

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 final funding available to support the plan outlined here is pending final FY 2018 appropriation. If any further changes are made to this plan it will be reflected in a revised posting.



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PRESIDENT'S MALARIA INITIATIVE

KENYA

Malaria Operational Plan FY 2018

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ABBREVIATIONS and ACRONYMS

ACSM	Advocacy, communication, and social mobilization
ACT	Artemisinin-based combination therapy
AL	Artemether-lumefantrine
ANC	Antenatal care
CCM	Community case management (of malaria)
CDC	Centers for Disease Control and Prevention
CHA	Community health assistant
CHAI	Clinton Health Access Initiative
CHMT	County health management team
CHV	Community health volunteer
CMCC	County Malaria Control Coordinator
CWC	Child welfare clinic (when vaccinations are given and other monitoring done)
DfID	U.K. Department for International Development
DHA-PIP	Dihydroartemisinin-piperaquine
DHIS2	District Health Information System, version 2
DHS	Demographic and Health Survey
DivMEHRDI	Division of Monitoring and Evaluation, Health Research Development, and Health Informatics
eIDSR	Electronic Integrated Disease Surveillance and Response
FELTP	Field Epidemiology and Laboratory Training Program
FY	Fiscal year
GHI	Global Health Initiative
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
GoK	Government of Kenya
HMIS	Health management information system
iCCM	Integrated community case management (of childhood illness)
IEC	Information, education, communication
IM	Intramuscular
IPC	Interpersonal communication
IPTp	Intermittent preventive treatment for pregnant women
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito net
KEMSA	Kenya Medical Supply Agency
KEPH	Kenya Essential Package for Health
KMHFL	Kenya Master Health Facility List
KMS	Kenya Malaria Strategy 2009–2018
KNBS	Kenya National Bureau of Statistics
LMIS	Logistics management information system
MICC	Malaria Interagency Coordinating Committee
MIP	Malaria in pregnancy
MIS	Malaria indicator survey
MoH	Ministry of Health
MMV	Medicines for Malaria Venture
MOP	Malaria Operational Plan
MPR	Malaria Program Review

NMCP	National Malaria Control Program
NQCL	National Quality Control Laboratory
OTSS	Outreach training and supportive supervision
PMI	President's Malaria Initiative
PPB	Pharmacy and Poisons Board
QA/QC	Quality assurance / quality control
QI	Quality improvement
QoC	Quality of Care (survey)
RDT	Rapid diagnostic test
RMNH	Reproductive Maternal Newborn Health
SBCC	Social and behavior change communication
SCHMT	Sub-county health management team
SM&E	Surveillance, monitoring, and evaluation
SP	Sulfadoxine-pyrimethamine
TRAC	Tracking results continuously
TWG	Technical working group
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
USG	United States Government
WHO	World Health Organization

I. EXECUTIVE SUMMARY

When it was launched in 2005, the goal of the President's Malaria Initiative (PMI) was to reduce malaria-related mortality by 50% across 15 high-burden countries in sub-Saharan Africa through a rapid scale-up of four proven and highly effective malaria prevention and treatment measures: insecticide-treated mosquito nets (ITNs); indoor residual spraying (IRS); accurate diagnosis and prompt treatment with artemisinin-based combination therapies (ACTs); and intermittent preventive treatment of pregnant women (IPTp). With the passage of the Tom Lantos and Henry J. Hyde Global Leadership against HIV/AIDS, Tuberculosis, and Malaria Act in 2008, PMI developed a U.S. Government Malaria Strategy for 2009–2014. This strategy included a long-term vision for malaria control in which sustained high coverage with malaria prevention and treatment interventions would progressively lead to malaria-free zones in Africa, with the ultimate goal of worldwide malaria eradication by 2040-2050. Consistent with this strategy and the increase in annual appropriations supporting PMI, four new sub-Saharan African countries and one regional program in the Greater Mekong Sub region of Southeast Asia were added in 2011. The contributions of PMI, together with those of other partners, have led to dramatic improvements in the coverage of malaria control interventions in PMI-supported countries, and all 15 original countries have documented substantial declines in all-cause mortality rates among children less than five years of age.

In 2015, PMI launched the next six-year strategy, setting forth a bold and ambitious goal and objectives. The PMI Strategy for 2015-2020 takes into account the progress over the past decade and the new challenges that have arisen. Malaria prevention and control remains a major U.S. foreign assistance objective and PMI's Strategy fully aligns with the U.S. Government's vision of ending preventable child and maternal deaths and ending extreme poverty. It is also in line with the goals articulated in the Roll Back Malaria (RBM) Partnership's second generation global malaria action plan, *Action and Investment to defeat Malaria (AIM) 2016-2030: for a Malaria-Free World* and World Health Organization's (WHO's) updated *Global Technical Strategy: 2016-2030*. Under the PMI Strategy 2015-2020, the U.S. Government's goal is to work with PMI-supported countries and partners to further reduce malaria deaths and substantially decrease malaria morbidity, towards the long-term goal of elimination.

Kenya began implementation as a PMI focus country in fiscal year (FY) 2007.

This FY 2018 Malaria Operational Plan (MOP) presents a detailed implementation plan for Kenya, based on the strategies of PMI and the National Malaria Control Program (NMCP). It was developed in consultation with the NMCP and with the participation of national and international partners involved in malaria prevention and control in the country. The activities that PMI is proposing to support fit in well with the Kenya Malaria Strategy (KMS) and build on investments made by PMI and other partners to improve and expand malaria-related services, including the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund) malaria grants. This document briefly reviews the current status of malaria control policies and interventions in Kenya, describes progress to date, identifies challenges and unmet needs to achieving the targets of the NMCP and PMI, and provides a description of activities that are planned with FY 2018 funding.

The proposed FY 2018 PMI budget for Kenya is \$30 million. PMI will support the following intervention areas with these funds:

Entomologic monitoring and insecticide resistance management: IRS activities in Kenya are guided by an IRS business plan and an Insecticide Resistance Management plan. To support these vector control objectives, capacity is being developed at the county level for entomological surveillance and insecticide resistance monitoring. PMI has been supporting entomological surveillance and insecticide resistance monitoring in up to 16 sites throughout western Kenya since 2008.

With FY 2018 funding, PMI will support entomological surveillance, insecticide resistance monitoring, and assessment of the IRS spray campaign in 12 sites in counties with IRS programs, as well as in 2 additional counties in western Kenya.

Insecticide-treated nets (ITNs): Kenya seeks to achieve universal coverage with long-lasting ITNs, defined as one net per two people, in 23 endemic and epidemic-prone counties through distribution of free ITNs through antenatal care (ANC) and child welfare clinics (CWC) and mass ITN campaigns. The 2017 campaign is currently underway and PMI has provided support for microplanning and the distribution of 1.9 million ITNs in two counties in western Kenya. In an additional 13 malaria-prone counties, free ITNs are provided through ANC and CWC to protect the most vulnerable populations.

With FY 2018 funding, PMI will procure an estimated 1 million ITNs for free routine distribution through ANC and CWC in 2019 and an estimated 150,000 ITNs to support development of alternative continuous distribution channels in one endemic county to maintain universal coverage following the 2017 mass campaign. The Malaria Program Review (MPR) in late 2017 will review possible additional net distribution channels and guide the choice of alternative channel(s) to be included in the new KMS. PMI will support durability monitoring for nets distributed during the 2017 mass campaign. Additionally, PMI will continue to work with implementing partners and local non-governmental organizations on community-based social and behavior change communication (SBCC) programs to increase demand for ITNs and encourage correct and consistent use.

Indoor residual spraying (IRS): The NMCP's IRS Business Plan targets spraying in the lake-endemic counties of western Kenya, reaching 7 counties with an estimated population of 8.7 million. PMI has supported IRS in Kenya since 2008. With the emergence of high-level pyrethroid resistance throughout much of western Kenya, no spraying took place from 2013–2016 while national policy was updated and until a non-pyrethroid insecticide could be identified and registered. Despite access to a subsidized price through the NgenIRS program, the higher costs of non-pyrethroid insecticides have reduced the scope of IRS. In 2017 PMI supported IRS in Migori County using a long-acting organophosphate and covered 906,388 people (212,029 structures).

With FY 2018 funding, PMI, in collaboration with the NMCP, will support IRS in 2 counties with an estimated population coverage is 2.2 million people (491,000 structures). PMI will also support environmental monitoring associated with the IRS activities.

Malaria in pregnancy (MIP): The national package of ANC services includes both malaria prevention and treatment interventions based on epidemiologic-risk zones. Free ITNs and malaria prevention SBCC are provided for all pregnant women in 36 counties; IPTp with sulfadoxine-pyrimethamine (SP) is policy in the 14 counties with high malaria endemicity. All women attending ANC clinics nationwide are screened for anemia during the first and fourth visits as part of profiling for pregnant women, and all pregnant women with signs and symptoms consistent with malaria should receive a diagnostic test and prompt treatment if positive. Since 2011, PMI has provided support for MIP interventions at the national level including policy reviews, review, development and dissemination of messages, procurement and

distribution of ITNs through ANC, and strengthening of case management. In five malaria-endemic counties, PMI has provided support for the full package of MIP interventions, including ITNs, SBCC to promote ITN use, and IPTp.

With FY 2018 funding, PMI will support scale-up of intensive MIP interventions in 4 counties targeting about 400 health facilities with ANC services and an estimated 4,000 community health volunteers (CHVs). These interventions should reach an estimated 40,000 pregnant women, encouraging early ANC attendance and receipt of the full package of prevention and case management services.

Case management: The fifth edition of the *National Guidelines for Diagnosis, Treatment and Prevention of Malaria in Kenya*, 2016 recommends diagnosis with a parasitological test and first-line treatment with artemether-lumefantrine (AL) for uncomplicated malaria and parenteral artesunate for severe malaria. PMI has invested in malaria diagnostics, effective treatment, and supply chain management strengthening. Since 2008, PMI has procured and distributed over 160 microscopes, 24 million malaria rapid diagnostic tests (RDTs), and supported strengthening of diagnostics by training over 4,800 healthcare workers. PMI has also procured 59 million AL treatments and has trained over 5,000 healthcare workers on national case management guidelines.

With FY 2018 funding, PMI will support integrated strengthening of case management at the health-facility, sub-county, and county levels. PMI will procure and distribute approximately 5.6 million RDTs to help meet the projected national RDT gap based on testing of all suspected malaria. Quality assurance of diagnosis by light microscopy and RDTs will also be supported through trainings and reinforcing quality assurance systems. PMI will also procure and distribute approximately 5.8 million AL treatments to help meet the projected national AL gap and 500,000 vials of injectable artesunate to treat severe malaria and complement the funding for this medication from other partners and the Government of Kenya.

Health systems strengthening and capacity building: Since 2008, PMI has invested in efforts to build capacity and integrate malaria control and prevention with other programs across the health sector. PMI strengthens the overall health system by investing in human capacity through the Field Epidemiology and Laboratory Training Program (FELTP) to increase epidemiology capacity in the Ministry of Health; building capacity for health information systems, surveillance, and monitoring and evaluation (SM&E) across the health sector; strengthening commodity management systems; expanding access to and ensuring a reliable supply of essential medicines; and improving service delivery in the different intervention areas. PMI is also improving governance in the pharmaceutical sector and monitoring of drug quality by building and expanding the capacity of the Pharmacy and Poisons Board (PPB) for routine post market surveillance and strengthening the ability of the National Quality Control Laboratory (NQCL) to conduct confirmatory testing.

With FY 2018 funding, PMI will continue to support capacity building through short- and long-term training and mentoring, health systems strengthening for pharmaceutical regulation and monitoring, supply chain management, and health information utilization at the national level. PMI will support one FELTP resident for the two-year program. PMI will provide support to the NMCP and County Health Management Teams (CHMT) and support quality improvement activities with County and sub-County Health Management Teams (SCHMT). PMI will continue to direct its focus and resources to the county level, specifically in the eight lake endemic counties.

Social and behavior change communication (SBCC): PMI continues to promote correct and consistent ITN use, prompt diagnosis and treatment for fever, and demand creation for community and facility-based case management and MIP services (IPTp and treatment) by CHVs since 2008 through different approaches, i.e., community mobilization, interpersonal communication, and mass media. Since 2013, PMI has been supporting intensive community-based interpersonal communication (IPC) at the household level via local community organizations and CHVs to reach the highest-risk populations in high-burden malaria counties with historically low intervention uptake.

With FY 2018 funding, PMI will continue to support cross-cutting SBCC investments at community, sub-county, county, and national levels, with particular emphasis on working with community-based local organizations to strengthen and target interpersonal communication (IPC) activities at the household and village levels to at-risk and hard-to-reach populations.

Surveillance, monitoring, and evaluation (SM&E): PMI provides support to the NMCP to ensure that critical gaps in the *Kenya Malaria Strategy Monitoring and Evaluation Plan 2009–2018* are funded. PMI has supported SM&E capacity needs assessments at the national and county levels, development and implementation of a malaria surveillance curriculum to improve routine malaria surveillance data, development and production of quarterly malaria surveillance bulletins, national annual malaria reports, semiannual Quality of Care (QoC) surveys, national surveys (MIS and DHS), and data quality audits in priority counties to standardize malaria data collection and reporting.

With FY 2018 funding, PMI will concentrate support at the national level on specific gaps identified in SM&E capacity and in M&E Plan activities, support data management and updating DHIS2 malaria forms, expand support for capacity building at the county and sub-county levels based on identified needs, and support outpatient and inpatient QoC surveys.

Operational research (OR): PMI supports the NMCP's strategic OR activities that are in line with PMI's OR priorities list. With PMI core funding and PMI/Kenya MOP funding, PMI has supported a wide range of OR activities across the focus areas including vector control, case management, and MIP in Kenya. PMI is supporting ongoing OR studies but no new OR studies are planned with FY 2018 funding.

II. STRATEGY

1. Introduction

When it was launched in 2005, the goal of PMI was to reduce malaria-related mortality by 50% across 15 high-burden countries in sub-Saharan Africa through a rapid scale-up of four proven and highly effective malaria prevention and treatment measures: insecticide-treated mosquito nets (ITNs); indoor residual spraying (IRS); accurate diagnosis and prompt treatment with artemisinin-based combination therapies (ACTs); and intermittent preventive treatment of pregnant women (IPTp). With the passage of the Tom Lantos and Henry J. Hyde Global Leadership against HIV/AIDS, Tuberculosis, and Malaria Act in 2008, PMI developed a U.S. Government Malaria Strategy for 2009–2014. This strategy included a long-term vision for malaria control in which sustained high coverage with malaria prevention and treatment interventions would progressively lead to malaria-free zones in Africa, with the ultimate goal of worldwide malaria eradication by 2040-2050. Consistent with this strategy and the increase in annual appropriations supporting PMI, four new sub-Saharan African countries and one regional program in the Greater Mekong Sub region of Southeast Asia were added in 2011. The contributions of PMI, together with those of other partners, have led to dramatic improvements in the coverage of malaria control interventions in PMI-supported countries, and all 15 original countries have documented substantial declines in all-cause mortality rates among children less than five years of age.

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Figure 1. Map of Kenya showing 47 counties.



2. Malaria situation in Kenya

Kenya's 2018 population is projected to be 47.9 million according to the Kenya National Bureau of Statistics.¹ Of the total population, children under age 5 account for 16% and children under age 15 account for 42%.^{1,2} Geographically, the country falls into two main regions: lowland areas, both coastal and around the Lake Victoria basin, and highland areas along the Great Rift Valley. Kenya has approximately 42 ethnic groups and a predominantly agricultural economy with a strong industrial base. Kenya is ranked 146 out of 188 countries on the 2015 United Nation's Human Development Index, which measures life expectancy, adult literacy, and per capita income.³ Life expectancy in Kenya has seen an overall downward trend since the late 1980s but increased to an estimated 62 years in 2015.⁴ The estimated adult prevalence of HIV/AIDS is 5.9% in 2015.⁵ Total expenditure on health increased slightly from 4.3% of the gross domestic product in 2004 to 5.7% in 2014,⁶ with Government of Kenya's (GoK) per capita health expenditures also increasing from \$19 in 2000 to \$78 in 2014.⁶ The mortality rate in children under five years of age has declined by 55%, from 115 deaths per 1,000 live births in the 2003 Kenya Demographic and Health Survey (DHS) to 52 deaths per 1,000 observed in the 2014 DHS.^{7, 8}

Malaria still remains a major public health problem in Kenya and accounts for an estimated 16% of outpatient consultations based on data from the routine health information system.⁹ Malaria transmission and infection risk in Kenya is determined largely by altitude, rainfall patterns, and temperature. The variations in altitude and terrain create contrasts in the country's climate, which ranges from tropical along the coast to temperate in the interior to very dry in the north and northeast. The two rainy seasons are the long rains occur from March to May and the short rains from October to December. Temperatures are highest from February to March and lowest from July to August. Therefore, malaria prevalence varies considerably by season and across geographic regions.

All four species of *Plasmodium* that infect humans occur in Kenya. *Plasmodium falciparum*, which causes the most severe form of the disease, is the most common accounting for over 99% of all malaria infections in the country. The major malaria vectors in Kenya are from the *An. gambiae* complex (i.e., *An. gambiae* s.s., *An. arabiensis*, and *An. merus*), as well as *An. funestus*. The malaria vector distribution in the country is not uniform due to variation in climatic factors, particularly temperature and rainfall.

¹ 2009 Kenya Population and Housing Census, Volume XIV: Population Projections. Nairobi: Kenya National Bureau of Statistics, March 2012. <https://www.knbs.or.ke/download/266/analytical-reports/2381/analytical-report-on-population-projections-volume-xiv.pdf>. Accessed 6 June 2017

² UNICEF, State of the World's Children 2015, http://www.unicef.org/infobycountry/kenya_statistics.html. Accessed 14 April 2016.

³ United Nations Development Programme. Human Development Report 2016, http://hdr.undp.org/sites/default/files/2016_human_development_report.pdf. Accessed 6 June 2017.

⁴ World Bank-compiled data available at http://databank.worldbank.org/data/Views/Reports/ReportWidgetCustom.aspx?Report_Name=CountryProfile&Id=b450fd57&tbar=y&dd=y&inf=n&zm=n&country=KEN, accessed 30 June 2017.

⁵ UNAIDS, AIDSinfo. <http://aidsinfo.unaids.org/> Accessed 6 June 2017.

⁶ World Bank, <http://data.worldbank.org/indicator/SH.XPD.PCAP?locations=KE>. Accessed 6 June 2017. [Public health expenditure consists of recurrent and capital spending from government (central and local) budgets, external borrowings and grants (including donations from international agencies and nongovernmental organizations) and social (or compulsory) health insurance funds.]

⁷ Central Bureau of Statistics (CBS) [Kenya], Ministry of Health (MOH) [Kenya], and ORC Macro. 2004. *Kenya Demographic and Health Survey 2003*. Calverton, Maryland: CBS, MOH, and ORC Macro.

⁸ Kenya National Bureau of Statistics (KNBS), Ministry of Health (MOH) [Kenya], and ICF International. 2015. *Kenya Demographic and Health Survey Key Indicators 2014*. Nairobi, Kenya: KNBS, MOH, and ICF International.

⁹ Kenya National Bureau of Statistics. *Economic Survey, 2017*. Nairobi: KNBS, 2017. https://www.knbs.or.ke/wp-admin/admin-ajax.php?juwfpisadmin=false&action=wpfd&task=file.download&wpfd_category_id=202&wpfd_file_id=2740, accessed 6 June 2017

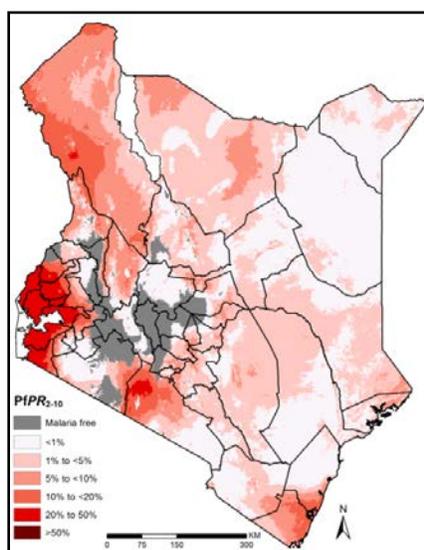
Approximately 70% of the Kenyan population is at risk for malaria. For the purposes of malaria control, the country has been stratified into four epidemiological zones to address the varied risks:

- **Endemic areas:** Areas of stable malaria with altitudes ranging from sea level in the coastal region to up to 1,300 meters around the Lake Victoria basin in western Kenya. Transmission is intense throughout the year with *P. falciparum* prevalence historically greater than 20% and high annual entomological inoculation rates. The five coastal counties now have malaria prevalence ranging from 5–20%. Based on population projections for 2018, 29% of the total population (14.1 million people based on projections for 2018) live in a malaria-endemic zone, with an estimated 9.6 million in the eight lake endemic counties. Two of the lake endemic counties have sub-counties classified as highland-epidemic prone.
- **Highland and epidemic-prone areas:** Malaria transmission in the western highlands is seasonal with considerable year-to-year variation. The entire population is vulnerable and case-fatality rates during an epidemic can be greater than in endemic regions. Approximately 20% of Kenyans (estimated to be 9.3 million in 2018) live in these 9 counties. In addition, four sub-counties, one each in two lake endemic counties (Bungoma and Kakamega) and two sub-counties in a seasonal risk county (Baringo) are classified as highland-epidemic prone. In highland epidemic counties, malaria prevalence ranges from 5–20%.
- **Seasonal malaria transmission areas:** This epidemiological zone includes the arid and semi-arid areas of northern and central parts of the country, which experience short periods of intense malaria transmission during the rainy seasons. Although geographically the largest zone, only 17% of the population (estimated to be 8.1 million in 2018) lives in these 15 counties. One seasonal risk county, Baringo, has two sub-counties classified as highland-epidemic prone. In seasonal risk counties, malaria prevalence is between 1–5%.
- **Low malaria risk areas:** This zone covers 10 counties in the central highlands of Kenya including Nairobi. Approximately 34% of the population (estimated to be 16.4 million in 2018) lives in this zone.

Kenya's 2015 population-adjusted *P. falciparum* prevalence map (Figure 2) depicts the malaria prevalence, with the highest *P. falciparum* prevalence in the dark-shaded areas of the lake-endemic counties. The 2015 Malaria Indicator Survey (MIS) indicated that malaria prevalence in the western lake endemic zone, the darkest area of the map, remained very high at 27%.¹⁰

¹⁰ National Malaria Control Programme (NMCP), Kenya National Bureau of Statistics (KNBS), and ICF International. Kenya Malaria Indicator Survey 2015. Nairobi, Kenya and Rockville, Maryland: NMCP, KNBS, and ICF International, 2016.

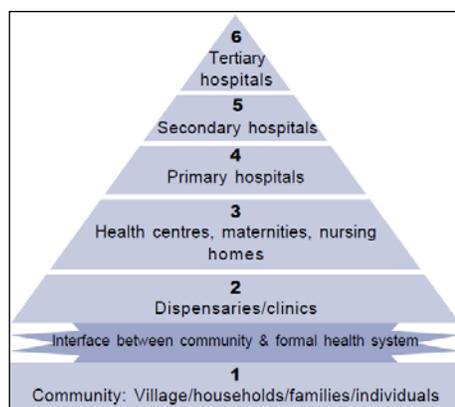
Figure 2. Map showing population-adjusted *P. falciparum* prevalence in children 2 – 10 years of age (PfPR₂₋₁₀) in 2015¹¹



3. Country health system delivery structure and Ministry of Health (MoH) organization

Service delivery is provided along a continuum of care starting from the community level and ending at the country’s national referral hospitals through a hierarchy of healthcare levels (Figure 3). In the Kenya Master Health Facility List (KMHL)¹² 4 facilities are at level 6, 17 at level 5, 448 at level 4, 1,297 at level 3, and 6,810 at level 2 (Figure 3). The various levels of government run 51% of the 8,585 healthcare facilities in the KMHL, with 36% run by the private, for-profit sector and 13% by the private, not-for-profit sector (e.g. faith-based organizations).

Figure 3. Service Delivery Pathway¹³ and Number of Facilities by Service Delivery Level



Level	Number of Facilities
6	4
5	17
4	448
3	1297
2	6810

¹¹ Ministry of Health. *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.

¹² Kenya Master Health Facility List. <http://kmhfl.health.go.ke/#/home>. Accessed 7 June 2017

¹³ Ministry of Health. *Reversing the Trends: The Second National Health Sector Strategic Plan of Kenya, NHSSP II, 2005-2010*. http://www.ihpmr.org/wp-content/uploads/2012/10/NHSSP-II_2005-2010.pdf. Accessed 7 June 2017

The national long-term development plan, *Kenya Vision 2030*, guides the country's strategies. The Ministry of Health (MoH) has in turn elaborated the Kenya Health Policy to guide attainment of the long-term health goals of the country outlined in *Vision 2030*. The Kenya Health Sector Strategic and Investment Plan (KHSSP) 2014–2018 provides a range of services and interventions that will be covered under this plan.¹² These services are comprehensively defined under the Kenya Essential Package for Health Services (KEPH),¹² and malaria has been identified as a disease program area contributing to the following service delivery objectives:

1. Accelerate the reduction of the burden of communicable conditions
2. Halt and reduce the burden of non-communicable diseases
3. Reduce the burden of violence and injuries
4. Improve access to, and the quality of, person-centered essential health services
5. Reduce exposure to health risk factors through inter-sectoral health promotion
6. Strengthen collaboration with private and other sectors that have an impact on health

In 2013, Kenya began the process of devolution as set forth in the 2010 Constitution of Kenya. A Transitional Authority guided implementation of devolution during the initial period after devolution. The Transitional Authority, working together with Sectoral Function Assignment and Competency Teams, established roles, responsibilities, and functions of the national and the 47 county governments (Figure 1). The Intergovernmental Relations Technical Committee, which replaced the Transitional Authority in March 2016, serves as secretariat to the Summit between President and Governors. The two levels of governance coordinate the health sector through consultative forums as spelled out in the Intergovernmental Relations Act, 2012.

The Health Sector Intergovernmental Forum serves as a link between national and county governments. All 47 County Executive Committee Members for Health and the Permanent and Cabinet Secretaries of the MoH make up the Health Sector Intergovernmental Forum that meets quarterly to address health issues affecting national and county governments. The Council of Governors serves as the main forum for county governments to meet, share information, and discuss issues related to national and county government. The National and County Government Coordinating Summit meets twice a year to improve inter-government consultation and cooperation, through evaluating performance of governments at the different levels, monitor implementation of development plans, and coordinate / harmonize county and national policies, and facilitate the transfer of functions, power, or competencies from one level to the other. On the following pages, table 1 outlines the roles of each level of government and Figure 4 shows the parallel organization at national and county levels.

The changes in government structure necessitated the re-alignment of PMI-supported interventions and implementation at the new administrative units starting in 2014. The changes have had an impact on operational costs and human resources due to shifting roles, responsibilities, and functions.

Table 1. Health Stewardship Roles of the County and the National Government

National Government	County Government
<ul style="list-style-type: none"> • Formulating policy, developing strategic plans, setting priorities • Budgeting, allocating resources • Regulating, setting standards, formulating guidelines • Monitoring performance and adherence to the planning cycle • Mobilizing resources • Coordinating with all (internal and external) partners • Provision of technical support to the county level • Capacity building of county level • National health referral services • Training health staff both, pre- and in-service, ensuring curricula and training institutions are in place 	<ul style="list-style-type: none"> • Provide leadership and stewardship for overall health management in the county • Provide strategic and operational planning, monitoring & evaluation of health services in the county • Provide a linkage with the National Ministry responsible for health • Collaborate with State and Non-State Stakeholders at the county and between counties in health services • Mobilize resources for county health services • Establish mechanisms for the referral function within and between the counties, and between the different levels of the health system in line with the sector referral strategy • Coordinating and collaborating through County Health Stakeholder Forums (CHMB, FBOs, NGOs, CSOs, development partners) • Supervise county health services • Delivering services in all health facilities (levels 1–3) • Developing and implementing Facility Health Plans (FHPs) • Supervising and controlling the implementation of FHP (M&E) • Coordinating and collaborating through County Health Stakeholder Forums (FBOs, NGOs, CSOs, development partners) • Training and developing capacity (on job training) • Maintaining quality control and adherence to guidelines

National Ministry of Health

At the national level, the MoH has a Cabinet Secretary, Principal Secretary, and Director of Medical Services. The NMCP falls under the Division of Strategic Public Health Programs, Department of Preventive and Promotive Health Services. Key functions at the national level include health policy, national referral health facilities and reference laboratories, disease surveillance, monitoring and evaluation, health commodity procurement for large donor-funded programs including malaria, capacity building, and technical assistance.

