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Uganda

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

ACT	Artemisinin-based combination therapy
AL	Artemether-lumefantrine
AMF	Against Malaria Foundation
ANC	Antenatal care
ASAQ	Artesunate-amodiaquine
BMGF	Bill & Melinda Gates Foundation
CCM	Community case management
CDC	U.S. Centers for Disease Control and Prevention
CHEW	Community health extension worker
CHW	Community health worker
CQI	Continuous quality improvement
CSO	Civil Service society organization
CY	Calendar year
DHA/PPQ	Dihydroartemisinin-piperaquine
DHIS2	District Health Information Software 2
DHMT	District Health Management Team
DHS	Demographic and Health Survey
DOT	Directly observed treatment
EIR	Entomological inoculation rate
EPI	Expanded Program on Immunization
ERP	Enterprise resource planning
FCDO	Foreign Commonwealth and Development Office (United Kingdom)
FETP	Field Epidemiology Training Program
FY	Fiscal year
Global Fund	Global Fund to Fight AIDS, Tuberculosis, and Malaria
GOU	Government of Uganda
HC	Health center
HF	Health facility
HLC	Human landing catches
HMIS	Health Management Information System
HRH	Human Resources for Health
HSS	Health system strengthening
iCCM	Integrated Community Case Management
IPTp	Intermittent preventive treatment in pregnancy
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito net
JMS	Joint Medical Stores
LMIS	Logistics Management Information System
MAAM	Mass Action Against Malaria
MIP	Malaria in pregnancy
MIS	Malaria indicator survey
MOH	Ministry of Health

MOP	Malaria Operational Plan
NMCD	National Malaria Control Division
NMS	National Medical Stores
OR	Operational Research
PBO	Piperonyl butoxide
PE	Program evaluation
PMI	U.S. President's Malaria Initiative
PNFP	Private not- for- profit
PSC	Pyrethrum spray catches
RBM	Roll Back Malaria
RDT	Rapid diagnostic test
RRH	Regional referral hospital
SBC	Social and behavior change
SDP	Service delivery point
SM&E	Surveillance, monitoring, and evaluation
SP	Sulfadoxine-pyrimethamine
SPAQ	Sulfadoxine-pyrimethamine + amodiaquine
TA	Technical assistance
TES	Therapeutic efficacy study
TRP	Technical resource person
TWG	Technical working group
UCC	Universal coverage campaign
UMRESP	Uganda Malaria Reduction and Elimination Strategic Plan
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	United States Government
VHT	Village Health Team
WHO	World Health Organization

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 Uganda to end malaria. PMI has been a proud partner of Uganda since 2006, helping to decrease child death rates by 53 percent (Demographic and Health Survey [DHS] 2006, DHS 2016) through investments totaling almost $450 million through fiscal year (FY) 2021.

The proposed PMI fiscal year FY 2022 budget for Uganda is $31 million, subject to appropriations. This Malaria Operational Plan (MOP) outlines planned PMI activities in Uganda using FY 2022 funds. Developed in consultation with the National Malaria Control Division (NMCD) 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 Uganda (GOU) as well as other donors and partners.

Uganda's population currently stands at 44 million people with 95 percent of them at risk for malaria. *Plasmodium falciparum* is the parasite causing malaria in 97 percent of cases (Malaria Indicator Survey [MIS] 2018–2019). Typically, there are two high-transmission seasons, during the rainy months from March to June and from October to November. However, during the last 18 months, continuous rain was observed even during the dry season.

Significant progress has been made in the scale-up of evidence-based malaria interventions in Uganda, leading to a substantial impact on malaria morbidity and mortality. Between 2009 and 2018–2019, insecticide-treated net (ITN) ownership increased from 47 percent to 83 percent, ITN use in children under five years of age increased from 33 percent to 60 percent, pregnant women who benefit from intermittent preventive treatment in pregnancy (IPTp 2) went from 33 percent to 72 percent, while of IPTp3+ and IPTp4 in PMI focused districts is at 58 percent and 51 percent respectively. Children who receive the appropriate treatment for malaria, an artemisinin combination therapy (ACT), increased from 39 percent to 88 percent. As a result, malaria prevalence in children under five decreased from 45 percent in 2009 to 9 percent in 2018–2019, and child mortality decreased from 128 deaths per 1,000 live births in 2006 to 64 in 2016. However, these achievements are not uniformly seen across the country, with the North carrying the highest malaria burden.

PMI plans to make further progress in malaria prevention and control by supporting the objectives of the Uganda National Malaria Reduction and Elimination Strategic Plan (UMRESP) 2021–2025, in collaboration with other donors such as the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund). After supporting the West Nile, Mid-West, and Central regions through a malaria bilateral program for the past five years, with additional support in five regions (East, East Central, North-Acholi, North-Lango, and South-West) through integrated mechanisms, PMI plans a strategic shift in its support to focus on the high-burden regions of Karamoja, West Nile, Busoga, Lango, and Acholi and will implement the following activities for each technical area:

- Vector Control

- Entomological Monitoring: PMI conducts insecticide susceptibility monitoring and vector bionomics monitoring in 16 sites, four of which are indoor residual spraying (IRS) districts. PMI will maintain the same budget and geographic coverage for entomological monitoring activities, while paying close attention to the six districts formerly funded by the United Kingdom Foreign Commonwealth and Development Office (FCDO) for IRS, and closely monitoring vector density and behavior to promptly detect and respond to any changes.
- ITNs: PMI supports the continuous distribution of ITNs nationwide through antenatal care (ANC) and Expanded Program on Immunization (EPI) clinics, and will continue to do that with piperonyl butoxide (PBO)-treated nets and as many dual active ingredient nets as the budget will allow, to counter the challenge of insecticide resistance. Subject to the availability of additional funds, PMI will also consider supporting community-level distribution of nets. Similar to the 2020–2021 mass ITN coverage campaign, PMI will support the 2023 campaign with operational funding for ITN storage and distribution through prior year MOP funds.
- IRS: PMI and FCDO have been collaboratively supporting 16 districts for IRS since 2015, achieving a malaria prevalence of 3.4 percent in those districts, from 35.6 percent when IRS started. Although FCDO's funding for six IRS districts will be phased out by 2022, PMI will continue to fund IRS in the same 10 eastern and northern districts it has been supporting. In line with Uganda's insecticide resistance management plan, PMI will continue rotating among available classes of insecticides to which mosquitoes are susceptible every three years.

- Human Health
  - Case Management: PMI provides technical assistance (TA) for the development and dissemination of case management guidelines and policies, supporting onsite mentorships and focused training at facility and community levels, and procuring all commodities required to cover the needs of private not-for-profit (PNFP) facilities for the diagnosis and treatment of uncomplicated and severe malaria. PMI will increase the overall budget for case management to expand integrated community case management (iCCM) coverage, or malaria community case management (CCM) coverage in the absence of non-malaria commodities, to at least 15 high-burden districts. Meanwhile, PMI plans to maintain investments for case management at health facilities to sustain the substantial reduction in malaria that was achieved since PMI started working in Uganda, focusing on lower-level facilities that see the highest proportion of malaria cases. PMI will also increase its support to private facilities to strengthen case management.
  - Drug-Based Prevention (Malaria in Pregnancy [MIP]): PMI offers TA to promote the provision of a minimum of three doses of intermittent preventive treatment in pregnancy (IPTp3) with sulfadoxine pyrimethamine (SP) to pregnant women attending ANC, starting at 13 weeks gestational age. PMI plans to maintain this support, and will also advocate for the Government of Uganda to continue procuring SP and ensuring adequate stock.
- Cross Cutting and Other Health Systems
  - Supply Chain: PMI provides TA to the NMCD, district health management teams, and facilities to improve supply chain management and develop accurate stock inventories of ACTs, rapid diagnostic tests (RDTs), SP, ITNs, and severe malaria drugs. PMI also provides TA to the quantification and procurement planning unit of the Ministry of Health to support proper quantification of malaria commodities. PMI will maintain these activities, and will work with in-country partners and the NMCD to draft a stockout reduction strategy.

- Surveillance Monitoring and Evaluation (SM&E): PMI contributes to the generation of a wealth of routine and survey data to track progress and to inform future programmatic direction. As a result of investments in the health management information system (HMIS), routine data has sustained progress in terms of timeliness and completeness. Data quality is also improving but requires continuous attention. PMI will keep its current level of support for these critical activities, while increasing support to the community level and to health facility IIs, which have been historically overlooked when it comes to surveillance strengthening.
- Program Evaluation & Operational Research (PE & OR): In addition to program evaluations and learning reviews, PMI currently supports a study to assess the impact, feasibility, and cost-effectiveness of Proactive Community Treatment (ProAct or ProCCM) as a post-IRS transition strategy. PMI contributes to this study with in-kind malaria commodities. Additionally, PMI supports a core-funded study to assess the impact of housing modification combined with PBO ITNs on the reduction of malaria burden. PMI will finalize the implementation of these studies, and continue to work with the NMCD to leverage Uganda's strong research capacity and advance its dynamic research agenda, contribute to its implementation, and use resulting data to inform programmatic decisions.
- Social Behavior Change (SBC): PMI supports national level SBC campaigns to promote demand for all malaria interventions, and rapid assessment (dipstick) surveys to evaluate beneficiary attitude, beliefs and perceptions influencing the uptake of key malaria behaviors. In addition to continuing these activities, PMI will also work with the NMCD to include the SBC module in the next malaria indicator survey (MIS), which is currently planned for 2023.
- Health System Strengthening (HSS): PMI supports the central, district, and health facility levels in updating, disseminating, and implementing malaria-related policies and guidelines. This includes support for coordination platforms at all levels. PMI also supports Peace Corps volunteers to implement small scale malaria projects. PMI will maintain this funding and continue to leverage other U.S. Government (USG) investments to build a strong health system.

1. 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 Uganda to end malaria. PMI has been a proud partner of Uganda since 2006, helping to decrease child death rates by 53 percent (DHS 2006, DHS 2016) through investments totaling almost $481 million including FY 2022.

The proposed PMI fiscal year (FY) 2022 budget for Uganda is $31 million. This Malaria Operational Plan (MOP) outlines planned PMI activities in Uganda using FY 2022 funds. Developed in consultation with the National Malaria Control Division (NMCD) 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 the Republic of Uganda as well as other donors and partners.

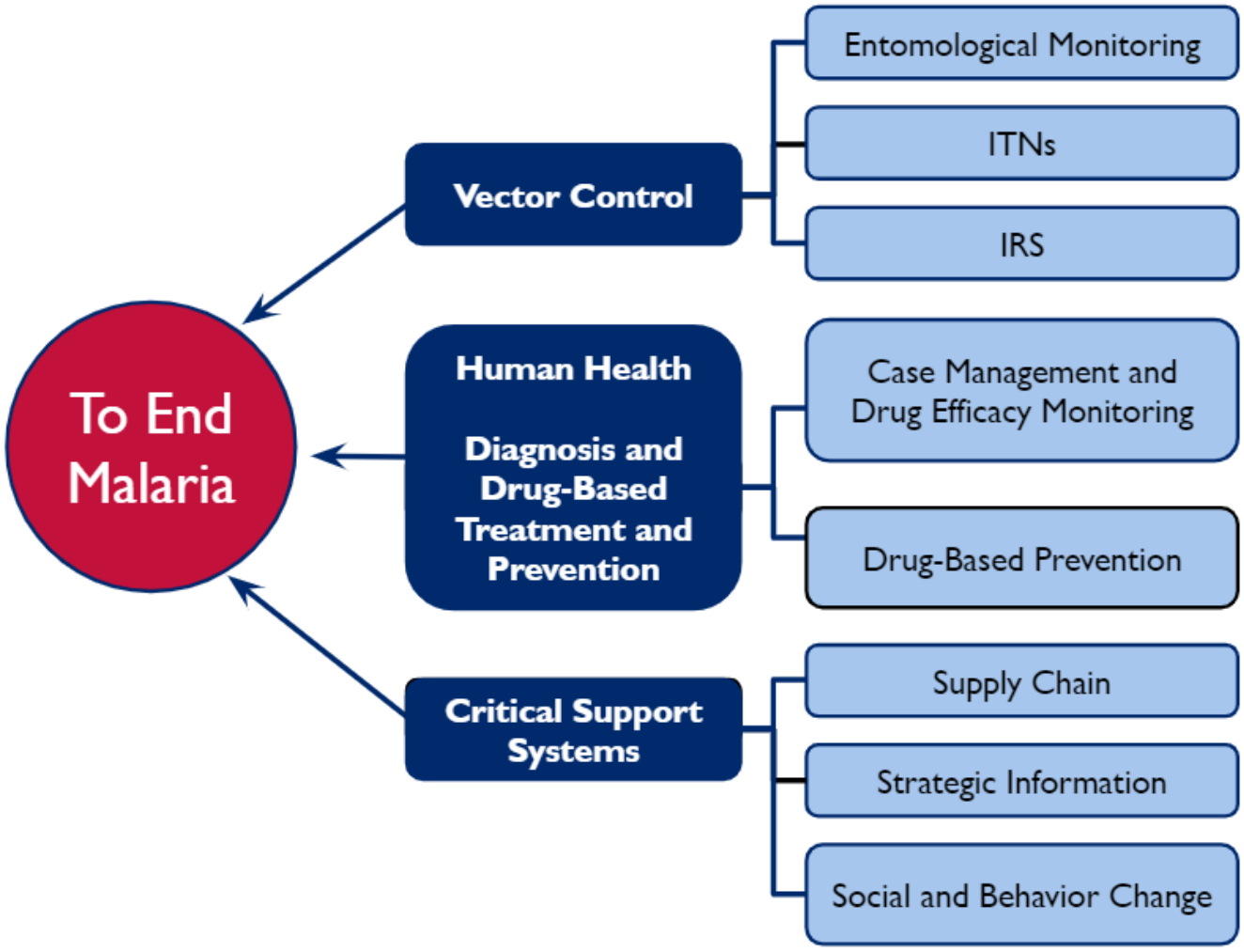
Uganda at a Glance

- **Geography:** Uganda is a landlocked country in eastern Africa with five bordering countries (all malaria endemic) covering a total of 241,551km^2, including 37,000 km^2 of water. The country is split into 136 districts. It is situated on a fertile plateau in the center of which is Lake Kyoga. The plateau extends to the Great Rift Valley, with Lakes Albert and Edward in the west, the Ruwenzori and Virunga mountains in the southwest, and Lake Victoria in the south.
- **Climate and Malaria Transmission Seasonality:** Two rainy seasons (a long one from March to June, and a short one from October to November) and two dry (December to February and July to September). However, during the past 18 months continuous rain was observed even during the dry seasons.
- **Population in 2021:** 44 million (Uganda Bureau of Statistics, End of Month Population Projection 2015–2040)
- **Population at Risk of Malaria:** 95% of the population (NMCD).
- **Principal Malaria Parasites:** *Plasmodium falciparum* is the major species by far dominating at 96.9% of all infections (NMCD).
- **Principal Malaria Vectors:** *An. gambiae* s.l. and *An. funestus* s.l. are the dominant vector species.
- **Malaria Case Incidence per 1,000 Population:** In FY 2019/20, 201 malaria cases per 1,000 persons were reported (Uganda/Ministry of Health [MOH], Annual Health Sector Performance Report FY 2019/2020).
- **Under-Five Mortality Rate:** The under-five mortality rate in Uganda fell gradually from 128 deaths per thousand live births in 2006 to 64 deaths per thousand live births in 2016 (MOH/Uganda).
- **World Bank Income Classification and GDP:** Uganda's real GDP grew at 2.9% in FY 2020, less than half the 6.8% recorded in FY19, due to the effects of the COVID-19 pandemic. The GDP is expected to grow at a similar level in FY 2021 (New World Bank country classifications by income level: 2020–2021, July 2020).
- **Government Health Budget:** General government budget allocated to health is 7.2% of the total national budget, which is less than half of the 15% Abuja Declaration (Uganda MOH, Annual Health Sector Performance Report FY 2019–2020).

- **Trafficking in Persons Designations, 2018–2020:** The Government of Uganda does not fully meet the minimum standards for the elimination of trafficking; however, it is making significant efforts to do so. The government demonstrated increasing efforts investigating, prosecuting, and achieving convictions in more cases, initiated criminal prosecution of labor recruitment, and elevated Uganda's Coordination Office to Combat Trafficking in Persons to an official department, which enabled the office to improve its anti-trafficking efforts. However, the government did not meet the minimum standards in several key areas including insufficient funding, which hindered government efforts, especially in victim protection, in assisting victims, and the availability of victim services is inconsistent. Uganda remained in Tier 2 per the U.S. Department of State, 2020 Trafficking in Persons Report.
- **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)
  - United Kingdom Foreign Commonwealth and Development Office (FCDO)
  - Malaria Consortium
  - United Nation Children's Fund (UNICEF)
  - Against Malaria Foundation (AMF)
  - Clinton Health Access Initiative (CHAI)
  - Bill & Melinda Gates Foundation (BMGF)
  - Rotary International
- **PMI Support of National Malaria Control Strategy:** PMI operates both nationally in support of NMCD policy development, dissemination, implementation, monitoring and evaluation, as well as procurement, distribution, and monitoring of malaria commodities (diagnostics, drugs, ITNs, IRS and others), and with direct program support through one bilateral program in 53 districts (West Nile, Mid-west, and Central regions) and five regional integrated projects in 76 districts (South West, East Central, Eastern, Northern Acholi, and Northern Lango regions). PMI supports NMCD through one centrally funded indoor residual spraying activity in 10 districts. These programs cover a population of ~ 22 million and an area of 241,551km^2 (See III. Overview of PMI's support of Uganda's Malaria Control Strategy for additional details.)
- **PMI Investments:** Uganda began implementation as a PMI focus country in FY 2006. The proposed FY 2022 PMI budget for Uganda is $31 million; this brings the total PMI investment to nearly $481 million.

PMI organizes its investments around the activities below, in line with the Uganda National Malaria Reduction and Elimination Strategic Plan (UMRESP) 2021–2025.

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



Building and strengthening the capacity of Uganda'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/Uganda will continue to rely on and engage with local partners such as NMCD, WHO, UNICEF, FCDO, and United Nations High Commissioner for Refugees, and is expanding its local partner base to reach community-based organizations and civil society organizations (CSOs). Finally, PMI/Uganda will continue to rely on private sector partnerships such as Malaria Free Uganda, Private Sector Foundation Uganda, Uganda Healthcare Federation, and Rotary International Uganda.

[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.

To accelerate sustainable development, PMI developed a programmatic inventory to assess the strengths and persistent challenges of Uganda's program (see Annex B). The activities proposed in this MOP are tailored to draw on these 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 Uganda to fully finance its development priorities, PMI will work with other partners (e.g., the Global Fund) to jointly track Uganda's funding commitments across the malaria portfolio.

II. MALARIA SITUATION AND PROGRESS

Ninety-five percent of the population of Uganda is considered at risk for malaria, although transmission varies significantly among regions. *Plasmodium falciparum* accounts for 97 percent of malaria infection in Uganda. The principal vectors of malaria in Uganda are *An. funestus* s.l. *and An. gambiae* s.l. Uganda has made significant progress in malaria control in partnership with PMI, the Global Fund, FCDO, research institutions, and others. As a result, malaria prevalence in children under five decreased from 45 percent in 2009 to 9 percent in 2018–2019, and all-cause child mortality decreased from 128 deaths per 1,000 live births in 2006 to 64 in 2016.

Figure 2. Trends in malaria prevalence

Children 6 to 59 months of age who tested positive for malaria by microscopy/RDT, 2009–2018/2019

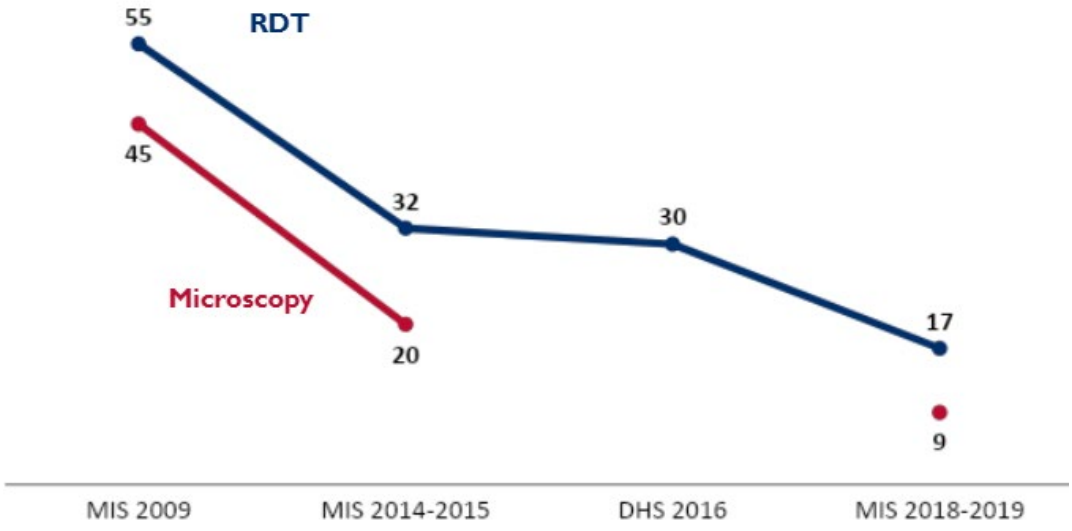


Figure 3. Malaria prevalence by geographic area

Children 6 to 59 months of age who tested positive for malaria by microscopy, MIS 2018–2019

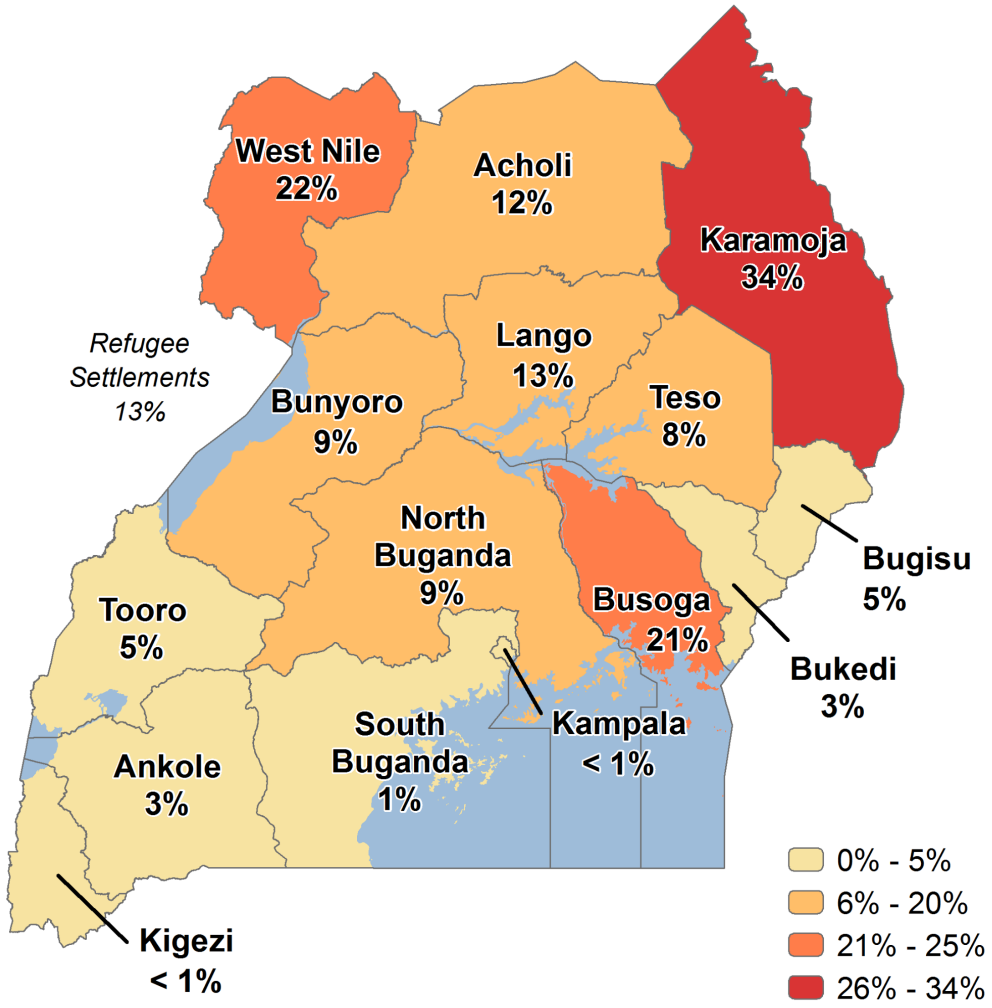


Table 1. Key indicators from demographic health surveys (DHS) and malaria indicator surveys (MIS) from 2006 to 2018–2019

Indicator	2006 DHS	2009 MIS	2011 DHS	2014 MIS	2016 DHS	2018–2019 MIS
% Households with at least one ITN	34%	47%	60%	90%	78%	83%
% Households with at least one ITN for every two people	15%	16%	28%	62%	51%	54%
% Population with access to an ITN	34%	32%	45%	79%	65%	72%
% Population that slept under an ITN the previous night	N/A	26%	35%	69%	55%	68%
% Children under five years of age who slept under an ITN the previous night	22%	33%	43%	74%	62%	60%
% Pregnant women who slept under an ITN the previous night	23%	44%	47%	75%	64%	65%
% Children under five years of age with fever in the last two weeks for whom advice or treatment was sought	75%	82%	84%	82%	81%	87%
% Children under five years of age with fever in the last two weeks who had a finger or heel stick	N/A	17%	26%	36%	49%	51%
% 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	39%	69%	87%	88%	88%
% Women who received two or more doses of IPTp	16%	33%	27%	49%	46%	72%

Indicator	2006 DHS	2009 MIS	2011 DHS	2014 MIS	2016 DHS	2018–2019 MIS
during their last pregnancy in the last two years						
% Women who received three or more doses of IPTp during their last pregnancy in the last two years	N/A	17%	10%	28%	17%	41%
Under-five mortality rate per 1,000 live births	128	N/A	90	N/A	64	N/A
Prevalence of parasitemia (by microscopy) in children 0 to 59 months of age	N/A	45%	N/A	20%	N/A	9%
Prevalence of parasitemia (by RDT) in children 0 to 59 months of age	N/A	55%	N/A	32%	30%	17%
Prevalence of severe anemia in children 6 to 59 months of age (Hgb<8 g/dl)	7%	10%	5%	5%	6%	4%

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

	2015	2016	2017	2018	2019	2020
# Suspect malaria cases[2]	10,752,472	22,038,689	23,754,918	19,912,582	23,566,813	23,040,029
# Patients receiving diagnostic test for malaria[3]	21,592,824	30,088,519	30,263,002	25,896,321	33,887,015	27,146,894
Total # malaria cases (confirmed and presumed)[4]	13,080,797	16,071,710	14,485,313	10,481,632	12,476,118	14,725,532
# Confirmed cases[5]	7,144,971	9,644,154	10,251,007	7,878,334	11,087,640	13,133,497
# Presumed cases[6]	5,935,826	6,427,556	4,234,306	2,134,124	1,388,478	1,592,035
% Malaria cases confirmed[7]	55%	60%	71%	75%	89%	89.2%
Test positivity rate (TPR)[8]	33%	32%	34%	30%	65%	48%
Total # <5 malaria cases[9]	3,886,786	4,464,146	3,566,893	2,745,493	2,782,646	3,301,546
% Cases under 5[10]	30%	28%	25%	26%	22%	22.4%
Total # severe cases[11]	694,369	818,754	750,171	466,107	353,192	593,174
Total # malaria deaths[12]	4,672	5,635	6,079	3,067	4,896	5,093

[2] Number of patients presenting with signs or symptoms possibly due to malaria (e.g., fever).

[3] RDT or microscopy, all ages, outpatient and inpatient.

[4] Total reported malaria cases; all ages, outpatient and inpatient, confirmed and unconfirmed cases.

[5] Diagnostically confirmed; all ages, outpatient and inpatient.

[6] Clinical/presumed/unconfirmed; all ages, outpatient and inpatient.

[7] Confirmed cases divided by total # cases.

[8] Confirmed cases divided by # patients receiving a diagnostic test for malaria (RDT or microscopy).

[9] Outpatient and inpatient, confirmed and unconfirmed.

[10] Total # <5 cases divided by total # of case.

[11] Severe malaria is a malaria illness that is serious enough to be an immediate threat to the life of the patient. A severe malaria patient has positive blood film (RDT +) and any of the following features [severe anemia (HB < 5 g/dl), respiratory distress (nasal flaring and intercostal recession), low blood glucose (< 60 mg/dl), circulatory collapse (low systolic pressure), renal failure (urine output < 12 ml/kg/24hrs), unexplained spontaneous bleeding, repeated convulsions acidosis (deep breathing), black water fever (dark urine) and impaired consciousness].

[12] All ages, outpatient, inpatient, confirmed, and unconfirmed.

	2015	2016	2017	2018	2019	2020
# Facilities reporting[13]	50,897	52,733	56,180	60,677	60,547	63,066
Data form completeness (%)[14]	99%	97%	92%	96%	95%	58%

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

The support PMI provides in Uganda complements the UMRESP 2021–2025. It builds on investments made by other partners, including the Global Fund, WHO, and United Kingdom's FCDO to improve and expand malaria-related services. PMI also aims to leverage investments made by other USG programs to strengthen health systems and reach common goals, especially when it comes to supply chain strengthening, workforce and governance, and SM&E. PMI's malaria control activities are implemented in high-burden districts of Uganda to reduce their above national average malaria burden to national levels in support of the UMRESP 2021–2025 and the WHO recommendations targeting High Burden High Impact strategies that have been adopted by Uganda. PMI's support at different levels of the health system depends upon need, NMCD priorities, and geographic coverage of other donors and partners to ensure complementarity and to have the greatest impact. PMI is supporting the implementation and scale-up of case management, IPTp, ITN distribution, SM&E, and SBC as well as vector monitoring and control in high-burden districts. For additional information on PMI's geographic coverage, see the technical sections below.

Vector Control: PMI provides focused support to the mass distribution of ITNs through universal coverage campaigns (UCCs), which cover the entire country. In addition, PMI supports continuous distribution, nationally, through antenatal care (ANC) and the Expanded Program on Immunization (EPI) which covers all public facilities as well as PNFP facilities. PMI-supported IRS currently covers 10 districts in the northern and eastern parts of Uganda and FCDO complements PMI's funding to cover an additional four contiguous districts; however, these four FCDO districts will be phased out after the completion of the 2021 spray campaign, in addition to two districts that were already dropped in 2021. In most districts, the Uganda Vector Control Division places a vector control officer to assist with vector related issues. The NMCD plans to collaborate with the Vector Control Division and other partners to help build and improve a comprehensive national vector surveillance plan.

Malaria in Pregnancy (MIP): PMI's support covers over two-thirds of the country in capacity-building through training, mentorship, and supportive supervision. PMI also supports prevention, early diagnosis, and prompt treatment for MIP. PMI provides ITNs through ANC for public and private (PNFP) facilities nationwide. PMI's support is national except for commodities, which go through the Joint Medical Stores (JMS) and covers more than 760 PNFP facilities nationwide.

Case Management: The bulk of PMI's work in case management will be implemented in 49 high-burden districts in West Nile, Acholi, Lango, Karamoja, and Busoga. PMI is also beginning to scale up integrated community case

[13] Total # of health facilities reporting data into the HMIS/DHIS2 system that year.

[14] # monthly reports from health facilities divided by # health facility reports expected.

management (iCCM) in a phased manner in approximately 15 selected hard-to-reach and high-burden districts. Case management commodities support is currently directed at all PNFP facilities nationwide.

