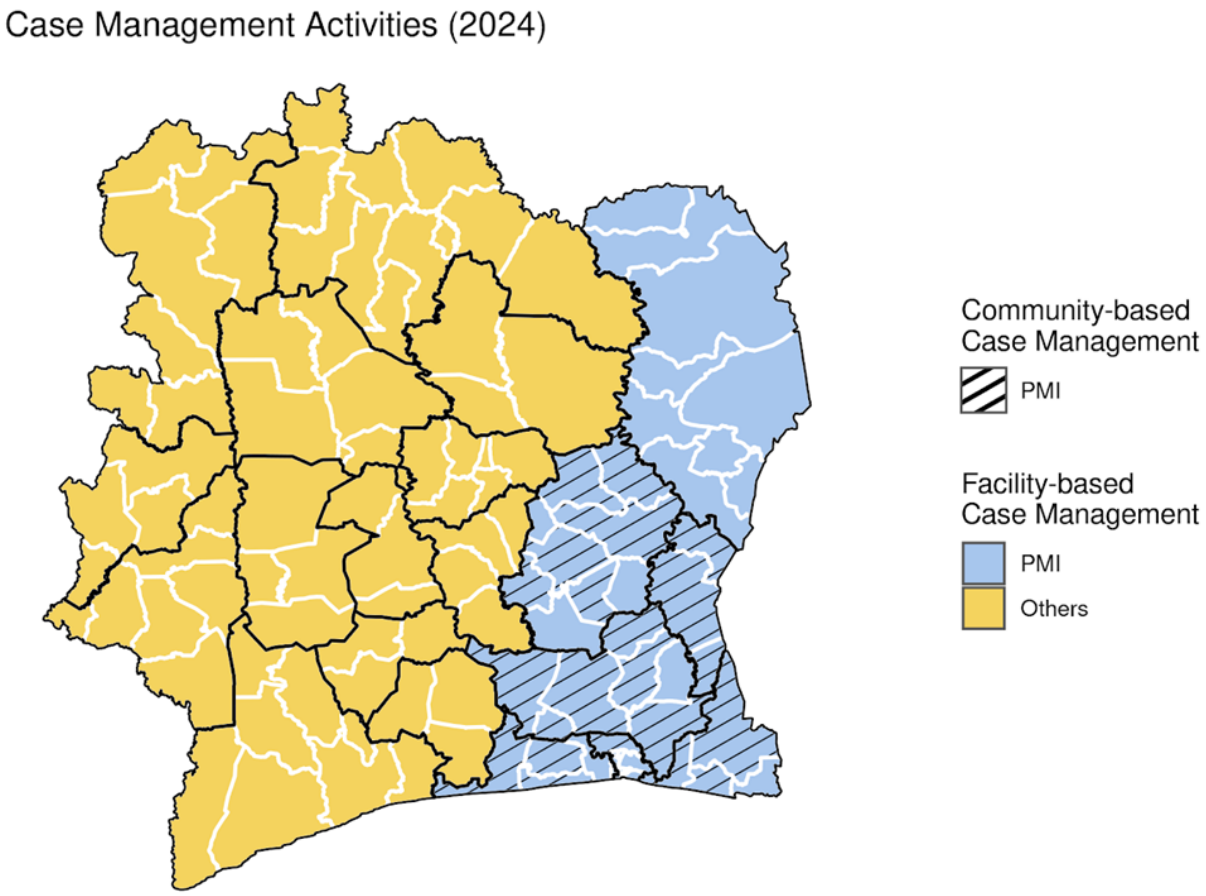
DSC and PMI implementing partner teams. The community health system in Côte d'Ivoire is currently facing many challenges, in part due to its nascency. Among these challenges are:

- Low completion rate of community data entered in DHIS2.
- Non-availability of community data collection tools.
- Stockouts of malaria case management commodities, mainly RDTs, over certain periods.
- Insufficient supervision and coaching of CHWs by their facility supervisors.

To address those challenges, PMI is working with the NMCP to:

- Support the districts in the organization of monthly community data validation meetings in HFs. Validation will be done by CHWs and supervising health workers in each HF. It will consist of verifying the data reported by the CHWs and the completion of the primary collection tools. Moving forward, PMI plans to use data validation as a justification for the payment of incentive bonuses to CHWs.
- Make community data collection tools available and timely.

Figure 4. Map of PMI-supported Case Management Geographic Areas in Côte d'Ivoire



4.2. Recent Progress (between September 2021 and March 31, 2022)

National-level Case Management Activities:

During the past six months (from September 2021 to March 2022), PMI:

- Supported the NMCP to conduct microscopic malaria diagnosis training according to their capacity-building plan. The capacity-building of biotechnologists on the quality microscopic diagnosis of malaria was delayed in the laboratories of referral hospitals.
- Supported the NMCP for the revision of the OTSS+ laboratory checklist. This workshop combined the review of both the clinical OTSS+ and the laboratory OTSS+ checklists.
- Supported the assessment of compliance with malaria quality diagnostic standards based on performance of the Internal Quality Improvement program for microscopy and availability of malaria laboratory reference materials with a target score≥75 percent. Only Bondoukou and Taabo hospitals come close to the desired performance with scores of 64 percent.

- Supported the NMCP for the ongoing development of the national malaria diagnostic guide (microscopy and RDTs). Supported the NMCP for the revision of the OTSS+ clinical checklist. This was the review of the checklist developed and implemented under the previous project in 12 health districts. It allowed PMI partners to readjust and adapt certain criteria for evaluating the performance of service providers offering malaria control services.

Other activities not otherwise specified:

- In January 2022, the report of the first pharmaceutical interlaboratory control on AL tablets funded by PMI was released to the National Laboratory for Public Health.
- During the past six months, the PMI team participated in monthly discussion with the President's Emergency Plan for AIDS Relief team, the Global Health Security Agenda team, and the Cote d'Ivoire Global Fund portfolio management team to better coordinate U.S. Government and Global Fund's support to strengthen the laboratory system in the country.

Commodities

- Supported the procurement and distribution of 3,189,406 RDTs to fill the country RDT gap, accounting for approximately 47.07 percent of needs.
- Supported the procurement and distribution of 2,361,000 AL/ACT treatments to fill the country gap, accounting for approximately 56.87 percent of needs.
- Supported the procurement and distribution of 36,009 rectal artesunate suppositories for nationwide distribution, accounting for 100 percent of needs.

