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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U.S. PRESIDENT'S MALARIA INITIATIVE

CDC
CENTERS FOR DISEASE CONTROL AND PREVENTION

PRESIDENT'S MALARIA INITIATIVE

NIGERIA

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
AMFm	Affordable Medicines Facility-malaria
ANC	Antenatal care
AS/AQ	Artesunate-amodiaquine
CDC	Centers for Disease Control and Prevention
CHAI	Clinton Health Access Initiative
CHW	Community Health Worker
CMS	Central medical stores
DDIC	Direct Delivery and Information Capture
DfID	United Kingdom Department for International Development
DHIS	District health information system
DOD	Department of Defense
DOT	Directly observed therapy
DPRS	Department of Planning, Research and Statistics
DQA	Data Quality Assessment
DTET	Drug therapeutic efficacy testing
EPI	Expanded Program on Immunization
EUV	End-use verification
FANC	Focused antenatal care
FMoH	Federal Ministry of Health
FGN	Federal Government of Nigeria
FSN	Foreign service national
FY	Fiscal year
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
GHSA	Global Health Security Agenda
GoN	Government of Nigeria
HC3	Health Communication Capacity Collaborative
HIV/AIDS	Human Immunodeficiency Virus/Acquired Immunodeficiency Syndrome
HMIS	Health management information system
HPN	Health, Population, and Nutrition
iCCM	Integrated community case management
IEC	Information, education, communication
IAS	Injectable artesunate
IPC	Inter personal communication
IPTp	Intermittent preventive treatment for pregnant women
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito net
LGA	Local government area
LMCU	Logistics Management Coordination Unit

LMIS	Logistics Management Information System
M&E	Monitoring and Evaluation
MAPS	Malaria Action Program for States
MIA	Malaria Implementation Assessment
MIP	Malaria in pregnancy
MNCH	Maternal, Newborn and Child Health
MoH	Ministry of Health
MOP	Malaria Operational Plan
NAFDAC	National Agency for Food and Drug Administration and Control
NDHS	Nigeria Demographic and Health Survey
NFELTP	Nigeria Field Epidemiology and Laboratory Training Program
NFM	New Funding Model
NMEP	National Malaria Elimination Program
NMIS	Nigeria Malaria Indicator Survey
NMSP	National Malaria Strategic Plan
NSTOP	National Stop Transmission of Polio
OR	Operational research
PCR	Polymerase chain reaction
PEPFAR	President's Emergency Plan for AIDS Relief
PD&L	Program Design and Learning
PHC	Primary Health Care
PMI	President's Malaria Initiative
PPMVs	Proprietary patent medicine vendors
PSM	Procurement and Supply Chain Management
QA	Quality assurance
QC	Quality control
RBM	Roll Back Malaria
RDT	Rapid diagnostic test
RIA	Rapid Impact Assessment
SBCC	Social and behavior change communication
SMC	Seasonal malaria chemoprevention
SM&E	Surveillance, monitoring, and evaluation
SMEP	State Malaria Elimination Program
SOML	Saving One Million Lives
SOP	Standard Operating Procedures
SP	Sulfadoxine-pyrimethamine
SuNMaP	Support for the National Malaria Program
TWG	Technical Working Group
UNFPA	United Nations Fund for Population Activities
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
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 the World Health Organization (WHO)'s updated *Global Technical Strategy for Malaria: 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.

Nigeria began implementation as a PMI focus country in fiscal year (FY) 2011 PMI began with support to three states (Cross River, Nasarawa, and Zamfara). In 2012, PMI expanded to six more states (Bauchi, Benue, Ebonyi, Kogi, Oyo, and Sokoto), and in 2013, added two more states (Akwa Ibom and Kebbi) for a total of 11 states. A strategy review meeting held in April 2016 revisited the states for PMI support. States were selected based on malaria disease burden, ITN use and coverage, presence of other donors, strength of state leadership, and security. Based on these criteria, 10 states were retained and Kogi, with a prevalence of malaria parasitemia in children under five years of age of 5%, was replaced with Plateau State with parasitemia in children under five years of age of 36%. Support to Kogi State will be phased out in the calendar year 2017. The projected population of the 11 states to receive PMI support in 2019 is 57.8 million. PMI provides support to all 230 local government areas (LGAs) in the 11 supported states. The Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund) will continue to

support 8 of the 11 PMI-supported states through 2017. In 2018, the Global Fund will no longer support these states, rather the focus will be in an additional 13 states where PMI does not operate.

This FY 2018 Malaria Operational Plan presents a detailed implementation plan for Nigeria, based on the strategies of PMI and the National Malaria Elimination Program (NMEP). It was developed in consultation with the NMEP 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 national malaria control strategy and plan and build on investments made by PMI and other partners to improve and expand malaria-related services, including Global Fund malaria grants. This document briefly reviews the current status of malaria control policies and interventions in Nigeria, describes progress to date, identifies challenges and unmet needs to achieving the targets of the NMEP and PMI, and provides a description of activities that are planned with FY 2018 funding.

The proposed FY 2018 PMI budget for Nigeria is $60 million. PMI will support the following intervention areas with these funds:

Entomological monitoring and insecticide resistance management:
The Nigerian National Malaria Strategic Plan (NMSP) 2014-2020 calls for entomological surveillance to provide data that will inform vector control activities as well as targeted interventions. PMI began supporting entomological monitoring in 2011 as part of a two-year IRS demonstration program in Nasarawa State. In 2013 PMI expanded entomological monitoring activities from Nasarawa to six states across all of Nigeria's five ecological zones. The ecological zones are mangrove swamps, rain forest, Guinea-savannah, Sudan-savannah, and Sahel-savannah. The entomological monitoring provides monthly data on vector density and annual data on insecticide susceptibility.

In FY 2017, PMI continued and intensified longitudinal entomological surveillance in six PMI-supported states: Akwa Ibom, Bauchi, Ebonyi, Nasarawa, Oyo, and Sokoto; indoor resting densities, pyrethrum spray catches, and light/human-baited traps were conducted in all six sites to determine mosquito biting time and speciation. Detailed results can be found on pages 31 – 33 of this plan.

With FY 2018 funding, PMI will continue to monitor key entomological indicators in these sites to guide further PMI interventions in the country. Entomological data will also provide information on vector infection rates. PMI will continue support for training and equipment procurement in order to build capacity for entomological expertise at the national, state, and local levels.

Insecticide-treated nets (ITNs):
The NMSP 2014-2020 objective is to achieve universal coverage with ITNs. Universal coverage is defined as one ITN for every two persons. PMI's goal is to support the NMEP in achieving and maintaining its targets for ITN coverage and use, especially in PMI-supported states.

PMI supports free mass ITN campaigns every three years, and strengthening continuous distribution channels that include antenatal care (ANC) and immunization clinics, schools, and community-based distributions where feasible and cost-effective. Since 2010, PMI has procured a total of 40.7 million ITNs for mass campaigns and continuous distribution, and distributed over 60 million ITNs, including over 24 million ITNs procured by other partners. From December 2013 to May 2017, the NMEP and its partners distributed 60.8 million ITNs through mass campaigns in 23 states, including over 26 million ITNs in all the 11 PMI-supported states of Sokoto, Bauchi, Nasarawa, Kebbi, Cross River, Ebonyi, Zamfara, Benue, Akwa Ibom, Oyo and Kogi.

Data from two Nigeria Malaria Indicator Surveys (NMIS) show ownership of at least one ITN in a household increased substantially from 8% in 2010 to 69% nationally in 2015. The average number of ITNs per household doubled from 0.8 to 1.6 (2015 NMIS). Eight of the 11 PMI-supported states had higher ownership of at least one ITN per household than the national average. The percentage of the total population that slept under an ITN increased from 23% in 2010 to 37% in 2015.

With FY 2018 funds, PMI will procure approximately 1,887,070 ITNs which will be used for continuous distribution in the 11 PMI-supported states, and to internally displaced persons. FY 2018 funds will also be used to distribute approximately 6.7 million ITNs through mass campaigns in Cross River, Ebonyi, and Zamfara from state warehouses to the various service delivery points, and support durability monitoring for ITNs.

Indoor residual spraying (IRS):
PMI supported a two-year IRS demonstration program in Nasarawa State from 2011 to 2013. While the NMSP 2014-2020 calls for scaling-up of IRS to cover at least 40% of areas with high malaria transmission, IRS is currently only carried out in a limited number of LGAs in some states with local funds. PMI has no plans to support IRS activities in Nigeria with FY 2018 funding.

Malaria in pregnancy (MIP):
The NMSP 2014-2020 reflects the WHO policy of providing IPTp at every antenatal care visit after the first trimester, with four weeks between doses, providing an ITN during the first ANC visit, and prompt appropriate management of malaria illness during pregnancy. Nigeria recently experienced an increase in the percentage of pregnant women who received 2 or more doses of SP from 13% in 2010 to 37% in 2015 (NMIS), however, effective scale-up of IPTp continues to be a challenge in Nigeria. The factors that contribute to the low uptake of IPTp in public health facilities include missed opportunities at ANCs, non-availability of SP, restriction of non-pharmacy health workers to dispense SP, low ANC attendance rates, and poor quality of ANC service delivery.

To address these challenges, PMI has procured SP for IPTp as a part of focused antenatal care support in the 11 PMI-supported states. PMI also supported scale up of the implementation of the WHO IPTp policy, establishment of MIP working groups at national- and state-levels, development and distribution of job aids on IPTp, and initiated the processes for addressing

missed opportunities for IPTp delivery.

With FY 2018 funding, PMI will continue to support capacity building for health workers according to the MIP guidelines, advocate for states to address missed opportunities for IPTp directly observed therapy, advocate for state domestic resources to procure SP, monitor state planned SP procurement actions, improve IPTp coverage through interpersonal communication innovations for health workers, and create demand for IPTp in the community. PMI will also support implementation of IPTp as part of health facility outreach services for focused antenatal care for the three states of Kebbi, Sokoto, and Zamfara in northern Nigeria where ANC attendance is less than 25%.

Case management:
The Nigerian National Guidelines for Diagnosis and Treatment of Malaria aligns with the WHO recommendations on universal diagnostic testing and treatment with an ACT. Since PMI began in Nigeria, case management support has been directed at the following key areas: 1) procurement and distribution of diagnostic and treatment commodities; 2) training and supervision of laboratory and clinical care personnel in accurate malaria diagnostics and appropriate treatment; 3) implementation of quality assurance (QA) systems for malaria diagnostics.

Since 2011 PMI has supported the scale up of quality-assured case management for malaria across the supported states working with NMEP and other donors. High priority was given to increasing diagnostic testing rates and adherence to test results as artemisinin-based combination therapy is available at most service delivery points. PMI supported case management implementation through procurement and distribution of about 20 million rapid diagnostic tests (RDTs) and 42 million ACTs to public health facilities and enhanced capacity of service providers in malaria parasitological diagnosis. Improving QA was a focus for PMI while strengthening quality of microscopy at secondary and tertiary facilities. PMI also supported the improvement in management of severe malaria through procurement of injectable artesunate, capacity building of senior health providers, and clinical mentoring in line with revised WHO treatment guidelines.

With FY 2018 funding, PMI will build on the progress to date and will continue to support the NMEP's malaria case management policy through provision of malaria commodities, case management training/refresher training, supportive supervision, and diagnostic quality assurance/quality control (QA/QC). PMI will procure and distribute approximately 17 million RDTs and 12 million ACTs to help meet the projected need in PMI-supported states. Also, PMI plans to continue support for seasonal malaria chemoprevention (SMC) efforts targeted at children under the age of five years in parts of three PMI-supported states in the Sahel region.

Health systems strengthening and capacity building:
PMI supports a broad array of health system strengthening activities that cut across case management; procurement and supply management; surveillance, monitoring and evaluation (SM&E); and integrated vector management.

With FY 2018 funds, PMI will work with other development partners to strengthen capacities at national and state level in effective program management. PMI funds will also be used to strengthen the capacity of facility and operational level staff in malaria case management; prevention of MIP; entomological monitoring; and SM&E. In addition, PMI will continue to provide support for the Nigeria Field Epidemiology and Laboratory Training Program (NFELTP) that builds capacity of health workers in epidemiology and disease outbreak investigations.

Social and behavior change communication (SBCC):
Nigeria's Advocacy, Communication, and Social Mobilization (ACSM) guidelines for malaria recommend various channels of communication based on the target audiences. Malaria educational messages generally reach households using radio, community drama, printed materials, community and religious leaders, and through community support groups and household visits by volunteers. Nationwide surveys have shown that there is widespread knowledge of malaria interventions; however, there are misconceptions about the cause and ways to manage malaria. Since 2011, PMI has provided support for SBCC across all key malaria interventions.

With FY 2018 funds, PMI will continue to support an overarching national 'malaria-free' communications campaign to increase utility of malaria control interventions at national, state, and local levels. State and local government-level activities will focus on transmitting malaria communication messages in local languages through radio, and use of community volunteers to reinforce messages and address specific barriers to behavior change among priority sub-populations, identified using evidence from data. PMI SBCC interventions will also continue to target health care workers, especially those within the public sector, to increase compliance to malaria prevention and treatment guidelines, and improve interpersonal communication.

Surveillance, monitoring and evaluation:
Surveillance, monitoring, and evaluation (SM&E) is an integral part of the NMSP 2014-2020, with one of the primary objectives focusing on routine collection and reporting of malaria data, and use of such data for program improvement. Evidence-based decision-making requires a strong and functional SM&E system that provides good quality data. PMI supports strengthening the routine health information system at various levels. Periodic population-based surveys such as the Malaria Indicator Survey (2015 NMIS) and facility-based surveys are also used to measure the status of key malaria indicators.

Since 2011, PMI has supported health management information system (HMIS) strengthening at national and state levels that has led to significant improvement in completeness and timeliness of routine data reported in the PMI-supported states. With funding from PMI and partners, the National Bureau of Statistics implemented the 2015 NMIS from October 2015 through November 2015. The country as a whole saw a marked decrease in malaria prevalence measured by microscopy in children age 6-59 months (42% in 2010; 27% in 2015; relative difference of 36%). The end-use verification surveys are done every six months to assess stock availability of malaria commodities, testing for malaria before treatment, prescription of ACTs, storage conditions for commodities, and training of health workers.

With FY 2018 funds, PMI/Nigeria's SM&E activities will continue to rely on a combination of routine malaria data collected through the HMIS and the logistics management information system (LMIS), household surveys, health facility surveys and assessments, and information from partners. PMI will continue to strengthen the routine health information system at the health facility, LGA, state, and national levels through the harmonized HMIS (using the District Health Information Software version 2 [DHIS2] application). There will be an increased focus on data analysis through triangulation, mapping, and move towards targeting interventions based on the verified DHIS2 results.

Operational research (OR):
The 2012 Malaria Program Review (MPR) identified a lack of OR available to inform both scientific and communications-related strategy development. The NMSP 2014-2020 proposed earmarking funding from the NMEP monitoring and evaluation (M&E) budget to OR. In 2014, the NMEP and development partners held a scientific meeting to identify priority areas across the core interventions. PMI will work with NMEP and other development partners to analyze and use HMIS and NMIS data, as well as revisit the NMEP OR prioritized list to identify areas for PMI support. No funds are requested for OR in 2018.

Sustainability:
The burden of malaria is huge and resources in Nigeria to tackle this problem are inadequate. PMI is collaborating with GoN counterparts to better define needs and mobilize additional resources for the program. With FY 2017 funds, PMI plans to conduct fiscal space analyses and resource tracking in priority states. The results will guide memoranda of understanding that will be developed with the leadership of states, which will detail plans for ensuring sustainability of PMI investments through increased domestic investment in malaria control and prevention.

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. Nigeria was selected as a PMI focus country in FY 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 the World Health Organization's (WHO's) *Global Technical Strategy for Malaria, 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.

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This FY 2018 Malaria Operational Plan presents an implementation plan for Nigeria, based on the strategies of PMI and the National Malaria Elimination Program (NMEP). It was developed in consultation with the NMEP 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 National Malaria Control Strategy and Plan (NMSP) 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 Nigeria, describes progress to date, identifies challenges and unmet needs to achieving the targets of the NMEP and PMI, and provides a description of activities that are planned with FY 2018 funding.

2. Malaria situation in Nigeria

Nigeria is the most populous country in Africa with a projected total population of approximately 212 million for 2019 (National Population Commission, 2006, Projected) and an estimated annual growth rate of about 3.2%. It comprises six geopolitical zones (North West, North East, North Central, South West, South South, and South East), 36 states (plus the Federal Capital Territory of Abuja), 774 local government areas (LGAs) with an average population of about 273,000 residents per LGA, and 8,812 wards. Each state has an elected governor, an executive council, and a house of assembly with the power to enact state laws. State governments have substantial autonomy and exercise considerable authority over the allocation and utilization of their resources, limiting the influence of the federal government over state and local government affairs.

Nigeria is ranked 152 out of 188 countries 2016 United Nations Development Program Human Development Index[1]. According to the 2016 report, Nigeria maintained the same status as 2015. The 2015 ranking data represents only a two-point positive change from 2014 a ranking data. Under-five mortality is estimated at 128 per 1,000 live births and maternal mortality is estimated at 576 per 100,000 live births according to 2013 Nigeria Demographic and Health Survey (DHS). Nearly all health and socioeconomic indicators in the south of the country are significantly better than in the north. For example, under-five mortality rates are about one and a half times higher and maternal mortality rates are three times higher in some northern zones than in the rest of the country. The South West Zone has the lowest under-five mortality. The country's gross domestic product increased during the past decade, with oil revenues as the main driver of the economy. However, falling oil and gas prices in the world market are affecting the Nigerian economy, and the local currency, the Naira, has come under severe pressure, which is linked to the decrease in supply of petrodollars. Overall, economic growth of the past decade has not improved the welfare of the majority of the population nor has it affected the high incidence of poverty.

Malaria is transmitted throughout Nigeria, with 76% of the population living in high and 24% in low malaria transmission areas[2]. Five ecological zones define the intensity and seasonality of transmission and mosquito vector species: mangrove swamps, rainforest, Guinea-savannah, Sudan-savannah, and Sahel-savannah. These various ecological zones with mosaics are distinguished by rainfall and other climatic conditions. The rainfall duration ranges from about three months in the Sahel-savannah to nine months in the mangrove swamps and rain forest.

[1] Human Development Report 2016: http://hdr.undp.org/sites/default/files/2016_human_development_report.pdf

[2] World Malaria Report 2016: Country Profiles. Geneva: World Health Organization; 2017

These climatic patterns affect vegetation and most flora and fauna are differentiated across the ecological zones.

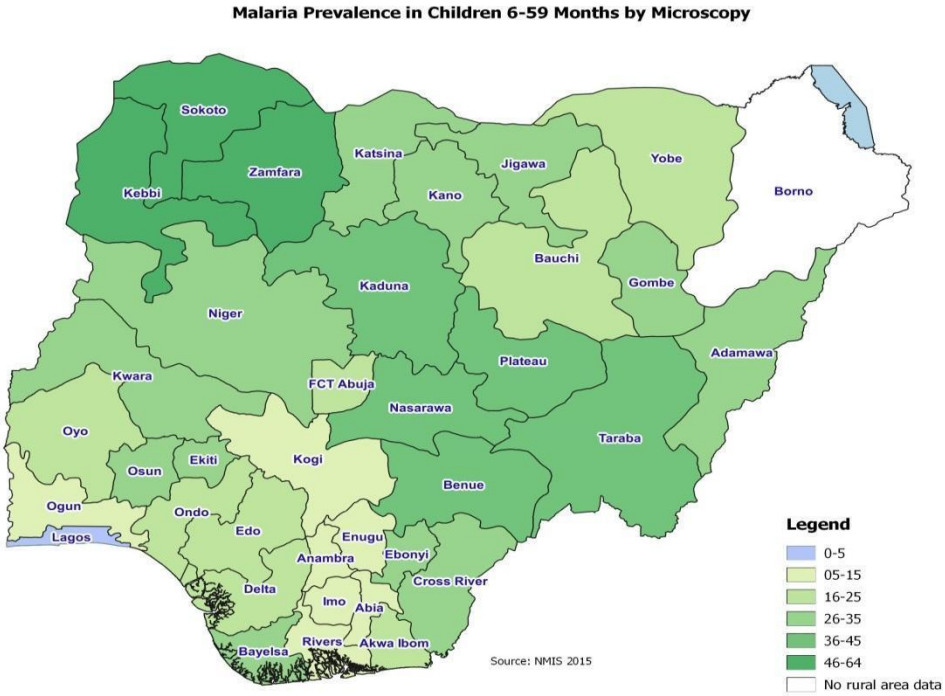
The National Malaria Strategic plan recommends at least two sentinel sites per ecological zone that will generate data on the vector bionomics and insecticide susceptibility. The duration of the transmission season ranges from year-round transmission in the south to three months or less in the north. *Plasmodium falciparum* is the predominant malaria species. The primary vector across most of the country is *An. gambiae* s.s. The data from the 2016 Nigeria Entomology Report showed that *Anopheles gambiae* s.s. was the predominant member of the *Anopheles gambiae* complex varying from 48% in the arid/semi-arid Sahel to 89% in the mangrove swamps on the sea coast. *Anopheles arabiensis* was the other member of the complex identified by polymerase chain reaction (PCR) but was absent in the Ebonyi sentinel sites. Overall, 66% of mosquitoes with sporozoites that tested positive with PCR were *An. gambiae s*.s. while *An. arabiensis* represented 16% indicating that both species transmit malaria in Nigeria.

According to the WHO World Malaria Report 2016, 76% of the population lives in a high transmission area, defined by the WHO as an area with more than 1 case per 1,000 population. There was a less than 50% decrease in projected incidence of malaria from 2000 – 2015. Nigeria and the Democratic Republic of Congo account for more than 35% of the global total of estimated malaria deaths. The Verbal Autopsy/Social Autopsy (VASA) Survey[3] conducted in 2014 reported that malaria, diarrheal disease, and pneumonia were the leading causes of deaths among children ages 1 – 59 months. With a major symptom of malaria being fever, the prevalence of fever care seeking serves as a proxy for malaria care seeking behavior. The 2015 Nigeria Malaria Indicator Survey (MIS) reported a fever prevalence of 41 percent in children in the two weeks before the survey. Of those with fever, 66% sought advice or treatment and among those with fever who sought care, only 30% went to the public sector.

Microscopy data from the 2015 NMIS show that the prevalence of malaria parasitemia in children under five years of age is 27%, with wide regional differences (Figure 1). Parasite prevalence ranges from 14% in the South East Zone to 37% in the North West Zone. The prevalence of malaria parasitemia in rural populations is three times that in urban populations (36% vs 12%) and when compared to the highest socioeconomic group, the prevalence among children in the lowest socioeconomic group is 10 times higher (43% vs. 4%).

[3] National Population Commission (Nigeria), Federal Ministry of Health of Nigeria, National Bureau of Statistics (Nigeria), and Institute for International Programs at Johns Hopkins Bloomberg School of Public Health. A verbal/social autopsy study to improve estimates of the causes and determinants of neonatal and child mortality in Nigeria, 2014. Abuja, Nigeria, and Baltimore, Maryland, USA. 2016.

Figure 1: Map of Malaria Parasitemia Prevalence in Children 6 to 59 Months by Microscopy, 2015 NMIS



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

The public health care system is divided into three tiers, each associated with one of the administrative levels of government: federal, state, and LGA. While the 774 LGAs are the constitutionally-designated providers of primary health care, they are the weakest level of the health care system. In addition to the Federal Ministry of Health (FMoH), the National Primary Health Care Development Agency, a centrally-funded agency, has the mandate to support the promotion and implementation of high-quality and sustainable primary health care. This agency is particularly active in the development of community-based systems and functional infrastructure as well as ensuring that infants are fully immunized against vaccine-preventable diseases. The federal health budget covers tertiary care and disease control programs, including malaria control; state health budgets pay for secondary care; and LGA budgets cover primary health care. The amount of government spending on health and malaria is difficult to determine, as funding levels vary and actual spending does not always match the original budget. National Health Accounts have been developed but available reports are out of date. It is generally believed that the government spends less than 5% of its national budget on health. In 2014, the National Health Act was signed into law. The National Health Act establishes a Basic Health Care Fund to be financed from a Federal Government Annual Grant of not less than one percent of its Consolidated Revenue Fund, supplemented by grants by international donor partners, and funds from any other source. It provides a framework for the regulation, development, and

management of a national health system and sets standards for rendering health services in the federation.

Nigeria has an estimated 34,173 health facilities: 30,098 primary, 3,992 secondary, and 83 tertiary. The private sector constitutes approximately 33% of all health facilities in Nigeria. Private health facilities include private not-for-profit, private for-profit, pharmacies, proprietary patent medicine vendors (PPMVs), and mobile clinics.

Nigeria's public health system challenges include:

- Inadequate, inaccessible, and poor quality service delivery, particularly at the periphery, where most primary health care facilities offer only a limited package of services due to limited availability of trained health workers; poor quality services, often due to insufficient infrastructure, unskilled or lack of available health care providers, and/or inadequate supply of essential commodities;
- Lack of necessary referral linkages between the different levels of health care;
- Weak logistics systems for commodities, with as many as six separate vertical commodities management systems with little or no coordination between them;
- Poorly maintained infrastructure with many buildings and equipment in need of repair and/or maintenance;
- Corruption, including through the embezzlement from health budgets, health insurance fraud, fraudulent drug procurement or bribes extorted at the service delivery level;
- Weak institutional capacity with inadequate supervision of health services; and
- Limited availability of health workers, and poor deployment in the rural health facilities.

Led by a coordinator, the NMEP consists of about 120 staff members and is divided into six branches: Program Management; Procurement and Supply Management; Integrated Vector Management; Case Management; Surveillance, Monitoring and Evaluation; and Advocacy, Communication, and Social Mobilization (ACSM). At the national level, the NMEP is responsible for establishing policies, developing guidelines, coordinating partners and activities, and monitoring program implementation. Each state and LGA has a Malaria Program Officer (a local civil servant) who oversees malaria activities in his or her area.

The private health care system provides care for a substantial proportion of the Nigerian population. It consists of tertiary, secondary, and primary health care facilities, as well as pharmacies, PPMVs, and unregistered drug sellers. Approximately 76% of all secondary facilities and about 28% of primary health care facilities are private. Sixty-six percent of all fever cases seek treatment first in the private sector (2015 NMIS). Services provided by the private sector may be subsidized, as in missionary health facilities, or full-cost, as in at profit privately owned clinics and hospitals. The latter are more common in urban areas. In rural areas, about two-thirds of the population lives within five kilometers of a primary health care clinic. The estimated 34,173 health facilities nationwide are fairly evenly distributed between urban and rural areas.

Through 2016, the total number of public health facilities in the 11 PMI-supported states was around 8,817, of which PMI has supported 3,722 facilities (42%). Of the 3,722 health facilities, 3,169 (85%) have received a full package of interventions that includes ITNs; MIP; malaria case management; malaria commodities; and surveillance, monitoring, and evaluation (SM&E). The remaining 553 facilities receive only commodities that are procured by the Government of Nigeria (GoN) and other donors, which are distributed with PMI funds.

All health facilities in Nigeria receive support from the states and LGAs. PMI support for states, LGAs, and facilities is intended to fill critical gaps without becoming a substitute for resources from the GoN. The focus and level of funding of PMI support in each state are guided by the availability of other donors, and the capacity of the state and national governments to provide resources for malaria. Within each state, PMI works closely with the state and other partners to assess needs and set priorities. The needs and priorities will vary from state to state. Typically, when PMI initially partners with a state, the intervention focus is on high-volume facilities in each LGA. As PMI becomes established, efforts are expanded to next level facilities in coordination with the state and partners. Overall, PMI support has expanded from 705 health facilities in 2010-2011 to 3,722 by May 2016. This expansion reflects the critical gaps expressed by the NMEP and the state malaria elimination programs during joint planning meetings, and the availability of PMI resources to meet those needs.

4. National malaria control strategy

The National Malaria Strategic Plan 2014-2020 (NMSP 2014-2020) is based on the National Strategic Health Development Plan 2010-2015 and aligns with national health and development priorities. The strategy outlines the provision of a comprehensive package of integrated malaria prevention and treatment services through the community, primary, secondary, and tertiary levels. The strategy also defines the roles of each health care cadre/level relative to malaria control and case management across all health care services including public, private, and traditional health providers.

With the vision of achieving a malaria-free Nigeria and the goal of reducing malaria burden to very low levels and bringing malaria-related mortality to zero, the objectives of the NMSP 2014-2020 are to:

- Provide a least 80% of targeted populations with appropriate preventive measures by 2020
- Test all care-seeking persons with suspected malaria using RDTs or microscopy by 2020
- Treat all individuals with confirmed malaria seen in public or private facilities with effective antimalarial drugs by 2020
- Provide adequate information to all Nigerians such that at least 80% of the population habitually takes appropriate malaria preventive and treatment measures as necessary by 2020
- Ensure the timely availability of appropriate antimalarial medicines and commodities required for prevention and treatment of malaria in Nigeria wherever they are needed by 2018

- Ensure at least 80% of health facilities in all LGAs report routinely on malaria by 2020, progress is measured, and evidence is used for program improvement

Under the strategic plan, the GoN supports the provision of ITNs, IRS, larval source management, IPTp, SMC, and diagnosis and treatment of uncomplicated malaria through routine health services and iCCM. The strategy also supports the treatment of severe malaria using injectable artesunate.

The NMSP 2014-2020 emphasizes the strengthening of public-private partnerships across intervention areas. Of note are the planned collaborations with corporate organizations in the implementation of IRS, implementation of IPTp, integration of the commodity logistics system, and improving malaria case management in private health facilities, including proprietary patent medicine vendors (PPMVs), and procuring locally produced ITNs. In 2017, there is renewed interest of the GoN to procure locally manufactured ITNs. For the first time, the Global Fund procured 250,000 ITNs from a local manufacturer called Roses Garment that is affiliated with Tana Industries.

5. Updates in the strategy section

USAID/Nigeria has developed an operational strategy aimed to increase state ownership and sustainability of U.S. Government-funded activities. This strategy requires states to commit more resources to primary health care activities, including malaria. Memoranda of Understanding (MOUs) will guide USAID engagement with each state which will clearly define responsibilities and levels of support to be provided by both USAID and the State. The MOUs for PMI-supported states will be in place in 2018.

USAID/Nigeria is currently conducting stakeholder analyses as well as fiscal space analyses in each focus state, the results of which will determine how MOUs are structured and the specific expectations that will be communicated in each MOU. MOUs will be customized to the unique situation of each focus state and will likely use three main indicators to monitor state performance: 1) amount of state funds allocated to health activities; 2) amount of state funds released to support health activities; and, 3) amount of state funds expended in accordance with the budget. States will also be held to certain basic commitments through the MOU, such as payment of health workers, procurement of essential commodities, and achievement of specific health targets. USAID/Nigeria may withdraw its resources from a state, should the state not meet its MOU commitments. However, any such decision will also be based on intervention coverage and epidemiologic factors to avoid leaving vulnerable populations at risk.

PMI coverage

PMI began in 2011 with support to three states (Cross River, Nasarawa, and Zamfara). In 2012, PMI expanded to 6 more states (Bauchi, Benue, Ebonyi, Kogi, Oyo, and Sokoto), and in 2013 added 2 more states (Akwa Ibom and Kebbi), for a total of 11 states. Table 1 provides a detailed description of PMI investment areas for the past and current 11 PMI-supported states.

A strategy review meeting held in April 2016 revisited the states that should benefit from PMI support starting with FY 2016 funds. The state selection process was guided by a tool developed by PMI that uses multiple criteria including malaria disease burden, ITN coverage, presence of other donors, complementarity of other health and U.S. Government investment, the strength of state leadership, and security situation. The strategy development team recommended PMI Nigeria to remain active in 11 states, but replace Kogi with Plateau. Kogi State was dropped because of evidence from the 2015 NMIS that showed low malaria parasite prevalence in the state. Both Kogi and Plateau have the same projected 2016 population of approximately 4.4 million people but malaria parasitemia prevalence in Plateau in children under the age of five was 36% while in Kogi it was 5%. Kogi State has benefited from funding from the Global Fund but Plateau has had no other donor support (Figure 2). All PMI funding in Kogi State ended in May 2017.

Table 1: PMI-Supported States by Start-up Year and Intervention Support as of June 2017

No.	State	Population (2017 projection)	Start-up year	PMI Interventions						Other Partners
				ITNs	MIP/ IPTp	CM[1]	iCCM	EM[2]	SBCC	
1	Cross River	3,974,499	2011	X	X	X			X	Global Fund
2	Nasarawa	2,591,756	2011	X	X	X		X	X	
3	Zamfara	4,635,203	2011	X	X	X			X	Global Fund
4	Bauchi	6,797,416	2012	X	X	X	X	X	X	Global Fund
5	Sokoto	5,142,408	2012	X	X	X		X	X	Global Fund
6	Benue	5,868,834	2012	X	X	X			X	Global Fund
7	Ebonyi	2,957,485	2012	X	X	X	X	X	X	
8	Oyo	8,127,582	2012	X	X	X		X	X	Global Fund
9	Kogi*	4,560,271	2012	X	X	X			X	Global Fund
10	Akwa Ibom	5,698,168	2013	X	X	X		X	X	Global Fund
11	Kebbi[3]	4,554,655	2013	X	X	X			X	Global Fund
12	Plateau*	4,410,230	2017	X	X	X			X	

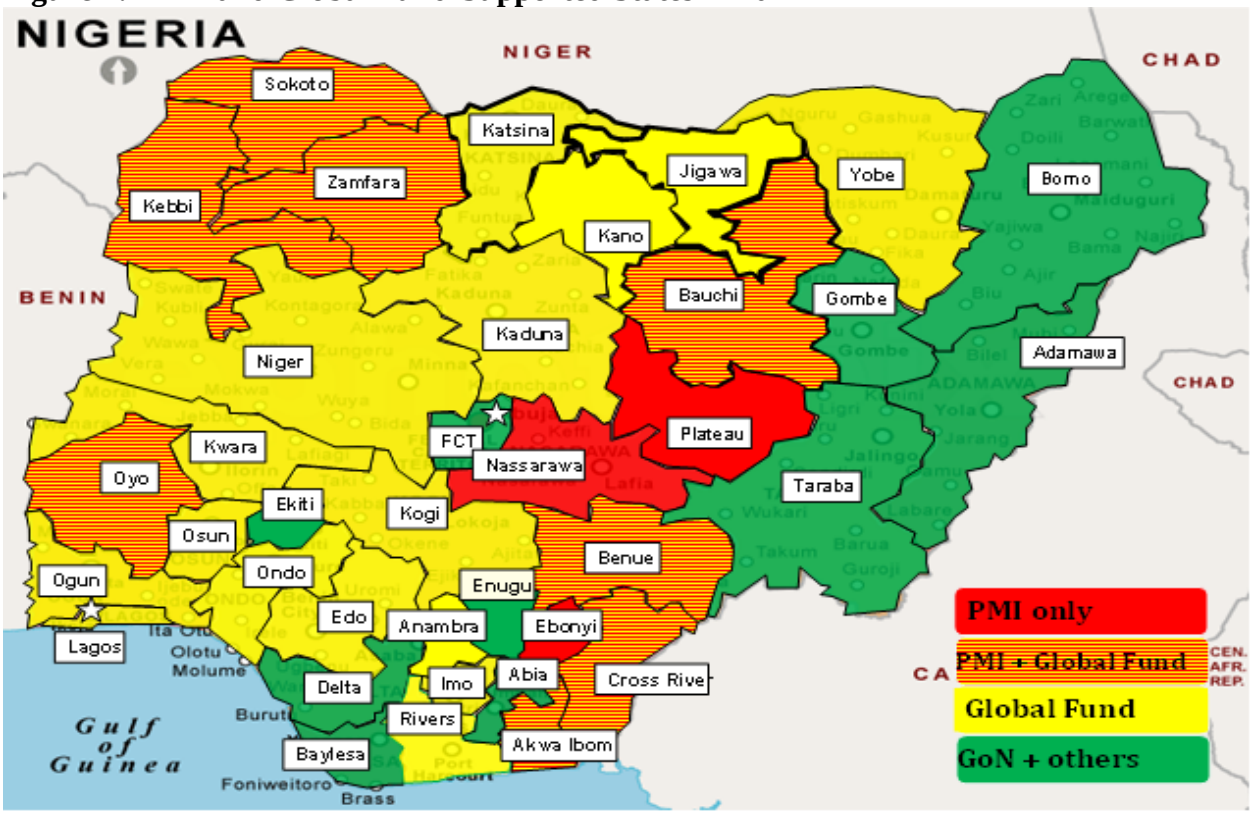
[1.] CM=Case management

[2.] EM= entomological monitoring
[3.] UNICEF is supporting iCCM in Kebbi State with funding from the Gates Foundation.
*PMI support for Kogi State carried over into 2017 in order to complete a mass ITN campaign.

After Plateau State expressed interest to partner with the U.S. Government, PMI undertook an advocacy visit in December 2016. This was followed by a situational analysis that will inform the memorandum of understanding with the state. PMI support was initiated with malaria diagnostic training, supply chain and logistics management, and distribution of case management commodities. Implementation of additional activities will commence later in 2017, including: development of a state malaria operational plan; training of health workers in case management, MIP, and SM&E as necessary; distribution of ITNs through routine channels; and capacity building for supportive supervision.

PMI previously overlapped with the Global Fund in 8 of the 11 states (Figure 2). However, beginning in 2018, the Global Fund will target support to 13 non-PMI-supported states. The projected population for 2019 in the 11 PMI-supported states is 57.8 million.

Figure 2: PMI- and Global Fund-Supported States in 2017



PMI currently provides support to all 230 LGAs and an average of 42% of health facilities per state. PMI has gradually scaled up the number of health facilities supported over time: 705 in 2010/2011; 1,441 in 2012/2013; 1,893 in 2014; 3,066 in 2015, and 3,722 in 2016. PMI's expansion plan for additional health facilities by the end of 2017 is shown in Table 2 below. The

expansion prioritizes health facilities previously covered by the Global Fund and those that operate on a daily basis, that have health workers available to provide health services (including malaria diagnosis and treatment), and that report high outpatient and/or ANC attendance. PMI support goes to a select number of health facilities within the supported LGAs. Other health facilities within the same LGAs have been supported by the Global Fund, as well as the states, and other donors.

The main sources of funding for malaria efforts within the 11 PMI-supported states have been PMI, the Global Fund, and domestic resources from the states themselves. A recent additional resource for the states is the Saving One Million Lives Initiative (SOML) Program-for-Results (PforR) Project. The objective of this US$500 million World Bank-funded project is to increase the utilization and quality of high impact reproductive, child health, and nutrition interventions. Still, external funding does not cover all technical assistance and implementation support needs for all health facilities within these 11 states. In 8 of the 11 states, the Global Fund has also been supporting some 17 health facilities per LGA – for a total of 3,000 health facilities. The support by PMI and the Global Fund still leaves a significant number of health facilities unsupported by PMI or the Global Fund. On average, PMI and the Global Fund supported approximately 60-80% of all health facilities in a state with commodities and technical assistance for training and supervision. Using domestic resources, the states also covered approximately an additional 10% of health facilities with malaria commodities as well as health worker salary and facility operational support more broadly. However, starting in 2018, the Global Fund will not collocate in the 11 PMI-supported states and PMI is expected to expand to more health facilities, including those that are currently receiving support from the Global Fund.

The total estimated number of health facilities in the 11 PMI-supported states is 8,817. PMI, coordinating with NMEP and other partners, will support approximately 6,000 health facilities in 2018 and 2019 with FY 2017 and FY 2018 funding (Table 2). The expansion plan addresses both the addition of more health facilities over time and also an intention to strengthen the quality of service delivery at each supported facility. The intervention package is not standard across states or facilities because it takes into consideration support from the states (which includes the World Bank SOML project).

Table 2: Health Facility Expansion plan in PMI-supported States: 2010-2018

State	Total LGAs	HFs		PMI-Supported HFs								
		Total	Total public	2011	2012	2013	2014	2015	2016	2017	2018-2020	%*
Akwa-Ibom	31	583	482	.	.	.	452	461	442	462	482	100
Bauchi	20	1,127	1,050	.	415	415	415	165	206	206	250	24
Benue	23	1,367	1,096	.	92	184	184	247	282	300	650	59
Cross River	18	1,266	1,043	72	144	144	144	235	377	400	560	54
Ebonyi	13	646	523	.	56	104	104	163	349	360	500	96

Kebbi	21	730	675	.				165	270	300	545	81
Nasarawa	13	1,034	790	52	105	105	105	186	494	525	730	92
Oyo	33	1,523	783	.	132	132	132	176	178	210	450	57
Plateau	17	1,141	978	.	.	.	.	.	.	200	650	66
Sokoto	23	760	693	.	161	161	161	161	267	310	450	65
Zamfara	14	740	704	56	56	112	112	130	267	370	400	57
		10,917	8,817	180	1,161	1,357	1,809	2,089	3,132	3,643	5,667	64

* Percent of public health facilities slated to receive PMI support in 2018–2020.

Notes:

- PMI support for Plateau State started in calendar year 2017
- The Global Fund and PMI co-exist in 8 of the 11 PMI-supported states through 2017 (Global Fund did not work in Ebonyi, Nasarawa, and Plateau States)
- The Global Fund has supported approximately 17 health facilities in each LGA
- An additional 553 health facilities received commodities procured by the GoN and other donors and distributed with PMI funds in 2015 and 2016

The current Global Fund grant ends in December 2017. The current NMEP funding request to the Global Fund will be implemented in 13 non-PMI states. Thus, the number of unsupported health facilities within PMI-supported states will increase. PMI will continue to expand support within the states, but new external or domestic resources must also be identified. For sustainability, PMI will work with the supported states through the MOU to identify domestic funding opportunities to strengthen efforts in malaria control and reduce dependence on donor funding. By enhancing coordination with other development partners and programs, especially around logistics and data management, PMI will leverage other donor resources to reach more health facilities and people. PMI through USAID/Nigeria leadership will advocate with state Governors to obtain state support for malaria activities in PMI-supported states.

6. Integration, collaboration, and coordination

Key international partners

Nigeria has benefited from support from various partners for malaria control. Currently, the largest funding partners are the Global Fund, the U.S. Government, and United Kingdom Department for International Development (DfID). Other key partners include the United Nations Children's Fund (UNICEF) and the WHO. There is also corporate sector support for malaria control including ExxonMobil, Chevron, Royal Dutch Shell, Dangote Foundation, and telecommunication companies. The Global Business Coalition through the Corporate Alliance on Malaria in Africa is galvanizing corporate efforts to support resource mobilization as well as to leverage the strength of this sector.

Prior to 2014, Nigeria had three approved grants for malaria from the Global Fund, the latter two designating the NMEP as the Principal Recipient. In March 2015 the country and the Global Fund signed the New Funding Model (NFM) grant totaling over $400 million for two years. The approved grant for Nigeria under the NFM was $400,253,346 to cover the period of February 2015 to December 31, 2016. The fund was managed by the NMEP ($308,577,343) and the Society for Family Health ($91,676,003) as Principal Recipients. As of the end of January 2016,

$279,554,526 was committed to support various malaria activities, including procurement of malaria commodities. The Global Fund included a requirement that the GoN provide $22.5 million as counterpart financing for ITNs; however, the counterpart finance is yet to be provided[4].

As of April, 2017, a non-costed extension was granted for the Nigeria malaria grant, as well as a one-year grant with a new Principal Recipient, Catholic Relief Services, to implement long-lasting insecticidal net (LLIN) replacement mass campaigns in six states and continue implementation of the other malaria program activities through December, 2017. The extension and one-year CRS grant will maintain the scope and scale of essential malaria services in 2017 and will be funded through reinvestment of unspent funds within the current grant.

In terms of activities, the Global Fund grant supports scale-up of prevention and case management activities in line with the NMSP 2014-2020. The key interventions are to attain universal coverage of ITNs through mass campaigns and continuous distribution channels; improve coverage for MIP, especially with IPTp; to increase ACT roll-out in the public and private sectors; and to increase malaria diagnosis using microscopy and RDTs in public and private health facilities. The grant also supports broader health system activities: logistics management, the HMIS, and SBCC.

Nigeria submitted a funding request to the Global Fund in March 2017 for malaria activities in 13 states from January 2018 to December 2020. The funding request has been approved.

UNITAID invested $67.4 million over three years (September 2014 through August 2017) through its *Achieving Catalytic Expansion* of *Seasonal Malaria Chemoprevention in the Sahel (ACCESS-SMC) project* to expand the coverage of SMC to eligible children in the Sahel region in seven African countries: Burkina Faso, Chad, Gambia, Guinea, Mali, Niger, and Nigeria. In Nigeria, the UNITAID ACCESS-SMC project works in 37 LGAs across two Nigerian states: Sokoto and Zamfara. Over 6 million treatments will be delivered through the ACCESS-SMC project for the 2017 SMC campaign reaching an estimated 1.7 million children.

The World Bank Booster Program provided a total of about $280 million in loans between 2007 and 2009 to support seven Nigerian states and central-level malaria activities, including ITN campaigns in target states, IRS, and purchases of ACTs, RDTs, and SP for malaria control. The seven World Bank supported states were: Akwa Ibom, Anambra, Bauchi, Gombe, Jigawa, Kano, and Rivers. The Booster Program ended in March 2015. At present, the World Bank is exploring integrated health program implementation through performance-based financing options, private sector strengthening, and health governance support. The World Bank is also funding SOML, a GoN initiative designed to support at-scale delivery of evidence-based interventions and human

[4]The current Global Fund agreement, signed in 2014, originally required the GoN to provide $45.7 million in counterpart funding for net distribution. When the GoN failed to provide those funds, during grant extension negotiations in 2017, the Global Fund agreed to halve the amount required to $22.5 million. To date, the GoN has not provided this amount. The current Global Fund grant ends in December 2017, and unless GoN funds are provided prior to that grant expiration, counterpart funding requirements will not have been met.

resources for health in needed areas. All states have received the initial tranche of funding and performance will be monitored through five outcome indicators including a malaria-specific indicator to track ITN use through an annual national health facility survey.

DfID supported a £89 million project (about $140 million) called Support for the National Malaria Program (SuNMaP) from 2008 to March 2016. The program provided substantial support for the NMEP and 10 selected states, none of which overlapped with PMI's 11 states. In the DfID focus states, SuNMaP supported malaria prevention, diagnosis, and treatment, and supplied limited quantities of malaria commodities. SuNMaP developed a private sector component that examined diagnosis and treatment in the private sector, as well as a "market sector" component that addressed market interventions. DfID provided $140 million to the Global Fund to continue the subsidy for ACTs for an additional two years, up until the end of 2016. DfID has indicated a willingness to continue funding for malaria in Nigeria, however, an implementing project is yet to be awarded.

The WHO supports a national malaria program officer in each of the six geopolitical zones of Nigeria. They assist the states in their zones with malaria program planning and management. The WHO supported the first-ever malaria program review in Nigeria in 2012. The review recommended some strategic shifts for Nigeria, such as using state-specific strategies. All PMI activities are coordinated with these efforts.

Private sector

Although PMI recognizes the potential for private sector approaches in malaria control, the opportunities to work with these organizations under PMI have been limited. Large oil firms carry out their own malaria control activities in their work areas. Some firms also include malaria control in their corporate social responsibility work. ExxonMobil funded a study on extending IPTp and other malaria interventions to community-directed distributors in Akwa Ibom State and also supported SBCC interventions through Malaria No More. The community IPTp study demonstrated the potential of using community-directed distributors and has helped inform PMI plans for ITN keep-up and other activities.

The Affordable Medicines Facility-malaria program of the Global Fund has transitioned into the Private Sector Co-payment Mechanism. With funding from DfID, Nigeria received approval to continue implementation of the mechanism for 2015-2016 under the Global Fund's NFM. Nigeria has 48 first-line buyers who are authorized to procure and sell the quality-assured ACTs using their distribution channels, mostly in the private sector. A total of 136 million doses of ACTs were approved to be procured in 2014. Within the approved quantities, 50% were ACTs that could be used to treat children under five years of age. For 2015 and 2016, 80 million treatment doses each year were distributed by the first-line buyers. The country is working through the Case Management Sub-committee to monitor the implementation, strengthen parasite diagnosis before treatment, and improve rational drug use. The approved Global Fund above allocation funding request included $82 million for continuing the ACT co-payment.

The Private Sector Health Alliance for Millennium Development Goals included polio and malaria as target areas for attention. This alliance is co-chaired by the state minister for health and the former chief executive officer of a Nigerian bank, and the secretariat is supported by the Dangote Foundation, the corporate social responsibility venture of one of Nigeria's most prominent businesses. The NMEP created a committee to seek private sector support, though what role the private sector will play through these actions remains unclear. There have been continuing discussions regarding local production of ITNs and ACTs. As noted previously, a local manufacturer called Roses Garment is working with Tana Industries to produce ITNs in Nigeria.

The Corporate Alliance on Malaria in Africa (CAMA), a malaria subgroup of the Global Business Coalition for Health, is a unique coalition of companies from various industries with a common commitment to fight malaria. With co-chairs from the major industrial players in oil and gas, manufacturing, banking, and international NGOs, skills and resources are leveraged for malaria. In its third year, the annual technical forum in Nigeria aims to mobilize resources, skills, and capacity of the private sector in support of the NMSP 2014-2020. CAMA tracks private sector spending in health and reports that 3.2 billion Naira (approximately $9.1 million) is invested in health annually by 13 companies (40 percent of this investment is on malaria), focusing mainly on employees and their communities.

An important malaria social marketing activity in the private sector includes the UNITAID Private Sector RDT Project, implemented in five countries. In Nigeria, UNITAID funded a one-year pilot project to create a private sector market for malaria RDTs. The objective of the project was to increase access to and demand for quality-assured RDTs; improve private providers' febrile illness case management skills; and develop and implement a roadmap for public-private sector engagements that will guide policy and regulatory practices. Key interventions under the project were pricing, distribution/logistics, training and supervision, and waste management. A dissemination report indicates that there were some achievements with an improved policy environment for RDT, procurement and sale of RDT, lower median price of RDT, and trained personnel. It also recorded challenges with low demand for RDTs and potential leakages of public sector RDTs into the private sector.

Within the United States Government

PMI has identified opportunities to integrate investments with other U.S. Government program activities including: within the USAID Health, Population and Nutrition team; with other USAID teams; the U.S. Department of Defense (DoD); and the President's Emergency Plan for AIDS Relief (PEPFAR). In mid-2013, PMI and PEPFAR agreed to collaborate on commodity storage and distribution in two states, and are considering opportunities to expand collaboration to more states. Recently, the Global Health Security Agenda (GHSA) and the U.S. Government component within GHSA were launched. The key objective of GHSA is to prevent, detect, and respond to global health threats such as infectious disease outbreaks. To achieve this, the U.S. Government is supporting efforts to strengthen the health system in the areas of capacity building, laboratories, and surveillance which will also positively impact malaria control. The PMI and GHSA teams will coordinate to ensure U.S. Government resources are maximized as

health systems are strengthened with both funding streams and that efforts benefitting malaria control are coordinated under one PMI umbrella.

In 2015, PMI/Nigeria, CDC/Nigeria, the NMEP, and NFELTP/NSTOP initiated an NSTOP/Malaria Frontline project to expand the reach of U.S. Government investment in Nigeria to strengthen Nigeria's public health capacity to reduce malaria and to prevent, detect, and respond to epidemics and other endemic high-impact diseases. This project leverages the experience in polio eradication and Ebola response by strengthening the capacity at the facility, LGA, and state levels to analyze and use malaria surveillance data (from DHIS2) for decision-making in Kano and Zamfara States. Specifically, this project utilizes the NSTOP model to pair LGA-level malaria focal persons with trained NSTOP/Malaria officers to improve surveillance, identify intervention coverage gaps, conduct supportive supervision, and provide in-service training to facility staff. In Kano, the NSTOP/Malaria Frontline project is collaborating with the GoN and DfID on implementing malaria activities. In the last 12 months, PMI supported NSTOP in the development of a the protocol for the baseline survey in the two states, the planning of monthly data validation meetings, and the development of a health facility assessment protocol including geo-mapping with a GPS application in project areas which will be used to help update the Master Facility List used by the FMoH.

Support for improved malaria diagnostics has been built on the foundation established by the PEPFAR DoD-Walter Reed Program to improve human immunodeficiency virus (HIV)-related laboratory services. PMI is further expanding on this foundation to support training of trainers and the establishment of a functional malaria diagnosis quality assurance (QA) system in PMI-supported states.

PMI and PEPFAR are working to support Nigeria's integrated HMIS. This is requiring a shift from the NMEP's previous parallel system, which was created to support Global Fund reporting, and from the parallel PEPFAR system.

Steps are being taken to integrate approaches to commodity supply chain and logistics support for PEPFAR, PMI, and USAID-supported MCH and FP programs. This is particularly promising in terms of warehousing, which is a challenge in Nigeria. In four states (Bauchi, Ebonyi, Sokoto, and Zamfara), family planning and malaria funds are jointly supporting an innovative model – Direct Delivery and Information Capture (DDIC) – to improve distribution within states and collect better facility-level consumption data.

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 WHO criteria for national or sub-national pre-elimination.[5]

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
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:

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

[5] http://whqlibdoc.who.int/publications/2007/9789241596084_eng.pdf

8. Progress on coverage/impact indicators to date

Table 3: Evolution of Key Malaria Indicators in Nigeria[1] from 2008 to 2015

Indicator	2008 NDHS	2010 NMIS	2013 NDHS	2015 NMIS
% Households with at least one ITN	8%	22%	50%	69%
% Households with at least one ITN for every two people	N/A	N/A	22%	35%
% de-facto household population that slept under an ITN the previous night.	N/A	23%	13%	37%
% Children under five who slept under an ITN the previous night	6%	29%	17%	44%
% Pregnant women who slept under an ITN the previous night	5%	34%	16%	49%
% Households in targeted districts protected by IRS	N/A	N/A	N/A	1%[2]
% Children under five years old with fever in the last two weeks for whom advice or treatment was sought	33%	49%	70%	66%
% Children under five with fever in the last two weeks who had a finger or heel stick	N/A	5%	11%	13%
% Children receiving an ACT among children under five years old with fever in the last two weeks who received any antimalarial drugs	2%	6%	18%	38%
% Women who received two or more doses of IPTp during their last pregnancy in the last two years	5%	10%	15%	37%

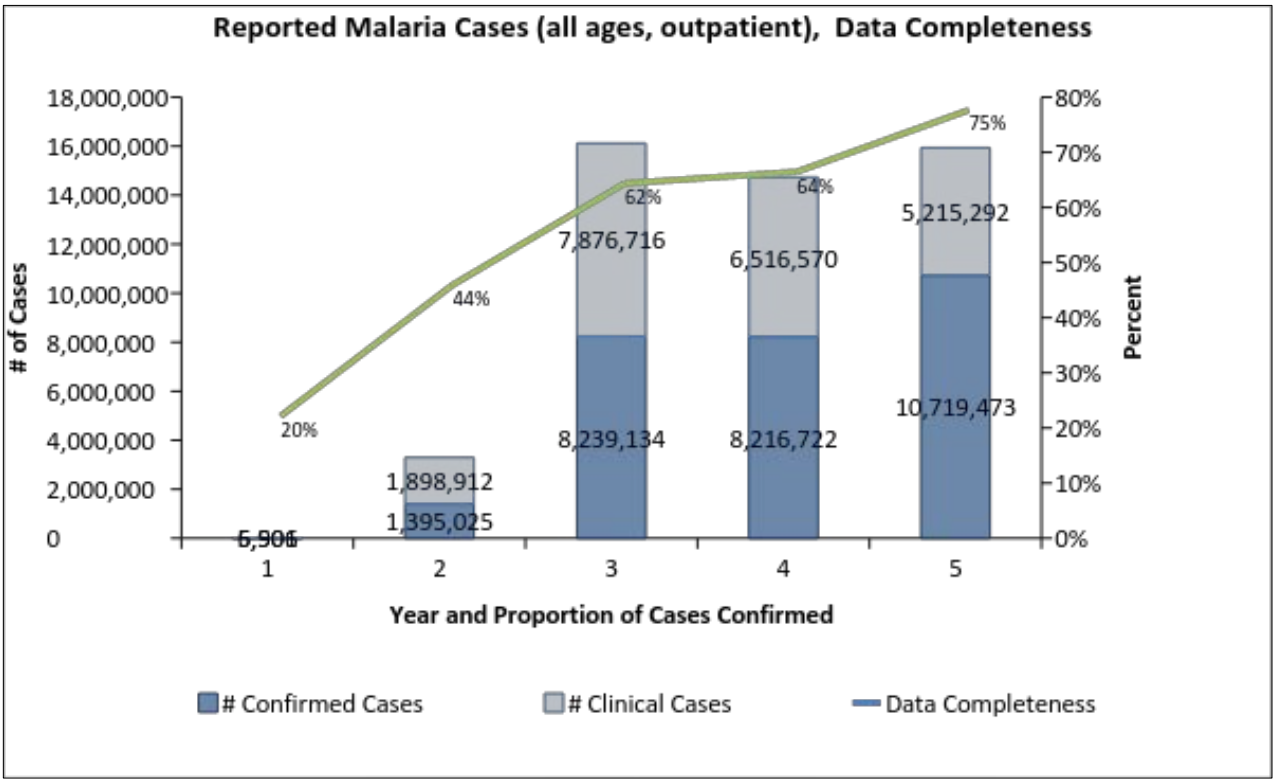
(1) State-level data are only available for a subset of the indicators and for recent years due to small sample size.
(2) IRS data indicates 1% across the whole country, and does not disaggregate by target states. PMI discontinued IRS in 2013.

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

Indicator	2012	2013	2014	2015	2016
Total # Cases	12,693	3,389,223	16,514,775	15,011,373	16,186,493
Total # Confirmed Cases	6,901	1,395,025	8,239,134	8,216,722	10,719,473
Total # Clinical Cases	5,506	1,898,912	7,876,716	6,516,570	5,215,292
Total # <5 Cases	4,348	1,425,200	6,953,305	6,460,393	6,535,867
Total # severe malaria	286	95,286	398,925	278,081	251,728
Data Reporting Rate (%)	20%	44%	62%	64%	75%
Test Positivity Rate (TPR)	62%	72%	72%	72%	72%

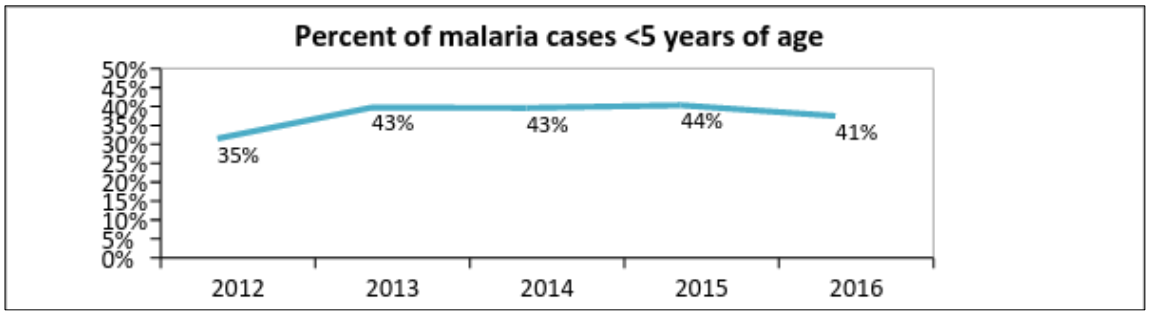
Notes: Prior to 2013, tools were not harmonized and reporting was paper-based with challenges with quantifying number of health facilities expected to report and incomplete reporting on all data elements. However, after 2013, the harmonized tools significantly improved reporting rates which explains the increase in number of cases.

Figures 3 – 6: Trends in Key Routine Malaria Indicators

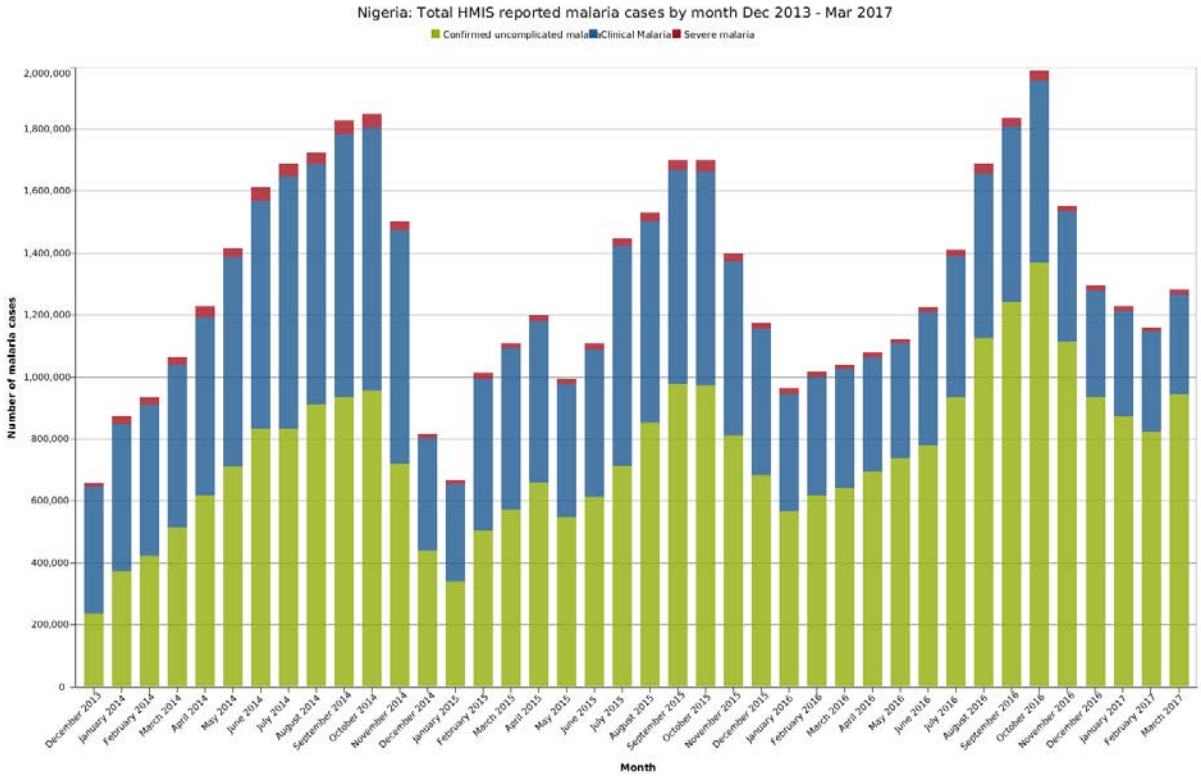


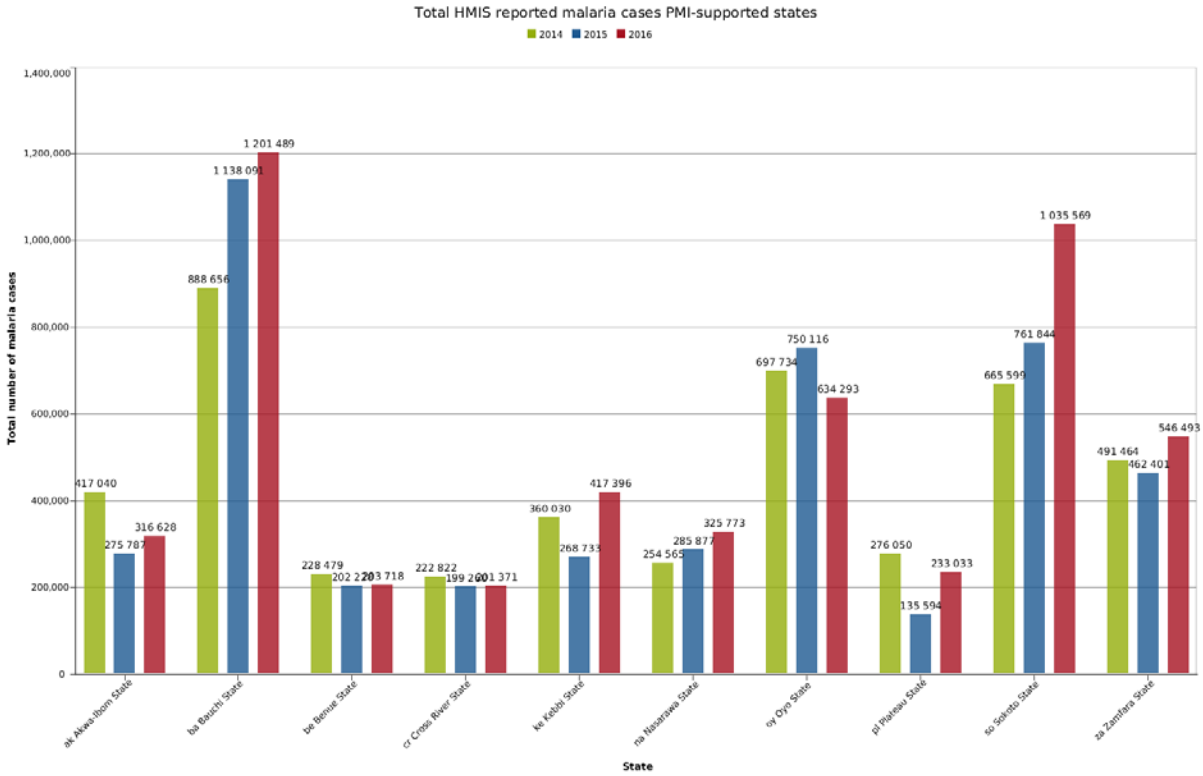
Note: This graph represents all malaria cases treated in a clinical setting and demonstrates the proportion of those cases diagnosed through clinical evaluation as compared with those diagnosed with a positive RDT or microcopy test (which is considered the gold standard and is the preference of the PMI program). The data demonstrate that the number of cases identified through a diagnostic test are increasing while the number of clinically diagnosed

cases is declining—an indication of programmatic success.



DHIS2 platform Data:





Note: These data represent only the raw number of patients who presented at health facilities with malaria. Many factors impact this reporting, including the number of people seeking treatment for fever (which PMI encourages), the number of health facilities reporting patient load through the national health management information system (HMIS) database, and the number of health facilities affected by strikes in a given year. Increasing reporting of malaria cases, therefore, is not necessarily an indication of programmatic failure—the PMI/Nigeria team will analyze this information to understand the root causes in each state and address any underlying problems while continuing to encourage high reporting rates through the HMIS.

9. Other relevant evidence on progress

FMOH through the National Primary Health Care Development Agency plans to renovate and improve at least one primary health care (PHC) facility per ward in the country over the next two years. If this project is completed as planned it is likely to contribute to addressing the challenges of ensuring access to the PHC system nationwide.

III. OPERATIONAL PLAN

This FY 2018 Malaria Operational Plan presents a detailed implementation plan for Nigeria, based on the strategies of PMI and the National Malaria Elimination Program (NMEP). It was developed in consultation with the NMEP 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 well with the National Malaria Control strategy with the aim to support the critical elements of the NMSP2014-2020 in 11 out of 37 states in Nigeria. The proposed FY 2018 PMI budget for Nigeria is $60 million.

1. Vector monitoring and control

NMCP/PMI objectives

Vector monitoring and control falls under the preventive section of the NMSP 2014-2020. Objective one of the NMSP 2014-2020 states "At least 80% of targeted population utilizes appropriate preventive measures by 2020." The prevention strategy for the NMSP 2014-2020 includes three strategies, namely:

1. Integrated vector management
2. Prevention of MIP; and,
3. Seasonal malaria chemoprevention (SMC).

This section will discuss integrated vector management. Prevention of MIP and SMC are discussed under the malaria in pregnancy and case management sections.

The NMSP 2014-2020 integrated vector management strategy includes universal access to ITNs; scaling up IRS in targeted areas to interrupt malaria transmission; expanding larval source management as complementary strategies for ITNs and IRS; and vector sentinel surveillance and resistance monitoring. The use of ITNs is the primary vector control method in Nigeria as IRS is not widely implemented. The goal of the NMSP 2014-2020 is to achieve universal coverage with ITNs. Universal coverage is operationally defined as one ITN for every two persons. From 2011-2013, PMI supported IRS in two LGAs in Nasarawa State to demonstrate how quality IRS can be implemented. IRS was discontinued in 2013 and efforts refocused on entomological surveillance and insecticide resistance monitoring. PMI currently provides technical assistance, especially in environmental compliance and microplanning, to NMEP and states that are planning to conduct IRS with their own resources.

The NMSP 2014-2020 targets are:

1. At least 80% of households with at least one ITN for every two persons
2. At least 80% of children under five years of age sleep under an ITN
3. At least 80% of pregnant women sleep under an ITN
4. At least 40% of households in IRS targeted areas will be protected by 2020.
5. At least 85% of all structures in targeted LGAs will be covered using IRS during each

spray cycle.

6. At least three vector surveillance sentinel sites will be established in each of the five ecological zones.

a. Entomologic monitoring and insecticide resistance management

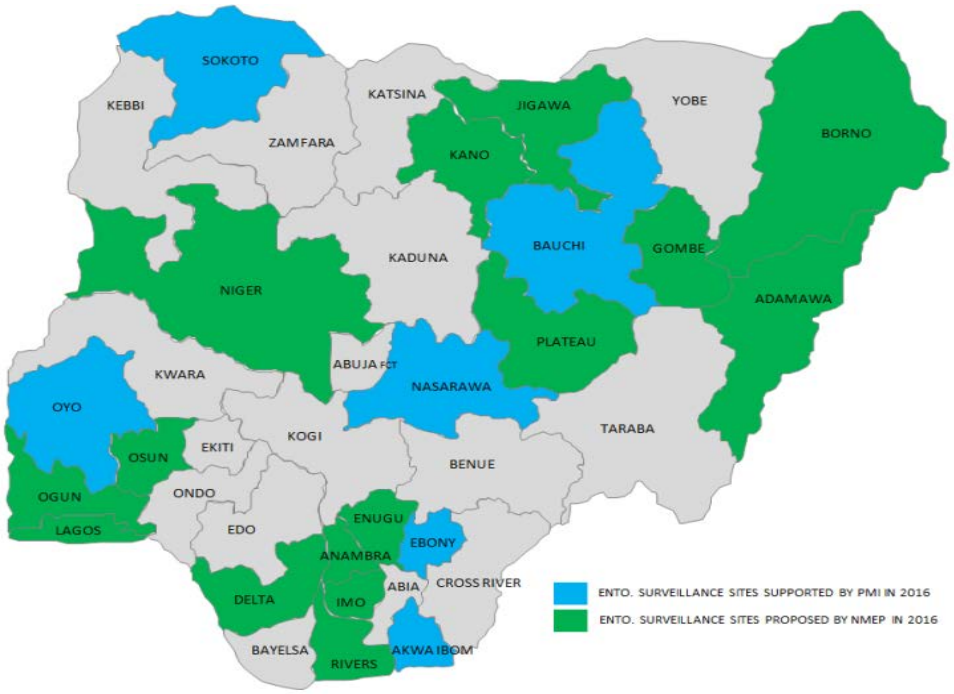
The National Malaria Strategic Plan (2014-2020) cites a lack of systematic coordination for insecticide resistance monitoring at the national level as one of the major gaps in its integrated vector management plan. Moreover, this gap is compounded by the lack of coordinated vector surveillance planning throughout the country. At the request of Nigeria's NMEP of the FMoH, PMI is supporting malaria vector surveillance and insecticide resistance monitoring in seven sites within six states (Figure 7); Nasarawa State has two sentinel sites. These sentinel sites are associated with universities/research institutions located in the same states. Vector density, distribution, seasonality, and feeding behavior are conducted monthly while vector susceptibility studies, resistance mechanism analysis and intensity are conducted annually.

Progress since PMI was launched

PMI has supported monitoring of insecticide decay rates, indoor and outdoor mosquito collections using CDC light traps, biting activity, pyrethrum spray catch (PSC) counts, and mosquito identification and distribution. In addition, in 2011, insecticide resistance monitoring was initiated as part of the IRS program in two LGAs of Nasarawa State. When PMI ended its support for the IRS program, entomological surveillance was expanded to seven sites in six states of Enugu, Jigawa, Nasarawa, Plateau, Rivers, and Sokoto. The states were selected based on the five ecological zones. In 2015, as part of PMI's strategic review process, PMI and the NMEP relocated four PMI-supported entomological monitoring sites to correspond with PMI-supported focus states.

In 2013, PMI established an insectary at the Nasarawa State University in Keffi to provide susceptible mosquitoes for conducting insecticide resistance studies and to build NMEP capacity in entomological monitoring. A new insectary was built in 2016 complete with space for molecular testing and mosquito rearing.

Figure 7: National and PMI-supported entomological sentinel sites, 2016



The insecticides tested are organochlorines, organophosphates, pyrethroids, and carbamates. The IRS demonstration activity and the entomological monitoring guided the design of the additional entomological sites in the country. CDC bottle intensity bioassays, oxidase enzyme testing for resistance mechanisms, and vector bionomics monitoring began in late 2014. PMI has continued and intensified entomological surveillance in six states.

The NMEP and partners have identified 18 sentinel sites for entomological monitoring, out of which 6 are functional; all are funded by PMI. Currently the NMEP is soliciting support from other donors to support the remaining 12 sentinel sites.

PMI is building local capacity. To date, PMI has trained 88 entomology technicians, state and national vector control officers, and 11 principal investigators from the six PMI-funded sentinel sites on CDC bottle bioassays, integrated vector control, and up to date entomological techniques, including larval sampling, pyrethrum spray catch, CDC light traps, WHO and CDC susceptibility and intensity testing, and data recording and reporting. These trainees are now conducting surveillance activities in the various sentinel sites. The capacity and data generated from PMI-supported sentinel sites has been used to develop vector distribution and insecticide resistance profiles.

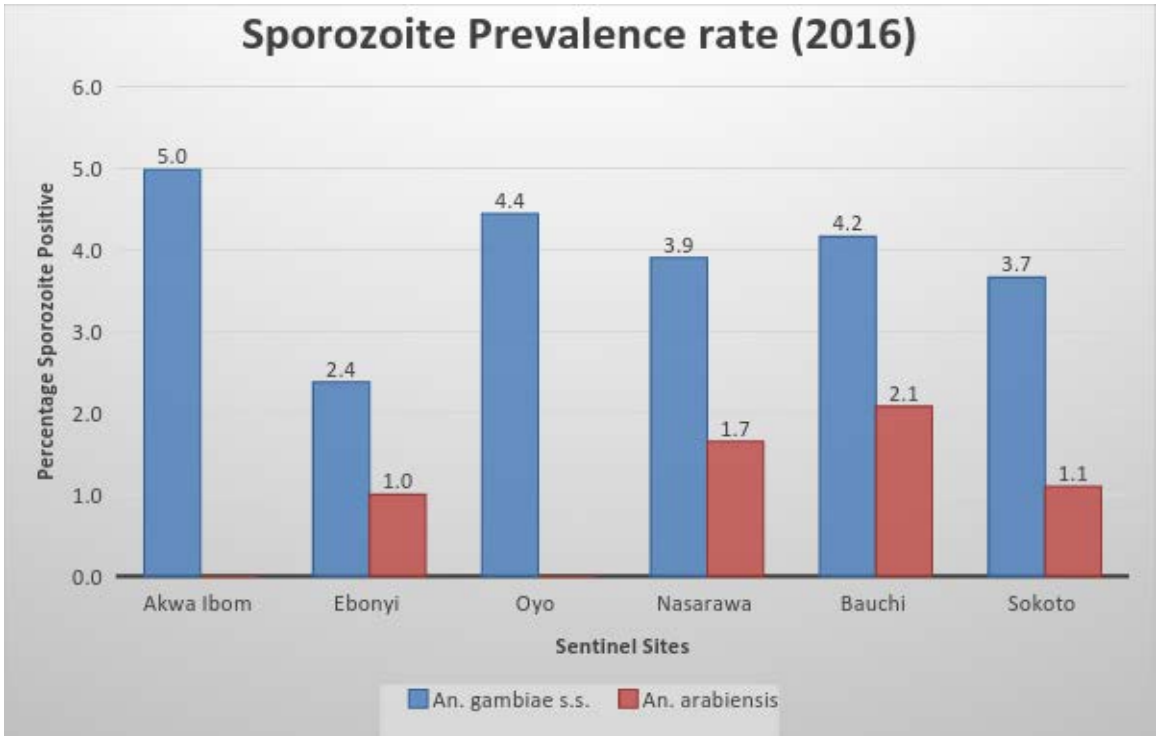
PMI also builds the capacity of the NMEP in order to strengthen: coordination of entomological surveillance, adequately assess surveillance sites, advocacy and engagement with state health authorities and development of policies, SOPs, and guidelines for entomological surveillance.

Progress during the past 12-18 months

PMI-supported mosquito surveillance included indoor resting densities (IRDs) with PSC and CDC light/human-baited traps to conduct speciation and to determine mosquito-biting time. A total of 17,535 *Anopheles* mosquitoes were collected in 2016: 90.6% *An. gambiae s.l.*, 0.5% *An. funestus*, 4.9% *An. coustani*, and 4% other species. A significantly higher number of *An. gambiae s.l.* were collected indoors than outdoors across the six sentinel sites. *An.coustani* was identified for the first time at these sites as a malaria vector biting both indoors and outdoors. A higher number of *An.coustani* were collected outdoors consistent with recent studies implicating *An. coustani* in outdoor transmission. The highest indoor biting peak was reported from the Sokoto site. PCR analysis for sporozoite infection indicated that the proportion of positive samples ranged from 2.4% (Ebonyi) to 5.0% (Akwa Ibom) in *An. gambiae* s.s., and 0.0% (Oyo) to 2.1% (Bauchi) in *An. arabiensis* 1.8% and 0.8% for indoor and outdoor collections of *An coustani* (Figure 8).

The highest IRD of 24.5 of *Anopheles* in a house per night or trapping cycle was observed in the month of August in Sokoto. A high indoor IRD of 19.1 was also observed in Ebonyi State in the month of March. Lastly, the IRD ranged from 0.1-1.9 in Akwa Ibom where it was the lowest among all the sentinel sites.

Figure 8: Proportion of *An. gambiae* s.s. and *An. arabiensis* infected with *Plasmodium falciparum* (2016)



PMI supported insecticide resistance testing using WHO tube tests validated with CDC bottle bioassays to determine the susceptibility level of the vector population across the sentinel sites (Table 6). The local mosquitoes (*An. gambiae* s.l) showed resistance to DDT (organochlorine) across the six sentinel sites, with the exception of Akwa Ibom. *An. gambiae* s.l. showed resistance to the pyrethroids (lambdacyhalothrin, deltamethrin, and permethrin) in most of the sites. Low mortality was observed for pirimiphos-methyl in Sokoto.

According to the National Plan for Insecticide Resistance Management Plan (2017-2020) the most commonly used pesticide in agriculture is Lindane (Gamma BHC) used to control kola-nut cocoa weevils. It is also widely used to kill fish for commercial purposes in Nigeria. As of 2015, about 75 insecticide compounds have been registered in Nigeria for use in the agriculture sector. Of these, 15 are organophosphates, 5 are carbamates and 8 are pyrethroids others belong to classes of insecticides not used in public health. Significant amounts of organophosphate and pyrethroid insecticides are being used annually in the agriculture sector across the country, but there are no statistics on the exact volumes and the amount of insecticides distributed. Over the past nine years, pyrethroid insecticides namely alphacypermethrin, bifenthrin, lambdacyalothrn, deltamethrin and bendiocarb have been used in IRS and LLIN to control malaria from 2006-2015.

PMI has supported insecticide resistance management by establishing and maintaining six vector sentinel sites for insecticide resistance monitoring. Furthermore, the Lagos State Government also established three sentinel sites to support this effort. An additional four sentinel sites were established in Cross River State through collaboration with USAID/Department of Defense/Walter Reed Nigeria Project and Africa Institute of Tropical Medical Research, University of Calabar. This was to generate information on the malaria vectors especially on their susceptibility or resistance to the different insecticides approved for malaria vector control in the country.

Table 6: *Anopheles gambiae s.l.* mean mortality rates (%) using the WHO Tube Bioassay Method to eight insecticides from six locations in Nigeria, 2016.

Insecticide	**Class***	Akawa Ibom	Sokoto	Bauchi	Ebonyi	Nasarawa	Oyo
Permethrin	P	96	70	85	36	82	74
Deltamethrin	P	100	77	93	96	77	75
α-cypermethrin	P	100	90	87	100	88	88
Lambda-cyhalothrin	P	100	71	94	77	69	60
DDT	OC	98	59	91	30	47	41
Bendiocarb	C	100	96	98	100	100	98
Propoxur	C	100	100	98	100	99	97
Pirimiphos-methyl	OP	100	79	99	90	100	100

*P= Pyrethroid, C= Carbamate, OC= Organochlorine, OP = Organophosphate
Source: AIRS Nigeria Final Entomology Report. November 2015 – December 2016

Plans and justification

With FY 2018 funds, PMI will continue to support the NMEP to conduct mosquito surveillance and insecticide resistance capacity building but will expand to seven states making a total of eight MIP sites because Nasarawa State has two sites. Although entomology capacity is still concentrated in Nasarawa and Lagos, the NMEP continues to seek other donor support to expand entomological monitoring.

While the scope of PMI operations may change, the number of states supported for entomological monitoring is expected to remain at six. Each site will have four surveillance "stations" to provide a consistent assessment of the vector population. Stations will include both pyrethrum spray catches and CDC light traps.

PMI support to the NMEP entomological monitoring activities will aim specifically to characterize insecticide susceptibility, spatial and temporal composition and distribution of anopheline species, assist with vector mapping using Geographic Information Systems, and provide continued support to the insectary, and continued technical assistance to the NMEP. Laboratory tests for mosquito infection rates will be conducted with PCR at the National Institute of Medical Research, Lagos. This will also provide valuable information to determine if PMI control initiatives are affecting vector infection rates.

Proposed activities with FY 2018 funding: *($961,810)*

1. *Provide support for vector surveillance and susceptibility monitoring across four ecological zones in Nigeria:* Supervision, entomological monitoring, vehicle rentals, and equipment to survey malaria vectors in six sites around the country once a year. *($817,810)*

2. *Strengthen capacity for entomological expertise at federal and state levels*. Strengthen capacity for entomological competence at national and state levels with training and equipment support (WHO cone wall bioassays, light trap collections, pyrethrum spray collections, surveillance equipment training, larval surveillance, and insecticide susceptibility training). Maintain an insectary in Nasarawa State. *($100,000)*

3. *Entomological supplies for sentinel sites:* Procure bioassays and test kits to supplement insecticide resistance and vector surveillance monitoring in six states (seven sites located in PMI-supported states). *($15,000)*

4. *CDC technical assistance to NMEP on entomology activities*. Two trips to provide insecticide resistance training for Nigerian NMEP and Vector Control staff, resistance test kits, and insecticide for Nigerian vector control officers attending training. Training and technical assistance to primary investigators involved in the sentinel surveillance project with implementing partners. *($29,000)*

b. Insecticide-treated nets

NMCP/PMI objectives

The NMEP ITN strategy identifies mass campaigns and four continuous distribution channels, namely:

- Mass free distributions of nets repeated every three years;
- Continuous distribution through:
    1. Routine health services: ANC and expanded program on immunization (EPI) clinics;
    2. School-based distributions;
    3. Community-based distribution; and,
    4. Social marketing through the commercial sector.

The ITN mass campaigns are planned for every three years in all the 36 states plus the Federal Capital Territory. Continuous ITN distribution through ANC and EPI clinics has been occurring and is supported by PMI in 11 states. The ITN strategies are complemented with the monitoring of use and durability of ITNs, and social and behavior change communication (SBCC) that is discussed under section 5 of the malaria operational plan.

As part of the strategic review process in 2014, PMI joined the NMEP and partners to review the available evidence to determine the most effective mix of distribution channels to reach the highest number of people. ANC/EPI attendance varies by zone, with significantly lower attendance in northern states. Despite these low ANC/EPI attendance rates, the NMEP is committed to including ITNs as part of a comprehensive ANC package of services in order to strengthen the overall service delivery platform that health facilities provide. The NMEP and partners support adding school and community distribution channels to ANC/EPI efforts. Ideally, scaling up continuous distribution channels—ANC, EPI, and either schools or communities—will reduce reliance on mass campaigns for achieving and maintaining high coverage.

PMI's goal is to support the NMEP in achieving and maintaining its targets for ITN coverage and use, especially in PMI-supported states. PMI supports mass free ITN campaigns, strengthening ANC and EPI channels for routine distribution, and adding school or community-based distribution where feasible and cost-effective.

Mass ITN campaigns will be required in Nigeria in order to achieve and maintain universal coverage for the foreseeable future. The ANC/EPI channels are not sufficient, and adding school and community channels will take time. The PMI-supported states can be grouped into three categories: 1. Low ANC/EPI and low school attendance; 2. Moderate ANC/EPI and moderate school attendance; 3. High ANC/EPI and high school attendance.

PMI/Nigeria's ITN approach is based on a state's category:

1. Group 1: These states will be heavily dependent on mass campaigns. PMI will support ANC/EPI distribution in high volume facilities (low ANC/EPI attendance is not uniform throughout the state), and PMI will support gradually adding community distribution

channels.

2. Group 2: These states will require mass campaigns. PMI will support ANC/EPI distributions in all health facilities. PMI will support gradually adding community distribution channels or schools.
3. Group 3: These states will require at least one more full universal coverage mass campaign. Subsequent mass campaigns might be transitioned to top-up campaigns depending on the success of the continuous channels. PMI will support ANC/EPI distributions in all health facilities. PMI will support gradually adding school distributions in all LGAs.

Table 7: Nigeria ITN Mass and Continuous Distribution Strategy in PMI-supported States

Group	State	Projected population 2019	ANC Attendance (2013 NDHS)	Measles Coverage (2013 NDHS)	**Net Primary School Attendance Ratio	ITN distribution channels			
						Mass campaign (year)	ANC+	EPI+	School or community
1	Kebbi	4,816,413	24%	34%	31%	2017	X	X	Community
	Sokoto	5,429,168	17%	33%	31%	2017	X	X	Community
	Zamfara	4,909,454	22%	35%	35%	2015	X	X	Community
2	Bauchi	7,222,453	56%	47%	41%	2014	X	X	Community
	Benue	6,196,102	57%	77%	71%	2016	X	X	Community
	Nasarawa	2,736,282	63%	71%	73%	2017	X	X	Community
	*Plateau	4,494,350	63%	47%	66%	2015	X	X	TBD
3	Akwa Ibom	6,054,469	73%	75%	83%	2014	X	X	School
	Cross River	4,189,309	73%	74%	78%	2015	X	X	School
	Ebonyi	3,112,220	85%	86%	83%	2015	X	X	School
	Oyo	8,635,793	87%	64%	74%	2016	X	X	School
	TOTAL	**56,274,521**							

+PMI targets health facilities with high outpatient load and ANC attendance.
* PMI support for Kogi State ended with 2017 mass campaign (FY 2015 funds)
* PMI will commence support to Plateau State starting with FY 2016 funds. Plateau State efforts will initially focus on ANC/EPI channels with a community continuous channel unlikely before 2020
** National Education Data Survey Percentage of official primary school age population that attend primary

school. Data obtained from 2015 NEDS.

Progress since PMI was launched

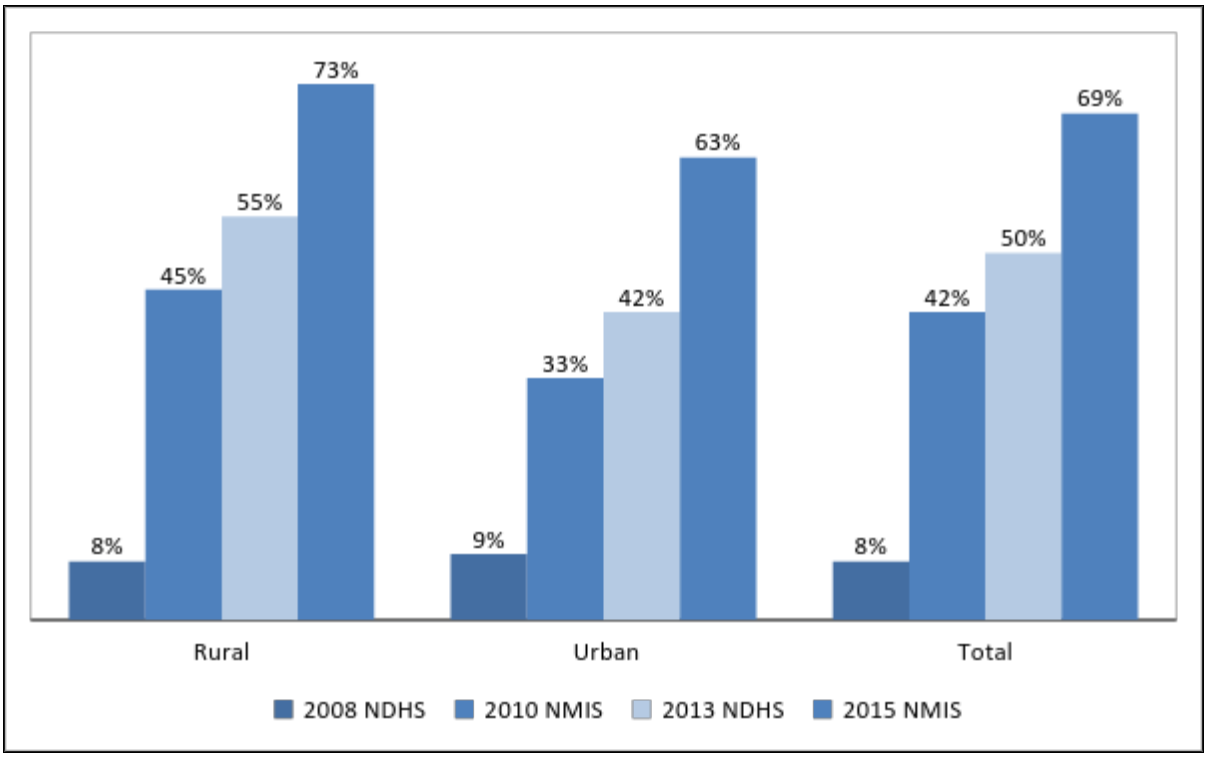
PMI has supported routine ITN distribution through ANC and EPI clinics from the start. However, routine ITN distribution has been limited to health facilities that are receiving PMI or Global Fund support. Through the new supply chain partner, PMI is working to ensure available stocks of LLIN at EPI facilities. There has also been increased effort aimed at improving routine immunization in the country supported by GoN and partners like GAVI. These efforts include training of providers on quality services, revision/update of the data collection tools, reporting and improvement in storage. At the same time there are efforts to increase awareness and demand for immunization at the communities. PMI through its case management partner will provide support to SM&E activities including the data registers.

Nigeria started piloting the school distribution channel in 2012 and the community-based distribution channels in 2013. The community channel is also being used to provide ITNs for internally displaced persons (IDPs) from the conflicts in the northeastern states. Based on lessons learned, Nigeria is refining these two channels to expand more broadly. States have an option of distributing ITNs through schools or community to supplement the routine distribution through ANC and EPI clinics. Distribution channels are adapted at state level to ensure a manageable level of specification is achieved.

Since 2011, PMI has procured a total of 40.7 million ITNs for mass campaigns and continuous distribution, and distributed approximately 60 million ITNs, including over 24 million ITNs procured by other partners and distributed using PMI funds. From December 2013 to May 2017, the NMEP and its partners distributed 60.8 million ITNs through mass campaigns in 23 states, including over 26.4 million ITNs in all the eleven PMI-supported states of Akwa Ibom, Bauchi, Benue, Cross River, Ebonyi, Kebbi, Kogi, Nasarawa, Oyo, Sokoto, and Zamfara,

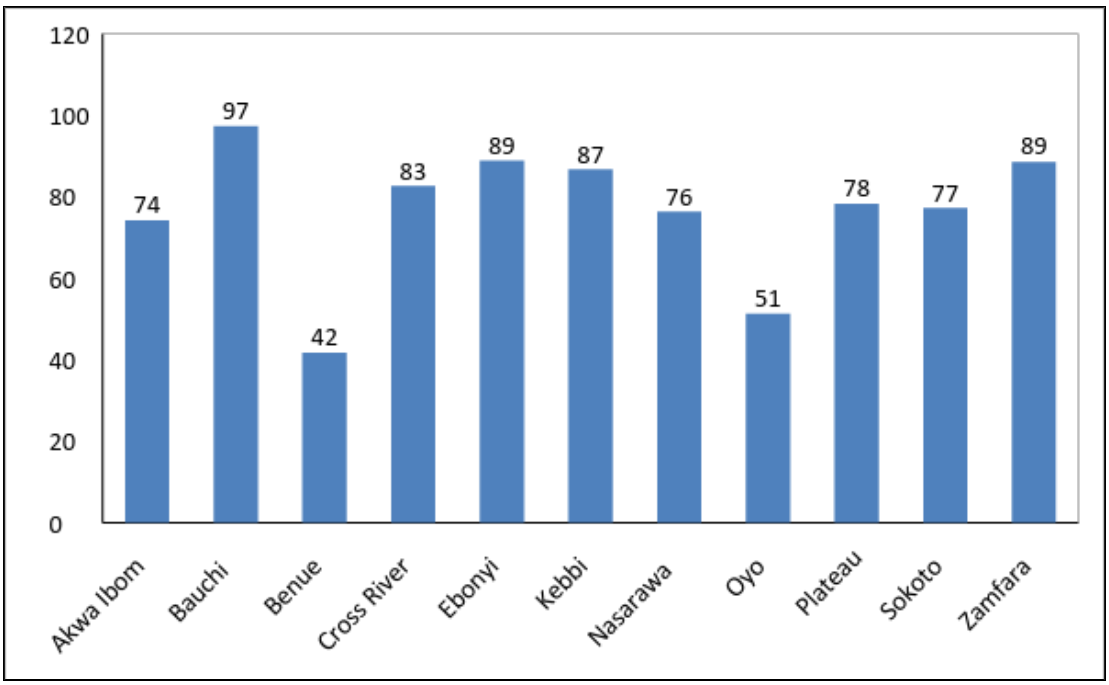
As detailed in the “Progress on Coverage/Impact Indicators” section, data from national surveys show ownership of at least one ITN in a household increased substantially from 8% (2008 NDHS) to 69% (2015 NMIS) (Figure 9).

Figure 9: Trends in ITN Ownership by Residence (Percent of households with at least one ITN)



The average number of ITNs per household doubled from 0.8 in 2010 NMIS to 1.6 in 2015 NMIS. Eight of the eleven PMI-supported states had a higher ownership of at least one ITN per household than the national average. The three states that had a lower ITN ownership than the national average were Benue, Kogi, and Oyo. Benue and Oyo conducted mass ITN campaigns in 2016 and Kogi completed a mass campaign in May 2017 (Figure 10).

Figure 10: Percentage of households with at least one ITN, in the 11 PMI Focus States (Source: 2015 NMIS)



Note: Mean national percentage of households with at least one ITN is 69%. Benue and Oyo had mass campaigns in 2016. Plateau replaced Kogi as a PMI-supported state in 2017.

The percentage of households with at least one ITN for every two people increased from 22% in the 2013 NDHS to 35% in the 2015 NMIS. The percentage of the total population that slept under an ITN increased from 23% in 2010 to 37% in the 2015 NMIS. The percentage of the *de facto* household population that slept under an ITN in households owning at least in one ITN did not change between 2010 (49%) and 2015 (50%). For children under five years of age and pregnant women, net use in households with ITNs was 59% and 65% in the 2010 NMIS, respectively; in the 2015 NMIS, it decreased slightly to 57% for children under five years of age and 62% in pregnant women. PMI/Nigeria with the NMEP and partners is conducting a secondary analysis of the NMIS 2015 data to investigate why improved access to ITNs did not result in increased ITN use. The report of this analysis will be available in September 2017.

There is evidence to show that Nigeria has addressed inequities in ITN ownership and use. The 2010 NMIS and 2015 NMIS data consistently show higher net ownership and use in poorer northern Nigeria and the rural populations, compared to southern Nigeria and urban populations. The 2015 NMIS data also show higher ITN ownership among the low wealth quintiles compared to high wealth quantile (86% vs. 58%).

PMI initiated a community-based distribution system through Community Drug Distributors in

in 2013, in 52 health facilities of Nasarawa State. A household survey conducted in April 2014[6] found that household occupants who were aware of the community-based distribution program were significantly more likely to have adequate ITN access than those unaware of the service. However, program effectiveness was low, with only 18% of households aware of the channel. Challenges encountered included stockouts of nets or net coupons and lack of understanding of the new scheme. Although the pilot results were less than expected, the NMEP and PMI opted to use the results as a framework for expanding community-based channels in select states.

To complement existing approaches, PMI supported pilots of both community- and school-based ITN distribution channels. In determining distribution methods, the NMEP, with PMI support, used community-based distribution in states with lower school attendance and high dropout rates, and school-based distribution in states with high school attendance and low dropout rates.

In 2012, PMI supported a school-based ITN distribution pilot in two LGAs of Cross River State. Collaborating closely with LGA education departments, PMI facilitated distribution through March 2014 of over 55,000 ITNs among four grade levels in 192 schools, reaching 95% of eligible children. An end-line evaluation survey in March 2014 showed that population access in households increased from 34% to 55% in the two LGAs with school-based distribution, versus decreasing from 38% to 26% in a control LGA with ANC distribution alone. In addition, ownership of at least one ITN reached between 76% and 77% in the two intervention LGAs, a 25% increase since 2012. This contrasts with a decrease in ownership from 50% to 43% in the control LGA. In 2014 and 2015, PMI continued supporting school-based distribution in Cross River State, and expanded to Oyo State. Through this effort, 126,654 nets have been distributed in schools in these two states.

Alongside the piloting of school and community-based distribution channels, PMI supported an ITN durability monitoring study to assess the physical integrity and attrition of ITNs in Nigeria. The PMI-funded net durability study in three states demonstrated that variance in the survival of a 100-denier polyester ITN among sites was driven by three extrinsic variables: living conditions, attitudes, and household behavior. The median net survival among states ranged from 3.0 to 4.7 years. Net-hole damage was commonly caused by pulling it (mechanical damage), rodent bites, and open flame. The results informed future plans and protocols for routine ITN durability monitoring.[7]

A study on net repair, maintenance, and care practices and their effect on ITN longevity was also carried out in Nasarawa State between March 2012 and April 2014.[6] The study found that while the comprehensive communication intervention improved attitudes and behaviors about the care

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[6] Albert Kilian and Emmanuel Obi: Community-Based, Continuous Distribution of LLIN in Nasarawa State, Nigeria. Report prepared for VectorWorks by Tropical Health LLP and Johns Hopkins Center for Communication Programs, August 6, 2015.

[7] Albert Kilian, Hannah Koenker, Emmanuel Obi, Richmond Selby, Megan Fotheringham, and Matthew Lynch: Field durability of the same type of long-lasting insecticidal net varies between regions in Nigeria due to differences in household behaviour and living conditions. *Malaria Journal* (2015) 14:123

and repair of nets, these efforts had little effect on overall net lifespan. While repair to damaged nets can be induced by changing attitudes towards repair, more effort should focus on preventive behavior, such as folding or tying up the net after use, and avoiding storage of food in the same room. A comprehensive SBCC intervention to promote these behaviors was incorporated into existing PMI malaria communication interventions.

Progress during the last 12-18 months

With FY 2015 funds, PMI procured 8,700,000 ITNs, out of which 6.8 million were designated for mass campaigns, 1.6 million for continuous distribution, and 300,000 for IDPs. The three states that conducted ITN mass campaigns were Benue, Kogi, and Oyo, with over 95% of registered households receiving a net. Due to the ongoing crisis in northeastern Nigeria and the migration of IDPs, PMI donated 300,000 ITNs for distribution to IDPs living in camps in 2016.

The Global Fund, through Catholic Relief Services (CRS), plans to support mass replacement campaigns in six priority states (Adamawa, Edo, Imo, Kwara, Osun, and Ondo) in 2017. PMI procured 2.5 million nets for Adamawa and the NMEP is planning to replace the nets in 2018. Implementation funds for the campaigns will also be provided by the Global Fund. Alliance for Malaria Prevention is providing technical support.

In addition, all 11 PMI-supported states of Akwa Ibom, Bauchi, Benue, Cross River, Ebonyi, Kebbi, Kogi, Nasarawa, Oyo, Sokoto, and Zamfara, and are distributing ITNs through ANC at first ANC visit and through EPI clinics with measles vaccination. With FY 2016 funds, PMI procured 1.6 million ITNs for routine distribution through ANC and EPI clinics, and community or school distribution. In 2016, PMI supported the five states of Benue, Ebonyi, Kogi, Nasarawa, and Zamfara to conduct community-based distribution of ITNs, and Oyo and Cross River states to distribute ITNs through schools. In total, with PMI support, the above states distributed 455,442 ITNs through the community channel, and 126,654 through schools. However, the community and school distribution channels are still on a limited scale; they will continue to slowly expand with FY 2017 funds.

In 2016, routine data from the HMIS on percent of women receiving an ITN during their first ANC visit at a public facility indicates that 8 of 11 PMI-supported states were above the national average of 39%, with Oyo State at 81%. Field visits confirm that ITN distribution through this channel functions well in some of the states especially where ANC attendance is high. The quality of record-keeping is variable, complicated by the register design. Clinic registers include a column for ANC-based distribution but not for EPI.

With FY 2016 funding, PMI continued year two of ITN durability monitoring in Ebonyi, Oyo, and Zamfara States to assess ITNs distributed during the 2015/16 mass campaign for attrition, physical integrity, and insecticidal effectiveness over a 36-month period. Durability monitoring is being conducted in one site per state, and each site is aligned with the entomological monitoring sites in each state. Data collection took place in Ebonyi and Zamfara, 6 and 12 months after net distribution, and in December 2016 in Oyo, 1.5 months after net distribution. The attrition of nets in the three sites was low as expected so soon after the mass campaign: 4%

after 6 months and 5.3% after 12 months in Zamfara: 13% after 6 months and 21.8% after 12 months in Ebonyi; and 9.2 % in Oyo after 6 months. At Zamfara and Ebonyi sites, the majority of nets (87%) were still in good condition, only 2% at each site were severely damaged (too torn), and 10% had moderate damage. 98% of campaign nets that were in the households were in serviceable condition. Of nets lost, 92% had been given to others to use.

Commodity gap analysis

With FY 2018 funds, PMI will support the distribution of ITNs through: a) mass campaigns and b) continuous distribution through ANC and EPI clinics, schools, and community structures. The timing of mass ITN campaigns is based on projected replacement needs every three years. The table below presents the gap analysis for the PMI-supported states by distribution channel.

Table 8: ITN Gap Analysis (2017-2019)

Calendar Year	2017	2018	2019
Total country population	199,220,487	205,595,543	212,174,600
Total Targeted Population	54,317,658	56,039,139	57,796,013
Total number of pregnant women (5%)	2,715,883	2,801,957	2,889,801
Total number of children < 1 year (5%)	2,715,883	2,801,957	2,889,801
Continuous Distribution Needs			
Channel #1: ANC	1,097,769	1,132,512	1,168,362
Channel #2: EPI	390,324	402,548	415,157
Channel #3: School/Community	269,498	278,069	286,914
Estimated Total Need for Continuous	1,757,591	1,813,129	1,870,433
Mass Distribution Needs			
Estimated Need for Mass Campaigns [2017/2018/2019]	8,993,049	7,133,528	9,215,097
Emergency distribution need for Internally displaced persons			
ITN need for internally displaced persons	300,000	400,000	300,000
Total Calculated Need:	**11,050,640**	**9,346,657**	**11,385,530**
Partner Contributions			
ITNs carried over from previous year	4,817,600	3,687,520	2,596,585
ITNs from Government	0	0	0
ITNs from Global Fund	2,020,560	0	0
ITNs from Other Donors	0	0	0
ITNs planned with PMI funding	7,900,000	8,255,722	8,788,945
Total ITNs Available	**14,738,160**	**11,943,242**	**11,385,530**
Total ITN Surplus (Gap)	**3,687,520**	**2,596,585**	**0**

*The expected number of pregnant women in Nigeria is 5% of the total population.
*Average of 57% ANC attendance in PMI-supported states, with average 71% in public sector. Calculated using state-specific ANC coverage by skilled provider - DHS 2013.
*The expected number of children < 1 year of age in Nigeria is 5% of the total population.
*Average of 57% measles vaccine coverage in PMI supported states, with assumed 25% implementation coverage
*Estimates for ITN mass campaigns are obtained by dividing the population in PMI states due for campaigns in 2017, 2018, and 2019 by 1.8 (to achieve 1 net per 2 people ratio). Kogi, Sokoto, Kebbi, and Nasarawa in 2017; Bauchi and Akwa Ibom, in 2018, and Cross River, Ebonyi, Zamfara, and Plateau in 2019.
*The insecurity in the North East has persisted requiring continued ITN support for IDPs.

Plans and justification

PMI will continue to support the national malaria strategy in conducting both ITN mass campaigns and expanding existing and appropriate new channels for continuous distribution. Routine distribution through ANC and EPI clinics will be complemented by expansion of school and community-based distribution channels. PMI will work with the NMEP and state-level programs to determine the most effective strategy for expanding continuous distribution channels. Mass campaigns are planned for Akwa Ibom and Bauchi in 2018 with FY 2017 funds. FY 2018 funds will support the distribution of ITNs for mass campaigns in Cross River, Ebonyi, Plateau, and Zamfara (9,215,097 ITNs). The ITNs for these mass campaigns will be procured from reprogramming of FY 2017 funds and supply chain pipeline. PMI will continue to support continuous distribution channels (1,870,433 ITNs).

The civil unrest in Nigeria has greatly affected and displaced a significant population in Northern Nigeria. Some PMI-supported states like Benue also experience internal conflicts that result in displacing populations from their residences. The IDPs are at risk of increased malaria transmission. The U.S. Government humanitarian response strategy includes distribution of ITNs to the displaced populations (300,000 ITNs).

Multi-channel SBCC efforts will continue to address the demographic and regional variations in ITN use. Using the findings of the 2015 NMIS and the results from the 2014 study on net care and repair, PMI will help develop, effectively target (geographically and by population group), and intensify national and local communications strategies to improve net preventive care and year-round net use in households.

To verify the quality and effectiveness of ITN products distributed, PMI will continue to support the monitoring of ITN physical integrity, attrition/survivorship, and insecticide content and effectiveness. The results inform both future net replacement strategies and communication approaches to promote proper care of nets. However, the durability monitoring is linked to mass distribution campaigns. The ongoing monitoring in three states will conclude in 2018. In order to include different states in the durability monitoring (Ebonyi and Zamfara are scheduled for mass campaigns in 2019), PMI will not fund this activity with FY 2018 funding, but rather, begin the next durability monitoring following mass campaigns in 2020/2021.

Proposed activities with FY 2018 funding: ($11,802,385)

1. *Procure approximately 1,817,625 ITNs with FY 2018 funds*. All of the 1,817,625 ITNs will be used for continuous distribution needs in all 11 PMI-supported states of Akwa Ibom, Bauchi, Benue, Cross River, Ebonyi, Kebbi, Nasarawa, Oyo, Plateau, Sokoto, and Zamfara. The additional ITNs required for mass campaigns (9,215,097) in Cross River (2,327,394), Ebonyi (1,729,011), Zamfara (2,727,474); and Plateau (2,431,218) and the 300,000 for IDPs will be procured from reprogramming of FY 2014, FY 2015, FY 2016 and FY 2017 funds and pipelines in GHSC-PSM (plus 2,596,585 carry over). Cost includes transport from manufacturer to state warehouses. *($5,234,760)*
2. *Distribution of ITNs through continuous channels*: ITNs will be distributed through the

ANC and EPI channels at the health facilities and through community and school channels in selected states. 1,817,625 ITNs moved from state warehouses to service delivery points in the 11 PMI-supported states and to schools in selected PMI focus states. *($1,817,625)*

3. *ITN mass campaigns*: Implement ITN mass campaigns in Cross River, Ebonyi, Plateau, and Zamfara (9,215,097 ITNs). This includes the distribution of ITNs from state warehouses to various distribution points, microplanning, training, household registration, development and procuring campaign materials, distribution of nets to beneficiaries through a network of volunteers, data collection and analysis, and report writing. This does not include SBCC costs for mass campaigns that are budgeted under the SBCC section. *($4,750,000)*
4. *Support for SBCC for malaria prevention*: PMI will support SBCC activities, including interpersonal communication (IPC), mass media, and social mobilization to promote ITN ownership and use, as well as other key aspects of malaria control and prevention. (*Costs included in cross-cutting activities described in the SBCC section.*)

c. Indoor residual spraying

The Nigeria Malaria Strategic Plan (2014 – 2020) states that IRS will be implemented in the country as a supplementary intervention to ITNs. However, in a country as large and populous as Nigeria, IRS is a prohibitively expensive intervention. PMI has determined that the relative benefits that would be achieved from massive IRS campaigns would not have sufficient impact on malaria prevalence in the country to warrant the expense. IRS implementation remains very low with 1% national coverage as reported in the Nigeria Malaria Indicator Survey of 2015.

Progress since PMI was launched

In 2011, PMI started support for a two-year IRS pilot activity in two local government areas of Nasarawa State. This IRS pilot program was designed as a demonstration spray program for MoH and local officials to see high-quality IRS implementation which was underpinned by reliable entomological surveillance and capacity building. During the two years of actual spraying, about 120,000 households were sprayed, protecting over 346,000 people each year in the two LGAs.

During the same period, the NMEP, with funding from the World Bank Booster Program, conducted IRS in 6 of the 7 Booster Program states (no overlap with PMI-supported states), in a total of 14 LGAs. This IRS program also had an entomological monitoring component which was implemented in collaboration with research institutions in the country. The World Bank Booster program ended in March 2014 and most states did not have domestic resources to continue IRS activities. The exception was Lagos, which has consistently conducted IRS since 2009 in two LGAs, although the last spray round in 2015 was delayed due to changes in political leadership in the state.

Among the corporate organizations, Chevron and Shell have conducted IRS in their drilling communities protecting both staff residential quarters and community catchment areas as part of

their corporate social responsibility and desire to protect the health of their employees and their families. The Ministry of Defense has also conducted IRS in the military residential communities.

PMI provides support for building the capacity of the GoN personnel, particularly at the NMEP, to provide consistent entomological monitoring activities as part of their annual malaria intervention. Staff members who were trained in insecticide resistance testing in 2014 received follow-up training on the CDC bottle bioassay in August 2015 using PMI funds.

PMI is not actively conducting IRS in Nigeria due to the cost-benefit calculation described above, and there is no IRS activity in any of the PMI-supported states. To support the entomological monitoring for IRS activities, in 2013, PMI set up an insectary at the Nasarawa State University in Keffi. The insectary provides susceptible mosquitoes for measuring IRS insecticide decay rates and can now support current state-managed IRS activities should they be planned or undertaken.

Table 9: PMI-supported IRS activities 2011 - 2013

Calendar Year	Number of Districts* Sprayed	Insecticide Used	Number of Structures Sprayed	Coverage Rate	Population Protected
2011	2 LGA	Pyrethroid	58,704	99.1%	346,115
2012	2 LGA	Pyrethroid	62,526	100%	346,544

Progress during the past 12-18 months

In November and December 2016, the Federal Government Nigeria (FGN) and the Public Private Partnership (PPP) began efforts to implement IRS using alphacypermethrin. The FGN provided funds for piloting IRS in selected LGAs in six selected states (one per geo-political zone of the country). These states were Nasarawa in North Central, Bauchi in North East, Jigawa in North West, Lagos in the South West, Rivers in South South, and Anambra in South East. Preliminary results are shown in Table 10. These states were selected because IRS had been implemented in the past and thus some capacity existed. Despite the limited time constraints and other logistic challenges encountered, the IRS in the selected communities was generally successfully implemented. The IRS beneficiaries accepted the operations while the personnel used were experienced and well-motivated. Policy makers at the state and LGA levels supported the process and provided conducive relationships for future IRS operations. Other states (not PMI-supported) have also communicated interest in conducting IRS to the NMEP and some have requested technical support in planning and implementation.

Table 10: Summary data for IRS in selected communities in six states in Nigeria

State	Households covered/visited	No of structures covered	No. of rooms sprayed	Total people protected
Anambra	6.500	6,218	19,106	32,800
Bauchi	4,314	4,537	12,037	28,243
Jigawa	2,706	6,590	9,219	21,130
Lagos	6,110	6,110	7,944	7218
Nasarawa	6,700	7,304	21,912	40,670
Rivers	7,220	6,860	21,028	36,100
Total	**19,837**	**30,759**	**70,218**	**130,061**

Plans and justification

PMI has no plans to support IRS activities in Nigeria.

Proposed activities with FY 2018 funding: ($0)

2. Malaria in pregnancy

NMEP/PMI objectives

Nigeria implements all three interventions recommended by WHO for the prevention and treatment of MIP:

- Use of long-lasting insecticidal nets
- IPTp with SP
- Prompt diagnosis and effective treatment of malaria illness.

High transmission rates and variable ANC attendance and ITN use in pregnancy have added to the high burden of malaria during pregnancy. The total population is projected to be over 212 million in 2019, with an estimated 10.6 million pregnancies. The NMSP 2014-2020 emphasizes that MIP interventions are a component of the focused antenatal care (FANC) services delivered by Reproductive/ Maternal/ Child Health Units within the FMoH. However, coordination of MIP activities is the responsibility of the NMEP through the MIP Technical Working Group (TWG) in collaboration with the Family Health Department, both located within the FMoH.

The NMSP 2014-2020 targets for MIP are:

- At least 80% of pregnant women will sleep inside ITNs
- All (100%) of eligible pregnant women attending ANC receive at least three doses of SP-IPTp by 2020 through directly observed therapy (DOT)
- Eighty percent of pregnant women with fever and malaria receive appropriate and timely treatment according to the national treatment guidelines by 2017, and 100% by 2020

Intermittent preventive treatment for pregnant women

In 2014, Nigeria adopted the updated WHO IPTp policy of providing IPTp with SP, starting as early as possible in the second trimester, for all pregnant women at each scheduled antenatal care visit until the time of delivery, provided that the doses are given at least one month apart. The IPTp SP is to be administered as DOT during ANC visits. The NMEP and partners have revised the training and SBCC materials to align with the new IPTp policy. The country is in the process of reviewing the HMIS registers to capture three or more doses of IPTp-SP. (See Table 11).

Table 11: Status of implementation of IPTp policy

Malaria In Pregnancy Policy updated to reflect WHO 2012 guidance	Status of training on updated IPTp policy	Number of HCW trained on new policy in the last year	Are the revised guidelines available at the facility level?	ANC register updated to capture 3 doses of IPTp-SP	HMIS/ DHIS2 updated to capture 3 or more doses of IPTp-SP
2014	Activity is a continuous process.	Cumulatively, 60% of ANC healthcare workers in supported states.	Guidelines are available in PMI supported health facilities	Estimated Completion Date: December 2017	Estimated Completion Date: December 2017

Iron / Folate

The national guidelines and strategies for malaria prevention and control during pregnancy states that SP shall be administered as part of the ANC package with other components including anti-helminthics in the second or third trimester, nutrition counselling, and daily hematinic supplements (iron and low dose folic acid). Because high dose folic acid is still procured and provided at ANC in Nigeria, the guideline recommends that since SP is an anti-folate, high dose folic acid should be withheld for one week after SP administration.

ITNs

Under the NMSP 2014-2020, one of the distribution channels for improving and sustaining access to ITNs is to provide an ITN to every pregnant woman during the first ANC visit. Support from PMI is discussed in the ITN section.

Management of acute malaria

According to Nigeria's National Guideline for Diagnosis and Treatment of Malaria (2015), the recommendation for treating uncomplicated MIP is quinine + clindamycin for the first trimester and an ACT for the second and third trimesters. For severe malaria, the guidelines recommend using injectable artesunate (IAS) (or intravenous quinine if IAS is not available). Quinine is on the essential medicines list and is readily available in country.

Progress since PMI was launched

PMI has supported a MIP strategy that includes IPTp, ITNs through ANC, and prompt case management of malaria during pregnancy. Efforts have focused on increasing IPTp coverage through provision of free SP to pregnant women in ANC clinics and promoting availability of low dose folic acid at health facilities, scaling up ITN distribution to pregnant women during the first ANC visit, and testing and promptly treating pregnant women with confirmed malaria. The national dissemination of the Malaria in Pregnancy guideline took place in June 2015. State level dissemination was done in the 11 PMI-supported states. PMI revised the quantification of SP to align with the new policy using three instead of two doses, and helped update the training materials and algorithms.

Based on WHO's new ANC guidelines, calling for one visit before 12 weeks followed by visits at 20, 26, 30, 34, 36, 38 and 40 weeks' gestation, PMI will support the NMEP and its partners to work closely with the Reproductive Health unit of the FMoH to adopt the recommendations from the WHO to ensure the revised national MIP guideline allows for early initiation of IPTp-SP administration while ensuring that doses are four weeks apart and low dose folic acid is available at health facilities.

To improve IPTp coverage and access to SP, PMI has procured 11 million treatments of SP since FY 2012, of which 5.2 million treatment doses have been distributed. