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Tanzania (Zanzibar)

Malaria Operational Plan FY 2023

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

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

CONTENTS

ABBREVIATIONS

ACT	Artemisinin-based Combination Therapy
AI	Active Ingredient
ANC	Antenatal Care
ASTMH	American Society of Tropical Medicine and Hygiene
CMSO	Council Malaria Surveillance Officer
DHIS2	District Health Information Software 2
ECAMM	External Competency Assessment Malaria Microscopy
eLMIS	Electronic Logistics Management Information System
EPI	Expanded Program on Immunization
FETP	Field Epidemiology Training Program
FY	Fiscal Year
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
HMIS	Health Management Information System
IDSR	Integrated Disease Surveillance and Response
IRS	Indoor Residual Spraying
IT	Information Technology
ITN	Insecticide-treated Mosquito Net
LSM	Larval Source Management
MBS	Malaria Behavior Survey
MCN	Malaria Case Notification
MDA	Mass Drug Administration
MEEDS	Malaria Early Epidemic Detection System
MIP	Malaria in Pregnancy
MOP	Malaria Operational Plan
mRDT	Malaria Rapid Diagnostic Test
MSDQI	Malaria Services and Data Quality Improvement
NMCP	National Malaria Control Program
OR	Operational Research
PBO	Piperonyl Butoxide
PE	Program Evaluation
PMI	U.S. President's Malaria Initiative
PSA	Public Service Announcement
QA/QC	Quality Assurance/Quality Control
RADZEC	Reactive Case Detection in Zanzibar Effectiveness and Cost
RCD	Reactive Case Detection
RDA	Reactive Drug Administration
SBC	Social and Behavior Change
SM&E	Surveillance, Monitoring, and Evaluation

SP	Sulfadoxine-pyrimethamine
TES	Therapeutic Efficacy Study
USAID	U.S. Agency for International Development
WHO	World Health Organization
ZAMEP	Zanzibar Malaria Elimination Program

EXECUTIVE SUMMARY

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

U.S. President's Malaria Initiative

Launched in 2005, PMI supports implementation of malaria prevention and treatment measures as well as cross-cutting interventions. PMI's 2021–2026 strategy, *End Malaria Faster*, envisions a world free of malaria within our generation with the goal of preventing malaria cases, reducing malaria deaths and illness, and eliminating malaria in PMI partner countries. PMI currently supports 24 countries in sub-Saharan Africa and three programs across the Greater Mekong Subregion in Southeast Asia to control and eliminate malaria. Tanzania began implementation as a PMI partner country in fiscal year (FY) 2006.

Rationale for PMI's Approach in Zanzibar

The malaria burden in Zanzibar has remained low over the past several years among its population. Overall, it had a test positivity rate of 1.0 percent in 2020 of those seeking treatment. The total number of malaria cases in 2021 was 6,095, with four deaths reported. The 2017 Tanzania Malaria Indicator Survey showed a malaria prevalence in Zanzibar of 0.2 percent by malaria rapid diagnostic test (mRDT), ranging from 0 percent in Pemba to 0.4 percent in Unguja. High coverage of insecticide-treated mosquito nets (ITNs) and indoor residual spraying (IRS) has resulted in a shift in the malaria vector population from *An. gambiae* s.s. to predominantly *An. arabiensis* and reflects the predominant outdoor biting pattern observed in both Pemba and Unguja.

Overview of Planned Interventions

The proposed FY 2023 PMI funding for Tanzania (both mainland and Zanzibar) is $39 million. In Zanzibar, PMI will support the following intervention areas with these funds:

1. Vector Monitoring and Control

PMI will support Zanzibar Malaria Elimination Program (ZAMEP) entomological monitoring activities, which includes insecticide resistance monitoring and ITN distributions. PMI's support for ITN coverage includes procurement and distribution of ITNs via antenatal care (ANC) and Expanded Program on Immunization (EPI) channels, a mass replacement campaign, community-based distribution, and distribution of Global

Fund to Fight AIDS, Tuberculosis and Malaria-procured ITNs through ANC/EPI channels at all primary health facilities. With this Malaria Operational Plan (MOP), PMI plans to start deployment of new types of nets (i.e., dual active ingredient ITNs). Planned activities include the following:

- Conduct annual rapid assessment surveys to determine ITN coverage across the 10 regions.
- Procure and distribute new types of ITNs for continuous distribution channels.
- Provide technical support for the targeted mass replacement campaigns.
- Support longitudinal entomological monitoring. PMI support focuses on the national insecticide resistance monitoring program at 10 sentinel sites.
- Support implementation of larval source management based on results and progress of ZAMEP and its research partners in 2022–2023.

2. Malaria in Pregnancy

PMI supports the World Health Organization's recommended approach to reduce the burden of malaria infection among pregnant women, including the provision of ITNs and effective case management of malaria illness and anemia.

- PMI will continue support for the procurement and provision of long-lasting ITNs to pregnant women through continuous distribution at ANC.
- PMI will continue support for social and behavior change (SBC) to increase ITN use, ANC attendance, and care-seeking behaviors.
- PMI will continue support for the implementation of malaria services and data quality improvement (MSDQI) supportive supervision with a priority given to lower performing facilities identified from previous rounds of MSDQI data.

3. Drug-based Prevention

- Zanzibar does not implement seasonal malaria chemoprevention or other drug-based prevention.

4. Case Management

- PMI will provide technical assistance for the slide bank, including procurement of slides, malaria microscopy, and mRDTs for ZAMEP.
- PMI will support the implementation and monitoring of microscopy proficiency testing for the national external quality assurance at ZAMEP.
- PMI will conduct basic and advanced malaria diagnostic refresher trainings and External Competency Assessment Malaria Microscopy training for laboratory technicians.

- PMI will continue to support implementation of MSDQI in all health facilities in Zanzibar, and provide technical guidance on the use of MSDQI data to target interventions.
- The Government of Zanzibar will procure the full quantities of combination mRDT, artemisinin-based combination therapy (ACT), parenteral artesunate, and single low-dose primaquine for Zanzibar. PMI will procure ACT, parenteral artesunate, or single low-dose primaquine if gaps are later identified.
- PMI will continue to support monitoring of the provision of single low-dose primaquine, and of the malaria RCD system in Zanzibar.

5. Health Supply Chain and Pharmaceutical Management

- PMI will support ZAMEP's 2018–2023 strategic plan through accurate quantification, timely delivery, and monitoring of malaria health commodities.
- PMI will further monitor ITNs through conducting multiple analyses of data generated from the Chandarua Kliniki dashboard to inform ZAMEP and the Government of Zanzibar on interventions needed to address ITN supply chain challenges.
- PMI will promote the Zanzibar Holistic Supply Chain Review recommendations on improving supply chain performance.

6. Social and Behavior Change

PMI supports ZAMEP in its efforts to eliminate malaria in alignment with the Zanzibar Malaria Elimination Strategic Plan 2018–2023 and Zanzibar Malaria Elimination SBC Strategy 2018–2023.

- PMI aims to support the objectives in these strategies through increasing uptake of key malaria interventions and care-seeking practices, including ITN use, prompt care-seeking for fever, and testing for malaria, including for travelers at entry points.
- PMI support will be guided by the malaria behavior survey, which was conducted in 2021 with support from PMI.
- PMI will continue to support SBC interventions addressing the following key behavioral objectives to support malaria elimination in Zanzibar: increased proportion of the population who seek prompt and appropriate care for symptoms of malaria, increased proportion of the population who are tested for malaria before taking malaria medication, increased proportion of the population who sleep under an ITNs every night, increase proportion of travelers who believe it is important to be tested for malaria at the point of entry, increased knowledge among travelers that ITNs should be used every

night in Zanzibar, and increased knowledge among Zanzibaris that they should use ITNs when traveling in malaria endemic areas.

- PMI will support use of multiple, reinforcing channels to reach target audiences in support of the above behavioral and communication objectives, these include use of media, targeted mid-media, and placement of out-of-home and digital messaging at points of entry.
- PMI will support development of revised ZAMEP SBC strategy, which will expire in 2023.
- PMI will support ZAMEP unit staff capacity building on use of data to support decision-making, resource allocation, and intervention design and evaluation of SBC activities.

7. Surveillance, Monitoring, and Evaluation

- PMI will continue to support activities to strengthen malaria surveillance and reactive case detection, including the data collection and management systems that enable the identification of new cases of malaria and trigger investigations and other response measures.
- If ZAMEP adopts reactive drug administration using the same mechanism used for reactive case detection, PMI will support implementation.
- Following the discontinuation of the Malaria Epidemic Early Detection System, PMI will continue to support strengthening and maintaining the Integrated Disease Detection and Response (IDSR) and routine Health Management Information System (HMIS) surveillance systems for malaria-related data capture and reporting at all government and private health facilities.
- PMI will support the integration of data generated from IDSR to the coconut system and District Health Information Software 2 (DHIS2) data dashboards, while building the capacity among ZAMEP and HMIS unit staff for system maintenance.
- PMI will continue to support the refinement and maintenance of an operational data dashboard to visualize entomological monitoring data and foci investigation findings in the new coconut system and DHIS2 malaria dashboards.

8. Operational Research and Program Evaluation

- No operational research or program evaluation studies are planned with FY 2023 funds.