Facility-level Case Management Activities

- OTSS+ and mentorship have steadily improved the performance of health care providers delivering malaria services in HFs in Côte d'Ivoire. Overall, provider performance improved between OTSS+ rounds 1 and 3, reflecting an improvement in the quality of services offered to clients.
- Eight districts carried out three OTSS+ visits each: Dimbokro, Bongouanou, Daoukro, Abengourou, Bouna, Bondoukou, Adzopé, and Dabou. Overall, data from these visits showed a marked improvement in the quality of care provided by health workers between OTSS+ rounds 1 and 3.
- For HF readiness, the percentage of facilities that met standards including appropriate materials, documentation, and qualified staff for quality malaria case management improved steadily, from a low baseline in round 1 of 14, 80 percent (median 82 percent) to 74 to 100 percent (median 100 percent) in round 3, with 100 percent of HFs meeting standards in two of the eight districts.

- For the competency of health workers using malaria RDTs, all providers in the eight districts improved and obtained a score≥90 percent during the third OTSS+ visit.
- For management of uncomplicated malaria, the percentage of health workers who obtained a score≥90 percent in the management of uncomplicated malaria in round 3 improved in seven out of eight Côte d'Ivoire districts. In Dimbokro, the eighth district that did not show improvement, the competency of health providers in managing uncomplicated malaria decreased from 64 percent in round 2 to 33 percent in round 3. This was attributed to stockouts of RDTs in most of the HFs visited in round 3, some of which were staffed by new providers. On-the-job training was implemented for the new providers during OTSS+, and quality improvement action plans developed at the facilities were followed up after the supervision round by the district staff, including addressing the stockouts of RDTs. Dimbokro is one of the four districts that benefited from mentorship between OTSS+ rounds, which means it had a full-time regional OTSS+ officer (mentor) based in the district throughout the project who was responsible for supporting the district health authorities to follow up the quality improvement action plans.
- Over three rounds of OTSS+, provider competency in preventing MIP improved in five of the eight districts; however, it fell in Abengourou, Bouna and Dimbokro; Challenges identified included insufficient communication on preventive measures for MIP, and poor implementation of a directly observed therapy due to stockouts of cups. Feedback and training were provided during the OTSS+ visit, and health district authorities were encouraged to follow up closely.

Community-level Case Management Activities:

After the remobilization of community health workers (CHWs) in September 2021 due to the transition between the previous central mechanism implementing partner and the new PMI partner, community case management activities were relaunched. In accordance with the strategy adopted by PMI's partner and lessons learned from the previous project:

- Monthly meetings were organized in the various health centers between CHWs and supervisors' health workers. These meetings consisted of verifying and validating the community data produced by CHWs prior to compilation and transmission to the districts.
- An increase in the number of suspected malaria cases was reported by CHWs. This upward trend is likely the result of the active search for individuals with fever by CHWs. There is also consistent management of

confirmed positive cases during the two quarters, 93 percent (July to September 2021) and 95 percent (October to December 2021).

- A workshop was organized in collaboration with the NMCP and the DSC from November 4 to 5, 2021, to develop the midterm evaluation report on community case management activities of 2021. An evaluation report detailing the coordination and monitoring of community activities implemented by the districts after the withdrawal of local NGOs in the last quarter of 2020 was also developed during this workshop.

4.3. Plans and Justification for FY 2023 Funding

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

National-level Case Management Activities

With FY 2023 resources, PMI will continue to support case management activities both at the HF and community levels. Activities will include training and supervision of health care providers. A specific emphasis will be placed on training laboratory technicians to enable them to accurately perform malaria diagnosis and interpret results for correct treatment. In collaboration with the NMCP, the DSC and other stakeholders, PMI and the Global Fund are working to strengthen the community health systems. This will include increasing the number of CHWs to allow for better access to iCCM services by the population living five kilometers beyond HFs.

Commodities

Regarding the HFs case management activities, PMI will support:

- The procurement of 3,070,946 RDTs to contribute to the nationwide RDT needs in the public and private, NGO not-for-profit sector. PMI does not supply commodities to for-profit private HFs.
- The procurement of 2,306,866 AL doses (dispersible and hard tablets) to contribute to the nationwide ACT needs in the public and private, NGO not-for-profit sector. PMI does not supply commodities to for-profit private HFs.
- The purchase of about 62,752 suppositories (100 mg to reflect policy change) for children less than 5 years of age for pre-referral treatment of severe malaria by CHWs to reference facilities. In accordance with WHO's recent recommendations on continuing supporting implementation of rectal artesunate without expanding further, PMI has discussed with the NMCP and

will not expand the use of rectal artesunate until WHO's further guidelines become available.

HF-level Case Management Activities

At the HF level, PMI will continue its support to malaria case management through provision of direct TA and support to strengthen malaria case management in 827 public and private, NGO not-for-profit HFs. TA will include training and supportive supervision for health care providers in diagnosis and treatment of malaria. PMI will continue its support to the OTSS+ started in FY 2020 and assist the NMCP to extend this approach to other districts supported by the Global Fund as well as at the community level.

Community-level Case Management Activities

To date, PMI has supported 1,932 CHWs under the service delivery activity. Those CHWs cover 29 of the 113 health districts. During the FY 2023 MOP discussions, PMI and the NMCP agreed to expand the reach of iCCM activities and aim to saturate districts that are currently partially covered with iCCM services. As part of the service delivery activity and in close collaboration with the NMCP, the Global Fund, and UNICEF, PMI will support the mapping of iCCM activities, the results of which will facilitate the identification of currently underserved areas. Consistent with the NMSP and the PMI 2021–2026 strategic plan, PMI will work with those partners to create an environment conducive to a greater political commitment to strengthen the community health systems in Côte d'Ivoire and to provide a pathway to build and consolidate primary health care in the country. As indicated in the PMI/Côte d'Ivoire strategy operationalization roadmap, PMI will request reprogramming of FYs 2021 and 2022 resources to support the strategic investment in community health strengthening activities.

With FY 2023 resources, PMI will support training, supervision, and implementation of iCCM. PMI will provide direct TA and support to strengthen iCCM in 35 districts and additional remote areas in four districts within Abidjan. Technical support will also be provided at the national level to impact country-wide iCCM implementation.

The commodities needed in support of the community level are already included in the quantification provided in the gap analysis table and in Table 2.

4.4. Monitoring Antimalarial Efficacy

Table 3. Ongoing and Planned Therapeutic Efficacy Studies

Ongoing Therapeutic Efficacy Studies			
Year	**Site Name**	**Treatment Arm(s)**	**Plan for Laboratory Testing of Samples**
2021–2022	Abengourou Aboisso	ASAQ AL	In-country at Institut Pasteur de Côte d'Ivoire
2021–2022	Bouaké San Pedro	ASAQ AL	In-country at Institut Pasteur de Côte d'Ivoire
Planned Therapeutic Efficacy Studies (funded with previous or current MOP)			
Year	**Site Name**	**Treatment Arm(s)**	**Plan for Laboratory Testing of Samples**
FY 2021		Antimalarial X Antimalarial Y	
FY 2023		Antimalarial X Antimalarial Y	

With FY 2023 funds, PMI will support the third therapeutic efficacy studies (TESs) at two sites to monitor the susceptibility of *P. falciparum* to first-line ACTs (AL and ASAQ) according to WHO recommended guidelines. Testing for molecular markers of resistance will be included at PMI sites. Four sites covered by PMI (two each year). Global Fund covers six sites.

