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Mozambique

Malaria Operational Plan FY 2024

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This Fiscal Year (FY) 2024 Malaria Operational Plan has been approved by the U.S. Global Malaria Coordinator and reflects collaborative discussions with national malaria control programs and other partners. Funding available to support outlined plans relies on the final FY 2024 appropriation from U.S. Congress. Any updates will be reflected in revised postings.

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ABBREVIATIONS

ACT	Artemisinin-based combination therapy
AL	Artemether-lumefantrine
ANC	Antenatal care
AS/PY	Artesunate-pyronaridine
BMGF	Bill & Melinda Gates Foundation
CBO	Community-based organization
CISM	Centro de Investigação em Saúde de Manhiça
CHAI	Clinton Health Access Initiative
CHW	Community health workers
CMAM	Central Medical Store
CY	Calendar year
DP	Dihydroartemisinin-piperaquine
DHIS2	District Health Information System-2
DQA	Data quality assurance
EPI	Expanded Program on Immunization
EQA	External quality assurance
FY	Fiscal year
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
G2G	Government-to-government
HF	Health facility
HMIS	Health management information system
IPTp	Intermittent preventive treatment for pregnant women
iMISS	Integrated Malaria Information Storage System
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito net
MDA	Mass drug administration
MIP	Malaria in pregnancy
MoH	Ministry of Health
MOP	Malaria Operational Plan
NMCP	National Malaria Control Program
NMP	National Malaria Program
NMSP	National Malaria Strategic Plan
PBO	Piperonyl butoxide
PMI	U.S. President’s Malaria Initiative
Q	Quarter
RDT	Rapid diagnostic test
SBC	Social and behavior change
SIGLUS	Sistema de Informação de Gestão Logística das Unidades Sanitária
SIMAM	Sistema de Informação de Medicamentos e Artigos Médicos
SM&E	Surveillance, monitoring, and evaluation

SP	Sulfadoxine-pyrimethamine
TA	Technical assistance
TWG	Technical working group
UCSF	University of California San Francisco
USAID	United States Agency for International Development
WHO	World Health Organization

EXECUTIVE SUMMARY

To review specific country context for Mozambique, please refer to the country malaria profile located on PMI's country team landing page, which provides an overview of the country malaria situation, key indicators, the National Malaria Program (NMP) strategic plan, and the partner landscape.

U.S. President's Malaria Initiative

Launched in 2005, the U.S. President's Malaria Initiative (PMI) supports implementation of malaria prevention and treatment measures as well as cross-cutting interventions. PMI's 2021–2026 strategy, *End Malaria Faster*, envisions a world free of malaria within our generation with the goal of preventing malaria cases, reducing malaria deaths and illness, and eliminating malaria in PMI partner countries. PMI currently supports 27 countries in Sub-Saharan Africa and 3 programs across the Greater Mekong Subregion (GMS) in Southeast Asia to control and eliminate malaria. Mozambique began implementation as a PMI partner country in fiscal (FY) 2007.

Rationale for PMI's Approach in Mozambique

Malaria is endemic in Mozambique. There were more than 12 million cases in 2022, with pregnant women and young children at greatest risk for severe malaria. Despite progress by the National Malaria Control Program (NMCP), PMI, and other partners, incidence remains high in central and northern Mozambique. Based on epidemiological trends and strategic discussions with NMCP, PMI Mozambique revised the list of provinces for targeted service delivery support to include Nampula, Zambézia, and Manica starting in FY 2022. A lighter-touch level of support to Tete will be maintained via government-to-government (G2G) agreements. Challenges to achieving malaria control include logistics of delivering commodities and services to hard-to-reach areas, insecticide resistance, and limited adherence to case management practices and care-seeking behaviors. Mozambique has experienced increased natural disasters and violent extremism, which have contributed to increased transmission and limited access to malaria services. PMI leverages investments to strengthen the capacity of Mozambican people and institutions to achieve malaria control.

Overview of Planned Interventions

The proposed FY 2024 PMI funding for Mozambique is $27.5 million. PMI will support the following intervention areas with these funds.

1. Vector Monitoring and Control

PMI supports the National Malaria Strategic Plan (NMSP) and National Integrated Vector Management Strategy through entomological monitoring and strengthening of entomology and IRS led by the Ministry of Health (MoH). The following activities will be implemented with FY 2024 funds:

- Year-round entomological data collection at sentinel sites throughout the country and annual insecticide resistance testing as part of supported IRS activities.
- Support for a senior entomologist seconded to NMCP, three laboratory technicians at the National Institute of Health, and two insectary managers.

2. Malaria in Pregnancy

PMI supports NMCP with the delivery of intermittent preventive treatment for pregnant women (IPTp) to all eligible pregnant women at all eligible antenatal care (ANC) visits in the target provinces of Nampula, Zambézia, and Manica. The following activities will be implemented with FY 2024 funds:

- PMI will continue to prioritize implementation of malaria in pregnancy (MIP) activities through the malaria integrated supervision platform.
- PMI will continue to provide technical support at the central level by participating in the MIP technical working group, which includes both NMP and maternal and child health representatives.

3. Drug-Based Prevention

PMI does not support seasonal malaria chemoprevention or other drug-based prevention in Mozambique. NMCP aims to articulate its strategic goals and plans for drug-based prevention activities in the next NMSP currently under development. PMI will provide technical assistance (TA) to NMCP and engage in stakeholder discussions around the introduction and rollout of the updated World Health Organization (WHO) recommendations on chemoprevention interventions, as appropriate for the Mozambican context.

4. Case Management

PMI support is closely aligned with NMSP and with the national guidelines on malaria treatment and supervision. PMI supports all of the recommended technical interventions of the strategy, but the geographic focus is limited to the provinces of Zambézia, Nampula, and Manica. The following activities will be implemented with FY 2024 funds:

- PMI will continue to support case management activities and provide TA at the central level.
- PMI will pilot the use of multiple drugs for the treatment of uncomplicated malaria in Manica Province. The plan is to continue to use artemether-lumefantrine (AL) at the health facility level and introduce a different drug (artesunate-pyronaridine [AS/PY] or dihydroartemisinin-piperaquine [DP]) at the community level. The final choice of the drug to be used at community level will be finalized during calendar year (CY) 2023; the decision will be based on the cost and availability of each drug.
- PMI will continue to procure rapid diagnostic tests (RDTs), artemisinin-based combination therapies (ACTs), injectable artesunate, and rectal artesunate.

- PMI will continue to support training and supervision of health care workers and laboratory technicians as well as the mentoring of community health workers (CHWs).
- PMI will continue to support integrated community case management, community case management of malaria for all ages, and prereferral rectal artesunate for severe malaria.

5. Health Supply Chain and Pharmaceutical Management

PMI provides TA to NMCP to improve the supply chain for malaria commodities, properly quantify needs, acquire accurate stocks, and minimize stockouts. With FY 2024 funds, PMI will continue to support:

- Expansion of the logistics management information system, data visibility, and data-driven decision making across the supply chain.
- Strengthening the stock status monitoring and commodities visibility of the Central Medical Store (CMAM) at the central, regional, and provincial level, and improving reporting rates to inform decision making.
- End-to-end visibility for malaria commodities.
- Malaria community kit planning, assembly, and distribution with CMAM and NMCP.
- The malaria supply chain technical working group and relevant stakeholders.

6. Malaria Vaccine

As a country with moderate to high malaria transmission rates and high all-cause child mortality, the MoH applied to Gavi to be considered for support for a malaria vaccine rollout in the second application window. Gavi approved the application in April 2023, and Mozambique is planning deployment beginning March 2024, but this is contingent on Mozambique receiving vaccine allocations from WHO. PMI provided TA for the application process. PMI is not currently planning to support vaccine implementation with FY 2024 resources.

7. Social and Behavior Change

PMI support is aligned with NMP's national strategy and social and behavioral change (SBC) strategy. SBC activities are implemented through a malaria-specific SBC approach that promotes adoption and adherence of malaria prevention behaviors with an emphasis on prompt care-seeking behavior, adherence to clinical guidelines, and acceptance of IPTp3. FY 2024 funds will support the implementation of a combination of evidence-based SBC interventions through community-based organizations and community radio stations, including mass media activities and interpersonal communication activities in Nampula, Zambézia, Manica, and Cabo Delgado (media only). The activities implemented will be based on the baseline assessments conducted during CY 2023.

8. Surveillance, Monitoring, and Evaluation

Aligned with the NMCP, PMI will continue to support surveillance, monitoring, and evaluation activities and provide TA at the central level. The field activities will be focused in the three focus provinces: Nampula, Zambézia, and Manica and through a G2G agreement in Tete province. In recent years, the Mozambique NMCP has made significant progress in the rollout of the Integrated Malaria Information Storage System (iMISS) platform across the country. Currently, this platform is established in all districts in Mozambique. As this is a continuous process, the strengthening of iMISS will continue to be a priority for PMI.

9. Operational Research and Program Evaluation

PMI supports NMCP with the identification and execution of operations research and program evaluation. There are no planned PMI-supported operational research projects.

10. Capacity Strengthening

PMI's capacity strengthening strategy supports a whole of society, multisectoral approach to improve health service delivery. Using FY 2024 funds, support will focus on:

- Strengthening the organizational capacity of local partners through direct support or subawards.
- Providing technical assistance at the central level and in target provinces to improve planning and coordination of malaria control activities among partners and to enhance the capacity to respond to future climatic emergencies.
- Ongoing support for the Mozambican MoH Field Epidemiology Training Program.

11. Staffing and Administration

An interagency team works together to oversee all technical and administrative aspects of PMI Mozambique's program.

I. CONTEXT & STRATEGY

1. Introduction

Mozambique began implementation as a PMI partner country in FY 2007. This FY 2024 Malaria Operational Plan (MOP) presents a detailed implementation plan for Mozambique based on the strategies of PMI and the National Malaria Control Program (NMCP). It was developed in consultation with NMCP and with the participation of national and international partners. The activities that PMI is 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 Mozambique, describes progress to date, identifies challenges and relevant contextual factors, and provides a description of activities that are planned with FY 2024 funding. For more detailed information on the country context, please refer to the country malaria Profile, which provides an overview of the country's malaria situation, key indicators, NMCP strategic plan, and the partner landscape.

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

PMI is led by the United States Agency for International Development (USAID) and implemented with the U.S. Centers for Disease Control and Prevention. Launched in 2005, PMI supports the implementation of malaria prevention and treatment measures such as insecticide-treated mosquito nets (ITNs), indoor residual spraying (IRS), accurate diagnosis and prompt treatment with artemisinin-based combination therapies (ACTs), intermittent preventive treatment for pregnant women (IPTp), and drug-based prevention, as well as cross-cutting interventions such as surveillance, monitoring, and evaluation (SM&E); social and behavior change (SBC); and capacity strengthening. PMI's 2021–2026 strategy, *End Malaria Faster*, envisions a world free of malaria in our generation, with the goal of preventing malaria cases, reducing malaria deaths and illness, and eliminating malaria in PMI partner countries. PMI currently supports 27 countries in Sub-Saharan Africa and 3 programs in the Greater Mekong Subregion (GMS) in Southeast Asia to control and eliminate malaria. Over the next five years, PMI aims to save lives, reduce health inequities, and improve disease surveillance and global health security.

Under the strategy, and building on progress already made in PMI-supported countries, PMI will work with national malaria control programs and partners to accomplish the following objectives by 2026:

1. Reduce malaria mortality by 33 percent from 2015 levels in high-burden PMI partner countries, achieving a greater than 80 percent reduction from 2000.
2. Reduce malaria morbidity by 40 percent from 2015 levels in PMI partner countries with high and moderate malaria burden.
3. Bring at least 10 PMI partner countries toward national or subnational elimination and assist at least one country in the Greater Mekong Subregion to eliminate malaria.

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

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

3. Rationale for PMI's Approach in Mozambique

3.1. Malaria Overview for Mozambique

For more detailed information on malaria indicators, refer to the country malaria profile.