9. Capacity Strengthening

- PMI will support capacity strengthening initiatives for ZAMEP staff to increase both technical and managerial skills through short-term training and participation in international meetings.
- PMI will continue to support overall strengthening of the HMIS systems, ZanPBR, and other community health information systems.

I. CONTEXT AND STRATEGY

1. Introduction

Tanzania began implementation as a U.S. President's Malaria Initiative (PMI) partner country in fiscal year (FY) 2006. This FY 2023 Malaria Operational Plan (MOP) presents a detailed implementation plan for Zanzibar, based on the strategies of PMI and the Zanzibar Malaria Elimination Program (ZAMEP). It was developed in consultation with the National Malaria Control Program (NMCP) and with the participation of national and international partners. PMI is proposing activities that build on partner investments to improve and expand malaria-related services, including investments by the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund). This document provides an overview of the strategies and interventions in Zanzibar, describes progress to date, identifies challenges and relevant contextual factors, and provides a description of activities that are planned with FY 2023 funding. For more detailed information on the country context, please refer to the Country Malaria Profile, which provides an overview of the country's malaria situation, key indicators, the ZAMEP strategic plan, and the partner landscape.

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

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

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

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

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

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

3. Rationale for PMI's Approach in Zanzibar

3.1. Malaria Overview for Zanzibar

The malaria burden in Zanzibar has remained low over the past several years, with a test positivity rate in those seeking treatment at 1.0 percent in 2021. The total number of malaria cases in 2021 was 6,095, with four deaths reported. The 2017 Tanzania Malaria Indicator Survey showed a malaria prevalence in Zanzibar of 0.2 percent by malaria rapid diagnostic test (mRDT), ranging from 0 percent in Pemba to 0.4 percent in Unguja. High coverage of ITNs and IRS has resulted in a shift in the malaria vector population from *An. gambiae* s.s. to predominantly *An. arabiensis* and reflects the predominant outdoor biting pattern observed in both Pemba and Unguja.

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

3.2. Key Challenges and Contextual Factors

Key challenges in achieving malaria elimination objectives include:

- Importation: There is evidence that a significant proportion (~60 percent) of cases reported in Zanzibar may be imported, largely through informal ports of entry from the mainland.
- Outdoor transmission may play a major role in overall transmission, suggesting that alternative vector control strategies are needed to complement ITNs.

3.3. PMI's Approach for Zanzibar

PMI supports a comprehensive package of malaria elimination interventions in support of ZAMEP's 2018–2023 Strategic Plan IV. The plan identifies three major strategies to achieve this goal:

- Malaria diagnosis and treatment: Ensure quality-assured diagnosis and appropriate case management in all health facilities and at community level by 2023.
- Integrated malaria vector control: Increase appropriate vector control measures to the population at risk of malaria to 100 percent by 2023.
- Surveillance, Monitoring and Evaluation:
    - Actively investigate and classify 100 percent of all confirmed cases of malaria and initiate entomological surveillance in malaria foci from 0 percent in 2017 to 100 percent by 2023.
    - Conduct entomological surveillance in 100 percent of malaria foci areas by 2023.

The plan also identifies three supporting strategies:

- Social Behavioral Change and Communication: Advocacy, messaging on behavior change, and mobilization reaches 90 percent of the general population by 2023
- Operational Research: Appropriate operational research undertaken to evaluate and optimize interventions to eliminate malaria
- Program Management and Coordination: Coordination structures strengthened for malaria elimination at different operational levels by 2023

Zanzibar implemented a Malaria Case Notification system (MCN) in 2011. This system requires that the Council Malaria Surveillance Officers (CMSOs) follow every case to the household level and test all household members. In addition, the CMSOs take the coordinates of each case and collect sufficient information on cases to classify foci as active, non-active, or potential. The goal is to follow up every case to the household level within 24 hours of notification of a confirmed case of malaria. In 2014, ZAMEP updated its case management guidelines to include a single low-dose primaquine

treatment to reduce transmission, a policy that was implemented beginning in 2016. PMI supports ZAMEP's ITN keep-up approach to maintain high net coverage via mass replacement campaigns and health facility-based distribution of ITNs through antenatal care and Expanded Program on Immunization (ANC/EPI) channels. ZAMEP conducts reactive focal IRS which reaches hotspot areas across Unguja and Pemba, and new approaches to larviciding are being tested.

PMI currently supports nearly all aspects of the ZAMEP strategy across all geographic areas of both islands, Unguja and Pemba, with the exception of reactive focal IRS. PMI support includes technical assistance for monitoring and informing larviciding protocols and will expand to implementation of larval source management (LSM) with this MOP. To assist Zanzibar in its efforts to eliminate malaria, PMI has supported ZAMEP to organize and convene a Zanzibar Malaria Elimination Advisory Committee, comprising international and local malaria experts. This independent group has met regularly beginning in 2018 to review progress and provide guidance to ZAMEP.

3.4. Key Changes in this MOP

Key shifts in the FY 2023 MOP are to:

- Transition from piperonyl butoxide (PBO) to dual active ingredient (AI) insecticide nets: PMI is shifting from procurement of PBO ITNs to dual AI nets for all distribution channels with the FY 2023 MOP.
- Implement reactive drug administration (RDA): Assuming favorable results from planned operational research (OR) between October 2022 and September 2023, PMI will support implementation of RDA as an alternative to reactive case detection (RCD).
- Support implementation of LSM: PMI will support implementation of larviciding based on results and progress of ZAMEP and its research partners in 2022–2023.

II. OPERATIONAL PLAN FOR FY 2023

1. Vector Monitoring and Control

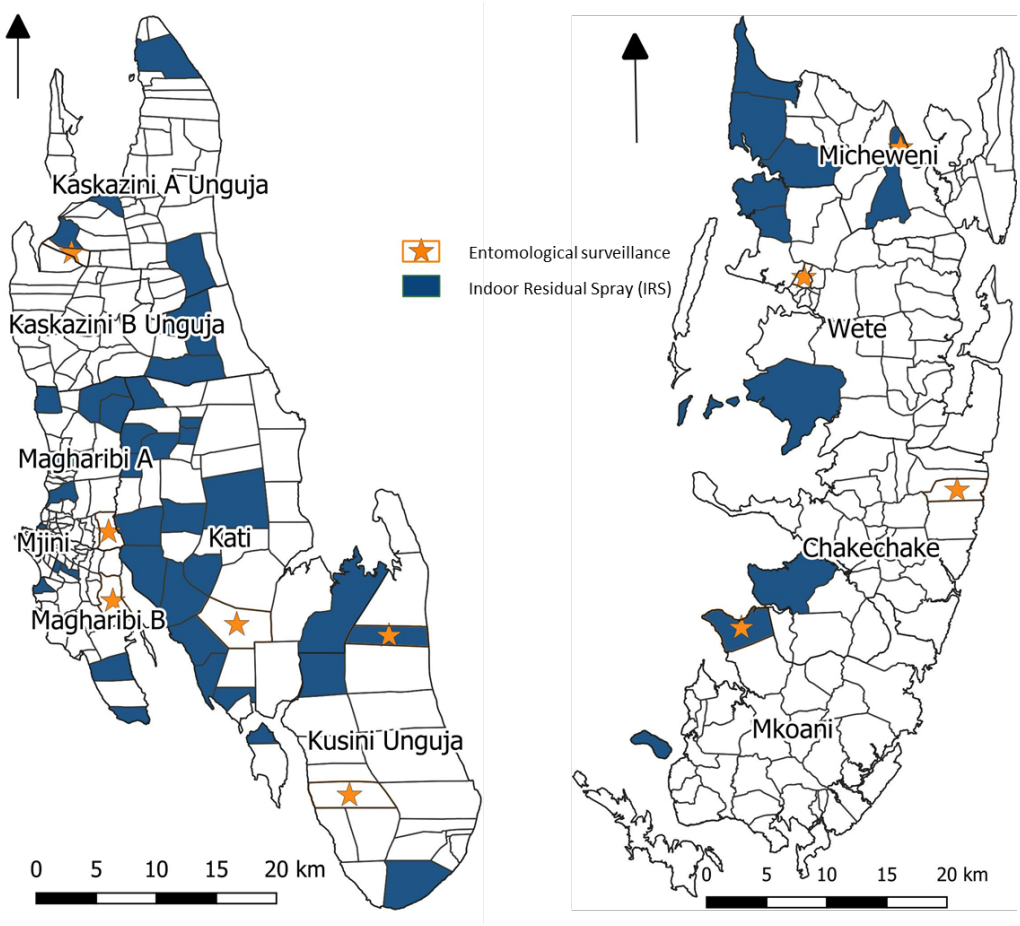
1.1. PMI Goal and Strategic Approach

The Zanzibar Malaria Strategic Plan IV 2018/2019–2022/2023 includes Integrated Malaria Vector Control (IMVC) as one of four major strategies for malaria elimination with a corresponding objective to increase appropriate vector control measures to the population at risk for malaria to 100 percent by 2023. IMVC interventions are: IRS in identified areas, or in areas where entomological investigations indicate the need for an IRS intervention; maximization of ITN ownership and use; larval source management; and vector surveillance in hotspot areas.

PMI supports and provides technical support for the use of all four of these interventions, including the implementation of LSM in areas where larval habitats can be efficiently located. PMI supports entomological monitoring in 10 sites. Both Global Fund and PMI support the procurement and distribution of ITN mass replacement campaigns. PMI supports continuous distribution of ITNs via ANC and EPI channels nationwide.

PMI/Tanzania does not currently support actual implementation of LSM activities. However, PMI will continue to provide technical support to improve targeting, monitoring, and evaluation of LSM under this MOP.

Figure 1. Map of PMI-supported Activities in Zanzibar, 2021*



*In addition to entomological surveillance and IRS support depicted on the map above, PMI supports procurement and continuous distribution of insecticide-treated mosquito nets, case management, and malaria in pregnancy service delivery in all health facilities, and social behavior change activities throughout all districts in Zanzibar (not shown on the map).

1.2. Recent Progress (between October 2020 and September 2021)

- Supported entomological monitoring in 10 sentinel sites—six in Unjuga and four in Pemba—in partnership with ZAMEP. Monitoring activities included insecticide resistance monitoring, vector bionomics monitoring, spray quality, and residual efficacy monitoring in PMI-supported areas implementing IRS.
- Provided technical assistance to ZAMEP for laboratory analysis of entomological collections, including procurement of equipment, laboratory supplies, and reagents.
- Strengthened entomological capacity with a study visit of ZAMEP entomology personnel to the National Institute for Medical Research (NIMR)-Mwanza, a two-week training for four new ZAMEP entomology staff at NIMR-Muheza, at a class with mainland vector control district officers and an orientation of 12 staff in entomological foci investigations.

- Collaborated with ZAMEP in February 2021 to conduct targeted IRS using clothianidin insecticide in 67 *Shehias* (56 in Unguja and 11 in Pemba). The campaign covered 94.5 percent (46,316 out of 49,238 targeted) of the structures protecting the population of 230,708.
- Supported the procurement and distribution of 110,360 PBO ITNs to pregnant women and children under the age of one year through ANC and EPI clinics.
- Provided technical assistance for planning for the June to August 2021 ITN mass distribution campaign, which distributed PBO ITNs nationwide. The activity was conducted in collaboration with Global Fund and ZAMEP.
- Supported national-level SBC activities to improve demand for ITNs, increase appropriate use, promote care, and mitigate against misuse. For more information, please refer to the **SBC section**.
- Provided technical assistance to ZAMEP, the Global Fund Principal Recipient, and District Health Offices with planning for the reactive IRS operations in foci investigated areas.

1.3. Plans and Justification for FY 2023 Funding

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

1.3.1. Entomological Monitoring

PMI no longer supports IRS in Zanzibar, and Zanzibar fully transitioned to PBO nets as of November 2020. With plans to start the deployment of dual AI nets in selected areas, PMI will continue to support longitudinal entomological surveillance in areas with ITNs (PBO and dual AI nets), entomological assessments specifically in hot-spot areas, and laboratory analysis of entomological specimens from the surveillance program

Recognizing ZAMEP's introduction of LSM as one of the vector control interventions in elimination areas, PMI is providing technical assistance to improve the targeting, monitoring and evaluation of LSM activities. PMI proposes to expand technical assistance to ZAMEP for LSM activities, building on experience/lessons learned and on the 2018–2020 pilot study using geospatial technologies to map potential larval habitats and targeting LSM, as resources allow.

Tanzania is a high-risk country for the introduction and establishment of *An. stephensi*. PMI will collaborate with ZAMEP and other partners to develop activities for enhanced surveillance of *An. stephensi* in accordance with the PMI *An. stephensi* action plan guidance for high, risk countries. As the NMCP LSM program conducts larval

surveillance, PMI and partners will look at ways of leveraging the existing LSM program to include *An. stephensi* surveillance.

Summary of Distribution and Bionomics of Malaria Vectors in Zanzibar
Longitudinal entomological monitoring (October 2020–September 2021) was conducted in six sentinel districts in Unguja and four districts in Pemba. In Pemba and Unguja, the primary vector was *An. gambiae* s.l. and the secondary vector was *An. funestus* s.l. Other *Anopheles* collected included *An. coustani* and *An. rufipes*. In Unguja and Pemba, the biting rate of *An. gambiae* s.l. was higher outdoors than indoors. In Unguja, the peak biting rate indoors of *An. gambiae* s.l. is between 9pm–1am and the outdoor peak biting rate was between 8pm–10pm, with a smaller biting peak between 4am–6am. In Pemba, the biting peak of *An. gambiae* s.l. was between 7pm–11pm indoors and between 8pm–midnight outdoors. *An. funestus* s.l. were mainly biting outdoors within peak biting hours.

An. arabiensis was the main vector and *An. merus* the second vector species of the *An. gambiae* complex identified by molecular speciation of the mosquito samples from the longitudinal entomological monitoring in Unguja and Pemba. *An. leesoni* was the main vector species from the *An. funestus* complex identified for both islands. *An. parenesis* and *An. rivulorum* from the *An. funestus* complex were also detected. All mosquitoes collected from the longitudinal entomological monitoring were tested for malaria parasite infection. The overall sporozoite rate was 0.38 percent in Unguja and 0.91 percent in Pemba

Status of Insecticide Resistance in Zanzibar
Insecticide resistance testing was conducted in the 10 sentinel sites from 10 sentinel districts in both Pemba and Unguja. *An. gambiae* s.l. was resistant to permethrin and alphacypermethrin. Resistance was also detected in deltamethrin and lambdacyhalothrin, which was tested in Pemba only. *An. gambiae* s.l. was fully susceptible to bendiocarb, pirimphos-methyl, and clothianidin in both Pemba and Unguja. As of 2021, PBO fully restored susceptibility to permethrin, deltamethrin, and alphacypermethrin in *An. gambiae* s.l. in both Unguja and Pemba.

1.3.2. Insecticide-Treated Nets (ITNs)

PMI will continue to support procurement and distribution of ITNs through continuous distribution channels. PMI will provide technical support to the country's 2024 mass replacement campaign through participation on a national task force. PMI also supports SBC to improve use and care of ITNs and to mitigate against misuse.

ITN Distribution in Zanzibar
In Zanzibar, ITNs are distributed via targeted mass campaigns every three years. ANC and EPI clinics serve as continuous distribution channels to reach pregnant women and children under the age of one year. ZAMEP is currently revising the ITN strategic plan to explore other alternative delivery systems to special population groups. The country has fully transitioned to PBO nets as of November 2020. There are plans to start deployment of dual AI nets, based on resistance data, in calendar year 2024.

There are not currently any anticipated ITN gaps. Please refer to the **ITN Gap Table** in the annex for more detail on planned quantities and distribution channels.

1.3.3. Indoor Residual Spraying (IRS)

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

IRS Insecticide Residual Efficacy in Zanzibar
The final PMI-supported IRS campaign in February 2021 used clothinidin in a total of 10 districts in Zanzibar: five in Unguja and five in Pemba. Quality of IRS and spray team performance assessment, carried out with World Health Organization (WHO) bioassays within one week of IRS operations using a susceptible colony of *An. gambiae* s.s, indicated a high quality of IRS operations. Wall bioassays were then conducted monthly and showed that for all surfaces there was >80 percent mortality nine months post-IRS in both islands.

2. Malaria in Pregnancy

2.1. PMI Goal and Strategic Approach

PMI supports WHO's recommended approach to reduce the burden of malaria infection among pregnant women, including through the provision of ITNs, and effective case management of malaria illness and anemia.

ZAMEP no longer implements intermittent preventive treatment in pregnancy and ended the intermittent screen and treat strategy in August 2016. ZAMEP has revised the diagnostics and treatment guidelines to include a malaria in pregnancy (MIP) chapter to focus on strengthening malaria case management for pregnant women, including screening for symptoms, timely diagnosis and treatment, and effective referral.

2.2. Recent Progress (between October 2020 and September 2021)

- PMI continued support for continuous ITN distribution through EPI and ANC clinics (see Vector Monitoring and Control section).
- PMI supported finalizing the development and baseline implementation of the Malaria Services and Data Quality Improvement (MSDQI) supportive

supervision package, adapted for Zanzibar, to encourage supervisors and providers to monitor and improve the quality of malaria services, including MIP, in health facilities. For more information on MSDQI, see the Case Management section.
- PMI supported ZAMEP to continue SBC interventions that addressed provider behaviors in adhering to recommended treatment regimens, increased advocacy on availability of malaria commodities at health facilities, and reinforced the messaging on the importance of pregnant women attending ANC early and early health-seeking behaviors for febrile illness. For more details, see the SBC section.

2.3. Plans and Justification for FY 2023 Funding

The FY 2023 funding tables contain a full list of malaria in pregnancy activities that PMI proposes to support in Zanzibar with FY 2023 funding. Please visit www.pmi.gov/mops for these FY 2023 funding tables.

- PMI will continue support for the procurement and provision of ITNs to pregnant women through continuous distribution at ANC (see budget and details in ITN section) and continue support for SBC to increase ITN use and ANC attendance (see SBC section).
- PMI will continue support for the implementation of MSDQI supportive supervision, prioritizing lower performing facilities identified from previous rounds of MSDQI data (see Case Management section).

3. Drug-based Prevention

Zanzibar does not implement seasonal malaria chemoprevention or other drug-based prevention. For a description of RDA, see the Operational Research and Program Evaluation and Surveillance, Monitoring, and Evaluation sections.

4. Case Management

4.1. PMI Goal and Strategic Approach

The case management goal of the ZAMEP Malaria Strategic Plan IV 2018–2023 is to achieve universal access to high quality malaria diagnostic testing and treatment in all health facilities and the community. The target in Zanzibar is to ensure quality-assured diagnosis and appropriate case management in all health facilities and the community level by 2023.

The Zanzibar Malaria Diagnosis & Treatment Guidelines, 2018 call for parasitological confirmation for all patients with signs or symptoms of malaria. Malaria microscopy and

mRDT are the principal diagnostic tools used in the 169 public and 112 private health facilities. Microscopy is available at hospitals and larger health facilities, and mRDTs are available in all public and most private health facilities.

Malaria microscopy quality assurance and quality control (QA/QC) were established in 2005, and by September 2019 expanded to 96 public and private health facilities (65 in Unguja, 31 in Pemba). ZAMEP collects slides from health facilities on a monthly basis, and 10 percent of negative and 100 percent of positive slides are re-examined in a blinded manner by the ZAMEP laboratory. In 2021, a total of 5,853 slides were re-examined, and microscopy testing sensitivity was 99.9 percent and specificity was 100 percent. Overall, 96.4 percent of positive slides were *Plasmodium falciparum*. In 2019 following recommendations from the Zanzibar Malaria Elimination Advisory Committee, ZAMEP began implementation of a process to confirm, speciate, and quantify malaria infections identified by combination mRDT at health facilities and the community (through active and reactive case detection) by microscopy. In 2021, positive mRDTs were collected from 29 health facilities from three districts (Mjini, Magharibi A and B, and Micheweni) for microscopy by ZAMEP. The microscopy results were *Plasmodium falciparum* 88.8 percent, *Plasmodium malariae* 8.9 percent, and negative 2.3 percent. Establishment of the ZAMEP slide bank was finalized in 2016.

A total of 182 public health facilities are using mRDTs. ZAMEP maintains a system of quarterly mRDT QC which documented 98.7 percent achievement of key quality indices in 2021. ZAMEP conducts quarterly mRDT supervisory visits to all public district hospitals and health centers and holds semi-annual stakeholder meetings to provide feedback to the districts about both microscopy and mRDT performance. The ZAMEP target is to scale up malaria diagnosis QA/QC for private health facilities from 32 percent in 2016 to 100 percent by 2023.

ACTs were deployed in Zanzibar in 2003, and the current first-line treatment for uncomplicated malaria is artesunate-amodiaquine, with artesunate as the drug of choice for severe malaria. Serial ZAMEP assessments have shown that ACTs are widely available in health facilities. The Zanzibar Malaria Diagnosis & Treatment Guidelines, 2018 include the WHO recommendation for the use of single low-dose (0.25 mg base/kg) primaquine for all patients with confirmed uncomplicated *P. falciparum* infection in areas pursuing elimination. Primaquine distribution began in October 2016, and by the end of 2017 all public health facilities were stocked. In 2021, 1,160 doses of primaquine were distributed in all 112 private facilities. ZAMEP is currently exploring options to monitor the stock and provision of primaquine, as private facilities are not linked to the electronic Logistics Management Information System (eLMIS).

The guidelines call for referral of patients with severe malaria from lower-level facilities to the nearest health center that can administer artesunate intravenously after first giving the patient an intramuscular injection of artesunate. Intramuscular artemether or quinine can be used as second-line drugs if artesunate is not available. Use of pre-referral rectal artesunate at peripheral health facilities is also permitted if injection is not available yet, though in practice this does not occur because rectal artesunate is not procured by either the Government of Zanzibar or its partners.

Adopting lessons learned from the successes of the MSDQI process used in mainland Tanzania, ZAMEP developed seven comprehensive tablet-based electronic MSDQI modules (checklists) to evaluate the quality of case management at health facilities and provide immediate onsite feedback for improvement and mentorship to health care workers. In addition to mRDT and microscopy QA/QC, the MSDQI process focuses on improving the clinical skills of individual health care workers and adherence to established malaria diagnostic and treatment guidelines. In total, the MSDQI process includes modules for outpatient and inpatient departments, ANC, mRDT, microscopy, SM&E, and logistics and supply. MSDQI is intended to be implemented by district supervisors; facility baseline MSDQI assessments were completed in early 2021. A score summarizes the data collected during MSDQI health facility supervisory visits, and these data are automatically uploaded to and available in District Health Information Software 2 (DHIS2).

4.2. Recent Progress (between October 2020 and September 2021)

Between October 2020 and September 2021, PMI supported the improvement of malaria case management with an emphasis on service delivery in all public health facilities in Zanzibar. PMI funded the baseline implementation and scale-up of the MSDQI supportive supervision package, including the electronic tablet-based system for recording, reporting, and using data. PMI supported training for and the maintenance of the microscopy and mRDT QA/QC systems in public and private facilities. PMI supported SBC activities to combat imported malaria cases by travelers, promoted preventive and curative malaria-related behaviors during active case detection activities, and promoted prompt care seeking upon onset of signs and symptoms of malaria.

National-Level Case Management Activities

- Provided technical assistance to ZAMEP for the development of policies, strategies, and implementation plans related to case management.
- Provided diagnostic technical assistance for the slide bank, malaria microscopy, and mRDT to ZAMEP.
- Provided information technology (IT) support to maintain the MSDQI electronic data system.
- Conducted a diagnostic capacity assessment for malaria microscopy.

- Procured 356 non-*Plasmodium falciparum* microscopy slides for the slide banks in Pemba and Unguja (ZAMEP).
- Procured and installed new microscopes for and renovated the ZAMEP microscopy laboratory in Pemba.
- Supported ZAMEP to train 60 laboratorians in malaria microscopy QA/QC and 100 health care workers in the preparation and management of thick and thick blood smears.
- Supported microscopy proficiency testing for national external quality assurance at ZAMEP.
- Conducted the training of 60 laboratory technicians in basic and 15 in advanced malaria diagnostic refresher training, among whom 10 were assessed in External Competency Assessment of Malaria Microscopy (ECAMM) courses and 8 were recommended for WHO ECAMM certification.

Commodities

- The Government of Zanzibar procures combination (multi-species) mRDTs, ACTs, parenteral artesunate, and low-dose primaquine. PMI does not financially support procurement of these commodities.
- Currently, rectal artesunate is not procured by either the Government of Zanzibar or its partners, including PMI.

Facility-Level Case Management Activities

- Supported ZAMEP in the implementation and scale-up of MSDQI supportive supervision visits and data analysis for all public health facilities.
- Trained 93 supervisors (55 in Unguja and 38 in Pemba) on MSDQI supportive supervision and use of the electronic data system.
- Supported eight quarterly feedback meetings (four each in Unguja and Pemba) with a total of 77 district and council health management team members to review MSDQI supportive supervision findings and improve performance on malaria case management.
- Trained 270 health care workers on knowledge and skills for malaria case management and 120 clinicians on management of severe malaria.
- Supported ZAMEP to monitor private health facilities on the rational use of ACTs plus single low-dose primaquine.

Community-Level Case Management Activities

The main activity in the community is SBC to promote malaria awareness and early health-seeking behavior (see SBC section). However, Zanzibar implements a malaria RCD system, whereby CMSOs provide diagnosis by mRDT and treatment in households of an index case passively diagnosed at a health facility. The quality of

CMSOs' case management is ensured through their assigned health facility. For a description of and PMI support for the RCD system, see the SM&E section.

Please note that Zanzibar does not routinely monitor antimalarial efficacy; the Therapeutic Efficacy Study (TES) approach for Tanzania is presented in the **Plans and Justification for FY 2023 Funding** in the mainland Tanzania MOP.

4.3. Plans and Justification for FY 2023 Funding

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

PMI will continue supporting malaria case management (and SM&E and SBC) with an emphasis on technical guidance. This will help ensure quality case management in facilities and the community through monitoring performance and making recommendations on the use of data to target interventions. PMI expects to continue the same activities described in the Recent Progress section, with new activities summarized below.

National-Level Case Management Activities
PMI will continue to provide technical assistance to NMCP for the development of policies, strategies, and implementation plans related to case management and malaria in pregnancy, including:

- Diagnostic technical assistance for the slide bank, malaria microscopy, and mRDT for ZAMEP.
- Procurement of microscopy slides for the two slide banks in Pemba and Unguja.
- Support for the implementation and monitoring of microscopy proficiency testing for the national external quality assurance at ZAMEP.
- Basic and advanced malaria diagnostic refresher trainings and ECAMM training for laboratory technicians.
- Planning and support for MSDQI supportive supervision visits for ZAMEP, and data analysis of MSDQI across all districts in Zanzibar.
- Support and participation in case management-related technical working groups.

Commodities
The Government of Zanzibar will procure the full quantities of ACT, parenteral artesunate, and single low-dose primaquine for Zanzibar. Global Fund will procure combination mRDT. PMI has not procured these commodities for Zanzibar for several years.

Please refer to the **Rapid Diagnostic Test, ACT, injectable artesunate, and single low-dose primaquine Gap Tables** in the annex for more detail on planned quantities and distribution channels.

Facility-Level Case Management Activities
PMI will continue to support implementation of MSDQI in all health facilities in Zanzibar and provide technical guidance on the use of MSDQI data for targeted interventions. ZAMEP will implement two rounds of MSDQI with support from Global Fund, and two rounds of MSDQI with support from PMI per year.