5. Health Supply Chain and Pharmaceutical Management

5.1. PMI Goal and Strategic Approach

Since FY 2018, PMI has opted for an integrated approach to support the supply chain, leveraging resources invested by the President's Emergency Plan for AIDS Relief during the past 15 years. PMI's support has included provision of TA to the NMCP for quantification, and procurement, storage, and distribution of commodities from the central warehouse to districts. PMI's support has also included strengthening the Logistics Management Information System through the electronic Logistics Management Information System (eLMIS) and mSupply systems. Finally, PMI has supported the implementation of the Malaria Commodities Management Control (ABC) and End-Use Verification (EUV) surveys on an annual basis.

In September 2020, PMI has contributed to a five-year cooperative agreement with the *Nouvelle Pharmacie de la. Santé Publique*/Central Medical Store (CMS), a local NGO charged with operating the health care supply chain. This agreement is signed for the implementation of the local health supplies procurement and logistics activities. This activity aims at achieving three specific objectives: 1) Ensure a rational and transparent supply, appropriate storage, and effective distribution of certain health commodities to the designated service providers; 2) Ensure ease of the customs clearance and transit

operations of the other health projects financed by the U.S. Government; and 3) Ensure maintenance of the eLMIS and implementation of a formal mechanism of data analysis for better decision-making at all levels of the supply chain. This mechanism ends in August 2023, and so activities in this MOP will be implemented under a new, yet to be determined, mechanism.

Cote d'Ivoire is in the process of updating its national supply chain strategy—the most recent strategy, the "*Plan National Stratégique de la Chaîne D'Approvisionnement en Produits Pharmaceutiques et Intrants Stratégiques*, 2016–2020," came to an end in 2020, and a new strategy has not yet been approved. The previous strategy had as its main objective to improve the availability of and access to medicines, vaccines, and other essential commodities at service delivery points. The NMCP follows government supply chain priorities as outlined by NMCP and the CMS in MOP planning meetings. These focus on: Capacity-building at all levels for supply chain management; increased data visibility; improved use of supply chain data for decision-making; and improved availability of health products at the last mile and, in particular, at the community level. These are the priorities on which this MOP focuses.

For more details of the country's public sector health care supply chain please see the Country Malaria Profile.

5.2. Recent Progress (between September 2020 and December 2021)

Côte d'Ivoire, as is the case for many countries, faces gaps in the routine availability of timely and quality supply chain data. There is still a dependence on surveys and spot checks to monitor system performance. Availability of products at the central level was high over 2020 and 2021 with no stockouts recorded.[7] The annual ABC survey shows improvement in malaria product availability at HFs from 2020 to 2021 with overall stockouts at time of visit for malaria products improving from 23 percent to 12 percent. For select malaria products, stockout rates were: AL, 6x4 2 percent; RDTs, 2 percent; and ITNs, 61 percent. The 2021 EUV Survey also showed generally high availability: For ALu the stockout rate was 3.2 percent (inability to treat with ALu). However, all sites had at least one first-line ACT (including ASAQ). Almost 48 percent of sites were stocked with each of the four ALu presentations. The stockout rates were zero for SP, PBO, and dual AI nets; for RDTs, only 2 percent of sites were stocked out. Most sites were stocked according to the norms. For example: 53 percent of facilities were stocked between the minimum and maximum for Alu 6x4; 57 percent for dual AI nets; 81 percent for RDTs; and 100 percent for SP. The EUV Survey also showed generally good availability of products at the district level. A gap in performance data exists for the

[7] Procurement Planning and Monitoring Report for Malaria.

community level: There is no data as to availability of malaria products at the community level although stakeholders declare improving availability at this level a priority. Various surveys also assess other aspects of supply chain performance. For instance, the ABC Survey showed improvement in alignment between supply chain and epidemiological data (from 16 percent to 46 percent), while accuracy of record-keeping declined slightly, from 58 percent to 53 percent. The EUV Survey showed poor record keeping for HFs. The percent of stock cards that are up to date varied from just over 70 percent to just over 20 percent, depending on the product.

5.3. Plans and Justification with FY 2023 Funding

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

For MOP 2023, support will continue for an annual quantification for malaria products. In addition, quarterly supply plans will be developed and shared with PMI's central procurement project (TBD). The CMS will support the reception and central level storage of products. In addition, the CMS will support routine delivery of products to districts. For MOP 2023, support to the eLMIS will continue to be a priority. This includes both the district level eLMIS system and, at facility level, the mSupply system and also includes support for the use of data for decision-making. To strengthen the system to generate routine data, additional funds will be invested in the eLMIS, and the ABC and EUV surveys will be combined. The ABC Survey samples high-volume sites to support annual quantification, while the EUV Survey included a representative sample of facilities. Combining the two will achieve cost economies. Investments in eLMIS will be primarily to strengthen mSupply at facility level. Use of the system at facilities is not optimal, and so there will be more emphasis on monitoring and supporting system use, including on-site support and training.

In summary, the MOP 2023 supply chain activities are:

- Strengthen the end-to-end supply chain. Support the CMS, district, and HF staff involved in the management of the supply chain to strengthen warehousing and inventory management. This includes support for mSupply inventory management systems at HFs and for improved product distribution and transportation, especially to service delivery points.
- Support for a combined EUV and ABC survey in facilities. ABC samples high-volume malaria sites to gather data to support quantification, while the EUV Survey is of a representative sample of facilities. The survey will assess

product availability, management, and use, and the work will include dissemination of results to stakeholders.

- Strengthen Logistic Management Information System: Work with the CMS to expand the use of eLMIS to all health staff through training and IT support. Support to the CMS and district pharmacists to ensure that the district-level eLMIS is used regularly and that data are complete and good quality. Strengthen the abilities of the CMS and National Health Insurance Fund to analyze eLMIS data and provide TA to staff at districts.
- Strengthen the capacity of the national laboratory for quality-control monitoring of malaria medicines. This activity includes helping the laboratory reach pre-qualification status and is in collaboration with Global Fund and Agence Française de Développement.
- Support the routine distribution of all products (except ITNs) from districts to health centers, including redistribution if needed.

6. SBC

6.1. PMI Goal and Strategic Approach

PMI supports the NMCP in strengthening their capacity to provide high-quality SBC interventions. PMI's SBC support to the NMCP is guided by the new National Communications Strategy for Malaria Control (2021–2025), which is fully aligned with and contributes to: increasing knowledge levels of malaria from baseline to at least 90 percent by 2025; and to improving uptake and correct use of key malaria interventions from baseline to 90 percent by 2025. PMI will support this activity at the district level for better involvement, ownership, transferring competency, and sustainability.