Malaria is endemic in Mozambique, and the entire population is at risk of contracting the disease. Pregnant women and children under five years of age have the greatest risk of developing severe malaria. *Plasmodium falciparum* accounts for 90 percent of all malaria infections, while *Plasmodium malariae* accounts for 9 percent and *Plasmodium ovale* for 1 percent. In 2022, malaria accounted for approximately 24 percent of all outpatient consultations, with over 12 million cases diagnosed in public health facilities and communities. From 2018 to 2022, the number of reported malaria cases nationwide increased each year, with the exception of 2021, when a slight reduction of cases was observed, likely related to the COVID-19 pandemic. The number of reported hospital malaria deaths decreased from 1,114 in 2018 to 423 in 2022. Malaria prevalence among children 6 to 59 months of age remained stable from 2011 to 2018 at around 40 percent, but the prevalence of low hemoglobin in the same age cohort increased from 9 percent in 2011 to 14 percent in 2018. Data from the 2018 Malaria Indicator Survey show that malaria prevalence varies across the country. Prevalence is higher in the northern and central regions (ranging from 29 percent in Sofala to 57 percent in Cabo Delgado) and lower in the southern region (ranging from 1 percent in Maputo city to 35 percent in Inhambane). Results from the 2022 Demographic Health Survey will be available in the second quarter of 2023.

3.2. Key Challenges and Contextual Factors

Despite the progress made by NMCP in collaboration with PMI and other partners, malaria incidence remains high in the center and north of the country. Particular challenges in achieving malaria control include logistical challenges (such as poor infrastructure and high cost) associated with delivering malaria commodities and services to hard-to-reach areas, increasing insecticide resistance, and gaps in understanding the barriers to adherence of case

management practices, prompt care-seeking behavior for persons with fever, and adherence to IPTp.

Mozambique is prone to natural disasters such as cyclones and floods, which have likely contributed to increases in malaria transmission in recent years, particularly in low-lying coastal areas and along major rivers. In 2019, the country was devastated by back-to-back cyclones, which killed at least 600 people and damaged or destroyed at least 240,000 homes, creating recovery needs estimated at $3.02 billion. In 2022, the country was hit by two cyclones and one tropical storm, which affected more than 300,000 people. In 2023, Maputo Province experienced heavy rains, affecting 44,000 people. The country was also hit twice by Tropical Cyclone Freddy, affecting almost 500,000 people in the provinces of Zambézia, Sofala, Tete, Manica, and Niassa.

Additionally, since late 2017, a violent extremist group now linked to the Islamic State, known as “Islamic State-Mozambique” has carried out over 600 attacks against the government and civilians in Cabo Delgado Province. The conflict in Cabo Delgado has made it unsafe for implementing partners to support the area and for residents to seek care.

3.3. PMI’s Approach for Mozambique

PMI activities align with the National Malaria Strategic Plan (NMSP) by supporting entomological monitoring, case management and drug efficacy monitoring, drug-based prevention, malaria commodity procurement and distribution, and SBC activities. PMI uses an integrated approach for the control of malaria in close collaboration with other key partners, such as the World Health Organization (WHO), the Global Fund, and the Bill & Melinda Gates Foundation (BMGF). PMI is gradually expanding its support to local partners by shifting to a model in which implementing partners provide more technical assistance (TA) and the provincial-level health departments lead the implementation of activities. Support to the provincial-level health departments will be through government-to-government (G2G) agreements. With FY 2024 funding, PMI will support direct G2G agreement in Nampula, Zambézia, Niassa, Tete, and the Instituto Nacional de Saúde. The agreements will support entomological surveillance in Nampula, Zambézia, Niassa, and Tete, and laboratory capacity in the Instituto Nacional de Saúde. PMI staff and PMI implementing partners will provide TA to the G2G agreements. PMI also supports agency priorities in localization, with significant components of the new malaria flagship activity and the new SBC activity prioritizing further strengthening of the technical, organizational, and management capacity of local organizations. PMI also invests in strengthening the overall health system through focused work to bolster the leadership of NMCP; concentrating on strengthening the capacity of the health care workers of the Ministry of Health (MoH); and strengthening the national supply chain system, including the capacity of the Central Medical Store (*Central de Medicamentos e Artigos Médicos*, or CMAM) to manage the supply information system and outsource drug transport to the private sector.

3.4 Key Changes in this MOP

There were two important changes in this MOP. First, PMI decided to focus its vector control interventions on entomologic monitoring and cease its support to IRS in Zambézia Province. This decision was based on the following factors: (1) the major vector control strategy in the country is the use of ITNs, which are delivered through universal coverage campaigns at the community level and to pregnant women during antenatal care (ANC) visits; (2) the country would have completed the introduction of piperonyl butoxide (PBO) and dual active ingredient ITNs through Global Fund support by the end of calendar year (CY) 2023, which are more durable and effective than standard ITNs. Second, Mozambique decided to continue to use artemether-lumefantrine (AL) at the health facility level and introduce a different ACT (dihydroartemisinin-piperaquine or artesunate-pyronaridine) at community level. The introduction of a new drug at the community level aims to reduce the pressure on the development of AL resistance.

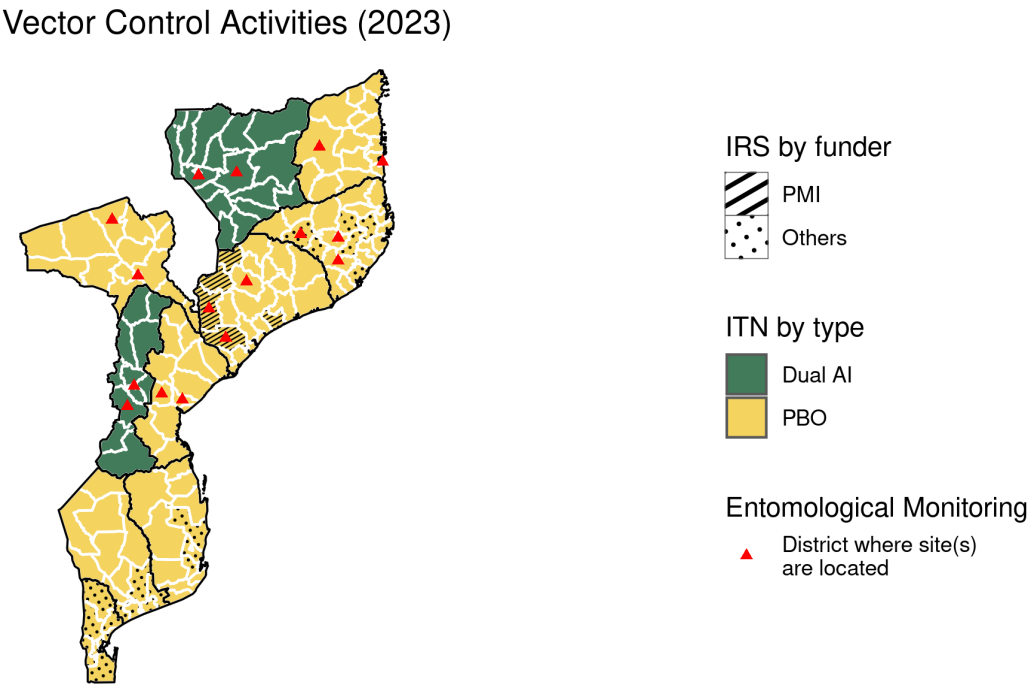
II. OPERATIONAL PLAN FOR FY 2024

1. Vector Monitoring and Control

1.1. PMI Goal and Strategic Approach

NMCP's objective for vector control is included with other malaria prevention strategies in their new strategic plan. NMCP aims to ensure that all districts with medium to high transmission rates benefit in a timely manner from at least one vector control intervention as well as from chemoprevention and/or vaccination, where applicable. To achieve their objective, NMSP promotes an integrated vector management strategy, including vector surveillance, insecticide-resistance management, and ITN distribution through national mass campaign distribution and ANC services. PMI supports entomological monitoring at 27 sentinel sites in 21 districts across 7 provinces. Twelve of these sentinel sites are managed by the vector control central mechanism (in Zambézia and Nampula provinces), and the remaining 15 sites are managed by the MoH with financial support through the central mechanism (in Cabo Delgado, Niassa, Tete, Sofala, and Manica provinces). Throughout FY 2023, PMI will implement IRS in Zambézia, while the Global Fund procures the insecticide. The Global Fund supports procurement and distribution of all ITNs.

Figure 1. Map of Vector Control Activities in Mozambique



1.2. Recent Progress (May 2022–April 2023)

- PMI conducted entomological monitoring at 12 sentinel sites managed by the central mechanism. Vector bionomics studies were conducted in three districts in Zambézia Province and another three districts in Nampula Province, and resistance monitoring was conducted in six districts in Zambézia and in three districts in Nampula. IRS quality and residual efficacy was monitored in two districts in Zambézia, where the IRS campaign was funded by PMI, and two IRS districts Nampula, where the IRS campaign was implemented by the MoH. For more information about entomological monitoring, refer to the 2022 Entomological Report.
- PMI provided financial and logistical support for entomological monitoring conducted by the MoH at 15 sentinel sites in three districts each in Cabo Delgado, Niassa, Tete, Sofala, and Manica provinces. Resistance monitoring was conducted in 15 districts, and vector bionomics studies were conducted in 10 districts.
- PMI supported the *Instituto Nacional de Saude* (National Institute of Health [INS]) by providing financial support for three entomology molecular biology technicians and procurement of laboratory materials and reagents.
- PMI provided TA to the insectary in Nampula Province through a seconded entomology manager, and financial support for logistical support and procurement of insectary supplies.
- PMI collected data on human-vector behavior in three districts in Zambézia Province and three districts in Nampula Province.
- PMI supported the planning, implementation, and evaluation of the 16th year of IRS in two districts of Zambézia, covering 140,939 structures and protecting 620,567 people from October 24 to November 26, 2022. For more information about IRS, refer to the most recent End of Spray Report.
- PMI trained and engaged community members in two districts of Zambézia Province to support IRS mobilization and spray activities. Provided technical and financial support to the MoH-led IRS campaign implemented in Nampula Province, including leading a training of trainers and funding central-level supervision.
- PMI supported the construction of a prefabricated insectary in Zambézia Province.
- PMI delivered TA to the NMCP vector control team through a seconded senior entomologist.
- PMI supported community-level SBC activities to increase the demand for ITNs, to promote their appropriate use and care, and to mitigate against their misuse. For more information, refer to the SBC section.

1.3. Plans and Justification for FY 2024 Funding

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

1.3.1. Entomological Monitoring

PMI will continue to support entomological monitoring activities at 27 sentinel sites in 21 districts across seven provinces. Financial support to nine sentinel sites in Cabo Delgado, Manica, and Sofala provinces will be provided through an entomology-specific implementing partner. Support to five districts in Zambézia, three districts of Nampula, three districts in Tete, and three districts in Niassa will be provided through province-specific G2G agreements. The entomology-specific implementing partner will continue to support essential staff for the Nampula and Zambézia insectaries, a senior entomologist seconded to NMCP, and international entomology-related procurements for seven provinces and the National Institute of Health. Lastly, via a G2G with INS, the institute will lead their local procurements and increase their entomological supervisions and training.

Summary of Distribution and Bionomics of Malaria Vectors in Mozambique

As of 2023, the predominant vectors in Mozambique are *Anopheles funestus s.l.*, *An. gambiae s.s.*, and *An. arabiensis*. The species *An. coustani* has been identified as a secondary vector. Blood meal analysis shows that both *An. funestus s.l.* and *An. gambiae s.l.* prefer to feed on humans. Peak transmission season is during the rainy season (November–April). *An. funestus s.l.* is generally more abundant during the dry season (May–October), while *An. gambiae s.l.* was found more frequently during the rainy season. In the center and northern regions of the country, *An. gambiae s.s.* is more prevalent, while *An. arabiensis* is more prevalent in the southern and central part of the country. *An. funestus s.s.* is distributed widely along the coast. *Anopheles merus* is rare but has been identified in Mozambique; its role in malaria transmission has not yet been determined.