Community-Level Case Management Activities
PMI will continue to support SBC on awareness of malaria, early health-seeking behavior, and uptake of malaria interventions (see SBC section), and the malaria RCD system (see SM&E section).

> **Monitoring Antimalarial Efficacy:** PMI does not support TES in Zanzibar. PMI will continue to support drug efficacy monitoring following the standard WHO protocol at four sentinel sites in mainland Tanzania and will include molecular testing of antimalarial resistance markers for artesunate-amodiaquine, Zanzibar's first-line ACT. For details about Tanzania's TES, see the TES section in the mainland Tanzania FY 2023 MOP.
>
> **Case Management Elimination Activities:** PMI will continue to provide financial support to ZAMEP for monitoring the provision of single low-dose primaquine, and the malaria RCD system in Zanzibar (see the SM&E section). Please see the SBC section for details on challenges and opportunities to improve intervention uptake or maintenance.

5. Health Supply Chain and Pharmaceutical Management

5.1. PMI Goal and Strategic Approach

PMI/Tanzania's objective for health supply chain and pharmaceutical management is to support ZAMEP's 2018–2023 Strategic Plan through accurate quantification, timely delivery, and monitoring of malaria health commodities.

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

PMI's principal supply chain investments supporting the elimination of malaria by 2023 are in forecasting and supply planning, management information systems, procurement, and supply chain monitoring. In addition, capacity building in the office of the Chief Pharmacist of the Ministry of Health is a key priority to timely and accurately develop and disseminate stock status reports to ZAMEP monthly. PipeLine software capacity building is planned to replace the current Excel sheet, which does not account for

shipments updates. These investments, together with the arrival of commodity shipments to the Central Medical Store including Artesunate + Amodiaquine (6 tab) tablet 100/270 mg/mg, Primaquine tablets (both 7.5mg and 15mg), and mRDTs in February 2021, have contributed to the overall reduction of malaria commodity stockouts. Late in April 2021, a shipment of ITNs also arrived. Overall facility level stockouts for malaria commodities have steadily reduced, from 24 percent in October 2020 to 4 percent in September 2021.

Quantification of malaria medicines and rapid diagnostic test kits in Zanzibar
In August 2021, PMI supported quantification of malaria medicines and rapid diagnostic test kits in Zanzibar. The outcome of the quantification was the estimation of the total funding requirements for the period from January 2022 to December 2023.

Handover of Zanzibar *Chandarua Kliniki* dashboard
PMI supported development of the *Chandarua Kliniki* dashboard and in FY 2021 completed its upgrade. The development process started by assessing DHIS2 data collection tools and current DHIS2 infrastructure, followed by re-development of eLMIS-DHIS2 data mapping and dashboard development. The re-development was accompanied by training of Health Management Information System (HMIS) and information, communications, and technology teams on dashboard use and maintenance (including creating a maintenance plan) before handover.

Clarifying Processes for Tracking ITN Distribution and Availability in Zanzibar
PMI support helped the office of Chief Pharmacist of the Ministry of Health Zanzibar and ZAMEP develop a Standard Operating Procedure manual for tracking ITN availability at the Central Medical Store and health facilities.

5.3. Plans and Justification with FY 2023 Funding

ZAMEP's 2018–2023 Strategic Plan IV goal is to eliminate malaria by 2023. Elimination will be achieved by providing quality, equitable, affordable, cost-effective, and sustainable anti-malarial interventions in collaboration with all stakeholders at all levels of implementation for the benefit of the general population. The objective for this year is to ensure quality-assured diagnosis and appropriate case management in all health facilities and at community level to 100 percent by 2023.

To improve commodity availability and thus contribute to eliminating malaria by 2023, PMI will continue to support ZAMEP to quantify needs and produce supply plans to inform timely procurement of malaria health commodities. PMI will also support ZAMEP to conduct regular quantification reviews to update plans as needed. PMI will support national-level IMPACT (Information Mobilized for Performance Analysis and Continuous Transformation) team coordination to identify and address malaria commodity

availability challenges. The IMPACT team approach is a data use and data quality improvement initiative anchored in Government of Zanzibar oversight structures such as Medicine and Therapeutic Committees to ensure sustainability. PMI will also support monitoring of ITN supply by conducting multiple analyses of data generated from the *Chandarua Kliniki* to inform ZAMEP and the Government of Zanzibar on interventions needed to address ITN supply chain challenges. PMI will also support the Zanzibar Holistic Supply Chain Review recommendations for improving supply chain performance.

6. Social and Behavior Change

6.1. PMI Goal and Strategic Approach

PMI supports ZAMEP in its efforts to eliminate malaria in alignment with its Strategic Plan 2018–2023 and the SBC Strategy 2018–2023. PMI aims to support the objectives in these strategies by increasing uptake of key malaria interventions: ITN use, prompt care-seeking for fever, and testing for malaria, including for travelers at entry points. PMI supports the targeted implementation of SBC activities across all districts in Zanzibar, with greater emphasis on districts with higher numbers of malaria cases. This approach allows for more strategic and coordinated activities that focus on sustaining performance of priority behaviors and reinforcing positive social norms to achieve the goal of malaria elimination in Zanzibar.

PMI also supports cross-cutting SBC to the ZAMEP SBC Unit, strengthens skills in SBC planning, management, monitoring, and coordination, and strengthens technical skills, such as audience insights collection, pre-testing, and material design.

6.2. Recent Progress (between October 2020 and September 2021)

Between September 2020 and October 2021, PMI supported the ZAMEP to implement SBC activities promoting ITN use and care-seeking for fever during the rainy season. Implementation started in May across 49 *Shehias* with the highest numbers of malaria cases—high and medium transmission areas. As part of community mobilization, a total of 1,008 public service announcements (PSAs) were conducted, reaching 165,004 people. The PSAs targeted heads of households, travelers, pregnant women, and parents and caregivers of children under five years of age with messages on ITN access and use, early care seeking, and malaria testing at points of entry.

PMI also provided SBC support during the ITN mass distribution campaign which took place in July 2021. This included the development of SBC messages and materials promoting community acceptance and participation for the campaign activities to ensure smooth distribution of ITNs. Additionally, PMI supported implementation of community mobilization activities before ITN mass distribution to raise awareness of the

distribution, and during and after distribution to promote net hanging, use, and care practices. A total of 1,005 PSAs were conducted across 335 *Shehias* where ITNs were distributed in Zanzibar. The intensity of PSAs after ITN distribution depends on transmission zone, where a large proportion of PSAs were directed across *Shehias* with high and medium malaria transmission, while few PSAs were directed to low-transmission *Shehias*.

With PMI support, Zanzibar conducted a Malaria Behavior Survey (MBS) in 2021. The goal of the survey was to provide a better understanding of the socio-demographic and ideational characteristics associated with malaria-related behavioral outcomes in Zanzibar; and inform SBC activities to improve malaria-related ideational and behavioral outcomes to achieve malaria elimination in Zanzibar. The MBS was implemented in both Unguja and Pemba, the major islands in Zanzibar; interviews were conducted with 1,007 households and 1,745 individuals (871 women aged 15-49, and 874 men aged 18-59).

Findings are summarized below.

ITN Use

Prior to the July/August 2021 ITN distribution campaign, about 66 percent of households had at least one ITN. Therefore, the survey, which was conducted before the campaign, undercounted 2022 ITN access. Only 37 percent of people consistently (every night of the week) use a net, with 85 percent reporting sleeping under an ITN the night prior to the MBS, reflecting inadequate net coverage (again, pre-campaign findings). Approximately 81 percent of respondents had positive attitudes toward ITNs. Only 35 percent believe it is easy to bring a net when they spend the night away from home, an important behavioral determinant for ITN use when on travel. Perception regarding the importance of ITN use while on travel among Zanzibaris requires priority focus going forward.

Case Management for Fever

Almost all respondents (99 percent) identified the health facility as the best place to go when a person has a fever. However, actual care-seeking for fever (in the last two weeks prior to the survey) was lower, with 81 percent of people in Unguja and 72 percent in Pemba seeking care at a health facility within the same day or next day. Furthermore, only 74 percent of respondents in Unguja and 62 percent in Pemba identified taking a blood test as the best way to know if someone has malaria. MBS findings also highlight that, among respondents who had a fever two weeks prior the survey, only 53 percent were tested for malaria. Less than half of respondents (47 percent) indicated that they considered malaria testing efficacious.

Reactive Case Detection (RCD)
Even though awareness about RCD was found to be low, willingness to participate in the RCD was found to be high (86 percent and 74 percent in high transmission and low transmission areas, respectively). More information needs to be provided on this particular intervention.

Media Consumption
A clear majority of respondents (80 percent) owned a mobile phone and/or tablet, while fewer respondents listened to the radio (49 percent) or watched TV (42 percent overall, Unguja 52 percent, Pemba 23 percent) at least once a week. These results can be used to help determine the best media to reach the majority of the people with malaria messaging.

Larval Source Management (LSM): Larviciding
Only 29 percent of respondents had heard of LSM or larviciding. Once described to them, nearly 92 percent of all respondents had favorable attitudes regarding larviciding.

Mass Drug Administration (MDA)
About 16 percent of respondents stated that they were aware of the MDA program, and more than two-thirds (69 percent) of respondents noted that they would be willing to accept MDA if offered. With these results, a need to increase awareness of this intervention is key.

