PMI | U.S. PRESIDENT'S MALARIA INITIATIVE

LED BY

This Malaria Operational Plan has been approved by the U.S. Global Malaria Coordinator and reflects collaborative discussions with the national malaria control programs and partners in country. The funding available to support the plan outlined here is pending finalization of the FY 2020 appropriation. If any further changes are made to this plan it will be reflected in a revised posting.

U.S. PRESIDENT'S MALARIA INITIATIVE

KENYA

Malaria Operational Plan FY 2020

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ABBREVIATIONS

ACT	Artemisinin-based combination therapy
ACSM	Advocacy, communication, and social mobilization
AL	Artemether-lumefantrine
AMREF	African Medical and Research Foundation
ANC	Antenatal care
CCMm	Community case management of malaria
CCND	Continuous community net distribution
CDC	U.S. Centers for Disease Control and Prevention
CHA	Community health assistant
CHMT	County health management team
CHU	Community health units
CHV	Community health volunteer
CoE	Committee of Experts
CWC	Child welfare clinics
CY	Calendar year
DfID	U.K. Department for International Development
DHA-PIP	Dihydroartemisinin/piperaquine
DHIS2	District Health Information System - Version 2
DHS	Demographic and Health Survey
DQA	Data quality assessment
EPR	Epidemic preparedness and response
FELTP	Field Epidemiology and Laboratory Training Program
FY	Fiscal year
Global Fund	Global Fund to Fight AIDS, Tuberculosis, and Malaria
GoK	Government of Kenya
HMIS	Health management information system
HMPTU	Health Medical Products and Technologies Unit
IPTp	Intermittent preventive treatment for pregnant women
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito net
KDHS	Kenya Demographic and Health Survey
KEMRI	Kenya Medical Research Institute
KEMSA	Kenya Medical Supply Agency
KHIS	Kenya Health Information System
KMIS	Kenya Malaria Indicator Survey
KMS	Kenya Malaria Strategy
LMIS	Logistics management information system
M&E	Monitoring and evaluation

MIP	Malaria in pregnancy
MIS	Malaria indicator survey
MOH	Kenya Ministry of Health
MOP	Malaria Operational Plan
MPR	Kenya Malaria Program Review
NMP	Kenya National Malaria Program
OR	Operational research
PBO	Piperonyl butoxide
PMI	U.S. President's Malaria Initiative
PMLLIN	Post Mass Long Lasting Insecticidal Net Distribution Survey
PPB	Pharmacy and Poisons Board
PSC	Pyrethrum spray catches
PSM	Procurement and supply management
QA/QC	Quality assurance/quality control
QoC	Quality of Care Survey
RDT	Rapid diagnostic test
SBC	Social and behavior change
SCHMT	Sub-county health management team
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

I. INTRODUCTION

The U.S. President's Malaria Initiative (PMI)—led by the U.S. Agency for International Development (USAID) and implemented together with the U.S. Centers for Disease Control and Prevention (CDC)—delivers cost-effective, lifesaving malaria interventions alongside catalytic technical and operational assistance to support Kenya to end malaria. PMI has been a proud partner of Kenya since 2007, helping to decrease child death rates by 55 percent through investments totaling almost $391 million.

The proposed PMI fiscal year (FY) 2020 budget for Kenya is $34 million. This Malaria Operational Plan (MOP) outlines planned PMI activities in Kenya for FY 2020. Developed in consultation with the National Malaria Program (NMP)[1] and key 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 Kenya (GoK) as well as other donors and partners.

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).[2]
- **Climate:** 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: 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 2018:** 50.8 Million[3]
- **Population at Risk of Malaria:** 75 percent or 34.4 Million
- **Malaria Incidence per 1000 Population:** 70.8 per 1,000 Population at Risk[4]
- **Under-Five Mortality Rate:** 52 Deaths per 1,000 Live Births[5]
- **World Bank Income Classification and GDP:** Kenya is a lower middle-income country with a GDP per capita of $1,710.[6]

[1] Please note that Kenya's National Malaria Control Program was renamed Kenya's National Malaria Program in June 2019. References to documents produced prior to June 2019 retain the name National Malaria Control Program.

[2] National Malaria Control Program. (2019). Towards a Malaria-Free Kenya: Kenya Malaria Strategy 2019-2023. Kenya Ministry of Health.

[3] National Malaria Control Program. (2019). Towards a Malaria-Free Kenya: Kenya Malaria Strategy 2019-2023. Kenya Ministry of Health.

[4] World Bank Open Data. 2018. Incidence of Malaria per 1,000 Population at Risk. World Bank.

[5] Kenya National Bureau of Statistics. (2015). Kenya Demographic and Health Survey - 2014. Government of Kenya.

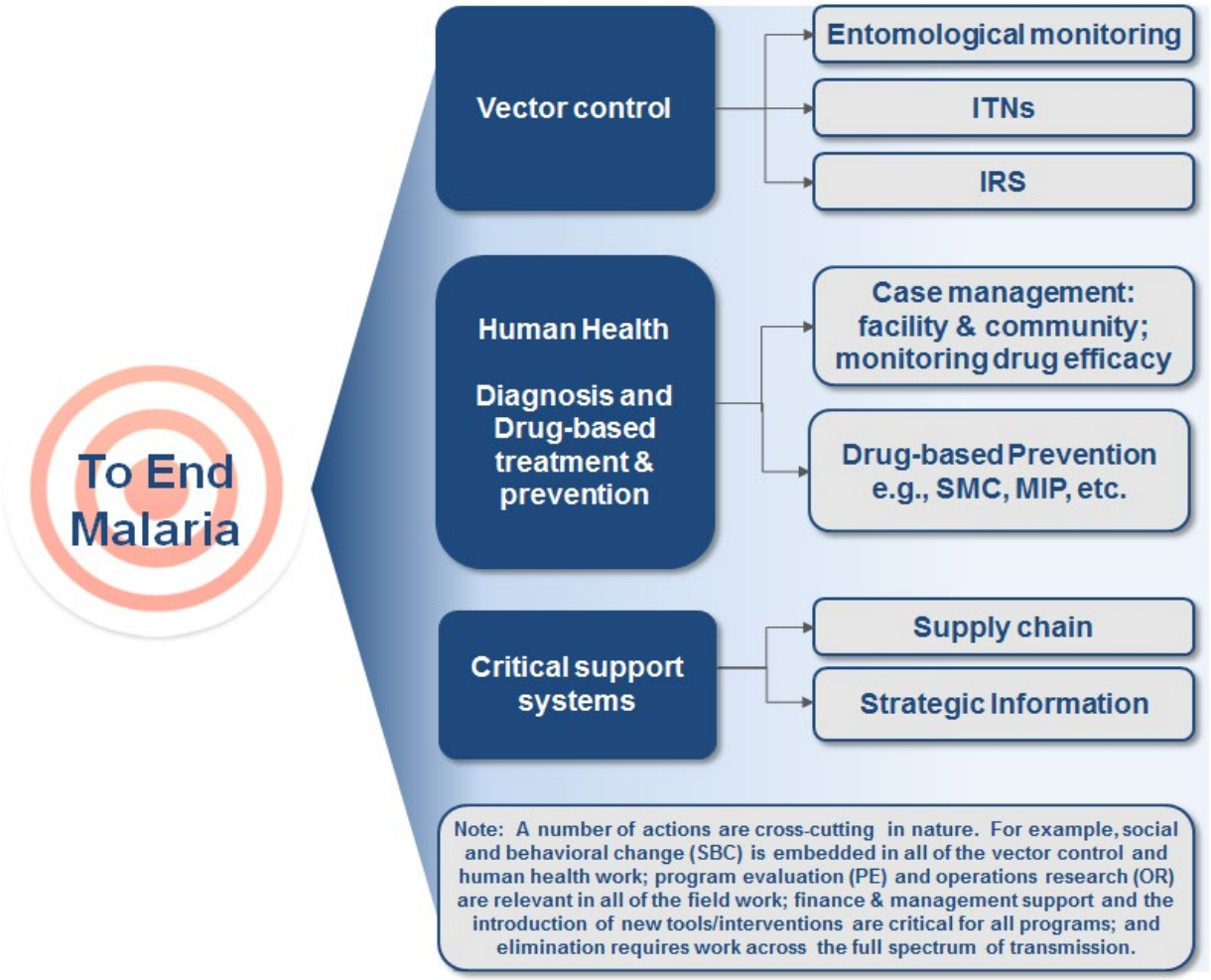
[6] World Bank Open Data. 2018. GDP Per Capita in Current US Dollars. World Bank.

- **Political System:** Presidential Republic
- **Trafficking in Persons Designations for 2016-2018:** Tier 2[7]
- **Malaria Partners Providing Funding and Program Support Include:**
  - Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund)
  - World Health Organization (WHO)
  - United Nations Children's Fund (UNICEF)
  - World Vision
  - Malaria Vaccine Implementation Program
  - U.S. Army Medical Research Directorate - Kenya
  - Kenya Medical Research Institute (KEMRI)
- **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 NMP and other partners.
- **PMI Investments:** Kenya began implementation as a PMI focus country in FY 2008. The proposed FY 2020 PMI budget for Kenya is $34 million; that brings the total PMI investment to nearly $425 million.

PMI organizes its activities and planning levels around the activities in Figure 1, in line with the national malaria strategy.

[7] Department of State. (2019). Trafficking in Persons Report. US Government.

Figure 1. PMI's Approach to End Malaria



PMI's approach is both consistent with and contributes to USAID's Journey to Self-Reliance Framework. 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, remains paramount to PMI. As denoted in Table 2 (the budget table), nearly all of PMI's planned support for FY 2020 in the areas of vector control, human health, supply chain and strategic information contains elements of capacity building and system strengthening. PMI/Kenya will continue to rely on and engage with local partners such as Kenya Medical Supplies Authority (KEMSA) for supply chain activities, the University of Nairobi for strengthening malaria data on the DHIS2 platform, and Jaramogi and Kakamega Teaching and Referral Hospitals for clinical mentorship for severe malaria management. PMI/Kenya is also expanding its local partner base to reach communities through interpersonal communication activities with locally based organizations and community units. Finally, PMI/Kenya will explore private sector partnerships for expanded malaria case data capture in the private sector.

PMI will also reposition our maturing partnership with Kenya to evolve our relationships with national and county governments, as well as civil society, academia, and the private sector to strengthen the social contract and increase citizen participation, political commitment, and stewardship while crowding-in all forms of domestic resources (e.g., financial, technical, in-kind) for transformational and sustainable impact.

II. MALARIA SITUATION AND MALARIA CONTROL PROGRESS IN KENYA

Malaria in Kenya accounts for an estimated 16 percent of outpatient consultations and 75 percent of the population is at risk of the disease.[8] Malaria transmission and infection risk varies considerably based on altitude, rainfall patterns, and temperature. To help target malaria control interventions, the country is stratified into four epidemiological zones:

- **Endemic Areas:** In endemic areas, malaria transmission is intense throughout the year, with high entomological inoculation rates and *P. falciparum* prevalence greater than 20 percent near Lake Victoria and between 5–20 percent in coastal counties. In 2019, an estimated 27 percent of the total population (13.7 million) lived in endemic areas, including 9.4 million in the eight lake endemic counties. Four sub-counties in the endemic counties are classified as highland-epidemic prone.
- **Highland Epidemic-Prone Areas:** In highland epidemic-prone areas, malaria transmission is seasonal with considerable year-to-year variation, and case-fatality rates during epidemics can be greater than in endemic regions. In highland-epidemic counties, malaria prevalence ranges from 5–20 percent. In 2019, an estimated 19 percent of Kenyans (9.6 million) lived in the nine counties classified as highland epidemic prone. In addition, four sub-counties in the lake endemic (Mt. Elgon, Tongaren, and Cheptais in Bungoma and Likuyani in Kakamega), and four sub-counties in the seasonal malaria transmission (two in Baringo and two in West Pokot) counties are predominantly classified as highland-epidemic prone.
- **Seasonal Malaria Transmission Areas:** The seasonal malaria transmission areas are arid and semi-arid areas of northern and central Kenya that experience short periods of intense malaria transmission after the rainy seasons. In 2019, an estimated 23 percent of the population (11.5 million) lived in these 16 counties. Two seasonal-risk counties, Baringo and West Pokot have some of the sub-counties classified as highland-epidemic prone. In seasonal-risk counties, malaria prevalence is between 1–5 percent.
- **Low Malaria Risk Areas:** There are 10 counties in the central highlands of Kenya, including Nairobi, that are classified as low malaria risk areas. These areas have an estimated 31 percent of the population (15.5 million) and malaria prevalence of less than 1 percent.

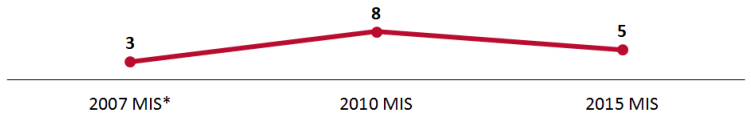
[8] National Malaria Control Program. (2019). Kenya Ministry of Health.

Plasmodium falciparum is the most common species causing malaria in Kenya, accounting for more than 99 percent of all malaria infections. The major malaria vectors in Kenya are from the *Anopheles gambiae* complex (i.e., *An. gambiae* s.s., *An. arabiensis,* and *An. merus*), as well as *An. funestus*.

Over more than a decade, Kenya substantially increased coverage of malaria prevention interventions. This effort has resulted in significant declines in morbidity and mortality. For instance, all-cause child mortality in Kenya declined from 115 deaths per 1,000 live births in 1999–2003 to 52 deaths per 1,000 live births in 2010–2014, a 55 percent reduction, which has been partly attributed to increased coverage of malaria control and prevention interventions.[9]

Figure 2. Trends in Malaria Prevalence

Percent of children age 6-59 months who tested positive for malaria by microscopy

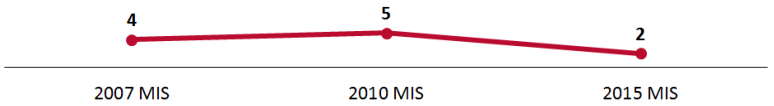


**The 2007 MIS presents this indicator for children ages 1-59 months, while the data points 2010 and 2015 surveys are for children ages 6-59 months.*

Other trends also reflect progress as a result of investments in malaria control and prevention interventions. Among children aged 6–59 months, who are considered especially vulnerable, malaria prevalence decreased from 8 percent in 2010 to 5 percent in 2015. While malaria prevalence continues to be much higher in the lake endemic zone than in other zones, the rate among children aged 6 months to 14 years was markedly lower in 2015 (27 percent) than in 2010 (38 percent).

Figure 3. Trends in Prevalence of Low Hemoglobin

Percent of children 6-59 months of age with moderate-to-severe anemia (hemoglobin <8.0g/dl)



The prevalence of low hemoglobin among children also declined. In 2010, five percent of children between 6–59 months of age were found to have moderate to severe anemia, compared

[9] Kenya Malaria Impact Evaluation Group. (2017). Evaluation of the Impact of Malaria Control Interventions on All- Cause Mortality in Children Under Five Years of Age in Kenya 2003- 2015.

with only 2 percent of children between 6–59 months of age in 2015. It is important to note, however, that although having malaria more than doubled the likelihood that a child would be anemic, more than 80 percent (1,852/2,252) of children who were anemic, did not have malaria (KMIS 2015). This reflects the fact that anemia among young children in Kenya has diverse causes, including dietary deficiencies as well as malaria and other childhood illnesses.

Figures 4 and 5 provide additional insight into the malaria situation in Kenya, as well as the progress that has been made over the past decade.

Figure 4. Malaria Parasite Prevalence Among Children by Transmission Zone from the 2015 Malaria Indicator Survey

Percent of children 6-59 months of age who tested positive for malaria by microscopy

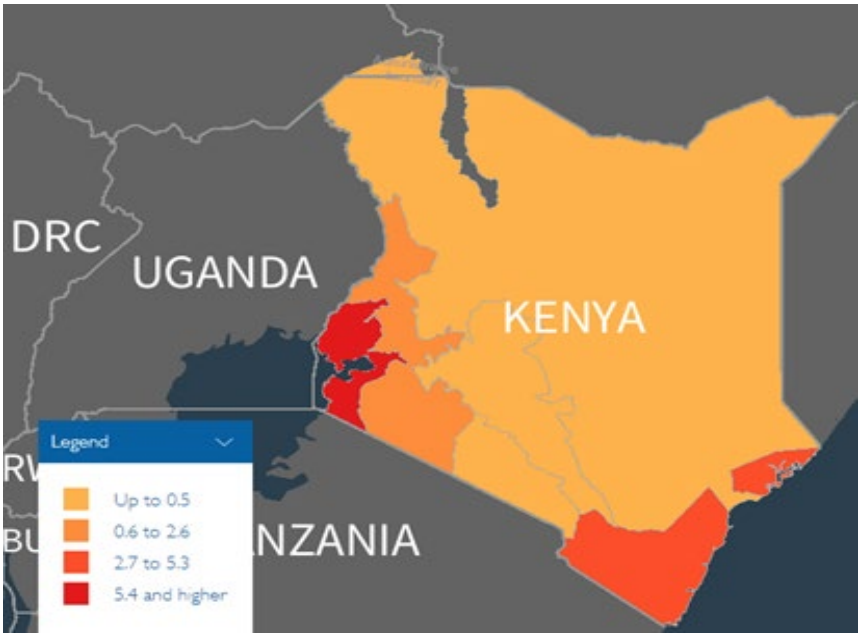


Figure 5. Key Indicators for Malaria Prevention and Treatment Coverage and Impact Indicators from DHS and MIS, 2003–2015

Indicator	2003 DHS	2007 MIS	2008 DHS	2010 MIS	2014 DHS	2015 MIS
% Households with at least one ITN	6	48	56	48	59	63
% 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
% Pregnant women who slept under an ITN the previous night	4	32	49	41	51	58

Indicator	2003 DHS	2007 MIS	2008 DHS	2010 MIS	2014 DHS	2015 MIS
% Children under five years of age with fever in the last two weeks for whom advice or treatment was sought[2]	74	26	62	59	72	72
% Children under five years of age with fever in the last two weeks who had a finger or heel stick	N/A	N/A	N/A	N/A	35	39
% Children receiving an ACT among children under five years of age with fever in the last two weeks who received any antimalarial drugs	N/A	N/A	34	N/A	86	92
% Women who received two or more doses of IPTp during their last pregnancy in the last two years[1]	4	13	14	22	39	56
% 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
Under-five mortality rate per 1,000 live births	115	N/A	74	N/A	52	N/A
% Children under five years of age with parasitemia (by **microscopy,** if done)[3]	N/A	3	N/A	8	N/A	5
% Children under five years of age with parasitemia (by **RDT**, if done)[3]	N/A	8	N/A	13	N/A	9
% Children under five years of age with moderate-to-severe anemia (Hb<8gm/dl)	4	4	N/A	5	N/A	2

Please note: DHS surveys are generally done during the dry season, whereas MIS surveys are deliberately done during the high transmission season, which should be taken into consideration when interpreting these indicators.

[1] This indicator has been recalculated according to the newest definition (at least the specified number of doses of SP from any source wherever possible). Additionally, this indicator has been recalculated to only show the totals for regions targeted for IPTp.

[2] This indicator has been recalculated according to the newest definition (care or treatment from any source excluding traditional practitioners wherever possible).

[3] Note that the data points for the 2007 MIS are for children ages 1–59 months, while those for 2010 and 2015 are for children ages 6–59 months.

Figure 6. Key Indicators for Malaria Prevention and Treatment Coverage and Impact Indicators from the MIS in Lake Endemic Counties*, 2010 and 2015

Indicator	2010 MIS Lake Endemic	2015 MIS Lake Endemic
% Households with at least one ITN	60	87
% Households with at least one ITN for every two people	N/A	54
% Population with access to an ITN	N/A	70
% Population that slept under an ITN the previous night	38	67
% Children under five years of age who slept under an ITN the previous night	48	73
% Pregnant women who slept under an ITN the previous night	58	78
% Children under five years of age with fever in the last two weeks for whom advice or treatment was sought[2]	50	65
% Children under five years of age with fever in the last two weeks who had a finger or heel stick	11	59
% Children receiving an ACT among children under five years of age with fever in the last two weeks who received any antimalarial drugs	N/A	94
% Women who received two or more doses of IPTp during their last pregnancy in the last two years[1]	22	55
% Women who received three or more doses of IPTp during their last pregnancy in the last two years	N/A	35

Indicator	2010 MIS Lake Endemic	2015 MIS Lake Endemic
Under-five mortality rate per 1,000 live births	N/A	N/A
% Children under five years of age with parasitemia (by microscopy, if done)[3]	26	17
% Children under five years of age with parasitemia (by RDT, if done)[3]	42	34
% Children under five years of age with moderate-to-severe anemia (Hb<8gm/dl)[3]	8	4

***Please Note:** The indicators from the 2010 and 2015 MIS are shown for the eight Lake Endemic counties (Bungoma, Busia, Homa Bay, Kakamega, Kisumu, Migori, Siaya, Vihiga)

[1] This indicator has been recalculated according to the newest definition (at least the specified number of doses of SP from any source wherever possible). Additionally, this indicator has been recalculated to only show the totals for regions targeted for IPTp.

[2] This indicator has been recalculated according to the newest definition (care or treatment from any source excluding traditional practitioners wherever possible).

[3] For 2015, the age range is 6–59 months for malaria parasitemia and anemia prevalence; for 2010, it is 3–59 months for malaria parasitemia and 6–59 months for anemia prevalence.

Figure 7. Evolution of Key Malaria Indicators Reported Through Routine Surveillance Systems

	2014	2015	2016	2017	2018
# Suspect malaria cases[1]	N/A	N/A	N/A	N/A	N/A
# Patients receiving diagnostic test for malaria[2]	N/A	N/A	N/A	N/A	N/A
Total # malaria cases[3] *(confirmed and presumed)*	9,634,857	7,677,421	7,826,679	7,964,281	9,945,475
# Confirmed cases[4]	4,606,880	5,496,688	4,910,549	4,104,138	3,944,459
# Presumed cases[5]	5,027,977	2,180,753	2,916,130	3,860,143	6,005,590[14]
% of malaria cases confirmed[6]	47%	77%	62%	52%	40%[14]
Test positivity rate[7]	32%	34%	32%	35%	27%
Total # <5 malaria cases[8]	3,264,472	2,484,913	2,448,913	2,397,517	2,824,130
% of cases under 5[9]	34%	32%	31%	30%	28%
Total # severe cases[10]	N/A	N/A	N/A	N/A	N/A
Total # malaria deaths[11]	23,456	15,061	2,928	N/A	N/A
# Facilities reporting[12]	77,821	82,611	88,086	86,861	102,249
Data form completeness[13]	88%	91%	92%	88%	97%

Definitions:

[1] Number of patients presenting with signs or symptoms considered to be possibly due to malaria (e.g., this could be the number of patients presenting with fever or history of fever in the previous 24 or 48 hours).

[2] Number patients receiving a diagnostic test for malaria (RDT or microscopy). All ages, outpatient, inpatient.

[3] Total number of reported malaria cases. All ages, outpatient, inpatient, confirmed and unconfirmed cases.

[4] Total diagnostically confirmed cases. All ages, outpatient, inpatient.

[5] Total clinical/presumed/unconfirmed cases. All ages, outpatient, inpatient.

[6] Number of confirmed cases / total number of cases.

[7] Number of confirmed cases / number patients receiving a diagnostic test for malaria.

[8] Total number of <5 cases. Outpatient, inpatient, confirmed, and unconfirmed.

[9] Total number of <5 cases / Total number of cases.

[10] Kenya does not report on the number of severe malaria cases.

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

[12] Total number of health facilities reporting data into the HMIS/DHIS2 system for that year.
[13] Number of monthly reports received from health facilities / number of health facility reports expected (i.e., number of facilities expected to report multiplied by the number of months considered).
[14] Because of transition from presumed cases to suspected cases using the same data element slot in the registers, the total number of presumed cases may be different from previous years.

Please Note: In July 2015, death reporting by cause required ICD-10 coding. Reporting rates fell as most staff involved in cause-of-death reporting had not yet been trained. Reporting also was poor in the last 2 months of 2016 during a nationwide doctors' strike, then stopped in 2017 because of technical issues.

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

The GoK is committed to improving health service delivery and places a high priority on malaria prevention and control with eventual malaria 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 of 2016 levels by 2023. The KMS outlines six strategic objectives to be reached by 2023:

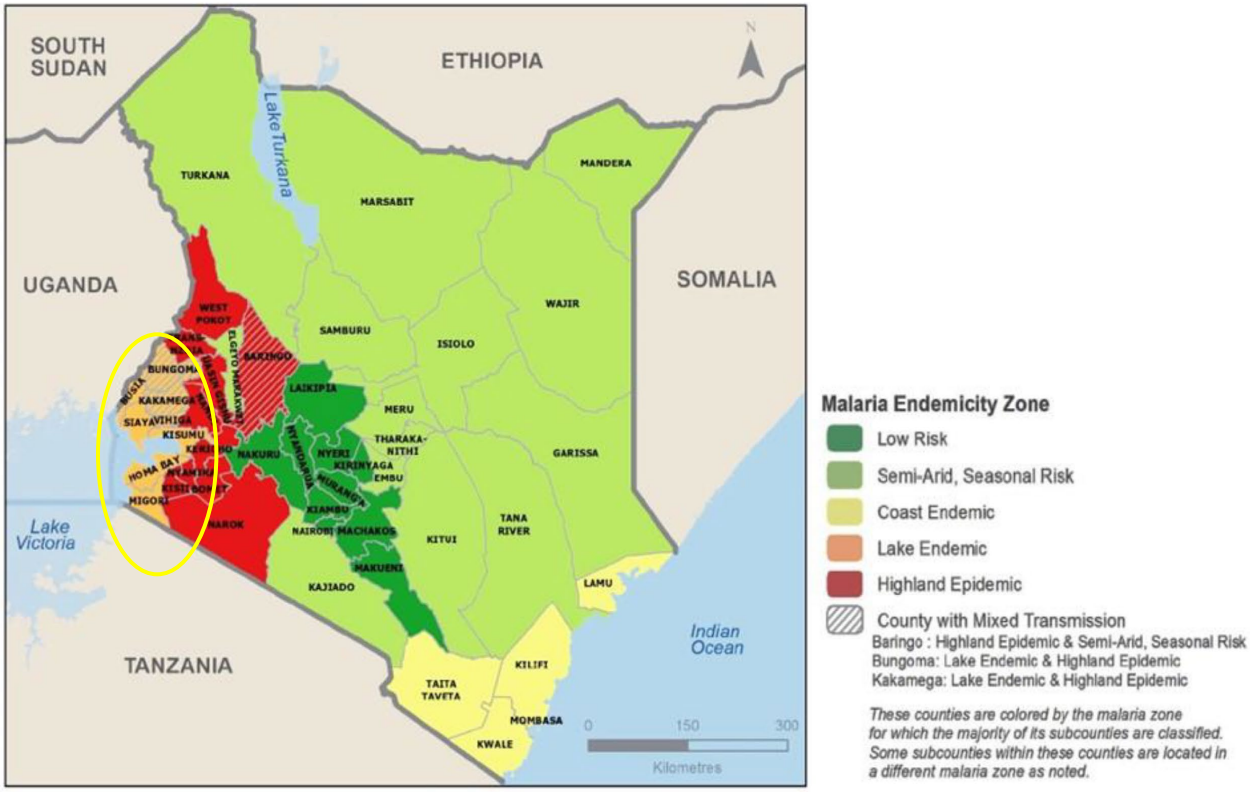
1. To protect 100 percent of people living in malaria risk areas through access to appropriate malaria preventive interventions by 2023;
2. To manage 100 percent of suspected malaria cases according to the Kenya malaria treatment guidelines by 2023;
3. To establish systems for malaria elimination in 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; and
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 to achieving the KMS objectives include ensuring human rights, gender, and equity; adopting a multisectoral approach to malaria control; ensuring appropriate targeting of interventions using routinely-collected data; strengthening malaria control performance and monitoring systems; strengthening linkages between national and county level; investing in health systems strengthening; leveraging the community health service; systematically managing risks; moving towards sustainable financing; and implementing in line with the principles of aid effectiveness.

The goals and principles of the KMS 2019–2023 are in line with PMI Technical Guidance, except that Kenya is not a country currently targeted for elimination by PMI. In collaboration with the WHO, PMI will, however, support the NMP to develop policy documents that will guide establishment of elimination structures in select counties.

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 three epidemic prone sub-counties in Bungoma and one in Kakamega. 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 (see Figure 8).

Figure 8. Map Showing Counties by Malaria Endemicity and PMI Focus Counties[10]



In the other 39 counties, NMP and other partners lead in providing technical support. PMI complements these efforts by: (1) providing national level support for review, harmonization, and standardization of policy documents; (2) strengthening malaria health information through the District Health Information System platform (DHIS2), and (3) conducting post-market surveillance of malaria medicines. 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 Committee of Experts (CoE) and Malaria Health Sector Committee.

[10] Ministry of Health (2016). *The epidemiology and control profile of malaria in Kenya: reviewing the evidence to guide the future vector control*. National Malaria Control Programme, Ministry of Health. Technical support provided by the LINK Project (London School of Hygiene and Tropical Medicine and the Information for Malaria (INFORM) Project, KEMRI-Wellcome Trust Research Programme), Nairobi, Kenya, April 2016.

Routine distribution of PMI-procured insecticide-treated mosquito net (ITNs) also extends beyond the lake endemic zone to cover 28 additional counties. Mass net distributions in 23 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), including PMI-procured SP, is distributed in the coast and lake endemic counties, while PMI-procured artemisinin-based combination therapy (ACTs), rapid diagnostic tests (RDTs), and treatments for severe malaria are distributed nationwide by KEMSA, along with similar commodities purchased through Global Fund.

The two main donors that support the GoK and NMP are PMI and Global Fund. Global Fund grants have two principal recipients in Kenya: the National Treasury (state) and the African Medical and Research Foundation (AMREF) (non-state). The current Global Fund grant covers 2018–2021 and will provide support for the 2020 ITN mass distribution (40 percent of the grant total), case management commodities (29 percent), program management (10 percent), M&E (8 percent), case management training (6 percent), SBC (5 percent), and post-marketing surveillance and quality insurance of antimalarials (2 percent). In addition, the country recently received funding under a Performance Above Allocation Request to cover a mass net gap to a total of 12.9 million ITNs.