Supply Chain: PMI procures ITNs, RDTs, ACTs, and severe malaria drugs for the PNFP facilities in Uganda, in addition to limited public sector support for ITNs distributed through routine channels as outlined above. PMI supports the management of commodities at the central level by offering technical assistance to the Ministry of Health (MOH) for strengthening of the supply chain system, commodity forecasting and quantification, and the implementation of end use verification surveys.

SM&E: SM&E activities are predominantly implemented in 49 districts (West Nile, Acholi, Lango, Karamoja, and Busoga). PMI helps NMCD and District Health Management Teams (DHMTs) to coordinate SM&E-focused activities implemented in all five regions to strengthen HMIS at the district, regional, and national levels. PMI also carries out surveillance of antimalarial drug efficacy as well as ITN durability monitoring.

SBC: SBC activities are mainly supported at the national level as well as in 49 high-burden districts, with additional activities nationwide in an integrated manner with maternal and child health activities of the bilateral mechanism.

Other Health System Strengthening (HSS): PMI supports the national, district, health facility, and community levels in updating, disseminating, and implementing malaria-related policies and guidelines. PMI also supports the Peace Corps to implement small-scale malaria projects.

PMI is considering a strategic shift from mainly facility-based case management interventions toward iCCM and community-based preventive approaches guided by robust SBC, in line with the government's Mass Action Against Malaria (MAAM) initiative. Case management at the facility level has improved significantly (reporting and testing rates have improved and presumptive treatment has significantly declined) while the need at the community level remains largely unmet. See Annex A for additional details.

Donor Support in Uganda:

- The Global Fund: Since the inception of support to the GOU in 2002, the Global Fund has signed a total of 21 grants amounting to $1 billion. The current Global Fund grant for malaria supports procurement and distribution of ACTs, intravenous artesunate, and RDTs for treatment and diagnosis of malaria as well as ITNs for the last UCC (2020–2021). The case management component of the grants also includes support for SBC, iCCM, and subsidized ACTs for the private sector (copayment mechanism). The Global Fund procures and distributes malaria commodities for public facilities while PMI support largely covers PNFP facilities to ensure complementarity and the greatest coverage of donor-funded commodities. In addition, PMI and Global Fund frequently coordinate to fill commodity gaps, under the direction of the NMCD, as needed. The total amount of the 2021–2023 Global Fund Malaria Grant is $263,024,950. This grant funds interventions in case management in public and private health facilities, iCCM, and activities to ensure drug quality, IPTp, entomological monitoring, IRS in the West Nile region, and ITNs for mass campaigns.
- FCDO: FCDO made a commitment in 2010 to significantly increase support for health and malaria control in Uganda. In 2012, a special arrangement between USAID and FCDO allowed the use of PMI's supported projects to scale up its contribution to malaria control in Uganda. FCDO has historically supported the procurement and distribution of ITNs for UCCs and routine net distribution, in addition to support for IRS in six districts, iCCM, NMCD capacity-building through the secondment of staff, and

support to district-level HSS. However, FCDO is transitioning away from all bilateral malaria support in Uganda in June 2021. By 2023, FCDO will have completely phased out direct support for malaria.

- **Other partners**: In addition to PMI, the Global Fund, and FCDO, other partners include the UK-based nongovernmental organization Against Malaria Foundation (AMF) that supports activities in Uganda. The AMF provided ITNs for the last two UCCs (2017–2018 and 2020–2021).
- **Roll Back Malaria (RBM) Partnership:** An RBM partners meeting is carried out quarterly and is jointly sponsored by partners, including PMI. This meeting is the highest coordinating forum where all malaria stakeholders (NMCD, District Health Officers, donors, implementing partners, faith-based organizations, CSOs, academia, research institutes, members of Parliament, etc.) meet to discuss the strategic direction of the program. Policies and guidelines, technical and research updates, and the status of activities at all levels are thoroughly discussed.
- **Joint grant cycle planning:** The NMCD in collaboration with PMI, the Global Fund, and other stakeholders including WHO and UNICEF jointly plan all work being undertaken in Uganda. The joint planning ensures the complementarity of the NMCD's annual work plans, PMI's MOPs, Global Fund grant applications, as well as WHO's and UNICEF's annual plans.
- **Geographic overlap:** Under the leadership of the NMCD, all of the activities and support being provided by donors is coordinated to ensure minimal geographic overlap.

Figure 4. Map of target areas for PMI interventions

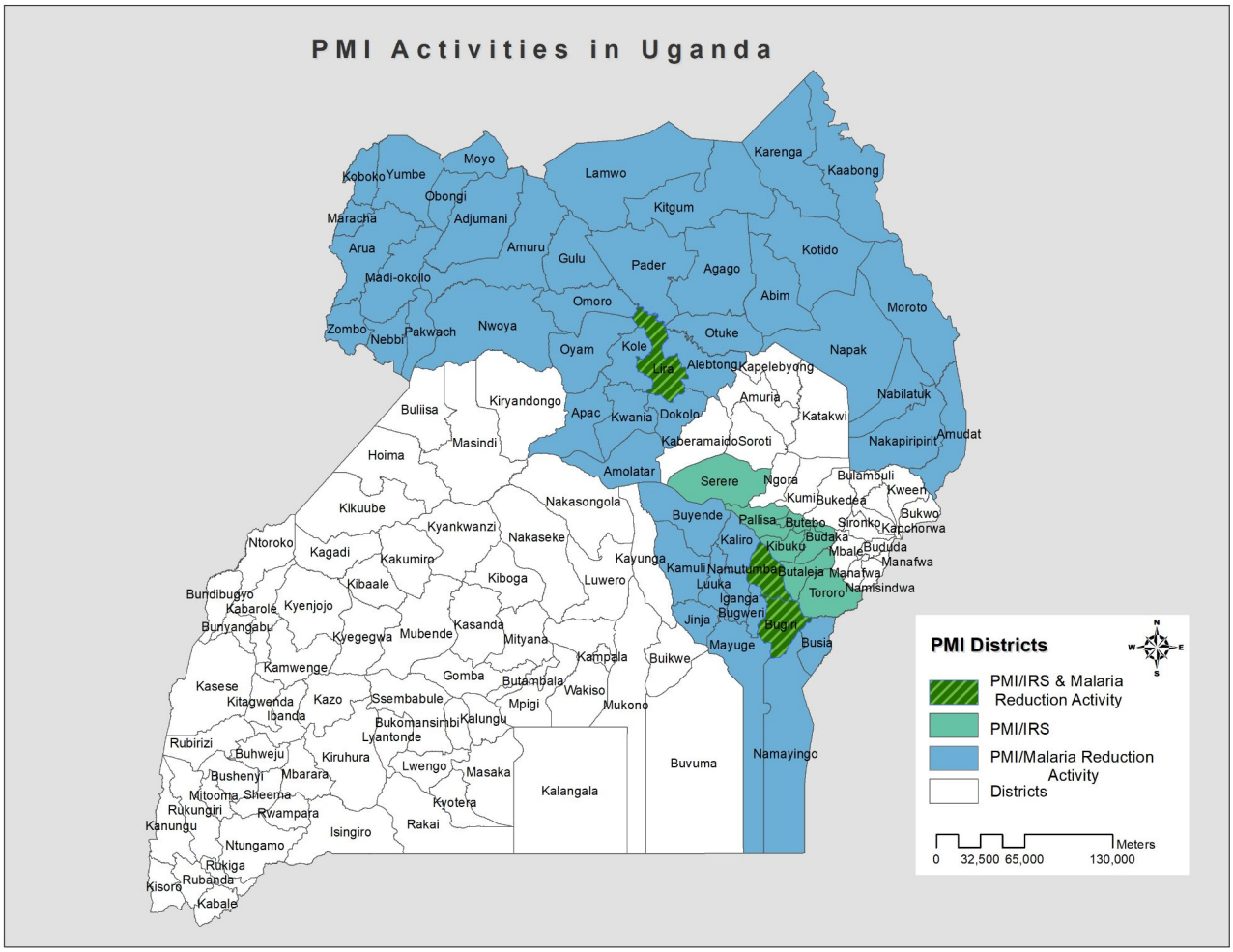
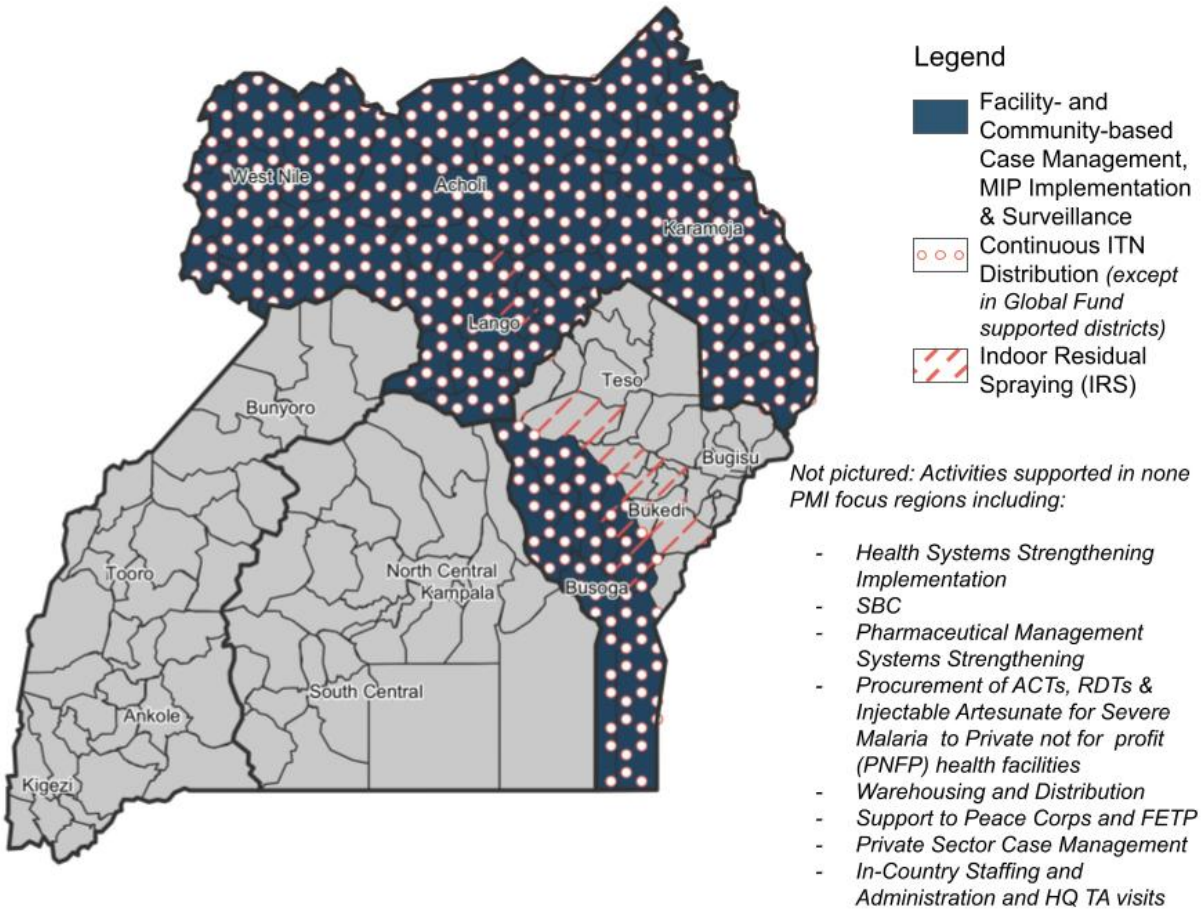
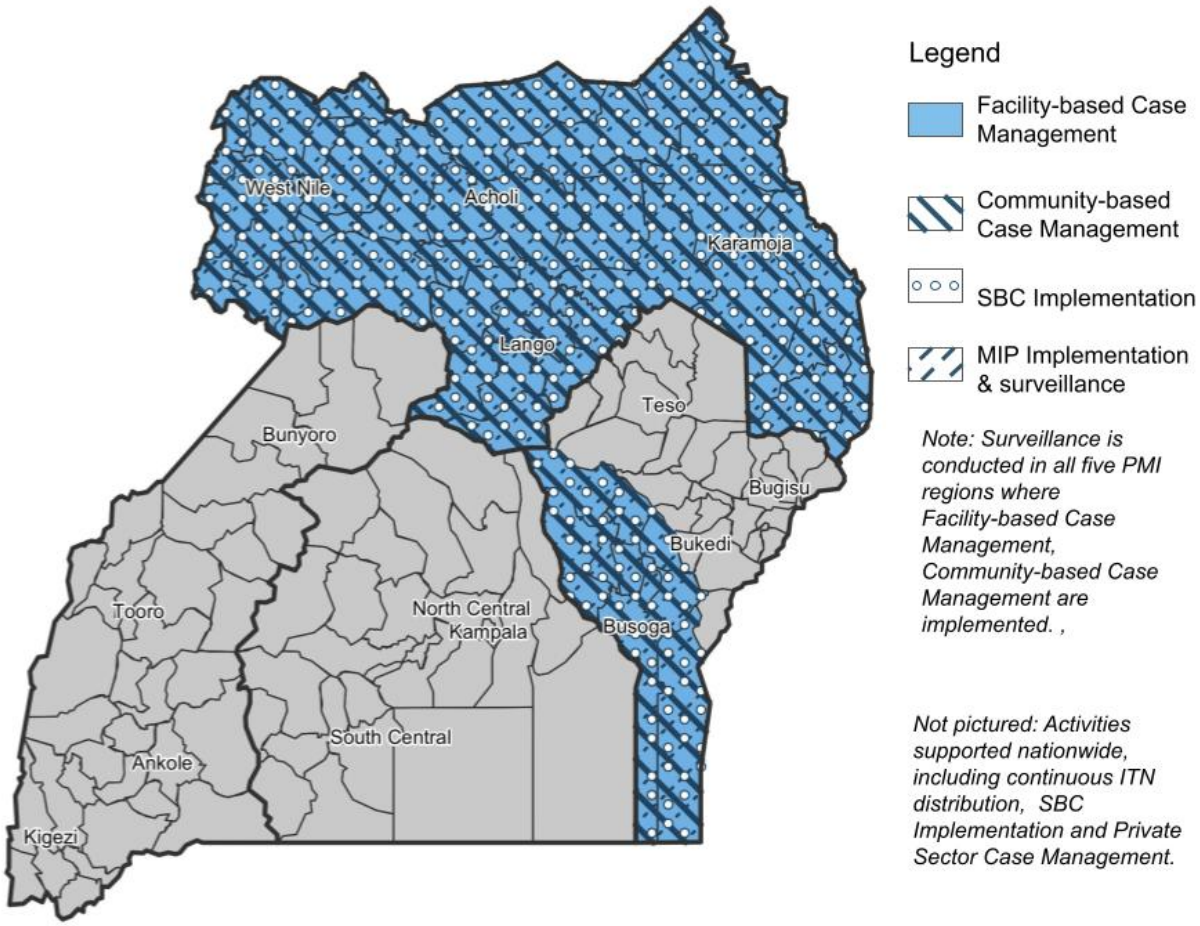


Figure 5. PMI-Supported Activities in Uganda



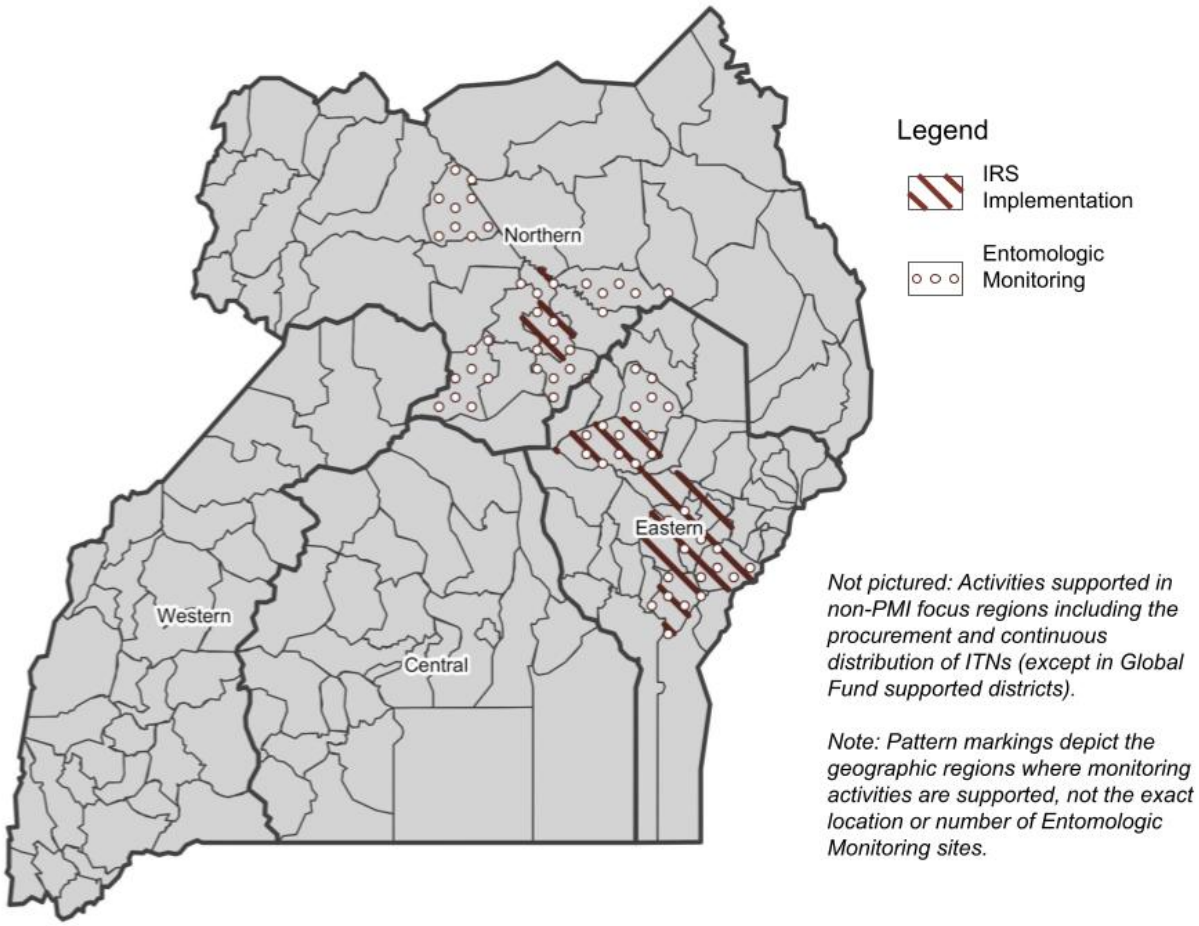
Source: Uganda MOP Funding Table 2, Fiscal Year 2021 Malaria Data Integration and Visualization (M-DIVE).

Figure 6. PMI-Supported Service Delivery and Social and Behavior Change Activities in Uganda



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

Figure 7. PMI-Supported Vector Control Activities in Uganda



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

IV. PARTNER FUNDING LANDSCAPE

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. 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 GOU budgets based on the Ugandan fiscal year, which goes from July to June.

The tables below summarize contributions by key external partners and partner country governments in calendar years 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.

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	$17.4M	$5.0M	$1.0M	$1.5M	$4.4M	$3.7M	$33.0M
Global Fund	$74.5M	$46.7M	$0.1M	$0.2M	$1.3M	$3.1M	$125.9M
Total Per Category	$91.9M	$51.7M	$1.1M	$1.7M	$5.7M	$6.8M	158.9M

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	$19.9M	$5.7M	$0.7M	$1.0M	$3.5M	$4.3M	$35.0M
Global Fund	$1.7M	$35.1M	$1.0M		$9.7M	$40.2M	$87.7M
Total Per Category	$21.5M	$40.8M	$1.8M	$1.0M	$13.2M	$44.4M	$122.7M

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	$20.5M	$3.8M	$0.6M	$1.0M	$2.4M	$2.8M	$31.0M
Global Fund	$12.3M	$47.0M	$1.8M		$0.4M	$7.0M	$68.5M
Total Per Category	$32.8M	$50.8M	$2.4M	$1.0M	$2.8M	$9.7M	$99.5M

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.

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]	$7.5M		$6.5M	$0.0M	$0.0M	$0.7M			$14.7M
Global Fund[3]		$32.8M		$24.8M	$8.4M				$66.0M
Total	$7.5M	$32.8M	$6.5M	$24.8M	$8.4M	$0.7M	$0.0M	$0	$80.7M

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]	$4.7M		$7.0M	$0.1M	$0.5M	$0.4M	$0.0M		$12.7M
Global Fund[3]			$0.0M	$10.7M	$6.4M		$0.0M		$17.1M
Total	$4.7M	$0.0M	$7.0M	$10.8M	$6.9M	$0.4M	$0.0M	$0	$29.8M

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]	$5.6M		$6.9M	$0.0M	$0.5M	$0.3M			$13.5M
Global Fund[3]			$2.6M	$16.2M	$8.6M		$0.5M		$27.9M
Total	$5.6M	$0.0M	$9.5M	$16.2M	$9.1M	$0.3M	$0.5M	$0	$41.4M

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.

V. 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 Uganda 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

NMCD Objective

All of PMI's vector control activities in Uganda are guided by the six strategic objectives outlined in the new UMRESP 2021–2025, most notably strategic objectives 1 and 6. The aim of strategic objective 1 is to accelerate access to malaria preventive and curative services to achieve universal coverage in all eligible populations by 2025. The aim of strategic objective 6 is for 80 percent of districts to have a strengthened enabling environment to deliver malaria interventions and measure progress through coordinated partnership and multi-sectoral collaboration by 2025. The national policy for ITN ownership is 90 percent and the coverage is 85 percent of the population have access to at least one ITN for every two people. The national policy for IRS coverage is 90 percent in all districts where IRS is targeted.

NMCD Approach

According to the UMRESP, interventions will be driven by contextual and operational considerations. Based on this, ITNs will be deployed in the whole country with different delivery channels while IRS will be deployed in regions with a high malaria burden and high transmission intensity.

The national deployment strategy is the distribution of ITNs through two major channels. Every three or four years since 2013–2014 there have been ITN mass distribution campaigns to help ensure 85 percent of the population has access to at least one ITN for every two people. There have been three ITN mass coverage campaigns to date (2013–2014, 2017–2018, and 2020–2021) in Uganda. Mass distribution campaigns are complemented by robust ITN distribution through routine channels, most notably through ANC/EPI to ensure every child under five years of age and pregnant women have access to an ITN for malaria prevention. PMI supported school based distribution in 2018–2019 and the Global Fund has plans to support school based distribution in 2021–2023.

PMI Objective in Support of NMCD

PMI supports all elements of the NMCD's UMRESP, with the exception of larval source management. For ITNs, PMI provides limited operational support for mass coverage campaigns, primarily focusing on support for continuous distribution channels, including ANC and EPI, which is complementary to the support provided by Global Fund and other donors. PMI implements IRS in 10 high-burden districts in support of the NMCD strategy. PMI supports comprehensive entomological monitoring, which includes insecticide decay rate testing, bionomics monitoring, insecticide resistance monitoring, CDC bottle intensity bioassays, and oxidase enzyme testing.

PMI-Supported Recent Progress (FY 2020)

In FY 20, PMI supported the following vector control activities:

- Procured 3.94 million ITNs over the last two years which were distributed through ANC/EPI.
- Supported the 2020–2021 mass coverage campaign with $4 million for operational costs (warehousing and transportation). Provided TA and supportive supervision to the mass campaign and initiated baseline durability monitoring.

- Trained 5,920 people across various cadres to support vector control activities such as IRS supervision and entomological monitoring at national and district level. This includes participants from the MOH, DHMTs, site supervisors, spray operators, and team leaders.
- Sprayed with long-lasting insecticides (Fludora® Fusion, SumiShield®, and Actellic®) 1,001,746 structures and protected 3,847,573 people (of which 756,617 were children under five years of age and 110,170 were pregnant women) through high-quality IRS.
- Conducted entomological monitoring activities monthly using human landing catches (HLCs) and pyrethrum spray catches (PSCs) in six districts: Bugiri, Lira, Otuke, and Tororo (current IRS districts), Apac and Soroti (non-IRS control districts); and wall cone bioassays (in eight current IRS districts for IRS quality assurance studies for only the first month and subsequently in four of these IRS districts for residual efficacy studies).
- Conducted insecticide susceptibility tests on pirimiphos-methyl (organophosphate), bendiocarb (carbamate), three pyrethroids (alpha-cypermethrin, deltamethrin, and permethrin), clothianidin (neonicotinoid) and chlorfenapyr (pyrrole), in three IRS districts (Bugiri, Lira, and Tororo) and eight non-IRS districts (Hoima, Gulu, Kamwenge, Katakwi, Kitgum, Nakaseke, Soroti, and Wakiso), all located in various parts of Uganda, to evaluate *Anopheles (An.) gambiae* s.l. susceptibility status to those insecticides and resistance intensity to pyrethroids.

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

PMI will support the following activities in FY 2021 with currently available funds:

- Conduct insecticide resistance monitoring in eight sites (five non-IRS and three IRS).
- Conduct vector bionomics monitoring monthly in six sites.
- Conduct 12-month durability monitoring data collection.
- Procure PBO ITNs and distribute them through ANC/EPI at PNFP facilities.
- Implement IRS in 10 high-burden districts from March to May 2021, targeting approximately one million structures and protecting four million people.
- Conduct community mobilization activities in conjunction with IRS operations to ensure high coverage.

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

Please see Table A-1 showing entomological monitoring activities, where the activities are taking place, and the source of funding.

Table A-1. Entomological monitoring activities

Site	District	Activities	Supported by
Bubwoki	Bugiri	Bionomics studies (HLC and PSC)	PMI
Nangalama	Bugiri	Bionomics studies (PSC)	PMI
Mugera	Bugiri	Bionomics studies (PSC)	PMI
Kapyanga	Bugiri	IRS quality assurance and residual efficacy (wall cone bioassay) studies	PMI
Buswiriri	Bugiri	Insecticide susceptibility	PMI
Nkaizi	Bugiri	Insecticide susceptibility	PMI
Ndifakulya A	Bugiri	Insecticide susceptibility	PMI
Butema	Bugiri	Insecticide susceptibility	PMI
Bubago	Bugiri	Insecticide susceptibility	PMI
Nabikaka	Bugiri	Insecticide susceptibility	PMI
Te-Okole	Lira	Bionomics studies (HLC and PSC)	PMI
Araki	Lira	Bionomics studies (PSC)	PMI
Alikpot	Lira	Bionomics studies (PSC)	PMI
Telela	Lira	IRS quality assurance and residual efficacy (wall cone bioassay) studies	PMI
Te-okole	Lira	Insecticide susceptibility	PMI
Ayac	Lira	Insecticide susceptibility	PMI
Oboloko	Otuke	Bionomics studies (HLC and PSC)	PMI
Barodugu cell	Otuke	Bionomics studies (PSC) and IRS quality assurance and residual efficacy (wall cone bioassay) studies	PMI
Baraliro	Otuke	Bionomics studies (PSC)	PMI
Nagoke	Tororo	Bionomics studies (HLC and PSC)	PMI
Rugot	Tororo	Bionomics studies (PSC) and Wall cone bioassay studies	PMI
Kajarau North	Tororo	Bionomics studies (PSC)	PMI
Onyunyur	Tororo	IRS quality assurance and residual efficacy (wall cone bioassay) studies	PMI
Mukujju A	Tororo	Insecticide susceptibility	PMI
Morukiswa	Tororo	Insecticide susceptibility	PMI
Sesera	Tororo	Insecticide susceptibility	PMI
Butaleja	Butaleja	IRS quality assurance (wall cone bioassay) studies	PMI
Kasasira	Kibuku	IRS quality assurance (wall cone bioassay) studies	PMI

Site	District	Activities	Supported by
Agwata	Dokolo	IRS quality assurance (wall cone bioassay) studies	PMI
Olio	Serere	IRS quality assurance and residual efficacy (wall cone bioassay) studies	PMI
Atar	Apac	Bionomics studies (HLC and PSC)	PMI
Aporotuku	Apac	Bionomics studies (PSC) and wall cone bioassay studies	PMI
Amwonyocao-B	Apac	Bionomics studies (PSC)	PMI
Amii	Apac	Insecticide susceptibility	PMI
Aluga	Apac	Insecticide susceptibility	PMI
Obangakura	Apac	Insecticide susceptibility	PMI
Awoja	Soroti	Bionomics studies (HLC and PSC) Insecticide susceptibility	PMI
Madera central cell	Soroti	Bionomics studies (PSC) and Wall cone bioassay studies, Insecticide susceptibility	PMI
Agora	Soroti	Bionomics studies (PSC)	PMI
Mugana	Soroti	Insecticide susceptibility	PMI
Omodoi	Soroti	Insecticide susceptibility	PMI
Kyamugyenzi	Hoima	Insecticide susceptibility	PMI
Itara	Hoima	Insecticide susceptibility	PMI
Kiryaki	Hoima	Insecticide susceptibility	PMI
Obia	Gulu	Insecticide susceptibility	PMI
Lakwela	Gulu	Insecticide susceptibility	PMI
Kanyagoga	Gulu	Insecticide susceptibility	PMI
Kidere	Gulu	Insecticide susceptibility	PMI
Oding	Gulu	Insecticide susceptibility	PMI
Burcoro	Gulu	Insecticide susceptibility	PMI
Olam	Gulu	Insecticide susceptibility	PMI
Bwizi	Kamwenge	Insecticide susceptibility	PMI
Rubaba I	Kamwenge	Insecticide susceptibility	PMI
Rwebikwato IIIB	Kamwenge	Insecticide susceptibility	PMI
Wizi	Kamwenge	Insecticide susceptibility	PMI
Mukore	Kamwenge	Insecticide susceptibility	PMI
Abwokodia	Katakwi	Insecticide susceptibility	PMI
Agiriguri	Katakwi	Insecticide susceptibility	PMI
Dadas	Katakwi	Insecticide susceptibility	PMI
Obem North	Kitgum	Insecticide susceptibility	PMI
Padol	Kitgum	Insecticide susceptibility	PMI

Site	District	Activities	Supported by
Ocet Toke West	Kitgum	Insecticide susceptibility	PMI
Mulama	Nakaseke	Insecticide susceptibility	PMI
Nvuye	Nakaseke	Insecticide susceptibility	PMI
Kyamutakasa	Nakaseke	Insecticide susceptibility	PMI
Kikandwa	Wakiso	Insecticide susceptibility	PMI
Buwuzuume	Wakiso	Insecticide susceptibility	PMI
Namavundu	Wakiso	Insecticide susceptibility	PMI
Ombu	Arua	Insecticide susceptibility	PMI
Ewachaku	Arua	Insecticide susceptibility	PMI
Bushere II	Kanungu	Insecticide susceptibility	PMI
Kitookye	Kanungu	Insecticide susceptibility	PMI
Rwenyerere B	Kanungu	Insecticide susceptibility	PMI
Aweimuju	Moroto	Insecticide susceptibility	PMI
Longoleki	Moroto	Insecticide susceptibility	PMI
Namus	Moroto	Insecticide susceptibility	PMI
Kaloe	Moroto	Insecticide susceptibility	PMI
Kaloi	Moroto	Insecticide susceptibility	PMI
Malembo	Rakai (to be replaced by Mityana)	Insecticide susceptibility	PMI
Njala	Rakai (to be replaced by Mityana)	Insecticide susceptibility	PMI

Table A-2. Distribution and bionomics of malaria vectors

Site/ District	Vector*	Season (month)	Preferred Biting Location	Peak Biting Time	Preferred Resting Location**	Preferred Host	Annual EIR***
Apac	*An. gambiae* s.l.	May–June/ September–November	Indoor and Outdoor (0.50 / 0.50)	11:00 p.m.–7:00 a.m.	N/A	Human	N/A
Apac	***An. funestus* s.l.**	October–December	Indoors	10:00 p.m.–7:00 a.m.	N/A	Human	N/A
Bugiri	***An. gambiae* s.l.**	October–December	Outdoors	7:00 p.m.–3:00 a.m.	N/A	Human	N/A
Bugiri	*An. funestus* s.l.	October–December Caught in low numbers	N/A	N/A	N/A	Human	N/A
Lira	*An. gambiae* s.l.	May–June	Indoor and Outdoor (0.58 / 0.42)	0:00 a.m.–6:00 a.m.	N/A	Human	N/A
Lira	***An. funestus* s.l.**	September–December	Indoors	0:00 a.m.–6:00 a.m.	N/A	Human	N/A
Otuke	*An. gambiae* s.l.	April–May	Indoor and Outdoor (0.47 / 0.53)	1:00 a.m.–5:00 a.m.	N/A	Human	N/A
Otuke	***An. funestus* s.l.**	September–December	Indoors	1:00 a.m.–6:00 a.m.	N/A	Human	N/A
Soroti	*An. gambiae* s.l.	April–June	Indoor and Outdoor (0.48 / 0.52)	0:00 a.m.–6:00 a.m.	N/A	Human	N/A

Site/ District	Vector*	Season (month)	Preferred Biting Location	Peak Biting Time	Preferred Resting Location**	Preferred Host	Annual EIR***
Soroti	***An. funestus* s.l.**	July– October	Indoors	1:00 a.m.– 7:00 a.m.	N/A	Human	N/A
Tororo	***An. gambiae* s.l.**	April–May	Outdoors	1:00 a.m.– 7:00 a.m.	N/A	Human	N/A
Tororo	*An. funestus* s.l.	Not clear, too few numbers caught	N/A	N/A	N/A	Human	N/A

*Primary vector listed in bold.