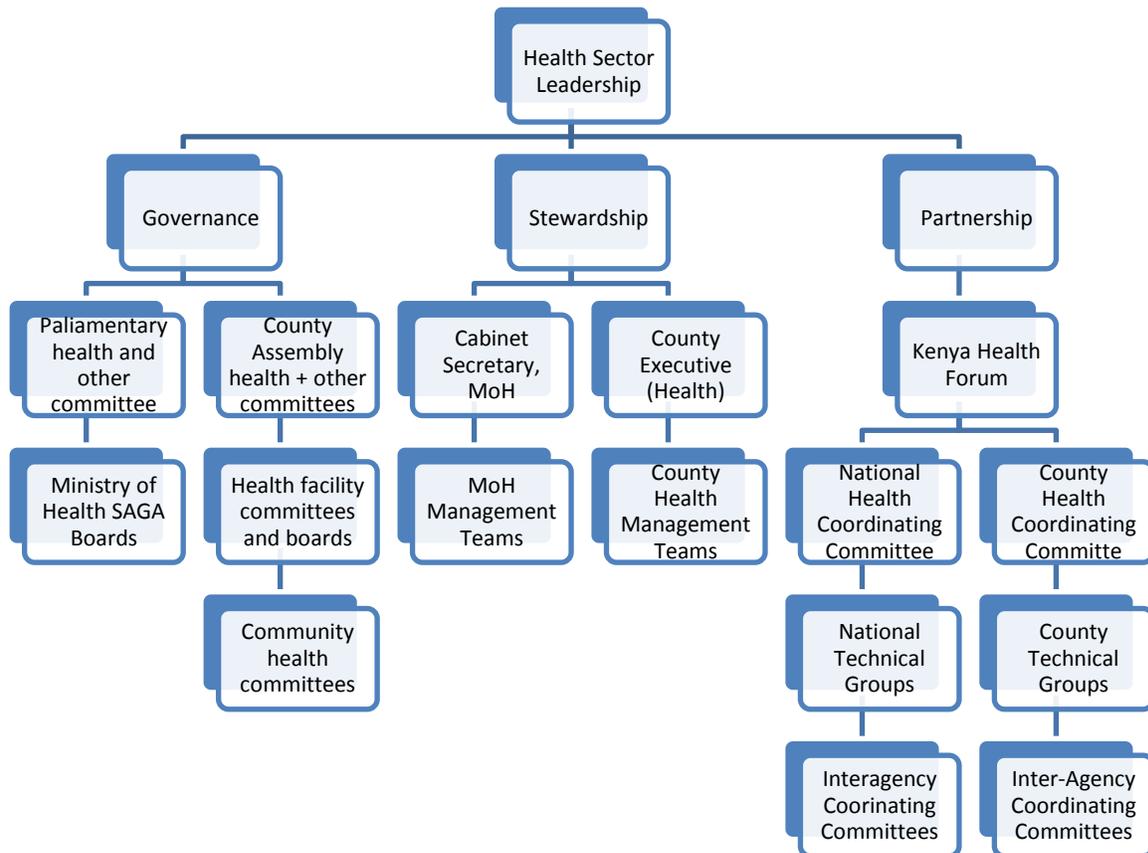
National Malaria Control Program

The NMCP is currently staffed by technical professionals who are seconded from other divisions in the MoH. The unit has six technical teams: (1) vector control; (2) case management; (3) malaria in pregnancy; (4) epidemic preparedness and response; (5) advocacy, communication and social mobilization; and (6) surveillance, monitoring, and evaluation (SM&E) and operational research (OR). Each team has a focal point and one or more technical officers.

The Malaria Interagency Coordination Committee (MICC) is convened biannually and on an *ad hoc* basis by the NMCP on behalf of the Director of Preventive and Promotive Services. The MICC includes other MoH divisions and units, representatives from County Health Ministries, non-governmental organizations, community-based organizations, private sector, partners and donors. The NMCP also has six primary technical working groups (TWGs) that meet quarterly and are aligned with the six technical

teams. In addition, the primary TWGs have the capacity to form sub-committees for more concentrated discussion or work around a particular issue. The sub-committees report back through the primary working group structure. For example, the Advocacy, Communication, and Social Mobilization TWG started a Resource Mobilization sub-committee in 2013, and the Case Management TWG has standing Drug Management and Diagnostic sub-committees.

Figure 4. Arrangement of Health Leadership at National and County Level



County Departments of Health

The counties have a health executive and a director for health, who oversee the health management team. The health executive and director for health are appointed by the governor in each county. Though the county health executives are not necessarily from the health sector, the majority of county health directors are physicians. Each county health department normally has a County Health Management Team (CHMT) and four primary units including curative and rehabilitative services, health promotion and disease prevention, sector planning, and governance and administration. The county malaria control program and malaria control coordinator (CMCC) typically are part of the preventive and promotive services unit. County health records and information officers (HRIOs) are primarily responsible for receiving, managing, and validating health data coming from sub-county- and county-level structures. Functions important to malaria control programs that have been transferred to the counties include health services delivery and management, communicable and vector-borne disease control and management, and environmental health services. Health financing, health information systems, and M&E are expected to be functions shared between the national and county levels. However, the structures and personnel are not yet all fully in place in the counties to implement these functions effectively. Figure 4 shows the organization of health leadership at each level of government.

Counties are in turn divided into sub-counties each with an administrator appointed by the county governor and a sub-county health management team (SCHMT) that includes a sub-county malaria control coordinator.

The devolution of responsibilities, powers, and funding to county governments has impacted the NMCP and PMI. The administrative changes have impacted operational plans and costs as a result of new county-level health structures and malaria control programs. New CHMT and SCHMTs, including CMCCs, pharmacists, and health records and information officers have all required training and capacity building. The program costs have increased as county health structures and malaria control programs have become functional. The NMCP continues to provide oversight to ensure continuity of operations and implementation of malaria interventions, though the counties are increasingly asserting their roles in these areas.

Community Health Services

The MoH has developed a Community Health Strategy¹⁴ based on community health volunteers (CHV) to help deliver the Kenya Essential Package for Health to all cohorts and socioeconomic groups in Kenya. CHVs, recruited and managed by village and facility health committees, should provide level 1 services to roughly 20 households. Their work is supported and managed by Community Health Assistants (CHAs). One or more CHAs are assigned to a Community Health Unit (CHU) that should have a catchment population of 5,000 people. CHUs are based at a “link facility,” a health facility that supports and supervises the work of the CHVs and links the community to the formal health sector. Link facilities can support one or more CHUs. The CHVs normally volunteer their services for supporting specific activities (e.g., mass net distributions or vaccination campaigns) though a few counties provide CHVs with a monthly stipend. Their work normally includes disease prevention and control, family health services, and hygiene and environmental sanitation using advocacy, communication and social mobilization. In certain counties, their work has expanded to include integrated community case management of childhood illness and community case management of malaria, as described under Case Management.

4. National malaria control strategy

The GoK remains committed to improving health service delivery and places a high priority on malaria prevention and control, with eventual malaria elimination one of the strategic objectives of the Kenya Health Policy. The NMCP is guided by the KMS and M&E Plan 2009–2018, both revised in 2014 after a mid-term review. These documents outline six strategic objectives to be reached by 2018 and the strategies for prevention and treatment that together aim to reach a two-third reduction of malaria morbidity and mortality by 2018 compared to 2009, the start date of the original strategy:

- **Objective 1:** To have at least 80% of people living in malaria-risk areas using appropriate malaria preventive interventions.
- **Objective 2:** To have 100% of all suspected malaria cases presenting to a health provider managed according to the National Malaria Treatment Guidelines.

¹⁴Ministry of Health, Kenya. *Taking the Kenya Essential Package for Health to the Community: A Strategy for the Delivery of LEVEL ONE SERVICES*. Nairobi, Kenya, June 2016.

- **Objective 3:** To ensure that 100% of malaria epidemic-prone and seasonal-transmission counties have the capacity to detect and the ability to respond to malaria epidemics.
- **Objective 4:** Ensure that all malaria indicators are routinely monitored, reported and evaluated in all counties.
- **Objective 5:** To increase utilization of all malaria control interventions by communities in Kenya to at least 80%.
- **Objective 6:** To improve capacity in coordination, leadership, governance and resource mobilization at all levels towards achievement of the malaria program objectives.

Strategies to support the achievement of KMS objectives include adopting a multi-sectoral approach to malaria control, decentralizing malaria control operations to counties, tailoring interventions to the prevailing epidemiology, and strengthening the malaria control performance monitoring and evaluation system. Given the varied and changing malaria epidemiology, the NMCP is strategically targeting different interventions to counties based on their risk of malaria.

Kenya Malaria Strategy – strategic approach by intervention

Vector Control

The GoK plans to achieve universal coverage with ITNs (i.e., one net for every two people) for all groups in malaria-endemic and epidemic-prone counties through: (1) regular rolling mass distribution campaigns, carried out every three years in the 23 malaria-endemic and epidemic-prone counties and 5 sub-counties with large irrigated areas; (2) routine distribution through antenatal care (ANC) and child welfare clinics (CWC) (where immunizations and other services are given) in 36 malaria-prone counties including the 23 mass campaign counties; and (3) social marketing of nets particularly in designated rural counties. The revised KMS and the NMCP IRS Business Plan have prioritized IRS for burden reduction in endemic counties, beginning at the periphery of the endemic zone and moving inwards, with additional support for capacity building and focal IRS in epidemic-prone counties to prevent outbreaks.

Malaria in Pregnancy

The fifth edition of the *National Guidelines for the Diagnosis, Treatment and Prevention of Malaria in Kenya* (2016) emphasizes the integration of malaria in pregnancy (MIP) in the overall ANC package for maternal health that includes IPTp, ITNs, prompt diagnosis and treatment of fever due to malaria, and SBCC to promote early ANC attendance, ITN use, and IPTp uptake. In line with WHO guidance, the KMS recommends a minimum of three doses of IPTp for pregnant women living in the 14 malaria-endemic counties. Sulfadoxine-pyrimethamine (SP) should be administered at each ANC visit after quickening at four-week intervals under direct observation. CHVs who promote these services work within their community units linked to health facilities where they refer pregnant women for health services ANC included.

Case Management

The KMS target for case management is to ensure that 100% of all suspected malaria cases receive a parasitological diagnosis by microscopy or malaria rapid diagnostic test (RDT) and appropriate treatment with the first-line treatment, artemether-lumefantrine (AL) based on test results. The KMS

recommends that hospitals (level 4 and 5 facilities) should use microscopy for malaria diagnosis, and in the community and level 1, 2, and 3 health facilities RDTs should be used. However, current practice is to prioritize microscopic diagnosis whenever possible and reserve the use of RDTs to health facilities lacking a lab or to times when electricity or laboratory technicians are unavailable. Parenteral artesunate is recommended for pre-referral and treatment of severe malaria.

The KMS recommends that CHVs receive training and supportive supervision for case management of malaria, prevention, behavior change communication, record keeping and reporting in malaria endemic areas. In malaria-endemic areas both RDTs and AL should be integrated into the CHV kit, and all CHVs should be linked to the nearest health facility for resupply of commodities, supervision, monitoring and referral.

Advocacy, Communication, and Social Mobilization

Objective 5 requires the effective deployment of advocacy, communication, and social mobilization activities to increase utilization of malaria interventions at the community level. Implementation of SBCC activities focus on the involvement of health providers and CHVs in malaria prevention and control activities. Additional emphasis is placed on using interpersonal communication (IPC) approaches delivered by CHVs, community-based organizations and special interest groups to target hard-to-reach populations and deliver personalized messaging. Traditional channels of communication (e.g., television, radio, print, mobile phones) are used, particularly during mass ITN campaigns.

Surveillance, Monitoring and Evaluation, and Operational Research

Surveillance, monitoring and evaluation (SM&E) and operational research (OR) are vital for tracking the progress of malaria prevention and control activities. The NMCP has a comprehensive M&E Plan to accompany the KMS, which provides the recommended frequency and methodology of monitoring key program indicators for each of the interventions in order to assess and inform program implementation. In 2016, the NMCP updated the OR priorities agenda in line with the revised KMS following a consultative process with stakeholders and partners.

5. Updates in the strategy section

The current KMS ends in 2018 and in preparation for developing a new strategy the NMCP plans to hold a Malaria Program Review (MPR) in late 2017. This activity will include both a document review and field visits to validate the results of the document review and potentially collect new data. Multiple documents will be reviewed: the county malaria profiles, the results of the post-mass ITN distribution survey, the evaluation of the continuous community ITN distribution done in Samia Sub-county, routine malaria data from District Health Information System, version 2 (DHIS2), inpatient and outpatient Quality of Care Surveys, and previous surveys and evaluations. Development of the new KMS 2019-2028 will take place after the MPR, in 2018.

Kenya has been selected as a site for the RTS,S Malaria Vaccine Implementation Programme to assess the feasibility, impact on mortality, and safety profile of the RTS,S malaria vaccine. In Kenya, the Malaria Vaccine Implementation Program will be directed by the Kenyan National Vaccines and Immunization Programme with support from the NMCP, and will take place in nine counties in Western Kenya, including all eight counties in the lake endemic zone. Sub-counties (or segments of large sub-counties) will be randomized to have all children receive four doses of RTS,S at 6, 7, 9, and 24 months of age in addition to standard vaccines or to have all children receive the standard vaccines. The pilot should begin in mid-2018 and continue through 2020. The assessment will focus on mortality rates in

children under 4 years of age, with deaths identified through fortnightly visits by village recorders, rates of severe malaria seen at sentinel hospitals, serious adverse events related to RTS,S identified at sentinel hospitals and through routine reporting, and the feasibility of adding RTS,S into the vaccination program. Household surveys will be done in the study area at baseline, mid-pilot, and one year after enrolment is finished to assess coverage with RTS,S, standard vaccines, and malaria control interventions. The NMCP and its partners, including PMI, are expected to maximize coverage of malaria prevention and treatment interventions in the area of the pilot.

6. Integration, collaboration, and coordination

The U.S. Government team in Kenya has developed a strategy that embraces a whole-of-government, multi-layer structure, reflecting all fundamental principles of PMI. The Department of Defense, Department of Health and Human Services through the Centers for Disease Control and Prevention (CDC) and the National Institutes of Health, Department of State, Peace Corps, U.S. Agency for International Development (USAID), and President's Emergency Plan for AIDS Relief (PEPFAR) have implemented and reported on a large program base over the past several years. This multi-tiered governance structure allows for full participation across agencies, at all levels, and across technical areas resulting in better alignment to Kenya's needs. Examples include:

- The NMCP and PMI have worked closely with the Walter Reed Army Institute of Research's Malaria Diagnostics Center to support and strengthen malaria diagnostic capacity and implement a quality assurance/quality control (QA/QC) program for malaria diagnostics. PMI-supported activities have included the procurement and distribution of microscopes, malaria microscopy training, QA/QC officer training, development and production of the *National Guidelines on Parasitological Diagnosis of Malaria and Malaria Vector Surveillance in Kenya* (2013) and accompanying microscopy wall charts and job aids, and implementation of the QA/QC program for malaria diagnostics in health facilities.
- The NMCP and PMI have partnered with Peace Corps since 2011 to support community-based malaria activities. PMI supported trained malaria volunteers in 2012–2013 and 2013–2014 to mobilize volunteers across sectors to plan and incorporate malaria prevention and control activities in the communities where they live and work. These activities have been on hold since the withdrawal in 2014 of all Peace Corps volunteers from Kenya due to security concerns.
- The NMCP and PMI have a long-standing relationship with the Kenya Medical Research Institute (KEMRI) collaborations with CDC and Wellcome Trust. Malaria research conducted through KEMRI collaborations has contributed to the development of each of the pillars of malaria prevention and control (i.e., effective case management, IPTp, ITNs, and IRS). Recent PMI supported surveillance and OR activities have been focused on epidemiological and entomological surveillance and new medications and treatment strategies to inform national policy, strategies, and program implementation.

In addition to U.S. Government integration and collaboration, PMI facilitates coordination of activities among key malaria partners in Kenya, including Global Fund, United Kingdom's Department for International Development (DfID), WHO, United Nations Children's Fund (UNICEF), research institutions, non-governmental organizations, private sector, and other donors and stakeholders. PMI is an integral partner to the NMCP and actively participates in annual planning and reviews, technical working groups, interagency coordination committees, and other stakeholder-related activities.

Since 2013 PMI has prioritized the areas of Kenya with the highest burden of malaria, in order to achieve the greatest reduction in malaria morbidity and mortality. The eight counties of Bungoma, Busia, Homa Bay, Kakamega, Kisumu, Migori, Siaya and Vihiga together have an estimated population of 9.6 million in 2018. They have the highest malaria burden and form the lake endemic zone, with the exception of one sub-county in Bungoma and one in Kakamega in the highland epidemic zone. According to the nineteenth NMCP quarterly surveillance bulletin released in December 2016, these counties reported 73% of all confirmed malaria cases reported from October 2015 through December 2016, with an annual incidence in 2016 of 233 cases per 1000 population, compared to 65 per 1000 population nationally. The 2015 MIS¹⁵ showed that parasite prevalence (by microscopy) was 26.7% in the lake-endemic areas compared to 8.2% nationally. PMI has focused its support for ITNs, IRS, case management, supply chain management, MIP, and SM&E on these eight counties.

In other counties PMI still provides support in certain areas in line with the KMS and NMCP policy, though the NMCP and other partners lead in providing technical support. Figure 5 shows the counties and the estimated malaria burden, and Table 2 describes PMI-supported activities by county and strategy. Routine distribution of PMI-procured ITNs extends beyond the lake endemic zone to cover 24 additional malaria-prone counties (36 in total). Mass net distributions cover 23 counties in the lake endemic, coast endemic, and highland epidemic zones, primarily through support from Global Fund and other sources, though PMI has filled critical gaps in counties of the lake endemic zone. SP for IPTp, including PMI-procured SP, is distributed in 14 counties in the lake endemic zone plus five coast endemic counties and Tana River County. PMI-procured ACTs, RDTs, and treatments for severe malaria are distributed nationwide, together with similar commodities purchased through other sources. PMI also supports the distribution of malaria commodities in coordination with the NMCP and key partners, following NMCP / MOH policies and strategies. PMI also provides support at the national level for SM&E, SBCC, and other areas through participation in TWGs.

¹⁵ National Malaria Control Programme (NMCP), Kenya National Bureau of Statistics (KNBS), and ICF International. Kenya Malaria Indicator Survey 2015. Nairobi, Kenya and Rockville, Maryland: NMCP, KNBS, and ICF International, 2016.

Figure 5. Map showing counties by malaria endemicity and PMI focus counties.¹⁶

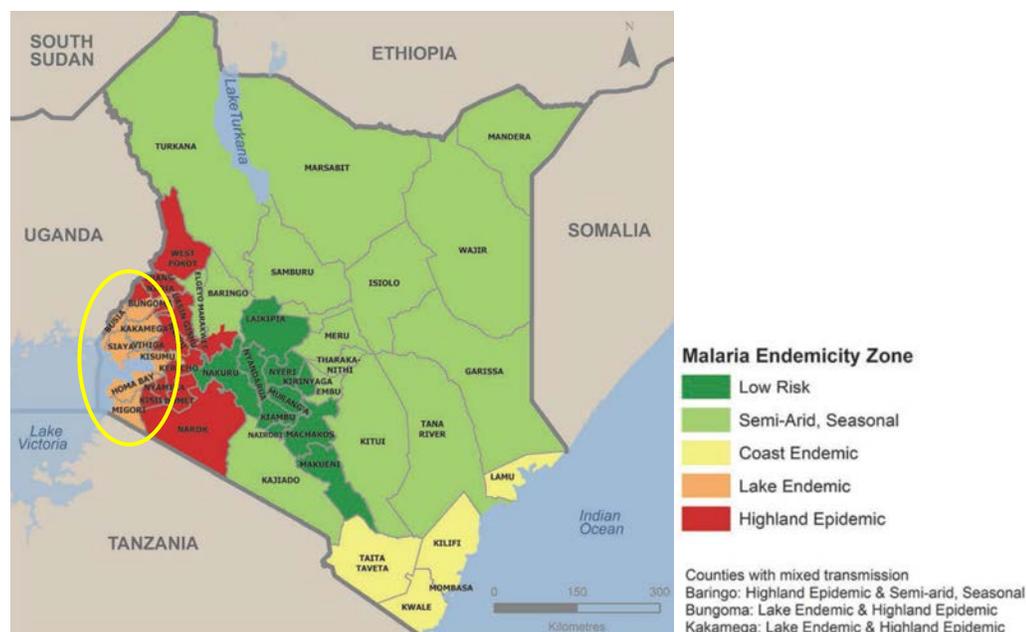


Table 2. Geographic Focus of PMI-Supported Activities by Transmission Zone and Strategy

Transmission Zone	Counties (#)	Malaria Interventions					
		ITNs (# of counties for routine distribution)	IRS	IPTp / MIP	Case management	SBCC	SM&E
Lake endemic (yellow circle on map)	8	X (8)	X	X	X	X	X
Coast endemic	5	X (5)		X	L	X	L
Highland epidemic	9	X (9)			L	L	L
Seasonal	15	X (9)		*	L	L	L
Low-risk	10	X (5)			L	L	L

IPTp/MIP=intermittent preventive treatment in pregnancy/malaria in pregnancy; ITNs=insecticide-treated bed nets; SBCC=social and behavioral change communication; SM&E=surveillance, monitoring and evaluation; IRS=indoor residual spraying with insecticides

Coding: white=no activities; gray shading=activities ongoing; X=Focused PMI support; L=limited PMI support; * Tana River County

Financial support to implement the KMS has historically come from three primary sources: PMI, Global Fund, and DfID. The Global Fund Round 10 grant had two primary recipients, the National Treasury (with the NMCP being a subrecipient), receiving \$111 million, and the African Medical and Research

¹⁶ 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.

Foundations (AMREF), receiving \$16 million. The grant originally ran five years, from 2012–2016, but was extended through December 2017 with additional funding. For the period from 2018 to 2020 the Global Fund allocated \$63.2 million to Kenya for malaria control, with \$3.1 million of that amount going for cross-cutting activities aimed at resilient and sustainable systems for health. The NMCP requested support for the 2020 ITN mass distribution (40% of the allocation request), case management commodities (29%), program management (10%), monitoring and evaluation (8%), case management training (6%), SBCC (5%), and post-marketing surveillance and quality insurance of antimalarials (2%). Additional activities, including 60% of the costs for the 2020 mass ITN distribution and expansion of IRS to two additional counties, was included in the \$51 million of activities submitted to Global Fund as “prioritized above allocation request”. For the first time, the county governments are likely to be subrecipients of the Global Fund grant to support case management and prevention activities devolved to the counties.

Historically, DfID has provided about half (approximately 1.2–1.4 million) of the ITNs for routine distribution through ANC and child welfare clinics, 600,000–800,000 ITNs for social-marketing channels, support through WHO for technical assistance, surveillance, monitoring and evaluation, and OR, and an extension of the Affordable Medicines Facility – malaria (AMFm). However, the DfID malaria program ended in March 2017 and future plans to support malaria have not been released. Support for subsidized prices of ACTs in the private sector now comes from Global Fund grants.

Based on the revised KMS, budget analysis, and the funding request to the Global Fund, PMI has concluded that the FY 2018 budget should be focused on filling critical program gaps, particularly commodities. If current trends continue, then PMI will be the only major donor other than the Global Fund. The \$4 million projected available GoK funding to support the NMCP’s annual malaria prevention and control plan falls significantly short of the estimated annual need of over \$300 million (based on the revised KMS costing for the Global Fund request).

7. PMI goal, objectives, strategic areas, and key indicators

Under the PMI Strategy for 2015–2020, the U.S. Government’s goal is to work with PMI-supported countries and partners to further reduce malaria deaths and substantially decrease malaria morbidity, towards the long-term goal of elimination. Building upon the progress to date in PMI-supported countries, PMI will work with NMCPs and partners to accomplish the following objectives by 2020:

1. Reduce malaria mortality by one-third from 2015 levels in PMI-supported countries, achieving a greater than 80% reduction from PMI’s original 2000 baseline levels.
2. Reduce malaria morbidity in PMI-supported countries by 40% from 2015 levels.
3. Assist at least five PMI-supported countries to meet the World Health Organization’s (WHO) criteria for national or sub-national pre-elimination.¹⁷

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

1. Achieving and sustaining scale of proven interventions
2. Adapting to changing epidemiology and incorporating new tools
3. Improving countries’ capacity to collect and use information

¹⁷http://whqlibdoc.who.int/publications/2007/9789241596084_eng.pdf

4. Mitigating risk against the current malaria control gains
5. Building capacity and health systems towards full country ownership

To track progress toward achieving and sustaining scale of proven interventions (area of strategic focus #1), PMI will continue to track the key indicators recommended by the Roll Back Malaria Monitoring and Evaluation Reference Group (RBM MERG) as listed below:

- Proportion of households with at least one ITN
- Proportion of households with at least one ITN for every two people
- Proportion of children under five years old who slept under an ITN the previous night
- Proportion of pregnant women who slept under an ITN the previous night
- Proportion of households in targeted districts protected by IRS
- Proportion of children under five years old with fever in the last two weeks for whom advice or treatment was sought
- Proportion of children under five with fever in the last two weeks who had a finger or heel stick
- Proportion receiving an ACT among children under five years old with fever in the last two weeks who received any antimalarial drugs
- Proportion of women who received two or more doses of IPTp for malaria during ANC visits during their last pregnancy

8. Progress on coverage/impact indicators to date

Table 3. Evolution of Key Malaria Indicators in Kenya from 2003 to 2015

Indicator	2003 DHS ^a	2007 MIS ^b	2008–09 DHS ^c	2010 MIS	2014 DHS	2015 MIS	2015 MIS Lake Zone
% Households with at least one ITN	6%	48%	56%	48%	59%	63%	87%
% Households with at least one ITN for every two people	N/A	N/A	N/A	N/A	34%	40%	54%
% Children under five who slept under an ITN the previous night	5%	39%	47%	42%	54%	56%	73%
% Pregnant women who slept under an ITN the previous night	4%	40%	49%	41%	51%	58%	78%
% Households in targeted districts protected by IRS	N/A	N/A	N/A	26% ^d	N/A	N/A	N/A
% Children under five years old with fever in the last two weeks for whom advice or treatment was sought	74%	70% ^e	N/A	59%	72%	72%	65%
% Children under five with fever in the last two weeks who had a finger or heel stick	N/A	N/A	N/A	12%	35%	39%	59%

% Children receiving an ACT among children under five years old with fever in the last two weeks who received any antimalarial drugs	N/A	N/A	N/A	51%	86%	92%	94%
% Women who received two or more doses of IPTp during their last pregnancy in the last two years ^f	4%	14%	16%	22%	37%	56%	55%
% Children aged 6-59 months with a hemoglobin measurement of <8 g/dL	N/A	4%	N/A	5%	N/A	2.2%	3.5%
% Children aged 6-59 months with malaria infection ^g	N/A	3%	N/A	8%	N/A	5%	17%
^a Pre-PMI baseline data for all-cause under-five mortality ^b PMI baseline data for coverage indicators ^c PMI baseline data for all-cause under-five mortality ^d In epidemic-prone highlands and lake-endemic areas targeted for IRS ^e Indicator: percentage of children under five years old with fever who sought treatment from a facility or health provider the same or next day ^f IPTp estimates for 2003 are the proportion receiving any dose of IPTp; for 2007-2014 estimates are the arithmetic average of results from 14 target counties with an IPTp policy; 2015 estimate is that reported for the 14 endemic counties with an IPTp policy; national estimate was 17% in 2014 and 35% in 2015 ^g By microscopy							

Table 4. Evolution of Key Malaria Indicators reported through routine surveillance systems in Kenya from 2012 to 2016

Indicator	2012	2013	2014	2015	2016
Total # Cases	9,337,239	8,754,198	9,634,857	7,677,421	7,826,679
Total # Confirmed Cases	2,411,978	3,663,853	4,606,880	5,496,668	4,910,549
Total # Clinical Cases	6,925,261	5,090,345	5,027,977	2,180,753	2,916,130
Total # <5 Cases	3,458,580	3,089,786	3,264,472	2,484,913	2,448,863
Total # inpatient malaria deaths	26,712	20,136	23,456	15,061 [†]	2,928 [†]
Data Completeness* (%)	81%	84%	88%	91%	92%
Test Positivity Rate (TPR)	26%	31%	32%	34%	32%