PMI's support is achieved through data-driven, coordinated communication and non-communication interventions deployed across PMI geographic focus areas. Through partnerships with local media organizations, community-based organizations, and collaboration with women's groups, community action groups, and CHWs, PMI supports the NMCP's efforts to expand mass media, community mobilization, and IPC at the community level.

These SBC activities are aimed at increasing correct and consistent ITN use and care, prompt care-seeking for fever, uptake of RDT tests and IPTp, and provider adherence to diagnostic results for treatment with ACTs. At the national and district levels, PMI provides TA for capacity-strengthening, including coordination and the development of SBC materials and tools according to the national SBC strategy.

In addition, the behavioral economics approach improved IPC between providers and clients and helped strengthen the sense of accountability among providers and

ownership among clients. This approach was implemented in eight HFs within eight health districts. The assessment of this approach demonstrated that 80 percent of care providers believe that the use of the tracking sheet has improved the SP rate during pregnancy. However, early use of ANC by pregnant women and the drop-out rate of ANC remain key challenges. Therefore, to address these challenges, women's group–led IPC approaches focus on early use of ANC by pregnant women and loss to follow-up of pregnant women, contributing to a significant increase in IPTp uptake.

From October 2020 to February 2021, out of 416 pregnant women who missed ANC visits, 319 (77 percent) were found, referred by women's groups, and received their third dose of IPTp.

6.2. Recent Progress

PMI supports the Government of Côte d'Ivoire MOH through the NMCP, in implementing SBC interventions to improve malaria prevention, care, and support-related behaviors. These SBC activities include mass media with local radio and TV, IPC with women's groups, community mobilization with community action groups, and use of communication technology, such as SMS reminders, and capacity-strengthening through refreshment training, supervision, and on-site coaching.

The progress made during the previous 12 months is reflected in the following milestones:

- Finalized and disseminated the National SBC Plan to Fight Malaria in Côte d'Ivoire 2021–2025. The MOH signed the validated malaria SBC strategy, and the NMCP disseminated 250 copies to partners. This new plan was developed by building on the findings of Malaria Behavior Survey (MBS) 2019, which was a useful tool for measurement of the impact of the previous SBC plan.
- Finalized and disseminated communication materials supporting the national malaria SBC campaign. With input from the NMCP and key stakeholders, PMI supported the finalization of 6 TV and radio spots and 6 posters about ITN use, prompt care-seeking for fever, and IPTp. Also, PMI supported the distribution of 12,000 posters and the broadcasting of 8,607 radio spots on 23 community radio stations and 225 TV spots on 4 TV stations. A total of 943,315 people were exposed to the radio messages.
- Mobilized 200 communities to fight against malaria. PMI supported the training of 169 health district stakeholders from 28 health districts to set up, guide, and monitor communities using the Community Action Cycle. In total, 200 communities in priority health areas benefited from "Model Mother" group activities and community action group activities.

- Coached 116 Model Mother groups in IPC.
- Identified and trained 82 new Model Mother groups in 28 health districts, trained each of the 82 new health center personnel in community mobilization, established community action groups in the corresponding HF catchment areas, and helped health district personnel and community action groups develop their own community action plans.
- Reinforced the capacity of the five existing health districts and 35 corresponding community action groups by coaching each as they carried out their planned community mobilization activities.
- Improved midwives' communication skills and increased pregnant women's satisfaction with ANC services. Using a behavioral economics approach, PMI supported the design and implementation of an intervention to improve health provider behavior, which both improved IPC between providers and clients and helped strengthen the sense of accountability among providers and ownership among clients. For instance, 80 percent of care providers believe that the use of the tracking sheet has improved SP uptake during pregnancy.
- Advocated for and secured support from religious leaders, kings, and traditional chiefs to prevent malaria. PMI supported advocacy sessions for the six high religious authorities to earn their commitment to involve religious leaders in the fight against malaria. As a result of this advocacy, the executive board of the National Chamber of Traditional Kings and Chiefs of Côte d'Ivoire committed their support to the NMCP and its partners to prevent malaria.
- Trained 20 new national SBC trainers. PMI supported the training of trainers session to set a pool of 20 new SBC trainers. These trainers from various specialized MOH programs and civil society will be responsible for supporting the health regions and districts in designing and implementing high-quality SBC interventions.
- Four national malaria SBC media campaigns were conducted based on culturally compelling messages about ITN use, prompt care-seeking for fever, and IPTp. These media campaigns reached an estimated 943,315 people.
- Organized malaria-themed campaign on ITN use, prompt care-seeking for fever, and IPTp in four health regions (Moronou, N'zi, Sud-comoe, and Agneby Tiassa Me) and six health districts (Dimbokro, Bocanda, Kouassi-Kouassikro, Bongouanou, Aboisso, and Agboville), reaching approximately 6,000 people

In some health districts and health centers, there has been a lack of sufficient engagement with community action groups and/or Model Mother groups. Conflicting schedules and the competing interests of several health programs delayed scheduling and implementation of district- and community-level

activities. Activities that require health district and/or health center personnel involvement were disrupted and often progress slowed during implementation.

ITNs

ITN use among those with access increased in Côte d'Ivoire between 2012 (Demographic and Health Survey [DHS]) and 2016 (MICS) from 68 percent to 79 percent. Unfortunately, 2018–2019 MBS data indicate this ratio has fallen to 70 percent. Seventy percent of children under five years of age slept under an ITN and 69 percent of pregnant women slept under an ITN in 2019, indicating high rates of use among those most vulnerable. In terms of equity, women 30 to 40 years of age and men 40 to 60+ years of age were prioritized for ITN use when there were not enough ITNs in a household. School-aged children and young men were the least prioritized for ITN use when there were not enough.

SBC activities during the ITNs mass distribution campaign contributed to increased access to ITNs with a national distribution coverage of 97 percent.[8] Mass media campaigns with international and national TV channels, national and local radios, social and community mobilization, and IPC through home-based mobilization contributed significantly to increased access of the ITNs during mass distribution in 2021. According to the 2020 RASS , the routine distribution during ANC showed that the proportion of pregnant women having received one ITN in ANC is 77.52 percent at the national level, a slight drop from the 2019 figure of 79.78 percent.[9] In terms of routine distribution during EPI,[10] the proportion of children under one year of age seen in Penta1, having received one ITN at the national level, was 64.63 percent against 64.7 percent in 2019 (i.e., a decrease of 0.10 percent).

MIP

The key challenges are the early use of ANC by pregnant women and the drop-out rate of ANC. In 2020, the national drop-out rate of ANC was 57.29 percent. This rate decreased (by 0.71 percent) in comparison to the 2019 rate of 58.00 percent. Therefore, to address this main challenge, women's group–led IPC approaches focused on early use of ANC by pregnant women and loss to follow-up of pregnant women, contributing to a significant increase in IPTp uptake.

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[8] Mass campaign report 2021.
[9] RASS 2020.
[10] Ibid.

Case Management

According to the findings of the MBS 2019, while 90 percent of those who seek care for their febrile children (under five years of age), only about 75 percent seek care the same or the next day, and just 63 percent go to a health worker or HF as their first recourse. Thus, increasing care-seeking for fever (within 24 hours) from a health worker or service provider (including CHW) among caregivers of children under five years of age is prioritized as the most important malaria case management behavior in the NMCP SBC Strategy. These data indicate that it is not care-seeking itself that needs to increase among caregivers in Côte d'Ivoire, but where and how quickly care is sought. Going to a health worker or HF first was more likely in Abidjan than in central, northern, or southern zones, suggesting access in more rural areas may be a barrier.

To expand the reach of malaria messages, PMI collaborates with local radio stations, while community mobilization is also conducted with religious leaders and kings and traditional chiefs committed to malaria control and elimination. PMI supported national malaria SBC media campaigns through local radio, emphasizing prompt care-seeking for fever. PMI also supports the malaria-themed campaign on prompt care-seeking for fever and, at the district level, increasing access to case management service delivery at the facility and community levels.

In addition, IPC is used by CHWs, women's groups, and community action groups for prompt care-seeking of fever, particularly for children and pregnant women. At the facility level, OTSS is used for supervision to improve quality service delivery by care providers. This tool will be used for improving quality community-based service delivery, including iCCM.

Service Delivery

PMI will support the scaling-up of the behavioral economics service provider behavior change approach at the facility level and an OTSS supervision approach at the community level. PMI will contribute to the saturation strategy of having CHW provide iCCM services to communities living more than five kilometers away from a facility. This saturation strategy will be implemented after a mapping of CHW to fill service delivery gaps according to the national community health strategy guidance (one CHW for 250 to 500 people). Thus, people living more than five kilometers away from a facility will be progressively covered by CHWs. These SBC strategies will be useful for improving both accessibility and quality of services at facility and community levels.

Plans and Justification with FY 2023 Funding

The FY 2023 funding tables contain a full list of SBC activities that PMI proposes to support in Cote d'Ivoire with FY 2023 funding. Please visit

http://www.pmi.gov/resources/malaria-operational-plans-mops for these FY 2023 funding tables.

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

6.3. Additional Support Activities

Using SBC interventions, PMI supports the uptake and correct and consistent use of malaria interventions in alignment with the country's national malaria control communication strategy, thereby improving the overall quality of malaria control efforts that will contribute to reduction in malaria.

Based on the analyses in the different intervention sections (summarized below), as well as the availability of new data on determinants of behavior, PMI is proposing to increase the funding allocation for SBC activities. In collaboration with the Global Fund, PMI will continue supporting the NMCP to make a better impact on changing malaria-related behaviors.

Through implementation of the second MBS and ongoing operational research (OR) studies, specific determinants for the community and provider will be determined. Thus, PMI will continue SBC capacity-building at both the national and district levels through planning, design, implementation, and monitoring and evaluation of SBC activities. This support will be conducted by:

- Strengthening SBC activities' coordination at the national level with NMCP.
- Empowering district-specific SBC focal points and community coordinators to increase coordination and ensure the impact of SBC investments.
- Strengthening capacity of key stakeholders for effective SBC design, implementation, and monitoring and evaluation.
- Capacity strengthening for NMCP staff on the use of data (from DHIS2 and MBS) to inform SBC program priorities and strategies.

7. SM&E

7.1. PMI Goal and Strategic Approach

The NMSP 2021–2025 aims to strengthen SM&E at the central, regional, and district levels, including the community levels of the health system by reinforcing the capacity of the National Health Management Information System. PMI collaborates with the Global Fund and UNICEF in providing resources and TA to the NMCP for SM&E activities; a particular focus is on data quality improvement and data use for decision-making at all levels. This SM&E system should be adept at providing high-quality data for epidemiologic, entomological, and parasitological surveillance. Specific objectives

include reinforcing the operational capacity for malaria data management, developing monitoring and evaluation tools, reinforcing quality control, disseminating data, and using data for better decision-making at all levels.

7.2. Recent Progress (between March 2021 and February 2022)

During the past 12 months, PMI supported the following activities:

At the central level:

- Configuration of the data quality review module in the national DHIS2 to capture data inconsistencies during data entry.
- Development of malaria Routine Data Quality Assessment (RDQA) tool for on-site data verification.
- Development of data validation rule manual to guide identification and correction of data inconsistencies in collaboration with the NMCP and the Directorate of Information Technology and Health Information.
- Configuration of for-profit private-sector monthly health report in DHIS2.
- Development of mobile scorecard and dashboard application in two districts to strengthen data usage for decision-making.
- Development and dissemination of a quarterly surveillance bulletin as an electronic version posted on the NMCP website and in hard copies.
- Development of the national malaria monitoring and evaluation implementation guidelines.
- Training of NMCP staff in conducting routine malaria data analysis and disseminating the results.
- Mentoring and coaching of 4 NMCP staff to conduct joint supervisions with 33 HFs in 11 districts.
- Training of 19 NMCP staff on the use of malaria training database and activity dashboard.

At the operational level:

- Strengthening of the capacity of the regional technical advisors and health district teams in the field data assessment in the 20 health districts selected for enhanced malaria surveillance and data quality improvement.
- Training of 19 community focal points in data quality control to improve community data quality.
- Mentoring and coaching of 10 regional technical advisors and 54 district teams to conduct data quality assessment in 60 HFs.
- Training of 25 senior health staff on SM&E.
- Providing support to the NMCP in reviewing cases of malaria-related death using the RDQA tool in the reference hospitals of five health districts.