Figure 9. PMI and Global Fund Intervention Support

Malaria Interventions									
Transmission Zone	Counties (#)	Routine ITN Distribution	Mass ITN Distribution	IRS	IPTp / MIP	CM	EPR	SBC	SM&E
Lake Endemic	8	P (8)	G/P (8)	P	P	P		P	P
Coast Endemic	5	P (5)	G (5)		P	G/PL		P	G/PL
Highland Epidemic	9	P (9)	G (9)			G/PL	PL	G/PL	G/PL
Seasonal	15	P (9)	G (1)		P*	G/PL	PL	G/PL	G/PL
Low Risk	10	P (5)				G/PL	PL	G/PL	G/PL

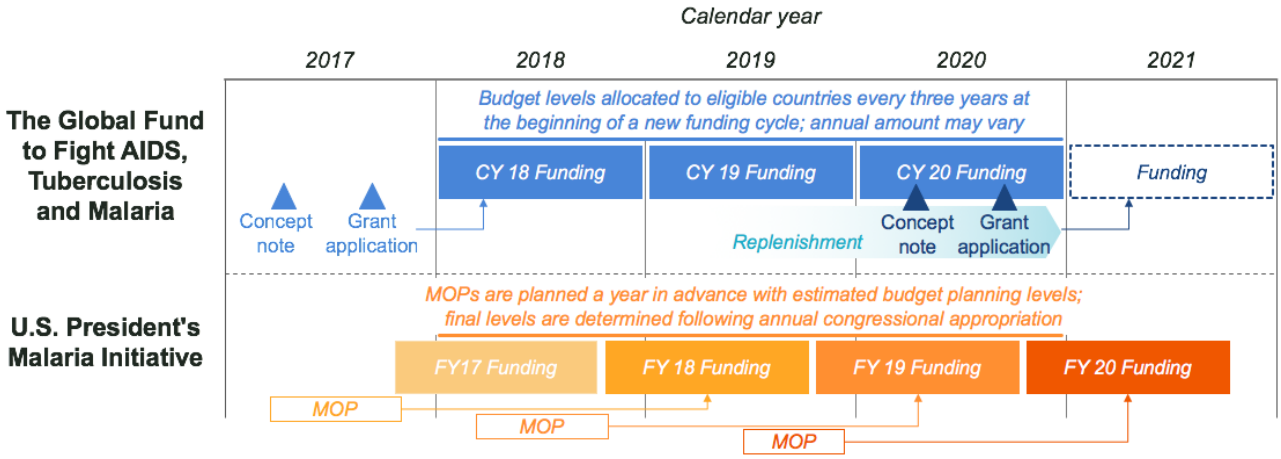
* Tana River County
P = Focused PMI Support
PL = Limited PMI Support
G = Global Fund Support

IV. PARTNER FUNDING LANDSCAPE

PMI emphasizes the importance of partner alignment in malaria control. Recognizing that each of the partner agencies emphasize complementary funding support for the national malaria control effort in a given country, over the last year, PMI, Global Fund, and the Bill and Melinda Gates Foundation (BMGF) set out to harmonize financial, supply chain, and programmatic data, and this effort remains ongoing as of the time of this MOP. A harmonized financial taxonomy has been developed for PMI and Global Fund (i.e. mapping cost categories across organizations).

Figure 10 visualizes the annual cycle of PMI funding and the MOP implementation year. As Figures 10 illustrates, any given FY MOP funds activities during the next FY. For example, a FY 2018 MOP funds implementation during FY 2019. Global Fund funding (and often, other partners and host country governments) is based on a three-year grant cycle on a calendar year (CY) timeframe during which activities were implemented, while annual PMI country budget allocations depend largely on the U.S. Congress's total overall malaria funding appropriation to USAID in a given fiscal year, as well as other considerations (e.g., previous funding levels, activity and program pipelines, other donor contributions, known commodity needs/gaps, progress on ongoing PMI-supported activities, clear evidence of continued government commitment to malaria control).

Figure 10. PMI and Global Fund Funding Cycle Alignment



Please note: This figure depicts the typical alignment. In some cases, Global Fund's funding may come in partway through the calendar year or may extend beyond three years. Kenya's current grant runs from 2018 through June 2021. Funding levels in "Section IV - Partner Funding Landscape" and commodity procurement amounts listed in "Annex A - Intervention Specific Data" may differ given the lag between the year that funding was planned and the year when procurement orders were placed. Differences may be a reflection of timing and/or based on changes in commodity consumption levels at country level, changes in commodity costs, or other donor orders.

The tables below summarize contributions by external partners and host country government in CY 2018-2020, with the goal of highlighting total country investments. For Kenya, data is available for PMI FY 2017–2019 and Global Fund CY 2018–2021. As the Global Fund 2021–

2024 grant funding cycle is not yet underway at the time of this PMI FY 2020 MOP development, Global Fund country investments beyond the June 2021 implementation period are not yet known. Please note that the host country government invests substantial funding into the national-to-local infrastructure and service delivery for malaria and many other programs. However, there has not been a standardized method for attributing those investments to malaria specifically. Thus, it may not yet be possible in the FY 2020 MOP cycle to attribute funding from the host country government into specific categories. There may be similar challenges for other partners.

Figure 11. Annual Budget by Level 1 Category

Year[1]	Funder	Vector Control	Case Management	Drug-Based prevention[2]	Supply Chain[3]	Monitoring, Evaluation & Research	Other Cross-Cutting and Health Systems Strengthening	Total
FY17/ CY18	PMI	$14.5M	$9.8M	$0.7M	$2.9M	$2.0M	$5.2M	**$35.0M**
	Global Fund	$.4M	$5.7M	$1.0M	$0.01M	$2.1M	$5.2M	**$14.3M**
	Host Gov[4]	-	-	-	-	-	-	**$ 5M**
	Total	**$14.9M**	**$15.4M**	**$1.7M**	**$2.9M**	**$4.1M**	**$10.4M**	**$54.3M**
FY18/ CY19	PMI	$15.1M	$10.8M	$0.8M	$2.2M	$1.8M	$4.4M	**$35.0M**
	Global Fund	$40.3M	$6.0M	$0.7M	$0.01M	$2.1M	$4.6M	**$53.7M**
	Host Gov[4]	-	-	-	-	-	-	**$5M**
	Total	**$55.4M**	**$16.8M**	**$1.5M**	**$2.2M**	**$3.9M**	**$9.0M**	**$93.7M**
FY19/ CY20	PMI	$14.9M	$9.7M	$.9M	$2.5M	$1.6M	$4.5M	**$34.0M**
	Global Fund	$.3M	$.5M	$.8M	$0.01M	$1.0M	$3.3M	**$5.9M**
	Host Gov[4]	-	-	-	-	-	-	**$4M**
	Total	**$15.2M**	**$10.2M**	**$1.7M**	**$2.5M**	**$2.6M**	**$7.8M**	**$43.9M**

[1] Each year's figures represent the FY for PMI and one CY for Global Fund that most closely align.
[2] Drug-based prevention, including SMC and MIP where relevant.
[3] Covers management of in-country warehousing and distribution of malaria commodities, except for ITNs which are separately captured under "vector control."
[4] GOK funding is provided in the Total column, breakdowns by technical area are not available at this time.

Please note: Categories shown 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. There is the potential for categories to continue to evolve through FY 2020 MOP process, as well as for additional donors and host country governments to adopt and reflect funding using the same categories.

Figure 12. Annual Budget by Level 3 Category, Detailed Breakdown for PMI and Global Fund

		FY17/CY18[1]		FY18/CY19[1]		FY19/CY20[1]	
Level 1 Category	**Level 3 Category**	**PMI**	**Global Fund**	**PMI**	**Global Fund**	**PMI**	**Global Fund**
Vector Control	Procure ITNs for Continuous Distribution	$1.5M	-	$2.0M	-	$4.3M	-
	Distribute ITNs via Continuous Distribution	$0.8M	-	$0.8M	-	$1.7M	-
	Procure ITNs for Mass Campaigns	$3.3M	-	$2.1M	$27.3M	$0.4M	-
	Distribute ITNs via Mass Campaigns	$0.8M	-	$0.8M	$11.5M	$0.1M	-
	Other ITN Implementation*	$0.3M	-	-	-	-	-
	IRS Implementation[4]	$7.0M	-	$8.7M	-	$7.5M	-
	Procure IRS Insecticide[4]	-	-	-	-	-	-
	Other IRS*	$0.4M	-	-	-	$0.3M	-
	Entomological Monitoring	$0.9M	$0.4M	$0.7M	$0.3M	$0.8M	$0.3M
	SBC for Vector Control[5]	-	-	-	-	-	-
	Other Vector Control Measures	-	-	-	-	-	-
	Removing Human Rights- and Gender-Related Barriers to Vector Control Programs**	-	-	-	-	-	-

		FY17/CY18[1]		FY18/CY19[1]		FY19/CY20[1]	
Level 1 Category	**Level 3 Category**	**PMI**	**Global Fund**	**PMI**	**Global Fund**	**PMI**	**Global Fund**
Case Management	Active Case Detection**	-	-	-	-	-	-
	Community-Based Case Management	-	-	-	-	-	-
	Facility-Based Case Management	-	$2.7M	-	$0.7M	-	$0.5M
	Private-Sector Case Management	-	-	-	-	-	-
	Procure ACTs	$5.2M	$1.4M	$5.1M	$4.4M	$4.9M	-
	Procure Drugs for Severe Malaria	$3.0M	$0.8M	$1.3M	$0.1M	$0.7M	-
	Procure Other Diagnosis-Related Commodities	-	-	-	-	-	-
	Procure Other Treatment-Related Commodities	-	-	-	-	-	-
	Procure RDTs	$0.1M	$0.5M	$2.5M	$0.6M	$2.4M	-
	Therapeutic Efficacy	-	-	$0.3M	-	-	-
	SBC for Case Management[5]	-	-	-	-	-	-
	Other Case Management	$1.4M	-	$1.6M	-	$1.7M	-
Drug-Based Prevention[2]	Procure SMC-Related Commodities	-	-	-	-	-	-
	SMC Implementation	-	-	-	-	-	-
	Prevention of Malaria in Pregnancy Implementation	$0.7M	-	$0.7M	-	$0.9M	-
	Procure IPTp-Related Commodities	-	-	$0.1M	-	-	-
	IPTi**	-	-	-	-	-	-

		FY17/CY18[1]		FY18/CY19[1]		FY19/CY20[1]	
Level 1 Category	**Level 3 Category**	**PMI**	**Global Fund**	**PMI**	**Global Fund**	**PMI**	**Global Fund**
	SBC for Drug-Based Prevention[5]	-	$1.0M	-	$0.7M	-	$0.8M
	Other Prevention**	-	-	-	-	-	-
Supply Chain[3]	In-Country Supply Chain[3]	$0.3M	-	$0.7M	-	$0.6M	-
	Supply Chain Infrastructure	-	-	-	-	-	-
	Ensuring Quality	-	$0.01M	-	$0.01M	-	$0.01M
	Pharmaceutical Management Systems Strengthening	$2.6M	-	$1.5M	-	$1.9M	-
	Supply Chain System Strengthening	-	-	-	-	-	-
Monitoring, Evaluation & Research	Reporting, Monitoring, and Evaluation	$1.9M	$0.8M	$1.7M	$1.5M	$1.4M	$0.2M
	Program and Data Quality, Analysis and Operations Research	-	$0.4M	-	$0.4M	-	$0.1M
	Surveys	-	$0.9M	-	$0.2M	-	$0.7M
	Other Data Sources**	-	-	-	-	-	-
	Support for FETP*	$0.1M	-	$0.1M	-	$0.2M	-
Other Cross-Cutting and Health Systems Strengthening	Integrated Service Delivery, Quality Improvement, and National Health Strategies**	-	$1.9M	-	$1.7M	-	$0.9M
	Financial Management Systems**	-	$1.0M	-	$0.5M	-	-
	Community Responses and Systems**	-	-	-	-	-	-
	Support for PCV and SPAs*	-	-	-	-	-	-
	Cross-Cutting Human Resources for Health**	-	-	-	-	-	-

		FY17/CY18[1]		FY18/CY19[1]		FY19/CY20[1]	
Level 1 Category	**Level 3 Category**	**PMI**	**Global Fund**	**PMI**	**Global Fund**	**PMI**	**Global Fund**
	Central and Regional Program Management[6]	$1.5M	$0.3M	$1.0M	$0.3M	$1.3M	$0.3M
	In-Country Staffing and Administration*	$2.2M	-	$2.1M	-	$1.8M	-
	Other Program Management**	-	$2.0M	-	$2.0M	-	$2.1M
	SBC Unspecified[5]	$1.4M	-	$1.4M	-	$1.4M	-
Total		**$35.0M**	**$14.3M**	**$35.0M**	**$53.7M**	**$34.0M**	**$5.9M**

[1] Each year's figures represent the FY for PMI and one CY for Global Fund that most closely align.
[2] Drug-based prevention, including SMC and MIP where relevant.
[3] Covers management of in-country warehousing and distribution of malaria commodities, except for ITNs which are separately captured under "vector control."
[4] May include cost of IRS insecticides if full cost of IRS implementation including commodities was bundled within single line in prior year's Table 2.
[5] SBC was not historically split in the PMI budget across intervention areas, hence the row "SBC (unspecified)" for the FY2020 MOP cycle. Going forward, SBC proposed activities will be categorized across vector control, case management, and prevention (new categories).
[6] PMI proposed activity "national-level support for case management" rolls up under "Case Management" Level 1.
Please note: Categories shown 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. There is the potential for categories to continue to evolve through FY 2020 MOP process, as well as for additional donors and host country governments to adopt and reflect funding using the same categories.
* Category currently funded by PMI only
** Category currently funded by Global Fund only

Figure 13. Annual Budget, Breakdown by Commodity

Year[1]	Funder	ITNs for Continuous Distribution	ITNs for Mass Distribution	IRS Insecticide[4]	ACTs	RDTs	Severe Malaria	SMC-Related	IPTp-Related	Total
FY17/ CY18	PMI	$1.5M	$3.3M	-	$5.2M	$0.1M	$3.0M	-	-	**$13.1M**
	Global Fund	-	-	-	$1.4M	$0.5M	$0.8M	-	-	**$2.7M**
	Total	**$1.5M**	**$3.3M**	**-**	**$6.6M**	**$0.6M**	**$3.8M**	**-**	**-**	**$15.8M**
FY18/ CY19	PMI	$2.0M	$2.1M	-	$5.1M	$2.5M	$1.3M	-	$0.1M	**$13.1M**
	Global Fund	-	$27.3M	-	$4.4M	$0.6M	$0.1M	-	-	**$32.3M**
	Total	**$2.0M**	**$29.4M**	**-**	**$9.5M**	**$3.1M**	**$1.3M**	**-**		**$45.4M**

Year[1]	Funder	ITNs for Continuous Distribution	ITNs for Mass Distribution	IRS Insecticide[4]	ACTs	RDTs	Severe Malaria	SMC-Related	IPTp-Related	Total
FY19/ CY20	PMI	$4.3M	$0.4M	-	$4.9M	$2.4M	$0.7M	-	-	**$12.7M**
	Global Fund	-	-	-	-	-	-	-	-	**-**
	Total	**$4.3M**	**$0.4M**	**-**	**$4.9M**	**$2.4M**	**$0.7M**	**-**	**-**	**$12.7M**

[1] Each year's figures represent the FY for PMI and one CY for Global Fund that most closely align.
[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 table above only include ex-works commodity value in a given year. Additional costs, including quality control, freight, insurance, and customs totaled $1.5M over the CY 2018-2020 period.
[4] IRS insecticide; for PMI, IRS insecticide commodity costs may be inextricable from IRS implementation costs in historical data – field left blank where this is the case.
Please note: Categories shown 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. There is the potential for categories to continue to evolve through FY 2020 MOP process, as well as for additional donors and host country governments to adopt and reflect funding using the same categories.

V. ACTIVITIES TO BE SUPPORTED WITH FY 2020 FUNDING

Please see the FY 2020 budget tables (Tables 1 and 2) for a detailed list of activities PMI proposes to support in Kenya with FY 2020 funding. Please refer to www.pmi.gov/resource-library/mops for the latest tables. Key data used for decision-making can be found in Annex A.

ANNEX A: INTERVENTION-SPECIFIC DATA

1. VECTOR CONTROL

NMP Objective
Protect 100 percent of people living in malaria risk areas through access to appropriate malaria preventive interventions by 2023.
NMP Approach
1. Achieve and sustain universal coverage of ITNs in malaria-endemic and epidemic-prone counties through mass distribution campaigns carried out every three years; continuous distribution channels in antenatal care (ANC) and child welfare clinics (CWC), at the community level and through other channels. 2. Use indoor residual spraying (IRS) in targeted areas to reduce the burden of malaria, and focalized IRS to interrupt transmission. 3. Use larval source management in targeted areas. 4. Ensure effective deployment of SBC activities at the community level in order to ensure the utilization of malaria control interventions, including the use of ITNs. 5. Conduct entomological surveillance to monitor vector densities and resistance in order to inform decision-making and track progress on key vector control indicators.
PMI Objective in Support of NMP
PMI provides support to all NMP strategies for vector control, except larval source management.
PMI-Supported Recent Progress *(Past 12–18 Months)*
From January 2018 to July 2019, PMI supported the NMP to: ▪ Distribute approximately 1.5 ITNs to pregnant women and children under one year of age in 36 counties. ▪ Distribute approximately 1.8 million Global Fund procured ITNs as part of the 2017/2018 mass net distribution campaign in Busia, Kakamega, and Bungoma Counties. ▪ Spray 286,233 structures in Homa Bay County and 221,544 structures in Migori County, resulting in an overall spray coverage rate of 92 percent. ▪ Train 2,909 people selected from local communities to assist with IRS operations, including community health volunteers (CHVs) and personnel from social services department. ▪ Conduct wall bioassays in four sites: Rongo and Nyatike sub-counties in Migori County, and two sites in Rachuonyo North sub-county in Homa Bay County.

PMI-Supported Planned Activities *(Next 12–18 Months, Supported by Currently Available Funds)*
▪ Procure and distribute up to 1.8 million ITNs to pregnant women and children under one year of age through ANC and CWCs. ▪ Procure and distribute approximately 3.1 million ITNs for the 2020/21 mass distribution campaign. ▪ Procure 325,500 PBO nets for distribution through ANC and CWCs in Busia, Bungoma, and Kakamega Counties, where there are high levels of pyrethroid resistance. ▪ Support the NMP to establish a continuous community net distribution (CCND) channel in Migori and Homa Bay Counties. ▪ Support the finalization and dissemination of the findings of the 2018 Post Mass Long Lasting Insecticidal Net Distribution Survey (PMLLIN). ▪ Conduct IRS between January to March 2020 in Migori and Homa Bay in order to protect up to two million people. ▪ Provide technical assistant to the NMP for development of the vector control guiding documents including the Insecticide Resistance Management Plan, IRS Implementation Strategy, which will include a chapter on an IRS exit strategy, Integrated Vector Control Strategy, and Mosquito Surveillance Guidelines. ▪ Coordinate an integrated approach to social and behavior change activities working closely with county MOH officials, county health promotion officers, and CHVs to raise community awareness, understanding, and demand for IRS and ITNs. ▪ Conduct monthly entomological monitoring at ten sentinel sites in western Kenya to monitor the impact of IRS, as well as piperonyl butoxide (PBO) nets that will be distributed in three counties in 2020. ▪ Monitor four sites (two in Kakamega and two in Vihiga) using a community-based approach. ▪ Conduct entomological surveillance from four locations in Turkana County once per year to support vector control planning. ▪ Conduct 24 and 36 months post-distribution ITN durability monitoring in Kwale and Busia Counties.

1.A. 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.

Do you propose to increase, decrease, or maintain funding allocation levels for this activity? Why, and what data did you use to arrive at that conclusion?
PMI/Kenya is proposing to maintain funding allocation levels for entomological monitoring. Monthly monitoring of malaria vector distribution, bionomics, and insecticide resistance profiles will continue to be conducted in ten sites. Additional collections will be undertaken by community-based teams in Vihiga and Kakamega Counties and one-off collections in Turkana County. Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

Key Question 1

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

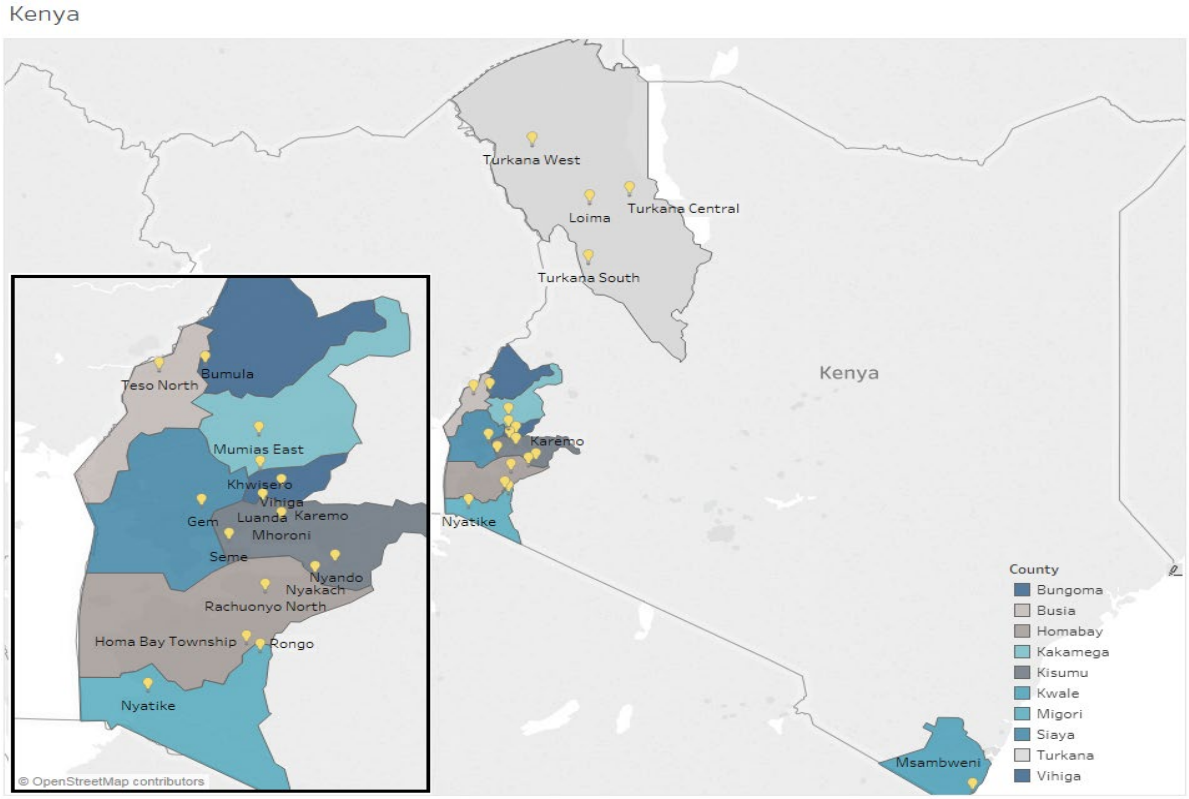
Supporting Data

Figure A1. List of Entomological Monitoring Sites and Activities to be Conducted at Each Site

County	Total Sentinel Sites	Activities	Supported By
Migori County	2	Vector bionomics and insecticide resistance monitoring; insecticide decay rate on sprayed walls; vector biting behavior	PMI
Homa Bay County	2	Vector bionomics and insecticide resistance monitoring; insecticide decay rate on sprayed walls; vector biting behavior	PMI
Kisumu County	4	Vector bionomics and insecticide resistance monitoring; vector biting behavior	PMI
Siaya County	2	Vector bionomics and insecticide resistance monitoring	PMI

County	Total Sentinel Sites	Activities	Supported By
Bungoma County	2	Vector bionomics and insecticide resistance monitoring	PMI
Busia County	2	Vector bionomics and insecticide resistance monitoring	PMI
Kakamega County	2	Community-based monitoring of vector bionomics; insecticide resistance monitoring	PMI
Vihiga County	2	Community-based monitoring of vector bionomics	PMI
Turkana County	4	Vector bionomics and insecticide resistance monitoring	PMI

Figure A2. Map Indicating Proposed Sites for Entomological Monitoring



Key information on the geographic distribution of malaria vectors and bionomical data is summarized below:

- The number of mosquitoes collected from sites where IRS was conducted was very low.

- In sites where IRS was not conducted, the numbers of mosquitoes collected were much higher with *An. funestus* being predominant in Kisumu County, Siaya County, and Bungoma County while *An. gambiae* s.l. were predominant in Busia County.
- In Kwale County, *An. funestus* was predominant with a mean of 2.1 mosquitoes per night in light traps and 1.0 in pyrethrum spray catches (PSCs). The mean catch of *An. gambiae* s.l. per house per night was 0.1 in light traps and 0.0 in PSCs.
- In Turkana County, *An. gambiae* s.l. were numerous in all collection methods with the highest densities collected in outdoor CDC light traps and Furvela tent traps. It was observed that sleeping outdoors is a common practice in most parts of Turkana County.
- Densities were extremely low in Trans-Nzoia using PSC and indoor CDC light trap as shown in the table below.
- Additional entomological surveillance is coordinated by the NMP with technicians trained in all 47 counties to conduct mosquito trapping. The aim of the surveillance is to determine the geographic distribution of different malaria vectors in Kenya.

Figure A3. Mean Number of *An. funestus* and *An. gambiae* s.l. in Kwale, Turkana, and Trans-Nzoia Counties per Trap Night, by Different Collection Methods

County	Collection Method	*An. funestus*	*An. gambiae* s.l.
Kwale	Indoor Light Trap	2.05±0.34	0.11±0.04
	PSC	1.01±0.19	0.0
Turkana	Furvela Tent Trap	0.05±0.03	1.46±0.47
	Indoor Light Trap	0.17±0.06	0.88±0.20
	Outdoor Light Trap	0.07±0.03	2.34±0.59
	PSC	0.33±0.09	0.44±0.08
Trans Nzoia	Indoor Light Trap	0.04±0.02	0.03±0.01
	PSC	0.01±0.01	0.02±0.01

- Sporozoite infection rates among a subset of anophelines were 0 percent (0/8) in Migori (sprayed), 0 percent (0/32) in Homa Bay (sprayed), 2.2 percent (21/947) in Kisumu (unsprayed), 3.5 percent (95/2,692) in Siaya (unsprayed), 4.2 percent (3/71) in Busia (unsprayed), 4 percent (3/76) in Bungoma (unsprayed), 4 percent (16/398) in Kwale (unsprayed) and 0 percent (0/21) in Trans-Nzoia (unsprayed).

Figure A4. Predominant Mosquito Species and their Bionomics at Each Entomological Monitoring Site

Site	Major Vector	Minor Vector	Peak Abundance	Preferred Biting Location	Preferred Resting Location	Preferred Host	Peak Sporozoite Rate	Annual* EIR
Migori	*An. arabiensis* and *An. funestus*	*An. coustani*	April – June and October – December	*An. funestus* – indoor *An. arabiensis* - both indoor and outdoor	*An. funestus* – indoor *An. arabiensis*- both indoor and outdoor	*An. funestus*- Humans *An. arabiensis* - cattle	Zero over the last two years	N/A – Not calculated
Homa Bay	*An. arabiensis* and *An. funestus*	*An. coustani*	April – June and October – December	*An. funestus* – indoor *An. arabiensis* - both indoor and outdoor	*An. funestus* – indoor *An. arabiensis*- both indoor and outdoor	*An. funestus*- Humans *An. arabiensis* - cattle	Zero over the last one years	N/A – Not calculated
Kisumu	*An. arabiensis* and *An. funestus*	*An. coustani*	April – June and October – December	*An. funestus* – indoor *An. arabiensis* - both indoor and outdoor	*An. funestus* – indoor *An. arabiensis*- both indoor and outdoor	*An. funestus*- Humans *An. arabiensis* - cattle	4.5%	N/A – Not calculated
Siaya	*An. arabiensis* and *An. funestus*	An. coustani	April – June and October – December	*An. funestus* – indoor *An. arabiensis* - both indoor and outdoor	*An. funestus* – indoor *An. arabiensis*- both indoor and outdoor	*An. funestus*- Humans *An. arabiensis* - cattle	3.5%	N/A – Not calculated

Site	Major Vector	Minor Vector	Peak Abundance	Preferred Biting Location	Preferred Resting Location	Preferred Host	Peak Sporozoite Rate	Annual* EIR
Busia	-*An. gambiae s.s.* -*An. arabiensis* and -*An. funestus*	*An. coustani*	April – June and October – December	*An. gambiae s.s.* - indoor *An. funestus* – indoor *An. arabiensis* - both indoor and outdoor	-*An. gambiae s.s.* - indoor -*An. funestus* – indoor -*An. arabiensis*- both indoor and outdoor	-*An. funestus* and *An. gambiae s.s.*, Humans -*An. arabiensis* , cattle	4.0%	N/A – Not calculated
Bungoma	-*An. gambiae s.s* -*An. arabiensis* and -*An. funestus*	*An. coustani*	April – June and October – December	*An. gambiae s.s.* - indoor *An. funestus* – indoor *An. arabiensis* - both indoor and outdoor	-*An. gambiae s.s.* - indoor -*An. .funestus* – indoor -An. a*rabiensis*- both indoor and outdoor	*An. funestus*- Humans *An. arabiensis* - cattle	4.0%	N/A – Not calculated

Conclusion

- PMI supports entomological surveillance activities in ten sites, eight in endemic counties and two in low transmission zone. IRS is carried out in two of the endemic counties. The activities supported through PMI funding include mapping of the geographic distribution, bionomics, and insecticide resistance profiles of the mosquitoes in the areas. PMI support for entomological surveillance will be coordinated with the NMP as well as counties in an effort to devolve these activities to the county level. Standard operating procedures are currently under development by the NMP with support from PMI. PMI will continue to support community based entomological monitoring in four sites in two counties.
- Sustained annual spraying with Actellic 300CS has kept vector populations low in Migori and Homa Bay counties. Sustaining these gains is essential. IRS should be continued until alternative malaria control tools are in place to maintain reduced transmission. Optimization and utilization of complementary interventions, including health system strengthening efforts

such as improved routine surveillance, should also be considered to ensure sustained malaria control.

- *An. funestus* was the predominant mosquito species in the unsprayed counties with extremely high densities in Siaya County. Given the high vectorial capacity of this species along with increasing reports of pyrethroid resistance, the use of nets with PBO nets, next generation nets, or non-pyrethroid IRS is required to ensure effective malaria vector control in this region.