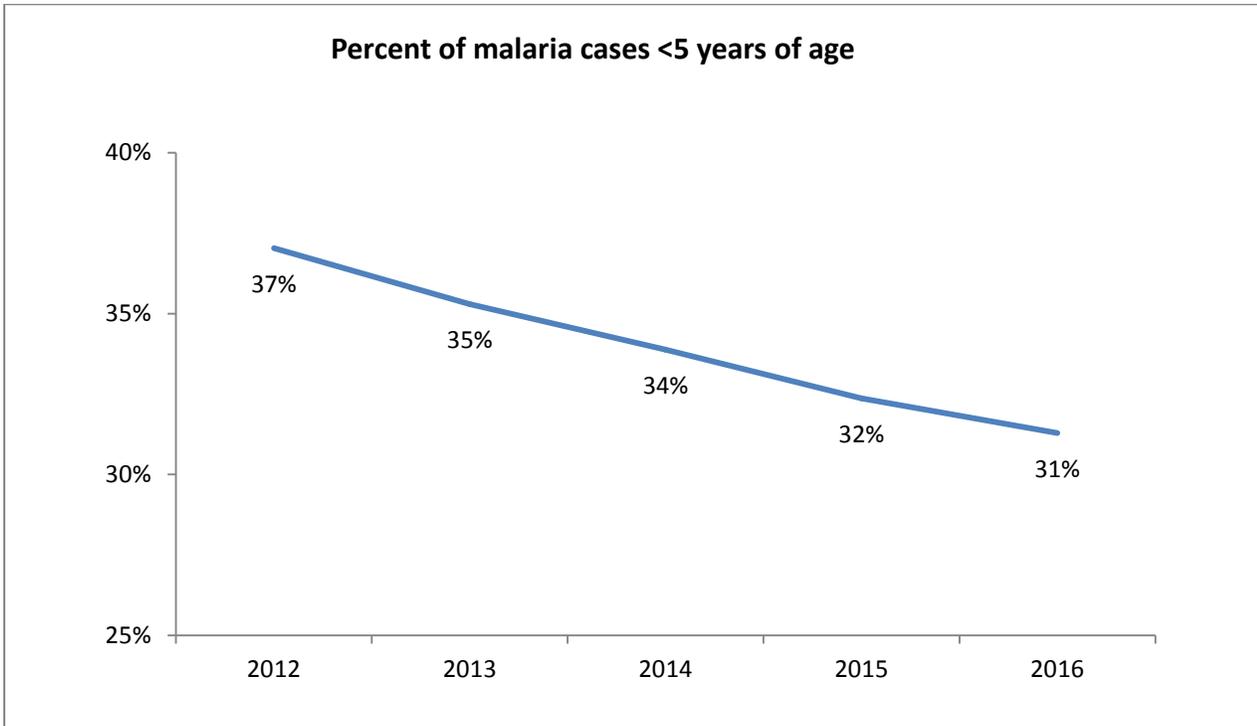
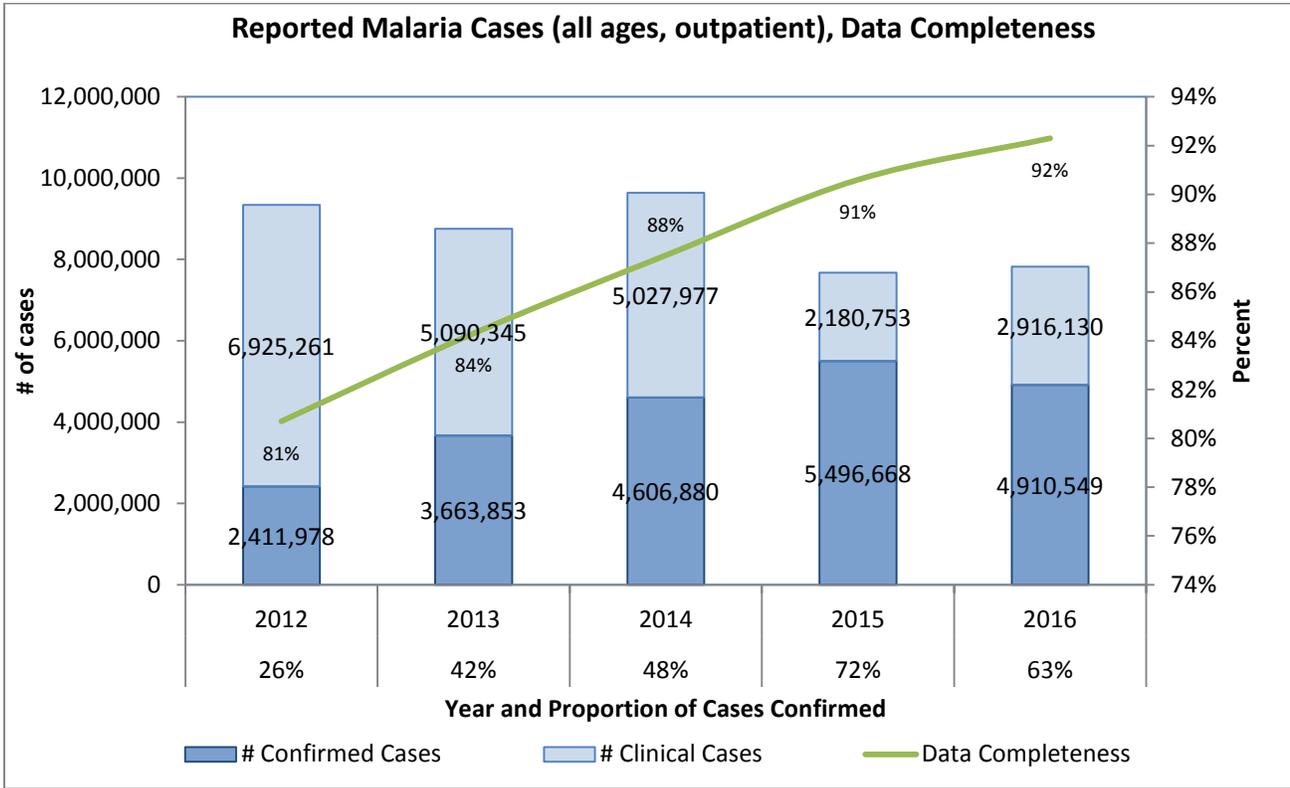
* Percentage of health facilities reporting each month

[†] 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 is expected to improve as more staff are trained and are reporting.

Reporting also was poor in the last 2 months of 2016 during a nationwide doctors' strike.

Source: Kenya District Health Information System 2, <https://hiskenya.org/dhis-web-commons/security/login.action>, accessed 30 June 2017

Figures 6 and 7. Trends in Key Routine Based Malaria Indicators



9. Other relevant evidence on progress

A recent secondary analysis of household survey data, calculating ITN use to access ratios across PMI counties, showed that Kenya has a high use to access ratio (>0.8) across all geographic regions and wealth quintiles.¹⁸ In the 14 malaria-endemic counties, the use to access ratio was >0.95 indicating that almost all persons slept under a net if they had access to one.¹⁸ Therefore, the proportion of the population that uses ITNs is higher than the national target of 80% when there are enough nets in the household such that all persons have access. With only 54% of households in the lake endemic zone achieving universal coverage (i.e., one ITN per two persons per household) and only 45% of households in the coast endemic zone achieving universal coverage, as estimated by the 2015 MIS, increasing access to ITNs remains a substantial challenge for Kenya.¹⁷

The Quality of Care surveys have documented improvements in health worker adherence to diagnostic and treatment guidelines in both inpatient and outpatient settings, as described in the Case Management section.

In 2017, PMI released the final results of the Kenya Impact Evaluation.¹⁹ This evaluation assesses the plausible attribution of the expansion of malaria control interventions between 2003 and 2015 to changes in key outcomes of malaria-related morbidity, all-cause child mortality, and malaria-related mortality in children under five years of age in Kenya, while accounting for other contextual determinants of children survival. Data came primarily from nationally representative, population-based household surveys, supplemented by data from routinely collected health information, QoC surveys, and special studies. Overall, coverage of malaria prevention and case management interventions sharply increased during the evaluation period. At the same time, prevalence of malaria and severe anemia (hemoglobin <8 g/dL) declined among children aged 6-59 months, with greater declines in the lake and coast endemic zones. All-cause child mortality also decreased at the national level during this period, with greater reductions in malaria endemic zones compared to those in lower-risk zones. At the same time, Kenyans also benefited from increases in gross domestic product per capita, and increases in measures of household wealth such as ownership of telephones, access to improved sources of water and electricity, and literacy rates. The coverage of other maternal and child health interventions, such as ANC attendance, vaccination coverage, and vitamin A supplementation, also increased during this period. However, based on the geographic and temporal relationships between increasing coverage of malaria interventions, decreasing malaria prevalence, and decreasing all-cause child mortality, it was concluded that the declining trends in under-five mortality in Kenya are consistent with the expected impact of the rollout of malaria control interventions in Kenya.

¹⁸ Koenker H, Ricotta E. April 2017. Insecticide-Treated Nets (ITN) Access and Use Report. Baltimore, MD. PMI | VectorWorks Project, Johns Hopkins Center for Communication Programs. <http://www.vector-works.org/resources/itn-access-and-use/>. Accessed 7 June 2017.

¹⁹ 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.

III. OPERATIONAL PLAN

PMI supports the NMCP in its implementation of the KMS. PMI's support includes health system strengthening, continued support for the Health Management Information System (HMIS), the electronic Integrated Disease Surveillance and Response (eIDSR), and Logistics Management Information System (LMIS) reporting in DHIS2, improving pharmaceutical and commodity supply chain management, improving malaria case management, the management of malaria in pregnancy, and enhancing SBCC activities. Improving diagnostic capacity, promoting quality medicines, and supporting ITN distribution through ANC clinics and child welfare clinics, and indoor residual spraying are among specific interventions that PMI will continue to support under its investment approach. Although it is included in the KMS, PMI does not support larviciding in Kenya. Continuing with the approach in previous years, PMI commodities will be distributed nationwide, and limited technical assistance will be provided at the national level with intense focus in the eight high-burden malaria endemic counties in western Kenya. PMI will also support the NMCP to conduct the MPR in late 2017 and the development of the new KMS during 2018.

1. Vector monitoring and control

NMCP/PMI objectives: Vector control is a key component of Kenya's malaria strategy. The objective is to have at least 80% of people in malaria risk areas using appropriate malaria preventive interventions by 2018. The use of ITNs and IRS are the primary vector control tools, with larval source management as a supplementary tool in line with Kenya's Integrated Vector Management strategy. Kenya aims to achieve universal coverage of ITNs, defined as one net for every two people at risk, through multiple distribution channels, including mass campaigns, distribution to pregnant women and children through ANC/child health visits, and through social marketing. Targeted IRS is recommended in endemic areas for burden reduction, as well as in epidemic prone areas based upon surveillance data to avert epidemics. Kenya has developed an IRS Business Plan and an Insecticide Resistance Management Plan to guide IRS activities in the country. PMI has prioritized the eight endemic counties for intense targeted support with the aim of significantly reducing morbidity by combining two vector control interventions, IRS and ITNs, to achieve burden reduction while slowing down the development of resistance to pyrethroids. Current data shows increasing pyrethroid resistance and supports the need to protect the only insecticide currently recommended for use in ITNs. To support these vector control objectives, Kenya aims to continue to build capacity at the national level and develop capacity at the county level to implement entomological surveillance and insecticide resistance monitoring.

a. Entomologic monitoring and insecticide resistance management

Progress since PMI was launched

PMI's ongoing support for vector control interventions in Kenya relies upon careful monitoring of an array of entomologic parameters. Robust entomological surveillance and insecticide resistance monitoring efforts were conducted in up to 16 sites throughout western Kenya between 2008 and 2015. The primary malaria vectors in this region are *An. funestus*, *An. arabiensis*, and *An. gambiae* s.s. In 2008, *An. arabiensis* was the most common species of the three collected in most sites, with the exception of sites in Busia and Bungoma counties near the border with Uganda, where *An. gambiae* s.s. was more common. However, in recent years, *An. funestus* and, to a lesser extent, *An. gambiae* s.s. have been found in increasing numbers. In 2016, morphological identification of nearly 6,000 female *Anopheles* collected at PMI-funded entomologic monitoring sites showed the overall species

composition was 85% *An. funestus* s.l. and 13% *An. gambiae* s.l. Genetic sequencing results confirmed the local vector population in 2016 to be predominantly *An. funestus* s.s. (93%) and *An. arabiensis* (7%), with very few *An. gambiae* s.s. (0.06%). At the same time, increasing resistance to pyrethroid insecticides has been documented at multiple monitoring sites in both *An. funestus* and *An. arabiensis*.

Progress during the last 12-18 months

In late 2015, entomologic monitoring activities were restructured to focus on sites in and around the areas targeted by the March 2017 IRS spray campaign. In December 2015, monitoring began at eight sites in Awendo, Rongo, and Uriri sub-counties of Migori County and Homa Bay and Ndhiwa sub-counties of Homa Bay County (Table 5 and Figure 8). In July 2016, one site each was dropped in Awendo, Rongo, and Uriri to allow monitoring at additional sites in Nyatike, Kuria West, Kuria East, and Suna West sub-counties, bringing the total number of sites to 12 (6 in IRS areas and 6 in non-IRS areas). Vector densities were monitored through monthly pyrethrum spray catches, light traps, window exit traps, and outdoor resting collections. Human landing catches were conducted in February at four sites and November 2016 at five sites to assess changes in mosquito behavior. Wall cone bioassays, reported in the IRS section, were also done at four sites in Migori County beginning two weeks after spraying and then at monthly intervals.

The predominant vector species collected throughout 2016 (by all trapping methods) was *An. funestus*, with two clear peaks of high densities: one in December to February (following the short rains of October-December) and another in May to July (following the longer rains in April-June).

Table 5. Entomological monitoring sites (*Italics denotes sites where monitoring stopped in July 2016*)

County	Sub-County	Location	Status	Period Monitored	Data Collected Monthly	Data Collected every 6 months
Migori	Awendo	Uradi	IRS	Dec 2015 - Present	Density*	Insecticide resistance, human landing catch
		<i>Ranen</i>	<i>IRS</i>	<i>Dec 2015 – June 2016</i>	<i>Density*</i>	
	Rongo	Sumba	IRS	Dec 2015 - Present	Density*, wall cone bioassay [†]	Insecticide resistance, human landing catch
		<i>Matagaro</i>	<i>IRS</i>	<i>Dec 2015 – June 2016</i>	<i>Density*</i>	
	Nyatike	Sori-Karungu	IRS	July 2016 – Present	Density*	Human landing catch
		Kalangi-Macalder	IRS	July 2016 - Present	Density*, wall cone bioassay [†]	
	Suna West	God-kwer	IRS	July 2016 - Present	Density*, wall cone bioassay [†]	
	Uriri	Ngiya	IRS	Dec 2015 - Present	Density*, wall cone bioassay [†]	Insecticide resistance
		<i>Nyamilu</i>	<i>IRS</i>	<i>Dec 2015 – June 2016</i>	<i>Density*</i>	<i>Insecticide resistance</i>
	Kuria West	Mabera	Control	July 2016 - Present	Density*	
Kuria East	Nyabasi East	Control	July 2016 - Present	Density*		
Homa Bay	Homa Bay	Imbo	Control	July 2016 - Present	Density*	Insecticide resistance, human landing catch
		Katuma	Control	July 2016 - Present	Density*	
		<i>Marindi</i>	<i>Control</i>	<i>Dec 2015 – June 2016</i>	<i>Density*</i>	<i>Insecticide resistance</i>
	Ndhiwa	Sikwadhi	Control	July 2016 - Present	Density*	
		Ndhiwa	Control	July 2016 - Present	Density*	Insecticide resistance, human landing catch
<i>Pala</i>	<i>Control</i>	<i>Dec 2015 – June 2016</i>	<i>Density*</i>	<i>Insecticide resistance, human landing catch</i>		
Siaya	Bondo	Bar Kanyango	Other Sites	May 2017 - Present	Density*	Insecticide resistance
Bungoma	Bungoma North	Bitobo	Sites	Sep 2017 - Present		Insecticide resistance

*Density includes resting density, species composition, sporozoite rates

[†] Wall cone bioassays done 2 weeks after spray campaign and then monthly

Insecticide resistance monitoring was conducted in eight sites, including four in Migori County, two in Homa Bay County and one each in Bungoma and Siaya Counties. Table 6 gives insecticide resistance monitoring results for 2016, indicating resistance to the pyrethroid class insecticides, but susceptibility in most areas to bendiocarb and in all sites to pirimiphos-methyl, the insecticide chosen for the 2017 spray campaign. Resistance to pyrethroids was observed in both species. As a complement to the WHO susceptibility assays, CDC intensity bioassays were performed on *An. funestus* and *An. arabiensis* in 2016. Table 7 shows that exposure of mosquitoes to increasing doses of deltamethrin and permethrin showed a worrying situation, with mosquitoes surviving up to 10 times the diagnostic dose of the

insecticide. The intensity assay showed very high resistance to deltamethrin and permethrin while the WHO susceptibility tests showed only moderate resistance to the insecticides.

Table 6. Results of insecticide resistance testing, 2016 (% mortality)

Species	County	Sub-County	Pyrethroid		Carbamate	Organo-phosphate
			Deltamethrin	Permethrin	Bendiocarb	Pirimiphos-methyl
<i>An. gambiae</i> s.l.	Homa Bay	Homa Bay	72	75	100	100
<i>An. gambiae</i> s.l.	Homa Bay	Ndhiwa	60	73	100	100
<i>An. gambiae</i> s.l.	Migori	Rongo	73	69	100	100
<i>An. gambiae</i> s.l.	Migori	Uriri	84	75	75	100
<i>An. funestus</i>	Migori	Awendo	85	85	93	100
<i>An. funestus</i>	Migori	Rongo	NA	NA	100	100
<i>An. funestus</i>	Migori	Uriri	NA	NA	100	100

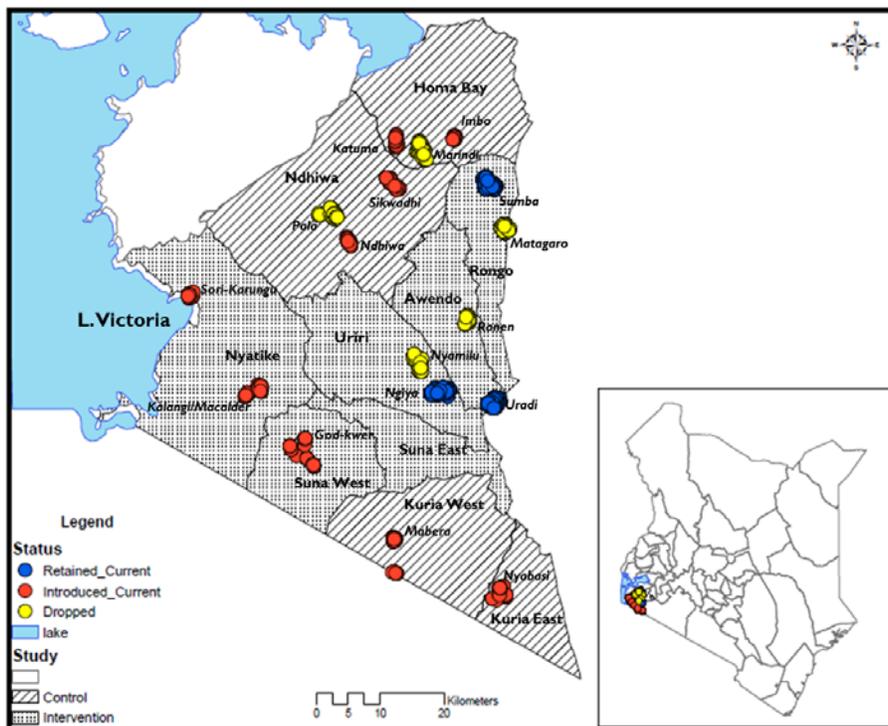
*Due to difficulties finding larval breeding sites for *An. funestus*, teams were unable to raise sufficient numbers in all the sites for the required tests.

Table 7. Pyrethroid intensity results, 2016 (% mortality)

Species*	Site	Insecticide	5X dose	10X
<i>An. funestus</i>	Awendo	permethrin	65%	90%
<i>An. funestus</i>	Awendo	deltamethrin	72%	97%
<i>An. arabiensis</i>	Ndhiwa	permethrin	95%	98%
<i>An. arabiensis</i>	Homa Bay	permethrin	62%	100%

**An. funestus* were collected as adults; *An. arabiensis* were collected as larvae and reared to adulthood

Figure 8. Entomologic monitoring sites in Migori and Homa Bay Counties, western Kenya



Plans and justification

In 2018, the NMCP will expand IRS to target both Migori and Homa Bay Counties. In 2019, if funds are available, the NMCP would also like to expand IRS to target Kisumu as well as Migori and Homa Bay Counties. Therefore, with FY 2018 funds PMI will support entomological surveillance and insecticide resistance monitoring in up to 12 sites: 10 distributed in Migori, Homa Bay, and Kisumu Counties plus one site each in Siaya and Bungoma Counties. Sites in Siaya and Bungoma Counties were chosen to follow the higher levels of pyrethroid resistance previously detected there, as any decline in ITN efficacy would be a concern.²⁰ With support from other donors, additional sites will be assessed for insecticide resistance in central as well as coastal Kenya. Entomological surveillance will include monthly monitoring of mosquito densities, species composition, and behavior through pyrethrum spray catches, window exit traps, and light traps. In addition, sites will include outdoor resting traps as indoor collections often yield low numbers of mosquitoes. Insecticide resistance monitoring will be done at eight sites (six in IRS counties and one each in Bungoma and Siaya Counties) to include both WHO susceptibility assays of all four insecticide classes as well as CDC bottle assays to measure the intensity of pyrethroid resistance in the vector population. Wall cone bioassays will also be done at up to four sites per county where IRS is done to monitor quality of spraying and rate of decay of insecticide.

Proposed activities with FY 2018 funding: (\$529,000)

1. **Entomological monitoring and capacity building:** Support for vector density surveillance at 12 sites, insecticide resistance monitoring at 8 sites (6 in IRS counties and one each in Bungoma and Siaya Counties), and monitoring of spray quality and decay rate of insecticide at up to four sites per county where spraying is done. Capacity building will primarily be through inclusion of County Health Officers in the entomological monitoring activities. The designated County Health Officers will also assist in insecticide resistance testing, often done directly in the field. For capacity building, PMI will provide transport and per diem for up to two members of the County Health Teams during mosquito collection periods in their respective counties. (\$500,000)
2. **Technical assistance for entomological capacity building:** Funding for two technical assistance visits from CDC to help develop entomological capacity at the national and county level. (\$29,000)

b. Insecticide-treated nets

The NMCP objective for ITNs is to have at least 80% of people in malaria risk areas using appropriate malaria preventive interventions by 2018. Under the current KMS, Kenya aims to achieve universal coverage of ITNs, defined as one net for every two people at risk, through mass campaigns, distribution to pregnant women and children attending ANC and CWC, and social marketing.

Progress since PMI was launched

Since 2008, PMI has procured over 13 million ITNs and distributed 8 million through routine continuous distribution at health facilities and mass campaigns, with 5 million ITNs still in the process

²⁰ Ochomo E, Bayoh NM, Kamau L, Atieli F, Vulule J, Ouma C, Ombok M, Njagi K, Soti D, Mathenge E, Muthami L, Kinyari T, Subramaniam K, Kleinschmidt I, Donnelly MJ, Mbogo C. Pyrethroid susceptibility of malaria vectors in four Districts of western Kenya. *Parasit Vectors*. 2014 Jul 4;7:310

Wanjala CL, Zhou G, Mbugi J, Simbauni J, Afrane YA, Ototo E, Gesuge M, Atieli H, Githeko AK, Yan G. Insecticidal decay effects of long-lasting insecticide nets and indoor residual spraying on *Anopheles gambiae* and *Anopheles arabiensis* in Western Kenya. *Parasit Vectors*. 2015 Nov 14;8:588

of being delivered. In 2014–2015, 13.6 million ITNs were distributed in a rolling universal coverage mass distribution campaign in 23 counties. PMI supported procurement and distribution of 3.8 million ITNs in 5 counties, World Vision supported procurement and distribution in 1 county, and Global Fund supported the remaining 17 counties. PMI also supports routine distribution of free ITNs through ANC and CWC in 36 counties to reach the most vulnerable populations, pregnant women and children under one year.

Despite substantial investments in ITNs by PMI and other partners for over a decade, by 2015 at national level only 63% of households had at least one ITN and just 40% had at least one ITN per two persons (i.e., universal coverage).²¹ In the PMI focus counties in the lake endemic zone, the proportion of households with at least one ITN was higher at 87%, as was the proportion of households with at least one ITN per two persons (54%).

Communication and promotion efforts to increase uptake and utilization of ITNs were focused initially on national mass media campaigns, particularly around universal coverage mass distributions. Between the mass distributions, PMI re-focused efforts on SBCC at the community level in high-burden areas where ITN usage has historically been low. Access to ITNs at the household level appears to be the primary factor associated with use in both children less than five years of age and pregnant women. According to the 2015 MIS, 56% of children less than five years of age and 58% of pregnant women slept under an ITN the previous night, whereas these estimates were 79% and 82%, respectively, in households that had at least one ITN. Overall, for those who had access to an ITN, 91% slept under an ITN the night before the survey.¹⁹

To complement existing routine distribution channels, the NMCP has been exploring alternative channels such as through the community or through schools. PMI piloted a community channel that would exploit existing community structures. Samia sub-county in Busia was chosen for this pilot program as it had full coverage of functional CHUs. Through the pilot program, CHVs would assess replacement net needs at home visits and record the number needed on a voucher. Household members would then collect these nets at distribution sites. The proportion of households with universal coverage (one net per two people), determined by household survey, increased from 50.4% at baseline to 78.7% at end line in the intervention area, compared to a decrease from 49.7% to 44.6% in the control area. The pilot showed that this channel was feasible and could increase and sustain universal coverage, where functional CHUs exist. Although the NMCP appreciated the success of the pilot, and is concerned about the high rates of ITN attrition seen through ITN durability monitoring, it deferred any action based on the pilot until the MPR is finished and a new KMS is in place, as described below.

Progress during the last 12-18 months

PMI resident advisors supported the development of the Global Fund Funding Request proposal in early 2017, including the quantification of vector control commodity needs and technical assistance for 2018 to 2020.

Routine distribution: Between October 2016 and March 2017, PMI supported the distribution of 568,758 ITNs through ANC and CWC clinics, and leveraged DfID funding to distribute an additional 289,840 nets. PMI also supported capacity building at the county level for ITN commodity and logistics

²¹National Malaria Control Programme (NMCP), Kenya National Bureau of Statistics (KNBS), and ICF International. 2016. *Kenya Malaria Indicator Survey 2015*. Nairobi, Kenya, and Rockville, Maryland, USA: NMCP, KNBS, and ICF International.

management. To date, 437 training-of-trainers have occurred, and 2,428 of 5,367 health facility workers have been trained on commodity management best practices.

Mass campaign: Kenya is conducting a mass campaign in 2017, targeting 23 of the 47 counties and distributing 15.2 million ITNs procured with Global Fund support. PMI is supporting the microplanning and distribution of 1.9 million Global Fund-procured ITNs in two counties in Western Kenya (Bungoma and Busia), with distribution in the remaining 21 counties supported by Global Fund.

ITN durability monitoring: After the 2014-2015 mass campaign, PMI supported ITN durability monitoring in four sites (Siaya, West Pokot, Kilifi, and Kisii), each one receiving a different brand of ITN and representing a different eco-epidemiological zone and phase of the rolling campaign. At each site, 350-508 households were identified, and 750-773 ITNs tagged at baseline. Siaya and West Pokot have been followed for 24 months, while the Kilifi and Kisii 18-month surveys are underway at the time of writing. Preliminary results showed 51-76% ITN survival at 12 months. The most common reasons that nets were missing at 12 months were that they were lost, given away, or absent because the owner had migrated; while few (0-4%) were missing due to damage. Compared to the 12-month survey, by 24 months ITN survival had dropped from 57% to 8% in West Pokot and from 76% to 38% in Siaya. Analyses are ongoing to determine the causes of the high attrition between 12 and 24 months. At all time points, the physical condition of ITNs was significantly different between sites, with larger holes seen in Siaya and Kisii, and by 12 months, 13% to 26% of nets were considered “too torn” (hole area >1000cm²). This cohort will be monitored until 36 months, with the final surveys occurring September 2017-October 2018. The last round of durability monitoring provided key results used for the ITN quantification for the next Global Fund concept note.

Commodity gap analysis

Table 8. ITN Gap Analysis

Calendar Year	2017	2018	2019
Total Country Population	46,621,575	47,854,071	49,086,567
Total Targeted Population (36 counties) ^a	34,399,673	35,191,261	35,982,849
Total Targeted Population (23 counties) ^b	22,988,331	n/a	n/a
Continuous Distribution Needs (in 36 counties)			
Channel #1: ANC ^c	1,122,805	1,160,608	1,186,714
Channel #2: CWC ^d	1,071,103	1,095,750	1,131,948
Channel #3: Alternate distribution pilot			150,000
<i>Estimated Total Need for Continuous (ANC and CWC)</i>	2,193,908	2,256,358	2,468,662
Mass Distribution Needs (in 23 counties)			
2017 mass distribution campaign	15,178,203 ^e	0	0
<i>Estimated Total Need for Campaigns</i>	15,178,203	0	0
Total Calculated Need: Continuous and Campaign	17,372,111	2,256,358	2,468,662
Partner Contributions			
ITNs carried over from previous year	1,178,280	3,131,169	1,374,811
ITNs from Government	0	0	0
ITNs from Global Fund ^f	15,200,000	0	6,087,200
ITNs from DFID	800,000	0	0
ITNs planned with PMI funding	3,325,000	500,000	1,150,000
Total ITNs Available	20,503,280	3,631,169	8,612,011
Total ITN Surplus (Gap)	3,131,169	1,374,811	6,143,349
^a 36 counties targeted for routine ANC and EPI: Lake endemic, coast endemic, highland epidemic, certain semi-arid and low risk counties ^b 23 counties targeted for mass campaign: Lake endemic, coast endemic, highland epidemic ^c ANC: 3.4% of the population is pregnant, 96% attend first ANC in 2017 and 97% in 2018 and 2019 ^d CWC: 3.21% of the population is <1yr, 97% EPI coverage in 2017 and 2018, 98% in 2019 ^e Mass campaign need calculated based on 1 net per 1.8 people plus 10% buffer. Based on previous, higher, population estimates. ^f 6 million nets from Global Fund in 2019 will be used for the campaign in early 2020. Planning numbers indicate there will be over a 9 million net gap in 2020.			

Plans and justification

With FY 2018 funds and commodity cost savings from previous years, PMI will procure and distribute up to 1 million ITNs free of charge to pregnant women and children under one year through ANC and CWC. PMI will procure 150,000 ITNs and support the implementation and evaluation of an alternate distribution channel in one county, with the ultimate goal of using routine distributions to fill more of the net gap that develops between mass campaigns. As the current KMS only includes routine distribution through ANC and CWC, no additional channels can start before a new KMS is finalized. The MPR will examine the possible alternative channels and make recommendations that will guide the

choice of channels to be included the new KMS. PMI support for additional continuous distribution channels will then follow the new KMS.

Due to the high ITN attrition seen from the last round of durability monitoring, and as different ITN brands being distributed in the next mass campaign, ITNs will be monitored at two sites after the 2017 mass campaign. The NMCP would prefer sites in areas of highest malaria burden, such as the lake and coast endemic zones. Reprogrammed FY 2017 funds will be used for the baseline and 12-month surveys and FY 2018 funds will be used for the 24-month survey. Durability monitoring after the 2017 distribution, following the PMI guidance, will include additional questions to understand environmental risk factors, SBCC exposure, knowledge and attitudes, and causes of net attrition, in case net loss is as high as what was seen in the last round of monitoring from the 2014/15 campaign.

Proposed activities with FY 2018 funding: (\$2,875,000)

1. ***Procure ITNs for routine distribution:*** Fill the ITN gap for routine distribution by purchasing up to 1 million ITNs for routine distribution through ANC and CWC in 36 target counties. (\$1,000,000) (an additional \$2,000,000 from commodity cost savings in 2016 will contribute to this procurement)
2. ***Logistic and program support for routine ITN distribution:*** Provide logistical support, including transportation and storage of ITNs, for distribution of the 1 million ITNs within the 36-county routine distribution system. (\$1,000,000)
3. ***Procure ITNs for an alternate continuous distribution channel in one endemic county:*** Procure 150,000 ITNs for a continuous distribution channel in one sub-county, with the eventual goal of scaling up in high transmission areas. The specific approach will be based on the outcome of the MPR in late 2017 and the new KMS, expected by the end of 2018. (\$450,000)
4. ***Logistic and program support for continuous ITN distribution:*** Support an alternate ITN distribution channel to maintain high coverage following the 2017 mass campaign. The specific approach will be based on the outcome of the MPR in late 2017 and the new KMS, expected by the end of 2018. The current amount is based on actual costs for the continuous community distribution pilot. (\$225,000)
5. ***Net durability monitoring:*** Support the 24-month ITN durability monitoring survey at two sites that will be receiving nets during the 2017–2018 mass campaign, one site each in the lake and coast endemic zones. Support includes ensuring data quality and conducting analyses. (\$200,000)
6. ***SBCC to support ITN use:*** At the community level, CHVs will enhance interpersonal communication (IPC) approaches to target household members during their routine household visits. Enhanced IPC will ensure that the target risk groups receive appropriate messages promoting the correct and consistent use of ITNs. Messages on ITN use will be delivered in health facilities, particularly ANC clinics and during consultations in OPD, at women’s groups, during health talks, and through poster and information displays. Community *barazas*, dramas, and public gatherings will also be used to deliver malaria prevention and control messaging, including use of ITNs. (see more details in the SBCC section)

c. Indoor residual spraying

Progress since PMI was launched

PMI began spraying in Kenya in two highland districts and one lowland district (now sub-counties) in 2008 (Table 9). However, the NMCP shifted the IRS strategy to focus on lowland-endemic sub-counties beginning in 2010. In response, PMI shifted resources to target in 2012 six sub-counties from three counties and cover a total population of 2.4 million. Resistance to pyrethroids was observed in several locations in western Kenya and after the 2012 spray campaign, the NMCP decided to halt IRS until alternative non-pyrethroid insecticides could be registered for use. Since 2012, the NMCP has developed Integrated Vector Management and Insecticide Resistance Management strategies along with an IRS Business Plan, and in 2016 a long-acting organophosphate insecticide was registered for IRS. The IRS Business Plan calls for targeting an increasing number of endemic counties, starting with those bordering the highlands of western Kenya. This approach aims to reduce the malaria burden in the targeted endemic counties and to serve as a barrier to the introduction of malaria into highland, epidemic prone areas.

Table 9. PMI-supported IRS activities, 2008 – 2019

Calendar Year	Number of Counties Sprayed	Number of Sub-Counties Sprayed	Insecticide Used	Number of Structures Sprayed [†]	Coverage Rate [†]	Population Protected [†]
2008	2	3	Lambdacyhalothrin	764,050	96%	3,061,967
2009	2	3	Deltamethrin	517,051	94.6%	1,435,272
2010	2	5	Alphacypermethrin	503,707	97.1%	1,892,725
2011	2	5	Deltamethrin	485,043	89%	1,832,090
2012	3	6	Deltamethrin	460,447	98%	2,435,836
2013	0	0	NA	0	NA	0
2014	0	0	NA	0	NA	0
2015	0	0	NA	0	NA	0
2016	0	0	NA	0	NA	0
2017	1	6	Pirimiphos-methyl	212,029	98%	906,388
2018*	2	14	Pirimiphos-methyl	491,044	NA	2,155,806
2019*	2	14	TBD	491,044	NA	2,155,806

*Represents projected targets based on national strategic plan and/or discussions with the NMCP.
[†]Figures presented through 2012 are from the Kenya IRS2 Task Order Final Report.

Progress during the last 12-18 months

In 2016 Kenya agreed to be one of the countries participating in the second round of the UNITAID NgenIRS project. The country, therefore, benefited from a copayment for a long-lasting, non-pyrethroid insecticide, allowing purchase of adequate product to cover the entire target area.

In 2016, the NMCP planned a small GoK-funded IRS campaign in two sub-counties in Migori County, with technical assistance from PMI. Although the GoK procured insecticide for the campaign, no funds were released for spray operations. The GoK, therefore, donated 27,755 bottles of insecticide to the 2017 campaign, reducing the amount PMI needed to procure.

After a five-year pause, IRS was conducted in Kenya from February to March 2017. Six sub-counties in Migori County were sprayed (Awendo, Nyatike, Rongo, Suna East, Suna West, and Uriri) while two remaining highland sub-counties with lower estimated parasite prevalence were not targeted. Prior to the start of the campaign, PMI supported micro-planning, geographical reconnaissance, pre-season

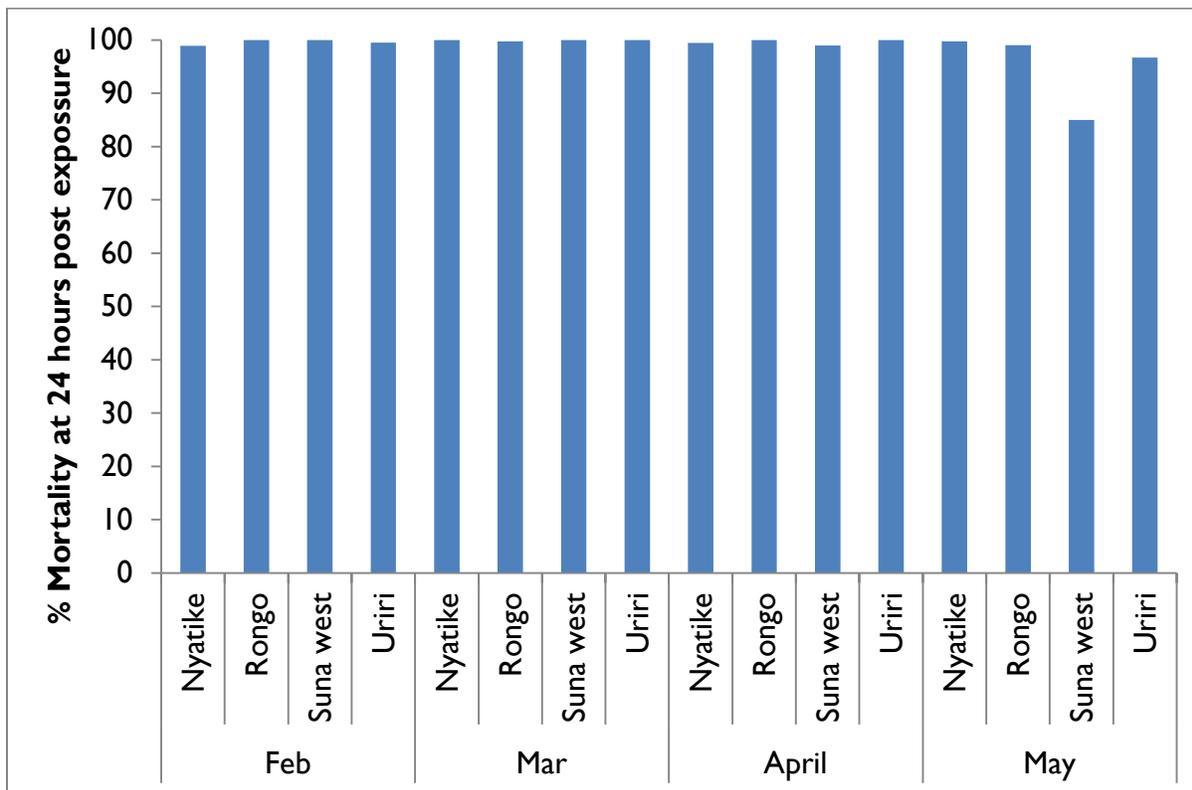
environmental compliance assessments of IRS operational sites, training for all cadres of seasonal workers, and door-to-door mobilization of the community. A total of 2,270 seasonal workers (48% female and 52% male) and 106 vehicles were hired to support the IRS activities.

This campaign targeted an estimated 226,826 structures in the 6 sub-counties. Spraying covered 212,029 of the 217,100 structures actually found, resulting in 98% spray coverage. A total of 906,388 people were protected, including 16,932 pregnant women and 127,157 children under five years of age. As there was no recent IRS on which to base insecticide quantification, PMI's implementing partner estimated that a single bottle of insecticide could cover 2.4 structures. Data on actual use from the 2017 spray campaign showed higher efficiency, with 3 structures per bottle. As of the writing of this MOP, a post-spray data quality assessment was underway to verify spray coverage data.

Challenges experienced during the campaign included rains interfering with operations, many refusals due to myths and misconceptions, locked structures in many urban areas, data quality, depletion of the IRS cards, and delays in paying stipends from the use of mPesa mobile payment system. However, by the third week of the campaign, most of the challenges had been resolved through supervision, weekly meetings at the sub-county level, and exchange of information between supervisors using WhatsApp.

Finally, to determine quality of IRS operations in Migori, wall bioassays were conducted within two weeks of spray implementation using a laboratory-reared, susceptible colony of *An. gambiae* s.s. Kisumu strain and then at monthly intervals. In each sub-county, a village with sprayed houses was identified for wall bioassays (Table 5), with seven houses of mud walls and three cemented walls selected. Results from cone bioassay tests demonstrated high potency of the insecticide used in the 2017 IRS program (Figure 9). Similar results were recorded across different sub-counties and at varying heights on the wall (data not shown), demonstrating good quality IRS. A fall below 90% mortality has been observed at one site with high survival of exposed mosquitoes from specific houses. However, these may be isolated cases of possible interference with the sprayed surfaces by the residents. There have been undocumented reports of some people washing their walls to remove the smell and stains of the insecticide and others smearing the walls with clay. Houses where the walls were smeared were excluded from the study but it was not possible to determine if household owners had washed the walls.

Figure 9. Percent mortality of susceptible *An. gambiae* s.s. Kisumu strain 24 hours post exposure via wall bioassays, by month of collection and by sub-county.



In February-March 2018, using FY 2017 MOP funds, the second round of spraying will be done in the 6 subcounties of Migori County sprayed in 2017, and the first round of spraying will be done in all 8 subcounties of Homa Bay County.

Plans and justification

PMI will support with FY 2018 funds an additional round of IRS in 2019 in Migori and Homa Bay, targeting an estimated population of 2.2 million people using a non-pyrethroid insecticide. Due to higher efficiency in spraying (covering 3 structures per bottle, vs. the expected 2.4), and the NgenIRS co-payment for insecticide, PMI expects to be able to cover with the same investment a larger number of structures in future campaigns. If funds are available (for example, from the Global Fund, as the TRP has approved the inclusion of IRS in Kenya’s request for funding for 2018-2020), then the 2019 IRS campaign may be extended to Kisumu County.

Proposed activities with FY 2018 funding: (\$7,000,000)

1. **IRS implementation and management:** Support IRS in Migori and Homa Bay Counties (estimated to reach 491,044 structures and up to 2.2 million people) with at least 85% coverage in all targeted areas, with blanket spraying within sub-counties. (\$7,000,000)

2. Malaria in Pregnancy

NMCP/PMI objectives

In the current KMS, the management of MIP is under objective 1, to ensure that 80% of people living in malaria-risk areas are using appropriate malaria prevention interventions by 2018. Malaria in pregnancy interventions are coordinated by the NMCP in partnership with the Reproductive Maternal and Newborn Health (RMNH) Unit. The goal of RMNH Unit is to ensure that all pregnant women who present at ANC receive the complete package for maternal health and new born services, including the three key malaria interventions: IPTp, provision of ITNs, and prompt diagnosis and treatment of malaria. To ensure proper oversight of MIP interventions, a technical working group chaired by the RMNH unit meets on a quarterly basis to review progress and provide guidance on any changes affecting services related to the management of malaria in pregnancy.

Kenya has adopted both the updated 2012 WHO policy on IPTp, as well as the 2013 consensus statement by MIP stakeholders, governments, multilaterals, bilaterals, and non-governmental organizations to optimize the delivery of MIP interventions. IPTp with SP in Kenya is recommended for 14 counties with endemic malaria, 5 in the coast endemic zone, 8 in the lake endemic zone, plus Tana River County, and administered by directly observed therapy (DOT) at each visit after quickening at 4-week intervals. The target is to ensure that all pregnant women receive a minimum of three doses of SP, as stated in the KMS 2009–2018. During the first ANC visit all pregnant women receive a free ITN and receive key messages on the importance of and need for using ITNs consistently.

In line with the case management strategy, any pregnant women with signs and/or symptoms of malaria at any ANC visit should be tested for malaria with a parasitological test and treated if positive. The first-line treatment for uncomplicated malaria in pregnancy is oral quinine in the first trimester and AL in the second and third trimesters. The recommended treatment for severe malaria in pregnancy is parenteral artesunate. The national diagnosis and treatment guidelines recommend that pregnant women receive ferrous sulfate (200 mcg) and folic acid (0.4 mg) at all ANC visits and are evaluated for anemia during the first and fourth ANC visits. If a woman is found to be anemic, then diagnostic testing for malaria is recommended.

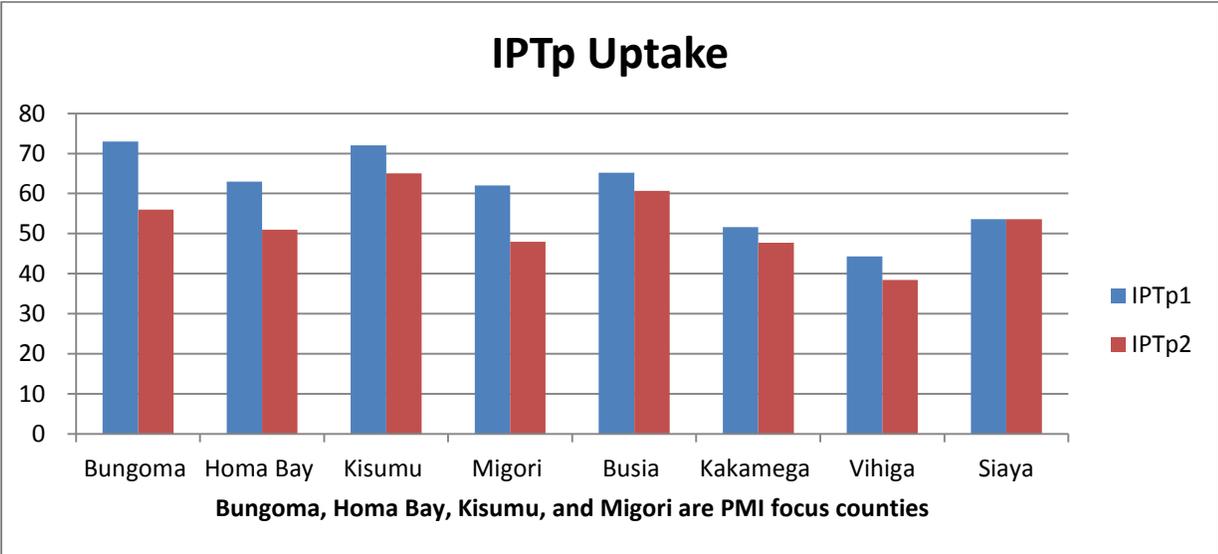
Progress since PMI was launched

Since PMI started supporting MIP interventions, a total of 2.5 million doses of SP have been procured and 30,168 healthcare workers trained on the MIP package of interventions. Since Kenya adopted the MIP strategy more than 16 years ago, IPTp coverage has remained below the national target of 80% despite a high first ANC attendance of 94% in women who receive services from a skilled provider (a doctor, nurse, or midwife). However, the 14 targeted endemic counties have made good progress, with estimated coverage with two or more doses of IPTp increasing from 13% in the 2007 MIS to the 56% in the 2015 KMIS. The latest survey also showed that an estimated 38% of pregnant women in endemic regions received the currently recommended three or more doses.

The 2015 KMIS also indicated that nationally over 58% of pregnant women used an ITN the night before the survey, an increase from 36% reported in the 2010 MIS survey. In the areas targeted for routine ITN distribution through ANC the proportion was higher, ranging from 62% in the highland epidemic zone to 84% in the coast endemic zone. Though overall the use of an ITN was well below the 80% target, in households with at least one ITN the proportion of pregnant women sleeping under an ITN was 82% nationally and over 88% in the lake and coastal endemic zones.

PMI has supported community-based MIP activities since 2011. These activities include MIP messaging, use of community data collection tools to capture IPTp uptake, and early referral of pregnant women to health facilities to access ANC and IPTp services. The CHVs in PMI-supported counties routinely visit households monthly in their area to collect data on health issues, register new pregnant women, check on previously registered ones, determine whether they are receiving SP at the health facility, and if not find out why. Newly-registered pregnant women are also referred to attend ANC clinics and sensitized to actually go to ANC and receive as many SP doses as scheduled. To date more than 200,098 pregnant women in targeted counties have been reached by CHVs. A comparison of routine data on IPTp uptake between PMI focus counties and some other counties, from DHIS2, indicated PMI focus counties had higher IPTp coverage than non-focus counties, 67.5% vs 53.7% for IPTp1 and 55% vs 50.1% for IPT2, respectively, as shown in Figure 10 below.

Figure 10. Uptake of IPTp in PMI focus counties vs. non-focus counties



Data collected by CHVs is forwarded to CHAs who verify and forward the data to the link facility health records and information officer for analysis and entry into the DHIS2 system. Counties use this data to identify areas with low IPTp uptake, identify influencing factors, and propose possible solutions. The DHIS2 system does not yet capture IPTp3 coverage, as that indicator was adopted as the preferred coverage indicator after the last revision of the DHIS2 aggregation tools. However, the current ANC register captures all IPTp doses given and the Division of Monitoring and Evaluation, Health Research Development, and Health Informatics (DivMEHRDI) has agreed to add IPTp3 to the aggregation tool when it is revised in 2018.

Table 10. Status of IPTp policy implementation in Kenya

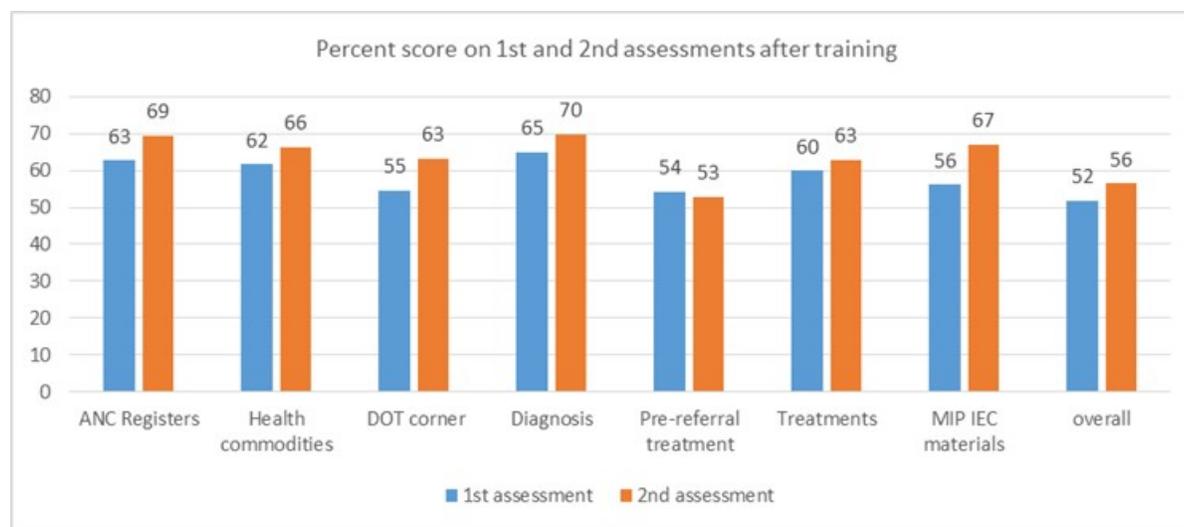
Status of training on updated IPTp policy		Number and proportion of HCW trained on new policy in the last year if training on new policy is not yet completed	Are the revised guidelines available at the facility level?	ANC register updated to capture 3 doses of IPTp-SP	HMIS/ DHIS updated to capture 3 doses of IPTp-SP
Completed/Not Completed	Date when expected to be completed				
First training conducted between 2011 and 2012 (5,759 trained). Second training on policy and standards-based management and recognition conducted in 2013 (1,200 facility in-charges trained). Third training conducted from 2014 and still in progress to date (8,049 trained so far).	In the next two years	1,068 (October 2016 to March 2017)	Yes	Yes	No

Progress during the last 12-18 months

PMI resident advisors participated throughout the development of the Global Fund request in early 2017, including the quantification of MIP commodity and TA for 2018 to 2020.

In the last 12-18 months PMI has continued to support MIP activities at the national, county, facility, and community levels. At the national level, NMCP has supported the management and coordination of the MIP TWG meetings under the leadership of the RMNH department. In addition, PMI supported the development, revision, printing, and dissemination of MIP information, education, and communication (IEC) materials, including the distribution of 1,200 copies of a job aid on decontamination of water cups to the counties, and review of a revised job aid changing the recommended minimum number of IPTp doses from two to three. At the county and sub-county levels, PMI has continued to support MIP interventions in the four targeted counties (Bungoma, Homa Bay, Kisumu, and Migori). In these counties PMI supported the development of annual MIP work plans (2016/17) which were consolidated with county plans. With respect to capacity building, PMI has supported trainings for both SCHMTs and CHMTs on MIP interventions. A total of 1,690 HCWs in 171 health facilities were mentored through supportive supervision with a focus on improving MIP performance standards, with improvement of assessment scores as shown in Figure 11. At the community level, a total of 4,964 CHVs were oriented on MIP and they in turn managed to reach 131,736 pregnant women with MIP-related messages.

Figure 11. Malaria in Pregnancy HCWs Performance Standards Assessment



Commodity gap analysis

Recent commodity forecasts show Kenya has adequate SP through 2019. The NMCP has proposed that, given the low costs for SP, they will advocate that the GoK fund future SP procurements after 2020.

Table 11. SP Gap Analysis for Malaria in Pregnancy by Calendar Year

Calendar Year	2017	2018	2019
Total population	46,621,575	47,854,071	49,086,567
Targeted population (14 counties)	13,734,651	14,058,069	14,381,487
SP Needs			
Total number of pregnant women attending ANC	395,558	404,872	414,187
Total SP Need (in treatments)	1,186,674	1,214,617	1,242,560
Partner Contributions			
SP carried over from previous year	4,318,320	3,131,646	1,917,029
SP from Government	0	0	0
SP from Global Fund	0	0	0
SP from other donors (UNICEF)	0	0	0
SP planned with PMI funding	0	0	0
Total SP Available	4,318,320	3,131,646	1,917,029
Total SP Surplus (Gap)	3,131,646	1,917,029	674,469
Assumptions:			
• population growth estimated 2.7% per year			
• average of 3.6% of the population would become pregnant in 14 counties (Coast, Western and Nyanza)			
• 80% of the pregnant women attend ANC			
• plan for 3 treatments of SP per pregnant woman			

Plans and justification

PMI will continue to support the implementation of MIP interventions, strengthening of ANC health worker capacity in endemic areas, dissemination of IPTp guidelines, and supportive supervision, with expansion into additional sub-counties. The focus on specific counties enabled the implementing partner to interact more closely with the four CHMTs and have deeper interactions with community health management teams and CHVs. The partner, CHMTs, and the CHVs together planned the various interventions identified for the particular county, carried out capacity building activities with the different groups, and then supported implementation, supervision, and regular reviews. PMI will continue to support the community health strategy by building the capacity of CHVs to mobilize, refer, track, and report on pregnant women and ANC attendance in their communities. The combined approach of supporting CHVs, CHAs, and healthcare worker through orientations, simplified guidelines, and supportive supervision helps to improve ANC attendance by pregnant women and coverage of IPTp and ITNs, in addition to other health services.

In the other lake endemic counties PMI supports MIP activities at county level through the CMCCs by facilitating support supervision in facilities, provision of promotional materials as well as supporting refresher trainings for health workers. In addition to support for SP procurement and distribution in coast endemic counties, in coast endemic and more moderate transmission counties, pregnant women are targeted for mass and routine ITN distributions and case management training on managing MIP. The NMCP feels these interventions are adequate to protect pregnant women from the effects of malaria in pregnancy.

At the national level, with FY 2018 funding PMI will continue to support MIP TWG meetings, MIP assessments during the MPR, quarterly coordination meetings between the NMCP and the RMNH Unit, and any necessary review of new guidelines and policy documents (for example, based on the new KMS). At county level, PMI will continue to support the training of both health workers and CHVs in about 400 health facilities across the four focus counties. The trainings will support the scale up of the package of MIP interventions, including IPTp delivery and quality improvement frameworks, in health facilities in the targeted endemic counties of Bungoma, Homa Bay, Kisumu, and Migori.

Proposed activities with FY 2018 funding: (\$700,000)

- 1. Sensitize and train healthcare workers and supervisors on malaria in pregnancy package of interventions and improve health facility reporting:** Healthcare workers in all healthcare facilities that provide ANC services in Bungoma, Homa Bay, Kisumu, and Migori Counties will receive training or refresher trainings with an estimated target of reaching over 400 healthcare facilities. Activities will include the re-orientation and training of facility in-charges and health service providers on the MIP package and ANC data collection, and implementation of a quality improvement framework. (\$300,000)
- 2. Sensitize, orient, and supervise CHVs on malaria in pregnancy package of interventions and improve reporting:** This activity will include the orientation, training, and supervision of CHVs to increase early referral to ANC services, register all pregnancies for follow-up, and provide advice on case management and ITNs. CHVs are trained to undertake SBCC activities and to refer and follow pregnant women to promote IPTp at health facilities. An estimated 4,000 CHVs will be sensitized and oriented using the community strategy and other innovative approaches. The target is to reach approximately 40,000 women of reproductive age with community MIP messages and services in four counties. (\$300,000)

3. **Strengthen national and county policy and monitoring capacity:** Though most of the activity implementation will be at county level, limited support will be provided at the national level in the areas of policy and monitoring and evaluation of MIP-specific activities. Technical assistance support will be provided to counties on MIP. (\$100,000)
4. **ITN continuous distribution channels:** PMI will support routine distribution of ITNs to pregnant women during the first ANC visit. (*Costs covered under the ITN section*)
5. **SBCC activities to promote IPTp and net use:** PMI will continue to promote ANC uptake and ITN use among pregnant women through integrated activities that are outlined in the SBCC section of this MOP. (*Costs covered under the SBCC section*)

3. Case management

a. Diagnosis and treatment

NMCP/PMI objectives

Early and accurate detection of *Plasmodium* infection followed by prompt treatment with an effective antimalarial are the cornerstones of malaria case management. Malaria case management policies, guidelines, and practices outlined in the *National Guidelines for Diagnosis and Treatment of Malaria in Kenya, Fifth edition, 2016* are fully aligned with WHO recommendations on universal diagnostic testing and treatment (Table 11). Objective 2 of the KMS is to have 100% of all suspected malaria cases presenting to a health provider managed according to the national malaria treatment guidelines by 2018. This objective will be achieved through the following strategies:

1. Capacity building of health workers in malaria diagnosis and treatment at health facilities.
2. Access to affordable malaria medicines and diagnostics through the private sector.
3. Strengthening community case management of malaria (CCMm) using the community strategy through CHVs.
4. Ensuring commodity security of antimalarials and diagnostics in the public sector.

The guidelines state that patients with symptoms of malaria (i.e., fever) in all age groups and in all epidemiologic zones should be tested by either microscopy or RDT, and only patients with test positive confirmed malaria should receive antimalarial treatment. However, appropriate treatment should not be denied or delayed due to absence of testing capacity. The KMS states that microscopy shall be deployed in hospitals (level 4 and 5 facilities) for malaria diagnosis, and RDTs will be used at the community and level 1, 2 and 3 health facilities. However, the NMCP 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. The national treatment guidelines recommend AL as the first-line treatment for uncomplicated malaria, and dihydroartemisinin-piperaquine (DHA-PIP) as the second-line therapy. Parenteral artesunate is the recommended first-line treatment for severe malaria. During pregnancy, the recommended first-line treatment for uncomplicated malaria is oral quinine in the first trimester and AL in the second and third trimesters. The recommended treatment for severe malaria in pregnancy is parenteral artesunate. The recommended pre-referral treatment for severe malaria is intramuscular (IM) or rectal artesunate (procured by Global Fund). If artesunate is not

available, IM artemether may be administered. In the absence of these pre-referral therapies, IM quinine is recommended.

Strengthening quality assurance of malaria diagnostic methods is a critical piece of the case management strategy. The malaria program is operationalizing the QA/QC implementation plan at national and county levels. Implementation of QA/QC includes training of QA officers, supportive supervision and on-the-job training of technicians and QA officers, disseminating the malaria laboratory guidelines and curricula, convening laboratory sub-committee meetings to monitor progress, and identification and setting up of national and county reference labs.

Table 12. Status of Case Management Policy in Kenya according to National Guidelines for the Diagnosis, Treatment, and Prevention of Malaria in Kenya, 2016	
Diagnostic testing:	All cases should be confirmed by light microscopy or RDT and only those with positive results should be treated
First-line treatment for uncomplicated <i>P. falciparum</i> malaria:	AL
Second-line treatment for uncomplicated <i>P.falciparum</i> malaria:	DHA-PIP
Treatment for uncomplicated <i>P vivax</i> malaria:	AL plus 14-day course of primaquine
First-line treatment for severe malaria:	Parenteral artesunate (intravenous preferred)
In pregnancy, first-line treatment for uncomplicated <i>P. falciparum</i> malaria in the first trimester:	Oral quinine for 7 days (AL if quinine unavailable) (*no treatment specified for <i>P. vivax</i>)
In pregnancy, first-line treatment for uncomplicated <i>P. falciparum</i> malaria in the second and third trimesters:	AL (*no treatment specified for <i>P. vivax</i>)
In pregnancy, first-line treatment for severe malaria:	Parenteral artesunate (intravenous preferred) (artemether or quinine if artesunate unavailable)
Recommendations for pre-referral treatment of severe disease at peripheral health facilities:	Intramuscular or rectal artesunate Intramuscular artemether if artesunate unavailable
Recommendations for pre-referral treatment of severe disease recommended for community health workers:	Roll-out of providing rectal artesunate and training to CHV to begin in 2018
Recommended age group for pre-referral rectal artesunate treatment:	Children <6 years of age, and only when intramuscular artesunate is unavailable

Case management in the private sector

Kenya has a large and robust private health sector, including a growing health insurance component, with numerous commercial, governmental, and non-governmental partners working on quality of care initiatives, from diagnostic algorithms to physician detailing to pay-for performance incentives. The KMS includes support for the private sector. Private pharmacy and OTC staff have been trained on malaria case management, recognition of severe malaria signs, referral advice, and appropriate drug storage in order to improve prescriber practices among the outlets. UNITAID, DfID, Clinton Health Access Initiative (CHAI), and the Global Fund have supported the NMCP with various projects to strengthen availability of RDTs and ACTs in the private sector, as described below.

Case management at community level

Two approaches to community case management of malaria are currently pursued in Kenya through the community health system. The NMCP supports CCMm through CHVs in the eight lake endemic and two highland epidemic counties, while UNICEF supports a broader national strategy to implement integrated community case management (iCCM) of malaria, pneumonia, and diarrhea in children under 5 years of age in 11 counties (including 2 counties in the lake endemic zone, Siaya and Homa Bay, and Turkana County in the seasonal transmission zone). The NMCP supports CCMm as part of the MoH Community Health Strategy, and is prioritizing expansion of CCMm throughout the endemic counties. The MPR, scheduled for late 2017, will examine opportunities for coordination and integration of CCMm and iCCM. A standard malaria curriculum is used to train CHVs on CCMm, SBCC, and reporting. The “link” specific health facility supplies CHVs with ACTs, RDTs, and SBCC materials and CHAs who conduct supportive supervision. The CHVs are trained to test and treat for uncomplicated malaria with RDTs and ACTs; pre-referral treatment by CHVs should begin in 2020, after an initial phase where it will be done in level 2 and 3 facilities.

Progress since PMI was launched

The NMCP, PMI, and partners have invested in three key areas related to malaria case management: 1) provision of microscopes and training and supervision of clinical and laboratory personnel; 2) implementation of QA/QC systems for malaria microscopy and RDTs; and 3) procurement and distribution of malaria commodities.

PMI resident advisors participate on the case management TWG that meets quarterly and provides a forum for planning and coordinating case management activities and disseminating findings. They also participate at two case management sub-committees convened by the NMCP: i) drug management and ii) diagnostics.

Since 2008, PMI has procured and distributed approximately 160 microscopes, 24 million RDTs, and 55 million AL treatments. PMI procures RDTs and AL that are pooled centrally and distributed to all public health facilities. In the lake endemic counties, where functional CHUs exist and CHVs have been trained in CCMm, RDTs, and AL are provided to CHVs from their link health facilities for CCMm.

The NMCP, PMI, and partners have supported the training and supervision of clinical and laboratory personnel in accurate malaria diagnostics and appropriate treatment of uncomplicated and severe malaria. PMI has supported strengthening of diagnostics by training over 5,600 healthcare and laboratory workers. PMI has also trained over 5,000 healthcare workers on national case management guidelines (all prior to 2011).

A QA/QC system for malaria diagnostics was established in late 2012 with support from PMI, DfID, WHO, and World Bank. The initial focus was two-fold: (1) to select experienced laboratory technicians from county and sub-county laboratories and train them to be QA officers, and (2) to develop standard operating procedures, tools, and supervisory checklists for both internal and external QA/QC at the health-facility level. The NMCP has requested that counties identify existing laboratory space and technicians for a county reference laboratory and that county health plans and budgets include routine QA/QC systems for laboratory diagnostics. PMI has focused support on development of guidelines and training of QA officers in the eight malaria endemic counties. Initial PMI support focused on training quality assurance officers and supporting their QA/QC visits in low-transmission areas, where slide positivity rates were 3-7%. They found at the start of training staff had low scores for sensitivity, counting, and species ident, but good scores for specificity. The QA/QC training led to improved

specificity from 88% to 98%, increased use of QA/QC practices, and increased availability of job aids and other reference materials. Similar results were found in visits to health facilities in low-transmission areas, with high agreement for specificity between supervisor reading and tech reading, but low agreement on sensitivity and overall low concordance of results (Kappa = 0.48).²²

Although private-sector case management activities have not been a priority for PMI in Kenya, UNITAID, DfID, and CHAI have supported pilot projects to increase RDT use in the private sector and Kenya received support from the Affordable Medicine Facility for Malaria (AMFm) and other donors to subsidize the price of ACTs in the private sector. Pilot projects to increase access to RDTs in the private sector in coast endemic counties were done from 2013 to 2017 with DfID and UNITAID support. The NMCP 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. The implementing partner is now continuing to strengthen the market for RDTs while transitioning sales to private suppliers, and advocating to include private sector RDTs in NMCP's quality assurance program.

After the AMFm pilot phase in Kenya from 2010 to 2012, support for the subsidies has continued with support from DfID (2013-2017) and the Global Fund malaria grant (2018-on) through the Global Fund co-payment mechanism. A study conducted by a malaria Field Epidemiology and Laboratory Training Program (FELTP) resident and supported by PMI found that by October 2013, 91% of rural, informal drug outlets stocked quality-assured AL at the price target of \$1.00 per treatment, but only 10% of drug outlets stocked RDTs.²³ The 2016 ACTwatch Outlet Survey for 2016²⁴ found ACTs in stock in 71% of registered pharmacies and 64% 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% of private, for-profit health facilities and 10% of general retailers with at least one antimalarial in stock. Facilities without ACTs typically stocked SP or oral quinine.

The NMCP has rolled out CCMm training in all 10 counties. Through the Global Fund grant AMREF has provided support for the training and support for 735 CHUs which includes over 35,000 CHVs and 1,400 CHAs providing services to a beneficiary population of 3.5 million people. No support is in place to train the remaining CHVs in the remaining functional CHUs. Continued support for the work of these CHVs has been included in the Global Fund request for 2018-2020. PMI support for CCMm is limited to provision of ACTs and RDTs to CHVs. UNICEF generally provides antibiotics, oral rehydration/zinc, and respiratory timers for CHVs implementing iCCM in 11 counties.

The 2015 MIS reported that mothers sought advice or treatment for 72% of children under five years of age who had a fever in the two weeks before the survey, an increase from 58% in the 2010 MIS. Among the vast majority of children, the advice or treatment was received from a government (72%) [including faith-based] or private health provider (25%), with only 1% receiving CCMm from a CHV. Compared

²² Wanja E, Achilla R, Obare P, Adeny R, Moseti C, Otieno V, Morang'a C, Murigi E, Nyamuni J, Monthei DR, Ogutu B, Buff AM. Evaluation of a laboratory quality assurance pilot programme for malaria diagnostics in low-transmission areas of Kenya, 2013. *Malar J.* 2017 May 25;16:221

²³ Kioko U, Riley C, Dellicour S, Were V, Ouma P, Gutman J, Kariuki S, Omar A, Desai M, Buff AM. A cross-sectional study of the availability and price of anti-malarial medicines and malaria rapid diagnostic tests in private sector retail drug outlets in rural Western Kenya, 2013. *Malar J.* 2016 Jul 12;15:359.

²⁴ ACTwatch Group and Population Services Kenya (PSK). (2017) ACTwatch Study Reference Document: Kenya Outlet Survey 2016. Washington, DC: PSI. Available at www.ACTwatch.info, accessed 22 June 2017

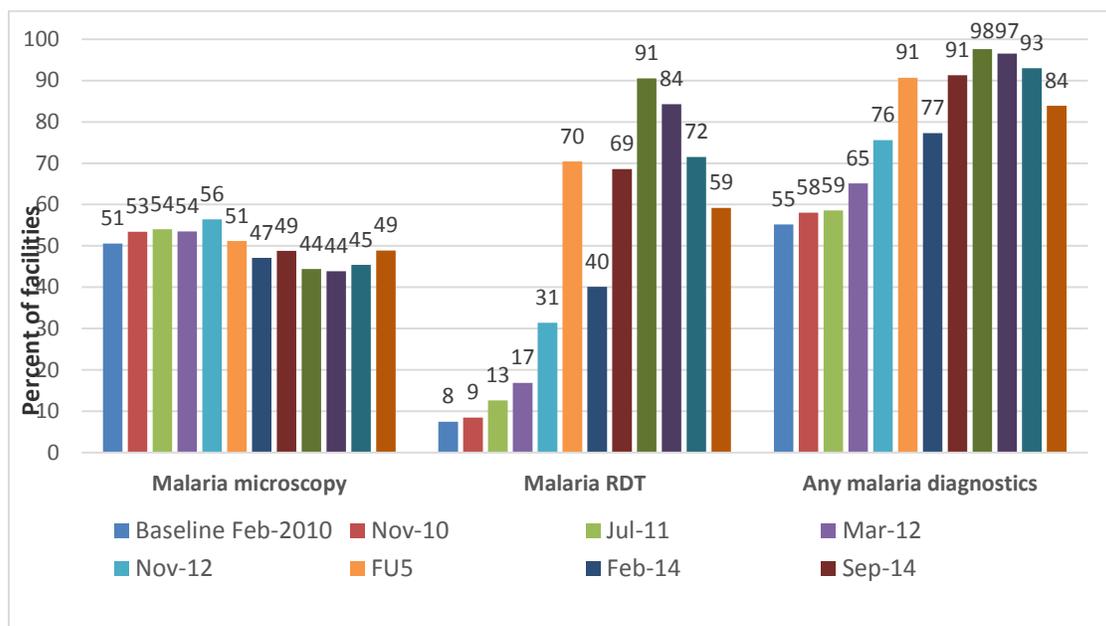
with the 2010 MIS, government provider increased 4%, private increased 2%, and CHV decreased 1%. In the Lake Endemic Zone, the 2015 MIS reported 65% care seeking, of which 73% was government, 22% private, and 4% CHV. This survey also showed progress in testing of suspect malaria cases when compared to the 2010 MIS. The percentage of children under five years of age with fever who had blood taken for testing increased from 12% in 2010 to 39% in 2015 nationwide and increased from 11% to 59% in the Lake Endemic Zone. In 2015, among children with fever given an antimalarial drug, 92% took an ACT compared to 51% in 2010.

Progress during the last 12-18 months

In early 2017, PMI resident advisors participated throughout in the development of the case management section of the Global Fund request, provided TA for case management, monitoring field visits, and case management TWG meetings. A national strike of public-sector health workers in November and December 2016 greatly affected service delivery, mostly at government-run hospitals and lower-level facilities. Commodity orders and data reporting also suffered during this time

PMI investments in health worker training and job aids continue to support the official launch and dissemination of the latest edition of the national guidelines for malaria case management. The QoC survey done in February 2017 indicates that 67% of health workers were trained on the newest case management policy; and 64% of health facilities had up-to-date case-management guidelines, 43% had AL dispensing charts, and 25% had new diagnostic algorithms on display.

Figure 12. National trends in the coverage of health facilities with malaria diagnostics—Kenya, 2010–2017

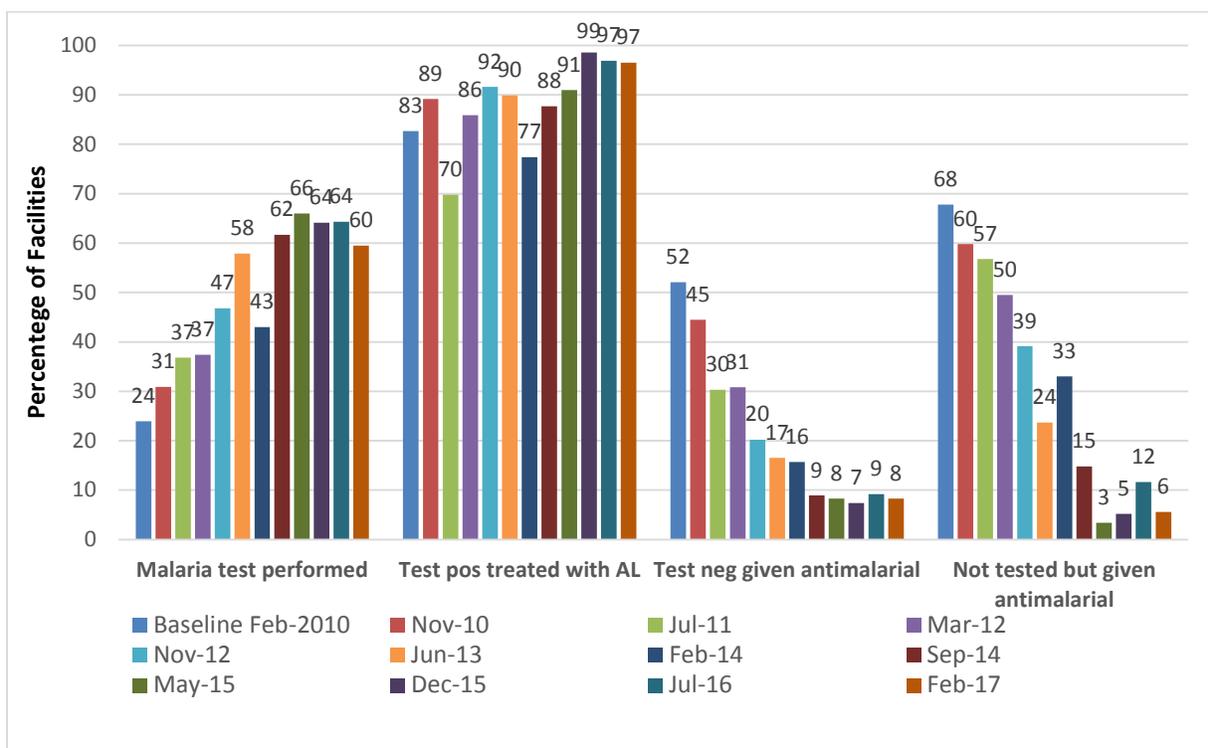


The QoC surveys also evaluate aspects of health worker performance in case management. Figure 12 shows the availability of malaria diagnostics at health facilities has increased overall from 55% in 2010 to 98% in May 2015, with a later decline to 84% in February 2017. Most of this trend has been due to increases in availability of RDTs to 91% of facilities in May 2015, with a similar fall since, to 59% in February 2017. Figure 11 shows that testing of patients with fever and suspected malaria increased from 24% at baseline in 2010 to 60% in 2016. As availability of malaria diagnostics is now consistently over 80%, the plateau in national rates of testing suspected malaria cases may be related to the epidemiology

of malaria in Kenya. Most of the country has low malaria prevalence, thus clinicians are less likely to suspect malaria and test every patient coming with fever, especially if another source of infection is identified. The impact low transmission areas may have on QoC results is supported by the 2015 MIS, which found higher testing rates in the two endemic zones for children under five years of age with fever (59% lake endemic and 44% coastal endemic) than those in non-endemic zones (38% highland epidemic, 23% seasonal, and 26% low risk). In addition, the low proportion of patients not tested who are prescribed an antimalarial behavior in the latest survey (6%) suggests clinicians are not still suspecting malaria even when they do not test (Figure 11). However, the overall rates of testing also follow the trend in availability of RDTs, with a peak in May 2015 and a decline since, suggesting remaining gaps in access to diagnostics and in testing all suspected malaria cases.

Treatment of patients who test positive in health facilities where AL was available reached 97% in the February 2017 QoC survey. The percentage of test-negative patients who still received an antimalarial declined to 8% in February 2017, reflecting a dramatic improvement in the inappropriate practice of treating unconfirmed cases with an antimalarial (Figure 13).

Figure 13. National trends in health workers diagnostic and treatment adherence to national case management guidelines where malaria diagnostic services were available and AL was in stock—Kenya, 2010–2017



In addition to RDT procurement, distribution, and training, the NMCP, through counterpart financing required as a condition of the Global Fund grant, has provided an average of 17 microscopes to each county, with 5 dedicated to a county reference lab and the rest to health facilities according to the county’s priorities. PMI continues to support the QA/QC system for malaria diagnostics both nationally and in eight counties of the lake endemic zone. PMI has been supporting the finalization of the National Quality Assurance Guidelines on Parasitological Diagnosis of Malaria. In the lake endemic counties, PMI partners supported training of 73 laboratory supervisors in outreach training and supportive supervision (OTSS) during advanced diagnostic refresher training and 159 health facility lab staff during

basic diagnostic refresher training. As with previous training, results were poor at the start of microscopy trainings (63-75% for detection, 22-24% for identification, <10% for quantification), and though scores improved after training, just over half of technicians reached the required standard. OTSS visits showed that half of facilities offering microscopic diagnosis of malaria had staff trained in that subject. PMI has also supported training on RDT performance and QA/QC for 491 health facility staff in the lake endemic counties. A third round of OTSS was conducted at 930 health facilities across all eight endemic counties. The proportion of laboratories meeting 90% standard for malaria diagnosis during OTSS was low at the first visit (40%), increasing to 70% in those receiving three OTSS visits. The OTSS results for RDT usage has generally been higher, 75-85% during all OTSS rounds.

The NMCP plans to provide additional assistance to county reference laboratories using funds from the upcoming Global Fund allocation, specifically for QA training, proficiency testing, slide re-checking, and quarterly exams. Additional resources will be needed for future purchases of consumables and reagents, QA training, establishing a reference slide bank, and quarterly review meetings and examinations.

Over 14,000 healthcare workers have been trained on the use of parenteral artesunate for severe malaria. The latest inpatient QoC survey reported that 48% of health facilities had parenteral artesunate in stock on the day of the survey. A new OTSS performance checklist was developed for evaluating management of severe malaria and anemia management.

PMI has been supporting therapeutic efficacy monitoring at sites in western Kenya to complement therapeutic efficacy monitoring supported by other partners (Table 13). A therapeutic efficacy study (TES) was begun at one site in 2015, but the study was terminated due to financial issues with the implementing partner. The PMI-funded TES was restarted at three sites in 2016 and completed data collection by mid-2017. The World Bank currently funds TESs at four other sites in western and coastal Kenya, with results expect in late 2017. Analysis of the *P. falciparum* K-13 propeller mutation associated with artemisinin resistance is planned.

Table 13. Therapeutic efficacy monitoring status, 2015-2019

Completed TESs		
Year	Site name	Treatment arm(s)
2015	Siaya County Hospital	AL, DP
Ongoing TESs		
Year	Site name	Treatment arm(s)
2016-17	Siaya County Hospital	AL, DP
2016-17	Bar Agula Dispensary (Siaya County)	AL, DP
2016-17	Mulaha Dispensary (Siaya County)	AL, DP
2017	Msambweni (Kwale County, coast endemic)	AL, DP
2017	Ahero (Kisumu County)	AL, DP
2017	Busia (Busia County)	AL, DP
2017	Kisii (Kisii County, highland epidemic)	AL, DP
Planned TESs FY 2018		
Year	Site name	Treatment arm(s)
2019	Siaya County Hospital	AL, DP
2019	Bar Agula Dispensary (Siaya County)	AL, DP
2019	Mulaha Dispensary (Siaya County)	AL, DP
2019	Msambweni (Kwale County, coast endemic)	AL, DP

*Commodity gap analysis***Table 14. RDT Gap Analysis**

Calendar Year	2017	2018	2019
RDT Needs			
Total country population	46,621,575	47,854,071	49,086,567
Population at risk for malaria	46,621,575	47,854,071	49,086,567
PMI-targeted at-risk population	46,621,575	47,854,071	49,086,567
Total number of projected fever cases ^(a)	20,429,327	21,129,569	21,855,012
Percent of fever cases tested with an RDT	55%	50%	50%
Total RDT Needs ^(b)	11,841,282	10,916,944	11,307,256
Partner Contributions			
RDTs carried over from previous year	0	6,770,643	100,000
RDTs from Government	0	0	0
RDTs from Global Fund	10,751,925	1,246,301	5,653,628
RDTs from Other Donors	0	0	0
RDTs planned with PMI funding ^(c)	7,500,000	3,000,000	5,600,000
Total RDTs Available	18,251,925	11,016,944	11,353,628
Total RDTs Surplus(Gap)	6,770,643	100,000	46,372
(a) Projected number of fever cases (public, community and private) calculated from malaria cases in DHIS2 (confirmed and suspected) adjusted for testing rate (baseline 64%, projected to increase to 80% by 2020), positivity rate (32%) and compliance (87.5%) [Kenya Global Fund Gap Analysis Tables, May 2017]			
(b) Total RDT needs for public health facilities (73%) and community (2%)			
(c) PMI RDTs for 2017 (7,500,000) have been rescheduled for delivery in early 2018			

Table 15: ACT Gap Analysis

Calendar Year	2017	2018	2019
ACT Needs			
Total country population	46,621,575	47,854,071	49,086,567
Population at risk for malaria	46,621,575	47,854,071	49,086,567
PMI-targeted at-risk population	46,621,575	47,854,071	49,086,567
Total projected number of malaria cases ^(a)	15,894,017	15,672,506	15,414,343
Total ACT Needs ^(b)	11,920,513	11,754,379	11,560,758
Partner Contributions			
ACTs carried over from previous year	3,050,000	1,865,997	811
ACTs from Government	0	0	0
ACTs from Global Fund	6,786,510	4,011,193	5,780,379
ACTs from Other Donors	0	0	0
ACTs planned with PMI funding	3,950,000	5,878,000	5,800,000
Total ACTs Available	13,786,510	11,755,190	11,581,190
Total ACT Surplus (gap)	1,865,997	811	20,432
(a) Projected number of malaria cases (public, community, and private sector) calculated from DHIS2 adjusting for reporting rates, stockout rates (13.5%), vector control (5%-2018, 10%-2019), and increasing diagnosis and compliance [Kenya Global Fund Gap Analysis Tables, May 2017]			
(b) Total ACT needs for public health facilities (73%) and community (2%)			

Plans and justification

With FY 2018 funds, PMI will build upon progress to date in scaling-up malaria diagnostic testing capacity, strengthening of treatment practices and patient management, and QA/QC systems. PMI supports biannual national quantification analyses to ensure that RDT and AL requirements are properly forecasted. PMI is closely monitoring the use and supplies of RDTs and ACTs and working with the NMCP to avoid overstock and out-of-stock situations at county and lower levels (see Pharmaceutical Management section). Procurements with FY 2018 funds will be based on the quantification developed by the NMCP, PMI, and PMI partners for the Global Fund request, with the total quantities split roughly 50:50 between those funded by PMI and those funded by Global Fund. Therefore, PMI will procure approximately 5.6 million RDTs to help meet the projected national RDT need based on testing of all suspected malaria cases. Increased emphasis on the use of microscopy at all levels of care, where functioning microscopes exist, has led to overstocks of RDTs in 2017. As a result, the NMCP and PMI have had reduce RDT orders for 2017. The national AL need has been decreasing due to prevention efforts, increased availability of diagnostics, and implementation of the “test, treat, track” policy. PMI will procure approximately 5.8 million AL treatments to help meet the projected national AL need. In addition, using FY 2018 funds, PMI will procure 500,000 vials of injectable artesunate to meet 44% of the need for treatment of severe malaria, with the balance to be supported by Global Fund.

PMI will work with the NMCP during the upcoming MPR to better document current practice and gaps in reaching the goal of testing 100% of suspected cases, and to provide recommendations to improve QA/QC systems. While programming may need to change in line with changes in the new malaria strategy for 2019-2028, PMI will build on previous investments and continue to support integrated strengthening of case management (i.e., strengthening diagnostic capacity and clinical treatment proficiency together) at the health-facility, sub-county, and county levels, focusing on the eight high-burden high-priority counties in western Kenya.

Proposed activities with FY 2018 funding: (\$11,347,464)

1. **Procure RDTs:** Procure approximately 5.6 million RDTs, which represent approximately 50% of the total annual public-sector facility and community need. (\$2,520,000)
2. **Procure AL:** Procure approximately 5.8 million AL treatments, which represent approximately 50% of the total public-sector facility and community need. (\$5,130,104)
3. **Procure severe malaria medications:** Procure severe malaria drugs, including up to approximately 500,000 vials of injectable artesunate for severe malaria, which represent approximately 44% of the total public-sector need. (\$1,260,000)
4. **Logistic and program support for RDT, AL, and parenteral artesunate distribution:** Provide warehousing, storage, and distribution for RDTs, AL, and severe malaria medicines from central to facility level nationwide via KEMSA. (\$715,360)
5. **Capacity building for and support to the NMCP for malaria case management and diagnostics:** Support to the National Malaria Control Program for oversight and mentorship of malaria case management and diagnostics. (\$300,000)
6. **Capacity building for and strengthening malaria case management at county and health facility level:** Achieve higher performance among users of RDTs and microscopy to inform treatment decisions for uncomplicated and severe malaria at high-volume and community-linked health facilities in all eight lake endemic counties. The target for activity implementation is over 800 public health facilities. The diagnostics component will include strengthening diagnostic capacity of existing laboratory and healthcare staff through ongoing refresher trainings and OTSS for laboratory supervisors, on-the job training, and mentoring of county/sub-county/health-facility staff to enable case management improvements at the health-facility level. Support will also be provided for integrated implementation and strengthening of the QA/QC framework for malaria diagnostics in focus counties.

The treatment component will include strengthening clinical capacity of existing healthcare staff through refresher trainings and capacity building for supportive supervision, on-the-job training, and mentoring of county/sub-county/health-facility staff to improve the management of uncomplicated and severe malaria and malaria in pregnancy. In-line with national case management guidelines PMI will support the appropriate and rational use of AL and parenteral artesunate at referral, high-volume and community-linked health facilities in all eight malaria-endemic counties in western Kenya. (\$1,100,000)
7. **Therapeutic Efficacy Studies:** Implement TESs at four sites, three in western Kenya and one on the coast, during the high transmission season of 2019. Both the first-line (AL) and second-line (DHA-PPQ) ACTs will be included, with K13 testing also planned. (\$312,000)
8. **Technical assistance:** Support one CDC in-country technical assistance site visit for malaria case management. (\$10,000)

b. Pharmaceutical management

NMCP/PMI objectives

The *National Guidelines for the Diagnosis, Treatment and Prevention of Malaria in Kenya Fifth Edition, 2016* identifies commodity security as a critical component for effective case management of

malaria. Confirmed parasitological diagnosis and appropriate and effective treatment of malaria requires a well-functioning supply chain system that ensures a consistent availability of malaria medicines and diagnostics to all levels of health care. A highly skilled health work force is also essential for good stock management and appropriate use of malaria commodities. PMI continues to support the NMCP to fill commodity gaps through procurement of malaria commodities including RDTs, all weight-based packs of AL, SP, and artesunate, their distribution to over 5,000 public MoH facilities countrywide, and training health workers at facility level on stock and logistics management. PMI works closely with the NMCP and partners to estimate the country needs annually through forecasting and quantification, monitoring stock status and pipeline review. KEMSA distributes malaria commodities to all public health facilities country wide. The county pharmacists are responsible for reporting to DHIS2 and placing orders through KEMSA

In 2016, PMI procured 11.3 million RDTs and distributed 6.1 million, with the remaining distributed in 2017. PMI also procured 4.7 million AL treatments and distributed 4.2 million treatments to health facilities. These procurements contributed to national RDT and AL stocks and complemented Global Fund procurement cycles.

Progress since PMI was launched

Since 2008, PMI has supported the NMCP to strengthen the health supply chain systems through procurement of 19.8 million RDTs and 54.7 million ACTs for distribution to beneficiaries.

PMI has supported the NMCP to improve availability of life-saving malaria commodities at service delivery points countrywide and the community level in high burden counties where CCMm is implemented. PMI has also provided technical support to the NMCP by building staff capacity for forecasting and quantification and strengthening leadership and coordination skills for commodity management. At county level, PMI has supported the formation and functionality of commodity security TWGs in focus counties as well as human and institutional capacity for commodity management. To improve reporting on malaria commodity logistics data, PMI has supported the NMCP to develop and disseminate reporting tools to all public health facilities, trained pharmaceutical personnel, and strengthened upstream flow of logistics data through DHIS2.

Since 2010, PMI provided support to the NMCP, the Pharmacy and Poisons Board (PPB), and the National Quality Control Laboratory (NQCL) for antimalarial medicines quality monitoring using Minilab® technology. Eleven sentinel sites where in-flow of commodities is greatest and where counties with large populations and high malaria burden are situated have been established and PMI supported procurement of a Minilab® for each site. With PMI support, PPB has completed six rounds of medicines quality monitoring and established a Pharmacovigilance and Post Marketing Surveillance technical working group with membership from Kenya Medical Supplies Agency (KEMSA), Mission for Essential Drugs (MEDS), the NQCL, and the priority Public Health Programs for HIV, TB, and Malaria. PMI has also supported the NQCL to achieve and maintain ISO 17025 accreditation.

Progress during the last 12-18 months

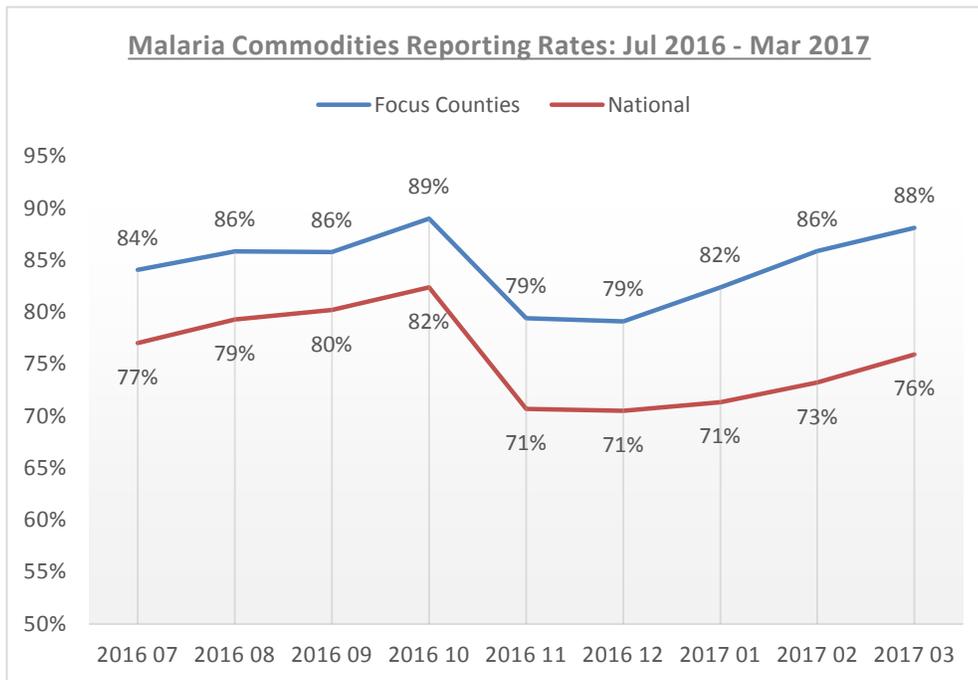
PMI has continued to support the NMCP to strengthen malaria commodity management at the national, county, and facility levels and to ensure logistics data are available to inform forecasting, quantification, procurement planning, pipeline, and stock status monitoring. In August 2016 the NMCP, with PMI support, conducted the FY 2016/17 National Annual Quantification for malaria commodities. A midyear review in March 2017 informed the adjustment of the projected procurement quantities and delivery timelines for already ordered commodities. During January to May 2017, PMI provided technical

support to the NMCP for completing the commodity gap analysis and writing the pharmaceutical management section of the Global Fund funding request for 2018-2020. In December 2016 and May 2017, PMI provided logistical and technical support to the NMCP for a biannual county pharmacists' forum that brings together, pharmacists, and lab personnel from the 47 counties to share best practices and lessons on malaria commodity management.

At the national level, PMI provided support for capacity building of newly recruited NMCP case management staff for quantification and supply planning of malaria commodity needs for over 5,000 public health facilities. PMI also supported pipeline-monitoring activities including the malaria commodities monthly stock status report. As a result, short expiry RDTs were redistributed from a seasonal transmission to a high burden county and the allocation of malaria commodities to 24 counties was increased to mitigate any upsurge of malaria following the rainy season.

To monitor progress in commodity availability status, PMI, in collaboration with Global Fund, supported the NMCP to undertake two rounds of quality of care surveys in August 2016 and February 2017. The results from both survey rounds revealed a declining trend in the availability of RDTs – only 59% of facilities were stocked with RDTs on the survey day in 2017 compared to 72% in 2016 (Figure 14). A similar decline was observed for availability of any AL pack on the survey day, from 95% in 2016 to 79% in 2017 (Figure 14). Possible reasons for the decline in availability of malaria commodities at facility level include logistical challenges associated with distribution of program commodities to counties procuring outside KEMSA and inaccurate reporting by the county on facility needs. The NMCP and partners, including PMI, have invested in strengthening the supply chain and supported counties to improve quantification and forecasting of commodity needs using routine DHIS2 data to ensure rational procurements. PMI is supporting the Drug Management Subcommittee and the Case Management TWG to identify and address the reasons for the declining and inadequate stock levels of malaria commodities observed at service delivery points. However, efforts to build capacity for forecasting and quantification have largely focused on county health workers with limited expansion to include sub-county and health facility staff.

Figure 15. Comparison trends of Reporting Rates for Malaria Commodities between PMI Priority Counties and Nationally: July 2016–March 2017



To date, more than 50 personnel from national and county levels have been trained on the use of Minilab® basic tests, sampling strategies, and reporting of antimalarial medicines quality monitoring. In addition, the PPB has trained 22 inspectors to conduct Minilab® tests. PMI supported the PPB to develop a standard post-market surveillance protocol describing all steps needed to conduct sampling, to test on-site, and to confirm the field screening with additional quality control testing at the NQCL and MEDS. This protocol has now also been adopted by the Tuberculosis and HIV programs.

To build capacity and strengthen medicines quality monitoring activities, PMI supported PPB and NQCL staff to undertake the sixth round of Medicines Quality Monitoring (MQM). In the sixth round, 673 malaria medicine samples were screened at the Minilab® and 34 were tested by compendia. Though the findings for the latest compendia testing have not been released, since 2009 the number of medicines that have failed quality testing has declined dramatically. In instances where samples failed testing, the medicines identified as counterfeit were recalled and actions were taken against the sellers. PPB is providing financial support for confirmatory testing of malaria medicines that failed field screening tests during the sixth round of MQM.

Plans and justification

With FY 2018 funding, PMI plans to continue to provide support to the NMCP to enhance capacity and strengthen leadership, coordination and governance structures for health supply chain and commodity management systems at national level, and for oversight and mentorship for all 47 counties. PMI will also provide support for improving end-to-end visibility of logistics data from central to facility level to inform planning for continuous and uninterrupted availability of malaria commodities and institutionalization of proven commodity management interventions.

In high-priority Lake Endemic counties, PMI will build on earlier investments and continue to provide intense and targeted technical support to improve inventory management, quality of commodity data

reported, and strengthening functionality of county commodity security TWGs. Since devolution, support to capacity building for pharmaceutical management has focused at county level with limited trickledown effect seen at the sub-county level. In addition to the county level, PMI will also support capacity building for sub-county and facility staff and work with link health facilities to improve availability of commodities at community level. PMI, in collaboration with Global Fund, will also complement the NMCP efforts for south-to-south learning through technical and logistical support for regional and county pharmacists and lab personnel forums.

Following devolution, counties have been receiving funds for health directly and allocate varied amounts for procurement of health commodities. In the lake endemic counties, severe malaria medicines and sometimes ACTs are procured through the private sector. Continued support to post marketing surveillance will ensure that locally procured malaria medicines that flow through the health system are monitored for quality and that the country has a sufficient pool of staff that are skilled in post marketing surveillance.

PMI will continue to provide financial support for warehousing and distribution of malaria commodities from KEMSA to health facilities countrywide and support inter- and intra-county re-distribution of commodities to prevent stock outs and minimize wastage and expiries.

Proposed activities with FY 2018 funding: (\$1,700,000)

- 1. Strengthen supply chain management for malaria commodities at the national level:** PMI will continue to provide support to strengthen and institutionalize proven supply chain management strategies to ensure quality commodity data is available through DHIS2 and used to accurately forecast and quantify commodity needs, monitor the pipeline, plan procurements, and prevent stockouts at all levels of the health system. Areas of technical and operational support to the NMCP will include: supporting the Drug Management Subcommittee and Case Management TWG, building capacity of priority counties for improved reporting and stock management, strengthening logistics data quality and reporting through DHIS2, improving access to diagnostics (RDTs) and treatment among functional community units in lake endemic counties, and strengthening linkages between national and county levels through platforms such as the county pharmacists and lab personnel forum, technical exchange and sharing of county best practices for uptake by non-PMI priority counties. PMI will support commodity management and reporting system orientations, data audits, reporting form and job aid reviews, and dissemination to health-facility, sub-county, and county levels. Support to KEMSA will include monitoring and performance evaluation, and strengthening information system linkages with the NMCP. PMI will continue to support end-use verification data collection as part of the larger QoC surveys conducted biannually to ensure malaria commodities are reaching intended beneficiaries (QoC surveys budgeted under the SM&E section). *(\$400,000)*
- 2. Strengthen supply chain management for malaria commodities at the county, sub-county, and health-facility levels:** PMI will provide support to build capacity at county, sub-county, and health facility levels for enhancing commodity security and availability of quality data to inform malaria commodity needs and improved stock management. Operational and technical activities will focus on sustaining the functionality of the county commodity security TWGs, conducting supply chain audits to inform corrective action, mentorship and supervision, support to redistribution of commodities to alleviate supply shortages and avoid expiries, and troubleshooting to identify distribution bottlenecks and gaps. Capacity-building activities at the

county and sub-county level will target county and sub-county health management teams – including pharmacists, lab personnel and CMCCs – and will include training and mentoring to strengthen supervisory and decision-making skills for supply chain management, developing work plans that include supply chain activity monitoring, undertaking commodity audits, and supporting supervisory visits, strengthening malaria commodity data reporting via DHIS2 and use of data for decision making. PMI will also support regional forums that bring together sub-county level pharmacists and lab personnel from PMI priority counties to share experiences and best practices to expand the pool of health workers with skills in commodity management. (\$1,000,000)

- 3. Strengthen antimalarial drug quality monitoring and surveillance:** PMI will continue to provide technical, strategic, and operational support to the PPB. The support will include technical assistance and participation in the Post Marketing Surveillance TWG, as well as expanding the number of personnel trained in antimalarial drug quality monitoring at national and county level. Operational and technical activities will focus on: training of additional personnel for PPB-procured minilabs; sustained engagement and partnerships with county governments to build county capacity for inspection and regulation, since they undertake their own procurements; routine post-market surveillance and promotion of cost effective dissemination strategies of surveillance findings to counties; support strategies to sustain a pool of trainers and champions for medicines quality monitoring activities at PPB and NQCL; support to PPB for continued functionality of the Pharmacovigilance and Post Marketing Surveillance TWG. PMI will also support the NQCL to maintain its accreditation and promote close working collaboration with key stakeholders including PPB, KEMSA, national health programs, and Mission for Essential Drugs. (\$300,000)

4. Health system strengthening and capacity building

PMI supports a broad array of health system strengthening activities cutting across many intervention areas. These include training of health workers, supply chain management, and health information systems strengthening, drug quality monitoring, and NCMP capacity building.

NMCP/PMI objectives

The NMCP provides leadership and coordination to ensure that malaria control services are delivered, equitably and efficiently, in all health facilities in malaria endemic and epidemic regions of the country. To achieve this, the program has identified key strategies as part of its program management objective 6 of the KMS to address health systems challenges, namely: a) to develop, update, and disseminate policy and lobby for legislation and regulations to guide malaria control in Kenya; b) to strengthen capacity for planning, partnerships, coordination, and implementation at all levels; c) to strengthen resource mobilization to improve malaria control financing; and d) to strengthen procurement and supply management systems for malaria medicines and commodities. With devolution and transfer of most of the national functions to the 47 counties, changing roles and responsibilities at national level have affected service delivery. For example, some of the NMCP's malaria coordinators were assigned new responsibilities thus affecting effective planning, supervision and coordination of malaria control activities in these counties. In addition, counties are grappling with efficient and rational planning and budgeting for public health programs, particularly in the funding of human resources (around 70% of the county budget) and commodities and inadequate dissemination of policy and guidelines at all levels. The NMCP together with PMI and other partners work together to promptly address bottlenecks in service delivery and support continuity of services.

Progress since PMI was launched

PMI has continued to support the GoK's health systems by enhancing the technical capacity of NMCP personnel, developing the procurement and supply chain system to more efficiently deliver supplies and commodities to health facilities, improving and streamlining the routine malaria data collection, and assisting the program in monitoring its achievements.

To support streamlining and expansion of routine health systems to ensure collection and improve availability and use of quality malaria data, PMI has supported the training of 30 national-level Health Information Systems / Information Communication Technology staff on DHIS2/KMHFL data management, data quality, and data use. In addition, over 190 participants from 12 counties have also been trained, thus increasing the capacity of CHMTs and facility managers to use the new information system. PMI has also supported integration and reporting for malaria commodity data into the DHIS2 platform.

To strengthen the capacity of the NMCP to plan and oversee implementation of malaria control activities, PMI resident advisors work with the NMCP and the technical working groups to develop, review, and disseminate tools and guidelines for malaria activity implementation. This support has included review and updating of the KMS and M&E plans for 2009–18, development of the Global Fund Round 10 concept note and budget reallocation requests, and successful design and implementation of the Kenya MIS 2015.

At the county level, PMI supported the establishment of 8 malaria TWGs in the lake endemic counties to coordinate the implementation of malaria prevention and control activities in consultation with other programs and sectors and supported establishment of 14 county commodity security TWGs to manage supply chain strengthening activities, including forecasting, quantification, and ordering.

PMI has supported the NMCP and PPB to establish and equip 11 sentinel sites with Minilabs® to test the quality of malaria medicines dispensed to patients in health facilities. PMI has also procured and distributed over 160 microscopes to health facilities in both endemic and epidemic regions of the country for strengthening malaria diagnosis, and supported capacity building for effective malaria case management. PMI has helped build the capacity of PPB staff at national and county Minilab® sites for post-market surveillance activities such as sample collection, sampling strategies, and Minilab® basic tests.

Since FY 2012, PMI has supported seven FELTP residents who have acquired skills such as epidemiology, program evaluation, surveillance, and manuscript development. They have used these skills in critical technical and leadership positions in malaria control and in the public health sector overall. The current positions of the graduated residents include: 1) CMCC for Mombasa County; 2) outbreak response official for the MoH; 3) Head of the Malaria Section of the National Public Health Laboratory; 4) County Epidemiologist for Taita Taveta County; 5) Director of a County Laboratory; 6) Immunologist at a County Laboratory; 7) Technician in Zoonotics Section of the National Public Health Laboratory; and 8) vector control officer at the NMCP.

Progress during the last 12-18 months

Capacity building:

To strengthen the capacity of counties to increase IPTp uptake, PMI supported training of 356 clinical mentors who have in turn oriented 6,142 health workers in 570 facilities on MIP guidelines. PMI has also supported supervision for MIP of 1,571 health workers at 182 facilities and 3036 CHVs. To

strengthen case management, PMI has supported training of 73 laboratory supervisors in OTSS and 159 health facility lab staff in refreshing light microscopy diagnostic skills. PMI has also supported training on RDT performance and QA/QC for 491 health facility staff in the lake endemic counties.

PMI continued to support eight county malaria TWGs to coordinate and provide oversight for implementation of malaria prevention and control activities in collaboration with other partners, to develop integrated malaria work plans for the counties, and to provide support supervision. PMI also supported the revision of the Kenya Malaria Communication Strategy, supported an in-depth curriculum review for Logistic Management Information System (LMIS) for ITNs, facilitated TOT and participant trainings, and supported commodity management trainings for 2,428 health care workers.

Since 2014, PMI has provided support for formation of one quality improvement (QI) teams in each of 25 sub-counties in three malaria endemic counties, Busia, Kakamega, and Siaya. These QI teams conduct joint quarterly QI meetings, county QI learning sessions, and malaria QI data validation for select facilities. The health workers are part of work improvement teams who provide on-site quality improvement mentorship to address low performing malaria indicators. The teams are composed of a pharmacist, laboratory technologist, clinician, and records officer. Health facilities have been supported to form work improvement teams to promote proper malaria case management at the patient level. Their promotion efforts have resulted in a demonstrable increase in adherence to malaria case management guidelines, with more suspected cases being tested for malaria before treatment in most target health facilities. These efforts have also led to a marked reduction in health workers treating test negative cases with antimalarials, thus preserving these life-saving commodities for only those requiring them. For 2016, PMI provided direct QI support to 25 high volume facilities, an additional 403 facilities were reached with QI initiatives indirectly through CMCCs and coaches during malaria data review and commodity security sessions. For MIP, 20 facilities were supported with QI initiatives in Homa Bay and Migori Counties.

Health information systems: PMI supported the roll out of surveillance training in the 8 malaria endemic counties where 79 training of trainers and 1,152 health workers were trained. PMI continued to work with the NMCP to strengthen reporting of malaria case and commodity management data in DHIS2 and helped strengthen institutional capacity at the national level to manage integrated national HMIS, including DHIS2, LMIS, DSL, and eIDSR. PMI supported improvements in data quality and use in 5 counties by identifying 15 malaria data champions. Technical assistance was provided to support the design, review, and publication of malaria surveillance profiles in six counties using routinely collected data.

Health workforce: PMI has continued to support activities geared towards the development of a health workforce that is able to deliver effective and efficient health services for malaria control. Two FELTP residents are currently assigned to the NMCP and support both national and field activities. The current residents work with the NMCP in the areas of case management, ITN management, and diagnostics. Over the past two years FELTP residents have participated in the following activities: (1) surveillance evaluations; (2) training for case management / parenteral artesunate and malaria microscopy; (3) technical working groups for case management, vector control, and surveillance, M&E, and OR; (4) MIS 2015 report writing workshop; (5) malaria impact evaluation technical committee; (6) fieldwork for the QoC surveys; (7) malaria microscopy refresher trainings at county level; and (8) ITN durability monitoring. One FELTP resident recently published a manuscript entitled “Factors associated with malaria microscopy diagnostic performance following a pilot quality-assurance programme in

health facilities in malaria low-transmission areas of Kenya, 2014,”²⁵ and another resident gave an oral presentation entitled, “Cross-sectional survey of long-lasting insecticide-treated bednet durability and use among fishing and pastoralist communities—Kenya, 2015” at the ninth Training Programs in Epidemiology and Public Health Interventions Network (TEPHINET) Global Scientific Conference in August 2017.

Essential medical products, vaccines and technologies: At the national level, PMI provided support to the NMCP for forecasting and quantification, pipeline monitoring, and planning for redistribution of malaria commodities at county level. PMI also supported two meetings where county pharmacists from all 47 counties discussed commodity security challenges and shared best practices. In addition, PMI provided support to eight county commodity security TWGs for monitoring and supervision of supply chain strengthening activities, including reporting consumption of malaria commodities and stock management.

Table 16: Health Systems Strengthening Activities

HSS Building Block	Technical Area	Description of Activity
Health Services	<i>Case Management</i>	<ul style="list-style-type: none"> • Support on-the-job training, mentoring, and supportive supervision of county/sub-county/health facility staff to improve management of uncomplicated and severe malaria • Strengthen diagnostic capacity of existing laboratory and healthcare staff through refresher trainings and capacity building for supportive supervision, on-the job training, and mentoring of county/sub-county/health-facility staff
Health Workforce	<i>Health Systems Strengthening</i>	<ul style="list-style-type: none"> • Support quality improvement activities with CHMTs and SCHMTs in four to eight counties across all health interventions • Continue with the sensitization and orientation of CHVs on MIP messaging and IPC for increased uptake of ANC services • Train one FELTP resident in epidemiology and program evaluation
Health Information	<i>Surveillance, Monitoring and Evaluation</i>	<ul style="list-style-type: none"> • Contribute to the integrated support and oversight of DHIS2 • Improve reporting, use of data for decision making, development of county and national level information products, and data review meetings • Provide technical assistance to the NMCP on MIS 2018 implementation and dissemination • Support outpatient and inpatient QoC surveys (outpatient surveys include EUV indicators)
Essential Medical Products, Vaccines, and Technologies	<i>Pharmaceutical management</i>	<ul style="list-style-type: none"> • Support the NMCP in forecasting, pipeline monitoring, procurement planning for malaria commodities, and use of data for decision making to prevent stock outs at the national and peripheral levels • Continue to support the functioning of commodity security TWGs to oversee commodity management in eight high burden counties • Support inter- and intra-county redistribution of malaria commodities to prevent expiry, overstocking, and stockouts

²⁵ Odhiambo F, Buff AM, Moranga C, Mosei CM, Wesongah JO, Lowther SA, Arvelo W, Galgalo T, Achia TO, Roka ZG, Boru W, Chepkurui L, Ogutu B, Wanja E. Factors associated with malaria microscopy diagnostic performance following a pilot quality-assurance programme in health facilities in malaria low-transmission areas of Kenya, 2014. *Malar J.* 2017 Sep 13;16:371

		<ul style="list-style-type: none"> • Support the PPB for expansion and strengthening of antimalarial drug quality monitoring at national and county level
Leadership and Governance	<i>Health Systems Strengthening</i>	<ul style="list-style-type: none"> • Support TWGs across the technical areas and Malaria Interagency Coordinating Committee at national level • Continue to support the Malaria Control TWGs in eight endemic counties to coordinate the implementation of malaria control activities in consultation with other sectors, and to spearhead the development of malaria control work plans for these counties

Plans and justification

PMI, in collaboration with other partners and the NMCP, 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. As a result of task shifting and reduction in technical staff at the national level, PMI anticipates additional capacity development 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.

Proposed activities with FY 2018 funding: (\$1,000,000)

1. **PMI direct technical support to the NMCP:** Provision of technical support by PMI advisors and specialists to the NMCP. Advisors and specialists will spend a portion of the work week with the NMCP to provide direct technical assistance and support for activities. (*Built into staff costs*)
2. **Other support to NMCP:** PMI will provide technical assistance and capacity building to improve management, scientific, and administrative capacity. (*\$200,000*)
 - a. **NMCP capacity building:** Improve the NMCP’s technical capacity with regard to program implementation, management, and leadership development through formal and informal training, courses and workshops, supportive supervision, on-the-job coaching, and mentoring.
 - b. **Attendance of NMCP staff at technical consultative meetings:** Provide assistance for NMCP program management and technical team members and CMCCs from priority counties to attend key technical meetings (e.g., Multilateral Initiative on Malaria). Attendees will be expected to make presentations and share key technical updates with TWGs, partners, and stakeholders.
 - c. **Support to TWGs and MICC:** Functional and collaborative TWGs and MICC are essential to monitor and evaluate the progress of malaria prevention and control interventions and inform partners, donors, and stakeholders. PMI will continue to support the MICC and TWGs as essential platforms for NMCP policy, strategy, and guideline review, updating, and validation processes.
3. **Support for county and sub-county malaria control programs:** PMI will support the county malaria control programs to develop malaria-specific work plans consistent with each county’s malaria profile and the revised KMS and M&E Plan and assist with inter-county coordination. PMI will support staff in CHMTs and SCHMTs (CMCCs, SCMCCs, county pharmacists, county lab coordinators, disease surveillance coordinators, and health records and information officers) to increase supervision and management capacity for program implementation. PMI will support

CHMTs in collating and analyzing malaria related information to be used in planning for the county's need in terms of carrying out quantification for drugs and laboratory supplies and planning for the training of more health workers in areas where capacity gaps have been identified. PMI will also support county teams in organizing review meetings with the sub-counties to assess progress made in implementing malaria control interventions. These activities will be carried out in the eight high-burden malaria-endemic counties. (\$400,000)

- 4. Support CHMTs and SCHMTs for QI activities:** PMI will support QI activities both at the county and sub-county levels by working with the technical teams (CHMTs and SCHMTs) to improve program performance across all malaria intervention areas. PMI will expand to work in the eight endemic counties supporting malaria TWGs, the QI teams, and increase the number of work improvement teams by expanding to new facilities within the eight counties. PMI will support CHMTs, and other partners in applying QI approaches to augment ongoing efforts to improve malaria prevention and case management interventions and support the robust learning environment on how to apply improvement science within malaria programming in the counties. (\$300,000)
- 5. Support FELTP:** Provide support for one malaria-focused FELTP resident for the full two-year training program. The budget for each trainee includes tuition and fees, stipend, laptop, books and equipment, a field project, travel, supervision and administration. (\$100,000)

5. Social and behavior change communication

NMCP/PMI objectives: The activities of the National Malaria Control Program (NMCP) are guided by the KMS. In the strategy, SBCC interventions directly support achieving objective 5, to increase utilization of all malaria control interventions by communities to at least 80% by 2018. In order to achieve this objective, PMI supported the NMCP to revise and develop a new communication strategy (2016-2021).