In Zambézia Province, *An. funestus s.l.* is typically more abundant than *An. gambiae s.l.*. However, 2020 collections in Maganja de Costa and 2021 collections in Milange yielded higher numbers of *An. gambiae s.l.* than *An. funestus s.l.*, suggesting that there is a need to monitor this species composition over time. *An. gambiae s.l*. had lower levels of indoor resting than *An. funestus s.l.* The biting patterns for both *An. funestus s.l.* and *An. gambiae s.l*. show that most biting occurs in the early hours of the night as people are going to bed or are sleeping, as well as in the early morning hours. In Nampula Province, *An. gambiae s.l.* is the predominant Anopheles vector species. Peak indoor and outdoor biting time of *An. funestus s.l.* across all sentinel sites in Nampula was between 6:00 p.m. and 3:00 a.m., although biting continued indoors and outdoors from 5:00 a.m. to 6:00 a.m., as people were starting to wake up and venture outdoors.

Anopheles stephensi, an invasive urban vector mainly breeding in artificial containers, has been identified in four PMI countries as of 2023. Although it had not been detected in Mozambique at the time this MOP was written, PMI will provide TA to NMCP's developing action plan for enhanced surveillance of *An. stephensi* in accordance with PMI's *An. stephensi* action plan guidance for at-risk countries.

Status of Insecticide Resistance in Mozambique

Susceptibility tests were conducted in six districts in Zambézia Province and three districts in Nampula Province. In each district, the insecticides used to perform the tests were prioritized according to the insecticides that were planned to be used in upcoming IRS and ITN campaigns. Information is provided only for the species and insecticide used for susceptibility testing. If no information is provided, that is because either the species or the insecticide were not tested. *An. gambiae s.l.* was susceptible to pirimiphos-methyl in all districts tested (Milange, Molumbo, Mopeia, Maganja da Costa, Morrumbala, Lugela, Erati, Nampula, and Mogovolas). *An. funestus s.l.* was susceptible to pirimiphos-methyl in the districts where the vector was collected for testing (Milange and Morrumbala). *An. funestus s.l.* was resistant to alpha-cypermethrin in Maganja da Costa, Morrumbala, and Mogovalas. Possible resistance to bendiocarb by *An. funestus s.l.* was detected in Mopeia. *An. gambiae s.l.* was resistant in Mopeia and Nampula districts and susceptible in Erati, Mogovolas, Melange, Molumbo, and Maganja da Costa. *An. gambiae s.l.* was resistant to permethrin in Milange, Molumbo, and Nampula. There was susceptibility of *An. gambiae s.l.* to clothianidin and chlorfenapyr in all tested districts in Zambézia (Milange, Molumbo, Mopeia, Maganja da Costa, Morrumbala, and Lugela).

Tests were conducted to explore the role of PBO on pyrethroid susceptibility on *An. gambiae s.l.* PBO restored susceptibility to alpha-cypermethrin in Molumbo (100 percent) and partially restored it in the districts of Milange (93.3 percent), Morrumbala (92 percent), and Maganja da Costa (42.6 percent). Permethrin susceptibility was restored in Lugela and Morrumbala (100 percent) and was partially restored in Mopeia (90.6 percent). Susceptibility to deltamethrin was restored to 100 percent in Lugela and partially restored in Mopeia (93.3 percent), Morrumbala (90.6 percent), Molombo (42.6 percent), and Maganja da Costa (77.3 percent). Susceptibility to lambda-cyhalothrin was fully restored in Maganja da Costa. In Nampula, PBO only partially increased susceptibility to permethrin (66.7 percent in Nampula District) and alpha-cypermethrin (96 percent in Mogovolas District). Mortality after pre-exposure to PBO below 98 percent indicates that monooxygenases are not the only form of metabolic resistance in the area. In summary, although resistance to pyrethroids is observed throughout Mozambique, PBO restored susceptibility either partially or fully at testing sites from Zambézia and Milange. In districts with partial susceptibility, the mortality rate was below 98 percent, suggesting that non-PBO ITNs should be considered for future campaigns. Additionally, susceptibility to chlorfenapyr supports the procurement of Interceptor G2 ITNs.

1.3.2. Insecticide-Treated Nets

The Global Fund will continue to procure ITNs for distribution through ANC services and universal coverage campaigns. PMI will continue to support SBC activities that address barriers to use and maintenance with an enhanced focus on populations or localities demonstrating suboptimal use and care.

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

ITN Distribution in Mozambique

In Mozambique, ITNs are distributed via national mass campaigns every 2.5 and 3 years, with ITNs rolled out in a few provinces at a time over a 12-month span. The most recent mass campaign began in August 2022 in Cabo Delgado Province, followed by Nampula in November 2022. The rest of the provinces will receive ITNs during CY 2023. Dual active-ingredient ITNs will be distributed in Manica and Niassa, while the rest of the provinces will receive PBO nets. ITNs are continuously distributed to pregnant women through ANC services. Every pregnant woman is expected to receive an ITN at her first ANC visit. Capital cities in Mozambique were not included in the ITN national mass campaign and will receive ITNs only through ANC services, except Quelimane, the capital city of Zambézia Province, where ITNs were distributed in response to Tropical Cyclone Freddy. All ITNs are procured by the Global Fund, and there is currently a gap for the capital cities. NMCP is continuously advocating with current and potential partners to address the ongoing ITN gap.

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

Durability monitoring was supported through the New Nets Project with funding by Unitaid and the Global Fund. Data collection concluded in 2022.

Table 1. Standard Durability Monitoring

Campaign Date	Site	Brand	Baseline	12-month	24-month	36-month
2020	Mandimba, Niassa	Royal Guard	August, 2020	September, 2021	September, 2022	Not planned
2020	Changara, Tete	OlysetPlus	August, 2020	September, 2021	September, 2022	Not planned
2020	Guro, Manica	Interceptor G2	August, 2020	September, 2021	September, 2022	Not planned

1.3.3. Indoor Residual Spraying (IRS)

Beginning in CY 2024, NMCP will be withdrawing from IRS efforts in most of the country, including PMI-supported provinces. Thus, in CY 2025, PMI will not support the planning and implementation of IRS.

Table 2. PMI-Supported IRS Coverage

Calendar Year	District[1]	Structures Sprayed (#)	Coverage Rate (%)	Population Protected (#)	Insecticide
2022	Morrumbala and Mopeia	140,939	85.0	605,324	Pirimiphos-Methyl and Bendiocarb
2023	Milange, Molumbo, Mopeia, Morrumbala, and Maganja da Costa	350,172	85	1,484,191	Pirimiphos-Methyl and deltamethrin-clothianidin
2024[2]	N/A	N/A	N/A	N/A	N/A
2025[2]	N/A	N/A	N/A	N/A	N/A

[1] If more than 10 districts, list regions/provinces. [2] Planned.

IRS Insecticide Residual Efficacy in Mozambique

Wall bioassays were conducted monthly following the 2021 IRS campaign. The residual efficacy of Ficam (bendiocarb) was three months in Mopeia and five months in the city of Nampula. Actellic 300 CS (pirimiphos-methyl) had a residual efficacy of one month in Milange and five months in Molumbo.

2. Malaria in Pregnancy

2.1. PMI Goal and Strategic Approach

The objective of the Mozambique NMCP is to improve coverage of IPTp to reach all eligible pregnant women attending ANC services. PMI supports NMCP with the delivery of IPTp to all eligible pregnant women at all eligible ANC visits in the target provinces of Nampula, Zambézia, and Manica. At the central level, there is a malaria in pregnancy (MIP) working group chaired by NMCP that includes participants from the maternal and child health department, through which PMI also provides technical support through the MIP working group.

Mozambique has been implementing the WHO updated guidelines on IPTp since 2014, which recommend administering IPTp as early as possible starting in the second trimester (13 weeks) and at each scheduled ANC visit until the time of delivery, as long as there has been an interval of at least one month since the last sulfadoxine-pyrimethamine (SP) dose. The national guidelines also state that SP is contraindicated in women receiving cotrimoxazole HIV/AIDS preventive treatment.

Malaria in pregnancy is a component of the malaria integrated supervision platform. PMI's supportive supervision and training efforts aim to reach all health workers from at least two health facilities (one referral and one peripheral) in each of the 57 target districts of the three focus provinces of Nampula, Zambézia, and Manica.

Results from the national household surveys (2007, 2011, 2015, and 2018) show that coverage for at least one ANC visit is high, at 85 percent or more. However, coverage of at least four ANC visits remains low, at around 55 percent. In addition, less than 20 percent of women start their ANC during the first trimester of pregnancy. Mozambique has adopted the 2016 WHO ANC guidance, and the national guidelines recommend a minimum of eight ANC visits. The country policy also supports early initiation of IPTp between 13 and 16 weeks. However, the fact that most women start ANC later in their pregnancy, coupled with the fact that most women do not return for follow-up visits, poses serious challenges to the implementation of this policy. To address these challenges, it is important to: (1) understand the barriers for early ANC attendance and devise a set of interventions focused on health promotion to address them; (2) understand the health system barriers that prevent women from returning for follow-up visits and devise a set of interventions to improve the quality of health care; and (3) understand community barriers that prevent women from returning for follow-up visits and devise a set of health promotion activities to address them.

Since 2007, results from four national household surveys (2007, 2011, 2015, and 2018) have shown a gradual increase in the uptake of IPTp. The proportion of women receiving at least one dose of IPTp increased from 27 percent in 2007 to 84 percent in 2018, while the proportion of women receiving at least three doses of IPTp increased from 11 percent in 2007 to 41 percent in 2018. These data demonstrate the need to ensure that pregnant women return for follow-up ANC visits and that they receive all ANC services, particularly IPTp, although these findings also show that important progress has been made to date. Routine health information system data continues to show improvements in the uptake of IPTp. In fact, the proportion of pregnant women who received two or more doses of IPTp increased from 77 percent in CY 2021 to 84 percent in CY 2022. Similarly, the proportion of pregnant women who received four or more doses of IPTp increased from 56 percent in 2021 to 66 percent in 2022. In Mozambique, the District Health Information System-2 (DHIS2) does not track coverage of IPTp3, and PMI, and other stakeholders continue to advocate for the inclusion of IPTp3 in DHIS2 reports.

Data on the barriers and facilitators to IPTp coverage are limited in Mozambique, especially among providers. Low IPTp uptake has been associated with noninstitutional deliveries, first ANC visit after 28 weeks, low awareness of IPTp, and having no or only a primary education. To address this data gap, PMI is working with NMCP and other stakeholders to conduct an analysis of barriers to IPTp coverage.

Since 2019, distribution of ITNs to pregnant women has been carried out solely with Global Fund support. The ITNs are distributed directly from three ports of entry to each district. Each district receives two shipments per year. The ITNs for districts that do not have warehouse capacity are stored in neighboring districts. This new distribution system has led to a reduction in transportation costs. However, it also poses new challenges in terms of stock control, low visibility of the ITNs in the logistic information system, warehouse capacity at the district level, and potential commodity diversion. In fact, the proportion of pregnant women receiving an ITN during ANC slightly declined from 94 percent in 2019 to 90 percent in 2021 and in 2022. PMI is engaged in discussions with NMCP and other partners to identify opportunities to improve ITN delivery through routine channels.

Malaria case management among pregnant women is a priority intervention. All pregnant women presenting with fever must receive a malaria diagnostic test. All pregnant women with a positive test must receive prompt treatment with an adequate antimalarial drug. For uncomplicated malaria, pregnant women are treated with AL during all trimesters. For severe malaria, women are treated with injectable artesunate during all trimesters. In CY 2022, 45,390 pregnant women were treated with AL, across the country.