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

*** Entomological inoculation rate.

PMI Uganda conducts insecticide susceptibility monitoring in 16 sites (Apac, Arua, Bugiri, Gulu, Hoima, Kamwenge, Kanungu, Katakwi, Kitgum, Lira, Moroto, Nakaseke, Rakai [to be replaced by Mityana], Soroti, Tororo, and Wakiso) and vector bionomics monitoring monthly in six sites (Apac, Bugiri, Lira, Otuke, Soroti, and Tororo). Of the 16 insecticide susceptibility sites and six bionomics monitoring sites, four are within IRS districts (Bugiri, Lira, Otuke, and Tororo). In all six vector bionomics monitoring districts, a total of 3,891 *An. gambiae* s.l. were collected with both HLCs and PSCs. A total of 32,536 *An. funestus* s.l. were collected in the five districts of Apac, Soroti, Katakwi, Lira, and Otuke (in high numbers), while in Bugiri and Tororo in smaller numbers (5.5 percent and 2.8 percent of the total *Anopheles* collected in Bugiri and Tororo, respectively).

The biting of *An. funestus* s.l. usually starts as early as between 6:00 p.m. and 7:00 p.m. with numbers increasing rapidly from 10:00 p.m. and reaching a peak between 4:00 a.m. and 5:00 a.m. Biting reduces thereafter but not dramatically especially in the non-IRS district of Soroti. Outdoor biting follows the same pattern but peak biting is reached between 5:00 a.m. and 6:00 a.m. in Soroti. Biting appears constant throughout the night especially in Soroti district. However, the biting pattern was not very clear in the IRS districts due to a lack of sufficient mosquitoes to draw conclusions.

An. gambiae s.l. usually starts biting between 7:00 p.m. and 8:00 p.m. with numbers increasing rapidly from 10:00 p.m. and reaching a peak between midnight and 1:00 a.m. In addition, there is a small peak between 4:00 a.m. and 5:00 a.m. with biting reducing thereafter but not dramatically. Outdoor biting followed the same pattern but the peak biting period is reached between 5:00 a.m. and 6:00 a.m. Biting appears constant throughout the night in almost all districts. Outdoor biting followed the same pattern but the peak was reached between 5:00 a.m. and 6:00 a.m. in Soroti. As with *An. funestus* s.l., the biting pattern was not very clear in the IRS districts due to a lack of sufficient mosquitoes to draw conclusions.

Numbers of *An. gambiae* s.l. mosquitoes are usually highest during the rainy seasons given that *An. gambiae* s.l. prefers to breed in stagnant water exposed to sunlight. *An. funestus* s.l. is usually available throughout the year as it breeds in permanent water bodies like edges of swamps, lakes, and rivers.

Samples collected in 2020 and slated for further molecular testing (species identification and infectious rate determination) were sent to Infectious Diseases Research Collaboration Molecular Laboratories. Results from these assays were still pending at the time this MOP was written due to a delayed arrival of assay reagents, thus the annual entomological inoculation rate (EIR), the number of infectious bites per person per unit of time, could not be determined.

Key Question 2

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

Supporting Data

An. gambiae s.l. is generally susceptible to pirimiphos-methyl in almost all the districts where it has been tested except for reduced susceptibility in Kitgum (97 percent mortality) observed in 2020. Reduced susceptibility of *An. gambiae* s.l. to bendiocarb has been observed in a few districts but it is generally susceptible in most districts where it has been tested over the last few years. *An. gambiae* s.l. is generally resistant to pyrethroids (alphacypermethrin, deltamethrin, and permethrin) in all districts tested. *An. gambiae* s.l. is susceptible to clothianidin and chlorfenapyr insecticides. Synergist tests with PBO with *An. gambiae* s.l. fully or partially restored susceptibility to pyrethroids indicating that the resistance mechanism involves monooxygenases. *An. funestus* s.l. is resistant to pyrethroids (alphacypermethrin, deltamethrin, and permethrin) in districts where it has been tested such as Katakwi and Soroti but susceptible to pirimiphos-methyl.

Please see Table A-3 and Figures A-1 and A-2 below for further details on the current insecticide susceptibility profile of *An. gambiae* s.l.

Table A-3. Percent 24-hour holding mortality of *An. gambiae* s.l. after exposure to insecticides, September to October 2020 (results for adults reared from larvae)

Insecticide	Bugiri # Tested (Mortality)	Hoima # Tested (Mortality)	Gulu # Tested (Mortality)	Kamwenge # Tested (Mortality)	Katakwi # Tested (Mortality)	Kitgum # Tested (Mortality)	Lira # Tested (Mortality)	Nakaseke # Tested (Mortality)	Soroti # Tested (Mortality)	Tororo # Tested (Mortality)	Wakiso # Tested (Mortality)
Pirimiphos-methyl 0.25 percent	105 (100.0%)	100 (100.0)	100 (100.0%)	100 (100.0%)	104 (100.0%)	100 (97.0%)	-	100 (100.0%)	100 (100.0%)	102 (100.0%)	100 (100.0%)
Bendiocarb 0.10%	109 (100.0%)	-	-	30 (86.7%)	-	-	-	100 (100.0%)	106 (100.0%)	102 (100.0%)	100 (100.0%)
Deltamethrin 0.05%	100 (39.0%)	100 (49.0%)	100 (4.0%)	100 (19.0%)	94 (45.7%)	-	100 (83.0%)	100 (89.0%)	-	89 (85.4%)	100 (22.0%)
PBO + Deltamethrin 0.05%	100 (100.0%)	-	100 (96.0%)	-	-	-	100 (100.0%)	100 (100.0%)	-	103 (100%)	100 (100.0%)
Permethrin 0.75% (x1)	105 (55.2%)		100 (0.0%)	100 (15.0%)	103 (72.8%)	-	100 (67.0%)	-	103 (23.3%)	100 (71.0%)	100 (21.0%)
PBO + Permethrin 0.75%	-	-	-	-	-	-	100 (100%)	-	-	-	100 (85.0%)
Alphacypermethrin 0.05%	103 (18.4%)	100 (32.0%)	100 (6.0%)	100 (7.0%)	99 (12.1%)	100 (74.0%)	100 (84.0%)	100 (20.0%)	105 (80.0%)	100 (40.0%)	100 (11.0%)
PBO + Alphacypermethrin 0.05%	110 (100.0%)	100 (85.0%)	100 (73.0%)	100 (85.0%)	101 (79.2%)	100 (99.0%)	100 (93.0%)	100 (100.0%)	103 (98.0%)	100 (100.0%)	100 (64.0%)
Alphacypermethrin 0.25% (x5)	-	-	100 (14.0%)	-	-	-	-	-		-	100 (44.0%)
Alphacypermethrin 0.5% (x10)	-	-	100 (56.0%)	-	-	-	-	-	-	-	-
KEY :			Confirmed resistance < 90%			Probable resistance 90–97%			Susceptible 98–100%		

Figure A-1. Percent mortality of *An. gambiae* s.l. after exposure to clothianidin filter papers treated with 13.2mg active ingredient per paper (results shown are from adults reared from field-caught larvae); the green line indicates the susceptibility threshold and the red line indicates susceptibility threshold

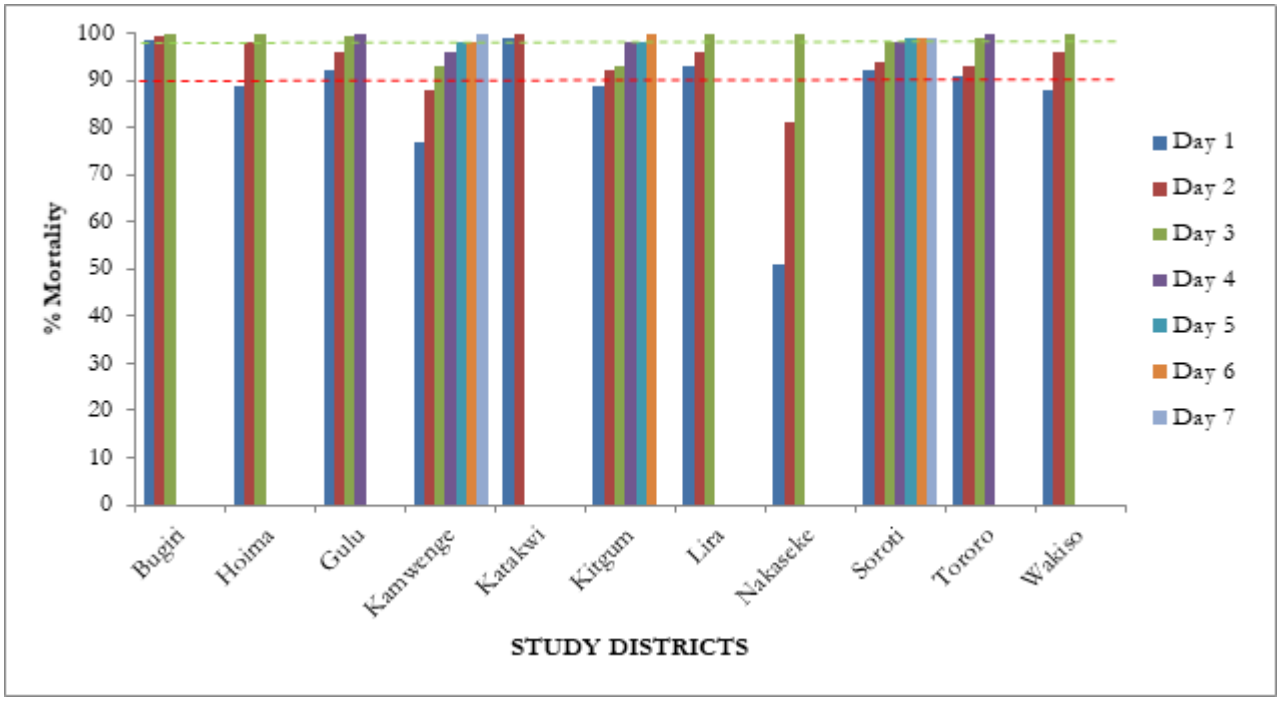
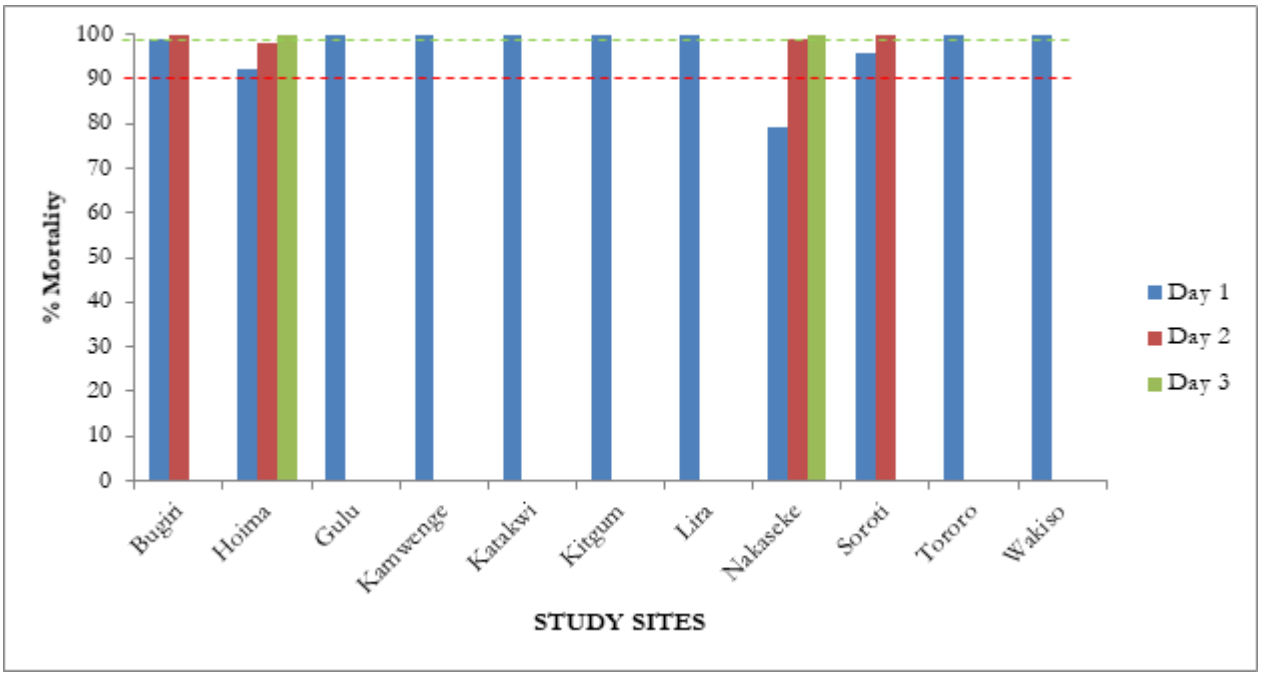


Figure A-2. Percent mortality of *An. gambiae* s.l. after exposure to chlorfenapyr at a concentration of 100µg/bottle (results shown are from adults reared from field-caught larvae); the green line indicates the susceptibility threshold and the red line indicates susceptibility threshold



Conclusions for Entomologic Monitoring Investments

PMI Uganda is proposing to maintain the same level of support for entomological monitoring activities. Based on insecticide resistance data, PMI is proposing to maintain blanket IRS using clothianidin-based insecticides based on the latest resistance data in 10 current IRS districts, PBO nets throughout the country through routine systems, and dual active ingredient nets in the six former IRS districts (that were previously supported by the UK's FCDO).

PMI Uganda recognizes that there are two main areas in which deeper dive into the entomological monitoring data is needed:

1. Given the phased withdrawal of IRS support in FCDO-funded districts, PMI will closely monitor mosquito abundance and other entomological trends in these six former IRS districts.
2. Recent HLC data has suggested that mosquitoes may be shifting their biting behavior to earlier in the evening. This is currently not a pattern observed in all of the sentinel sites, but it has been flagged as something to monitor closely to determine whether this is a contributing factor to the increased malaria cases that have been reported in the past year.

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).

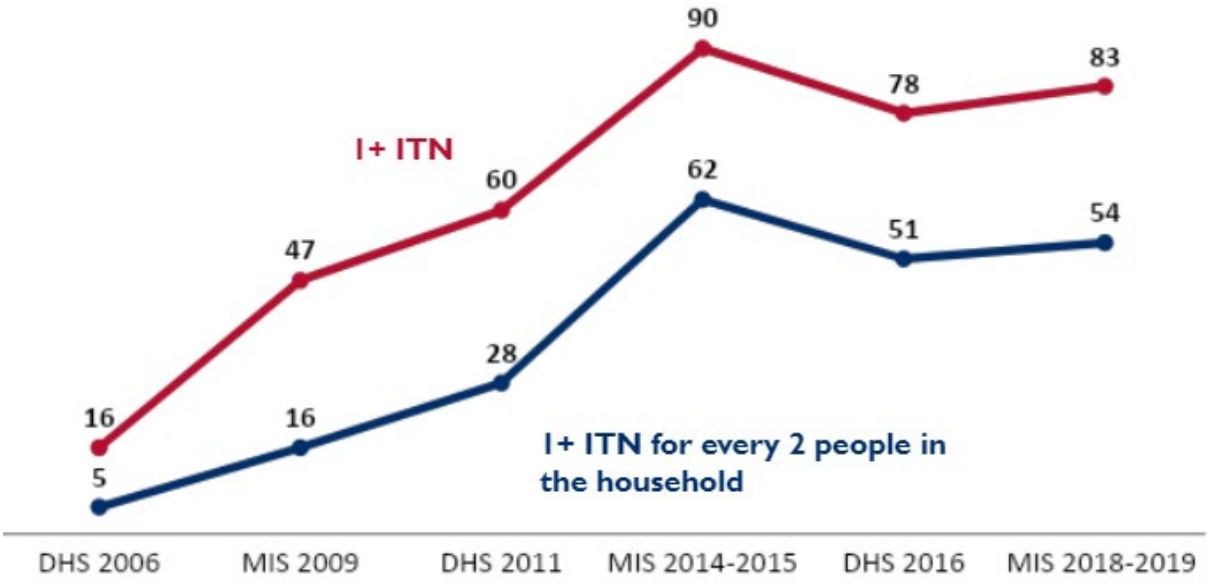
Key Question 1

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

Supporting Data

Figure A-3. Trends in ITN ownership

Percentage of households that own ITNs



Ownership of at least one ITN has generally increased over time. Households owning at least one ITN increased from 47 percent in 2009 to 83 percent in 2018–2019. 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 16 percent in 2009 to 54 percent in 2018–2019. Uganda conducted a mass ITN coverage campaign from June 2020 to March 2021. The ITN ownership (households owning at least one ITN) levels nationally are estimated to increase to at least 90 percent. Results from the 2018–2019 MIS indicate a slight improvement in ownership of ITNs over the 2016 DHS.

There is a critical focus on ensuring Uganda is maintaining the gains achieved in the most recent mass net coverage campaign through continuous ITN distribution. PMI is planning to continue its focus on strengthening existing continuous distribution channels (ANC/EPI) and plans to contribute operational funds to the next mass

coverage campaign, which is scheduled for 2023, using prior year MOP funds. The NMCD and partners including PMI have plans to support continuous and consistent use of nets to minimize the possible risk perception change for community members.

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?

Supporting Data

Figure A-4. Trends in ITN access and use

Percentage of household population with access to an ITN and percentage of those who slept under an ITN the night before the survey

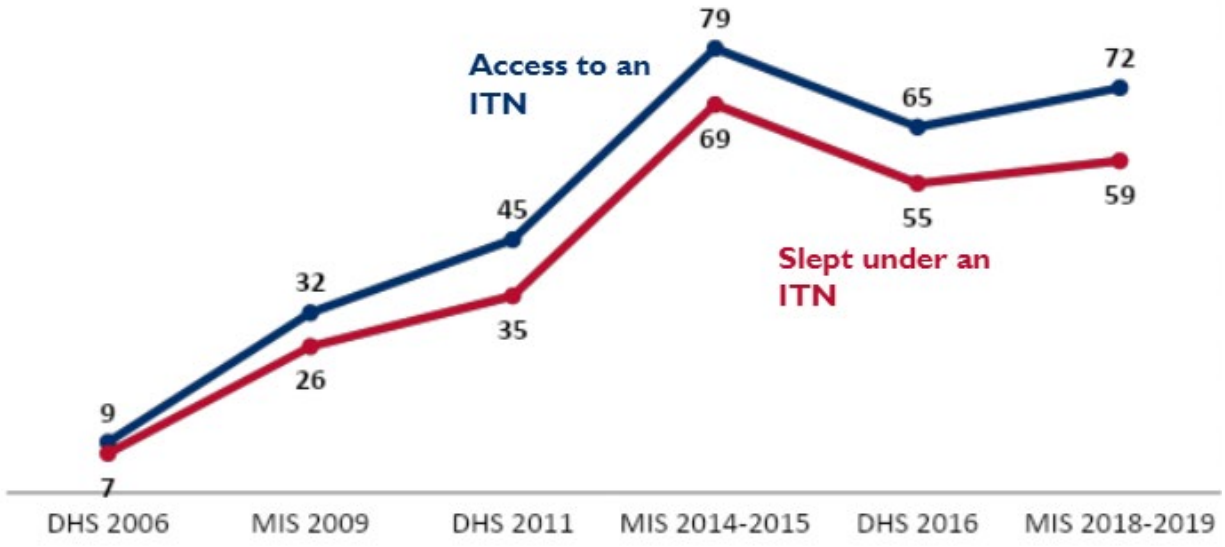
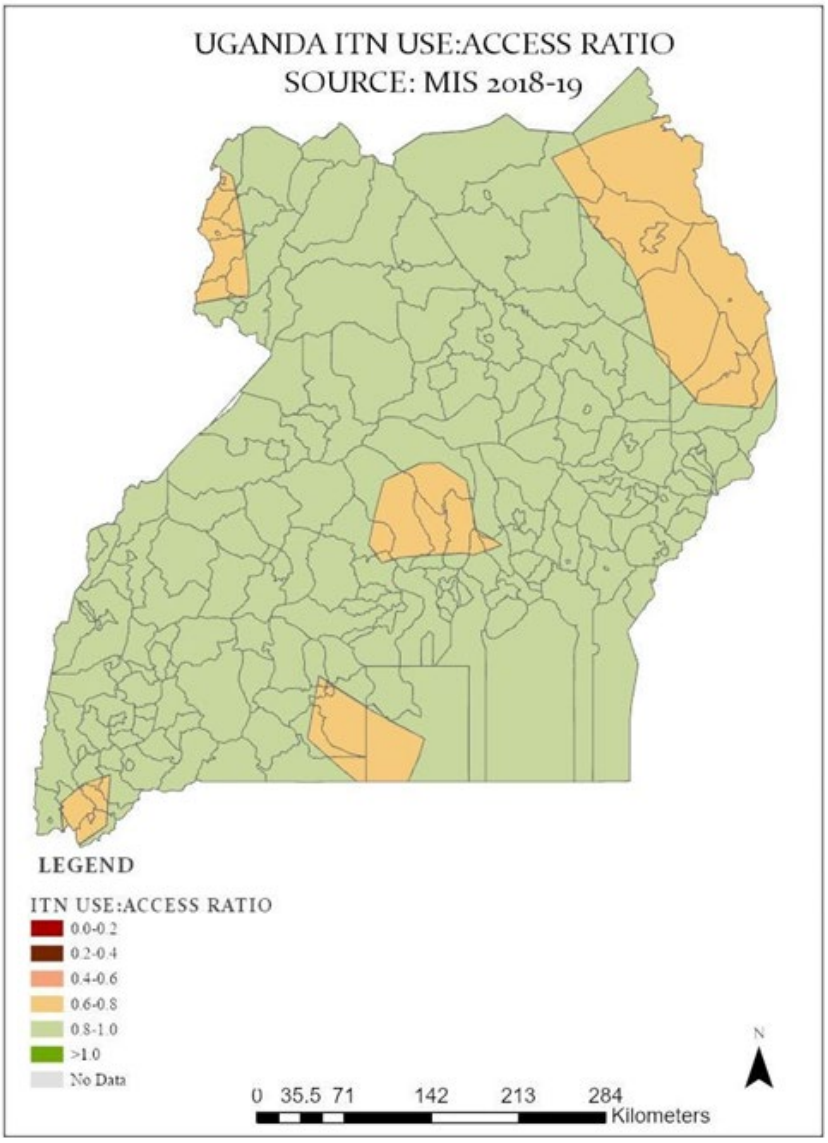


Figure A-5. Uganda ITN use:access ratio map



According to the 2016 DHS access:use ratio in Uganda was 65:55 (1.2:1) while in the 2018–2019 MIS it was 72:59 (1.2:1). The ITN use:access ratio in both surveys is almost 1:1 and indicates that access to a net is predictive of its use. The access to enough ITNs within households is the main restriction of ITN use in Uganda. As access to ITNs increases, the use of ITNs increases as well.

Net ownership and use vary widely across sociodemographic characteristics within the regions of Uganda. In addition, predictors such as household setting, wealth, and cultural or religious influence affect net access and use. The identified barriers to not using ITNs highlight the importance of conducting robust and multipronged SBC campaigns. Even though Uganda is doing well both in terms of access and use when compared with other countries (VectorWorks report ITN-Access-and-use, 2019); PMI, in collaboration with NMCD and RBM

partners, will continue to improve ITN access and net use through increasing and maintaining high ITN ownership levels.

The recently completed 2020–2021 mass net coverage campaign is expected to increase the access to ITNs because more than 91 percent of the population was reached (MOH preliminary UCC 2020 report). As the access to ITNs increases, the use of ITNs is expected to increase as well. PMI will aim to increase access to ITNs through various ITN distribution methods and will continue to promote robust SBC to increase net use including during the drier seasons (December–February and July–August) where some communities become relaxed and do not use their nets. The MAAM program of NMCD is working on a targeted SBC approach at community and household levels.

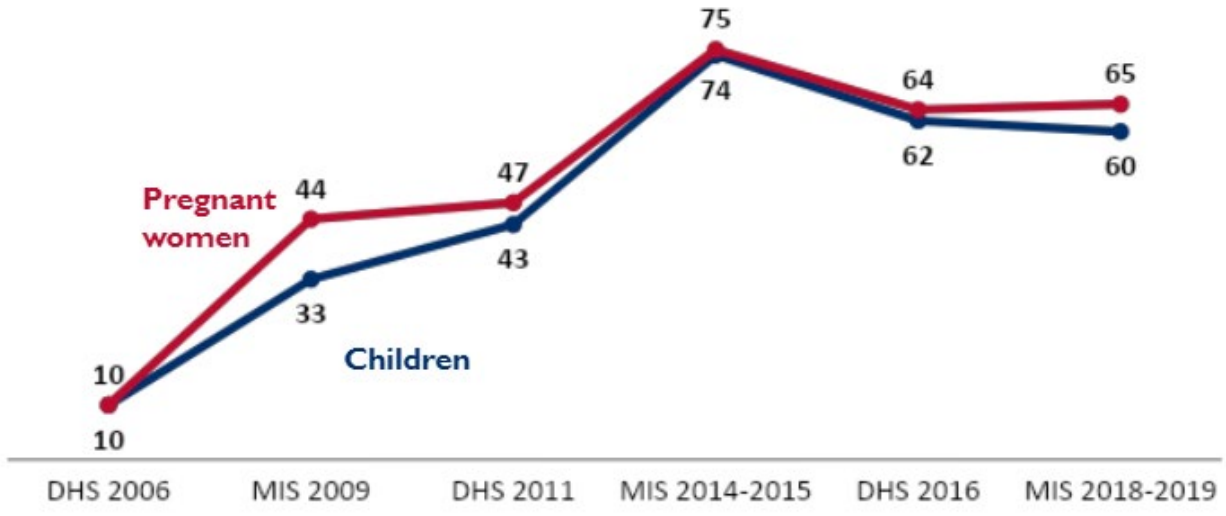
Key Question 2b

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

Supporting Data

Figure A-6. 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



ITN use has generally increased over time. ITN use by children increased from 33 percent in 2009 to 60 percent in 2018–2019. Use of ITNs by pregnant women increased from 44 percent in 2009 to 65 percent in 2018–2019. However, according to the DHS 2016 and MIS 2018–2019, there was a slight decline in ITN use among children under five years of age over the same period (62 percent to 60 percent). The recently completed 2020–2021 mass coverage campaign has increased ITN ownership and ITN use indicators are expected to increase as well. However, there is still the need to focus additional attention on ensuring optimal ITN use in these vulnerable populations.

To improve the use of ITNs among pregnant women and children, PMI will strengthen continuous distribution channels to ensure a consistent supply of ITNs given the intricate link between access and use. PMI will also intensify ITN-related SBC, including messaging to households to promote correct and consistent ITN use by pregnant women and children under five years of age, and targeting village-level opinion leaders, community and faith-based organizations, and civil society at the village and parish levels to support the promotion of ITN use by leveraging the NMCD's highly visible MAAM platform, which uses a multisectoral implementation approach to bring everyone on board in the fight against malaria. There are plans through MAAM to promote consistent and correct use of nets and care nationwide with emphasis in the six previous IRS districts to enhance the risk perception for malaria.

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

The 2016 DHS and the MIS 2018–2019 surveys show that the ITN access:use ratio is almost 1:1 and the access to enough ITNs within households is the main restriction of ITN use in Uganda. However, there are still barriers to ITN access and use.

Table A-4. Barriers to ITN access and use

Barrier	Type of Factor	Data Source	Evidence
Problem hanging nets	Economic	Qualitative Study	Communities that lead unsettled lifestyles (e.g., fishing, pastoralist, and refugee/immigrant communities) experienced problems of net hanging related to poor housing and lack of a bed [2]. Qualitative field observations showed that in mud-and-wattle houses, lack of beds and inadequate sleeping spaces prevented hanging of nets for use. These field observations concur with economic factors in published literature—populations in the poorest wealth quintiles experience these problems of poor housing and bedding conditions that make it difficult to hang nets for use. [2] Strachan, C. E. et al. (2016). "What drives the consistent use of long-lasting insecticidal nets over time? A multi-method qualitative study in mid-western Uganda." Malaria Journal, vol. 15, no. 1, article no. 1101.

Barrier	Type of Factor	Data Source	Evidence
Limited perceived benefit of nets	Internal	Field activity reports (2018–2019)	Experiences of receiving early evening mosquito bites before going to bed even with nets available at home led to a lack of faith for full protection of the method. [3] Study findings imply that the risk of human exposure to potentially infectious bites is equally distributed throughout the night, thus supplementary measures to protect people against bites in the evening and morning are desirable. --- [3] Milali, M. P. et al. (2017). "Bites before and after bedtime can carry a high risk of human malaria infection." Malaria J. 2017; 16: 91. Published online 2017 Feb 28. doi: 10.1186/s12936-017-1740-0
Religious beliefs	Social	Chase malaria campaign assessment report (2018)	Religious beliefs with specific reference to Kanyiriri, a religious sect commonly found in Eastern Uganda that discourages its members from attending gatherings or being registered or numbered. It was reported that the sect members are unable to participate in community events to learn about health-seeking behaviors or even go to health centers for fear of being registered.
Myths and misconceptions	Social	Chase malaria campaign assessment report (2018)	Examples of the highlighted myths and misconceptions was the belief that the use of long-lasting insecticide-treated nets causes impotence and birth-related challenges, perceived discomfort that comes with the feeling of confinement while under the net and the heat generated from the confinement, and fear of fire breaks that may be precipitated by the net.

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

Key Question 4

What type of nets are being distributed via which channels?