At the national level, the Health Promotion Unit chairs the advocacy communication social mobilization (ACSM) TWG meetings. The TWG meetings are comprised of representatives from each of the intervention areas in the NMCP as well as representatives from organizations, institutions and bilateral partners that implement malaria control interventions, i.e., AMREF, World Vision, KEMRI, WHO, and UNICEF, among others. Deliberations and consultations held by the ACSM TWG drive the agenda for behavior change in malaria control. The TWG meetings help coordinate the development, production, and dissemination of all malaria SBCC materials and tools. The materials produced for SBCC activities are designed for different target groups, i.e., health workers, CHVs, and the community at large. In specific regions, the materials are also translated into the local languages for easier understanding and acceptance. Electronic media is also another key channel of communication and different products are developed for dissemination through mobile phones, TV, or radio. These include announcements for public functions like World Malaria Day, mass net distribution campaigns, and attendance in public meetings at the community (*barazas*).

Progress since PMI was launched

Since 2008, PMI/Kenya has supported training opportunities for malaria program staff on SBCC, the production of guidelines, reprinting of 20,000 copies of the malaria treatment guidelines for use in training health workers, and education and communication materials on different aspects of malaria control for World Malaria Day.

PMI has supported the NMCP to expand the community strategy, which provides an opportunity for CHVs to use IPC skills at the household level, where CHVs have one-on-one discussions with household members in order to identify barriers that could be preventing community members from using/accessing the available malaria control interventions and tools provided by the government, i.e. consistent use of nets, early ANC attendance to receive IPTp, early treatment for any fevers, as well as adherence to treatment regimens. During monthly meetings, CHVs and CHAs discuss and suggest solutions to the various reasons for not using/accessing malaria interventions raised by community members. The solutions are used to design future messages on the different interventions.

Other partners like AMREF and World Vision have supported SBCC activities on ITN use and case management at the community level. CHVs are trained on passing messages on the importance of consistently using nets and ensuring that all suspected fevers are presented to health facilities within 24 hours in order to get the appropriate treatment in line with national treatment guidelines. UNICEF has been supporting the NMCP by implementing an iCCM project where CHVs have been trained on the integrated management of childhood illness (pneumonia, diarrhea, and malaria). The CHVs also communicate messages about the prevention of malaria and refer patients to health facilities in their communities.

In the last four years, PMI has focused SBCC activities at the community level through chosen local organizations and established community health units in some counties within the malaria endemic regions of the country. This approach allows for more interpersonal interactions on a one-to-one basis between the CHVs and the beneficiaries of the various malaria control tools such as ownership and use of ITNs and the management of MIP by receiving the appropriate doses of IPTp in line with policy guidelines.

PMI has supported qualitative surveys to monitor the determinants of behaviors related to malaria interventions (e.g., net use). The latest survey found that the major determinants of key malaria-related behavior include knowledge of the severity of malaria, knowledge of the importance of appropriate diagnosis and treatment, distance to health facility, access to free malaria diagnosis and treatment services, socio-economic status, knowledge of the importance of IPTp, and access to ITNs. Drivers and barriers to specific key behaviors are given below.

ITN Use:

Drivers: Past negative experience due to malaria, perceived socio-economic benefits associated with preventing malaria, communication campaigns, free net distribution in public health facilities and *Tunza* clinics, mass net distribution, cold/rainy seasons, and the type of net.
Barriers: Cultural factors, beliefs, limited sleeping spaces making it difficult to hang up a net, lack of access to nets, and perceived side effects to the chemical used to treat the net.

IPTp Uptake:

Drivers: Supervised consumption of IPTp drugs by health care providers at the health facilities, health education and creating awareness on the benefits of IPTp drugs, ANC attendance, availability of IPTp drugs, and perceived risk.
Barriers: Late ANC attendance, health care worker confusion about the dose and timing, stockouts of IPTp drugs, low level of awareness of the use and importance of IPTp as a malaria preventive measure, lack of cups for drinking water in health facilities, and myths and misconceptions on IPTp drugs.

Seeking care at a health facility for children under five years of age:

Drivers: Communication messages on malaria, outreaches by health facilities, availability of free drugs, bad personal experience, worsening symptoms, failure of traditional methods and informal consultations.

Barriers: Delays in seeking care (lack of transport money, waiting for first aid measures to work, waiting for permission from head of household), reaching care (long distance to health facility, insecurity), and receiving care (long queues at the health facility, lack of malaria test kits, unavailability of doctors, drug stockouts)

PMI-supported SBCC activities promote key malaria-related behaviors through work with CHMTs and CHVs, communication campaigns, engagement of CHV and community leaders in addressing myths and misconceptions around IPTp, and education of healthcare providers on how to be respectful to women at ANC. PMI supports CHMTs and CHVs to sensitize community members on correct and consistent use of nets, need for regular ANC visits and IPTp uptake, and the benefits of early care seeking for children with fever in health facilities. PMI-supported communications campaigns target identified barriers to net use, IPTp uptake, prompt care seeking, and testing prior to treatment.

Progress during the last 12-18 months

In the last 12-18 months, PMI has continued its support to the NMCP's SBCC activities at the national, county, and community levels. At the national level, PMI supported the revision and development of the new communication strategy (2016-2021). This was necessitated by the need to align the communication strategy with the KMS. The communications strategy was launched this year by the Cabinet Secretary of Health during a media breakfast meeting on 19 April 2017 in preparation for the World Malaria Day. The World Malaria Day was commemorated in Narok County and presided over both by the Director of Medical Services and the County Executive of Health in Narok. The event was covered by both local and national media. Malaria messaging was included in the main national newspapers and on several national and local radio and television channels.

In addition to supporting production of materials for the World Malaria Day, PMI also supported the development/revision, printing, and dissemination of MIP IEC materials (1,200 copies of a job aid on decontamination of water cups were distributed to counties, while another job aid instructing the minimum 3 doses of IPTp was reviewed).

Several studies have evaluated SBCC activities, including the 2015 KMIS, the surveys evaluating the pilot of continuous community-based ITN distribution in Samia, and the Malaria Tracking Results Continuously (TRaC) surveys. As a result of the various SBCC activities, in comparison with the 2010 KMIS, the 2015 KMIS results indicate utilization levels of ITNs the night before the survey increased from 29% to 48%; prompt treatment seeking behavior increased from 18% to 60% among those who took action on the same or next day; and IPTp uptake of the second and third dose of SP rose from 26% to 56% and 25% to 38%, respectively. The surveys to evaluate the continuous net distribution pilot demonstrated an increase in net use among household members in the intervention sites from 91% at baseline to 96% at endline. In the control area, net use decreased from 88% to 86% respectively. The improvement in net use within the intervention area could be attributed to not only increased access to ITNs, but also active interpersonal communication carried out by CHVs. The malaria TRaC survey, completed in 2014, demonstrated an increased use of nets the previous night by children under five years in households exposed to any form of IPC compared to households not exposed (87% vs. 78%). In the last five years, the progress towards promoting net utilization has made access to ITNs at the

household level the primary factor associated with ITN use. For example, according to the 2015 KMIS, while 48% of the general population slept under an ITN the previous night, 71% did so in households that had at least one ITN, and 83% did so in household with at least one ITN for every two people.

At the community level, SBCC activities undertaken have primarily focused on ensuring that the highest-risk groups are aware of, have access to, and consistently use the available malaria prevention and control tools. In the ongoing mass net campaign preparations, the ACSM TWG has coordinated the development of communication and promotion materials for the campaign. The materials being developed include posters, banners, T-shirts, and voucher cards for net redemption. In addition, radio and TV announcements about the campaign are aired on national and county broadcasting stations to raise awareness and inform beneficiaries on how they could access the mosquito nets. In the recently concluded indoor residual spraying activities in Migori County, SBCC activities were carried out prior to and after spraying to ensure that all household owners knew what was expected of them during the actual spraying and after the spraying. For example, prior to spraying messages were delivered on removing household furniture and wall hangings and covering food items before the sprayers moved into the houses to carry out the spraying. After the spraying, they were advised not to wash or paint the wall surfaces.

Though PMI in Kenya has continued to support mass media channels of communication through production of TV and radio messages on malaria control, it has prioritized intensive community-based interventions through small group sessions and IPC at the household level to promote the consistent use and maintenance of ITNs and prompt diagnosis and treatment of malaria. These IPC activities have targeted the highest risk groups in eight sub-counties of Migori and Bungoma counties in lake endemic zone and Kilifi and Kwale in Coast endemic zone. Three local organizations in each of these sub-counties and CHVs were able to reach 42,212 people in 32,614 households with messages on the various malaria control interventions. The wider community was reached through public *barazas*, and local radio and television messaging, interviews, and shows. With regard to MIP activities at the community level, CHVs in the four counties of Homa Bay, Migori, Kisumu and Bungoma managed to reach 131,736 pregnant women with MIP messages through IPC and small group sessions. In order to address specific behavior-change drivers in malaria control, the NMCP and partners carry out in-depth qualitative research in some of the targeted counties. Based on these findings, the SBCC campaign is designed, pretested, and rolled out through a multi-channeled approach. For example, research carried out in 2013 revealed that people in the malaria endemic regions felt at risk “only” during rainy seasons, leading to consistent net use only during the rainy season. This finding guided the development of a net use campaign dubbed *msimu wowote* or “use nets during all seasons of the year.” The KMIS 2015 revealed that risk perception throughout all seasons had increased, with the highest increase noted in the malaria endemic regions; the increase could be in part attributed to this campaign.

PMI and NMCP continue to work together with county governments to ensure that there are teams at the county level to coordinate and build the capacity of county staff to carry out malaria control activities. County teams comprised of key county health management focal persons have been trained on how to plan and implement county specific malaria SBCC activities under the leadership of the CMCCs. In addition, PMI, NMCP, and the CHMTs from the eight lake endemic counties have developed a capacity building plan that will provide continuous capacity building of the CMCCs on SBCC and other aspects of program management. This plan is based on needs assessment conducted among the eight CMCCs and will be strengthening what is already working and building capacities on identified gaps.

Plans and justification

Even though a great deal has been achieved in increasing the use of the various malaria control tools as demonstrated in the 2015 KMIS, efforts to increase the awareness and ensure optimal use of these interventions still need to continue. Some of the specific problem behaviors that will be prioritized for SBCC activities include consistent net use, early ANC attendance for uptake of IPTp and nets, and seeking early and prompt treatment. With FY 2018 funding, PMI will continue to support SBCC activities focused at the community level where the community health strategy remains a viable platform for delivering malaria prevention and control messages in endemic and epidemic prone counties. PMI also plans to support other traditional (mass media) channels of communication to ensure that other groups are reached with malaria prevention and control messaging via Short Messages, Out of Home Branding, radio, television, and print media.

PMI will continue to support ACSM activities at county level by supporting county Health Promotion Advisory Committees to develop and oversee the implementation of county health communication strategies; providing technical assistance in the development of communication materials and supporting quarterly Health Promotion Advisory Committees meetings for the priority counties. In addition, PMI will advocate for health communication resources through active participation in the development of county annual work plans.

Proposed activities with FY 2018 funding: (\$1,350,000)

1. **Integrated community-based SBCC:** PMI is supporting the NMCP to carry out a desk review on available literature on drivers of net use, IPTp, and malaria case management behaviors. Based on the identified gaps, support will be provided to conduct an in-depth qualitative study in sampled regions within the target areas to further understand what is driving this behavior. It is from these findings that an evidence based multi-channeled communication campaign will be developed, pretested, revised and rolled out. The communication materials and messages will be developed for all intervention areas addressed in the KMS and in line with the newly released Communication strategy.

Support will be provided towards expansion of community-based SBCC efforts by increasing outreach to priority populations in endemic counties through different strategies and channels of communication. Enhanced IPC delivered via the community approach will be one of the main channels of communication at the household level. In health facilities, particularly ANC clinics, women's groups, health talks, poster and information displays, and IPC during consultations will be used to deliver malaria messaging. Community *barazas*, dramas, and public gatherings will also be used to deliver malaria prevention and control messaging, including promotion of correct and consistent use of ITNs, early and regular ANC attendance by pregnant women to increase the proportion of women receiving IPTp and nets, and early and appropriate health-seeking behavior and prompt diagnosis and treatment for all persons with fever. The activity will be carried out in five counties in malaria endemic zones, namely Bungoma, Migori, Homa Bay, Kilifi, and Kwale, with a population of over 5 million. The target population for the activity is estimated at 1.5 million people, mainly women of reproductive age group. (\$1,250,000)

2. **National SBCC promotion and material production:** PMI will support national-level SBCC message development and dissemination of key malaria interventions related to the new policies and guidelines. PMI will work with other partners, donors, and stakeholders to coordinate advocacy-related activities, including regular ACSM TWGs and other ad hoc review meetings to monitor and evaluate progress towards malaria control targets. In addition, PMI will support the

NMCP to implement its revised communication strategy as well as the printing of new copies of the malaria treatment guidelines. (\$100,000)

6. Surveillance, monitoring, and evaluation

NMCP/PMI objectives

The NMCP's goal is to have all malaria surveillance, monitoring, and evaluation (SM&E), and program indicators routinely monitored, reported, and evaluated in all counties by 2018 as included in the current KMS and the Kenya Malaria Monitoring and Evaluation Plan.

Since 2009, the NMCP and stakeholders have relied on a comprehensive national M&E Plan to enable transparent and objective monitoring and evaluation of malaria control activities. The costed M&E Plan is used for M&E advocacy, communications, and resource mobilization. Kenya has a large number of stakeholders, including governments, universities, research institutions, private sector, non-government organizations, and donor agencies, organized into an SM&E TWG that meets on a quarterly basis to provide a forum for discussion, coordination, and dissemination of findings of the SM&E activities.

In 2015, the NMCP prioritized SM&E and OR activities for 2015–2018 to align with the revised KMS during a consultative process that included academia, partners, donors, and stakeholders. Key SM&E and OR activities were also prioritized for funding within the strategy areas: vector control, case management, MIP, and ACSM. The SM&E and OR activities prioritized by the NMCP for vector control were: (1) monitoring the durability and efficacy of next-generation ITNs under field conditions, (2) feasibility and efficacy of dry season larval control in different malaria epidemiological zones, and (3) effectiveness of targeted IRS versus blanket IRS for malaria vector control. The activities prioritized for case management were: (1) identify the factors that facilitate and/or hinder testing and confirmation of patients with suspected malaria and adherence to treatment guidelines by health workers, and (2) measure the impact of devolved health care on quantification and distribution of malaria commodities (i.e., RDTs and ACTs) and quality of malaria case management. The activity prioritized for malaria in pregnancy was to evaluate the potential for IPTp and/or intermittent screen and treat alternatives to SP (e.g., DHA-PIP) on maternal malaria morbidity and infant birth weight. The two activities prioritized for ACSM were to evaluate the: (1) impact of communication messages for the ITN mass distribution campaign on the uptake and use of interventions (e.g., *msimu wowote* or “every season” messaging), and (2) communication models to influence positive behavior change for intervention uptake within specific population groups and malaria epidemiologic zones. The NMCP implements most malaria SM&E activities through funding from the Global Fund, PMI, and WHO/DfID. Available funding is targeted towards achieving:

- Improved functioning of SM&E unit resources (e.g., technical capacity, hardware and software capability, and information collection, analysis, reporting and dissemination)
- Coordination of malaria SM&E activities within the country
- Improved data flow to/from all levels of the health system
- Data quality assurance
- Data use for decision making

PMI's support to SM&E in Kenya aligns with the M&E plan. Sources of data and information will include the routine health information system, integrated disease surveillance system, periodic household and facility surveys, and activity reports from the implementing partners.

Progress since PMI was launched

PMI has supported data collection activities in Kenya through the routine health information system and periodic household surveys, supporting the 2008–2009 DHS, 2010 KMIS, 2014 DHS, and 2015 KMIS. DHIS2 is a national HMIS platform that has been adopted by the country for collection, analysis, validation, and presentation of aggregate and patient-based service statistics. It houses several malaria data sets namely community health, case management, commodity, and eIDSR, and is linked to the county and sub-county levels. PMI provided support to strengthen routine malaria-specific reporting in DHIS2, which started in 2010, to ensure malaria indicators were included in the reporting modules and to develop a malaria commodity module with the NMCP for inclusion in DHIS2. Standard malaria indicators are reported at the facility, sub-county, and county levels on a monthly basis.

In addition, PMI has provided support for SM&E capacity building for the NMCP, including support to attend international M&E courses and holding an M&E course in Kenya for MoH staff at all levels of the health system, and two Kenya National Malaria Forums. In addition, PMI supported technical assistance for the development and implementation of the National Malaria M&E Plan 2009–2018 within the framework of the KMS.

The malaria surveillance systems in Kenya include HMIS and eIDSR; both are accessible on the DHIS2 platform. The NMCP uses data from both HMIS and eIDSR in generating the quarterly surveillance bulletins. PMI's support for surveillance activities included supporting the surveillance curriculum development based on WHO surveillance guidance, which focuses on HMIS and eIDSR data. The surveillance curriculum has been used to train healthcare workers on malaria surveillance, including threshold setting in epidemic-prone areas. By April 2016, a total of 313 training of trainers and 4,669 health workers had been trained countrywide. PMI supported the rollout of the surveillance training in the eight lake endemic counties where 79 training of trainers (out of 313) and 1,152 (out of 4,669) health workers were trained, while Global Fund supported the trainings in the other counties. In addition, PMI provided technical assistance for quality control during the surveillance trainings including the Global Fund-supported trainings in seasonal and low-malaria transmission areas.

Epidemiologic health facility-based surveillance in former IRS sub-counties (four IRS sub-counties and one non-IRS sub-county, two facilities per sub-county) began in August 2012 with PMI support. Data collection ended in April 2015. Information on suspected malaria cases, RDT test-positivity rate, and the proportion of confirmed cases prescribed an ACT was collected. From February 2013 to December 2014, the testing rate of suspected cases was above 99% across the 10 health facilities. The RDT test-positivity rate for all patients ranged from 37–56% across the facilities, but was highly dependent on seasonality. Three of the five sub-counties saw an increase in malaria test positivity rate in 2014 compared to 2013. Five bulletins were developed and disseminated to report the findings from this activity to the NMCP, counties, PMI, and stakeholders. A manuscript is in preparation.

Progress during the last 12-18 months

An assessment was conducted of NMCP malaria SM&E capacity and an SM&E capacity building action plan was developed based on this assessment in 2013. A comprehensive follow-up assessment was completed in 2017 to assess changes in M&E capacity, identify key drivers of the changes, and identify any remaining gaps in M&E capacity. The report will be finalized by September 2017 and will be used to guide investments in M&E capacity strengthening in the new KMS and new M&E Plan. PMI continues to build capacity by supporting attendance at regional and international trainings and

conferences. PMI provided support for CMCCs to attend the regional M&E training in Ghana in June 2016.

Quarterly malaria surveillance bulletins are developed and distributed by the NMCP to malaria stakeholders in Kenya with PMI support. The nineteenth surveillance bulletin was released in December 2016. Over the past two years, responsibility for preparing the malaria surveillance bulletins transitioned to the NMCP, with PMI supporting minimal technical and production assistance as needed. The bulletins include the malaria indicators recommended by the WHO surveillance guidance, standardized graphs, and updates on key activities. In addition, PMI has provided support to assist the endemic counties to develop malaria surveillance bulletins and county malaria profiles (the county profiles include other disease reporting in addition to malaria). As a result, county profiles have been developed and released by Kisumu (4 profiles), Kakamega (3), Migori (2), Homa Bay (1) and Siaya (1) Counties and malaria bulletins have been developed and released by Vihiga (1 bulletin) and Bungoma (1) Counties.

CHMTs in five high burden counties were supported to identify and build the capacity of malaria surveillance champions. Fifteen champions have been trained as of May 2017, on data mining, analysis, and interpretation, which will provide sustainability for M&E strengthening efforts at the county level. The malaria surveillance champions populate county, sub-county and facility malaria dashboards to track trends in malaria indicators and conduct targeted facility mentoring visits.

Data quality audit (DQA) tools were harmonized across programs with PMI and other support. Previously there were multiple DQA tools used in country, now there is one national DQA protocol, which all health programs and partners use. Support was provided to the NMCP to adopt and utilize the national DQA protocol. Support was also provided to the NMCP and CHMTs to conduct data review meetings.

PMI continued to support the outpatient QoC surveys which are conducted on a semi-annual basis and incorporate PMI's standard end-use verification indicators. A stratified random sample of at least 170 of the approximately 6,000 health facilities is selected for each survey, for a total of an estimated 340 health facilities visited per year. The nationally representative sample includes dispensaries, health centers, and hospital outpatient departments owned by the GoK, faith-based organizations, and non-governmental organizations across the country. The data from the QoC surveys are referenced frequently to demonstrate program progress and performance and were used to assess trends in malaria case management in the malaria impact evaluation. Fieldwork for QoC round 13 was completed in May 2017.

In 2012, the NMCP launched revised guidelines for the management of severe malaria recommending a change in the treatment policy from quinine to parenteral artesunate. Given the increased investments in management of severe malaria through commodity procurement, training for parenteral artesunate, and the need to measure implementation progress, the NMCP developed and rolled out the first semi-annual inpatient QoC survey (with Global Fund and CHAI support) in February 2016 at 47 county hospitals where 185 inpatient health workers were interviewed and data extracted from 1,410 medical files for patients admitted with suspected malaria. During these surveys, supportive supervision is provided to correct any issues found with inpatient care of severe malaria, including issues of drug management. PMI supported the third inpatient QoC survey, which was completed in May 2017. The inpatient QoC will be conducted twice per year in 2016 and will shift to once per year in 2017.

The PMI-supported Roll Back Malaria impact evaluation used the malaria intervention coverage and mortality data from the 2014 DHS survey. The malaria impact evaluation was started in the last half of 2015 and a preliminary summary report disseminated on World Malaria Day 2016. The evaluation report was completed and will be released by the end of 2017. An abstract based on the impact evaluation results was submitted for the ASTMH 2017 meeting.

PMI supported technical assistance for the SM&E and governance structures including the SM&E TWGs. Assistance was also provided for preparation of the Global Fund New Funding Model request in 2017.

Table 17 below summarizes the available data sources and assessments since 2011 and planned activities through 2019. Note this table is not exhaustive as there are many additional studies from the demographic surveillance system sites (six in Kenya) and by research institutions.

Table 17. Surveillance, Monitoring, and Evaluation Data Sources in Kenya, 2011–2019

Data Source	Survey Activities	Year								
		2011	2012	2013	2014	2015	2016	2017	2018	2019
National-level Household surveys	Demographic Health Survey (DHS) ^a				X					
	Malaria Indicator Survey (MIS)					X			X	
	TRaCSurvey ^b				X*					
Health Facility and Other Surveys	School-based malaria survey (national and sub-national) ^c	X*								
	Service Availability and Readiness Assessment Mapping			X*				X*		
	Quality of Care survey (outpatient) ^d	X	X	X	X	X	X	X	(X)	(X)
	Inpatient QoC survey						X*	X	(X*)	(X)
	ITN Post-campaign survey		X					X*		
	ITN Post-campaign qualitative assessment			X						
Malaria Surveillance and Routine System Support	Support to malaria surveillance system ^e		X	X	X	X				
	Support to HMIS/DHIS2	X	X	X	X	X	X	X	(X)	(X)
	Support to IDSR/eIDSR	X*	(X*)	(X*)						
Therapeutic Efficacy monitoring ^f	In vivo efficacy testing	X		X		X	X*	X*	(X*)	(X)
Entomology	Entomological surveillance and resistance monitoring	X	X	X	X	X	X	X	(X)	(X)
	ITN durability monitoring					X	X	X	(X)	(X)

Other malaria-related evaluations	Rapid epidemic preparedness and response assessment		X							
	MPR / Midterm Review				X*			X		
	Epidemiologic Risk Map & County Malaria Profiles		X				X			
Other Data Sources	Malaria Impact Evaluation ^g					X	X			
<p>*Not PMI-funded</p> <p>^a The next DHS will be in 2019 or 2020, following the 2019 census.</p> <p>^b Aloo, S. Findings of the 2014 malaria TRaC study among populations living in different malarial zones of Kenya.</p> <p>^c C.W. Gitonga et al., 2010. Malar J, 9:306; K.E. Halliday et al., 2012. Trop Med Int Health, 17(5):532-49; K.E. Halliday et al., 2014. PLoS Med, 11(1):e1001594.</p> <p>^d End-use verification survey started in 2009 and was incorporated into the Quality of Care survey in 2010.</p> <p>^e Health facility-based surveillance in IRS districts, PMI funded. August 2012–April 2015.</p> <p>^f PMI-funded TEM activities are shown in the table. Additional TEM activities prior to 2017 were funded by other donors and are not shown.</p> <p>^g 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.</p>										

Plans and justification

PMI will support the MPR and development of a new KMS 2019–2028 and associated M&E plan. With FY 2018 funding, PMI will support the implementation of the new national malaria M&E plan. PMI will work with the NMCP, counties, and partners to ensure continuity of SM&E activities. PMI will continue to focus on strengthening SM&E at the county level in the eight high burden counties in western Kenya. PMI will support the collection, reporting, analysis, and use of routine malaria data through the DHIS2 at health facility, sub-county, and county levels to enable data-driven decision-making.

PMI will support both the DHIS2 and the next rounds of QoC surveys. The QoC provides data and results that are complementary to those coming from the DHIS2. For instance, QoC surveys capture longitudinal case management data and indicators on an individual patient and facility level that allows evaluation of the quality of services provided and adherence to guidelines by health providers. DHIS2 captures aggregate data but does not currently include routine reporting of laboratory results (i.e., RDT and microscopy) or the number of suspect malaria cases. In addition, because the QoC surveys have been implemented biannually since 2010, they provide important trend data for evaluation of interventions. The completeness of DHIS2 malaria indicator data and reporting rates have improved steadily since 2010; however, the ongoing changes in data collection tools, division of responsibilities in completing data collection tools at health facilities, and indicator definitions, as well as health workers' strikes, make trend analysis difficult. The NMCP, partners, and donors rely on the data and analysis provided both by QoC surveys and by DHIS2 for decision-making and targeting of interventions and program support. In addition, the QoC surveys include commodity availability information typically collected in EUV surveys.

The inpatient QoC, implemented for the first time in 2016, was funded by donors supporting case management because inpatient data currently are not available in the DHIS2, as it currently captures less than 20% of inpatient admissions in Kenya. The inpatient QoC survey will be implemented annually,

with PMI supporting the inpatient QoC in alternating years. Global Fund will provide the remaining support for the outpatient and inpatient QoC surveys.

The USAID Kenya and East Africa Mission launched a suite of SM&E and strategic information projects in 2016 to strengthen leadership and governance for national and county HMIS and SM&E systems. One project will support the University of Nairobi to house the DHIS2 system. A second project will provide support to DivMEHRDI to strengthen leadership and governance for SM&E, including strengthening national policies, strategies, standards, and reporting. The project will also build capacity for data analytics at DivMEHRDI and the NMCP. Finally, a third project supports CHMTs to strengthen data management and data analytics. PMI will utilize these three approaches and leverage the support of other USAID health elements to assist the NMCP to improve malaria reporting in DHIS2 and to strengthen SM&E throughout the health system in Kenya from the national to county levels.

PMI will provide support for HMIS strengthening focusing on capacity building for NMCP program staff on data analysis, use and governance, and will also work with the NMCP to define and refine malaria outputs for inclusion into DHIS2. This support will include creation of data visualization dashboards and products, dissemination and use of data, development of Application Program Interphase enabling programs to manage and validate data from various sources such as HMIS, LMIS, and IDSR. PMI will also support strengthening linkages between national and county HMIS through a county Measurement Learning and Accountability Platform to ensure standardization of indicators tracked across the country and dissemination of national HMIS tools and policies to counties. PMI will continue to support training and supervision of strategy components that feed information into DHIS2 and data collection/analysis/data demand and use strengthening for facility and county personnel. Each county has about 200-250 personnel at facility, sub-county and county levels who are primarily responsible for DHIS2 data. PMI provides additional support to ensure high-quality data in the DHIS2 through training on surveillance, data review meetings and strengthening reporting through DHIS2. PMI will build on Mission-wide DHIS2 support, by focusing HMIS/DHIS2 strengthening activities at the facility and county levels in the eight focus endemic counties. Other partners supporting DHIS2 include the World Bank, UNICEF, DfID, the Danish International Development Agency (DANIDA), and CDC.

PMI will support SM&E activities at the county level to help address problems with data collection, recording, and demand and use at the county level, some resulting from devolution. Devolution limits the NMCP to only an oversight role for SM&E at county level, a challenge given the limited number of staff at national level. Previously the NMCP was responsible for all DQAs and now the counties are also taking on some of the responsibility. Counties lack sufficient capacity for conducting DQAs and using data for decision making. Reporting rates for the DHIS2 have improved but quality and completeness of data is still suboptimal.

PMI will support, along with other stakeholders, implementation of the next MIS in Kenya. The fieldwork for the survey is scheduled to take place in July and August 2018.