2.2. Recent Progress (May 2022–April 2023)

- PMI participated in discussions related to the implementation of community IPTp. After reviewing all the evidence and considering the costs associated with this intervention, the country decided not to include it in the new strategic plan.
- PMI also supported training and supervision of 317 maternal child health nurses in IPTp in the target provinces of Nampula, Zambézia, and Manica.
- The Mozambican government continues to allocate enough funding to cover all SP needs. SP is produced locally in Mozambique, although production capacity was recently reduced due to lack of raw materials, leading to stockouts. To help address this issue, PMI-supported the procurement of 6.4 million tablets of SP. This stock is expected to be delivered in May 2023. It is important to note that the issue of the lack of raw materials has been addressed, and the factory has resumed full production.

2.3. Plans and Justification for FY 2024 Funding

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

Mozambique will continue to support all MIP activities as described in the recent progress section. PMI will continue to prioritize implementation of MIP activities through the malaria integrated supervision platform. PMI will also continue to provide technical support at the central level by participating in the MIP technical working group. This group includes both NMCP and maternal and child health representatives.

The Mozambican government will continue to cover all SP needs. The country is also monitoring the prevalence of molecular markers for the SP resistance. Preliminary data from the TIPTOP project evaluation, carried out in 2021, show that the IRNI_ISGEGA haplotype (sextuple mutation) was not detected, indicating that SP is still likely to be efficacious for IPTp-SP in Mozambique. The country will continue to monitor the prevalence of SP molecular markers through the GenMoz project.

In terms of treatment of uncomplicated malaria cases, Mozambique is already using AL during all trimesters of pregnancy.

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

PMI Mozambique will also continue to engage in discussions with the MoH and other stakeholders to improve procurement, transportation, and delivery of ITNs to pregnant women.

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

3. Drug-Based Prevention

PMI does not support seasonal malaria chemoprevention or other drug-based prevention in Mozambique. NMCP aims to articulate its strategic goals and plans for drug-based prevention activities in the next NMSP, currently under development. PMI will provide TA to NMCP and engage in stakeholder discussions around the introduction and rollout of the updated WHO-recommended chemoprevention interventions, as appropriate to the Mozambican context. In the meantime, other donors have been providing limited support to pilots and studies to help inform these conversations, including:

- **BMGF:** Feasibility, acceptability, and impact of seasonal malaria chemoprevention in Nampula;
- **Unitaid:** Impact of ivermectin mass drug administration (MDA) on malaria infection in Mopeia;
- **Global Fund:** Coverage and impact of dihydroartemisinin-piperaquine (DP) MDA in the context of a humanitarian emergency in Cabo Delgado;
- **European and Developing Countries Clinical Trials Partnership:** Assessing MDA in Gaza and focal drug administration in Maputo to advance malaria elimination, and a new study still under development to assess coverage of perennial malaria chemoprevention in the district of Massinga located in Inhambane; and
- **Unitaid through Population Service International:** Piloting the implementation of perennial malaria chemoprevention in Sofala Province.

4. Case Management

4.1. PMI Goal and Strategic Approach

NMCP is finalizing its new 2023–2030 NMSP. According to this plan, the objective for case management remains the same: to test 100 percent of suspected malaria cases and treat 100 percent of confirmed malaria cases at the health facility and community level.

NMCP and PMI prioritize the scaling-up of quality-assured diagnostic testing and treatment of all confirmed cases through the following means:

- Procuring rapid diagnostic tests (RDTs), microscopes, laboratory supplies, and reagents;
- Procuring ACTs;
- Supporting the implementation of the malaria integrated supervision package; and
- Scaling up quality assurance/control systems for malaria diagnostics and treatment.

In line with NMCP objectives, PMI aims to achieve the following objectives:

- Improve malaria case management at the health facility and community levels through mentoring, supervision, and training;
- Improve forecasting, allocation, distribution, stock management, access, and use of case management commodities (e.g., ACTs and RDTs) in the country, including at the community level; and
- Improve quality assurance/control for both microscopy and RDTs.

PMI support is closely aligned with NMSP and with the national malaria treatment and supervision guidelines. PMI supports all of the recommended technical interventions of the strategy, but the geographic focus is limited to the provinces of Zambézia, Nampula, and Manica.

NMSP promotes a comprehensive case management strategy, including universal, quality-assured parasitological testing of all cases of suspected uncomplicated malaria, prompt and effective treatment with ACT of all cases of parasitologically confirmed uncomplicated malaria, and emergent prereferral and/or definitive management of severe febrile illness and severe malaria. Most diagnostic testing in Mozambique relies on the use of RDTs, which are currently only HRP2-based. Health facility surveys in 2018 and 2021 confirmed low rates of hrp2/3-gene-deleted parasites and non-falciparum infections, providing evidence for continued use of HRP2-based RDTs for malaria diagnosis in Mozambique.

PMI supports all aspects of this approach through support to national-level policy and programmatic activities, commodity procurement, and improvement of facility and community-level health worker performance. PMI supports the nationwide procurement of malaria RDTs, ACTs, and injectable and rectal artesunate, accounting for approximately 50 percent of the national need; the Global Fund supports the other 50 percent. PMI also

supports supportive supervision and on-the-job training activities in the three focus provinces; the Global Fund supports the remaining seven provinces.

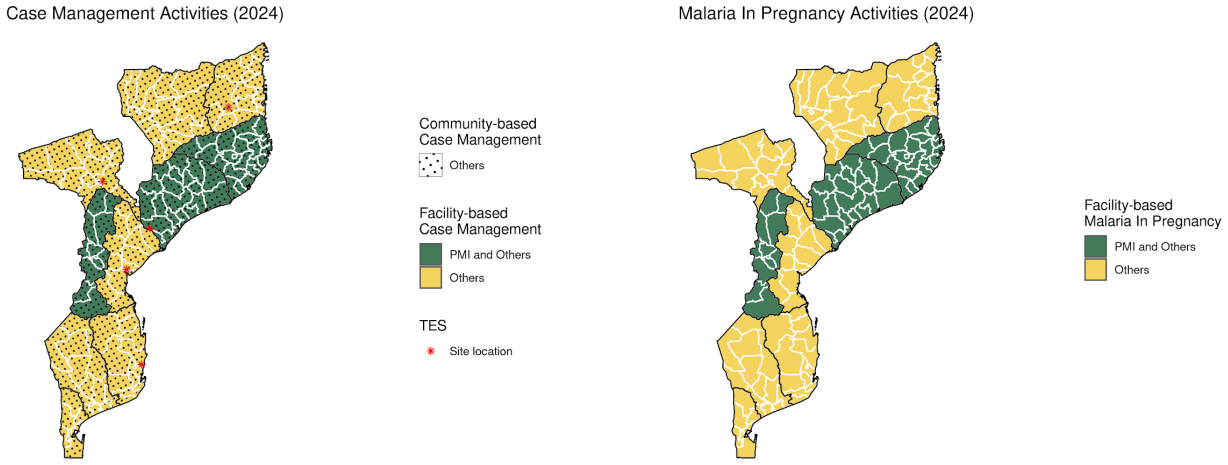
In the three PMI-focus provinces of Nampula, Zambézia, and Manica, there are 3,397 community health workers (CHWs). PMI will provide support to these CHWs through mentoring at health facilities to deliver community-based case management for malaria to all ages and prereferral rectal artesunate treatment. PMI also supports procurement and distribution of RDTs and ACTs for about 60 percent of the total CHWs across the country.

By December 2022, there were a total of 7,096 active CHWs across the country. This number is lower than the 7,329 CHWs that were active in 2021, as the country is not currently training new CHWs. It is important to note that the MoH is reviewing its community health strategy and will likely establish new targets for 2023 and beyond, including a determination of how many new CHWs will be added to this cadre and trained. PMI does not currently provide direct routine payment to CHWs; this is covered by the World Bank. The biggest current challenge faced by the community health system is to ensure a regular supply of malaria commodities (RDTs and ACTs) and ensure sufficient funding for training and supervision. To address these issues, PMI is working in collaboration with NMCP and the Global Fund to expand production of malaria CHW kits and improve delivery to the CHWs. PMI and the Global Fund will continue to support on-the-job training and supervision of CHWs, and the World Bank is expected to continue to support CHW salaries.

Health facility surveys in 2018 and 2021 identified important gaps in health facility-based malaria case management, including in commodity availability, and adherence to testing and treatment guidelines. Key recommendations from the 2021 survey included to:

- Continue to strengthen malaria case management through ongoing training and supportive supervision, both at the health facility and community level, focusing on barriers to fever testing;
- Tailor ongoing training to the specific needs of providers (in each district or health facility), focused on strengthening knowledge and skills;
- Monitor consumption of antimalarials and ensure the functioning of the supply chain (especially AL and CHW malaria kits);
- Map provinces with ITN shortages and mobilize resources to secure stocks;
- Map health facilities with needs for microscopy reagents and ensure their supply; and
- Strengthen the data quality assurance (DQA) at the district level through regular assessments and continuous use of the Integrated Malaria Information Storage System (iMISS).

Figure 2. Map of Case Management, Community Health, and Malaria in Pregnancy Service Delivery Activities in Mozambique



Note: “Others” refers to the Global Fund and World Bank (only for community health).

4.2. Recent Progress (May 2022–April 2023)

National-Level Case Management Activities

- PMI developed the case management section of the new 2023–2030 National Malaria Strategy.
- PMI updated the malaria treatment guidelines, which now include the use of multiple drugs for the treatment of uncomplicated malaria, namely AL, artesunate-pyronaridine (AS/PY), and dihydroartemisinin-piperaquine. The plan is to continue to use AL at the health facility level and introduce a different drug (AS/PY or DP) at the community level.
- PMI updated the malaria laboratory diagnostic microscopy manual.
- PMI collaborated on the design of a malaria case management e-learning module directed at all clinicians.
- PMI convened and led three national-level technical working group (TWG) meetings as well as a provincial TWG meeting in each of the target provinces of Nampula, Zambézia, and Manica.
- PMI continued to collaborate with other relevant stakeholders in the implementation of the iMISS, as well as in the design of the case management dashboards.

Commodities

- PMI supported the procurement of 12,627,575 million malaria RDTs for nationwide distribution, accounting for 57 percent of all shipments received between May 2022 and April 2023. The Global Fund supported the remaining amount. PMI also supported the nationwide distribution of 9,538,900 million malaria RDTs through the CHW kits.

- PMI supported the procurement of 13,572,240 million ACTs for nationwide distribution, accounting for 71 percent of the needs for the period between May 2022 and April 2023. PMI also supported the nationwide distribution of 4,683,180 ACTs through the CHW kits.
- PMI supported the procurement of 640,000 vials of parenteral artesunate for nationwide distribution, accounting for 55 percent of the needs for May 2022–April 2023.
- PMI supported the procurement and nationwide distribution of 39,072 rectal artesunate suppositories through the CHW kits, which represented 15 percent of the needs for May 2022–April 2023.

Facility Level

- In the past 12 months, PMI finalized a new award to support case management activities. Across the three PMI target provinces of Nampula, Zambézia, and Manica, there are 57 districts with approximately 667 health facilities. PMI conducted on-site training and supportive supervision visits in 43 health facilities of 13 districts, reaching 175 health care workers, according to data from the Malaria Capacity Strengthening Program, January–March 2023. These supervision and mentoring visits at the health facility and community level also served to strengthen the supervisory and management capacity of district and provincial health staff in case management and other areas.
- In Nampula Province, PMI continued to support external quality assurance (EQA) activities by training 14 laboratory technicians and by supporting the participation of laboratories in the EQA program. As a result, the proportion of eligible laboratories participating in the EQA process increased from 68 to 89.5 percent in the last two rounds.

Community Level

- PMI conducted 43 on-site mentorship visits, reaching 33 CHWs, according to data from the Malaria Capacity Strengthening Program, January–March 2023.
- PMI continued to support the CHW program by providing RDTs and ACTs and by supporting the kitting system through which these commodities are distributed to CHWs.
- Supported the development of the community information subsystem implementation plan, including a description of the architecture system, requisites of the electronic system, budget, and others.

