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Kenya

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

ACSM	Advocacy, communication, and social mobilization
ACT	Artemisinin-based combination therapy
AL	Artemether-lumefantrine
AMREF	African Medical and Research Foundation
ANC	Antenatal care
BMGF	Bill & Melinda Gates Foundation
CCMm	Community case management of malaria
CDC	U.S. Centers for Disease Control and Prevention
CHA	Community health assistants
CHMT	County Health Management Team
CHRIO	County Health Records and Information Officer
CHU	Community Health Unit
CHV	Community health volunteer
COE	Committee of experts
CPU	County Proximate University
CWC	Child welfare clinics
CY	Calendar year
DHIS2	District Health Information Software 2
DHP	Division of Health Promotion
DHS	Demographic and Health Survey
DNMP	Division of the National Malaria Program
DP	Dihydroartemisinin-piperaquine
DQA	Data Quality Assessment
EPR	Epidemic preparedness and response
FELTP	Field Epidemiology and Laboratory Training Program
FY	Fiscal year
GHI	Global Health Initiative
Global Fund	Global Fund to Fight AIDS, Tuberculosis, and Malaria
GOK	Government of Kenya
HPT	Health products and technologies
HPTU	Health Products and Technologies Unit
HRIO	Health Records Information Officer
HSS	Health system strengthening
IDSR	Integrated Disease Surveillance and Response
IPTp	Intermittent preventive treatment for pregnant women
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito net
KEMRI	Kenya Medical Research Institute
KHIS	Kenya Health Information System
KMIS	Kenya Malaria Indicator Survey
KMS	Kenya Malaria Strategy
LMIS	Logistics management information system

MBS	Malaria Behavior Survey
MCAT	Malaria Community Action Team
M&E	Monitoring and evaluation
MIP	Malaria in pregnancy
MIS	Malaria indicator survey
MOH	Ministry of Health
MOP	Malaria Operational Plan
OR	Operational research
PBO	Piperonyl butoxide
PE	Program evaluation
PMI	U.S. President's Malaria Initiative
PMLLIN	Post-Mass Long-Lasting Insecticidal Net campaign survey
PSM	Procurement and supply management
RDT	Rapid diagnostic test
SBC	Social and behavior change
SCHMT	Sub-County Health Management Team
SCHRIO	Sub-County Health Records and Information Officer
SM&E	Surveillance, monitoring, and evaluation
SMEOR	Surveillance, monitoring, and evaluation and operations research
SP	Sulfadoxine-pyrimethamine
TES	Therapeutic efficacy study
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
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 Kenya to end malaria. PMI has been a proud partner of Kenya since 2006, helping to decrease child death rates by 55 percent and increasing ownership of insecticide treated nets (ITNs) by 63 percent through investments totaling almost $442 million.

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

Approximately 75 percent of the population in Kenya is at risk for malaria infection. Malaria transmission is heterogeneous in Kenya, and its epidemiology is influenced by altitude, rainfall patterns, and temperature. The country is divided into four epidemiological zones: endemic (lake and coast), epidemic (highland), seasonal (semi-arid), and low risk. Modeling of KMIS survey data from 2000 to 2015, published in Kenya Malaria Indicator Survey (KMIS) 2015, demonstrates all counties in the lake endemic area have transitioned from high-transmission areas to low- to moderate- transmission areas based on the prevalence of malaria parasites in children younger than five years of age.

Since 2013, PMI has prioritized the areas of Kenya with the highest burden of malaria to complement funding from the GOK and other partners to achieve the greatest reduction in malaria morbidity and mortality. The eight counties of Bungoma, Busia, Homa Bay, Kakamega, Kisumu, Migori, Siaya, and Vihiga, with an estimated population of 9.8 million in 2019, form the lake endemic zone and have the highest malaria burden. PMI has focused its support for vector control, case management, supply chain management, malaria in pregnancy (MIP), social and behavior change (SBC), and surveillance, monitoring, and evaluation (SM&E) on these eight counties in the lake endemic zone.

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

Vector Control

Entomological Monitoring: PMI prioritizes entomological surveillance and insecticide-resistance monitoring in the counties with the highest burden of malaria to facilitate evidence-based decision-making about appropriate vector control interventions. Entomological monitoring supported by PMI has shown that while malaria vectors were generally resistant to pyrethroids insecticides, pre-exposure to piperonyl butoxide (PBO) before exposure to pyrethroid restored susceptibility in six of 11 sites. These insights have helped inform insecticide selection for indoor residual spraying (IRS), as well as decisions about the most appropriate ITNs for mass and routine distribution.

With FY 2022 funds, PMI plans to maintain the same level of entomological monitoring. Routine vector surveillance and insecticide-resistance monitoring will continue in selected sites based on the ongoing ITN distribution plan.

Insecticide-Treated Nets: PMI has been the primary source of funding for routine distribution of ITNs through antenatal care (ANC) and child welfare clinics (CWCs). PMI also contributes ITNs to periodic mass campaigns. As a result of these contributions, ownership and use of ITNs has remained stable with ownership of at least one ITN ranging from 48 percent in 2007 to 63 percent in 2015. While ownership did decline to 49 percent in the 2020 KMIS, contributing factors, including the timing of the survey and COVID-19 pandemic, likely significantly impacted the results. It is expected that ownership will increase considerably following the 2021 mass campaign.

With FY 2022 funds, PMI will procure approximately 1.7 million standard pyrethroid ITNs for routine distribution through ANC and CWC, provide logistical support for ITNs that will be distributed through routine channels as well as those to be distributed in the 2023–2024 mass campaign, support durability monitoring of PBO ITNs, and continue to support SBC activities aimed at maintaining high levels of net use and care.

Indoor Residual Spraying: The main goal of the Kenya IRS Implementation Strategy (2020–2024) is to strengthen capacity for evidence-based IRS operations in high malaria burden and epidemic-prone counties to protect 100 percent of the population at risk of malaria in Kenya. In support of this goal, PMI has been funding IRS in two lake endemic counties in western Kenya (Migori and Homa Bay) for a number of years. The sustained use of IRS in Migori and Homa Bay has been critical to keeping the vector populations in the counties very low.

With FY 2022 funds, PMI plans to continue to support high IRS coverage in the targeted areas of Migori and Homa Bay, targeting an estimated 500,000 structures with at least 85 percent coverage and protecting an estimated 2 million people.

Human Health

Case Management: The current Kenya Malaria Strategy (KMS) 2019–2023 objective is to manage 100 percent of suspected malaria cases according to national guidelines by 2023. Since PMI began in Kenya, composite outpatient case management quality of care survey indicators have improved from 16 percent to 60 percent in facilities where diagnostics and medication are available, and inpatient indicators have also improved. However, care-seeking and overall testing rates remain suboptimal. Addressing these gaps requires strengthening of prompt care-seeking, integrated malaria case management, community case management of malaria (CCMm), quality diagnostics, and commodity provision.

With FY 2022 funds, PMI will support integrated strengthening of case management at community, facility, subcounty, county, and national levels. PMI will procure and distribute approximately 4 million rapid diagnostic tests (RDTs), 1.6 million artemisinin-based combination therapies (ACTs), and 300,000 vials of injectable artesunate to help meet the projected case management commodity gaps.

Drug-Based Prevention: Support from PMI has led to achievements in the management of malaria in pregnancy, as shown in the latest Kenya Malaria Indicator Survey (KMIS) 2020, where coverage for two or more doses of intermittent preventive treatment for pregnant women (IPTp) increased from 55.4 percent in the 2015 KMIS to 68 percent, and likewise for three or more doses of IPTp from 36 percent to 48.6 percent in the lake endemic regions where PMI's efforts are focused.

With FY 2022 funds, PMI will continue to enhance the capacities of both health workers and community health volunteers (CHVs) to provide appropriate services for pregnant women and disseminate information on the importance of preventing malaria in pregnancy in communities. This will help ensure pregnant women are able to access these services at the right time thereby improving birth outcomes.

Cross-Cutting and Other Health Systems

Supply Chain (with malaria focus): PMI support has enabled sustained reporting rates for malaria commodities in PMI's eight priority counties at 99 percent and improvements in other counties to an average of 86 percent despite COVID-19 related challenges. Importation bottlenecks over the last calendar year have contributed to an increase in stockout rates for sulfadoxine-pyrimethamine (SP), artemether-lumefantrine (AL), and RDTs resulting in a drop in adherence to the test and treat policy.

With FY 2022 funds, PMI will focus on strengthening leadership and governance capacity of the Health Products and Technologies (HPT) units at national and county levels for commodity management. Accountability for commodities will also be prioritized through support to the Council of Governors and the HPT units to develop and implement an accountability framework. The Kenya Health Information System (KHIS) will also be expanded and enhanced to enable end-to-end visibility of logistics data, order rationalization, and resupply.

Surveillance, Monitoring, and Evaluation (SM&E): The KHIS platform has continued to expand over the past year with the addition of new modules and dashboards, including a module for tracking ITN distribution as part of the 2020–2021 campaign. The timeliness and completeness of the Ministry of Health (MOH) 705A Outpatient Summary Form <5 years, which includes confirmed malaria cases, has remained above 90 percent in 2019 and 2020. Timeliness of the MOH Summary Forms relevant to malaria ranged from 74.2 percent to 92.9 percent in 2020. In addition to expansion of the platform, the quality of data has improved as seen from the routine data quality assessments (rDQAs) conducted in 2019 and 2020, where the deviations between the register and summary data has significantly declined in all eight PMI-focus counties.

With FY 2022 funding, PMI will continue to support the hosting and maintenance of the KHIS platform, malaria module, and dashboards. PMI will support County and Sub-County Health Management Teams (C/SCHMTs) to conduct rDQAs and data review meetings to continue to improve the quality and use of data, and support the development of information products. PMI will continue shifting its approach for strengthening malaria data quality from county level to direct support to subcounty Health Records Information Officers (HRIOs) to supervise and strengthen data quality within their facilities. PMI will also continue to support epidemic preparedness and response (EPR) dashboard updates and use by epidemic-prone counties/subcounties to monitor malaria trends. PMI will also support the DNMP to establish elimination systems, including enhanced county-level KHIS surveillance of epidemic thresholds in four to five targeted counties with low or negligible malaria burden. Counties that have been preliminarily identified by DNMP for targeting include Laikipia, Nyandarua, Nyeri, and Kirinyaga.

Program Evaluation & Operational Research (PE & OR): PMI/Kenya did not fund any PE or studies over the past year and does not have any planned for the coming year. PMI/Kenya does not plan to fund any PE or studies with FY 2022 funding.

Social and Behavior Change (SBC): Since the start of programming in Kenya, PMI has worked closely with the DNMP, Division of Health Promotion (DHP), and other stakeholders to build capacity and conduct high-quality, evidence-based, theory informed, contextually appropriate SBC interventions nationally and subnationally. These

investments have contributed to high levels of knowledge about malaria prevention and treatment, as well as a strong culture of net use.

With FY 2022 funds, PMI will continue to improve the adoption and maintenance of malaria prevention and treatment behaviors among individuals, families, communities, and health workers. Approaches that build on and are well integrated into local leadership and community structures will be prioritized, as will close collaboration with service delivery stakeholders to strengthen service communication and address challenges related to health provider behavior.

General Health Systems Strengthening (HSS): PMI has provided support to the DNMP for program management, coordination of multi-sectoral stakeholders, program-based budgeting capacity, strengthening linkages between national and county governments, and ensuring that DNMP staff have the skills and knowledge required to effectively fulfill their mandate for successful implementation of the KMS 2019–2023.

With FY 2022 funds, PMI will continue to support the development of managerial and technical capacity of national and county-level staff to ensure the malaria program meets the core functions outlined in the KMS 2019–2023. Specific areas will include the Field Epidemiology and Laboratory Training Program (FELTP), the Frontline FELTP Program, efforts to increase county level budgeting for malaria control activities, and building capacity of national and county health teams on leadership and governance.

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 Kenya to end malaria. PMI has been a proud partner of Kenya since 2006, helping to decrease child death rates by 55 percent and increasing ownership of insecticide treated nets by 63 percent through investments totaling almost $442 million.

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Kenya at a Glance

- **Geography:** Kenya is located in East Africa and borders Ethiopia, Somalia, Tanzania, Uganda, South Sudan, and the Indian Ocean. The country has three main regions: lowland (along the coast of the Indian Ocean and Lake Victoria), highland (along the Great Rift Valley), and arid (the north and northeast areas of the country).[1]
- **Climate and Malaria Transmission Seasonality:** Kenya's climate is tropical along the Indian Ocean coast, temperate in the highland interior, and very dry in the north and northeast. There are two rainy seasons when malaria transmission is highest: long rains from March to May, and short rains from October to December. The country experiences its highest temperatures from February to March and its lowest temperatures from July to August.
- **Population in 2019:** 47.5 million[2]
- **Population at Risk of Malaria:** 75 percent or 35.6 million[3]
- **Population in 8-county Lake Endemic PMI focus area:** 9.8 million[4]
- **Principal Malaria Parasites:** *Plasmodium (P.) falciparum* >85%, *P. vivax* 5-10%, *P. ovale* rare[5]; Mono-infections >97%, mixed infections <3%[6]
- **Principal Malaria Vectors:** *Anopheles (An.) gambiae, An. funestus, An. arabiensis, An. coustani*[7]
- **Malaria Case Incidence per 1000 Population:** 70.1 per 1,000 population at risk[8]

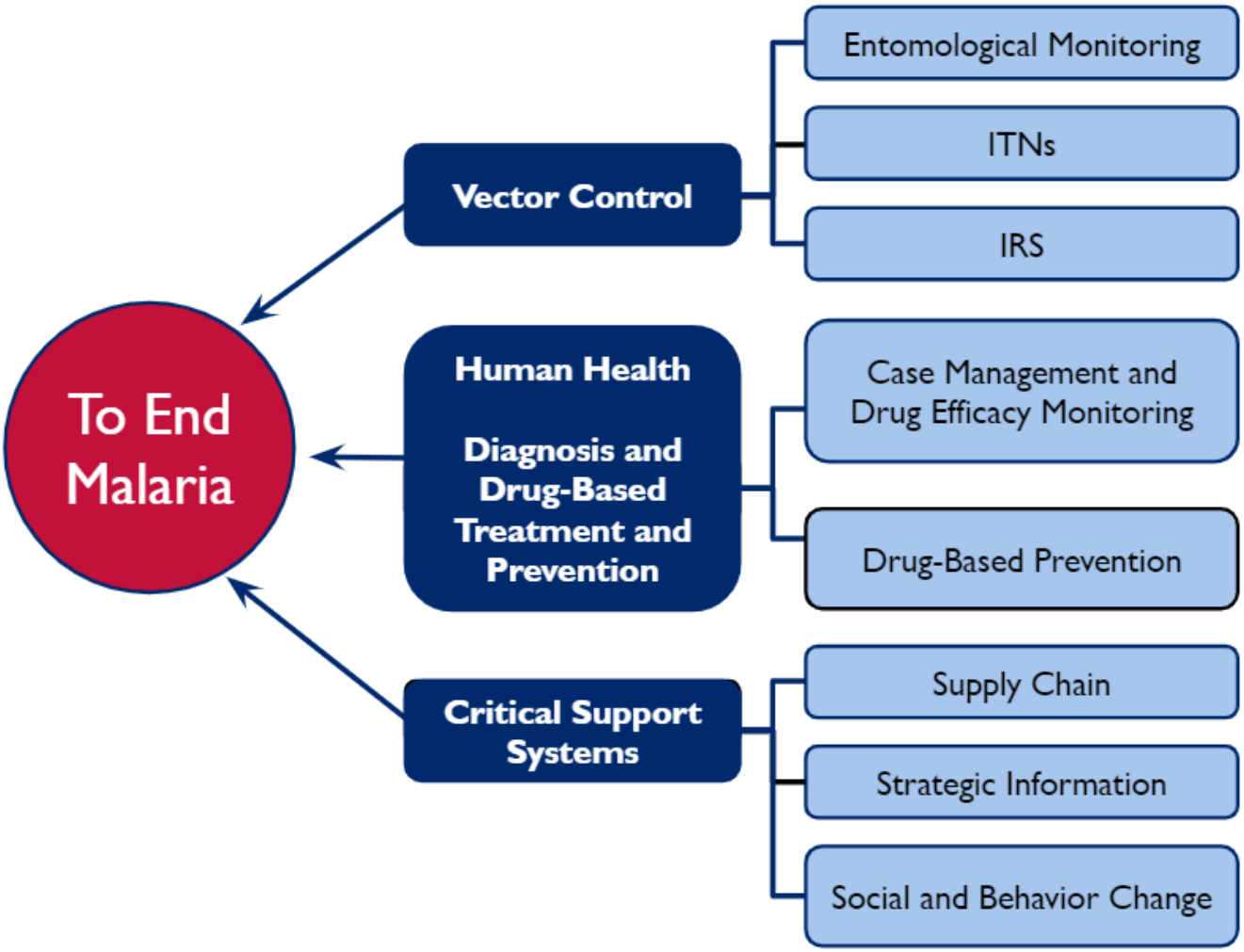
[1] National Malaria Control Program. (2019). Toward a Malaria-Free Kenya: Kenya Malaria Strategy 2019–2023. Kenya Ministry of Health.
[2] Kenya National Bureau of Statistics. (2019). Kenya Population and Housing Census 2019.
[3] Kenya Malaria Control Program. (2019). Kenya Malaria Strategy 2019–2023.
[4] Kenya Malaria Control Program. (2019). Kenya Malaria Strategy 2019–2023.
[5] Centers for Disease Control and Prevention. (2021). Health Information for the International Traveler.
[6] Centers for Disease Control and Prevention. (2021). Antimalarial Therapeutic Efficacy Study, Siaya County, Kenya.
[7] Kenya Malaria Control Program. (2019). Kenya Malaria Strategy 2019–2023.
[8] World Bank Open Data. (2018). Incidence of Malaria per 1,000 Population at Risk. World Bank

- **Under-Five Mortality Rate:** 52 deaths per 1,000 live births[9]
- **World Bank Income Classification and Gross Domestic Product:** Kenya is a lower middle-income country with a GDP per capita of $1,816[10]
- **Government Health Budget:** Ksh 217 billion *(approximate)*[11]
- **Trafficking in Persons Designations, 2018–2020:** Tier 2[12]
- **Malaria Funding and Program Support Partners Include:**
  - U.S. President's Malaria Initiative
  - Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund)
  - World Health Organization (WHO)
  - Kenya Medical Research Institute (KEMRI) Wellcome Trust
  - Malaria No More UK
  - African Medical and Research Foundation (AMREF) Health Africa
  - World Vision
  - United Nations Children's Fund (UNICEF)
- **PMI Support of National Malaria Control Strategy:** PMI prioritizes the areas of Kenya with the highest burden of malaria to achieve the greatest reduction in malaria morbidity and mortality. As such, PMI support is focused in the eight counties of Bungoma, Busia, Homa Bay, Kakamega, Kisumu, Migori, Siaya, and Vihiga, which have the highest malaria burden and form the lake endemic region. In other areas of Kenya, PMI provides support for procurement of malaria commodities and implementation of the country's national malaria control strategy through collaborative efforts led by the DNMP and other partners (See III. Overview of PMI's support of Kenya's Malaria Control Strategy for additional details.)
- **PMI Investments:** Kenya began implementation as a PMI focus country in FY 2006. The proposed FY 2022 PMI budget for Kenya is $31 million; this brings the total PMI investment to nearly $442 million.

PMI organizes its investments around the activities below, in line with the Kenya Malaria Strategy (KMS) 2019–2023.

[9] Kenya National Bureau of Statistics. (2015). Kenya Demographic and Health Survey 2014.
[10] World Bank Open Data. (2018). GDP Per Capita in Current US Dollars. World Bank.
[11] Ministry of Health. (2020). National and County Health Budget Analysis FY 2019–2020. Republic of Kenya.
[12] Department of State. (2019). Trafficking in Persons Report. US Government.

Figure 1. PMI's approach to end malaria[13]



Building and strengthening the capacity of Kenya'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. Nearly all of PMI's planned support for FY 2022 in the areas of vector control, human health, supply chain, and strategic information contains elements of capacity-building and system strengthening. PMI/Kenya will also continue to rely on and engage with local partners such as the University of Nairobi for strengthening malaria data capture and reporting on the KHIS platform, Jaramogi and Kakamega Teaching and Referral Hospitals for clinical mentorship for severe malaria case management, and the Kenya School of Government for leadership and governance capacity-building of county health management teams. PMI/Kenya is also expanding its local partner base to reach communities through social and behavior change (SBC) activities and strengthening and expanding existing community health platforms for malaria case management. Finally, PMI

[13]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.

will continue to explore private sector partnerships for improved quality of care in management of malaria cases in the private sector.

In addition, PMI recognizes that the GOK is making progress in incrementally increasing funding for health and malaria annually. The Ministry of Health (MOH) and Division of the National Malaria Program (DNMP) are making efforts to promote sustainable development through domestic resource mobilization. These efforts include working with the recently established End Malaria Council to advocate for domestic resources and complimentary support from the private sector, creating an enabling environment for local manufacture of some malaria commodities, and diversifying the partner base. At the county level, county health teams are increasing visibility for malaria by advocating to county assemblies for increased resource allocation and enacting laws that will anchor CHVs in formal health system structures. To support these efforts, PMI will work with the MOH and other partners (e.g., the Global Fund) to jointly track Kenya's funding commitments across the malaria portfolio.

II. MALARIA SITUATION AND PROGRESS

Malaria risk in Kenya is heterogeneous, and its epidemiology is influenced by altitude, rainfall patterns, and temperature. The country is divided into four epidemiological zones: endemic (lake and coast), epidemic (highland), seasonal (semi-arid), and low risk. Modeling of Kenya Malaria Indicator Surveys (KMISs) conducted from 2000 to 2015 suggests that all counties in the lake endemic region have transitioned from high- to low-to-moderate transmission based on the prevalence of malaria parasites in children less than five years.

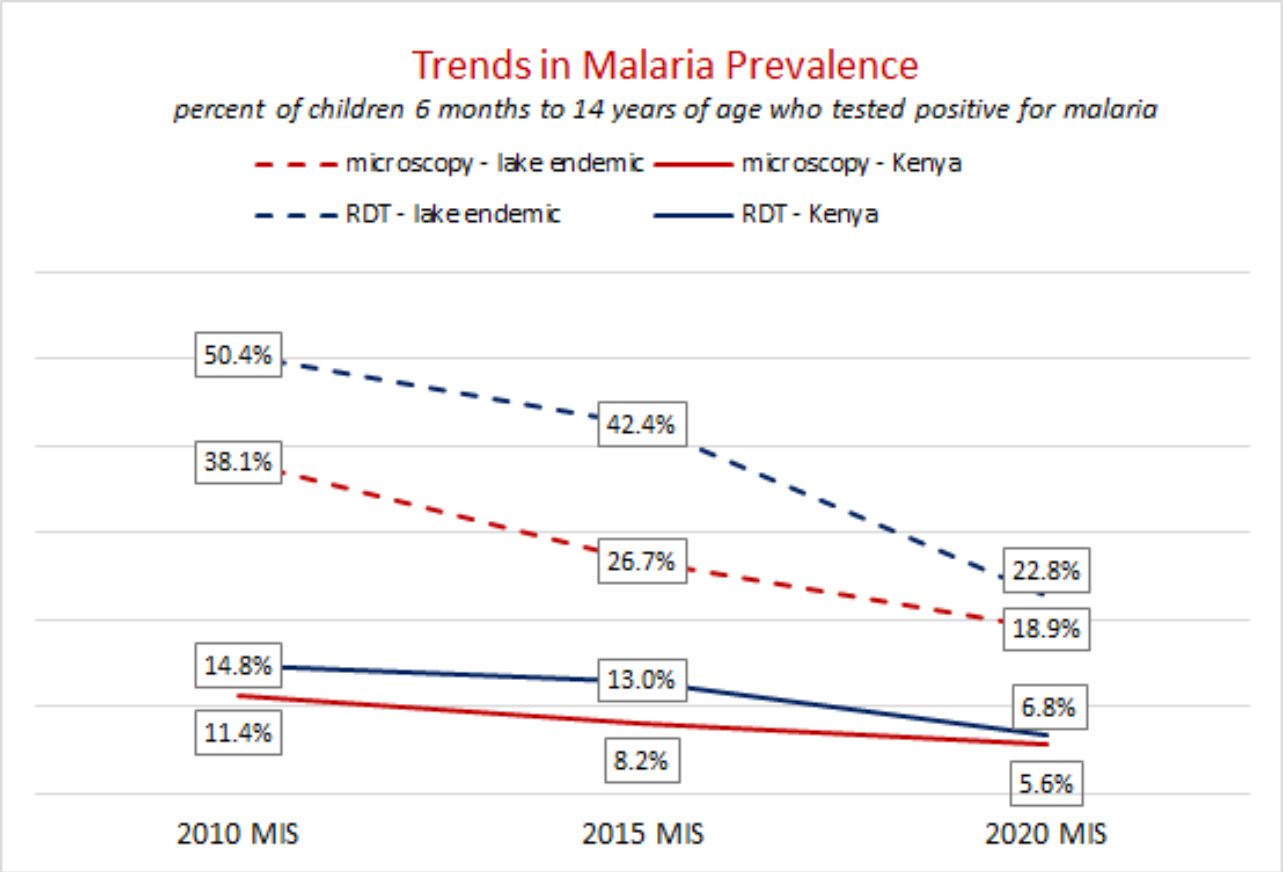
Table 1. Malaria epidemiological zones in Kenya

Zone	Counties/Subcounties	Total Population [14]	Microscopic Malaria Prevalence in Children 6 Months to 14 Years [15]
Endemic (Lake/Coast)	Eight counties around Lake Victoria (except four subcounties classified as epidemic prone) and five coastal counties	27%	18.9%/4.5%
Epidemic Prone (Highland)	Nine counties and four subcounties in otherwise endemic counties	19%	0.7%
Seasonal (Semi-Arid)	Fifteen counties	23%	1.8%
Low-Risk	Ten counties, including Nairobi	31%	0.4%

[14] Total population does not correspond exactly to population at risk because individuals living in low-risk zones are at risk for malaria due to travel and a low, but not zero, risk of malaria transmission in these zones.
[15] National Malaria Control Program. (2020). Kenya Malaria Indicator Survey 2020 Key Indicator Results. Government of Kenya.

Figure 2. Trends in malaria prevalence

Children 6 months to 14 years of age who tested positive for malaria by microscopy and RDT in the 2010, 2015, and 2020 Kenya Malaria Indicator Survey (KMIS)



*Note: 2010 Malaria Indicator Survey (MIS) estimates include children 3 months to 14 years of age.

Figure 3a. Malaria incidence by subcounty in the 8-county lake endemic zone, 2020

Persons presenting to the public health system with positive malaria diagnostic tests in 2020

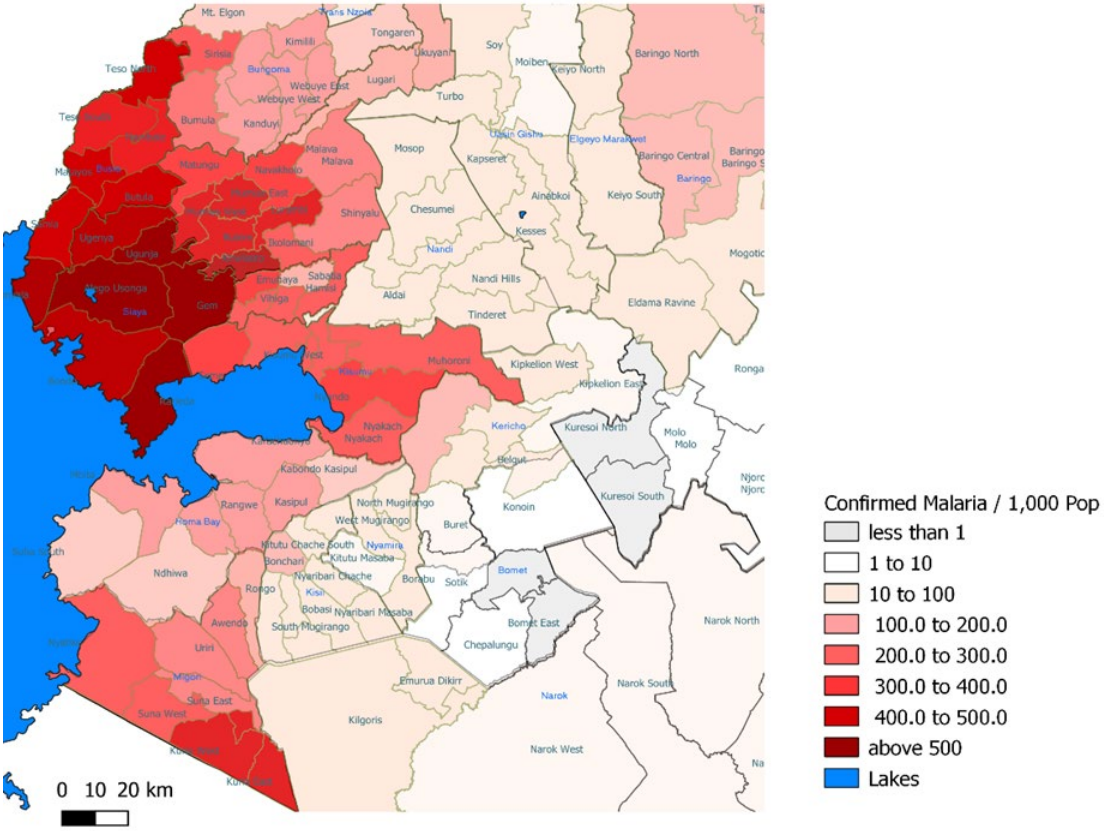


Figure 3b. Malaria prevalence by geographic area, children 2 to 10 years of age

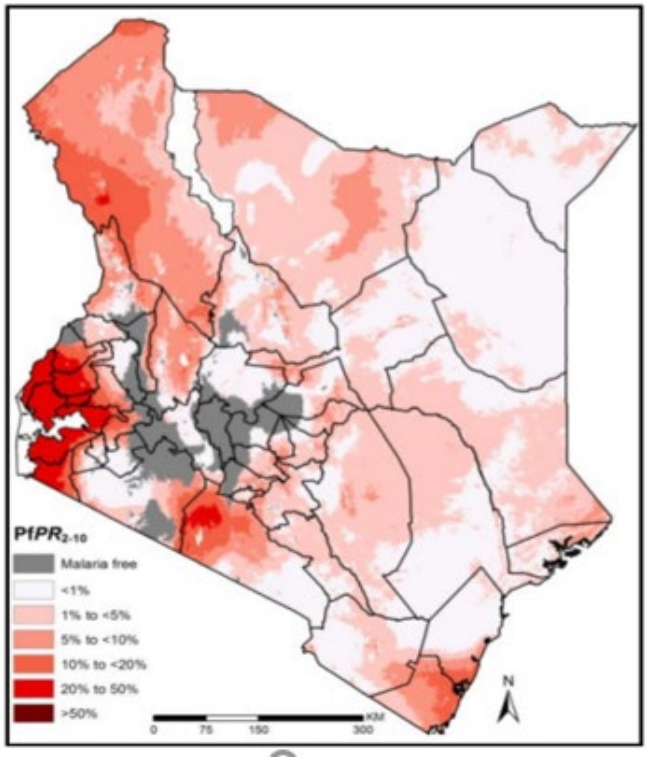


Table 2. Key indicators from Demographic Health Surveys (DHS) and KMIS

Indicator	2003 DHS	2007 KMIS	2008 DHS	2010 KMIS	2014 DHS	2015 KMIS	2020 KMIS*
% Households with at least one ITN	6	48	56	48	49	63	49
% Households with at least one ITN for every two people	4	N/A	27	N/A	34	40	-
% Population with access to an ITN	5	N/A	42	N/A	48	53	-
% Population that slept under an ITN the previous night	5	N/A	35	N/A	42	48	-
% Children under five years of age who slept under an ITN the previous night	5	39	47	42	54	56	42
% Pregnant women who slept under an ITN the previous night	4	32	49	41	51	58	40
% Children under five years of age with a fever in the last two weeks for whom advice or treatment was sought	74	26	62	59	72	72	64
% Children under five years of age with a fever in the last two weeks who had a finger or heel stick	N/A	N/A	N/A	N/A	35	39	36
% Children receiving an ACT among children under five years of age with a fever in the last two weeks who received any antimalarial drug	N/A	N/A	34	N/A	86	92	91
% Women who received two or more doses of IPTp during their last pregnancy in the last two years	4	13	14	22	39	56	30
% Women who received three or more doses of IPTp during their last pregnancy in the last two years	N/A	6	N/A	N/A	23	39	22
Under five years of age mortality rate per 1,000 live births	115	N/A	74	N/A	52	N/A	N/A
% Children under five years of age with parasitemia by microscopy**	N/A	3	N/A	8	N/A	8	6**
% Children under five years of age with parasitemia by RDT**	N/A	8	N/A	13	N/A	13	7**
% Children under five years of age with severe anemia (Hb<8gm/dl)	4	4	N/A	5	N/A	2	2

*Please note that the complete 2020 KMIS results have not yet been officially released. Please also note that the 2020 KMIS results were obtained (1) during a different season (after the short rains, as opposed to the long rains when malaria prevalence peaks); (2) immediately

prior to the mass ITN distribution campaign (rather than immediately after, which is the usual timing); and (3) during the COVID-19 pandemic. Thus, these data likely represent a nadir for ITN indicators, might have slightly lower than expected malaria prevalence estimates, and lower than expected care-seeking for fever and IPTp due to COVID-19.