Key Question 2

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

Supporting Data

Figure A5. Mortality (%) of *An. gambiae* s.l. and *An. funestus* 24 Hours After Exposure to the Diagnostic Concentration of Pyrethroids (Plus PBO) and Pirimiphos-Methyl in WHO Susceptibility Tests

Species	Counties/Sites	Pirimiphos-methyl	Deltamethrin	Deltamethrin +PBO	Permethrin	Permethrin +PBO	Alphacy-permethrin
An. gambiae	Migori	100	92	100	81	-	-
	Homa Bay	100	67	93	66	-	-
	Kisumu	100	56	100	28	-	-
	Siaya	100	67	96	64	88	46
	Bungoma	100	62	100	43	-	-
	Busia	100	54	94	5	-	-
	Kakamega	100	17	54	1	-	-
	Kwale, Kinango	100	13	97	48	100	49
	Kwale, Msambweni	100	62	84	73	78	26
	Turkana, Kakuma	100	12	67	16	78	36
	Turkana, Lodwar	100	32	97	64	100	19
	Turkana, Loima	100	36	100	35	-	75

Species	Counties/Sites	Pirimiphos-methyl	Deltamethrin	Deltamethrin +PBO	Permethrin	Permethrin +PBO	Alphacy-permethrin
An. funestus	Kisumu	100	35	100		-	-
	Siaya	100	10	76	27	-	-

- High levels of pyrethroid resistance was observed in *An.* gambiae s.l. in both lake and coastal endemic regions as well in north western regions of Kenya as shown in the above table, with mortalities ranging from 1-81 percent in WHO tube assays. Mortality to deltamethrin and permethrin increased in all sites with pre-exposure to PBO. Pre-exposure to PBO restored full susceptibility to deltamethrin in Migori, Kisumu, Bungoma, and Turkana. In other sites, mortality to deltamethrin and permethrin after PBO pre-exposure ranged from 54-97 percent.
- Mortality to clothianidin reached 100 percent within five days following exposure of *An. gambiae* s.l. from Turkana and Kwale counties.
- Susceptibility test for *An. funestus* were conducted in Siaya and Kisumu Counties. The vector population were fully susceptible to pirimiphos-methyl but resistant to deltamethrin (35 percent and 10 percent mortality in Kisumu and Siaya respectively). Pre-PBO exposure reversed resistance to complete susceptibility in Kisumu County while the mortality rate of *An. funestus* exposed to deltamethrin following PBO pre-exposure was 76 percent in Siaya County.

Conclusion

- There is widespread resistance to pyrethroid insecticides in *An. gambiae* s.l. and *An. funestus*. However, pre-exposure to PBO resulted in greatly increased mortality rates for deltamethrin, indicating that PBO nets would likely be more effective than conventional pyrethroid ITNs in most of western Kenya.
- *An. gambiae* s.l. and *An. funestus* are susceptible to pirimiphos-methyl and clothianidin. Although mosquitoes remain susceptible to pirimiphos-methyl, this insecticide has been sprayed for three years in Migori County and for two years in Homa Bay County. It is essential that new insecticides incorporating clothianidin are registered in-country so that the NMP can implement an insecticide resistance management strategy.

Key Question 3

What are the in-country considerations that impact your funding allocation in this category? If there is a specific budget line item in Table 2 that is not covered by the above questions, please address here.

Supporting Data

The delay in issuance of a tax waiver by the GoK in 2019 for PMI-procured insecticide impacts the ability to conduct a timely spray in 2020. In addition, high insecticide and operational costs of IRS may require negotiations with the NMP and counties around cost sharing for continued blanket spray or the adoption of a more targeted spray approach within the two counties.

Conclusion

PMI/Kenya will continue to work with the NMP and PMI Vector Control Team to identify the best spray approach given the epidemiological and entomological data and available funding.

1.B. INSECTICIDE-TREATED NETS (ITNs)

PMI Goal
Achieve high ITN coverage and usage of effective nets in endemic PMI-supported areas (in the context of the current insecticide resistance); and maintain high coverage and use with consistent ITN distribution (via campaigns and/or continuous channels in a combination that is most effective given country context).
Are you proposing to increase, decrease, or maintain funding allocation levels for ITN distribution and SBC activities? Why? What data did you use to arrive at that conclusion?
PMI/Kenya proposes increasing funding levels from approximately $4.2 million in FY 2019 to approximately $6.7 million in FY 2020 to support: ▪ Procurement and distribution of up to 1.2 million ITNs for pregnant women and children under one year of age through ANC and CWCs in malaria endemic and epidemic prone counties. ▪ Procurement and provision of logistical support, including transportation and storage of ITNs, for distribution of 336,224 ITNs within the CCND system in Homa Bay and Migori. ▪ Establishment of structures and transition of net distribution to a local distribution entity. ▪ Efforts to determine sites for durability monitoring following the 2020 mass campaign, including one site for monitoring of PBO nets. Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

Key Question 1

How has net ownership evolved since the start of PMI in the country? Are households fully covered?

Supporting Data

Figure A6. Trends in ITN Ownership: Percent of Households

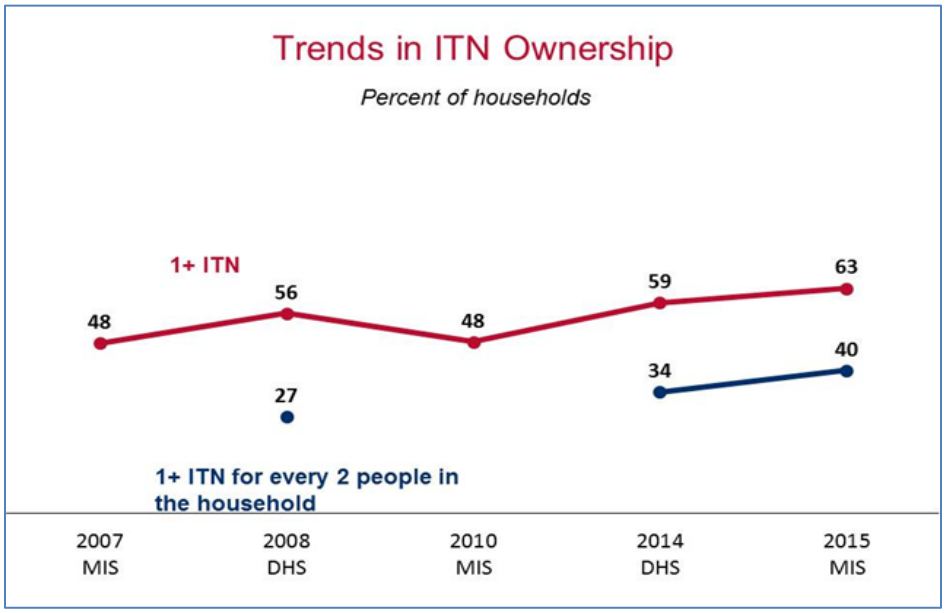
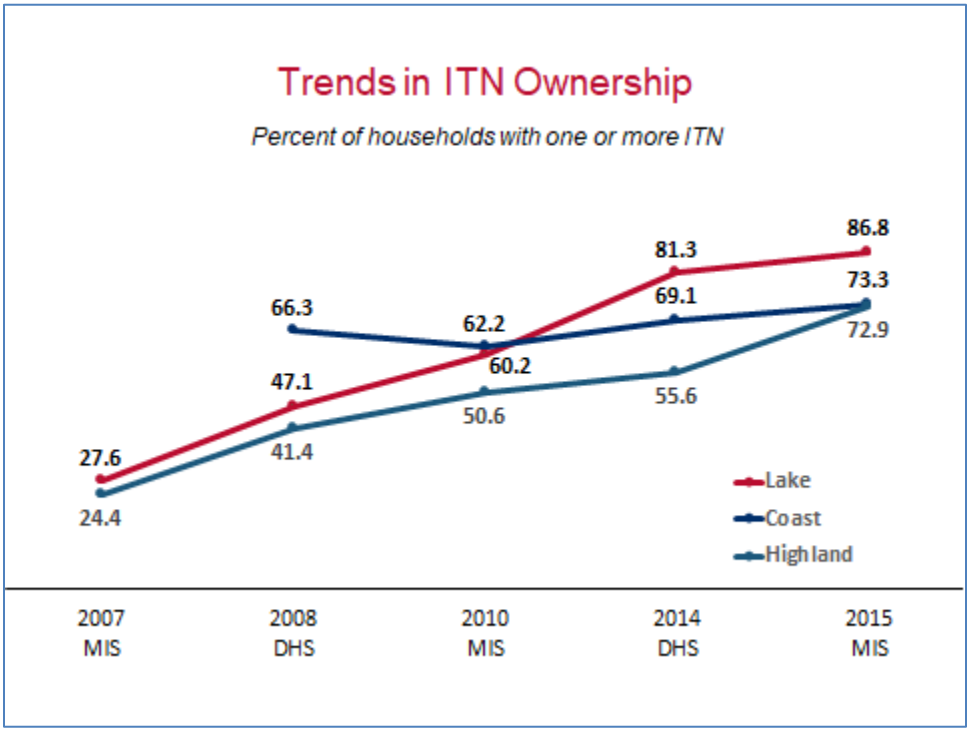


Figure A7. Trends in ITN Ownership: Percent of Households with One or More ITN



Conclusion

Despite substantial investments in ITNs by PMI and other partners for over a decade, only 63 percent of households had at least one ITN and only 40 percent had at least one ITN per two people (i.e., universal coverage) by 2015. NMP policy and strategic guidance currently targets ITNs to endemic and epidemic-prone areas. In the lake endemic counties, the proportion of households with at least one ITN was 87 percent, while the proportion of households that had achieved universal coverage (one ITN per two people) was 54 percent. The 2018 PMLLIN Survey, which was conducted in July/August 2018, found that in the lake and coast endemic and highland zones, 91 percent of households reported having at least one ITN and 51 percent reported having at least one ITN for every two people in the household. PMI will support the NMP to optimize coverage of ITNs through improved planning for the upcoming 2020 mass campaign and an expansion of continuous distribution channels to include a community platform in two counties.

Key Question 2

What proportion of the population has access to an ITN? In contrast, what proportion of the population reporting using an ITN? What is the ratio between access and use? Does it vary geographically?

Supporting Data

Figure A8. Trends in ITN Access and Use: Percent of Household Population with Access to an ITN and Who Slept Under and ITN the Night before the Survey

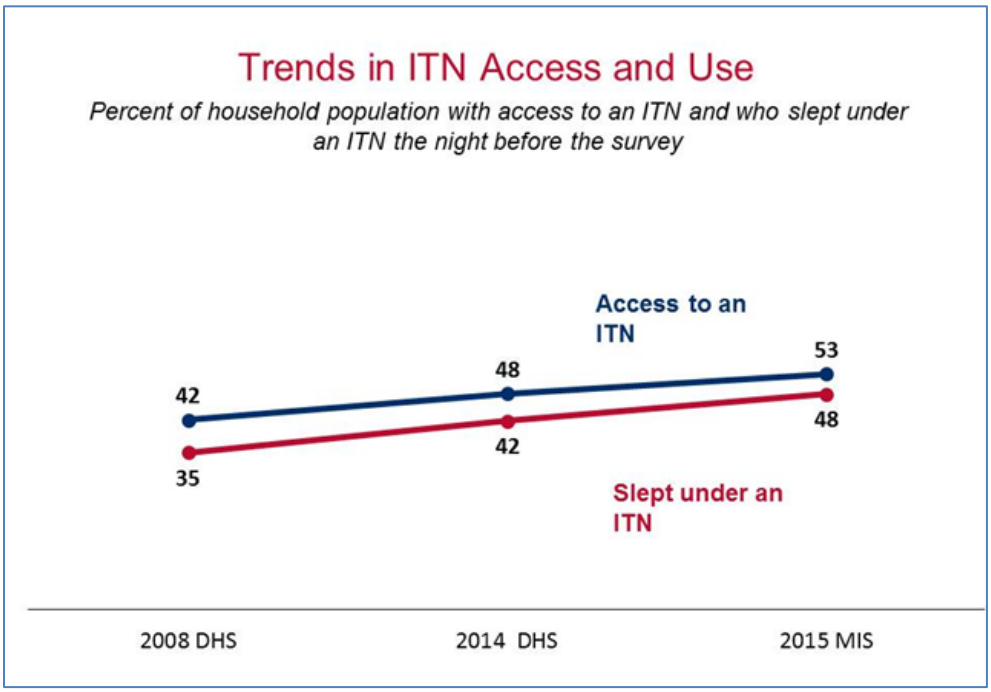


Figure A9. Trends in ITN Use: Percent of Household Population Who Slept Under and ITN the Night before the Survey

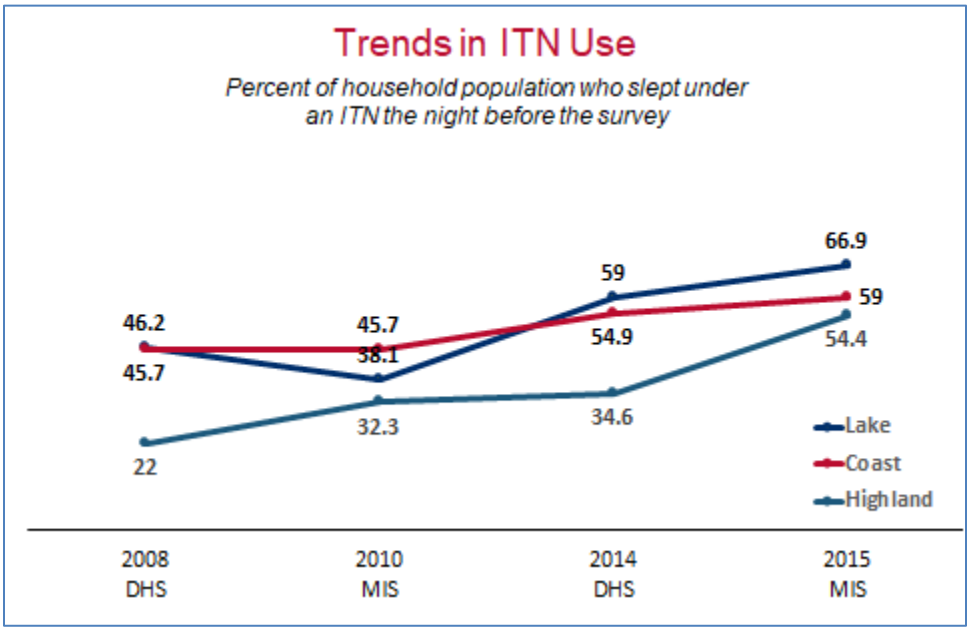
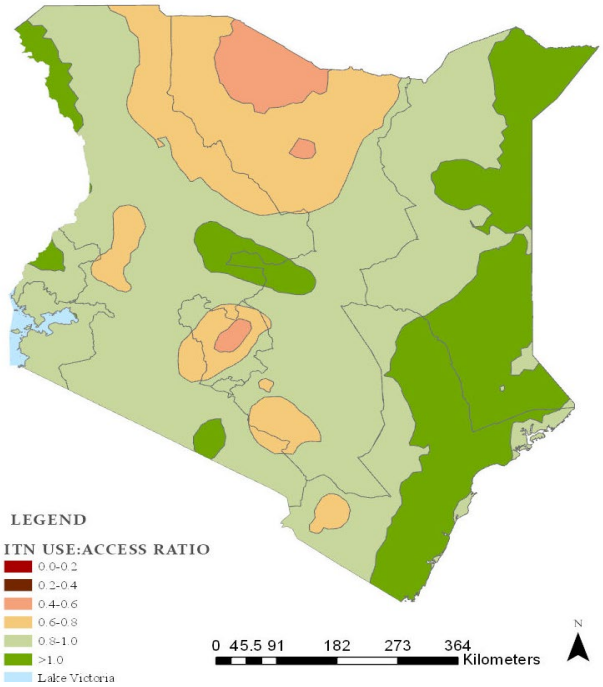


Figure A10. Kenya ITN Use: Access Ratio – 2015 MIS



Figures 9 and 10 show that ITN use is generally high given access, are further supported by the 2018 PMLLIN Survey. The 2018 PMLLIN Survey, which was conducted following the 2017/2018 mass distribution campaign (where ITNs were targeted to the endemic and epidemic-

prone areas) and utilized a methodology similar to the MIS, 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.[11]

Conclusion

In Kenya, available data suggest that in the areas targeted for ITN distribution, most people who have access to nets actually sleep under them. Recognizing that there is widespread adoption of ITN use when nets are available, the focus of SBC efforts in PMI's eight focus counties will be shifted toward maintenance of ITN use and adoption of net care and repair practices in FY 2020. It is important to note, however, that in areas of the country where malaria risk is low, ITN use given access also tends to be lower. Therefore, PMI will fund operational research that focuses on the effectiveness of behavior change approaches in different malaria transmission zones. It is expected that this research will provide insights into the most appropriate behavior change approach and messages for specific behaviors, including ITN use, in areas with low malaria transmission. This effort will also support the NMP's goal of developing structures to support elimination in targeted counties.

Key Question 3

In areas where ITN access is high but use is low, what is known about the key barriers and facilitators to use?

Supporting Data

Figure A11. Key Barriers and Facilitators to ITN Use in Kenya

Facilitator	Type of Factor	Data Source	Evidence
High Perceived Severity as a Result of the Experiences of Friends / Relatives	Internal	Malaria Qualitative Survey - 2016	One of the biggest drivers of net use is perceived risk of malaria. Perceived risk is closely tied to whether an individual's friends or neighbors have died or become severely ill as a result of malaria.
High Self-Efficacy Around Net Hanging Ability	Internal	Post Mass LLIN Distribution Survey - 2018	Nationally, 91 percent of respondents indicated they could hang a net anywhere where people sleep in their house.
Belief that ITNs Are Safe to Sleep Under	Social	Post Mass LLIN Distribution Survey - 2018	In the coast and lake endemic regions, 89 and 90 percent, respectively, of respondents indicated that ITNs are safe to sleep under.

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

Barrier	Type of Factor	Data Source	Evidence
Universal Coverage with ITNs Not Achieved	Environmental	Post Mass LLIN Distribution Survey - 2018	Eighty-three percent of households surveyed own at least one LLIN, but only 51 percent of households surveyed had attained universal coverage (1 LLIN per every two people sleeping in the household).
Perceived Susceptibility Dependent on Season	Internal	Post Mass LLIN Distribution Survey - 2018	In the lake endemic region, 28 percent of respondents stated that people are only at risk of getting malaria during the rainy season. This figure increased to 37 percent in the coastal endemic region.
Belief that ITN Use Causes Infertility	Social	Malaria Qualitative Survey - 2016	In the lake endemic region, it is believed that ITN use can cause infertility. The extent of this misconception has not yet been quantified.

Conclusion

The available data on behavioral outcomes suggests that SBC activities should support maintenance of ITN uptake and increase the emphasis on net care and repair behaviors, which can help extend the life of ITNs and contribute to sustaining universal coverage. This recommendation is supported by evidence from the 2018 PMLLIN Survey, which 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. Such efforts will also complement investments aimed at increasing ITN access through mass distribution, routine distribution, and continuous distribution.

A shift towards maintenance of ITN uptake and net care and repair will be achieved through a combination of mass media and interpersonal communication activities. Mass media activities will be targeted at reinforcing and maintaining net use, while interpersonal communication activities will focus on building skills, knowledge, self-efficacy around net care and repair and addressing barriers to net use. Special focus will be placed on increasing mothers' self-efficacy around net care and repair given that existing research suggests this population has the most influence on net use behaviors.[12]

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

Key Question 4

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

Supporting Data

Figure A12. Trends in ITN Use among Children and Pregnant Women

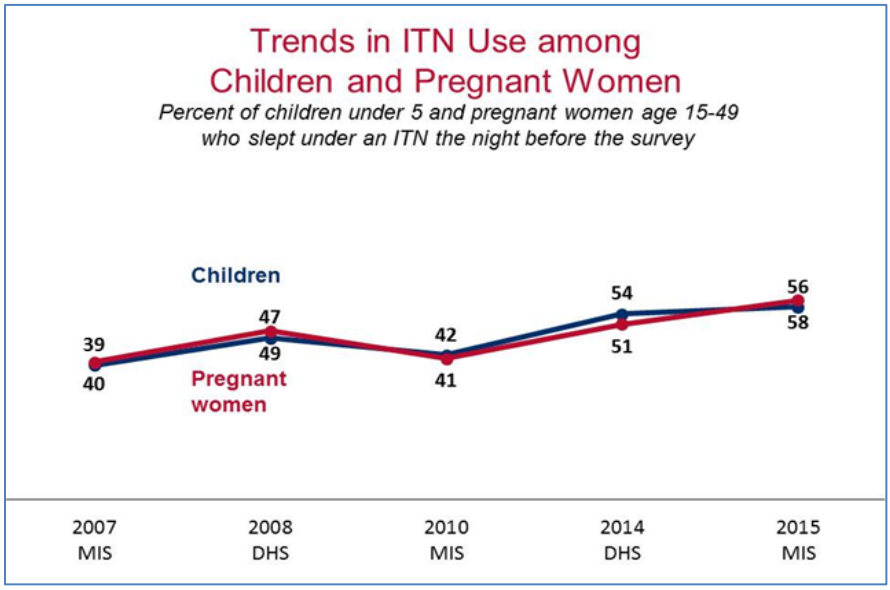
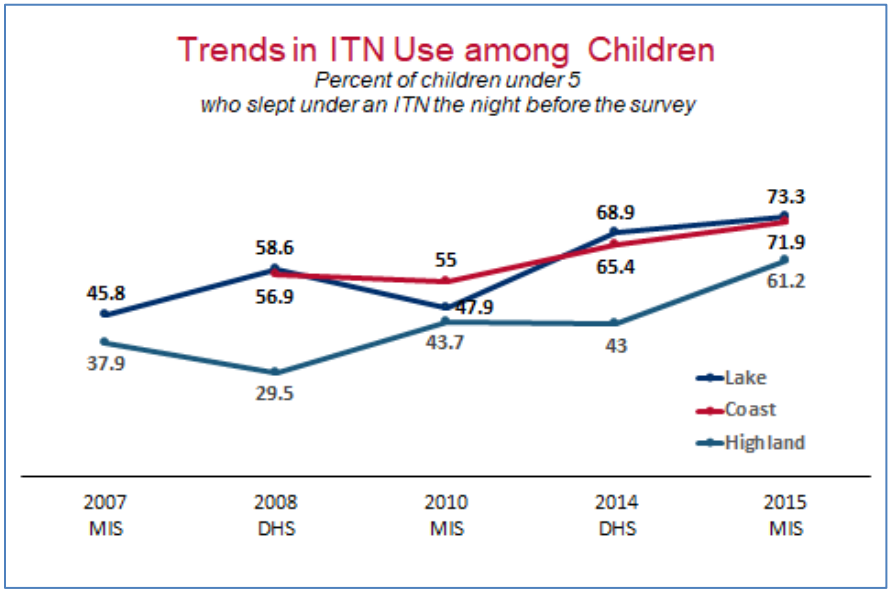


Figure 13. Trends in ITN Use among Children



Conclusion

ITN use is directly linked to access. To maintain high use levels, universal coverage needs to be achieved and maintained. ITN usage has steadily increased over the years, mirroring the improvements in ITN ownership. The 2018 PMLLIN Survey conducted in 23 ITN target counties (lake endemic, highland, and coastal) found that:

- Eighty-three percent of households had at least one ITN and 51 percent of households had at least one ITN per two people.
- Sixty-six percent of household members slept under an ITN the night before the survey.
- Ninety-one percent of members of households with at least one ITN for every two people slept under an ITN the night before the survey.
- Seventy-three percent of children under five years of age slept under an ITN the night before the survey.
- Seventy-five percent of pregnant women slept under an ITN the night before the survey.
- Ninety-seven percent of pregnant women slept under an ITN in households with one or more ITNs for every two people.

Key Question 5

What channels are used to distribute ITNs?

Supporting Data

The NMP deploys various ITN distribution channels with the objective of achieving and sustaining universal coverage. These include:

- **Routine Distribution:** Targets distribution of ITNs to pregnant women and children under one year of age through ANC and CWC visits in 36 malaria counties. Primary method used to sustain universal coverage between mass distribution campaigns.
- **Mass Distribution:** Carried out every three years in 23 endemic and highland epidemic counties to achieve universal coverage (i.e., one net for every two people). Targets all households and involves registration of households and distribution of ITNs at set locations.
- **Continuous Community Net Distribution:** PMI supported a pilot of CCND in Samia and Busia Counties between 2013–2016. The objective of the pilot was to test the feasibility of maintaining universal coverage through community-based distribution channels. The pilot used a pull driven distribution mechanism, with the need for an ITN determined at the household level. After the pilot, 79 percent of households among the surveyed population at the intervention site had at least one net for every two persons compared to 44.6 percent at the control site. There was, therefore, a steady increase in net ownership over the pilot period. Based on the pilot results, the NMP has recommended the use of CCND in Homa Bay and Migori (IRS counties) following the mass campaign in 2020.

Figure A14. Quantities Distributed by Channel Under PMI

	October 2015 - September 2016	October 2016 - September 2017	October 2017 - September 2018	October 2018 - June 2019
ANC/CWC	981,560	1,568,476	2,050,963	1,455,755*
Schools	X	X	X	X
Community	30,063	X	X	X
Mass Campaign	3,786,040	X	1,826,699	X

Conclusion

The NMP deploys various ITN distribution channels with the objective of achieving and sustaining universal coverage. These include mass campaigns and routine distribution through ANC and CWCs. These channels have resulted in improvements in coverage and access. The addition of a community channel starting with two counties is expected to accelerate progress towards universal coverage.

Key Question 6

What is the estimated need for ITNs over the next three calendar years? What volume of ITNs are available from partners and the public sector for the next three calendar years?

Supporting Data

Figure A15. Estimated ITN Distribution Need and Partner Contributions Over the Next Three Calendar Years

Calendar Year	2019	2020	2021
Total Targeted Population[1]	35,982,849	36,774,578	37,767,492
Continuous Distribution Needs			
Channel #1: ANC[2]	1,127,379	1,152,184	1,183,293
Channel #2: EPI/CWC[3]	848,961	925,484	1,009,876
Channel #3: CCND[4]	0	0	336,424
Estimated Total Need for Continuous Channels	1,976,340	2,077,668	2,529,593
Mass Campaign Distribution Needs			
2020/2021 mass distribution campaign(s)[5]	0	15,707,752	0
Estimated Total Need for Campaigns	0	15,707,752	0
Total ITN Need: Routine and Campaign	**1,976,340**	**17,785,420**	**2,529,593**
Partner Contributions			
ITNs carried over from previous year	*36,488*	*213,223*	*1,541,055*

Calendar Year	2019	2020	2021
ITNs from MOH	0	0	0
ITNs from Global Fund	0	12,611,428	0
ITNs from other donors	0	0	0
ITNs planned with PMI funding[6]	2,153,075	6,501,824	1,200,000
Total ITNs Available	**2,189,563**	**19,326,475**	**2,741,055**
Total ITN Surplus (Gap)	**213,223**	**1,541,055**	**211,462**

[1]36 counties targeted for routine ANC and EPI/CWC: Lake endemic, coast endemic, highland epidemic, certain semi-arid and low risk counties
[2] Proportion of pregnant women 3.4% of population; ANC Attendance coverage 97% (KMIS 2015); with projected increase through 2020; Program Efficiency 95% (Source Malaria Surveillance Bulletin Dec 2017)
[3] Proportion of Children Under 1 year 3.21% (KNBS). WHO UNICEF estimate of Penta1 coverage in 2015, with projected increases through 2020 (EPI coverage over time is 98%); Program efficiency 70% with projected 5% increase per year.
[4] Nets for Migori and Homa Bay calculated based on sustaining 80% ITN coverage (KMS 2009-2018) using NetCalc and below assumptions: % of household with any net 88.2% (KMIS 2015), % of household with any LLIN 86.8% (KMIS 2015), median LLIN survival rate is 3 (WHO LLIN survival report)
[5]23 counties targeted for mass campaign: Lake endemic, coast endemic, highland epidemic. The population figures were divided by 1.8 to arrive at the LLINs required for mass distribution.
[6]2,780,000 ITNs listed for PMI in 2020 are the nets PMI ordered for 2019, but because of importation waiver delays will likely not arrive until 2020.

Conclusion

For routine ITN distribution, 2019 and 2020 projections estimated a surplus of 213,223 and 1,541,055 ITNs respectively, and the planned amounts for 2021 have been adjusted accordingly. The net orders deliveries in-country will be scheduled to avoid overstock situations in country. A tax waiver has recently been granted for PMI commodities so orders will be resumed.

Key Question 7

Durability monitoring is ongoing at two sites following the mass campaign in 2017/2018. The DawaPlus 2.0 and the DuraNet are being monitored at Busia and Kwale, respectively. Status of the durability monitoring is summarized in the table below.

Figure A16. 2017/2018 ITN Campaign Durability Monitoring

Campaign Date	Sites	Brands	Baseline	12-month	24-month	36-month
July 2017	Busia	DawaPlus 2.0	X	X	-	-
Oct 2017	Kwale	DuraNet	X	X	-	-

Conclusion

Results for the baseline and 12-month time points are available and the team is awaiting the 24-month and 36-month time points.

Key Question 8

What are the in-country considerations that impact your funding allocation in this category? If there is a specific budget line item in Table 2 that is not covered by the above questions, please address here.

Supporting Data

With FY 2019 funds, PMI/Kenya is supporting the establishment of distribution and accountability structures leveraging the community platform and link health facilities to support the introduction of a new CCND channel in Homa Bay and Migori Counties following the 2020 mass campaign. With FY 2019 funds, PMI/Kenya is also supporting the identification, assessment, and capacity building of a local entity to support net distribution in 2021.

Conclusion

Expansion of continuous distribution channels to include the community is expected to accelerate progress towards achieving universal coverage with ITNs which currently stands at 51 percent (2018 PMLLIN) against a national target of 80 percent. Strengthening the capacity of a local entity to distribute ITNs will contribute to USAID's Journey to Self-Reliance efforts in Kenya.

1.C. INDOOR RESIDUAL SPRAYING (IRS)

Key Goal
Ensure high spray coverage, with an appropriate insecticide, in targeted endemic PMI-supported areas.
Do you propose to increase, decrease, or maintain funding allocation levels for this activity? Why, and what data did you use to arrive at that conclusion?
PMI/Kenya proposes maintain funding levels in the FY 2020 MOP compared to recent years. We are undertaking a cost analysis of IRS operations in Kenya that will inform future funding levels and the FY 2020 MOP funding will be revised as needed. Given the increased costs of undertaking IRS in Kenya, the amount of funding available, the cost of insecticide, and operational costs will determine the spray coverage. PMI will support the NMP to continue to actively collect entomological and epidemiological data to inform focal spray considerations. Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

Key Question 1

What areas are targeted for IRS and why?

Supporting Data

At present, two counties are targeted for IRS: Migori and Homa Bay. In line with the NMP's IRS Business Plan, IRS is used as a tool for burden reduction by creating a buffer between highland epidemic regions and the lowland endemic regions. IRS coverage started in the highlands, transitioning to the lowland counties in the endemic areas.