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

4.3. Plans and Justification for FY 2024 Funding

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

National-Level Case Management Activities

PMI will continue to support case management activities and provide TA at the central level as described in the Recent Progress section. PMI will also pilot the use of multiple drugs for the treatment of uncomplicated malaria in Manica Province. The plan is to continue to use AL at the health facility level and introduce a different drug (AS/PY or DP) at the community level. The final choice of the drug to be used at community level will be finalized during CY 2023; the decision will be based on the cost and availability of each drug.

Commodities

PMI will continue to procure RDTs, ACTs, injectable artesunate, and rectal artesunate as described in the recent progress section. PMI and the Global Fund are the two main donors that support procurement of RDTs and ACTs. Given that the current Global Fund grant will end in December 2023, PMI will coordinate shipments with the Global Fund to ensure a continuous supply of malaria commodities to the country.

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

Facility Level

PMI will continue to support training and supervision of health care workers and laboratory technicians as well as mentoring of CHWs as described in the recent progress section.

Community Level

PMI will continue to support integrated community case management, community case management of malaria for all ages, and prereferral rectal artesunate for severe malaria, as described in the recent progress section. With FY 2024 funds, PMI will continue to implement these activities in Nampula, Zambézia, and Manica provinces. In Mozambique, the World Bank supports compensation of CHWs; with the design of the new community strategy, the Mozambican government has created a new cadre of elementary workers and approved the salary for this cadre. It is expected that the existing and future CHWs will be included in this cadre and will be paid directly by the government.

Monitoring Antimalarial Efficacy

Table 3. Ongoing and Planned Therapeutic Efficacy Studies

Year	Site Name	Treatment Arm(s)	Plan for Laboratory Testing of Samples
Ongoing Studies			
2022	Moatize	AL, AS/PY	In-country at CISM
2022	Montepuez	AL, DP	In-country at CISM
2022	Mopeia, Dondo, Massinga	AL, ASAQ	In-country at CISM
Planned Studies (funded with previous or current MOP)			
2024	Moatize, Montepuez, Mopeia, Dondo, Massinga	AL Other drugs TBD	In-country at CISM

AL: artemether and lumefantrine; AS/PY: artesunate-pyronaridine; CISM: Centro de Investigação em Saúde de Manhiça; DP: dihydroartemisinin-piperaquine; MOP: Malaria Operational Plan; TBD: to be determined.

5. Health Supply Chain and Pharmaceutical Management

5.1. PMI Goal and Strategic Approach

To reduce malaria deaths and substantially decrease malaria morbidity, with the long-term goal of elimination, NMCP aims for all malaria case management and prevention commodities to be available at all service delivery points and reduce the malaria products stockouts.

For an overview of Mozambique's supply chain system, please view the Country Health System section of the Country Profile. In alignment with NMCP, PMI aims to achieve the following objectives:

- Develop more effective public sector medical supplies/commodity forecasting, support for commodities and supply planning, and procurement capacity;
- Improve public sector warehousing and distribution at all levels;
- Improve the use of medicines and develop more effective pharmaceutical services;
- Strengthen the CMAM's strategic planning and management capacity;
- Strengthen overall regulatory capacity; and
- Reduce the malaria products stockout rates by optimizing PMI's supply chain investments. (According to the country monitoring and evaluation report, comparing second quarter data from FY 2018 with FY 2023, ACTs stockout rates decreased by 45 percent at the service-delivery-point level. Similarly, mRDTs stockout rates decreased by 55 percent, and SP stockout rates decreased by 21 percent during the same period. This trend is expected to continue.

5.2. Recent Progress (May 2022–April 2023)

PMI supports country strategies and priorities that fall under the following three program objectives: (1) global commodity procurement and logistics; (2) systems strengthening TA; and (3) collaboration to improve long-term availability of health commodities.The principal supply chain investments are aimed at improving malaria commodity availability at service delivery points and reduce malaria commodity stockouts. PMI provides TA on forecasting and supply planning, management information systems, warehousing and distribution, direct warehousing, and the delivery of commodities to health facilities.

During the past year, PMI provided TA on the quantification and monitoring of malaria commodity stock levels, supervision, and mentoring to NMCP staff at all levels, including CMAM, to manage the supply chain more efficiently and effectively.

PMI also supported procurement, alongside the Global Fund, of CHW malaria commodities and the kitting and distribution of these commodities. In addition, PMI supported the training of CHWs supervisors, the facilitation of community health committee meetings with CHWs, and SBC to promote appropriate community care at a facility.

The country also continued to make significant progress in rolling out its electronic logistics management information system (*Sistema de Informação de Gestão Logística das Unidades Sanitária*, or SIGLUS]). As of December 2022, 1,616 of the 1,750 public health facilities nationwide (92 percent) were equipped and trained with SIGLUS.

In addition, the country is rolling out a new information system for medicines and medical supplies, known as *Sistema de Informação de Medicamentos e Artigos Médicos* (SIMAM). The new SIMAM is based on OpenLMIS v3.9, and it will provide data visibility from intermediate warehouses to warehouses at health facilities. However, the system will not allow visibility into the use of commodities at the community level. PMI supported the rollout of new SIMAM in the city of Maputo and Maputo, Manica, and Zambézia provinces, and the development of a standard operating procedure for quarantining CHW kits at the provincial level.

PMI supported NMCP and CMAM with malaria commodities through third-party logistics of all malaria medicines, including AL and RDT for CHWs. Through third-party logistics, the kitting activity has led to a large improvement in the speed of production, which is simultaneously resulting in higher-quality production. The number of kits produced per year are expected to at least triple during FY 2023 (from 21,000 to 76,000 kits per year) compared with FY 2022. This amount nearly reaches NMCP’s target to distribute 90,000 kits per year to 7,000 CHWs.

PMI supported CMAM in calculating monthly indicators by using data exported from SIGLUS. By using the data exported by SIGLUS, CMAM was able to monitor, reconcile, and report stock on hand. Daily automatic transactions are synchronized between the logistics management information system from health facilities, provincial and regional warehouses, and CMAM’s management software.

In the last 12 months, PMI helped strengthen the human resources capacity and provided field support, conducting e-supervision in 7 out of 11 provinces, covering 181 CHWs at 86 health facilities.

PMI continued to provide support to the malaria case management TWG, chaired by CMAM and comprising multiple U.S. government implementing partners, including WHO, MoH officials, and other donors. The TWG meets monthly to review forecasting and quantification of malaria commodities, monitor shipments of malaria commodities, and track commodity consumption data to support the management and oversight of health commodities via regular supply plan updates.

Other recent activities supported by PMI through provincial logistic advisors in all 11 provinces (one per province) include district and provincial quarterly meetings to review and improve supply chain and logistics data and performance, training and supervision on logistics standard operating procedures, and TA for district and facility staff to improve data quality.

5.3. Plans and Justification with FY 2024 Funding

The FY 2024 funding tables contain a full list of health supply chain and pharmaceutical management systems strengthening activities that PMI proposes to support in Mozambique in FY 2024.

PMI will continue supporting procurement, quality control, management and oversight, and distribution of PMI-procured malaria commodities; multiple drugs for the treatment of uncomplicated malaria, such as ACTs, RDTs, SP; and other drugs for severe malaria. The plan is to continue to use AL at the health facility level and introduce a different drug (DP or AS/PY) at the community level.

Also, PMI will provide warehousing and distribution support for procured malaria commodities from the ports of entrance to provincial and intermediate warehouses to last-mile service delivery points.

Additionally, PMI will continue providing support for logistics management information system supervision, training, e-supervision, and on-site supervision. During the e-supervision and on-site supervision, DQAs of commodity stock will be conducted at the health facility and regional levels to improve data completeness, consistency, accuracy, and timeliness. Data will be included in the iMISS system, which supports data visibility across all levels of decision making. Additionally, PMI will strengthen the skills of key personnel in supply chain, commodities planning, and management at the national, regional, and provincial levels.

Technical support will be provided to improve forecasting and supply planning focused on:

- Annual quantification exercises, quarterly supply plan updates, and continuous order/status monitoring;
- Expansion of the logistics management information system, data visibility, and data-driven decision making across the supply chain;
- Supporting CMAM on stock status monitoring and commodities visibility at the central, regional, and provincial level, and improving reporting rates to inform decision making;
- Supporting end-to-end visibility for malaria commodities (ACTs and malaria RDTs) and other commodities included within the integrated SIGLUS;
- Planning malaria community kits assembly and distribution with CMAM and NMCP; and
- Continued support for the malaria supply chain TWG and relevant stakeholders.

6. Malaria Vaccine

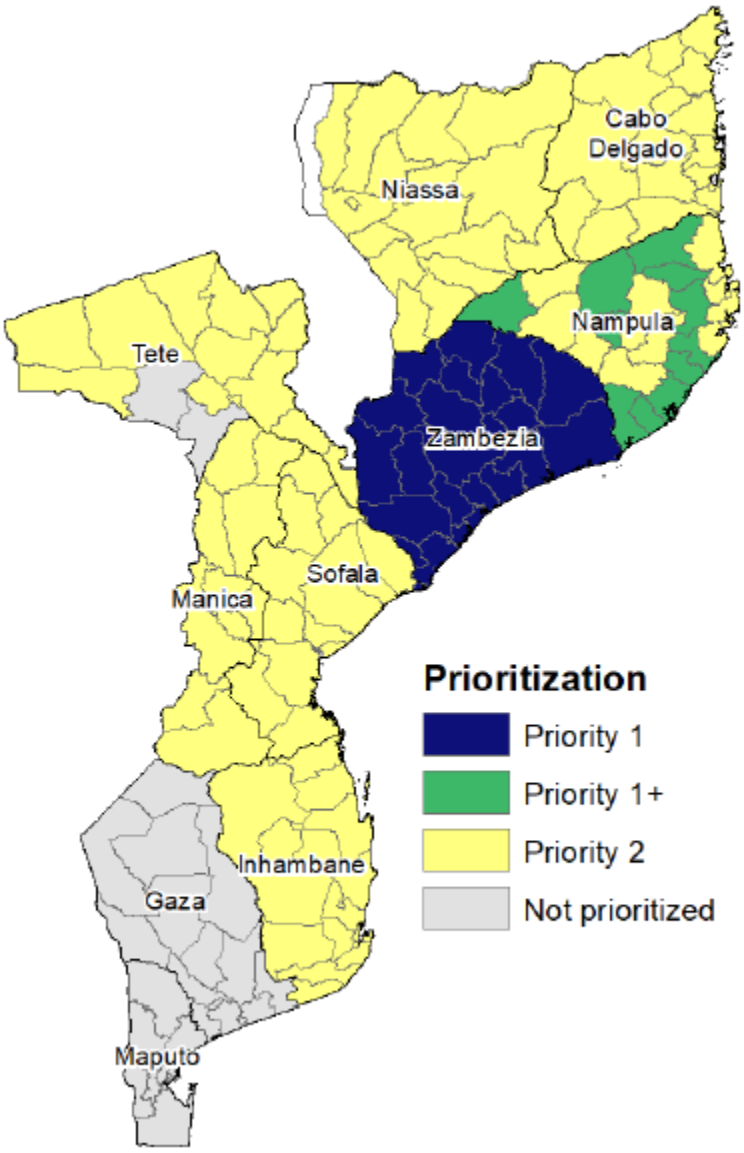
6.1. PMI Goal and Strategic Approach

PMI's goal in terms of the malaria vaccine in Mozambique is to support the MoH to strategically deploy this intervention as a complementary tool to the existing core interventions, in the event Mozambique is allocated RTS'S vaccine doses for CY 2024 and afterward. The PMI support includes TA and complementary support in the planning, delivery, and monitoring of vaccine development to NMCP as it engages with the national Expanded Program on Immunization (EPI).

6.2. Recent Progress (April 2022–March 2023)

In January 2023, Mozambique applied to Gavi support for the procurement and deployment of the malaria vaccine. The PMI technical team supported NMCP and EPI programs on the Gavi vaccine application. The malaria vaccine in Mozambique would be deployed at health facilities to infants at 6, 7, 9, and 18 months of age as a part of routine EPI service delivery, complemented by Periodic Intensification of Routine Immunization activities. If doses are allocated for Mozambique, vaccine procurement will be supported by the United Nations Children's Fund (UNICEF) with Gavi funding. Several challenges were anticipated during the development of the vaccine application, including the risk of dropouts for the doses that are not co-administered with pre-existing vaccines and incorrect application of the eligibility criteria by health care providers. The challenges highlight the needs of having well-trained health care providers and robust SBC activities for acceptability and adherence to the malaria vaccine schedule.

