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Tanzania (Mainland)

Malaria Operational Plan FY 2022

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This FY 2022 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 2022 appropriation from U.S. Congress. Any updates will be reflected in revised postings.

This document was prepared in the early months of 2021 as the COVID-19 pandemic continued to evolve worldwide, including in PMI-focus countries. The effects of the pandemic on malaria control and elimination work in 2022 are difficult to predict. However, because U.S. Congressional appropriations for PMI are specific to work against malaria and any appropriations for work against the COVID-19 are specific for that purpose and planned through separate future U.S. Government planning processes, this FY 2022 MOP will not specifically address the malaria-COVID-19 interface and will reassess any complementary work through timely reprogramming in countries.

CONTENTS

ABBREVIATIONS

ACD	Active case detection
ACT	Artemisinin-based combination therapy
ADDO	Accredited drug dispensing outlet
AL	Artemether-lumefantrine
ANC	Antenatal care
BMGF	Bill & Melinda Gates Foundation
CDC	Centers for Disease Control and Prevention
CHMT	Council Health Management Team
CHW	Community health worker
CY	Calendar year
DHIS2	District Health Information System 2
DHS	Demographic and Health Survey
DQA	Data quality assessment
eIDSR	Electronic Infectious Disease Surveillance and Response
eLMIS	Electronic Logistics Management Information System
EPI	Expanded Program on Immunizations
EUV	End-use verification
FETP	Field Epidemiology Training Program
FY	Fiscal year
Global Fund	Global Fund to Fight AIDS, Tuberculosis, and Malaria
GOT	Government of Tanzania
HCW	Healthcare worker
HMIS	Health Management Information System
HSS	Health systems strengthening
IDSR	Infectious disease surveillance and response
ILS	Integrated Logistics System
IMPACT	Information Mobilized for Performance Analysis and Continuous Transformation
IPTi	Intermittent preventive treatment in infants
IPTp	Intermittent preventive treatment for pregnant women
IPTsc	Intermittent preventive treatment in school children
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito net
LGA	Local Government Authority
LMIS	Logistics Management Information System
LSM	Larval source management
MBS	Malaria Behavioral Survey
MIP	Malaria in pregnancy
MIS	Malaria indicator survey
MOH	Ministry of Health
MOHCDGEC	Ministry of Health, Community Development, Gender, Elderly, and Children
MOP	Malaria Operational Plan
mRDT	Malaria rapid diagnostic test
MSD	Medical Stores Department

MSDQI	Malaria Service and Data Quality Improvement
NIMR	National Institute for Medical Research
NMCP	National Malaria Control Program
NMSP	National Malaria Strategic Plan
OPD	Outpatient department
OR	Operational research
PBO	Piperonyl butoxide
PCV	Peace Corps volunteer
PMI	U.S. President's Malaria Initiative
PO-RALG	President's Office – Regional Administration and Local Government
QA/QC	Quality assurance/quality control
RCH	Reproductive and child health
RDT	Rapid diagnostic test
SBC	Social and behavior change
SDC	Swiss Development Corporation
SMC	Seasonal malaria chemoprevention
SM&E	Surveillance, monitoring, and evaluation
SNP	School net program
SP	Sulfadoxine-pyrimethamine
STPH	Swiss Tropical Public Health Institute
TA	Technical Assistance
TES	Therapeutic efficacy study
THMIS	Tanzania HIV and Malaria Indicator Survey
TWG	Technical working group
USAID	United States Agency for International Development
WHO	World Health Organization
ZAMEP	Zanzibar Malaria Elimination Program

EXECUTIVE SUMMARY

The U.S. President's Malaria Initiative (PMI)—led by the U.S. Agency for International Development (USAID) and implemented together with the U.S. Centers for Disease Control and Prevention (CDC)—delivers cost-effective, lifesaving malaria interventions alongside catalytic technical and operational assistance to support Tanzania to end malaria. PMI has been a proud partner of Tanzania since 2006, helping to decrease child death rates by 40 percent through investments totaling over $613 million.

The proposed PMI fiscal year (FY) 2022 budget for Tanzania (both Mainland and Zanzibar) is $39 million. This Malaria Operational Plan (MOP) outlines planned PMI activities in Tanzania using FY 2022 funds. Developed in consultation with the National Malaria Control Program (NMCP) and key malaria stakeholders, proposed activities reflect national and PMI strategies, draw on best-available data, and align with the country context and health system. Proposed PMI investments support and build on those made by the Government of Tanzania (GOT) as well as other donors and partners.

PMI will support investments in the following intervention areas with FY 2022 funds:

Vector control

Progress in FY 2020:

- Procured 1,105,018 standard insecticide-treated mosquito nets (ITNs) and 2,247,001 piperonyl butoxide (PBO) nets. Supported the distribution of 3,111,175 ITNs for the School Net Program (SNP), and distributed 4,507,340 ITNs procured by Global Fund through Reproductive and Child Health (RCH), Expanded Program on Immunization (EPI), and SNP channels.
- Supported blanket IRS in six districts in the Lake Zone reaching approximately 471,622 structures and protecting about 1.9 million people.
- Supported indoor residual spraying (IRS) efficacy and longitudinal entomological monitoring. PMI support focuses on the national insecticide resistance monitoring program at 22 mainland sentinel sites.

Proposed investments with FY 2022 funding:

- Annual rapid assessment surveys to determine the ITN coverage across the 26 regions.
- Procurement and distribution of ITNs for SNP, support distribution of Global Fund-procured ITNs.
- Creating an enabling environment to revive the commercial market for ITNs by focusing on tracking quantities, prices, and origins of nets, engaging stakeholders to analyze market trends, and using the data to inform interventions to shape the market to favor increased sales of ITNs.
- Annual guidance on effectiveness of vector control interventions used in Tanzania and provide guidance on new evidence-based vector control approaches that show potential for successful outcomes in Tanzania.
- Blanket IRS in six districts in the Lake Zone to cover approximately 470,000 structures and protecting about 2.5 million people.
- Support IRS efficacy and longitudinal entomological monitoring. PMI support focuses on the national insecticide resistance monitoring program at 22 mainland sentinel sites.

Case Management

Progress in FY 2020:

- In the 11 PMI-supported regions in FY 2020, Malaria Services and Data Quality Improvement (MSDQI) supportive supervision visits were conducted in 1,491 health facilities (85 percent) across 7 regions (51 councils) of the Lake and Western zones, and 1,131 health facilities (92 percent) across 4 regions (32 councils) in the Southern Zone.
- By the end of fiscal year 2020, PMI partners have strengthened the capacity of 2,416 healthcare workers (HCWs) in the Lake and Western zones, and 342 supervisors and 278 HCWs in the Southern Zone to provide onsite mentoring and improve case management with MSDQI supportive supervision.
- PMI continued to support the microscopy external quality assurance (EQA) system using the National Malaria Slide Bank implemented by PMI in 2017 for proficiency testing of microscopists at health facilities. PMI also procured 40 new microscopes for the facilities conducting the EQA.
- PMI transitioned the scope of support from the previous 11 regions to three regions at the end of FY 2020 to focus on high malaria burden priority regions that complement support provided by the Global Fund during the 2021–2023 grant period. The PMI-supported regions beginning in fiscal year 2021 were Katavi, Lindi, and Mtwara.

Proposed investments with FY 2022 funding:

- PMI will provide high-quality technical assistance (TA) to NMCP for the development of policies and strategies, and to strengthen malaria rapid diagnostic test (mRDT) and microscopy diagnostic capacity, and planning for the implementation of malaria case management through the use of data generated from the MSDQI process.
- For FY 2022, PMI will procure approximately $2.5 million in artemisinin-based combination therapy (ACTs) and injectable artesunate, and support drug efficacy monitoring following the standard World Health Organization (WHO) protocol at four sentinel sites in mainland Tanzania including molecular testing of antimalarial resistance markers for first- and second-line ACTs.

Malaria in Pregnancy (MIP)

Progress in FY 2020:

- Since 2016, there has been an increase in the proportion of pregnant women who receive intermittent preventive treatment in pregnancy (IPTp) 2 and 3 reported in Health Management Information System (HMIS)/District Health Information Software 2 (DHIS2). PMI-supported Council Health Management Teams (CHMTs) conducted supervision visits and training to improve the quality of MIP services using NMCP's quality improvement MSDQI supportive supervision in 1,491 health facilities (85 percent) across 7 regions (51 councils) of the Lake and Western zones and 1,131 health facilities (92 percent) across 4 regions (32 councils) in the Southern Zone.
- PMI partners also conducted training for 172 HCWs on the updated ANC guidelines and for 239 volunteers to serve as community change agents.

Proposed investments with FY 2022 funding:

- PMI will continue supporting MIP activities in high-burden regions, with a focus on supporting Local Government Authorities (LGAs) to implement supportive supervision and mentorship through MSDQI.

Supply Chain

Progress in FY 2020:

- Quantified and analyzed supply chain, including assessments of quality of data on ACTs entered in DHIS2 and compared with data entered in electronic Logistics Management Information System (eLMIS).
- Monitored and reported on logistics data and performance issues that need corrective actions.
- Delivered commodities at service sites by supporting rollout of redesigned logistics system used for malaria commodities management, which will improve availability at all levels.

Proposed investments with FY 2022 funding:

- Strengthen forecasting, supply planning, strategy and planning, in-country storage and distribution, monitoring and evaluation, and human resources capacity-building, as well as support management information systems such as Logistics Management Information System (LMIS).
- Support NMCP to conduct quantification exercises and the quarterly review of the supply plan to improve coordination and procurement planning across development partners.
- Support the improvement of data quality within the eLMIS to ensure increased data visibility and use for routine supply chain decision-making including Information Mobilized for Performance Analysis and Continuous Transformation (IMPACT) teams across all levels.

Surveillance, Monitoring, and Evaluation (SM&E)

Progress in FY 2020:

- PMI has provided TA and support to the NMCP in reviewing monthly HMIS data after each reporting period; provided training on the DHIS2 malaria dashboard; prepared, printed, and disseminated quarterly and annual malaria bulletins using HMIS data; and revised, printed, and disseminated HMIS supervision tools.
- PMI partners updated an analysis of the national Electronic Infectious Disease Surveillance and Response (eIDSR) data 2014–2020 to target programmatic improvements in the quality and timeliness of malaria indicators reported through eIDSR and ascertain its usefulness as a tool for case-based surveillance and epidemic detection. PMI partners also supported the analysis of the 2019 School Malaria Parasitemia and Nutrition Survey.
- PMI supported additional training and attendance in short courses on topics such as epidemiology, data analysis and interpretation, and scientific writing; and supported three surveillance officer trainees from high-burden malaria regions in the Frontline (Basic) Field Epidemiology Training Program (FETP).

Proposed investments with FY 2022 funding:

- PMI will continue to support efforts to (1) strengthen the malaria-related data integration and management systems (i.e., DHIS2 malaria dashboard and composite database), tools (e.g., eIDSR and MSDQI), and unit within the NMCP to analyze and disseminate information for decision-making, and (2) hold regular meetings and attend technical working group (TWG) meetings to review and discuss SM&E activities.
- In coordination with other partners supporting routine surveillance in the mainland, PMI will support improving data quality in HMIS through the continued implementation of MSDQI and provide support to routine health information system strengthening efforts.
- PMI will provide technical guidance but not direct implementation on the continued development of eIDSR as a possible tool for management of surveillance data for early epidemic detection and active case detection (ACD) in lower malaria burden regions.

Program Evaluation and Operational Research

Progress in FY 2020:

- The group antenatal care (ANC) study, originally planned to be implemented in 2020–2021, was canceled in mid-2020 for multiple reasons.

Proposed investments with FY 2022 funding:

- No activities are planned under the FY 2022 MOP.

Social and Behavioral Change (SBC)

Progress in FY 2020:

- Implemented media activities: 7,944 radio spots promoting ITN use and care, prompt care-seeking for onset of fever, early ANC attendance, and increased uptake of IPTp 3 through mass media, interpersonal communication, and national and regional radio stations.
- Trained 1,258 community volunteers to implement small group discussion sessions and timed household visits on malaria priority behaviors.
- Revised IRS materials in advance of spring campaigns in the Lake Zone. Materials revised included three radio spots, an IRS poster, tear-off sheet, Frequently Asked Questions (FAQ) informational brochure, and leaflet.

Proposed investments with FY 2022 funding:

- Continue to support three priority behaviors as per approved Communication Advocacy Guide 2021–2025: ITN use and care, prompt care-seeking onset of fever, and increase uptake of IPTp3+.
- Conduct SBC activities such as intensified community theatre and mass media and radio programs across PMI priority regions.

Health Systems Strengthening (HSS) general/other

Progress in FY 2020:

- Built NMCP capacity for inclusive participation in international and national-level activities and training.
- FETP graduated its 11th cohort of 22 residents. The majority (20) have returned to the government institutions and have played a crucial role in the implementation of the malaria control program at regional and district levels.
- Supported system enhancements and maintenance (DHIS2, MSDQI, dashboards, and malaria composite database).
- Oriented 400 regional and council health management teams from 6 regions and 40 councils and NMCP in DHIS2, resulting in increased utilization of DHIS2 and eLMIS data within councils.

Proposed investments with FY 2022 funding:

- Support the FETP program and contribute to the advanced training of Tanzanian epidemiologists for a 12-month period and three Peace Corp volunteers (PCVs) to work with the NMCP and PMI-supported implementing partners.

- Provide funds to support PCVs' community-based malaria SBC activities.
- Continue to improve data for decision-making by supporting the rollout, scale-up, and improvement of routine HMIS and eLMIS.
- Contribute to strengthened interoperability functions of several GOT information management systems to inform decision-making.
- Build NMCP capacity, including staff attendance at conferences; participate in short-term trainings, study tours, other educational programs, and other needs as determined by the current training needs assessments; and improve the President's Office for Regional and Local Government (PO-RALG) investment/involvement in malaria program.

I. INTRODUCTION

The U.S. President's Malaria Initiative (PMI)—led by the U.S. Agency for International Development (USAID) and implemented together with the U.S. Centers for Disease Control and Prevention (CDC)—delivers cost-effective, lifesaving malaria interventions alongside catalytic technical and operational assistance to support Tanzania to end malaria. PMI has been a proud partner of Tanzania since 2006, helping to decrease child death rates by 40 percent through investments totaling over $613 million.

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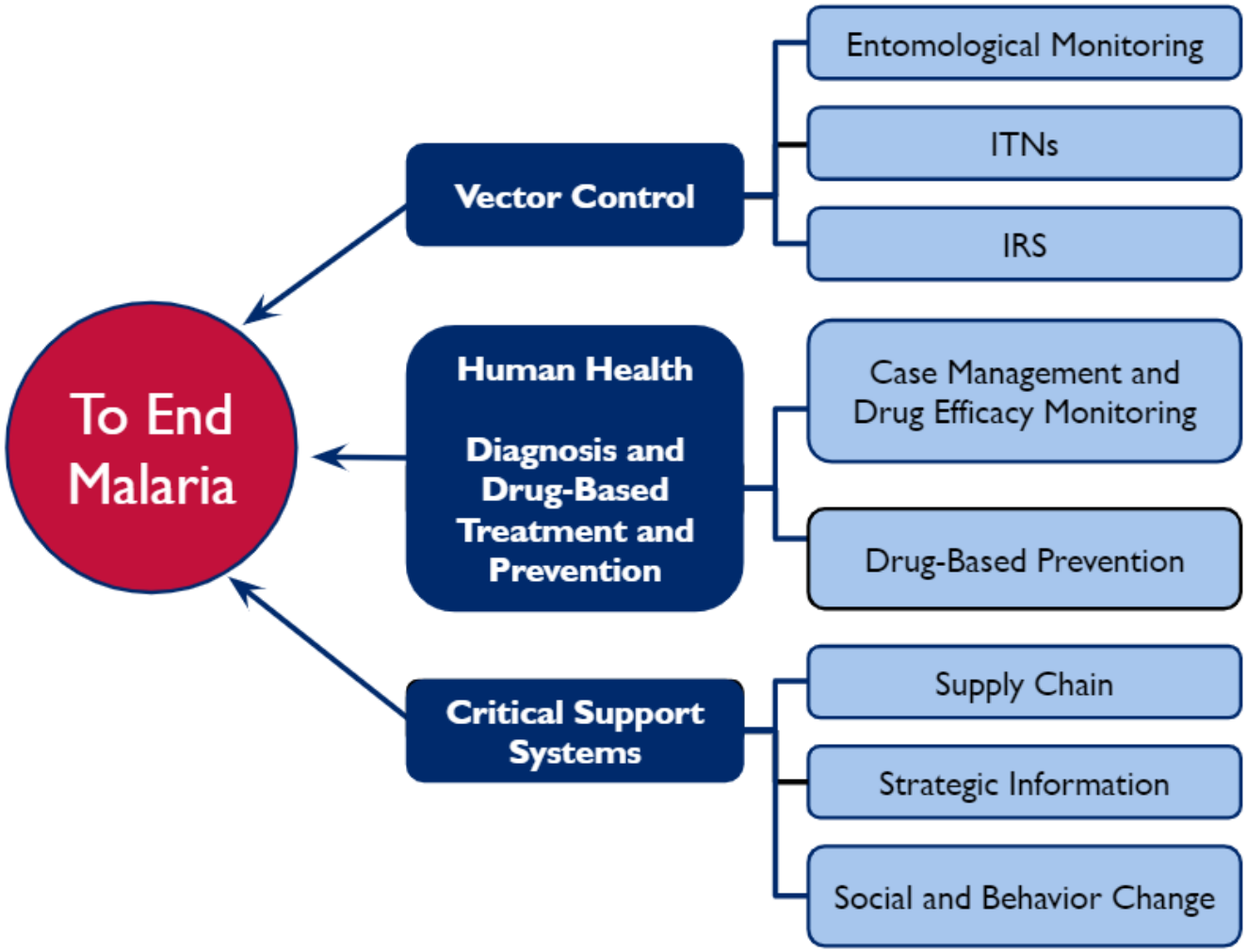
Tanzania at a Glance

- **Geography:** Located in East Africa along the Indian Ocean with a land area of over 947,000 square kilometers. Comprises the Mainland, Zanzibar (two islands, Unguja and Pemba), and a number of offshore islands.
- **Climate and Malaria Transmission Seasonality:** Largely tropical climate with regional variations due to topography, with cooler, less humid regions in the highlands. The north and east experience two rainy seasons in October–December and March–May, while the central, southern, and western regions have one longer wet season from October through April or May. Rainy seasons correspond to high malaria transmission periods.
- **Population in 2021:** 59,441,988 (National Bureau of Statistics)
- **Population at Risk of Malaria:** 100% (WHO)
- **Principal Malaria Parasites:** *Plasmodium falciparum* (NMCP, Zanzibar Malaria Elimination Program [ZAMEP])
- **Principal Malaria Vectors:** *An. arabiensis*, *An. funestus* s.s., *An. gambiae* s.s. (National Institute of Medical Research; ZAMEP)
- **Malaria Case Incidence per 1,000 Population:** 113/1,000 (WHO)
- **Under-Five Mortality Rate:** 67/1,000 (2015–2016 DHS)
- **World Bank Income Classification and Gross Domestic Product (GDP):** Low-income, GDP per capita $1,051 (World Bank Group)
- **Government Health Budget:** $936,538,506, Ministry of Health (MOH) Budget 2020–2021
- **Trafficking in Persons Designations, 2018–2020:** Tier 2 Watchlist Country (Department of State Trafficking in Persons Report, June 2020)

- **Malaria Funding and Program Support Partners Include:**
  - U.S. President's Malaria Initiative (PMI)
  - Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund)
  - World Health Organization (WHO)
  - Swiss Development Corporation (SDC)
  - Comic Relief
- **PMI Support of National Malaria Control Strategy:** As a major partner of the Tanzania National Malaria Control Program and the Zanzibar Malaria Elimination Program, PMI aims to help Mainland Tanzania reduce its malaria burden with a focus on the high to moderate regions, and to help Zanzibar push toward its goal of elimination. PMI supports most of the interventions laid out in both programs' strategic plans. (See III. Overview of PMI's support of Tanzania's Malaria Control Strategy for additional details.)
- **PMI Investments:** Tanzania began implementation as a PMI-focus country in FY 2006. The proposed FY 2022 PMI budget for Tanzania is $39 million; this brings the total PMI investment to over $650 million.

PMI organizes its investments around the activities below, in line with the Tanzania national malaria strategy.

Figure 1. PMI's approach to end malaria[1]



Building and strengthening the capacity of Tanzania's people and institutions—from the central level to communities—to effectively lead and implement evidence-based malaria control and elimination activities is paramount to PMI. The majority of PMI's planned support for FY 2022, across the areas of vector control, human health, and critical support systems such as supply chain, contains elements of capacity-building and system strengthening. PMI/Tanzania will continue to rely on and engage with local partners such as National Institute of Medical Research (NIMR), Ifakara Health Institute, and Muhimbili University of Health and Allied Sciences. Finally, PMI/Tanzania is continuing to build private sector partnerships to extend case management and service delivery

[1]A number of actions are cross-cutting in nature. For example, social and behavioral change (SBC) is embedded in all vector control and human health work; program evaluation (PE) and operational research (OR) are relevant in all of the fieldwork; finance and management support and the introduction of new tools/interventions are critical for all programs; and elimination requires work across the full spectrum of transmission.

through Accredited Drug Dispensing Outlets (ADDOs) and working alongside other partners to advocate for the inclusion of mRDT testing in their suite of services offered.

The activities proposed in this MOP are tailored to draw on strengths and address weaknesses; activities will be monitored to evaluate the effectiveness of capacity-building efforts. In addition, while PMI understands it will take time for Tanzania to fully finance its development priorities, PMI will work with other partners (e.g., the Global Fund) to jointly track Tanzania's funding commitments across the malaria portfolio.

II. MALARIA SITUATION AND PROGRESS

The entire population of Mainland Tanzania is considered at risk for malaria, although transmission varies significantly among and within regions. *Plasmodium falciparum* accounts for 96 percent of malaria infection in Tanzania. The principal vectors of malaria in Tanzania are mosquitoes of the *Anopheles gambiae* complex (*An. gambiae s.s. and An. arabiensis*), and *An. funestus*. Tanzania has made significant progress in malaria control in partnership with PMI, the Global Fund, the Department for International Development, the Swiss Development Corporation, research institutions, and others. Results from the 2017 MIS showed that 8 percent of children under five years of age in Tanzania tested positive for malaria by mRDT, down from the 10 percent in the 2011–2012 Tanzania HIV and Malaria Indicator Survey (THMIS) and 15 percent in the 2015–2016 Demographic and Health Survey (DHS)-MIS. Prevalence on the Mainland varies by region from <1 percent in the highlands of Arusha to as high as 15 percent in the Southern Zone and 24 percent along the Lake and Western zones. Other encouraging indicators from the 2017 MIS include:

- 78 percent of households owned at least one ITN, an increase from 38 percent in 2007–2008.
- 54 percent of children slept under bed nets, an increase from 25 percent in 2007–2008.
- 57 percent of pregnant women received medications to prevent malaria, an increase from 30 percent in 2007–2008.

Figure 2. Trends in malaria prevalence

This figure is a line graph of malaria prevalence among children 6 to 59 months of age who tested positive for malaria by microscopy or mRDT during the 2007–2008 THMIS, 2011–2012 THMIS, 2015–2016 DHS-MIS, and 2017 MIS. Prevalence has decreased from 18 percent during the 2007–2008 THMIS to 8 percent during the 2017 MIS.

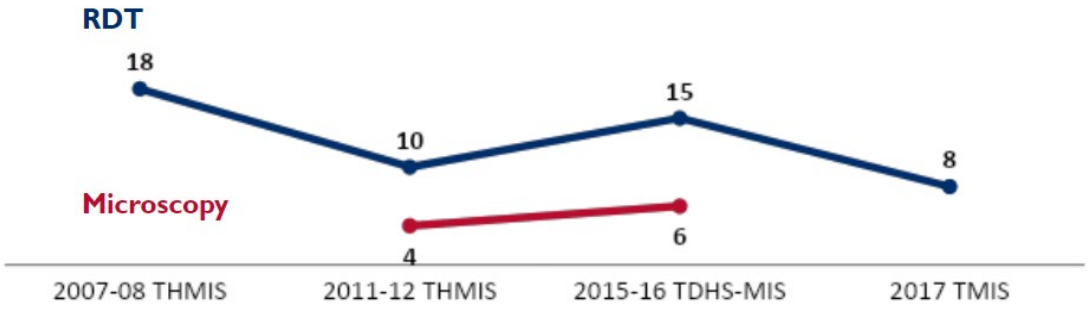


Figure 3. Malaria prevalence by region

This figure is a map of malaria prevalence by region among children 6 to 59 months of age who tested positive for malaria by mRDT during the 2017. The overall prevalence by region ranges from 24 percent in Kigoma to less than 1 percent in Kilimanjaro region. The highest prevalence regions are in the northwest and southeast areas of mainland Tanzania.

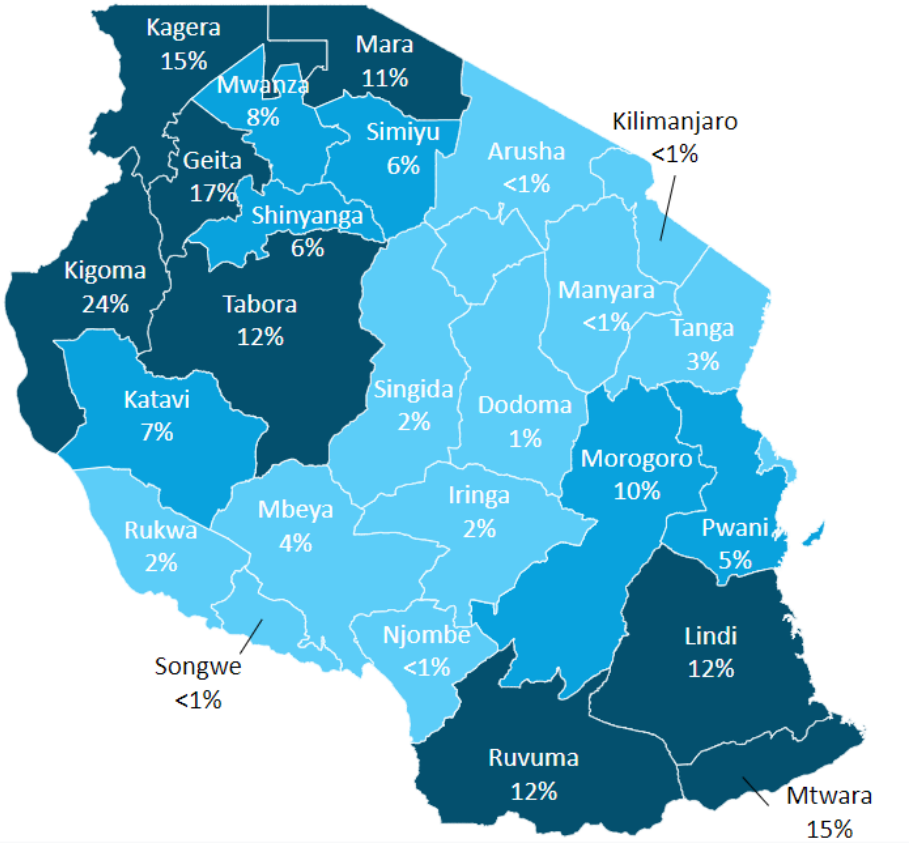


Table 1. Key indicators from demographic health surveys (DHS) and malaria indicator surveys (MIS)

Indicator	2004–2005 DHS	2007–2008 THMIS	2010 DHS	2011–2012 THMIS	2015–2016 DHS-MIS	2017 MIS
% Households with at least one ITN	23	38	63	92	65	78
% Households with at least one ITN for every two people	N/A	N/A	N/A	57	39	42
% Population with access to an ITN	N/A	N/A	N/A	N/A	56	53
% Population that slept under an ITN the previous night*	N/A	N/A	45	69	49	52
% Children under five years of age who slept under an ITN the previous night*	16	25	64	73	54	54
% Pregnant women who slept under an ITN the previous night*	15	26	57	76	54	51
% Children under five years of age with fever in the last two weeks for whom advice or treatment was sought[1]	N/A	N/A	65	78	80	75
% Children under five years of age with fever in the last two weeks who had a finger or heel stick	N/A	N/A	N/A	25	36	43
% Children receiving an ACT among children under five years of age with fever in the last two weeks who received any antimalarial drugs	N/A	N/A	N/A	61	N/A	89
% Women who received two or more doses of IPTp during their last pregnancy in the last two years	22	30	27	33	35	57
% Women who received three or more doses of IPTp during their last pregnancy in the last two years	N/A	N/A	N/A	N/A	8	26
Under-five mortality rate per 1,000 live births	133	112	93	N/A	79	N/A

Indicator	2004–2005 DHS	2007–2008 THMIS	2010 DHS	2011–2012 THMIS	2015–2016 DHS-MIS	2017 MIS
% Children under five years of age with parasitemia (by **microscopy,** if done)	N/A	N/A	N/A	4	6	N/A
% Children under five years of age with parasitemia (by **RDT**, if done)	N/A	18	N/A	10	15	8
% Children under five years of age with severe anemia (Hb<8gm/dl)	N/A	8	5	6	5	5

Table 2. Evolution of key malaria indicators reported through routine surveillance systems

Indicator	2016	2017	2018	2019	2020
# Suspect malaria cases[1]	N/A	N/A	N/A	N/A	N/A
# Patients receiving diagnostic test for malaria[2]	10,298,455	17,883,913	22,275,989	24,394,153	21,958,066
Total # malaria cases[3]	6,562,660	5,954,189	6,547,499	7,096,018	6,311,437
# Confirmed cases[4]	5,542,505	5,658,839	6,438,519	6,980,683	6,267,344
# Presumed cases[5]	1,020,155	295,350	108,980	115,335	44,093
% Malaria cases confirmed[6]	84.5%	95%	98.3%	98.4%	99.3%
Test positivity rate (TPR)[7]	53.8%	31.6%	28.9%	28.6%	28.5%
Total # under five years of age malaria cases[8]	2,491,911	2,277,994	2,464,013	2,968,782	2,793,863
% Cases in children under five years of age[9]	38%	38.3%	37.6%	41.8%	44.3%
Total # severe cases[10]	410,013	334,711	324,747	335,250	311,640
Total # malaria deaths[11]	4,068	3,680	2,541	2,110	2,414
# Facilities reporting[12]	7,922	8,153	8,505	8709	9022

Indicator	2016	2017	2018	2019	2020
% Data completeness[13]	98.8%	99.7%	99.5%	99.7%	99.8%

1. Number of patients presenting with signs or symptoms possibly due to malaria (e.g., fever). 2. RDT or microscopy, all ages, outpatient and inpatient. 3. Total reported malaria cases; all ages, outpatient and inpatient, confirmed and unconfirmed cases. 4. Diagnostically confirmed; all ages, outpatient and inpatient. 5. Clinical/presumed/unconfirmed; all ages, outpatient and inpatient. 6. # confirmed cases divided by total # cases. 7. Confirmed cases divided by # patients receiving a diagnostic test for malaria (RDT or microscopy). 8. Outpatient and inpatient, confirmed and unconfirmed. 9. Total # <5 cases divided by total # of cases. 10. Severe cases are defined in a patient with *P. falciparum* asexual parasitemia and no other obvious cause of symptoms, the presence of one or more of the following clinical features: behavioral changes, prostration/extreme weakness, coma, respiratory distress, convulsions, vomiting everything, inability to drink or breast feed, circulatory collapse/shock, pulmonary edema, bleeding tendency/DIC, jaundice, acute renal failure, and hemoglobinuria. 11. All ages, outpatient, inpatient, confirmed, and unconfirmed. 12. Total # of health facilities reporting data into the HMIS/DHIS2 system that year. 13. # monthly reports from health facilities divided by # health facility reports expected.