Summary of the recommendations of the MBS:

- There is a need to increase community awareness on the larviciding program.
- There is a need to increase awareness of ACT use as effective medicine for treatment of malaria.
- Awareness on focal MDA should be increased to the maximum extent possible once the administration starts.
- The SBC unit should increase interpersonal communication as means of communication for malaria elimination Zanzibar.
- Mass media findings suggest that messaging around malaria prevention should to use social media intensively to maximize reach, given broad telephone use (WhatsApp, YouTube, Instagram) and SMS use.
- There is a need to increase community awareness on the signs and symptoms of malaria.
- The program should use different channels of communication to ensure that appropriate information about malaria elimination strategies is disseminated to general public.

6.3. Plans and Justification with FY 2023 Funding

During FY 2023, in addition to drawing from MBS survey results, PMI will continue to support SBC interventions addressing the following key behavioral objectives to support malaria elimination in Zanzibar:

- Increase the proportion of the population who seek prompt and appropriate care for symptoms of malaria.
- Increase proportion of the population who are tested for malaria before taking malaria medication.
- Increase the proportion of the population who sleep under an ITN every night.
- Increase the proportion of travelers who believe it is important to be tested for malaria at the point of entry; increase knowledge among travelers that ITNs should be used every night in Zanzibar; and increase knowledge among Zanzibaris that they should use ITNs every night when traveling to malaria endemic areas.

PMI will support use of multiple, reinforcing channels to reach target audiences in support of the above behavioral and communication objectives. This will include the following:

- Media engagement: Airing of radio spots, with airing intensified during December–January and March–May. Key behaviors promoted will be consistent use of ITNs, early care-seeking for fever, and ANC attendance.
- Targeted mid-media to trigger discussions around ITN use, early care-seeking, ANC attendance, and entomological surveillance. PMI will support PSA across hotspot *Shehias*.
- Messaging at points of entry to remind travelers to test for malaria when entering Zanzibar and sleep under an ITN when traveling to malaria endemic areas.
- Support to malaria school programs with particular emphasis on boarding schools and temporary examination camps.
- Support for focused SBC activities targeting malaria hotspots areas, travelers, larviciding, focal MDAs, and IRS.
- Support for ZAMEP to strengthen community-based malaria interventions including training and monitoring of community health volunteers.
- Revision of Malaria Elimination Social and Behavior Change Communication strategy, which will be ending in 2023.

Table 1. Priority Behaviors to Address

Behavior	Target Population	Geographic Focus	Programming to Address Behavior
Sleep under an ITN every night	Travelers, general population	Magharibi B, Mjini, Kati, Magharibi A Entry Point: Malindi, Mkokotoni, Mkoani	Conduct targeted community mobilization activities across *Shehias* with higher burden Promote emphasis on net use when traveling to malaria endemic places. Ensure high listenership trends among the target audience.
Seek prompt and appropriate care for symptoms of malaria	Hotspot travelers, pregnant women, caregivers of children under five years of age	All districts	Conduct targeted community mobilization activities during seasons with higher malaria cases. Implement interventions to increase the number of health care workers using guidelines for malaria testing and treatment.
Proactive malaria testing	Travelers	All districts	Placement of out of home and digital messaging at points of entry.

Additional Support Activities

The current Zanzibar Malaria Elimination SBC Strategy 2018–2023 will expire in 2023. There is a need to develop the new strategy, which will identify priority objectives and inform interventions based on transmission risk strata. The 2021 MBS informed activities which require support as indicated above. Additionally, the results of the Malaria Indicator Survey, conducted in 2022, will be used to inform SBC intervention requirements in MOP FY 2024.

FY 2023 funding will support additional capacity strengthening focused on the following priority areas: Use of data to inform decision-making and resource allocation for higher quality and more responsive SBC activities; and strengthening ZAMEP capacity in the areas of intervention design and evaluation to support the implementation of locally appropriate, relevant, and effective SBC programming.

7. Surveillance, Monitoring, and Evaluation

7.1. PMI Goal and Strategic Approach

The SM&E priority objective in the ZAMEP Malaria Strategic Plan IV 2018–2023 is to reinforce malaria surveillance capacity for malaria elimination to actively investigate and classify 100 percent of confirmed malaria cases by 2023.

ZAMEP's approach to SM&E for malaria elimination is to maintain and strengthen malaria case surveillance and RCD, including a data collection and management system that enables the identification of new cases of malaria and triggers investigation and response measures. ZAMEP achieves this through the use of the malaria early

epidemic detection system (MEEDS), the MCN system, and the HMIS through the DHIS2 platform.

MEEDS includes a strategy to collect daily data for three key indicators (total visits, confirmed malaria-positive cases, confirmed malaria-negative cases) among outpatients from all health facilities (public and private). Weekly aggregated data are transmitted from each health facility using a customized cell phone menu. Text messages with a weekly data summary are sent to cell phones of key ZAMEP staff and District Medical Officers, and longitudinal weekly aggregated data are made available for viewing over a secure website and have been integrated for visualization on a data dashboard within the DHIS2 platform.

In 2019, the Zanzibar Ministry of Health implemented and began efforts to strengthen the Integrated Disease Surveillance and Response (IDSR) system through the DHIS2 platform. With input from ZAMEP and PMI partners, the IDSR system was modified to collect weekly data for the following key malaria indicators from all public and private health facilities: 1) number of all outpatient visits, 2) number of suspected malaria cases, 3) total number of individuals tested for malaria (disaggregated by diagnostic method), 4) Number of confirmed malaria cases (disaggregated by severity—i.e., uncomplicated and severe, and by type of parasite), and 5) number of malaria cases treated (disaggregated by type of treatment). Weekly aggregated data are entered into DHIS2 from each health facility using a laptop or tablet, where currently approximately 60 percent of health facilities use this approach. The remaining facilities send a summary paper-based report to District Medical Officers where the data are entered into DHIS2.

With support from PMI partners and in collaboration with the HMIS unit of the Zanzibar Ministry of Health, ZAMEP conducted an IDSR evaluation in response to WHO and the Zanzibar Malaria Elimination Advisory Committee recommendation on integrating MEEDS within Zanzibar's routine surveillance system. The evaluation used both quantitative methods (comparing MEEDS and IDSR data to facility registers) and qualitative methods (key stakeholder interviews). Preliminary findings of 2021 reporting data indicate a reporting rate of 93 percent for IDSR compared to 99 percent for MEEDS, and timeliness of 77 percent for IDSR compared to 81 percent for MEEDS. The plan is to fully transition weekly reporting of aggregated malaria data from MEEDS to IDSR by mid–2022 when MEEDS will be discontinued. IDSR data can be accessed and visualized in the DHIS2 data dashboard.

Health facilities also collect and report monthly aggregate malaria indicators for the routine HMIS through the DHIS2 platform. ZAMEP utilizes the HMIS/DHIS2 data on severe malaria cases, inpatient admissions, and mortality-related to malaria.

The aim of the MCN system is to prompt a household investigation for every confirmed case of malaria infection within 24 hours of notification and conduct RCD and classification. In this system, a CMSO travels to the case household to interview and test household members and occasionally those of neighboring households when specific hotspots are identified and investigated. Individual case clinical and epidemiological data are collected by CMSOs during the investigation through tablet-based devices and transmitted to the same server used for MEEDS. As part of the investigation, CMSOs also classify cases according to the WHO Framework for Malaria Elimination, 2017. The MCN tablet tool has functions that allow ZAMEP to assess the accuracy of CMSOs in performing case investigation and classification. In 2021, the overall proportion of cases investigated at the household level was 95 percent (and 94 percent within 48 hours of notification), and 95 percent of cases were classified by CMSOs. In 2021, 62 percent of investigated cases were classified as imported, with the majority of the cases reporting travel originating from Dar es Salaam, Morogoro, Pwani, Shinyanga, Tabora, and Tanga. The classification also identified districts like Mkoani and Chakechake in Pemba and West A, Urban, North A, and South in Unguja, with over 90 percent of cases classified as imported.

On a weekly basis, the MCN system generates automated data outputs describing malaria case notifications, classifications, and distribution (location) that is accessible in DHIS2. Using these data, ZAMEP completes village mapping to highlight foci of transmission (i.e., hotspots) in relation to implementation of various malaria interventions. ZAMEP, with support from PMI partners, developed additional data capture capability for reactive entomological surveillance through the MCN system and tablet tool, and collectively consolidated these data within the web-based “coconut surveillance” system. PMI is currently supporting the establishment of a data server to host the coconut surveillance system at Zanzibar’s national data center that manages HMIS/DHIS2, IDSR, and health program data. This will allow PMI and ZAMEP to discontinue the support for and use of the third-party server and case notification process used for MEEDS and MCN, while promoting data ownership and strengthening system sustainability in Zanzibar.

With the planned discontinuation of MEEDS, PMI partners supported ZAMEP to develop a case notification and classification application, *shokishoki*, within the coconut surveillance web-based system. Health care workers use a web-based interface to enter demographic and clinical information on individuals with confirmed malaria infection into the coconut system and send a case notification to CMSOs. The *shokishoki* system guides health care workers through prompts to enter the limited information needed to classify cases and notify CMSOs. CMSOs are blinded to the case classifications conducted by facility-based health care workers. With the initial

information entered by facilities, CMSOs are able to travel directly to households to begin the case investigation and classification process.

In addition to household investigations, CMSOs also provide SBC materials to households on the need for early malaria testing and adherence to anti-malaria treatment. CMSOs ascertain ITN use and identify visible mosquito larval sources, and provide information on environmental management.

Results from the PMI-funded Reactive Case Detection in Zanzibar: Effectiveness and Cost (RADZEC) study suggest more malaria infections would be treated with household-level RDA, described as the provision of ACTs to all household members of index cases without first administering an mRDT, compared to RCD. ZAMEP plans to implement RDA in calendar year 2023. PMI partners are supporting ZAMEP in the development of guidelines for ACT choice and standard operating procedures for small-scale targeted implementation of RDA.

7.2. Recent Progress (between October 2020 and September 2021)

PMI partners continued to support data management and analyses, such as data reviews, learning agenda data analyses, and stratification and hotspot analyses; development of malaria bulletins; and regular program and PMI updates on malaria epidemiology through weekly notifications and monthly dissemination meetings.

- Continued technical and financial support for the MEEDS and MCN systems to notify, investigate, and classify cases; for CMSOs to conduct RCD; and to report aggregated and case-based malaria surveillance data.
- Enhanced the DHIS2 data dashboard and coconut system to capture the MEEDS/MCN case-based and malaria-related surveillance information to identify foci.
- Supported data review sessions, commodities status and management procedures, and case mapping.
- In 2021, ZAMEP identified and investigated 28 foci:
    - ZAMEP responded with active case detection; overall, among 25,936 individuals tested with mRDT, 520 (2 percent) had a positive test result.
    - 23 permanent mosquito breeding sites were identified and treated, and 61 temporary breeding sites were identified and destroyed.
    - 15 schools were provided with health education on malaria prevention.
- Enhanced the coconut system to capture reactive entomological surveillance data using the MCN tablet tool.

- PMI partners completed the Zanzibar malaria epidemiological stratification and intervention package for each strata. The stratification will inform the development of the new strategic plan 2023–2028.

7.3. Plans and Justification with FY 2023 Funding

The FY 2023 funding tables contain a full list of SM&E activities that PMI proposes to support in Zanzibar with FY 2023 funding. Please visit Malaria-operational plans for these FY 2023 funding tables.

PMI will continue to support activities to strengthen malaria surveillance and RCD, including the data collection and management systems that enable the identification of new cases of malaria and trigger CMSO investigations and other response measures. If ZAMEP adopts RDA using the same mechanism used for RCD, PMI will support implementation.

Following the discontinuation of MEEDS, PMI will continue to support strengthening and maintaining IDSR and routine HMIS surveillance systems for malaria-related data capture and reporting at all government and private health facilities.

PMI will support the integration of data generated from IDSR to the coconut system and DHIS2 data dashboards, while building the capacity among ZAMEP and HMIS unit staff for basic IT system maintenance and troubleshooting IT issues related to the new coconut system and data server until they are maintained by the Zanzibar national data center.

PMI will continue to support the refinement and maintenance of an operational data dashboard to visualize entomological monitoring data and foci investigation findings in the new coconut system and DHIS2 malaria dashboards.

PMI will continue to strengthen ZAMEP's ability to analyze and disseminate SM&E-related information for decision-making, hold regular meetings and attend technical working groups to review and discuss SM&E activities, and make regular SM&E supervisory visits to the field.

PMI will support participants for the Field Epidemiology Training Program (FETP) Frontline (Basic) course with an emphasis on selecting participants working in malaria, such as surveillance officers, malaria focal persons, and data quality improvement liaisons. For a description of FETP activities, see the Capacity Strengthening section.

For a description of PMI support for entomological surveillance and insecticide resistance monitoring, see the Vector Control section. For a description of PMI support for therapeutic efficacy studies, see the Case Management section in the mainland

Tanzania MOP 2023. For a description of PMI support for operational research and program evaluation, see the Operational Research section.

Table 2. Available Malaria Surveillance Sources

Source	Data Collection Activity	2020	2021	2022	2023	2024	2025
Household Surveys	Demographic Health Survey			P			
Household Surveys	Malaria Indicator Survey			P			
Household Surveys	Multiple Indicator Cluster Survey						
Household Surveys	EPI Survey						
Health Facility Surveys	Service Provision Assessment						
Health Facility Surveys	Service Availability Readiness Assessment (SARA) Survey						
Health Facility Surveys	Other Health Facility Survey						
Malaria Surveillance and Routine System Support	Therapeutic Efficacy Studies (TES)						
Malaria Surveillance and Routine System Support	Support to Parallel Malaria Surveillance System	X	X	P			
Malaria Surveillance and Routine System Support	Support to HMIS		X	P	P	P	P
Malaria Surveillance and Routine System Support	Support to Integrated Disease Surveillance and Response (IDSR)			P	P	P	P
Malaria Surveillance and Routine System Support	Electronic Logistics Management Information System (eLMIS)	X	X	P	P	P	P
Malaria Surveillance and Routine System Support	Malaria Rapid Reporting System	X	X	P	P	P	P
Other	End-User Verification						
Other	School-based Malaria Survey						
Other	Knowledge, Attitudes and Practices Survey, Malaria Behavior Survey		X				
Other	Malaria Impact Evaluation						
Other	Entomologic Monitoring Surveys	X	X	P	P	P	P

*Asterisk denotes non-PMI funded activities, X denotes completed activities, and P denotes planned activities.

8. Operational Research and Program Evaluation

8.1. PMI Goal and Strategic Approach

The priority objective for operational research (OR) in the ZAMEP Malaria Strategic Plan IV 2018–2023 is to evaluate and optimize malaria program management and coordination. ZAMEP addresses potential OR and program evaluation (PE) topics during the program and data reviews conducted during the various thematic technical working groups (e.g., vector control, case management, SM&E, SBC, etc.). They prioritized proposals to evaluate and optimize malaria interventions, update national strategies and guidelines, address new challenges, and guide scale-up of proven strategies in collaboration with research institutions. PMI works jointly with ZAMEP, implementing partners, other donors and research institutions to identify and support relevant OR/PE.

8.2. Recent Progress (between October 2020 and September 2021)

PMI supported the genetic sequencing of samples collected during the rolling cross-sectional survey in the RCD OR study, “Operational research to increase the effectiveness of the malaria surveillance and response system in Zanzibar (RADZEC study),” to further understand parasite population genetic diversity and multiplicity of *Plasmodium falciparum* infections in Zanzibar. Initial results indicated that infections in RCD foci are related, that genetic differences could not be discerned between locally acquired and imported cases, and that parasite populations on Pemba appear to be genetically isolated, indicating that importation may be limited and local transmission may be more important in Pemba than Unguja. Pemba may therefore benefit from reactive focal MDA to reduce local transmission.

Table 3. PMI-funded Operational Research/Program Evaluation Studies in Zanzibar

Ongoing or Planned OR/PE Studies	Status	Start date	End date
Reactive Case Detection in Zanzibar—System Effectiveness and Cost (RADZEC) Genetics Follow-up	Ongoing; data analysis	June 2020	June 2022
Reactive Drug Administration (RDA) OR	Concept note development	October 2022	September 2023

Table 4. Non-PMI funded Operational Research/Program Evaluation Studies Planned/Ongoing in Zanzibar

Source of Funding	Implementing institution	Research Question/Topic	Current status/ timeline
Various	Karolinska Institutet, Sweden	Randomized control trial on MDA, trend analysis of intervention implementation and malaria burden	Completed with follow-on work planned (TBD)

8.2. Plans and Justification with FY 2023 Funding

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

9. Capacity Strengthening

9.1. PMI Goal and Strategic Approach

PMI continues to strengthen health systems through support of activities to achieve USAID's development objectives in Tanzania. PMI support enables countries and communities to lead, manage, and implement their own programs through effective supply chain management, training and supervision of health care workers, health financing systems including engaging with national health insurance schemes, and monitoring and disease surveillance systems.

9.2. Recent Progress (between October 2020 and September 2021)

Capacity for ZAMEP

- Participated in international, regional, and national-level training, including meetings, such as the annual American Society of Tropical Medicine and Hygiene (ASTMH) conference, Roll Back Malaria technical working group meetings (vector control, SBC and MIP), and regional medical and vector-borne diseases conferences.
- Coauthored presentations at the ASTMH 2021 conference: "Biting Behavior of Anopheles Mosquitoes in Zanzibar: Implications for the Malaria Elimination Program," "Spatio-temporal Dynamics of Malaria in Zanzibar," and "High-Resolution sub-District Stratification of Malaria Risk in Zanzibar."
- PMI supported training for 41 ZAMEP, HMIS and information, communications, and technology, and CMSO end users on systems use and orientation to the application of the "coconut surveillance" and DHIS2 systems in Zanzibar. The primary training objective was to increase the pool of program staff who can use these systems in their day-to-day surveillance activity jobs.
- PMI supported training for nine ZAMEP staff on reproducing the malaria stratification and maps using the Multiple Correspondence Analysis approach

and the Jamovi tool. The training builds capacity for the ZAMEP team to repeat the stratification and produce new outputs every two years, or as required.
- Four newly hired ZAMEP entomologists were trained on routine entomological monitoring and other vector control activities.
- PMI supported a study tour for ZAMEP staff to mainland Tanzania to exchange knowledge on managing entomological surveillance activities.