7.3. Plans and Justification with FY 2023 Funding

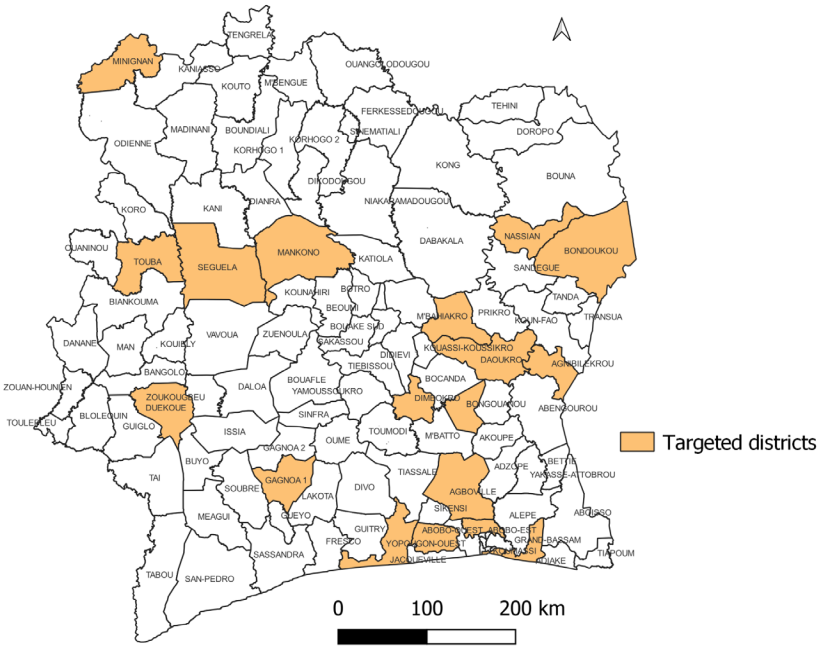
The FY 2023 funding tables contain a full list of SM&E activities that PMI proposes to support in Cote d'Ivoire with FY 2023 funding. Please visit www.pmi.gov/resources/malaria-operational-plans-mops for these FY 2023 funding tables.

Data quality remains a major challenge at the operational level and most of the HFs are unable to provide consistent data to inform decisions. In partnership with key stakeholders, including Global Fund, UNICEF, and other technical partners, PMI will continue to support the NMCP in assuring quality of data collection, collation, and analysis of malaria data and use.

PMI FY 2023 funds will support the following activities:

- Strengthening SM&E activities at regional, district, facility, and community levels to improve data quality and use.
- Increasing private sector (for-profit and not-for-profit) data integration into DHIS2.
- Implementing data quality specific approach for use within reference hospitals, at the community level, and in the private sector.
- Supervising and training of health care workers at the regional and district levels, focusing on districts with higher data inconsistency.
- Supporting integration of malaria information management, reporting, and data use in the quarterly coordination meeting with PMI partners.
- Conducting field data verification visits at targeted facilities in selected districts every two months. At the end of these site visits, the monthly reports will be corrected and data updated in DHIS2.
- Mentoring the NMCP to conduct joint quarterly supervision visits with the health district teams to priority facilities in selected districts.
- Supporting the NMCP in the development and dissemination of a quarterly surveillance bulletin as electronic and hard copies and posted on the NMCP website.
- Providing guidance to the NMCP to organize a quarterly data review meeting with all the stakeholders.
- Assisting the NMCP in elaborating malaria program annual report.
- Supporting and encouraging the NMCP to work closely with the Directorate of Information Technology and Health Information in the organization of the monthly meeting on the data verification.
- Supporting the digitization process of the community health information system.

Figure 5. PMI Supports Twenty Districts for SM&E



For SM&E activities, PMI supported 20 districts distributed in all the geographical areas of the country (see Figure 5 above). These districts received at least two on-site data verification visits and one RDQA. These data quality improvement activities permit strengthening the data collection and reporting of these targeted districts based on the identified weakness.

Table 4. Available Malaria Surveillance Sources

Source	Data Collection Activity	2020	2021	2022	2023	2024	2025
Household Surveys	Demographic and Health Survey		*X				
Household Surveys	Malaria Indicator Survey						
Household Surveys	MICS		X				
Household Surveys	Expand Program Immunization Survey						
Health Facility Surveys	Service Provision Assessment						
HF Surveys	Service Availability Readiness Assessment Survey						
HF Surveys	Other Health Facility Survey						

Source	Data Collection Activity	2020	2021	2022	2023	2024	2025
Malaria Surveillance and Routine System Support	Therapeutic Efficacy Studies		X			P	
Malaria Surveillance and Routine System Support	Support to Parallel Malaria Surveillance System			P	P	P	
Malaria Surveillance and Routine System Support	Support to Health Management Information System			P	P	P	
Malaria Surveillance and Routine System Support	Support to Integrated Disease Surveillance and Response						
Malaria Surveillance and Routine System Support	Electronic Logistics Management Information System		X				
Malaria Surveillance and Routine System Support	Malaria Rapid Reporting System			P	P	P	
Other	EUV Survey		X				
Other	School-based Malaria Survey						
Other	Knowledge, Attitudes and Practices Survey, Malaria Behavior Survey						
Other	Malaria Impact Evaluation			P			
Other	Entomologic Monitoring Surveys						

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

8. OR and Program Evaluation (PE)

8.1. PMI Goal and Strategic Approach

The NMCP intends to enhance and strengthen the quality of malaria interventions for the Côte d’Ivoire population through effective OR and PE that contributes to improvement of programming and implementation of malaria activities.

PMI aims to support the NMCP and the national malaria strategy 2021–2025. The NMCP listed a schedule of planned surveys and studies (12 total) in their "Plan S&E Paludisme 2021–2025 Final Valide ASA 10012021.” The goals of the NMCP are that 80 percent of the activities will be conducted and 100 percent of study results will be disseminated and used. These studies and research activities include strengthening the surveillance system (entomological, epidemiological, and anthropological) and the initiating of studies to assess feasibility of implementing IPTp, Intermittent preventive treatment of infants, and SMC.

PMI has not been involved in OR activities since its inception in Côte d'Ivoire. Nonetheless, PMI planned to fund the evaluation of the impact of the IRS implemented in Côte d'Ivoire in 2020. Due to COVID-19 pandemic restrictions in 2020, the first IRS campaign was delayed until August 2020, hence the evaluation into 2021. The second IRS campaign was also postponed to August 2021, due to conflict with the 2021 ITN mass campaign. Because of these delays, the NMCP and PMI decided to combine the evaluation of the 2020 and 2021 IRS campaigns. Although PMI and the NMCP have agreed to discontinue IRS after the third campaign in 2022, the Government of Côte d'Ivoire will learn from the PMI impact evaluation for future IRS operations should they select to implement the strategy in the future.

To accelerate the launching of the OR agenda, PMI in collaboration with the NMCP has organized a half-day consultation with academic and local research institutions to foster their participation in malaria control and begin conversations on OR to support the malaria control efforts in the country.

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

PMI supported the development of dashboards summarizing epidemiological, entomological, IRS and ITN coverage data, and climate data (e.g., rainfall, vegetation). Both 2020 and 2021 IRS campaigns data were included in the dashboard as a baseline period for the IRS impact evaluation.

Prior to starting, PMI supported a HF data quality audit that compared data in DHIS2 with HF registers. Based on the data quality audit findings, the NMCP and the evaluation team decided to conduct field-based data collection directly from the HF registers at HFs instead of using DHIS2 for the evaluation. PMI supported the consultation meeting with the NMCP as well as academic and local research institutions. This meeting saw the engagement of these institutions in partnering with the NMCP for groundbreaking malaria OR and the identification of some OR topics.