III. OVERVIEW OF PMI'S SUPPORT OF TANZANIA'S MALARIA STRATEGY

PMI supports a comprehensive package of malaria control interventions in support of the NMCP's *National Malaria Strategic Plan (NMSP) 2021–2025*. The plan outlines a long-term vision of a society free from malaria. The mission articulated in the strategy is that all Tanzanians have equitable access to sustainable, quality, effective, safe, and affordable malaria preventive and curative services through efficient collaborative partnership and community ownership. The national goal is to reduce the average malaria prevalence in children under 5 years of age (*Plasmodium falciparum* parasite rate [*pfpr*]) from 7 percent in 2017 to less than 3.5 percent in 2025. Further, there are targets for each of the epidemiological strata, identified in a nationwide stratification exercise conducted in 2017. These targets are to reduce malaria burden in moderate to high-risk strata, from 15 percent *pfpr* in 2017 to less than 7.5 percent *pfpr* in 2025 and to maintain and further reduce transmission in low and very low prevalence in areas targeting elimination from 1 percent *pfpr* in 2017 to less than 0.5 percent *pfpr* in 2025.

The strategy to achieve these targets consists of six components, the first three as core strategies and the last three as support strategies:

1. Integrated malaria vector control
2. Malaria diagnosis, treatment, and preventative therapies
3. Surveillance monitoring, and evaluation
4. Commodities and logistics management
5. Social behavioral change and advocacy
6. Program management

Each strategic component has specific objectives and outcomes, with specific intervention packages that vary by epidemiologic stratum.

PMI focuses most of its technical assistance (TA) on 11 of 25 regions: seven high-burden regions in the Lake/Western zones and four high-burden regions in the Southern Zone. Implementation support is provided by the Global Fund for interventions in the remaining 14 regions. Consistent with PMI technical guidance, PMI/Tanzania's investment strategy focuses on the promotion of high coverage of a set of high-quality, evidence-based malaria control interventions:

1. Indoor residual spraying, complemented by entomological monitoring.
2. PBO and standard insecticide treated mosquito nets, distributed continuously through clinics and schools.
3. Malaria in pregnancy interventions, including intermittent preventive treatment.
4. Case management of malaria, including prompt diagnosis and treatment and pharmaceutical supply chain strengthening.
5. Data for decision-making, gleaned from surveillance, monitoring, and evaluation, and operations research activities.
6. Social and behavior change (SBC) activities, to promote consistent and correct use of interventions by high proportions of target populations and service providers.

According to the stratification of malaria burden and delineation of intervention packages tailored to each epidemiological stratum, regions in the Lake/Western and Southern zones are largely classified in the moderate and high-burden strata, where the NMCP priority remains burden reduction. PMI support for interventions, as listed above, largely aligns with the intervention packages and approaches recommended in the NMSP for these strata. Exceptions to PMI support of the NMSP intervention packages include bio-larviciding as well as newer chemoprevention approaches including seasonal malaria chemoprevention (SMC) and intermittent preventive treatment in school children (IPTsc) and in infants (IPTi), which are currently being investigated for their efficacy, effectiveness, and feasibility under implementation research through support from Global Fund and other sources.

Figure 4. Map of target areas for PMI interventions (2021)

Showing PMI-supported IRS in districts in Kagera, Geita, and Kigoma regions and in Zanzibar; PMI distribution of Global Fund- and PMI-procured ITNs through facility and school channels in 14 regions in the Lake/Western and Southern zones; PMI procured and distributed ITNs through facilities in Zanzibar; and PMI-supported Case Management and MIP activities in 11 regions in Lake/Western and Southern zones as well as in Zanzibar.

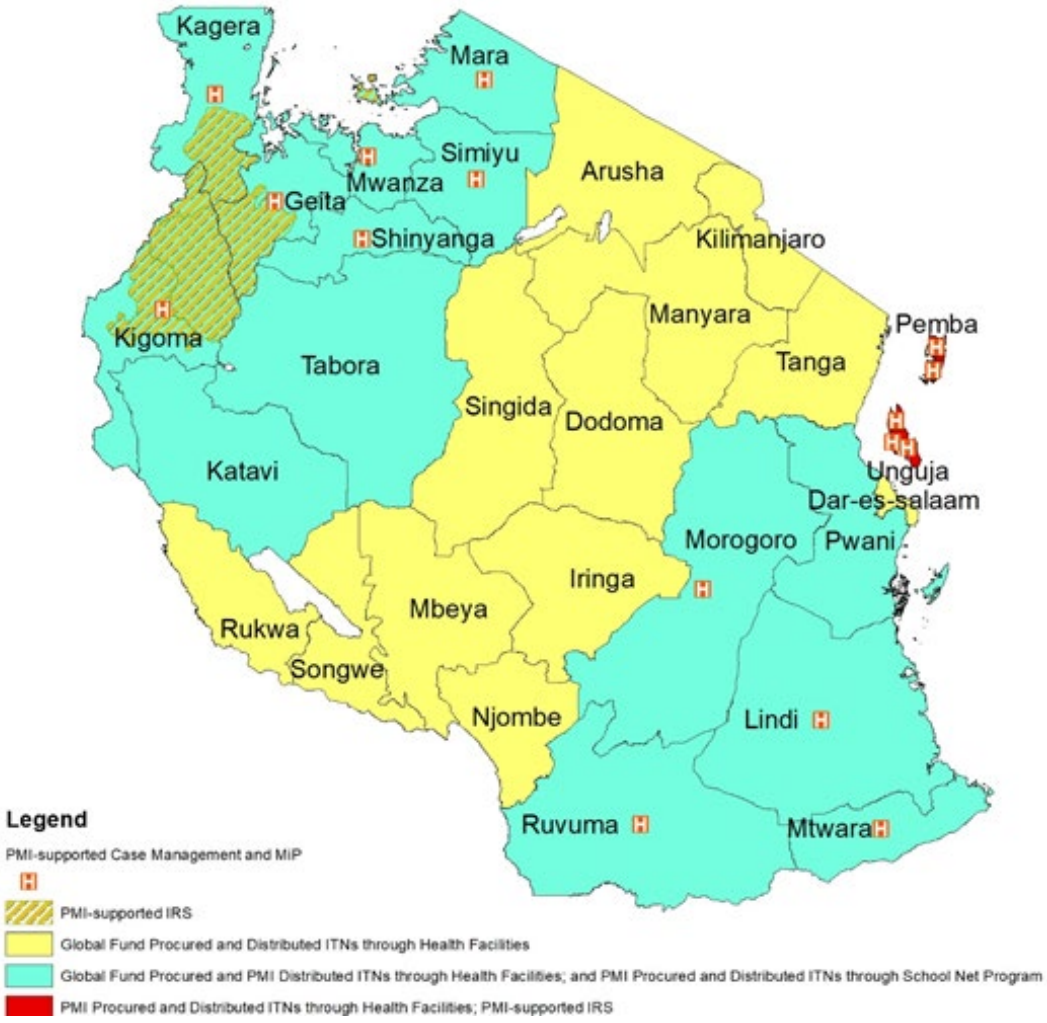
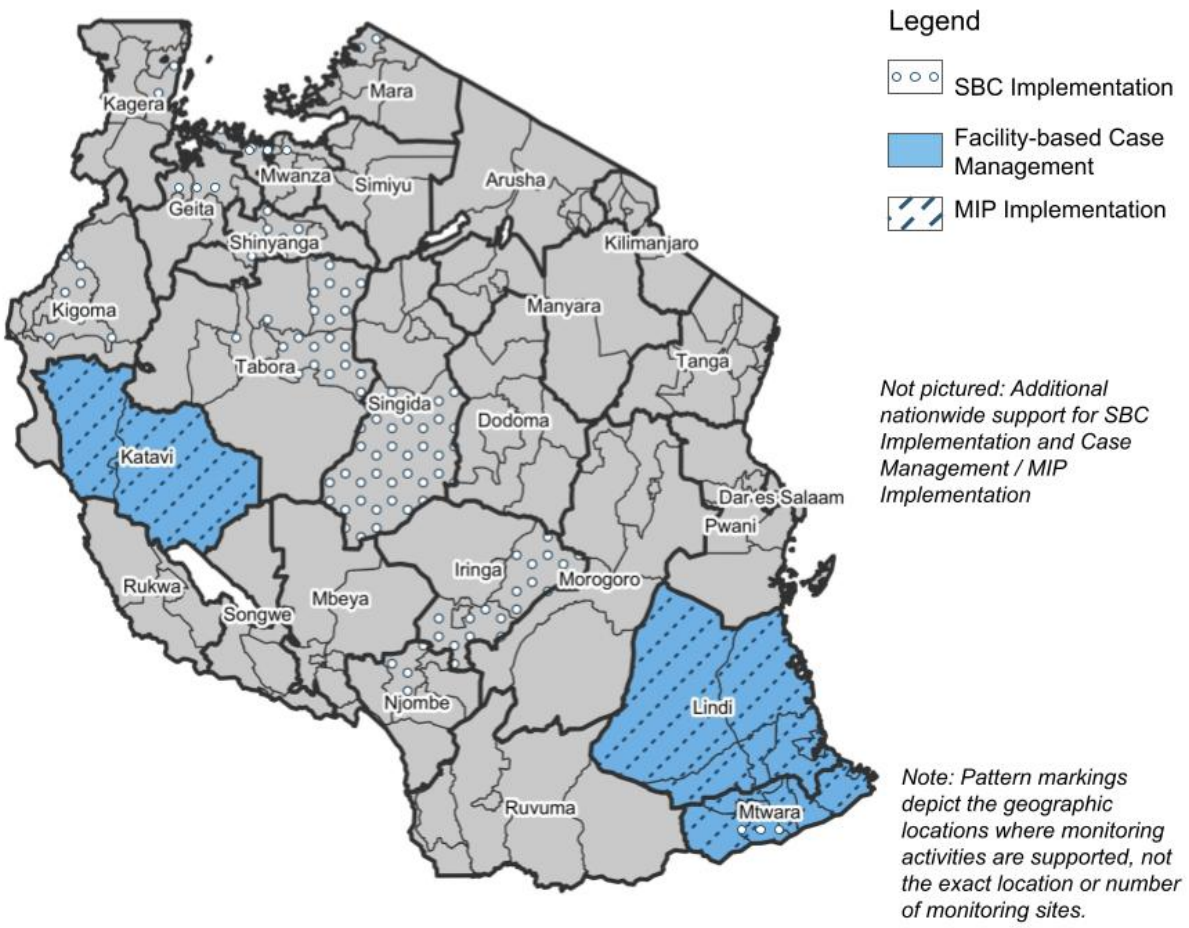
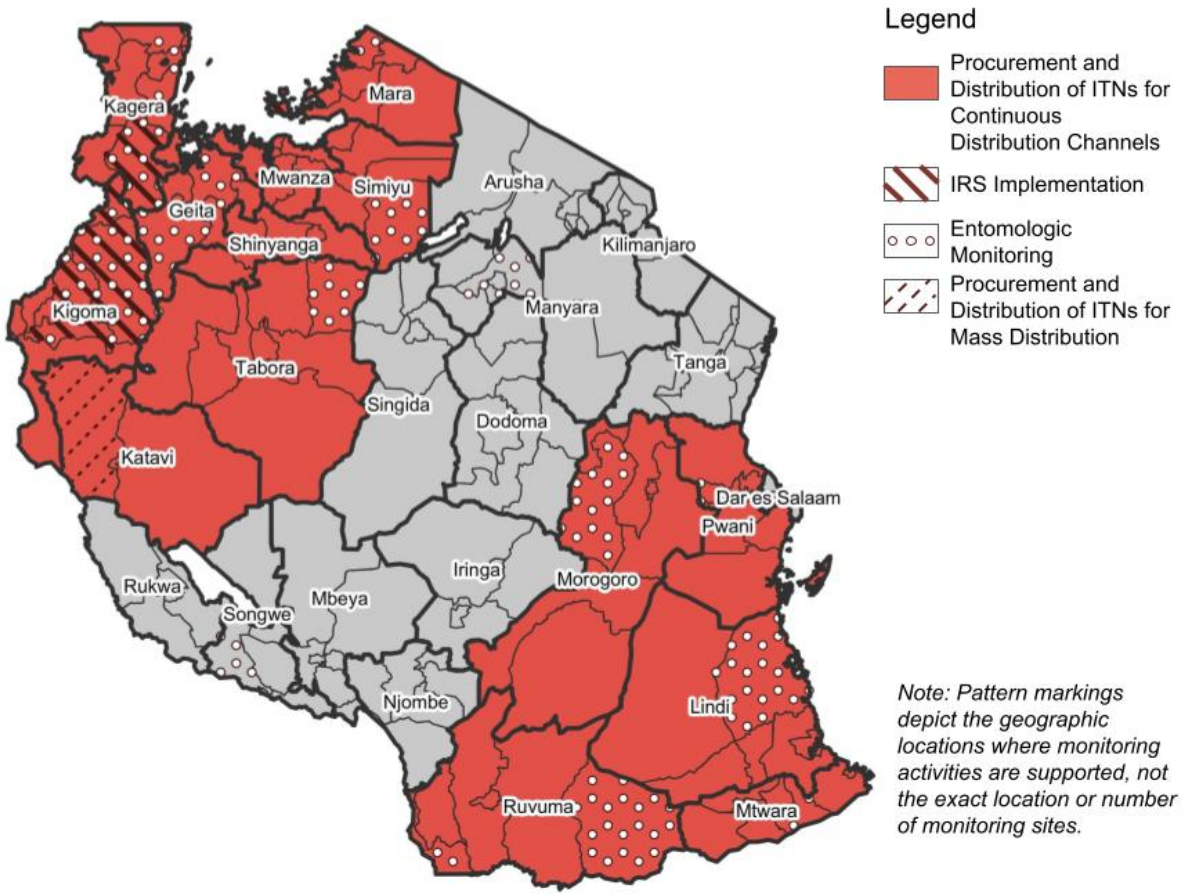


Figure 5. PMI-supported service delivery and SBC activities in Tanzania (Mainland)



Source: Tanzania MOP Funding Table 2, Fiscal Year 2021 Malaria Data Integration and Visualization (M-DIVE).

Figure 6. PMI-supported vector control activities in Tanzania (Mainland)



Source: Tanzania MOP Funding Table 2, Fiscal Year 2021 Malaria Data Integration and Visualization (M-DIVE).

IV. PARTNER FUNDING LANDSCAPE

Note: The Partner Funding Landscape applies to all of Tanzania (Mainland and Zanzibar).

PMI emphasizes the importance of partner alignment for malaria control, recognizing that different partners bring complementary expertise and resources. In recent years, PMI, the Global Fund, and the Bill & Melinda Gates Foundation (BMGF) have harmonized financial, supply chain, and programmatic data. In particular, PMI and the Global Fund agreed to a harmonized financial taxonomy to aid comparison of our investments to better identify potential overlap or gaps.

Due to the U.S. Government fiscal year budget cycle and approximate timing of annual appropriations, PMI MOP resources fund activities that largely occur during the following fiscal year (FY). For example, this FY 2022 MOP is

anticipated to largely fund implementation of activities starting in 2023. Global Fund resources are based on the calendar year (CY) and planned for a three-year grant cycle. Most partner country governments and other partners also budget based on the calendar year.

The tables below summarize contributions by key external partners and partner country governments in CY 2020–2022, providing insight into total country investments. Because new grants funded through the Global Fund 2021–2023 grant cycle are just beginning, or will begin later in 2021, Global Fund country investments may still evolve in some countries. The partner country government invests substantial funding into the national-to-local infrastructure and service delivery that benefits malaria programs and many others. However, it is not always possible to attribute funding for malaria specifically from the partner country government without a standardized method. There may be similar challenges for attributing other partner funds.

In some cases, Global Fund's funding may come in partway through the calendar year. Funding levels in "Section IV: Partner Funding Landscape" and commodity procurement amounts listed in "Annex A: Intervention-Specific Data" may differ given the lag between the year that funding was planned and the year when procurement orders were placed. Differences may reflect timing and/or based on changes in commodity consumption levels at country level, changes in commodity costs, or other donor orders.

Table 3a. Annual budget by Level 1 category for FY 2019/CY 2020

Funder	Vector Control	Case Management	Drug-Based Prevention[1]	Supply Chain[2]	Monitoring, Evaluation & Research	Cross-cutting and HSS[3]	Total Per Funder
PMI	$28.1M	$5.2M	$1.0M	$1.1M	$3.8M	$4.7M	$43.9M
Global Fund	$18.0M	$27.1M		$0.7M	$1.5M	$14.3M	$61.6M
Gov	0				0	0	0
SDC – STPH[4]	$942,638				$408,000	$201,365	$1.5M
Total Per Category	$47.0M	$32.3M	$1.0M	$1.8M	$5.7M	$19.2M	$107.0M

Table 3b. Annual budget by Level 1 category for FY 2020/CY 2021

Funder	Vector Control	Case Management	Drug-Based Prevention[1]	Supply Chain[2]	Monitoring, Evaluation & Research	Cross-cutting and HSS[3]	Total Per Funder
PMI	$27.8M	$5.5M	$0.4M	$0.8M	$2.5M	$5.1M	$42.1M
Global Fund	$7.3M	$21.1M		$0.5M	$2.7M	$34.4M	$66.0M
Gov	0	0	0	0	0	0	$0.0M
SDC - STPH[4]	$612,638	$308,393			$305,999	$62,363	$1.3M
Total Per Category	$35.7M	$26.9M	$0.4M	$1.3M	$5.5M	$39.6M	$109.4M

Table 3c. Annual budget by Level 1 category for FY 2021/CY 2022

Funder	Vector Control	Case Management	Drug-Based Prevention[1]	Supply Chain[2]	Monitoring, Evaluation & Research	Cross-cutting and HSS[3]	Total Per Funder
PMI	$26.8M	$4.0M	$0.5M	$1.0M	$2.7M	$5.2M	$40.2M
Global Fund	$5.3M	$20.1M		$0.5M	$3.7M	$30.6M	$60.2M
Gov	0	0	0	0	0	0	$0.0M
SDC – STPH[4]	$612,638	$405,606	0	0	0	$88,117	$1.1M
Total Per Category	$32.7M	$24.5M	$0.5M	$1.5M	$6.4M	$35.9M	$101.3M

1. Drug-based prevention, including SMC and MIP where applicable. 2. Covers management of in-country warehousing and distribution of malaria commodities, except for ITNs, which are separately captured under Vector Control. 3. HSS = health systems strengthening. 4. SDC = Swiss Development Corporation, STPH = Swiss Tropical Public Health Institute.

Table 4a. Annual budget, breakdown by commodity, FY 2019/CY 2020

Funder	ITNs *Continuous Distribution*	ITNs *Mass Distribution*	IRS[1] *Insecticide*	ACTs	RDTs	Severe Malaria	SMC-Related	IPTp-Related	Total
PMI[2]	$8.1M		$9.4M					0	$17.5M
Global Fund[3]	$12.6M			$7.9M	$9.6M	$3.6M		0	$33.7M
Gov	0	0	0	0	0	0	0	$26,309	$26,309
Other								0	$0.0M
Total	$20.7M	$0.0M	$9.4M	$7.9M	$9.6M	$3.6M	$0.0M	$26,309	$51.2M

Table 4b. Annual budget, breakdown by commodity, FY 2020/CY 2021

Funder	ITNs *Continuous Distribution*	ITNs *Mass Distribution*	IRS[1] *Insecticide*	ACTs	RDTs	Severe Malaria	SMC-Related	IPTp-Related	Total
PMI[2]	$10.6M		$8.2M	$1.5M	$0.0M	$1.0M	$0.0M	0	$21.3M
Global Fund[3]		$2.8M		$6.2M	$8.5M			0	$17.5M
Gov	0	0	0	0	0	0	0	$109,380	$109,380
Other								0	$0.0M
Total	$10.6M	$2.8M	$8.2M	$7.7M	$8.5M	$1.0M	$0.0M	$109,380	$38.9M

Table 4c. Annual budget, breakdown by commodity, FY 2021/CY 2022

Funder	ITNs *Continuous Distribution*	ITNs *Mass Distribution*	IRS[1] *Insecticide*	ACTs	RDTs	Severe Malaria	SMC-Related	IPTp-Related	Total
PMI[2]	$10.6M		$7.7M					0	$18.2M
Global Fund[3]		$2.9M		$5.4M	$7.8M			0	$16.1M
Gov	0	0	0	0	0	0	0	$114,756	$114,756
Other								0	$0.0M
Total	$10.6M	$2.9M	$7.7M	$5.4M	$7.8M	$0.0M	$0.0M	$114,756M	$34.4M

Note: Categories reflect the harmonized financial taxonomy (Levels 1-3) developed by BMGF, Global Fund, and PMI in 2019, as part of a broader data harmonization initiative but may continue to evolve. 1. IRS insecticide: for PMI, commodity costs may be inextricable from IRS implementation costs in historical data; field identified as ND where this is the case. 2. PMI commodity costs are fully loaded, including costs for the ex-works price of the commodity, quality control, freight, insurance, and customs. 3. Global Fund commodity costs in the table above only include ex-works commodity value.

ACTIVITIES TO BE SUPPORTED WITH FY 2022 FUNDING

The FY 2022 budget tables contain a full list of activities that PMI proposes to support in Tanzania with FY 2022 funding. Please visit www.pmi.gov/resource-library/mops for these FY 2022 budget tables. Key data used for decision-making for this MOP planned investments is provided in Annex A of this document.

ANNEX A: INTERVENTION-SPECIFIC DATA

This section outlines key data that helped inform decision-making around FY 2022 MOP funding allocations to PMI-supported activities.

1. VECTOR CONTROL

NMCP Objective

The strategic objective of integrated malaria vector control as presented in the draft Tanzania National Malaria Strategic Plan (NMSP) 2021–2025 is to reduce malaria parasites transmission by maintaining recommended evidence-based vector control interventions according to the targeted malaria risk strata. The targets are to reduce the entomological inoculation rate to <0.1 by 2020 and increase the percentage of the population who slept under an ITN the previous night or in a dwelling sprayed with IRS in the past six months from 78 percent in 2017 to 95 percent in 2025. The specific objectives of integrated vector control are to:

1. Ensure universal access of long-lasting insecticide-treated nets according to malaria transmission settings.
2. Consolidate and expand IRS in epidemiologically and operationally suitable areas.
3. Implement appropriate, sustainable, and quality larval source management (larviciding, environmental management, and biological control) interventions in suitable epidemiological and operational areas.
4. Provide a strategic framework for coordination and continuous assessment for the implementation of evidence-based integrated malaria vector control interventions.

NMCP Approach

The draft NMSP 2021–2025 outlined vector control approaches that laid down the most appropriate methods or combinations of malaria vector control activities that will help the NMCP to achieve its goal of reducing the malaria parasite prevalence in children under five years of age to less than 3.5 percent in 2025. The strategy also provided approaches and set up implementation of intervention packages to match with malaria risk strata in the country. It provides a credible and realistic strategic approach toward malaria elimination in Tanzania mainland.

IRS and ITNs are the core vector control interventions while larval source management (LSM) is recommended as a supplementary initiative to be implemented upon attainment of universal coverage of the two core interventions. These interventions shall be directed based on stratification and by considering epidemiological and ecology of the local vector and overlapping vector-borne diseases to maximize benefit.

The malaria vector control approaches are as follows:

1. By 2025, ensure that 85 percent of the population of Tanzania has access to an ITN within their household, which will be achieved using deployment of ITNs by:

    - Targeted mass replacement campaign when required according to accessibility and epidemiological risk.
    - School net program (SNP) distribution.
    - RCH/EPI to protect biologically vulnerable groups, infants and pregnant women.
    - Alternative delivery system to special population groups.
    - Create enabling environment for ITN availability in commercial market.

2. Consolidate and expand IRS in epidemiologically and operationally suitable areas.
    - Create an enabling environment to plan, implement, and conduct quality IRS by using community engagement including guidelines, training packages, monitoring system, environmental compliance, and a pesticide management plan.
    - Build capacity of Council Health Management Teams (CHMTs) and private sector to plan, manage, implement, and evaluate IRS.
    - Apply quality IRS through community participation and engagement in the respective councils.
3. Implement appropriate, sustainable, and quality LSM interventions in suitable epidemiological and operational areas.
4. Provide strategic framework for coordination and continuous assessment for the implementation of evidence-based vector control innovations.

PMI Objective in Support of NMCP

PMI specifically supports seven operational objectives:

1. PMI supports ITN coverage, including procurement and annual distribution of ITNs through an SNP in the 14 regions with the highest prevalence of malaria. Nine regions with the highest malaria burden are covered with PBO ITNs and the other five regions currently receive standard ITNs. PMI also supports the distribution of Global Fund-procured ITNs through reproductive and child health (RCH) channels (ANC/EPI) at all primary health facilities in the same 14 regions of the country.
2. PMI supports annual rapid assessment surveys to determine the ITN population access among targeted populations and the quantity of ITNs needed in the coming year to maintain high population access to ITNs around 26 regions. Districts/regions that show ITN population access at less than 60 percent will result in activation of targeted mass campaigns.
3. PMI supports activities to create an enabling environment to revive the commercial market for ITNs.
4. PMI provides annual guidance on effectiveness of vector control interventions used in Tanzania ensuring the GOT and stakeholders are well informed of new promising, evidence-based vector control approaches that may be appropriate for the epidemiological, ecological, and human behavior settings in Tanzania.
5. PMI provides guidance on new evidence-based vector control approaches that show potential for successful outcomes in Tanzania and, when appropriate, assist with implementation of proven approaches.
6. PMI supports IRS, including procurement of insecticides and spray operation logistics for about six districts where there is a combination of high prevalence of malaria and vector resistance to pyrethroid insecticides. The IRS operation adheres to high standards for the protection of the environment and safe disposal of waste, in accordance with the approved Pesticide Evaluation Report and Safe Use Action Plans. Environmental inspection visits are conducted regularly to assess compliance with the U.S. Government and Tanzanian national environmental standards.
7. PMI supports entomological monitoring through three activities:

A. Yearly nationwide monitoring of resistance to insecticides used for vector control.
B. Monthly cone bioassay monitoring of residual insecticidal activity of the IRS program.
C. Monitoring of vector species abundance and distribution, resting behavior, and sporozoite rates at established sentinel sites.

The NMCP, with Global Fund support, conducts monthly monitoring on vector species abundance and spatial/temporal distribution in 32 sites nationwide, mainly in areas not supported by PMI.

Larval source management and environmental management are not supported by PMI.

PMI-Supported Recent Progress (FY 2020)

PMI supported an assessment to determine the ITN coverage across the 26 regions that are included in the SNP. The findings will be used to determine the ITN input required to maintain population access in the SNP regions at greater than 60 percent.

- PMI procured 1,105,018 standard ITNs and 2,247,001 PBO ITNs.
- Between January 2020 and February 2021, PMI supported the distribution of 3,111,175 ITNs for SNP, as well as the distribution of Global Fund-procured 4,507,340 ITNs through RCH/EPI and SNP channels in the SNP regions.
- PMI supported blanket IRS in six districts in the Lake Zone reaching approximately 471,622 structures and protecting about 1.9 million people, under leadership from NMCP.
- PMI supported IRS efficacy and longitudinal entomological monitoring and laboratory support for sample processing and analysis. PMI support focuses on the national insecticide resistance monitoring program at 22 mainland sentinel sites.

PMI-Supported Planned Activities (FY 2021 with currently available funds)

- Rapid assessment surveys to determine the ITN coverage across the 26 regions that are included in the SNP. NetCalc, or other suitable software programs, will be used to determine the ITN input required to maintain population access in the SNP regions at greater than 60 percent.
- Procurement and distribution of ITNs for SNP, as well as support the distribution of Global Fund-procured ITNs through approved channels in the SNP regions. PMI will procure standard long-lasting insecticide-treated nets for five regions and PBO nets for nine regions.
- Creating an enabling environment to revive the commercial market for ITNs (i.e., tracking quantities, prices, and origins of nets; engaging stakeholders to analyze market trends; and using the data to inform interventions to shape the market to favor increased sales of ITNs).
- Annual guidance on effectiveness of vector control interventions used in Tanzania ensuring the GOT and stakeholders are well informed of new promising, evidence-based vector control approaches that may be appropriate for the epidemiological, ecological, and human behavior settings in Tanzania.
- Blanket IRS in six districts in the Lake Zone reaching approximately 470,000 structures and protecting about 2.5 million people. Under leadership from the NMCP, PMI will continue to use an appropriate insecticide for the IRS round in late 2021 and/or early 2022.

- Refreshing and tailoring of promotional messages and materials to increase household readiness and acceptance of IRS in the Lake Zone and drawing from best practice experience.
- SBC activities such as intensified community theatre, mass media, and radio programs across PMI priority regions by further regionalizing content for these communication mediums. This will be achieved through a better understanding and prioritization of context-specific ITN use social norm barriers and influencers.
- For IRS, SBC activities will be used to inform people where, when, and why IRS activities are being conducted in their community; inform people in areas where IRS was withdrawn why it was withdrawn and inform them of available methods of alternative protection; and inform communities of the reasons why other insects appear after IRS.
- SBC activities, under the *"Chandarua Kliniki"* campaign, will be conducted in the 14 SNP regions to increase awareness of the SNP, increase awareness of the availability of ITNs in health facilities, and promote correct and consistent net use and net care.
- Entomological monitoring: This includes longitudinal monitoring in the Lake Zone in PMI-supported IRS areas and WHO bioassays to monitor insecticide residual efficacy. In the Lake Zone where PMI is supporting the distribution of ITN+PBO, the longitudinal monitoring will include areas where these nets will be implemented. PMI will continue to provide laboratory support for the analysis of entomological samples.
- National Insecticide Monitoring: Insecticide resistance monitoring at 22 national sentinel sites, and increased testing in regions where there may be the introduction of new interventions. Insecticides to be tested may include next-generation insecticides that may be used in IRS or ITNs and insecticide resistance intensity testing expanded. This will provide a database of insecticide resistance and efficacy and increased monitoring of possible impact on IRS and ITNs for the NMCP and other partners.
- TA for SBC and entomological monitoring: PMI/CDC staff will conduct two entomology and one SBC TA visits.

1.1. ENTOMOLOGICAL MONITORING

Key Goal

Determine the geographic distribution, bionomics, and insecticide resistance profiles of the main malaria vectors in the country to inform vector control decision-making.

Key Question 1

Where is entomological monitoring taking place, what types of activities are occurring, and what is the source of funding?

Supporting Data

From October 2019 to September 2020, PMI supported longitudinal entomological monitoring activities in five regions in the Lake Zone at 10 sentinel sites, six of which were located in IRS districts (Biharamulo, Ukerewe, Bukombe, Kasulu DC, Kibondo, and Kakonko) and four in non-IRS districts as control sites (Bunda DC, Muleba DC, Geita DC, and Kasulu TC). (See Figure A-1.) In addition, PMI supported insecticide resistance testing in 22 national sentinel sites. Clothianidin was the insecticide used in Biharamulo, Bukombe, and Ukerewe districts and

pirimiphos-methyl in Kakonko, Kibondo, and Kasulu DC districts in the 2019–2020 IRS campaign. Control sites received ITNs through public schools and ANC/EPI. Muleba, Geita DC, and Kasula TC received PBO nets while Bunda DC received standard ITNs. Mosquito collections were made with CDC light traps, clay pot traps, Prokopack aspirators, and CDC light traps with collection bottle rotators as a proxy for human collections.

The NMCP established a national longitudinal entomological surveillance program in 62 sentinel districts in 2015 with Global Fund funding. The aim was to provide a greater understanding of species composition and distribution, seasonality, and biting behavior in the push toward malaria elimination. Monthly collections were made by CDC light traps for indoor collections and bucket traps for indoor and outdoor collections. Other activities include research studies on efficacy of next-generation ITNs being conducted under the New Nets Project.