Supporting Data

A total of 28.6 million ITNs were distributed through the mass coverage campaign covering 1,856 subcounties in 136 districts. The type of ITN distributed in each of the five waves is listed below.

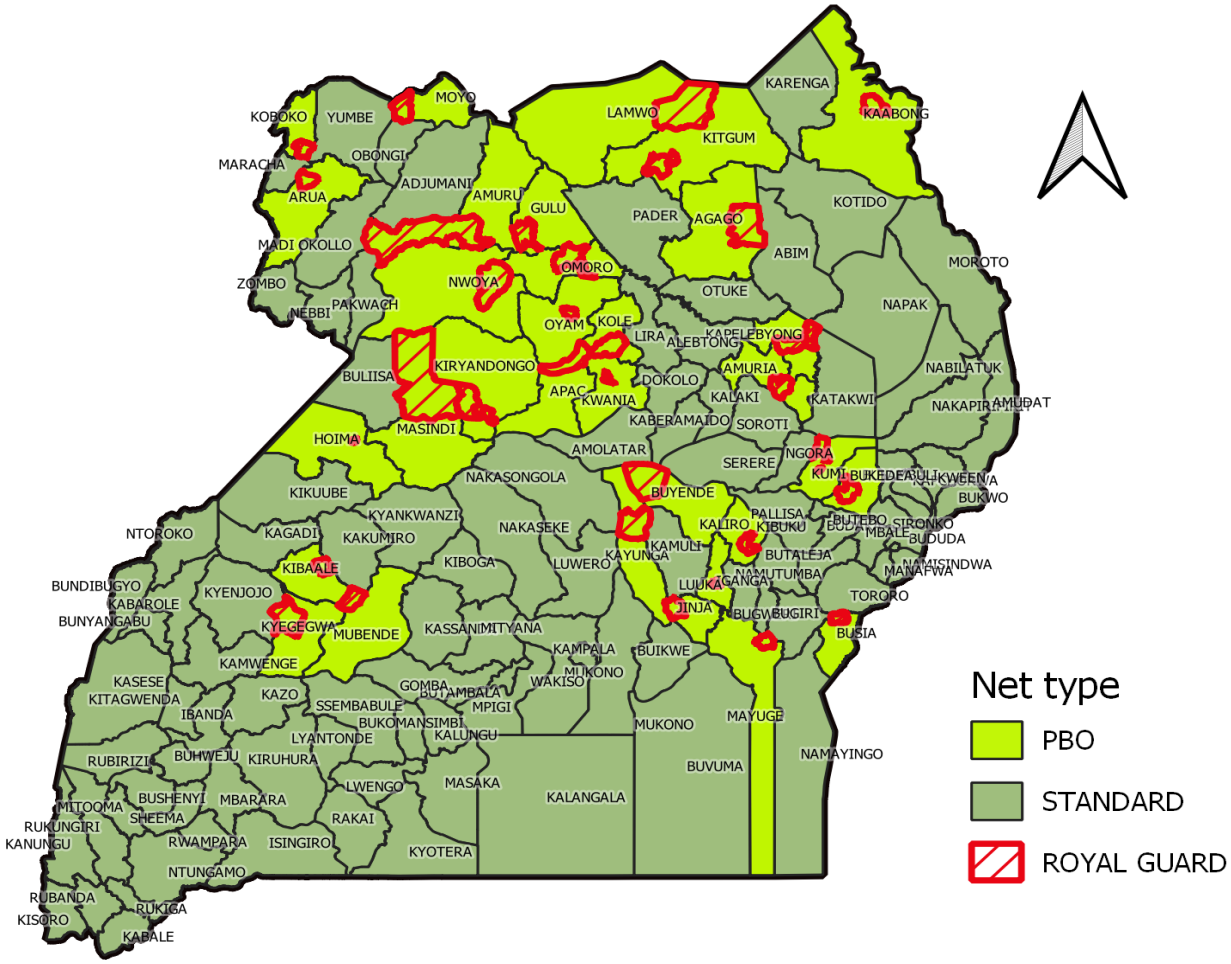
Table A-5. Mass ITN coverage campaign (June 2020 through March 2021) allocation and distribution by ITN brand in bales*

Brand Description	Wave 1 (June 2020)	Wave 2 (August 2020)	Wave 3 October–November 2020)	Wave 4 (December 2020)	Wave 5A (January 2021)	Wave 5B (March 2021	Cumulative quantity in bales (Waves 1-5B)	Total ITNs pieces**
PermaNet 2.0	66,210	93,084	49,686	0	55,638	0	264,622	10,584,880
Yorkool	43,278	0	0	32,521	13,175	0	88,969	3,558,760
Interceptor G2	0	32,442	0	0	0	0	32,442	1,297,680
SafeNet	0	0	56,928	47,977	0	48,807	153,712	6,148,480
PermaNet 3.0	0	0	48,045	57,898	0	54,645	160,592	6,423,680
Royal Guard	0	0	5,503	4,794	0	5,315	15,526	621,040
Total ITNs in bales	109,483	125,256	160,162	143,100	68,813	108,767	607,104	24,284,160
Total ITNs in pieces	4,379,320	5,021,040	6,406,480	5,724,000	2,752,520	4,350,680	715,867	28,634,680

*Each bale has 40 ITNs.

**Excludes ITNs removed for durability monitoring activities.

Figure A-7. Uganda 2020–2021 mass coverage campaign ITN distribution, by net type



ITNs distributed through the 2020–2021 mass coverage campaign were procured by the Global Fund and the Against Malaria Foundation. PMI contributed significant funding to support the operational costs associated with the mass coverage campaign. In addition, over the past 12 to 18 months PMI procured PBO ITNs to support the ANC/EPI needs for continuous distribution.

Table A-6. ITN distribution by channel, October 2019–March 2021

Level Nationwide/Region/ State/Province	Mass Coverage Campaign June 2020–March 2021	ANC + EPI	School	Community*	Other
Nationwide	28,634,840	1,870,253	0	99,800	0
PMI's five focus regions (West Nile, Midwest, Rwenzori, Central 1, and Central 2)	9,145,804**	935,194	0	27,060***	0

*Rotary supported ITN distribution in communities affected by significant flooding (integrated outreach).
**9,145,804 ITNs were distributed in PMI's five focus regions as part of the mass coverage campaign.
***27,060 ITNs were distributed in PMI's five focus regions as part of the total community-level distribution.

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 below shows in detail the estimated need, donors' contributions, and types of ITNs projected to be procured during calendar years 2021–2023. With FY 2022 funds, PMI plans to procure approximately 1,005,729 total ITNs, which will be a mix of PBO and dual active ingredient ITNs for distribution at ANC and EPI. The final split on how many ITNs will be PBO vs. dual active ingredient ITNs will be determined once final ITN prices are known. The Global Fund through the New Funding Model 3 allocated funds to procure 17.7 million PBO ITNs for the 2023 mass coverage campaign and 878,793 PBO ITNs to be distributed at schools. The Against Malaria Foundation (AMF) is currently expected to procure 6 million ITNs for the 2023 mass coverage campaign. The estimated ITNs needed to cover both the 2023 mass coverage campaign and continuous distribution needs is 33 million, however, only 24.7 million ITNs are currently projected to be available, leaving a gap of approximately 8.3 million ITNs (please see the gap analysis table below). PMI will engage in additional discussions with other donors to help close the ITN gap.

Table A-7. ITN Gap Analysis Table

Calendar Year	2021	2022	2023
Total country population	44,099,177	45,422,152	46,784,817
Total population at risk for malaria	44,099,177	45,422,152	46,784,817
PMI-targeted at-risk population	44,099,177	45,422,152	46,784,817
Population targeted for ITNs	39,905,499	41,098,351	42,329,529
Continuous Distribution Needs			
Channel 1: ANC	1,616,173	1,719,966	1,809,587
Channel 2: EPI	1,596,220	1,643,934	1,693,181
Channel 3: School	828,347	853,198	878,793
Channel 4:	301,420	304,900	308,220
Additional ITNs required to avoid ITN stockouts	0	0	0
Estimated Total Need for Continuous Channels	4,342,160	4,521,998	4,998,002
Mass Campaign Distribution Needs			
Mass distribution campaigns	0	0	23,516,405
Estimated Total Need for Campaigns	0	0	28,219,686
Total ITN Need: Continuous and Campaign	***4,342,160***	***4,521,998***	***33,217,688***
Partner Contributions			
ITNs carried over from previous year	639,169	743,680	0
ITNs from Government	*0*	*0*	*0*
ITNs from Global Fund	1,546,144	1,714,481	17,693,106
ITNs from other donors	0	0	6,000,000
ITNs planned with PMI funding	2,900,527	1,584,674	1,005,729
Total ITNs Contribution Per Calendar Year	*5,085,840*	*4,042,836*	*24,698,835*
Total ITN Surplus (Gap)	***743,680***	***(479,162)***	***(8,518,853)***

Key Question 6

What is the current status of durability monitoring?

Supporting Data

Table A-8. Timing of durability monitoring

Campaign Date	Site	Brand	Baseline	12-month	24-month	36-month
December 2020	Apac District	Royal Guard & PermaNet 3.0	March–May 2021	December 2021	December 2022	December 2023
December 2020	Mubende District	Royal Guard & PermaNet 3.0	March–May 2021	December 2021	December 2022	December 2023

Monitoring is ongoing; conclusions will be presented at the end of the monitoring activity. The 36- month report will be final in 2023–2024.

Conclusions for ITN Investments

To address the widespread pyrethroid resistance that threatens the effectiveness of pyrethroid-only ITNs in Uganda, PMI in collaboration with the NMCD, WHO, Global Fund, and other stakeholders developed an integrated vector management strategy to guide the selection of vector control tools to ensure maximum impact and cost effectiveness. Based on the country's integrated vector management strategy and resistance monitoring plan, PMI has been solely procuring new types of ITNs (PBO synergist) for the past two years. Depending on available funding and the final price of new types of nets when PMI's ITN order is placed, PMI plans to procure a combination of PBO and dual active ingredient ITNs with FY 2022 funds. PMI will also use reprogrammed FY 2021 MOP funds to support procurement of new types of nets for the FY 2022 MOP funding period.

PMI will continue supporting continuous distribution of ITNs nationwide through ANC/EPI and the Global Fund will support ITN distribution in selected schools. Based on ITN ownership data, PMI will provide support to maintain the current high level of ITN ownership achieved through the 2020–2021 mass coverage campaign (MOH UCC 2020 report) using its well established continuous distribution channels through ANC/EPI. If additional funds become available and the ANC/EPI channels are fully covered, PMI will consider supporting community-level distribution to help cover unreached communities, subject to the availability of funds.

A major challenge that threatens PMI's ability to procure ITNs is the MOH's policy requiring that only polyester ITNs be procured in Uganda, which is inconsistent with PMI's procurement policies. PMI, in collaboration with USAID Mission leadership and other donors continues to work to address this issue.

PMI in collaboration with NMCD, WHO, Global Fund, and the Peace Corps, also plans to adjust its SBC activities to increase ITN use, targeting SBC activities at the district, sub county, parish, and village levels. The PMI funded Malaria Smart Schools approach organizes malaria clubs for the sensitization of pupils and teachers on malaria prevention approaches. Through this model, PMI promotes school children to be change agents for malaria prevention and control within the communities they come from. In addition, MAAM activities will continue in the five PMI high-burden focus regions. PMI will continue robust SBC in the targeted communities to reinforce that all nets being distributed are effective and to promote ITN care behavior in households.

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

1.3. INDOOR RESIDUAL SPRAYING (IRS)

Key Goal

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.

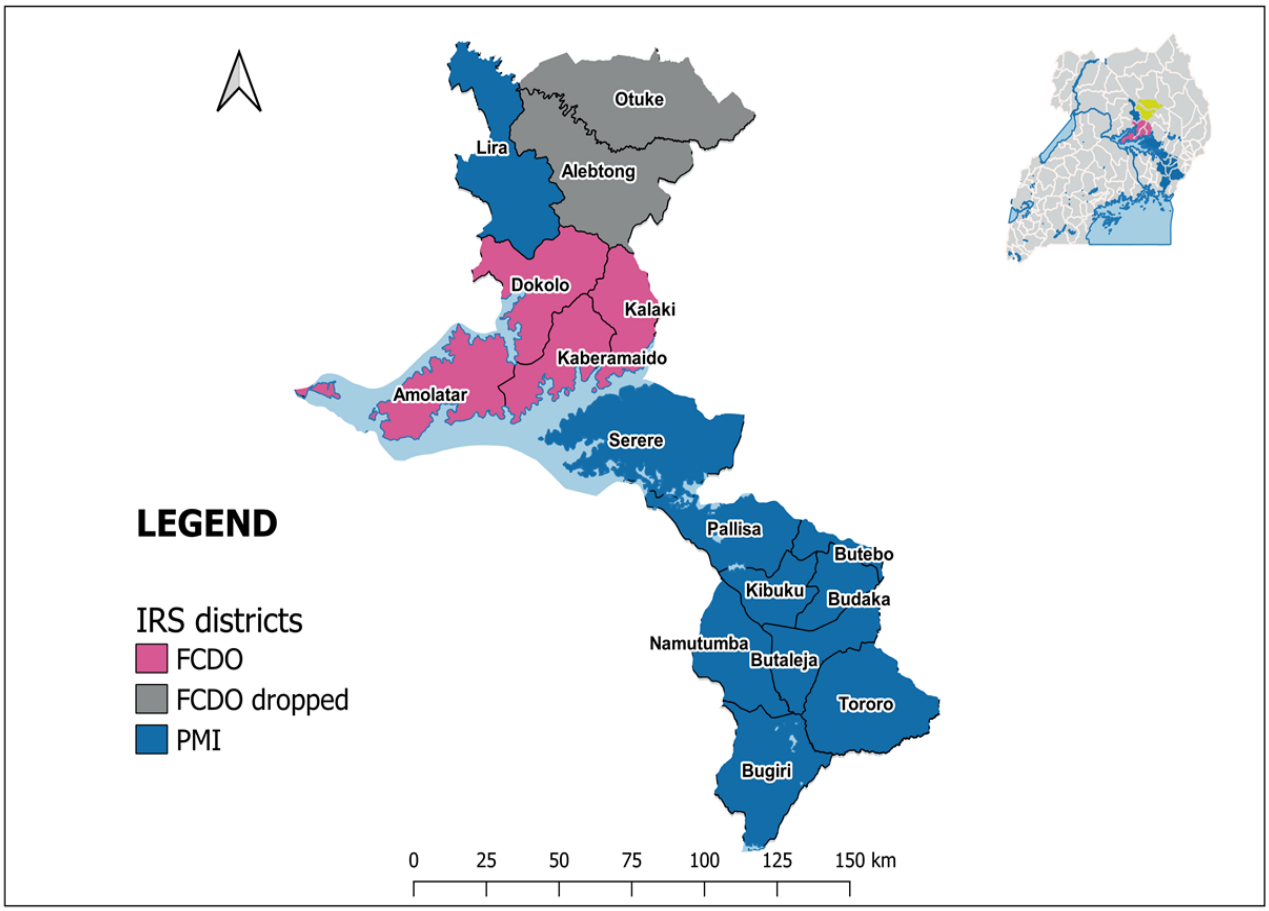
Key Question 1

What areas are targeted for IRS and why?

Supporting Data

In 2021, 14 districts in the northern and eastern regions of Uganda were targeted for IRS because they had some of the highest malaria burdens in the country. Ten districts were funded by PMI and four districts were funded by FCDO. FCDO used to fund six districts, but dropped two in 2020. This will be the final spray round for the remaining four FCDO-funded districts. IRS is not supported by the Global Fund or the government at this time; however, support for IRS in West Nile in 2022 has been included in the latest Global Fund grant.

Figure A-8. 2021 Indoor residual spraying target districts



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-9. IRS coverage, 2018–2021

Calendar Year	Districts Sprayed (#)	Districts	Structures Sprayed (#)	Coverage Rate (%)	Population Protected (#)
2018	10	Budaka, Bugiri, Butebo, Butaleja, Kibuku, Lira, Namutumba, Pallisa, Serere, and Tororo	950,939	94%	3,504,041
2019	10	Budaka, Bugiri, Butebo, Butaleja, Kibuku, Lira, Namutumba, Pallisa, Serere, and Tororo	934,512	92%	3,490,673
2020	10	Budaka, Bugiri, Butebo, Butaleja, Kibuku, Lira, Namutumba, Pallisa, Serere, and Tororo	1,001,746	94%	3,847,573
2021*	10	Budaka, Bugiri, Butebo, Butaleja, Kibuku, Lira, Namutumba, Pallisa, Serere, and Tororo	~1,000,000	85%+	~4,000,000

*Denotes targets for current year.

Key Question 3

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

Supporting Data

Table A-10. IRS insecticide residual efficacy

Site/District	Year	Insecticide	Average Residual Efficacy (months)
Bugiri	2019	Actellic® 300CS	8
Otuke	2019	Actellic® 300CS	7
Tororo	2019	Actellic® 300CS	8
Lira	2019	SumiShield®	8
Bugiri	2020	Actellic® 300CS	7
	2020	Fludora® Fusion	7
Lira	2020	SumiShield®	6
	2020	Fludora® Fusion	6
Otuke	2020	SumiShield®	7
	2020	Fludora® Fusion	7

Site/District	Year	Insecticide	Average Residual Efficacy (months)
Tororo	2020	Actellic® 300CS	6
	2020	Fludora® Fusion	6

The residual efficacy of Actellic® 300CS sprayed in IRS districts in 2019 and 2020 and over the last several years varied between six and eight months on average across all wall surfaces but extended to nine months on plastered painted wall surfaces. The residual efficacy of Fludora® Fusion sprayed in 2020 in IRS districts varied between six and seven months on average on all wall surfaces but extended to eight to nine months on plastered painted wall surfaces. The residual efficacy of SumiShield® sprayed in IRS districts in 2019 and 2020 varied between six and eight months on average across all wall surfaces but extended to eight months on plastered painted wall surfaces. All three insecticides performed best on a plastered painted surface followed by plain brick surfaces with mud surfaces having the poorest residual efficacy. In general, the insecticides in use for the PMI-funded spray campaigns cover the main transmission peak; however, they wane during the second peak in the fall.

Key Question 4

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

Supporting Data

Please see Table A-11 for the insecticide rotation plan in PMI-supported areas.

Table A-11. Insecticide rotation plan

Target Spray Area	2020	2021	2022*	2023
Budaka	Organophosphate & Neonicotinoid + Pyrethroid	Neonicotinoid + Pyrethroid	Neonicotinoid + Pyrethroid & Neonicotinoid	TBD
Bugiri	Organophosphate & Neonicotinoid + Pyrethroid	Neonicotinoid + Pyrethroid	Neonicotinoid + Pyrethroid & Neonicotinoid	TBD
Butebo	Organophosphate & Neonicotinoid + Pyrethroid	Neonicotinoid + Pyrethroid	Neonicotinoid + Pyrethroid & Neonicotinoid	TBD
Butaleja	Organophosphate & Neonicotinoid + Pyrethroid	Neonicotinoid + Pyrethroid	Neonicotinoid + Pyrethroid & Neonicotinoid	TBD
Kibuku	Organophosphate & Neonicotinoid + Pyrethroid	Neonicotinoid + Pyrethroid	Neonicotinoid + Pyrethroid & Neonicotinoid	TBD
Lira	Neonicotinoid & Neonicotinoid + Pyrethroid	Neonicotinoid + Pyrethroid	Neonicotinoid + Pyrethroid & Neonicotinoid	TBD

Target Spray Area	2020	2021	2022*	2023
Namatumba	Organophosphate & Neonicotinoid + Pyrethroid	Neonicotinoid + Pyrethroid	Neonicotinoid + Pyrethroid & Neonicotinoid	TBD
Pallisa	Organophosphate & Neonicotinoid + Pyrethroid	Neonicotinoid + Pyrethroid	Neonicotinoid + Pyrethroid & Neonicotinoid	TBD
Serere	Neonicotinoid & Neonicotinoid + Pyrethroid	Neonicotinoid + Pyrethroid	Neonicotinoid + Pyrethroid & Neonicotinoid	TBD
Tororo	Organophosphate & Neonicotinoid + Pyrethroid	Neonicotinoid + Pyrethroid	Neonicotinoid + Pyrethroid & Neonicotinoid	TBD

*Denotes planned insecticide class.

Given the continued susceptibility to both pirimiphos-methyl CS and clothianidin, PMI will continue to rotate among these classes of insecticides. The MOH policy is to rotate insecticide every three years, so PMI plans to use a neonicotinoid-based insecticide again in 2022 for the third and final year.

Conclusions for IRS Investments

PMI is proposing to maintain IRS in the same 10 districts in eastern and northern Uganda that have been supported since 2015. IRS will be withdrawn in six northern Uganda districts previously supported by the UK's FCDO: 2020 was the last round of spraying for two districts and 2021 will be the last round of spraying for the remaining four districts. Based on residual efficacy data and in line with the insecticide rotation plan, PMI will continue rotating among available classes of susceptible insecticides, including any new insecticides that may receive WHO prequalification for IRS prior to 2023. In the six districts where IRS is being withdrawn, PMI plans to introduce new dual active ingredient ITNs through ANC/EPI channels in order to mitigate the anticipated increases in malaria transmission following IRS withdrawal. In addition, Global Fund is providing support for iCCM in these districts. PMI will also support a robust SBC program in the IRS withdrawal districts in order to promote net use for malaria prevention and early treatment seeking behaviors. PMI, in collaboration with the NMCD will monitor the entomological and epidemiological trends in the FCDO withdrawal districts to enable a prompt response to any upsurges that may be seen.

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

NMCD Objective

Per the UMRESP 2021–2025, the NMCD's objective for case management is to accelerate access to malaria curative services to achieve universal coverage in all eligible populations by 2025. Specifically, the NMCD aims for 90 percent of malaria cases to be appropriately managed in public and private facilities and at the community level. The UMRESP includes an additional objective that specifically targets the private sector and aspires to enhance the quality of malaria services in at least 80 percent of the private health facilities managing malaria, according to national guidelines.

NMCD Approach

The NMCD aims to enhance multi-sectoral approaches to improve access and utilization of malaria services. Malaria case management is delivered through health facilities, community health services (iCCM, CCM, and community outreach), and public–private partnerships, including care through private and private not-for-profit (PNFP) health facilities.

In urban areas, case management is delivered through a combination of standard care and care through private facilities. In rural areas where some communities are hard to reach and not within five km of fixed health facilities, community health workers (CHWs), which are locally called village health teams (VHTs), deliver malaria services through iCCM. iCCM currently targets children under five years of age, but the NMCD has the ambition to target all age groups with malaria testing and treatment moving forward. This is combined with community outreach services targeted during high-transmission seasons or in areas with persistent high transmission despite high levels of vector control interventions. In areas like Karamoja where the population depends on livestock for their livelihood, the NMCD plans to train VHTs to conduct outreach to nomadic pastoralist communities where they will provide treatment to all ages, in addition to offering CCM services.

The 2018 National Malaria Control Policy states that all suspected malaria cases shall be subjected to quality assured parasite-based diagnosis. However, this policy does not include a standard definition for "suspected malaria cases." In practice, this is synonymous with all cases presenting with a fever.

Although microscopy is the gold standard in Uganda, which is to be practiced whenever available, the policy allows for malaria RDTs to be used at all levels of the health system, including where microscopy is available, to ensure optimal diagnostic coverage. External quality assurance for both microscopy and RDTs is routinely performed. This involves cross-checking of blood slides by expert microscopists with proven competency on a quarterly basis, and field stability monitoring to assess any deterioration of RDT performance under field conditions, which is overseen by highly qualified laboratory technicians identified in collaboration with the Central Public Health Laboratory, the National Health Laboratory Services, and the NMCD.

ACTs are the approved drugs for the treatment of uncomplicated malaria. Artemether-lumefantrine (AL) is the first-line treatment, artesunate-amodiaquine (ASAQ) is the alternative first-line treatment, and dihydroartemisinin-piperaquine (DHA/PPQ) is the second-line treatment. Additionally, the NMCD revised the

malaria case management guidelines to reflect AL as a safe drug for treating uncomplicated malaria during the first trimester of pregnancy, in addition to oral quinine. Therapeutic efficacy studies (TES) to monitor the efficacy of antimalarials and detect early signs of drug failure, which would result in changes to malaria treatment regimens, are conducted every two years.

For severe malaria, intravenous or intramuscular artesunate is the recommended treatment for all adults and children. When artesunate is not available, parenteral artemether or quinine can be used. Once a patient is able to tolerate oral medication, and after at least 24 hours of parenteral therapy, treatment should be completed with a full course of an oral first-line ACT. For pre-referral treatment before transfer to an appropriate level of care, a single intramuscular dose of artesunate, intramuscular artemether, or intramuscular quinine can be used. At the community and lower-level health facilities, or where injections are not available, a single dose of rectal artesunate can be used as pre-referral treatment for children under six years of age only.

The private sector is the preferred first point of contact for nearly 59 percent of children with fever, with 44 percent going to private hospitals or clinics and 14 percent going to private pharmacies.

The private sector's contribution to service delivery has been lacking in coordination, fragmented, and difficult to measure. Moreover, the midterm review of the previous national malaria strategy indicated minimal adherence to national malaria policies and guidelines in the private sector. The UMRESP's second strategic objective seeks to improve efficiency of service delivery coordination, information management, and sustainability of the private sector for health, and will deploy four strategies to achieve this:

- Establish a malaria private sector coordination mechanism to strengthen the coordination, advocacy, and resource mobilization capacity of the private sector, and support information gathering and sharing among private sector actors regarding malaria interventions.
- Strengthen the capacity of the private sector to deliver quality malaria preventive and curative services by training and mentoring private sector health workers in integrated malaria management using appropriate modalities, increasing their access to affordable, quality assured malaria commodities and conducting quality assurance for malaria diagnostics.
- Strengthen the private sector accreditation and regulatory environment, including data reporting, through private sector service providers mapping, capacity-building, incentives and disincentives to conform to good practice norms, and to increase participation in research, evaluation, and decision fora.
- Ensure sustainable financing of affordable malaria interventions at workplaces and institutions through supporting the implementation of public–private partnerships for health strategic arrangements. The NMCD also aims to leverage the private sector to optimize coverage by health insurance providers, enhance uptake and use of market shaping and subsidized access strategies, and increase engagement in corporate social responsibility for malaria control.

The iCCM Strategic Plan 2020–2025 is in the final stages of development. There are two NMCD staff supporting iCCM at the national level, one of whom is supported by the Global Fund. The iCCM program in the country has progressed from covering 13 to 78 out of 136 districts, between 2013 and 2020, using both public and private sector delivery and mainstreaming procurement and supply management of iCCM commodities. In the public sector, approximately 65,000 VHTs implement iCCM in addition to engaging in health promotion activities such as education of households on net use, registration of household members, and mobilization for immunization.

In the private sector, several nongovernmental organizations, including BRAC and Living Goods, have community case management projects that employ various models, some providing monetary incentives to CHWs, including opportunities to sell products for a profit.

In the public sector, VHTs remain volunteers with varying incentives and retention strategies that include a quarterly stipend of about $9 as well as a transport refund, meals during their quarterly meeting, training and supervision, items such as T-shirts/bags/name tags, and recognition by their community, district, and subcounty leadership. Uganda is currently developing its Community Health Extension Workers (CHEWs) strategy. The CHEWs program, which has not been rolled out to date, is intended to complement efforts of the VHTs by creating a new cadre of community health workers who will sit at the parish level and supervise VHTs. Specifically, the CHEWs program aims to address the following objectives:

- Establish functional community health systems for sustainable delivery of promotive, preventive, curative and rehabilitative health services to individuals, families, and the community.
- Establish a well-trained, motivated, and performing community health workforce, to support VHTs and other community health volunteers or resource persons, and link directly to existing structures.
- Strengthen the linkages and collaboration of the existing services and management structures at parish and subcounty levels.
- Strengthen the referral system between the community and the formal health service delivery system for continuum of care.
- Improve community participation, engagement, and ownership of health programs.

With support from the NMCD and partners, the DHMTs conduct integrated supervision to health facilities. Some general hospitals also lead health subdistricts through their community health departments and supervise lower-level health units in the district. Currently, health assistants at health center (HC) IIs supervise and mentor VHTs, but it is anticipated that this role will be taken over by CHEWs once this program is rolled out in October 2021.

PMI Objective in Support of NMCD

At the national level, PMI provides TA for the development and updating of case management guidelines and policy documents. PMI also contributes to the dissemination of these policies and guidelines at the national, regional, and district level, and at point-of-care through onsite mentorships and focused training.

PMI procures all the commodities required to cover the needs of PNFP facilities for the diagnosis and treatment of uncomplicated and severe malaria. Efforts targeting private for profit facilities focus on reinforcing good testing, treatment, and reporting practices.

At the community level, PMI supports iCCM implementation in targeted subcounties in the MidWest, West Nile, and Central regions.

PMI-Supported Recent Progress (FY 2020)

- Between October 2019 and September 2020, PMI procured 2,274,900 ACTs, 2,850,000 RDTs and 300,000 vials of injectable artesunate that supported coverage in the PNFP facilities across the country.

PMI trained 5,217 health workers in malaria case management and 4,554 in lab diagnostics with RDTs and microscopy.

- Supported the NMCD to scale up quality assurance/quality control systems for diagnostics and strengthened malaria case management for uncomplicated and severe malaria in public health facilities through supportive supervision, clinical audits of severe malaria cases, and on-the-job mentoring of health workers in integrated malaria management. Case management strengthening activities were carried out in South West, East, East Central, North Lango and North Acholi, MidWest, Central and West Nile regions, covering over 95 percent of the country.
- Supported iCCM in 13 districts in the MidWest, West Nile, and Central regions. Although VHTs were trained to carry out comprehensive iCCM, there were challenges with ensuring the provision of non-malaria commodities. PMI supported ongoing efforts to include community- level needs in the district quantification of essential commodities. In situations where non-malaria commodities were not available, PMI implemented malaria CCM.
- Malaria implementation over the past 12 months in Uganda was complicated by the COVID-19 pandemic, affecting PMI activities and access to health services due to government-imposed lockdowns, economic activity disruptions, supply chain issues, challenges with the availability of personal protective equipment, as well as stigma and fear to seek healthcare in the community. PMI, through its implementing partners, made adaptations in service delivery approaches to maintain continuity of services while ensuring the safety of its staff, implementing partners, and the communities they interacted with.
- Mentorship activities were maintained during the pandemic through virtual platforms, and follow-ups were largely by phone in places with limited internet. VHTs continued to be engaged through interactive short message service (SMS) platforms, but this was a challenge to some VHTs who did not own cell phones. Planned health worker trainings were converted to virtual phone engagements as well as recordings of online sessions in places where internet coverage was poor. Trainees were also emailed the training content to update their skills on case management.
- The past implementation year was also complicated by heavy rains that caused flooding and landslides across many parts of the country, contributing to an increased number of malaria cases. PMI supported national preparedness and planning for displaced persons affected by flooding, to specifically provide them with ITNs and access to health interventions to prevent malaria outbreaks in the temporary shelters provided.
- During the few instances of commodity stockouts due to disruptions in transportation at both national and international levels, PMI worked with the NMCD and partners to redistribute stocks between districts.

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

PMI will support the following activities, with a focus on the high-burden districts in West Nile, Karamoja, Busoga, Lango, and Acholi:

- Maintain the gains made in malaria case management at the district level through continuous capacity-building, with an emphasis on improving the management, planning, and program implementation skills of DHMTs, to include gender- and youth-targeted activities.
- Similarly, maintain gains made in public health facilities in malaria diagnosis and treatment, including management of severe malaria, by providing TA to health workers. This is to include key interventions

that have proven to have a significant impact in the past, such as supportive supervision and clinical/death audits based on identified gaps.