**Reported among children 6 months to 14 years of age in 2020 KMIS Key Indicator Results.

***Coverage and usage estimates included in the above table are national. Coverage and usage is generally higher in PMI focus counties.

Table 3. Evolution of key malaria indicators reported through routine surveillance systems

Indicator	2016	2017	2018	2019	2020
# Suspect malaria cases[1]	N/A	N/A	N/A	8,914,636	7,734,237
# Patients receiving diagnostic test for malaria[2]	N/A	N/A	N/A	14,075,680	10,093,136
Total # malaria cases[3]	7,826,679	7,964,281	9,945,475	6,095,963	5,190,945
# Confirmed cases[4]	4,910,549	4,104,138	3,944,459	5,022,092	4,206,403
# Presumed cases[5]	2,916,130	3,860,143	6,005,590	1,073,871	984,542
% Malaria cases confirmed[6]	62%	52%	40%	82%	81%
Test positivity rate (TPR)[7]	32%	35%	27%	32%	34%
Total # <5 malaria cases[8]	2,488,913	2,937,517	2,824,130	2,249,259	1,871,220
% Cases in children<5[9]	31%	30%	28%	29%	29%
Total # severe cases[10]	N/A	N/A	N/A	200,000	200,000
Total # malaria deaths[11]	2,928	N/A	N/A	1,170	1,376
# Facilities reporting[12]	7,431	7,325	8,624	9,096	9,701
% Data completeness[13]	92%	88%	97%	94%	96%

[1] "Suspect malaria case" was first defined by KMS in 2019, and updated data collection tools were rolled out in October 2020. Prior to October 2020, the estimated number of suspect malaria cases was derived from available data for patients presenting with signs or symptoms possibly due to malaria (e.g., fever) collected from tools with different reporting rates, data element completeness, and data accuracy; based on comparisons of patients receiving diagnostic tests, the suspect malaria case indicator is underestimated.

[2] RDT or microscopy, all ages, outpatient and inpatient; based on microscopy data from MOH 706 and RDT data from malaria commodity form.

[3] Total reported malaria cases; all ages, outpatient and inpatient, confirmed and unconfirmed cases; based on antimalarial doses consumed in faith-based and GOK health facilities, does not include cases treated in private sector, pharmacies, etc.

[4] Diagnostically confirmed; all ages, outpatient and inpatient; based on confirmed malaria cases captured in outpatient department summaries for all GOK health facilities and community, irrespective of level.

[5] Clinical/presumed/unconfirmed; all ages, outpatient and inpatient; calculated based on difference between suspected and confirmed.

[6] Number of confirmed cases divided by total number of cases.

[7] Confirmed cases divided by number of patients receiving a diagnostic test for malaria (RDT or microscopy); based on MOH 505 Integrated Disease Surveillance and Response (IDSR) summary reports.

[8] Outpatient and inpatient, confirmed and unconfirmed; based on malaria cases managed in health facilities as reported in KHIS MOH 705 for under five years of age.

[9] Total number under five years of age cases divided by total number of cases.

[10] 'Severe' defined by WHO criteria; based on artesunate vials consumed.

[11] All ages, outpatient, inpatient, confirmed, and unconfirmed; based on malaria deaths reported in KHIS tracker.

[12] Total number of health facilities reporting data into the HMIS/District Health Information Software 2 (DHIS2) system that year.

[13] Number of monthly reports from health facilities divided by number of health facility reports expected.

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

The Government of Kenya (GOK) is committed to improving health service delivery and places a high priority on malaria prevention and control with eventual elimination listed as one of the strategic objectives of the Kenya Health Policy. The GOK is guided by the Kenya Malaria Strategy (KMS) and its Monitoring and Evaluation (M&E) Plan 2019–2023, which aims to reduce malaria incidence and deaths by at least 75 percent from 2016 levels by 2023. The KMS 2019–2023 outlines six strategic objectives to be reached by 2023:

1. To protect 100 percent of people living in malaria risk areas through access to appropriate malaria preventive interventions by 2023
2. To manage 100 percent of suspected malaria cases according to the Kenya malaria guidelines by 2023
3. To establish systems for malaria elimination in targeted counties by 2023
4. To increase utilization of appropriate malaria interventions in Kenya to at least 80 percent by 2023
5. To strengthen malaria surveillance and use of information to improve decision-making for program performance
6. To provide leadership and management for optimal implementation of malaria interventions at all levels, for the achievement of all objectives by 2023

Guiding principles for achieving the KMS objectives include ensuring human rights, gender, and equity; adopting a multisectoral approach; ensuring appropriate targeting of interventions using routinely collected data; strengthening malaria control performance and monitoring systems; strengthening linkages between national and county levels; investing in health systems strengthening; leveraging the community health service; systematically managing risks; moving toward sustainable financing; and implementing in line with the principles of aid effectiveness.

Notably, the KMS 2019–2023 introduced a new elimination objective, Objective 3, to establish systems for malaria elimination in targeted counties by 2023. In view of the shrinking malaria disease burden, and especially in low-risk areas, the country aims to establish the requisite structures necessary to guide the implementation of subnational malaria elimination. To achieve this objective, Kenya plans to do the following:

1. Establish structures and capacity at the national and county levels to coordinate and drive implementation of the elimination agenda by establishing a coordinating mechanism to provide leadership for the institutionalization of elimination.
2. Develop capacity for malaria elimination by developing, disseminating, and providing training to support a malaria elimination business plan, guidelines, training curriculum, and standard operating procedures.
3. Establish active case detection, notification, investigation, and response systems for elimination in targeted counties.
4. Strengthen quality assurance for diagnosis, treatment, and entomology to enhance surveillance.

5. Strengthen SBC for malaria elimination.

The goals and principles of the KMS 2019–2023 are generally well aligned with PMI-supported interventions, with two notable exceptions. First, Kenya is not currently a country targeted for elimination by PMI. Nonetheless, PMI, in collaboration with WHO, will support the DNMP to develop policy documents that will guide the establishment of elimination structures in select counties. This will help ensure that Kenya is well positioned should focal areas be targeted for implementation of subnational elimination activities by PMI at some point in the future. Second, although the KMS 2019–2023 includes larval source management, PMI does not currently support this vector control approach.

The two main donors that support the GOK and DNMP are PMI and Global Fund. Global Fund grants have two principal recipients in Kenya: the National Treasury (state), Principal Recipient 1, and the African Medical and Research Foundation (AMREF, non-state), Principal Recipient 2. The new Global Fund grant covering 2021–2024 has a total allocation of $86,966,676 for malaria, with Principal Recipient 1 allocated $63,817,901 to provide support for vector control, including the 2023–2024 ITN mass distribution, (64 percent); case management (23 percent); MIP, SBC, and Malaria elimination (3 percent); program management (5 percent); and M&E (5 percent); and Principal Recipient 2 receiving an allocation of $17.2M for strengthening community health systems for delivery of malaria services and approximately $6M toward resilient and sustainable systems for health. Overall, 58 percent of the grant total is for malaria commodities, 19 percent for procurement and supply-chain management costs, and 23 percent for support activities.

Table 4. PMI and Global Fund intervention support

Malaria Intervention										
Trans-mission Zone	Coun-ties (#)	Routine ITN Distri-bution	Mass ITN Distri-bution	IRS	IPTp/ MIP	CM	EPR	SBC	SM&E	Elimina-tion
Lake Endemic	8	P (8)	G/P (8)	P (2)	P	P		P	P	
Coast Endemic	5	P (5)	G (6)		P	G/PL		P	G/PL	
Highland Epidemic	8	P (9)	G (8)		5	G/PL	PL	G/PL	G/PL	
Seasonal	15	P (9)	G (4)		P*	G/PL	PL	G/PL	G/PL	
Low Risk	10	P (5)	G (1)			G/PL	PL	G/PL	G/PL	G/PL (4)

* Tana River County; P = Focused PMI Support; PL = Limited PMI Support; G = Global Fund Support

Since 2013, PMI has prioritized the areas of Kenya with the highest burden of malaria to achieve the greatest reduction in malaria morbidity and mortality. The eight counties of Bungoma, Busia, Homa Bay, Kakamega, Kisumu, Migori, Siaya, and Vihiga, with an estimated population of 9.8 million in 2019, form the lake endemic zone and have the highest malaria burden with the exception of five epidemic-prone subcounties, three in Bungoma (Cheptais, Mt. Elgon, and Tongren) and two in Kakamega (Likuyani and Lugari). PMI has focused its support for vector control, case management, supply chain management, MIP, SBC, and SM&E in these eight counties in the lake endemic zone (see Table 4). The epidemic-prone subcounties within this region are exposed to county-targeted interventions, but are not specifically targeted for subcounty interventions.

In the other 39 counties, DNMP and other partners lead in providing technical support. PMI complements these efforts by (1) providing national level support for development, review, harmonization, and standardization of policy documents; (2) strengthening malaria health information through the KHIS platform; and (3) strengthening regulatory systems for post-marketing surveillance, and quality assurance of malaria medicines and building workforce capacity. PMI also provides support at the national level for SM&E, SBC, supply chain management, health financing, and program management through participation in the GOK's Committees of Experts (COEs) and Malaria Health Sector Working Group. Routine distribution of PMI-procured ITNs also extends beyond the lake endemic zone to cover 28 additional counties. Mass net distributions in 27 counties are primarily supported by Global Fund, with PMI filling critical gaps in the lake endemic zone. Sulfadoxine-pyrimethamine (SP) for intermittent preventive treatment for pregnant women (IPTp), is distributed in the coastal and lake endemic counties, while PMI-procured artemisinin-based combination therapies (ACTs), rapid diagnostic tests (RDTs), and treatments for severe malaria are distributed nationwide, along with similar commodities purchased through Global Fund and GOK.

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 (i.e., mapping cost categories across organizations) 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 and planned for a three-year grant cycle. Most partner country governments and other partners also budget based on the calendar year.

The tables below summarize contributions by key external partners and partner country governments in calendar years 2020–2022, providing insight into total country investments. Because new grants funded through the Global Fund 2021–2024 grant cycle 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 5a. 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	$16.4M	$7.1M	$1.3M	$2.2M	$4.4M	$3.5M	$35.0M
Global Fund	$51.4M	$5.3M	-	-	$1.8M	$5.2M	$63.7M
Gov[4]	-	-	-	-	-	-	$5.4M
Total Per Category	$67.8M	$12.4M	$1.3M	$2.2M	$6.2M	$8.7M	$104.1M

Table 5b. 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	$15.8M	$7.4M	$0.8M	$2.0M	$2.7M	$4.8M	$33.5M
Global Fund	$0.2M	$0.2M	-	-	$0.7M	$1.9M	$3.0M
Gov[4]	-	-	-	-	-	-	$10.0M
Total Per Category	$16.0M	$7.6M	$0.8M	$2.0M	$3.4M	$6.7M	$46.5M

Table 5c. 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	$17.9M	$6.0M	$0.8M	$1.9M	$2.5M	$4.5M	$33.5M
Global Fund	-	-	-	-	-	-	$0.0M
Gov[4]	-	-	-	-	-	-	TBD
Total Per Category	$17.9M	$6.0M	$0.8M	$1.9M	$2.5M	$4.5M	$33.5M

[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 stands for health systems strengthening.

[4] GOK data are provided in the total column, breakdown by technical area is not available at this time.

Table 6a. 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]	$1.9M	-	$9.6M	$2.4M	$2.1M	$1.2M	-	-	$17.2M
Global Fund[3]	-	$34.9M	-	$2.2M	$1.1M	$0.7M	-	-	$38.9M
Gov[4]	-	-	-	-	-	$1.4M	-	$0.1M	$1.5M
Total	$1.9M	$34.9M	$9.6M	$4.6M	$3.2M	$3.3M	$0.0M	$0.1M	$57.6M

Table 6b. 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]	$4.9M	-	$6.1M	$2.6M	$3.0M	$0.0M	-	-	$16.6M
Global Fund[3]	-	-	-	-	-	-	-	-	$0.0M
Gov[4]	$0.4M	-	-	$0.1M	-	-	-	$0.1M	$0.6M
Total	$5.3M	$0.0M	$6.1M	$2.7M	$3.0M	$0.0M	$0.0M	$0.1M	$17.2M

Table 6c. 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]	$7.0M	-	$4.7M	$1.5M	$2.3M	$0.6M	-	-	$16.1M
Global Fund [3]	-	-	-	-	-	-	-	-	$0.0M
Gov[4]	-	-	-	-	$0.8M	$1.5M	-	$0.4M	$2.7M
Total	$7.0M	$0.0M	$4.7M	$1.5M	$3.1M	$2.1M	$0.0M	$0.4M	$18.8M

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; additional costs for procurement agent and handling fees total $889,540 over the CY 2022–2024 period. 4. GOK procurements, including those made with counterpart financing, are included for each year.

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 Kenya 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

DNMP Objective

Protect 100 percent of people living in malaria risk areas through access to appropriate malaria preventive interventions by 2023. The three vector control strategies—ITNs, IRS, and larval source management—will be deployed according to malaria risk stratification. New innovations, especially those that address the emerging threat of insecticide resistance, and modern, effective malaria vector control methods will be considered as they become available. All vector control interventions will be deployed in the context of integrated vector management.

DNMP Approach

To meet the above objective, the KMS 2019–2023 outlines several vector control strategies:

- Achieve and sustain universal coverage of ITNs in malaria-endemic and epidemic-prone counties through mass distribution campaigns carried out every three years and continuous distribution in antenatal care (ANC), child welfare clinics (CWC), at the community level, and other channels.
- Use indoor residual spraying (IRS) in targeted areas to reduce the burden of malaria, and focalized IRS to interrupt transmission.
- Use larval source management in targeted areas.
- Ensure effective deployment of SBC activities at the community level to ensure the utilization of malaria control interventions, including the use of ITNs.
- Conduct entomological surveillance to monitor vector susceptibility to insecticides and seasonality, and use data generated to develop entomological profile maps and other outputs for targeted subcounties.

PMI Objective in Support of DNMP

PMI provides support to all DNMP strategies for vector control, with the exception of larval source management. Specifically, PMI has been the primary source of funding for routine distribution of ITNs through ANC and CWCs. PMI also contributes ITNs to periodic mass campaigns. PMI is currently funding IRS in two lake endemic counties in western Kenya. Entomological monitoring supported by PMI has informed insecticide selection for IRS and, based on susceptibility data, PMI is now procuring PBO ITNs for both routine distribution and for distribution in specific counties as part of the most recent mass campaign. PMI has also supported the development of an integrated vector control strategy, an insecticide resistance management strategy, and an IRS implementation plan. PMI also provides support for Vector Control COE meetings that are held quarterly by the DNMP.

PMI-Supported Recent Progress (FY 2020)

In FY 2020 and Q1 and Q2 of FY 2021, PMI supported the DNMP in the following activities:

- Conducted IRS in two malaria endemic counties in Migori and Homa Bay.
- Supported vector surveillance and insecticide resistance monitoring in 10 counties.
- Supported community-based vector surveillance in Kakamega and Vihiga counties.

- Procured and distributed ITNs for pregnant women and children through CWC and ANC clinics in 36 counties.
- Supported the development of the National Vector Control policy documents including IRS Implementation Strategy, Malaria Vector Surveillance Operational Guidelines, Integrated Vector Control Strategy, and Insecticide Resistance Management Plan.
- Held a dissemination meeting on the national vector control policy documents.
- Conducted 24- and 36-month durability monitoring to monitor DawaPlus 2.0 ITNs in Busia subcounty and DuraNet ITNs in Kwale subcounty.
- Supported training of 2,309 seasonal workers in preparation for the 2021 IRS campaign with COVID-19 mitigation measures infused into the training.

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

In FY 2021 and the beginning of FY 2022, PMI plans to support the DNMP in the following activities:

- With FY 2020 money, PMI plans to procure 1.2 million nets (336,000 PBO ITNs and 864,000 standard pyrethroid ITNs) for routine distribution through ANC and child welfare clinics (CWCs) in endemic and epidemic counties. PMI will also provide logistical support including transportation and storage of ITNs to be distributed through ANC and CWC systems.
- Support the ongoing mass campaign by providing 3.1 million PBO ITNs for the distribution in three counties in western Kenya (Bungoma, Busia, and Kakamega). PMI will support micro- planning and distribution in Bungoma County.
- Collect and analyze pre-distribution and baseline durability monitoring data to assess the biological efficacy of PBO ITNs distributed through the mass campaign.
- Conduct IRS in Homa Bay and Migori counties from February to March 2022.
- Conduct community mobilization activities in conjunction with the IRS campaign in Homa Bay and Migori counties.
- Conduct insecticide resistance monitoring and mosquito bionomics in nine counties and streamlined durability monitoring of PBO ITNs in two sites.

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

PMI currently supports monthly entomological monitoring at 23 sites in 10 counties (Figure A-1), including four sites in Migori and Homa Bay counties where IRS is being conducted, four sites in Kisumu county, two sites in Bungoma, two sites in Busia where PBO ITNs were deployed in 2020, and two sites in Siaya. Activities being

carried out at the sites include indoor and outdoor CDC light traps collection, window exit traps, and Furvela tent trap collection. Community health volunteers (CHVs) were engaged in mosquito collection in two sites in Kakamega County and two sites in Vihiga County as a pilot of community-based mosquito surveillance. Collections made within villages provide information on vector bionomics and insecticide resistance status of *Anopheles* in Kenya. One-off collections were also made in Kwale and Turkana counties for insecticide-resistance monitoring (Table 1.1).

Figure A-1. Entomological monitoring sites supported by PMI in Kenya in 2020–2021

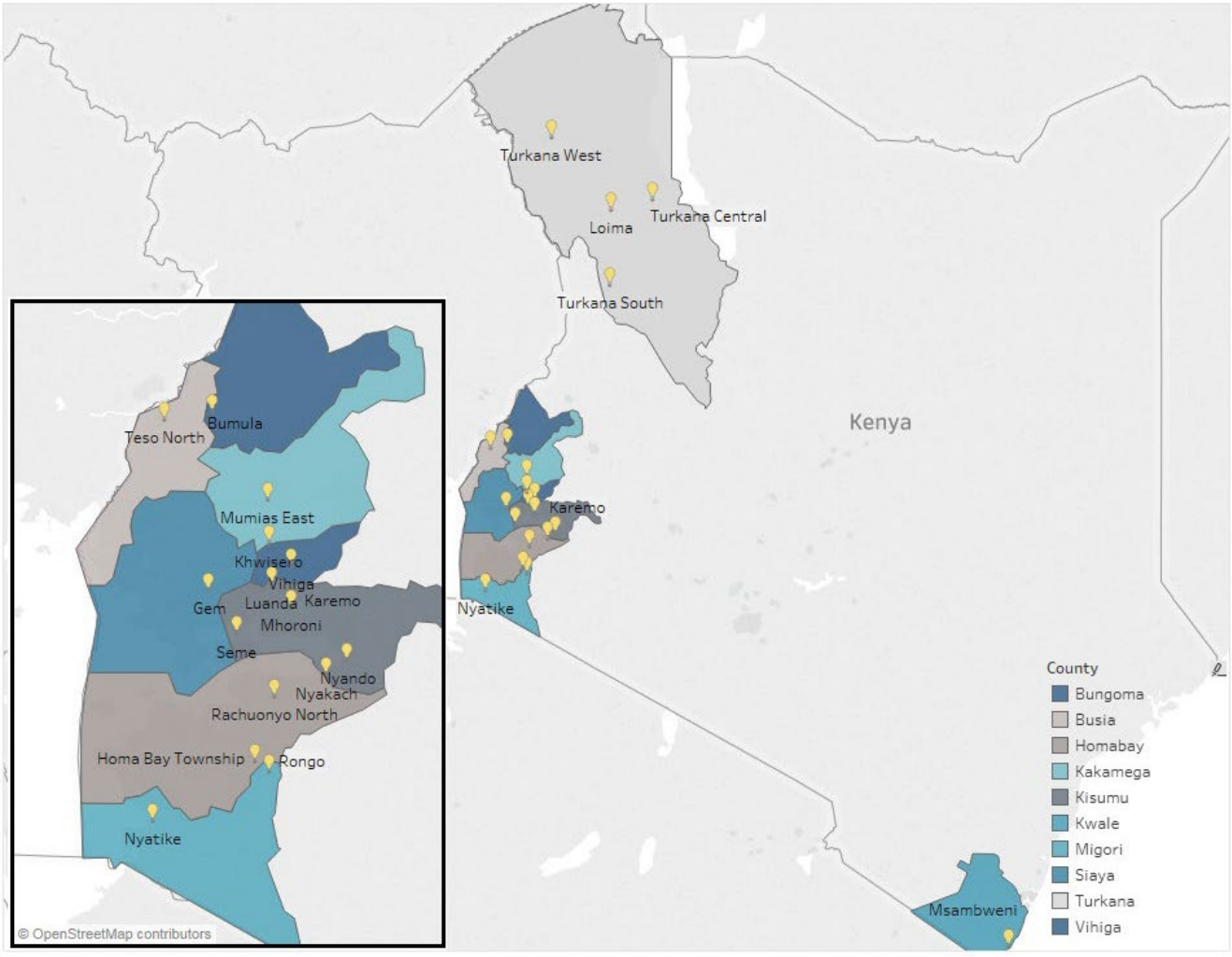


Table A-1. Entomological monitoring activities

Sites	County	Activities	Supported by
Imbos Oyugis	Homa Bay	Vector bionomics/insecticide resistance monitoring	PMI
Sumba Sori-Karungu	Migori	Vector bionomics/insecticide resistance monitoring	PMI
Ahero Kirindo Sango Rota Masogo	Kisumu	Vector bionomics/insecticide resistance monitoring	PMI
Kimaiti Mechimeru	Bungoma	Vector bionomics/insecticide resistance monitoring	PMI
Odioi Akriamasit	Busia	Vector bionomics/insecticide resistance monitoring	PMI
Kadenge Dienya	Siaya	Vector bionomics/insecticide resistance monitoring	PMI
Buhili Eshiakulo	Kakamega	Vector bionomics (Community-based vector monitoring)	PMI
Busano Ebulakho	Vihiga	Vector bionomics (Community-based vector monitoring)	PMI
Kinango Msambweni	Kwale	Insecticide resistance monitoring	PMI
Kakuna Lodwar Loima	Turkana	Insecticide resistance monitoring	PMI

Data on vector distribution and behaviour provide guidance for deployment of vector control interventions in the country. Although *An. gambiae s.l.* is widespread biting both indoor and outdoor (Table A-2) across the counties, *An. funestus* is emerging as the main vector in the endemic lowland areas along Lake Victoria as well as highland epidemic prone areas (Figure A-2). While the mean monthly density of both *An. gambiae* s.l. and *An. funestus* remained very low in the sprayed sites of Migori and Homa Bay counties, there are consistent seasonal changes in vector species composition across other counties. *An. funestus* s.l. densities were highest in non-IRS counties of Kisumu and Siaya (Figure A-3).

Table A-2. Distribution and bionomics of malaria vectors

Site / County	Vector*	Season *(month)*	Preferred Biting Location	Peak Biting Time	Preferred Resting Location**	Preferred Host	Annual EIR†
Migori	***An. gambiae s.l.*** *An. Funestus*	Apr–Dec	indoor/ outdoor	N/A	N/A	N/A	0
Homa Bay	***An. gambiae s.l.*** *An. Funestus*	Mar–Dec	indoor/ outdoor	N/A	N/A	N/A	2.9
Kisumu	***An. funestus*** ***An. gambiae s.l.***	Apr–Dec	indoor	N/A	N/A	N/A	19.6
Bungoma	***An. gambiae s.l.*** *An. Funestus*	May–Dec	indoor/ outdoor	N/A	N/A	N/A	70.4
Busia	***An. gambiae s.l.*** *An. Funestus*	Apr–Dec	indoor/ outdoor	N/A	N/A	N/A	44.0
Siaya	***An. funestus*** *An. gambiae s.l.*	Apr–Dec	indoor	N/A	N/A	N/A	259
Kakamega	***An. gambiae s.l.*** *An. funestus*	Apr–Dec	N/A	N/A	N/A	N/A	N/A
Vihiga	***An. gambiae s.l.*** *An. funestus*	Apr–Dec	N/A	N/A	N/A	N/A	N/A
Turkana	***An. gambiae s.l.*** *An. funestus*	N/A	N/A	N/A	N/A	N/A	N/A

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

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

† EIR = entomological inoculation rate.

Figure A-2. Distribution of Anopheles gambiae s.l. and Anopheles funestus in Kenya

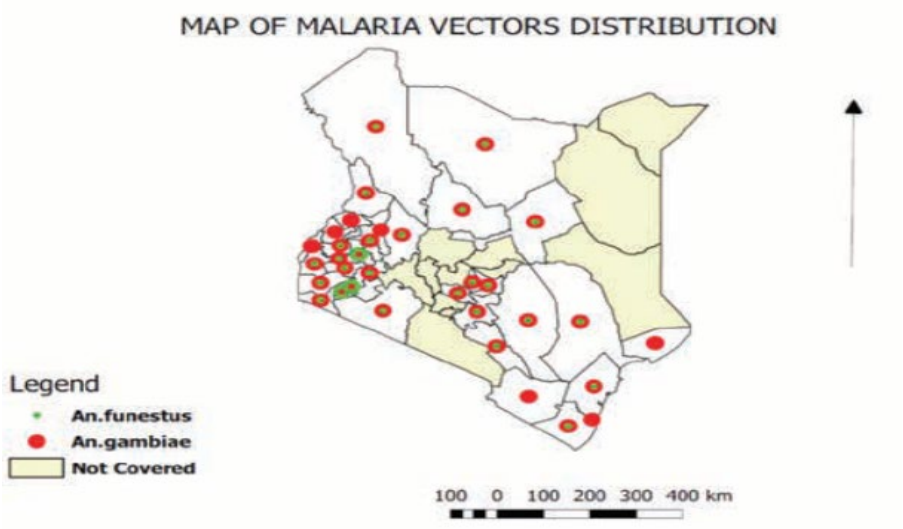
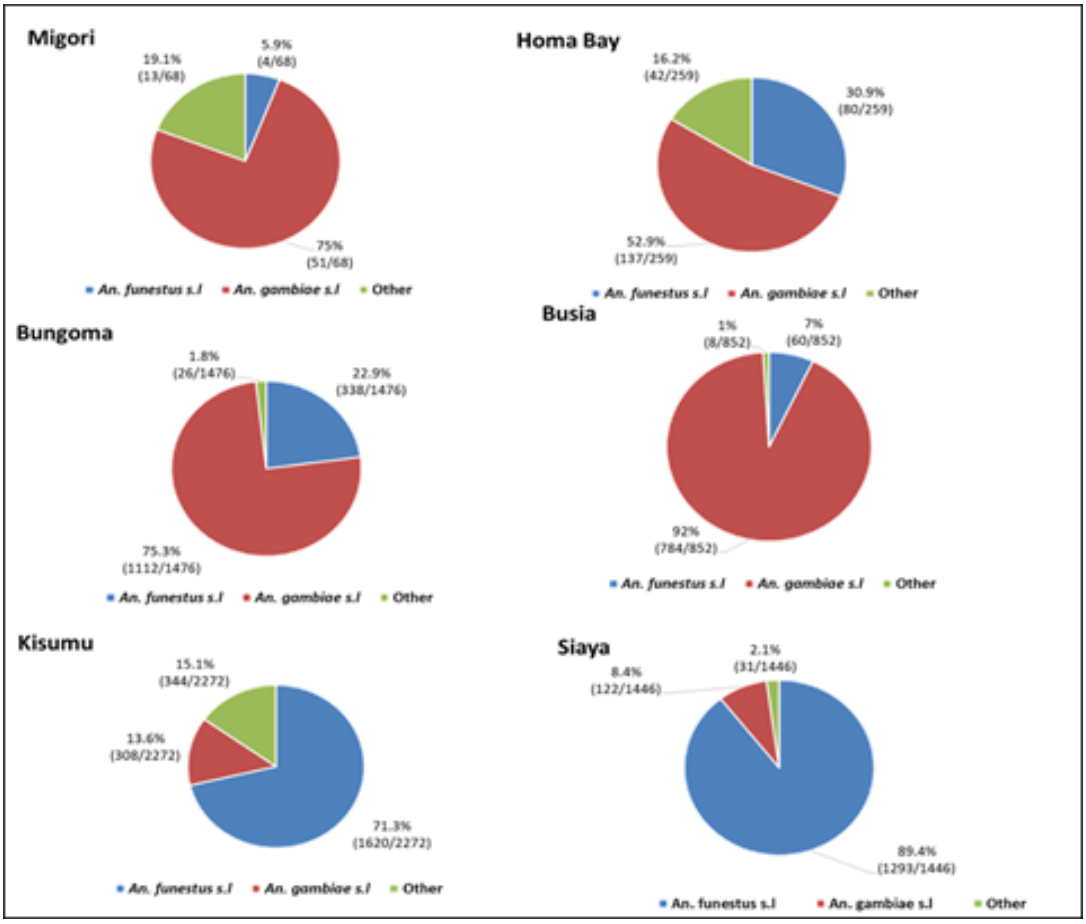


Figure A-3. Species composition of *Anopheles* collected in 2020[16]



Key Question 2

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

Supporting Data

Malaria vector susceptibility status to insecticides was measured in 10 sites in 2020 including the IRS sites in Homa Bay and Migori. Resistance to permethrin, deltamethrin, and alpha-cypermethrin was observed in all sites where testing has been conducted (Figures A-4 and A-5). In Siaya, where *An. funestus* is the major vector, mosquitoes survived 10 times the diagnostic dose of deltamethrin. Similarly, in other sites, *An. gambiae* s.l. survived even when the diagnostic dose was increased up to 10 times showing high pyrethroid resistance intensity across the counties. The addition of PBO to permethrin or deltamethrin generally increased mortality compared with permethrin or deltamethrin alone. Susceptibility was fully restored in four sites (Migori, Kisumu, Bungoma, and Turkana-Loima) with the addition of PBO to deltamethrin and two sites (Kwale-Kinango and Turkana-Lodwar) with the addition of PBO to permethrin. With the addition of PBO at other sites, only partial susceptibility to

[16] PMI VectorLink Project. (2020). 2019–2020 Annual Entomological Report: Kenya. Abt Associates Inc., Rockville, MD.

deltamethrin and permethrin was restored. *An. gambiae* s.l. were fully susceptible to pirimiphos-methyl in nine districts and clothianidin in Migori, Homa Bay, Kakamega, and Siaya (Figures A-5 and A-6).

Figure A-4. Susceptibility status of *An gambiae* s.l. to deltamethrin and permethrin with or without PBO in Kenya

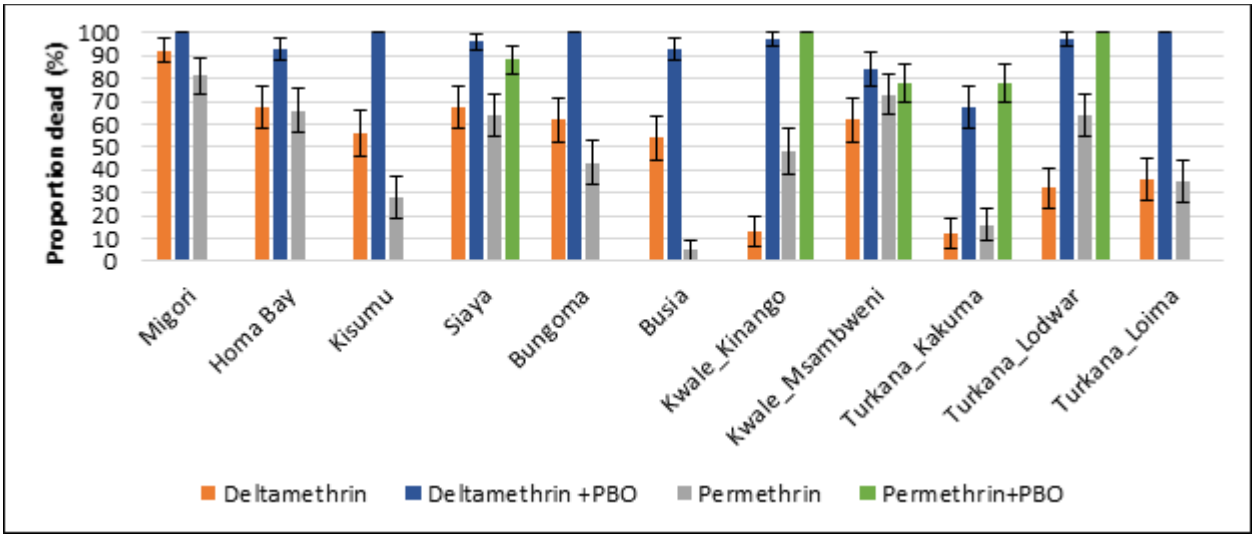


Figure A-5. Susceptibility of *An. gambiae* s.l. to alpha-cypermethrin and pirimiphos-methyl in Kenya

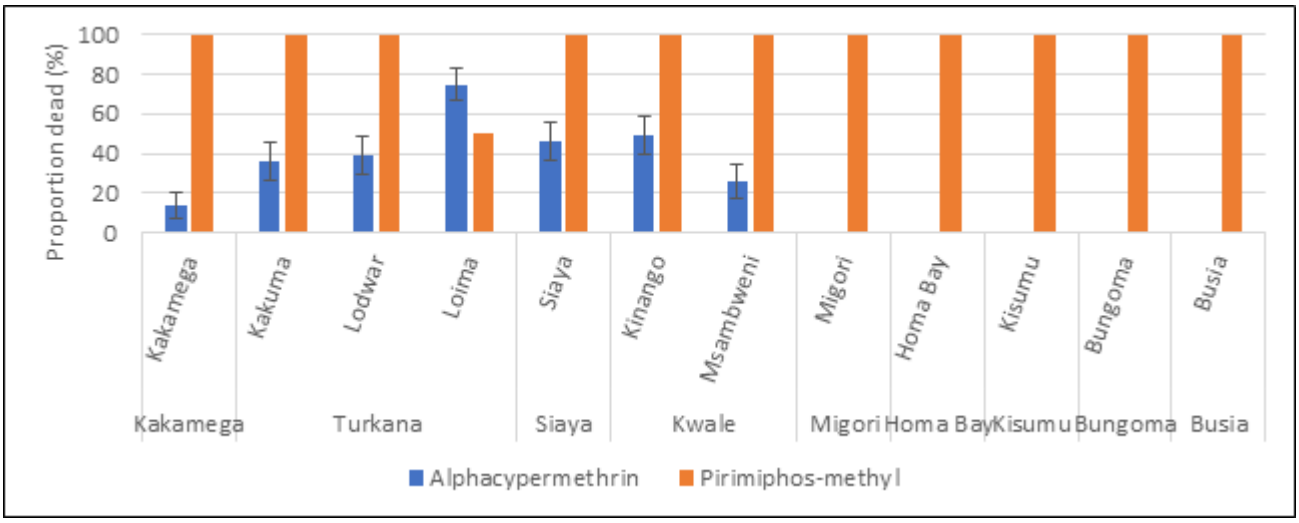
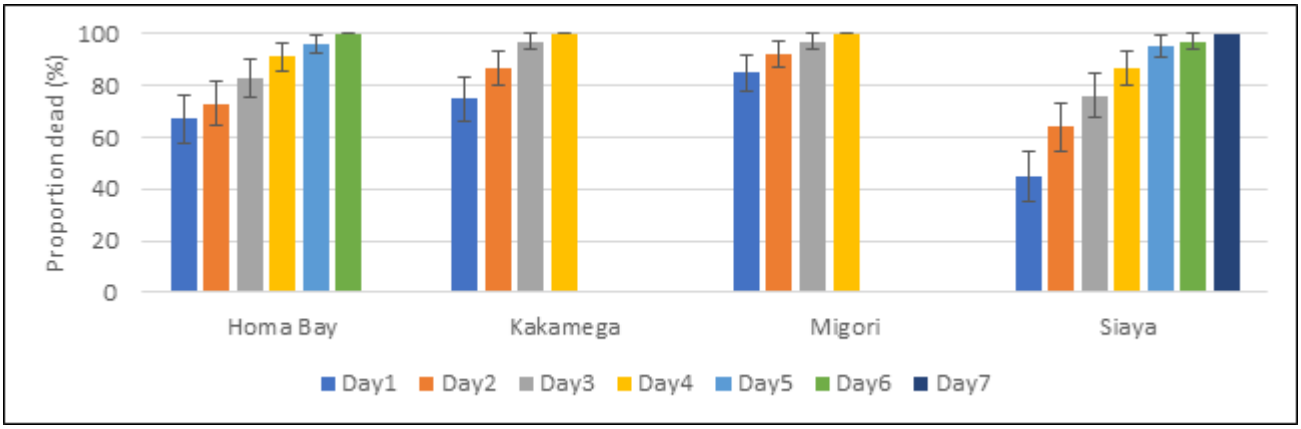


Figure A-6. Susceptibility of *An. gambiae* s.l. to clothianidin in Kenya



Conclusions for Entomologic Monitoring Investments

Programmatic implications of available insecticide-resistance and vector bionomics data include:

- Vector populations remained low in Migori and Homa Bay counties as a result of continued annual spraying with Actellic 300CS.
- Malaria vectors were resistant to the three pyrethroids tested (deltamethrin, permethrin, and alpha-cypermethrin) at all the sites. Pre-exposure of mosquitoes to PBO before exposure to deltamethrin or permethrin showed increased mortality and susceptibility was fully restored in six sites suggesting involvement of metabolic resistance. This would assist the DMNP in selecting areas that could be considered for PBO-based ITN distribution with deltamethrin+PBO or permethrin+PBO.
- Mosquitoes from all the sites were fully susceptible to pirimiphos methyl and clothianidin which support the selection of formulations of these insecticides for IRS in western Kenya.
- CHVs were successfully involved in routine mosquito collection. Future efforts to involve CHVs in routine entomological surveillance activities, including insecticide-resistance monitoring, may be warranted. PMI will continue to support community-based entomological monitoring in two counties.

PMI plans to reduce funding to $600,000. The same entomological monitoring activities will be conducted with FY 2022 funds with consolidation of sites to accommodate the reduced budget. Routine vector surveillance and insecticide-resistance monitoring will continue in selected sites based on the ongoing IRS implementation and ITN distribution plans. 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

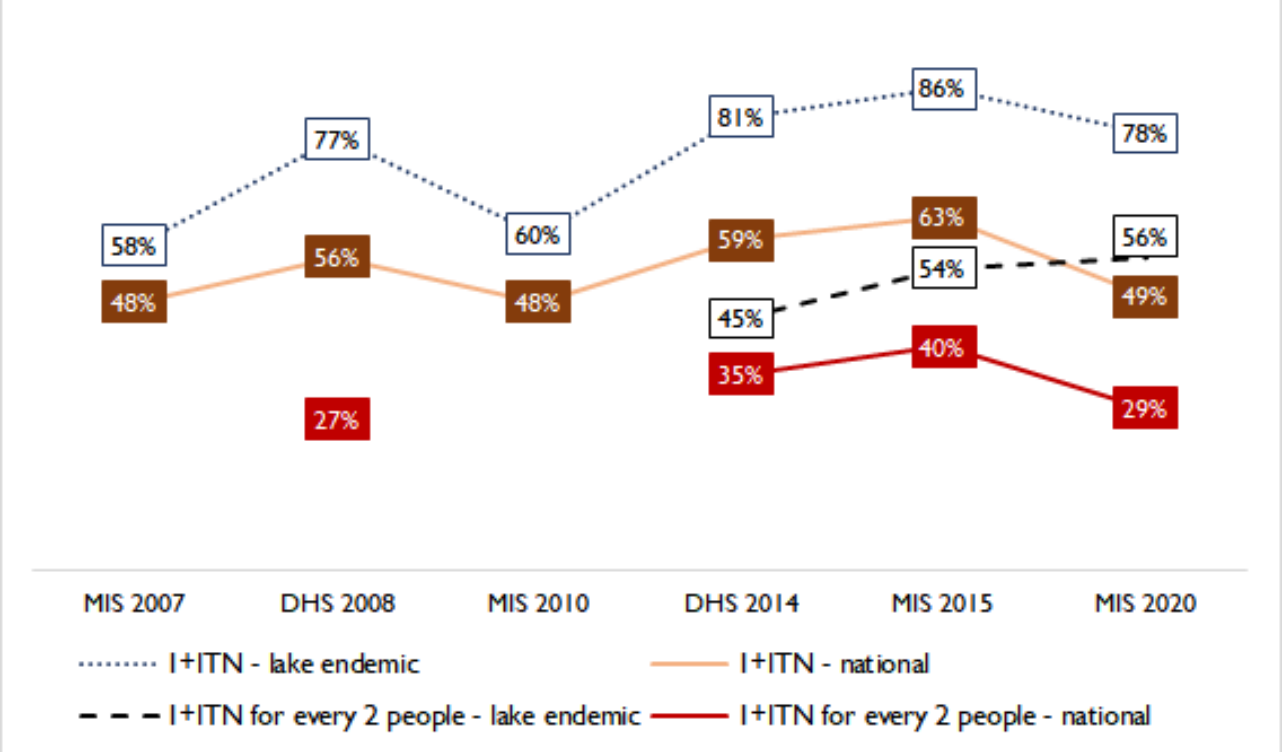
How has net ownership evolved since the start of PMI in the country?

Supporting Data

Household ownership of ITNs in Kenya has been relatively stable with 48 percent of households owning at least one ITN in the 2007 KMIS and 49 percent of households owning at least one ITN in the 2020 KMIS. The highest level of ITN ownership was observed in the 2015 KMIS, when 63 percent of households reported owning at least one ITN. However, the survey data likely obscure some important trends. First, the most recent KMIS was conducted in 2020. The rolling mass campaign, which was planned to start in 2020, was delayed due to COVID-19 and restarted in 2021. Therefore, coverage will likely increase substantially by the end of 2021. Furthermore, there were regional differences in ITN ownership, which was highest in the lake endemic (77.9 percent) and highland epidemic prone (64.8 percent) areas. Ownership in areas considered low risk or highly seasonal was only 30.6 percent and 35.0 percent, respectively.

Figure A-7. Trends in ITN ownership

Percentage of households that own ITNs



Key Question 2a

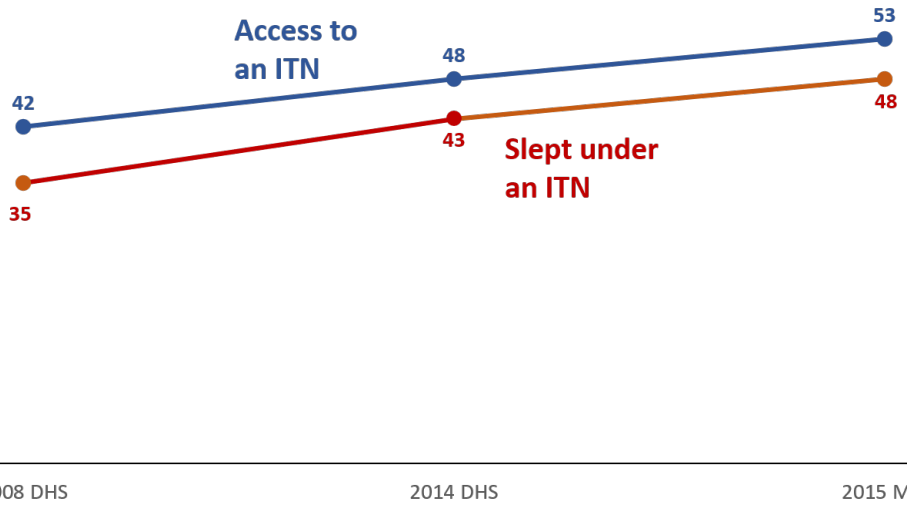
What proportion of the population has access to an ITN? Of those who have access, what proportion of the population reports using an ITN?

Supporting Data

From 2008 through 2015, ITN access and use gradually increased in Kenya. However, data on access and use among the general population are not yet available from the most recent KMIS (2020). Similarly, ITN use given access is generally high and has increased steadily from 2008 to 2015. This finding is further supported by the 2018 Post-Mass Long-Lasting Insecticidal Net (PMLLIN) campaign survey, which was conducted following the 2017–2018 mass distribution campaign (where ITNs were targeted to the endemic and epidemic-prone areas) and which utilized a methodology similar to the MIS. The survey found that 91 percent of members of households with at least one ITN for every two people slept under an ITN the night before the survey.[17]

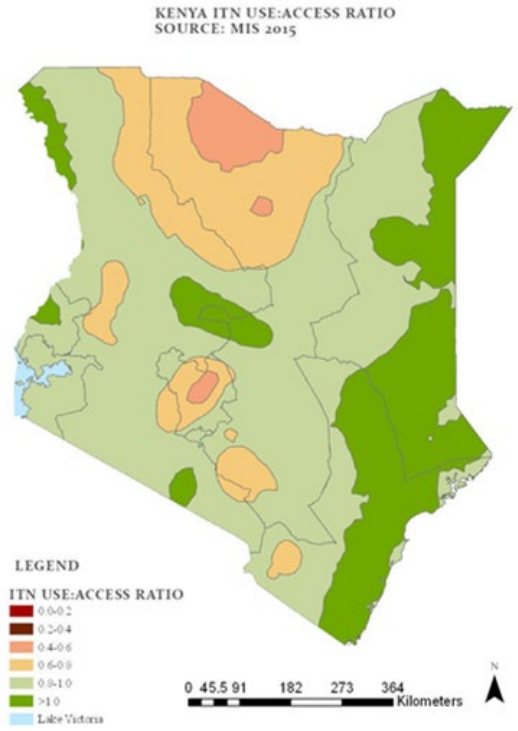
Figure A-8. Trends in ITN access and use

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



[17] National Malaria Control Program. (2019). Post-Mass Long-Lasting Insecticidal Net Distribution Survey 2018. Kenya Ministry of Health.

Figure A-9. ITN use:access ratio in Kenya



Key Question 2b

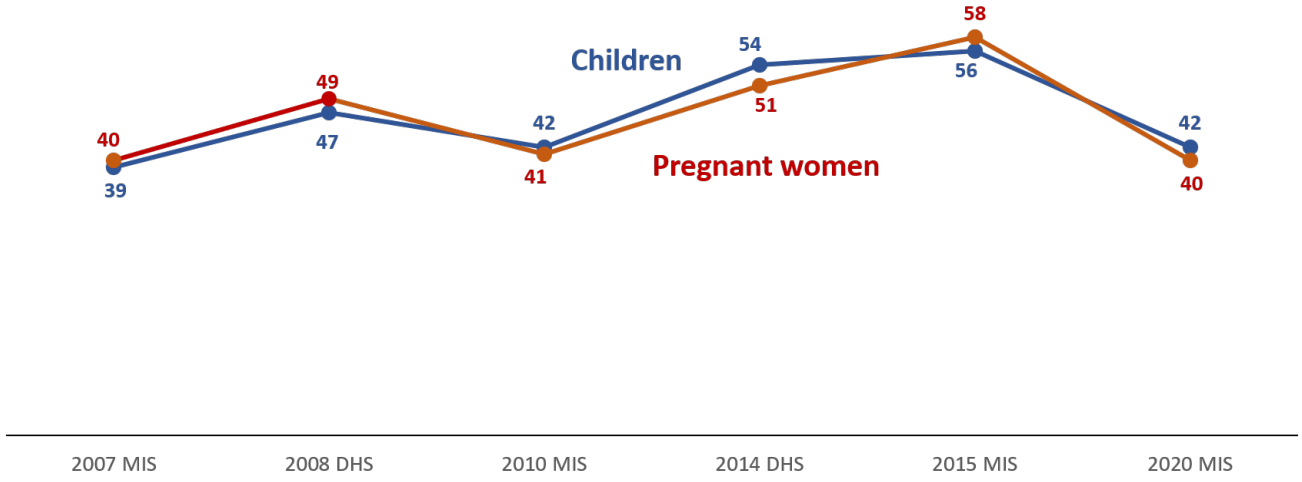
What percent of pregnant women and children under five years of age report sleeping under an ITN?

Supporting Data

ITN use among children and pregnant women the night before national surveys conducted from 2007 to 2020 has ranged from 39 percent in children under five years of age (2007 KMIS) to 58 percent among pregnant women (2015 KMIS). Figures from the 2020 KMIS indicated that nationally, 42 percent of children and 40 percent of pregnant women slept under an ITN the night before the survey. As noted for household ownership, national figures obscure regional differences, as ITN use in the lake endemic region, where malaria transmission is highest and where PMI efforts are focused, was 58 percent among children under five years of age and 67 percent among pregnant women. ITN use among these groups was approximately half in low-risk and seasonal areas. Furthermore, the 2020 KMIS was conducted before the start of the 2020–2021 mass campaign. As ITNs are being distributed through the mass campaign beginning in April 2021, it is expected that national rates of ITN access, and subsequently, use, will rise.

Figure A-10. 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



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

Available data suggest that there are not significant structural or behavioral challenges that affect the adoption and maintenance of ITN use behaviors. In areas targeted for ITN distribution in Kenya, most people who have access to nets actually sleep under them. Kenya's culture of net use has been facilitated by high levels of perceived risk of malaria, which has resulted in part from the experience of seeing friends or neighbors become severely ill or die due to malaria.[18] High levels of self-efficacy around net use, with 85.7 percent of respondents nationally and 90.1 percent of respondents in the lake endemic region indicating they could hang a net, has also supported a culture of net use.[19] However, there is some evidence to suggest that a belief that individuals are only at risk of contracting malaria during the rainy season[20] and a belief that ITN use can cause infertility serve as barriers to net use.[21]

While net use given access is generally high throughout the country, it is notably lower in areas where malaria risk is low. Given the DNMP's goal of establishing systems and structures to support elimination in targeted counties by 2023, it will be important to understand the barriers to net use in low-transmission areas that are still targeted

[18] Health Communication and Marketing. 2017. Malaria Qualitative Study in Endemic and Epidemic Zones in Kenya. U.S. President's Malaria Initiative.
[19] Division of National Malaria Program. 2021. Kenya Malaria Indicator Survey 2020: Key Indicators. Government of Kenya.
[20] National Malaria Control Program. (2019). Post-Mass Long-Lasting Insecticidal Net Distribution Survey 2018. Kenya Ministry of Health.
[21] Health Communication and Marketing. 2017. Malaria Qualitative Study in Endemic and Epidemic Zones in Kenya. U.S. President's Malaria Initiative.

for ITN distribution. This will facilitate efforts to ensure that net use remains high throughout the country as transmission continues to decline. Similarly, available data suggests a need for greater focus on net care behaviors, which can help extend the life of ITNs and contribute to sustaining universal coverage. The 2018 PMLLIN survey found that 40 percent of the de facto household population who slept under a mosquito net slept under a net with holes of varying sizes in the lake endemic region.[22] Increased promotion of net care behaviors through targeted SBC activities are needed to help address this gap. 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

Kenya has been distributing pyrethroid-only nets due to concerns about increased cost and reduced coverage if the country were to switch completely to PBO or dual active ingredient ITNs. However, pyrethroid resistance in much of western Kenya is very high, particularly along the border with Uganda. PMI therefore began distributing PBO ITNs through routine channels in three counties (Busia, Bungoma, and Kakamega) and supported the procurement of PBO ITNs for the same counties for the 2021 mass campaign.

Table A-3. ITN distribution

County	Mass Campaign	ANC	CWC
Busia	PBO (2021)	PBO	PBO
Bungoma	PBO (2021)	PBO	PBO
Kakamega	PBO (2021)	PBO	PBO
Nationwide*	Pyrethroid	Pyrethroid	Pyrethroid

* Twenty-seven counties are targeted for the mass campaign and 36 counties are targeted for routine distribution ANC and CWC.

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

Kenya's routine ITN needs are estimated at approximately 2.7 million nets for 2021, rising to 3.0 million nets by 2023. Kenya's next mass campaign is scheduled for 2023–2024, when an estimated 15.9 million nets are required. With funding from the Global Fund and PMI, Kenya will have enough ITNs for the 2023–2024 mass campaign, but there will likely be a gap in ITNs for routine distribution in 2023. The DNMP and partners are reviewing the

[22] National Malaria Control Program. (2019). Post-Mass Long-Lasting Insecticidal Net Distribution Survey 2018. Kenya Ministry of Health.

routine ITN needs across the counties, so the number of counties receiving routine ITNs will likely change by 2023, thereby reducing the gap.

Table A-4. ITN Gap Analysis Table

Calendar Year	2021	2022	2023
Total country population	50,274,755	51,701,503	53,178,554
Total population at risk for malaria	37,706,066	38,776,127	39,883,916
PMI-targeted at-risk population	37,706,066	38,776,127	39,883,916
Population targeted for ITNs	35,459,926	36,336,025	37,237,485
Continuous Distribution Needs			
Channel 1: ANC	1,146,471	1,188,482	1,219,577
Channel 2: EPI	1,065,269	1,128,323	1,194,008
Additional ITNs required to avoid ITN stockouts	552,935	579,201	603,396
Estimated Total Need for Continuous Channels	2,764,674	2,896,006	3,016,981
Mass Campaign Distribution Needs			
Mass distribution campaigns	8,511,247	0	15,899,491
Estimated Total Need for Campaigns	8,511,247	0	15,899,491
Total ITN Need: Continuous and Campaign	***11,275,921***	***2,896,006***	***18,916,472***
Partner Contributions			
ITNs carried over from previous year	1,147,464	906,280	10,274
ITNs from Government	194,690	0	0
ITNs from Global Fund	6,018,886	0	12,650,968
ITNs from other donors	0	0	0
ITNs planned with PMI funding	4,821,161	2,000,000	4,463,710
Total ITNs Contribution Per Calendar Year	***12,182,201***	***2,906,280***	***17,124,952***
Total ITN Surplus (Gap)	***906,280***	***10,274***	***-1,791,520***

Key Question 6

What is the current status of durability monitoring?

Supporting Data

Two ITN brands were monitored following the 2018 mass campaign: DawaPlus in Busia County in western Kenya and DuraNet in Kwale County in coastal Kenya.

Table A-5. Timing of durability monitoring

Campaign Date	Site	Brand	Baseline	12-Month	24-Month	36-Month
July 2018	Busia	DawaPlus 2.0	X	X	X	X
Oct 2018	Kwale	DuraNet	X	X	X	X

Because different brands were distributed in different areas, direct comparisons should be interpreted cautiously because it is not possible to separate the effects of ITN brand and local practices related to net use and care. However, in general, the DuraNets in coastal Kenya were more likely to be lost due to wear and tear than the DawaPlus distributed in western Kenya. Additionally, the DuraNets generally maintained their biological activity better than the DawaPlus, although on average, despite unexplained low bioefficacy for the DawaPlus at 24 months, both products maintained average mortality against susceptible mosquitoes of >80 percent indicating these performed as expected under programmatic conditions.

Table A-6. Results of durability monitoring

Site	Survey and Time Since Distribution (months)	Attrition to Wear and Tear (%)	Nets in Serviceable Condition (%)	Optimal Insecticidal Effectiveness in Bioassay (%)
Busia DawaPlus 2.0	12	2.4%	88.3%	96.7%
Busia DawaPlus 2.0	24	17.7%	81.8%	23.3%
Busia DawaPlus 2.0	36	26.2%	68.0%	82.8%
Kwale DuraNet	12	7.1%	86.4%	96.7%
Kwale DuraNet	24	27.9%	74.8%	90.0%
Kwale DuraNet	36	37.0%	66.7%	100%

Conclusions for ITN Investments

With FY 2022 investments, PMI will:

- Procure approximately 1.7 million standard pyrethroid ITNs for routine distribution through ANC and CWCs. An additional 330,000 PBO ITNs will be provided for Bungoma, Busia, and Kakamega counties from prior year carryover of PBO nets.

- Procure approximately 2.7 million PBO ITNs for the 2023–2024 mass campaign. However, these nets will not be procured with FY 2022 funds, but rather from savings from previous years and FY 2021 reprogramming.
- Provide logistical support—including transportation and storage—for ITNs that will be distributed through routine channels as well as those to be distributed in the 2023–2024 mass campaign.
- Support 24-month data collection for streamlined durability monitoring of PBO ITNs that are being distributed in the 2020–2021 mass campaign. Since Kenya has conducted several rounds of durability monitoring, this activity will focus on the bioefficacy of the PBO ITNs to monitor their residual activity against pyrethroid resistant mosquito strains.
- Continue to support a combination of mass media and interpersonal communication activities aimed at maintaining high levels of net use and promoting net care. Mass media activities will be targeted at reinforcing and maintaining net use, while interpersonal communication activities will focus on building skills, knowledge, and self-efficacy around net care and addressing barriers to net use. Efforts to identify barriers to net use, including in low-transmission areas still targeted for net distribution, will also be supported.

Please see 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

The main goal of the Kenya IRS Implementation Strategy (2020–2024) is to strengthen capacity for evidence-based IRS operations in high malaria burden and epidemic-prone counties to protect 100 percent of the population at risk of malaria in Kenya. The previous Kenya IRS Business Plan called for targeting endemic counties in the lake basin region of western Kenya, starting with those bordering Tanzania. This approach aimed to reduce the malaria burden in the targeted endemic counties and to serve as a barrier to the introduction of malaria into highland, epidemic prone areas. The strategy called for counties to be sprayed for three consecutive years before moving to a new area. Based on the original IRS Business Plan, the DNMP prioritized Migori and Homa Bay for IRS implementation in 2018, 2019, and 2020. Under the new IRS Implementation Strategy, a specific exit strategy has not been defined and the DNMP recommended continuation of IRS in Migori and Homa Bay in 2021 (Figures A-12 and A-13). According to the Kenyan Insecticide Resistance Management Strategy, IRS should be conducted with a single insecticide for two consecutive years and then rotated with another insecticide. In addition to pyrethroids; insecticides currently registered for IRS in Kenya include Actellic 300 SC (organophosphate), SumiShield® (clothianidin) and Fludora® Fusion (IRS formulations containing deltamethrin + clothianidin).

The 2019 and 2020 spray operations were carried out with Actellic 300 CS in both counties covering all eight subcounties in Homa Bay and six out of the eight subcounties in Migori with high estimated incidence as estimated by the KHIS. The two remaining subcounties in Migori (Kuria East and West) were not sprayed because they have a lower estimated parasite prevalence. In 2021, Kenya introduced Fludora Fusion and sprayed both counties with this insecticide as part of a rotational strategy. Results of this spraying are currently pending. Both Migori and Homa Bay Counties have been sprayed for four consecutive years. Decisions on whether to continue spraying in both counties after 2021 will come from the IRS Exit Plan, which is still being finalized. Stopping IRS in a specific area requires replacement with effective vector control tools (e.g., new types of ITNs); heightened epidemiological and entomological surveillance; SBC to promote ITN use; strengthening of County Health Management Team (CHMT) awareness, ownership, and capacity to implement an exit strategy; ensuring procurement and availability of RDTs and ACTs to address any increase in cases; training on epidemic preparedness and response (EPR); data reporting; and advocacy for funding from county budgets to support surveillance activities. In this regard, new counties/subcounties for spraying will be determined in consultation with the DNMP Vector Control Team.

Figure A-11. Map of Kenya showing PMI-supported IRS intervention counties in 2021

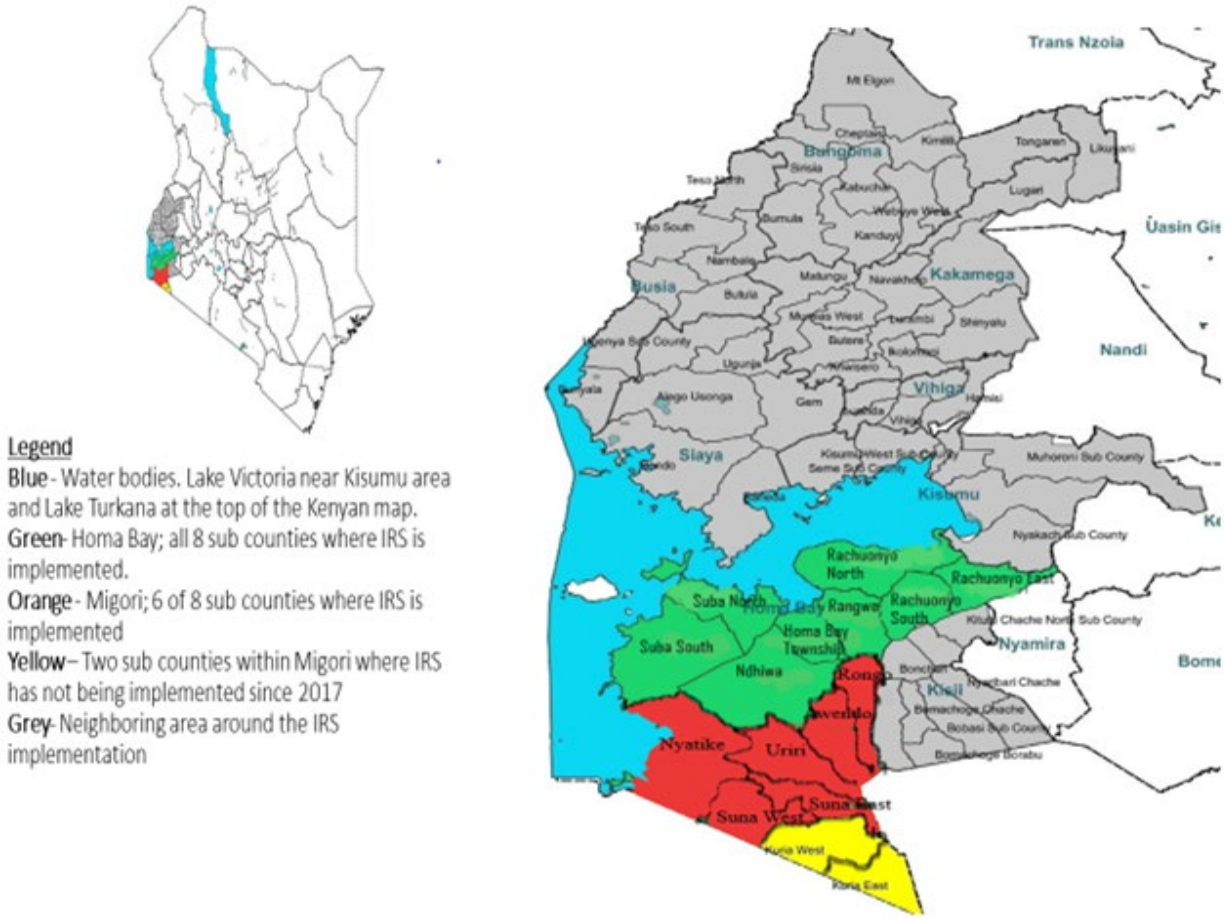


Figure A-12. Annual confirmed malaria cases per 1,000 population at baseline (2016) and during the IRS implementation years (2017–2020) in Homa Bay County, western Kenya

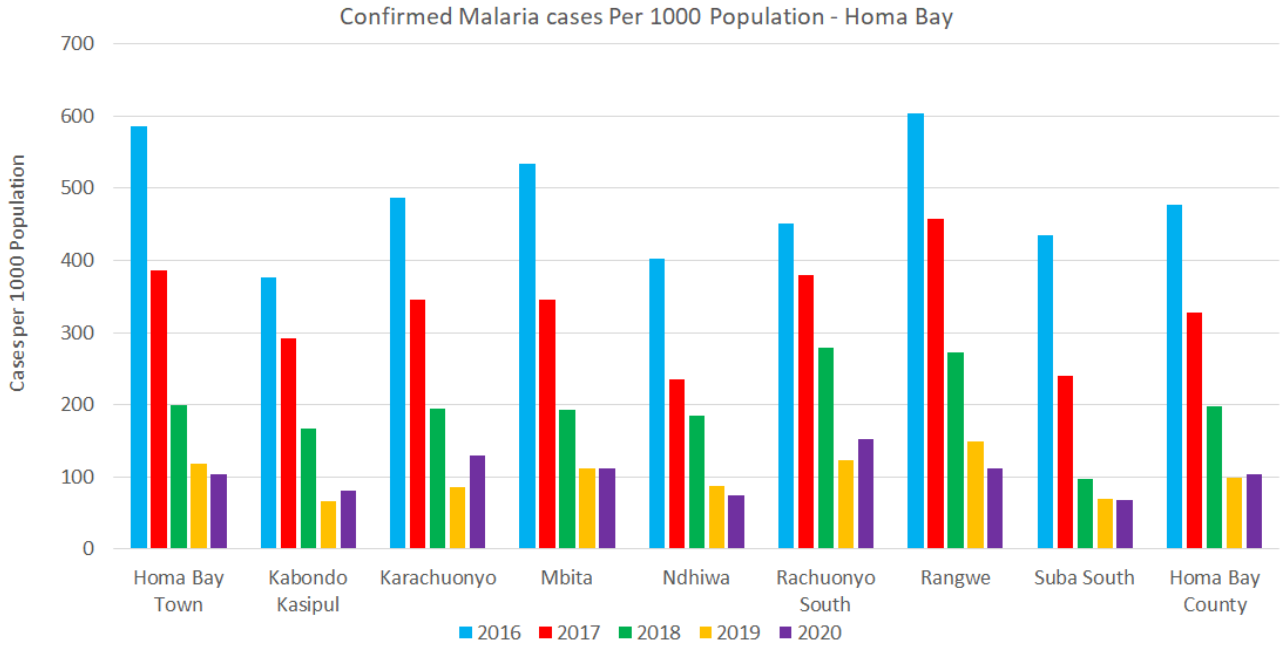
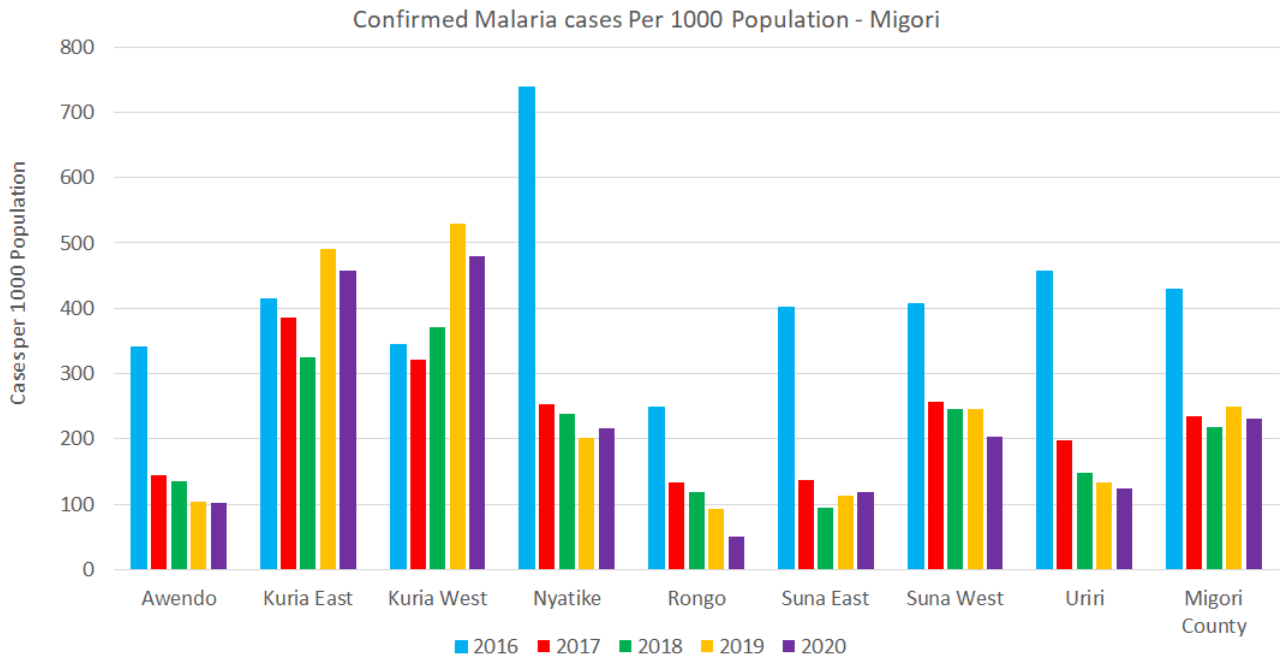


Figure A-13. Annual confirmed malaria cases per 1,000 population at baseline (2016) and during IRS implementation years (2017–2020) in Migori County, western Kenya



Note: The Homa Bay subcounties of Kuria East and Kuria West did not receive the IRS intervention.

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

In 2018 and 2019, the IRS campaign sprayed 488,323 and 507,777 structures with a coverage of 94 percent and 92 percent and protected a total of 1,833,860 and 2,011,860 people for the two years, respectively, while the 2020 campaign achieved 90.4 percent coverage. The 2021 campaign sprayed 493,487 structures with a 97 percent coverage rate and an estimated 2,065,733 people protected.

Table A-7. IRS coverage

Calendar Year	Counties Sprayed (#)	Counties	Structures Sprayed (#)	Coverage Rate (%)	Population Protected (#)
2018	2	Migori Homa Bay	488,323	94	1,833860
2019	2	Migori Homa Bay	507,777	92	2,011,860
2020	2	Migori Homa Bay	436,472	90	1,792,495
2021*	2	Migori Homa Bay	493,487	97	2,065,733

* Please note these are preliminary results. Final figures are not yet available for the 2021 campaign.

Key Question 3

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

Supporting Data

Results from cone bioassay tests demonstrated high efficacy of Actellic 300CS used for IRS from 2018 to 2020. Results were similar across different subcounties and when assays were done at varying heights on the wall demonstrating the high quality of the IRS. The duration of efficacy of Actellic 300CS as estimated by cone bioassays varied between years but ranged from 4 to 10 months. Activities for the 2021 cone bioassays are in progress. Because Fludora Fusion is a pyrethroid/ neonicotinoid mixture, it is important to conduct cone bioassays using wild collected pyrethroid resistant *An. funestus* for Fludora Fusion-sprayed walls while insectary reared susceptible *An. gambiae* Kisumu strains may be used for Actellic 300CS-sprayed walls.

Table A-8. IRS insecticide residual efficacy

Site/District	Year	Insecticide	Average Residual Efficacy (months)
Migori	2018	Actellic 300 CS (pirimiphos-methyl)	10
Homa Bay	2018	Actellic 300 CS (pirimiphos-methyl)	10
Migori	2019	Actellic 300 CS (pirimiphos-methyl)	4-6
Homa Bay	2019	Actellic 300 CS (pirimiphos-methyl)	4-6
Migori	2020	Actellic 300 CS (pirimiphos-methyl)	10
Homa Bay	2020	Actellic 300 CS (pirimiphos-methyl)	10
Migori	2021	Fludora Fusion (clothianidin + deltamethrin)	TBD
Homa Bay	2021	Actellic 300 CS (pirimiphos-methyl)/ Fludora Fusion (clothianidin + deltamethrin)	TBD

Key Question 4

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

Supporting Data

The table below reflects the insecticide rotation plan for PMI-supported areas.

Table A-9. Insecticide rotation plan

Target Spray Area	2020	2021	2022*	2023*
Migori	Pirimiphos-methyl (organophosphate)	Clothianidin (neonicotinoid)	Clothianidin (neonicotinoid)	Clothianidin (neonicotinoid)/ organophosphate
Homa Bay	Pirimiphos-methyl (organophosphate)	organophosphate/ neonicotinoid	Clothianidin (neonicotinoid)	Clothianidin (neonicotinoid)/ organophosphate

*Denotes planned insecticide classes.

Conclusions for IRS Investments

With FY 2022 funding, PMI will:

- Support the same level of IRS implementation activities. PMI continues to achieve high IRS coverage in the targeted areas of Migori and Homa Bay. PMI will support an additional round of IRS in 2022 in those two counties (since the IRS Exit Strategy is on hold until further direction from the Kenya DNMP), targeting an estimated 500,000 structures with at least 85 percent coverage and protecting an estimated 2 million people.

- Wild mosquitoes in the IRS counties of Migori and Homa Bay are susceptible to both pirimiphos-methyl and clothianidin. Insecticide products incorporating these insecticides will be rotated every other year as part of a rotational strategy to ensure continued susceptibility of mosquitoes to these insecticides.

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

DNMP Objective

Objective 2 of the KMS 2019–2023 is to manage 100 percent of suspected malaria cases according to Kenya's malaria treatment guidelines by 2023. This objective will be achieved through the following strategies:

1. Strengthen capacity for integrated malaria case management.
2. Strengthen capacity for case management of severe malaria.
3. Provide malaria case management at the community level in targeted areas.
4. Ensure quality malaria parasitological diagnosis.
5. Procure diagnostic and treatment commodities.

DNMP Approach

National Guidelines for the Diagnosis, Treatment, and Prevention of Malaria in Kenya 2020 (6th Edition) state that all people with suspected malaria, defined as any person of any age group in any epidemiological zone presenting to a healthcare provider with fever or a history of fever, should have a parasitological test to confirm the diagnosis. The diagnosis can be confirmed by use of an RDT or microscopy. However, treatment should never be delayed or denied due to inability to test for malaria.

Table A-10. National case management policy according to *Guidelines for the Diagnosis, Treatment, and Prevention of Malaria in Kenya 2020 (6th Edition)*

National Case Management Policy According to *Guidelines for the Diagnosis, Treatment, and Prevention of Malaria in Kenya 2020 (6th Edition)*	
First-line treatment for uncomplicated *P. falciparum* malaria	AL
Second-line treatment for uncomplicated *P. falciparum* malaria	Dihydroartemisinin-piperaquine
First-line treatment for severe malaria	Intravenous or intramuscular artesunate, for a minimum of three doses or 24 hours
First-line treatment for uncomplicated *P. falciparum* malaria in the first trimester	Oral quinine for seven days; AL if quinine unavailable
First-line treatment for uncomplicated *P. falciparum* malaria in the second and third trimesters	AL
First-line treatment for severe malaria in pregnancy	Intravenous (preferred) or intramuscular artesunate; artemether or quinine if artesunate unavailable
Pre-referral treatment of severe disease at peripheral health facilities	Intramuscular artesunate; intramuscular artemether or quinine if artesunate unavailable; in settings where intramuscular injections are unavailable or not possible, treat children younger than six years of age with rectal artesunate*
Pre-referral treatment of severe disease by community health volunteers	Not addressed in the *Guidelines for the Diagnosis, Treatment, and Prevention of Malaria in Kenya 2020 (6th Edition)*

* Rectal artesunate not currently implemented.

Key components of the DNMP's approach to case management include the following:

Private sector case management

KMIS 2015 found that approximately 25 percent of caregivers of children with fever seek care in the private sector. Much smaller proportions of children received advice or treatment about fevers from faith-based facilities (3 percent), shops (3 percent), or CHVs (1 percent). Traditional healers were rarely consulted (<1 percent). Although the majority of children receive care for fever at government facilities, the proportion seeking care varies by community type and geography. Government facilities were consulted in the case of 75 percent of rural children receiving advice or treatment for fever, compared with 56 percent of their urban counterparts. Government facilities were also more likely to have been consulted in the lake endemic zone (72 percent), coast endemic zone (68 percent), and highland epidemic zone (76 percent) than in low-risk zones (59 percent).

The Kenya Malaria Strategy 2019–2023 includes support for the private sector focused on improving the quality of care for malaria case management, strengthening partnerships, and coordination for enhanced delivery of

malaria interventions. In line with the objectives of the KMS 2019–2023, as well as MOH policy that mandates malaria testing as a prerequisite for the initiation of antimalarial therapy in 2012, the DNMP has supported efforts in both the private and public sectors to ensure appropriate case management through in-service trainings, guideline dissemination, supportive supervision, antimalarial quality assurance, and SBC. Private pharmacy and over-the-counter staff have undergone training on malaria case management, recognition of severe malaria, referral advice, and appropriate drug storage to improve prescriber practices among outlets. Global Fund has supported various projects to strengthen the availability of RDTs and ACTs in the private sector, and additional support has come from Unitaid, Clinton Health Access Initiative, and other donors.

A review of antimalarial stock levels in the 2020 Health Systems Readiness and Quality of Malaria Case Management in the Private Retail Drug Outlets in Kenya assessment found that nationally, most drug outlets had at least one ACT in stock (94.9 percent). Of those, nearly all (99 percent) stocked AL, with Lonart being the most common brand (83.1 percent). Artemisinin monotherapy was found at 16.7 percent of outlets, and SP at 46.8 percent, followed by quinine (11.5 percent), artesunate (11.8 percent), artemether (11.5 percent), proguanil (2.2 percent), and amodiaquine (<1 percent). Approximately 15 percent of outlets reported at least seven days of ACT stockouts during the three months preceding the survey (October to December 2020). Use of these antimalarials was not assessed beyond the treatment of symptomatic children, described in the case management practice assessment below.

The 2020 Health Systems Readiness and Quality of Malaria Case Management in the Private Retail Drug Outlets in Kenya also assessed national private sector case management practices. Of the 408 health workers assessed in the private retail outlets, 71.2 percent complied with malaria treatment guidelines, and 77.6 percent of those who tested positive were offered AL, while 65.0 percent of those who tested negative were not given any antimalarial, and 72.7 percent without testing were offered antimalarials. Among clients who received antimalarials, 94.7 percent received ACTs (89.0 percent AL, 5.7 percent dihydroartemisinin-piperaquine). These assessments assumed testing had been conducted appropriately.

Community case management of malaria

Per Kenya's Community Health Strategy, community health volunteers (CHVs) provide services in a defined geographical area referred to as a Community Health Unit (CHU). A CHU's catchment area covers approximately 5,000 people (or 1,000 households) and is served by approximately 10 CHVs. At the health facility linked to the CHU, CHVs are overseen by Community Health Assistants (CHAs), who are government employees, mandated to provide health services at the household and community levels and make referrals and linkages to health facilities. In the eight PMI-supported lake-endemic counties, there are 1,998 CHUs made up of approximately 19,980 CHVs. Of the 1,998 CHUs, 1,773 (89 percent) and their associated CHVs (approximately 17,730) are functional (Table 2.1.2.).

Table A-11. Community health units and functionality by county in the lake-endemic region of Kenya in 2021

County	Community Health Units – Total	Community Health Units – Functional
Bungoma	333	329
Busia	191	191
Homa Bay	270	231
Kakamega	427	422
Kisumu	208	144
Migori	205	172
Siaya	219	175
Vihiga	145	109
Total	**1,998**	**1,773**

Two approaches to community case management of malaria (CCMm) are currently pursued in Kenya through the community health system. The DNMP supports CCMm in all ages by CHVs in the eight lake-endemic and two highland epidemic counties, while UNICEF supports integrated community case management of malaria, pneumonia, and diarrhea in children younger than five years of age in 11 counties (including Siaya and Homa Bay in the lake-endemic zone and Turkana in the seasonal transmission zone). CHVs have been performing CCMm since 2012, including the administration of RDTs and AL; however, the expiration of the 2014 delegated authority waiver allowing non-laboratory personnel to conduct RDTs in 2019, and a subsequent court ruling that barred non-laboratory staff from conducting diagnostic tests, has affected CCMm implementation by CHVs. Despite the court ruling, some counties have allowed implementation of CCMm, including the use of RDTs, while others have reverted to an "identify and refer" strategy for CHVs. The counties implementing a test and treat strategy for CCMm include Busia and Bungoma counties in the lake-endemic region. In these counties, all 1,910 CHVs in Busia and 3,330 CHVs in Bungoma have been trained on CCMm by the county through support from PMI, Living Goods, and AMREF. The PMI support for training covered CCMm training for 34 CHUs in Bungoma (10 percent coverage) and 53 CHUs in Busia (27 percent coverage). PMI also supports case management commodities and MOH tools for data collection in all eight counties, which are distributed to CHVs for CCMm according to the county's stance on the court ruling for delegation of authority for testing.

In April 2019, a court ruling barred non-laboratory staff from administering RDTs. Since that time, PMI has supported the DNMP and other stakeholders in efforts to address this legislation to allow CHVs to administer mRDTs. According to the Community Health Strategy, CHVs are recognized as Level I health workers, which means that the counties are able to create legislation to outline CHV engagement, protections, and compensations based on this status. At the national level, the Department of Community Health Services guides CHV engagement and the establishment of functional CHUs; this policy guides counties. However, some counties have pursued and enacted legislation to outline CHV engagement, protections, and compensation, while others

have adopted CHV stipends that are not safeguarded by any legislation and therefore are at risk of changing with shifts in leadership. This results in an inconsistent and late CHV stipend payments and CHV attrition.

PMI supported CHV training and supervision programs are in place in all eight lake-endemic counties, including the activities in the two counties implementing the "test and treat" approach to CCMm described earlier. The overall CCMm training and supervision approach involves mapping CHUs to determine their functionality and whether they implement CCMm. Based on these data County and Sub-County Health Management Teams (C/SCHMTs) develop a training needs assessment, which is used to roll out CCMm and MIP trainings in functional CHUs with training gaps using the MOH training manual. Following trainings, C/SCHMTs use existing KHIS (DHIS2-based) data platforms to identify health facilities with performance gaps for supervision. In addition to targeting the facilities themselves, the CHUs linked to these underperforming facilities are targeted with supportive supervision. AMREF, with support from the Global Fund, also supports CHU supervision in 10 counties (Kisii and Nyamira, in addition to the eight PMI-supported lake-endemic counties). In counties supported by both PMI and AMREF, the two partners support different CHUs within the same subcounties to ensure there is no duplication of efforts.

Health worker supervision

Supportive supervision is a key aspect of all service delivery oriented programs within the MOH. Counties conduct integrated routine supportive supervision that cuts across different service delivery areas at different levels. There are also program-specific technical supportive supervision activities, including malaria-specific supportive supervision. In the devolved healthcare system, responsibilities are assigned to the national and county levels; the responsibility for supportive supervision is vested at the county level. Within the DNMP, there are supportive supervision guidelines that have incorporated a mentorship program component, which is carried out by the national level. Both mentorship and supportive supervision are conducted on a quarterly basis using the standardized, integrated (all malaria control interventions) supportive supervision checklists. The overall objective of the supervision is to help identify challenges in quality and access to service provision, and to develop workable strategies to overcome them. Routine performance reviews of malaria indicators at all levels (community, health facility, and subcounty) are conducted using data from KHIS (DHIS2-based) to identify and target facilities and their linked CHUs for supportive supervision.

The supervision team is made up of personnel with varying skills, knowledge, and experience to allow supervision of various aspects of service delivery (clinical, laboratory, pharmacy, data management). Following supervision visits, action plans are developed and used to monitor and review the progress of proposed solutions. At the facility level, CHVs are also supervised regularly by CHAs, who are government employees mandated to provide health services at the household and community levels and make referrals and linkages to health facilities. Each CHV should receive supportive supervision monthly from a CHA, at either the health facility or in the community. The supervision consists of on-the-job training, report reviews, and household visits with a CHA. CHVs also receive mentorship at the link facilities to enhance their competencies in the use of RDTs. By the end of every month, it is expected that all CHVs (on average 20–30 per facility) will have received mentorship at the facility.

PMI Objective in Support of DNMP

PMI supports the DNMP's malaria case management strategy as described in the KMS 2019–2023, complementing Global Fund and GOK contributions. Limited technical assistance is provided at the national level, with an intensive focus in the eight high-burden malaria endemic counties in western Kenya.

PMI-Supported Recent Progress (FY 2020)

At the **national level**, PMI has supported the following:

- Quarterly Case Management COE meetings to advance the case management policy agenda.
- Developed case management policy documents, including (1) Guidelines for the Diagnosis, Treatment, and Prevention of Malaria in Kenya; (2) Kenya Quality Assurance Guidelines on Parasitological Diagnosis of Malaria; (3) Implementation Plan for the Kenya Quality Assurance Guidelines on Parasitological Diagnosis of Malaria; (4) In-Service Parasitological Training Curriculum; and (5) Guidelines for the Use of mRDTs at the Community Level.
- Conducted an assessment of national laboratory capacity to support malaria case management in 165 health facilities in 43 out of 47 counties to identify gaps in laboratory service provision and target interventions.
- Prepared a report on the delegation of authority for CHVs to conduct mRDTs for use by the MOH Legal Department to resolve the court impasse regarding the 2019 court ruling barring CHVs from administering mRDTs.

At the **county and subcounty levels,** PMI has supported the following:

- Clinical mentorship on severe malaria management for healthcare workers from 16 facilities in four of the eight lake-endemic counties.
- Post-training mentorship on severe malaria management for 161 healthcare workers in 31 admitting facilities.
- Training of 112 mentors (4 medical officers, 17 nurses, 23 clinical officers, 17 pharmacy staff, 16 laboratory officers, and 14 health records and information officers) from 16 subcounties to build the capacity of new healthcare workers and conduct follow-up mentorship of trained healthcare workers.
- Continuing medical education on the management of severe malaria in 24 faith-based facilities in three of the eight lake-endemic counties, improving competencies in 162 key healthcare workers.
- Continuing medical education on malaria microscopy in one lake-endemic county.
- Dissemination of malaria clinical data collection tools in three of the eight lake-endemic counties.
- Development of county malaria workplans focused on malaria service delivery in three of the eight lake-endemic counties.
- Training for the Health Network Quality Improvement System, including training of 20 DNMP staff to serve as training facilitators at the county level.
- County data review meeting to discuss facility reporting and enhance understanding of malaria case management indicators by S/CHMT members.
- Advocacy for increased resource allocation for malaria service delivery in three of the right lake-endemic counties.
- Support for Malaria Technical Working Group meetings, which include ongoing monitoring of malaria case management indicators, in six of the eight lake-endemic counties.

At the **facility and community levels**, PMI has supported the following:

- Training of 485 healthcare workers (94 clinical officers, 253 nursing officers, 41 health records and information officers, 58 laboratory officers, and 38 pharmacy staff) in 221 health facilities by subcounty mentors.
- Monthly monitoring of facility-level malaria wall charts for malaria case management indicators.
- Sensitization of 96 healthcare workers and 18 SCHMT members on revised MOH reporting tools.
- Training of 30 CHAs and 361 CHVs on integrated CCMm and MIP in two counties.
- Orientation of 31 CHAs and 361 CHVs on MIP in five counties.

Some challenges that slowed or limited progress included:

- COVID-19 pandemic and associated national-level mitigation measures, which limited the number of individuals allowed to participate in training sessions to a maximum of 15, restricted travel between Nairobi and the lake-endemic region, and resulted in shifts in health facility staffing that resulted in transfers of malaria-trained healthcare workers to non-admitting facilities and the deployment of newly trained healthcare workers to positions that do not involve malaria case management.
- A prolonged (70 day) nationwide healthcare worker strike from November 2020 through January 2021 limited malaria service provision and healthcare worker availability for training, mentorship, and supervision.
- Intermittent commodity stockouts (RDT, AL, and SP) limited service provision.
- A court ruling barring CHVs from administering RDTs limited testing of fevers at the community level.

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

In FY 2021, PMI plans to support the scale-up of malaria case management interventions to all 63 subcounties in its eight focus counties, including:

- Capacity-building in malaria case management through training, mentorship, and supportive supervision of healthcare workers to improve performance and population health outcomes.
- Training of CHVs on the use of interpersonal communication to promote malaria prevention and treatment behaviors.
- Support for malaria diagnosis quality assurance activities at all levels of care.
- Strengthening linkages between communities and facilities through indicator monitoring, problem identification, and target setting.
- Scale-up training and utilization of the digitized supportive supervision checklist and TrainSMART database from the national to the county level.
- Support for strengthening case management data capture, reporting, and use through facility wall chart monitoring of malaria indicators.
- Support coordination of national and county level malaria case management activities, including the review and development of malaria work plans, facilitation of COE meetings, and the review and update of policy documents.
- Ensure documentation of lessons learned during implementation by publication of manuscripts, abstracts, best practices, and success stories.

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.

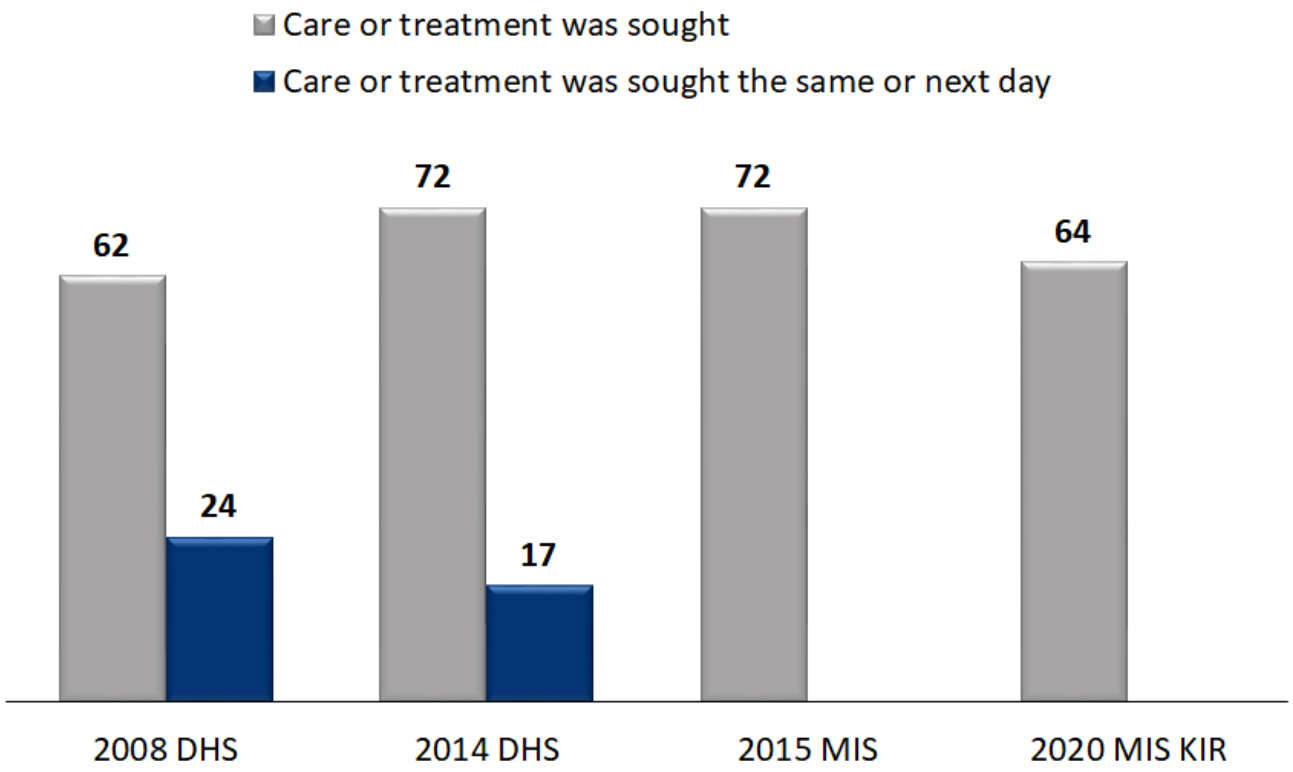
Key Question 1a

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

Supporting Data

Figure A-14. National 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



This figure demonstrates trends in care-seeking for fever based on data collected from the 2008 DHS, 2014 DHS, 2015 KMIS, and 2020 KMIS, all of which asked caregivers of children who had experienced fever within the two weeks before the survey whether they sought care or treatment for the child, and if so, whether care or treatment was sought the same or next day. Over time, the percentage of caregivers who reported seeking care or treatment increased from 62 percent (2008) to 72 percent (2014), where it stayed the following year (72 percent in 2015), before declining (64 percent in 2020). The DHS surveys demonstrated that the proportion of caregivers who reported seeking care for the febrile child the same or next day decreased from 24 percent in 2008 to 17 percent in 2014. This indicator was not reported by the 2015 KMIS and is still being calculated for the 2020 KMIS.

Key Question 1b

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

Supporting Data

The COVID-19 pandemic has negatively impacted care-seeking for fever, with outpatient clinic attendance significantly lower since COVID-19 was first detected in Kenya in March 2020. To mitigate the effects of decreased care-seeking for fever on malaria morbidity and mortality, PMI has supported the development of SBC interventions aimed at encouraging prompt care-seeking for fever, including a social media campaign and videos aired on local television.

Prior to COVID-19, most caregivers of children with fever sought care (72 percent nationally, 65 percent in lake-endemic region), usually in public health facilities (70 percent nationally, 73 percent in lake-endemic region) according to a 2016 study conducted by the DNMP. However, while the majority of parents seek advice or care for children with a fever and overwhelmingly do so from some kind of health facility, many do not do so immediately. According to the 2014 DHS, of the 72 percent of caregivers who indicated they sought care for their child's fever, only 17 percent did so the same or next day. Furthermore, a 2017 qualitative study found that some parents delayed seeking care for their child until symptoms became extreme, such as high fevers, hallucinations, listlessness, or extended periods of vomiting and diarrhea. These parents reported first trying traditional medicine or home remedies and only sought care after these did not improve the illness. Alternative methods for treatment of malaria symptoms in the lake-endemic region included local medicinal plants, such as neem, nyayado (senna occidentalis), and okita.[23] Structural factors, such as the cost of services and the cost of transportation, have also been identified as barriers to prompt care-seeking. Only 38 percent of respondents to the 2015 KMIS indicated that they found treatment very affordable or affordable when their child had a fever. Taken together, these data points suggest there is still more work to be done around the promotion of prompt care-seeking for fever.[24]

To address these challenges, PMI will support SBC interventions aimed at promoting prompt care-seeking. It is anticipated interventions will rely heavily on interpersonal communication at the household and community level and will utilize local community structures, such as ANCs and Malaria Community Action Teams (MCATs), to stress the importance of seeking care immediately at the first sign of a fever or other malaria-related symptoms, as past research has identified community elders, faith leaders, and CHVs as key influencers for decision-making related to malaria testing and treatment.[25] However, the specific nature of the interventions will be reassessed following the Malaria Behavior Survey (MBS), which is planned for the first half of 2021 and is expected to provide greater insight into the values, beliefs, and attitudes that influence prompt care-seeking for fever. Please refer to Section 3.4 for more information on how SBC interventions will be directed to address the behavioral challenges identified above.

[23] Health Communication and Marketing. (2017). Malaria Qualitative Study in Endemic and Epidemic Zones in Kenya. U.S. President's Malaria Initiative.

[24] Breakthrough ACTION. (2020). Malaria-Related Behaviors and Ideation in Kenya: Western and Lake Regions. U.S. President's Malaria Initiative.

[25] Ibid.

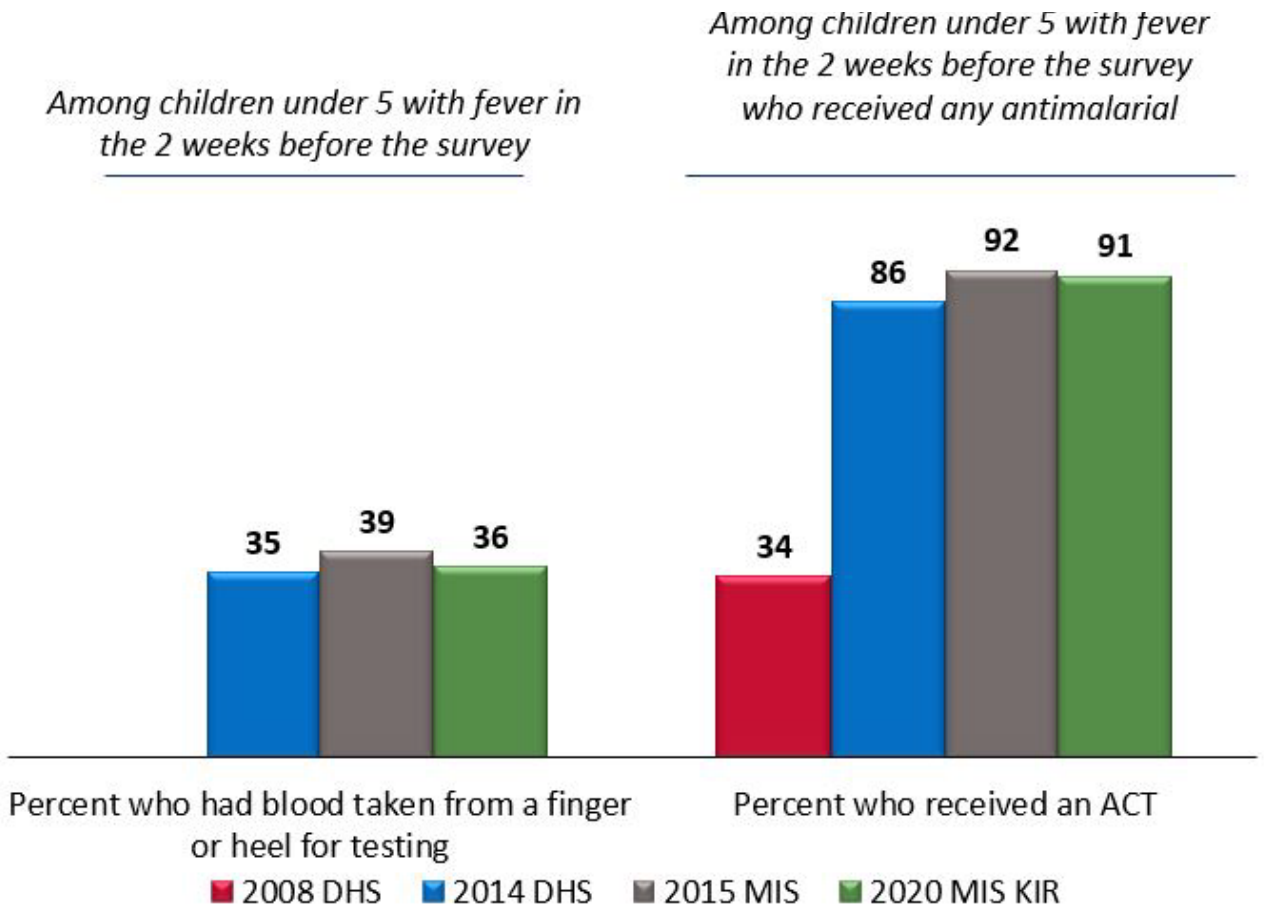
Key Question 2a

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

Supporting Data

Figure A-15. Trends in diagnosis and treatment of children with fever

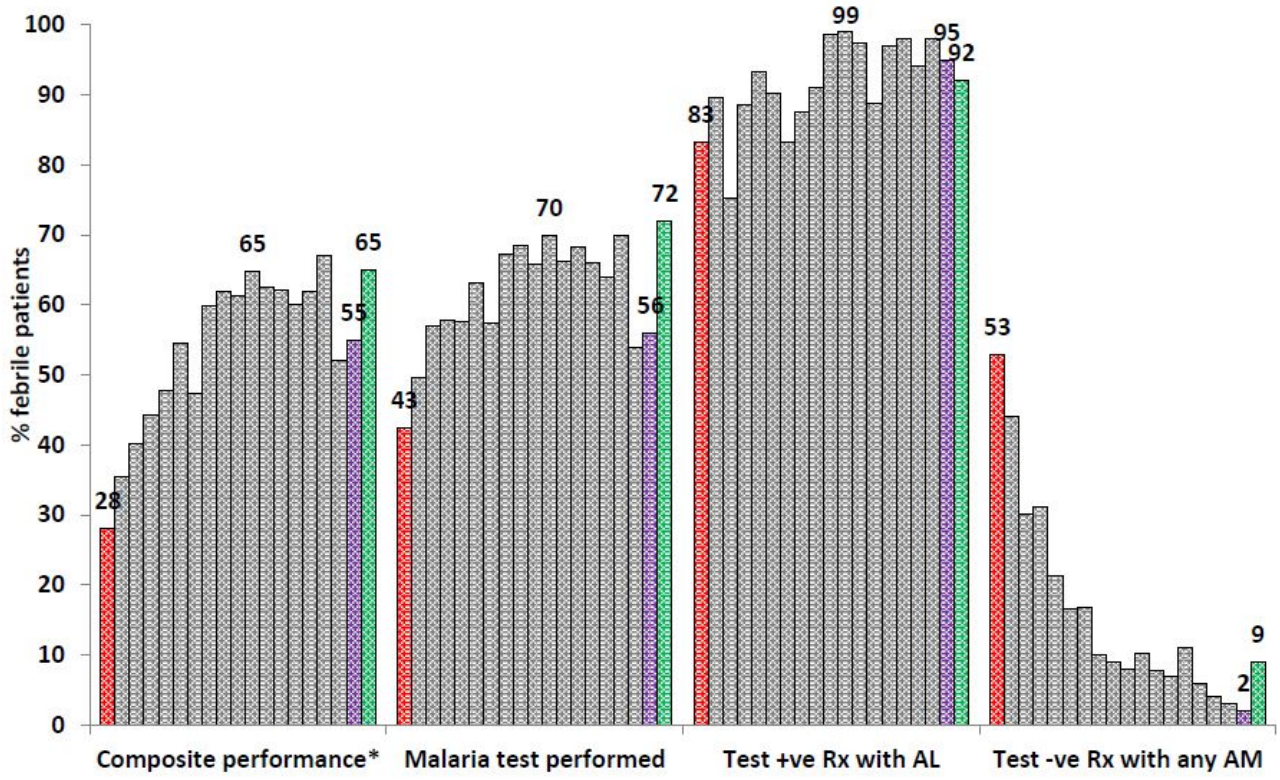
Among children under five years of age with fever in the two weeks before the survey and with fever in the two weeks before the survey who received any antimalarial



This figure demonstrates trends in diagnosis and treatment of children with fever based on survey data collected from the 2008 DHS, 2014 DHS, 2015 KMIS, and 2020 KMIS, all of which asked caregivers of children younger than five years of age with fever during the two weeks before the survey whether the child had blood taken from a finger or heel for testing, and whether the child had received an ACT (the appropriate treatment for malaria in this setting) if an antimalarial had been prescribed. In the 2014 DHS, 35 percent of caregivers reported blood had been taken, and this proportion increased slightly to 39 percent during the 2015 KMIS and decreased slightly to 36 percent during the 2020 KMIS; the question was not asked on the 2008 DHS. Of the caregivers who reported the child had received an antimalarial, 34 percent said it was an ACT during the 2008 DHS, compared with 86 percent during the 2014 DHS, 92 percent during the 2015 KMIS, and 91 percent during the 2020 KMIS.

Figure A-16. National trends in health worker adherence to national case management guidelines where malaria diagnostic services and stock were available

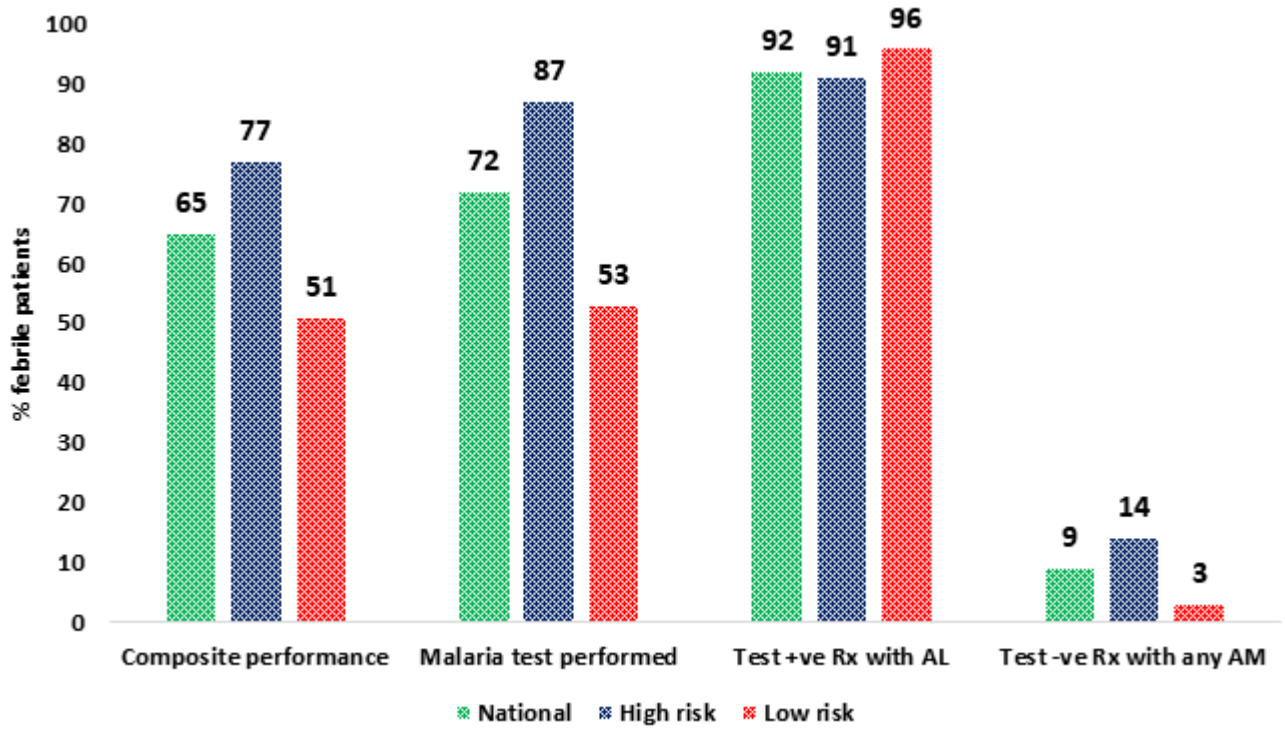
Performance of the overall "test and treat" case management performance, measured at all facilities as a composite indicator, with the component indicators of (1) proportion of fevers tested for malaria; (2) proportion of malaria-positive cases treated with artemether-lumefantrine; and (3) proportion of malaria-negative cases treated with antimalarials.



*Legend: red=baseline, purple=last evaluation; green=current evaluation; the 19 interval Quality of Care survey rounds were conducted from 2010 to 2021 with one or two surveys conducted per year.

This figure demonstrates national trends in case management performance results from 19 interval quality of care survey rounds conducted from 2010 to 2021 (one or two per year). The 2021 indicators demonstrate malaria tests were performed for 72 percent of patients presenting with fever, 92 percent of malaria-positive patients received the appropriate treatment of AL, and 9 percent of malaria-negative patients inappropriately received AL, corresponding with 65 percent of patients with suspected malaria receiving appropriate management. Compared with the baseline assessment in 2010, this represents an improvement in all case management components with composite performance improving by 37 percentage points (28 percent to 65 percent), testing rates improving by 29 percentage points (43 percent to 72 percent), case management of malaria-positive patients improving by 9 percentage points (83 percent to 92 percent), and case management of malaria-negative patients improving 44 percentage points (53 percent to 9 percent).

Figure A-17. Key test and treat adherence indicators stratified by malaria risk, January 2021



This figure from the January 2021 Quality of Care survey demonstrates the latest case management test and treat performance data stratified by malaria transmission risk. The 2021 indicators demonstrate malaria tests were performed for 87 percent of patients presenting with fever in high-risk areas (lake and coastal endemic counties) compared with 53 percent in the low-risk counties (highland epidemic prone, semi-arid seasonal, and low-risk counties). Ninety-one percent of malaria-positive patients in the high-risk counties received the appropriate treatment of AL compared with 96 percent in the low-risk counties. Fourteen percent of malaria-negative patients inappropriately received AL in the high-risk counties compared with just 3 percent in the low-risk counties.

Key Question 2b

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

Supporting Data

Survey data indicates there is a significant gap between the number of children under five years of age who have blood taken from a finger or heel for testing and the number of children under five years of age who received an antimalarial, which suggests challenges with adherence to case management guidelines among providers. This finding is further supported by the 2021 Quality of Care Assessment, which determined that the overall quality of malaria case management in Kenya, as measured using a composite performance indicator, was 60 percent. However, the assessment also found that provider adherence to the "test and treat" policy remained high at facilities where malaria diagnostics and AL were available, which suggests that structural factors such as AL stockouts and decreased laboratory capacity (e.g., lack of functioning diagnostic equipment, commodities, or staff

trained in malaria diagnostics) played an important role in providers' ability to adhere to case management guidelines.[26]

With respect to testing, the April 2019 court ruling barring non-laboratory staff from administering RDTs has significantly affected testing and treatment practices among CHVs. While some counties have allowed implementation of CCMm, including the use of RDTs, despite the court ruling, the majority have not. Challenges related to malaria testing practices extend to the health facility as well. The 2021 Quality of Care Assessment concluded that while microscopy is nearly universal (99 percent), RDTs are only available at a small portion of health facilities (33 percent) nationally. Given the time and resource intensive nature of microscopy, this is less than ideal for lower-level, high-burden facilities.

At present, there is little available evidence to suggest that lack of adherence to testing and treatment practice among providers is behavioral in nature. Rather, there is strong evidence to suggest that training and structural-level factors (e.g., availability of supplies, a supportive policy environment, etc.) are significant determinants of adherence to case management guidelines. There has been, however, little research to understand whether behavioral factors, such as perceived response efficacy of microscopy versus RDTs, are influencing provider testing and treatment practices.

To address the aforementioned challenges, PMI will continue to invest in malaria case management capacity-building through training, mentorship, and supportive supervision of healthcare workers, as well as advocacy to expand the use of RDTs. PMI will also support formative research to better understand how providers' attitudes and beliefs influence testing and treatment practices.

Key Question 3

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

[26] Division of National Malaria Program. (2021). Monitoring Quality of Inpatient Malaria Case Management at Kenyan Hospitals. Government of Kenya.

Supporting Data

Table A-12. Donor support for CHVs in CCMm training/orientation and supportive supervision in lake-endemic counties in Kenya

County	CCMm Training	Supportive Supervision
Bungoma	PL, GFL	PL
Busia	PL, GFL	PL
Homa Bay	GFL	PL
Kakamega	GFL	PL
Kisumu	GFL	PL
Migori	GFL	PL
Siaya	GFL	PL
Vihiga	GFL	PL
Estimated coverage	**30%**	**15%**

Abbreviations: PL=PMI Limited Support; GFL=Global Fund Limited Support

*Global Fund has committed to expand from meeting 30% to 60% of needed support for CCMm by 2024.

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 estimated RDT need for CY 2021 is 8.4 million, 9.3 million in CY 2022, and 9.6 million in CY 2023. The need is being met each year. Kenya aims to maintain a minimum of nine months of stock at the end of each year and currently there is a projected gap of approximately 60,000 tests in 2022 and 2.8 million tests in 2023 based on anticipated partner contributions. The estimated need in 2023 assumes that testing rates (2021 Quality of Care survey estimates) will have increased to 80 percent, with 45 percent of the testing by RDT, by 2023.

Table A-13. RDT Gap Analysis Table

Calendar Year	2021	2022	2023
Total country population	50,274,755	51,701,503	53,178,554
Population at risk for malaria	37,706,066	38,776,127	39,883,916
PMI-targeted at-risk population	37,706,066	38,776,127	39,883,916
RDT Needs			
Total number of projected fever cases	24,937,356	26,679,649	26,804,703
Percent of fever cases tested with an RDT	34%	35%	36%
RDT Needs (tests)	**8,416,358**	**9,304,528**	**9,649,693**
Needs Estimated based on a Combination of HMIS and Consumption Data			
Partner Contributions (tests)			
RDTs from Government	*0*	*2,500,000*	*0*
RDTs from Global Fund	4,130,000	2,700,000	3,137,837
RDTs from other donors	0	0	0
RDTs planned with PMI funding	4,900,000	4,200,000	4,000,000
Total RDT Contributions per Calendar Year	***9,030,000***	***9,400,000***	***7,137,837***
Stock Balance (tests)			
Beginning Balance	6,209,487	6,823,129	6,918,601
- Product Need	8,416,358	9,304,528	9,649,693
+ Total Contributions (received/expected)	9,030,000	9,400,000	7,137,837
Ending Balance	6,823,129	6,918,601	4,406,745
Desired End of Year Stock (months of stock)	9	9	9
Desired End of Year Stock (quantities)	6,312,268	6,978,396	7,237,270
Total Surplus (Gap)	***510,861***	***(59,794)***	***(2,830,524)***

Key Question 5

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

Supporting Data

The estimated need for ACTs in CY 2021 is 5.9 million, 5.9 million in CY 2022, and 6.1 million in CY 2023. There are no projected gaps during this time period and the targeted nine months of stock at the end of each year should be met.

Table A-14. ACT Gap Analysis Table

Calendar Year	2021	2022	2023
Total country population	50,274,755	51,701,503	53,178,554
Population at risk for malaria	37,706,066	38,776,127	39,883,916
PMI-targeted at-risk population	37,706,066	38,776,127	39,883,916
ACT Needs			
Total projected number of malaria cases	5,941,325	5,934,621	6,067,513
Total ACT Needs (treatments)	***5,941,325***	***5,934,621***	***6,067,513***
Needs Estimated based on a Combination of HMIS and Consumption Data			
Partner Contributions (treatments)			
ACTs from Government	*300,000*	*0*	*1,300,000*
ACTs from Global Fund	1,483,500	4,600,000	6,400,000
ACTs from other donors *[specify donor]*	0	0	0
ACTs planned with PMI funding	5,199,990	1,920,000	1,550,000
Total ACTs Contributions per Calendar Year	***6,983,490***	***6,520,000***	***9,250,000***
Stock Balance (treatments)			
Beginning Balance	5,027,896	6,070,061	6,655,440
- Product Need	5,941,325	5,934,621	6,067,513
+ Total Contributions (received/expected)	6,983,490	6,520,000	9,250,000
Ending Balance	6,070,061	6,655,440	9,837,927
Desired End of Year Stock (months of stock)	9	9	9
Desired End of Year Stock (quantities)	4,455,994	4,450,966	4,550,634
Total Surplus (Gap)	***1,614,067***	***2,204,474***	***5,287,292***

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

Only facility-based healthcare workers are permitted to administer pre-referral parenteral artesunate when severe malaria is diagnosed at a peripheral facility. Parenteral artesunate will be used for pre-referral treatment at all peripheral facilities and definitive treatment of severe malaria at all referral facilities. Rectal artesunate is not currently used in Kenya. The estimated need for injectable artesunate in CY 2021, CY 2022, and CY 2023 is 1.09 million per year, which will be met. However, an anticipated gap of approximately 162,000 vials is expected in 2021 in meeting the nine-month desired end-of-year stock.

Table A-15. Injectable Artesunate Gap Analysis Table

Calendar Year	2021	2022	2023
Injectable Artesunate Needs			
Projected number of severe cases	196,526	196,159	195,649
Projected number of severe cases among children <5 years	78,610	78,464	78,260
Average number of vials required for severe cases among children <5 years	4	4	4
Projected number of severe cases among children 5-15 years	70,749	70,617	70,434
Average number of vials required for severe cases among children 5-15 years	5	5	5
Projected number of severe cases among adults >=15 years	47,166	47,078	46,956
Average number of vials required for severe cases among adults >=15 years	9	9	9
Total Injectable Artesunate Needs (vials)	***1,092,684***	***1,090,643***	***1,087,808***
Needs Estimated based on a Combination of HMIS and Consumption Data			
Partner Contributions (vials)			
Injectable artesunate from Government	0	850,000	340,000
Injectable artesunate from Global Fund	510,000	250,000	480,000
Injectable artesunate from other donors [specify donor]			
Injectable artesunate planned with PMI funding	500,000	250,000	300,000
Total Injectable Artesunate Contributions per Calendar Year	***1,010,000***	***1,350,000***	***1,120,000***
Stock Balance (vials)			
Beginning Balance	740,131	657,447	916,804
- Product Need	1,092,684	1,090,643	1,087,808
+ Total Contributions (received/expected)	1,010,000	1,350,000	1,120,000
Ending Balance	657,447	916,804	948,997
Desired End of Year Stock (months of stock)	9	9	9
Desired End of Year Stock (quantities)	819,513	817,982	815,856
Total Surplus (Gap)	***(162,065)***	***98,822***	***133,141***

Key Question 7

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

Supporting Data

No other standard antimalarial drugs are procured by PMI for use in Kenya.

Key Question 8

Are first-line ACTs effective and monitored regularly?

Supporting Data

To leverage institutional capacities to the fullest, PMI and the Global Fund agreed in February 2020 that PMI would assume sole funding and technical responsibilities for therapeutic efficacy studies (TES) in all PMI-supported African countries, including where the Global Fund currently or previously funded a TES. The first PMI-funded TES conducted after this transition began enrolling participants in March 2021 at two sites (Makhonge Health Centre in Bungoma County, and Kaluo Health Centre in Siaya County), and WHO recommends conducting a TES every two years at multiple sites. Before this, the TES conducted in Siaya in 2016–2017 found a day 28 PCR-corrected efficacy of 88.5 percent (95 percent confidence interval: 80.9–93.3 percent) for AL and day 42 efficacy of 93 percent (95 percent confidence interval: 86.9–96.4 percent) for dihydroartemisinin-piperaquine (DP), indicating that both AL and DP were efficacious treatments for uncomplicated malaria in western Kenya, but that AL efficacy, defined by WHO as efficacy above 90 percent, might be waning.

Table A-16. Recently completed and ongoing antimalarial TES

Most Recent Study Year	Sites	PMI Funded (Y/N)	Treatment Arms	PCR-Corrected Efficacy>90% (Y/N)
2016–2017[27]	Siaya	Y	AL	N
2016–2017[28]	Siaya	Y	DP	Y
2021	Siaya	Y	AL	TBD
2021	Siaya	Y	DP	TBD
2021	Bungoma	Y	AL	TBD
2021	Bungoma	Y	DP	TBD
2023	TBD	Y	TBD	TBD

Key Question 9

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

Supporting Data

CCMm is not currently funded to provide full coverage in PMI's eight focus counties in the lake endemic region. Global Fund has committed to double its CCMm efforts in the upcoming grant cycle to reach 60 percent

[27] Westercamp, N., Owidhi, M., Otieno, K., et al. (Pre-Publication.) Efficacy of artemether-lumefantrine and dihydroartemisinin-piperaquine for the treatment of uncomplicated Plasmodium falciparum malaria among children in western Kenya, 2016–2017.
[28] Ibid.

coverage by 2024. PMI currently has relatively small investments in CCMm activities and should consider expanding its activities at the community level to narrow the coverage gap in the eight PMI focus counties as funding allows; however, this expansion is not currently possible with available funds.

Conclusions for Case Management Investments

With FY 2022 investments, PMI will conduct similar activities with a slightly lower budget due to overall reductions in funding. The activities will include the following:

- Support and expand the capacity of the DNMP to oversee and manage case management activities, including those at the community level.
- Build upon progress to date in scaling up malaria diagnostic testing capacity, strengthening treatment practices and patient management, and implementing quality assurance and quality control systems.
- Monitor the use and supply of RDTs and ACTs and work with the DNMP to avoid stockouts at county and lower levels.
- Procure approximately 1.55 million AL treatments, 300,000 vials of injectable artesunate, and 4.0 million RDTs to meet the projected annual need. Additionally, PMI will work with the DNMP during the upcoming KMS review to better document current practice and gaps in meeting its objectives.

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

2.2. DRUG-BASED PREVENTION

DNMP Objective

According to the KMS 2019–2023, drug-based prevention of MIP falls under Objective One, which states that 100 percent of the people living in malaria risk areas will be accessing appropriate malaria preventive interventions by 2023.

DNMP Approach

The DNMP's approach to MIP, as described in the KMS 2019–2023, involves providing IPTp at ANC in targeted areas in the endemic regions of the country and utilizing CHVs to identify missed opportunities to deliver IPTp and refer those women to health facilities for services. IPTp is given to all pregnant women in the 14 targeted counties, most of which are located in malaria endemic regions of the country. However, as part of the 2018 Malaria Program Review, four counties outside of the country's malaria endemic regions were recommended to receive IPTp, namely Kisii, Nyamira, and Nandi counties and Cheptais Subcounty in Bungoma County as shown in the map below.

Figure A-18. Map of counties in which IPTp is provided to pregnant women in Kenya

Within the MOH, the delivery of MIP services is facilitated collaboratively by the DNMP and the Division of Family Health, which chairs the MIP COE meetings between the two divisions related to improving the uptake of IPTp. The two divisions collaborated last year to ensure the new MIP data collection tools to capture IPTp3 were disseminated to all health facilities in malaria-endemic regions.

PMI Objective in Support of DNMP

PMI supports IPTp and the use of SP, which is made available in all ANC clinics in health facilities in targeted counties. Pregnant women are expected to get their first dose of IPTp at 13 weeks. Doses are usually administered by health workers at ANC clinics as directly observed treatments.

PMI-Supported Recent Progress (FY 2020)

PMI supported the following activities at the national level and in the specific counties where most of PMI's support is focused:

- Trained a total of 1,047 healthcare workers and 1,500 CHVs from the eight counties targeted for MIP in the lake endemic region of Western Kenya. Trainings addressed MIP and CCMm.
- Trained 112 mentors to support a cascade of MIP trainings in health facilities in targeted subcounties. Mentors were recruited from 16 subcounties, each of which had several mentors.
- Facilitated meetings to review health and community workers in-service curriculums to identify guidelines, standard operating procedures, and orientation materials related to MIP that needed updating.
- Supporting the MIP COE's deliberations on distribution plans for revised IPTp3 data recording tools and revisions to malaria case management guidelines. Participants in these meetings included representatives from the Division of Reproductive Health, WHO, CDC, PMI, and learning institutions.

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

In FY 2021, PMI will continue to support the government's efforts to control malaria in pregnant women through the following activities:

- Continued support for quarterly MIP COE meetings at the national level.
- Facilitating interagency meetings on MIP at the national level.
- Training 1,400 health workers, some of whom would have graduated from medical colleges and some in the field, on MIP intervention packages, supportive supervision, and mentoring.
- Distributing the new data recording tools for IPTp3 in the ANC register.
- Facilitating refresher training on the revised ANC schedules for 2,000 health workers from 650 health facilities/
- Training 2,500 CHVs at the community level to support continuation of activities geared toward demand creation for ANC and MIP through social mobilization and dissemination of information to pregnant women in the communities.
- SBC interventions aimed at increasing demand for IPTp and other ANC-related services.

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

2.2.1. MALARIA IN PREGNANCY (MIP)

Key Goal

Support the national strategy for MIP, which includes providing ITNs at the first ANC visit, a minimum of three doses of IPTp in malaria endemic areas starting at 13 week's gestational age, and effective case management of malaria per WHO guidelines.

Key Question 1a

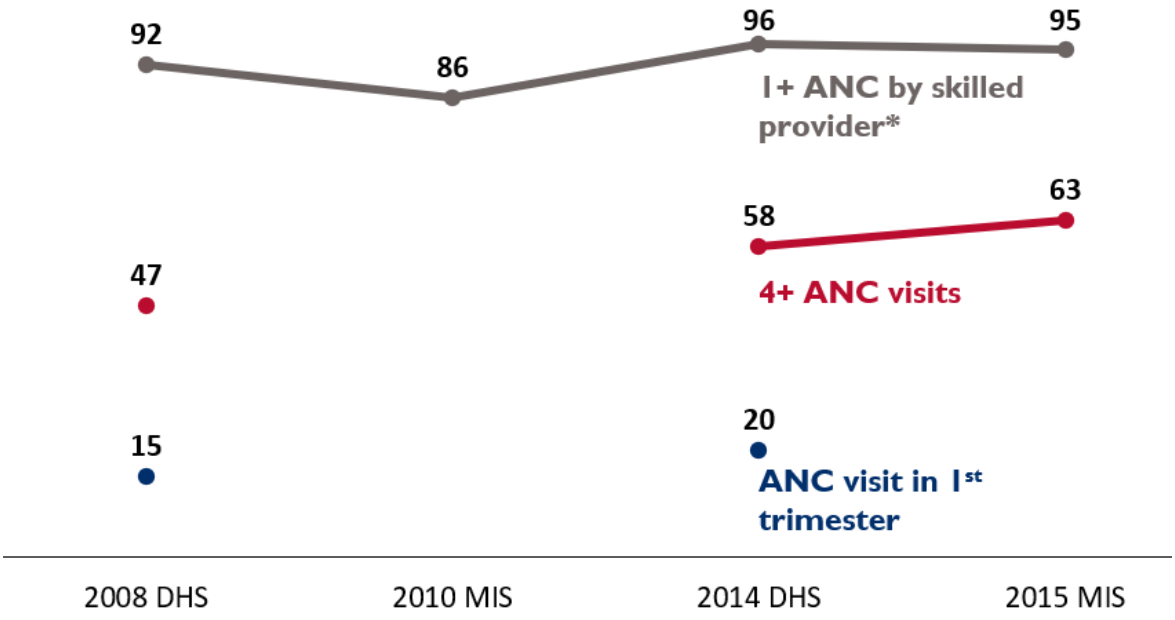
What proportion of pregnant women are accessing ANC early and frequently (as recommended by national and/or WHO strategies) during their pregnancy?

Supporting Data

While the proportion of pregnant women attending four or more ANC visits in the first trimester increased from the 2014 DHS (58 percent) to the 2015 MIS (63 percent), the proportion is still far below the target of 80 percent in the KMS 2019–2023, as well as the revised WHO guidelines, which advocate for eight visits. It is therefore important to identify social, structural, internal, and environmental barriers that might be preventing women from achieving the desired number of ANC visits. In line with the revised WHO guidelines, the Kenyan MOH revised the targeted number of ANC visits to eight for all health facilities in the country in 2020. As part of its support to the DNMP for their efforts to improve ANC attendance, PMI will support SBC to address the identified factors and strengthen the capacity of both healthcare workers and CHVs to deliver ANC services.

Figure A-19. 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.*

Key Question 1b

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

Supporting Data

There are several health systems and behavioral barriers that affect ANC attendance at health facilities. Notably, since the outbreak of COVID-19 in March 2020, outpatient health services utilization decreased in most health facilities by more than 36 percent as observed in a study carried out by the MOH in July 2020. The study showed that ANC attendance dropped from March to May 2020, increasing slightly in June 2020.[29]

[29] Ministry of Health. (2020). Impact of COVID-19 on Essential Health Services in Kenya. Government of Kenya.

However, on a more routine basis, inadequate human resources, stockouts, healthcare worker attitudes, distance, and costs have been identified as barriers to ANC attendance. According to several studies and MOH reports, lower-level facilities are understaffed, leading to long waiting times that demotivate clients from returning for subsequent visits.[30] Similarly, reports of stockouts can deter women from visiting health facilities for ANC. Starting in late 2019 and extending through October 2020, there were SP stockouts in some health facilities in the lake endemic regions where IPTp is supported.

Economic challenges and the distance to health facilities have also been identified as barriers to ANC attendance. Specifically, laboratory costs associated with conducting ANC profiles have been cited as deterring women from attending ANC, or delaying their attendance while they raise the necessary funds.[31] Similarly, the distance to health facilities has been identified as deterring women from seeking care due to the cost of transportation and availability of a vehicle.[32] Healthcare worker attitudes have also been identified as a barrier to ANC attendance. Some pregnant women who visit health facilities, especially adolescents and those with short intervals between pregnancies, are put off by health workers' comments and may hesitate to ask questions or attend additional visits.[33] The 2018 Malaria Program Review concluded that healthcare workers do not spend sufficient time explaining to clients the frequency with which ANC visits should take place, which likely contributes to a limited number of subsequent visits.

Conversely, there are also a number of factors that help to facilitate ANC attendance. For instance, a past qualitative study found that respondents' knowledge of the potential adverse effects of malaria on pregnant women, including the possibility of miscarriage, was a driver to ANC attendance and IPTp uptake.[34] A recent pilot study in four lake endemic counties of Western Kenya also demonstrated that CHV referrals can be a powerful strategy for driving ANC attendance and IPTp uptake.[35] The policy environment is also supportive of ANC attendance, with Kenya in 2020, adopting the WHO's 2016 guidance around starting IPTp between 13 and 16 weeks. The table below shows the recommended IPTp provision schedule in Kenya.

[30] Health Communications and Marketing. (2017). Malaria qualitative study in endemic and epidemic zones in Kenya.
[31] Dellicour, S., et al. (2016). Effectiveness of the delivery of interventions to prevent malaria in pregnancy in Kenya.
[32] Health Communications and Marketing. (2017). Malaria qualitative study in endemic and epidemic zones in Kenya.
[33] Pell, C., et al. (2013). Factors affecting ANC attendance: Results from qualitative studies in Ghana, Kenya and Malawi.
[34] Health Communications and Marketing. (2017). Malaria qualitative study in endemic and epidemic zones in Kenya.
[35] Division of the National Malaria Program. (2018). Malaria Program Review 2018. Government of Kenya.

Figure A-20. IPTp provision schedule for 2020

Timing of Contact	Dose #
1: Up to 12 weeks	
1a: 13-16 weeks	IPTp-SP dose 1
2: 20 weeks	IPTp-SP dose 2
3: 26 weeks	IPTp-SP dose 3
4: 30 weeks	IPTp-SP dose 4
5: 34 weeks	IPTp-SP dose 5
6: 36 weeks	No SP, if last dose received <1 month ago
7: 38 weeks	IPTp-SP dose 6 (if no dose in past month)
8: 40 weeks	

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

Key Question 2

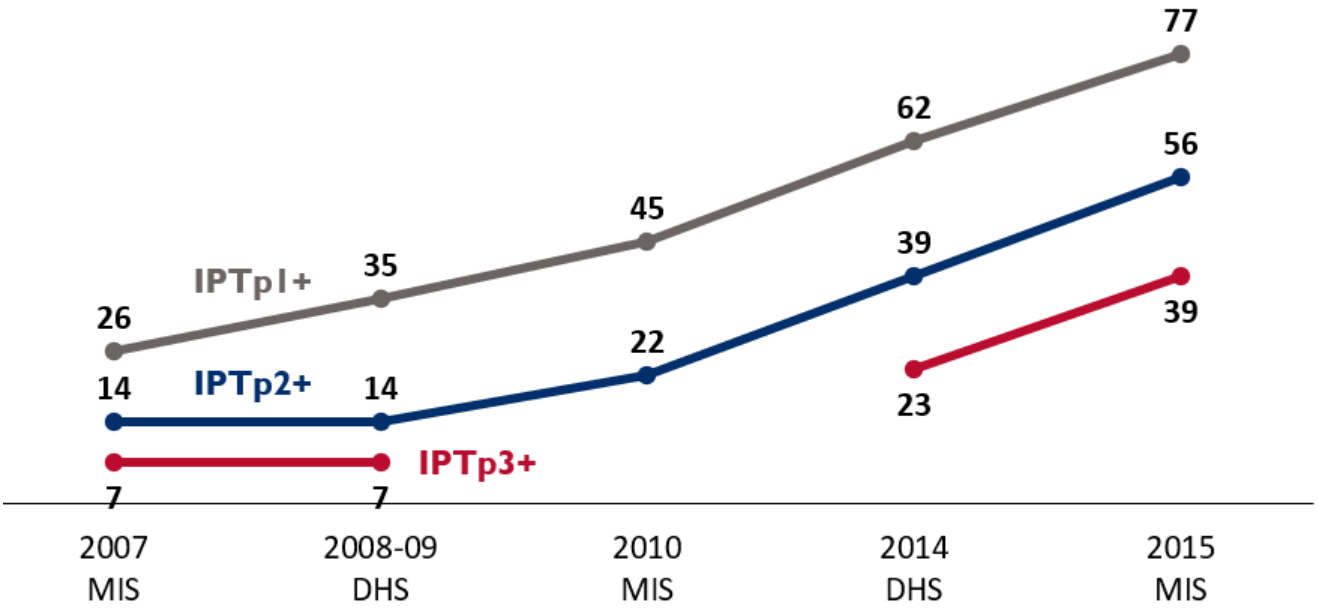
What proportion of pregnant women are receiving the recommended doses of IPTp?

Supporting Data

The proportion of pregnant women receiving the recommended number of IPTp doses (a minimum of three) remains low. While coverage for IPTp1 was 77 percent and IPTp2 was 56 percent in the 2015 KMIS, IPTp3 was very low at 36 percent. In the recent 2020 KMIS, IPTp uptake decreased further at the national level to 30 percent for IPTp2 and 22 percent for IPTp3. However, in the lake endemic region where IPTp is targeted, the KMIS 2020 showed an increase in uptake to 68 percent and 48.6 percent for IPTp2 and IPTp3, respectively, compared with 55.4 percent and 36 percent in the 2015 KMIS. This, however, is still far below the national target of 100 percent. The DNMP and PMI have been working closely with county governments to ensure that more pregnant women complete their scheduled ANC visits and receive the recommended number of doses of IPTp during their pregnancies. Declines in ANC attendance and, as a result, IPTp, were observed during an SP stockout in FY 2020 Q3 and were compounded by COVID-19 and a health worker strike in the same quarter.

Figure A-21. National trends in IPTp in Kenya

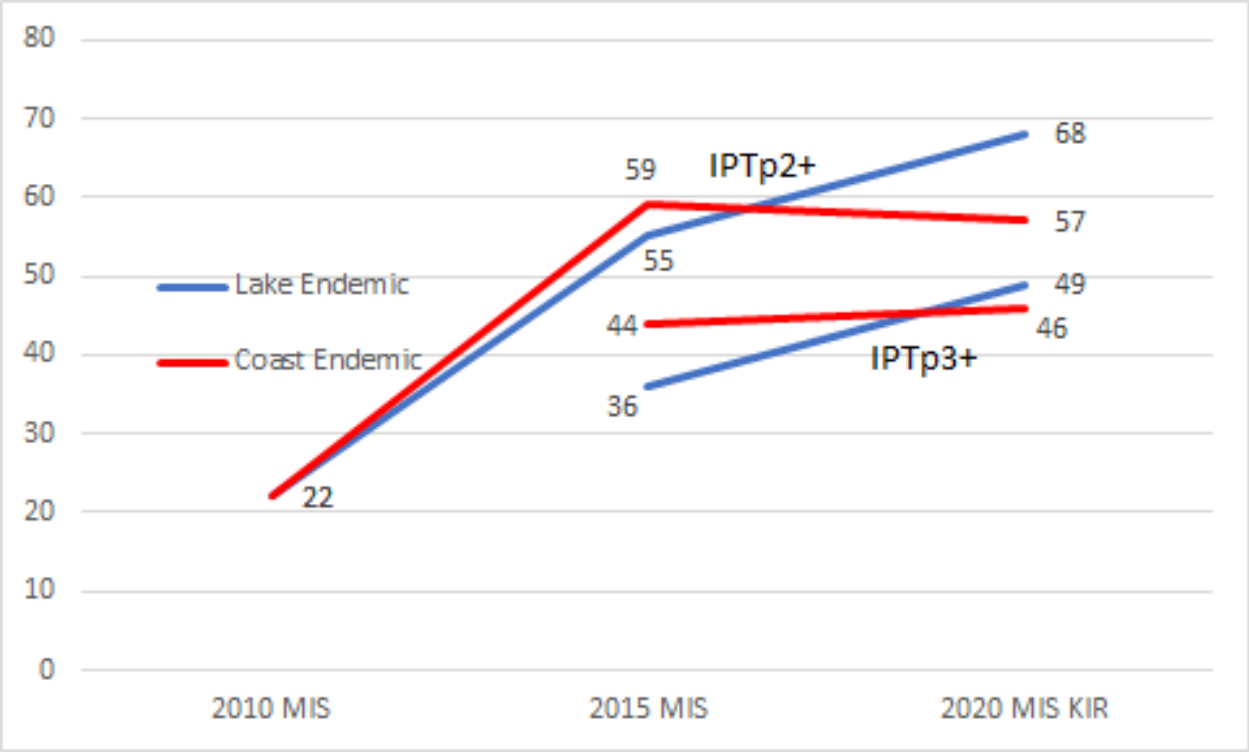
Women 15 to 49 years of age with a live birth in the two years before the survey who received the specified number of doses of SP/Fansidar during their last pregnancy



**National totals have been recalculated to only include regions where IPTp programs are implemented*

Please note that the IPTp3 baseline uses the first survey available after the recommendation was updated to three or more doses.

Figure A-22. Trends in IPTp2+ and IPTp3+ in the lake and coastal endemic regions of Kenya



Key Question 3a

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

Supporting Data

The gap between women who made four or more ANC visits and those who received three or more doses of IPTp has remained relatively wide, ranging from 40 percent in the 2008 DHS to 24 percent in the 2015 KMIS. This suggests that there are significant missed opportunities for the delivery of IPTp at ANC. Stockouts, late first attendance, a lack of appropriate data collection tools, and healthcare worker strikes are all likely contributing factors. From March to July 2020, there were stockouts of SP in the country. Uptake of IPTp, compared with ANC, subsequently dropped, as shown in the figure below, which draws on data from KHIS. During that period, the country was also experiencing an acute phase of the COVID-19 pandemic and curfew with restrictive measures that interfered with travel further exacerbated the situation. There is also some evidence to suggest that inadequate reporting forms have contributed to underreporting of IPTp. In September 2020, a revised tool for forwarding IPTp3 data to KHIS was introduced in health facilities. Following the introduction of the revised form, IPTp3 increased from less than 5 percent to about 41 percent in December 2020.

Figure A-23. Proportion of pregnant women attending ANC and receiving IPTp2 and 3 doses

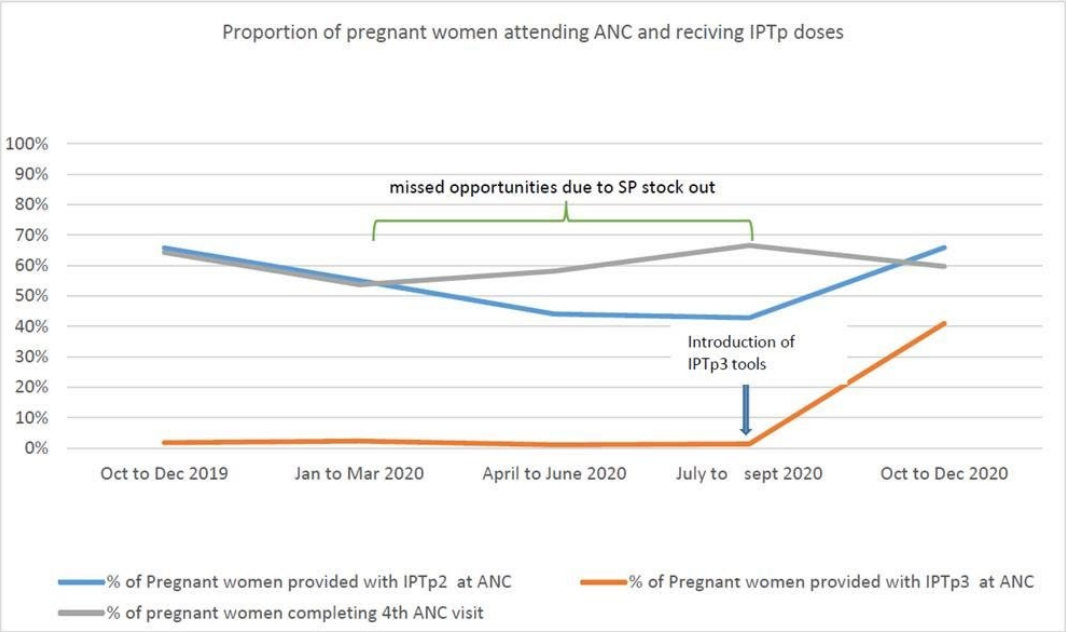
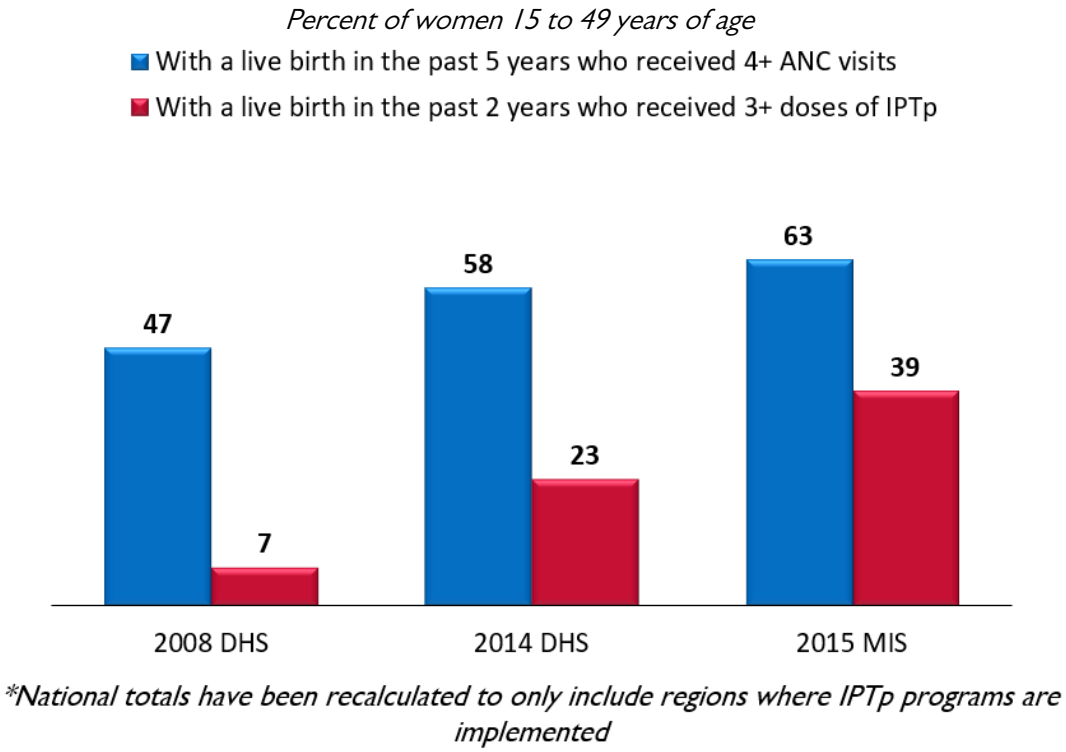


Figure A-24. Trends in missed opportunities for IPTp



**National totals have been recalculated to only include regions where IPTp programs are implemented*

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

A number of health systems factors have been identified as affecting provider delivery of MIP services by health workers, including the following:

- A lack of MIP guidelines and job aids at some health facilities
- Inadequate supplies for administration of IPTp (e.g., no cups, no running water, etc.)
- Occasional stockouts of SP, the medication used for IPTp, and delayed delivery of ITNs
- Gaps in knowledge about MIP services among newly qualified health workers posted to health facilities
- Inadequate staffing at some health facilities
- Lack of training of CHVs on MIP services and counseling for pregnant women
- Inadequate data reporting tools among CHVs and challenges related to completing the forms, which results in incomplete information on services rendered for IPTp uptake

There is limited evidence to suggest that provider beliefs, values, or attitudes are influencing provider delivery of MIP services. Rather, the biggest issues seem to be structural in nature, with a need for ensuring facilities are appropriately staffed, that medications and materials are available, and that staff are adequately trained on administration and reporting of MIP services. To address these challenges, PMI will continue to invest in capacity-building related to MIP services through training, mentorship, and supportive supervision of healthcare workers.

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

Previously, data collected through KHIS provided the proportion of pregnant women diagnosed with malaria in outpatient departments. The system did not, however, track testing rates, diagnostic test outcomes, or treatments administered. However, in October 2020, new tools that collect these data were introduced. The DNMP and PMI are currently in the process of disseminating these tools to ensure that all facilities and health workers in counties where IPTp services are offered are using the tools to record data on the proportion of women presenting with fever and their management.

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 Commodities Management Sub-Committee carries out an annual quantification exercise to establish the country's need for supplies of various malaria control and prevention tools. The current gap analysis uses data from last year's quantification exercise that was updated in February 2021. The estimated need for SP from 2021–2023 is about 3.3 million doses. This need will be met through GOK counterpart financing. PMI will not be allocating resources to procure SP because there are no anticipated gaps over this period. However, there is additional need in each of the years to meet the desired nine months of stock at the end of the year. See details on the Gap Analysis table.

Table A-17. SP Gap Analysis Table

Calendar Year	2021	2022	2023
Total Country Population	50,274,755	51,701,503	53,178,554
Total Population at Risk for Malaria	37,706,066	38,776,127	39,883,916
PMI Targeted at Risk Population	37,706,066	38,776,127	39,883,916
SP Needs			
Total Number of Pregnant Women	472,093	484,113	496,470
Proportion of women expected to attend ANC1 at 13 weeks or greater	82.5%	85.0%	87.5%
Proportion of women expected to attend ANC2	63%	65%	70%
Proportion of women expected to attend ANC3	43%	50%	63%
Proportion of women expected to attend ANC4	25%	28%	30%
Total SP Needs (treatments)	***1,003,197***	***1,101,358***	***1,241,175***
Needs Estimated based on HMIS Data			
Partner Contributions (treatments)			
SP from Government	500,000	1,100,000	1,133,333
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	***500,000***	***1,100,000***	***1,133,333***
Stock Balance (treatments)			
Beginning balance	1,192,035	688,837	687,479
- Product Need	1,003,197	1,101,358	1,241,175
+ Total Contributions (Received/expected)	500,000	1,100,000	1,133,333
Ending Balance	688,837	687,479	579,638
Desired End of Year Stock (months of stock)	9	9	9
Desired End of Year Stock (quantities)	752,398	826,018	930,881
Total Surplus (Gap)	***(63,561)***	***(138,539)***	***(351,244)***

Conclusions for MIP Investments

The data presented above indicates slow progress toward the country's recommended three doses of IPTp before delivery. PMI, the DNMP, and affected counties continue working in collaboration to ensure that factors hindering optimal uptake of IPTp are addressed. Consistent with the 2018 Malaria Program Review, MIP services will be expanded to cover the new counties, namely Kisii, Nyamira, Nandi, Kericho, and Cheptais subcounty in Bungoma. PMI will use its FY 2022 investments to support these efforts by the following:

- Supporting the DNMP in the review and updating of guidelines on MIP to support the GOK and other stakeholders in the use of appropriate tools and protocols for the management of MIP.
- Organizing quarterly COE meetings to discuss issues related to MIP implementation.
- Supporting training of health workers who offer services in ANC, including training some health workers as mentors to ensure continuity among health workers who are new to ANC services.

- Training health records information officers (HRIOs) on the use of the new MIP data collection tools, which include revised schedules based on WHO's 2016 guidance on ANC attendance and IPTp.
- Training CHVs on MIP and SBC to generate demand among pregnant women. Specifically, CHVs will be trained on use of appropriate channels of communication for different types of messages to pregnant women and their spouses.
- Piloting a group ANC approach to strengthen counseling of pregnant women, in which pregnant women of the same gestational age are grouped together to receive ANC services on the same day and meet as a group to discuss their experience in meetings facilitated by health workers. This activity was planned to start in January 2020, but after the outbreak of COVID 19 the implementation could not continue; hopefully, when conditions allow the activity will continue.

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 Kenya.

2.2.3. ADDITIONAL DRUG-BASED PREVENTIVE STRATEGIES

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

3. CROSS-CUTTING AND OTHER HEALTH SYSTEMS

3.1. SUPPLY CHAIN

DNMP Objective

Objective 6 of the KMS 2019–2023 focuses on provision of leadership and management for optimal implementation of malaria interventions for the achievement of all strategic objectives by 2023. This encompasses supply chain, which is also reflected in the list of strategic approaches proposed by the DNMP. Strategies 5 and 6 aim to enhance malaria commodity security at all levels of the health system and strengthen the availability and use of quality supply chain data for decision-making.

DNMP Approach

The approach for supply chain strengthening for enhanced malaria commodity security outlined in the KMS 2019–2023 includes the following:

- Establishing a well-coordinated and comprehensive Procurement and Supply Management (PSM) Framework with clear terms of reference and broad representation of donors, implementing partners, and government stakeholders who serve as members of the PSM COE for efficient quantification, timely procurement, and distribution of commodities.

- Strengthening and continuing collaboration with regulatory authorities and relevant stakeholders to ensure patient safety, quality, and efficacy for malaria commodities. These authorities include the Pharmacy and Poisons Board and the National Quality Control Lab.
- Expanding the national logistics management information system (LMIS) and maintenance of a robust and functional health supply chain portal on DHIS2 to enhance end-to-end visibility of quality supply chain data and strengthened use of supply chain data for decision-making.

PMI Objective in Support of DNMP

PMI complements DNMP and other donor efforts to ensure uninterrupted supply of malaria commodities, which are essential and critical for quality malaria service delivery through support for procurement, warehousing, and distribution. PMI also supports the DNMP to strengthen supply chain systems through leadership and governance activities with the recently established Health Products and Technology Units (HPTUs) at the national and county level, national and county Commodity Security Technical Working Groups, and by building capacity for inventory management and pipeline monitoring toward enhanced commodity security.

PMI also works with the DNMP to ensure end-to-end visibility of quality supply chain data for decision-making at all levels of the system by investing in a robust LMIS within the DHIS2 that has the capability to receive complementary data from other sources.

PMI-Supported Recent Progress (FY 2020)

PMI has supported the following:

- Technical support to the Division of Health Products and Technology (HPT) to develop and launch the country's first comprehensive National HPT Strategy, which will guide the country's HPT investments and interventions from 2020–2025.
- Technical and financial support to the annual forecasting and quantification 2021 for all malaria commodities and malaria commodity gap analysis and supply planning to inform the Global Fund 2021–2024 grant proposal and the MOP commodity inputs.
- Served as a member of the DNMP's PSM COE and the Commodities Management subcommittee of the PSM and supported the PSM COE to undertake periodic pipeline monitoring of malaria commodities and address emerging stock gap challenges.
- Developed and deployed standard LMIS templates for monthly reporting and ordering of ITNs in 36 counties. More than 1.3 million ITNs were distributed to 4,339 health facilities in 34 counties between June 2020 and February 2021.
- Supported select high-burden counties to establish HPTUs embedded within the county organization structure for coordination and oversight for all health commodities and related supply chain issues in the county.
- Facilitated subcounty health management teams to convene forums with health facility in-charges to address priority commodity management-related issues, including commodity data capture and reporting for malaria commodities.
- Participated in the review and update of malaria reporting tools in the KHIS in line with the updated outpatient data capture tools and included routine ITNs in the appropriate MOH form for monthly reporting of malaria commodities.

- Helped ensure continuous availability of life-saving and essential medicines and medical supplies by facilitating a training of 34 healthcare workers on quantification and supply planning for essential medicines and medical supplies and supported a subsequent exercise to estimate commodity needs for Kakamega County for the period 2021–2022.

Some challenges that slowed or limited progress include:

- The lack of customs clearance for PMI-funded commodities, compounded by transition to a new warehousing and distribution mechanism, severely disrupted the malaria commodities pipeline and resulted in a central-level stockout of all malaria program commodities at one point in 2020.
- The COVID-19 pandemic affected care-seeking behavior in 2020, leading to a decline in demand for malaria services, which resulted in a decline in patient numbers at health facilities and increased risk of expiry of short shelf life commodities.
- Optimal use of the community platform to deliver malaria services was hampered by stockouts and/or low stock availability at link facilities.
- Lack of harmonized implementation of the malaria test and treat policy at the community level due to a 2019 court ruling that barred diagnostic testing by non-laboratory personnel, including CHVs.
- Widespread healthcare workers' strikes from November 2020 to January 2021 led to poor reporting in DHIS2 and reduced consumption of commodities.

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

PMI plans to support the following in FY 2021:

- Collaboration with DNMP to develop the Kenya Malaria Commodities Specifications document.
- Forecasting and quantification of malaria commodities for CY 2022.
- Deployment of an ITN data management system within the KHIS and expansion of the malaria module to enable order rationalization.
- Logistical support for the mass ITN distribution campaign in Bungoma County.
- Capacity-building of subcounty MOH officials to provide oversight for ITN management in 36 counties.
- Supportive supervision and accountability monitoring for ITNs, malaria medicines, and test kits in 36 counties.
- Strengthened governance and oversight for malaria commodities through strengthening of county HPTUs.
- Support to the Council of Governors for development of an accountability framework for strategic health commodities.

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 at 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 past year (2020)? If not, have they been under, over, or stocked out?

Supporting Data

For most of 2020, all AL weight bands were understocked at the central level (below six months of stock), ranging between two and four months of stock, and in some instances stocked out completely. This can be attributed to the challenges related to the provision of a tax waiver for PMI commodities that impacted the ability for timely in-country delivery and service delivery point availability of malaria commodities. Stock levels of AL rose in FY 2021 Q1 representing an increase in availability of malaria commodities following the release of funds by the GOK to cover taxes that enabled delivery of PMI-procured stock. Additional procurements through counterpart financing by GOK contributed to the increased months of stock.

Artesunate injection saw a sharp increase in stock availability from FY 2019 Q4 to FY 2020 Q3. This is the result of procurements through counterpart financing, Global Fund, and a donation from a Chinese company.

RDT stock levels fluctuated for most of 2020 and remained below minimum levels until FY 2021 Q1. The low stock levels were due to tax importation-related challenges in the country that impacted timely delivery of RDTs. In late 2020, GOK availed funds to pay the taxes, which enabled PMI to procure and deliver RDTs resulting in the increased stock levels seen in FY 2021 Q1.

SP was stocked out at central level from Q1 to Q3 of FY 2020, with three months of GOK counterpart financing and 14 months of PMI-funded stock received in FY 2020 Q4.

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?

Supporting Data

At the service delivery point, stockout rates for all AL weight bands fluctuated between FY 2019 Q4 and FY 2021 Q1 with stockout rates decreasing substantially (to less than 10 percent except for AL 6x1) in FY 2021 Q1. The declining stockout rates observed from FY 2020 Q4 across all weight bands can be explained by the GOK releasing funds to pay taxes that enabled delivery of PMI-funded AL. A reduction in total AL stockout (all weight bands) to almost zero in FY 2021 Q1 was a result of GOK releasing funds to pay taxes that enabled delivery of PMI-funded commodities.

The proportion of service delivery points stocked out of RDTs fluctuated over the period FY 2019 Q4 to FY 2021 Q1. The highest stockout rates were observed in the first quarter of 2020 due to tax waiver challenges for PMI funded commodities that resulted in stockouts at central level with a trickle effect at the SDPs. The proportion of facilities with RDT stockouts decreased substantially to less than 20 percent during 2020 Q2 when GOK funds became available to pay taxes for PMI funded commodities and additional RDTs were secured through GOK counterpart financing and Global Fund resources.

Ninety percent of SDPs had SP in stock with less than 10 percent stockouts observed in FY 2019 Q4. In 2020, the percentage of SDPs stocked out of SP increased to 30 percent in Q3 and a decline was noted thereafter to 20 percent in FY 2021 Q1.

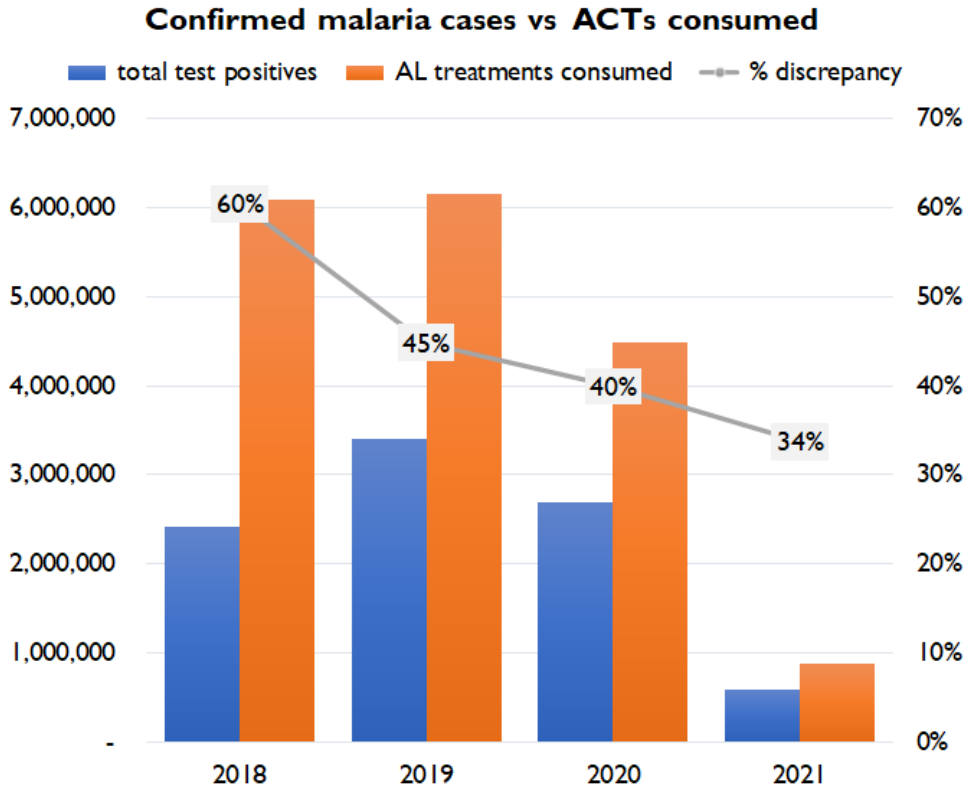
Key Question 3

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

The graph below shows a 60 percent difference between ACTs consumed and malaria cases in 2018. This difference has declined progressively over the last three years to 34 percent in 2021. The differences observed between ACTs consumed and malaria cases can be attributed to patients getting ACTs without a positive test result due to either lack of diagnostics services (RDTs and microscopy) or noncompliance with test and treat guidelines (i.e., negative test or non-tested getting treated with AL). There is improved adherence to treatment guidelines noted over the years that can be attributed to investments in supervision, mentorship, and refresher training of healthcare workers on the malaria treatment guidelines.

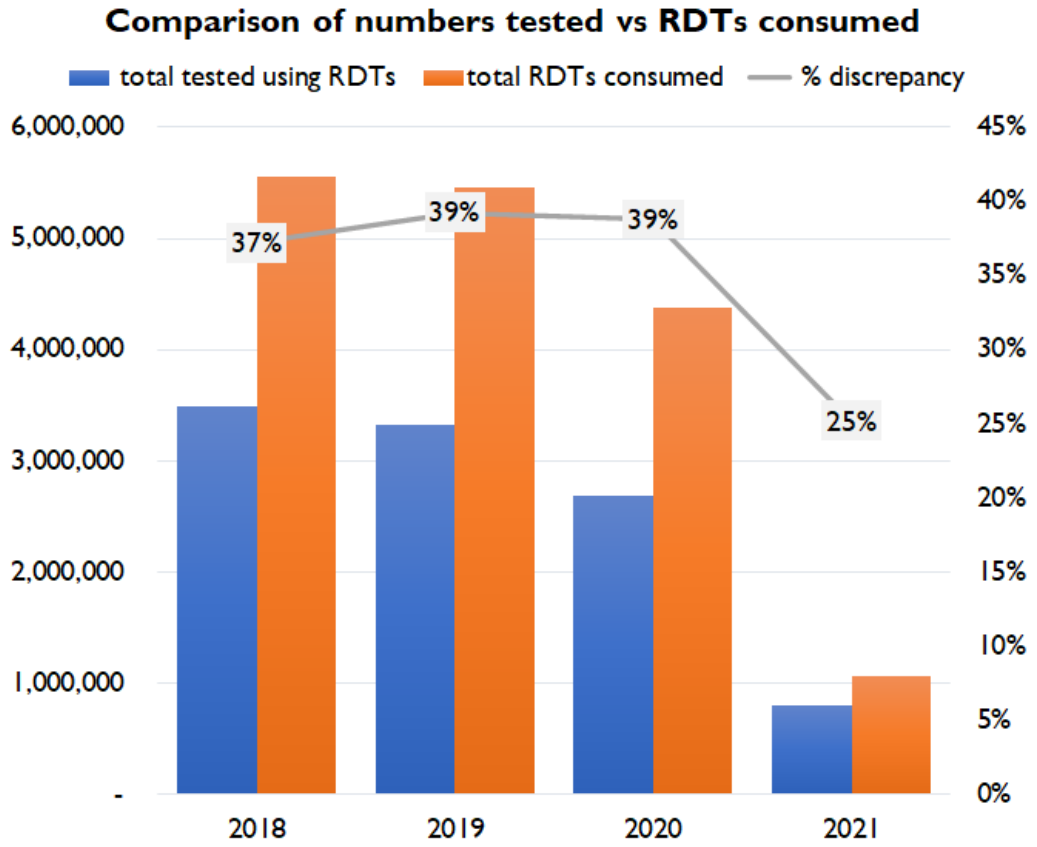
Figure A-25. Difference between quantities of ACTs consumed and malaria cases in Kenya



The graph below shows a 39 percent discrepancy between RDTs consumed and numbers tested in 2019 and 2020 with improvement (25 percent) noted in 2021. The discrepancy is attributed to the use of different forms for data capture on RDTs consumed and numbers tested. These differences are as a result of challenges with documentation of laboratory (RDT) test data at different testing points within a facility, which is not fully aggregated within the summary monthly report, and the use of a different tool to capture consumption data.

These two data sets are not harmonized. These challenges have been progressively addressed through DQAs, county data review meetings, and advocating for streamlining of malaria diagnostics data capture tools.

Figure A-26. Differences between RDTs consumed and numbers tested in Kenya



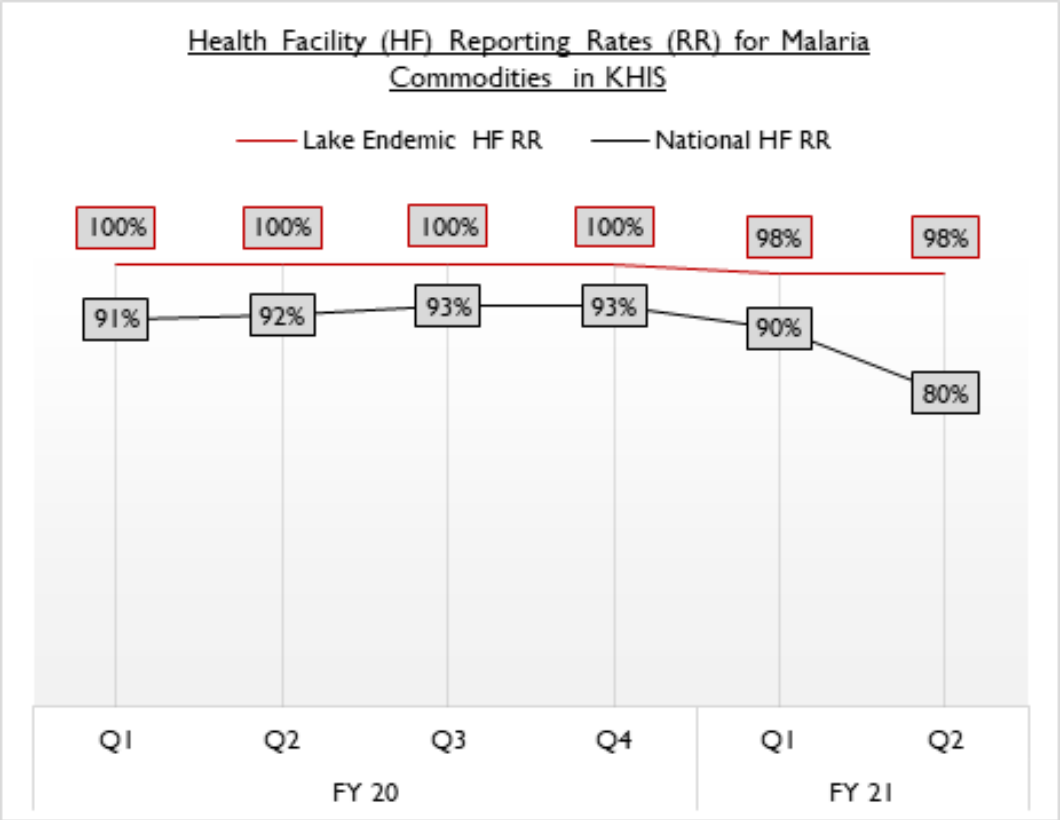
Key Question 4

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

Supporting Data

Kenya has high LMIS reporting rates: above 90 percent for the country in FY 2020, with a drop to 80 percent observed in FY 2021 Q2 and reporting rate consistently above 98 percent for lake endemic counties visible through KHIS. Lower-level data is captured on manual forms that are then uploaded at the subcounty level. Kenya has invested in a robust health commodities dashboard that is embedded in KHIS and used to aggregate and analyze community-, facility-, and national-level data and includes data on pending shipments. Kenya is almost fully dependent on routine data and utilizes surveys to validate routine data findings and to obtain information on specific indicators for forecasting purposes such as testing rates and adherence to treatment guidelines.

Figure A-27. LMIS reporting rate in Kenya



To a small extent, quality of data is tracked routinely in the health commodity dashboard, which looks at completeness and consistency by county and also triangulates service and commodity data on the dashboard. Commodity data verification is also undertaken at the subcounty level as part of routine supervision. These exercises involve comparing primary source documents with summary reports and KHIS data. Typically, there are significant differences observed between the monthly summary and primary source document and minimal differences between KHIS and summary documents. The cause of these discrepancies is likely the high workload, especially in lake endemic counties where daily activity registers are not always updated and where bin cards are used for estimates.

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

PMI supply chain technical assistance is distributed across the national level (26 percent) and the eight high-burden malaria endemic counties (74 percent). PMI also provides technical support to other divisions of the MOH that form an integral part of the supply chain ecosystem, including the Division of Health Products and

Technologies, Pharmacy and Poisons Board, and the National Quality Control Lab. National-level technical assistance encompasses priorities outlined in the KMS 2019–2023 and the National Supply Chain Strategy for cascade to non-PMI focus counties.

Table A-18. PMI funding for supply chain technical assistance at the national and county level

Level of MOH	Activity	Total
National (National Malaria Control Program)	Monitoring, evaluation, and learning	10.0%
	Policy, strategy, and regulatory support for supply chain	9.6%
	Capacity-building for supply chain leadership and governance	4.5%
	Forecasting, quantification, supply planning, and end-to-end supply chain visibility	1.8%
	Total	**25.9%**
County (Eight High-Burden Counties)	Strengthen commodity security and accountability for malaria commodities	28.2%
	Strengthen county leadership and governance for supply chain	10.7%
	Strengthen the use of KHIS data for order management and supply chain decision-making	0.8%
	Mass net campaign (micro-planning and distribution) in Bungoma County	34.4%
	County Total	**74.1%**
	Overall Total	**100.0%**

At the national level, PMI investments support the following:

- Forecasting and supply planning of malaria commodities.
- Technical and logistical support for relevant COEs including regular pipeline monitoring, production of monthly stock status reports and quarterly PPMRs for malaria.
- Organizational capacity development to the National Division of Health Products and Technology for leadership and governance.
- Development and review of Procurement and Supply Management malaria related policy documents.
- Procurement, warehousing, and distribution of malaria commodities [PMI (50 percent), Global Fund (40 percent), and GOK (10 percent via counterpart financing)].
- LMIS and end-to-end supply chain visibility.

- Monitoring, evaluation, and learning.

At the county level, PMI investments support the following:

- Establishment and functionality of county HPTUs for commodity security coordination and oversight.
- Capacity-building of county teams for commodity management and accountability.
- Commodity data quality improvements.
- Facilitation for commodity management supportive supervision for subcounty teams to health facilities.
- LMIS and end-to-end supply chain visibility

Finally, to continue to strengthen local capacity and ownership, PMI supports the following:

- Ownership of commodity security by GOK and county leadership.
- Domestic resource mobilization toward commodity procurement.
- Mainstream reporting on all malaria commodities to nationally owned tools.
- End-to-end visibility and continuous improvements to the Malaria Dashboard, which pulls data from KHIS and commodity partners, to inform decision-making and enable tracking of supply chain indicators, order rationalization, management, and resupply.
- Development and deployment of an accountability framework for HPTs.
- County-level implementation of the National Supply chain strategy.

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

Technical assistance is prioritized in areas with the highest burden of malaria. The lake endemic counties in western Kenya account for 70 percent of malaria commodity needs and therefore PMI prioritizes these counties for supply chain technical assistance. Complementary funding from the Global Fund and GOK determines allocation for quantities to be procured and cascade support to non PMI focus counties. Global Fund supports tool printing for malaria commodities.

Integrated distribution with essential medicines lowers the overall cost for warehousing and distribution. The current budget does not cover standalone distribution costs that may result from parallel distribution if we are not able to combine with essential medicines or other commodity distribution.

Conclusions for Supply Chain Investments

With FY 2022 investments, PMI will do the following:

- Expand supply chain activities to build structures for ITN accountability and malaria commodities in 36 counties.
- Strengthen reporting of ITNs commodity data on KHIS.
- Establish and support functionality of the HPTUs at the county level in 36 counties.
- Strengthen performance of supply chain indicators.

- Provide technical assistance for finalization and implementation of the HPT Accountability Framework, a collaborative effort between the HPT, Council of Governors, and PMI.
- Support digitally enabled supportive supervision phased rollout including data uploading in KHIS for aggregation, analysis, and informed decision-making.
- Conduct monitoring, evaluation, and learning for improvements in supply chain performance.

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)

DNMP Objective

Objective 5 in the KMS 2019–2023 is to strengthen malaria surveillance and use of information to improve decision-making for program performance. A related objective (Objective 3) is to establish systems for malaria elimination in targeted counties by 2023.

DNMP Approach

In alignment with the KMS 2019–2023, the DNMP employs several approaches for strengthening malaria surveillance and the use of information for decision-making, including:

- Strengthening of malaria surveillance through the use of DHIS2, now referred to as KHIS, to obtain essential malaria surveillance data. Improvements will also be to strengthen surveillance and data use, including:
  - Updating KHIS tools to strengthen malaria data collection and standardize information collected nationwide by all facilities.
  - Conducting annual National DQAs across the 47 counties (all referral hospitals plus two subcounty hospitals, two health centers, and one dispensary per county) to inform required improvements in the KHIS system.
  - Creating a functional health supply chain portal in KHIS to make quality malaria commodity data available for decision-making.
- Conducting and facilitating health facility surveys and community surveys.
- Strengthening of malaria Epidemic Preparedness and Response (EPR) structures, including the establishment of the requisite structures necessary to guide the implementation of subnational malaria elimination (see the Strategy Section for more details), including:
  - Establishing structures and capacity at the national and county levels to coordinate and drive the implementation of the elimination agenda.
  - Developing the capacity for malaria elimination.
  - Establishing active case detection, notification, investigation, and response systems for elimination in targeted counties.
  - Strengthening quality assurance for diagnosis, treatment, and entomology to enhance surveillance.
- Monitoring the efficacy and effectiveness of vector control tools and technologies and entomological surveillance as captured under the Vector Control Section.
- Increasing the use of malaria data for decision-making.

PMI Objective in Support of DNMP

PMI support is aligned to the Malaria M&E Plan 2019–2023 and prioritizes capacity development for malaria SM&E in the following areas:

- Strengthening structures and mechanisms for SM&E coordination.
- Ensuring the availability of quality data, including strengthening the KHIS platform, creating dashboards (including the malaria commodity dashboard and EPR dashboard), and capturing inpatient data.
- Promoting the use of malaria data for planning and decision-making.
- Providing technical oversight for the SM&E COE meetings.
- Coordinating strategic partnerships with other entities such as universities and research institutions.
- Building SM&E leadership competencies and capacity of MOH staff at the national, county, and subcounty levels.

This support has been operationalized through a number of activities, including the following:

- Technical assistance to the MOH/HIS to maintain the KHIS platform, ensuring the routine collection of malaria information and creating dashboards to assist the DNMP and its partners.
- Development of quarterly malaria surveillance bulletins to monitor malaria. PMI supported the development of the bulletins from 2012 to 2014. Since 2015, the DNMP has sustained production of the quarterly bulletin without support from partners and continues to improve it with the addition of incidence maps and data reported through the community health information system.
- Technical assistance for SM&E at the county and subcounty levels to improve the quality of malaria data and enhance the use of malaria data to inform malaria programming in the eight lake endemic counties.
- Strengthening of collaborative data review processes by providing data review guidelines and technical assistance in analyzing data and packaging information to inform malaria programming, including production of county malaria bulletins.
- Support for operationalization and improving the functionality of county malaria technical working groups that provide structured platforms for joint planning, performance review and accountability, and building capacity of county and subcounty malaria control coordinators on malaria SM&E.
- Periodic household surveys (MIS, DHS, PMLLIN) to obtain key malaria indicators. MIS surveys were conducted in 2010, 2015, and 2020, while PMLLIN surveys were conducted in 2017 and 2018. These surveys provide useful indicators of population coverage of malaria interventions. Through 2019, PMI supported health facility-based quality of care surveys to monitor malaria commodity stock levels and key malaria case management indicators in a representative sample of health facilities.
- Support for three national malaria forums bringing together researchers, policy makers and implementers to share evidence, inform malaria policies, and define the malaria agenda.
- Development of elimination structures related to surveillance and establishment of an elimination COE.

PMI-Supported Recent Progress (FY 2020)

PMI supported the following activities at the **central level:**

- Provided support for the University of Nairobi data center to host the Kenya Health Information System (KHIS), which is the DHIS2 platform in Kenya. The system has maintained greater than 90 percent on-

time reporting. Support includes management, optimization, and monitoring the host environment and platforms.

- Supported the DNMP to update the Malaria Commodity Form (MOH 743), enhance the Malaria Commodity Dashboard to provide end-to-end supply chain visibility, and revise indicators in KHIS.
- Supported the development of a malaria case-based surveillance module in KHIS.
- Developed a data capture system for the upcoming mass ITN campaign and trained DNMP on its use.
- Enhanced data exchange between KHIS and the Kenya Medical Supplies Authority (KEMSA) eLMIS, where KEMSA is providing information on stock levels and issues to health facilities.
- Supported a consultative forum among DNMP, Division of Health Informatics, Disease Surveillance and Response Unit, and partners on improving the availability of malaria inpatient data and provided technical support for the development of a roadmap on availability of malaria inpatient data. Currently, approximately 400 inpatient health facilities (70 percent of eligible facilities) are reporting inpatient data.
- Enhanced the capacity of MOH/HIS, county proximate universities (CPUs), County Health Records and Information Officers (CHRIOs) and Sub-County Health Records and Information Officers (SCHRIOS) to provide learner support.
- Supported an online learning platform for healthcare workers.
- Provided technical support to update malaria incidence and prevalence stratification for the Global Fund grant application and for the analysis of malaria trends in COVID-19 context.
- Supported quarterly surveillance, monitoring, and evaluation and operations research (SMEOR) COE meetings and supported national data subcommittee meetings.
- Supported implementation of the Kenya Malaria Indicator Survey as a member of the steering group.
- Provided assistance to lay the foundation for a Malaria Elimination Surveillance System in selected counties.
- Provided technical and financial support for quarterly malaria elimination COE meetings.
- Collaborated with WHO to increase capacity of COE members in malaria elimination.

PMI supported the following activities at the **county, subcounty, and facility level**:

- Supported the development and review of a malaria EPR dashboard with the DNMP and stakeholders.
- Disseminated and sensitized epidemic-prone counties and subcounties on the EPR dashboard.
- Supported four workshops on review and updating of county and subcounty malaria EPR plans in 15 of 27 epidemic-prone counties in the western highlands and the seasonal transmission zones of northern and southeastern Kenya.
- Sensitized the county and subcounty teams (pharmacists, CHRIOs, HRIOs, Disease surveillance officers and malaria control coordinators) on use of the Malaria Commodities Dashboard.
- Raised awareness and built capacity in KHIS and health informatics in the CPUs and CHMTs.
- Linked CHMTs to local universities through the CPU model to support malaria activities.
- Oriented DNMP and partners on the revised malaria routine data quality audit (rDQA) tool. Supported the eight counties in Western Kenya to conduct data quality improvement activities such rDQAs per the National DQA Protocol, disseminated rDQA results, conducted data quality reviews, developed and tracked data quality improvement plans. Five facilities per subcounty (63 subcounties in the eight counties), for a total of 315 health facilities were targeted out of ~1,000 health facilities for the rDQAs, based on facilities with high patient burden and poor data quality.
- Facilitated sharing and learning across the counties in data quality practices.

- Supported six of the eight counties to hold subcounty malaria data quality review meetings (Siaya, Kakamega, Busia, Bungoma, Homa Bay, and Vihiga). Data quality review meetings were not held in the other two counties due to COVID-19 and competing priorities in FY 2020. As a result, participants from facilities with poor data quality indicators were able to draw lessons from subcounties or facilities with consistently good quality malaria data for replication.
- Trained 45 malaria program officers (four each from the eight lake endemic counties and Mombasa County and an additional nine from DNMP and partners) on the use of the Africa Leaders Malaria Alliance scorecard.
- Trained 30 malaria program officers from Siaya County on geographic information system mapping to improve their visualization skills and thus increased their use of data.
- Supported participation of 40 officers (5 per county) in the FELTP Frontline training (discussed further in the Health Systems Strengthening section).
- Supported CHMTs to develop information products, including malaria bulletins and factsheets. These information products presented county performance on key indicators tracked by the malaria program including malaria morbidity and mortality, case management and malaria in pregnancy. The factsheets have been utilized by Kakamega and Busia counties to advocate for resources for malaria.
- Supported a study of the use of scanform registers in 91 MOH facilities in Homa Bay and Migori counties. The MOH registers were converted into scannable forms and a cellular phone used to scan and upload the data. CDC is also piloting scanforms at ANC clinics in Kisumu County. Data improvements have been observed with concordance of greater than 90 percent and timeliness of greater than 95 percent. The technology has also improved availability of patient line data and summary statistics can now be generated on a daily basis.

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

In FY 2021, PMI plans to support the following activities:

- Continued support for KHIS, including:
  - Hosting through University of Nairobi and maintenance of malaria dashboards.
  - Finalization and operationalization of the case-based surveillance and inpatient module in the Kenya Electronic Medical Records (KenyaEMR) system.
  - Finalization of a separate malaria module in KHIS.
  - Development of data capture tools for community level malaria surveillance.
- Support for supply chain management through the KHIS, including:
  - Assistance with county malaria commodities stock status and data review meetings.
  - Inclusion of ITN stock status in the malaria commodities dashboard.
  - Malaria commodity ordering through the LMIS Rationalization Module, whereby ordering is informed by consumption data.
  - End-to-end visualization throughout the supply chain and ensuring interoperability between the different supply chain systems going forward.
- Support to the DNMP for strengthening SM&E, including:
  - Technical assistance and support for malaria data governance, oversight, indicator harmonization, and utilization of the malaria module in KHIS.
  - Facilitation of quarterly SMEOR COE meetings.
  - Finalization of draft malaria inpatient roadmap. Strengthen reporting and analysis of inpatient data.

- Support for dissemination of the 2020 KMIS and development of national and county malaria profiles using the 2020 KMIS data.
- Support for a midterm review of the KMS 2019–2023.
- Support the remaining 12 epidemic-prone counties to update their EPR plans.
- Continued support to the 27 epidemic-prone counties and subcounties to monitor malaria trends utilizing the EPR dashboard.
- Assessment of requirements for surveillance systems in counties targeted for malaria elimination.
- Development of a malaria elimination implementation plan.
- Strengthening malaria surveillance at the county level through support for:
    - Data quality improvement initiatives by SCHRIOs and facility HRIOs to conduct facility malaria visits/rDQAs.
    - Monthly subcounty malaria data quality reviews.
    - FELTP Frontline health worker graduates to generate analytic products to scale use of malaria data at county and subcounty level and mentor others.
    - Capture and reporting of malaria data and conducting regular stratification using routine surveillance data.
- Improving the quality and use of malaria data through support for:
    - Ongoing targeted data quality improvement activities, including routine data quality validation checks using the malaria data quality dashboard/Africa Leaders Malaria Alliance scorecard and ensuring these activities are transitioned to and spearheaded by the county teams and FELTP champions.
    - Facilitate HRIOs' ability to provide technical assistance during county/subcounty/facility malaria data quality reviews.
    - County malaria technical working groups and development of quarterly information products.
    - Strengthening inpatient malaria morbidity and mortality reporting in high volume facilities.
    - Finalizing and distributing facility-level malaria data quality "talking walls" to enhance the culture of use of data at facility level. The talking wall allows for a cross-check of data by the facilities themselves.
- Completion of implementation of the scanform evaluation and dissemination of findings on costing, data quality, and data usefulness to relevant stakeholders to inform decisions about the future use of the technology. DNMP and MOH/HIS will assess the direct and indirect costs and improvements in data collection before deciding whether to take this to scale.

Key Goal

To support the DNMP 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-19. Available malaria surveillance sources

Source	Data Collection Activity	2019	2020	2021	2022	2023	2024
Household Surveys	Demographic Health Survey			P*	P*		
Household Surveys	Malaria Indicator Survey		X				P
Household Surveys	Multiple Indicator Cluster Survey						
Household Surveys	Expanded Program on Immunization Survey						
Health Facility Surveys	Service Provision Assessment						
Health Facility Surveys	Service Availability Readiness Assessment						
Health Facility Surveys	Other Health Facility Survey (Inpatient and Outpatient Quality of Care Survey)	X	X*	X*	P*	P*	P*
Malaria Surveillance and Routine System Support	Therapeutic Efficacy Studies		X		P		P
Malaria Surveillance and Routine System Support	Support to Parallel Malaria Surveillance System						
Malaria Surveillance and Routine System Support	Support to HMIS	X	X	X	P	P	P
Malaria Surveillance and Routine System Support	Support to Integrated Disease Surveillance and Response	X*	X*	X*	P*	P*	P*
Malaria Surveillance and Routine System Support	Electronic Logistics Management Information System	X	X	X	P	P	P
Malaria Surveillance and Routine System Support	Malaria Rapid Reporting System						
Other	End Use Verification						
Other	School-Based Malaria Survey						
Other	Knowledge, Attitudes and Practices Survey or Malaria Behavior Survey	X			P		

Source	Data Collection Activity	2019	2020	2021	2022	2023	2024
Other	Countywide Provider and Laboratory Assessment for Malaria Diagnosis		X		P		
Other	Malaria Impact Evaluation						
Other	Post-Mass ITN Distribution Survey			P			P
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.

PMI will continue to support the KHIS platform hosting and maintenance, dashboard development, use and updating, and ensure reporting on malaria indicators through the revised data collection forms. A KMIS took place in 2020 and the next one is planned for 2024. PMI complements other partners' efforts supporting IDSR by working closely with the IDSR unit to harmonize indicator definitions on the weekly and monthly reporting forms. PMI supports capacity-building for quality data monitoring for both HIS and IDSR officers. The 2020–2021 mass ITN campaign is ongoing and the DNMP and partners are planning post-campaign quantitative and/or qualitative surveys to evaluate the campaign, because the campaign is occurring after the 2020 KMIS. There are also planned laboratory diagnostic assessments. PMI stopped funding the Quality of Care Survey in 2019. The Global Fund continues to fund one outpatient and one inpatient survey per year and is proposing to combine them into one survey in the 2021–2023 grant. A Malaria Behavior Survey is planned for the first half of 2022. The various survey and assessment results are used to inform programmatic decisions and monitor performance against set targets.

Key Question 2

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

Supporting Data

PMI supports HMIS activities at the national, county, subcounty, and facility level. PMI provides support for the University of Nairobi Data Center to host the Kenya Health Information System (KHIS), which is what DHIS2 is called in Kenya. PMI has also supported the development of various dashboards within KHIS, starting with the Malaria Commodity Dashboard. This has now been replicated to cover other health commodities. KHIS and the eLMIS are now exchanging data to provide end-to-end commodity visibility. PMI has supported the development of an EPR dashboard. PMI has also supported the development of a malaria case-based surveillance module in KHIS and is supporting current efforts to develop an inpatient module. PMI is also supporting the DNMP and DHIS to develop a malaria module in KHIS, which would pull all malaria data into one location. Global Fund supports community level data collection through AMREF, DQAs across the remaining 39 counties, and printing of the malaria commodity tools.

With FY 2022 funding, PMI will continue to support hosting of the KHIS platform and maintenance of the malaria module and dashboards. PMI will also continue to support the development of the EPR and inpatient modules and strengthen the collection and reporting of inpatient data. Support for county and subcounty health teams to

conduct rDQAs of the HMIS data will be provided, as will support for the use of data through data review meetings and the development of information products including bulletins and fact sheets.

Key Question 3

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

Supporting Data

Table A-20. Outcomes of HMIS strengthening efforts

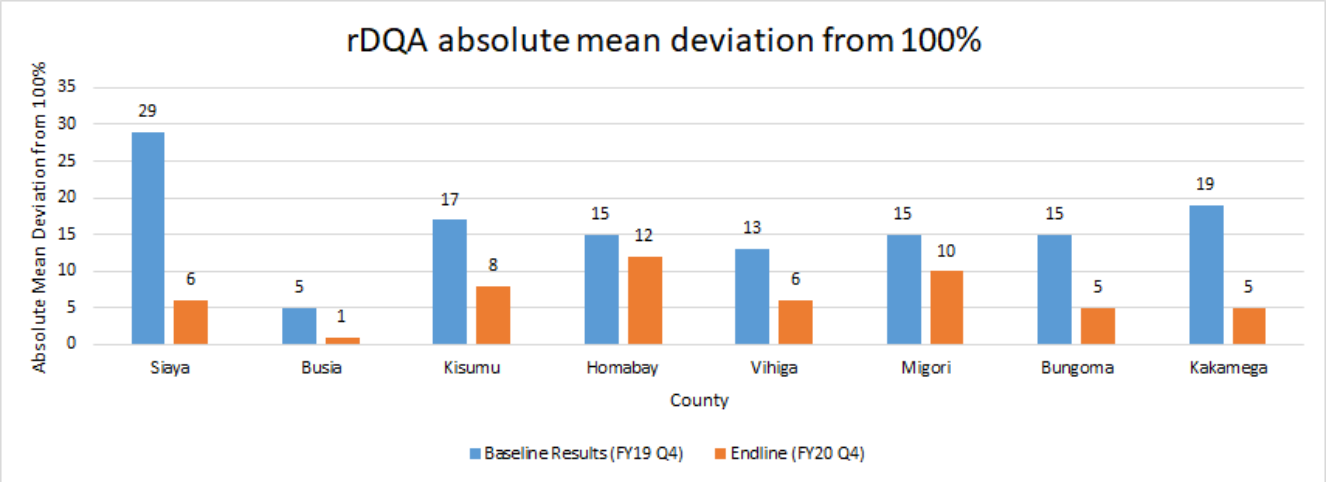
	Indicator	2019	2020
Timeliness	Percent of reports received on time (MOH 705A Outpatient Summary under five years of age) *(See Table 3.2.3 below for additional forms)*	90.5%	92.9%
Completeness	Confirmed malaria cases for children under five years of age was reported in X percent of facility-months (MOH 705A Outpatient Summary <5 Years)	91.6%	93.8%
Accuracy	Most recent DQA data	See Table A-19	See Table A-19

Table A-21. Timeliness of reporting to KHIS for the various forms

Report	2019	2020
MOH 706 Laboratory Summary Report (Revised 2020)	75.8%	83.0%
MOH 705 A Outpatient Summary under five years of age (Revised 2020)	90.5%	92.9%
MOH 705 B Outpatient Summary under five years of age (Revised 2020)	90.8%	92.7%
MOH 505 IDSR Weekly Epidemic Monitoring Form (Revised 2020)	78.4%	75.2%
MOH 743 Malaria Commodities Form (Revised 2020)	85.5%	74.2%
MOH 515 Community Health Data Summary (Revised 2020)	70.6%	78.0%

The timeliness and completeness of the MOH 705A Outpatient Summary Form <5 Years, which includes confirmed malaria cases, has remained above 90 percent in 2019 and 2020 (Table 3.2.2). Timeliness of the MOH Summary Forms relevant to malaria ranged from 74.2 percent to 92.9 percent in 2020 (Table 3.2.3).

Figure A-28. Improvements in malaria data quality from rDQAs between 2019 and 2020



PMI supported three rounds of malaria rDQAs and follow-up visits in over 500 target health facilities in the eight focus counties. To evaluate the impact of the DQAs, results of the baseline rDQA and the endline rDQA were compared. The expected concurrence between malaria source documents (e.g., registers) and summary tools should be 100 percent for the eight key indicators measured. The deviation from the perfect score of 100 percent at baseline and at endline was calculated and graphed above. The deviation declined significantly ($p = 0.00494$) across the eight counties and within each county indicating an improvement in malaria data quality.

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

The 2018 Malaria Program Review found consistently low test positivity rates (<5 percent) in large sections of the country. Based on this evidence, the KMS 2019–2023 adopted a subnational malaria elimination objective in targeted areas (four to five low-risk counties) of the country to establish systems for elimination. Malaria elimination depends on effective surveillance systems to notify all malaria cases detected within 24 hours and conduct both case and foci investigations. PMI plans to support the DNMP to develop policies and guidelines for the establishment of surveillance systems for malaria elimination. PMI will continue supporting the DNMP and DHIS to strengthen the quality of data reported and will support surveillance in elimination counties and subcounties to be able to detect and respond to malaria cases. This will require that resources be targeted toward building capacity among HRIOs in elimination counties for monitoring data quality and for conducting structured data review meetings. PMI and WHO will continue to support the DNMP to develop elimination systems, including enhanced surveillance comparing incidence with epidemic thresholds, in the counties/subcounties targeted for elimination. An elimination COE was established and will continue to meet to define Kenya's elimination strategy.

Conclusions for Surveillance, Monitoring, and Evaluation Investments

The KHIS platform has continued to expand over the past year with the addition of new modules and dashboards, including a module for tracking ITN distribution as part of the 2020–2021 campaign. The timeliness

and completeness of the MOH 705A Outpatient Summary Form <5 Years, which includes confirmed malaria cases, has remained above 90 percent in 2019 and 2020. Timeliness of the MOH Summary Forms relevant to malaria ranged from 74.2 percent to 92.9 percent in 2020. In addition to expansion of the platform, the quality of data has improved as seen from the rDQAs conducted in 2019 and 2020, where the deviations between the register and summary data have significantly declined in all eight PMI-focus counties.

Overall funding for SM&E is roughly similar to the original FY 2021 MOP, with slight decreases due to the overall lower planning level for the FY 2022 MOP. Additional time-specific activities are being added to the FY 2021 MOP through reprogramming, including supporting the Kenya National Malaria Forum, midterm review of the KMS 2019–2023, and development of the county profiles based on the MIS 2020 results. Specifically, with FY 2022 investments, PMI will do the following:

- Continue to support the hosting and maintenance of the KHIS platform, malaria module, and dashboards.
- Support CHMTs and SCHMTs to conduct rDQAs and data review meetings to continue to improve data quality and use of data, and support the development of information products.
- Support the newly created county Health Information System/M&E Units to follow up and implement data quality improvement plans and provide regular updates and feedback to the CHMTs and County Departments of Health.
- Continue shifting its approach for strengthening malaria data quality from county level to direct support to SCHRIOs to supervise and strengthen data quality within their facilities. This strategy will build on the investments that have already gone into identifying the facility-level data quality gaps and work with the SCHRIOs and facility HRIOs to develop solutions and strategies to address the gaps.
- Support EPR dashboard updates and use by epidemic-prone counties/subcounties to monitor malaria trends.
- Support the DNMP to establish elimination systems, including enhanced surveillance, in four to five targeted counties with low or negligible malaria burden.

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

3.3. OPERATIONAL RESEARCH

DNMP Objective

The DNMP proposes to strengthen and support the implementation of research studies that help to inform the various malaria control and prevention interventions undertaken by the program in addition to the development of policies to guide the implementation framework.

DNMP Approach

The DNMP has an existing COE composed of malaria focal points and representatives from research institutions and academia (e.g., KEMRI, Wellcome Trust, University of Nairobi, and Moi University), other MOH division focal points, and malaria stakeholders, including PMI. The DNMP identifies key research areas and presents these to the COE, which reviews and recommends the most appropriate research questions for the program to undertake. Once a research question has been recommended for action the program prepares a concept paper

that is reviewed by the COE and subsequently a research protocol is developed and forwarded to the KEMRI Institutional Review Board for approval to carry out the research.

PMI Objective in Support of DNMP

PMI contributes to the country's operational research (OR) initiatives by participating in the COE's deliberations on key research questions and concept and protocol development processes. PMI may also offer to support the implementation of given research activities.

PMI-Supported Recent Progress (FY 2020)

PMI has not supported any PE/OR activities in the recent past.

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

PMI has no PE/OR activities planned with FY 2020 or FY 2021 funding.

PMI Goal

PMI will conduct PE/OR that helps to evaluate coverage of populations 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 DNMP, have technical challenges or operational bottlenecks in program interventions been identified that require PE/OR? How have they been prioritized?

Supporting Data

The DNMP identified research questions, which were sent to PMI for consideration. PMI reviewed the proposed topics using the instructions provided for prioritization of PMI-supported research questions and one of the questions submitted by the program meets the criteria, specifically around SBC. PMI originally added an OR study to the FY 2020 MOP to analyze the effectiveness of behavior change interventions in different malaria transmission zones to understand the most appropriate behavior change approach for areas transitioning from high and moderate to low, very low, and zero malaria transmission. This activity has since been removed from the FY 2020 MOP. Instead, the PMI/Kenya team is supporting a Malaria Behavior Survey and will revisit the proposed SBC OR study once that has been completed.

The table below summarizes PE/OR currently being conducted in Kenya with non-PMI funding (e.g., other U.S. government, Global Fund, multilaterals, or other major donors).

Table A-22. Ongoing program evaluation and operational research

Funding Source	Implementing Institution	Research Question/Topic	Status/Timeline
Medicines for Malaria Venture	Strathmore University, Kenya MOH/DNMP, KEMSA, Counties of Migori and Homa Bay	Pilot of multiple first-line therapy	Ongoing
CDC COVID-19 International Task Force	London School of Hygiene & Tropical Medicine	Intensive support to fill program gaps in malaria diagnostics, net distribution, and IPTp uptake	Ongoing
London School of Hygiene & Tropical Medicine	London School of Hygiene & Tropical Medicine	ACT pharmacovigilance in pregnant women during pilot of multiple first-line therapy	Ongoing
BMGF, GAVI, Global Fund, UNITAID, and GlaxoSmithKline	KEMRI, CDC, Wellcome Trust, PATH, United States Army Medical Research Unit-Kenya	Malaria vaccine implementation project evaluations	Ongoing
Wellcome Trust	KEMRI, Wellcome Trust	Long-term observational study of severe malaria surveillance in Kilifi	Ongoing
NIH	University of California - Davis, Case Western Reserve University, KEMRI, Maseno University	Studies of malaria epidemiology, entomology, and interventions in Western Kenya	Ongoing
European Union, Shin Poong Pharmaceutical Company, Medicines for Malaria Venture	KEMRI, University of Nairobi, others outside Kenya	Safety and efficacy of pyronaridine-artesunate for uncomplicated malaria	Ongoing
PATH, BMGF	KEMRI, CDC, Siaya County	Continuous malaria indicator survey	Ongoing
BMGF, Malaria Eradication Scientific Alliance, CDC	KEMRI, CDC	Attractive targeted sugar baits	Ongoing
European & Developing Countries Clinical Trials Partnership, PATH, Foundation for Innovative New Diagnostics	KEMRI, CDC, Liverpool School of Tropical Medicine, MOH Malawi and Tanzania	Efficacy and safety of monthly intermittent preventive treatment using DP vs. DP+AZ vs. SP for prevention of MIP	Ongoing

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

Kenya has been conducting IRS in two counties in western Kenya for the past five years and currently does not have an exit strategy. PMI will support the DNMP to develop an IRS exit strategy over the coming year, which will guide interventions in these two counties as we look to transition IRS if appropriate based on the criteria established in the exit strategy.

Key Question 3

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

Supporting Data

PMI is not planning to conduct any OR studies with FY 2022 funding.

Conclusions for Program Evaluation and Operational Research Investments

As part of the DNMP SMEOR COE, PMI continues to evaluate proposed PE and OR topics and determines where we can complement ongoing studies to inform malaria programming and accelerate progress toward achievement of national targets. Based on the 2022 Malaria Behavior Survey, PMI will also work with the DNMP to develop an OR proposal to explore the effectiveness of behavior change interventions in different malaria transmission zones if still applicable. However, at this time, no specific OR activities are being proposed with FY 2022 funding.

3.4. SOCIAL AND BEHAVIOR CHANGE (SBC)

DNMP Objective

The DNMP seeks to reduce malaria incidence and deaths by at least 75 percent of 2016 levels by 2023 through six main objectives, including increasing utilization of appropriate malaria interventions in Kenya to at least 80 percent by 2023. This objective will be realized through the use of the four key SBC strategies listed below:

1. Scale up malaria advocacy at national and county levels for increased utilization of malaria interventions.
2. Strengthen community-based SBC activities for all malaria interventions.
3. Strengthen structures for the delivery of malaria SBC interventions at all levels.
4. Strengthen program communication for increased utilization of all malaria interventions.

DNMP Approach

Currently, Kenya's approach to malaria SBC is guided by the Kenya Malaria Communication Strategy 2016–2021, which provides a framework for advocacy, communication, and social mobilization activities in support of the Kenya Malaria Strategy 2019–2023. However, the DNMP, with leadership from the SBC COE and Division of Health Promotion (DHP) and support from key stakeholders, is in the process of developing a new Kenya

Malaria Communication Strategy, which is expected to be completed in 2021 and which will establish priorities for malaria SBC in Kenya post–2021.

The overarching goal of the current strategy, which is designed for implementation at the national, subnational, and community level, is to increase utilization of appropriate malaria interventions at the household level to 80 percent through well-coordinated malaria advocacy, communication, and social mobilization (ACSM) activities. The specific objectives of the strategy are:

1. Influence positive behavior change among target audiences with regard to malaria control behavior that will help to reduce the incidence of malaria in Kenya.
2. Galvanize action around malaria through advocacy aimed at increasing funding for malaria by county governments and strengthen links between the national and county governments.
3. Strengthen coordination and linkages of ACSM interventions and improve the dissemination of information to key target audiences at national, county, community, and household levels through a planned and systematic series of activities and channels.
4. Harmonize malaria ACSM activities implemented by the different partners.

To accomplish these objectives, Kenya uses four main strategies:

1. Strengthening structures for the delivery of ACSM interventions at all levels, including by building capacity and providing mentorship and technical assistance to counties.
2. Strengthening program communication for increased utilization of malaria interventions at household level through the use of multi-channel approaches that combine mass media, interpersonal communication, and structural interventions to promote new or modified behaviors.
3. Increasing inter-sector advocacy and collaboration for malaria interventions by strengthening coordination of malaria advocacy activities with the aim of fostering strong linkages between the national and county governments and across health and non-health sector.
4. Strengthening community-based SBC communication activities for all malaria interventions and ensuring the participation of local communities in malaria control initiatives through existing local networks.

One of the ways these objectives, and the Kenya Malaria Communication Strategy more broadly, are operationalized is through the SBC COE, which advises on malaria ACSM activities and oversees the planning, implementation, and evaluation of all such activities at the national level. The DNMP serves as the secretariat for the SBC COE, which is chaired by the DHP. Membership of the SBC COE includes representatives from relevant technical areas, as well as all stakeholders involved in malaria SBC in Kenya, including PMI, AMREF, UNICEF, Living Goods, World Vision, Merlin, Vestergaard, and Sumitomo Chemicals.

PMI Objective in Support of DNMP

PMI supports the GOK in its effort to increase the utilization of appropriate malaria interventions in Kenya to at least 80 percent by 2023. PMI provides support for implementation of the Kenya Malaria Communication Strategy 2016–2021 at the national, county, community, and facility levels. Nationally, PMI provides technical assistance and support for capacity-strengthening activities, coordination, and the development of mass media materials and relevant tools and guidelines, such as the forthcoming revised Kenya Malaria Communications Strategy. At the county level, PMI support is focused in the eight PMI focus counties in the lake endemic region (Kisumu, Siaya, Homa Bay, Migori, Bungoma, Busia, Kakamega, and Vihiga) and involves the development of

county health communication strategies and implementation plans and the provision of technical assistance for coordination and material development.

The bulk of PMI's SBC activities, however, are directed at the community and health facility level in the eight PMI focus counties in the lake endemic region. Through partnerships with local organizations and collaboration with local leaders and CHVs, PMI supports the DNMP and DHP's efforts to expand the use of multi-channel approaches that combine mass media, interpersonal communication, and structural interventions to increase adoption and maintenance of key malaria prevention and treatment behaviors, including correct and consistent ITN use, early and frequent ANC attendance, and prompt and appropriate care-seeking. PMI also supports efforts to understand and address provider attitudes, norms, and beliefs that may impact the delivery or quality of malaria services received at health facilities; and strengthen service communication among healthcare workers and CHVs.

PMI-Supported Recent Progress (FY 2020)

PMI has worked closely with the DNMP, DHP, and other stakeholders to build capacity and conduct high-quality, evidence-based, theory informed, contextually appropriate SBC interventions nationally and subnationally. Specifically, PMI has supported the following activities:

Formative Assessments, Research, and Monitoring and Evaluation

- Conducted a literature review of peer-reviewed and gray literature to identify determinants of the uptake and maintenance of malaria prevention and treatment behaviors in Kenya's lake endemic region.
- Facilitated a journey mapping activity to understand the experiences of key target audiences (healthcare workers and pregnant women) as they relate to the performance of malaria-related behaviors to identify challenges, barriers, and facilitating factors that contribute toward the adoption and maintenance of desired malaria prevention and treatment behaviors.

Capacity Strengthening and Coordination

- Collaborated with DNMP, DHP, and other stakeholders to identify technical assistance needs, assess organizational SBC strengths and gaps, and develop a plan for capacity strengthening.
- Collaborated with service delivery stakeholders to ensure coordination and harmonization across planned service delivery and SBC activities through the development of a joint implementation plan.
- Facilitated a partner mapping activity to identify all stakeholders engaged in malaria SBC activities, as well as their roles, opportunities, and ongoing challenges.
- Supported the regular convening of SBC COE meetings at the national level and aided in the drafting and dissemination of meeting agendas and materials to strengthen coordination and harmonization of malaria SBC activities in Kenya.

National-Level Implementation

- Provided technical assistance to the DNMP and SBC COE for the development and production of animated television spots promoting continued testing and treatment for malaria symptoms in the context of COVID-19. The spots were aired nationally with Global Fund resources.
- Collaborated with DNMP and service delivery stakeholders to implement a social media campaign aimed at encouraging prompt care-seeking for fever in the context of COVID-19. The campaign utilized tailored

messages to reassure beneficiaries that health facilities are safe and that providers are following COVID-19 safety protocols.

Community- and Facility-Level Implementation

- Developed a draft Malaria Community SBC Strategy to guide community-level SBC interventions. The strategy, which emphasizes community engagement and aims to strengthen community capacity, utilizes human-centered design and the community action cycle to empower communities to identify solutions and design interventions that encourage the adoption and maintenance of key behaviors. The strategy also aligns with the existing Kenya Malaria Communication Strategy, Community Health Strategy, and county-specific malaria SBC plans.
- Held meetings with County Health Management Teams in eight counties and the Sub-county Malaria Coordinating Teams in 16 subcounties to identify priorities for strengthening the uptake and maintenance of malaria prevention and to select 48 health facilities and 96 community units for implementation of malaria SBC activities based on jointly developed criteria.
- Formed, oriented, and trained 48 Malaria Community Action Teams (MCATs) around selected health facilities and community health units. MCATs are charged with mobilizing their communities toward utilization of malaria interventions using the community action cycle framework.

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

In FY 2021, PMI will continue to support the DNMP and DHP in their efforts to build capacity and conduct high quality, evidence-based, theory informed SBC interventions nationally and subnationally. Specifically, PMI plans to support the following activities:

Formative Assessments, Research, and Monitoring and Evaluation

- Use of human-centered design to explore the experience of pregnant women and health workers and deepen understanding of barriers, enablers, influencers, and social factors related to the uptake of IPTp.
- Support for preparations for the MBS, a household survey that measures malaria-related behaviors and their ideational determinants that will be fielded in the first half of 2022.
- Collaborate with service delivery stakeholders to test the feasibility and acceptability of a set of tools aimed at diagnosing areas where provider behavior change or enhanced provider support is needed, and identifying potential programmatic approaches for addressing those needs.

Capacity Strengthening and Coordination

- Continue to support the regular convening of SBC COE meetings and aid in the drafting and dissemination of meeting agendas and materials to strengthen coordination and harmonization of malaria SBC activities in Kenya.
- Support SBC technical working group meetings in each of the PMI focus counties in the lake endemic region to foster county-level ownership and coordination of malaria SBC activities.
- Conduct training for members of the DNMP and DHP on priority topics identified as part of earlier capacity assessments, including monitoring and evaluation and gender considerations for malaria SBC.
- Work closely with the DNMP, DHP, and SBC COE to support the development and launch of the new Kenya Malaria Communication Strategy, including analysis of progress made under the previous strategy.

National-Level Implementation

- Identify gaps in the existing national curriculum on malaria case management and malaria in pregnancy and lead efforts to revise the existing module on interpersonal communication and counseling to facilitate positive relationships between providers and patients and strengthen service communication.
- Collaborate with service delivery stakeholders to adapt and develop job aides to support the rollout of the revised national guidelines for malaria case management and prevention of malaria in pregnancy.
- Implement a mass and mid-media campaign designed to complement and build on activities being conducted at the community level. The campaign will utilize radio, SMS, social media, posters, and flyers, and will be deployed nationally.
- Provide technical support to DNMP to measure the reach and impact of planned malaria SBC activities.

Community- and Facility-Level Implementation

- Collaborate with national and county health teams to test the feasibility of the newly developed Malaria Community SBC Strategy and assess whether it should be integrated into the forthcoming revised Kenya Malaria Communication Strategy.
- Engage MCTs, SMCTs, and MCATs in key components of the community action cycle, including trainings, community entry meetings, root cause analysis and exploration of key determinants of malaria behaviors, validation of community action plans, and monitoring and evaluation.
- Train CHVs from 96 community units on interpersonal communication, including delivery of messages on ITN use, care-seeking for fever, and ANC attendance at the household level.
- Train and support magnet theater groups across PMI focus counties in the dissemination of key messages designed to influence the determinants of consistent ITN use, early and frequent ANC and IPTp uptake, and prompt and appropriate care-seeking for fever through interactive theater performances.
- Support targeted community dialogues between CHVs, women groups, and community members to discuss challenges related to malaria and address bottlenecks in care-seeking and/or access to services.
- Participate in supportive supervision visits in target health facilities to identify barriers and facilitators related to provider adherence to case management and malaria in pregnancy guidelines.
- Conduct community–facility dialogues that aim to build mutual trust and empathy between health providers and community members.

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 will continue to work with the DNMP, DHP, and other malaria stakeholders to improve adoption and maintenance of malaria prevention and treatment behaviors among individuals, families, communities, and health

workers through evidence-based, theory-informed, contextually appropriate, and targeted SBC activities. While PMI's efforts will address the full range of behaviors affecting the uptake and maintenance of malaria interventions in Kenya, PMI will prioritize efforts aimed at promoting prompt and appropriate care-seeking for children under five years of age, early and frequent ANC attendance, and adherence to case management guidelines. Community and health facility-level activities will be targeted in the PMI focus counties of Kisumu, Siaya, Homa Bay, Migori, Bungoma, Busia, Kakamega, and Vihiga, while capacity strengthening and mass media activities will be national in their reach.

Table A-23. Prioritized behaviors with FY 2022 funds

Behavior	Target Population	Geographic Focus	Justification
Prompt and Appropriate Care-Seeking	Mothers of Children Under Five Years of Age	Lake Endemic Counties	In the 2014 KDHS, there was a 55 percentage point difference between those individuals who sought care and those who did so promptly. This suggests an urgent need for increased SBC activities promoting prompt care-seeking.
Early and Frequent ANC Attendance	Mothers of Children Under Five Years of Age	Lake Endemic Counties	There is a notable gap between coverage of IPTp1 and IPTp2. The 2018 Malaria Program Review concluded that this gap was largely due to women starting ANC late, with women who received IPTp1 delivering by the time they were due for IPTp2.
Adherence to Case Management Guidelines	Health Facility- Based Providers	Lake Endemic Counties	Nationally, health workers adherence to diagnostic and treatment guidelines at facilities where malaria diagnostics and treatment were available was estimated to be only around 60 percent. However, there is not much known about the extent to which provider beliefs, values, and attitudes influence the provision of services. This will be explored with FY 2022 funds.

Key Question 2a

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

Supporting Data

While there is some information on the reasons caregivers delay care-seeking when their child has a fever, available data is primarily qualitative and does not quantify the extent of certain trends or challenges, such as a preference for initially using traditional medicines or home remedies. In addition, other barriers like costs for transport to visit health facilities will be addressed through the involvement of men in discussions on the importance of supporting women to attend ANC clinics for scheduled visits. In 2022, PMI will field an MBS in Kenya. The results of the MBS are expected to provide more detailed information on malaria-related behaviors, including prompt care-seeking, and their ideational determinants. Following the MBS, PMI will assess whether there are any remaining knowledge gaps related to prompt care-seeking. If priority gaps are identified based on the results of the MBS, plans will be made for addressing those gaps.

Key Question 2b

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

Delayed first presentation at ANC contributes to inadequate uptake of the recommended three doses of IPTp. While there is evidence to suggest that structural, institutional, and internal factors all play a role in influencing pregnant women's late presentation at ANC, more information about the internal factors will be critical for informing SBC interventions. It is anticipated that the planned MBS, as well as the ongoing human-centered design activity, will help shed light on these factors. Following the MBS and human-centered design activity, PMI will assess whether there are any remaining knowledge gaps related to early and frequent ANC attendance. If priority gaps are identified based on the results of the MBS, plans will be made for addressing those gaps. Some of the behaviors that need to be understood better include how health providers relate and interact with pregnant women seeking ANC services.

Key Question 2c

For adherence to case management guidelines, what gaps exist in understanding the barriers to the adoption and maintenance of malaria prevention and treatment behaviors?

Supporting Data

At present, there is a lack of understanding of how providers' attitudes and beliefs, such as perceived response efficacy of microscopy vs. RDTs, influence providers' testing and treatment practices. To better understand how provider behavior is influencing the delivery of malaria services, PMI will support formative research aimed at identifying determinants of provider behavior around testing and treatment for malaria. This work will build off ongoing efforts to test the feasibility and acceptability of a set of tools aimed at diagnosing areas where provider behavior change is needed.

Key Question 3

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

Supporting Data

The 2018 Malaria Program Review assessed achievements and challenges related to increasing utilization of appropriate malaria interventions to at least 80 percent by 2023. Strengths identified included:

- Dissemination and use of the Kenya Malaria Communications Strategy 2016–2021, which provides a framework for implementation of ACSM activities in Kenya.
- Development of a community strategy framework, which facilitates the delivery of behavior change interventions at the household level through the community health system.
- Partnerships with media houses for the promotion of malaria behaviors through mass media.
- Strong collaboration throughout the MOH, GOK, and community-based and civil society organizations that fosters advocacy and mobilization at the community level.

Weaknesses identified included:

- Weak coordination at the national and county levels, including irregular meetings and a decrease in partner participation.
- Limited investments, with only 1 percent of the DNMP's budget allocated to SBC activities.
- Unsuccessful advocacy efforts as a result of limited collaboration and information sharing with the non-health sector.

Results from a recent PMI-supported capacity assessment (2020) support the Malaria Program Review's findings. The assessment, which evaluated both the DNMP and DHP's capacity to design, implement, manage, and evaluate SBC activities, found there are some fundamental gaps in understanding about SBC, as well as misunderstandings about the level to which DNMP and DHP's SBC processes currently function. For instance, of those surveyed, only 10 percent reported systematically using a series of seven key steps to conduct a situational analysis or problem diagnosis, while another 10 percent reported not using any steps and only 20 percent always used theoretical concepts.

To address these challenges, there is a need for continued capacity-building at both the national and subnational levels. To that end, PMI will continue to support national-level coordination through the SBC COE, county-specific SBC planning aimed at increasing subnational coordination and ensuring the impact of SBC investments, and capacity strengthening for key stakeholders at both the national and subnational level.

Conclusions for SBC Investments

With FY 2022 investments, PMI will continue to prioritize SBC approaches that build on and are well integrated into local leadership and community structures. This will help ensure prioritized interventions are sustainable, scalable, and reflective of local context and needs. Specifically, PMI will support:

- Design and implementation of a multi-channel mass and mid-media campaign to promote adoption and maintenance of desired malaria prevention and treatment behaviors, including prompt care-seeking for fever and early ANC attendance. Channel selection, specific behavior and communication objectives, and the target audience for the campaign will be determined using insights from the 2022 MBS.
- Training of CHVs and facility-based providers on approaches to interpersonal communication that facilitate behavior change and malaria prevention and treatment behaviors, including early ANC attendance, prompt care-seeking, and net care to strengthen service communication.
- Qualitative research to identify barriers to net use and other malaria prevention and treatment behaviors in low-transmission counties that are still targeted for ITN distribution. Insights from this formative research activity will be used to support the DNMP's elimination agenda.
- Collaboration with local community and faith-based organizations to utilize the existing community platform and expand the reach of PMI-supported interpersonal communication and community engagement activities. Specific behaviors to be promoted will leverage social support to encourage the adoption of malaria prevention and treatment behaviors and be identified based on the results of the MBS.
- Interpersonal communication activities (e.g., small group discussions, household visits, etc.) at the household and community level utilizing local community structures, such as CHVs and MCATs, to promote desired malaria-related behaviors and strengthen advocacy and demand for quality malaria services. The importance of seeking care immediately at the first sign of a fever or other malaria-related

symptoms will be strongly emphasized through these activities, as past research has identified community elders, faith leaders, and CHVs as key influencers for decision-making related to malaria testing and treatment.
- Formative research or secondary analysis of existing data sources (e.g., Quality of Care Surveys, supportive supervision checklists, etc.) to better understand how providers' attitudes, beliefs, and values influence testing and treatment practices. The specific methodology will be identified in consultation with the DNMP, DHP, and other key stakeholders.
- Coordination between stakeholders through national and county-level capacity strengthening activities, including development of county-specific SBC plans and tools, support for the SBC COE and county level SBC technical working group meetings, and training of key stakeholders on priority topics identified as part of earlier capacity assessments.
- Collaboration with service delivery stakeholders to identify gaps and revise existing job aids and national curricula on malaria case management and MIP to facilitate positive relationships between providers and patients and strengthen service communication.
- Participation in supportive supervision visits in target health facilities to identify barriers and facilitators related to provider adherence to case management and MIP guidelines.
- Technical assistance to the DNMP, DHP, and other stakeholders to measure the reach and impact of planned malaria SBC activities.

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

3.5. OTHER HEALTH SYSTEMS STRENGTHENING

DNMP Objective

Objective 6 of the KMS 2019–2023 is to provide leadership and management for optimal implementation of malaria interventions at all levels, for the achievement of all objectives by 2023. This objective addresses leadership, partnerships, and coordination at all levels to provide a conducive strategy implementation environment and the resources necessary for achievement of the KMS goals and objectives.

DNMP Approach

To achieve Objective Six of the KMS 2019–2023, the DNMP is prioritizing:

- Aligning malaria governance and legislation to constitutional mandates and core functions
- Strengthening partnerships and coordination for malaria program management
- Strengthening capacity for malaria programming at national and county levels
- Strengthening resource mobilization initiatives for malaria
- Enhancing malaria commodity security at all levels
- Strengthening the use of supply chain data for decision-making

The DNMP is also providing leadership and coordination to ensure malaria prevention and control services are delivered equitably and efficiently in all health facilities in malaria endemic and epidemic regions of the country. The KMS 2019–2023 outlines the structure, terms of reference, and membership for the Malaria Health Sector Working Committee and COE, whose roles include technical, operational, and strategic oversight of the KMS

2019–2023. The DNMP has appointed focal persons responsible for each objective area who work collaboratively with other stakeholders as part of the COE. Through these structures, the DNMP seeks to:

- Build capacity of staff through technical assistance offered in partnership with partners, including through attendance at targeted malaria conferences.
- Improve efficiency in the use of existing resources, as well as to advocate for sustainable investment of malaria interventions at the national and county levels.
- Provide a safe and secure environment for meetings and interactions with stakeholders and leverage technology for communication and data acquisition.
- Strengthen linkages between national and county levels of government to ensure standardized and harmonized policy implementation and delivery of malaria services.
- Coordinate with other ministries and agencies, including regulatory bodies, the private sector, universities, civil society organizations, and relevant ministries.

PMI Objective in Support of DNMP

PMI provides support to the DNMP for overall program management, coordination with multi-sectoral stakeholders, strengthening of linkages between national and county governments, and ensuring that the DNMP staff have the skills and capacity needed to effectively fulfill their mandate for successful implementation of the KMS 2019–2023. PMI has supported DNMP staff attendance at conferences to gain new knowledge and strengthen their capacity for leadership, governance, and SM&E. PMI has also provided support through the procurement of audio-visual equipment, internet services, and the establishment of a website for program visibility, health communication, and interaction with the public.

PMI-Supported Recent Progress (FY 2020)

PMI-supported health systems strengthening efforts and progress are reflected in several technical areas across this document. Additional progress not previously listed includes:

- Supported the dissemination and implementation of the KMS 2019–2023.
- Supported DNMP efforts to increase GOK funding for key priority areas through the development of an advocacy briefer on investing in malaria control and elimination interventions.
- Supported the DNMP with grant-making activities for health financing.
- Continued support for the DNMP website, including maintenance, to ensure continued visibility of the malaria program to the public and stakeholders.
- Provided technical assistance to focus counties to help with planning and budgeting for increased domestic resources in the health sector at the county level.
- Assisted counties with the development of malaria factsheets to advocate for malaria budget allocation increases from county authorities.
- Supported focus counties to strengthen leadership and governance systems for sustained malaria control outcomes.

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

To continue building upon investments in health systems strengthening, PMI plans to support the following activities in FY 2021:

- Developing managerial and technical capacity of national and county level staff to ensure the malaria program meets the core functions outlined in the KMS 2019–2023.
- Collecting and analyzing data to support budget absorption for malaria.
- Strengthening technical/scientific capacity at the national and county levels through FELTP.
- Training county and subcounty staff in epidemiology, surveillance, data management, and analysis through the FELTP Frontline Program.

Key Goal

The goal of PMI for health systems is to ensure that countries acquire the necessary capacities to enable them to plan and monitor the progress of their malaria control activities. This is made possible when a country has a skilled workforce and an infrastructure to work within.

Key Question 1

What additional capacity development support is required to fully operationalize the KMS 2019–2023?

Supporting Data

The KMS 2019–2023 was launched in April 2019, but has yet to be fully implemented at the county level. Health is a devolved function in Kenya and effective dissemination of the strategy is critical for county acceptance and successful implementation. PMI anticipates that additional capacity development and infrastructure support will be required at the national and county levels to ensure adequate program management and technical expertise for management oversight and effective implementation.

Conclusions for Additional Health Systems Strengthening Investments

With FY 2022 investments, PMI will continue to support the development of technical and managerial capacity of national and county level staff to ensure the malaria program meets the core functions outlined in the KMS 2019–2023. Specifically, PMI will do the following:

- Continue to support increased technical capacity at the national and county levels through FELTP.
- Support training of county and subcounty staff in epidemiology, data collection, management, and analysis through the FELTP Frontline Program.
- Support the DNMP to establish structures for implementing elimination activities in selected counties.
- Support advocacy efforts by the DNMP and MOH to the National Treasury for increased government resource allocation toward malaria control efforts in Kenya.
- Support county-level budgeting and resource allocation requests from county authorities for malaria control efforts.

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