Figure A-1. Entomological surveillance sites for PMI-supported IRS and ITNs in the Lake Zone for October 2019–September 2020

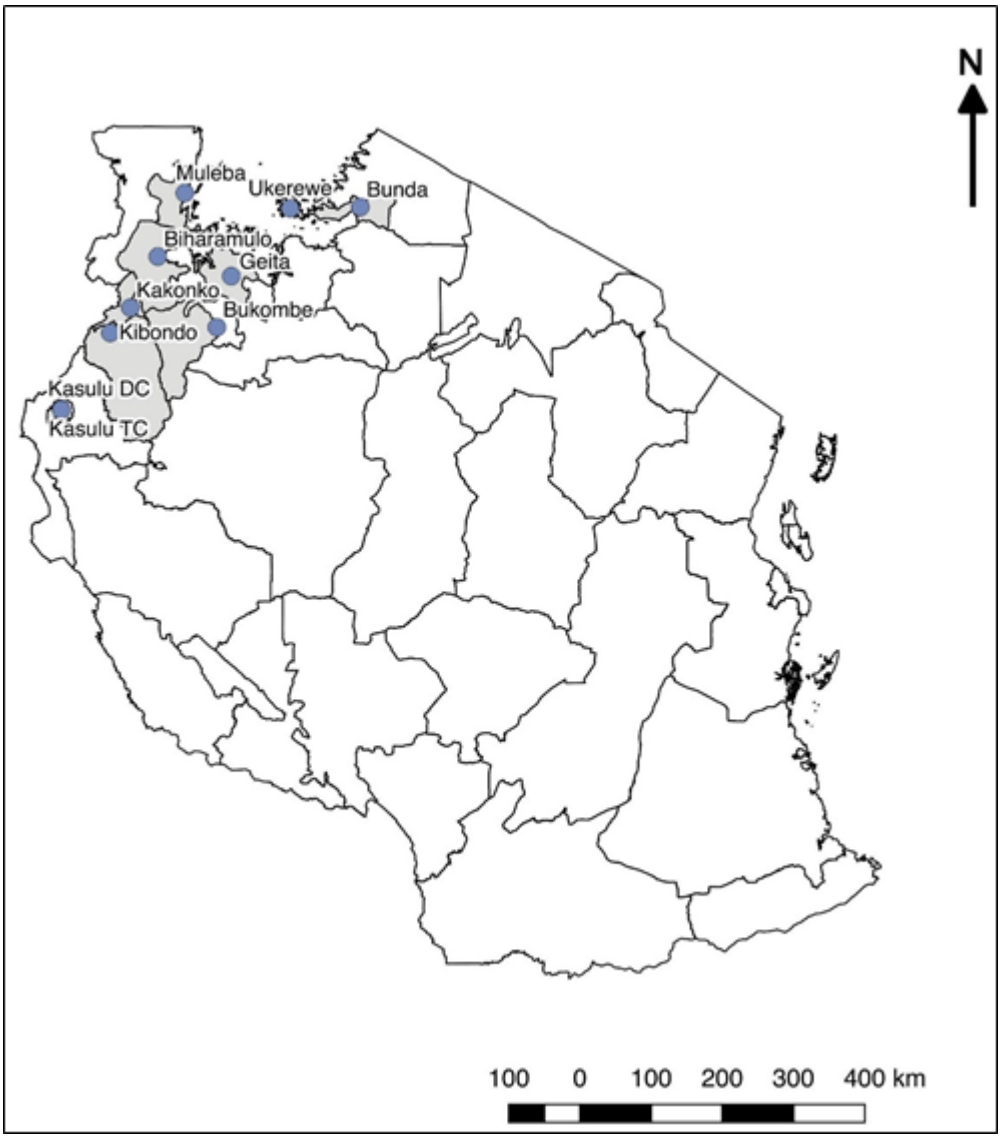


Table A-1. PMI-supported vector entomological monitoring activities for Mainland Tanzania for October 2019–September 2020

Region	District	Site	Activities	Supported by
Kagera	2 (Biharamulo, Muleba) 4 (Bukoba Rural, Ngara, Misyeni, Karagwe)	2 (Kalabezo, Kakoma) Multiple sites	Longitudinal Monitoring (2) Resistance Monitoring (4)	PMI
Geita	2 (Geita DC, Bobombe) 1 (Nyang'wale, Chato)	2 (Chikobe, Lyambamgongo) Multiple sites	Longitudinal Monitoring (2) Resistance Monitoring (2)	PMI
Kigoma	4 (Kakonko, Kibondo, Kusulu DC, Kusulu TC) 3 (Uvinva, Kigoma DC, Kakonko)	4 (Itumbiko, Minyinya, Kagerankanda, Murufiti) Multiple sites	Longitudinal Monitoring (4) Resistance Monitoring (3)	PMI
Mwanza	1 (Ukerewe) 4 (Misungi, Magu, Sengerema, Buchosa)	1 (Bukongo) Multiple sites	Longitudinal Monitoring (1) Resistance Monitoring (4)	PMI
Mara	1 (Bunda DC)	1 (Bwanza)	Longitudinal Monitoring (1)	PMI
Dar es Salaam	1 (Kinondoni)	Multiple sites	Resistance Monitoring (1)	PMI
Katavi	1 (Mpanda)	Multiple sites	Resistance Monitoring (1)	PMI
Lindi	1 (Ruangwa)	Multiple sites	Resistance Monitoring (1)	PMI
Pwani	1 (Bagamoyo)	Multiple sites	Resistance Monitoring (1)	PMI
Tabora	1 (Nzega)	Multiple sites	Resistance Monitoring (1)	PMI
Morogoro	1 (Kilombero DC)	Multiple sites	Resistance Monitoring (1)	PMI
Mbeya	1 (Kyela)	Multiple sites	Resistance Monitoring (1)	PMI
Ruvuma	1 (Nyasa)	Multiple sites	Resistance Monitoring (1)	PMI

Note: Larvae collected from multiple sites/villages for insecticide resistance testing.

A total of 39,686 female *Anopheles* mosquitoes were collected from IRS sprayed and non-IRS districts. Morphological identification showed that *An. gambiae* s.l. was the most abundant vector species in all IRS districts (76.6 percent) and non-IRS districts (66.5 percent). In non-IRS districts, greater numbers of *An. funestus* s.l. (29.3 percent) were collected than in IRS districts (15.2 percent), and it was the second most abundant vector collected. In the two non-IRS districts (Geita DC and Kasulu TC), *An. funestus* s.l. was the most abundant vector. Other *Anopheles* collected included *An. coustani*, *An. pharoensis,* and *An. rufipes*.

64.5 percent of *Anopheles* collected were randomly selected across the collection methods and analyzed by molecular methods for species identification and 68.4 percent were tested for presence of sporozoites. All mosquitoes from the CDC light trap with bottle rotators as human collection proxy were tested for sporozoites as part of a systematic evaluation of transmission and effects of IRS and was used to calculate the entomological inoculation rate (EIR). In this subsample, *An. funestus* s.s. (40.9 percent) was a predominant species found, followed by *An. arabiensis* (37.6 percent), *An. gambiae* (15.6 percent), and *An. parensis* (1.1 percent). The sporozoite rate was statistically higher in the non-IRS sites (1.8 percent) than the IRS sites (0.9 percent). At the species level *An. funestus* s.s. had the highest sporozoite rate (2.1 percent), followed by *An. gambiae* s.s. (1.3 percent), and *An. arabiensis* (0.9 percent).

A total of 707 samples with signs of blood meal were analyzed for blood meal source (human, bovine, goat, and dog). Although 32.2 percent (128/398) of *An. arabiensis* fed on humans only, 62.1 percent showed opportunistic behavior, feeding both on humans and animals. In contrast, 65.7 percent of *An. funestus* s.s. fed on humans only and 12.9 percent were feeding on humans and animals.

In both pre-IRS and non-IRS sites, both *An. gambiae* s.l. and *An. funestus* s.l. indoor biting rates were higher than outdoor biting. In all IRS sentinel sites, indoor biting decreased post-IRS except in Kasulu DC, where there was a slight surge of *An. gambiae* s.l. biting indoors. Mean bites per person per hour were below 0.2 after IRS in contrast to the non-IRS sites or pre-IRS.

IRS with both clothianidin and pirimiphos-methyl appears to have been effective in decreasing vector density and significantly lowering sporozoite rates in sprayed districts compared to non-sprayed districts. In addition, the parity rate in non-IRS sites was 15.8 percent. In IRS sites, parity rates decreased from 20 percent to 1.2 percent post-IRS.

Table A-2. Distribution and bionomics of malaria vectors of IRS and non-IRS sites

Site/ District	Vector*	Season (month)	Preferred Biting Location (Indoor/Outdoor Biting Rate)	Peak Biting Time	Preferred Resting Location**	Preferred Host	Annual EIR
Kalebezo/ Biharamulo (IRS site)	*An. gambiae* s.l. *An. funestus* s.l.	*An. gambiae* s.l. (Jan) *An. funestus* s.l. (Apr–May)	*An. gambiae* s.l. (1.7/0.4) *An. funestus* s.l. (3.4/2.1)	*An. gambiae* s.l. (I=7 p.m.–10 p.m.) (O=1 a.m.–2 a.m.) *An. funestus* s.l. (I=10 p.m.–11 p.m.) (O=9 p.m.–10 p.m.)	*An. gambiae* s.l. (I) *An. funestus* s.l. (I)	Undetermined	1.9
Bukongo/ Ukerewe (IRS site)	*An. gambiae* s.l.	*An. gambiae* s.l. (Nov–Dec)	*An. gambiae* s.l. (2.8/0.1) *An. funestus*	*An. gambiae* s.l. (I=10 p.m.–11 p.m.) (O=5	*An. gambiae* s.l. (I) *An. funestus*	*An. gambiae* s.l. (Mixed)	0.1

Site/ District	Vector*	Season (month)	Preferred Biting Location (Indoor/Outdoor Biting Rate)	Peak Biting Time	Preferred Resting Location**	Preferred Host	Annual EIR
	An. funestus s.l.	*An. funestus* s.l. (Dec)	s.l. (0.02-0)	**a.m.–6 a.m.)** *An. funestus* s.l. (I=10 p.m.–11 p.m., midnight–1 a.m.) (O=Undetermined)	s.l. (O)		
Lyambamgongo/Bukombe (IRS site)	***An. gambiae* s.l.** *An. funestus* s.l.	***An. gambiae* s.l. (Jan–Feb)** *An. funestus* s.l. (Jun)	***An. gambiae* s.l. (6.9/5.1)** *An. funestus* s.l. (0.4/0.4))	***An. gambiae* s.l. (I=midnight–1 a.m.) (O=midnight–1 a.m.)** *An. funestus* s.l. (I=midnight–1 a.m.) (O=10 p.m.-11 p.m.)	***An. gambiae* s.l. (O)** *An. funestus* s.l. (O)	***An. gambiae* s.l. (Human, Mixed)** *An. funestus* s.l. (Human, Mixed)	1.9
Kagera Nkanda/ Kasulu DC (IRS site)	***An. gambiae* s.l.** *An. funestus* s.l.	***An. gambiae* s.l. (Mar, May)** *An. funestus* s.l. (May)	***An. gambiae* s.l. (0.8/0.3)** *An. funestus* s.l. (0.1/0.2)	***An. gambiae* s.l. (I=6 p.m.–7 p.m.) (O=1 a.m.–2 a.m.)** *An. funestus* s.l. (I=6 p.m.–7 p.m.) (O=6 p.m.–7 p.m.)	***An. gambiae* s.l. (I)** *An. funestus* s.l. (I)	Undetermined	0
Minyinya/ Kibondo (IRS site)	***An. gambiae* s.l.** *An. funestus* s.l.	***An. gambiae* s.l. (Jan–Feb)** *An. funestus* s.l. (Jan–Feb)	***An. gambiae* s.l. (0.4/0.3)** *An. funestus* s.l. (0.2/0.1)	***An. gambiae* s.l. (I=9 p.m.–10 p.m. (O=midnight–1 a.m.)** *An. funestus* s.l. (I=10 p.m.–11	***An. gambiae* s.l. (I)** *An. funestus* s.l. (O)	***An. gambiae* s.l. (Human, Mixed)** *An. funestus* s.l. (Human)	0.1

Site/ District	Vector*	Season (month)	Preferred Biting Location (Indoor/Outdoor Biting Rate)	Peak Biting Time	Preferred Resting Location**	Preferred Host	Annual EIR
				p.m.) (O=9 p.m.–10 p.m.)			
Itumbiko/ Kakongo (IRS site)	***An. gambiae* s.l.** *An. funestus* s.l.	***An. gambiae* s.l. (Dec–Jan)** *An. funestus* s.l. (Mar, Jun)	***An. gambiae* s.l. (4.6/3.1)** *An. funestus* s.l. (0.9/0.9)	***An. gambiae* s.l. (I=11 p.m.–midnight) (O=6 p.m.–7 p.m.)** *An. funestus* s.l. (I=10 p.m.-11 p.m., midnight–1 a.m.) (O=Undetermined)	***An. gambiae* s.l. (I)** *An. funestus* s.l. (O)	***An. gambiae* s.l. (Human, Mixed)** *An. funestus* s.l. (Human, Mixed)	0.8
Bwanza/ Bunda DC (Non-IRS site)	***An. gambiae* s.l.** *An. funestus* s.l.	***An. gambiae* s.l. (Jan–Mar)** *An. funestus* s.l. (Jul)	***An. gambiae* s.l. (3.6/2.9)** *An. funestus* s.l. (1.2/0.9)	***An. gambiae* s.l. (I=midnight–1 a.m.) (O=midnight–1 a.m.)** *An. funestus* s.l. (I=midnight–1 a.m.) (O=10 p.m.–11 p.m.)	***An. gambiae* s.l. (O)** *An. funestus* s.l. (O)	***An. gambiae* s.l.** (Human. Animal) *An. funestus* s.l. (Human)	0.5
Kakoma/ Muleba (Non-IRS site)	***An. gambiae* s.l.** *An. funestus* s.l.	***An. gambiae* s.l. (Nov-Dec)** *An. funestus* s.l. (Jan–Feb)	***An. gambiae* s.l. (9.9/4.6)** *An. funestus* s.l. (1.4/0.9)	***An. gambiae* s.l. (I=2 a.m.–3 a.m.) (O=9 p.m.-10 p.m.)** *An. funestus* s.l. (I=6 p.m.–7 p.m.) (O=6 p.m.–7 p.m.)	***An. gambiae* s.l. (I)** *An. funestus* s.l. (I)	***An. gambiae* s.l. (N/A)** *An. funestus* s.l. (Human)	5.7

Site/ District	Vector*	Season (month)	Preferred Biting Location (Indoor/Outdoor Biting Rate)	Peak Biting Time	Preferred Resting Location**	Preferred Host	Annual EIR
Chikobe/ Geita DC (Non-IRS site)	***An. funestus* s.l.** *An. gambiae* s.l.	***An. funestus* s.l. (Jan-Mar)** *An. gambiae* s.l. (May–Jul)	***An. funestus* s.l. (1.8/1.1)** *An. gambiae* s.l. (0.4/0.3)	***An. funestus* s.l. (I=11 p.m.–midnight) (O=11 p.m.–midnight)** *An. gambiae* s.l. (I=midnight–3 a.m.) (O= 11 p.m.–midnight)	***An. funestus* sl. (I)** *An. gambiae* s.l. (I)	***An. funestus* s.l. (Human, Mixed)** *An. gambiae* s.l. (Human, Mixed)	1.7
Murufiti/ Kasulu TC (Non-IRS site)	***An. funestus* s.l.** *An. gambiae* s.l.	***An. funestus* s.l. (Jan)** *An. gambiae* s.l. (Feb–May)	***An. funestus* s.l. (4.9/1.8)** *An. gambiae* s.l. (3.1/1.4)	***An. funestus* s.l. (I=10 p.m.–11 p.m.) (O=11 p.m.–midnight)** *An. gambiae* s.l. (I=11 p.m.–12 a.m.) (O=1 a.m.–2 a.m.)	***An. funestus* s.l. (I)** *An. gambiae* s.l. (I)	***An. funestus* s.l. (Human, Mixed)** *An. gambiae* s.l. (Human, Mixed)	2.3

*Primary vector listed first, in bold, followed by secondary vectors.

** Marked as N/A if simultaneous indoor and outdoor collections are not conducted.

Note: Annual entomological inoculation rate (EIR) was not calculated because a sub-sample of randomly selected mosquitoes from all collection methods were tested.

Undetermined: Mosquito collection too low to reach any conclusions.

Mixed: Blood meal composed of human/animal or animal/animal blood.

I = Indoor, O = Outdoor

Key Question 2

What is the current insecticide resistance profile of the primary malaria vectors?

Figure A-2. Map of the distribution of 22 sentinel districts for insecticide resistance monitoring in Mainland Tanzania in 2020

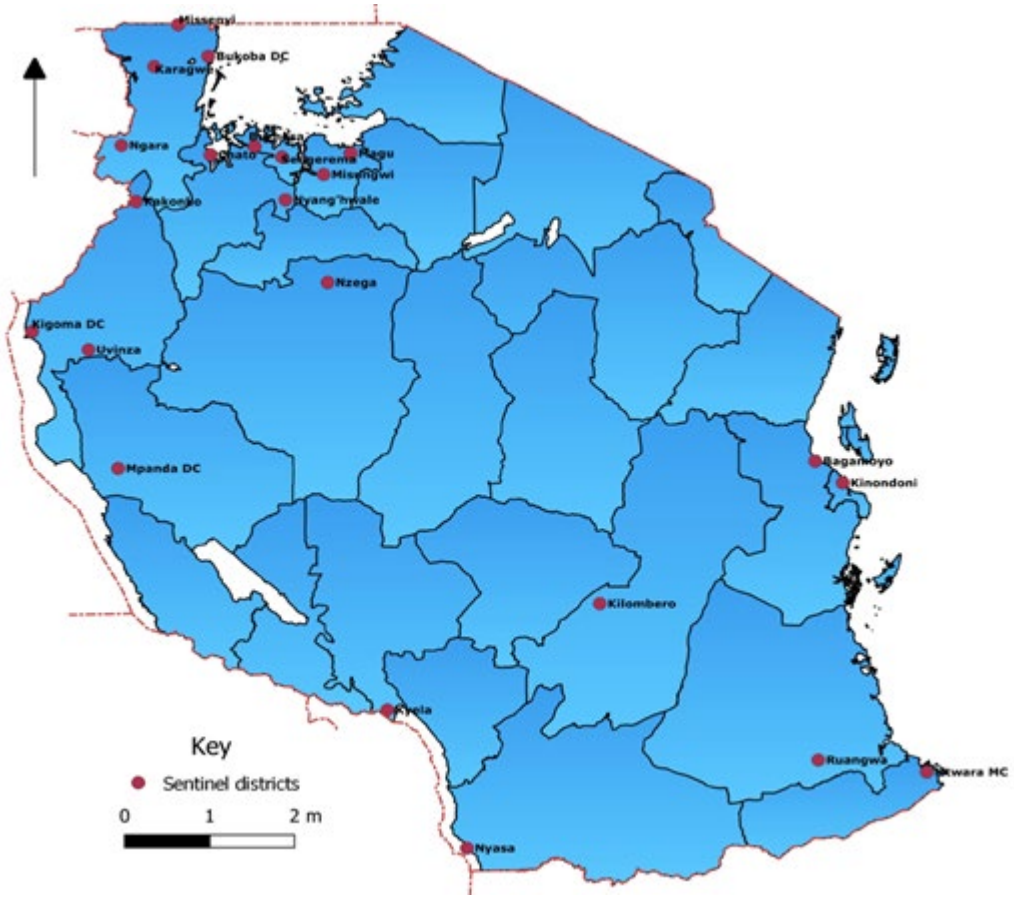


Figure A-3. Insecticide resistance from WHO insecticide resistance of adult *An. gambiae* s.l. from larval collections to a range of insecticides at respective diagnostic concentrations

Districts	Permethrin (% Mortality)	Deltamethrin (% Mortality)	Bendiocarb (% Mortality)	Pirimiphos-methyl (% Mortality)
Bagamoyo	31	16	75	95
Buchosa	37	74	100	82
Bukoba DC	32	56	93	100
Chato	40	56	100	100
Kakonko	50	33	100	100
Karagwe	58	55	100	96
Kigoma DC	35	20	98	100
Kilombero	95	90	100	100
Kinondoni	8	12	75	71
Kyela	90	82	98	80
Magu	40	39	93	96
Missenyi	23	19	100	65
Misungwi	95	96	99	88
Mpanda DC	75	95	100	100
Mtwara DC	100	100	100	100
Ngara	76	98	100	31
Nyang'hwale	21	23	100	97
Nyasa	70	90	100	100
Nzega DC	48	66	76	73
Ruangwa	11	3	100	100
Sengerema	30	70	100	98
Uvinza	78	91	100	100

Notes:

98–100%	= Susceptible	97–90%	= Suspected resistance	<90%	= Confirmed resistance

Figure A-4. Intensity of insecticide resistance of wild adult *An. gambiae* s.l. to 1x, 5x, and 10x of the diagnostic concentration of permethrin in five sentinel districts

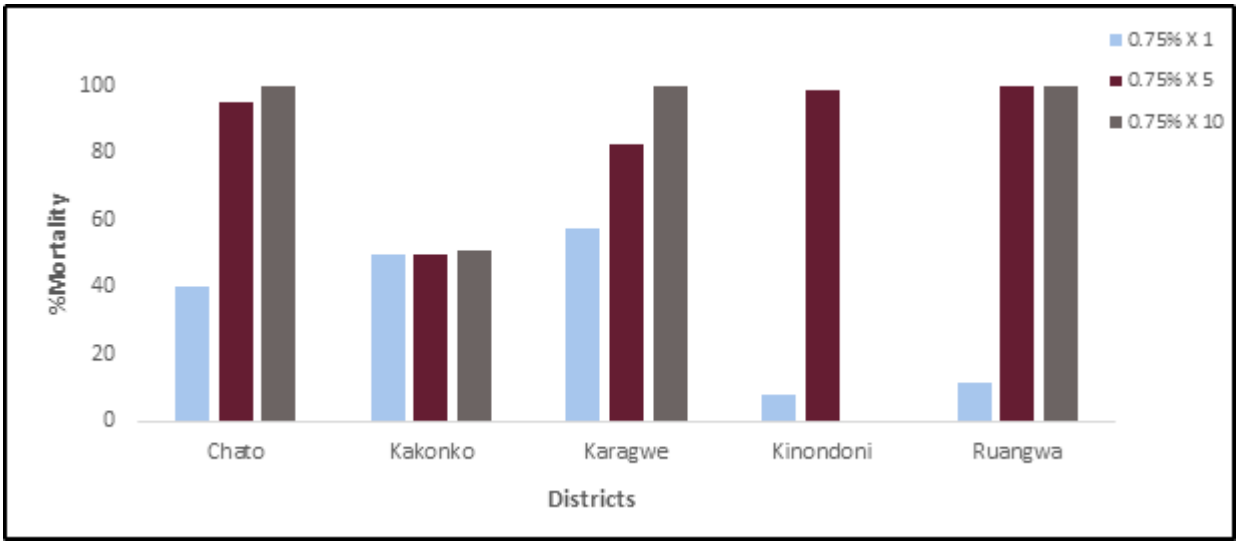
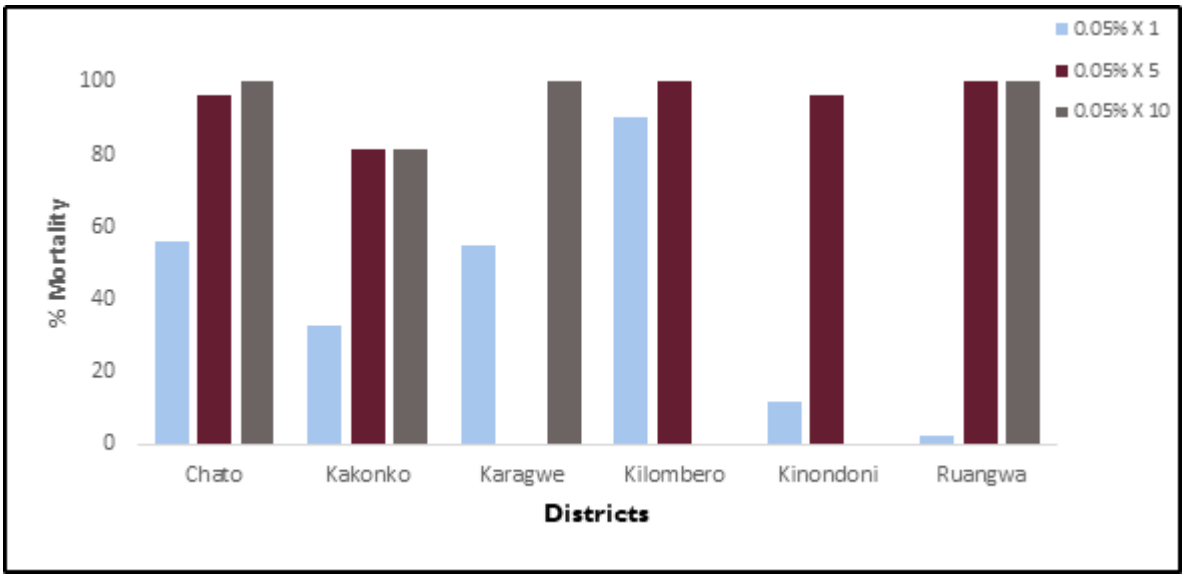


Figure A-5. Intensity of insecticide resistance of wild adult *An. gambiae* s.l. 1x, 5x, and 10x of the diagnostic concentration of deltamethrin in six sentinel districts



PMI supported insecticide resistance monitoring in 13 regions in 22 sentinel districts across Mainland Tanzania (Figures A-12 and A-13). Site selection was based on the WHO recommended criteria with priority given to areas of high malaria prevalence, evidence of insecticide resistance in previous surveys, areas with IRS in the Lake Zone, and districts bordering other countries with known insecticide resistance. As the areas covered by IRS in the Lake Zone have shifted over the years to focus on high malaria burden areas, so have some of the insecticide resistance testing sites. The selection of districts for resistance intensity testing was based on the high level of permethrin and deltamethrin resistance found during previous insecticide resistance monitoring. Insecticide resistance tested was carried out using the WHO susceptibility assay on *An. gambiae* s.l. adults from larval

collections. Following WHO resistance assay guidelines, mortalities between 98 percent and 100 percent indicate that mosquitoes are susceptible, mortalities between 90 percent and 97 percent indicate possible resistance, while anything below 90 percent mortality indicates resistance.

Anopheles gambiae s.l. shows widespread resistance to permethrin and deltamethrin in 22 sentinel sites distributed across the country (Figures A-4 and A-5). *Anopheles gambiae* s.l. were resistant to pirimiphos-methyl in seven sites. Three of the 22 sites showed resistance to bendiocarb. *Anopheles gambiae* s.l. were fully susceptible to clothianidin in six of the seven sentinel districts, with reduced and/or suspected resistance in Nyang'hwale (mortality rate of 97.5 percent).

Because permethrin and deltamethrin are main insecticides in the ITNs in Tanzania's bed net program, intensity of resistance testing using 5x and 10x the discriminating concentrations were carried out in six districts that had previously shown high resistance to these two insecticides. Permethrin intensity assays were carried out in Chato, Kakonko, Karagwe, Kinondoni, and Ruangwa (Figures A-4 and A-5). Deltamethrin intensity assays were carried out in six districts, five of which were the same districts as permethrin and the sixth in Kilombero. In Kanonko, *An. gambiae* s.l. were highly resistant to permethrin (mortality rate <50 percent) at 10x the diagnostic concentration and to deltamethrin 10x (mortality rate <80 percent). In Karagwe there was reduced mortality (<90 percent) to permethrin 5x the diagnostic concentration. Pre-exposing the mosquitoes to PBO synergist restored the susceptibility in all the test sites (Chato, Kakonko, Karagwe, Kinondoni, and Ruangwa) for both permethrin and deltamethrin. This suggests that insecticide resistance in *An. gambiae* population is mainly mediated by oxidase-based metabolic resistance, possibility with minor contribution from other mechanisms such as *kdr* mutations. Molecular identification of the *Anopheles gambiae* s.l. indicated that *An. arabiensis* (85 percent) was the dominant species, followed by *An. gambiae s.s.* (10 percent), and *An. quadriannulatus* (5 percent). As new insecticides (e.g., chlorfenapyr) are approved for malaria control either for IRS or ITN, insecticide resistance testing will be expanded to include these insecticides.

Conclusions for Entomological Monitoring Investments

As the areas covered by IRS in the Lake Zone have shifted over the years to focus on high malaria burden areas, so will the longitudinal entomological monitoring and insecticide resistance testing sites. The results show that the IRS is working in controlling malaria in the lake zone of Tanzania mainland. Assessment of vector biting showed that there is considerable outdoor biting risk from *An. arabiensis* and *An. funestus* s.s. from IRS and non-IRS areas. With permethrin and deltamethrin resistance in almost all sentinel districts, and the increasing resistance to pirimiphos-methyl, the plans are for two-year rotations of insecticides. With increasing resistance intensity and data indicating the restoration of insecticide efficacy with PBO, the expansion of ITN+PBO net implementation is recommended.

Please see FY 2022 PMI budget tables for a detailed list of proposed activities with FY 2022 funding.

1.2. INSECTICIDE-TREATED NETS (ITNs)

Key Goal

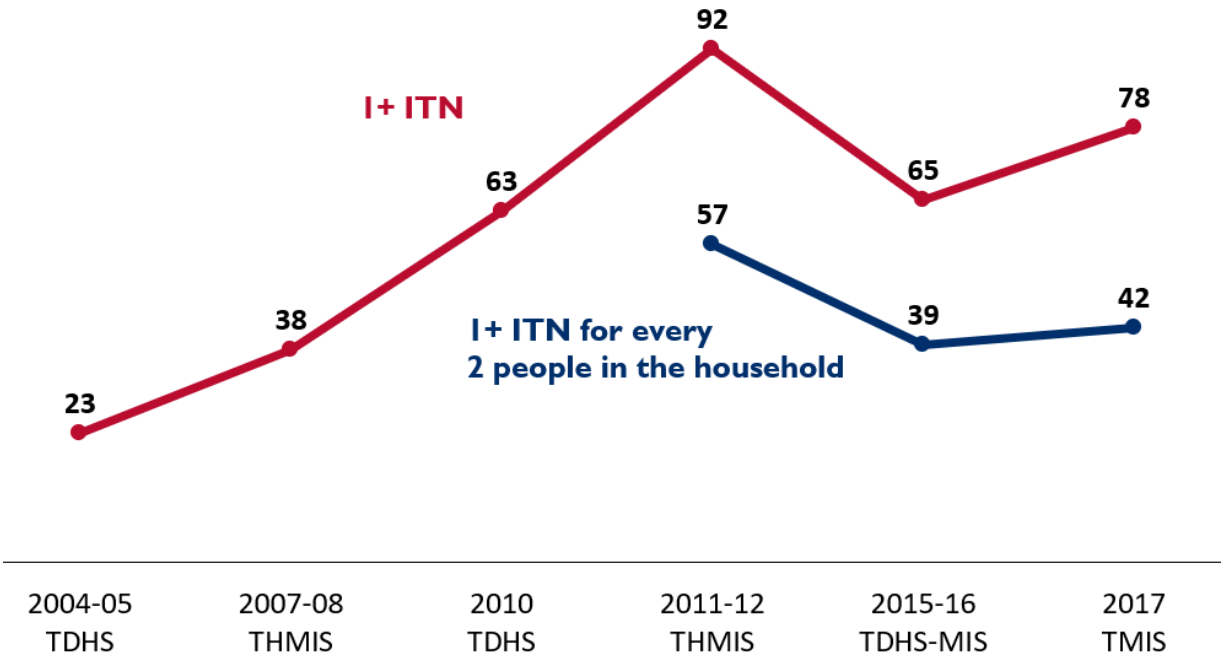
Achieve high ITN coverage and use targets with effective nets, based on insecticide resistance data, in PMI-supported areas; and maintain high coverage and use with consistent ITN distribution (via campaigns and/or continuous channels).

Key Question 1

How has net ownership evolved since the start of PMI in the country?

Figure A-6 Trends in ITN ownership

Line graph shows households owning at least one ITN increased from 65 percent in 2015–2016 DHS-MIS to 78 in the 2017 MIS. Full household ITN coverage, as measured by the percent of households with at least one ITN for every two people in the household, increased from 39 percent in 2015–2016 DHS-MIS to 42 percent in 2017 MIS.



ITN ownership has steadily increased in Tanzania since it became a PMI-focus country, reaching a peak of 92 percent of households with at least one ITN in 2011–2012. It should be noted that the 2015–2016 DHS-MIS was conducted before completion of a mass distribution campaign, which likely contributed to the observed decrease. Continued high levels of coverage point to the effectiveness of the School Net Program.