- Support the NMCD's objective of improving the quality of malaria services in private health facilities. To this end, PMI is supporting an initiative to expand Uganda's engagement with private sector actors and leverage the for-profit private sector to maintain gains in malaria control and sustainably work toward malaria elimination. Following a comprehensive landscape of relevant private sector activities in Uganda, this initiative will generate recommendations on priority opportunities for strategic partnerships with the private sector, and develop a private sector engagement toolkit with resources tailored to build the capacity of in-country stakeholders to identify and pursue private sector engagement opportunities. PMI plans to utilize this toolkit to guide the implementation of interventions aimed at improving case management in the private sector.
- In line with the NMCD's goal to move the fight against malaria to households, PMI will shift focus to increase support for the implementation of iCCM to establish a solid foundation for accessible quality malaria services at the community level. PMI will start by expanding community services to about 15 priority districts, favoring hard-to-reach and highly endemic areas, as well as areas with the highest potential for cost-effective impact based on an assessment previously conducted by a third party. This will include support to the rollout of CHEWs, a new cadre of health workers hired and paid by the GOU, with the central role of supervising community health services. Additionally, PMI will work with the GOU and other donors to advocate for the procurement of non-malaria commodities to support comprehensive iCCM services. PMI will aim to increase the participation and integration of the community in community programming in order to ensure sustainability in reaching the objectives of the NMCD's MAAM initiative.
- Continue to conduct therapeutic efficacy studies to monitor the efficacy of current first-line and second-line malaria drugs and decide on mitigation measures well before the appearance of resistance to those drugs in Uganda.

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

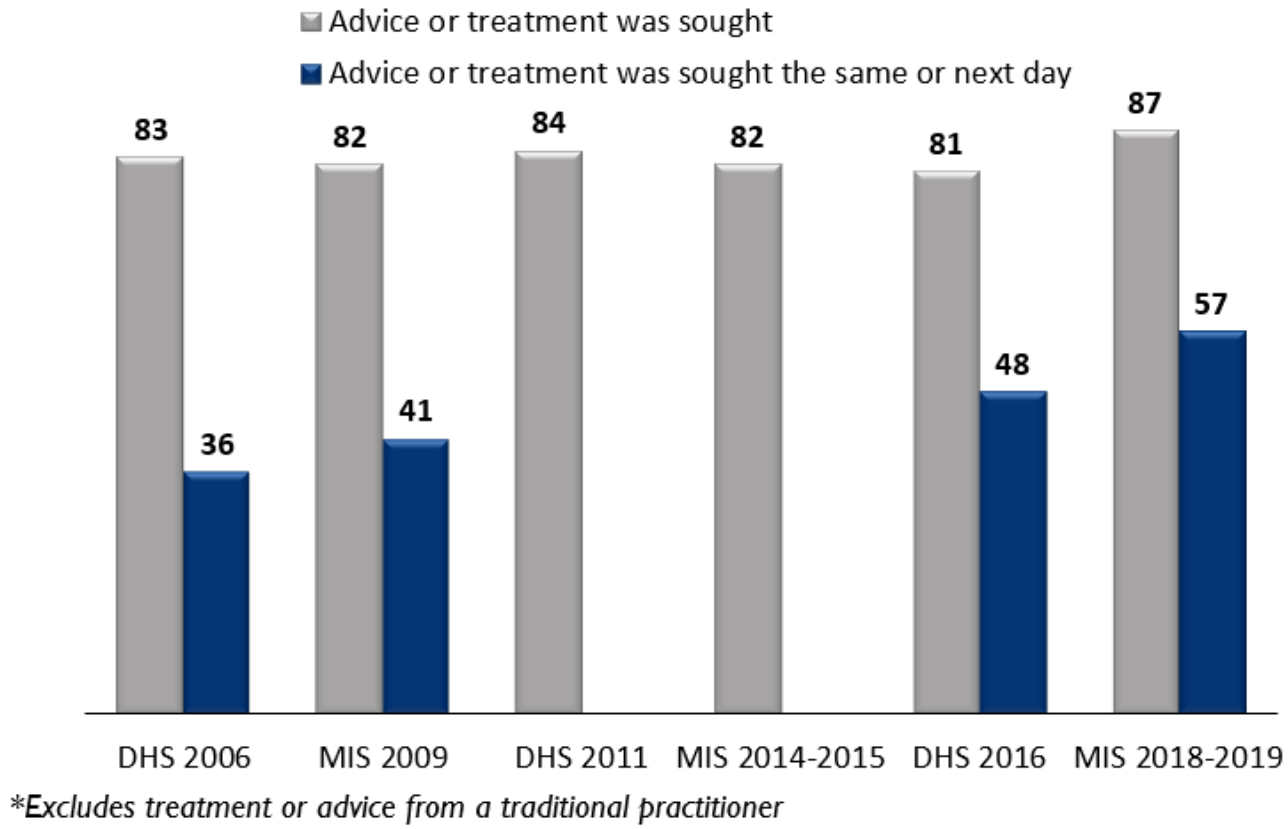
What is the status of care-seeking and/or access to care for children under five years of age with fever?

Supporting Data

Care-seeking for children under five years of age with fever has remained consistently high in Uganda. Since 2006, between 81 percent and 87 percent of caretakers seek advice or treatment when their child has a fever. However, prompt care-seeking, within 24 hours of onset of fever, remains a challenge. Although this indicator has improved from 36 percent in 2006 to 57 percent in 2018, more needs to be done to support behavior change.

Figure A-9. Trends in care-seeking for fever

Among children under five years of age with fever in the two weeks before the survey, percentage for whom advice or treatment was sought.



**Excludes treatment or advice from a traditional practitioner*

Key Question 1b

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

Supporting Data

The table below lists key factors that have been identified as affecting prompt care-seeking at the facility and community levels. Please refer to Section 3.4 for information on how SBC interventions will be directed to address the challenges identified below.

Table A-12. Facilitators and barriers related to care-seeking in Uganda

Facilitator	Type of Factor	Data Source	Evidence
Quality of services and proper handling of clients by health workers	Environmental	Uganda National Household Survey 2016–2017	Provider behavior (handling clients with respect is the top-quality issue for public (29%) and private (37%) facilities).

Facilitator	Type of Factor	Data Source	Evidence
The availability of diagnostic and treatment commodities and physical access to health facilities	Environmental	MOH Annual Health Sector Performance Report 2017–2018	No RDT stockout at 85% of public health facilities and no ACT stockout at 84% of public health facilities.
Availability and access to testing and treatment services	Environmental	Chase Malaria Campaign Assessment Report (2018)	The assessment showed that before the adoption and use of RDTs, testing was often a challenge. Over time, the use of RDTs and the confidence the participants have in the test results have contributed to an increase in seeking care and treatment services.
Barrier	**Type of Factor**	**Data Source**	**Evidence**
Low risk perception of the illness with delay to seek care	Internal	Uganda National Household Survey 2016–2017	Low risk perception (57%)
Distance to health facility	Environmental	Uganda National Household Survey 2016–2017	Facilities being far (14%)
Cost of health services	Environmental	Uganda National Household Survey 2016–2017	Overall, cost considerations (13%). In private facilities, services being expensive (39%).
Combination of factors at health facilities including long waiting time, limited range of services, and understaffing	Environmental	Uganda National Household Survey 2016–2017	Public facilities, long waiting time (13%), limited range of services (14% - public facilities; 23% - private facilities), and understaffing (10%)

Barrier	Type of Factor	Data Source	Evidence
Misconceptions	Social	Chase Malaria Campaign Assessment Report (2018)	Common misconceptions on the cause of malaria included having long nails, unwashed hands, having no toilet, not putting on warm clothes, playing in stagnant water, putting on dirty clothes, and untidy hair.
Complacency	Internal	Chase malaria campaign assessment report (2018)	Complacency could likely be due to message overload as well as progress made, affecting risk perception.

Key Question 2a

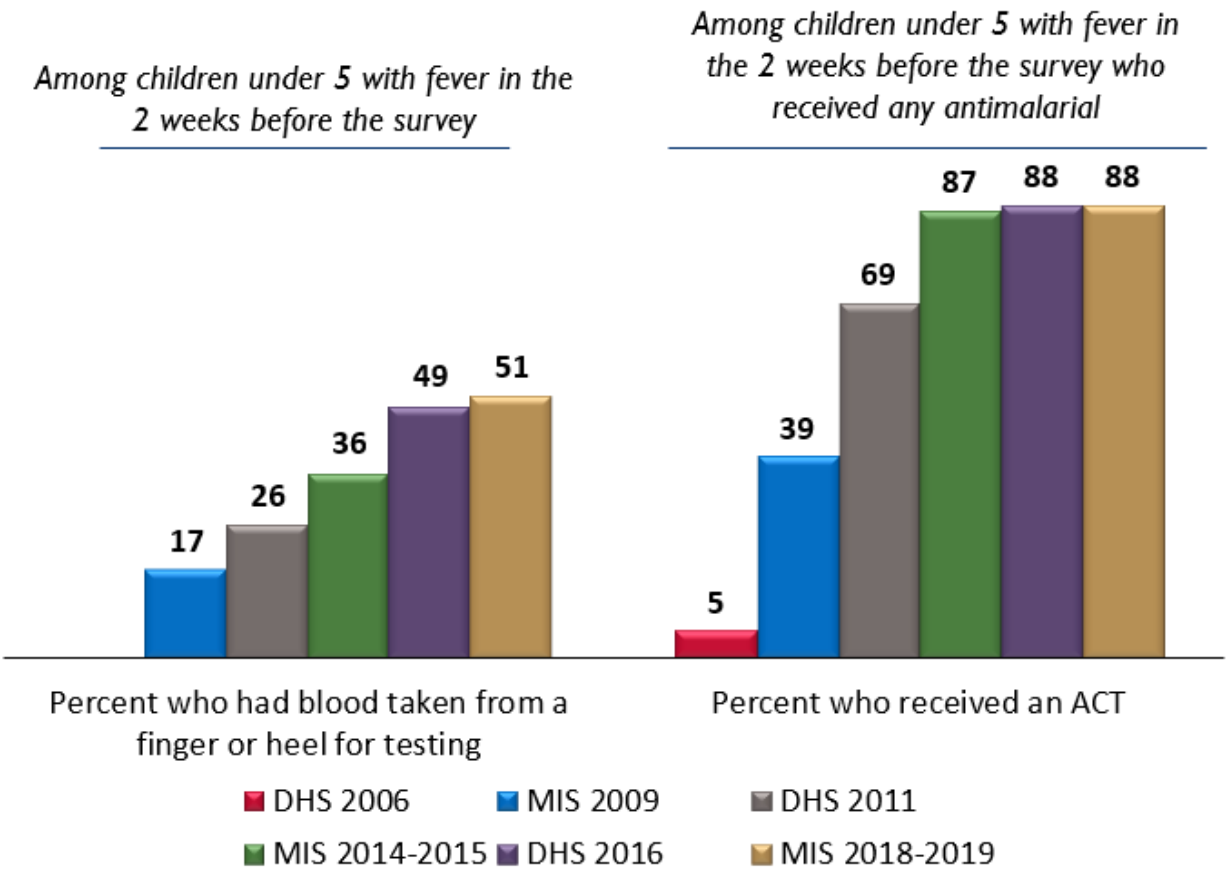
What proportion of patients are being tested and appropriately treated for malaria?

Supporting Data

Household surveys demonstrate that testing for children under five years of age with a fever has steadily increased from 17 percent in 2009 to 51 percent in 2018, which still leaves a lot of room for improvement. This contrasts with the routine data, which shows testing sometimes approaches or surpasses 100 percent. On the other hand, fever cases appropriately treated with an ACT increased from 5 percent in 2006 to 87 percent in 2014, and have remained at that level to date.

Figure A-10 Trends in diagnosis and treatment of children with fever

Among children under five years of age with fever in the two weeks before the survey and with fever in the two weeks before the survey who received any antimalarial



Key Question 2b

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

Supporting Data

To meet the objectives of the MAAM initiative, the main target for malaria assessments and activities is the community and households. However, it is known that provider behavior also plays an important role in influencing performance in malaria testing and treatment. According to the knowledge, attitudes, practices, and behaviors study done in Northern Uganda by FCDO, UNICEF, MOH, and Malaria Consortium in 2019, health workers sometimes doubt RDT results especially among children under five years of age who continue to have fevers. Some health workers have difficulty accepting negative RDT results with some caregivers not appreciating that there are many other causes of fever besides malaria. The other challenge faced by health workers is when RDT results contradict microscopy results making health workers have less confidence in RDT results. Treatment of patients with negative RDT results with ACTs has significantly reduced in the past five years from 11 percent to 1.6 percent in PMI supported areas, but is still over 7 percent in other areas.

The UMRESP aims to empower health workers at all levels to promote demand for services including user-friendly initiatives and quality of care approaches. However, it is unclear what specific provider behaviors these efforts should target. PMI expects that the behavioral survey planned in the next few years will provide more information on challenges related to provider behaviors that affect malaria case management to better direct related future interventions.

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

Key Question 3

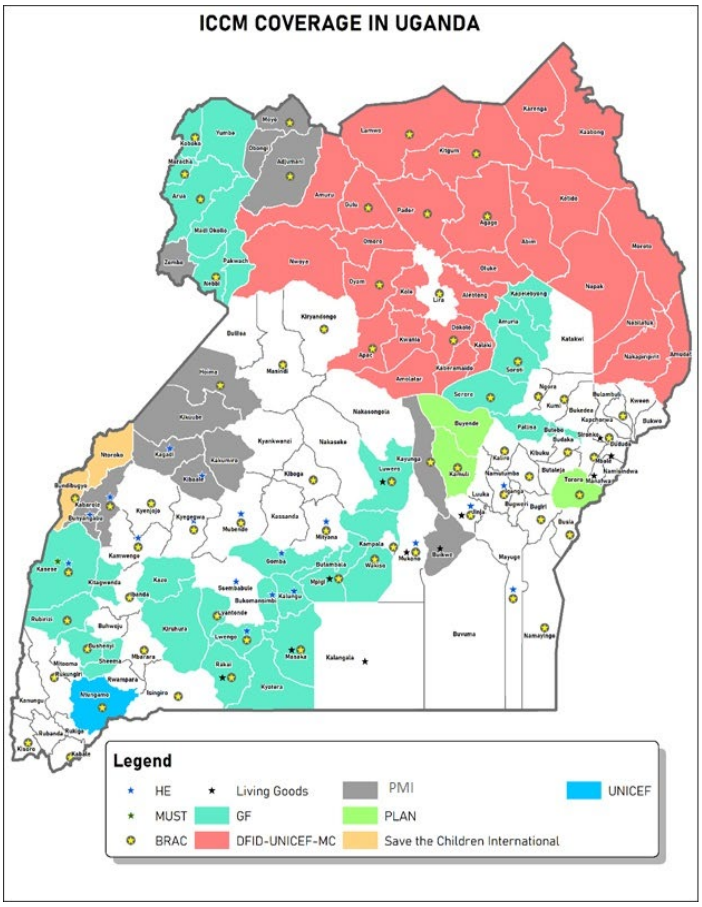
What is the current and planned support for case management at health facilities and in the communities by CHWs?

Supporting Data

PMI will continue to support mentorships in diagnostic and treatment guidelines at all levels, with an increased focus on the lower-level facilities and the communities in high-burden areas of West Nile and Northern Uganda. This includes support to pre- and in-service training for the management of uncomplicated and severe malaria, integrated supportive supervision at health facilities, and clinical audits.

PMI will continue to support implementation of iCCM in hard-to-reach and highly endemic areas, shifting from central and midwestern regions as shown in the map below to concentrate efforts in the Northern and West Nile regions, and tailoring support for the Karamoja region to meet the needs of the nomadic lifestyle of its inhabitants.

Figure A-11. Current iCCM coverage in Uganda[15]



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?

Supporting Data

The RDT gap analysis table below shows in detail the estimated RDT needs and donors' contributions during calendar years 2021–2023.

PMI's planned funding will support PNFP facilities that account for 10 percent of malaria cases. The RDT needs for the public sector will be covered by the Global Fund. For calendar years 2021, 2022, and 2023, total RDT needs are 35,063,211, 37,967,983, and 39,552,525, respectively. Planned procurements of 1,250,000 for 2021 and 2022, and 1,500,000 for 2023 are expected to cover the PNFP needs, but leave a gap for achieving the desired end-of-year balance of three months of stock. PMI will work with the NMCD and the Global Fund to reach an appropriate RDT balance at the end of each year.

[15] Note that PMI's support will shift to cover the West Nile, Busoga, and Northern regions under the Malaria Reduction Activity.

Table A-13. RDT Gap Analysis Table

Calendar Year	2021	2022	2023
Total country population	44,099,177	45,422,152	46,784,817
Population at risk for malaria	44,099,177	45,422,152	46,784,817
PMI-targeted at-risk population	44,099,177	45,422,152	46,784,817
RDT Needs			
Total number of projected fever cases	38,007,450	41,995,788	43,633,644
Percent of fever cases tested with an RDT	92%	90%	91%
epidemic response	0	4,199,579	4,363,364
RDT Needs (tests)	**35,063,211**	**42,167,562**	**43,915,890**
Needs Estimated based on Other (specify in comments)			
Partner Contributions (tests)			
RDTs from Government	*0*	*0*	*0*
RDTs from Global Fund	28,437,471	36,967,351	38,559,476
RDTs from other donors	0	0	0
RDTs planned with PMI funding	1,250,000	1,250,000	1,500,000
Total RDT Contributions per Calendar Year	***29,687,471***	***38,217,351***	***40,059,476***
Stock Balance (tests)			
Beginning Balance	11,609,275	6,233,535	2,283,325
- Product Need	35,063,211	42,167,562	43,915,890
+ Total Contributions (received/expected)	29,687,471	38,217,351	40,059,476
Ending Balance	6,233,535	2,283,325	-1,573,089
Desired End of Year Stock (months of stock)	3	3	3
Desired End of Year Stock (quantities)	8,765,803	10,541,890	10,978,972
Total Surplus (Gap)	***(2,532,267)***	***(8,258,566)***	***(12,552,061)***

Key Question 5

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

Supporting Data

The ACT gap analysis table below shows in detail the estimated ACT needs and donors' contributions during calendar years 2021–2023.

For calendar years 2021, 2022, and 2023, total ACT needs are 18,571,408, 19,695,294, and 19,291,260, respectively. PMI has placed orders for 1,852,040 ACTs in CY 2021 and will procure 95,000 ACTs in CY 2022 and 800,000 ACTs in CY 2023. PMI planned procurements are not able to fully cover PNFP needs at this time. As such, PMI will work with the NMCD and the Global Fund to cover this gap.

Table A-14. ACT Gap Analysis Table

Calendar Year	2021	2022	2023
Total country population	44,099,177	45,422,152	46,784,817
Population at risk for malaria	44,099,177	45,422,152	46,784,817
PMI-targeted at-risk population	44,099,177	45,422,152	46,784,817
ACT Needs			
Total projected number of malaria cases	17,520,197	16,398,482	16,077,924
Retreatment for the first treatment failure	1,051,212	983,909	964,675
epidemic response	0	1,639,848	1,607,792
Total ACT Needs (treatments)	***18,571,408***	***19,022,239***	***18,650,392***
Needs Estimated based on Other (specify in comments)			
Partner Contributions (treatments)			
ACTs from Government	*1,560,000*	*1,560,000*	*1,560,000*
ACTs from Global Fund	8,124,027	16,582,087	16,240,623
ACTs from other donors *[specify donor]*	0	0	0
ACTs planned with PMI funding	1,852,040	95,000	800,000
Total ACTs Contributions per Calendar Year	***11,536,067***	***18,237,087***	***18,600,623***
Stock Balance (treatments)			
Beginning Balance	11,702,334	4,666,993	3,881,841
- Product Need	18,571,408	19,022,239	18,650,392
+ Total Contributions (received/expected)	11,536,067	18,237,087	18,600,623
Ending Balance	4,666,993	3,881,841	3,832,072
Desired End of Year Stock (months of stock)	3	3	3
Desired End of Year Stock (quantities)	4,642,852	4,755,560	4,662,598
Total Surplus (Gap)	***24,141***	***(873,719)***	***(830,526)***

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?

Supporting Data

The severe malaria gap analysis tables below show in detail the estimated needs and donors' contributions during calendar years 2021–2023.

Total estimated needs for injectable artesunate are 2,989,447, 3,020,543, and 2,922,667, respectively for calendar years 2021–2023. For 2023, PMI will support treatment for severe malaria in the PNFP health facilities and will procure 350,000 vials of injectable artesunate, which will cover the needs for this sector. A small gap will remain in order to reach three months of stock at the end of each calendar year, but PMI will work with the Global Fund and the NMCD to address this.

PMI does not plan to procure rectal artesunate at this point, because this intervention is not yet scaled up in Uganda.

Table A-15.Inj. Artesunate Gap Analysis Table

Calendar Year	2021	2022	2023
Injectable Artesunate Needs			
Projected number of severe cases	747,362	690,949	668,560
Projected number of severe cases among children (Less than 20Kg)	603,638	558,074	539,991
Average number of vials required for severe cases among children	3	3	3
Projected number of severe cases among children between 20kg and <35kg	95,816	88,583	85,713
Average number of vials required for severe cases among children between 20kg and <35kg	6	6	6
Projected number of severe cases among adults	47,908	44,292	42,856
Average number of vials required for severe cases among adults	12	12	12
Epidemic response	0	69,095	66,856
Total Injectable Artesunate Needs (vials)	*2,960,702*	*3,013,602*	*2,915,951*
Needs Estimated based on Other (specify in comments)			
Partner Contributions (vials)			
Injectable artesunate from Government	0	0	0
Injectable artesunate from Global Fund	2,074,932	2,718,489	2,516,853
Injectable artesunate from other donors [specify donor]	0	0	0
Injectable artesunate planned with PMI funding	350,000	150,000	350,000
Total Injectable Artesunate Contributions per Calendar Year	***2,424,932***	***2,868,489***	***2,866,853***
Stock Balance (vials)			
Beginning Balance	1,288,196	752,426	607,313
- Product Need	2,960,702	3,013,602	2,915,951
+ Total Contributions (received/expected)	2,424,932	2,868,489	2,866,853
Ending Balance	752,426	607,313	558,215
Desired End of Year Stock (months of stock)	3	3	3
Desired End of Year Stock (quantities)	740,176	753,400	728,988
Total Surplus (Gap)	***12,250***	***(146,088)***	***(170,772)***

Table A-16. RAS Gap Analysis Table

Calendar Year	2021	2022	2023
Artesunate Suppository Needs			
Number of severe cases expected to require pre-referral dose	131,193	131,684	133,994
Total Artesunate Suppository Needs (suppositories)	***262,386***	***263,369***	***267,988***
Needs Estimated based on Other (please specify in comment section)			
Partner Contributions (suppositories)			
Artesunate suppositories from Government	0	0	0
Artesunate suppositories from Global Fund	291,423	253,685	258,729
Artesunate suppositories from other donors	0	0	0
Artesunate suppositories planned with PMI funding	0	0	0
Total Artesunate Suppositories Available	***291,423***	***253,685***	***258,729***
Stock Balance (suppositories)			
Beginning Balance	0	29,036	19,352
- Product Need	262,386	263,369	267,988
+ Total Contributions (received/expected)	291,423	253,685	258,729
Ending Balance	29,036	19,352	10,093
Desired End of Year Stock (months of stock)	3	3	3
Desired End of Year Stock (quantities)	65,597	65,842	66,997
Total Surplus (Gap)	***(36,560)***	***(46,490)***	***(56,904)***

Key Question 8

Are first-line ACTs effective and monitored regularly?

Supporting Data

PMI supports the NMCD to complete therapeutic efficacy studies every two years, per WHO guidelines. The table below details the approach and results for the most recent study.

Table A-17. Recently completed and ongoing antimalarial therapeutic efficacy studies

Most Recent Study Year[16]	Sites	PMI Funded (Y/N)	Treatment Arms	PCR-Corrected Efficacy >90% (Y/N)
2018–2019	Aduku	Y	AL	Y
2018–2019	Aduku	Y	DP	Y
2018–2019	Arua	Y	AL	N
2018–2019	Arua	Y	DP	Y
2018–2019	Masafu	Y	AL	N
2018–2019	Masafu	Y	DP	Y

Ongoing TES: None **Next Planned TES:** 2021

Key Question 9

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

Supporting Data

PMI will continue to support efforts to strengthen malaria laboratory diagnostics in both public and private sectors through training and supportive supervision within the existing structures. PMI plans to increase its support to the private sector, especially the lower-level private facilities, to adhere to national policies and guidelines for malaria case management.

Conclusions for Case Management Investments

PMI proposes to increase the overall budget for case management to expand iCCM coverage to at least 15 high-burden districts. Meanwhile, PMI plans to maintain investments for case management at health facilities to sustain the substantial reduction in malaria associated morbidity and mortality that was achieved, focusing on lower-level facilities that see the highest proportion of malaria cases. PMI will also increase its support to private facilities to strengthen case management. PMI's geographical focus will be in high-burden areas of West Nile, Karamoja, Acholi, Lango, and Busoga.

These decisions are in response to findings from the malaria program review and a PMI-funded learning review, which showed that great case management progress has been made at the health facility level, but many gaps and challenges remain at the community level. The lack of support to and coordination with the private health sector, where the majority of malaria cases are first seen, was also evidenced. This shift in focus also aligns well with the

[16] Pre-publication: Ebong C., Sserwanga, A., Namuganga, J.F., Kapisi, J., Mpimbaza, A., Gonahasa, S., Asua, V., Gudoi, S., Kigozi. R., Tibenderana, J., Bwanika, J.B., Bosco, A., Rubahika, D., Kyabayinze, D., Opigo, J., Rutazana, D., Sebikaari, G., Belay, K., Halsey, E.S., Moriarty, L.F., Lucchi, N.W., Souza Svigels S.S., Nsobya, S., Kamya, M.R., & Yeka, A. Efficacy and safety of artemether-lumefantrine and dihydroartemisinin-piperaquine for the treatment of uncomplicated *Plasmodium falciparum* malaria in Uganda.

NMCD's plan to take the fight against malaria to the community and households, and with the objectives of the UMRESP 2021–2025.

Please see Table 2 for a detailed list of proposed activities with FY 2022 funding.

2.2. DRUG-BASED PREVENTION

NMCD Objective

In collaboration with partners including PMI, NMCD will strengthen the management of MIP with emphasis on promoting IPTp3 coverage from the current 41 percent (UMIS 2018–2019), to at least 85 percent.

The NMCD does not implement SMC to reduce malaria transmission because transmission is not highly seasonal (60 percent of cases do not occur within a four-month period). However, there is a pilot SMC program going on in Karamoja region, which has one rainy season unlike the other regions of the country with two rainy seasons. Malaria Consortium, in collaboration with NMCD, is carrying out the pilot with funding from GiveWell. PMI remains concerned about SP resistance and has indicated our concerns to both the NMCD and Malaria Consortium. The study team has indicated that SMC with sulfadoxine-pyrimethamine + amodiaquine (SPAQ) could potentially provide benefits in Uganda where there is relatively high prevalence of resistance to SP. The relation between the degree of resistance and the protective efficacy as well as the overall effectiveness of SMC on malaria has not been studied. The study in Karamoja seeks to address this knowledge gap by investigating the feasibility, acceptability, safety, and protective effectiveness of SMC using SPAQ in Karamoja region in Uganda. The study team of SMC of Malaria Consortium shared the reasons with us.

The UMRESP 2021–2025 Strategic Objective 1 focuses on accelerating access to malaria prevention through strengthening and sustaining access to quality prevention interventions for malaria in pregnancy in 85 percent of pregnant women.

NMCD Approach

The current MIP/IPTp policy and programming promotes a minimum eight ANC contacts for an uncomplicated pregnancy. Despite promoting early ANC attendance, if a woman attends ANC later than in the first trimester, preceding goals should be combined and attended to. The policy supports IPTp, iron, folic acid, and mebendazole at ANC contact 1 during weeks 13–16 and ANC 2 at 20 weeks. The NMCD in coordination with the Reproductive Health Division monitors the provision of services and quality of care at the facility level through integrated supportive supervision. The MIP/IPTp policy supports the engagement of VHTs in mobilizing pregnant women to attend ANC and complete the set targets of eight visits.

Uganda has also adopted the WHO guidelines for IPTp, which includes a treatment dose of SP for HIV negative women at each scheduled ANC visit starting at 13 weeks gestational age, with a minimum of four weeks between doses, and a recommended minimum of three doses (IPTp3). SP is recommended to be administered as directly observed therapy (DOT).

PMI Objective in Support of NMCD

PMI supports the national strategy for MIP, which includes provision of ITNs at first ANC visit, IPTp to all HIV negative pregnant women starting at 13 weeks gestational age for a minimum of three doses provided these visits are at least one month apart, and effective case management of malaria. PMI supports the implementation of IPTp with SP by DOT in over 85 percent of the country. The MOH and partners provide all supplies (SP, iron, and folic acid) for MIP at ANC.

PMI-Supported Recent Progress (October 1, 2019, to September 30, 2020)

PMI supported the implementation of high-quality, accessible programs for prevention of MIP through training of district technical resource persons (TRPs) as additional malaria clinical services mentors, and supporting mentorship of ANC health workers on malaria service delivery. PMI in coordination with DHMTs established a malaria point of service corner in ANC to minimize missed opportunities for IPTp. During the last 12 months, 34 new TRPs from 31 districts were trained as malaria clinical services mentors, and 1,914 ANC health workers from 647 health facilities (HFs) benefited from onsite and virtual mentorship in MIP. Malaria point of service corners were established in 232 HFs.

PMI supported Continuous Quality Improvement (CQI) of MIP services and uptake of MIP through provision of commodities for MIP and DOT of SP. During the last 12 months, CQI projects started in 76 HFs and 200 water purifiers and 6,000 tumblers were procured and distributed for IPTp DOT. In addition, PMI assisted in the redistribution of SP from facilities that were overstocked to those who were out of stock.

PMI, in collaboration with NMCD, DHMTs, and health facility in-charges introduced MIP grand rounds for pre-service training institutions and referral hospitals (RRHs) with an objective of improving the MIP knowledge of the trainees and strengthening the practice of MIP for the facilities they serve. During the past 12 months, one Grand Round was held at one of the general hospitals (Mukono) with participation from 78 health workers.

PMI continued providing support in strengthening the NMCD's capacity to coordinate and increase IPTp uptake including supporting the full implementation of the revised MIP policies in all ANC facilities.

PMI seconded one senior MIP expert to NMCD who provides full time TA and follows day-to-day progress of MIP. Through technical support to the NMCD, MIP and related issues have continued to improve with involvement of the MOH, Reproductive Health Division, and other stakeholders focusing on malaria as one of the major causes of poor fetal and maternal outcomes.

The GOU procured and distributed 46,383,000 tablets of SP during the last two years. PMI continued its high level of advocacy in support of the NMCD to have SP included in the essential medicines list and procured as a priority medicine. PMI, in collaboration with RBM partners, continued advocating for low-dose folic acid as recommended by the WHO as well.

PMI, in collaboration with the NMCD and DHMTs, designed and shared SMS messages to VHTs and health workers about MIP and gender interventions in the context of COVID-19. These gender interventions targeted women of reproductive age, pregnant women, husbands, and household decision-makers. When MOH eased the lockdown, PMI mobilized VHTs in the focus districts with SMS to encourage pregnant mothers in their respective villages to attend ANC.