8.3. PMI-funded OR/PE Studies in Cote d'Ivoire

No PMI-funded OR/PE is ongoing or has been recently completed.

Table 5. Non-PMI funded Operational Research/Program Evaluation Studies Planned/Ongoing in Cote d'Ivoire

Source of Funding	Implementing Institution	Research Question/Topic	Current Status/ Timeline
Global Fund	NMCP and Consultants	Retrospective evaluation of the impact of malaria interventions in Côte d'Ivoire	Data collection and integration in data warehouse 2022 completion

8.4. Plans and Justification with FY 2023 Funding

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

PMI will support OR/PE resulting from the forum discussion with the NMCP and the academic and local research institutions that: help evaluate coverage of population at-risk, intervention quality, community engagement, or delivery efficiency; study reducing malaria transmission and disease burden; test effectiveness of new or evolved priority interventions and strategies; or explore new metrics and mechanisms to assess intervention impact. PMI will continue discussion with the NMCP and local research institutions to explore OR activities that will introduce innovations in the programming of the interventions and advance malaria control efforts.

Because OR discussions have just begun and research topics are being proposed, there is currently no OR/PE planned by PMI; this section is blank in the FY2023 PMI budget tables.

9. Capacity Strengthening

9.1. PMI Goal and Strategic Approach

Although the NMCP coordinates the program under the supervision of the general directorate of health since 2016, the NMCP is expected to build the technical and managerial capacity of the program to meet the goal of malaria control set forth in the NMSP. The NMCP therefore relies on partnerships with donors such as PMI, the Global Fund, UNICEF, and the private sector to build the capacity to better coordinate the program.

In 2019, PMI supported an evaluation of the management capacity of the NMCP, the results and recommendations of which have been translated into a capacity-building plan to enable the NMCP to better coordinate an increasing investment form PMI and the Global Fund. Moreover, PMI supports the development and the implementation of a TA plan for adaptive and specific capacity strengthening through temporary duty travel.

Consistent with the PMI strategy 2021–2026, PMI will support the government of Côte d'Ivoire successfully lead and execute malaria programs through:

- Strengthening national leadership and local staff technical skills.
- Creating equitable and dignified partnerships with local government, the private sector, and the civil society to lead the design and implementation of malaria interventions.

Thus, PMI support will reinforce the national health system's capacity to deliver and manage quality malaria prevention and control interventions in communities and HFs by training Côte d'Ivoire technicians, providing TA, and supporting the rehabilitation and equipment of NMCP and other national institutions.

9.2. Recent Progress

PMI supported the management capacity strengthening action plan for better coordination of supply chain, case management, malaria prevention, vector control, SBC intervention and monitoring and evaluation activities with PMI's partners. PMI supported the following capacity strengthening activities during the past 12 months:

- Assessed private sector landscaping which identified opportunities for investment in malaria control and elimination. The findings of the assessment will serve to design a strategy of partnership that will allow the NMCP to mobilize resources from the private sector in support of malaria control and elimination.
- Strengthened coordination of NMCP in the following areas: Malaria Task Force semi-annual meetings (jointly funded PMI/Global Fund), quarterly review meetings and annual planning (jointly funded PMI/Global Fund).
- Provided institutional and logistic support to improve data collection to reduce malaria transmission to three entomological institutions (Institut National d'Hygiène Publique, Centre d'Entomologie, and Institut Pierre Richet) with laboratory donation and insect housing rehabilitation, including insectarium material, laboratory equipment and other lab inputs.
- Procured a server for the NMCP to strengthen the use of new technologies in data integration for evidence-based decision-making.
- Trained 25 health officers from the central, regional, and district levels on SM&E to strengthen their capacity for better monitoring of malaria prevention and control activities.
- Provided technical support to the National Laboratory for Public Health malaria drugs quality control.

9.3. Plans and Justification with FY 2023 Funding

During the next 12 months, PMI will continue supporting the following capacity strengthening activities:

- Support the NMCP and stakeholders' coordination meetings and TWG meetings: Support the NMCP to convene all malaria TWGs at least every semester to ensure effective coordination and technical support by all actors active in malaria control efforts.

- Support regional technical advisors: Continue support for 10 regional advisors (one for approximately two health regions) to build capacity of the regional- and district-level staff for effective malaria program management and implementation—in close coordination with the NMCP, PMI staff, and PMI implementing partners—and continuing education for regional technical advisors. Global Fund has also supported the recruitment of 10 other technical advisors deployed to the field in the first semester of 2022.
- Support NMCP to participate in seminars, international conferences, and study tours.
- Support one long-term technical advisor seconded to the NMCP to build strengthening of the NMCP staff for effective supply chain, procurement, forecasting, and commodity logistics management. Support the Malariology Course by a training workshop of 25 district-level health officers to understand malaria epidemiology and continuum from control to elimination, including partnerships and the international funding landscape and the management of malaria prevention and control activities.
- Support one SM&E session to strengthen the capacity of 25 health officers at the central, regional, and district levels to monitor malaria prevention and control interventions.
- Support the implementation of the capacity strengthening plan (in collaboration with Global Fund and other support).

10. Staffing and Administration

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

ANNEX: GAP ANALYSIS TABLES

Table A-1. ITN Gap Analysis Table

Calendar Year	2022	2023	2024
Total country population	29,069,148	29,824,946	30,600,394
Total population at risk for malaria	29,069,148	29,824,946	30,600,394
PMI-targeted at-risk population	12,883,433	13,218,401	13,562,080
Population targeted for ITNs	2,164,838	2,226,767	2,294,914
Continuous Distribution Needs			
Channel 1: ANC	932,422	959,886	988,148
Channel 1: ANC Type of ITN	All three (Dual AI, PBO and Single Pyrethroid)	All three (Dual AI, PBO and Single Pyrethroid)	All three (Dual AI, PBO and Single Pyrethroid)
Channel 2: EPI	1,232,416	1,266,880	1,306,766
Channel 2: EPI Type of ITN			
Channel 3: School			
Channel 3: School Type of ITN			
Channel 4: Community			
Channel 4: Community Type of ITN			
Channel 5:			
Channel 5: Type of ITN			
Estimated Total Need for Continuous Channels	2,164,838	2,226,767	2,294,914
Mass Campaign Distribution Needs			
Mass distribution campaigns		18,014,003	
Mass distribution ITN type	All three (Dual AI, PBO and Single Pyrethroid)	All three (Dual AI, PBO and Single Pyrethroid)	All three (Dual AI, PBO and Single Pyrethroid)
Estimated Total Need for Campaigns	0	18,014,003	0
Total ITN Need: Continuous and Campaign	**2,164,838**	**20,240,770**	**2,294,914**
Partner Contributions			
ITNs carried over from previous year	2,668,218	2,668,218	1,542,047
ITNs from Government	280,000	280,000	280,000
Type of ITNs from Government	PBO and Single Pyrethroid	PBO and Single Pyrethroid	PBO and Single Pyrethroid
ITNs from Global Fund	1,062,200	13,992,435	1,140,081
Type of ITNs from Global Fund	Dual AI and Single Pyrethroid	All three (Dual AI, PBO and Single Pyrethroid)	Dual AI and Single Pyrethroid
ITNs from other donors	0	0	0
Type of ITNs from other donors			
ITNs planned with PMI funding	822,638	4,842,164	870,371