Figure A17. Counties Targeted for IRS

County	Number of Structures	Funder	Insecticide
Migori	212,029	PMI	Pirimiphos-methyl CS
Homa Bay	319,269	PMI	Pirimiphos-methyl CS

Conclusion

Even with the reduction in vector densities in the two IRS counties it is critical to strengthen routine health facility surveillance systems to inform progress on epidemiological indicators. The NMP recommends continued spray in the two counties until sufficient data is available to inform an IRS exit and county structures have been strengthened to respond timely to any malaria upsurge.

Key Question 2

In PMI-supported areas, what spray coverage rates have been achieved in the past five years?

Supporting Data

Figure A18. Coverage of IRS in Western Kenya

Calendar Year	Number of Counties Sprayed	County Names	Number of Structures Sprayed	Coverage Rate	Population Protected
2016	0	N/A	N/A	N/A	N/A
2017	1	Migori	212,029	98%	906,388

Calendar Year	Number of Counties Sprayed	County Names	Number of Structures Sprayed	Coverage Rate	Population Protected
2018	2	Migori and Homa Bay	488,323	94%	1,833,860
2019	2	Migori and Homa Bay	507,777	92%	2,011,860
2020*	2	Migori and Homa Bay	TBD	TBD	TBD

**Denotes targets for FY2020.*

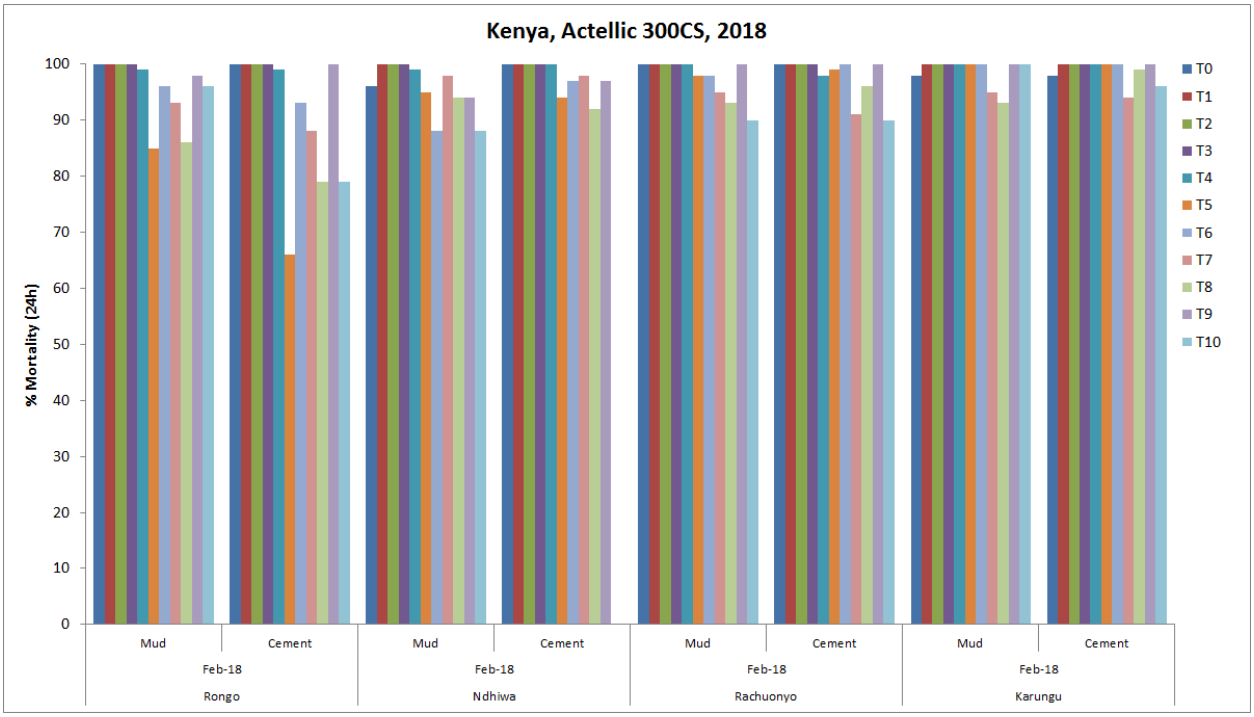
Conclusion

PMI has continually achieved high coverage of IRS in the targeted areas. It is essential that epidemiological and entomological surveillance systems are strengthened to provide data to inform impact. There is a need to intensify efforts for scale up of other malaria control interventions to achieve optimal coverage while working with the counties to establish sustainable structures for response to upsurges.

Key Question 3

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

Figure A19. Mortality of *An. gambiae* Kisumu Strain in Wall Cone Bioassays Up to Ten Months After Spraying



PMI sprayed pirimiphos-methyl in 2018, which had a residual life of approximately ten months. Residual efficacy monitoring of the 2019 spray campaign is ongoing. Current data suggests that pirimiphos-methyl sprayed in 2019 is lasting approximately three to four months, while clothianidin is lasting at least four months, with additional testing ongoing.

Conclusion

Data from 2017 and 2018 indicated long-lasting effectiveness of pirimiphos-methyl with up to ten months of residual activity. Data collected in 2019 suggest a shorter residual efficacy which should be investigated to assess potential reasons. Preliminary data on the residual activity of clothianidin suggests its effectiveness is at least as long as pirimiphos-methyl and products incorporating this insecticide could be incorporated into a resistance management strategy. It is therefore important to register products based upon clothianidin in Kenya.

Key Question 4

What is the plan for insecticide rotation? What insecticide will be used next in PMI-supported areas?

Supporting Data

Figure A20. Insecticide Selection by Year

Year	Migori	Homa Bay
2017	Pirimiphos-methyl CS	N/A
2018	Pirimiphos-methyl CS	Pirimiphos-methyl CS
2019	Pirimiphos-methyl CS	Pirimiphos-methyl CS and a small pilot of clothianidin
2020*	Pirimiphos-methyl CS	Pirimiphos-methyl CS and a small pilot of clothianidin

**Denotes planned insecticide classes.*

In 2018, susceptibility (>98 percent mortality) of wild *An. arabiensis* to pirimiphos-methyl was observed in all sub-counties where testing was conducted. Similarly, in 2018, 100 percent mortality of wild *An. arabiensis* to clothianidin was recorded after 96 hours (four days) post exposure in WHO tube tests at all sites. Therefore, there is full susceptibility to both insecticides proposed to be used in 2020. Due to the fact that Kenya has been spraying pirimiphos-methyl CS for two to three years, it is recommended that some sites rotate to clothianidin to mitigate any potential insecticide resistance.

Conclusion

Wild mosquitoes in the IRS target areas are susceptible to both pirimiphos-methyl and clothianidin. Insecticide products incorporating these insecticides should be rotated every year or every other year to ensure continued susceptibility of mosquitoes to each insecticide. However, clothianidin has not yet been fully registered in Kenya, and thus only a small-scale pilot is likely for 2020.

Key Question 5

Are any PMI-supported areas considering withdrawing IRS? If so, what programs are in place to cover anticipated increases in malaria cases and promote consistent net use and care-seeking behaviors?

Supporting Data

Based on funding available for IRS, PMI may consider supporting the NMP to undertake targeted spraying within select counties. A CCND channel will also be added to accelerate progress toward universal coverage and complement existing routine distribution channels, which target pregnant women and children. These efforts will be supported by interpersonal

communication activities, which leverage the community platform to increase utilization of the targeted interventions. Finally, in the event IRS is withdrawn, PMI would consider procuring and distributing PBO nets for those areas, based on the entomological data.

Conclusion

N/A

Key Question 6

What are the in-country considerations that impact your funding allocation in this category? If there is a specific budget line item in Table 2 that is not covered by the above questions, please address here.

Supporting Data

Cost of spray operations have risen significantly impacting the ability to spray two full counties going forward**.**

Conclusion

N/A

2. HUMAN HEALTH

2.A CASE MANAGEMENT IN HEALTH FACILITIES AND COMMUNITIES

NMP Objective
Manage 100 percent of suspected malaria cases according to Objective Two of the KMS 2019–2023 and the Kenya Malaria Treatment Guidelines by 2023.
NMP Approach
Prompt diagnosis and effective treatment of malaria is crucial towards achieving the goal of this strategy. This objective will focus on updating and disseminating relevant documents, enhancing the skills of healthcare providers, and ensuring access to diagnosis and treatment commodities. The target defined under this objective will be achieved through implementation of the following strategies: ▪ Strengthen capacity for integrated malaria case management; ▪ Strengthen capacity for case management of severe malaria; ▪ Provide malaria case management at the community level in targeted areas; ▪ Ensure the provision of quality malaria parasitological diagnosis; ▪ Procure diagnostic and treatment commodities.

PMI Objective in Support of NMP
Early and accurate detection of *Plasmodium* infection followed by prompt treatment with an effective antimalarial are the cornerstones of case management. PMI is aligned to NMP guidance on the provision of malaria case management and CCMm in the eight malaria-endemic counties, where malaria prevalence is highest (27 percent of the population). This focused approach allows the program to maximize program impact on reducing malaria morbidity and mortality with limited resources. To achieve this, the NMP, PMI, and partners have invested in the key strategies aimed at improving the quality of and access to malaria case management services in the KMS 2019–2023.
PMI-Supported Recent Progress *(Past 12–18 Months)*
From January 2018 to July 2019, PMI supported the NMP to: ▪ Conduct a program review and develop a new KMS 2019–2023. ▪ Finalize and launch the new manual for QA/QC for malaria diagnosis. ▪ Revise the 2010 Supportive Supervision Manual. ▪ Develop a cadre of national master trainers on case management and MIP who, in turn, trained regional trainers with plans for cascade training on case management for both uncomplicated and severe malaria and MIP. ▪ Provide refresher training for existing CHAs and train new CHAs, thus expanding CCMm. ▪ Hold meetings of CoE for case management, diagnosis, and drug management. ▪ Provide malaria-related commodities.
PMI-Supported Planned Activities *(Next 12–18 months, Supported by Currently Available Funds)*
From July 2019 to December 2020, PMI plans to support the following case management strategies: ▪ Strengthen capacity for malaria case management by: ◦ Developing guidelines for mentorship, supportive supervision, and continuing medical education; ◦ Developing a training database to track training events and trained personnel; and ◦ Supporting NMP and County Health Management Teams (CHMTs) to provide mentorship and supportive supervision. ▪ Collaborate with CHMTs and the NMP to provide targeted mentorship and supervision; support national-level CoE and county-level malaria technical working group meetings, support biannual meetings between NMP and malaria-endemic county teams; provide technical assistance during annual county work planning.

- Strengthen capacity for case management of severe malaria by partnering with two local referral hospitals (Jaramogi Oginga Odinga Teaching and Referral Hospital and Kakamega County Referral Hospital) to offer clinical mentorship on management of severe malaria for up to 64 clinicians from the eight malaria endemic counties. The clinicians will be selected from admitting facilities within the catchment areas of the referral (level five) hospital.
- Support the NMP in assessing gaps in national- and county-level reference laboratory capacity to inform donor and counterpart funding.
- Collaborate with a local malaria diagnostic centre and local university to conduct therapeutic efficacy studies at four sites, including testing for molecular markers of resistance to artemisinins or partner drugs.

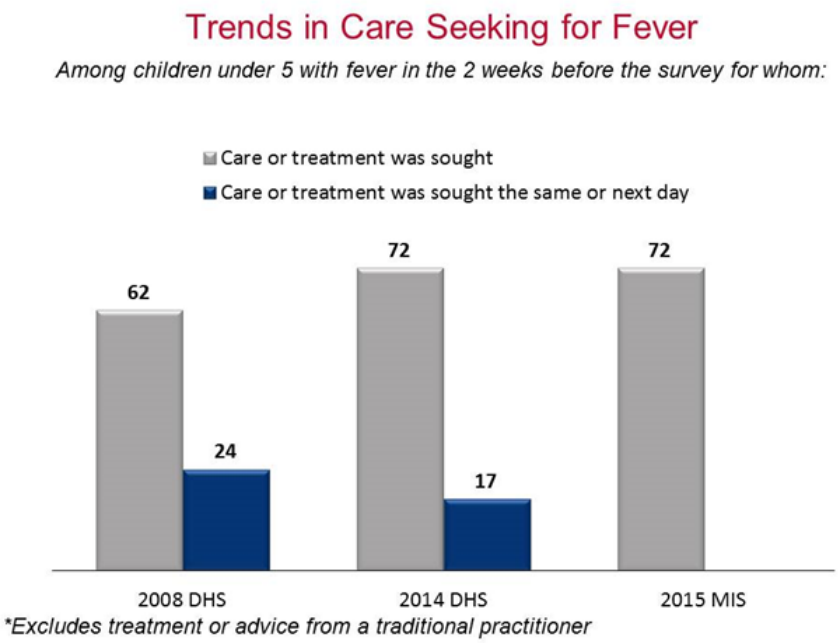
PMI Goal
Improve access to and utilization of timely, quality, and well-documented malaria testing and treatment by providing facility- and community-based health workers with training, supervision, and malaria commodities to be able to provide high quality, effective care.

Do you propose to increase, decrease, or maintain funding allocation levels for this activity? Why, and what data did you use to arrive at that conclusion?
PMI/Kenya proposes increasing funding for malaria case management activities, in addition to increasing support for commodities and supply chain strengthening. As noted in the key questions below, areas where case management needs strengthening include training, supportive supervision, and mentoring and reinforcing systems for malaria diagnosis QA/QC. The country currently lacks a comprehensive approach for strengthening malaria QA/QC systems. PMI will invest in supporting the NMP to: ▪ Undertake a comprehensive assessment of the malaria QA/QC system to identify gaps and prioritize funding requirements to support the implementation of a sustainable quality system for malaria microscopy and RDTs, including strengthening of the national malaria reference laboratory, in addition to establishing a proficiency test and an external quality assessment system supported by a mentorship program for lab managers integrated with case management. ▪ Support the scale up of the roll out of the digitized support supervision tools across all counties ensuring data is uploaded into DHIS2 and used for decision making. Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

Key Question 1

What is the status of care seeking?

Supporting Data



The 2014 KDHS and 2015 KMIS provide information on care seeking for fevers among children below five years of age. In both surveys, advice or treatment was obtained from a health provider for about two thirds of children with fever in the lake-endemic areas. Approximately 70 percent went to a public health facility, with most visiting a government dispensary (33 percent), and about 30 percent visited a private care provider. However, more recent data suggests that individuals may be increasingly seeking care from CHVs. The 2018 MPR identified a shift of care seeking behavior from facilities to the community. It demonstrated that approximately 160,000 children who tested positive by a CHV were treated with ACT in 2017, compared to 103,900 children in 2016. Despite this increase, coverage of CCMm was only in limited areas of the lake endemic zone and was not implemented in other regions of the country according to the national strategy.

Conclusion

National level data demonstrates that care seeking for fever remains suboptimal. Of particular concern is the significant difference between the percentage of individuals who sought care and the percentage of individuals who did so the same or next day. In accordance with the Global Technical Strategy for Malaria 2016–2030, prompt care seeking (defined as seeking care within

24 hours of the onset of symptoms) is critical for preventing progression from uncomplicated to severe malaria. 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 a need for increased SBC activities promoting prompt care seeking.

Key Question 2

What is known about the major barriers and facilitators to care-seeking?

Supporting Data

Key Barriers and Facilitators to Care Seeking

Facilitator	Type of Factor	Data Source	Evidence
Belief that Seeking Treatment Immediately is Important	Internal	Malaria Indicator Survey – 2015	Nationally, 45 percent of respondents indicated that it is extremely/very important to seek antimalarial treatment immediately if a child has a fever. While this is positive, this figure also suggests there is significant room for growth.
Barrier	**Type of Factor**	**Data Source**	**Evidence**
Preference for Home Treatment or Treatment at Pharmaceutical Retailer	Social	Malaria Qualitative Survey – 2016	Most respondents in a recent qualitative survey indicated they attempted home treatment or treatment from a pharmaceutical retailer and only sought treatment at a health facility in response to severe symptoms.
Limited Knowledge About Recommended Treatment for Malaria	Internal	Malaria Indicator Survey – 2015	In the lake and coastal endemic regions, only 71 and 45 percent of respondents respectively had heard or seen information about ACT/AL.
Perception that Treatment is Not Affordable	Environmental	Malaria Indicator Survey – 2015	Only 38 percent of respondents indicated that treatment is very affordable/affordable when their child has a fever.

Conclusion

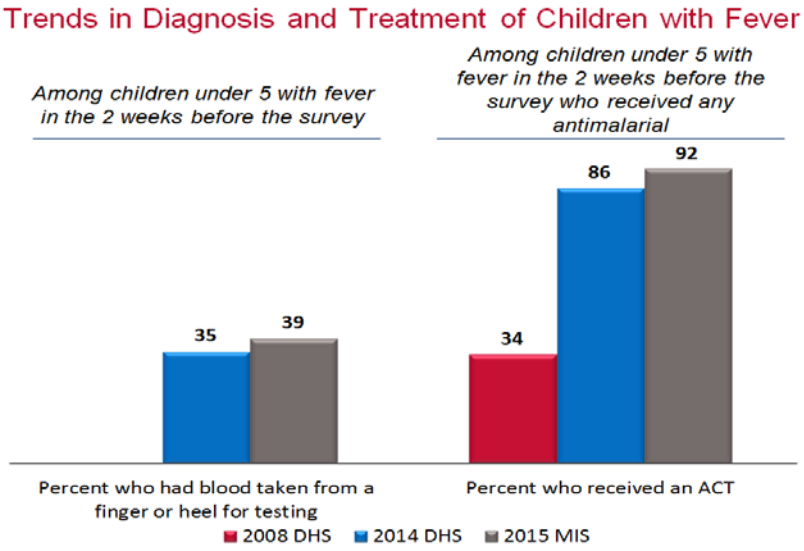
SBC efforts around timely care seeking clearly need to increase. The understanding that timely care seeking is important is not as widely shared as one would hope. Knowledge about the recommended treatment for malaria is also somewhat limited. These facts, coupled with the significant difference between the percentage of individuals who sought care and the percentage of individuals who did so the same or next day, suggest the need for SBC interventions that emphasize the critical nature of timely care seeking. Such efforts should also assess in greater detail the reasons for a preference toward home treatment or treatment from a pharmaceutical retailer, so that messaging can be designed to be responsive to this barrier.

SBC interventions to promote prompt care seeking will rely heavily on enhanced interpersonal communication at the household and community level. Service communication efforts, through CHVs, ANC, and group ANC, will also emphasize the importance of prompt care seeking. Finally, the collection of additional data on the specific barriers to prompt care seeking will be prioritized. PMI, in partnership with the NMP, will leverage ongoing SBC activities to collect additional data on the internal and social factors that contribute to delays in care seeking. PMI will fund operational research that focuses on the effectiveness of behavior change approaches in different malaria transmission zones. It is expected that this research will provide insights into the most appropriate behavior change approach and messages for specific behaviors, including care seeking.

Key Question 3

How have malaria testing and treatment practices evolved over time?

Supporting Data



- Kenya's guidelines state that all people with suspected malaria (i.e., fever) in all age groups and all epidemiologic zones should undergo malaria parasitological testing with microscopy or RDTs.[1] KMS 2019-2023 states that microscopy should be deployed in hospitals (level four and above) for malaria diagnosis, and RDTs should be used in the community and at level two and three health facilities.
- The guidelines state that only patients with test positive confirmed malaria should receive antimalarial treatment. However, appropriate treatment should never be denied or delayed due to inability to test for malaria.[2]
- First-line treatment for uncomplicated malaria for all (except pregnant women in their first trimester) is artemether-lumefantrine (AL). Second line treatment for non-pregnant individuals with uncomplicated malaria is dihydroartemisinin-piperaquine (DHA-PIP).[3]
- Pregnant women with uncomplicated malaria in the first trimester should be treated with a 7-day dose of oral quinine (AL if quinine is unavailable; no specific treatment for *P. vivax*).[4]
- Severe malaria in all age groups, including pregnant women in all trimesters, should be treated with parenteral artesunate for a minimum of three doses and, once the patient is stable, a full dose of AL should be used to complete treatment.[5]
- If artesunate is not available at peripheral health facilities, pre-referral treatment of severe disease with intramuscular artesunate (or artemether, if artesunate is not available) is recommended for all ages. When intramuscular treatments are not available, a single rectal artesunate dose of 10 mg/kg body weight is recommended for children younger than six years of age only.[6]
- Overall case management performance (measured as a proportion of health facilities testing patients with fever for malaria; treating test positives with AL; and not treating test negatives with an antimalarial among all facilities, regardless of availability of diagnostics and AL) has oscillated between 54 and 60 percent for the last four years, and was 60 percent in June 2019.[7]
- Eighty-eight percent of health facilities had malaria parasitological diagnostics as of June 2019, with microscopy/mRDT availability ratio of 100 percent / 39 percent at hospitals, 74 percent / 60 percent at health centers, and 20 percent / 78 percent at dispensaries. This represents a decrease in parasitological test availability from 98 percent in 2015, mainly due to supply chain-related decreases in RDT availability.[8]

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[1] National Malaria Control Program. (2019). Towards a Malaria-Free Kenya: Kenya Malaria Strategy 2019-2023. Kenya Ministry of Health.

[2] National Malaria Control Program. (2016). National Guidelines for the Diagnosis, Treatment, and Prevention of Malaria in Kenya. 5th Edition. Kenya Ministry of Health.

[3] Ibid.

[4] Ibid.

[5] Ibid.

[6] Ibid.

[7] National Malaria Control Program. (2019) Draft Outpatient Quality of Care Survey Report - Progress Report: January 2010 to January 2019. Kenya Ministry of Health.

[8] National Malaria Control Program. (2019) Draft Outpatient Quality of Care Survey Report - Progress Report: January 2010 to January 2019. Kenya Ministry of Health.

Conclusion

From FY 2018 Quarter 2 (October – December) KHIS data, suspected malaria cases tested with a parasite-based test was optimal between 74 and 100 percent.[9] According to the June 2019, Quality of Care (QoC) Survey, at health facilities regardless of availability of malaria diagnostics and AL, 63 percent of patients with fever were tested. Among malaria test positive patients, nearly all (94 percent) were prescribed AL; and among malaria test negative patients, only 4 percent were inappropriately treated with antimalarials, the lowest since 2010.[10] Stagnation and declines to the composite case management indicator have been mainly due to low performance in testing rates, especially in the low malaria transmission zones. Additional programmatic and regulatory interventions focusing on ensuring availability and use of malaria testing and treatment commodities at the lowest levels of the healthcare system and in the low transmission zones are needed to optimize case management and CCMm.

Key Question 4

What is known about provider behavior in relation to testing and treatment practices?

Supporting Data

Key Barriers and Facilitators to Appropriate Testing and Treatment Practices

Facilitator	Type of Factor	Data Source	Evidence
Growing Political Support for Community Health Strategy	Environmental	Malaria Program Review - 2018	The 2018 MPR concluded that there is growing nationwide support for the community health strategy, which includes CCMm of uncomplicated malaria.
Strong Knowledge of First-Line Treatment for Malaria Among Registered Facilities	Internal	ACTwatch Outlet Survey - 2016	More than 90 percent of providers among antimalarial-stocking public health facilities and registered pharmacies correctly stated the first-line treatment for uncomplicated malaria.

[9] National Malaria Control Program. (2018). Malaria Surveillance Bulletin: Issue 27. Kenya Ministry of Health.

[10] National Malaria Control Program. (2019) Draft Outpatient Quality of Care Survey Report - Progress Report: January 2010 to January 2019. Kenya Ministry of Health.

Barrier	Type of Factor	Data source	Evidence
Limited Knowledge of First-Line Treatment for Malaria Among General Retailers	Internal	ACTwatch Outlet Survey - 2016	In a 2016 survey, less than 20 percent of general retailers could correctly state the first-line treatment for uncomplicated malaria. Given the preference for home treatment, this warrants further exploration.
Suboptimal Adherence to Case Management Guidelines Among Health Workers	Unknown – Specific Determinants Need Further Exploration	Outpatient Quality of Care Survey – 2019	Nationally, health workers adherence to diagnostic and treatment guidelines at facilities where malaria diagnostics and treatment were available was estimated to be around 67 percent.

Providers' malaria testing and treatment practices are also influenced by the regulatory environment. The KMS 2019-2023 states that microscopy should be deployed in hospitals (level four and above) for malaria diagnosis and that RDTs should be used at the community and lower level health facilities (levels two and three). However, the NMP recommends that wherever trained laboratory staff are equipped with a microscope and necessary supplies, microscopy should be used for malaria diagnosis, including some lower level health facilities. Thus, microscopy is used at lower than optimal facility levels. Further, the current regulatory framework does not provide for CHV use of RDTs and ACTs, resulting in an "identify and refer" approach that reduces access to care relative to "test and treat" approach to CCMm that NMP recommends.

Conclusion

There are a number of regulatory barriers that hamper provider adherence to diagnostic and treatment guidelines. Current programming efforts aim to work within these limitations while strengthening training and supportive supervision for malaria case management and CCMm, including the recognition of severe malaria, to optimize access to and proper use of malaria commodities among providers.

The available data also suggests there is a need for greater exploration of the determinants of provider behavior. While provider behavior has not historically been an area of focus for SBC efforts in Kenya, evidence suggests that provider adherence to case management guidelines is suboptimal even at facilities where malaria diagnostics and treatment are available. However, the reasons for this are not clearly documented. To address this, PMI will support NMP efforts to explore determinants of provider behavior using existing tools and data, including QoC surveys, supportive supervision checklists, and related monitoring tools.

Key Question 5

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

Supporting Data

A functional and effective testing, treatment, and referral system is crucial for the provision of severe malaria management services. Since 2017, no significant improvements have been observed in knowledge about pre-referral treatment for severe malaria (only 41 percent of health workers knew about pre-referral treatment for pregnant women).[11] Currently, 66 percent of health workers report having training on malaria case management.[12] Between December 2018 and June 2019, the proportion of microscopy-providing health facilities receiving quality control visits decreased from 31 to 13 percent, and the proportion of facilities receiving RDT supervisory visits decreased from 27 to 15 percent.[13] Kenya aims to train 8,688 private and public sector health workers on malaria case management; 175 on case management specific to severe malaria; and 625 CHAs and 6,250 CHVs on CCMm during the period 2020–2021.[14] On the community level, Kenya has 4,656 community health units (3,029 fully functional, 1,255 semi-functional, 266 non-functional; and 106 closed). In the eight lake endemic PMI focus counties, approximately 19,040 CHVs work at 1,904 community health units (CHUs), of which 1,871 were functional in 2019. Of these CHUs, 1,130 operate with incentives; 793 with county government-paid stipends; and 55 percent implementing CCMm. “Link” health facilities supply CHVs with commodities and supportive supervision by community health assistants (CHAs). CHV coverage in target locations is approximately 30 percent. Current and planned PMI support for case management in health facilities and communities by CHWs ensures:

- CHVs are equipped to recognize signs and symptoms of severe malaria, institute pre-referral treatment, and ensure prompt referral to an appropriate level of care;
- Severe malaria can be identified and appropriately managed by health workers via clinical mentorship involving severe malaria, internships in level five facilities, and delivery of standardized content for continuing medical education for outpatient departments;
- Malaria data capture, reporting, and use is strengthened within the NMP’s Centers of Excellence for In-Patient Department Reporting, including support to monitor inpatient case fatality and to facilitate clinical mentorship; and
- Consistent QA/QC and supervisory visits are conducted to evaluate facility and community case management and focus implementation activities.

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[11] National Malaria Control Program. (2019) Draft Outpatient Quality of Care Survey Report - Progress Report: January 2010 to January 2019. Kenya Ministry of Health.

[12] National Malaria Control Program. (2019) Draft Outpatient Quality of Care Survey Report - Progress Report: January 2010 to January 2019. Kenya Ministry of Health.

[13] National Malaria Control Program. (2019) Draft Outpatient Quality of Care Survey Report - Progress Report: January 2010 to January 2019. Kenya Ministry of Health.

[14] National Malaria Control Program. (2019). Towards a Malaria-Free Kenya: Kenya Malaria Strategy 2019-2023. Kenya Ministry of Health.

Donor Funding for Case Management Activities

Intervention	PMI-Funded?			Does Global Fund Plan to Fund?	Does Another Donor Plan to Fund?
	FY18	FY19	FY20		
Revision and dissemination of NMP guidelines for malaria diagnosis, treatment and prevention of malaria, pre-service training curricula		X			
Revision of NMP CCMm curriculum and biosafety guidelines for level one; development of NMP CCMm guidelines			X		
Revision of NMP guidelines on parasitological diagnosis of malaria and the quality assurance implementation plan		X	X		
Training-of-trainers; and health care workers training on malaria case management and reporting		X	X	X *(FY 19)*	
Training-of-trainers; and health care workers training on severe malaria case management and reporting		X	X		
Establishment of clinical audit/quality improvement activities for severe malaria			X		
Training/orientation of community health assistants		X	X		
Support supervision at all levels including for CCMm[15]				X	
Training-of-trainers; and health care workers training on malaria parasitological diagnosis		X			
Support supervision for quality assurance of malaria diagnosis			X		
External quality assurance activities			X		
Procurement and distribution of diagnostics and treatment commodities	X	X	X	X	

Conclusion

Facility and community weaknesses in the diagnosis, treatment, and referral of patients with severe malaria has been identified as a case management gap resulting in suboptimal commodity use and poor patient outcomes. By providing training, supportive supervision, and mentorship, programming efforts aim to improve access to and proper use of malaria diagnosis and treatment

[15] Global Fund support for CCMm may be coming to an end this year.

commodities. To monitor and evaluate the impact of these interventions, programming will include improved malaria data reporting, capture, and use.

Currently, 66 percent of health care workers report having training on malaria case management.[16] The country aims to train 8,688 private and public sector health care workers on malaria case management; 175 on case management specific to severe malaria; and 625 CHAs and 6,250 CHVs on CCMm during the period 2020–2021.[17]

Key Question 6

What is the estimated need for RDTs for FY 2020?