PMI supported districts and health workers to use the new MIP related HMIS tool which allows for recording IPTp3 and IPTp4 since the lack of HMIS tools influences the performance of the IPTp3 indicator. PMI also supported DHMTs and health facilities through TRPs on site mentoring to minimize missed opportunities, promote early ANC attendance, fourth and eighth ANC contacts, availability of SP in health facilities, and improving the quality and timeliness of reporting. This has improved the reporting rate of IPTp3 significantly.

PMI supported the monthly MIP technical working group (TWG) meetings and contributed to the development and dissemination of the new WHO/MOH MIP Policy Guidelines, and ensured a MIP emphasis within the updated Reproductive Maternal and Child Health guidelines. PMI also improved MIP services within private facilities through capacity-building of private midwives with domiciliary services.

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

Based on the successful results achieved during the previous year, PMI will continue to support:

- Implementation of high-quality, accessible programs for the prevention of MIP through training of district TRPs and for the TRPs to mentor health workers with the regularly updated MIP training manuals on sites at PMI target facilities.
- Sustaining a malaria point of service corner in ANC to minimize missed opportunities to provide IPTp. At the corner, every pregnant woman is encouraged to attend MIP services.
- CQI of MIP services and increased uptake of MIP through provision of commodities for MIP and updating the knowledge and practice of the health workers.
- DOT of SP and advocacy for the availability of SP in all PMI focused health facilities.
- MIP grand rounds for pre-service training institutions RRHs.
- Strengthening the NMCD's and DHMTs capacities to coordinate and increase IPTp3 uptake
- Monthly MIP TWG meetings and coordinating for effective collaboration between the MIP TWG within the ANC TWG.
- Advocating for an emphasis on MIP within the Reproductive Maternal and Child Health guidelines.
- Community mobilization through VHTs targeting pregnant women to promote the uptake of early and regular attendance at ANC to minimize missed opportunities for ANC contact visits.
- Ensuring availability of SP in health facilities through advocacy at MOH and district levels.
- Improving the regular reporting, analysis and date use of IPTp3 uptake.
- SMS messages to VHTs and health workers about promoting the continuation of ANC and MIP in the context of COVID-19 within communities.
- Advocating for low-dose folic acid (or iron and folate combination tablets, with 60 mg/day iron and 0.4 mg/day of folate) as recommended by the WHO and the GOU to procure and make available sufficient stock of SP.

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

PMI supports the national strategy for MIP, which includes provision of ITNs at the first antenatal care (ANC) visit, a minimum of three doses of IPTp (IPTp3) starting at 13 weeks gestational age, and effective case management of malaria illnesses and anemia per WHO guidelines.

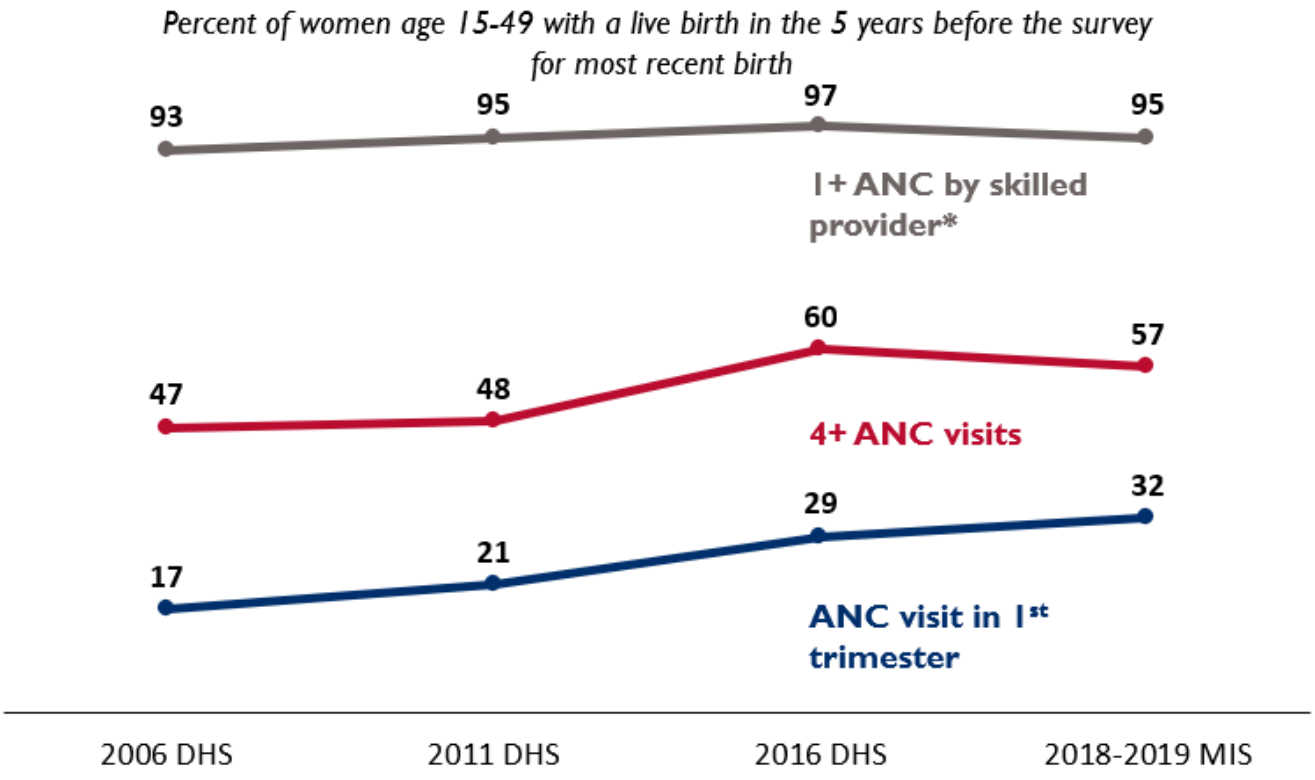
Key Question 1a

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-12. 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)



*Skilled provider includes doctor, nurse, or midwife.

The proportion of women who had at least four ANC visits increased slightly from 47 percent in 2006 to 48 percent in 2011 and then increased more markedly in 2016 to 60 percent but declined slightly to 57 percent in 2018. Over the same time period, the proportion of women who attended ANC in the first trimester of pregnancy increased from 17 percent in 2006 to 32 percent in 2018.

Key Question 1b

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

Supporting Data

There are internal factors that have been identified as affecting early ANC attendance, most notably myths and misconceptions about reporting pregnancy very early. The ANC 1 contact is not regularly happening during the first trimester and one contributing factor is cultural beliefs and practices that lead pregnant women to report late. For example, in some tribes/cultures, a pregnant woman presenting to ANC before the pregnancy is overt is considered abnormal.[17] The main obstacles to the provision of IPTp are likely to be supply-side (health system-related factors) challenges as listed below:

- Stockout of commodities (SP)
- Poor records and reporting into the DHIS2, and data use
- Provider barriers and self-stigma
- Facility-based barriers related to inadequate staff at ANC, the limited schedule of ANC services per week, and lack of clean water and cups for DOT
- Missed opportunities due to late arrival at ANC to reach at least three IPTp doses

Poor knowledge and practice in the implementation of IPTp guidelines remains a challenge. Heavy workload of the ANC staff resulted in an inability to form strong relationships with pregnant women and a perception of ANC staff being in a hurry and not able to fully meet pregnant women's needs. This has an impact on developing client trust, demonstrating empathy, and being culturally responsive to every ANC attendance. There were some field observations that teenage pregnant women were denied services by elderly ANC staff and pregnant adolescent girls were also facing challenges in seeking care, such as a fear of being judged by providers.

Demand side (internal factor): Lack of awareness of pregnancy-related health risks, a tendency to initiate antenatal care late, reluctance to take medication, and concerns about side effects of IPTp. Some pregnant women also look for alternatives to IPTp from traditional birth attendants due to concerns that SP tabs irritate the stomach.[18]

Given the high ANC attendance rates in Uganda, supply-side barriers are likely to account for many missed opportunities for the provision of IPTp in Uganda. Women and communities have largely positive views of ANC, IPTp and refusal rates of IPTp are low. However, to increase uptake of IPTp on the demand side, health workers should be encouraged to reassure eligible women that IPTp is safe. Lack of husband/partner support (internal factor): an assessment observed that pregnant women were not being morally, emotionally, financially, and physically supported by their partners during pregnancy including attending ANC.[19] Another study on men's participation in maternal and child health (MCH) in Western Uganda explored the community perspectives toward participation of men in MCH. The study used a case study approach and identified that patriarchal community values and norms influencing gender roles hindered male involvement in MCH. Men's participation

[17] Reference: Pell, C. et al., *"Social and cultural factors affecting uptake of interventions for malaria in pregnancy in Africa: A systematic review of the qualitative research."* PLoS One. 2011;6(7):e22452. doi: 10.1371/journal.pone.0022452. Epub 2011 Jul 20. Published: July 20, 2011.

[18] Reference: An implementing partner's assessment of *"Barriers to IPTp uptake in Uganda."*

[19] Reference: Chase Malaria Campaign Assessment Report (2018).

including in ANC is affected by multiple factors emanating from the community and health institutions. Involving men in MCH is critical, and therefore participatory and comprehensive approaches should be applied to encourage participation. Sensitization of communities is fundamental for increasing awareness of the significance of male involvement in MCH to fully support pregnant women. There were also challenges during the first nationwide lockdown due to COVID-19 (March–June 2020) when all means of transportation were stopped. During this period, we observed problems of accessibility related to means of transport, distance to ANC facilities and limited services due to inadequate staff. There was inadequate COVID-19 related personal protective equipment for district staff, healthcare workers and VHTs that affected ANC/MIP services during this time. However, PMI, in collaboration with NMCD and MOH, worked on the continuation of essential services including MIP. PMI supported the DHMTs to assess the level of preparedness during the COVID-19 pandemic and conducted supportive supervision and onsite mentorship to monitor continuity of malaria services during COVID-19.[20]

PMI engaged DHMTs in 53 focus districts to ensure continuity of malaria activities and develop malaria and MIP specific messages to suit the COVID-19 context. The districts were provided with the guidelines of continuity of malaria services in the context of COVID-19. The Presidential permission to transport pregnant women to health facilities to deliver or attend ANC during COVID-19 lockdowns helped to improve ANC services to pre-COVID-19 levels.

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

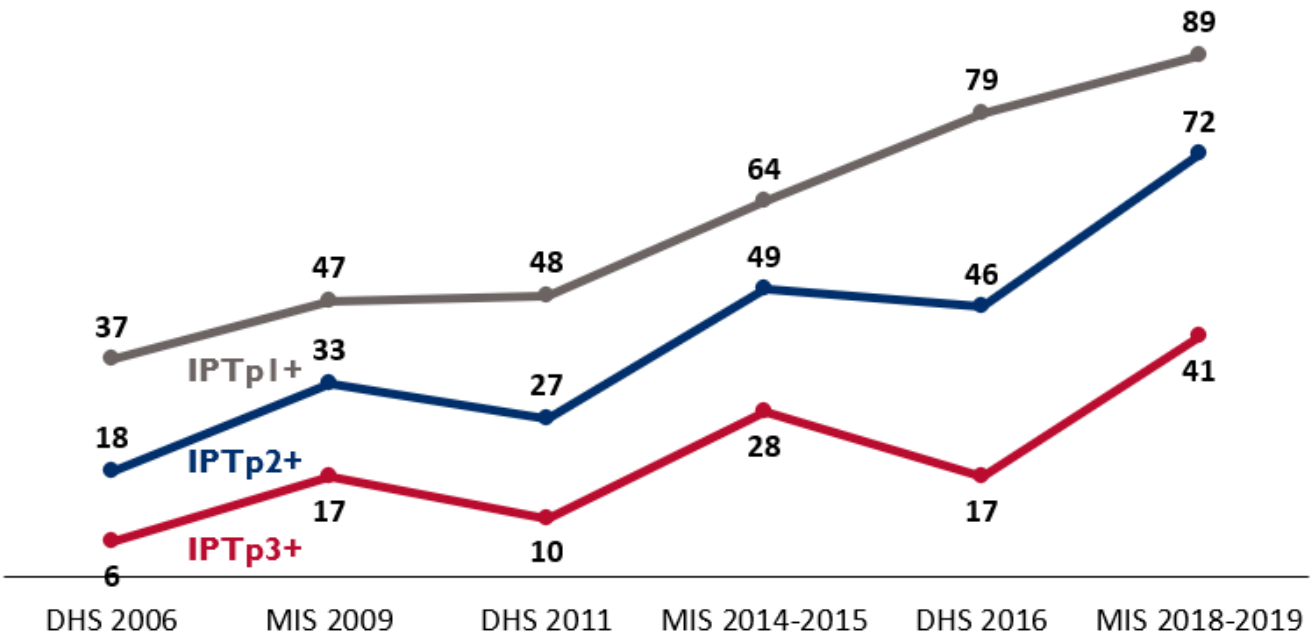
Key Question 2

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

[20] Reference: NMCD, DHMTs, and implementing partner reports and desk reviews.

Figure A-13. Trends in IPTp

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 that historical estimates have been recalculated to reflect the new definition of IPTp indicators, which includes all doses of SP/Fansidar received, regardless of source.

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

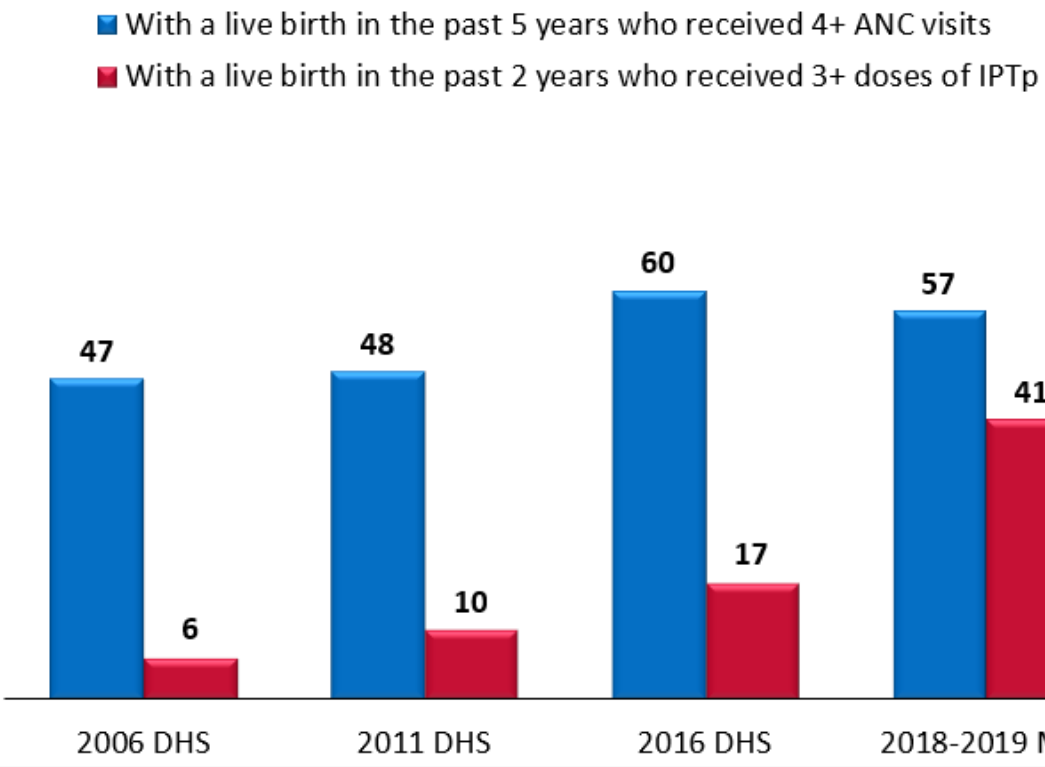
The national IPTp1 uptake increased from 37 percent in 2006 to 89 percent in 2018–2019, IPTp2 increased from 18 percent in 2006 to 72 percent and IPTp3 increased from 6 percent in 2006 to 41 percent in 2018–2019. The national IPTp3 uptake has significantly increased over time, which is a very encouraging sign for IPTp in Uganda. It is worth noting that IPTp3 has been monitored since 2006 before the WHO recommendation was put in place in 2012. The IPTp3 uptake in some of PMI's focus districts has reached 70 percent; however, the average IPTp 3 uptake in PMI's 53 focus districts is currently at 52.4 percent.

Key Question 3a

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

Figure A-14. Trends in missed opportunities for IPTp

Percentage of women 15 to 49 years of age



In the 2018–2019 MIS, the fourth ANC contact was at 57 percent while IPTp3 was at 41 percent. The gap between ANC attendance and IPTp3 uptake is wide. However, IPTp3+ levels are greatly improving, rising from 17 percent in 2016 to 41 percent in 2018–2019 (a 2.4x increase). The gap between ANC fourth contact and IPTp3 uptake was reduced from 43 percent in 2016 to 16 percent in 2018–2019. It is envisaged that this indicator will further improve with robust mentoring of the ANC staff, strengthening the point of service corners, mobilizing pregnant women to report early, and ensuring availability of ANC and MIP guidelines at focus health facilities, which will further guide health workers in the need for the implementation of both indicators for better results.

The Reproductive Health Division within the MOH implements MIP with a three-pronged approach at ANC in collaboration with the NMCD. The coordination between the two MOH divisions is essential for successful implementation of MIP. PMI will continue to support NMCD for better coordination between the malaria and reproductive health programs to reduce the missed opportunities. PMI will also ensure that providers follow up-to-date guidelines, and improve patient counseling on IPTp in order to facilitate optimal uptake.

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)?

Supporting Data

Cultural beliefs and practices lead to women attending their first ANC visit late in their pregnancy. However, most women go to ANC at least four times but there are missed opportunities for IPTp uptake. Through establishing the malaria point of service corners at ANC in health facilities, pregnant women were encouraged to seek MIP services. These efforts are expected to improve IPTp uptake.

The behavioral challenges that affect provider delivery of MIP services are factors related to inadequate knowledge and practice in the implementation of IPTp guidelines. The workload of the ANC staff which is related to significant health system weakness resulted in inadequate relationships with pregnant women in building a positive relationship through appropriate counseling without being in a hurry. The poor counseling doesn't develop the trust of clients. The ANC staff don't demonstrate empathy and being culturally responsive to every ANC attendant. It was observed in the field that some pregnant teenagers were denied services by elderly ANC staff.

PMI, in collaboration with NMCD's SBC TWG, will continue to use different SBC approaches to address both supply and demand side challenges (internal, social, health system, and environmental factors) and the attitude of providers to minimize missed opportunities and maximize MIP services.

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

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?

Supporting Data

Table A-18. DHIS 2 data (January 2020–February 2021) proportion of pregnant women with fever tested positive for malaria, admitted, and number of deaths

Period/ Data	Total Malaria Cases	ANC 1st Visit for women	Malaria in pregnancy cases	**% of malaria cases over the ANC attendance**	Malaria in pregnancy admissions	**% of severe malaria cases that occur in pregnancy**	Malaria in pregnancy (Deaths)	ANC 4th Visit for women	ANC 8 contacts/visits for women
20-Jan	1,260,762	177,743	25,968	**14.6%**	5,457	**21%**	30	73811	3,165
20-Feb	1,051,863	150,514	20,846	**13.8%**	5,160	**25%**	52	72752	4,040
20-Mar	1,076,938	152,617	21,339	**14.0%**	4,922	**23%**	40	67030	6,148
20-Apr	975,263	140,733	24,321	**17.3%**	5,255	**22%**	44	67113	4,924
20-May	1,171,196	168,766	28,717	**17.0%**	6,368	**22%**	15	71,229	4,033
20-Jun	1,363,188	182,479	31,146	**17.1%**	7,979	**26%**	11	78,231	4,342
20-Jul	1,290,609	164,705	30,142	**18.3%**	7,183	**24%**	41	84,170	3,726
20-Aug	1,187,751	152,306	27,267	**17.9%**	6,811	**25%**	14	87,995	4,763
20-Sep	1,339,609	146,358	29,330	**20.0%**	6,479	**22%**	10	91,918	9,371
20-Oct	1,202,198	149,615	31,115	**20.8%**	6,589	**21%**	39	90,635	6,124
20-Nov	1,234,362	153,840	28,364	**18.4%**	6,784	**24%**	44	86,649	6,696
20-Dec	1,323,224	138,388	29,695	**21.5%**	7,032	**24%**	24	76,900	5,285
21-Jan	953,217	163,764	27,153	**16.6%**	6,455	**24%**	19	85,086	6,437
21-Feb	895,635	157,583	24,442	**15.5%**	5,279	**22%**	33	86,352	5,294
	16,325,815	**2,199,411**	**379,845**	**17.3%**	**87,753**	**23%**	**416**	**1,119,871**	**74,348**

The data show that the ANC4 contacts are 51 percent of the ANC1 attendance but ANC8 contacts are 6.6 percent of ANC4 attendances. The reason for this poor outcome of ANC4 and ANC8 is many pregnant women start ANC1 later in their pregnancy (toward the end of the second trimester) and they deliver before they reach ANC8.

The data also indicate that among ANC1 attendees, 17 percent were confirmed positive for malaria. Among all pregnant women confirmed for malaria, 23 percent were admitted for complicated malaria and the case fatality rate was 0.0047 percent. The reason for the high admission rate is that pregnant women tend to visit health facilities very late after malaria becomes severe.

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 SP gap analysis table below shows in detail the estimated needs and donors' contributions during calendar years 2021–2023.

The estimated needs for SP in 2021–2023 are 3,959,202, 4,564,960, and 5,238,449 doses, respectively. The GOU procures sufficient SP to meet the national need and there is no estimated gap of SP for these three years. There have been challenges observed over the years in procuring the right amount at the right time for the right health facilities. However, PMI, in collaboration with the NMCD, the National Medical Stores (NMS) and JMS, will advocate for pull-system procurement and redistribution where there are misallocations.

PMI will support NMCD in forecasting, quantification, and redistribution of SP to minimize stockout.

Table A-19. SP Gap Analysis Table

Calendar Year	2021	2022	2023
Total Country Population	44,099,177	45,422,152	46,784,817
Total Population at Risk for Malaria	44,099,177	45,422,152	46,784,817
PMI Targeted at Risk Population	44,099,177	45,422,152	46,784,817
SP Needs			
Total Number of Pregnant Women	1,408,969	1,449,194	1,505,301
Proportion of women expected to attend ANC1 at 13 weeks or greater	90%	93%	95%
Proportion of women expected to attend ANC2	82%	90%	95%
Proportion of women expected to attend ANC3	60%	70%	85%
Proportion of women expected to attend ANC4	50%	65%	75%
Total SP Needs (treatments)	***3,973,292***	***4,608,436***	***5,268,555***
Needs Estimated based on Other (specify in comments)			
Partner Contributions (treatments)			
SP from Government	5,083,901	5,010,144	5,010,144
SP from Global Fund	0	0	0
SP from Other Donors	0	0	0
SP planned with PMI funding	0	0	0
Total SP Contributions per Calendar Year	***5,083,901***	***5,010,144***	***5,010,144***
Stock Balance (treatments)			
Beginning balance	2,785,000	3,895,609	4,297,317
- Product Need	3,973,292	4,608,436	5,268,555
+ Total Contributions (Received/expected)	5,083,901	5,010,144	5,010,144
Ending Balance	3,895,609	4,297,317	4,038,906
Desired End of Year Stock (months of stock)	3	3	3
Desired End of Year Stock (quantities)	993,323	1,152,109	1,317,139
Total Surplus (Gap)	***2,902,286***	***3,145,208***	***2,721,767***

Conclusions for MIP Investments

PMI will continue to support the three main MIP activities at the facility level through ANC. PMI, in collaboration with NMCD's SBC TWG, will continue to use different SBC approaches to address both supply and demand side challenges (internal, social, health system, and environmental factors) and the attitude of providers to minimize missed opportunities and maximize MIP services.

MIP services have gradually improved over the past three or four years. In PMI-focus districts, IPTp3 has improved from 17 percent in 2017 to above 50 percent in 2020. The continuous distribution of ITNs through ANC/EPI has also improved. A total of 1,870,253 ITNs (October 2019–March 2021) were distributed in the context of COVID-19. Despite the need for improvement in the collaboration between the NMCD and Reproductive Health Division, the WHO guidelines on MIP have been jointly adopted and implemented.

The data above, especially relating to SP procurements, and continuous mentoring of health workers at ANC have implications on programming and need regular appraisal to minimize stockouts of SP and missed opportunities. An inadequate number of health workers at ANC remains a challenge, especially at lower levels where they are unable to conduct daily ANC clinics to enable the pregnant woman to attend when she is able rather than on fixed days. There are health facilities that lack clean drinking water and cups to administer SP as DOT, which contributes to the challenges of IPTp administration.

While the government procures SP to meet the national need, PMI will continue to advocate for SP to be included as an essential medicine for consistent supplies.

NMCD, together with the Reproductive Health Division and other malaria stakeholders including PMI will continue mentoring health workers on knowledge, skills and attitude in conducting ANC services and strengthening the implementation of the WHO/MOH MIP Guidelines at all levels.

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 Uganda. However, in collaboration with partners, NMCD is preparing to carry out a pilot SMC study in selected sites within Karamoja region.

2.2.3. ADDITIONAL DRUG-BASED PREVENTIVE STRATEGIES

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

3. CROSS-CUTTING AND OTHER HEALTH SYSTEMS

3.1. SUPPLY CHAIN

NMCD Objective

The aim of the new UMRESP 2021–2025 is to strengthen the existing operational procurement system. Specifically, the UMRESP aims to drastically reduce commodity stockouts and promote redistribution thereby overcoming the distribution challenges that characterized the push system under the previous strategic plan.

NMCD Approach

The NMCD will work with the procurement and disposal of assets unit in the MOH for the procurement and supply management of pharmaceuticals, medical, and non-medical health products. This unit is responsible for the central procurement and supply management of commodities in Uganda. NMCD will work with the NMS for the procurement, warehousing, and distribution of essential medicines and supplies for the public sector and with the JMS for the PNFP sector. NMS conducts the procurement and supply management role on behalf of the procurement and disposal of assets unit within the MOH. JMS uses both private sector and GOU resources for the procurement, warehousing, and distribution of its commodities. NMCD also works with the quantification and procurement planning unit of the MOH to ensure proper quantification of malaria commodities.

The NMCD will build the capacity of DHMTs and lower-level health facilities in proper quantification, ordering, and administration of malaria commodities. This will be done through training and regular support supervision. Lower facilities will be required to quantify and forward their orders to the District Health Office. The district will then aggregate the orders and forward to NMS. This will be a bottom-up approach commonly known as the pull system in the procurement and supply of commodities. This bottom-up approach will contribute to the reduction of stockouts in the country while strengthening staff skills in procurement and supply management.

The NMCD will work with the National Drug Authority to conduct post-shipment and market surveillance to ensure quality of antimalarials on the market. The NMCD will continue to implement a private sector copayment system to supply the private sector with subsidized ACTs. This system will have a monitoring mechanism to ensure the subsidy benefit is passed onto the service beneficiaries.

PMI Objective in Support of NMCD

PMI provides technical assistance to the NMCD, DHMTs, and facilities to improve supply chain management and develop accurate stock inventories of AL, RDTs, SP, ITNs, and severe malaria drugs. PMI also provides TA to the quantification and procurement planning unit of the MOH to support proper quantification of malaria commodities. PMI's supply chain activities are at the national level, which is in line with the UMRESP.

PMI-Supported Recent Progress (FY 2020)

In FY 2020, NMS received support to install an integrated enterprise resource planning tool (ERP). This tool will greatly improve visibility of all commodities and equipment in the public sector and facilitates monitoring of both

stocks and consumption of commodities. The ERP is scheduled to go live at NMS in July 2021 and thereafter will be fully rolled out to all health facilities. The ERP is being piloted in 266 health facilities at different levels of care including all RRHs and district hospitals and selected HC IVs and HC IIIs. JMS is also receiving support to ensure the use of global standards (GS1) using barcodes including barcode readers and scanners as well as implementing activity-based costing. The barcode system will be completed by September 2021. These initiatives will provide the foundational capacity required to meet the country's strategic goal of end-to-end visibility of supply chain systems as well as leverage the global momentum around GS1 product identification and labeling of products.

Commodity management remains a key activity in all districts. PMI, together with other malaria stakeholders, supports DHMTs to conduct dedicated technical supportive supervision as well as integrated supervision to ensure commodity management at health facilities for the public, private, and PNFP sectors. Support includes mentorship/supervision from locally employed health workers referred to as medicine management supervisors using five indicators (dispensing, prescription, store management, stock management, and reporting). This support has improved staff performance in stock management, storage management, ordering and reporting, prescribing quality, and dispensing quality in government and PNFP health facilities. This has in return improved forecasting and supply planning accuracy at the national level.

In the last year, PMI prioritized commodity procurement due to the anticipated impact of COVID-19 on the supply chain.

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

PMI-supported planned supply chain activities include the following:

- PMI is proposing to procure 1,584,674 PBO nets for distribution in ANC/EPI clinics countrywide.
- PMI is proposing to procure 1,250,000 RDTs to support the country's test and treat policy.
- PMI is proposing to procure 95,000 ACT treatments to support the management of uncomplicated malaria.
- PMI is proposing to procure 150,000 vials of IV artesunate to support the management of severe malaria cases.
- PMI will support the rollout of the ERP system at NMS and at high-volume health facilities nationwide and the barcoding system at JMS.
- PMI will require all vendors to include GSI barcodes.
- PMI will support the stockout reduction initiative (prioritize commodity procurement to reduce stockouts).

Key Goal

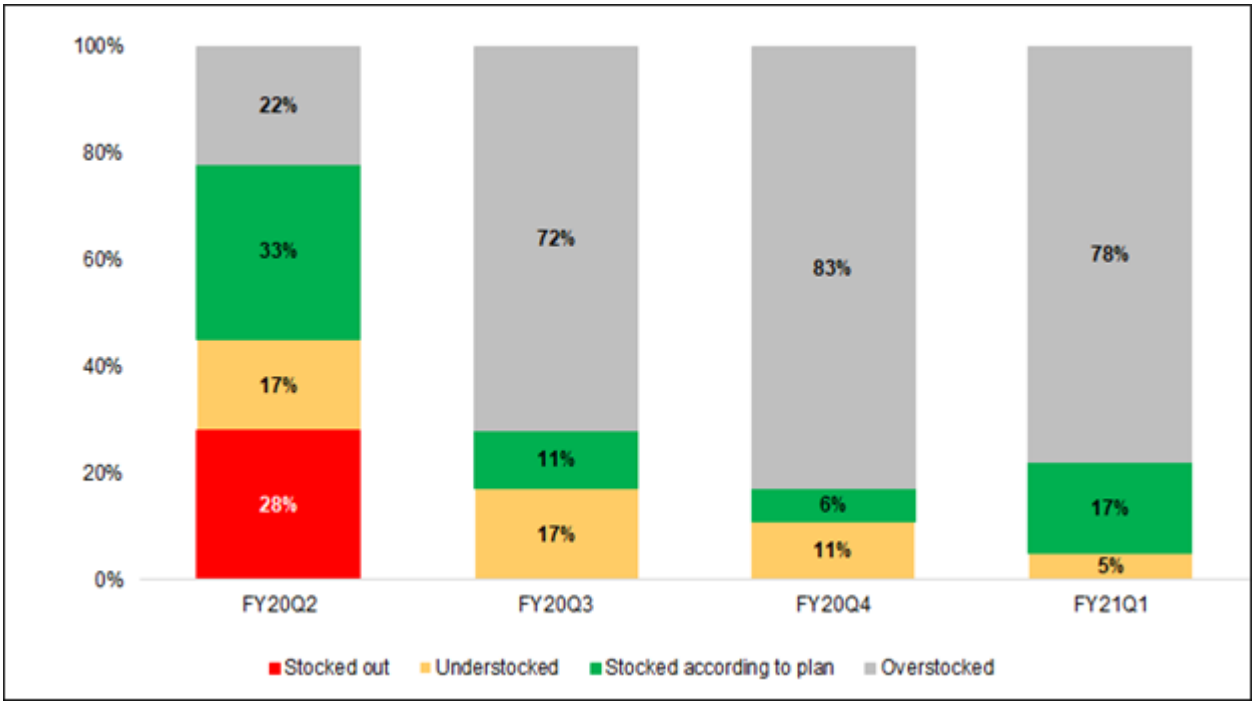
Ensure continual availability of quality products needed for malaria control and elimination (ACTs, RDTs, SP, Art. Inj., and ITNs) at health facilities and the community level.