Figure 3. Map of Malaria Vaccine Plans in Mozambique



6.3. Plans and Justification for FY 2024 Funding

Given that the country has not yet received confirmation on the timing of malaria vaccine introduction, PMI will not allocate funding for its introduction. PMI will leverage the expertise and resources of current implementing partners to support NMCP and EPI programs in the implementation of the vaccine and to address anticipated challenges.

7. Social and Behavior Change

7.1. PMI Goal and Strategic Approach

NMCP aims to ensure access to information so that 85 percent of people seek health care services in a timely manner and accept and adhere to other malaria prevention methods. To achieve that goal, Mozambique has a national SBC strategy that includes strategic communication interventions for advocacy, malaria prevention, and appropriate case management. There is an active national SBC technical working group that meets to coordinate partner activities, review SBC materials, plan commemorative activities, and support NMCP strategic planning. The provinces of Zambézia, Nampula, and Sofala have formalized SBC TWGs.

PMI support is closely aligned with NMSP and the SBC strategy. PMI supports implementation of all the SBC technical interventions through community-based organizations (CBOs), faith-based organizations, and community radio stations. This is done through social and behavioral change specific partners. PMI SBC interventions take place in the provinces of Nampula, Zambézia, Manica, Cabo Delgado, and Sofala. PMI also supports community-level projects that focus on education of malaria prevention, treatment, and transmission through the Peace Corps. All PMI SBC support, including central- and provincial-level planning and community-level implementation is aligned with complementary SBC support from the Global Fund.

7.2. Recent Progress (May 2022–April 2023)

By June 2022, CBOs and radio stations in Cabo Delgado, Tete, Nampula, and Zambézia shut down at the end of a malaria implementing project. However, last year, a new SBC-specific project was awarded, with the goal of increasing adoption and maintenance of malaria prevention and treatment behaviors. The project is expected to increase design and implementation technical skills, use of SBC malaria data to inform service delivery, and managerial skills for efficient and effective implementation of SBC interventions at all levels of the health system by the MoH and local stakeholders. Although the new project has not started implementing activities, the following activities were completed over the past year:

- Thirty-three radio stations and nine CBOs in Nampula and Zambézia disseminated messages on the prevention of MIP through adherence to IPTp, proper use of ITNs, and the importance of seeking health care promptly.
- Interpersonal communication and counseling training materials were finalized, and a training of trainers was conducted in Zambézia and Nampula reaching 21 participants. Also, 44 health care providers in the cities of Nampula and Quelimane were trained on interpersonal communication and counseling.
- The faith-based organization project that uses an integrated approach reached 56,083 people through sermons; 81,357 people through community dialogues; 18,419 people through men’s focus groups; and 15,042 people through women’s focus

groups in Sofala, Zambézia, Nampula, and Cabo Delgado. In the same provinces, 12 radio stations conducted 1,090 debates, and 24 journalists were trained.
- Two Grassroot Soccer coaches trained by the Peace Corps delivered key malaria messages (malaria symptoms, prevention, and treatment) to 20 adolescents at a school in Chimoio.

Despite the SBC interventions described above, challenges remain, as outlined by technical area below and for which continued SBC investment is needed to address the determinants of uptake and/or maintenance of prevention, care-seeking, and treatment behaviors.

- **ITNs:** According to data from Malaria Indicator Survey 2018, net use was lower than the country's average in Niassa, Nampula, Zambézia, and Manica provinces, despite access being equal or above average. ITN use, most recently supported by the New Net Project, is increasing among Mozambicans. After the 2020 ITN campaign, net ownership, access, and use improved dramatically in the study districts of Gurue, Cuamba, Mandimba, Chemba, Guro, and Changara (unpublished data). The New Nets Project also reported that net ownership decreased after two years primarily due to poor physical durability, particularly among districts with polyester ITNs. However there are still gaps in appropriate use and care. Prevalence of positive net care attitudes is low, according to a monitoring and durability study conducted in the Inhambane, Tete, and Nampula provinces (Abilio et al. 2020). Given the shorter physical durability of some ITNs, it is important to continue to promote positive net care attitudes. There is a need to understand barriers to ITN access, use, and proper care for the development of specific SBC interventions. Additionally, considering the influx of ITNs through ANC distribution and national mass campaigns, SBC interventions that focus on repurposing of old ITNs are needed.
- **MIP:** NMCP policy is for pregnant women to take three doses of IPTp; however, in Mozambique, some pregnant women refuse SP because they fear the side effects, do not understand the difference between drug-based prevention and treatment, and are unaware of the benefits of SP for themselves and their unborn children. There is also a need to align the SBC strategies with existing social norms around pregnancy and maternal health-seeking practices, the active involvement of influential and trusted actors in implementation activities, existing and sustained trust in CHWs, the influence of husbands and other relatives in pregnant women's care-seeking decision making, the working conditions of CHWs, pregnant women's perceptions of SP for IPTp, and persistent access barriers to facility-based ANC. SBC campaigns aimed at increasing the use of malaria prevention strategies during pregnancy should target rural populations to increase IPTp-SP knowledge, stimulate early visits to ANC, expand access to health services, and improve the quality of provided services. Additionally, evaluating the impact of interventions aimed at increasing IPTp-3 coverage is challenging because IPT-3 is not reported to SIS-MA, and only IPTp-2 and IPTp-4 coverage is available.

- **Chemoprevention:** A mixed-method study conducted in the Magude District in southern Mozambique (Galatas et al. 2021), showed that the main barrier for the success of the MDA campaign was the absenteeism of heads of households. Other common factors that negatively affected the acceptability of MDA include the fear of adverse events, rumors of deaths, and being unable to drink alcohol while taking the drugs. These challenges could also be expected with seasonal malaria chemoprevention campaigns. Further understanding the barriers to acceptability and adherence to these interventions will help develop targeted SBC interventions to address them.

Perennial malaria chemoprevention is a new intervention in Mozambique and, as a result, there is currently not enough information about its challenges. SBC interventions designed to capture attitudes and perceptions regarding perennial malaria chemoprevention in Mozambique could help identify challenges and solutions. For example, rumor tracking systems are recommended to monitor and help inform strategies for debunking misconceptions through the use of trusted sources (e.g., religious leaders, medical experts, and local influencers) to deliver health information on the benefits and safety of chemoprevention.

- **Service delivery:** There are still critical gaps in quality of care provision, as documented in the 2018 and 2021 health facility survey. Critical gaps include failure to test febrile patients and the provision of antimalarial treatment with negative test results. There are gaps in understanding internal and external barriers that providers face in adhering to clinical barriers.
- **Case management:** According to an observational study based on a secondary data analysis of the 2018 MIS, the main reasons reported for not seeking care include distance to health facility (46.3 percent of respondents), the perception that the fever is not severe (22.4 percent) and the perception that treatment is not available at the health facility (15 percent) (Cassy et al. 2022).

To improve timely care seeking and ultimately reduce the high burden of child deaths, interventions to increase the risk perception and raise caregiver awareness of the importance of early and appropriate care seeking during episodes of fever should be intensified alongside quality of care interventions that reinforce people's trust in formal health facilities. The messages should reinforce the benefits of seeking care within 24 hours of the onset of malaria symptoms and must also consider integration of gender transformative approaches and family-based strategies to influence the decision making process for seeking care for children with fever.

- **Vaccine:** Mozambicans are generally not vaccine-hesitant because routine immunization, particularly among children, is a well-established public health intervention. However, some segments of the population have expressed hesitancy or indetermination related to fear of the vaccine's side effects, inefficient delivery of vaccination services to children, inadequate community engagement due to lack of

information about the vaccine, suboptimal quality of the health services (Dimala et al. 2018) convenience costs, risk of infection, availability of vaccines, attitude of neighbors, or safety and effectiveness of the vaccine (Vera Cruz et al. 2019). Additionally, due to production limitations, the vaccine will not be available to everyone in Mozambique, complicating messaging regarding eligibility criteria.

7.3. Plans and Justification with FY 2024 Funding

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

In FY 2024, implementation of SBC interventions through a malaria-specific SBC implementing partner will continue. These activities will seek to enhance the technical capacity of MoH and local stakeholders on SBC, increase the use and generation of data for the design and implementation of SBC interventions, and improve the management and supervision of SBC interventions. Activities implemented during FY 2024 will be designed based on the FY 2023 baseline evaluation results. These activities will be implemented through CBOs via community dialogues, community radio spots, health facility and community-based health talks, influential leader training, and door-to-door visits using the standardized malaria SBC package in targeted communities in Zambézia, Nampula, Manica, and Cabo Delgado (media only)—subject to change based on the baseline results and human-centered design workshops. These interventions are anticipated to target influential community members to improve malaria prevention and care-seeking behavior. The malaria-specific SBC implementing partner will also collaborate with the PMI service delivery implementing partner to address provider behavior at health facilities, evaluate and improve job aids to improve the quality of malaria care counseling and the quality of the provision of malaria care counseling by health care providers at health facilities. PMI will also provide SBC TA at the central level and continue to actively participate in the SBC technical working group. PMI will also leverage the malaria-specific SBC partner to promote acceptance and adherence and to address myths and rumors of new interventions, such as the malaria vaccine (if the country is allocated doses) and chemoprevention. Lastly, the malaria-specific SBC partner will support NMCP in the design of an IRS withdrawal plan and delivery in the relevant districts of Zambézia.

Priorities

While PMI supports SBC activities that promote the uptake and maintenance of all key malaria interventions, Table 4 outlines the three behaviors to be prioritized with FY 2024 funds.

Table 4. Priority Behaviors to Address

Behavior	Target Population	Geographic Focus	Programming to Address Behavior
Pregnant women take three doses of IPTp during ANC visits	Primary: ● Pregnant women ● Husbands ● Caregivers ● Mothers-in-law Secondary: ● Health providers ● CHWs ● Religious leaders ● Traditional birth attendants ● Radio producers	Nampula, Zambézia, and Manica provinces	● Conduct conversations, community dialogues, and radio debates in combination with women's real stories and other gender transformative approaches to promote the value of preventative services to the mother and the unborn child. ● Use MoH hotlines and other free-of-charge platforms to reach women directly to convey the benefits and value of IPTp as part of routine ANC visits. ● Collaborate with SBC and service delivery partners to equip health workers with relevant, locally tailored, behavior-centered job aids to provide better IPTp services to women.
Caregivers promptly seek care from health care providers	Primary: ● Parents and caregivers ● Mothers-in-law Secondary: ● Health providers ● CHWs ● Religious leaders ● Traditional birth attendants ● Radio producers	Zambézia, Nampula, and Manica provinces	● Design and implement SBC activities through community dialogues and local radio to educate caregivers on malaria symptoms, danger signs, severity of malaria, and the importance and benefits of seeking care within 24 hours of the onset of malaria symptoms. ● Train community agents and local organizations to integrate gender transformative approaches and family-based strategies to influence the decision making process for seeking care for children with fever. ● Conduct community mobilization activities for family and community influencers to ensure caregiver support systems around malaria care seeking, diagnosis, treatment, and counseling to promote prompt care seeking.
Health care providers adhere to national case management guidelines	Primary: ● Health providers ● CHWs Secondary: ● Members of community health committees	Zambézia, Nampula, and Manica provinces	● Develop and validate clinical decision support tools, job aids to improve provider counseling, and history taking. ● Sustain peer-to-peer engagement to promote provider behavior change regarding the use of RDTs for testing and treatment decisions.

ANC: antenatal care; IPTp: intermittent preventive treatment for pregnant women; MoH: Ministry of Health; RDT: rapid diagnostic test; SBC: social and behavior change.