Other Public Health Capacity Strengthening

- USAID/Tanzania, with PMI funding, strengthened the inclusion of malaria interventions in the planning, budgeting, and financing process (ZanPBR) to improve the matching of financial resources with malaria interventions from facility, community, and local government authority levels. This system enables Zanzibar to collect and use malaria (and other health program) data for planning and better allocation of resources for implementation.
- Resolved DHIS2 system technical challenges to ensure smooth operations of the system.
- Periodically reviewed existing Human Resources for Health (HRH) information system and developed comprehensive HRH information system vision and requirements.
- Reviewed the existing data collection methods, tools, and systems for malaria and other health programs, and developed a phased plan for establishing an interoperable system in line with the Zanzibar Digital Health Strategy.
- Strengthened health information systems in Zanzibar's routine monthly and weekly collection, management, and reporting of malaria-related data from health facilities with a focus on data quality, completeness, and timeliness.
- Supported training of HMIS staff on the use of health information systems data for decision-making (see SM&E section).
- FETP graduates at the Zanzibar Ministry of Health include the Director of Preventive Services; Head of Epidemiology Unit; and Manager for Zanzibar Malaria Elimination Program.

9.3. Plans and Justification with FY 2023 Funding

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

- PMI will continue to support overall strengthening of the HMIS systems, ZanPBR, and possibly other community systems, including the integration of malaria data sources within HMIS in Zanzibar and the ongoing efforts to

develop Zanzibar Health Enterprise Architecture and interoperability layer to ensure seamless information sharing and exchange across different systems. For a description of malaria-related data systems, see the SM&E section.

- PMI will continue to strengthen the capacity of local government authorities to implement and oversee malaria intervention in Zanzibar, such as through training on the use of malaria-related data, ZanPBR, and supportive supervision.
- PMI will continue to support short-term training opportunities for ZAMEP staff to increase both technical and managerial skills, including participation in international meetings (e.g., ASTMH conference and RBM technical working groups meetings).

10. Staffing and Administration

A minimum of five health professionals oversee PMI in Tanzania. The single interagency team led by the USAID Mission Director or their designee consists of a Resident Advisor representing USAID, a Resident Advisor representing the Centers for Disease Control and Prevention, and three locally hired experts known as Foreign Service Nationals. The PMI interagency team works together to oversee all technical and administrative aspects of PMI, including finalizing details of the project design, implementing malaria prevention and treatment activities, monitoring and evaluation of outcomes and impact, reporting of results, and providing guidance and direction to PMI implementing partners.

ANNEX: GAP ANALYSIS TABLES

Table A-1. ITN Gap Analysis Table

Calendar Year	2022	2023	2024
Total country population	1,762,989	1,807,581	1,852,170
Total population at risk for malaria	1,762,989	1,807,581	1,852,170
PMI-targeted at-risk population	1,762,989	1,807,581	1,852,170
Population targeted for ITNs	1,762,989	1,807,581	1,852,170
Continuous Distribution Needs			
Channel 1: ANC	70,519	72,303	74,087
Channel 1: ANC Type of ITN	PBO	PBO	Dual AI
Channel 2: EPI	70,519	72,303	74,087
Channel 2: EPI Type of ITN	PBO	PBO	Dual AI
Estimated Total Need for Continuous Channels	141,038	144,606	148,174
Mass Campaign Distribution Needs			
Mass distribution campaigns	0	197,031	713,000
Mass distribution ITN type	PBO	PBO	Dual AI
Estimated Total Need for Campaigns	0	197,031	0
Total ITN Need: Continuous and Campaign	**141,038**	**341,637**	**148,174**
Partner Contributions			
ITNs carried over from previous year	116,720	116,566	84,589
ITNs from Government	0	0	0
Type of ITNs from Government			
ITNs from Global Fund	0	147,660	0
Type of ITNs from Global Fund		PBO	Dual AI
ITNs from other donors	0	0	0
Type of ITNs from other donors			
ITNs planned with PMI funding	140,884	162,000	150,000
Type of ITNs with PMI funding	PBO	PBO	Dual AI
Total ITNs Contribution Per Calendar Year	**257,604**	**426,226**	**234,589**
Total ITN Surplus (Gap)	**116,566**	**84,589**	**86,415**

Table A-2. RDT Gap Analysis Table

Calendar Year	2022	2023	2024
Total country population	1,762,989	1,807,581	1,852,170
Population at risk for malaria	1,762,989	1,807,581	1,852,170
PMI-targeted at-risk population	1,762,989	1,807,581	1,852,170
RDT Needs			
Total number of projected suspected malaria cases	428,160	436,965	446,141
Percent of suspected malaria cases tested with an RDT	85%	85%	85%
RDT Needs (tests)	**428,160**	**436,965**	**446,141**
Needs Estimated based on HMIS Data			
Partner Contributions (tests)			
RDTs from Government	0	0	0
RDTs from Global Fund	428,160	436,965	342,871
RDTs from other donors	0	0	0
RDTs planned with PMI funding	0	0	0
Total RDT Contributions per Calendar Year	**428,160**	**436,965**	**342,871**
Stock Balance (tests)			
Beginning Balance	326,340	326,340	326,340
- Product Need	428,160	436,965	446,141
+ Total Contributions (received/expected)	428,160	436,965	342,871
Ending Balance	**326,340**	**326,340**	**223,070**
Desired End of Year Stock (months of stock)	6	6	6
Desired End of Year Stock (quantities)	214,080	218,482	223,070
Total Surplus (Gap)	**112,260**	**107,858**	**0**

Table A-3. ACT Gap Analysis Table

Calendar Year	2022	2023	2024
Total country population	1,762,989	1,807,581	1,852,170
Population at risk for malaria	1,762,989	1,807,581	1,852,170
PMI-targeted at-risk population	1,762,989	1,807,581	1,852,170
ACT Needs			
Total projected number of malaria cases	6,880	5,890	5,042
Total ACT Needs (treatments)	**7,912**	**6,774**	**5,798**
Needs Estimated based on HMIS Data			
Partner Contributions (treatments)			
ACTs from Government	7,912	6,774	5,798
ACTs from Global Fund	0	0	0
ACTs from other donors	0	0	0
ACTs planned with PMI funding	0	0	0
Total ACTs Contributions per Calendar Year	**7,912**	**6,774**	**5,798**
Stock Balance (treatments)			
Beginning Balance	2,958	2,958	2,958
- Product Need	7,912	6,774	5,798
+ Total Contributions (received/expected)	7,912	6,774	5,798
Ending Balance	**2,958**	**2,958**	**2,958**
Desired End of Year Stock (months of stock)	6	6	6
Desired End of Year Stock (quantities)	3,956	3,387	2,899
Total Surplus (Gap)	**(998)**	**(429)**	**59**

Table A-4. Inj. Artesunate Gap Analysis Table

Calendar Year	2022	2023	2024
Injectable Artesunate Needs			
Projected number of severe cases	360	324	292
Projected number of severe cases among children	0	0	0
Average number of vials required for severe cases among children	3	3	3
Projected number of severe cases among adults	360	324	292
Average number of vials required for severe cases among adults	9	9	9
Total Injectable Artesunate Needs (vials)	**3,240**	**2,916**	**2,628**
Needs Estimated based on HMIS Data			
Partner Contributions (vials)			
Injectable artesunate from Government	3,240	2,916	2,628
Injectable artesunate from Global Fund	0	0	0
Injectable artesunate from other donors	0	0	0
Injectable artesunate planned with PMI funding	0	0	0
Total Injectable Artesunate Contributions per Calendar Year	**3,240**	**2,916**	**2,628**
Stock Balance (vials)			
Beginning Balance	340	340	340
- Product Need	3,240	2,916	2,628
+ Total Contributions (received/expected)	3,240	2,916	2,628
Ending Balance	**340**	**340**	**340**
Desired End of Year Stock (months of stock)	6	6	6
Desired End of Year Stock (quantities)	1,620	1,458	1,314
Total Surplus (Gap)	**(1,280)**	**(1,118)**	**(974)**

Table A-5. Primaquine Gap Analysis Table

Calendar Year	2022	2023	2024
Total Country Population	1,762,989	1,807,581	1,852,170
Total population at risk for malaria	1,762,989	1,807,581	1,852,170
PMI-targeted at-risk population	1,762,989	1,807,581	1,852,170
Primaquine Needs			
Total projected number of malaria cases	6,880	5,890	5,042
Total projected number of Pf cases			
Total projected number of Pv cases			
Total projected number of mixed cases (Pf + Pv)			
Total Primaquine Needs (tablets)	**7,596**	**6,503**	**5,566**
Needs Estimated based on HMIS Data			
Partner Contributions (tablets)			
Primaquine from Government	7,596	6,503	5,566
Primaquine from Global Fund			
Primaquine from other donors			
Primaquine planned with PMI funding			
Total Primaquine Contributions per Calendar Year	**7,596**	**6,503**	**5,566**
Stock Balance (tablets)			
Beginning Balance	15,946	15,946	15,946
- Product Need	7,596	6,503	5,566
+ Total Contributions (received/expected)	7,596	6,503	5,566
Ending Balance	**15,946**	**15,946**	**15,946**
Desired End of Year Stock (months of stock)	6	6	6
Desired End of Year Stock (quantities)	3,798	3,251	2,783
Total Surplus (Gap)	**12,148**	**12,695**	**13,163**