Calendar Year	2022	2023	2024
Type of ITNs with PMI funding	PBO and Single Pyrethroid	PBO and Single Pyrethroid	PBO and Single Pyrethroid
Total ITNs Contribution Per Calendar Year	**4,833,056**	**21,782,817**	**3,832,499**
Total ITN Surplus (Gap)	**2,668,218**	**1,542,047**	**1,537,586**

Table A-2. RDT Gap Analysis Table

Calendar Year	2022	2023	2024
Total country population	29,069,148	29,824,946	30,600,394
Population at risk for malaria	29,069,148	29,824,946	30,600,394
PMI-targeted at-risk population	12,883,433	13,218,401	13,562,080
RDT Needs			
Total number of projected suspected malaria cases	8,692,813	8,934,779	9,183,452
Percent of suspected malaria cases tested with an RDT	80%	80%	80%
RDT Needs (tests)	**6,954,250**	**7,147,823**	**7,346,761**
Needs Estimated based on HMIS Data			
Partner Contributions (tests)			
RDTs from Government	0	0	0
RDTs from Global Fund	4,399,317	4,431,650	4,554,992
RDTs from other donors	0	0	0
RDTs planned with PMI funding	2,554,933	2,987,790	3,070,946
Total RDT Contributions per Calendar Year	**6,954,250**	**7,419,440**	**7,625,938**
Stock Balance (tests)			
Beginning Balance	3,317,325	3,317,325	3,588,941
- Product Need	6,954,250	7,147,823	7,346,761
+ Total Contributions (received/expected)	6,954,250	7,419,440	7,625,938
Ending Balance	**3,317,325**	**3,588,941**	**3,868,118**
Desired End of Year Stock (months of stock)	6	6	6
Desired End of Year Stock (quantities)	3,477,125	3,573,912	3,673,381
Total Surplus (Gap)	**(159,800)**	**15,030**	**194,738**

Table A-3. ACT Gap Analysis Table

Calendar Year	2022	2023	2024
Total country population	29,069,148	29,824,946	30,600,394
Population at risk for malaria	29,069,148	29,824,946	30,600,394
PMI-targeted at-risk population	12,883,433	13,218,401	13,562,080
ACT Needs			
Total projected number of malaria cases	6,425,727	6,604,589	6,788,407
Total ACT Needs (treatments)	**6,416,269**	**6,594,867**	**6,778,415**
Select Data Source			
Partner Contributions (treatments)			
ACTs from Government	0	0	0
ACTs from Global Fund	4,731,545	4,831,701	4,471,549
ACTs from other donors	0	0	0
ACTs planned with PMI funding	1,684,724	1,763,166	2,306,866
Total ACTs Contributions per Calendar Year	**6,416,269**	**6,594,867**	**6,778,415**
Stock Balance (treatments)			
Beginning Balance	1,444,105	1,444,105	1,444,105
- Product Need	6,416,269	6,594,867	6,778,415
+ Total Contributions (received/expected)	6,416,269	6,594,867	6,778,415
Ending Balance	**1,444,105**	**1,444,105**	**1,444,105**
Desired End of Year Stock (months of stock)	3	3	3
Desired End of Year Stock (quantities)	1,604,067	1,648,717	1,694,604
Total Surplus (Gap)	**(159,963)**	**(204,612)**	**(250,499)**

Table A-4. RAS Gap Analysis Table

Calendar Year	2022	2023	2024
Artesunate Suppository Needs			
Number of severe cases expected to require pre-referral dose (or expected to require pre-referral dose based on number of providers for the service)	77,876	79,901	81,978
Total Artesunate Suppository Needs (suppositories)	**77,876**	**79,901**	**81,978**
Needs Estimated based on a Combination of HMIS and Consumption Data			
Partner Contributions (suppositories)			
Artesunate suppositories from Government	0	0	0
Artesunate suppositories from Global Fund	0	0	0
Artesunate suppositories from other donors	0	0	0
Artesunate suppositories planned with PMI funding	55,800	59,276	62,752
Total Artesunate Suppositories Available	**55,800**	**59,276**	**62,752**
Stock Balance (suppositories)			
Beginning Balance	89,838	67,762	47,137
- Product Need	77,876	79,901	81,978
+ Total Contributions (received/expected)	55,800	59,276	62,752
Ending Balance	**67,762**	**47,137**	**27,911**
Desired End of Year Stock (months of stock)	6	6	6
Desired End of Year Stock (quantities)	38,938	39,950	40,989
Total Surplus (Gap)	**28,824**	**7,187**	**(13,078)**

Table A-5. SP Gap Analysis Table

Calendar Year	2022	2023	2024
Total Country Population	29,069,148	29,824,946	30,600,394
Total Population at Risk for Malaria	29,069,148	29,824,946	30,600,394
PMI Targeted at Risk Population	12,883,433	13,218,401	13,562,080
SP Needs			
Total Number of Pregnant Women	1162766	1192998	1224016
Percent of pregnant women expected to receive IPTp1	71%	72%	72%
Percent of pregnant women expected to receive IPTp2	64%	64%	65%
Percent of pregnant women expected to receive IPTp3	58%	58%	58%
Percent of pregnant women expected to receive IPTp4	0%	0%	0%
Total SP Needs (doses)	**2,246,101**	**2,312,259**	**2,380,339**
Needs Estimated based on a Combination of HMIS and Consumption Data			
Partner Contributions (doses)			
SP from Government	0	2,120,000	2,380,400
SP from Global Fund	2,100,000	0	0
SP from other donors	0	0	0
SP planned with PMI funding	0	0	0
Total SP Contributions per Calendar Year	**2,100,000**	**2,120,000**	**2,380,400**
Stock Balance (doses)			
Beginning balance	833,750	687,649	495,390
- Product Need	2,246,101	2,312,259	2,380,339
+ Total Contributions (Received/expected)	2,100,000	2,120,000	2,380,400
Ending Balance	**687,649**	**495,390**	**495,452**
Desired End of Year Stock (months of stock)	4	4	4
Desired End of Year Stock (quantities)	748,700	770,753	793,446
Total Surplus (Gap)	**(61,051)**	**(275,363)**	**(297,995)**