Additional Support Activities

There is a need to collect data on the specific behavioral factors for prompt care-seeking behavior, early attendance to ANC visits, acceptance of three or more IPTp doses, and adherence to clinical guidelines. In addition, there is a need for continued SBC capacity strengthening at all levels of the MoH and among local partners. To address SBC knowledge gaps and bolster the capacity of MoH and local partners to plan, design, implement, and evaluate SBC activities, PMI will continue to support the following efforts through the malaria-specific SBC implementing partner:

- Full-scale implementation of its evidence-based, tailored, innovative package of malaria SBC interventions through CBOs in the provinces of Nampula, Zambézia, and Manica. This is expected to include interventions that target prompt care-seeking behavior, appropriate ITN use and care, care seeking for fevers and ANC, and acceptability and adherence of the malaria vaccine (if the country is allocated doses) and chemoprevention.
- Support for SBC TWGs at the national level and in PMI-targeted provinces for SBC (Zambézia, Nampula, and Manica).
- Improve malaria SBC design, implementation, and monitoring capacity of the MoH and implementation partners at the central, provincial, and district level.
- Capacity strengthening for NMCP on the use of malaria epidemiologic data and behavioral science to inform SBC strategies.

8. Surveillance, Monitoring, and Evaluation

8.1. PMI Goal and Strategic Approach

The objective of NMCP is to strengthen the malaria SM&E system, including data use at all levels.

In Mozambique, PMI collaborates with NMCP, the Global Fund, and BMGF to provide TA and resources for SM&E activities. One of NMCP priorities continues to be to strengthen the iMISS platform. This is a DHIS2-based platform that serves as the main malaria data repository. All malaria data from other platforms, including the health management information system (HMIS) and logistics management information system data, flows and are stocked at iMISS. It also includes data from other routine activities, including supervision, campaigns, entomology, and malaria surveys. In 2022, iMISS was transitioned from the partner to the MoH, which now manages it directly. Although this is an important step, there are still some challenges with iMISS, including the development of relevant modules and dashboards for data visualization. These challenges may hinder widespread use of the application.

In support of NMCP's strategy and the needs in Mozambique, PMI and NMCP have prioritized the following interventions:

- Strengthen malaria SM&E capacity at all levels;
- Strengthen the capacity of the DQA system;
- Expand and strengthen the capacity of the iMISS;
- Harmonize digital campaign data systems using a platform integrated with iMISS to improve coverage, quality, and measurement of malaria campaigns;
- Establish a system for malaria outbreak detection and response;
- Establish effective surveillance and response systems in low-transmission areas; and
- Update and implement the malaria operational research agenda.

In line with the National Malaria Program (NMP) objectives, PMI aims to achieve the following:

- Support the strengthening of malaria SM&E capacity, focusing on the three PMI target provinces of Nampula, Zambézia and Manica, as well as Tete, through the G2G agreement;
- Support DQAs in the three target provinces; and
- Support the expansion and stengthening of the iMISS platform.

8.2. Recent Progress (April 2022–March 2023)

PMI supported the following activities at the central and provincial level:

- PMI supported NMCP's elaboration of the SM&E plan for the new 2023–2030 Malaria Strategic Plan.
- PMI helped develop the terms of reference for DQA;
- PMI supported the implementation of iMISS at the central level and in the target provinces. iMISS has been rolled out to all provinces across the country. The main focus now is to improve visualization of data to facilitate use for decision making. PMI has therefore supported the mapping of the status of the platform in each of the target provinces.
- Continued to support two data managers, both seconded to NMCP. One of these data managers is an integral member of NMCP SM&E working group and provides technical support to NMCP for data access, data use, and production of annual reports, using iMISS and other data platforms. The second is responsible for supporting the rollout of the iMISS platform.

PMI supported the following activities at the district and health facility level:

- Supported improved access to iMISS at the district level.
- Between January and March 2023, PMI supported eight data review meetings in five districts across the three target provinces. Data review meetings are a continuous activity designed to promote data use and data to action.

- PMI provided TA for DQA at the district and province level. Between January and March 2023, 49 DQAs were conducted, covering 49 health facilities as part of the rapid assessment for DQA baseline of the project and integrated support supervision in the three target provinces. Results from this activity are still being analyzed. Preliminary results indicate that data accuracy remains a challenge in most health facilities.
- During the integrated support supervision visits, 79 technicians from 13 health facilities were trained in SM&E topics.
- PMI supported the strengthening of routine data quality through the implementation of the DQA tool during the malaria integrated support supervision visits. PMI supported the implementation of DQAs in 48 health facilities across the three focus provinces.

For years, PMI has consistently been reporting timely and completed data. Despite the improvements observed, accuracy continues to be an issue among data coming from health facilities. This is demonstrated by the low scores observed in the regular DQAs conducted as part of the integrated support supervision visits. During the last few years, NMCP has prioritized the rollout of the iMISS platform across the country. Currently, the platform is well established in all districts. The next step is to continue to strengthen the platform and to stimulate data use and data to action at all levels. Most of the SM&E activities, including trainings and DQAs, are conducted as part of the integrated support supervision. Still, logistical challenges continue to negatively affect the implementation of the planned number of visits.

8.3. Plans and Justification with FY 2024 Funding

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

Aligned with the country NMCP, PMI will continue to support SM&E activities and provide TA at the central level, as described in the recent progress section. The field activities will be focused in the three target provinces of Nampula, Zambézia, and Manica and through G2G in Tete Province. The strengthening of iMISS is a continuous process. This activity will continue to be a priority for PMI. Following gains since the rollout of iMISS in recent years, the country is currently focused on data use and data to action. Therefore, PMI will support such activities at all levels by supporting acquisition of devices for data collection, internet bundles, supervision, on-job training, and data analyses for action.

Table 5. Available Malaria Surveillance Sources

Source	Data Collection Activity	2020	2021	2022	2023	2024	2025
Household Surveys	Demographic Health Survey			*			
Household Surveys	Malaria Indicator Survey						
Household Surveys	Multiple Indicator Cluster Survey						
Household Surveys	EPI Survey						

Health Facility Surveys	Service Provision Assessment						
Health Facility Surveys	Service Availability Readiness Assessment Survey						
Health Facility Surveys	Other health facility survey		*				
Malaria Surveillance and Routine System Support	Therapeutic efficacy studies			X		P	
Malaria Surveillance and Routine System Support	Support to parallel malaria surveillance system						
Malaria Surveillance and Routine System Support	Support to HMIS	X	X	X	X	P	P
Malaria Surveillance and Routine System Support	Support to Integrated Disease Surveillance and Response	X	X	X	X	P	P
Malaria Surveillance and Routine System Support	eLMIS (electronic logistics management information system)	X	X	X	X	P	P
Malaria Surveillance and Routine System Support	Malaria Rapid Reporting System						
Other	End Use Verification						
Other	School-based Malaria Survey						
Other	Knowledge, Attitudes and Practices Survey, Malaria Behavior Survey						
Other	Malaria Impact Evaluation						
Other	Entomologic monitoring surveys	X	X	X	X	P	P

* Non-PMI funded activities, X = completed activities and P = planned activities. EPI: Expanded Program on Immunization; HMIS: health management information system.

9. Operational Research and Program Evaluation

9.1. PMI Goal and Strategic Approach

NMCP's objective is to ensure that relevant program evaluation and operations research are conducted and that results are rapidly used to inform programmatic decision making. To achieve this, individuals or entities interested in conducting research related to malaria propose their ideas to NMCP, who liaises with other national institutions, as appropriate. Studies are deemed relevant based on local needs. The research agenda must be reviewed by the National Health Bioethics Committee prior to implementation. PMI supports NMCP in defining and executing technically sound research and evaluation to inform programming.

9.2. Recent Progress (May 2022–April 2023)

NMCP is interested in appropriate stratification and targeting of interventions, including proven and novel vector control, SBC, surveillance, vaccination, and case management interventions, as part of the national high burden to high impact strategy. Specific gaps relate to determining the impact and barriers to uptake of existent interventions to inform adaptations and appropriate targeting and scale. There is a desire for more data on novel interventions and modeling to inform the geographic selection and combination of interventions for optimal effect. There are strong local research institutions to support NMCP's operational research and program evaluation studies, but the number of researchers and funding is not proportional to the programmatic information needs. The limited number of researchers and funding is a barrier to receiving timely data for programmatic decision making.

There are no recently completed operational research or program evaluation studies in Mozambique. A study aimed at determining if partial IRS was as effective as spraying an entire wall was scheduled for October 2023 in Mopeia. The study was relocated to a different country because of study design challenges.

Table 6. Non-PMI-Funded Operational Research/Program Evaluation Studies Planned/Ongoing in Mozambique

Source of Funding	Implementing Institution	Research Question/Topic	Current Status/Timeline
Unitaid, Global Fund	PATH, Tropical Health	**Vector control:** What is the impact of next-generation ITNs on the malaria burden?	Completed
Unitaid	ISGlobal, CISM	**Drug-based prevention:** What is the impact of ivermectin MDA on malaria infection in humans, on mosquito populations, and on the environment, as well as on its safety and acceptability by communities?	Ongoing
European & Developing Countries Clinical Trials Partnership	CISM	**Drug-based prevention:** What is the coverage of three or more doses of intermittent preventive treatment during infancy in children under two years of age attending the EPI at public health facilities in one district of Mozambique?	Planning underway
BASF	Tropical Health	**Vector control:** Does bursting strength affect ITN durability?	Ongoing
European & Developing Countries Clinical Trials Partnership	NMCP, CISM, ISGlobal	**Drug-based prevention:** Malaria mass and focal drug administration to advance malaria elimination in Mozambique: accelerating programmatic implementation and policy translation	Ongoing

European & Developing Countries Clinical Trials Partnership	CISM	**Vaccine:** What is the baseline incidence of malaria post radical cure with an effective anti-malarial in children aged 18–144 months? A baseline study in preparation for future vaccine trails	Ongoing
BMGF	PATH, Tropical Health	**MIP:** Are women attending their first ANC visit a pragmatic sentinel population for monitoring malaria burden and malaria intervention coverage at the health facility level in western Mozambique?	Completed
BMGF	Malaria Consortium, CISM	**Drug-based prevention:** What is the feasibility, acceptability, and impact of seasonal malaria chemoprevention in Mozambique?	Completed
BMGF	CISM	**SM&E:** What is the effectiveness of the implementation of reactive surveillance in two-burden districts?	Ongoing
BMGF	CISM	**SM&E:** How to use genomic approaches for malaria surveillance in Mozambique?	Ongoing
BMGF	CHAI, University of California San Diego	**SM&E:** Subnational analysis of transmission trends to determine causes of lack of progress in the south, center and north of the country	Completed
BMGF	CHAI	**Case management:** Evaluation of the community health case management landscape to determine areas of potential support	Completed
BMGF	UCSF	**Vector control:** Development of an entomological adaptive sampling framework	Ongoing
BMGF	CHAI	**Vector control:** IRS evaluation of seasonality of district-level rainfall and incidence to inform timing of IRS implementation	Ongoing
BMGF	CHAI, UCSF, ISGlobal, CISM	**Genomics, case management, SM&E:** Implementation of a genomic surveillance framework to inform antimalarial genetic resistance profiles, parasite movement, diagnostic performance, and elimination strategies	Ongoing
BMGF, The Research Foundation-Flanders	CHAI, Lancaster University, Hasselt University	**Surveillance:** Creation of a novel malaria early warning system algorithm using weekly and monthly incidence data	Ongoing
Global Fund	Tchau Tchau Malária	**Vector control:** Is there an additional impact of larviciding (Aquatain Mosquito Formulation) on top of IRS on local immature and adult mosquito numbers and malaria incidence in the city of Matola, Maputo Province?	Ongoing

BMGF: Bill & Melinda Gates Foundation; CHAI: Clinton Health Access Initiative; CISM: Centro de Investigação em Saúde de Manhiça; IRS: indoor residual spraying; ITN: insecticide-treated net; MDA: mass drug administration: SM&E: surveillance, monitoring, and evaluation.