Key Question 1

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

Supporting Data

Figure A-15. Stocked according to plan levels for JMS (PNFP sector) from January to December 2020



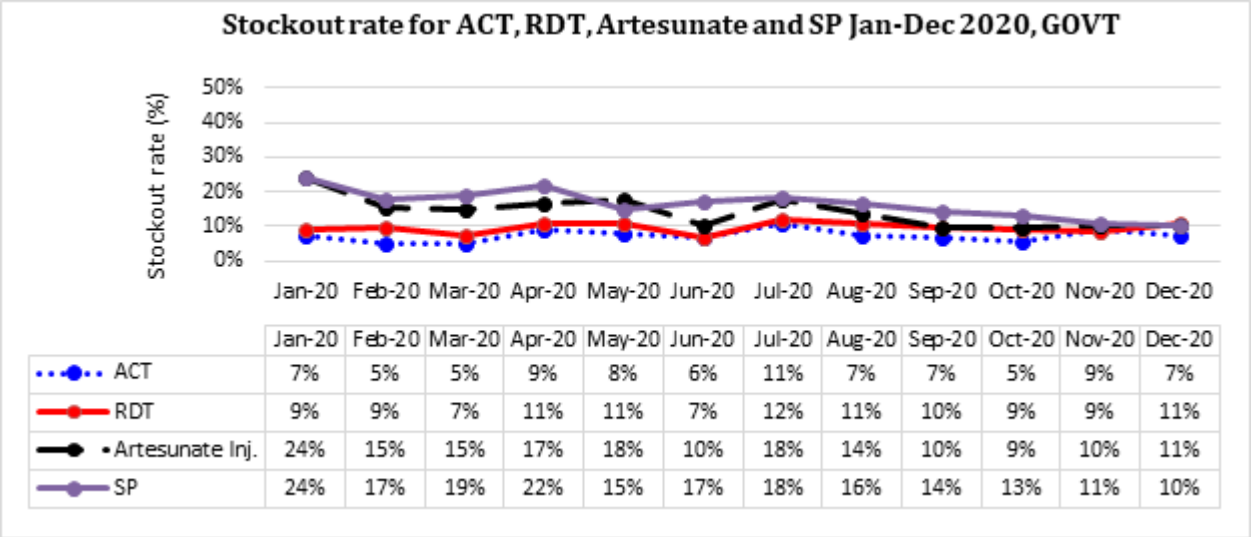
There was an increase in overstocks during the year because PMI prioritized securing all readily available pipeline orders and delivering them in-country due to the anticipated impact of COVID-19 on the supply chain. PMI continues to monitor consumption trends and expiry dates to avoid wastage.

Stockouts in Q2 FY 2020: Following the August 2019 upsurge in malaria cases outside the known peak seasons, there was a significant increase in consumption that exceeded the rate at which commodities could be delivered in the country. This exerted pressure on the available stock position leading to a stockout at JMS. This was addressed by borrowing stock from NMS to avoid interruptions in supply in the PNFP sector. The stock has since been refunded.

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?

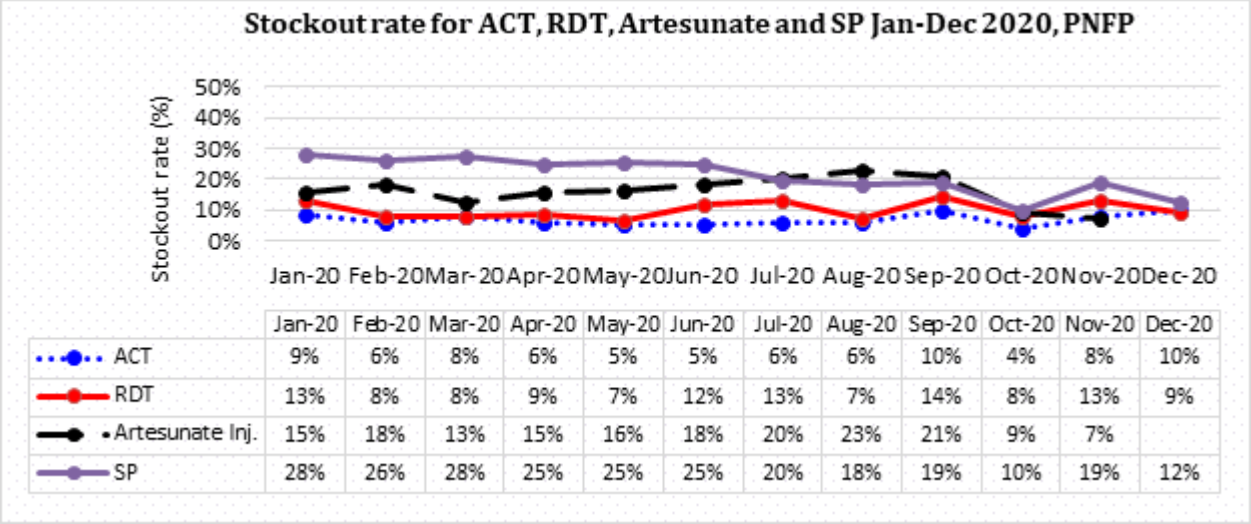
Figure A-16. Trends in service delivery point (SDP) stockout rates in the public sector, January–December 2020



	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20
ACT	7%	5%	5%	9%	8%	6%	11%	7%	7%	5%	9%	7%
RDT	9%	9%	7%	11%	11%	7%	12%	11%	10%	9%	9%	11%
Artesunate Inj.	24%	15%	15%	17%	18%	10%	18%	14%	10%	9%	10%	11%
SP	24%	17%	19%	22%	15%	17%	18%	16%	14%	13%	11%	10%

Of note, the stockout rate for ACTs, RDTs, injectable artesunate, and SP in government facilities has generally reduced and monthly variation is small. The stockout rate for ACTs is much lower than other commodities. The stockout rate for injectable artesunate and SP have generally been higher than other commodities.

Figure A-17. Trends in SDP stockout rates in the PNFP sector, January–December 2020



	Jan-20	Feb-20	Mar-20	Apr-20	May-20	Jun-20	Jul-20	Aug-20	Sep-20	Oct-20	Nov-20	Dec-20
ACT	9%	6%	8%	6%	5%	5%	6%	6%	10%	4%	8%	10%
RDT	13%	8%	8%	9%	7%	12%	13%	7%	14%	8%	13%	9%
Artesunate Inj.	15%	18%	13%	15%	16%	18%	20%	23%	21%	9%	7%	
SP	28%	26%	28%	25%	25%	25%	20%	18%	19%	10%	19%	12%

The stockout rate for ACTs, RDTs, injectable artesunate, and SP in PNFP facilities has generally reduced and the monthly variation is small. The stockout rate for ACTs is much lower than other commodities. The stockout rate for injectable artesunate and SP has generally been higher than other commodities.

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?

Supporting Data

Below is the data on discrepancies between ACTs consumed and confirmed malaria cases as well as RDTs consumed and number of tests done.

Note: Data is submitted on a bimonthly basis from all JMS supported health facilities. The data source used is JMS bimonthly reports.

Table A-20. ACT discrepancies and RDT discrepancies data, 2019–2020

Review Period	Total Malaria Cases Confirmed Reported	Total Dispensed	Difference	Total Tests	RDTs Dispensed	Difference
Nov–Dec 2019	244,396	353,171	-108,775	396,449	403,277	-6,828
Jan–Feb 2020	243,578	476,841	-233,263	360,730	448,404	-87,674
Mar–Apr 2020	429,036	311,815	117,221	657,164	377,925	279,239
May–June 2020	174,607	244,887	-70,280	259,923	304,775	-44,852
July–Aug 2020	186,997	280,802	-93,805	269,726	296,100	-26,374
Sept–Oct 2020	187,454	309,519	-122,065	276,249	173,320	102,929
Nov–Dec 2020	199,290	340,256	-140,966	305,714	332,959	-27,245

Figure A-18. ACTs consumed vs. malaria cases, 2019–2020

The data from the graph below is based on data reported at JMS from the PNFP health facilities. Generally, ACTs consumed exceed malaria cases and one of the driving factors could be that some healthcare workers are presumptively treating patients for malaria.

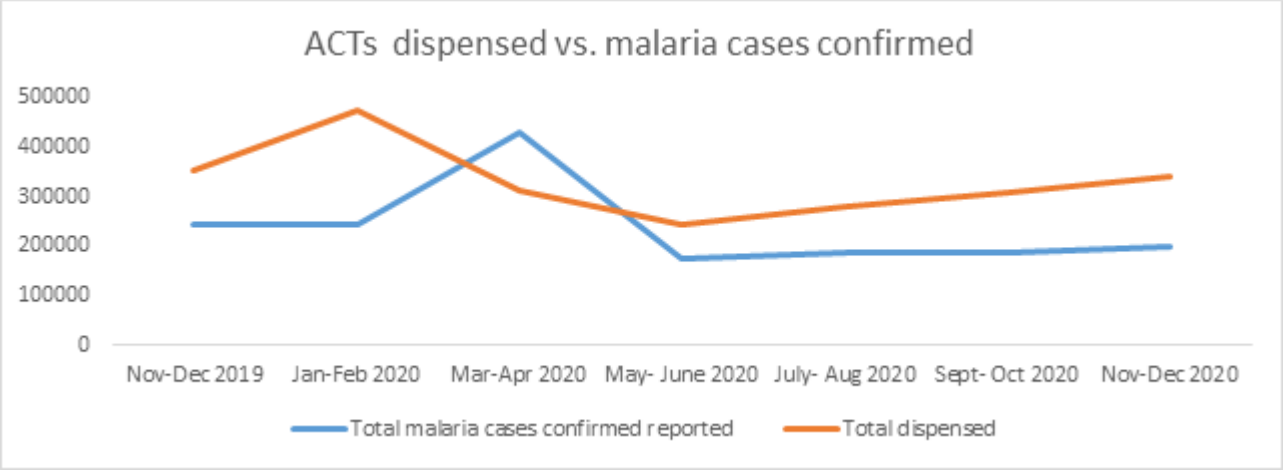
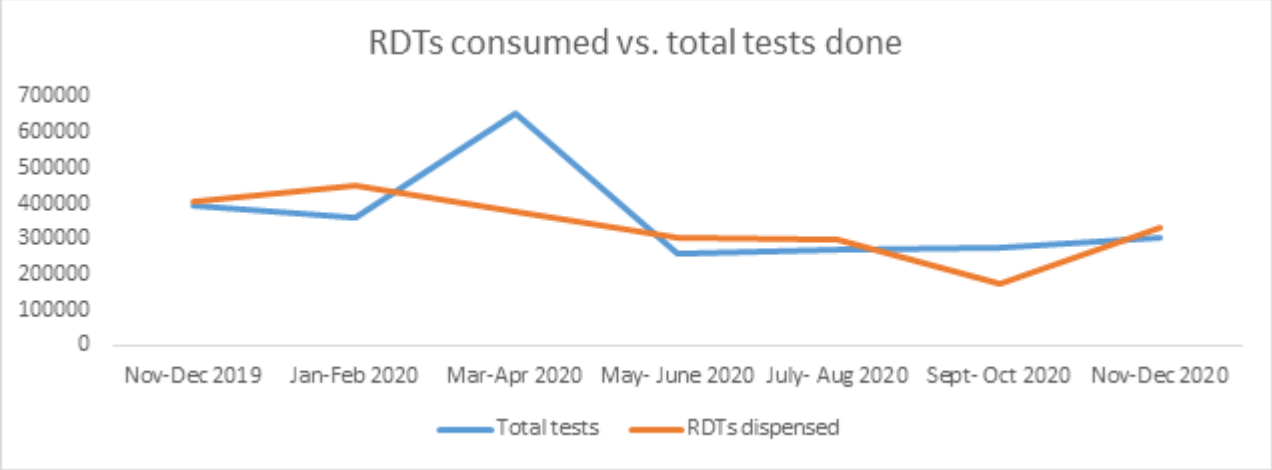


Figure A-19. RDTs consumed and numbers tested, 2019–2020

Although the variances are not wide for RDTs, the assumption is that some tests could be invalid thereby requiring the healthcare workers to use more RDTs than tests done.



Key Question 4

To what extent does a functional Logistics Management Information System (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?

Supporting Data

Uganda uses DHIS2 as the official electronic data collection and reporting system for the country. SDPs regularly submit LMIS and HMIS data into DHIS2 and this is used to guide decision-making at the different levels of the

supply chain. When health facilities submit these reports in DHIS2, the data is analyzed to create a dashboard that shows malaria cases reported and stock position for injectable artesunate, ACTs, SP, and RDTs at the different health facilities (both public and PNFP). The data is used by districts and other stakeholders to facilitate stock redistribution across the different SDPs as an immediate measure to address stockouts or overstock before the central warehouses intervenes. In the PNFP sector, SDPs also submit LMIS reports directly to the warehouse on a bimonthly basis and these reports are used to resupply SDPs with antimalarial commodities.

Commodity data visibility is more dependent on routine reports than surveys or supervisory data. Surveys and supervisory data are mostly used to identify areas that require additional support.

Key Question 5

What are the main supply chain technical assistance 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

The main supply chain TA functions supported by PMI include:

- Support JMS to warehouse and distribute antimalarial commodities for the PNFP sector.
- Support JMS to implement the barcoding system to improve efficiency of its operations and reduce errors in operations data management.
- Support JMS to adopt activity based costing tools and practices to enable continuous monitoring of operation costs.
- Support JMS and districts to carry out supportive supervision, mentoring, and coaching to build capacity for reporting and commodities management.
- Conduct End Use Verification surveys.
- Provide TA to NMCD for forecasting, supply planning, and coordination.

Figure A-20. PMI supply chain investment by technical area

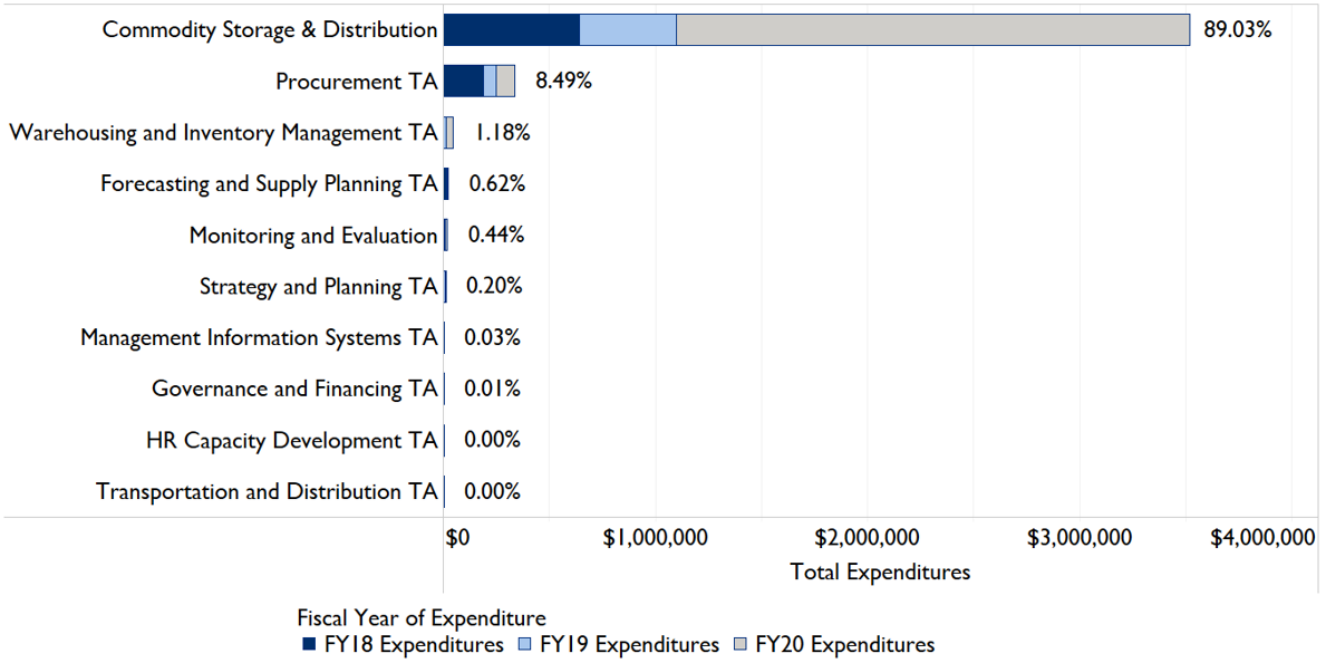


Table A-21. Priorities identified in the stockout strategy baseline

Proposed Investment	Root Cause	Detailed Description of Intervention
Investment 1: Advocate for and support quarterly reviews and updates of the public sector SDP supply plans.	Limited review of supply plans on a quarterly basis to ensure issues are addressed in a timely manner.	This will involve NMCD and PMI implementing partner staff reviewing the patient numbers and stock data submitted by health facilities into the DHIS2 and aligning the quantities in the kits to be able to meet the need. The output will be shared with NMS to adjust the kit and send out sufficient quantities to the HFs. This intervention will be applied to lower levels of care in the public sector that receive the standard kit. This can be done on a quarterly or biannual basis.
Investment 2: Strengthen the support supervision, coaching, and mentorship of HF staff through existing structures; MMS, JMS Technical Representatives, DHMTs, implementing partners, and program staff.	Failure to update stock cards at SDP level due to poor training and insufficient malaria dedicated staff.	This will involve conducting regular onsite support supervision, coaching, and mentorships for VHTs involved in the management of commodities at the HFs. Focus will be on inventory management, data collection and use, use of electronic inventory management systems, reporting, and rational drug use. The mentorships will focus on PNFP HFs as Global Fund will be covering the same activity in the public sector and will be conducted by teams from the NMCD, implementing partners, JMS Technical Representatives, and the DHMTs where applicable. Priority will be given to the HFs with significant challenges in data quality, which will be identified during the central-level reviews, as well as those that register stockouts and other significant stock imbalances.

Proposed Investment	Root Cause	Detailed Description of Intervention
Investment 3: Support JMS to carry out route planning and optimization as well as develop and implement key performance indicators to monitor transportation.	Poor route planning optimization for JMS, because for JMS unlike for NMS, there are no set key performance indicators to monitor transportation and routing optimization activities.	Hold initial consultations with JMS to understand if this recommendation has been implemented. Incorporate these discussions into the routine meetings with JMS to share ideas and updates on implementing this.
Investment 4: Support MOH to strengthen the information sharing system to include up-to-date information on overstocked and understocked health facilities to support redistribution mechanisms.	Lack of real-time information on SDP stock status leads to poor implementation of stock redistribution mechanisms.	Support MOH to upgrade the current monthly malaria commodities stock status analysis and support district health managers to utilize the information for planning. The activity will focus on developing of training materials and training district supervision staff to use available data in planning and implementing redistribution effectively and efficiently.
Investment 5: Improve training of SDP staff on data collection, reporting, and data analysis and use for decision-making.	Limited and poor training of staff on data collection, data reporting, data analysis, and rational prescribing results in stock imbalance at SDPs as well as poor quality orders.	Conduct regular capacity-building for healthcare workers in data management, use, and reporting for decision-making. These trainings can be aligned to use of the proposed eLMIS systems and can be conducted regionally with participation of the warehouses, NMCD, Division of Health Information, regional implementing partners, and DHMTs who will then follow up the trainings with onsite support mentorships and support supervision to address site specific issues.
Investment 6: Support SDPs to acquire infrastructure, software, and connectivity.	Lack of appropriate infrastructure to support use of eLMIS (lack of computers and internet connectivity).	Conduct mapping of the PNFP sector for availability of infrastructure, software, and connectivity to establish the actual need, and procure computers, internet, and support installation of eLMIS systems.
Investment 7: Support JMS to improve the order review process through automation.	Errors due to transcribing data from the paper forms into the electronic systems at JMS.	Work with the JMS team to develop and document the data review process of the reports from HFs and also develop an automated system to capture this data to ease further analysis and review.
Investment 8: Support MOH pharmacy division to finalize and implement the human resource plan to fill supply chain positions at SDPs.	Lack of sufficient HR to support supply chain functions at all levels of care.	Work with MOH pharmacy division to develop a human resource plan and work with the senior management team of MOH to fill the supply chain positions at the subnational level.

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.

Supporting Data

Because different partners support different sectors (public, private, and PNFP), there is a lot of coordination and collaboration needed to implement activities in an effective manner. The Global Fund for example supports the public sector while PMI supports the PNFP sector; the country's commodity gap analysis is based on this arrangement.

Conclusions for Supply Chain Investments

PMI will maintain the supply chain activities currently supported. In terms of changes from FY 2020–2021, PMI has worked with in-country partners and the NMCD to draft a stockout reduction strategy, whose rationale is explained in detail under key question five of the supply chain section.

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)

NMCD Objective

In line with the WHO Global Technical Strategy for Malaria, the NMCD has made malaria surveillance one of the six strategic objectives of its UMRESP 2021–2025. As outlined in this plan, this strategy aims to address the challenges of weak data use at health facility and community levels; low private sector reporting; limited entomological surveillance system; weak epidemic prevention, preparedness, and response; as well as maintain best practices such as regular malaria indicator surveys and operational research (OR).

Through this plan, the NMCD aims to do the following:

1. Develop a malaria surveillance framework to guide decision-making at all levels.
2. Strengthen HMIS data collection, quality, and use at facility and community levels.
3. Establish a national data repository for malaria.
4. Strengthen surveillance for vector bionomics, as well as insecticide and drug resistance.
5. Support learning, adaptation, innovation, best practices, and operations research.
6. Conduct periodic evaluations and reviews.
7. Strengthen malaria epidemic prevention, preparedness, and response at all levels.

NMCD Approach

Health data in Uganda, including malaria data, are collected through the DHIS2 platform, which is managed by the MOH Division of Health Information. The NMCD works with this division to support HMIS strengthening and use. Currently, DHIS2 covers all districts in Uganda. Paper HMIS reports from health facilities and VHTs are entered at the district level for onward digital submission to the national level. A small number of facilities with electronic medical systems have the ability to submit digital data directly into DHIS2. Community reporting remains largely incomplete (less than 40 percent) and occurs on a quarterly basis.

In addition to managing routine HMIS data, the NMCD supports population-based surveys and various assessments aimed at informing programmatic direction.

Several platforms that facilitate the flow of data from the primary source to all relevant stakeholders exist in Uganda. This includes the national SM&E TWG, which meets monthly with regular participation from NMCD, PMI, and partners, to discuss pertinent issues and lead the planning and review of key NMCD research and critical scientific inquiries. This TWG is also responsible for the development and tracking of the UMRESP monitoring and evaluation plan, which provides a framework for the collection, processing, reporting, analysis, and use of malaria data in Uganda, as well as outlining standard indicators, targets, and frequency of reporting.

Additionally, the NMCD is working with PMI and partners to leverage the offerings of PMI's M-DIVE platform in order to optimize data use and analysis for decision-making.

PMI Objective in Support of NMCD

PMI's support focuses on improving the quality, completeness, timeliness, and use of HMIS malaria data at the national, district, facility, and community levels. PMI also contributes to population-based national surveys such as DHS and MIS, and provides continuous technical assistance in SM&E to the NMCD and various malaria stakeholders. For example, PMI funds and participates in the national SM&E TWG meetings monthly.

PMI-Supported Recent Progress (FY 2020)

- Supported the dissemination of the 2018–2019 Uganda MIS at both the national and district levels. The results of this survey constituted the foundational evidence for the development of the UMRESP, which proposes a package of tailored interventions based on the stratified epidemic profiles of different regions.
- Supported national-level surveillance capacity-building, HMIS strengthening, and promoted HMIS data use by funding six Field Epidemiology Training Program (FETP) fellows assigned to the monitoring and evaluation unit at the NMCD. Part of these fellows' duties included drafting Uganda's quarterly malaria bulletin, which contributes to PMI's general support of national synthesis of HMIS data to ensure that high-quality and meaningful information is shared among all partners. Additionally, these fellows conducted outbreak investigations, risk assessments, program evaluations, and quality assurance projects aimed at answering questions of concern to the NMCD and PMI.
- Supported and actively participated in the NMCD's SM&E TWG to ensure coordination of data collection, use, and decision-making across partners.
- Supported surveillance capacity-building at the district and facility levels in 53 PMI focus districts, by using SM&E experts to help train district and health facility staff, and to monitor and improve data quality. In the 73 districts where PMI contributes to integrated health programming, PMI leveraged efforts led by other donors such as President's Emergency Plan for AIDS Relief (PEPFAR) to contribute to surveillance strengthening.
- Contributed to two USAID/Uganda Mission-wide mechanisms focused on data collection and use. One of these projects assisted other USAID health projects in developing performance management plans, collecting and tracking data on key program indicators, and conducting data quality assessments. The project also provided continuous external monitoring and evaluation of all Mission projects. The other project assisted the Mission in improving coordination, learning, and adaptation based on evidence.
- Worked with the GOU and partners to promote the analysis and use of community data and revised how community data is managed in DHIS2 so it can be integrated with monthly facility data instead of being reported quarterly.

- Contributed to the PMI Digital Community Health Initiative to understand how digital technologies are used in the country for community-based case management as well as data collection, reporting, and decision-making; and engaged the NMCD and partners to prioritize opportunities for improvement.
- Conducted a landscape analysis to better understand the extent of SM&E support from other USG programs and non-USG donors, identify opportunities for better coordination and leveraging of existing investments as well as gaps, and prioritize activities to strengthen HMIS and promote data use.
- Supported the rollout of the new HMIS tools through January 2020, including training to health workers and district biostatisticians on their use.

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

- Maintain investments in SM&E at the national, district, and health facility levels, with a focus on lower-level health facilities, in line with the findings of the landscape analysis conducted in 2019.
- In accordance with efforts to improve community health programming and increase efforts to improve data use at the community level.
- Build the capacity of districts in entomological monitoring techniques and data use by working with at least 40 vector control officers and providing technical assistance and equipment to district entomological labs, with a focus on districts that were previously supported by FCDO for IRS.
- Continue to support FETP fellows to contribute to capacity-building for surveillance, outbreak investigations, quality improvement, and program evaluation, with direct mentorship from PMI Uganda team members to prioritize projects. For example, PMI and FETP plan to second an FETP fellow to the Uganda Public Health Emergency Operations Center to closely monitor indicators for the two districts that were previously funded by FCDO for IRS, and sound alarms for prompt decisions and actions if and when the situation starts changing. Additionally, PMI is working on engaging FETP fellows to conduct an assessment of net use following the recent mass bed net distribution campaign.
- Continue to support two USAID Uganda mechanisms to track program indicators and improve mission wide coordination, learning, and adaptation.

Key Goal

To support the NMCD 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-22. 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 (baseline for new bilateral project)		X				
Malaria Surveillance and Routine System Support	Therapeutic Efficacy Studies (TES)	X		X		P	
Malaria Surveillance and Routine System Support	Support to Parallel Malaria Surveillance System						
Malaria Surveillance and Routine System Support	Support to HMIS	X	X	X	P	P	P
Malaria Surveillance and Routine System Support	Support to Integrated Disease Surveillance and Response (IDSR)	X	X	X	P	P	P
Malaria Surveillance and Routine System Support	Electronic Logistics Management Information System (eLMIS)	X	X	X	P	P	P
Malaria Surveillance and Routine System Support	Malaria Rapid Reporting System						
Other	EUV	X	X	X	P	P	P
Other	School-based Malaria Survey						
Other	Knowledge, Attitudes, and Practices Survey, Malaria Behavior Survey					P	
Other	Malaria Impact Evaluation						
Other	Entomologic Monitoring Surveys	X	X	X	P	P	P

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

Key Question 2

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

Supporting Data

At the central level, PMI will continue to fund activities aimed at improving data quality and use. These include data quality assessments, technical assistance and training to lower levels, coordination and updating of policy guidelines, and the development of annual operational plans. PMI will continue to embed FETP fellows at the NMCD to support SM&E priorities, and will continue to promote data use, and encourage the use of M-DIVE as an integrated platform wherever appropriate.

At the district level, PMI's focus will be on supervision and support to data quality review meetings to promote submission of timely, complete, and quality data into DHIS2, as well as data use and visualization to inform decision-making.

At the facility level, PMI will maintain progress made in data collection, transmission and use, by supporting supervision and data review meetings. These efforts will focus on HC IIs, as the landscape analysis conducted in 2019 demonstrated that there is a gap in supporting SM&E at this level, where most of the malaria burden is seen.

PMI will aim to increase support for data collection and use at the community level to ensure transmission of complete and quality data to higher levels, as well as use of community data by VHTs, facility providers, district teams, and national-level actors. This will be accomplished mainly through strengthened supervision to VHTs and consistent support for data review meetings. Also, PMI assessed iCCM reporting in 2019 and recommended that parish coordinators collect VHT reports and submit them to health facilities to streamline reporting and overcome transportation challenges. Other recommendations include adopting a more user-friendly reporting tool and reporting community data on a monthly basis.

Key Question 3

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

Table A-23. Outcomes of HMIS strengthening efforts

	Indicator	2019	2020[21]
Timeliness[22]	% of reports received on time	94.8	45.8
Completeness[23]	"Confirmed malaria cases for children under 5 years of age" was reported in X [percent] of facility-months	60%	61%
Accuracy	Populate with most recent data quality assessment (DQA) data:	Please see text and table below	Please see text and table below

In January 2020, USAID/Uganda conducted a DQA of indicators which had not been assessed for the past three years, including 15 malaria indicators. The data quality for each indicator was scored against five data quality standards: Validity, Reliability, Precision, Timeliness, and Integrity. Each indicator received a grade of 'Yes' or 'No' depending on whether it met the data quality standards based on qualitative and quantitative data collected through the assessment process. Overall indicator performance was rated as "Acceptable," "Acceptable if corrections are made," or "Not Acceptable" based on the criteria below.

Rating	Criteria
Acceptable	The indicator had no data quality issues identified.
Acceptable if corrections are made	The indicator had data quality issues that did not significantly affect the quality of the data.
Not acceptable	The indicator had data quality issues that are likely to have a significant impact on the data quality.

Five malaria indicators were rated "Acceptable," seven rated "Acceptable if corrections are made," and three were rated "Not Acceptable." The table below provides a summary of findings for all the malaria indicators assessed.

[21] The reporting rates decreased in FY 2020 due to a change in reporting tools in January 2020. COVID-19 also contributed to lower reporting rates due to government restrictions imposed on movements of health workers who have to physically take their monthly reports to the district for tabulation into DHIS2.
[22] Calculated as number of health facility reports received on time over total number of expected health facility reports.
[23] Calculated as number of health facility reports received and which report on the indicator "confirmed malaria cases for children under five years of age" over the total number of expected health facility reports.

Table A-24. USAID/Uganda data quality assessment ratings, January 2020

Indicator Statement and Number	Overall DQ Rating
HI.3.1-1 Number of ACTs purchased with United States Government (USG) funds	
HI.3.1-2 Number of RDTs purchased with USG funds	
HI.3.2-1 Number of ITNs purchased with USG funds	
FHT-1.7 Percentage of pregnant women who received all the three doses of IPTp for malaria	
3.1.3.4-4 Proportion of women who received IPTp during ANC visits during their last pregnancy	
3.1.3.1-2 Number of ACTs by other partners that were distributed with USG funds	
3.1.3.1-4 Number of ACTs purchased in any fiscal year with USG funds that were distributed in this reported fiscal year	
3.1.3.1-7 Number of RDTs purchased with USG funds that were distributed to health facilities	
3.1.3.1-8 Number of RDTs purchased in any fiscal year with USG funds that were distributed in this reported fiscal year	
3.1.3.2-1 Number of ITNs purchased by other partners that were distributed with USG funds	
3.1.3.4-2 Number of SP tablets purchased with USG funds	
3.1.3.4-5 Number of SP tablets purchased in any fiscal year with USG funds that were distributed in this reported fiscal year	
3.1.3.3-1 Number of people trained with USG funds to deliver indoor residual spraying	
3.1.3.3-3 Number of houses sprayed with IRS with USG funds	
3.1.3.3-4 Total number of residents of sprayed houses	

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)?

Supporting Data

With PMI's increased focus on strengthening community health services and community surveillance, close attention will have to be paid to the GOU's plans to implement a new cadre of community healthcare workers (CHEWs). Unlike current VHTs who are volunteers and inconsistently receive transportation allowances, CHEWs will be paid as an official cadre within the Uganda healthcare system. CHEWs will have a supervisory role for VHTs, which is expected to positively impact quality of service delivery, including data collection and use. As such, PMI plans to contribute to the rollout of CHEWs and their training.

Although PMI believes that the disruption in health data reporting due to COVID-19 was temporary, it will be important to closely monitor the impact of COVID-19 on malaria surveillance and maintain strong support to mitigate any challenges.

Conclusions for Surveillance, Monitoring, and Evaluation Investments

PMI contributes to the generation of a wealth of routine and survey data to track progress in the fight against malaria and to inform future programmatic direction. As a result of investments in HMIS from PMI and other donors such as PEPFAR and the Global Fund, routine data has sustained progress in terms of timeliness and completeness. However, when looking specifically at reports that comprehensively account for malaria indicators, completeness is much lower than what is usually reported.

Data quality is also improving but deserves continuous attention to ensure strategic and programmatic decisions are based on accurate evidence. PMI will keep its current level of support for these critical activities, while increasing support to the community level and to HF IIs, which have historically been overlooked when it comes to surveillance strengthening.

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

3.3. OPERATIONAL RESEARCH

NMCD Objective

The NMCD understands the importance of OR as an integral strategy to identify gaps and weaknesses to improve program implementation and measure the impact of malaria interventions, and has included the establishment of research priorities and the mobilization of funds for malaria research as core strategies in the updated National Malaria Control Policy. This policy also promotes the strengthening of the Uganda Malaria Research Centre to coordinate malaria research in Uganda.

Under Strategic Objective 4 of the UMRESP, the NMCD prioritizes support for learning, adaptation, innovation, best practices, and OR. This includes updating and disseminating its malaria OR agenda and research plan for its implementation, collaborating with relevant institutions to conduct research, documenting and disseminating research findings to promote their use, and conducting pilot studies on new innovations and delivery approaches.

The NMCD also aims to implement periodic evaluations and reviews and to use findings to strategize and refocus the program. Specifically, the NMCD plans to conduct program implementation reviews and evaluations such as a midterm review and a malaria program review tied to the UMRESP; conduct quarterly and annual reviews at national and subnational levels and disseminate related products such as weekly, quarterly, and annual bulletins; conduct regular surveys and evaluations such as the MIS every three years, DHS, Service Availability and Readiness Assessment (SARA), and school surveys; and conduct pharmacovigilance, pre- and post-shipment lot testing, and post-market surveillance in collaboration with the National Drug Authority and the National Health Laboratory Services.

NMCD Approach

The NMCD works with PMI and others to collaborate and help implement OR that is synergistic with NMCD and PMI-defined OR priorities. Current OR priorities are outlined in the OR agenda, which the NMCD finalized in 2018 and is planning to update. Studies completed and proposed with PMI support are aligned with this strategy and have focused on identifying and assessing insecticide and drug resistance, improving effectiveness and

scale-up of existing interventions, improving program efficiency to address bottlenecks in malaria program interventions, and investigating the impact of new tools and approaches.

Similarly, the NMCD works with PMI and relevant stakeholders to jointly plan and implement performance reviews for the UMRESP or individual projects contributing to this plan.

PMI Objective in Support of NMCD

PMI works with the NMCD and other stakeholders and donors including AMF and BMGF to identify OR needs and facilitate studies that meet those needs. PMI provides TA in designing appropriate scientific approaches that effectively answer research questions and provide the needed information for malaria decision-making. In addition PMI funds OR that addresses priorities and bottlenecks, and improves the effectiveness of malaria program interventions.

PMI also contributes TA and funding to program reviews aimed at generating learnings and recommendations to improve performance toward the goals of the UMRESP.

PMI-Supported Recent Progress (FY 2020)

Current and recently completed studies supported by PMI:

- Impact of addition of proactive case detection to integrated community case management on key malaria indicators following population based indoor residual spraying in combination with chemotherapy in a high transmission setting in north eastern Uganda
- UMRSP midterm and end-term performance review
- Malaria bilateral project learning review
- A core-funded cluster randomized trial on the impact of housing modifications combined with PBO ITNs on the reduction of malaria burden

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

- Continue to support the cluster randomized trial on the impact of housing modification with PBO ITNs on the reduction of malaria burden. The feasibility pilot (phase 1) is ongoing and expected to be completed in July 2021.
- Continue to support the study on the impact of proactive case detection on key malaria indicators following IRS. The endline survey is planned for August 2021.

PMI Goal

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

Key Question 1

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

Supporting Data

The following questions have emerged as areas of strategic importance to the NMCD, PMI, and other stakeholders following the malaria program review, as well as technical and strategic consultations:

- Do communities prefer to use polyester nets and reject or misuse polyethylene nets?
- What interventions need to be in place to maintain gains following IRS withdrawal?
- How do we accelerate iCCM implementation and address key issues related to quantification of commodities, reporting, funding of VHTs, and program sustainability?
- How do we improve data use at the district, health facility, and community levels?
- How do we measure and quantify the economic burden of malaria?
- How do we promote private sector engagement for malaria and improve the performance of private health facilities when it comes to the provision of quality services and data reporting?

Table A-25. Ongoing program evaluation and operational research

Funding Source	Implementing Institution	Research Question/Topic	Status/Timeline
BMGF/PMI/Rotary International	Pilgrim Africa	Phase I: Impact of IRS with and without mass drug administration on malaria Phase II: A pilot intervention to assess the impact, feasibility, and cost-effectiveness of Proactive Community Treatment (ProAct or ProCCM) as a post-IRS transition strategy compared to standard iCCM as a way to maintain the gains from IRS with or without mass drug administration	Phase I: Completed Phase II: Baseline and midline data collected and analyzed, endline data collection planned for August 2021
PMI	Infectious Disease Research Collaboration (IDRC)	Impact of housing modification combined with PBO ITNs on the reduction of malaria burden. Evaluation of the epidemiological and entomological effectiveness, cost-effectiveness, feasibility, and acceptability of housing modification.	Launched in August 2020 Phase I (feasibility pilot) is ongoing, to be completed in July 2021
National Institutes of Health (NIH)	Infectious Diseases Research Collaboration (IDRC), University of California San Francisco (UCSF), London School of Hygiene and Tropical Medicine	Are combination ITNs (with PBO or a combination of insecticides) more effective than conventional ITNs (without PBO or a combination of insecticides) for malaria control in Uganda, particularly in areas with high-level insecticide resistance?	Ongoing End date: 2023

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

Results from the midline survey of the Pilgrim study indicate that, although ProCCM leads to the transfer of a significant number of malaria cases from facilities to the community, thus relieving health facilities' caseload, post-IRS malaria resurgence is observed equally in the two study arms (ProCCM and iCCM) so far. If this trend is confirmed by the endline study, this would warrant a number of follow-up questions: Could we have seen a

different outcome if ProCCM had been initiated sooner after IRS? How long does it take for iCCM and ProCCM to scale up to an optimal performance level and what aspects of these interventions pose challenges for feasibility of implementation and retention of quality over the longer term? What other factors could be associated with successful IRS exit?

Regardless of the IRS context, it is important to understand the capacity and readiness of VHTs to implement iCCM or ProCCM, and document the processes at each stage of implementation.

Moreover, MIS 2018–2019 data as well as results from the Uganda PBO study demonstrate high net attrition, which merits further exploration of the determinants of high net attrition in Uganda.

Finally, Uganda has seen a sustained increase in malaria cases since 2019, and it is becoming urgent to understand what dynamics are feeding that increase.

Key Question 3

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

Supporting Data

Uganda is privileged to have strong in-country capacity for research. There is a need for the NMCD and partners to leverage this to ensure that relevant districts are capacitated to implement research activities, and to advocate for malaria research questions at the top of district priority lists. This capacity-building is an integral part of PMI supported OR.

Conclusions for Program Evaluation and Operational Research Investments

PMI will continue to work with the NMCD to leverage Uganda's strong research capacity and advance its dynamic research agenda, contribute to its implementation, and use resulting data to inform programmatic decisions.

PMI does not plan to allocate FY 2022 funding for OR, but will instead finalize the implementation of current priority research, and focus on translating research and program review findings into evidence based programming.

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

3.4. SOCIAL AND BEHAVIOR CHANGE (SBC)

NMCD Objective

The NMCD's objective for SBC falls within strategic objective three of the UMRESP 2021–2025 which states that by 2025, at least 90 percent of the population sustains the acquired knowledge, and utilizes and practices correct malaria prevention, control, and management measures.

NMCD Approach

The UMRESP places emphasis on consolidating and sustaining high levels of knowledge already gained by the population to avoid relapses that can lead to drops in already formed norms about malaria prevention. In addition, the UMRESP SBC strategy is to create demand and increase uptake and utilization of malaria interventions by empowering communities to demand malaria services and products, and to be able to take individual action for their health. To accelerate this, focus will be on actions that have a bearing on health providers, communities, households, and individuals through the following strategies:

- Create demand for preventive and curative services/products through increased population knowledge and adherence to positive malaria practices.
- Raise the profile of malaria among policy/decision-makers and actors at all levels.
- Strengthen structures and mechanisms for the delivery of malaria SBC interventions and full operationalization of the MAAM approach.
- Strengthen community-based behavioral change actions to harness and sustain positive malaria practices including working through VHTs at the community level.

To ensure community members practice prevention behaviors in areas where risk perception for malaria may have shifted such as in former IRS areas and to sustain gains there, the NMCD will do the following:

- Develop profiles of households that are most susceptible to malaria and those where the promoted malaria behaviors have not formed into habits.
- Develop SBC interventions tailored to the unique needs of the identified households.
- Deploy quality improvement approaches to continuously address emerging behavioral patterns among the identified households and adapt interventions to ensure sustained practice and adoption of the promoted malaria prevention practices.

The national SBC approach is to use all available mass media channels to reinforce malaria messages. The primary target audience for demand creation programs includes health workers, caregivers, and heads of households, including men. The purpose of this approach is to increase utilization of preventive and curative services at household and community levels. Among health workers, the national SBC approach promotes knowledge (reading and practice around the subject area i.e. continued medical education), provider communication/counseling skills (interpersonal communication), and provider attitude change.

PMI Objective in Support of NMCD

PMI supports the UMRESP SBC strategic objective with the aim of reaching all Ugandans with knowledge on the correct practices around malaria prevention, control, and management. PMI's priority behavioral objectives are the promotion of correct and consistent net use, prompt care-seeking for fever, and early and frequent ANC attendance. These behavioral objectives are aligned with the national-level SBC activities implemented by the Global Fund, UNICEF, FCDO, and Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ), the German cooperation agency. These partners undertake coordination, collaboration, layering, and harmonization of processes and approaches during activity implementation. PMI's interventions address relevant determinants to the uptake of various malaria related behaviors and services such as attitudes, risk perception, and self-efficacy through human-centered design (e.g., working with audiences to design SBC approaches that address all determinants that affect uptake of the promoted malaria behaviors and services).

PMI-Supported Recent Progress (FY 2020)

In the last year, PMI Uganda commenced the implementation of a new SBC activity. The focus was on the roll out of a baseline assessment, a mobile phone survey, and gender, youth, and social inclusion studies to inform future activities to be implemented by the new SBC program. The assessment was conducted among 1,400 men and women 18 to 49 years of age in four regions (central, northern, eastern, and western). It assessed knowledge around three behavioral determinants including ITN use, IPTp uptake, and prompt care-seeking. In addition, the assessment identified and considered other ideational factors beyond knowledge including ANC attendance and IPTp uptake among pregnant women, net access, net care and repair, attitudes, efficacy, and SBC exposure. These were used to map the malaria related gateway behaviors to focus on in SBC interventions. The high-level findings on these factors included the following:

- Nationally, 59 percent of all Ugandans slept under an ITN and among those with access to an ITN, 85 percent did so.
- Only 66 percent of suspected cases of malaria were offered a malaria test.
- Prompt care-seeking for a child with fever is low (57 percent).
- Only 45 percent of women who gave birth in the past two years took three or more doses of IPTp during pregnancy.

In addition, PMI continued active participation in the SBC TWG at national level and used that forum to provide technical assistance in the development of the new UMRESP strategy as well as program updates to malaria stakeholders. As the program was in startup mode and given the interruption of the COVID-19 pandemic, particularly given the nationwide lockdown, other activity implementation slowed down.

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

PMI will support the following activities in the next ~12 months at national level:

- Support comprehensive SBC for increased ANC attendance to address the behavioral challenge of early and frequent ANC attendance as one of the barriers of IPTp uptake. The assessment identified the best channels for communication as radio, health workers, and interpersonal communication (especially engaging key influencers such as political leaders, cultural and religious leaders, parents, health workers). Other communication channels included social media, TV, and print materials. This multi-channel approach incorporates channel preferences across target audiences hence the need to assess and monitor such variations to improve targeted intervention.
- Promote correct, consistent use, and care of ITNs to address the behavior challenge of correct and consistent net use.
- Promote early care-seeking for malaria diagnosis and treatment for children under five years of age and pregnant women to address the challenge of prompt care-seeking for fever.

This will be done through:

- Supporting the NMCD to review the Chase Malaria to Zero Campaign to adapt existing relevant materials and/or design new materials and interventions to address emerging gaps.
- Packaging shared audience mobilization approaches into “tool kits” for adoption by various implementing partners for use in their SBC activities at national, regional, and district levels.

- Supporting MOH and implementing partners to design, implement, and monitor interpersonal communication activities at individual, household, and community level that promote ITN use, care, repair, IPTp uptake, and early care-seeking.

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

PMI is proposing to prioritize three behaviors (correct and consistent net use, prompt care-seeking for fever, and early and frequent ANC attendance) through its SBC programming. Support will be at the national level.

Table A-26. Prioritized behaviors with FY 2022 funds

Behavior	Target Population	Geographic Focus	Justification
Correct and consistent net use	Mothers of children under five, men (male partners), heads of households and health workers	National, regional, and district level	The 2021 Social Behavior Change Activity final baseline assessment report showed that 25 percent of the households surveyed reported not using an ITN on the night before the survey. Although this is an improvement from the 41 percent found not using a net in the Uganda MIS 2018–2019, it suggests a need for increased SBC activities promoting correct and consistent net use in this proportion of the population.
Prompt care-seeking for fever	Mothers of children under five years of age, men (male partners), heads of households, and health workers	National	The Uganda MIS 2018–2019 showed that caretakers of children with fever sought advice or treatment for 87% of the children in the two weeks before the survey. Only 57% sought this help the same or next day pointing to the need for increased SBC activities promoting prompt care-seeking for fever among households.
Early and frequent ANC attendance	Pregnant women, mothers of children under five years of age, men (male partners), heads of households, and health workers	National	The Uganda MIS 2018–2019 showed that only four in ten women with a pregnancy in the two years preceding the survey (41%) received at least three doses of SP to prevent malaria during pregnancy. This points to the need to intensify activities reaching out to mothers, men, and heads of households.

Key Question 2a

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

Supporting Data

The MIS 2018/2019 showed that 78 percent of women 15 to 49 years of age know that malaria is caused by mosquitoes or mosquito bites. The MIS also showed that 94 percent of women know that there are ways to avoid getting malaria. Furthermore, 94 percent of women agree that they sleep under a bed net every night because it is the best way to avoid getting malaria. However, only 39 percent of women had heard or seen a malaria message in the six months preceding the survey. This implies that although knowledge around the cause and prevention of malaria through the use of nets is high, less than half of the SBC messages are reaching the intended audience, thereby inhibiting our ability to reach beneficiaries in order to improve their practices.

Further, there has been limited implementation of robust impact evaluation designs that would have more specifically highlighted the knowledge gaps in the causes of malaria as well as in consistent net use highlighted above. As a result, there is limited attribution of SBC interventions to desired change in net use. In addition, there is limited capacity at the national level to interpret and apply data to inform SBC activities at different levels of programming net use.

Key Question 2b

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

Supporting Data

The Uganda MIS 2018–2019 showed that 77 percent of women reported that children with fever need to be taken for treatment the day that the illness begins; 14 percent said that children with fever should be taken for treatment the next day. This implies that a gap still exists in knowledge of the correct practices around the need for prompt care-seeking given that a significant number of women interviewed did not see the need for immediate care for fever cases.

As indicated above, there has been limited implementation of robust impact evaluation designs that would have highlighted gaps in prompt care-seeking more specifically. As a result, there is limited attribution of SBC interventions to desired change in this intervention area. In addition, there is limited capacity to interpret and apply data to inform SBC activities at different levels of programming prompt care-seeking interventions.

Key Question 2c

For early and frequent ANC attendance, what gaps exist in understanding the barriers to the adoption and maintenance of malaria prevention and treatment behaviors?

Supporting Data

The Uganda MIS 2018–2019 showed that among women who know that there are ways to avoid getting malaria and who mentioned SP/Fansidar as a medication to be taken during pregnancy to avoid getting malaria, 54

percent indicated that SP/Fansidar should be taken three or more times. Given that almost half of the women interviewed did not know the importance of taking SP three or more times, there is a big knowledge gap in the usefulness of ANC attendance that needs to be further emphasized in future SBC programming.

Once again, as indicated above, there has been limited implementation of robust impact evaluation designs that would have better highlighted knowledge gaps around ANC attendance and the importance of taking SP among women of child bearing age. Additionally, there is limited attribution of SBC interventions to desired change around ANC SBC work. In addition, there is limited capacity to interpret and apply data to inform SBC ANC promotion activities at different levels of programming.

Key Question 3

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

Supporting Data

Uganda has a new comprehensive malaria strategic plan with robust guidelines for SBC activities in the country. The malaria control program is strong and well established with committed leadership. The program regularly provides guidance and conducts supportive supervision visits to lower levels of administration (at district and subcounty levels) and uses these opportunities to disseminate malaria SBC guidelines to district and subcounty health teams and to service providers. In addition, there is an active SBC TWG at the national level that meets quarterly to discuss the country's SBC priorities. Stakeholders from the MOH, PMI, and its implementing partners, the World Health Organization, UNICEF, and other public and private entities involved in the fight against malaria belong to this thematic working group. The thematic working group organizes the world malaria day activities annually.

To a great extent, Uganda has the capacity to design, implement, and monitor SBC interventions based on experience of implementing previous SBC interventions such as the Obulamu (life) campaign. There have been several successful malaria prevention and control campaigns that have promoted the desired behaviors and strengthened the capacity of players at national, district, and community levels. However, there is a need to strengthen capacity from the national to the lower levels to ensure sustainability of SBC interventions. This is because malaria control is not adequately funded and therefore has limited financial, human, material, and informational resources—Uganda's budget allocation to health overall is less than 15 percent of the national budget, which is below the target set by the Abuja declaration of 2001 to which the country is a signatory. In terms of coordination and collaboration, there is a need to strengthen the multisectoral response for SBC to include the gender and education aspects.

Conclusions for SBC Investments

PMI will work with the in-country SBC implementing mechanism to determine the appropriate focus of SBC through triangulating data on behavioral outcomes with data on behavioral determinants and demographics. Further, PMI will continue support to national-level campaigns (Chase Malaria, MAAM, Obulamu, and Zero Malaria Starts with Me). PMI will also support dipstick surveys to evaluate beneficiary attitude, beliefs, perceptions, and views toward the SBC interventions implemented.

PMI will support evidence-based, theory-informed SBC that is integrated under the Zero Malaria Starts with Me campaign umbrella. The campaign will engage political leaders, the private sector, and household members at the community level in promoting malaria control activities. Furthermore, in-country SBC activities will adopt the Draw the Line Against Malaria campaign aimed at engaging youth in the fight against malaria under the overall Chase Malaria campaign.

In addition, PMI will support a malaria behavior survey to generate data to address the knowledge gaps identified. PMI will also work with the NMCD to include the SBC module in the next MIS. PMI will continue supporting capacity-building efforts at the national level including support to the SBC thematic working group and providing TA in the implementation of the SBC efforts envisaged in the malaria strategic plan.

PMI is proposing an increase to the SBC budget to fund a malaria behavior survey, which as indicated above, will generate data to inform SBC programming at the national and district levels. No malaria behavior survey has been conducted in Uganda in the past.

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

3.5. OTHER HEALTH SYSTEMS STRENGTHENING

Since 2005, the Ugandan government has been in the process of dividing districts into smaller units. This decentralization is intended to prevent resources from being distributed primarily to larger towns and leaving the remainder of each district neglected. The proliferation of new districts has increased over the years from 112 in 2010 to 136 in June 2020. Services are decentralized to districts and within districts to health subdistricts with each level having specific roles and responsibilities. Health system strengthening was the cornerstone of Uganda's Health Sector Development Plan 2015–2020.

NMCD Objective

The NMCD general objectives in HSS are addressing key constraints in each of these core (vector control, MIP, case management and surveillance), and cross-cutting (SBC, capacity-building, and partnership) interventions with the goals of improving access in reaching the unreached. Improving the quality and prompt utilization of malaria prevention and treatment services, as well as, developing effective approaches for monitoring and evaluating the various levels of malaria program inputs (human resources, malaria commodities), processes (training, mentoring, and procuring commodities), outputs (required number of health force are trained and adequate commodities are distributed) and outcomes (malaria incidence reduced).

NMCD Approach

The UMRESP 2021–2025 approach includes the following:

- Strengthening the enabling environment to deliver malaria interventions and measure progress through coordinated partnership and multi-sectoral collaboration. Strengthening capacity of the NMCD to deliver on its mandate through providing policy direction, supporting malaria interventions, and monitoring progress. Improving the capacity of DHMTs, RRHs, and municipal councils to appropriately perform malaria programming.
- Empowering local political and community leaders to translate commitment to malaria reduction results.

- Strengthening the enabling environment to enhance quality of care of malaria services in private health facilities to appropriately manage malaria according to national guidelines, reporting quality data and providing capacity-building support and incentives to private sector providers to conform to good practice norms.
- Strengthening coordination between the NMCD and in-country malaria partners, especially the leadership of the program.
- Holding regularly scheduled expanded RBM Partnership Forum meetings with a standard agenda and action plans.
- Instituting quarterly and annual planning and review meetings to monitor progress of implementation of activities.
- Restricting the NMCD's central role to its core mandate (policy and guidelines development, standards setting, technical support and supervision, resource mobilization, quality assurance, and monitoring and evaluation) and revitalizing the role of districts and relevant decentralized levels in planning, implementation, and supervision of malaria control activities.

PMI Objective in Support of NMCD

PMI's objectives in support of NMCD are to improve health sector competitiveness through strengthening health service delivery systems by providing malaria commodities, and capacity-building (supporting training, mentoring, and coaching). PMI supports the collection, analysis, and use of epidemiological, entomological, and behavioral surveillance data. PMI also supports the health workforce through providing technical assistance and secondment of experts in critical technical areas that NMCD lacks such as MIP specialists and entomologists.

PMI-Supported Recent Progress (October 1, 2019, through September 30, 2020)

PMI supported NMCD in the development of both the UMRESP 2021–2025 and the Global Fund grant application. Following the first Ugandan COVID-19 case in March 2020, PMI in collaboration with the Health and HIV Office of USAID made immediate adaptations to its approaches to ensure safety of staff, partners, patients and communities and supported the continuation of malaria services.

Virtual mentorships to health workers fostered the continuation of essential malaria service delivery amid the COVID-19 pandemic including MIP prevention with IPTp using SP, distribution of ITNs, and prompt and effective malaria case management for malaria. Using virtual mentorship, PMI was able to maintain communication with health workers and sustain the gains in routine ITN distribution through ANC and uptake of IPTp. Virtual mentorship complemented existing approaches; however, there is a need for investment in equipment and improving internet connectivity in health facilities to facilitate more effective virtual collaboration.

Over the past 12 to 18 months, PMI-trained TRPs mentored 16,106 health workers in 1,800 health facilities. The TRPs received didactic/classroom training aimed at building their skills to an expert level so that they could mentor other health workers through on-site, hands-on training. PMI uses this TRP model to effectively address performance problems within the local context of health facilities. Further, through PMI support the NMCD distributed 499 job aids in MIP and malaria case management, and printed and distributed 250 SBC materials (brochures for health facilities, key influencers, interpersonal communication agents, and community dialogue guides) and shared 12 success stories with the greater malaria community and USAID Mission communications team.

PMI also supported district malaria task forces through joint planning and information sharing and participated in district emergency task forces for COVID-19 and Ebola to provide technical guidance on integration and continuity of essential malaria services.

PMI funded the secondment of two staff to the NMCD (MIP Specialist and Senior Entomology Advisor) to support coordination of MIP services and to support the implementation of integrated vector management guidelines.

PMI continued to build the capacity of districts through supportive supervision and mentorship, both onsite and virtually. PMI supported district teams to analyze DHIS2 data on malaria indicators on a weekly basis and to enact data driven actions. PMI supported 16 districts experiencing increases in malaria cases. PMI supported DHMTs to conduct a line listing of the high burden health facilities using DHIS2 data, and home visits to the affected villages to monitor and support prevention and treatment follow-up actions.

Lastly, PMI conducted joint planning with the MOH/NMCD and districts to respond to floods and supported the development of disaster preparedness plans and the formation of disaster preparedness committees. Additionally, PMI supported transportation of 64,800 MOH ITNs to 23,111 displaced people in 21 flood-affected districts.

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

PMI will continue supporting the capacity of the NMCD to manage and coordinate multi-sectoral malaria reduction efforts at all levels to implement the UMRESP 2021–2025. This includes the continuation of regular NMCD technical and management meetings, RBM in-country partnership coordination meetings, review, and planning meetings. PMI will also continue to support the NMCD to mainstream malaria activities into the health and non-health sectors' response, as well as coordinate the private sector and domestic resource mobilization.

In collaboration with PEPFAR and other USG health programs, PMI will continue to support regions and districts to improve health worker productivity, and staff training (pre-service and in-service). PMI will further engage the GOU to increase its commitment, transparency, and accountability for resources for malaria control.

PMI will strengthen systems through the expansion of VHTs and iCCM in selected hard-to-reach areas in PMI's five high burden focus regions. In addition, PMI will continue to support performance-based financing, strengthen leadership and management, and harness private sector pre-service training capacity to meet priority human resources for health (HRH) needs for malaria control. PMI's iCCM activities will be implemented through the existing VHT structure. The CHEW strategy is under development, and a pilot is planned for rollout, to start October/November 2021 depending on availability of funding. PMI, through the USAID Health System Strengthening team, will support the pilot rollout by supporting training and supportive supervision.

USAID/Uganda's district-based programs will implement the HRH support package including leadership capacity development and performance management developed by the HRH initiative. The district HRH support package includes a minimum set of interventions that every district must implement with partner support to achieve and maintain acceptable staffing levels. The interventions include the following:

- Recruitment of health workers to reduce vacancy rates.

- Coordinated needs-based in-service training to reduce absence from the facility due to training.
- Performance management to enhance productivity.
- Maintaining functionality and use of Human Resource Information System for evidence-based decision-making.

PMI's investments leverage other USG health investments for this area of health system strengthening. This activity will also include support for national MOH leadership training.

PMI will support CHWs, HFs, and DHMTs to conduct and sustain improved malaria control interventions through community-based organizations, civil societies, and traditional structures.

Furthermore, PMI will continue through the two Resident Advisors and four FSNs to support the NMCD, DHMTs, VHTs, and CHEWS training and deployment.

PMI will continue to support placement, training, and small-scale malaria projects through Peace Corps Volunteers at the community level. Small-scale projects enable PMI through Peace Corps Volunteers to build and sustain local capacity at the community level.

PMI will continue supporting one or two staff at the NMCD as part of its contribution to the implementation of the NMCD capacity development plan while the Global Fund will continue supporting two or three staff members. The long-term plan is for these staff to be rolled into the mainstream GOU/MOH payroll after four years of external support ending August 2024.

Key Goal

The key goal is to strengthen NMCD coordination capacity of malaria stakeholders; expand community health services; support the review of updated policies, guidelines, manuals, and job aids for various malaria interventions; and provide TA to support five major TWGs focused on monitoring and evaluation, integrated vector management, and case management including iCCM, MIP, and SBC communication.

Key Question 1

Supporting Data

PMI will continue to support and engage FETP in outbreak investigation and malaria program evaluation. PMI will also strengthen the Peace Corps' community outreach services in promoting vector control interventions (IRS and ITNs). PMI plans to support the CHEWs pilot program in Uganda, which is an expansion from the previously supported HSS to increase access to malaria prevention services and promote MAAM to reach beyond health facilities to hard-to-reach areas because there is inadequate staff in health facilities at lower levels.

Despite efforts of the GOU and development partners, the number of health workers at lower levels is not keeping up with the population growth or the epidemiological changes in malaria, emerging pandemic threats (Ebola, Crimaen-Congo hemorrhagic fever, Rift Valley fever, COVID-19, etc.), natural disasters (floods, landslides, etc.) and demographic trends (population growth rate of 3.3 percent). However, there is an unabsorbed large pool of qualified and licensed health professionals. The issues are recognized at the policy level, but insufficient funding and poor management are impeding the recruitment and retention of health workers.

Domestic resources are insufficient to fund a health system that offers a minimum healthcare package and most donors are reluctant to contribute to health workers' salaries. The GOU allocated only 7.2 percent (against 15 percent of the Abuja Declaration) of the national budget in 2020. However, PMI will continue advocacy for domestic resource mobilization through the GOU framework and with private enterprises as well as the philanthropic local and international organizations.

Conclusions for Additional Health Systems Strengthening Investments

The health workforce is not keeping up with the population growth or the epidemiological changes in malaria and demographic trends. Domestic resources are insufficient to fund a health system that can offer a minimum healthcare package. PMI, in collaboration with NMCD and malaria stakeholders, will advocate for domestic resource mobilization using available platforms. PMI will support the deployment of CHEWS to reach the unreached through community health interventions. PMI will support community-based organizations to promote malaria preventive services and support the large-scale MAAM activities.

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