Proposed activities with FY 2018 funding: (\$1,520,000)

- 1. Support MOH and NMCP leadership and governance for malaria M&E activities:** Contribute to the integrated support and oversight of DHIS2 in order to maintain and update system-wide data management capacity, and DHIS2 policies and standards. Support updating source documents and MOH forms, holding data demand and use meetings, and producing and disseminating malaria information products based on DHIS2 data. Support the NMCP to conduct data review meetings, streamline, and update malaria indicators in DHIS2. (\$200,000)

2. **Strengthen malaria SM&E at national level:** Provide support for implementation of the new national M&E plan by providing technical assistance to increase the capacity of existing NMCP M&E staff to ensure that data is used for program improvements. Specific activities are listed below. *(\$500,000)*
 - Support the TWGs to monitor implementation of the SM&E plan
 - Build NMCP SM&E staff capacity for data collection, analysis, and use
 - Provide technical assistance for production of annual reports, bulletins, and other information products
 - Support dissemination of 2018 MIS results
 - Support planning, logistics, and facilitation of the 2019 Kenya National Malaria Forum

3. **Strengthen malaria SM&E at county level:** Provide support for strengthening SM&E capacity and use of data for decision making at county and sub-county levels. PMI FY 2018 funding will also continue to support mentoring and on-the-job training for data collection and reporting at the county health management team, sub-county health management team, and facility level. Technical assistance will be provided during county data review meetings in the endemic counties to facilitate quality assurance activities and for increased demand and use of routine data. Reporting rates for case and commodity management, completeness and data quality of malaria indicators in the DHIS2 system will be monitored longitudinally, by county and facility to monitor the success of these activities. *(\$500,000)*

4. **Quality of Care Surveys**

Outpatient QoC Survey: Monitor health facility stocks of ACTs and RDTs and malaria case management practices. The data collection will be done semiannually with the EUV indicators included as part of the QoC survey to allow for a comprehensive evaluation of case management progress and performance, and replaces the need for a standalone EUV. Global Fund provides the remainder of the funding for this activity. *(\$100,000)*

In patient QoC Survey: Evaluate the diagnosis and treatment of severe malaria by monitoring key health systems and case-management indicators for inpatient care in level 5 hospitals in all 47 counties. Data will be collected annually. PMI will contribute funding for an inpatient QoC evaluation every other year. *(\$150,000)*

Technical assistance for QoCs: Provide support for technical assistance for the planning, supervision, and data analysis for the QoC surveys. *(\$50,000)*

5. **Technical assistance—CDC:** Support two CDC in-country visits to provide technical assistance for SM&E activities. *(\$20,000)*

7. Operational research

NMCP/PMI objectives

In 2016, the NMCP developed a revised list of OR priorities to improve malaria control interventions and programming in line with the revised KMS 2009–2018. The current OR priorities target vector control, case management, MIP, and SBCC research questions. In addition, the NMCP has identified research questions related to epidemic response and climate-related factors. In Kenya, OR priorities are

set by the NMCP and OR TWG in accordance with the KMS. The OR proposals are reviewed and agreed upon by the OR TWG, which includes PMI representation. PMI fills OR gaps that are identified by the NMCP and are in line with PMI's OR priorities and capacities. In addition to Kenya-specific PMI funding, PMI supports OR studies in Kenya via core funding. Below is a list of the OR studies funded by PMI that have been completed or are ongoing in Kenya.

Progress since PMI was launched

- **Phase III field evaluation of long-lasting insecticide treated nets (Kenya, Malawi, and Senegal).** This multi-year study, completed in May 2014, estimated and compared attrition, physical integrity, and insecticidal activity over time among several brands of long-lasting ITNs, under field conditions in western Kenya. The study found that attrition of nets (which ranged between 30%–40%) was primarily driven by nets being moved, taken, or given away. Findings from this study informed the revision of country specifications for ITNs and how frequently mass net campaigns should be conducted. The results were also used in the initial validation of resistance to damage scores for ITNs which are based upon laboratory textile tests and are designed to predict ITN durability under field conditions.
- **Longevity of insecticides used for IRS.** This study, completed in April 2012, was conducted to determine the optimal insecticide for use after Kenya shifted away from pyrethroid insecticides for IRS. The study identified one formulation of bendiocarb that had the longest duration of efficacy and highest level of acceptance among household owners. Findings from this study were used to inform policy change from pyrethroids to non-pyrethroid insecticides for IRS. Carbamates were recommended but could not be registered due to public health concerns. A single long-acting organophosphate has now been registered for IRS in Kenya.
- **Evaluation of integrated vector control in high- and low-transmission areas of western Kenya.** This study was completed in August 2009. It was conducted to assess changes in the prevalence of parasitemia and anemia after vector control measures were implemented, and estimate the effect of IRS and ITNs on malaria specific outcomes. In this study, ITNs were found to be moderately effective in reducing parasitemia. IRS was highly effective and may have masked the effects of ITNs. These data helped guide PMI and NMCP programmatic decisions and confirmed future commitments to implementing IRS for vector control. Study findings were published in January 2016.²⁶
- **Knowledge and adherence to malaria treatment guidelines for pregnant patients in rural western Kenya.** This study, which was completed in December 2013, was conducted to assess the knowledge of malaria treatment guidelines for pregnant women among health care providers and drug dispensers, and to describe their prescribing practices. Results from this study were presented at the Roll Back Malaria MIP Expert Review Group in July 2015. Study findings were disseminated to the wider public health community beyond Kenya at ASTMH and published in a peer-reviewed journal.²⁷ Findings from this study will be used in the revision of MIP case management documents as well as other MIP supporting materials.
- **Intermittent screening and treatment (IST) or intermittent preventive treatment (IPT) with DHA-PIP versus IPT with SP for the control of malaria in pregnancy in Kenya: assessment**

²⁶Gimnig, et al., PLoS One. 2016 Jan 5;11(1): e0145282.doi:10.1371/journal.pone.0145282

²⁷Riley, et al., [PLoS One](#). 2016 Jan 20;11(1):e0145616. doi: 10.1371/journal.pone.0145616

of acceptability, feasibility, and cost-effectiveness within a randomized controlled trial. This was a multi-year study that began in September 2012 and was completed in June 2015; the main trial results have been published.²⁸ PMI funded the final phase of the study addressing operational feasibility, which was based on the results of the interim analysis from the main trial. Results of the component to evaluate user and provider acceptability were published in March 2016.²⁹ The preliminary results from the operational feasibility component were presented at the Roll Back Malaria MIP Expert Review Group meeting in July 2015.

- **Evaluation of intermittent mass screening and treatment to reduce malaria transmission in western Kenya.** This study evaluates the addition of intermittent mass screening and treatment (IMSaT) for malaria to the standard malaria interventions (i.e., ITNs, case management) as a means to further reduce malaria transmission in a high-burden malaria-endemic setting. This was a multi-year study funded through PMI core operational research support. Six rounds of mass screening and treatment in an intervention arm of 27,000 people were completed by mid-2015. Preliminary findings were presented at the 64th American Society of Tropical Meeting and Hygiene Annual Meeting in November 2015 and with the Siaya County Health Management Team in early 2016. Results from the community component on perceptions of mass screen and treat were published in 2016.³⁰ Respondents were generally positive and willing to participate in the intervention; proper community sensitization was recommended for similar intervention activities. An additional manuscript describing the study design and methodology was published in 2017.³¹ Publications including the main outcomes and results will be published in 2017 and 2018.

Progress during the last 12-18 months

- **Impact of intensification of malaria prevention and control activities on household microeconomics and health service delivery in western Kenya.** PMI core operational research support funded this study, which began in January 2015. The microeconomic study will determine the economic impact of the intensive malaria-reduction efforts in western Kenya at the household and health-system levels. Study findings will provide evidence on the changes in household income and economic status as measured by wealth quintile as a result of improvements in malaria prevention and control activities. The study will demonstrate any improvements in the efficiency of health service delivery resulting from a decreasing burden of severe and uncomplicated malaria. The study will also provide evidence for the cost implications of malaria-elimination efforts at the county and national levels. Preliminary results were presented at the 65th American Society of Tropical Meeting and Hygiene Annual Meeting in November 2016.³² The study is expected to be completed in 2017.

²⁸Desai, et al., *Lancet*. 2015 Dec 19;386(10012):2507-19. doi: 10.1016/S0140-6736(15)00310-4

²⁹Hill, et al., *PLoS One*. 2016 Mar 17;11(3):e0150259. doi: 10.1371/journal.pone.0150259

³⁰Shulford, K, Were F, Awino N, Samuels A, Ouma P, Kariuki S, Desai M, Allen DR.. Community perceptions of mass screening and treatment for malaria in Siaya County, western Kenya. *Malaria Journal*. 2016 Feb 6;15:71.

³¹Samuels AM, Awino N, Odongo W, Abong'o B, Gimnig J, Otieno K, Shi YP, Were V, Allen DR, Were F, Sang T, Obor D, Williamson J, Hamel MJ, Patrick Kachur S, Slutsker L, Lindblade KA, Kariuki S, Desai M. Community-based intermittent mass testing and treatment for malaria in an area of high transmission intensity, western Kenya: study design and methodology for a cluster randomized controlled trial. *Malar J*. 2017 Jun 7;16:240

³²Were V, Desai M, Kariuki S, Buff AM, Hamel M, terKuile FO, Phillips-Howard P, Kachur SP, Niessen LW. Trends In Socioeconomic-Related Health Inequality In Rural Western Kenya: Data From Repeated Household Malaria Surveys 2006-2013. Poster 1451 at the 65th meeting of the American Society for Tropical Medicine and Hygiene, 2016.

Table 18. PMI-funded Operational Research Studies

Completed OR Studies			
Title	Start date	End date	Budget
Phase III field evaluation of long-lasting insecticide-treated nets (Kenya, Malawi, and Senegal)	December 2009	May 2014	\$150,000 (PMI core funding)
Longevity of insecticides used for IRS	September 2011	April 2012	\$50,000
Evaluation of integrated vector control in high- and low-transmission areas of western Kenya	May 2008	August 2009	\$193,000 (PMI core funding)
Knowledge and adherence to malaria treatment guidelines for pregnant patients in rural western Kenya	August 2013	December 2013	\$75,000
Intermittent screening and treatment (IST) or intermittent preventive treatment (IPT) with dihydroartemisinin-piperaquine versus IPT with sulfadoxine-pyrimethamine for the control of malaria in pregnancy in Kenya: Assessment of acceptability, feasibility and cost-effectiveness within a randomized controlled trial	September 2012	July 2015	\$150,000
Evaluation of intermittent mass screening and treatment (IMSaT) to reduce malaria transmission in western Kenya	January 2013	August 2016	\$2,150,000 (FY11–FY13 PMI Core funding)
Ongoing OR Studies			
Title	Start date	End date (est.)	Budget
Impact of intensification of malaria control activities on household microeconomics and health services in western Kenya	January 2015	December 2016	\$500,000 (\$88,000 of PMI Core funding)

Plans and justification

PMI currently has no studies planned with FY 2018 funding.

Proposed activities with FY 2018 funding: (\$0)

PMI currently has no studies planned with FY 2018 funding.

8. Staffing and administration

Two health professionals serve as Resident Advisors (RAs) to oversee PMI in Kenya, one representing CDC and one representing USAID. In addition, one Foreign Service National (FSN) and one Foreign Service Officer (FSO) (part-time) work as part of the PMI team. All PMI staff members are part of a single interagency team led by the USAID Mission Director or his/her designee in country. The PMI team shares responsibility for development and implementation of PMI strategies and work plans, coordination with national authorities, managing collaborating agencies, and supervising day-to-day activities. Candidates for RA positions (whether initial hires or replacements) will be evaluated and/or

interviewed jointly by USAID and CDC, and both agencies will be involved in hiring decisions, with the final decision made by the individual agency.

The PMI interagency professional staff work together to oversee all technical and administrative aspects of PMI, including finalizing details of the project design, implementing malaria prevention and treatment activities, monitoring and evaluation of outcomes and impact, reporting of results, and providing guidance and direction to PMI implementing partners.

The PMI lead in country is the USAID Mission Director. The day-to-day lead for PMI is delegated to the USAID Health Office Director and thus the two PMI RAs, one from USAID and one from CDC, report to the USAID Health Office Director for day-to-day leadership, and work together as a part of a single interagency team. Technical expertise housed in Atlanta and Washington complements PMI programmatic efforts.

The two PMI RAs are physically based within the USAID health office but are expected to spend approximately half of their time with and providing TA to the NMCPs and implementing partners, including time in the field monitoring program implementation and impact.

The number of locally-hired staff and necessary qualifications to successfully support PMI activities either in Ministries or in USAID will be approved by the USAID Mission Director. Because of the need to adhere to specific country policies and USAID accounting regulations, any transfer of PMI funds directly to Ministries or host governments will need to be approved by the USAID Mission Director and Controller, in addition to the U.S. Global Malaria Coordinator.

Proposed activities with FY 2018 funding: (\$1,978,536)

1. **USAID in-country staffing and administration:** Support for one PMI resident advisor and one Foreign Service National staff member to oversee activities supported by PMI in Kenya. Additionally, these funds will support pooled USAID Kenya Mission staff and mission-wide assistance from which PMI benefits. *(\$1,278,536)*
2. **CDC in-country staffing and administration:** Support for one PMI resident advisor to oversee activities supported by PMI in Kenya. *(\$700,000)*

**Table 1: Budget Breakdown by Mechanism
President's Malaria Initiative – KENYA
Planned Malaria Obligations for FY 2018**

Partner Organization	Geographic Area	Activity Description	Activity Budget	Partner Subtotals	%
CDC IAA	Endemic/ Epidemic Counties	Technical Assistance: CDC TDYs	\$29,000	\$159,000	1%
	Nationwide	Technical Assistance: CDC TDY	\$10,000		
		Technical Assistance: CDC TDYs	\$20,000		
		Support one FELTP resident for two years	\$100,000		
CMLAP	Endemic Counties	Strengthen malaria SM&E at county, sub-county and facility levels	\$500,000	\$500,000	2%
GHSC-PSM	Endemic/ Epidemic Counties	Procure ITNs for health facility-based distribution channels	\$1,000,000	\$10,360,104	35%
	Endemic County(s)	Procure ITNs for alternate distribution channel	\$450,000		
	Nationwide	Procure RDTs	\$2,520,000		
		Procure AL	\$5,130,104		
		Procure severe malaria medications	\$1,260,000		
Health Information Governance and Data Analytics (HIGDA)	National	Support MOH and NMCP leadership and governance for malaria M&E activities	\$200,000	\$200,000	1%
KEMSA Medical Commodities Project (MCP)	Nationwide	Provide warehousing and distribution for RDTs, ACTs and severe malaria medicines	\$715,360	\$715,360	2%
TBD - Service Delivery Award	Endemic Counties	Sensitize and train healthcare workers and supervisors on the malaria in pregnancy package of interventions and improve facility reporting	\$300,000	\$2,100,000	7%

		Sensitize, orient, and supervise CHVs on malaria in pregnancy package of interventions and improve reporting	\$300,000		
		Strengthen national and county level malaria in pregnancy policy and monitoring capacity	\$100,000		
		Capacity building for and support to the NMCP for malaria case management and diagnostics:	\$300,000		
		Capacity building for and strengthening malaria case management at county and health facility level	\$1,100,000		
Health Communications and Marketing Program (HCM)	Endemic/ Epidemic Counties	Logistic and program support for ITN distribution	\$1,000,000	\$3,175,000	11%
		Support alternate ITN distribution channel	\$225,000		
		Support for county malaria control programs	\$400,000		
		Integrated community-based SBCC	\$1,250,000		
	Nationwide	Support to NMCP	\$200,000		
		National SBCC promotion and material production	\$100,000		
TBD - IRS	Endemic Counties	IRS implementation and management	\$7,000,000	\$7,500,000	25%
	Endemic/ Epidemic Counties	Entomological and insecticide resistance monitoring in IRS and other selective areas	\$500,000		
GHSC-PSM TO5 (KSCSS)	Central	Strengthen supply chain management for malaria commodities at the national level	\$400,000	\$1,650,000	6%
		Quality of Care Survey (outpatient)	\$100,000		
		Inpatient Quality of Care Survey	\$150,000		

	Endemic Counties	Strengthen supply chain management for malaria commodities at the county, sub-county, and health-facility levels	\$1,000,000		
TBD - QI mechanism	Endemic/ Epidemic Counties	Support CHMTs and SCHMTs for quality improvement	\$300,000	\$300,000	1%
TBD (different mechanisms)	Endemic Counties	Support therapeutic efficacy monitoring	\$312,000	\$1,062,000	4%
	Endemic County(s)	Monitoring of interventions: ITN durability monitoring	\$200,000		
	Central	Strengthening malaria SM&E at the national level	\$500,000		
	Nationwide	Technical Assistance for Quality of Care Surveys	\$50,000		
USP PQM	Nationwide	Strengthen antimalarial drug quality monitoring and surveillance	\$300,000	\$300,000	1%
USAID/CDC	Nationwide	USAID and CDC in country staffing and administration	\$1,978,536	\$1,978,536	7%
FY 2018 Budget Total				\$30,000,000	100%

**Table 2: Budget Breakdown by Activity
President's Malaria Initiative – KENYA
Planned Malaria Obligations for FY 2018**

Proposed Activity	Mechanism	FY 2018 Budget	FY 2018 Commodities	Geographic area	Description of Activity
PREVENTIVE ACTIVITIES					
VECTOR MONITORING AND CONTROL					
Entomologic monitoring and insecticide resistance management					
Entomological and insecticide resistance monitoring in IRS and other selective areas	TBD - IRS	\$500,000	\$0	Endemic/ Epidemic Counties	Continue insecticide resistance monitoring (including resistance intensity) in endemic/epidemic counties in IRS and non-IRS areas.
Technical Assistance: CDC TDYs	CDC IAA	\$29,000	\$0	Endemic/ Epidemic Counties	Support two visits from CDC to provide assistance in implementing IRS and ento monitoring activities.
SUBTOTAL ENTO		\$529,000	\$0		
Insecticide Treated Nets					
Procure ITNs for health facility-based distribution channels	GHSC-PSM	\$1,000,000	\$1,000,000	Endemic/ Epidemic Counties	Fill the ITN gap for routine distribution by purchasing up to 1 million ITNs. Routine distribution: free-of-charge to pregnant women and children under one through the ANC and EPI/child health clinics. (\$2 million will come from commodity cost savings in previous years)

Logistic and program support for ITN distribution	Health Communications and Marketing Program (HCM)	\$1,000,000	\$0	Endemic/ Epidemic Counties	Provide logistical support, including transportation and storage of nets, for distribution of the 1 million ITNs within the national routine distribution system.
Procure ITNs for alternate distribution channel	GHSC-PSM	\$450,000	\$450,000	Endemic County(s)	Procure 150,000 ITNs for an alternate distribution channel.
Support alternate ITN distribution channel	HCM	\$225,000	\$0	Endemic County(s)	Support an alternate ITN distribution channel in about one county to maintain universal coverage. The specific approach (e.g. community-based, school-based) will be based on the Malaria Program Review and new Kenya Malaria Strategy in 2018.
Monitoring of interventions: ITN durability monitoring	TBD	\$200,000	\$0	Endemic County(s)	Net attrition/durability conducted on nets distributed in the 2017 mass ITN campaign. Includes the 24-month time point for two sites.
SUBTOTAL ITNs		\$2,875,000	\$1,450,000		
Indoor Residual Spraying					
IRS implementation and management	TBD Central Vector Control Mechanism	\$7,000,000	\$2,594,360	Endemic Counties	Support IRS in two endemic counties (estimated to reach 491,044 structures and up to 2.2 million people) with at least 85% coverage in all targeted areas.
SUBTOTAL IRS		\$7,000,000	\$2,594,360		
Malaria in Pregnancy					

Sensitize and train healthcare workers and supervisors on the malaria in pregnancy package of interventions and improve facility reporting	TBD - Service Delivery Award	\$300,000	\$0	Endemic Counties	Target all healthcare facilities that provide ANC services in up to eight counties. An estimated total of up to 400 healthcare facilities will be reached. Activities will include the orientation and training of facility in-charges and health service providers on the MIP package and ANC data collection.
Sensitize, orient, and supervise CHVs on malaria in pregnancy package of interventions and improve reporting	TBD - Service Delivery Award	\$300,000	\$0	Endemic Counties	This activity will include the orientation, training and supervision of CHVs to increase early referral to ANC services and to register all pregnant women for follow-up. An estimated 4,000 CHVs will be sensitized and oriented using the community strategy and other innovative community approaches. The target is to reach approximately 40,000 women of reproductive age with community MIP messages.
Strengthen national and county level malaria in pregnancy policy and monitoring capacity	TBD - Service Delivery Award	\$100,000	\$0	Endemic Counties	Support will be provided at the national and county levels for policy and monitoring of MIP-specific activities. Technical support will be provided to counties on MIP as necessary. Support cross-county learning, printing guidelines, and TWGs.
SUBTOTAL MIP		\$700,000	\$0		
SUBTOTAL PREVENTIVE		\$11,104,000	\$4,044,360		
CASE MANAGEMENT					
Diagnostics & Treatment					

Procure RDTs	GHSC-PSM	\$2,520,000	\$2,520,000	Nationwide	Procure up to 5.6 million RDTs to help fill the gap at level 2 and 3 health facilities (dispensaries and health centers) and to provide RDTs for the community case management strategy.
Procure AL	GHSC-PSM	\$5,130,104	\$5,130,104	Nationwide	Procure up to 5.8 million AL treatments to fill gaps in the public sector and community case management.
Procure severe malaria medications	GHSC-PSM	\$1,260,000	\$1,260,000	Nationwide	Procure severe malaria drugs, including up to approximately 500,000 vials of injectable artesunate, as needed.
Provide warehousing and distribution for RDTs, ACTs and severe malaria medicines	KEMSA Medical Commodities Project (MCP)	\$715,360	\$0	Nationwide	Provide warehousing and distribution for RDTs, ACTs and severe malaria medicines from central to facility level nationwide.
Capacity building for and support to the NMCP for malaria case management and diagnostics:	TBD - Service Delivery Award	\$300,000	\$0	Central	Support to the National Malaria Control Program for oversight and mentorship of malaria case management and diagnostics.

Capacity building for and strengthening malaria case management at county and health facility level	TBD - Service Delivery Award	\$1,100,000	\$0	Endemic Counties	Strengthening diagnostic capacity of existing laboratory and healthcare staff through ongoing refresher trainings and OTSS for laboratory supervisors, on-the job training, and mentoring of county/sub-county/health-facility staff to enable case management improvements at the health-facility level. Support integrated implementation and strengthening of the QA/QC framework for malaria diagnostics in focus counties.
Support therapeutic efficacy monitoring	TBD	\$312,000	\$0	Endemic Counties	Support therapeutic efficacy monitoring in four sites testing the first-line and second-line ACTs (AL and DHA-PPQ), with K13 testing also planned.
Technical Assistance: CDC TDY	CDC IAA	\$10,000	\$0	Nationwide	Support one CDC visit to provide technical assistance for malaria case management.
SUBTOTAL DIAGNOSIS AND TREATMENT		\$11,347,464	\$8,910,104		
Pharmaceutical Management					

Strengthen supply chain management for malaria commodities at the national level	GHSC-PSM TO5 (KSCSS)	\$400,000	\$0	Central	Support the NMCP to strengthen governance, coordination and leadership structures for supply chain management and build capacity to ensure accurate forecasting and supply planning for malaria commodity needs at the national level and upstream flow of logistics data through DHIS2 to inform the annual quantification process.
Strengthen supply chain management for malaria commodities at the county, sub-county, and health-facility levels	GHSC-PSM TO5 (KSCSS)	\$1,000,000	\$0	Endemic Counties	Support throughout the supply chain (county, sub-county, and health-facility levels) to build capacity and structures for proper commodity management and to ensure that quality logistics data is available and used to inform county malaria commodity needs.
Strengthen antimalarial drug quality monitoring and surveillance	USP PQM	\$300,000	\$0	Nationwide	Strengthen antimalarial drug quality monitoring through the provision of technical, strategic and operational support to the NMCP and counties, Pharmacy and Poisons Board, and National Quality Control Laboratory. Activities will be conducted in collaboration with KEMSA and MEDS.
SUBTOTAL PHARMACEUTICAL MANAGEMENT		\$1,700,000	\$0		
HEALTH SYSTEMS STRENGTHENING/CAPACITY BUILDING					

Support to NMCP	HCM	\$200,000	\$0	Nationwide	Provide technical assistance and capacity building to improve the NMCP's capacity to fulfill the roles and responsibilities in line with the KMS. Provide support for technical working groups and inter-agency coordination committees for robust participation and regular meetings.
Support for county malaria control programs	HCM	\$400,000	\$0	Endemic Counties	Programmatic support to malaria control coordinators, county pharmacist, county lab coordinator, disease surveillance coordinator, and health management teams at the county and sub-county levels to increase supervision and management capacity for program implementation. Support emerging malaria control issues at the county level. Assist with inter-county coordination.
Support CHMTs and SCHMTs for quality improvement	TBD - QI mechanism	\$300,000	\$0	Endemic/ Epidemic Counties	Support quality improvement activities with CHMTs and SCHMTs, to improve program performance across all malaria intervention areas.

Support one FELTP resident for two years	CDC IAA	\$100,000	\$0	Nationwide	Support one FELTP trainee for the two-year program to increase epidemiologic capacity within the MoH. PMI encourages the MoH to deploy FELTP graduates to the NMCP or endemic/epidemic counties to enhance the capacity of malaria control programs. The budget for each trainee includes tuition, stipend, laptop, materials, training and travel for the two-year program.
SUBTOTAL HSS & CAPACITY BUILDING		\$1,000,000	\$0		
SOCIAL AND BEHAVIOR CHANGE COMMUNICATION					
Integrated community-based SBCC	HCM	\$1,250,000	\$0	Endemic Counties	Expand community-based SBCC efforts by increasing outreach to priority counties and at-risk populations, particularly pregnant women and children less than five years of age, through different strategies and channels of communication, such as IPC. Messages and mode of dissemination will be dependent on the venue and target group but will include health facilities, ANC clinics, home visits by CHVs, <i>barazas</i> , and public gatherings.

National SBCC promotion and material production	HCM	\$100,000	\$0	Nationwide	Support national-level SBCC message development and dissemination on key malaria control interventions; donor coordination; advocacy-related activities, including regular review meetings with malaria partners, donors, and stakeholders to monitor and evaluate program progress. Activities will also strengthen the Division of Health Promotion.
SUBTOTAL BCC		\$1,350,000	\$0		
SURVEILLANCE, MONITORING AND EVALUATION					
Support MOH and NMCP leadership and governance for malaria M&E activities	Health Information Governance and Data Analytics (HIGDA)	\$200,000	\$0	Central	Oversight, governance, data management/analytics and updating DHIS2 forms for malaria.
Strengthening malaria SM&E at the national level	TBD	\$500,000	\$0	Central	Continue support to the NMCP for implementation of the national M&E plan by providing technical assistance to increase the capacity of M&E staff at the national level and to promote data use for decision making. Activities include quarterly surveillance bulletins, M&E TWGs, monitoring program activities, GMP reporting, data analysis, KNMF, etc.

Strengthen malaria SM&E at county, sub-county and facility levels	CMLAP	\$500,000	\$0	Endemic Counties	Increase data demand and use of routine data for programmatic improvements at county level. Support for M&E strengthening at the county level, working with the CHMT, SCHMT and select health facilities. Continue capacity building in counties for surveillance and M&E activities, mentorship, and reporting in line with county malaria control plans.
Quality of Care Survey (outpatient)	GHSC-PSM TO5 (KSCSS)	\$100,000	\$0	Nationwide	Monitor quality of care for malaria case management and assess stockouts through the End-use verification indicators included in the semi-annual Quality of Care surveys.
Inpatient Quality of Care Survey	GHSC-PSM TO5 (KSCSS)	\$150,000	\$0	Nationwide	Inpatient QoC survey in level 5 hospitals in all 47 counties on a semi-annual basis.
Technical Assistance for Quality of Care Surveys	TBD- mission mechanism	\$50,000	\$0	Nationwide	Technical assistance to support the QoC surveys.
Technical Assistance: CDC TDYs	CDC IAA	\$20,000	\$0	Nationwide	Support two CDC TDYs to provide technical assistance for M&E activities.
SUBTOTAL SM&E		\$1,520,000	\$0		
IN-COUNTRY STAFFING AND ADMINISTRATION					
USAID in-country staffing and administration	USAID	\$1,278,536	\$0	Nationwide	USAID staffing and mission-wide support costs.

CDC in-country staffing and administration	CDC IAA	\$700,000	\$0	Nationwide	CDC Advisor staffing and support costs.
SUBTOTAL IN-COUNTRY STAFFING		\$1,978,536	\$0		
GRAND TOTAL		\$30,000,000	\$12,954,464		