9.3. Plans and Justification with FY 2024 Funding

No operational research or program evaluation activities are proposed with FY 2024 funding.

10. Capacity Strengthening

10.1. PMI Goal and Strategic Approach

PMI supports the strengthening of NMCP management and coordination capacity to improve program management skills at the central, provincial, and district level to effectively achieve NMSP strategic objectives. PMI's strategic approach is to support activities that improve the technical knowledge and skills of Mozambican government staff to design, plan, implement, and monitor health activities, leading to an overall improved capacity of government entities to implement and manage key malaria reduction activities. This will result in better-quality health services and strengthened health systems.

The five main strategies to achieve this objective are to:

1. Strengthen NMCP management and coordination capacity at all levels to enable the effective implementation of activities;
2. Establish coordination and communication mechanisms with the different stakeholders to ensure harmonized planning and implementation of malaria-related activities;
3. Strengthen the integrated supervision, mentoring, and technical supportive visits;
4. Effectively coordinate procurement and supply chain management; and
5. Effectively coordinate the activities of the different program actors.

10.2. Recent Progress (May 2022–April 2023) [[start

In the last 12 months, PMI supported NMCP capacity- and system-strengthening activities on vector control, malaria case management, supply chains, and technical skills through health worker training. PMI also supported the laboratory and procurement of laboratory consumables used for quality control activities.

PMI supported the National Institute of Health with TA, three seconded technical staff, and acquisition of some reagents. PMI also supported the training of 20 laboratory staff to be part of the core group and become supervisors of the laboratory provincial teams.

Additional support was provided to entomological laboratory and field activities in 7 out of 11 provinces to produce results to guide decision making regarding the vector control strategy.

PMI provided TA for the NMCP's strategic plan mid-term review and the design of the new one that will cover 2023–2030. TA was provided to NMCP to strengthen the provincial and district technical teams' management capacity to provide oversight and supervision of malaria interventions and implementation of the digital platform for data collection and analysis during the integrated supervision.

PMI also supported HMIS data reporting, analysis, and use for decision making at the provincial, district, and health facility levels. PMI also pursued Grants Under Contract to civil society organizations and CBOs to improve individual care-seeking behaviors through SBC.

PMI provided technical and financial support for two Field Epidemiology Training Program residents. Residents conducted surveillance evaluation projects for NMP, with one project focused on the malaria integrated surveillance system and the second on the entomology surveillance system of Nampula. Residents also started their advanced analytical projects, supported NMCP in three provincial ITN campaign distribution, and supported the polio and cholera response.

10.3. Plans and Justification with FY 2024 Funding

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

Technical support will be provided at the central level and in target provinces to improve planning and coordination of malaria control activities and partners during emergencies, including climatic events, and to increase the ability to respond to future climatic emergencies. The support will focus on capacity strengthening for provincial- and district-level MoH managers for data assessment, analysis, and use in program decision making. Funding to support PMI-focus provinces during an emergency will be made available through crisis modifiers included within bilateral awards and emergency funding lines in G2G agreements. PMI will continue to provide technical and financial support for one Field Epidemiology Training Program resident in the advanced training program.

See FY 2024 PMI budget tables for a detailed list of proposed activities with FY 2024 funding.

11. Staffing and Administration

A total of five professionals oversee PMI in Mozambique. The single interagency team led by the United States Agency for International Development (USAID) Mission Director or their designee consists of a resident advisor representing USAID, a resident advisor representing the U.S. Centers for Disease Control and Prevention, 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	2023	2024	2025
Total country population	32,419,747	33,244,414	34,090,466
Total population at risk for malaria	32,419,747	33,244,414	34,090,466
PMI-targeted at-risk population	32,419,747	33,244,414	34,090,466
Population targeted for ITNs	32,419,747	33,244,414	34,090,466
Continuous distribution needs			
Channel 1: ANC		1,782,942	1,831,794
Channel 1: ANC type of ITN	PBO	PBO	PBO
Channel 2: EPI	0	0	0
Channel 2: EPI type of ITN			
Channel 3: School	0	0	0
Channel 3: School type of ITN			
Channel 4: Community	0	0	0
Channel 4: Community type of ITN			
Channel 5:	0	0	0
Channel 5: Type of ITN			
Estimated total need for continuous channels	0	1,782,942	1,831,794
Mass campaign distribution needs			
Mass distribution campaigns	0	0	9,376,800
Mass distribution ITN type			Dual AI and PBO
Estimated total need for campaigns	0	0	9,376,800
Total ITN need: Continuous and campaign	**0**	**1,782,942**	**11,208,594**
Partner contributions			
ITNs carried over from previous year	NA	0	0
ITNs from government	0	0	0
Type of ITNs from government			
ITNs from Global Fund	NA	1,782,942	11,208,594

Type of ITNs from Global Fund		Dual AI and PBO	Dual AI and PBO
ITNs from other donors	0	0	0
Type of ITNs from other donors			
ITNs planned with PMI funding	0	0	0
Type of ITNs with PMI funding			
Total ITNs contribution per calendar year	**0**	**1,782,942**	**11,208,594**
Total ITN surplus (gap)	**0**	**0**	**0**

Table A-2. RDT Gap Analysis Table

Calendar Year	2023	2024	2025
Total country population	32,419,747	33,244,414	34,090,466
Population at risk for malaria	32,419,747	33,244,414	34,090,466
PMI-targeted at-risk population	32,419,747	33,244,414	34,090,466
RDT needs			
Total number of projected suspected malaria cases	43,674,543	45,470,438	49,121,323
Percent of suspected malaria cases tested with an RDT	67%	69%	70%
RDT needs (tests)	**29,421,986**	**31,212,601**	**34,346,122**
Needs estimated based on a combination of HMIS and consumption data			
Partner contributions (tests)			
RDTs from government	0	0	0
RDTs from Global Fund	28,113,800	6,220,025	10,079,600
RDTs from other donors			
RDTs planned with PMI funding	18,168,825	19,000,000	19,000,000
Total RDT contributions per calendar year	**46,282,625**	**25,220,025**	**29,079,600**
Stock balance (tests)			
Beginning balance	14,184,950	31,045,589	25,053,013
- Product need	29,421,986	31,212,601	34,346,122
+ Total contributions (received/expected)	46,282,625	25,220,025	29,079,600
Ending balance	**31,045,589**	**25,053,013**	**19,786,491**
Desired end of year stock (months of stock)	10	7	7
Desired end of year stock (quantities)	24,518,322	18,207,351	20,035,238
Total surplus (gap)	**6,527,267**	**6,845,662**	**(248,747)**

Table A-3. ACT Gap Analysis Table

Calendar Year	2023	2024	2025
Total country population	32,419,747	33,244,414	34,090,466
Population at risk for malaria	32,419,747	33,244,414	34,090,466
PMI-targeted at-risk population	32,419,747	33,244,414	34,090,466
ACT needs			
Total projected number of malaria cases	13,471,410	14,516,476	14,702,969
Total ACT needs (treatments)	**19,372,762**	**19,943,887**	**19,969,478**
Needs estimated based on a combination of HMIS and consumption data			
Partner contributions (treatments)			
ACTs from government	0	0	0
ACTs from Global Fund	11,967,083	7,324,038	10,243,548
ACTs from other donors			
ACTs planned with PMI funding	13,924,713	9,000,000	9,000,000
Total ACTs contributions per calendar year	**25,891,796**	**16,324,038**	**19,243,548**
Stock balance (treatments)			
Beginning balance	16,277,030	22,796,064	19,176,215
- Product need	19,372,762	19,943,887	19,969,478
+ Total contributions (received/expected)	25,891,796	16,324,038	19,243,548
Ending balance	**22,796,064**	**19,176,215**	**18,450,285**
Desired end of year stock (months of stock)	12	10	10
Desired end of year stock (quantities)	19,943,887	16,641,232	16,259,405
Total surplus (gap)	**2,852,177**	**2,534,983**	**2,190,880**

Table A-4. Inj. Artesunate Gap Analysis Table

Calendar Year	2023	2024	2025
Injectable artesunate needs			
Projected number of severe cases	212,962	229,483	232,431
Projected number of severe cases among children	91,432	98,525	99,791
Average number of vials required for severe cases among children	6	6	6
Projected number of severe cases among adults	121,531	130,958	132,641
Average number of vials required for severe cases among adults	8	8	8
Total injectable artesunate needs (vials)	**1,504,332**	**1,621,033**	**1,641,859**
Needs estimated based on a combination of HMIS and consumption data			
Partner contributions (vials)			
Injectable artesunate from government		500,000	0
Injectable artesunate from Global Fund	653,040	835,026	647,704
Injectable artesunate from other donors			
Injectable artesunate planned with PMI funding		431,000	431,000
Total injectable artesunate contributions per calendar year	**653,040**	**1,766,026**	**1,078,704**
Stock balance (vials)			
Beginning balance	1,883,263	1,031,971	1,176,964
- Product need	1,504,332	1,621,033	1,641,859
+ Total contributions (received/expected)	653,040	1,766,026	1,078,704
Ending balance	**1,031,971**	**1,176,964**	**613,809**
Desired end of year stock (months of stock)	8	8	8
Desired end of year stock (quantities)	1,002,888	1,080,689	1,094,572
Total surplus (gap)	**29,083**	**96,275**	**(480,763)**

Table A-5. RAS Gap Analysis

Calendar Year	2023	2024	2025
Artesunate suppository needs			
Number of severe cases expected to require prereferral dose (or expected to require prereferral dose based on number of providers for the service)	50,662	56,405	56,405
Total artesunate suppository needs (suppositories)	50,662	56,405	56,405
Needs estimated based on number of providers offering prereferral services			
Partner Contributions (suppositories)			
Artesunate suppositories from government			
Artesunate suppositories from Global Fund	159,600	11,750	21,589
Artesunate suppositories from other donors			
Artesunate suppositories planned with PMI funding	0	0	0
Total artesunate suppositories available	**159,600**	**11,750**	**21,589**
Stock balance (suppositories)			
Beginning balance	61,664	170,602	125,947
- Product need	50,662	56,405	56,405
+ Total contributions (received/expected)	159,600	11,750	21,589
Ending balance	**170,602**	**125,947**	**91,131**
Desired end of year stock (months of stock)	6	6	6
Desired end of year stock (quantities)	25,331	28,203	28,203
Total surplus (gap)	**145,271**	**97,745**	**62,928**

Table A-6. SP Gap Analysis Table

Calendar Year	2023	2024	2025
Total country population	32,419,747	33,244,414	34,090,466
Total population at risk for malaria	32,419,747	33,244,414	34,090,466
PMI-targeted at-risk population	32,419,747	33,244,414	34,090,466
SP needs			
Total number of pregnant women	2,111,498	2,165,209	2,220,312
Percent of pregnant women expected to receive IPTp1	81%	83%	85%
Percent of pregnant women expected to receive IPTp2	81%	83%	85%
Percent of pregnant women expected to receive IPTp3	60%	59%	59%
Percent of pregnant women expected to receive IPTp4	62%	63%	65%
Total SP needs (doses)	**5,998,665**	**6,258,902**	**6,530,505**
Needs estimated based on a combination of HMIS and consumption data			
Partner contributions (doses)			
SP from government	7,324,667	7,460,402	6,734,207
SP from Global Fund	0	0	0
SP from other donors			
SP planned with PMI funding	2,133,333	0	0
Total SP contributions per calendar year	**9,458,000**	**7,460,402**	**6,734,207**
Stock balance (doses)			
Beginning balance	33,341	3,492,676	4,694,176
- Product need	5,998,665	6,258,902	6,530,505
+ Total contributions (received/expected)	9,458,000	7,460,402	6,734,207
Ending balance	**3,492,676**	**4,694,176**	**4,897,878**
Desired end of year stock (months of stock)	9	9	9
Desired end of year stock (quantities)	4,498,999	4,694,177	4,897,879
Total surplus (gap)	**(1,006,323)**	**(1)**	**(1)**