Key Question 2a

What proportion of the population has access to an ITN? Of those who have access, what proportion of the population reports using an ITN?

Figure A-7. Trends in ITN access and use

The line graph below shows that population access to an ITN increased from 56 percent in the 2015–2016 DHS-MIS to 63 percent in the 2017 MIS. Use of ITNs among the household population with access to an ITN increased from 49 percent in the 2015–2016 DHS-MIS to 52 percent in the 2017 MIS.

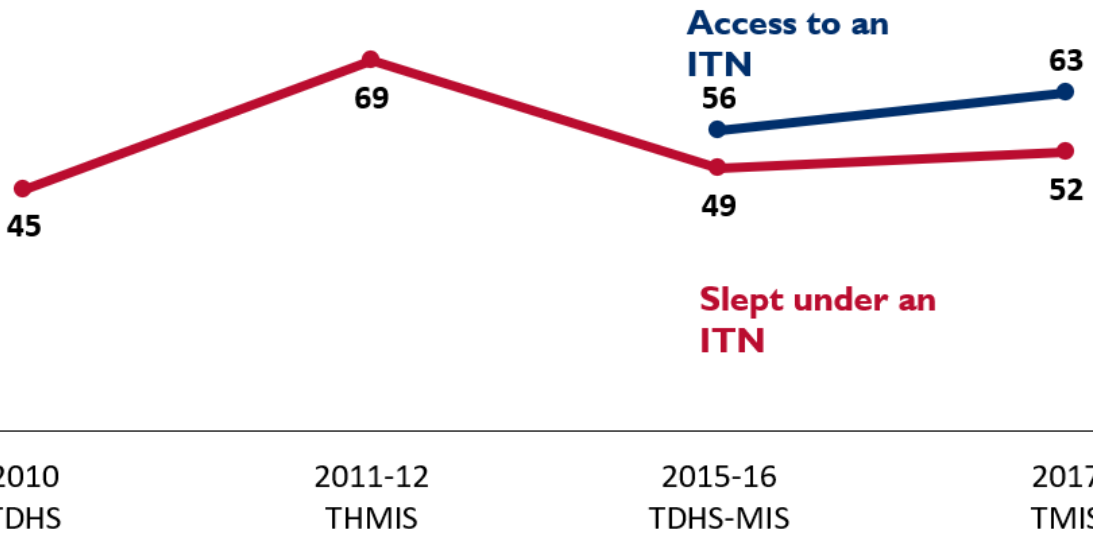
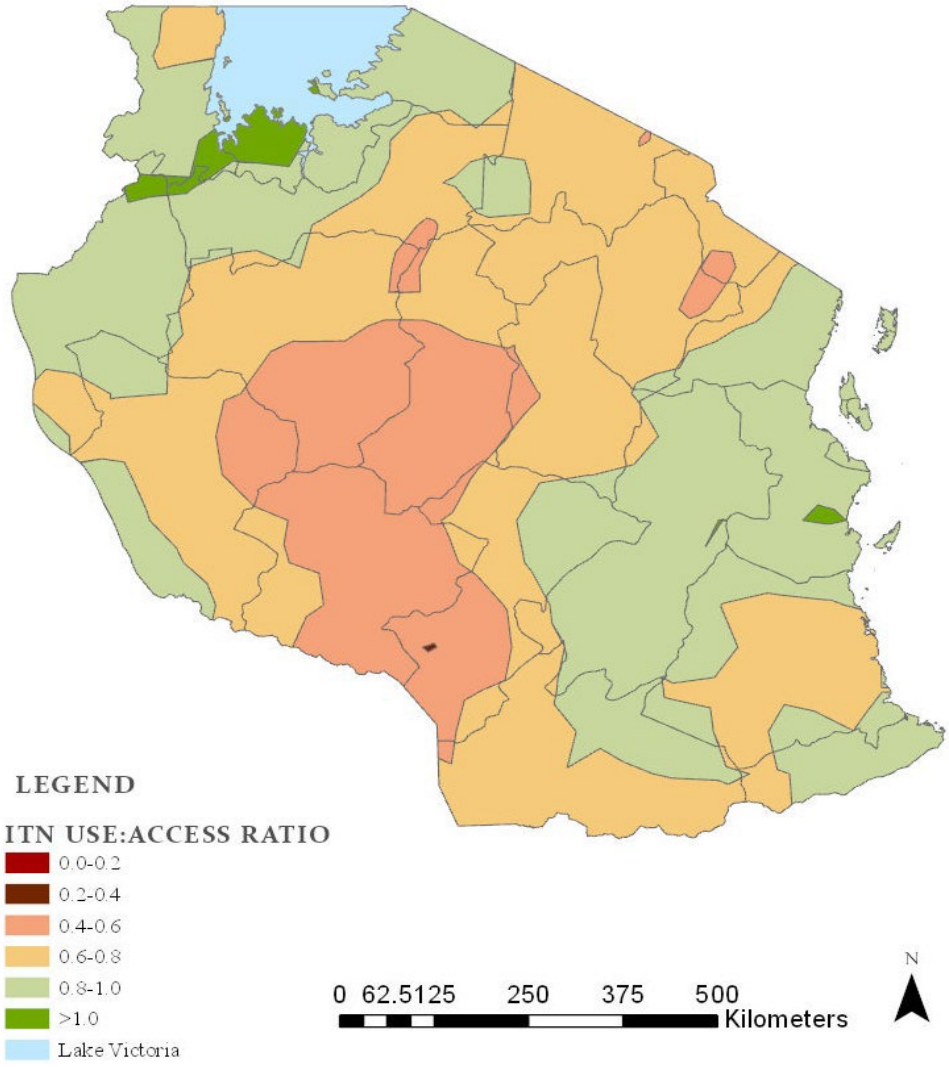


Figure A-8. Tanzania ITN use:access ratio



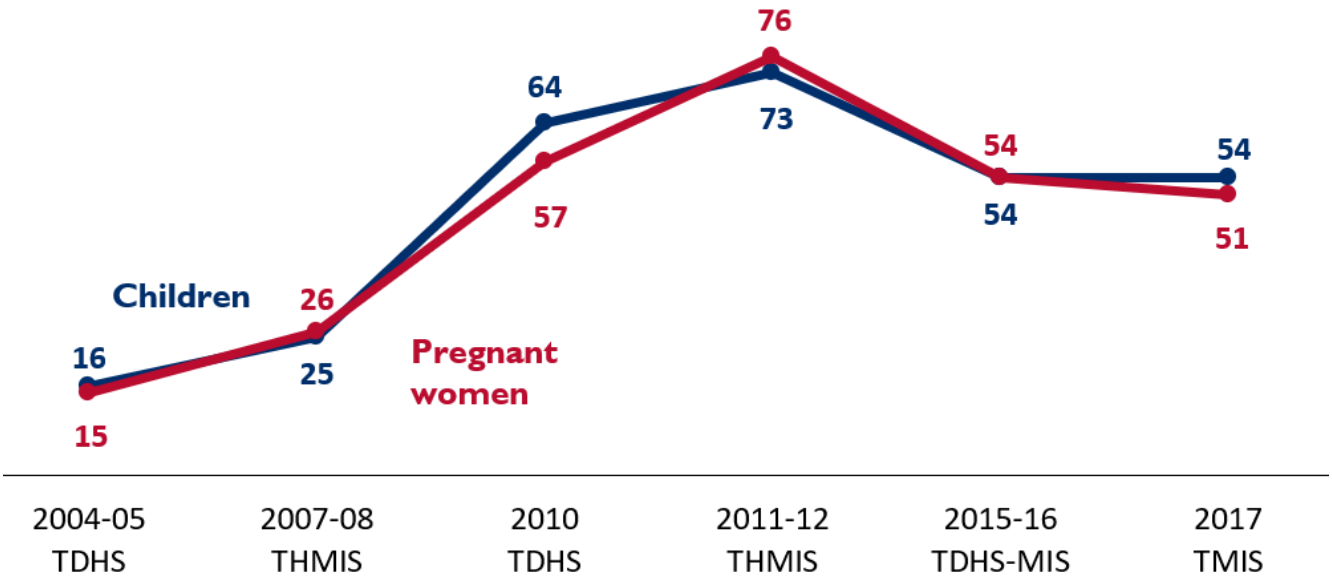
This map (Figure A-8) indicates a strong culture of net use, with the exception of some lower use to access ratios in higher altitude areas. Efforts to extend access should be maintained, as should SBC efforts designed to maintain high levels of year-round ITN use and promote net care.

Key Question 2b

What percent of pregnant women and children under five years of age report sleeping under an ITN?

Figure A-9. Trends in ITN use among children and pregnant women

Children under five years of age and pregnant women 15 to 49 years of age who slept under an ITN the night before the survey. Line graph shows that ITN use among children is 54 percent, the same trend in the 2015–2016 DHS-MIS and 2017 MIS. ITN use among pregnant women has declined from 54 percent in the 2015–2016 DHS-MIS to 51 percent in the 2017 MIS.



Use of ITNs by children and pregnant women follows the same trends as ITN use by the general household population, with the latest estimates showing very similar percentages of use among all household members, children under five years of age, and pregnant women. Recent data from the 2020 sentinel survey indicates the positive trends in proportionality of pregnant women who slept under an ITN the night before the survey from 82.5 percent in 2019 to 93 percent in 2020. This indicates both success in net access and SBC efforts to encourage net use by the entire population, as well as opportunities to better target messaging to ensure that vulnerable groups like pregnant women and children utilize ITNs.

Key Question 3

If ITN access is high but use is low, what significant structural and/or behavioral challenges affect the adoption and maintenance of ITN use and care behaviors?

Supporting Data

Please refer to Section 3.4 for information on how SBC interventions will be directed to address the challenges identified above.

Table A-3. Key facilitators and barriers of ITN use

Facilitator	Type of Factor	Data Source	Evidence
Positive attitudes toward ITN	Internal	USAID Tulonge Afya Annual Sentinel Survey 2019, 2020	Sentinel survey of 2020 indicates that 64% of pregnant women have positive attitudes toward ITN use compared with 60% in 2019. In the same survey, the positive trends have been observed in proportion of pregnant women who slept under ITN last night before the survey from 82.5% in 2019 to 93% in 2020.
Positive attitudes toward malaria and malaria treatment	Internal	Tanzania MIS 2017	92% of women reported a positive attitude toward malaria and malaria treatment.
High levels of knowledge about malaria prevention	Internal	Tanzania MIS 2017	87% of women knew that there is a way to avoid malaria and of those 98% mentioned ITNs.
Barrier	**Type of Factor**	**Data Source**	**Evidence**
Risk perception	Internal	USAID Tulonge Afya Annual Sentinel Survey 2020	Only 52% of pregnant women and their partners believe there is a heightened risk of malaria in pregnancy.
Low malaria risk perception	Internal	Tanzania MIS 2017	Only 57% of women believe malaria is the most serious health problem in their community.
Low rate of ITN ownership	Environmental	Tanzania MIS 2017	Only 45% of households own at least one ITN for every two persons in the household.
Belief that IRS/ITNs cause an increase in bed bugs	Internal	Tulonge Afya Insight Summary Report	Most participants of a focus group discussion said that using ITN causes agitation of/increase in bed bugs.

Data from the THMIS 2017 indicate that despite the fact that positive attitudes toward malaria and malaria treatment is high and knowledge about malaria prevention is high, there is low individual risk perception, some lingering negative beliefs about ITNs, and low ITN access. While attitude and knowledge are important, other determinants are also critical to ensuring adoption of desired behaviors. Recent data from the 2020 Sentinel Survey indicate that a positive attitude toward ITN is the key determinant to net use. The same data also propose that raising malaria risk perception should be a priority to increase net use. PMI will prioritize SBC activities geared toward promoting net use and care and addressing behavioral determinants, such as risk

perception and self-efficacy. The Malaria Behavioral Survey (MBS) will provide much better data on the behavioral determinants, which will allow NMCP to refine and focus its SBC approach for net use.

Key Question 4

What type of nets are being distributed via which channels?

Supporting Data

Table A-4. Insecticide-treated net (ITN) distribution channels

Level Nationwide/Region	Mass Campaign [2020]	ANC/EPI	School	Community	Other
Standard ITN	8,733,089	3,542,991	2,429,886	N/A	N/A
PBO ITN	0	1,283,200	1,672,949	N/A	N/A

Key Question 5

What is the estimated need for ITNs during calendar years 2021–2023? How many, and what types, of ITNs will be procured, and by what partners? Through what channels will ITNs be distributed? Are there any projected ITN gaps?

Supporting Data

The ITN gap analysis table is showing surplus on the support of ITNs as per quantification. The identified surplus was due to delays on availability of ITN in CY 2020.

Table A-5. ITN Gap Analysis Table

Calendar Year	2021	2022	2023
Total country population	57,724,380	59,517,754	61,342,896
Total population at risk for malaria	54,838,161	56,541,866	58,275,751
PMI-targeted at-risk population	27,419,081	28,270,933	29,137,876
Population targeted for ITNs			
Continuous Distribution Needs			
Channel 1: ANC	2,308,975	2,380,710	2,453,716
Channel 2: EPI	2,197,870	2,267,528	2,339,550
Channel 3: School	4,697,933	4,470,497	4,339,291
Channel 4: Special group	815,324	888,097	861,997
Additional ITNs required to avoid ITN stockouts	0	0	0
Estimated Total Need for Continuous Channels	10,020,102	10,006,832	9,994,553
Mass Campaign Distribution Needs			
Mass distribution campaigns	1,018,383	1,024,146	1,027,470
Estimated Total Need for Campaigns	1,018,383	1,024,146	1,027,470
Total ITN Need: Continuous and Campaign	***11,038,485***	***11,030,978***	***11,022,023***
Partner Contributions			
ITNs carried over from previous year	1,675,560	1,639,406	1,771,056
ITNs from Government	*0*	*0*	*0*
ITNs from Global Fund	7,891,157	8,051,452	8,143,925
ITNs from other donors	0	0	0
ITNs planned with PMI funding	3,111,175	3,111,175	3,111,175
Total ITNs Contribution Per Calendar Year	***12,677,892***	***12,802,033***	***13,026,155***
Total ITN Surplus (Gap)	***1,639,406***	***1,771,056***	***2,004,133***

Key Question 6

What is the current status of durability monitoring?

Previous studies have been conducted with other funding (https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7500675/pdf/pmed.1003248.pdf) and a Global Fund study is underway. Once that is completed, NMCP, PMI and other stakeholders will discuss the findings together.

Conclusions for ITN Investments

PMI will continue to support annual rapid assessment surveys to determine ITN coverage across the 26 regions using Lot Quality Assurance Survey and Random Digit Dialing. NetCalc, or other suitable programs, will be used to determine the ITN input required to maintain population access in the SNP regions at greater than 60 percent. PMI will support procurement and distribution of ITNs for SNP, as well as support the distribution of Global Fund-procured ITNs through other approved channels in the SNP regions. The NMCP, through its 2021–2023

Global Fund grant, will procure all ITNs needed nationally for RCH/EPI and other approved distribution and will support the Medical Stores Department (MSD) for distribution of ITNs through RCH in the 26 regions. Also NMCP is planning to introduce three other continuous distribution channels.

Using the data generated from insecticide resistance monitoring, it was concluded that there has been an exponential increase of intensity and spread of insecticide resistance among malaria vectors over time. A high level of pyrethroid resistance through metabolic resistance mechanisms, and possibly other resistance mechanisms such as target site (kdr) resistance, was observed; however, mosquitoes are still fully susceptible to both pirimiphos-methyl and clothianidin. Nine (out of 14) PMI-supported regions will deploy PBO ITNs that have shown metabolic resistance. PMI will continue to monitor the changing dynamics of mosquito species composition and insecticide resistance.

Please see FY 2022 PMI budget tables for a detailed list of proposed activities with FY 2022 funding.

1.3. INDOOR RESIDUAL SPRAYING (IRS)

Ensure high spray quality and coverage, with an appropriate insecticide, in targeted endemic PMI-supported areas, in alignment with the national insecticide resistance management strategy.

The 2019–2020 IRS districts were selected by the NMCP, in conjunction with PMI and other key malaria vector control stakeholders, such as the National Institute of Medical Research (NIMR), based on the available epidemiological and entomological data. These districts are within the Lake Zone region of Tanzania, which has among the highest prevalence of malaria in the Mainland. The same districts have been selected for IRS in 2020–2021 and 2021–2022.

Key Question 2

In PMI-supported areas, what spray coverage rates have been achieved in the past three years and what are the plans for 2021?

Supporting Data

Table A-6. IRS coverage

Calendar Year	Districts Sprayed (#)	Districts	Structures Sprayed (#)	Coverage Rate (%)	Population Protected (#)
2018	9	Bukoba Rural, Ngara, Missenyi, Chato, Nyang'hwale, Butiama	677,147	96%	2,506,212
2019	7	Ngara, Missenyi, Bukoba Rural, Chato, Nyang'hwale, Kakonko, Buchosa	501,584	96%	1,926,767
2020	6	Bukombe, Biharamulo, Kakonko, Kasulu Rural, Kibondo, Ukerewe	471,622	93.7%	1,915,151
2021*	6	Bukombe, Biharamulo, Kakonko, Kasulu Rural, Kibondo, Ukerewe	519,408	TBD	2,031,407

*Denotes targets for current year.

Over the previous five years, IRS coverage has been maintained over 90 percent.

Key Question 3

What is the residual efficacy of the insecticides used for IRS in PMI-supported areas?

Supporting Data

Residual efficacy testing to monitor IRS effectiveness was carried out immediately after post-IRS application of clothianidin and pirimiphos-methyl, between October and November 2019, and thereafter on a monthly basis until the effectiveness was <80 percent. The monitoring was carried out in three districts for clothianidin (Biharamulo, Bukombe, and Ukerewe) and in three districts for pirimiphos-methyl (Kakonko, Kasulu, and Kibondo) using WHO cone wall bioassay tests (Table A-7). Clothianidin is a slow-acting insecticide formulation, therefore the WHO protocol for cone bioassays was modified so that mortality was recorded every 24 hours for six consecutive days after insecticide exposure, with the exposure time remaining at 30 minutes. A susceptible colony of *An. gambiae* s.s. (Kisumu strain) from the insectary at NIMR-Mwanza was used for monitoring the insecticide efficacy on five types of wall surfaces (mud, cement, painted, whitewash, and burnt brick). The results show that the insecticide application was of high quality at all sites, as the assays conducted immediately post-IRS indicated 100 percent mortality. Clothianidin maintained a >80 percent mortality for 11 months on all wall surfaces for Biharamulo and six months for Bukombe and Ukerewe. The reduced monitoring in Bukombe and Ukerewe was due to COVID-19 disruptions to IRS implementation in these districts. Actellic remained efficacious for all wall types for seven to eight months post-IRS for certain wall types.

Table A-7. IRS Insecticide Residual Efficacy

Site/District	Year	Insecticide	Average Residual Efficacy (months)
Kalebezo/Biharamulo	2019–2020	Clothianidin	11
Lyambamgongo/Bukombe	2019–2020	Clothianidin	6
Bukongo/Ukerewe	2019–2020	Clothianidin	6
Minyinya/Kibondo	2019–2020	Pirimiphos-methyl	7
Kagerankanda/Kasulu DC	2019–2020	Pirimiphos-methyl	7
Itumbiko/Kakonko	2019–2020	Pirimiphos-methyl	7

Key Question 4

What is the insecticide rotation plan in PMI-supported areas?

Supporting Data

Table A-8. Indoor residual spraying insecticide use plan

Target Spray Area	2020	2021	2022*	2023*
Kakonko, Kasulu, Ukerewe, and Kibondo	Clothianidin	Clothianidin + deltamethrin	TBD	TBD
Biharamulo and Bukombe	Clothianidin + deltamethrin	Clothianidin	TBD	TBD

*Denotes planned insecticide classes.

PMI has started deploying PBO ITNs as part of transitioning away from IRS. Tanzania will consider deployment of two insecticides simultaneously. For instance, in the 2021–2022 IRS campaign four districts will spray using

clothianidin + deltamethrin (Kasulu, Kakonko, and Kibondo) and two districts will use clothianidin (Biharamulo and Ukerewe). The entire process is guided by PMI technical guidance and the national insecticide resistance management plan.

Conclusions for IRS Investments

Based on funding available for procurement and distribution of PBO ITNs and entomological data, PMI is planning on withdrawing IRS after successfully being able to distribute PBO ITNs through all the available channels (i.e., public schools, targeted mass campaigns, and ANC/EPI) for at least three years. These efforts will be supported by mid media, mass media and interpersonal communication activities, which leverage the community platform to increase utilization of PBO ITNs.

Please see FY 2022 PMI budget tables for a detailed list of proposed activities with FY 2022 funding.

2. HUMAN HEALTH

2.1. CASE MANAGEMENT

NMCP Objective

The case management goal of the NMSP 2021–2025 is to prevent the occurrence of mortality related to malaria infection through universal access to appropriate diagnosis and treatment and targeted provision of preventive therapies for vulnerable groups. The national targets are to increase to 85 percent the proportion of people with suspected malaria who receive appropriate diagnosis and treatment, and who receive appropriate management of both uncomplicated and severe malaria according to the National Guidelines for Malaria Diagnosis, Treatment, and Preventive Therapies 2020.

NMCP Approach

The National Guidelines for Malaria Diagnosis, Treatment, and Preventive Therapies 2020 calls for parasitological confirmation by microscopy or mRDT for all patients with suspected malaria before initiation of treatment. Malaria diagnostic and treatment services are offered by 6,990 public, 359 faith-based organizations, and 872 private health facilities, while an additional 8,000 pharmaceutical outlets offer malaria treatment options. Preventive therapies for pregnant women are delivered in over 7,000 reproductive, child health clinics (see Malaria in Pregnancy section).

The estimate for reliance on the private sector in mainland Tanzania is that approximately 40 percent of patients with fever seek treatment at private health facilities. Microscopic examination of Giemsa-stained blood films remains an important component of malaria diagnosis throughout Tanzania, but in the public sector is only available at regional and district hospitals and some health centers (about 20 percent of all health facilities), whereas about 70 percent of malaria cases in the private sector are confirmed via blood smears. Within the Dar es Salaam region, however, over 50 percent of malaria cases are diagnosed by microscopy in public facilities. HMIS data show that on average in 2020, 93 percent of malaria cases were confirmed by mRDT, 6 percent by microscopy, and 1 percent were unconfirmed in outpatient departments (OPDs). In the inpatient departments in

2020, 98 percent of malaria cases were confirmed by mRDT or microscopy, while 2 percent were unconfirmed. The rate of unconfirmed cases has been steadily declining from 36 percent in 2014 to 1 percent in 2020.

A national malaria microscopy quality assurance and quality control (mMQA/QC) was established in 2017 following the completion of the slide bank at the Malaria Reference Laboratory within the National Health Laboratory and Quality Assurance Training Center (NHLQATC). The mMQA/QC system includes monthly blinded cross-checking of blood slides by a district supervisor and periodic external QA via blinded positive and negative samples sent from the slide bank. District supervisors also monitor the mMQA/QC process and conduct mRDT QC at the health facility level through Malaria Services and Data Quality Improvement (MSDQI) supportive supervision, which is designed to improve microscopy and mRDT diagnostic quality via routine monitoring and training by district and regional supervisors and mentorship. Lot- testing of mRDT kits is coordinated by the NMCP using a WHO protocol and random samples are sent to the NHLQATC, and WHO-identified, qualified laboratories in Cambodia or the Philippines.

The use of ACTs in mainland Tanzania began in 2006 with artemether-lumefantrine (AL) as the first-line drug for the treatment of uncomplicated malaria. In 2013, the NMCP revised the National Diagnostic and Treatment guidelines to include injectable artesunate for the treatment of severe malaria. The current guidelines call for referral of patients with severe malaria from lower-level facilities to the nearest health center with the capability of administering intravenous artesunate after first giving the patient an intramuscular injection of artesunate. Intramuscular artemether can be used as second-line drugs if artesunate is not available. Use of pre-referral rectal artesunate at lower-level facilities is also permitted if injection is not available, yet in practice this does not occur because rectal artesunate is not procured by either the GOT or its partners.

To monitor and improve the quality of malaria-specific case management, MSDQI supervisors from the regional/council health management teams use the comprehensive electronic MSDQI checklists through tablet devices to evaluate and provide immediate onsite feedback and mentorship on case management issues to HCWs. Health facilities are evaluated at each department through seven MSDQI modules. Scoring is automated and provided to supervisors, facility managers and HCWs at the time of the evaluation. Data is also uploaded and displayed on the NMCP malaria dashboard in DHIS2. NMCP conducts regular zonal and regional data feedback meetings to prioritize interventions using MSDQI data.

The NMCP has participated in renewed efforts by the Ministry of Health, Community Development, Gender, Elderly, and Children (MOHCDGEC) in the development of the National Community-Based Health Program to further expand health services using Community Health Workers (CHWs). However, the guidelines do not permit CHWs to perform mRDTs or provide first-line antimalarials to confirmed or suspected cases in the community. MOHCDGEC is currently designing a new policy to guide the use of CHWs; the timeline for release of this policy is not yet known. The NMCP included a proposal within its 2021–2023 Global Fund grant to implement malaria community case management in five priority regions based on the following criteria: malaria transmission using prevalence estimates from the 2019 School Malaria Parasitological Survey, access to health facilities based on walking distance/ time, and population served per health facility. The top five priority regions were Katavi, Kagera, Geita, Kigoma, and Ruvuma. Currently, only Katavi is a PMI-supported region among these five. The proposal was approved by the Global Fund and implementation will begin through a district-level approach before the end of CY 2021 led by NMCP through this funding source.

NMCP works with both the public and private sector to promote universal access to mRDTs and ACTs. Through the support of the Global Fund and first-line buyers, the availability of quality, affordable ACT is facilitated in the private sector via a copay mechanism. NMCP's strategies, though not currently approved by MOHCDGEC, include expansion of mRDT diagnostic services to Accredited Drug Dispensing Outlet (ADDOs), of which there are over 6,000 in mainland Tanzania. The majority are located in rural areas where access to malaria commodities and testing services is limited. However, despite a pilot program that demonstrated the feasibility of mRDT introduction to ADDOs and consensus between the MOHCDGEC and various development and implementing partners that the program should be scaled up, the relevant regulatory bodies have not yet approved the introduction of mRDT.

PMI Objective in Support of NMCP

PMI supports NMCP's approach to quality case management, including accurate and timely diagnosis and treatment, through the provision of services at public health facilities and the community in high malaria burden regions. See the detailed description of planned activities below.

PMI-Supported Recent Progress (FY 2020)

In the 11 PMI supported regions in fiscal year 2020, MSDQI supportive supervision visits were conducted in 1,491 (85 percent) facilities across seven regions (51 councils) of the Lake and Western zones, and 1,131 (92 percent) health facilities across four regions (32 councils) in the Southern Zone. By the end of FY 2020, PMI partners had strengthened the capacity of 2,416 HCWs in the Lake and Western zones, and 342 supervisors and 278 HCWs in the Southern Zone to provide onsite mentoring and improve case management with MSDQI. Using MSDQI data to identify and prioritize gaps in case management within PMI-supported regions in fiscal year 2020, an additional 234 laboratory technicians received training on microscopy and mRDT QC. PMI partners also conducted training for 172 HCWs on the updated ANC guidelines and for 239 volunteers to serve as community change agents. In addition, PMI partners have supported quarterly district and regional-level workshops to provide facility-level results from the MSDQI visits and share lessons learned on MSDQI implementation. PMI continued to support the microscopy external quality assurance (EQA) system using the National Malaria Slide Bank implemented by PMI in 2017 for proficiency testing of microscopists at health facilities. PMI also procured 40 new microscopes for the facilities conducting the EQA. PMI supported the implementation of malaria testing and treatment services at 223 HIV care and treatment clinics in the Lake and Western zones. Among 135,434 people living with HIV attending these clinics, 4,331 were tested by mRDT for suspected malaria infection, and of those, 681 (15.7 percent) were positive.

Recognizing the increased capacity in the implementation of MSDQI supportive supervision visits by CHMTs to monitor and sustain quality case management at health facilities, PMI transitioned the scope of support from the previous 11 regions to three regions at the end of FY 2020 to focus on high malaria burden priority regions that complement support provided by the Global Fund during the 2021–2023 grant period. The PMI-supported regions beginning in FY 2021 were Katavi, Lindi, and Mtwara.

In collaboration with the NIMR Tanga, PMI partners conducted a two-week laboratory training session to continue building in-country expertise in molecular detection of drug resistance markers. The training was facilitated by NIMR Tanga laboratory experts trained through the PMI-supported Antimalarial Resistance

Monitoring in Africa program and CDC-Atlanta laboratory experts, who facilitated virtually. Participants were technical staff from the therapeutic efficacy study (TES) collaborating institutions in Tanzania: Catholic University of Health and Allied Sciences, Kilimanjaro Christian Medical Centre, Muhimbili University of Health and Allied Sciences, Ifakara Health Institute, and NMCP.

PMI-Supported Planned Activities (FY 2021 with currently available funds)

- Provide high-quality TA to NMCP for the development of policies, strategies, and implementation plans related to case management and malaria in pregnancy (see MIP section).
- Provide diagnostic TA for the slide bank, malaria microscopy, and mRDT to NMCP.
- Strengthen case management and MIP prevention (see MIP section) by supporting the planning for MSDQI and data use generated from the MSDQI process.
    - Support NMCP in planning for MSDQI supportive supervision visits and data analysis of MSDQI across all regions of mainland Tanzania.
    - Support MSDQI implementation in three regions (Katavi, Lindi, and Mtwara), including on-the-job training during MSDQI. Implementation of MSDQI in other regions of mainland Tanzania will be funded by the Global Fund with partial support from PMI via funds allotted to the NMCP and PO-RALG for integrated supportive supervision and technical oversight.
    - Support the transition from paper to electronic MSDQI in Katavi region.
    - Provide information technology support to maintain the MSDQI electronic data system.
    - Procure computers and tablets used to implement electronic MSDQI.
- Conduct skills training for HCWs and nurses on malaria case management (including severe and uncomplicated malaria) in Katavi, Lindi, and Mtwara.
- Conduct a diagnostic capacity assessment for malaria microscopy in mainland Tanzania and the National Public Health Laboratory.
- Procure 300 non-*Plasmodium falciparum* microscopy slides for the national slide bank.
- Support microscopy training and administration of the National Competency Assessment and recertification for malaria microscopists.
- For FY 2022, PMI will procure approximately $2.5 million in ACTs and injectable artesunate (see ACT and injection artesunate gap tables).
- 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 first- and second-line ACTs.

Key Goal

Improve access to and use of timely, quality, and well-documented malaria testing and treatment by providing facility- and community-based health workers with training, supervision, and malaria commodities to provide quality, effective care.

Key Question 1a

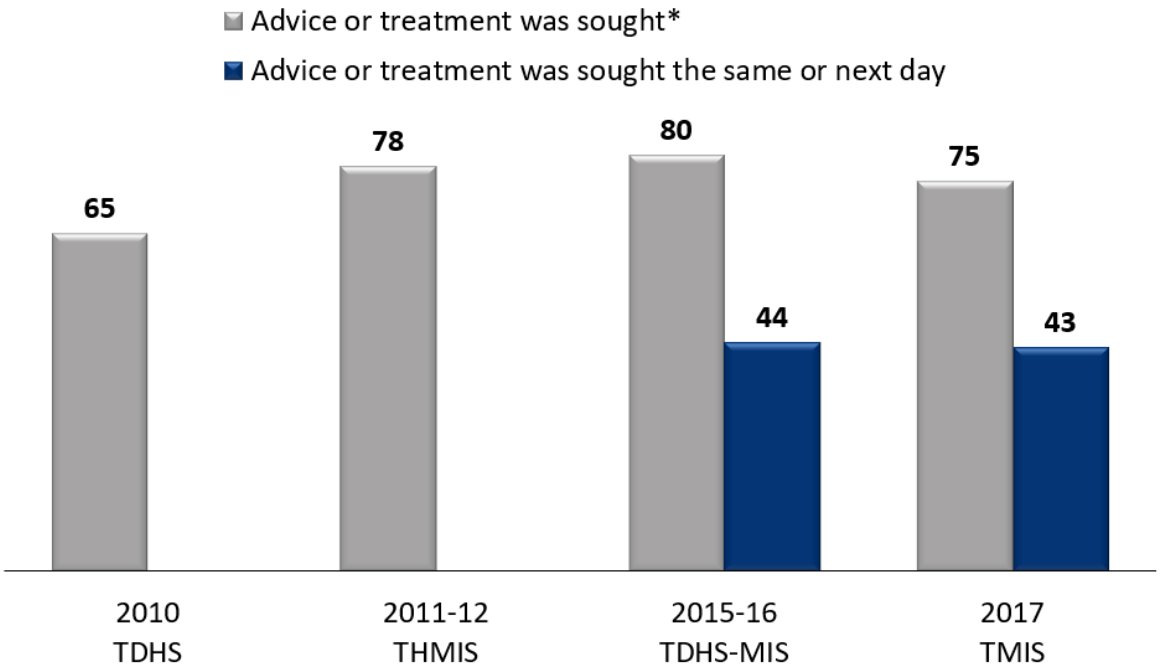
What is the status of care-seeking and/or access to care for children under five years of age with fever?