Supporting Data

Calendar Year	2019	2020	2021
RDT Needs			
Total country population	49,086,567	50,319,252	50,837,256
Population at risk for malaria	49,086,567	50,319,252	50,837,256
PMI-targeted at-risk population[1]	49,086,567	50,319,252	50,837,256
Total number of projected fever cases[2]	24,271,034	22,929,197	22,721,230
Percent of fever cases tested with an RDT	45%	45%	45%
Total RDT Needs[3]	**7,645,376**	**7,480,651**	**7,668,415**
Partner Contributions (to PMI target population if not entire area at risk)*			
RDTs carried over from previous year	*490,751*	*0*	*3,119,349*
RDTs from Government	0	0	0
RDTs from Global Fund	2,800,000	3,000,000	0
RDTs from other donors	0	0	0
RDTs planned with PMI funding[4]	0	7,600,000	7,000,000
Total RDTs Available	**3,290,751**	**10,600,000**	**10,119,349**
Total RDT Surplus (Gap)	**-4,354,625**	**3,119,349**	**2,450,934**

Note: The quantities required are drawn from the 2018 national malaria quantification report with updates done in August 2019 pending the full quantification exercise later in Aug/ Sep 2019. Since Kenya has fairly complete and reliable facility level LMIS data, consumption method was used as a starting point to estimate commodity needs followed by application of a number of programmatic assumptions on testing rates and compliance to treatment guidelines

[1]Geographic coverage: is the entire target area at risk based on the latest national quantification

[2]Projected fever cases was worked backwards from RDTs needed, RDT share and testing rate (70% as at June 2019; projected to improve to 72.5% and 75% in 2020 and 2021 respectively)

[3]The needs to fill the pipeline are included

[4]PMI RDTs planned for 2019 will likely be delivered in 2020 due to importation waiver delays.

[16] National Malaria Control Program. (2019) Draft Outpatient Quality of Care Survey Report - Progress Report: January 2010 to January 2019. Kenya Ministry of Health.

[17] National Malaria Control Program. (2019). Towards a Malaria-Free Kenya: Kenya Malaria Strategy 2019-2023. Kenya Ministry of Health.

Conclusion

The gap analysis table is based on the 2018 Kenya Quantification Report and a pipeline review that was undertaken by the NMP and partners in 2019. The country is due to undertake the annual quantification exercise for 2019/2020 in September and this shall provide updated estimates of commodity requirements. The forecasted RDT need is expected to increase due to improved reporting and data quality and access to commodities by CHVs. PMI commodity orders placed with FY 2018 funding for delivery in 2019 have been delayed due to challenges with the customs commodity tax waivers and are now likely to arrive in 2020, as a result some Global Fund orders have been called forward to mitigate stockouts. A tax waiver has recently been granted for PMI commodities so orders will be resumed.

Key Question 7

What is the estimated need for ACTs for FY 2020?

Supporting Data

Calendar Year	2019	2020	2021
ACT Needs			
Total country population	49,086,567	50,319,252	50,837,256
Population at risk for malaria	49,086,567	50,319,252	50,837,256
PMI-targeted at-risk population[1]	49,086,567	50,319,252	50,837,256
Total projected number of malaria cases	6,198,276	6,187,167	6,634,383
Total ACT Needs [2]	**6,198,276**	**6,187,167**	**6,634,383**
Partner Contributions (to PMI target population if not entire area at risk)			
ACTs carried over from previous year	*4,266,308*	*0*	*4,522,833*
ACTs from Government	0	0	0
ACTs from Global Fund	1,350,000	4,950,000	0
ACTs from other donors	0	0	0
ACTs planned with PMI funding[3]	0	5,760,000	5,140,000
Total ACTs Available	5,616,308	10,710,000	9,662,833
Total ACT Surplus (Gap)	-581,968	4,522,833	3,028,450

Note: The quantities required are drawn from the 2018 national malaria quantification report with updates done in August 2019 pending the full quantification exercise later in Aug/ Sep 2019. Since Kenya has farily complete and reliable facility level LMIS data, consumption method (using 2018 data) was used as a starting point to estimate commodity needs followed by the application of a number of programmatic assumptions: change in testing rate over time, change in compliance to treatment guidelines for test positive cases over time, change in non-compliance to treatment guidelines for test negative cases over time, change in non-compliance to treatment guidelines for non-tested cases over time, and effect of vector control measures (mass distribution of LLINs etc.).

[1]Geographic coverage: is the entire target area at risk based on the latest national quantification

[2]The needs to fill the pipeline are included

[3]PMI ACTs planned for 2019 will likely be delivered in 2020 due to importation waiver delays.

Conclusion

The gap analysis table above is based on the 2018 Kenya Quantification Report and a pipeline review that was undertaken by the NMP and partners in 2019. The country is due to undertake the annual quantification exercise for 2019/20 in September and this shall provide updated estimates of commodity requirements. PMI commodity orders placed with FY 2018 funding for delivery in 2019 have been delayed due to challenges with the customs commodity tax waivers and are now likely to arrive in 2020, as a result some Global Fund orders have been called forward to mitigate stockouts.

Key Question 8

What is the projected need for severe malaria treatment and any other treatments?

Supporting Data

Calendar Year	2019	2020	2021
Injectable Artesunate Needs			
Projected number of severe cases[1]	251,381	250,930	269,068
Projected # of severe cases among children	238,812	238,384	255,614
Projected # of severe cases among adults	12,569	12,547	13,453
Total Injectable Artesunate vials Needs [2]	**1,055,800**	**1,053,907**	**1,130,085**
Partner Contributions			
Injectable artesunate vials carried over from prior year	*98,830*	*0*	*606,093*
Injectable artesunate vials from Government	400,000	0	0
Injectable artesunate vials from Global Fund	450,000	0	0
Injectable artesunate vials from other donors	0	0	0
Injectable artesunate vials planned with PMI funding[3]	0	1,660,000	500,000
Total Injectable Artesunate vials Available	948,830	1,660,000	1,106,093
Total Injectable Artesunate vials Surplus (Gap)	-106,970	606,093	-23,993

Note: The quantities required are drawn from the 2018 national malaria quantification report with updates done in August 2019 pending the full quantification exercise later in Aug/ Sep 2019

[1]~4% of malaria cases are expected to be severe malaria. There is no reliable source of service data for severe malaria in Kenya; therefore this ratio was calculated based on consumption data and assuming that 95% of severe malaria cases will affect patients >12 years

[2]Average number of vials needed per case is 4 vials for patients from 0 to <8 years; 5 vials for patents from 8 to <12 years; and 9 vials for patients 12 years and above. All cases of severe malaria are expected to be treated with injectable artesunate. The needs to fill the pipeline are included.

[3]PMI injectable artesunate planned for 2019 will likely be delivered in 2020 due to importation waiver delays. By the beginning of 2020 the pipeline is projected to be ~1-2 months and additional commodities will be needed to return the pipeline to the minimum of 9 months.

Conclusion

The gap analysis table above is based on the 2018 Kenya Quantification Report and a pipeline review that was undertaken by the NMP and partners in 2019. The country is due to undertake the annual quantification exercise for 2019/20 in September and this shall provide updated estimates of commodity requirements. PMI commodity orders placed with FY 2018 funding for delivery in 2019 have been delayed due to challenges with the customs commodity tax waivers and are now likely to arrive in 2020, as a result some Global Fund orders have been called forward to mitigate stockouts. A tax waiver has recently been granted for PMI commodities so orders will be resumed.

Efforts are underway to improve compliance to treatment guidelines for severe malaria. Regular pipeline monitoring and adjustments of procurement quantities and call down schedules will ensure that the country procures the quantities appropriate to ensure optimum stock levels.

Key Question 9

Are the first-line ACTs effective and monitored regularly?

Supporting Data

Recently Completed and Ongoing Antimalarial Therapeutic Efficacy Studies

Year	Sites	Treatment Arms	PCR-Corrected ACPR>90%?	Where was Molecular Resistance Work Completed?
2016 - 2017	Siaya County	AL, DP	Yes	PARMA Visit - CDC Malaria Branch July - September 2017

Conclusion

Four TES sites will be established in the lake-endemic region in Western Kenya for monitoring of parasite AL and DHA-PPQ resistance, K13 mutations, and HRP2 deletions. Our plan is to ensure that therapeutic efficacy monitoring becomes a routine part of malaria case management, and that it can be conducted by NMP, CHMTs, and local partners.

Key Question 10

Are there other key items, such as for lab strengthening, private sector support, etc. that should be considered?

Supporting Data

Although the private sector manages 30 to 40 percent of malaria cases and the KMS 2019–2023 identifies the need to engage the private sector, PMI is not currently involved with private sector case management or case management commodities. Global Fund supports case management training for private sector health care workers. Additionally, UNITAID, the United Kingdom's Department for International Development (DfID), and the Clinton Health Access Initiative have supported pilot projects to increase RDT use in the private sector, and Kenya received support from the Affordable Medicine Facility for Malaria and other donors to subsidize the price of ACTs in the private sector. From 2013–2017, pilot projects to increase access to RDTs in the private sector in coastal endemic counties were done with DfID and UNITAID support. The NMP obtained a temporary waiver to allow staff to perform RDTs without a registered laboratory technician, a direct subsidy was introduced to bring RDT prices down to $0.60 per test, and 52 outlets were trained to use RDTs. In a cross-sectional survey of 406 private retail drug outlets conducted in December 2016 across the 47 counties, 46 percent of clients with negative results, and 92 percent without a test result were prescribed AL.[18] In a multi-country project assessment, higher rates of testing by any malaria diagnostic testing were observed in private health facilities compared to registered pharmacies.[19] The 2016 ACTwatch Outlet Survey found ACTs in stock in 71 percent of registered pharmacies and 64 percent of unregistered pharmacies with at least one antimalarial, with a median price of $1.31 per adult treatment and $0.50 per pediatric treatment, a nearly four-fold increase over the 2011 private sector adult treatment price of $0.52. ACTs were in stock in only 60 percent of private, for-profit health facilities and 10 percent of general retailers with at least one antimalarial in stock. Facilities without ACTs typically stocked SP or oral quinine.[20]

Conclusion

There are opportunities to work with the private sector to improve malaria case management by training and monitoring facility, private pharmacy, and over-the-counter staff on malaria case management, recognition of severe malaria, treatment options for malaria versus non-malaria fevers, referral advice, and appropriate drug storage to improve prescriber practices among the outlets. There are also opportunities for private sector interventions that ensure the affordability and availability of appropriate, quality-controlled malaria treatments while limiting their misuse. Lab strengthening should also be prioritized.

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[18] Machini, B. et al. (2016). Availability and Quality of Dispensing Practices of Artemisinin-Based Combination Therapies and Rapid Diagnostic Tests in the Private Retail Sector in Kenya.

[19] Poyer, S. et al. (2018). Fever Case Management at Private Health Facilities and Private Pharmacies on the Kenyan Coast: Analysis from Two Rounds of Client Exit Interviews and Mystery Client Visits.

[20] Machini, B. et al. (2016). Availability and Quality of Dispensing Practices of Artemisinin-Based Combination Therapies and Rapid Diagnostic Tests in the Private Retail Sector in Kenya.

Key Question 11

What are the in-country considerations that impact your funding allocation in this category?

Supporting Data

- The shift towards exploring opportunities for new implementation arrangements with local institutions, including universities, teaching and referral hospitals, and medical training colleges, to accelerate efforts to build a critical mass of locally competent staff and health workers and institutionalize best practices.
- Deeper collaboration by all stakeholders for coordinated national- and county-level malaria quality assurance and diagnostics policy frameworks, coupled with strengthened capacity for malaria diagnosis and treatment.
- Expanded use of the community platform for CCMm.

Conclusion

PMI will continue to strengthen and build new partnerships with local institutions and county health management teams to manage and oversight case management and advocate for incremental allocation of funds towards health system strengthening activities such as support supervision.

2.B. DRUG-BASED PREVENTION

2.B.i MALARIA PREVENTION IN PREGNANCY (MIP)

PMI Goal
Support the national strategy for MIP, which includes provision of ITNs at first ANC visit, IPTp for all pregnant women in malaria endemic area starting at 13 weeks gestational age, for a minimum of three doses, and effective case management of malaria in accordance with WHO recommendations.

Do you propose to increase, decrease, or maintain funding allocation levels for this activity? Why, and what data did you use to arrive at that conclusion?
In FY2020, PMI/Kenya proposes to maintain the allocation for MIP to support: ▪ **National Level** - Support the national program in the development and review of MIP guidelines and the production of materials to promote uptake of IPTp by pregnant women in targeted counties. ▪ **Facility Level in Counties and Sub-Counties** - Train several cadres of health workers who offer services to pregnant women on the content of the MIP intervention package for pregnant women and collation of MIP data into the DHIS2 system. A total of 1000 health care workers from 320 facilities in the eight malaria endemic counties will be trained. ▪ **Community Level** - Scale up support for CHVs to create demand for early ANC attendance and collaborate with the NMP to identify appropriate SBC messages targeting pregnant women. Continue to advocate for resources towards viable, low-cost platforms for dissemination of SBC messages, including interpersonal communication through CHVs and mobile phones. A total of 2500 CHWs will be trained on various behavior change approaches. To further improve IPTp uptake, PMI will work with facility health workers and CHWs to pilot group ANC, which involves recruiting pregnant women into groups of similar gestational cohorts. Groups are scheduled for specified services on a monthly basis and follow-ups are organized for visits to their villages. The group model leverages social support and provides opportunities for the dissemination of key messages and advice on pregnancy.

Key Question 1

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

Supporting Data

Figure A21. Trends in ANC Coverage

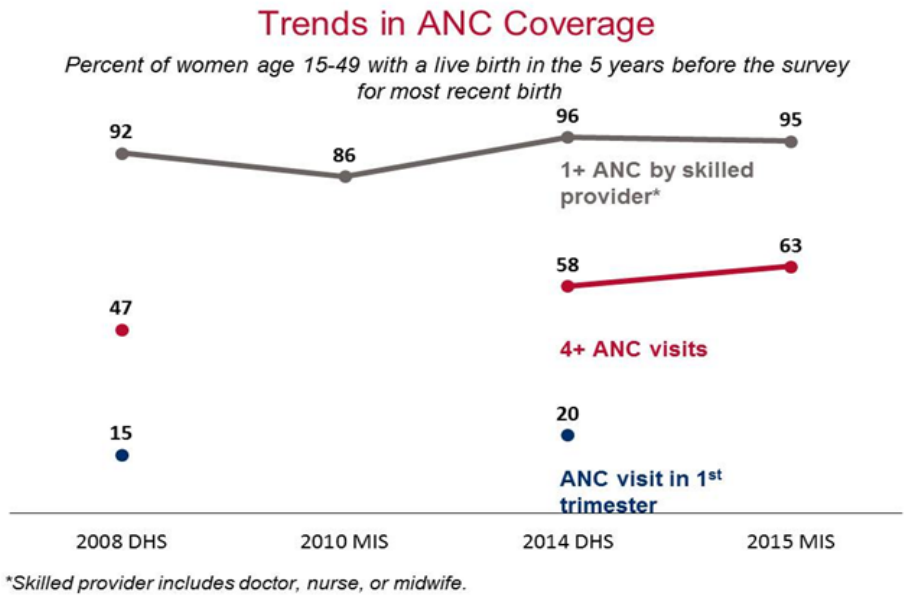


Figure A22. Key Barriers and Facilitators to ANC Attendance

Facilitator	Type of Factor	Data Source	Evidence
Perceived Risk of Malaria in Pregnant Women	Internal	Malaria Qualitative Survey - 2016	A recent 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.
Involvement of community health workers in referring Pregnant women for IPTp services	Environmental	Malaria Program Review - 2018	A pilot study in four lake endemic counties resulted in increased uptake of IPTp at ANC by promoting it through community health workers

Barrier	Type of Factor	Data Source	Evidence
Lack of Information from Providers on the Importance of IPTp	Internal	Malaria Program Review - 2018	Recent studies have shown that healthcare workers do not spend time to explain to clients the importance of IPTp, which likely contributes to limited uptake and limited number of ANC visits.
Limited Risk Perception in the Absence of Illness	Internal	Malaria Qualitative Survey - 2016	Findings from the 2015 KMIS suggest that women are reluctant to seek care for an illness that they do not have and for which they are not experiencing symptoms.
Preference for Seeking Initial Care from Traditional Birth Attendants	Internal / Environmental	Malaria Qualitative Survey - 2016	A recent qualitative study found that women tended to visit a traditional birth attendant before seeking services at a health facility. Traditional birth attendants were viewed as being more easily accessible and providing more personalized service.

Conclusion

There are a number of barriers to ANC attendance, especially early ANC attendance, in Kenya. Increasing early ANC attendance is critical for ensuring uptake of IPTp3+. More pregnant women attended at least four ANC visits for their most recent birth preceding the 2014 KDHS compared to 2008–2009. More recent data will be useful to inform programming. The 2016 WHO ANC model replaces the previous four-visit focused ANC model and recommends a minimum of eight contacts. This global guidance provides an opportunity to expand IPTp coverage but will require adoption by the MIP CoE, which is chaired by the Division of Reproductive and Maternal Health. Once adopted, revision of guidelines and orientation of health workers will be crucial to facilitate effective delivery.

Drawing on a recent pilot, which demonstrated that utilization of community health structures decreases perceived barriers associated with ANC attendance, PMI/Kenya plans to provide continued support for the strengthening of community health structures in the eight PMI focus counties. This will be achieved through continued training for CHVs on the importance of early ANC attendance to promote IPTp uptake, and through a pilot of group ANC, to leverage social support to increase ANC attendance.

Key Question 2

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

Supporting Data

Figure A23. Trends in IPTp

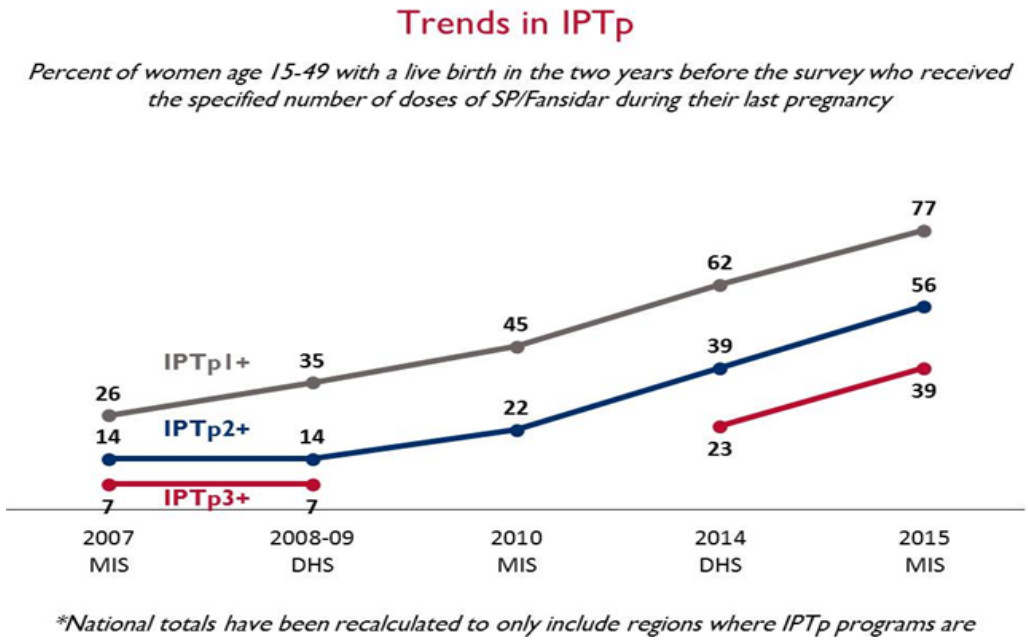
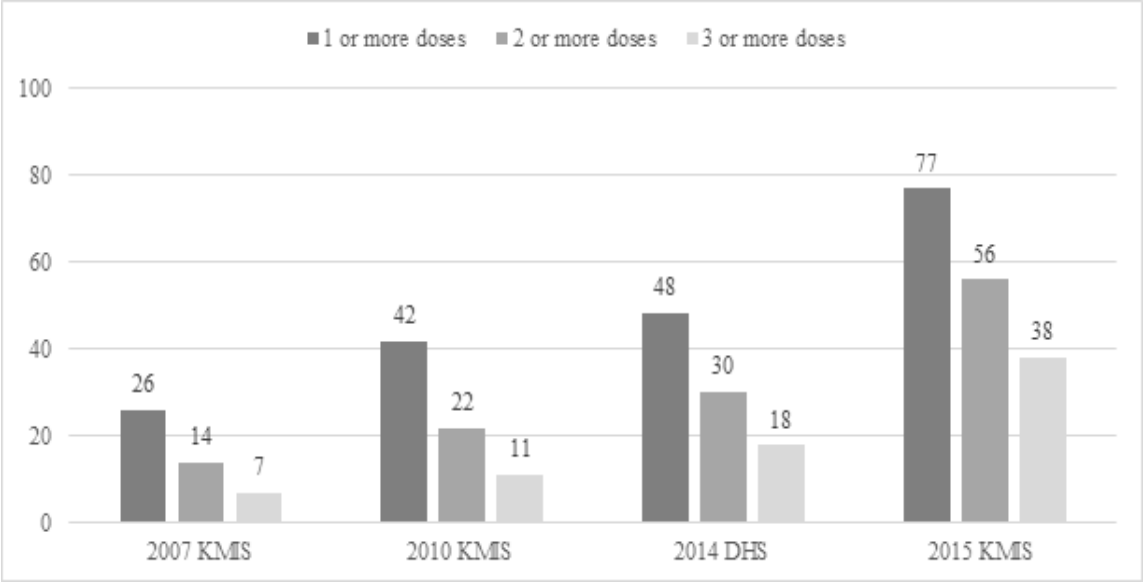


Figure A24. Trends in IPTp Uptake in Malaria Endemic Areas



The graph is from the 2015 KMIS. Cautious interpretation of the upward trend in IPTp coverage is warranted given differences in how questions were asked in the 2015 KMIS.

Figure A25. KHIS Data on ITN Distribution and IPTp Delivery at ANC from January to December 2018[13]

County	Proportion of Targeted Pregnant Women Provided with ITNs[1]	Proportion of Women Provided with IPTp1[2]	Proportion of Women Provided with IPTp2	Estimated Deliveries	Estimated Number of Pregnant Women
Bungoma	79.0	64.5	58.8	63,859	65,489
Busia	78.7	66.5	64.8	33,055	22,589
Homa Bay	75.1	58.0	52.9	47,469	47,462
Kakamega	80.7	61.7	57.1	70,084	70,084
Kisumu	85.7	64.0	60.6	46,653	47,067
Migori	85.5	72.5	61.8	49,246	49,246
Siaya	76.4	59.7	55.6	38,972	38,993
Vihiga	66.9	59.7	54.4	22,898	19,388

[1] *Pregnant women given ITNs out of expected pregnant women.*
[2] *Total IPTp1 out of estimated number of deliveries.*

Conclusion

Despite substantial improvement in IPTp uptake, only 38 percent of pregnant women in malaria-endemic regions received at least three doses of IPTp in 2015, well below the national target of 80 percent. The household survey data shows a gap between IPTp1, IPTp2, and IPTp3 that can be explained by delayed ANC attendance and lack of continuation with scheduled ANC visits. Similarly, KHIS data shows a gap between IPTp1 and IPTp2 and between ITN and IPTp delivery at ANC. The 2018 Malaria Program Review (MPR) recommended alignment of SP and ITN provision with the current Division of Reproductive Health guidelines.

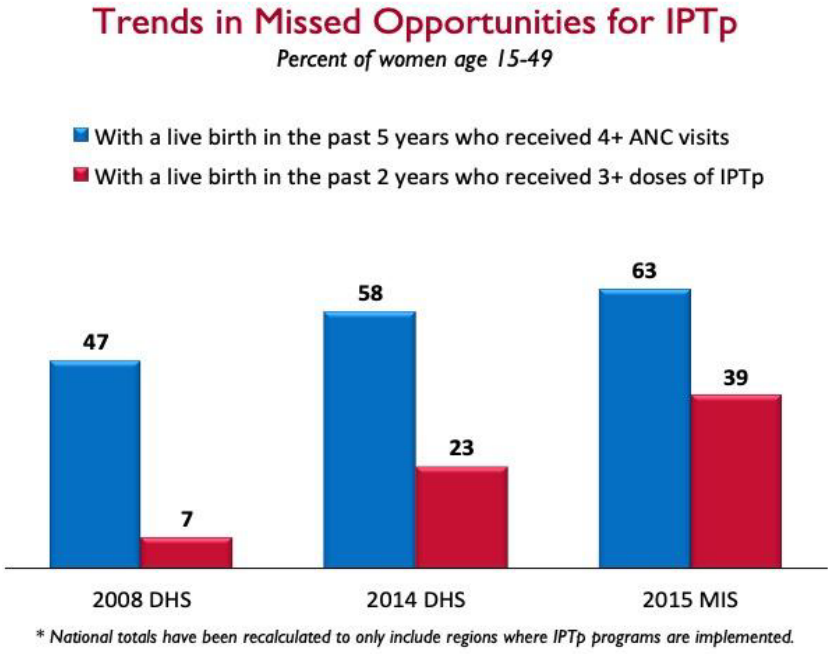
Key Question 3

What is the gap between ANC attendance and IPTp uptake (e.g. missed opportunities for providing IPTp at ANC)? What barriers and facilitators exist, especially among providers?

[13] IMPACT Malaria. (2019). Baseline Assessment Report. U.S. President's Malaria Initiative.

Supporting Data

Figure A26: Trends in Missed Opportunities for IPTp



According to KMIS 2015, 92 percent of pregnant women attended an initial ANC visit, and 63 percent made the recommended four ANC visits. Of those who made an initial ANC visit, 70 percent received IPTp1; on the other hand, of those who made four ANC visits, only 56 percent received IPTp2, and only 39 percent received IPTp3. The discrepancy between ANC attendance and IPTp uptakes suggests substantial missed opportunities and a need to identify facility and community level factors influencing ANC attendance IPTp uptake.

Figure A27. Key Barriers and Facilitators to IPTp Administration at ANC Visits

Facilitator	Type of Factor	Data Source	Evidence
Collaboration Between Reproductive Maternal and Newborn Health Unit and the NMP	Environmental	Malaria Program Review - 2018	The MIP CoE facilitates effective implementation across technical areas and helps ensure that all pregnant women who present at ANC receive IPTp, ITN, and malaria diagnosis and treatment.

Facilitator	Type of Factor	Data Source	Evidence
Supportive Supervision by SCHMTs	Internal / Environmental	Malaria Program Review - 2018	The 2018 MPR found that IPTp coverage was much higher in areas where supportive supervision was regularly conducted. This was likely the result of increased provider knowledge and self-efficacy around administration of IPTp.
Barrier	**Type of Factor**	**Data Source**	**Evidence**
Provider Uncertainty on IPTp Administration	Internal	Malaria Program Review - 2018	The 2018 MPR found that there was significant confusion among health care providers regarding when to administer IPTp.
Absence of Functional DOT Corners	Environmental	Malaria Program Review - 2018	The 2018 MPR found that directly observed therapy corners were often not maintained with the necessary resources (i.e., clean water, cups), making administration of IPTp difficult.
Stockouts of SP at Health Facilities	Environmental	Malaria Program Review - 2018	Following devolution, weak coordination and collaboration between national and county governments resulted in stockouts of SP at health facilities.
Late Presentation to ANC	Unknown – Specific Determinants Require Further Exploration	Malaria Program Review - 2018	There is a gap between coverage of IPTp1 and IPTp2. The 2018 MPR concludes that this gap is largely due to late starting of ANC, with women who received IPTp1 delivering by the time they were due for IPTp2.

Conclusion

Behaviorally, there are a number of key barriers to the administration of IPTp among women who attend ANC. While some of these barriers, such as stockouts of SP are structural, many appear to be behavioral in nature, with factors such as high levels of uncertainty on the appropriate timing for IPTp administration, as well as late presentation to ANC, affecting delivery of IPTp3+ in health facilities. To address these challenges, PMI/Kenya will support

strengthening provider and CHV capacity to counsel clients on the importance of early and continuing ANC. PMI/Kenya will also provide funding for continued supportive supervision and training in order to increase provider knowledge and self-efficacy around administration of IPTp.

Key Question 4

What proportion of pregnant women with fever and malaria infection are getting diagnosed and treated? What barriers and facilitators exist?

Supporting Data

No data currently are available on pregnant women with fever getting diagnosed. KHIS provides data on the number of malaria cases among pregnant women visiting the outpatient departments. The number can be presented as total malaria cases among pregnant women out of the expected number of pregnant women per 1,000 as shown in the table below for the period January-December 2018.

Figure A28. Malaria Cases in Pregnant Women, 2018

County	Number of Malaria Cases Among Pregnant Women	Estimated Number of Pregnant Women	Malaria in Pregnancy per 1,000 Expected Pregnant Women
Bungoma	8,852	65,489	135
Busia	6,892	22,589	305
Homa Bay	3,926	47,462	83
Kakamega	7,500	70,084	107
Kisumu	5,076	47,067	108
Migori	3,638	49,246	74
Siaya	6,478	38,993	166
Vihiga	1,500	19,388	77

Barriers and facilitators to diagnosis and treatment for pregnant women are not well studied. They are largely believed to be similar to the barriers and facilitators associated with prompt care-seeking for all populations. Thus, at present, no data is available on specific barriers and facilitators to testing and treatment specifically for pregnant women.

Conclusion

The data available on the proportion of pregnant women with fever who are tested and treated for malaria is limited. KHIS data provides some insight into the proportion of malaria cases among pregnant women presenting to outpatient departments, but there is no available data on testing rates for pregnant women presenting with fever. In addition, there is no data to suggest that pregnant women face unique barriers in testing and treatment for malaria.

Key Question 5

What is the estimated need for IPTp commodities over the next three years and what proportion of this need will PMI support?

Figure A29: Estimated Need for IPTp Commodities for 2019 - 2021

Calendar Year	2019	2020	2021
Total Population at Risk	15,595,289	15,952,387	16,137,791
SP Needs			
Total number of pregnant women (see footnote 1)	645,712	660,497	668,174
Total SP Need (in treatments) (see footnotes 2 and 3)	**1,418,352**	**1,450,829**	**1,467,691**
Partner Contributions			
SP carried over from previous years	*1,532,358*	*380,673*	*136,511*
SP from Government	266,667	0	1,223,333
SP from Global Fund	0	0	0
SP from Other Donors	0	0	0
SP planned with PMI funding (see footnote 4)	0	1,206,667	0
Total SP Available	**1,799,025**	**1,587,340**	**1,359,844**
Total SP Surplus (Gap)	**380,673**	**136,511**	**-107,846**

Footnotes: Numbers are derived from the 2018 national malaria quantification report
1) The total number of pregnant women is estimated at 4.14% of the total population in the areas targeted for IPTp. This is based on estimates by the Kenya National Bureau of Standards (KNBS)
2) The number of treatments are calculated using the total number of pregnant women attending ANC and estimating the percentage who will attend ANC1 (97%), ANC2 (97%), ANC3 (97%), ANC4 (63%) to receive IPTp. The 97% is based off planning figures for the 2018 quantification and the ANC4 coverage is based off MIS 2015.73% of ANC attendance occurs in the public sector and in recent years the forecast accuracy is 85%, meaning the actual is lower than the forecast so has been adjusted accordingly.
3) Quantities represent number of treatments and not the number of tablets. One treatment of IPTp is comprised of 3 SP tablets.
4) 2,000,000 SP tablets ordered for 2019 will arrive in 2020 due to importation waiver delays

Conclusion

The gap analysis table above is based on the 2018 Kenya Quantification Report and 2019 pipeline review estimates. The country is due to undertake the annual quantification exercise for 2019/2020 in September and this shall provide updated estimates of commodity requirements. PMI will fill the estimated country need in 2020, with the GoK picking up responsibility in 2021.

Key Question 6

What are the in-country considerations that impact your funding allocation in this category? If there is a specific budget line item in Table 2 that is not covered by the above questions, please address here.

Supporting Data

The NMP has set aside counterpart GoK funds to procure SP thus reducing the funding required from donors starting in 2021. In 2020, PMI will work with the national and county governments to prioritize and allocate funds for procurement of SP.

Conclusion

With the national and county governments setting aside funds to procure SP, there is likely to be reduced need for PMI to fill the SP gap from 2021 onwards.

3. CROSS-CUTTING AND OTHER HEALTH SYSTEMS

3.A. SUPPLY CHAIN

NMP Objective
Objective Six 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. Strategies Five and Six aim to enhance malaria commodity security at all levels of the health system and strengthen the use of supply chain data for decision making.
NMP Approach
The KMS 2019–2023 outlines the approach for supply chain strengthening for enhanced malaria commodity security through: ▪ Establishment of well-coordinated and comprehensive Procurement and Supply Management (PSM) Framework with clear terms of reference and broad representation of donors, implementing partners, and government who serve as members of the PSM CoE for efficient quantification, timely procurement, and distribution of commodities. ▪ Strengthened and continued 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 (PPB) and the National Quality Control Lab. ▪ Expansion of 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 NMP

- PMI complements NMP 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 supports the NMP to strengthen supply chain systems through leadership and governance activities with the national and county Commodity Security Technical Working Group's capacity building for inventory management and enhanced commodity security.
- PMI works with the NMP to ensure end-to-end visibility of quality supply chain data for decision-making at all levels of the system through investing in a LMIS within the DHIS2 that is linked to the KEMSA platform.

PMI-Supported Recent Progress *(Past 12–18 Months)*

- Development of the PSM section of the KMS 2019–2023.
- Technical assistance to the national and county level commodity security coordination bodies (i.e. the NMP Drug Management Sub-Committee, Procurement and Supply Management CoE, and the County and Sub-County Commodity Security Technical Working Groups in the eight malaria endemic counties).
- Supply chain data performance review and best practices sharing forum for the eight endemic counties in March 2019.
- Refinement and updating of the quantification guidelines and templates for enhanced forecasting accuracy. Percentage forecast error for all commodities (AL, RDTs, injectable artesunate, and SP) was maintained within the target set in the KMS 2019–2023 of ±15 percent for the latest six-month period.
- Provided logistical and technical support to the outpatient QoC survey in June 2018.
- Provided technical assistance to the NMP for monthly pipeline monitoring that informed intercounty redistribution of commodities worth $72,670. The proportion of health facilities with AL and RDTs stocked according to plan peaked at 31 percent and 36 percent respectively in May 2019, up from 16 and 13 percent, respectively, at the end of FY18. The proportion of organization units (health facilities and community units) with no variance between service data and AL dispensed increased from 21 percent in January 2019 to 47 percent in June 2019.
- Developed a health commodities dashboard on DHIS2 in collaboration with University of Nairobi that enhanced end-to-end supply chain visibility
- Collaborated with AMREF to enhance access to, and accountability for, ACTs and RDTs for CCMm. Reporting rate improved from 34 percent in January 2018 to 91 percent in June 2019.
- Facilitated inspirational supply chain leadership training for 14 county commodity managers from seven counties in January 2019 followed by capstone projects.

- Facilitated MOH trainers to provide targeted capacity building of health facility staff during health commodities supportive supervision using on-the-job training.
- Conducted supply chain audits in over 230 health facilities (20 percent) to assess commodity accountability.

PMI-Supported Planned Activities *(Next 12–18 Months, Supported by Currently Available Funds)*

National Level Activities:

- Operationalization of the NMP PSM CoE through development of terms of reference and a calendar of activities.
- Forecasting and quantification for all malaria commodities needs for FY 2020/2021.
- Transition of monthly pipeline monitoring to NMP staff.
- Conduct Inpatient Malaria QoC Survey in August/September 2019 and Outpatient QoC Survey in December 2019, both have an end-use verification component.
- Support establishment and functionality of the Health and Medical Products and Technologies Unit (HMPTU) at the national level, including development of terms of reference.

County Level Activities:

- Support the establishment of a HMPTU in two counties.
- Support sub-county officials and health facility in-charges to strengthen malaria commodity data quality, undertake supply chain audits, and conduct supportive supervision.
- Work with county health commodity managers to roll out of the new DHIS2 Health Commodities Dashboard to inform resupply by KEMSA and provide a tool for performance management at county level.

PMI Goal

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

Do you propose to increase, decrease, or maintain funding allocation levels for this activity? Why, and what data did you use to arrive at that conclusion?

PMI/Kenya proposes decreasing funding allocation for this activity in FY 2020:

- Higher funding levels in FY 2019 will ensure intensified focus on supporting sub-county health managers to work with health facility staff to address long-standing challenges with inventory management, including sub-optimal use of commodity registers and reporting forms.

- FY 2020 will build on the FY 2019 momentum to strengthen supply chain leadership and governance at national and county level through the establishment and operationalization of the HMPTU as part of the new MOH structure.

- Steady gains noted in supply chain management strengthening, as evidenced by the increase in proportion of health facilities stocked within the recommended stocking levels coupled with reduced stockout rates in the high-risk zones will be enhanced through supervision and oversight by the counties to ensure maintenance of optimum commodity management practices, especially in the high malaria risk counties that account for more than 70 percent of the overall commodities used in the country.

- With the rollout of the supply chain dashboard to the counties, it is expected that there will be increased visibility of malaria data to inform targeted supervision and that malaria commodity orders will be rationalized at source with reduced need for redistribution.

- There will be continued efforts to build the capacity of HMPTUs to enhance accountability for health commodities through the designated facility records and reports in order to safeguard government and donor investments.

Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

Key Question 1

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

Supporting Data

Figure A30. Central Stock Levels for ACTs

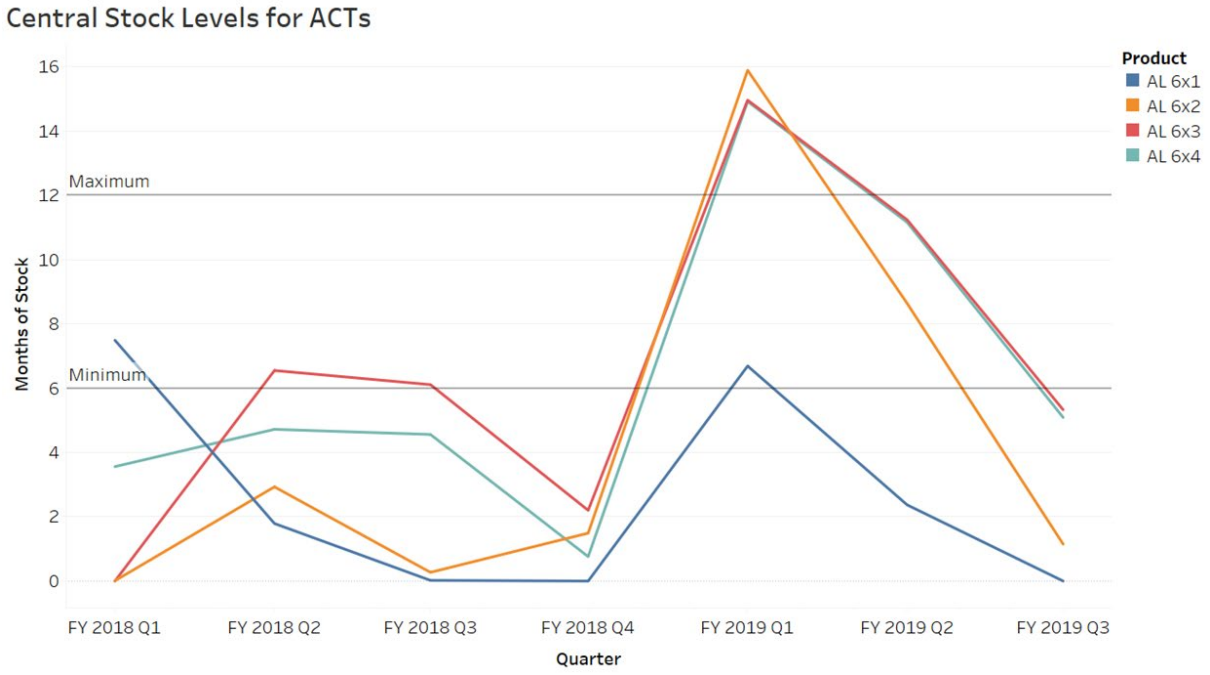


Figure A31. Central Stock Levels for RDTs and SP

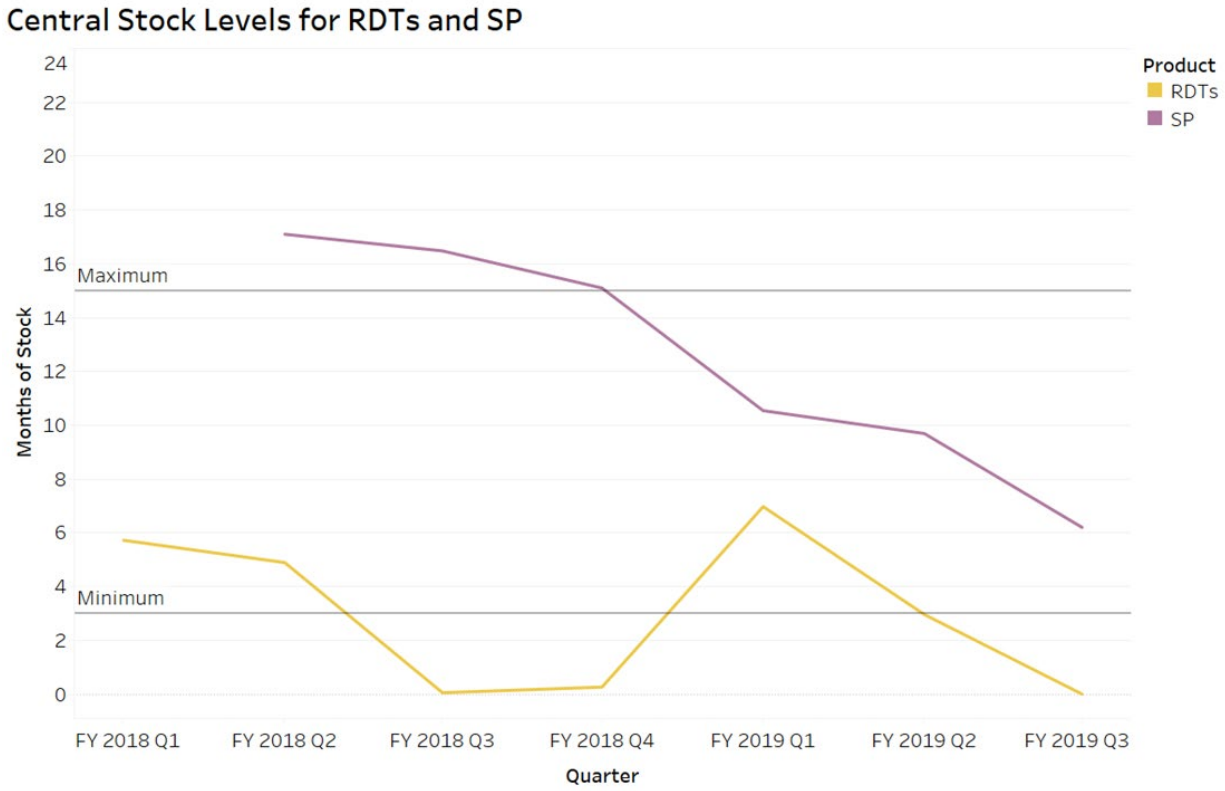
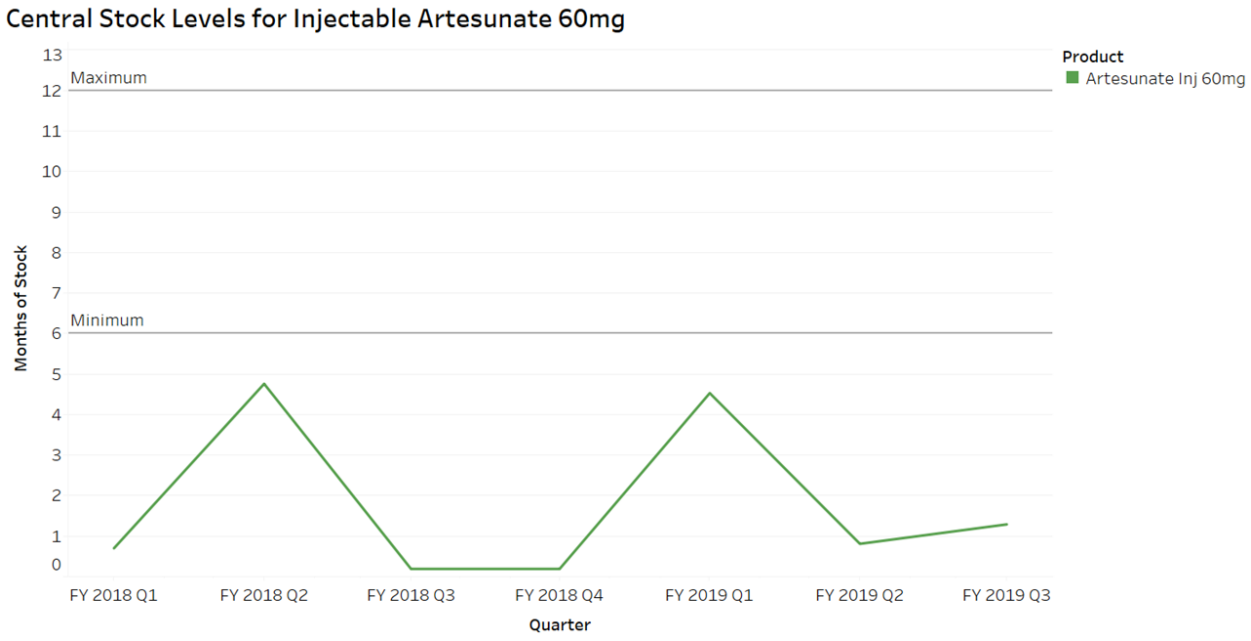


Figure A32. Central Stock Levels for Injectable Artesunate 60mg



Conclusion

Stocking levels have been suboptimal due to disruptions in the pipeline resulting from delays in getting a tax waiver for timely arrival of PMI-funded consignments in-country. That notwithstanding, overall AL treatment stock levels have been within the recommended levels for the past year with a dip in FY 2019 Quarters 2 and 3. RDTs and injectable artesunate have been mostly understocked. SP tabs that were overstocked since 2015 have been within the recommended levels since March 2019, given that no new orders have arrived. To mitigate disruptions in stock levels, Global Fund called forward all orders planned to arrive in 2021 to fill the gaps resulting from the tax waiver delays affecting PMI funded commodities. A tax waiver has recently been granted for PMI commodities so orders will be resumed.

Key Question 2

What are the trends in facility- and community health worker-level stockout rates for ACTs, RDTs, and SP over the last year? Is there a seasonal or geographic difference in stockout rates?

Supporting Data

Figure A32. ACT Stockout Rates

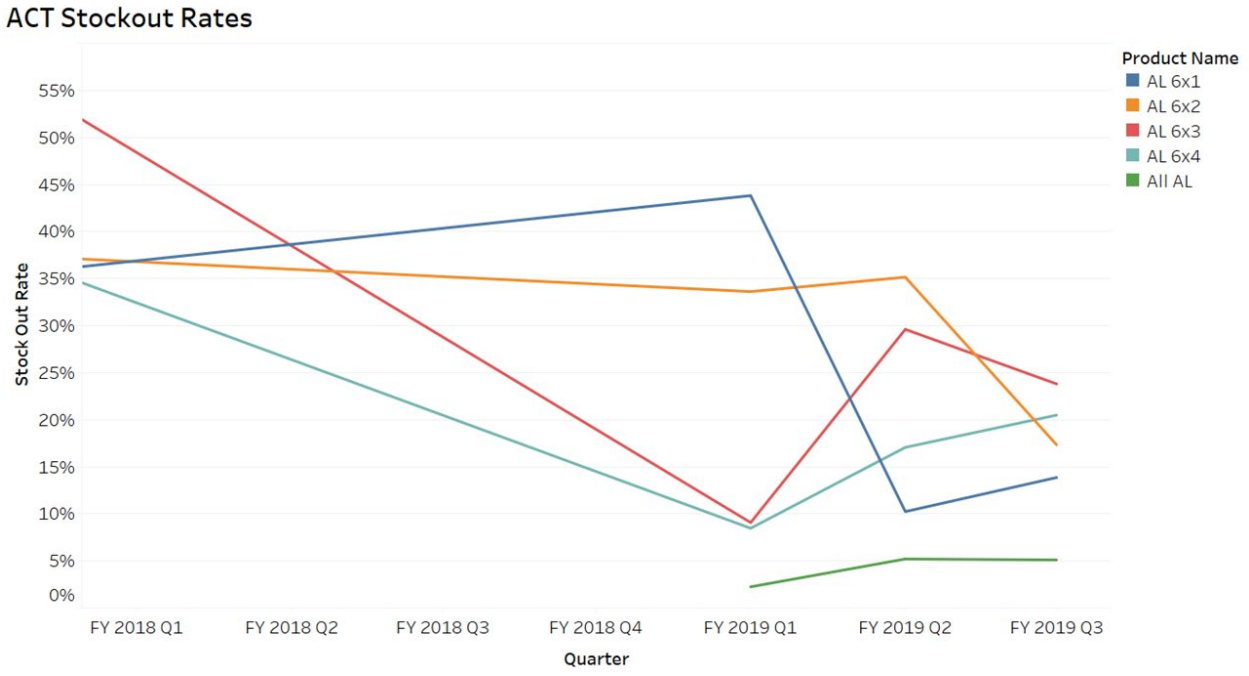


Figure A33. SP and RDT Stockout Rates

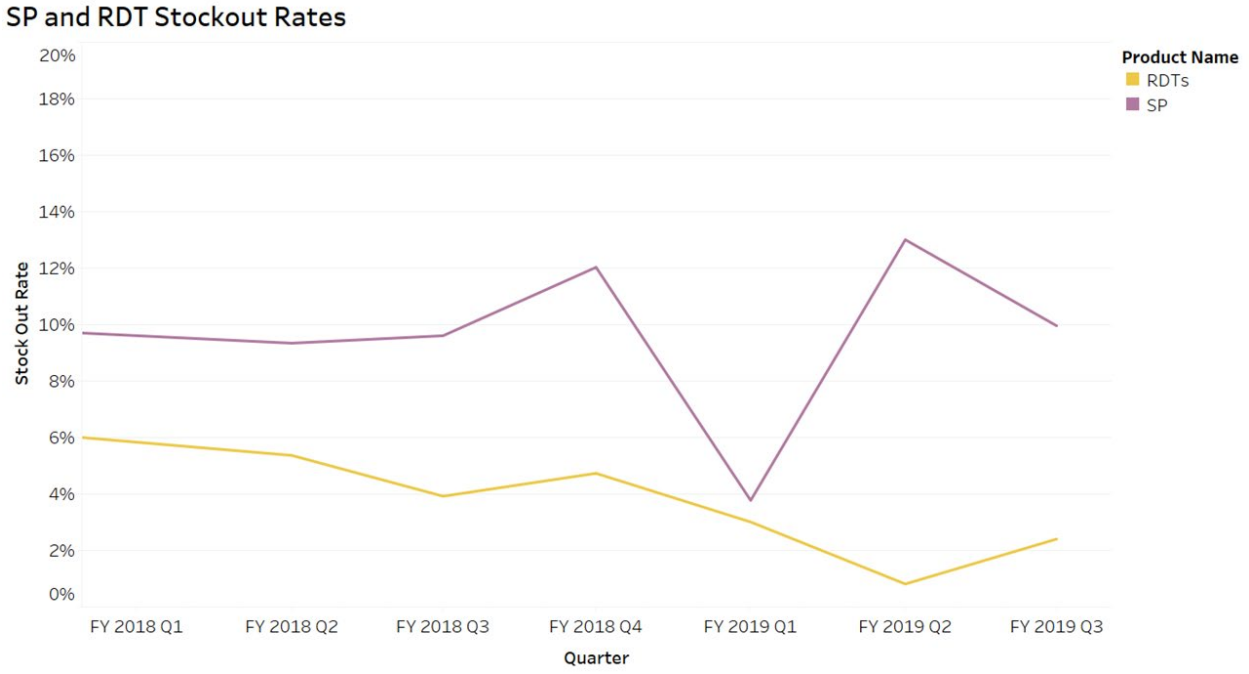
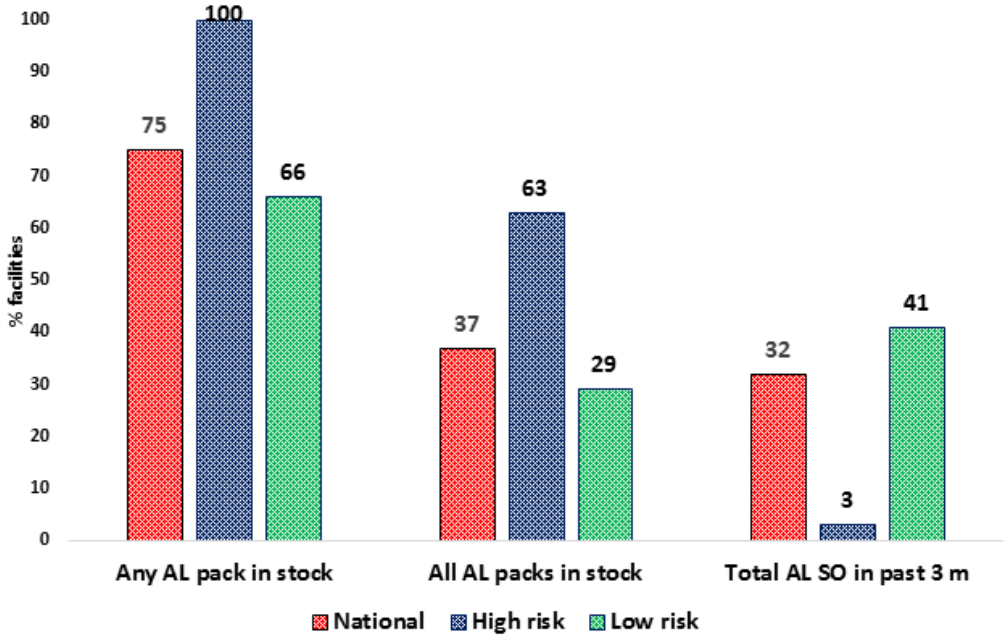
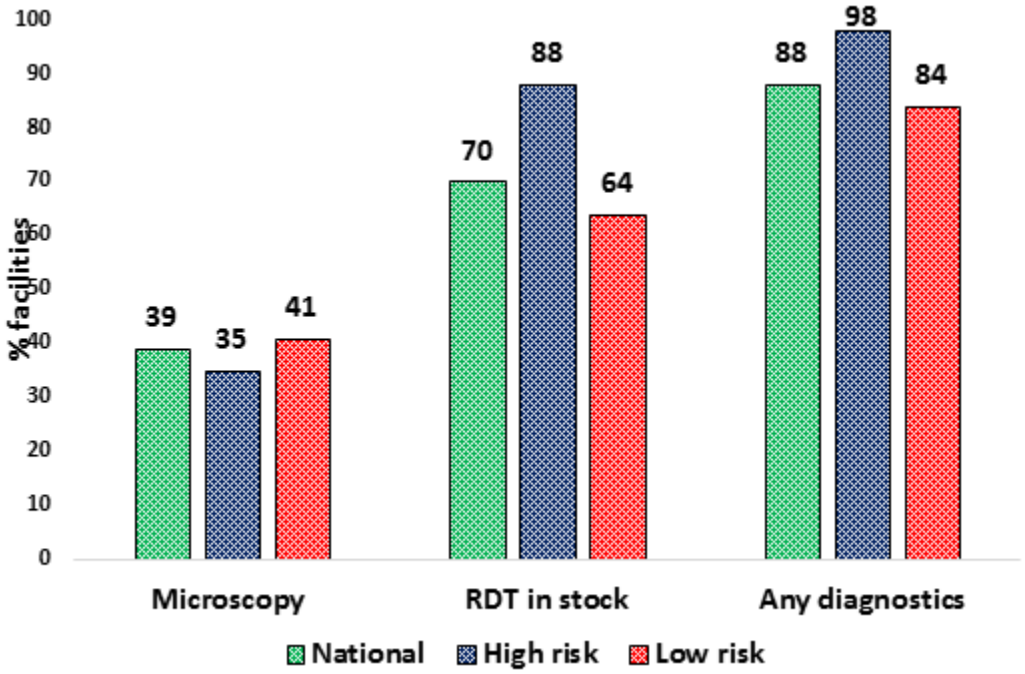


Figure A34. Key AL Availability Indicators Stratified by Malaria Risk - June 2019



**Data source: Quality of Care survey, June 2019*

Figure A35. Availability of Malaria Diagnostics Stratified by Malaria Risk - June 2019



**Data source: Quality of Care survey, June 2019*

Conclusion

Major differences in AL availability were observed during the last QoC Survey with respect to malaria risk. While in high malaria risk areas all health facilities (100 percent) stocked at least one AL pack and only 3 percent experienced total AL stockout three months prior to the survey, in low malaria risk areas the AL availability on survey days was significantly lower (66 percent) and total stockouts three months prior to the survey were significantly higher (41 percent). In the three month period between March and May 2019, 52.1 percent of facilities experienced stockouts of injectable artesunate, while in the areas where IPTp is recommended, 20.5 percent of facilities had stockouts of SP. Comparing with the 2018 survey, there was an increase in SP stockout levels (11.6 percent to 20.5 percent), while artesunate stockout levels were without significant changes (52.1 percent versus 53.9 percent).

Data for the lake endemic counties, which account for ~69 percent of malaria commodities consumed, shows a steady upward trend in appropriate stocking levels until May 2019 when effects of stockouts of AL and RDTs at central level started impacting health facilities. Despite negative trends in AL availability nationally, the availability of AL is universal in high malaria risk areas, while stockouts are very common in low risk areas. The NMP PSM CoE will need to prioritize pipeline monitoring and re-setting minimum and maximum holding levels for low-risk areas to ensure uninterrupted supply of malaria medicines and diagnostics.

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

Figure A36. Comparison of ACTs Consumed and Confirmed Malaria Cases from July 2018 to June 2019

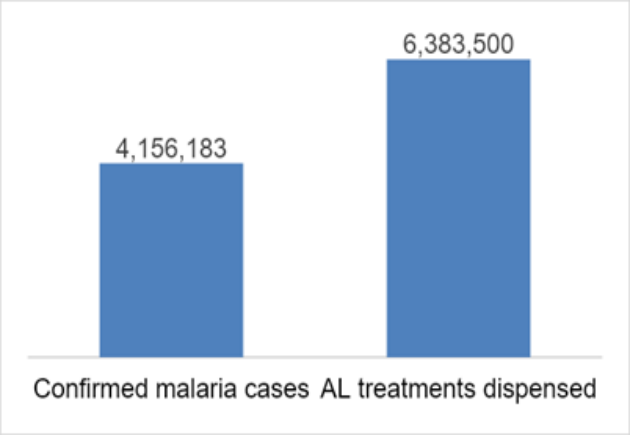
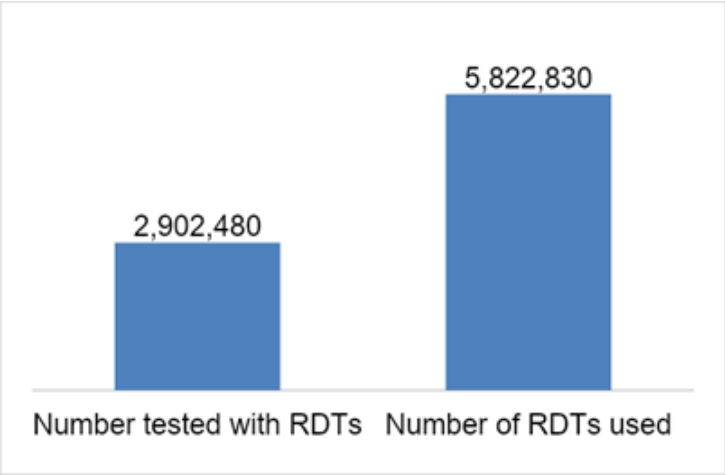


Figure A37. Comparison of RDTs Used and Number Tested Using RDTs from July 2018 to June 2019



Conclusion

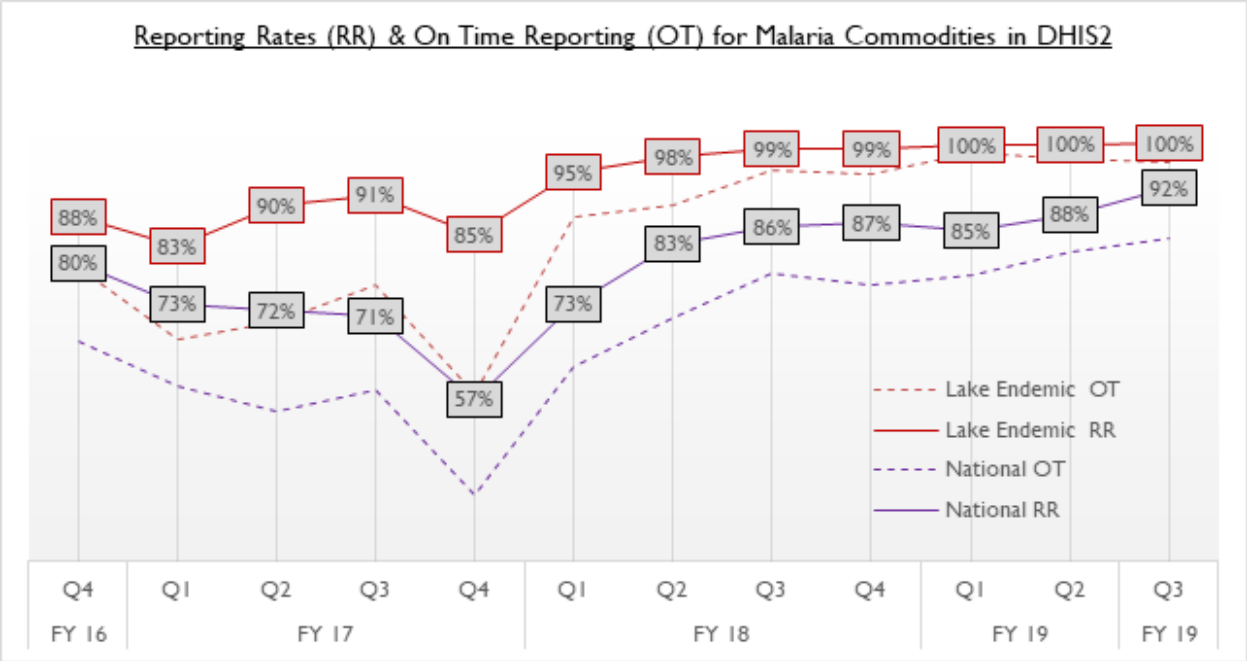
Significant variances are seen between service data and commodity data for both AL and RDTs. This is due to various factors, including incorrect understanding of some indicators (e.g. suspected malaria) and incomplete capture of primary data in the registers at health facilities. Updated outpatient department data capture and reporting tools proposed during the development of the KMS 2019–2023 will help to address the challenges experienced in reporting of malaria service data, particularly the number of suspected cases as well as testing data (number tested by microscopy and RDT and number confirmed positive disaggregated by testing method). A review of the malaria commodities forms in DHIS2 in 2018 revealed that within this form, there were discrepancies between the number of patients dispensed to and the quantity of AL dispensed for in over 80 percent of the organization units (health facilities and community units) assessed. Concerted efforts to review commodity reports before uploading to DHIS2 led to a steady improvement within six months and by June 2019, almost 50 percent of the organization units reviewed had no discrepancy between the two data sets. Continued efforts in FY 2020 are expected to lead to further reductions in these discrepancies.

Key Question 4

What are the trends in the LMIS reporting rates?

Supporting Data

Figure A38. Reporting Rates & On Time Reporting for Malaria Commodities in DHIS2



Conclusion

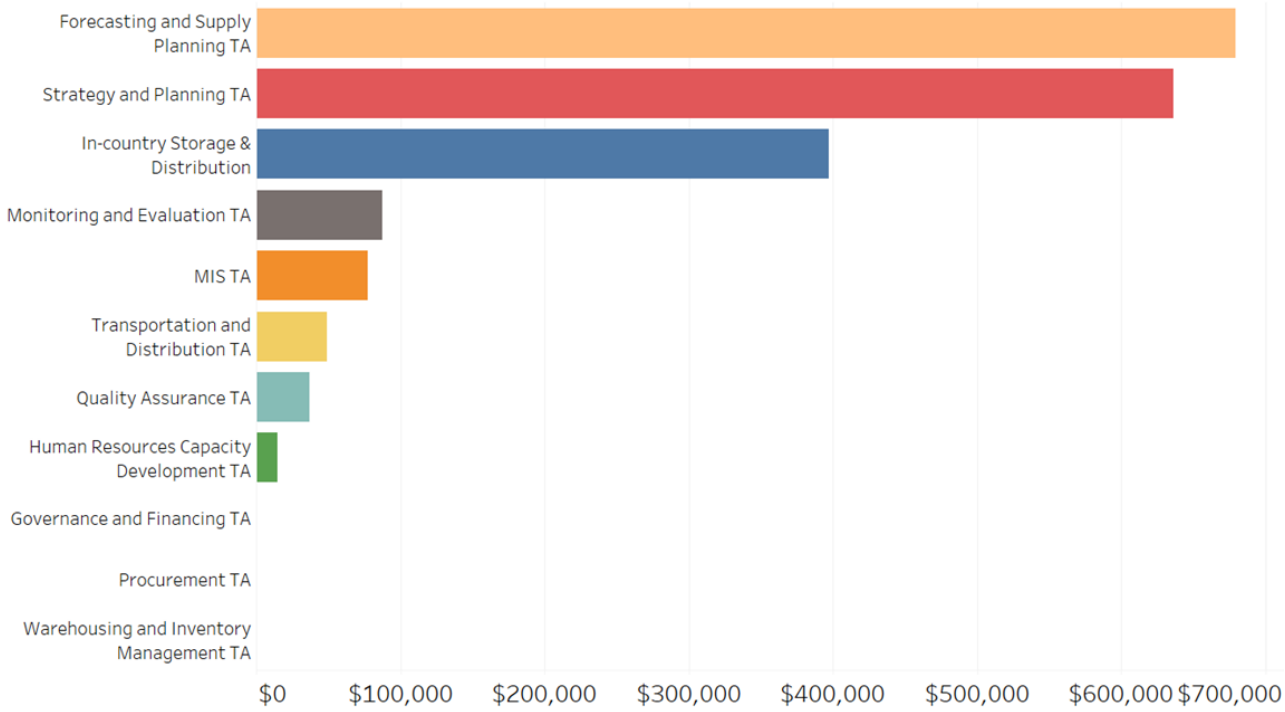
LMIS reporting rates are 100 percent in the lake endemic region and 92 percent overall. There is adequate LMIS data for informed decision-making although data quality challenges continue to exist and are being addressed. The challenges experienced are partly related to suboptimal or incorrect use of primary source documents (daily activity registers) at health facilities; these shall be addressed through support to sub-county health managers to coordinate regular review of records and conduct on-the-job training for health facility staff identified to discrepancies in their commodity records. Supply chain commodity audits conducted as part of commodity management supervision will also serve as a validation tool for quality of LMIS data reported through the system.

Key Question 5

What are the main supply chain functions supported by PMI? For areas that are not as strong is there additional investment that PMI should make? In areas performing well, is it dependent on PMI/donor funding and, if so, should it be maintained?

Supporting Data

Figure A39. PMI Supply Chain Investments in FY 2018



Conclusion

PMI has invested and supported the national systems for forecasting and supply planning, strategy and planning, integrated warehousing and inventory management, monitoring and evaluation, LMIS, quality assurance, and human resources capacity building. PMI should continue to provide support to the national level for procurement, supply planning, and transition pipeline monitoring to the NMP. In addition to the supply chain investments shown above, PMI has continued to support post-market surveillance and strengthening of the National Quality Control Lab at a level of $200,000-$300,000 per year. PMI should increasingly focus its investments in supporting the national and county governments to establish leadership and governance structures, including establishment of HMPTUs and development of supply chain policies and guidelines for enhanced commodity accountability. PMI will work with Sub-County Health Management Teams (SCHMTs) to strengthen supply chain management at facility level and advocate for allocation of government resources beyond counterpart financing for procurement of malaria commodities in the next financial year.

Key Question 6

What are the in-country considerations that impact your funding allocation in this category? If there is a specific budget line item in Table 2 that is not covered by the above questions, please address here.

Supporting Data

USAID/Kenya is considering a shift to include a local partner in the distribution of medical supplies. This is in an effort to diversify risk and will require the provision of supply chain technical assistance for the establishment of structures and capacity building for the local entity in order to ensure commodity security and accountability.

The country lacks harmonized policies and guidelines for supply chain leadership and governance. Available guidelines are linked to the strategic health programs. There is need for PMI to support the establishment of leadership and governance structures, such as HPMTUs, at the national level and within two focus counties to provide oversight and accountability for malaria commodities.

Conclusion

PMI will continue to work with the NMP, PPB, National Quality Control Laboratory, and the HMPTU to provide support for malaria commodity security and assure quality of malaria medicines.

3.B. SURVEILLANCE, MONITORING & EVALUATION (SM&E)

NMP Objective
Strengthen malaria surveillance and use of information to improve decision making for program performance.

NMP Approach
▪ Health Systems Strengthening/Information Systems--DHIS2: The NMP will continue to use DHIS2 to obtain essential malaria surveillance data. The NMP will use available opportunities to update the DHIS2 tools to strengthen data collection and standardize information collected nationwide by all facilities. The NMP will conduct annual data quality audits to inform required improvements in the system. Quality malaria commodity data will be made available for decision making through a functional health supply chain portal on DHIS2. ▪ Strengthen Malaria Surveillance ▪ Strengthen Malaria Epidemic Preparedness and Response ▪ Increase Use of Malaria Data for Decision Making ▪ Monitoring the efficacy and effectiveness of vector control tools and technologies, and entomological surveillance are captured under the vector control section.
PMI Objective in Support of the NMP
The KMS 2019–23 Objective Five is in line with the PMI 2015–2020 Strategy Three, which aims at improving countries capacity to collect and use information. PMI support is aligned to the Malaria M&E Plan 2010–2023 and prioritizes capacity development for malaria SM&E in the following areas: ▪ Strengthening structures and mechanisms for M&E coordination ▪ Ensuring the availability of quality data, including strengthening the DHIS2 platform, creating dashboards, including the malaria commodity dashboard ▪ 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 M&E leadership competencies and capacity of MOH staff at national, county and subcounty levels A Monitoring and Evaluation Capacity Assessment Toolkit measured the capacity of NMP across the five domains and showed an overall improvement from 65 percent at baseline in 2013 to 81 percent at end line in 2017. However, inadequate capacities were found in data demand and use, routine monitoring, financial autonomy, research and databases.[14] **Strengthen DHIS2 Platform -** PMI supports the MOH/HIS to maintain the DHIS2 platform, ensuring the routine collection of malaria information and creating dashboards to assist the NMP and its partners.

[14] MEASURE Evaluation PIMA. NMP M&E Capacity End Line Assessment Report. August 2017.

Data Use for Decision-Making - PMI supports the NMP to develop quarterly malaria surveillance bulletins to document achievements made towards data collection. PMI's implementing partner supported the development of the bulletins from 2012 to 2014. Since 2015, the NMP 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.

Strengthening County, Sub-county, and Health Facility SM&E Capacity - PMI provides support for SM&E at the county level and below to improve the quality of malaria data and enhance the use of malaria data to inform malaria programming in the eight lake endemic counties. PMI funds have been used to improve data quality through strengthening collaborative data review by providing data review guidelines and technical assistance in analyzing data and packaging information to inform malaria programming. PMI also supports strengthening malaria stakeholder coordination and strategic partnership through operationalization and improving functionality of county malaria TWGs that provide structured platforms for joint planning, performance review and accountability, building capacity of county and sub-county malaria control coordinators on malaria M&E.

Periodic Household and Health Facility-Based Surveys - PMI supports periodic household surveys (MIS, DHS, PMLLIN) to obtain key malaria indicators. MIS surveys were conducted in 2010 and 2015 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.

National Malaria Forums - PMI supported three national malaria forums, bringing together researchers, policy makers and implementers to share evidence, inform malaria policies and define the malaria agenda.

PMI-Supported Recent Progress *(Past 12–18 Months)*

PMI supported the following activities at the **central level** over the past 12–18 months:

- **Development of the Malaria Commodity Dashboard in DHIS2** - Working with MOH, NMP, and KEMSA, PMI supported the development of the Malaria Health Commodity Dashboard as a DHIS2 app to enhance availability, access, and utilization of the information products.
- **Support for the MPR, KMS 2019-2023, and M&E Plan 2019–2023 Development -** PMI supported the 2018 MPR. The MPR assessed performance of six strategic objectives outlined in the KMS 2009–2018 using a standard tool developed by WHO. PMI also provided technical assistance and support for the development of the KMS 2019–2023 and its accompanying M&E Plan. The development of these documents was informed by the recommendations from

the MPR. PMI also supported the launch of the KMS 2019–2023 and M&E plan, which was attended by over 200 policy makers and stakeholders.

- **Support for Strengthening SM&E at the NMP**- PMI supported quarterly surveillance, monitoring, and evaluation and operations research (SMEOR) CoE meetings and provided technical assistance in revising the malaria surveillance training curriculum package. PMI also supported the third Kenya National Malaria Forum held in September 2018 as part of the MPR process.
- **Epidemic Preparedness and Response (EPR) Workshops -** PMI supported workshops to develop capacity of 320 epidemic-prone county and sub-county health management officers in setting thresholds for monitoring upsurges in malaria cases and developing EPR plans. The workshops trained malaria control coordinators and disease surveillance officers in 127 sub-counties spread across 26 counties prone to malaria epidemics in the western highlands and the seasonal transmission zones of northern and south eastern Kenya.

PMI supported the following activities at the **county, sub-county, and facility level** over the past 12–18 months:

- **Improving Quality of Malaria Data -** PMI provided technical assistance to counties to synthesize the data quality assessment (DQA) reports for 2016, 2017 and 2018. PMI also supported counties to hire and deploy Health Records and Information Officers to conduct data quality improvement activities at the facility level. Eight officers were deployed in Kisumu, Migori, Busia, and Kakamega counties in October 2018, while Homa Bay and Siaya had four officers deployed in May 2019. The officers were oriented to identify and document data quality gaps, execute corrective measures either directly at the facility level or indirectly by escalating the issues to higher levels for action. Corrective actions at the facility level included mentorship on data documentation, indicator definitions, data collation, data validation, basic data analysis and completing the data collection and reporting tools. PMI supported the adaptation of data quality standard operating procedures from Kenya Health Sector Data Quality Assurance Protocol and their dissemination in the eight counties to ensure that data quality processes are done in line with the protocol.
- **Skills Building -** PMI supported a county-led capacity building package on M&E for the malaria program targeting the Sub-County Malaria Control Coordinators. A total of 46 (73 percent) out of the targeted 63 Sub-County Malaria Control Coordinators have been taken through several modules of the curriculum but are at different stages of completion of the 12 modules. The County Malaria Control Coordinators from Kisumu, Homa Bay, Siaya, Migori, Kakamega, and Vihiga trained on M&E of malaria programs at the University of Ghana School of Public Health and have steered the capacity building sessions that are convened monthly. The County Malaria Control Coordinators from Busia and Bungoma County were supported to

undertake the monitoring and evaluation of malaria programs course at the University of Ghana School of Public Health in June 2019.

- **Use of Malaria Data -** PMI supported the development of a tracking tool based on DHIS2 malaria data. The monitoring tool highlights facility level malaria data quality and reporting gaps. This tracking tool was adopted by the technical working groups in Kakamega, Busia, Kisumu, Siaya, and Homa Bay Counties for tracking of malaria data quality indicators. In FY18, PMI also provided technical assistance to the Health Records and Information Officers and Sub-County Malaria Control Coordinators in Vihiga County to develop visualizations in DHIS2 to identify the malaria reporting gaps. Consequently, the county intensified sensitization of their health workers on the importance of using tally sheets and complete documentation and reporting. Technical assistance was also provided to Homa Bay and Siaya Sub-County Malaria Control Coordinators to use the DHIS 2 dashboard for data quality reporting. Finally, PMI supported the development of the malaria factsheets that included the results of the synthesized DQA reports for all the eight malaria endemic counties. These fact sheets were disseminated during the County Department of Health Caucus meeting. During the dissemination, one of the action items that the County Department of Health resolved was to follow up on tracking of implementation of DQA action plans. The factsheets were also used for dissemination of county malaria status during the 2019 World Malaria Day celebration.
- **Strengthened County Malaria Technical Working Groups -** PMI supported the counties of Busia, Bungoma, Siaya, and Homa Bay to establish malaria technical working groups and the counties of Migori, Vihiga, Kakamega, and Kisumu to revive their malaria technical working groups. The technical assistance package included: review and development of terms of referencing, entrenching data quality and data use discussions as standing agenda items, and the introduction of a tool to track implementation of malaria activities in the annual work plan for accountability. The technical working group forums have been used to disseminate the current KMS 2019–2023 and M&E Plan.

PMI-Supported Planned Activities *(Next 12–18 months, Supported by Currently Available Funds)*

- **Continue Support for DHIS2:**
  - Support NMP and partners to develop/enhance the in-patient module in DHIS2 and establish linkages with other hospital-based systems.
  - Provide capacity to county health management teams during county data review meetings to enhance quality data on KHIS.
- **Support to the NMP for Strengthening SM&E:**
  - Disseminate the KMS 2019−2023 and M&E Plan during program and regional review meetings with counties.

- Provide technical assistance and support for malaria data governance, oversight, indicator harmonization, and linkage with DHIS2.
- Support the NMP to hold quarterly CoE meetings for SMEOR.

- **EPR Activities:**
  - Support the NMP to update the EPR guidelines to align with the KMS 2019–2023.
  - Support the NMP to develop EPR training manuals for facilitators and participants. The manuals will be used in cascade training for County and Sub-County Malaria Control Coordinators, Disease Surveillance Officers, and Health Records and Information Officers on malaria epidemic monitoring and response.
  - Support the NMP to conduct a rapid assessment of epidemic preparedness and response in selected counties/sub counties.
- **Improving the Quality and Use of Malaria Data:**
  - Strengthen M&E capacities of sub-county Health Records and Information Officers.
  - Facilitate Health Records and Information Officers ability to provide technical assistance during county/sub-county/facility malaria data quality reviews.
- **Support the 2020 MIS**
  - Support planning and implementation of the 2020 MIS

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

Are you proposing to increase, decrease, or maintain funding allocation levels for this activity? Why? What data did you use to arrive at that conclusion?
Overall, SM&E FY 2020 funding will decrease compared to FY 2019 because the 2020 MIS will be funded in the FY 2019 MOP; otherwise, we are proposing to maintain funding levels for SM&E activities in FY 2020. Activities will be prioritized based on the critical gaps in routine malaria surveillance identified in the 2018 MPR. PMI will continue to support the NMP to monitor progress in meeting the targets laid out in the M&E Plan 2019–2023. PMI proposes to support the following activities in line with the new KMS 2019–2023 and M&E Plan 2019–2023: 1. **Enhancing continuous availability of in-patient morbidity and mortality data -** The 2018 MPR could not assess progress made towards the KMS goal of reducing malaria morbidity

and mortality due to the lack of reliable in-patient and mortality data. PMI will support the goal of strengthened data collection from the 47 county hospitals and select high-burden facilities, with a particular focus on the eight high burden lake endemic counties. This support will go towards capacity building on ICD and improving routine health systems to capture and report in-patient and mortality data.

2. **Development of EPR dashboards and biennial EPR -** The 2018 MPR showed low performance of the EPR strategic objective with an overall score of 26.3 percent. The key outcome indicator for EPR is the proportion of targeted EPR sub counties reporting weekly malaria threshold data. PMI supported training of all the targeted 127 sub counties on threshold setting. However, determining the outcome of this effort is difficult since there is no standard tool to report the weekly thresholds. Support for development of an EPR dashboard will enhance analysis of weekly thresholds and enable health managers to monitor, detect, and respond to epidemics.
3. **Support for HIS malaria indicators harmonization and linkage with DHIS2 -** The MPR revealed inconsistencies across the data collection and reporting tools and lack of sufficient base registers at the service provision level. The Health Information Systems Unit recently completed revising the data collection and reporting tools. The rollout of the new tools is set to begin before the end of 2019. PMI will provide support for the rollout of the revised tools and ensuring indicators are harmonized and updated in the DHIS2 platform. PMI will also continue to work with Health Information Systems Unit to maintain and rollout the malaria commodity dashboard that was recently created.
4. **Capacity building for surveillance M&E -** The EPR workshops held in early 2019 found limited capacity for Sub-County and County Health Managers to analyze data and use it for decision making. Support for continued capacity development for EPR and routine malaria surveillance will be needed with FY 2020 funding.
5. **Technical support for SM&E coordination -** The SMEOR CoE serves as a coordination mechanism for SM&E and OR activities in Kenya. Support for continued technical assistance will be needed to monitor implementation of the KMS 2019–2023 and M&E Plan. The KMS 2019–2023 identifies regional review meetings as useful forums for enhanced peer learning.
6. **Elimination -** The 2018 MPR 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 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 proposes to support the NMP to develop policies and guidelines to guide establishment of surveillance systems for malaria elimination. Funding will be used at this time for an assessment and developing the surveillance framework.

Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

Key Question 1

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

Supporting Data

Figure A40. SM&E Data Sources, 2015–2023

Data Source	Data Collection Activity	Year								
		2015	2016	2017	2018	2019	2020	2021	2022	2023
Household Surveys	Demographic Health Survey (DHS)[1]							(X*)		
	Malaria Indicator Survey (MIS)	X					(X)			
	Multiple Indicator Cluster Survey (MICS)									
	EPI Survey									
Health Facility Surveys	Service Provision Assessment (SPA)				X*					
	Service Availability Readiness Assessment (SARA) Survey									
	Quality of Care Survey - Outpatient	X	X	X	X	X	(X*)	(X*)	(X*)	(X*)
	Quality of Care Survey - Inpatient		X*	X	X*	X	(X*)	(X*)	(X*)	(X*)
Other Surveys	EUV									

Data Source	Data Collection Activity	Year								
		2015	2016	2017	2018	2019	2020	2021	2022	2023
	School-Based Malaria Survey									
	Knowledge, Attitudes and Practices Survey			X	X	X	X	X	X	X
	Malaria Impact Evaluation[2]	X	X							
	Post-Mass ITN distribution Survey[3]			X*	X					
	Post-Mass ITN Distribution Qualitative Survey				X					
	Countywide Provider and Laboratory Assessment for Malaria Diagnosis					(X)			(X)	
Surveillance and Routine Systems	Support to Parallel Malaria Surveillance System[4]	X								
	Support to HMIS/DHIS2	X	X	X	X	X	(X)	(X)	(X)	(X)
	Support to Integrated Disease Surveillance and Response (IDSR)	X*	X*	X*	X*	X*	(X*)	(X*)	(X*)	(X*)
	Electronic Logistics Management Information System (eLMIS)	X	X	X	X	X	(X)	(X)	(X)	(X)

** Asterisk denotes non-PMI funded activities, X denotes completed activities, and (X) denotes planned activities.*
[1] *The timing of the next DHS is uncertain.*
[2] *Kenya Malaria Impact Evaluation Group. Evaluation of the Impact of Malaria Control Interventions on All-Cause Mortality in Children Under Five Years of Age in Kenya 2003-2015. Nairobi, Kenya, March 2017*
[3] *A post-mass ITN distribution survey was done after the 2014/5 distribution in two phases: one as part of MIS 2015 and the other in March 2017.*
[4] *Health facility-based surveillance in IRS districts, PMI funded. August 2012–April 2015.*

Conclusion

PMI will continue to support the DHIS2 platform maintenance, dashboard use and updating, and ensure reporting on malaria indicators through the revised data collection forms. A census is taking place in 2019 and an MIS is planned for 2020. A mass ITN campaign is planned for 2020/2021 and the NMP and partners will consider the need for post mass campaign quantitative and qualitative surveys to evaluate the campaign, if the information is not already captured in the 2020 MIS. There are also planned laboratory diagnostic assessments. 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 in your country? What current priorities will be supported with this MOP funding?

Supporting Data

Figure A41. Donor-Supported HMIS Activities

Intervention	PMI-Funded?			Does Global Fund Plan to Fund?	Does Another Donor Plan to Fund?
	FY 18	FY 19	FY 20		
Central Level					
Register, tools (e.g. checklists, indicator glossary), job aids (design, indicators, definition of data elements, data dictionary, system support)		X	X	X	
Data quality assessments (separate from supervision – funding for travel to lower levels)		X	X	X	
Program monitoring and technical assistance (funding for travel to lower levels)		X	X	X	
Training (funding for central level to conduct training at lower levels), capacity building (i.e. on the job training for central level staff)		X	X	X	
Human resources (secondment of person in the NMP for SM&E, office/team for SM&E)		X	X		
Data use (analysis, interpretation, visualization (dashboards, bulletins), dissemination/feedback to lower levels, decision-making)	X	X	X		
Policy guidelines and coordination (updating policies, guidelines, supporting sub-committee meetings, supporting participation in sub-committee meetings)	X	X	X		
External relations/communications/outreach (support travel to international meetings and publications)	X	X	X		
Support to annual operational plans for national malaria program	X	X	X		

Intervention	PMI-Funded?			Does Global Fund Plan to Fund?	Does Another Donor Plan to Fund?
	FY 18	FY 19	FY 20		
Desk review to catch "logic errors system" (provide TA to catch logic errors)		X	X		
Admin 1 Level - County *PMI supports activities mainly in 8 counties while Global Fund supports activities in all 47 counties.*					
Registers (warehousing, printing, distribution)				X	
Data quality assessments (separate from supervision – funding for travel to lower levels)	X	X	X	X *(Annual DQAs)*	
Program monitoring and technical assistance (funding for travel to lower levels)			X	X	
Training (funding for County staff to conduct training at lower levels, capacity building (i.e. on the job training for Sub-county level staff)	X	X	X	X	
Human resources (secondment of person for malaria SM&E, office/team for SM&E)	X	X			
Data use (analysis, interpretation, visualization (dashboards, bulletins), dissemination/feedback to lower levels, decision-making)	X	X	X		
Adaptation of national policy guidelines and coordination (adapting policies, guidelines, supporting sub-committee meetings, supporting participation in sub-committee meetings)	X	X	X		
Adaptation of checklists and job aids	X	X	X		
Participation in national meetings (support for travel costs)					

Intervention	PMI-Funded?			Does Global Fund Plan to Fund?	Does Another Donor Plan to Fund?
	FY 18	FY 19	FY 20		
Support to annual operational plans for county malaria program	X	X	X		
Admin 2 Level - Sub-County					
Data entry, summary, and transmission (training, re-training, computers, internet, tools)					
Supervision (training, traveling, supervision tools/checklists, create/design system for organized/methodical supervision)	X	X	X	X	
Data validation (data validation activities before monthly data submission - organize health facilities)		X	X		
Monthly/quarterly data quality review meetings (venue, meeting support)	X	X	X		
Data use (analysis, interpretation, visualization (dashboards), dissemination/feedback to facilities, decision-making)	X	X	X		
Human resources (secondment of person for malaria SM&E, office/team for SM&E)					
Annual planning with county (support travel)	X	X	X		
Facility Level					
Data collection/entry, summary, and transmission (training, re-training, computers, internet, tools)					
Supervision of CHWs (training, traveling, administering supervision tools/checklists of community health workers)					

Intervention	PMI-Funded?			Does Global Fund Plan to Fund?	Does Another Donor Plan to Fund?
	FY 18	FY 19	FY 20		
Data use (analysis, interpretation, visualization (dashboards), dissemination/feedback to CHWs, decision-making)			X	X	
Monthly/quarterly data quality review meetings (support for travel)		X	X		
Community Level					
Data collection/entry and transmission (training, re-training, tools					
Data use (analysis, interpretation, decision-making)				X	
Monthly/quarterly data quality review meetings (support for travel)				X	

Conclusion

PMI continues to strengthen data collection at the national, county, sub-county and facility level (at select high burden facilities). Global Fund supports the community level through AMREF (the second PR). Most PMI support is focused in the eight lake endemic counties, except for EPR activities which are in the epidemic prone counties. As the country begins to build systems for sub-national malaria elimination, PMI support may expand to low-risk counties.

Key Question 3

What are the outcomes of HMIS strengthening efforts?

Supporting Data

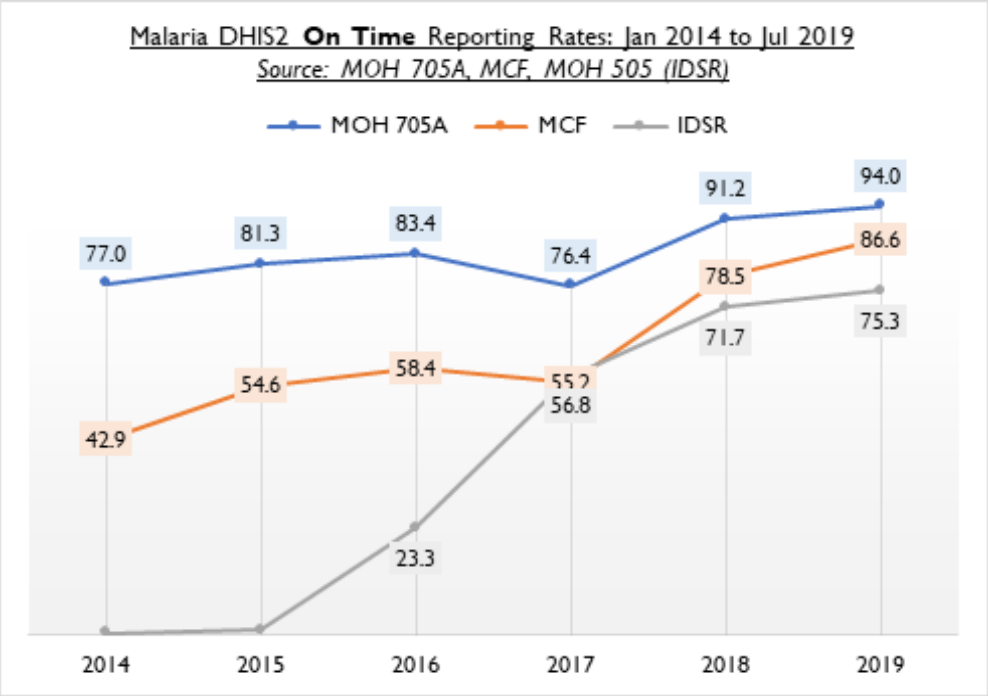
Figure A42. HMIS Reporting Timeliness, Completeness, and Accuracy

		2017	2018
Timeliness	Percent of reports received on time	64.5%	82.5%
Completeness	Confirmed malaria cases for children under five years of age was reported in X percentage of facility-months	24.0%	40.3%
Accuracy	Recounted value compared to the reported value	95.9%	93.1%

- Timeliness was calculated from the six outpatient HIS tools used to report malaria indicators in the KHIS. The timeliness for each of these tools was mined from KHIS as of 13 August 2019 for the eight lake endemic counties for the years 2017 and 2018. The average in timeliness across the six reports was then calculated and compared with the national reporting rate.
- Completeness data was drawn from KHIS form MOH 705 that reports the number of confirmed malaria cases is under 5. This was mined per facility for every month of the year 2017 and 2018. The number of counts that a facility had reported on this data element was calculated against the number of facilities. The percent average for the period was then determined. Note, currently DHIS2 cannot distinguish between a value of zero and no reporting.
- Accuracy was drawn from the annual NMP-supported DQA reports. The verification factor was calculated to determine the level of accuracy. Verification factor (VF) is a measure of accuracy of the reported values. The VF is calculated as the ratio of the recounted value of the indicator to the reported value. A VF >100 percent s suggestive of under reporting, while <100 percent suggests over reporting. On the other hand, a VF that is very close to 100 percent indicates a high level of accuracy of data. This compares aggregate data and DHIS2 data and does not represent source data.

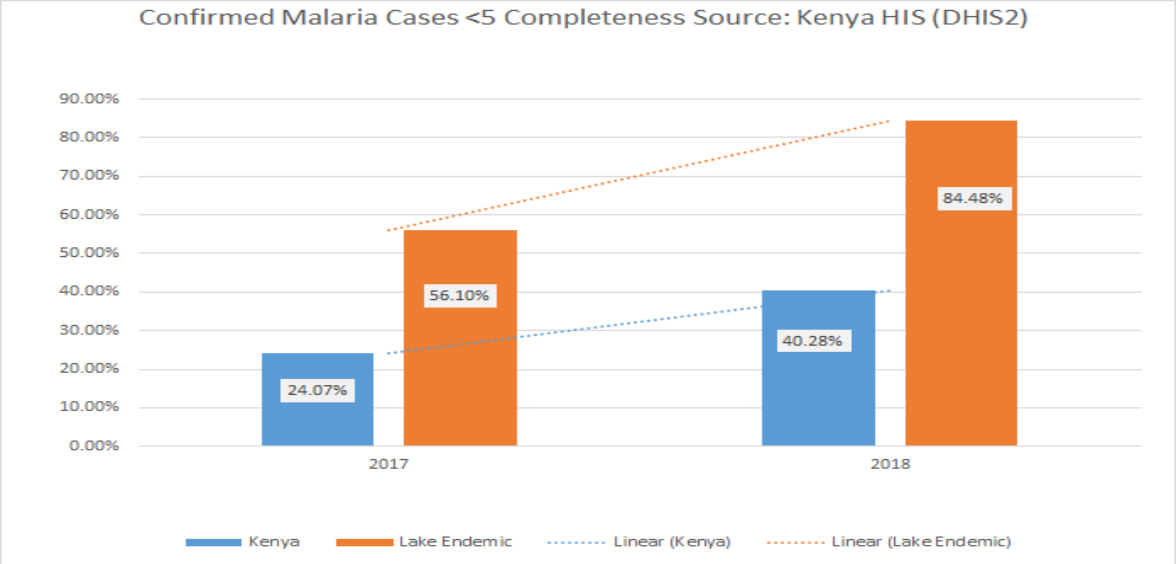
The DHIS2 showed overall improvements in timely reporting of malaria data through DHIS2, IDSR and LMIS (malaria commodity form) (Figure 42).

Figure A43. Health Facilities On-Time Reporting Rates by Data Reporting Tools in DHIS



Source: DHIS2, August 2019. MCF = Malaria Commodity Form

Figure A44. Malaria Data Completeness Nationally and Lake Endemic Counties, 2017 and 2018



A recent synthesis of DQA results highlighted data quality gaps consistently reported during the three DQAs conducted from 2016 to 2018. The results showed that less than 14 percent of the sub-counties whose data was analyzed had a significant change in the quality of malaria data. Qualitatively, a major challenge has been weak or non-implementation of data quality improvement activities after the DQAs.

The results of an assessment to determine the root cause of some of the identified data quality gaps are detailed in Table 44. The NMP and partners are developing solutions to address the causes.

Figure A45. Causes of Poor Data Quality

System	Technical	Behavioral
- Staffing shortages - Lack of/insufficient tools - Poor patient flow - Unresponsive EMRs - Poor handover procedures - Night/weekend/holiday shifts - Old versions of tools	- Indicator understanding - Knowledge gaps on data management processes, reporting guidelines, and correct documentation - Non-standard documentation - Transcription errors	- Staff attitude - Inherited practices/ traditions - Lack of clear roles and responsibilities - Poor data use culture

Source: USAID Tupime Kaunti, 2019

Conclusion

Reporting timeliness has improved, and accuracy remains high. Efforts are needed to improve the completeness of reporting in form MOH 705, which contains the number of confirmed malaria cases. Nationally, the completeness is very low (40 percent in 2018), but is much higher in the lake endemic counties supported by PMI for strengthening M&E (84 percent in 2018).

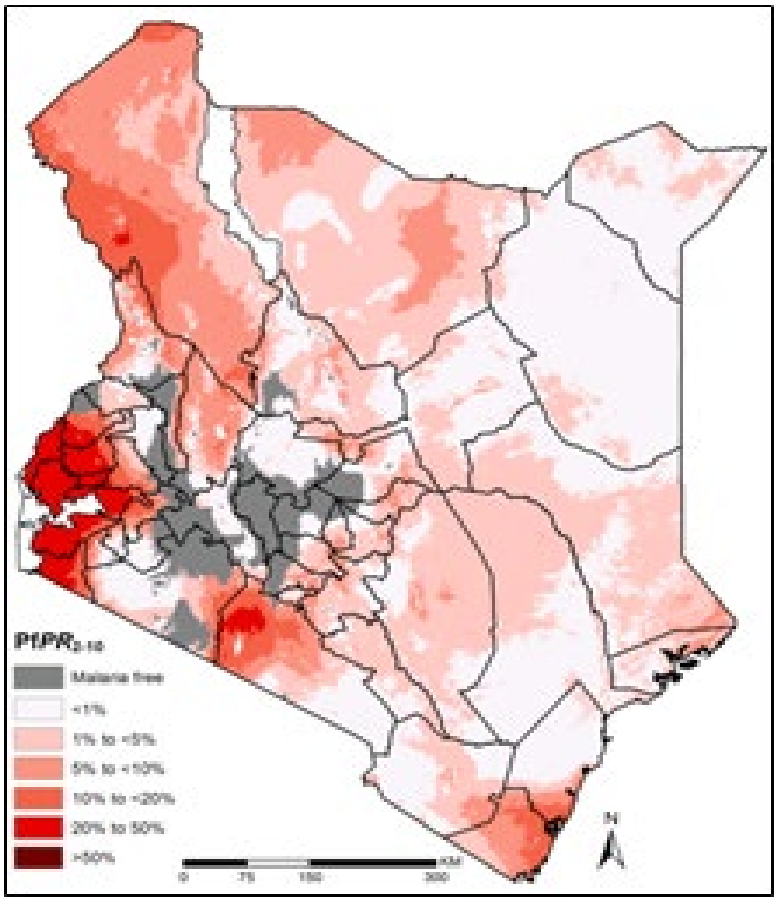
The synthesized DQA reports highlighted the common data quality gaps that were consistently reported during the three subsequent DQAs conducted in the year 2016–2018. A notable behavioral aspect was poor/non-implementation of data quality improvement plans developed after any DQA thus a plausible reason behind the lack of data quality improvement in these counties. PMI/Kenya will consider supporting the newly established 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.

Key Question 4

What are the in-country considerations that impact your funding allocation in this category? If there is a specific budget line item in Table 2 that is not covered by the above questions, please address here.

Supporting Data

Figure A46. Map of Population-Adjusted *P. falciparum* Prevalence in Children 2–10 Years of Age in 2015



Source: Ministry of Health. (2016). The Epidemiology and Control Profile of Malaria in Kenya: Reviewing the Evidence to Guide the Future Vector Control. National Malaria Control Program, Ministry of Health.

Conclusion

As outlined in the KMS 2019–2023, Kenya aims to build systems for elimination in four to five low risk counties by 2023 (grey areas in the figure above) and further strengthen routine reporting on all malaria indicators to enhance malaria programming. PMI will continue supporting the NMP and Division of Health Information Systems to strengthen the quality of data reported and consider supporting enhanced surveillance in elimination counties in order to be able to detect and respond to malaria cases. This will require that resources are targeted towards building capacity among Health Records and Information Officers for monitoring data quality and for conducting structured data review meetings.

3.C. SOCIAL AND BEHAVIORAL CHANGE (SBC)

NMP Objective
The NMP 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. The 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; and 4. Strengthen Program communication for increased utilization of all malaria interventions.
NMP Approach
PMI supports periodic household surveys (MIS, DHS, PMLLIN) to obtain key malaria indicators. MIS surveys were conducted in 2010 and 2015 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. 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. The communication strategy emphasizes implementation at both the national and county level and is intended to promote behavioral change across the political, service delivery, community, and individual levels. The overall goal of the strategy 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; and

4. Harmonize malaria ACSM activities implemented by the different partners.

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 NMP serves as the secretariat for the SBC CoE, which is chaired by the Head of the Health Promotion Unit. Membership of the SBC CoE includes representatives from relevant technical areas, as well as all major organizations involved in malaria SBC in Kenya, including PMI, Malaria No More, AMREF, UNICEF, Living Goods, World Vision, and Sumitomo Chemicals.

National Malaria Forums

PMI has supported three national malaria forums bringing together researchers, policy makers and implementers to share evidence, inform malaria policies and define the malaria agenda.

PMI Objective in Support of the NMP

PMI supports the NMP in its effort to increase the utilization of appropriate malaria interventions in Kenya to at least 80 percent by 2023. PMI provides support for these efforts at the national, county, and community levels. Nationally, PMI provides technical assistance and support for capacity strengthening activities and the development of materials and relevant guidelines, such as the Kenya Malaria Communications Strategy 2016–2021. At the county level, PMI support is focused on assisting PMI focus counties with the development of county health communication strategies and work plans and providing technical assistance for material development and coordination efforts. The bulk of PMI's SBC activities, however, are directed at the community level in the eight PMI focus counties. Through partnerships with local organizations and collaboration with CHVs, PMI supports the NMP's efforts to expand community level, interpersonal communication activities aimed at increasing correct and consistent ITN use, uptake of IPTp, and prompt care-seeking.

PMI-Supported Recent Progress *(Past 12–18 Months)*

- Facilitated national level coordination through the SBC CoE and provided technical assistance for the development of the SBC section of the KMS 2019–2023.
- Supported County Health Promotion Advisory Committees in the development and implementation of county malaria SBC plans in the eight PMI focus counties.
- Implemented the mixed-media *Malaria Shujaa (Malaria Champion)* campaign, which leverages community norms and social support to promote the adoption and maintenance of desired malaria prevention and treatment behaviors, such as net use, IPTp uptake, and early care-seeking.

- Utilized local radio and TV and SMS to extend the reach of the *Malaria Shujaa* campaign
- Reached an estimated 423,400 individuals in Bungoma, Migori, Kwale, and Kilifi counties through small group sessions and household visits aimed at promoting appropriate malaria prevention and treatment behaviors.
- Conducted a baseline population effectiveness test amongst 1,505 caregivers and pregnant women in the eight PMI priority counties to determine the impact of PMI's SBC investments.
- Utilized a mobile application to collect process and output data on malaria SBC activities in Kwale County.

PMI-Supported Planned Activities *(Next 12–18 Months Supported by Currently Available Funds)*

- Facilitate national level coordination through the SBC CoE and provide central-level technical assistance.
- Support County Health Promotion Advisory Committees in the continued implementation of county malaria SBC plans in the eight PMI focus counties.
- Strengthen community-based SBC activities through continued implementation of interpersonal communication activities, including community challenges and household visits, in the eight PMI focus counties.
- Implement the *Malaria Shujaa* campaign using local mass media, digital platforms, and print media to maintain progress made on key malaria-related behaviors.
- Scale-up the use of a mobile application at community level to collect process and output data on malaria SBC activities in Kwale and Vihiga Counties.
- Develop standardized malaria messages and job aids to assist provider and CHVs with counseling patients on desired malaria-related behaviors.

PMI Goal
Through the use of social and behavior change 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 morbidity and mortality.

Are you proposing to increase, decrease, or maintain funding allocation levels for this activity? Why? What data did you use to arrive at that conclusion?
With FY2020 funds, PMI/Kenya proposes to slightly decrease funding for SBC activities. This is not, however, reflective of a decreased need or decreased support for malaria SBC activities. Rather, it reflects that the current SBC project will come to an end in September 2021 and that lower costs are anticipated as the project closes out. With this funding, PMI/Kenya proposes to continue many of its current SBC activities. Support will remain focused across the three primary technical areas: vector control, case management, and MIP. However, increased emphasis will be placed on community-based efforts around case management and MIP, while high-levels of ITN use will be maintained through mass media channels. Funding has also been allocated for development of materials, donor coordination, and national and county level capacity strengthening activities, such as support to the SBC CoE and County Health Promotion Advisory Committees. Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

Key Question 1

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

Supporting Data

Figure A47. Prioritized Behaviors with FY2020 Funds

Behavior	Primary Target Population	Geographic Focus	Justification
Prompt Care-Seeking for Children Under Five Years of Age	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 a need for increased SBC activities promoting prompt care seeking.
Early 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 MPR concluded that this gap was largely due to late starting of ANC, with women who received IPTp1 delivering by the time they were due for IPTp2.
Adherence to Case Management Guidelines	Health Facility Based Providers	Lake and Coastal Endemic Counties	Nationally, health workers adherence to diagnostic and treatment guidelines at facilities where malaria diagnostics and treatment were available was estimated to be around 67 percent.

Conclusion

Historically, considerable emphasis has been placed on encouraging consistent and appropriate ITN use in Kenya. However, the data, as shown under the ITN Section (1.B.) indicates that behavioral issues may not be limiting net use. Rather, the more significant challenge in Kenya is ensuring universal access. Relatedly, under the Case Management (2.A.) and MIP (2.B.) Sections, respectively, there appears to be an urgent need to promote both early care-seeking and early ANC attendance. Drawing on this data, PMI/Kenya proposes prioritizing early care-seeking and early ANC attendance with FY2020 funds. Additional attention will also be given to adherence to case management guidelines. As noted in the Case Management Section (2.A.), adherence to case management guidelines is currently suboptimal. While some challenges are regulatory in nature, available data suggests behavioral factors also likely play a role. Unfortunately, at present, these factors are not widely understood. PMI/Kenya will support efforts to better understand the role that behavioral factors play in the testing and treatment practices in Kenya and to address those factors through continued training, mentorship, and supportive supervision.

Key Question 2

Given the priority behaviors identified, what data are available to better understand the factors influencing low uptake? What are the behavioral determinants of the prioritized behaviors? Are there gaps in understanding the barriers to uptake?

Supporting Data

Figure A48. Summary of Determinants and Gaps for FY2020 Prioritized Behaviors

Behavior	Key Facilitators	Key Barriers	Knowledge Gaps
Prompt Care-Seeking for Children Under Five Years of Age	▪ Belief that Seeking Treatment Immediately is Important	▪ Preference for Home Treatment or Treatment at Pharmaceutical Retailer ▪ Limited Knowledge About Recommended Treatment for Malaria ▪ Perception that Treatment is Not Affordable	More information on facilitators to prompt care-seeking would help better tailor SBC interventions.

Behavior	Key Facilitators	Key Barriers	Knowledge Gaps
Early ANC Attendance	▪ Perceived Risk of Malaria on Pregnant Women ▪ Decease in Perceived Barriers Due to Community Health Structures	▪ Lack of Information from Providers on the Importance of IPTp ▪ Limited Risk Perception in the Absence of Illness ▪ Preference for Seeking Initial Care from Traditional Birth Attendants	No major gaps identified at this time.
Adherence to Case Management Guidelines	▪ Strong Knowledge of First-Line Treatment for Malaria Among Registered Facilities	▪ Unknown	Behavioral barriers to adherence to case management guidelines have not been well studied.

Conclusion

The data available to better understand the factors influencing low uptake are summarized in the table above. More data is needed on determinants of provider behavior around testing and treatment for malaria, as well as on facilitators to prompt care-seeking. In order to improve and design appropriate interventions, PMI/Kenya proposes examining the ideational factors associated with provider adherence to case management guidelines using existing tools and data, including QoC surveys, supportive supervision checklists, and related monitoring tools.

Key Question 3

What activities are needed to bolster the country's capacity for SBC? Are these activities needed at the national or sub-national level?

Supporting Data

The 2018 MPR assessed achievements and challenges related to increasing utilization of appropriate malaria interventions to at least 80 percent by 2023.[15] Strengths identified included:

- Dissemination and use of the Kenya Malaria Communications Strategy 2016–2021, which provides a framework for implementation of advocacy, communication, and social mobilization activities in Kenya;

[15] Ministry of Health. Kenya Malaria Program Review. 2018. Republic of 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 in the promotion of desired malaria behaviors through mass media; and
- 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 NMP's budget allocated to SBC activities; and
- Unsuccessful advocacy efforts as a result of limited collaboration and information sharing with the non-health sector.

Conclusion

There is a need for continued SBC capacity building at both the national and sub-national levels. To bolster Kenya's capacity for the design, implementation, and evaluation of SBC activities, PMI/Kenya will support:

- Coordination at the national level through the SBC CoE;
- County-specific SBC planning aimed at increasing sub-national coordination and ensuring the impact of SBC investments;
- Alignment of SBC implementation efforts with country monitoring and evaluation plans;
- Citizen advocacy at the community and facility level through partnerships with local organizations;
- Strengthening of individual capacity of key players at both the national and sub-national level in order to ensure effective SBC activity implementation; and
- Advocacy with national and county level leadership in order to increase support for malaria control and prevention efforts.

Key Question 4

What are the in-country considerations that impact your funding allocation in this category? If there is a specific budget line item in Table 2 that is not covered by the above questions, please address here.

Supporting Data

A key focus of SBC is ensuring that activities are community owned. This focus aligns well with USAID's Journey to Self-Reliance and USAID/Kenya's Annual Program Statement, which emphasize fostering self-reliance by supporting local capacities and solutions. Through its community-based SBC efforts, PMI/Kenya is committed to strengthening local capacity.

Conclusion

Local partners will be used for the facilitation of interpersonal communication activities whenever possible. Planned SBC efforts also emphasize building on the country's existing community health strategy and structures, such as CHVs and existing community-based organizations, to promote desired malaria-related behaviors and strengthen advocacy and demand for quality malaria services among citizens.

3.D. PROGRAM EVALUATION AND OPERATIONAL RESEARCH

NMP Objective
The NMP 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.
NMP Approach
The NMP has an existing CoE that is comprised of malaria focal points and representatives from research institutions and academia (e.g., KEMRI, Wellcome Trust, University of Nairobi, Moi University), other MOH division focal points, and malaria stakeholders including PMI. The NMP 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 the NMP
PMI contributes to the country's operational research (OR) initiatives by participating in 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 *(Past 12–18 Months)*
PMI has not supported any OR activities in the last 12-18 months.
PMI-Supported Planned Activities *(Next 12–18 Months, Supported by Currently Available Funds)*
PMI has no OR activities planned with FY2019 funding.

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

Are you proposing to increase, decrease, or maintain funding allocation levels for this activity? Why? What data did you use to arrive at that conclusion?
PMI/Kenya proposes to increase funding for OR with FY2020 funding. In alignment with the NMP's stated priorities for OR, PMI proposes to set aside funds to carry out a study to analyze the effectiveness of behavior change interventions in different malaria transmission zones in order to understand the most appropriate behavior change approach for areas transitioning from high and moderate to low, very low and zero malaria transmission. As areas transition from high and moderate to low, very low, and zero malaria transmission, behavior change interventions need to be adapted to ensure the continued and appropriate use of proven interventions. This may involve adapting behavior change interventions to reflect changes in acquired immunity and severity, epidemiological and demographic patterns, and malaria control and prevention approaches. For example, in areas transitioning to very low malaria transmission, there may be a need to place increased emphasis on perceived severity as malaria cases and perceived risk decline.[16] Such shifts are likely to necessitate an emphasis on different behavioral determinants and the use of different theoretical models, which, in turn, may dictate the use of certain channels. In order to understand the dynamic between behavioral determinants, behavioral theory, and channel selection in areas transitioning from high and moderate to low, very low, and zero

[16] Health Communication Capacity Collaborative. (2017). Social and Behavior Change Considerations for Areas Transitioning from High and Moderate to Low, Very Low and Zero Malaria Transmission. U.S. President's Malaria Initiative.

malaria transmission, PMI/Kenya proposes a cross-sectional study utilizing both quantitative and qualitative research methods. The study will assess the relative effectiveness of behavior change interventions developed using different theoretical frameworks in order to understand the most appropriate behavior change approach for areas transitioning from high and moderate to low, very low and zero malaria transmission. This question, which was proposed by the NMP, will also provide insight into the appropriate channels for use in different epidemiological strata given that such decisions are based on the theoretical model and specific behavioral determinants that one seeks to influence. The proposed study will be carried out in the four malaria transmission zones of the country, and it is anticipated that the results will assist the NMP with their efforts to develop the evidence base for malaria elimination in counties with low malaria transmission.

Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

Key Question 1

Have technical challenges or operational bottlenecks that require operations research or program evaluation been identified in consultation with the NMP? How have they been prioritized?

Supporting Data

The NMP identified research questions, which were sent to PMI/Kenya for consideration. PMI/Kenya reviewed the proposed topics using the instructions provided for prioritization of PMI-supported research questions and only one out of the seven questions submitted by the program questions met the criteria. PMI/Kenya will work with the NMP to develop a concept note that will be submitted to PMI/Headquarters for review.

Figure A49. PE/OR Currently Being Conducted in Country by USG, Global Fund, Multilaterals or Other Major Donors

Source of Funding	Implementing Institution	Research Question/Topic	Current Status/Timeline
BMGF, GAVI, Global Fund, UNITAID, and GlaxoSmithKline	KEMRI, CDC, USAMRU-K, Wellcome Trust, PATH	Malaria vaccine implementation project evaluation	Baseline evaluation ongoing
PMI	VectorLink	Impact of IRS on malaria vectors and malaria incidence in Western Kenya	Ongoing

Source of Funding	Implementing Institution	Research Question/Topic	Current Status/Timeline
Wellcome Trust	KEMRI, Wellcome Trust	Long-term observational study of severe malaria surveillance in Kilifi	Ongoing
Sanaria	KEMRI, CDC	Safety and efficacy of Plasmodium falciparum sporozoite killed sporozoite vaccine	Enrolment complete, analysis ongoing
NIH	University of California - Davis, Case Western Reserve University, KEMRI, Maseno University	Studies of malaria epidemiology, entomology, and interventions in Western Kenya	Ongoing
BMGF, Malaria Eradication Scientific Alliance, CDC	KEMRI, Kisumu County, CDC, London School of Hygiene and Tropical Medicine, Liverpool School of Tropical Medicine	Impact of human high dose ivermectin on mosquito survival and malaria transmission	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
Research Council Norway, CDC	KEMRI, Liverpool School of Tropical Medicine, CDC, Makerere University - Kampala	Malaria chemoprevention with monthly DP after discharge for severe anemia	Enrolment complete, analysis 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

Source of Funding	Implementing Institution	Research Question/Topic	Current Status/Timeline
PMI	KEMRI, CDC, Liverpool School of Tropical Medicine	Intermittent screening and treatment or intermittent preventive treatment with DHA-PQP versus intermittent preventive therapy with SP for the control of MIP	Completed, analysis ongoing
European & Developing Countries Clinical Trials Partnership, PATH, Foundation for Innovative New Diagnostics (FIND)	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

Conclusion

As part of the NMP OR CoE, PMI continues to evaluate proposed program evaluation and OR topics and determines where we can complement ongoing studies to inform malaria programming and accelerate progress towards achievement of national targets

Key Question 2

In the technical areas covered above, are there specific issues in any of the intervention areas that merit further exploration, in anticipation of establishing intervention strategies that are or could become available in the future that could be applied?

Supporting Data

N/A

Conclusion

N/A

Key Question 3

What are the in-country considerations that impact your funding allocation in this category? If there is a specific budget line item in Table 2 that is not covered by the above questions, please address here.

Supporting Data

The NMP staff lack sufficient skills for development of research questions and require capacity building in research methodologies to enable them to undertake and lead research and program evaluations. There is also an opportunity to collaborate with local universities to develop partnerships for students interested in undertaking research based on some of the identified OR questions. Such an effort would also help build the pool of local, skilled research professionals.

Conclusion

Building the capacity of the NMP for identification and development of research concepts and participation in carrying out the research studies will be critical in enhancing ownership of research findings and translation of these findings into policy and program priorities.

3.E. OTHER HEALTH SYSTEMS STRENGTHENING

NMP Objective
Objective Six of the Kenya Malaria Strategy 2019–23 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 goal and objectives.
NMP Approach
To achieve Objective Six of the KMS 2019–2023, the following strategies will be implemented; ▪ Align malaria governance and legislation to constitutional mandates and core functions; ▪ Strengthen partnerships and coordination for malaria Program management; ▪ Strengthen capacity for malaria programming at national and county levels; ▪ Strengthen resource mobilization initiatives for malaria; ▪ Enhance malaria commodity security at all levels; and ▪ Strengthen the use of supply chain data for decision making. The NMP provides leadership and coordination to ensure that 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 the CoE, whose roles include technical, operational, and strategic oversight of the KMS 2019–2023. The NMP has appointed focal persons responsible for each objective area who work collaboratively with other stakeholders as part of the CoE. Through these structures, the NMP seeks to:

- Build capacity of staff through technical assistance offered in partnership with partners, including through attendance at target malaria conferences.
- Improve efficiency in the use of their existing resources, as well as to advocate for increased sustainable investment for 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.
- Coordinates with other ministries and agencies, including regulatory bodies, KEMSA, the private sector, universities, civil society organizations, and relevant ministries.

PMI Objective in Support of the NMP Infrastructure

PMI provides support to the NMP for overall program management, coordination with multi-sectoral stakeholders, strengthening of linkages between national and county governments, and to ensure that the NMP staff are able to work and have the capacity needed to effectively fulfill their mandate for successful implementation of the KMS 2019–2023. In the past, PMI supported the NMP staff attending and presenting at conferences in order to gain new knowledge and strengthen their capacity for leadership, governance, and M&E. PMI also provided infrastructural support through the procurement of conference equipment, internet services and the establishment of a website for program visibility, communication, and interaction with the public.

PMI-Supported Recent Progress *(Past 12–18 Months)*

- PMI supported the NMP to carry out a program financial review which identified challenges, including low absorption of funding allocated for malaria control interventions, weak linkages between the programmatic targets, outcomes, and funding, and a lack of a clear mechanism to track financial data at all levels of the health system.
- PMI supported the NMP to develop a fully costed strategy with a financial sustainability plan and prioritized interventions. The plan identified the resource availability and resource need for malaria programming and revealed a financing gap of Ksh 24.1 billion (40 percent) to implement the new KMS 2019–2023.
- PMI, in partnership with Kenya School of Government and county governments, trained a total of 10 county malaria control coordinators (eight in the eight-lake endemic and two in the epidemic-prone counties). Coordinators were provided with skills on leadership, coordination, planning, supervision and reporting, and are now providing leadership for the development of annual work plans and integrated development plans, including technical working group meetings in their respective counties to ensure malaria programming remains a priority area of investment for their county governments.
- Support the NMP in the development and launch of the KMS 2019–2023.

PMI-Supported Planned Activities *(Next 12–18 months, Supported by Currently Available Funds)*

▪ PMI will continue to support the NMP in the dissemination of the KMS 2019–2023.
▪ PMI in partnership with Kenya School of Government and the National Treasury will train the NMP staff on the budget cycle, expenditure reviews, budget tracking, linking planning, and budgeting and unbundling of the annual work plan to enable the NMP staff to fully participate in budget discussions and influence increase of domestic resources for malaria interventions.
▪ PMI, with the NMP and National Treasury, will identify bottlenecks that cause low absorption of government and donor funds and design interventions to address these challenges
▪ PMI, with the NMP, will generate evidence for malaria advocacy through:
  ◦ Review of the unit costs of major cost drivers of malaria control interventions; and
  ◦ A mini health household and utilization survey in one lake endemic county to understand the effect malaria has on citizens, including out-of-pocket and catastrophic health expenditures.
▪ PMI will strengthen the NMP's strategic leadership function through:
  ◦ Support to the NMP for review of the national malaria policy to ensure alignment with the KMS 2019–2023;
  ◦ Review and customization of the WHO guidelines for use by county malaria control coordinators to support and strengthen linkages between the national and county levels;
  ◦ Facilitation of an annual malaria program meeting between the NMP and county leadership to increase malaria program visibility and strengthen coordination; and
  ◦ Technical and logistical support during CoEs and attendance of select county representatives at the quarterly Malaria Health Sector Working Committee Meetings.
▪ PMI will continue to support the NMP and county representatives to participate in strategic county, national, and international conferences for information sharing, learning, and the NMP visibility.
▪ PMI, with the NMP and Kenya School of Government, will train selected the NMP and county staff on strategic leadership and management for strengthened governance practices.
▪ PMI will strengthen the capacities of focus counties for leadership and coordination of malaria control activities to:

- Develop sound county integrated development and annual work plans that include and address malaria priorities;
- Conduct structured malaria technical working groups with clear meeting outputs that address malaria program gaps and opportunities;
- Facilitate structured information-sharing platforms/mechanisms at both county and sub-county level to enhance coordinated communication between the management levels, including implementing partners;
- Strengthen the county CHMT leadership in advocating for CHV bills that will commit to placing CHVs on the county payroll and put in place a CHV scheme of service;
- Build county malaria control coordination capacity for advocacy with members of the county assembly, county health committees, and county health leadership for legislative actions that enhance and promote access to malaria service delivery with already existing platforms, such as the community platform; and
- Strengthen county capacity for oversight of community based organizations implementing malaria activities.

PMI 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 needed in order to operationalize the KMS 2019–2023?

Supporting Data

The KMS 2019-2023 was launched in April 2019, but has yet to be disseminated comprehensively at county level. Health is a devolved function in Kenya and effective dissemination of the strategy is critical for buy in by the counties and successful implementation. As a result of task shifting and new staff at the national level, PMI anticipates additional capacity development and infrastructure activities will be required at the national level in the short term, and at the county level in the short- and longer-term to ensure adequate program management and technical expertise for oversight and effective implementation.

Conclusion

PMI, in collaboration with other partners and the NMP, will continue to support the development of technical and managerial capacity of staff both at the national and county levels to ensure that the program meets the core functions in line with the KMS. To increase technical capacity in the lake endemic zone, an additional Field Epidemiology and Laboratory Training Program (FELTP) resident will be supported, to be based at a site in Western Kenya. In addition, PMI will support training of county and sub-county staff in epidemiology, data collection, management, and analysis through training in the frontline FELTP program in Kenya, with funding passing through an existing PMI implementing partner.

Key Question 2

What are the in-country considerations that impact your funding allocation in this category?

Supporting Data

- PMI will support the NMP in establishing structures that will be used in implementing malaria elimination activities in selected counties.
- PMI will support advocacy efforts by the NMP and MOH to the National Treasury for increased government resource allocation towards malaria control efforts in Kenya.
- PMI will support a National Professional Officer who will serve as a WHO focal point for malaria prevention and control activities and provide support to all relevant government departments and institutions.

Conclusion

The establishment of these structures (CoEs, data collation tools, and personnel and infrastructural capacity building) will ensure the NMP is able to address and track progress of its activities in these counties. This will go a long way in ensuring the program is able to plan and manage its elimination strategy as a means to self-reliance.