Between the DHS conducted in 2019 and the MIS in 2017, the range of proportions of caregivers of children 6 to 59 months of age who sought advice or treatment for fever was 65 percent to 80 percent. Approximately 43 percent of caregivers reported seeking advice or treatment the same or next day during the 2015 DHS/MIS and 2017 MIS.

Supporting Data

Figure A-10. Trends in care-seeking for fever

This figure is a histogram showing the proportion of children 6 to 59 months of age with fever who sought advice or treatment the same or next day and in the two weeks before the DHS or MIS survey completed by caretakers of children 6 to 59 months of age. Between the DHS conducted in 2010 and the MIS in 2017, the proportion of caregivers of children 6 to 59 months of age who sought advice or treatment for fever ranged between 65 percent and 80 percent. Approximately 43 percent of caregivers reported seeking advice or treatment the same or next day during the 2015 DHS/MIS and 2017 MIS.



**Note that this indicator has been recalculated according to the newest definition, care or treatment from any source, excluding traditional practitioners.*

Key Question 1b

What significant structural and/or behavioral challenges affect prompt care-seeking?

Care-seeking is a critical gateway behavior necessary to ensure linkage with appropriate care and treatment for malaria, and counseling to reduce malaria risk in future. The Malaria Behavioral Survey (MBS) planned for CY 2021 will provide additional data on behavioral determinants, which will allow NMCP to refine and focus its SBC approach for care-seeking behavior.

Please refer to Section 3.4 for information on how SBC interventions will be directed to address the challenges identified below.

Supporting Data

Table A-9. Structural and/or behavioral challenges affect prompt care-seeking

Facilitator	Type of Factor	Data Source	Evidence
Knowledge of malaria symptoms	Internal	USAID Tulonge Afya Baseline Survey 2018	The proportion of caregivers with comprehensive and correct knowledge of malaria causes, prevention, symptoms, and treatment increased from 41.2% in 2018 to 74.7% in 2020.
Positive attitudes toward malaria treatment	Internal	USAID Tulonge Afya Annual Sentinel Survey 2020	The proportion of caregivers with positive attitudes toward malaria treatment increased from 38.8% in 2018 to 69.5% in 2020. An improvement has also been observed in prompt care for a sick child from 71.3% in 2018 to 80.3% in 2020.
Barrier	**Type of Factor**	**Data Source**	**Evidence**
In households headed by men, treatment decisions are not made by mothers but by male family members	Social	USAID Tulonge Afya Baseline Survey 2018	Children with fever from households headed by female caretakers have almost three times higher odds of being taken to a health facility than those in households headed by men.
Attitudes toward a facility being the first place to seek care for a child with fever	Social	USAID Tulonge Afya Baseline Survey 2018	While nearly all caregivers reported attending health facilities to treat children with fever (98%), many stated that convulsions are best treated by traditional healers (43%).

Key Question 2a

What proportion of patients are being tested and appropriately treated for malaria?

Caregivers reported an increase from 25 percent to 43 percent in blood sticks for testing among children 6 to 59 months of age with fever two weeks before the THMIS 2011 and MIS 2017, respectively. Caregivers also reported an increase from 61 percent to 89 percent of children 6 to 59 months of age who received an ACT for fever among those who received any antimalarial in the two weeks before the THMIS 2011 and MIS 2017, respectively.

The annual proportion of overall clinical (unconfirmed) malaria cases decreased from 16 percent in 2016 to less than 1 percent in 2020. This indicates increased adherence to national guidelines of testing all suspected malaria cases at health facilities.

Between 2016 and 2020, the ratio of artemether-lumefantrine (AL) dispensed to confirmed malaria cases in outpatient departments reported in HMIS ranged from 0.5 to 1.2. In 2020, the dispensing ratio was 1.2. This indicates that overall more AL was dispensed than the number of cases that were diagnosed at health facilities.

Supporting Data

Figure A-11. Trends in diagnosis and treatment of children with fever

This figure is a histogram that shows the proportion of children 6 to 59 months of age with fever who received a blood stick for testing in the two weeks before the THMIS 2011–2012, DHS-MIS 2015–2016, and MIS 2017, and who received an ACT among any antimalarial in the two weeks before the THMIS 2011–2012 and MIS 2017.

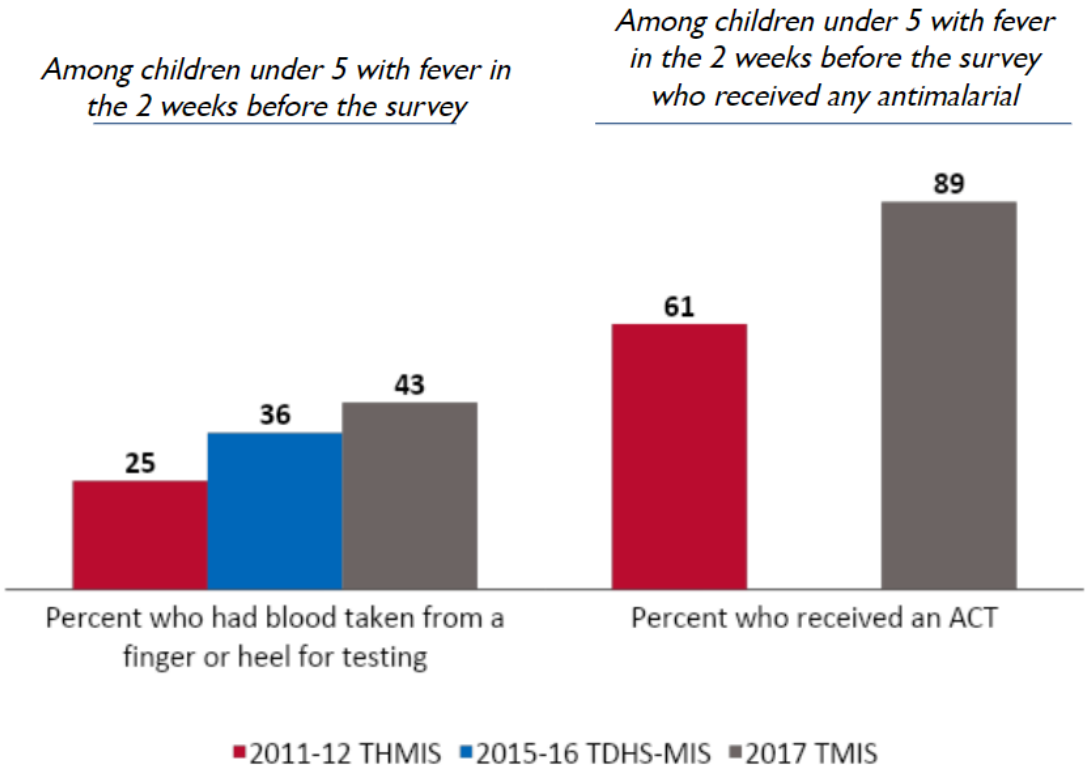


Figure A-12. Annual number of malaria cases by type of diagnosis in outpatient departments reported in HMIS, 2016–2020

This figure is a histogram that shows the annual number and proportion of malaria cases by type of diagnosis in outpatient departments that were reported from HMIS between 2016 and 2020. The annual proportion of overall clinical (unconfirmed) malaria cases decreased from 16 percent in 2016 to less than 1 percent in 2020. This indicates increased adherence to national guidelines of testing all suspected malaria cases at health facilities.

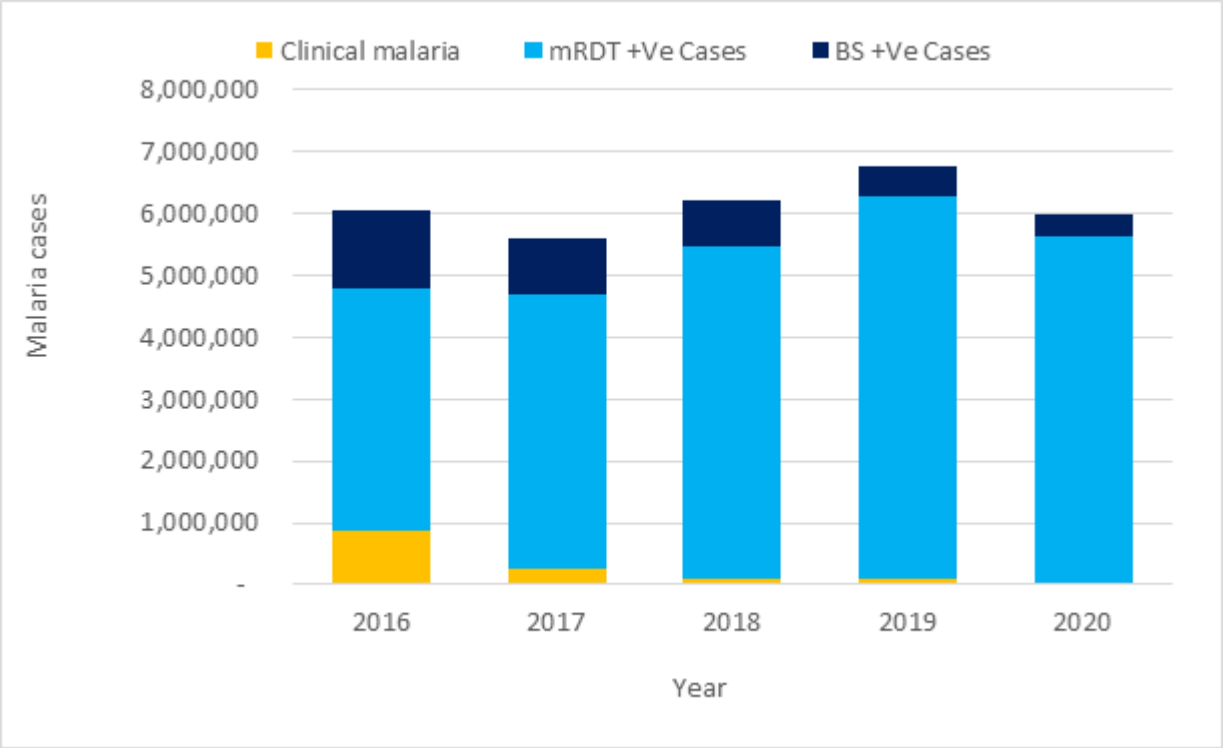
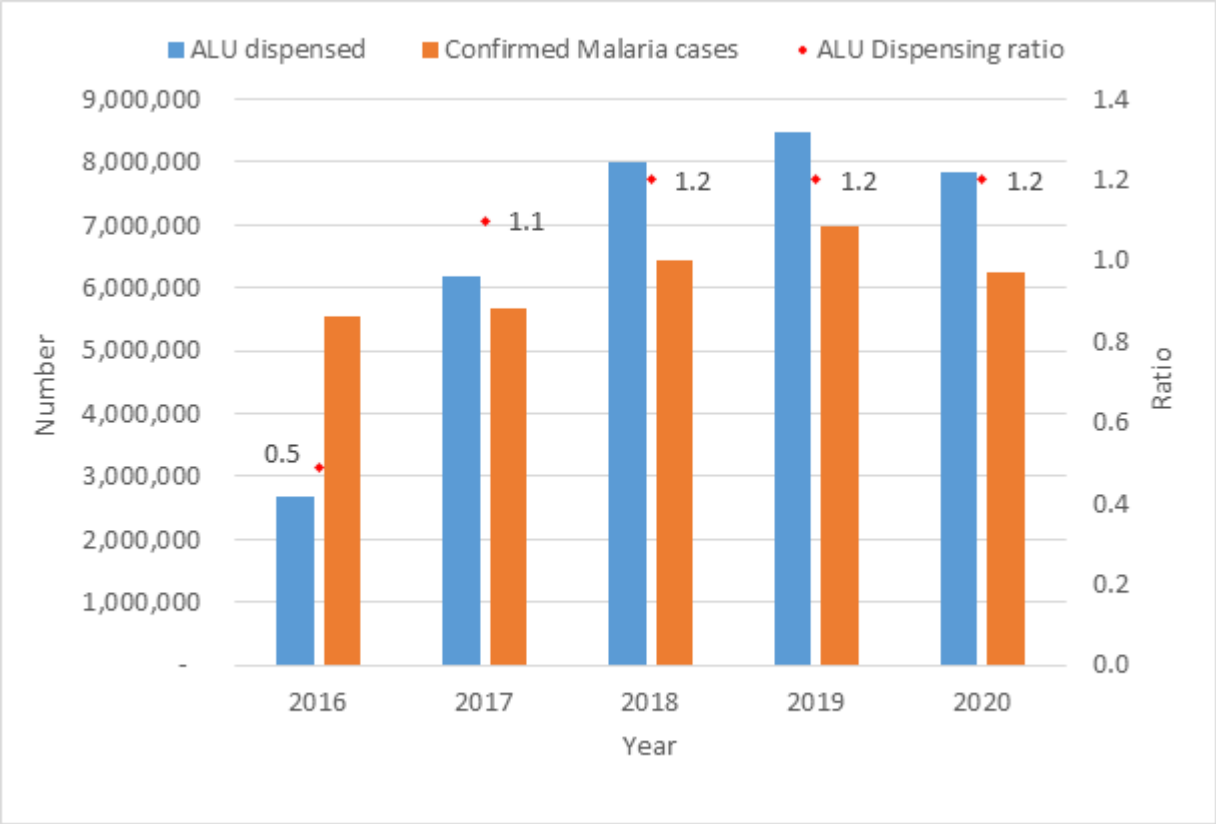


Figure A-13. Artemether-lumefantrine (AL) dispensing ratio in outpatient departments reported in HMIS, 2016–2020

This figure is a histogram that shows the annual number of confirmed malaria cases, number of AL treatments dispensed, and the dispensing ratio in outpatient departments that were reported from HMIS between 2016 and 2020.



Key Question 2b

What significant structural and behavioral challenges affect testing and treatment practices among providers?

Programming will ensure a positive attitude toward malaria and malaria treatment and providers' behavior in adhering to recommended antimalarials and malaria treatment regimen. PMI will continue to provide guidance on adhering to recommended antimalarials and malaria treatment regimens and addressing providers' attitudes toward negative malaria test results.

Please refer to Section 3.4 for information on how SBC interventions will be directed to address the challenges identified below.

Supporting Data

Table A-10. Challenges affect testing and treatment practices among providers

Facilitator	Type of Factor	Data Source	Evidence
Providers knowledge on the current guidelines	Environmental (accessibility of services)	Tanzania MIS 2017	89% of children under five years of age who had fever who took antimalarials took ACT. This is a 28% increase from the 2011–2012 survey.
Barrier	**Type of Factor**	**Data Source**	**Evidence**
Providers attitudes toward negative malaria test results in malaria endemic areas	Internal/Social	Mubi, et al. (2013). *Malaria Journal*, 12 (293).	Antibiotics were more likely to be prescribed to patients with negative test results than patients with positive results (81% vs. 39%, $p < 0.01$) and among not tested than those tested for malaria (84% vs. 69%, $p = 0.01$).

Key Question 3

What is the current and planned support for case management at health facilities and in the communities by CHWs?

As described above, PMI currently supports implementation of MSDQI, including the electronic tablet-based system, for monitoring and improving malaria case management in public health facilities in three high malaria burden regions (Katavi, Lindi, and Mtwara). While the policy and guidance for CHWs was approved by the GOT in late 2020, a CHW program has not yet been implemented. PMI currently supports community case management through advocacy on awareness of malaria and early health- seeking behavior. With support from the Global Fund for the grant period 2021–2023, NMCP will support implementation of MSDQI in public health facilities in the other 23 non-PMI-supported regions, with partial support from PMI via funds allotted to the NMCP and PO-RALG for integrated supportive supervision and technical oversight, and malaria community case management through the CHW program in five regions (Katavi, Kagera, Geita, Kigoma, and Ruvuma).

PMI is currently developing a new partner mechanism to support malaria case management and SM&E with an increasing emphasis on technical guidance to ensure quality case management in facilities and the community through monitoring performance and making recommendations on the use of data to target interventions at district and ward level funded by Global Fund and other partners in high malaria burden regions. PMI has not yet developed the scope of this activity.

Supporting Data

Geographic scope to be determined (see explanation above).

Key Question 4

What is the estimated need for RDTs during calendar years 2021–2023? Are there any projected RDT gaps based on anticipated partner contributions compared to estimated needs?

Tanzania uses combination (multi-species) mRDTs procured by Global Fund. PMI does not procure combination RDTs used in Tanzania. For CY 2023, NMCP estimates a surplus of 22,775,589 mRDTs. The excess observed is for testing interventions to increase testing among OPD attendees at health facilities to 50 percent and through active case detection in the community in low-transmission settings supported by the Global Fund for the period 2021–2023.

Supporting Data

Table A-11. RDT Gap Analysis Table

Calendar Year	2021	2022	2023
Total country population	57,724,380	59,517,754	61,342,896
Population at risk for malaria	54,838,161	56,541,866	58,275,751
PMI-targeted at-risk population	27,419,081	28,270,933	29,137,876
RDT Needs			
Total number of projected fever cases	23,368,872	24,397,206	25,648,580
Percent of fever cases tested with an RDT	95%	95%	95%
RDT Needs (tests)	**22,276,868**	**23,257,149**	**24,450,048**
Needs Estimated based on HMIS Data			
Partner Contributions (tests)			
RDTs from Government			
RDTs from Global Fund	30,186,600	27,787,150	29,361,175
RDTs from other donors			
RDTs planned with PMI funding			
Total RDT Contributions per Calendar Year	***30,186,600***	***27,787,150***	***29,361,175***
Stock Balance (tests)			
Beginning Balance	15,612,250	23,521,982	28,051,982
- Product Need	22,276,868	23,257,149	24,450,048
+ Total Contributions (received/expected)	30,186,600	27,787,150	29,361,175
Ending Balance	23,521,982	28,051,982	32,963,109
Desired End of Year Stock (months of stock)	12	12	12
Desired End of Year Stock (quantities)	22,276,868	23,257,149	24,450,048
Total Surplus (Gap)	***1,245,113***	***4,794,833***	***8,513,061***

Key Question 5

What is the estimated need for ACTs during calendar years 2021–2023? Are there any projected ACT gaps?

NMCP estimates an increasing surplus of ACTs culminating with a surplus of 7,964,440 ACTs by CY 2023. The surplus observed assumes an increased requirement for ACTs for malaria cases confirmed by the new testing strategies at facilities and in the community with funding from the Global Fund. PMI will procure 2,550,126 ACTs under MOP 2022.

Supporting Data

Table A-12. ACT Gap Analysis Table

Calendar Year	2021	2022	2023
Total country population	57,724,380	59,517,754	61,342,896
Population at risk for malaria	54,838,161	56,541,866	58,275,751
PMI-targeted at-risk population	27,419,081	28,270,933	29,137,876
ACT Needs			
Total projected number of malaria cases	6,381,215	6,676,985	6,972,043
Total ACT Needs (treatments)	***6,381,215***	***6,676,985***	***6,972,043***
Needs Estimated based on HMIS Data			
Partner Contributions (treatments)			
ACTs from Government			
ACTs from Global Fund	6,007,075	7,013,562	6,516,732
ACTs from other donors *[specify donor]*			
ACTs planned with PMI funding	2,052,990	2,550,126	2,550,126
Total ACTs Contributions per Calendar Year	***8,060,065***	***9,563,688***	***9,066,858***
Stock Balance (treatments)			
Beginning Balance	4,209,090	5,887,940	8,774,643
- Product Need	6,381,215	6,676,985	6,972,043
+ Total Contributions (received/expected)	8,060,065	9,563,688	9,066,858
Ending Balance	5,887,940	8,774,643	10,869,458
Desired End of Year Stock (months of stock)	12	12	12
Desired End of Year Stock (quantities)	6,381,215	6,676,985	6,972,043
Total Surplus (Gap)	***(493,275)***	***2,097,658***	***3,897,415***

Key Question 6

What is the estimated need for definitive treatment and pre-referral treatment for severe malaria during calendar years 2021–2023? Are there any anticipated gaps?

NMCP estimates a surplus of 491,410 vials of injectable artesunate in CY 2023. PMI will procure 210,000 vials under MOP 2022.

Under the new National Guidelines for Malaria Diagnosis, Treatment, and Preventive Therapies 2020, rectal artesunate (RAS) can be administered as a pre-referral medication of severe malaria in children under six years of

age in places where parenteral artemisinin administration is not possible. However, guidelines and training for HCWs on the use of RAS has not been implemented in Tanzania. A quantification for RAS was not conducted by NMCP for the Global Fund grant period 2021–2023. Currently, rectal artesunate is not procured by either the GOT or its partners.

Supporting Data

Table A-13. Inj. Artesunate Gap Analysis Table

Calendar Year	2021	2022	2023
Injectable Artesunate Needs			
Projected number of severe cases	279,712	278,134	276,556
Projected number of severe cases among children	112,724	112,088	111,452
Average number of vials required for severe cases among children	3	3	3
Projected number of severe cases among adults	166,988	166,046	165,104
Average number of vials required for severe cases among adults	6	6	6
Total Injectable Artesunate Needs (vials)	***1,689,370***	***1,628,569***	***1,567,768***
Needs Estimated based on HMIS Data			
Partner Contributions (vials)			
Injectable artesunate from Government			
Injectable artesunate from Global Fund	1,624,804	1,883,211	1,177,802
Injectable artesunate from other donors [specify donor]	0	0	0
Injectable artesunate planned with PMI funding	345,906	210,000	210,000
Total Injectable Artesunate Contributions per Calendar Year	***1,970,710***	***2,093,211***	***1,387,802***
Stock Balance (vials)			
Beginning Balance	578,631	859,971	1,324,613
- Product Need	1,689,370	1,628,569	1,567,768
+ Total Contributions (received/expected)	1,970,710	2,093,211	1,387,802
Ending Balance	859,971	1,324,613	1,144,647
Desired End of Year Stock (months of stock)	5	5	5
Desired End of Year Stock (quantities)	703,904	678,570	653,237
Total Surplus (Gap)	***156,067***	***646,043***	***491,410***

Table A-14. RAS Gap Analysis Table

Calendar Year	2021	2022	2023
Artesunate Suppository Needs			
Number of severe cases expected to require pre-referral dose			
Total Artesunate Suppository Needs (suppositories)			
Select Data Source			
Partner Contributions (suppositories)			
Artesunate suppositories from Government			
Artesunate suppositories from Global Fund			
Artesunate suppositories from other donors			
Artesunate suppositories planned with PMI funding			
Total Artesunate Suppositories Available	***0***	***0***	***0***
Stock Balance (suppositories)			
Beginning Balance		0	0
- Product Need	0	0	0
+ Total Contributions (received/expected)	0	0	0
Ending Balance	0	0	0
Desired End of Year Stock (months of stock)			
Desired End of Year Stock (quantities)	0	0	0
Total Surplus (Gap)	***0***	***0***	***0***

Key Question 7

What is the estimated need for any other standard antimalarial drug used in the country (e.g., primaquine for *P. vivax*) during calendar years 2021–2023? Are there any anticipated gaps?

N/A

Supporting Data

Key Question 8

Are first-line ACTs effective and monitored regularly?

Current evidence demonstrates that artemether-lumefantrine (AL) continues to be effective in Tanzania.

Supporting Data

Table A-15. Recently completed and ongoing antimalarial therapeutic efficacy studies

Most Recent Study Year	Sites	PMI Funded (Y/N)	Treatment Arms	PCR-Corrected Efficacy > 90% (Y/N)
2019[1]	Karume	Y	AL	Y
2019[1]	Simbo	Y	AL	Y
2019[1]	Ipinda	Y	AL	Y
2019[1]	Nagaga	Y	AL	Y

Ongoing TES: 2020 Next Planned TES: 2021

PCR: polymerase chain reaction

[1]United States Agency for International Development. (2020). *Efficacy and Safety of Artemether-Lumefantrine for the Treatment of Uncomplicated Falciparum Malaria: Mainland Tanzania*. U.S. President's Malaria Initiative.

Key Question 9

Are there other areas (e.g., lab strengthening, private sector support, etc.) that should be considered for PMI-support?

N/A

Supporting Data

Conclusions for Case Management Investments

PMI will provide high-quality TA to NMCP for the development of case management policies and strategies, to strengthen mRDT and microscopy diagnostic capacity, and to plan for the implementation of malaria case management through the use of data generated from the MSDQI process. For FY 2022, PMI will procure approximately $2.5 million in ACTs and injectable artesunate, and support drug efficacy monitoring following the standard WHO protocol at four sentinel sites in mainland Tanzania including molecular testing of antimalarial resistance markers for first- and second-line ACTs.

Please see FY 2022 PMI budget tables for a detailed list of proposed activities with FY 2022 funding.

2.2. DRUG-BASED PREVENTION

NMCP Objective

NMCP implements intermittent preventive treatment in pregnancy (IPTp) with sulfadoxine-pyrimethamine (SP) for all pregnant women except those in very low-transmission councils. The strategic focus is to increase the number of women accessing IPTp2 to 95 percent through improved supply chain management of SP, IPTp administration at each scheduled ANC visit, improved capacity of healthcare providers through training and

supervision, and improved frequency of ANC attendance. In 2014 NMCP introduced testing of all pregnant women attending the first ANC and treatment for those who are found to be positive according to national guidelines. In addition, new intervention packages in the NMSP include seasonal malaria chemoprevention (SMC) and intermittent preventive treatment in school children (IPTsc) and in infants (IPTi). These interventions are currently being explored for their efficacy, effectiveness, and feasibility under implementation research and have not yet been adopted by the program.

- Achieve 95 percent coverage of two doses of IPTp, and 85 percent of at least three doses of IPTp.
- Achieve 85 percent use of ITNs by pregnant women, and 100 percent prompt case management of malaria infections in pregnancy.

NMCP Approach

- NMCP strategic approach for Malaria Preventive Therapies is to provide appropriate and effective services to reduce the risk of malaria infection and its complications among populations biologically and socioeconomically vulnerable to malaria. The MOHCDGEC has adopted the updated WHO policy of IPTp3+, which is to give three or more doses of SP monthly until the day of delivery, administered as directly observed therapy during ANC visits. IPTp is recommended to be withdrawn in the very low stratum where CBS and risk mitigation have been established. In 2014, MOHCDGEC started implementation of a policy to screen all women with an mRDT at their first ANC visit, irrespective of symptoms, and treat those who test positive according to national guidelines. If a woman is treated for malaria with an antimalarial at the ANC visit or in the four weeks before, it is not necessary to give her SP. Instead, she should be instructed to return in about a month for her next ANC visit and IPTp-SP should be given at that time.
- Iron/folate combination (ferrous sulphate 200 mg + folic acid 0.25 mg) is provided at ANC according to national policy for prevention and treatment of anemia. High-dose folic acid is procured and provided for pediatric indications only and is not provided at ANC.
- Case management of uncomplicated malaria in pregnancy follows WHO recommendations. The NMCP has revised the malaria diagnosis and treatment guidelines to include injectable artesunate as the treatment of choice for severe malaria in the first trimester as recommended per WHO guidelines. In addition, the guideline recommends a specific ACT (AL) as the treatment of choice for uncomplicated malaria in all age groups and all trimesters during pregnancy (see more details in the Case Management section).
- The MSDQI process is used in health facilities to observe and evaluate diagnostic and treatment practices of providers at ANC. Facilities with low performance are targeted for supportive supervision and mentorship, and performance is monitored using data from the MSDQI tool and DHIS2. MSDQI mentors support facility HCWs to appropriately assess danger signs, take an adequate clinical history, conduct a sufficient physical examination, provide adequate counseling and communication, and ensure data quality in the HMIS register, tally, and summary that are entered into DHIS2. More details on MSDQI process are in the Case Management section.
- Increase ITNs access through discount vouchers or alternative schemes (see more details in the ITN section).

PMI Objective in Support of NMCP

PMI supports the WHO recommended three-pronged approach to reduce the burden of malaria infection among pregnant women:

- Intermittent preventive treatment of malaria during pregnancy
- Insecticide-treated nets
- Effective case management of malaria illness and anemia

PMI-Supported Recent Progress (FY 2020)

PMI supported Council Health Management Teams (CHMTs) conducted supportive supervision visits and training to improve the quality of MIP services using NMCP's quality improvement MSDQI process in 1,491 (85 percent) facilities across seven regions (51 councils) of the Lake and Western zones and1,131 (92 percent) health facilities across four regions (32 councils) in the Southern Zone. PMI partners also conducted training for 172 HCWs on the updated ANC guidelines and for 239 volunteers to serve as community change agents. PMI partners performed quarterly tracking of SP stocks at health facilities and conducted feedback meetings with Regional and District Health Management Teams to improve SP availability. In addition, PMI supported the MIP Task Force meetings, a group composed of members from the NMCP, the Reproductive and Child Health group, and other relevant stakeholders that has been working to address challenges in SP availability and IPTp uptake. Through Boresha Afya activities in the Lake and Southern zones, PMI supported scaled-up community digital initiatives that provided reminders and important notifications to pregnant women/CHWs, and targeted MIP educational content to mothers using content approved by the GOT. To date the system has enrolled 104,000 users including CHWs and clients (see case management section for more information on MSDQI).

PMI-Supported Planned Activities (FY 2021)

- PMI's funding will contribute to a larger effort funded by other USAID health programs to improve the demand for and the quality of ANC on the Mainland, including malaria prevention and treatment of acute infections.
- In collaboration with the National Ministry Trainers and Region and Council Health Management Teams (R/CHMTs), PMI will continue to support cascading of MSDQI supportive supervision and mentorship to ANC healthcare providers across the Lake and Southern zones.
- PMI will support continued training and supervision for IPTp3+ and case management integrated with family planning, maternal and child health, and HIV programming. Support for SBC to increase ITN use, ANC attendance, and IPTp uptake will continue as well.
- PMI will support provision of long-lasting ITNs to pregnant women through continuous distribution at ANC on the Mainland (more details in the ITN section).

Please see FY 2022 MOP budget tables for a detailed list of proposed activities with FY 2022 funding.

2.2.1. MALARIA IN PREGNANCY (MIP)

Key Goal

Support the national strategy for MIP, which includes provision of ITNs at the first antenatal care (ANC) visit, a minimum of three doses of intermittent preventive treatment for pregnant women (IPTp) in malaria endemic areas starting at 13 weeks gestational age, and effective case management of malaria per WHO guidelines.

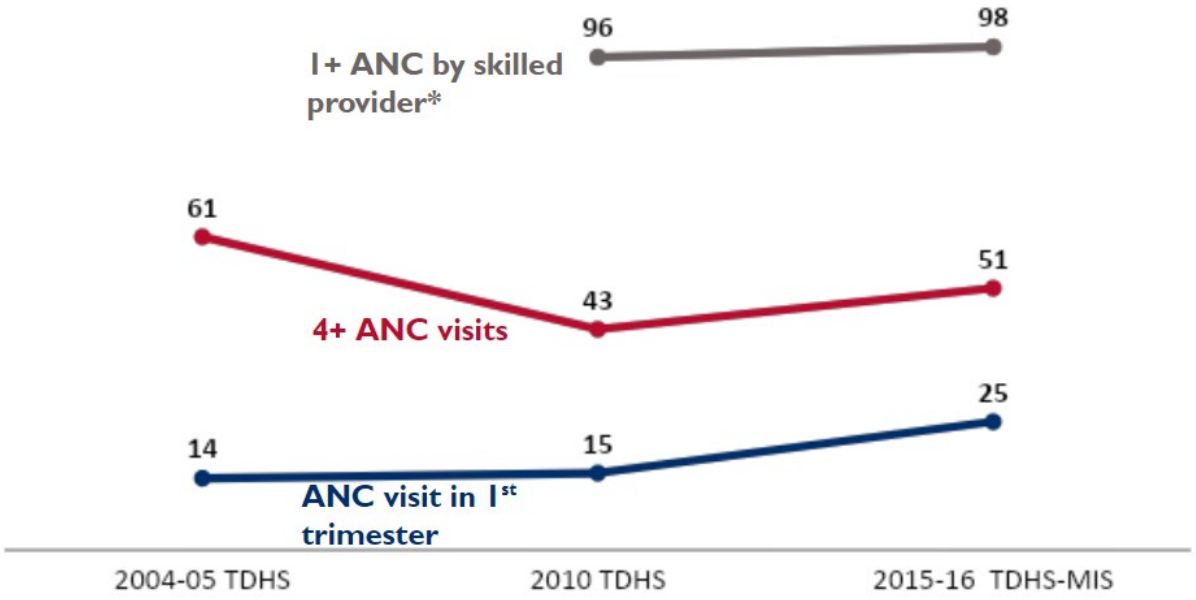
Key Question 1a

What proportion of pregnant women are accessing ANC early and frequently (as recommended by national and/or WHO strategies) during their pregnancy?

Supporting Data

Figure A-14. Trends in ANC coverage

Women 15 to 49 years of age with a live birth in the five years before the survey (most recent birth)



The proportion of women receiving at least one ANC visit from a skilled provider is very high, yet only half make four or more visits, and only one-quarter make their first visit during the first trimester, indicating significant gaps in knowledge about the importance of or access to early and frequent antenatal care.

Key Question 1b

Are there important health system and/or behavioral barriers to ANC attendance at health facilities?

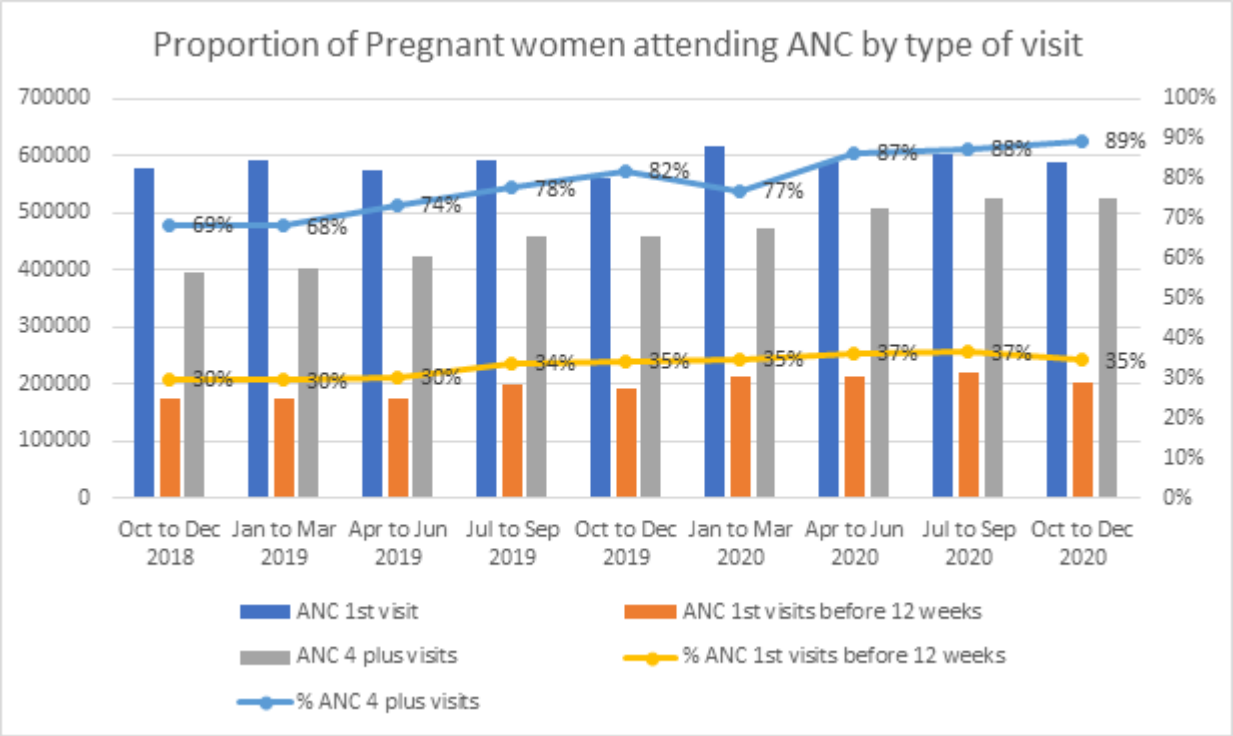
Table A-16. Key factors affecting ANC attendance

Facilitator	Type of Factor	Data Source	Evidence
Perceived confidence to attend ANC	Internal	USAID Tulonge Afya Annual Sentinel Survey 2020	A sentinel survey from 2020 indicates that 76% of pregnant women feel confident to attend ANC early and at least four times, compared with 72% in 2019.
Partner support	Social	USAID Tulonge Afya Annual Sentinel Survey 2020	An increase in the number of partners who have positive attitudes toward provision of support (accompaniment and provision of resources) to their pregnant partners to attend ANC increased slightly from 61% in 2019 to 64% in 2020. This may also contribute to the increase in early ANC attendance noted above.
Barrier	**Type of Factor**	**Data Source**	**Evidence**
Women are often unable to participate in household decision-making	Social	USAID Tulonge Afya MNCH Audience Insights: Summary Report 2018	Most surveyed women highlighted that the decision of pregnant women to attend ANC entirely depends on their husband or male partner and the monetary support to access health services.
Mistreatment of pregnant patients by providers	Structural	USAID Tulonge Afya MNCH Audience Insights: Summary Report 2018	During a focus group discussion some women reported mistreatment of pregnant patients (neglect, extortion, and verbal abuse) by providers.

While achievement of ANC4 has seen notable improvements from 80.5 percent in 2019 to 90.1 percent in 2020, there remain gaps in achievement of early ANC attendance, which indicates there is an important opportunity to increase uptake of this behavior. More is needed to build pregnant women's confidence, increase ability to act, and encourage partners' support in ANC accompaniment and provision of resources to increase early ANC.

Tanzania has adopted the 2016 WHO ANC guidelines systematically but gradually. Tanzania Mainland developed its package in 2019, comprising the national guidelines covering all five WHO categories around nutrition, maternal and fetal assessment, preventive measures, dealing with common physiological symptoms, and health system strengthening for quality care. The country policy supports early initiation of IPTp between 13 and 16 weeks and health providers have been oriented.

Figure A-15. Trends in ANC attendance, source DHIS2/HMIS



In March 2020, COVID-19 was declared in Tanzania. The country anticipated that ANC attendance might decrease due to fear of contracting the virus from health facilities. To respond to this, SBC activities under the NAWEZA platform (an integrated SBC strategy and platform for adults advanced by the USAID-funded Tulonge Afya project in Tanzania) were designed targeting pregnant women and their partners, to inform them of the importance of ANC attendance as well as to provide education on and ensure use of COVID-19 precautions, such as using hand sanitizer, wearing face masks, and maintaining social distance when accessing services. Thus far no changes have been observed in the proportion of pregnant women attending ANC.

Supporting Data

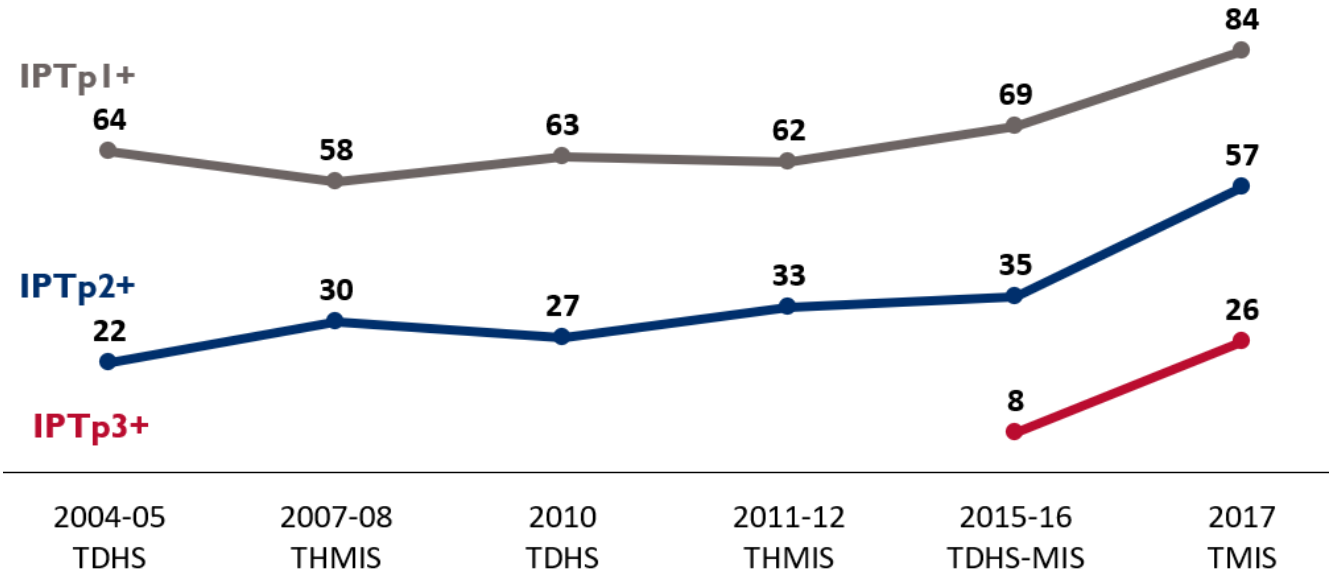
Please refer to Section 3.4 for information on how SBC interventions will be directed to address the challenges identified above.

Key Question 2

What proportion of pregnant women are receiving the recommended doses of IPTp?

Figure A-16. Trends in IPTp 1, 2, and 3

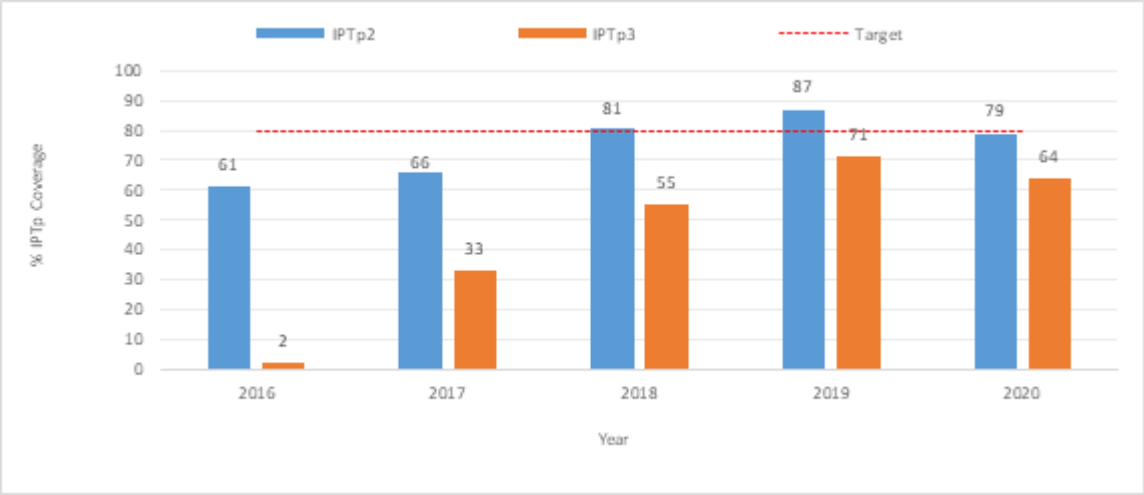
Women 15 to 49 years of age with a live birth in the two years before the survey who received the specified number of doses of SP/Fansidar during their last pregnancy



Note: IPTp3 baseline uses the first survey available after the recommendation was updated to three or more doses.

Survey data between the 2005 DHS and 2017 MIS show both steady increases in self-reporting by women who receive all doses of IPTp, as well as gaps between the proportion of women receiving at least one dose (84 percent) and those receiving three or more doses (26 percent).

Figure A-17. Annual IPTp2 and IPTp3 performance, 2016–2020



Since 2016, there has been an increase in the proportion of pregnant women who receive IPTp2 and 3 among women attending ANC reported in HMIS/DHIS2; however, declines were observed in 2020 due to shortages of SP throughout the country.

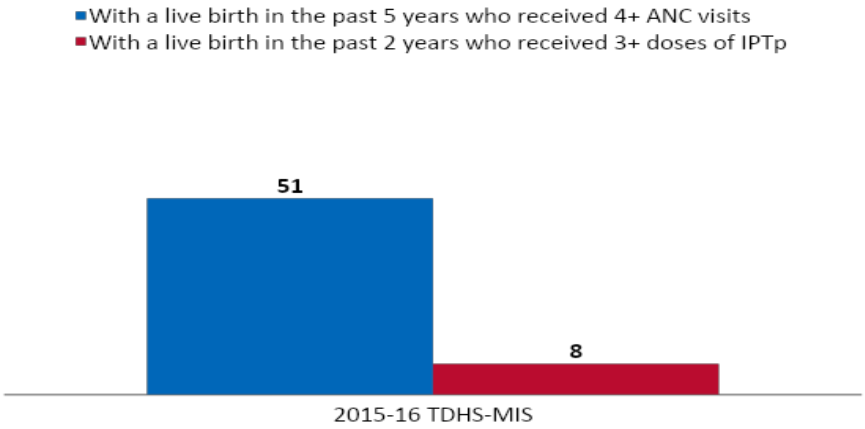
Key Question 3a

What is the gap between ANC attendance and IPTp uptake (i.e., missed opportunities for giving IPTp at ANC)?

Supporting Data

Figure A-18. Trends in missed opportunities for IPTp

Percentage of women 15 to 49 years of age



Based on self-reported information in the 2015–2016 DHS/MIS, 51 percent of women attended four or more ANC visits but only 8 percent received three or more doses of IPTp. However, based on information from MIS 2017, 26 percent of women self-reported receiving three or more doses of IPTp. In addition, routine HMIS 2020 data shows that among women who attend ANC, 64 percent of women receive three or more doses of IPTp (see Key Question 2 above). The programs will continue interventions that address providers' behavior in adhering to recommended treatment regimen and increasing advocacy on malaria commodities availability. NMCP and PMI must reinforce the messaging on the importance of pregnant women to take IPTp and encourage positive attitude toward IPTp among pregnant women, their partners, and the community at large.

Key Question 3b

What significant health system and/or behavioral challenges affect provider delivery of MIP services (e.g., IPTp and ITN distribution at ANC)?

Table A-17. Key barriers and facilitators to IPTp administration at ANC visits

Facilitator	Type of Factor	Data Source	Evidence
Exposure to IPTp3+ messages	Internal	USAID Tulonge Afya Baseline 2018	Respondents who recalled IPTp messages were more likely to have taken IPTp (p<.01).
Dialogues on IPTp use among pregnant women, partners, and family members	Internal	USAID Tulonge Afya Baseline 2018	Pregnant women who took IPTp were more likely (p<.05) to have discussed preventing malaria in pregnancy (past 6 months) than those who did not.
Confidence to prevent malaria during pregnancy	Internal	USAID Tulonge Afya Baseline 2018	Those who took IPTp were more likely (p<.0001) to report confidence taking medicine during pregnancy; as confidence improves, respondents were more likely to report taking IPTp (p<.0001).
Barrier	**Type of Factor**	**Data Source**	**Evidence**
Bias around administration of SP	Internal/ Social	Boresha Afya Project Reports	Project reports suggest that provider bias around the provision of SP persists.

Based on the Sentinel survey conducted in 2020, there was an increase in IPTp3+ message exposure and recall (25 percent in 2020, up from 7 percent in 2019) and confidence in preventing malaria during pregnancy, including taking IPTp (78 percent in 2020, up from 74 percent in 2019); however, the proportion of pregnant women taking three or more doses of IPTp is still low (64 percent in 2020, compared with 70.9 percent in 2019). There is a need to address supply-side barriers, especially regular SP stockouts. The programs will continue interventions that address providers' behavior in adhering to the recommended treatment regimen and increasing advocacy on malaria commodities availability. NMCP and PMI must reinforce the messaging on the malaria risks during pregnancy, importance of pregnant women to take IPTp, and encouraging dialogue on IPTp use among pregnant women, partners, and family members.

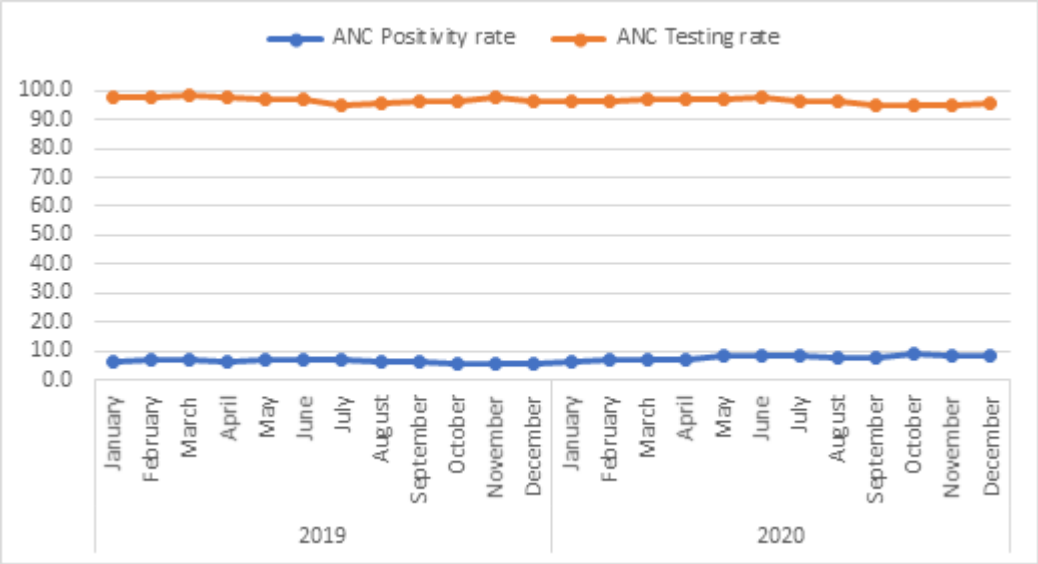
Supporting Data

Please refer to Section 3.4 for information on how SBC interventions will be directed to address the challenges identified above.

Key Question 4

Does the national ANC program or health information system collect data and track the proportion of pregnant women with fever, those tested for malaria, those found to have malaria infection, and those who are treated?

Figure A-19. Overall malaria testing and positivity rate in ANC



No data are currently available on pregnant women with fever being diagnosed with malaria. However, the above graphs shows malaria testing rates among pregnant women attending ANC have increased over time, and this could be attributed to the improved availability of malaria commodities and adherence to diagnostic and treatment guidelines.

Supporting Data

Key Question 5

What is the estimated need for SP during 2021–2023? Are there any anticipated SP gaps? Are there gaps in other IPTp commodities?

Supporting Data

The GOT has committed to procuring SP as part of its investments in maternal and child health. The figures shown in the table are from national quantification of need to ensure treatment and stock availability. There has been a nationwide stockout and challenges in distributing SP to peripheral health facilities. PMI is working with the NMCP and providing support for supply chain management to help address this problem and ensure availability at facilities with ANC clinics.

Table A-18. SP Gap Analysis Table

Calendar Year	2021	2022	2023
Total Country Population	57,724,380	59,517,754	61,342,896
Total Population at Risk for Malaria	54,838,161	56,541,866	58,275,751
PMI Targeted at Risk Population	27,419,081	28,270,933	29,137,876
SP Needs			
Total Number of Pregnant Women	2,308,975	2,380,710	2,453,716
Proportion of women expected to attend ANC1 at 13 weeks or greater	100%	100%	100%
Proportion of women expected to attend ANC2	91%	93%	95%
Proportion of women expected to attend ANC3	82%	84%	86%
Proportion of women expected to attend ANC4	75%	77%	79%
Total SP Needs (treatments)	***8,035,234***	***8,427,714***	***8,833,377***
Needs Estimated based on HMIS Data			
Partner Contributions (treatments)			
SP from Government	7,404,900	8,427,714	8,833,377
SP from Global Fund	2,136,000	0	0
SP from Other Donors			
SP planned with PMI funding	2,250,000	0	0
Total SP Contributions per Calendar Year	***11,790,900***	***8,427,714***	***8,833,377***
Stock Balance (treatments)			
Beginning balance	0	3,755,666	3,755,666
- Product Need	8,035,234	8,427,714	8,833,377
+ Total Contributions (Received/expected)	11,790,900	8,427,714	8,833,377
Ending Balance	3,755,666	3,755,666	3,755,666
Desired End of Year Stock (months of stock)	5	5	5
Desired End of Year Stock (quantities)	3,348,014	3,511,547	3,680,574
Total Surplus (Gap)	***407,652***	***244,119***	***75,093***

Conclusions for MIP Investments

PMI will continue supporting MIP activities in high-burden regions. More focus will be on supporting Local Government Authorities (LGAs) to implement supportive supervision and mentorship through MSDQI.

Please see FY 2022 MOP budget tables for a detailed list of proposed activities with FY 2022 funding.

2.2.2. SEASONAL MALARIA CHEMOPREVENTION (SMC)

SMC is not a recommended intervention for this country.

2.2.3. ADDITIONAL DRUG-BASED PREVENTIVE STRATEGIES

This country is not a designated country for near-term pre-elimination or elimination, and there is no PMI support planned for such work in Mainland Tanzania.

3. CROSS-CUTTING AND OTHER HEALTH SYSTEMS

3.1. SUPPLY CHAIN

NMCP Objective

Strategic objective: To maintain timely availability of safe and quality malaria commodities and supplies at the delivery points.

Specific objectives:

- Provide universal access to appropriate, quality, and timely malaria diagnosis to all people with signs and symptoms of malaria.
- Provide universal access to appropriate, quality, and timely treatment to all people who have malaria.
- Ensure that commodities used in malaria patient care and prevention are consistently safe, quality assured, and available at the points of care.

NMCP Approach

To improve continuous accessibility to diagnostics and medicines, the supply chain and logistics system will be strengthened, from quantification and procurement process up to service delivery points. NMCP approach will focus on the following areas:

- Promoting partnership to ensure malaria commodities are available at all service delivery points in the right amount and when needed through carrying out annual quantification and gap analysis for all malaria commodities and supplies; providing conducive partnership to properly conduct procurement of malaria commodities and supplies; procuring antimalarials for treatment of uncomplicated malaria for public and private health facilities, antimalarials for preventive therapies, diagnostic tests, antimalarials for treatment of severe malaria, ITNs, bio-larvicides, and insecticides for IRS; enhancing supply chain of insecticide-treated materials, insecticides, and larvicides, from point-of-entry/supplier to service delivery point; enhancing supply chain of medicines and diagnostics for malaria case management from point-of-entry/ supplier to healthcare facilities; and enhancing logistics management of medicines, diagnostics, and other malaria commodities within the healthcare facilities, including dispensing.
- Promoting partnership to ensure that all malaria commodities used at service delivery points are quality assured through strengthening commodities quality check for commodities for vector control and case management; conducting post-market surveillance for antimalarial medicines and malaria testing devices; and conducting post-market surveillance for vector control commodities, ITNs, insecticides, and larvicides.

- Promoting partnership to ensure that all malaria commodities used at service delivery points are safe by facilitating the relevant regulatory authorities (Tanzania Medicines and Medical Devices Authority) to conduct passive pharmacovigilance for malaria medicines and facilitating the relevant regulatory authorities, NIMR and TPRI, to conduct continuous evaluation use practices and reevaluation of potentially adverse effects to people and the environment.
- The approach will also focus on facilitating the malaria commodities procurement process as indicated by the comprehensive annual quantification, through the provision of timely ordering and clear delivery schedule to the selected procurement agency. Improve the LMIS to facilitate the commodities supply chain from MSD to healthcare facilities and to respond to stockouts. This includes the following implementation priorities/approach:
    - MSD level – NMCP and partners will constantly monitor the flow of information, expected shipments, received goods, stock levels, and distribution to zonal stores and healthcare facilities.
    - NMCP level – Data from existing electronic platforms including DHIS2, the eLMIS, and regular stock verification at the zonal MSD level will be consolidated to monitor accessibility and availability of malaria commodities.
    - District and health facility levels – Specific, periodic surveys will be promoted to monitor the efficiency of the logistics system in the public and private sectors.
- The current and anticipated initiatives will include assessment of service provision at healthcare facilities, spot checks at all levels of the supply chain, and batch tracking surveys. Specific periodic surveys will be promoted to monitor the efficiency of the logistics system in the public and private sectors. The Pharmaceutical Services Unit and NMCP, in collaboration with implementing partners, will promote and maintain a system for ordering and accounting for loss of malaria commodities.

PMI Objective in Support of NMCP

Supply chain strengthening work falls under PMI's strategic area 5: Building capacity and health systems. PMI contributes to NMCP's strategy and larger GOT health supply chain strategies and prioritized interventions. PMI provides nationwide support for supply chain strengthening.

PMI-Supported Recent Progress (FY 2020)

PMI partners provided overall TA to the GOT on supply chain strengthening. Malaria commodities are included as part of the Integrated Logistics System (ILS); in general, support to malaria is part of overall support to supply chain strengthening. The following activities have been supported over the past 12 months to improve malaria commodity availability at the last mile:

Quantification and supply chain analyses: Provided TA on quantification of all malaria commodities managed by the NMCP. This support included preparation, defining assumptions, holding a quantification workshop, and hosting the final debriefing meeting. The following key areas were considered during the process: supported development of supply plans and monitored the pipeline of malaria commodities and made any required adjustments in supply plan.

Conducted assessment on ACT data: An ACT assessment was conducted comparing consumption between eLMIS and DHIS2 to answer the question "Is there a difference in ACT consumption values between monthly data reported by health facilities and entered into the DHIS2 system versus eLMIS data?" A key finding was a

significant difference observed between overall eLMIS and DHIS2 ACT consumption values (by product, by facility, and by district). The table below shows an example of a variance by product. However, on closer examination of AL 4x6, it was realized that making a conclusion would be misleading because the data is significantly distorted by a single record from a single health facility (Bugisi Health Centre in Shinyanga Region, Shinyanga District Council).

Table A-19. Screenshot of eLMIS reports and data extraction display, an approach to minimize the reliance of working with developers to LMIS related data

E_Productname2(abbrev.)	Sum of E_eLMIS AMC	Sum of D_DHIS_monthly consumption	Sum of ABS (Difference eLMIS-DHIS2)	%
Alu4x6	737,648	96,658	732,737	65%
Alu3x6	162,914	21,414	146,464	13%
Alu1x6	154,398	34,320	132,380	12%
Alu2x6	120,662	16,682	109,780	10%
Grand Total	**1,175,622**	**169,074**	**1,121,361**	**100%**

Recommendations from the assessment included the following:

- Extract eLMIS reports and simplify data to minimize the reliance of working with developers to pull data out of the back end of eLMIS. The eLMIS, as currently structured, requires as many as 12 queries to be run to view one year's worth of data.
- Add a master data component, including both a master facility list (the Health Facility Registry) and a master product list to the Project Year 5 work plan to reconcile issues related to facility information in eLMIS, DHIS2, and other MOHCDGEC systems.
- Observe actual eLMIS and DHIS2 field use.

The findings will inform NMCP and other partners when making decisions on use of consumption data for ACTs from the two systems.

Monitoring and reporting: PMI through its supply chain partner analyzed the performance of the supply chain system and identified performance issues that need corrective actions: Types of analysis include forecast accuracy of malaria commodities; reporting rates; regularly monitoring pipeline data and updating procurement plans and ITN distribution data. PMI also supported monitoring the availability of malaria commodities, and presented and discussed findings with key stakeholders for corrective actions. It also provided advice on distribution and eLMIS improvement and use. PMI support also provided capacity-building through Information Mobilized for Performance Analysis and Continuous Transformation (IMPACT) teams (which are regional and district teams of commodities managers overseeing and monitoring quality of logistics data coming from health facilities and providing solutions to identified issues) and convened joint performance discussions with stakeholders.

Delivery of health commodities at service sites: PMI through its supply chain TA partner provided TA in developing the Essential Health Commodities Quantification Guidelines. These guidelines are intended to assist key players in applying a systematic and clear, step-by-step approach to demand forecasting and quantifying health commodity requirements and costs. The guideline has an impact on malaria commodities quantified by health

facilities such as SP. PMI also supported redesigning the logistics system in Tanzania mainland; a key component is the increase in delivery frequency of health commodities to health facilities (from quarterly to bimonthly) and an increase in reporting frequency (from quarterly to monthly). The redesign also reduces inventory holding levels in the supply chain aimed at freeing up funds for other supply chain activities, and harmonizing reporting frequencies across program commodities.

Broadened stakeholders understanding and engagement of the supply chain by building capacity in supply chain management: PMI through its supply chain TA partner, collaborated with key stakeholders to improve ITNs availability by participating and sharing supply chain information and created awareness in various task forces/forums/workshops such as Malaria in Pregnancy (MIP) Task Force Meeting and ITN workshops (Mwanza, Mtwara, and Tabora).

PMI-Supported Planned Activities (FY 2021 with currently available funds)

- Support quantification of malaria health commodities in Mainland Tanzania.
- Regularly monitor supplies and risks related to availability of malaria commodities.
- Conduct in-depth analysis of supply chain performance.
- Provide TA and build capacity and ownership of the quantification process by counterparts.
- Analyze quantification processes and outputs to determine points for improvements.
- Track availability of ITNs, conduct quarterly performance based on set indicators, and build capacity of stakeholders.
- Support updating of policy documents (supply chain components) and conduct routine reviews of implementation plans.
- Provide TA in harmonization and implementation of health commodities revolving fund, a key activity for sustainability.
- Facilitate eLMIS transition to government by implementing an eLMIS transition plan including migration of eLMIS live instance (server) to the National Internet Data Center.
- Assist the MSD on identification of areas of improved efficiency (technical support on implementation plan to improve distribution efficiency).
- Integrate eLMIS with facility-level system(s) [Government of Tanzania Hospital Management Information System (GOTHOMIS), AfyaCare, Facility Financial Accounting and Reporting System, Health Facility Registry, Epicor 10, DHIS2]. Identify needed automated data validation checks and develop into eLMIS.
- Roll out the IMPACT team's approach and monitor performance of the IMPACT teams; build capacity of R/CHMTs in using data.
- Facilitate the institutionalization of collecting and monitoring national supply chain key performance indicators.
- Support the implementation of a supply chain portal.
- Strengthen RHMTs, CHMTs, and other supply chain stakeholders to proactively manage health commodities and their movements by supporting development of a supply chain e-learning initiative to facilitate virtual, sustainable capacity-building for supply chain stakeholders.
- Provide technical support to strengthen supply chain governance through TA on national medicines audit tool, develop regimen transition guideline, and align national health supply chain IPs by disseminating National Health Supply Chain Partner's Alignment and Coordination Guidelines.

- Provide support to capacitate PO-RALG to play greater role in oversight on implementation of supply chain interventions

Key Goal

Ensure continual availability of quality products needed for malaria control and elimination (ACTs, mRDTs, SP, Art. Inj., and ITNs) at health facilities and community level.

Key Question 1

Has the central level (or subcentral level, if appropriate) been stocked according to plan for ACTs, mRDTs, SP, and Art. Inj. over the last year (2020)? If not, have they been under, over, or stocked out?

- Most products were under minimum stock levels, or just at minimum stock levels for most of the quarters in FY 2020, with a couple of exceptions. In most cases, shipments arrived that prevented central-level stockouts.
- PMI will continue supporting NMCP in pipeline monitoring and updating, highlighting required shipments or changes to existing shipments to ensure the stocks are maintained between minimum and maximum.

Key Question 2

What are the trends in service delivery point stockout rates for ACTs (including ability to treat), RDTs, Art. Inj., and SP over the last year (if tracked)? Is there a seasonal or geographic difference in stockout rates?

- As the revised logistics system is rolled out, facilities either receive commodities on a bimonthly or quarterly basis. There is no substantial difference in stockout rates between the quarterly and bimonthly system.
- For most products, the target stockout rate of less or equal to 5 percent was not reached. Stock availability has been challenging, in part due to distribution challenges in-country, availability of funding for procurement, availability at the central level to fulfill orders, and delivery delays due to COVID-19 issues.
- PMI will continue to support NMCP to conduct quantification exercises, monitor stock availability, and the quarterly review of the supply plan to improve coordination and procurement planning across development partners.
- PMI will also continue to support monitoring of stock levels of ACTs, mRDTs, artesunate injection, and SP across all MSD zones.
- PMI will continue to support the improvement of data quality within the eLMIS to ensure increased data visibility and use for routine supply chain decision-making including rollout of IMPACT teams across all levels.

Key Question 3

What is the difference between quantities for ACTs consumed and malaria cases, and RDTs consumed and numbers tested? What is driving any differences seen?

Figure A-20. ACTs consumed and malaria cases

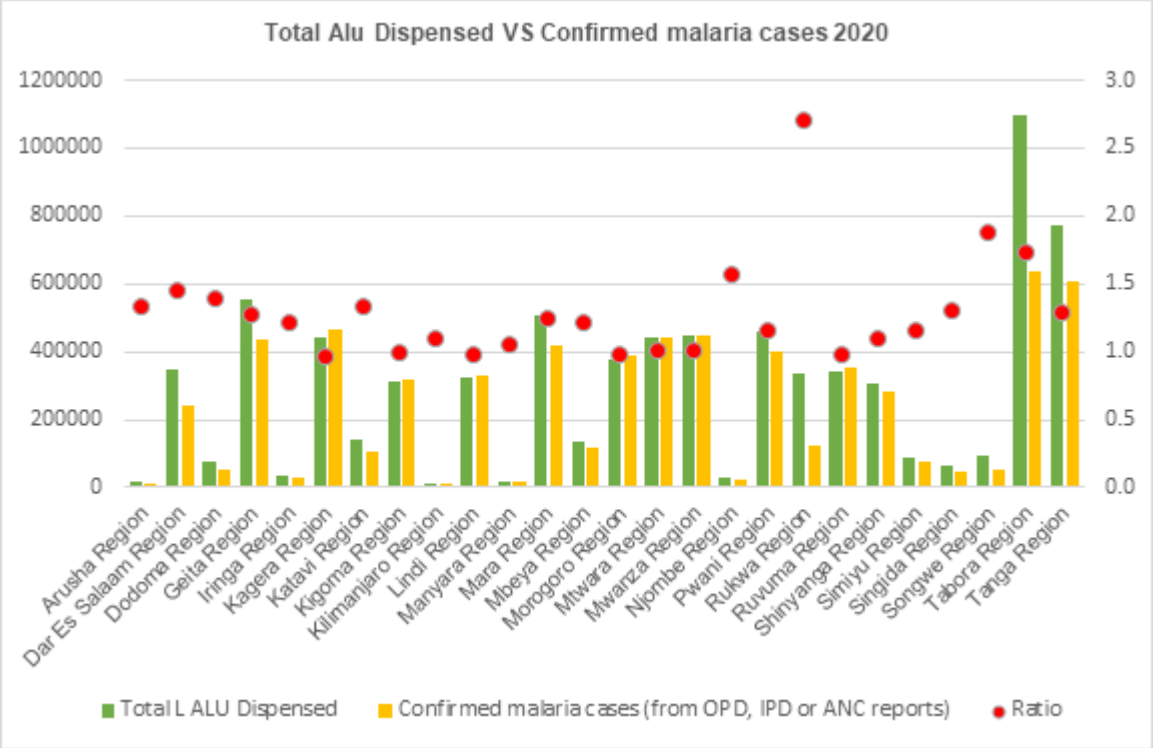
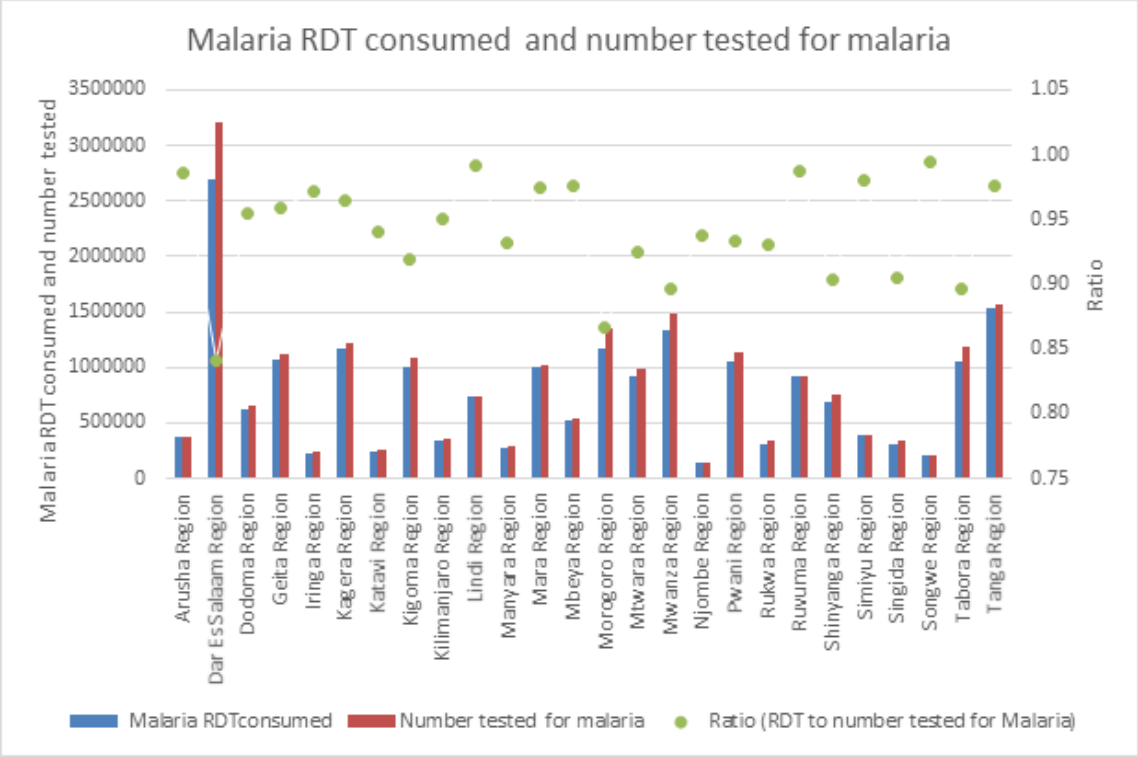


Figure A-21. RDTs consumed and numbers tested



- DHIS2 collects information on ACTs dispensed and confirmed malaria cases and mRDTs consumed and number tested. The data above is for the CY 2020.
- Overall there are more ACTs dispensed than confirmed cases. Ideally, the number of confirmed malaria cases would match the quantity of ACTs treatments dispensed. There are some regions like Mwanza and Mtwara where the ratio is 1.0 but in other regions like Rukwa the ratio goes up to 2.5. To help align these figures, analysis can be done to identify those regions, districts, and facilities where there are significant discrepancies, and targeted support can be provided to understand the actual issues.
- The number of mRDTs consumed versus the number of cases tested closely matches the ratio of mRDT consumed and number tested for malaria ranging from 0.8 (Dar es Salaam region) to 1.0 (Songwe and Kilimanjaro regions)

Key Question 4

To what extent does a functional LMIS provide visibility into timely and quality logistics data from various levels of the system? To what extent is commodity data visibility dependent on surveys or supervisory data rather than routine data reported by an LMIS?

- Health facilities at all levels use the eLMIS to report and request additional health malaria commodities from the MSD. Tanzania is in a phasing plan to transition from quarterly distribution systems and quarterly reporting to bimonthly distribution and monthly reporting of logistics data in accordance with the redesigned logistics system. In both of these systems, the reporting of malaria health commodities are reported together in the ILS.
- Reporting rate for both systems for four quarters (October 2019 to September 2020) has been almost 100 percent.
- More investments are needed in improvement of data quality recorded and reported in eLMIS by health facilities. PMI will continue to strengthen the LMIS, including improving data that is being reported through the eLMIS by supporting the IMPACT approach initiatives

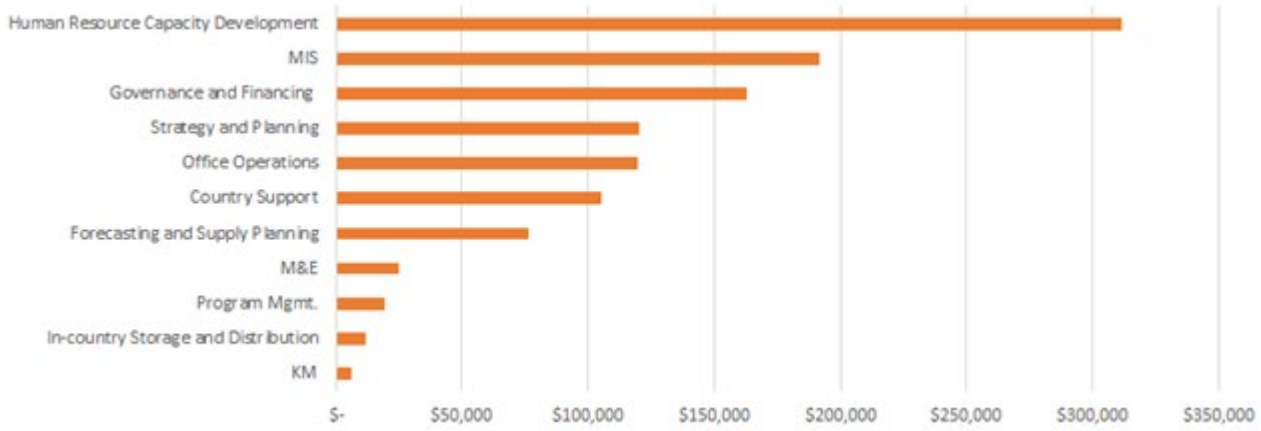
Key Question 5

What are the main supply chain TA functions supported by PMI? Are there additional investments that PMI should make (e.g., increasing visibility of demand at health facilities) to ensure continual availability of quality products needed for malaria control and elimination at health facilities and the community level? In areas performing well, is it dependent on PMI/donor funding (e.g., PMI and Global Fund pay for warehousing and distribution)? Should more be done to foster self-reliance in domestic systems and, if so, what approaches should be considered?

Supporting Data

For supply chain TA, PMI funding has been directed to support strategy and planning, human resources development and capacity-building, in country storage and distribution, governance and financing and forecasting, and supply chain management. Funding is broken down as shown in Global Health Supply Chain (GHSC) TA-TZ FY 20 PMI Investments figure below.

Figure A-22. GHSC TA-TZ FY 2020 PMI investments



- PMI will continue supporting efforts to strengthen forecasting, supply planning, strategy and planning, in-country storage and distribution, and monitoring and evaluation, as well as human resources capacity-building to support management information systems such as LMIS.
- PMI will continue efforts to strengthen the transitioned Logistics Management Unit to continue monitoring stock levels of all malaria commodities at MSD central and zones and health facilities through routine physical counts.
- PMI will continue to support NMCP to conduct quantification exercises and the quarterly review of the supply plan to improve coordination and procurement planning across development partners.
- PMI will continue to support the improvement of data quality within the eLMIS to ensure increased data visibility and use for routine supply chain decision-making including by IMPACT teams across all levels.

Key Question 6

Are there any other considerations that impact funding allocation in this category? If there is a specific budget line item in Table 2 that is not covered by the above questions, address here.

N/A

Supporting Data

N/A

Conclusions for Supply Chain Investments – FY 2022 funding activities

- PMI will continue supporting efforts to strengthen forecasting, supply planning, strategy and planning, in country storage and distribution, monitoring and evaluation as well as human resources capacity-building, and support management information systems such as eLMIS.
- PMI will continue with efforts to strengthen the transitioned Logistics Management Unit to continue with monitoring of stock levels of all malaria commodities at MSD central and zones and health facilities through routine physical counts.
- PMI will continue to support NMCP to conduct quantification exercises and the quarterly review of the supply plan to improve coordination and procurement planning across development partners.

Please see FY 2022 PMI budget tables for a detailed list of proposed activities with FY 2022 funding.

3.2. SURVEILLANCE, MONITORING, AND EVALUATION (SM&E)

NMCP Objective

NMCP's overarching goal of surveillance, monitoring, and evaluation (SME) is to provide timely and reliable information for assessing progress toward the global and national targets; ensure cost-effective uses of resources; and account for investments made in malaria control in the country. The Malaria Surveillance, Monitoring, and Evaluation Plan 2021–2025 strategy emphasizes three specific objectives, which target funding and guide the implementation of SME activities throughout the mainland.

Objective 1: Strengthen comprehensive malaria surveillance and response for improved programmatic performance.

Objective 2: Strengthen the malaria framework for collecting, processing, and storing essential indicators from periodic service delivery and programmatic surveys.

Objective 3: Strengthen the comprehensive malaria strategic information system to generate knowledge for evidence-based planning and decision-making at all levels.

NMCP Approach

The comprehensive malaria surveillance framework in mainland includes four major elements:

- Malaria disease surveillance: This includes passive monthly HMIS and weekly electronic IDSR (eIDSR) reporting through health facilities, and active case detection (ACD).
- Malaria programmatic surveillance: This includes malaria commodities supply management tracking, routine malaria preventive services, and insecticide resistance and therapeutic efficacy monitoring.
- Malaria transmission surveillance: This includes parasitological, such as sentinel population surveillance, malaria indicator and school malaria parasitological surveys, and antenatal clinic surveillance; entomological (malaria vector) surveillance; and meteorological monitoring.
- Malaria quality services surveillance: This includes malaria services and data quality improvement (MSDQI), data quality assessment (DQA), and health product QA/QC.

Malaria disease surveillance includes all routine malaria information reported by health facilities at monthly (HMIS) and weekly (IDSR) intervals. These two components constitute the foundation of passive surveillance and are well established in the mainland's healthcare delivery system. NMCP plans to implement a community-based ACD system and a facility-based Malaria Early Epidemic Detection System, such as those used in Zanzibar, for mainland that can detect sudden increases in malaria cases in low and very low prevalence locations.

The HMIS data from health facilities are typically recorded and reported in a paper-based format, whereas a mobile phone-based reporting system has been introduced for eIDSR. At larger health facilities and at the district level, HMIS data are entered by dedicated staff into DHIS2. A DQA process has been integrated into the MSDQI tool to improve the quality and use of routine malaria data reported from health facilities to HMIS nationwide

(see case management section). Routine data is reviewed and used for decision-making by Regional and Council Health Management Teams (R/CHMTs), NMCP, and partners.

NMCP has developed two distinctly separate but complementary electronic platforms within DHIS2 for the storage, analysis, visualization, interpretation, and utilization of aggregated malaria-related data: the Malaria Dashboard and Malaria Composite Database.

The Malaria Dashboard displays and provides access to five categories of indicators, populated primarily with data from the HMIS and service delivery departments. The categories include (1) uncomplicated malaria diagnosis through outpatient department (OPD), (2) malaria testing, (3) malaria commodities, or pharmaceuticals, (4) severe malaria morbidity and mortality through inpatient department, and (5) preventive services through RCH, including provision of ITNs.

The Malaria Composite Database is designed to systematically organize and integrate malaria-related information collected outside the routine HMIS. It is being developed in partnership by the University of Dar es Salaam College of Information and Communication Technologies. The data sources for the composite database are from programmatic and operational studies (e.g., Therapeutic Efficacy and Insecticide Resistance Monitoring), survey and surveillance outcomes (e.g., entomological and parasitological surveillance), vector control performance indicators (e.g., ITN, LSM, and IRS distribution), malaria commodities accountability through the eLMIS, the MSDQI process and SBC monitoring, and the Tanzania Meteorological Agency for evaluating climatic variations and suitability for malaria transmission.

For a description of the NMCP approach for entomological surveillance and insecticide resistance monitoring, see the Vector Control section. For a description of the malaria commodities supply management tracking (e.g., eLMIS), see the Supply Chain section. For a description of the therapeutic efficacy studies (TES), see the Case Management section.

PMI Objective in Support of NMCP

The PMI objectives are to support malaria surveillance system strengthening and monitoring, and evaluation of malaria interventions with a focus on high malaria burden regions. PMI also provides technical guidance, but not direct implementation, for SM&E of malaria interventions in lower malaria burden regions. See NMCP approach and PMI-supported planned activities.

PMI-Supported Recent Progress (FY 2020)

As part of a strategy to improve HMIS data availability and use, PMI has provided TA and support to the NMCP in reviewing monthly HMIS data after each reporting period; training on the DHIS2 malaria dashboard; preparing, printing, and disseminating quarterly and annual malaria bulletins using HMIS data; and revising, printing, and disseminating HMIS supervision tools.

PMI partners participated in training regional malaria focal persons to “operationalize” Tanzania’s Malaria Scorecard Management Tool, organized by the African Leaders Malaria Alliance, and attended by NMCP, PO-RALG, and the Tanzania Parliamentarians Against Malaria.

In 2020, PMI partners updated an analysis of the national eIDSR data 2014–2020 to target programmatic improvements in the quality and timeliness of malaria indicators reported through eIDSR and ascertain its usefulness as a tool for case-based surveillance and epidemic detection. Results from this analysis are pending. PMI partners also provided financial support and TA for the analysis of the 2019 School Malaria Parasitemia and Nutrition Survey. The survey collected data from 68,172 students 5 to 16 years of age from 700 public schools, sampled across 184 councils in all 26 regions of Mainland Tanzania. Dissemination of the results of this analysis are pending.

As part of the eHealth Strategy implementation, PMI has continued to support the integration of the multiple vertical health information systems used in mainland, such as HMIS and eIDSR, to achieve a uniform National Health Information Exchange architecture to improve integration and interoperability of health data, including data from the DHIS2 malaria dashboard and composite database. PMI has also provided technical guidance on the visualization of malaria indicators in the DHIS2 malaria dashboard.

In an effort to strengthen human resource capacity to use malaria-related data for decision-making, PMI supported additional training and attendance in short courses on topics such as epidemiology, data analysis and interpretation, and scientific writing; and three surveillance officer trainees from high-burden malaria regions in the Frontline (Basic) FETP. PMI partners provided technical support in the training of regional and district malaria focal persons on DHIS2 to improve the use of the malaria dashboard at the point of data generation. PMI partners conducted a virtual six-week "Foundation of R Language" course for three NMCP staff. R is an open-source statistical software package that is widely used in the fields of public health and epidemiology. For a description of the FETP activities, see the Health System Strengthening section.

As part of additional efforts to improve use of data for decision-making at the national level, PMI partners facilitated six data review meetings for selected malaria indicators led by NMCP, PO-RALG, and malaria partners in 2020. Participation was extended to regional focal persons as an inter-region cross-learning opportunity. Regional malaria focal persons shared best practices attributing to the improved performance for other regions to replicate. The data review meetings were also extended to malaria case management partners focused on reviewing trends of malaria performance indicators, including DQA scoring from MSDQI, to identify activities to improve malaria services and data quality in health facilities in the regions supported by PMI.

For a description of the progress of PMI-supported activities for entomological surveillance and insecticide resistance monitoring, see the Vector Control section. For a description of the progress of PMI-supported activities for therapeutic efficacy studies, see the Case Management section.

PMI-Supported Planned Activities (FY 2021 with currently available funds)

The core of the routine malaria surveillance system in mainland is the HMIS and IDSR systems, which are both on the DHIS2 platform. In coordination with other partners supporting routine surveillance in the mainland, PMI will support improving data quality in HMIS through the continued implementation of MSDQI (see Case Management section) and support to routine Health Information System strengthening (see Health System Strengthening section).

PMI will provide technical guidance but not direct implementation on the continued development of eIDSR as a possible tool for management of surveillance data for early epidemic detection and ACD in lower malaria burden

regions. This will include establishing eIDSR thresholds for lower malaria burden settings, and technical guidance on the development of standard operating procedures, including for case-based surveillance.

PMI will continue to support efforts to strengthen the malaria-related data integration and management systems (DHIS2 malaria dashboard and composite database), tools (e.g., eIDSR and MSDQI), and unit within the NMCP to analyze and disseminate information for decision-making, and will hold regular meetings and attend TWG meetings to review and discuss SM&E activities.

PMI will support the inclusion of malaria indicators in periodic national representative household surveys (DHS/MIS and MBS) and school-based surveys (School Malaria Parasitological Survey) planned for CY 2021.

PMI will support three participants for the 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 Health System 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. For a description of PMI support for operational research and program evaluation, see the Operational Research section.

Key Goal

To support the NMCP to build their capacity to conduct surveillance as a core malaria intervention using high-quality data from both surveys and routine health information systems.

Key Question 1

Which data sources are available to inform estimates of intervention coverage, service availability and readiness, and morbidity and mortality?

Table A-20. Available malaria surveillance sources

Source	Data Collection Activity	2019	2020	2021	2022	2023	2024
Household Surveys	Demographic Health Survey (DHS)			P			
Household Surveys	Malaria Indicator Survey (MIS)			P			
Household Surveys	Multiple Indicator Cluster Survey (MICS)						
Household Surveys	EPI survey						
Health Facility Surveys	Service Provision Assessment (SPA)						
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)	X	X	P	P	P	P
Malaria Surveillance and Routine System Support	Support to Parallel Malaria Surveillance System						
Malaria Surveillance and Routine System Support	Support to HMIS	X	X	P	P	P	P
Malaria Surveillance and Routine System Support	Support to Integrated Disease Surveillance and Response (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						
Other	End-Use Verification Survey (EUV)						
Other	School-based Malaria Survey[1]	X		P		P	
Other	Knowledge, Attitudes and Practices Survey, Malaria Behavior Survey			P			
Other	Malaria Impact Evaluation						
Other	Entomologic Monitoring	X	X	P	P	P	P

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

[1] Implementation of the school-based malaria survey is funded by Global Fund; PMI funds the analysis.

Key Question 2

What HMIS activities have been supported? What current priorities will be supported with FY 2022 MOP funding?

Support Health Information Management System (HMIS)/District Health Information System 2 (DHIS2):

- Assisted NMCP to monitor upgrades for the malaria composite database, MSDQI mobile app and dashboards, and DHIS2 malaria dashboard version 2.
- Conducted trainings for regional and council health management teams from Lindi, Morogoro, Mtwara, and Ruvuma regions to improve their capacity to access and use the system and review malaria data through the DHIS2 malaria dashboard version 2.
- Conducted monthly HMIS data review meetings with NMCP and other malaria partners.
- Provided TA in two of five malaria zonal meetings organized by the NMCP and PO-RALG that included regional and district malaria focal persons and other partners from the respective regions and councils.

PMI will support the following activities with fiscal year 2022 MOP funding:

- Support NMCP in improving the functionality of the HMIS/DHIS2 and eIDSR surveillance systems and the harmonization of malaria indicators within these systems.
- Provide technical support in the functionality and use of the malaria composite database, DHIS2, and MSDQI app.
- Facilitate bimonthly data use workshops with NMCP.
- Support NMCP to conduct zonal surveillance data review meetings.

Supporting Data

See proposed activities above.

Key Question 3

Are there specific outcomes of past/current HMIS strengthening efforts that can be identified?

Supporting Data

Table A-21. Outcomes of HMIS strengthening efforts

	Indicator	2019	2020
Timeliness	% of reports received on time	97.9%	98.5%
Completeness	Confirmed malaria cases for children under five years of age reported in Mainland Tanzania	99.7%	99.8%
Accuracy	Populate with most recent DQA data (data source: MSDQI)	31.4%	60.1%

Key Question 4

Are there any other considerations that impact your funding allocation in this category (e.g., strategic information or capacity-building in-country)?

N/A

Supporting Data

Conclusions for Surveillance, Monitoring, and Evaluation Investments

PMI will continue to support efforts to strengthen the malaria-related data integration and management systems (DHIS2 malaria dashboard and composite database), tools (e.g., eIDSR and MSDQI), and unit within the NMCP to analyze and disseminate information for decision-making, and will hold regular meetings and attend TWG meetings to review and discuss SM&E activities. In coordination with other partners supporting routine surveillance in the mainland, PMI will support improving data quality in HMIS through the continued implementation of MSDQI and provide support to routine health information system strengthening efforts. PMI will provide technical guidance but not direct implementation on the continued development of eIDSR as a possible tool for management of surveillance data for early epidemic detection and ACD in lower malaria burden regions.

Please see FY 2022 PMI budget tables for a detailed list of proposed activities with FY 2022 funding.

3.3. OPERATIONAL RESEARCH

NMCP Objective

The NMSP 2021–2025 indicates that a national malaria operational research agenda will be developed by NMCP and research partners to guide the strategic plan implementation and provide evidence for innovative initiatives. The agenda and the identified operational research priorities will form the basis for resource mobilization.

NMCP Approach

NMCP addresses potential OR/PE topics during the program and data reviews conducted during the various thematic TWGs (e.g., vector control, case management, SM&E, SBC, etc.) and will coordinate OR through a focal point.

PMI Objective in Support of NMCP

PMI works together with NMCP, implementing partners, and other donors and research institutions to support relevant OR/PE.

PMI-Supported Recent Progress (FY 2020)

The Group ANC study, originally planned to be implemented in 2020–2021, was canceled in mid-2020 for multiple reasons: mission directives to only continue essential services in the context of COVID-19; reductions in

ANC attendance as a result of the pandemic, which would lead to lower than expected intervention coverage, which would also affect our results and generalizability; and CDC guidance suggesting that group ANC not be held in settings of ongoing community transmission of COVID-19 given the potential increased risk to women as well as the perception of group meetings as a source of infection even if exposure is happening elsewhere in the community.

PMI-Supported Planned Activities (FY 2021 with currently available funds)

No studies are planned in the next 12 months.

PMI Goal

PMI will conduct PE/OR that helps to evaluate coverage of populations at-risk, intervention quality, or delivery efficiency; understand factors that reduce malaria transmission and disease burden; test effectiveness of new or evolved priority interventions and strategies; or explore new metrics and mechanisms to assess intervention impact.

Key Question 1

In consultation with the NMCP, have technical challenges or operational bottlenecks in program interventions been identified that require PE/OR? How have they been prioritized?

Supporting Data

Table A-22. Ongoing program evaluation and operational research

Funding Source	Implementing Institution	Research Question/Topic	Status/Timeline
Global Fund	Ifakara Health Institute	Evaluation of dihydroartemisinin-piperaquine as IPTi in high-transmission settings	Ongoing
Global Fund	Muhimbili University of Health and Allied Sciences	Evaluation of dihydroartemisinin-piperaquine for SMC in seasonal malaria transmission settings (i.e., based on 60% of rainfall in less than three months and 60% of malaria cases in less than four months)	Ongoing
Global Fund and U.S. Government (National Institutes of Health Grant)	National Institute of Medical Research (NIMR)-Tanga	Evaluation of dihydroartemisinin-piperaquine as IPTsc in high-transmission settings	Ongoing

Funding Source	Implementing Institution	Research Question/Topic	Status/Timeline
Social Care, the Department for International Development, the Medical Research Council, and Wellcome Trust	LSHTM, Kilimanjaro Christian Medical University College, NIMR-Mwanza, and University of Ottawa	Study title: Efficacy of different types of bi-treated long-lasting insecticidal nets and deployment strategy for control of malaria transmitted by pyrethroid resistant vectors. Short title: PAMVEC Study	April 2018–June 2022

Key Question 2

Are there specific challenges in any intervention areas that merit further exploration or research with the potential of establishing strategies or interventions applicable in the near future?

Supporting Data

Under a 2018 Presidential Directive, all local government authorities (councils) in the mainland are implementing LSM, specifically bio-larviciding using Bti (refer to Vector Control section). PMI does not support any aspect of bio-larviciding in mainland Tanzania. However, OR or PE to evaluate the impact of LSM on a broader scale, and determination of cost-effectiveness, would be helpful to the Tanzania malaria program. STPH is planning an evaluation of LSM beginning in 2021, which may inform future research questions and needs.

Key Question 3

Are there any other considerations that impact your funding allocation in this category?

N/A

Supporting Data

N/A

Conclusions for Program Evaluation and Operational Research Investments

OR on multiple chemoprevention approaches is underway with support from other donors. Once results are available, PMI will work with NMCP and partners to understand the implications and identify next steps.

No OR/PE activities are proposed with FY 2022 funding.

3.4. SOCIAL AND BEHAVIOR CHANGE (SBC)

NMCP Objective

The NMCP's SBC activities aim to promote increased access to and utilization of preventive and treatment services in mainland Tanzania. The Communication and Advocacy Guide, which will support the NMSP 2021–

2025 goals and objectives, is currently under development. The NMSP's overarching objective for SBC is to strengthen an enabling environment where individuals, households, and communities at risk of malaria are empowered to protect themselves and their families from malaria and seek proper and timely malaria care and treatment.

Strategic direction: To sustain the high knowledge on malaria interventions, while increasing the coverage and intensity of community mobilization, engagement, and interpersonal communication so as to bring the actual/desired behavior change in the uptake of malaria interventions.

NMCP Approach

Tanzania's approach to malaria SBC is guided by the Communication and Advocacy Guide. The current draft of the Communication and Advocacy Guide 2021–2025 identifies the following overarching aims for malaria SBC activities:

- Promote increased access to and utilization of integrated malaria vector control methods by targeted populations.
- Promote universal access to and utilization of appropriate malaria diagnosis, treatment, and targeted preventive therapies for vulnerable groups.
- Strengthen public–private partnerships to maximize SBC efforts and ensure consistency in the fight against malaria.
- Increase the visibility of specific malaria control campaigns among politicians, communities, and the general public so that malaria control is a priority at all levels.

The draft Communication and Advocacy Guide 2021–2025 also identifies specific considerations for SBC activities according to malaria risk strata. In moderate and high-risk strata, the focus is on continuing to promote uptake of all recommended malaria interventions, including consistent use of ITNs, acceptance of IRS (where it is implemented), seeking treatment for fever, testing before treatment, adherence to test results, use of recommended ACTs, and uptake of IPTp for pregnant women. In low and very low risk strata, the focus is on addressing the need to protect against malaria when traveling to endemic areas and regions with higher risk; addressing malaria risk perception, including shifts in immunity status due to malaria epidemiological transition; continued promotion of consistent ITN use; early treatment seeking; and active community participation and support for elimination activities, such as case-based surveillance.

PMI Objective in Support of NMCP

- PMI supports the NMCP SBC efforts that aims to promote positive human behaviors for malaria prevention and control in mainland Tanzania. The key focus is on increasing the utilization of appropriate malaria interventions among vulnerable populations. PMI provides support for these efforts at the national, district, and community levels.
- PMI supports mass media at the national level and community-level SBC activities in 29 districts with the aim of promoting increased ITN access, use, and care; acceptance of IRS (where it is implemented); prompt treatment-seeking for fever; testing before treatment; adherence to test results; use of recommended ACTs; and uptake of IPTp for pregnant women.

- PMI supports capacity strengthening activities and the development of materials and relevant guidelines, such as the Malaria Communications Strategy. At the district level, PMI support is focused on building the capacity of health promotion coordinators. The majority of PMI's SBC activities, however, are directed at the community level in the 14 PMI-focus regions. Through partnerships with local organizations, PMI supports the NMCP SBC efforts to expand community level interpersonal communication activities aimed at increasing correct and consistent use of ITNs, increased uptake of IPTp, prompt care-seeking, acceptance of IRS, and addressing misconceptions around IRS and ITNs.
- PMI supports the following priority behaviors: consistent and correct use of ITNs, increased uptake of IPTp, and prompt care-seeking.
- All malaria SBC activities are coordinated by the NMCP's SBC Unit. The SBC Unit holds quarterly TWG meetings that all malaria SBC implementing partners attend to review progress of the activities including reviewing and approving all new activities. The Health Promotion Section attends all SBC TWG meetings.
- PMI and Global Fund are the major donors that are funding malaria SBC activities in Tanzania. PMI is supporting comprehensive SBC activities in 14 regions (where malaria burden is highest) and Global Fund covers the remaining 12 regions. Both funders support the same campaigns and messages.

PMI-Supported Recent Progress (FY 2020)

Under the integrated health SBC platform, NAWEZA, PMI supported the rollout and implementation of a comprehensive set of SBC activities under the Parenting and Caregiving package (targeting parents and caregivers of children under five years of age), as well as continued implementation of SBC activities under the Pregnancy and Childbirth package (targeting pregnant women and their male partners). Activities, media and materials under these packages promote the following behavioral objectives:

Table A-23. Behavioral objectives promoted by the parenting and caregiving package

Behavior	Communications Objectives
Go early, attend, and complete more than four ANC visits (eight contacts are desired).	Pregnant women • Increase the percentage of pregnant women who know where and when to obtain ANC services. • Increase the percentage of pregnant women who feel confident to attend ANC early and more than four times (ideal behavior is eight ANC contacts, doable behavior may be more than four). • Increase the percentage of pregnant women who believe going to ANC early and more than four times, regardless of parity, benefits them and their baby. Partners • Increase in the percentage of partners of pregnant women who believe they should support (accompaniment and provision of resources) their pregnant partners to attend ANC. • Increase the percentage of partners of pregnant women who believe men like them support their partners to attend ANC.

Behavior	Communications Objectives
Take IPTp-3 during ANC visits.	Pregnant women • Increase the percentage of pregnant women who feel confident in their ability to prevent malaria during their pregnancy, including taking IPTp. Pregnant women and their partners • Increase the percentage of pregnant women and their partners who believe it is important to discuss preventing malaria during pregnancy with each other.
Sleep under an ITN every night, including pregnant women and children under five years of age.	Pregnant women and their partners • Increase the percentage of pregnant women and their partners who believe there is a heightened risk of malaria in pregnancy. • Increase the percentage of pregnant women and their partners who believe an ITN is safe and effective to use. • Increase the percentage of pregnant women and their partners who believe that ITNs prevent nuisance bugs that can disturb sleep. Caregivers of children under five years of age • Increase the percentage of caregivers who believe malaria is a serious threat for children under five years of age. • Increase the percentage of caregivers who believe an ITN is safe and effective to use. • Increase the percentage of caregivers who believe that ITNs prevent nuisance bugs that can disturb sleep.
Seek prompt and appropriate care for children under five years of age with a fever, including the use of a rapid diagnostic test (mRDT) to confirm malaria.	Caregivers of children under five years of age • Increase the percentage of caregivers who believe that the health facility is the first place they should take a sick child. • Increase the percentage of caregivers with comprehensive and correct knowledge of malaria causes, prevention, symptoms, and treatment. • Increase the percentage of caregivers who intend to take a sick child with fever to the health facility.

These packages are implemented through national-level mass and social media, as well as intensified community-level SBC activities in 29 districts. Key outputs and outcomes stemming from this support included the following:

- Training: 1,258 community volunteers were trained to implement small group discussion sessions and timed household visit activities under the NAWEZA Pregnancy and Childbirth and Pregnancy and Caregiving packages. These activities include promotion of the following malaria priority behaviors: ITN use, prompt care-seeking for fever, and uptake of three or more doses of SP (IPTp3+).
- Implementation of mass media activities:
  - 7,944 radio spots promoting ITN use and prompt care-seeking for fever were aired via national and regional radio stations, reaching 26 million people, with airing intensified during the rainy season.
  - Two NAWEZA anchor show episodes were developed, with one addressing ITN use and one addressing prompt care-seeking for fever, with each aired six times across three national radio stations reaching approximately 26 million people.
  - Three billboards and 53 signboards were installed across PMI priority areas in the 29 enhanced districts addressing ITN use, early care-seeking, and IPTp3+.

    - Developed and aired 44 community radio programs promoting ITN use, uptake of IPTp3+, and early care-seeking across 29 districts.
    - Reached at least 100,000 people via NAWEZA social media platforms (Facebook, Instagram, and Twitter) with malaria messages on ITN use, early care-seeking, ANC attendance and uptake of IPTp3+.
- Print materials: Distributed 1,000 ITN use posters, 1,000 early care-seeking posters, 1,000 early care-seeking brochures, and 12,000 ITN use and early care-seeking cards across 29 districts in the community and through health facilities and 4.2 million ITN use and care fliers were placed in each ITN and distributed in schools across 14 PMI regions.
- Implementation of mass media activities: Conducted 51 mother meet-up events across 29 districts reaching 2,293 women with children under 12 months of age in FY 2020. During these events, women hold discussions that allow them to share barriers to uptake of promoted behaviors and collectively problem-solve to identify barriers to overcome them. Malaria priority behaviors discussed during these events include ITN use and early care-seeking for fever.
- Implementation of interpersonal communication activities:
    - Reached 162,560 pregnant women and their partners through Pregnancy and Childbirth small group dialogue sessions promoting ANC attendance, uptake of IPTp3+, and ITN use during pregnancy.
    - Reached 199,920 mothers and caregivers of infants through timed household visits as part of the NAWEZA Caregiving package. These visits promote ITN use and prompt care-seeking for fever.

PMI-support key behavioral determinants were routinely tracked through omnibus and sentinel surveys. This tracking was intended to support understanding of how the above described activities were contributing to achievement of SBC objectives. Areas of positive progress identified through these surveys include:

- Positive attitudes toward ITN use (ITNs considered safe and effective at preventing malaria) rose from 59 percent in FY 2019 to 64 percent in FY 2020.
- The proportion of pregnant women and their partners who perceived an increased risk of malaria during pregnancy rose from 48 percent in FY 2019 to 52 percent in FY 2020.
- The proportion of pregnant women and women who gave birth 11 months prior the survey who reported confidence to use IPTp3+ and sleep under ITN during pregnancy rose from 74 percent in FY 2019 to 78 percent in FY 2020.
- Positive attitudes toward malaria treatment rose from 65 percent in FY 2019 to 69 percent in FY 2020.
- The proportion of people with comprehensive knowledge of malaria causes, symptoms, prevention, and treatment rose from 47 percent in FY 2019 to 75 percent in FY 2020.

Additional malaria SBC activities supported by PMI included the following strategic activities:

- Support during the SNP in 14 PMI regions: 3,436 cultural theater performances were held and 3,480 public announcements made, reaching 2.25 million people. The activities focused on promoting awareness of the SNP among parents and caregivers of school-age children, as well as addressing communication objectives related to net use, net care, and net sharing (i.e., redistribution of nets among households, with those having more nets than needed sharing with those who have insufficient nets).
- Supported revision of IRS materials in advance of spring campaigns in the Lake Zone. Materials revised included three radio spots, an IRS poster, tear-off sheet, FAQ informational brochure, and leaflet. The

materials are designed to increase the number of people in communities targeted for IRS who have accurate knowledge of IRS as a malaria prevention method, who believe that the insecticide used in IRS is safe, and who have supportive attitudes toward IRS.
- Provided technical guidance and coordination to NMCP in development of a guide outlining considerations for adapting malaria activities during COVID-19 (titled Tailoring Malaria Interventions in the Context of COVID-19).
- Provided TA to NMCP in the development of the Malaria Communication and Advocacy Guide 2021–2025 through co-facilitation of workshops during which content for the guide was drafted, and subsequent technical review and refinement of the draft content.
- Strengthened the knowledge base of malaria SBC activities within the NMCP and Health Promotion Section at national by enrollment in SBC online courses.

Key challenges observed during implementation of the above activities included:

- Low participation of male partners in community dialogue sessions: Men find formal settings intimidating, which limits their active participation. They will be more receptive to participate in SBC activities if they take place in settings where they already congregate and where they feel comfortable. In FY 2021, the project has begun development of the *Kijiwe Cha Kahawa* toolkit, which use male "hangouts" or points in the community such as coffee corners and use trained fellows to facilitate discussion on the importance of their support in family health issues, including malaria prevention and care-seeking behaviors.
- Regular stockout of SP, which affects uptake of IPTp3+ among pregnant women. Improvements have been observed in the number of pregnant women attending at least four ANC visits.

PMI-Supported Planned Activities (FY 2021 with currently available funds)

PMI is continuing to support SBC interventions addressing the following key behavioral and communication objectives:

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

- Airing of 1,400 radio spots, 1,400 DJ presenter mentions, and three anchor show episodes across three national and eight regional radio stations, with airing intensified during the rainy season. Key behaviors promoted will be consistent use of ITN, early care-seeking, early ANC attendance, and uptake of IPTp3+.
- Through mass media, to trigger discussions around ITN use, early care-seeking, early ANC attendance and uptake of IPTp3+, PMI will support 1,100 public service announcements to reach at least 110,000 people and 29 mother meet-ups across 29 districts to reach 1,450 women with children under 12 months of age.
- To increase dialogue on key malaria behaviors, PMI will support a range of interpersonal communication activities at community level, including timed household visits with new mothers, community dialogue sessions with pregnant women and their partners, and *Kijiwe Cha Kahawa* with men (men's coffee corner discussions) across 29 districts.

Additional activities to be conducted with PMI support include the following:

- Support for the MBS activity. The findings from the MBS will be used to identify the existing knowledge gap and shift the programmatic decision on SBC interventions.
- Audience insight gathering to inform SNP messaging will be conducted across two districts with the aim of better understanding factors related to ITN sharing and inter-household distribution of nets. The activity will aim to answer the following key questions:
    - What happens after the child receives a net from the school?
    - How are nets distributed within the household?
    - What happens when a household has more nets than they need?
    - Is there a culture of net sharing within the community?
    - How could this culture be created or supported?
    - What actions are people taking to care for their nets?
- Small group discussions (at least six individuals per group) will be conducted with members of the following target audiences:
    - Parents and caregivers of primary school children 6 to 14 years, including heads of household.
    - Heads of primary schools and primary school teachers.
    - Ward Education Coordinators.
    - Ward Executive Officers and Village Executive Officers
- SBC activities during the SNP bed net distribution in nine PMI regions: 600 public service announcements will be implemented in the community with the aim of reaching approximately 90,000 members of the target audiences (parents and caregivers of school children who are eligible and not eligible to receive ITNs, general population). Key behavioral determinants which will be addressed include:
    - Awareness of the school net distribution, including which classes are eligible and why they were selected (targeting parents and caregivers with school-age children).
    - Belief that it is important to sleep under an ITN every night (targeting general population).
    - Belief than an ITN is safe and effective to use (targeting general population).
    - Confidence in their ability to adopt correct ITN use, care, and repair practice (targeting general population).
    - Belief that malaria is a serious and life-threatening disease (targeting general population).
    - Belief that it is important to share extra nets (targeting head of households).

Also, to support the net distribution activity and promote ITN use and care, eight regional radio stations with high listenership will be engaged to provide information prior to, during, and after the distribution. This will include airing of three radio spots promoting SNP awareness, net use, and net sharing (to be aired 1,024 times) and 240 interviews for the period of three weeks around the net distribution. Presenter mentions (348) will also share information regarding distribution dates in each covered region.

- Finalizing development of Communication and Advocacy Guide 2021–2025, including support for technical review, layout, and validation.

Key Goal

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

Key Question 1

What behaviors is PMI proposing to prioritize through its SBC programming? What data support this prioritization? Will support be geographically targeted or national?

Supporting Data

Table A-24. Prioritized behaviors with FY 2022 funds

Behavior	Target Population	Geographic Focus	Justification
Sleep under an ITN every night.	Pregnant women and caregivers of children under five years of age	Geita, Kigoma, Mara, Morogoro, Mwanza, Shinyanga, Simiyu, Tabora	Correct, consistent use of ITNs remains one of the primary vector control interventions under the NMSP and addressing net use is a priority behavioral objective in the Malaria Communication and Advocacy Guide 2021–2025. While progress has been made in addressing barriers to net use, resulting in a positive net use culture in many areas of Tanzania, gaps still remain that require SBC support. Sustaining ITN use as malaria prevalence declines as Tanzania progresses toward malaria control will also be critical. The 2017 Malaria Indicator Survey (MIS) showed low net use given access in Simiyu (76%), Shinyanga (78%), and Tabora (70%), indicating an important gap remains to be filled through SBC activities targeting net use behavior in these key geographies. A sentinel survey conducted by the USAID Tulonge Afya project in 2020 also found: • Low proportion of pregnant women and their partners who believe an ITN is safe and effective to use in Geita (45%), Kigoma (59.1%), Mara (58.9%), Morogoro (45.5%), Mwanza (59.6%), Shinyanga (61.2%), Simiyu (51.5%), and Tabora (42.9%). The national average is 64%. • Low proportion of caregivers with positive attitudes toward ITNs in Geita (43.4%), Kigoma (58.6%), Mara (56.7%), Morogoro (44.3%), Mwanza (56.1%), Shinyanga (62.6%), Simiyu (51.5%), and Tabora (39.2%). The national average is 63.8%.
Promptly seek care for children under five years of age with fever.	Caregivers of children under five years of age	Kagera, Kigoma, Lindi, Mara, Shinyanga and Tabora	Ensuring prompt care-seeking for fever at a health facility is identified as a priority in the NMSP and the national Malaria Communication and Advocacy Guide. Care-seeking is also a critical gateway behavior necessary to ensure linkage with appropriate care and treatment for malaria, and counseling to reduce malaria risk in future. Based on data from USAID Tulonge Afya's sentinel survey in 2020, in the six regions proposed for targeting, the proportion of caregivers who sought prompt care for a sick child is 75% or below, which fails to reach the national target of 75% established in the NMSP. In terms of key behavioral determinants, sentinel survey data indicates:

Behavior	Target Population	Geographic Focus	Justification
			• Low proportion of caregivers with comprehensive and correct knowledge of malaria causes, prevention, symptoms and treatment in Shinyanga (35.6%) and Kagera (74%). The national average is 74.7%. • Low proportion of caregivers with positive attitudes toward malaria treatment in Kigoma (62.8%), Lindi (67.2%), Mara (68.6%), Shinyanga (67.3%), and Tabora (45.6%). The national average is 69.5%.
Uptake of IPTp3+ during ANC visit.	Pregnant women	Highly intensive intervention in Geita, Kagera, Morogoro, Shinyanga, and Simiyu	Achievement of IPTp3+ is a priority objective in the NMSP and a key behavioral objective in the National Malaria Communication and Advocacy Guide. While achievement of ANC4 has seen notable improvements in recent years, there remain gaps in achievement of IPTp3+, which indicates there is an important opportunity to increase uptake of this behavior. In the five regions noted for targeting, 2020 DHIS2 data shows that uptake of IPTp3+ and attendance of four or more ANC visits both fall below the national targets of 70% and 90% respectively. Behavioral data from USAID Tulonge Afya's 2020 sentinel survey also indicates: • Low proportion of pregnant women who feel confident in their ability to prevent malaria during their pregnancy, including taking SP in Morogoro (35.3%), Simiyu (66.7%), and Geita (63.2%). National average was 77.8%. • Low proportion of pregnant women and their partners who discuss preventing malaria during their pregnancy in Kagera (39.3%), Shinyanga (38.9%), and Simiyu (40%). National average was 51%. • Low proportion of pregnant women and their partners who believe there is a heightened risk of malaria in pregnancy in Geita (40%), Kagera (47.9%), Morogoro (43.9%), Shinyanga (43.3%), and Simiyu (47.9%). National average was 52%.

Key Question 2a

For ITN use and access, what gaps exist in understanding the barriers to the adoption and maintenance of malaria prevention and treatment behaviors?

Supporting Data

Net Use: It would be beneficial to conduct targeted information gathering to better understand the most influential determinants influencing consistent ITN use in communities where net access is high, but use is low. Further, net care and repair practices have an important impact on net longevity, with resultant impacts on net access and use. Knowledge gaps remain surrounding the barriers and motivators for net care and repair practices, including understanding effective locally driven practices that may be promoted through SBC programs. MBS planned to be conducted in CY 2021 will provide answers to most of these questions.

Net Access: More insight is required to get information on where did people buy their nets – at a pharmacy, duka, or black market? Do people know the difference between treated and untreated nets? What triggers the decision to buy a net? Were they exposed to promotion? Did they choose a particular brand? Why? This information will inform SBC messaging, materials, and activities. MBS planned to be conducted in CY 2021 will provide answers to most of these questions.

Key Question 2b

For prompt care-seeking, what gaps exist in understanding the barriers to the adoption and maintenance of malaria prevention and treatment behaviors?

Supporting Data

PMI supported a sentinel survey nationally that showed that intention to take a sick child with fever to the health facility is low (43.7 percent) even though the proportion of parents and caregivers who sought prompt care at a health facility for a child with fever was actually 80.3 percent. This raises questions regarding the linkage between intention to seek care and actual care-seeking, and how other determinants may be interacting or impacting this behavior. In particular, additional insights into parents and caregivers decision-making processes regarding when and where to seek care for a child with a fever would be beneficial. MBS planned to be conducted in CY 2021 will provide more insight on this area.

Key Question 2c

For uptake of IPTp3+ during ANC visit, what gaps exist in understanding the barriers to the adoption and maintenance of malaria prevention and treatment behaviors?

Supporting Data

Nationally, there is progress in achieving ANC attendance targets. However, some regions are still lagging behind. New insights into ways to overcome deeply entrenched barriers to achieving ANC4 in these regions would be beneficial. Additionally, there is a gap in understanding of the most critical barriers to achievement of IPTp3+ in areas where coverage of ANC4 is high, including examining the influence of service-side barriers versus demand-side barriers.

Key Question 3

What is the country's capacity to design, implement, and monitor SBC interventions at the national and subnational level?

Supporting Data

NMCP has demonstrated leadership in coordinating SBC implementing partners, including clear linkage with the Health Promotion Section of the MOHCDGEC. NMCP also demonstrates use of data like media monitoring reports to allocate resources; however, regular use of DHIS2 data needs to be strengthened. This also includes building the capacity of malaria stakeholders at the regional and district level on the use of SBC dashboard under DHIS2 to inform their planning and programming. Regular supportive supervision and on job orientation is required to build capacity of SBC staff at regional and district levels on ensuring quality malaria SBC delivery.

NMCP is coordinating malaria SBC between partners and across levels through the SBC Technical Working Group (TWG). More technical guidance is required to build the capacity of NMCP to use this platform to showcase SBC best practices.

Conclusions for SBC Investments – FY 2022 supported activities

This MOP will continue supporting the SBC interventions that will address the three prioritized behaviors of ITN use and care, decision- making related to care-seeking behavior for fever, and IPTp3+ in areas where achievement of ANC4 is high.

PMI is supporting the MBS in the CY 2021. The findings from the MBS survey will be used to identify the existing knowledge gap and shift the programmatic decision on SBC interventions.

PMI will continue to strengthen the knowledge base of malaria SBC practitioners at national, regional, and district levels by enrollment in SBC online courses and follow up via supportive supervision to ensure the application of SBC best practice.

Please see FY 2022 PMI budget tables for a detailed list of proposed activities with FY 2022 funding.

3.5. OTHER HEALTH SYSTEMS STRENGTHENING

NMCP Objective

According to the Strategic Plan 2021–2025, the following are the objectives:

- Reduce malaria parasite transmission by maintaining recommended evidence-based vector control interventions according to the targeted malaria risk strata.
- Prevent the occurrence of mortality related to malaria infection through universal access to appropriate diagnosis and treatment and targeted provision of preventive therapies for vulnerable groups.
- Provide timely and reliable information on malaria and its control needed to take appropriate actions in different transmission risk areas and ensure resources are used in the most cost-effective manner.
- Maintain timely availability of safe and quality malaria commodities and supplies at the delivery points.
- Strengthen an enabling environment where individuals at risk from malaria are empowered to protect themselves and their families from malaria and seek proper and timely treatment.
- Strengthen efficiency and effectiveness coordination on malaria implementation strategies via accountable partnership.

NMCP Approach

- Improve the effectiveness and accountability of malaria control implementation by strengthening partnerships and cooperation with malaria control stakeholders at all levels.
- Improve coordination and governance structures at all levels to strengthen coordination, communication, governance, and close follow-up of all malaria related interventions.
- Strengthen human resources capacity for effective strategic plan implementation at national and LGA levels.

- Enhance well-structured, coordinated, and harmonized supervision and verification system involving implementing entities at various levels.
- Advocate for RHMTs /CHMTs to budget for malaria interventions according to respective level and target (malaria elimination or burden reduction).
- Develop and update comprehensive business and operational plans for malaria control.
- Update comprehensive resource mobilization plan to attract adequate funding to support malaria implementation from domestic and development partner sources.

President's Office Regional Administration and Local Government approach:

The Health, Social Welfare, and Nutrition Services in the President's Office Regional Administration and Local Government (PO-RALG) is responsible for the interpretation of policies and coordination of policy implementation at the Regional and Local Government Authorities. There is a decentralized structure of management of health services with the Regional Health Management Teams at the regional level holding responsibility for conducting supportive supervision and mentorship for the district councils. The Council Health Management Teams (CHMT) at the district level will be responsible for ensuring that health programs are implemented according to the design. CHMTs are also responsible for providing TA to the primary healthcare facilities.

PMI Objective in Support of NMCP

- PMI and other malaria control partners support the NMCP to build and strengthen health systems to ensure malaria control efforts are sustainable, country-owned, and integrated into the health system. By supporting health systems interventions, PMI, the NMCP, and malaria partners aim to continue progress in the achievement of malaria control objectives and to sustain malaria control gains as Tanzania moves toward elimination. In particular, in alignment with the WHO HSS building blocks, PMI has prioritized support in the following areas:
    - Addressing critical health workforce shortages by improving recruitment, deployment, and retention systems for health workers.
    - Improving the availability of needed skills in the workforce to lead malaria control efforts by strengthening the capacity of staff at the NMCP.
    - Reducing drug stockouts by improving supply chain management and commodity forecasting, procurement, and distribution.
    - Decreasing donor dependency for financing of malaria control efforts through innovative domestic resource mobilization activities and public–private partnerships.
    - Strengthening accountability and management for delivery of health services.
    - Improving data for decision-making by continuing to support improvement of routine information systems including HMIS and eLMIS.

PMI-Supported Recent Progress (FY 2020)

Capacity-building for NMCP:

NMCP has engaged in various activities to increase the capacity of NMCP staff in various areas at both the national and regional level. The following activities were carried out to strengthen the malaria health systems.

- Supported system enhancements and maintenance (DHIS2, MSDQI, dashboards, and malaria composite database).
- Provided technical inputs in data cleaning, analysis, and report writing of the 2019 School Malaria Parasitological Survey.
- Oriented 400 regional and council health management teams from six regions and 40 councils, and NMCP in DHIS2 resulting in increased utilization of DHIS2 data within councils (Geita, Lindi, Morogoro, Mtwara, Ruvuma, and Tanga).
- Harmonized NMCP supervision tools and malaria indicators within DHIS2 and MSDQI mobile apps.
- Scaled up health promotion data collection and visualization dashboard under DHIS2.
- PMI strengthened feedback mechanisms between the formal health system with community structures in terms of malaria incidence, case notification, and overall program performance.
- Integrated malaria data systems with the national HMIS for seamless exchange of data and to facilitate timely decision-making and reduce data inequality challenges.
- Harmonized different data collection tools (internal harmonization).

FETP:

- The African Field Epidemiology Network, USAID Tanzania (with PMI funding), CDC-Atlanta, and CDC-Tanzania (with funding from the President's Emergency Plan for AIDS Relief) have all worked together since 2008 to develop and strengthen the Tanzania FETP. However, the impact of COVID-19 slowed FETP activities in 2020.
- In the past 12 months, FETP graduated its 11th cohort of 22 residents, which makes a total of 152 residents graduated since the program started in 2008. Following completion of the FETP training, these public health workers have returned to government institutions and work under various capacity such as Head of Vector Control (NMCP), Case Management Officer (NMCP); Head of Surveillance unit (NMCP) for Epidemiology Units in Tanzania mainland and Zanzibar; Malaria Coordinator for PO-RALG; Program Manager (Zanzibar Integrated HIV Hepatitis) for Tuberculosis and Leprosy program (Zanzibar); Strategic Information Coordinator (Zanzibar Integrated HIV Hepatitis, TB, and Leprosy program); Strategic Information manager (PMTCT-RCH mainland); Head Port Health (MOHCDGEC); Head Integrated RCH program (Zanzibar); Hepatitis Control and Prevention Coordinator (MOHCDGEC); Head Disease Surveillance (MOHCDGEC); Emergency Operation Center Manager (MOHCDGEC); Influenza Program Coordinator (MOHCDGEC); and Head and Deputy Head of Laboratory Services (PO-RALG). Others have been promoted to be District and Regional Medical Officers and have played a crucial role in the implementation of the malaria control program at regional and district levels. Following the completion of the FETP, these public health workers are expected to chair technical committees, thereby contributing to the oversight of important malaria-related issues including surveillance, disease

control, and commodities, and initiating discussions in these meetings, which might have impact on malaria interventions.
- PMI staff coordinates with the CDC-Tanzania FETP program and work with the Tanzania FETP Resident Advisor to facilitate linkages between Tanzania FETP residents, NMCP, ZAMEP, and implementing partners to ensure that residents take advantage of the available opportunities and experiences in the area of malaria control in Tanzania. PMI staff helps identify meaningful and appropriate field placements and research areas that allow the residents to select thesis topics around malaria.

PEACE CORPS:

- Due to the ongoing COVID-19 pandemic there have been no Peace Corp volunteers (PCVs) in Tanzania since March 2020.

PMI-Supported Planned Activities (FY 2021 with currently available funds)

Support capacity-building for NMCP staff:

- NMCP will be supported to engage in various activities to increase capacity of NMCP staff in various areas, including supportive supervision, participation in international and national-level trainings or conferences or workshops.

Support for FETP:

- PMI will continue support to the FETP program and contribute to the advanced training of Tanzanian epidemiologists for a 12-month period. The trainees will receive assistance from Resident Advisors and participate in malaria field assignments and investigations throughout Mainland and Zanzibar. PMI will continue to track the placement of FETP graduates into post-training MOHCDGEC assignments that directly influence malaria control policies and practices. In addition, PMI through implementing partners will support training for district-level health officers through the CDC FETP-Frontline course. The budget for these district-level officers will be included in implementing partner work plans. PMI will ensure that the frontline training does not duplicate ongoing PMI-supported training and capacity-building efforts supported by implementing partners. PMI and partners will consult the in-country FETP Program for exact cost.

Support for Peace Corps:

- It is anticipated that beginning in FY 2022, Peace Corps will restart a PCV program in Tanzania and therefore PMI will support up to three PCVs to work with the NMCP and PMI-supported implementing partners on malaria-related activities.
- Provide funds for Small Project Assistance grants that are available on a competitive basis to support PCVs' community-based malaria SBC activities.

Additional efforts to strengthen accountability and management for delivery of health services, through improvements in data and information systems for reporting, decision-making, planning, budgeting, and timely reporting.

- PMI will support HSS initiatives that will improve data for decision-making by supporting the rollout, scale-up, and improvement of routine information systems including the HMIS and the eLMIS. PMI will support strengthening of interoperability functions of several GOT information management systems to inform decision-making including DHIS2 with Government of Tanzania Hospital Management Information System (GOTHOMIS) and the planning and reporting system (PlanRep) with Facility Financial Accounting and Reporting System.
- Implementation of a new HSS initiative called *Makole*. This initiative will support PO-RALG to set up individual performance standards, ensure that facility management conducts oversight of individual performance, build staff skills in providing respectful care of clients, focus on institutional productivity (as opposed to quality of services), examine its administrative and financial system performance, and enforce existing rules to promote accountability.
- PMI will co-fund along with other USAID investments to support LGAs and facilities to prioritize the use of resources on key health areas such as management of malaria disease burden, purchase of relevant commodities, and appropriate use of incentives for deserving health workers. This investment will also focus on increasing GOT budget execution levels for allocated health budgets. This initiative will help to decrease donor dependency on financing of malaria control efforts through innovative domestic resource mobilization activities.
- Support for capacity-building of NMCP including staff attendance at conferences, participation in short-term training, study tours, other educational programs, and other needs as determined by the current training needs assessments.
- PMI funds will support LGAs and facilities as a continued support for PO-RALG to strengthen supportive supervision and capacity-building for CHMTs and RHMTs, and prioritize the use of these increased resources to support priority health areas such as management of malaria disease burden, purchase of relevant commodities, and appropriate use of incentives for deserving health workers.
- The *Makole* model will drive data use for evidence-based programming, quality outcome, and financial systems performance, and will enforce existing rules to promote accountability.
- PMI will improve PO-RALG investment/involvement in malaria program:
    - Incorporate MSDQI findings and planning into PO-RALG's main dashboard for greater overview and to improve coordination between PO-RALG and NMCP, councils/districts, and the national level.
    - Include indicators of interest to PMI into PO-RALG's real-time dashboard (supportive supervision and monitoring).
    - Include cross-cutting management indicators that may not be a focus of MSDQI but will improve quality of malaria services.
    - Ensure that findings of the MSDQI assessment is implemented.
    - Verify the distribution of ITNs was made as per distribution manifesto plan (spot-check for selected school when deemed necessary) at regional level.
    - Advocate for IRS activities to leaders at all levels and ensure that IRS is operated in a streamlined manner.
    - Assess IRS application performance, identify challenges, and assist in finding solutions.
    - Conduct mentorship to RHMTs and CHMTs to effectively translate the national malaria strategy, and plan and allocate resources for better targeting of malaria interventions.

Key Goal

PMI's support for HSS is aligned with USAID's Vision as stated in the PMI Strategy 2015–2020. Stronger health systems are necessary to extend access to health services to the most vulnerable, to deliver sustainable improvements in health outcomes, and ultimately to contribute to the country's economic growth. Overall, the HSS support aligns with USAID's Vision for Health Systems Strengthening 2015–2019, which defines four strategic outcomes to achieving universal health coverage (defined as a condition where all the people who need health services receive them without financial hardship):

- Financial protection: Reducing financial barriers to access life-saving services for the poor.
- Essential services: Ensuring that priority maternal, newborn, infectious disease services, etc. are included in the national essential benefits packages.
- Population coverage: Attaining coverage for people in the bottom wealth quintile and for other marginalized people.
- Responsiveness: Improving the satisfaction of poor and marginalized people with provision of essential services.

Key Question 1

Upon identifying specific goals, objectives, and actions for health systems strengthening focused on reducing malaria infection, morbidity and mortality, can you outline these and consider relevant support?

PMI/Tanzania will support efforts to address emergencies that result from outbreak or pandemic response activities. PMI will support activities for strengthening the capacity of FETP, PCVs, and health workers to address the outbreak or pandemic.

Supporting Data

N/A

Conclusions for Additional Health Systems Strengthening Investments

PMI will continue to support the capacity development of the Tanzania workforce at both the national and local government level to enhance technical and managerial knowledge to effectively implement malaria intentions.

PMI will support the FETP. PMI will also support the frontline FETP program that will target malaria focal persons and district and regional surveillance officers from high-burden regions. PMI will also support PCVs who work with local counterparts to implement malaria activities in their workplaces.

PMI will co-fund with other USAID resources to strengthen the MOHCDGEC and PO-RALG systems for planning, budgeting, reporting, and data use for decision-making.

PMI will support initiatives that will address critical health workforce shortages by improving recruitment, deployment, and retention systems for health workers. Through implementing partners, PMI will support the President's Office, Public Service Management, and PO-RALG at a central level to use evidence of malaria disease burden among other factors to allocate health workers based on need and priority interventions

PMI has allocated funding to support HSS initiatives supported by USAID. Through these, PMI will continue supporting capacity-building to increase capacity of the workforce in Tanzania and strengthening the financial and accountability systems for local government authorities and health facilities to be able to sustainably implement malaria activities.

Please see FY 2022 PMI budget tables for a detailed list of proposed activities with FY 2022 funding.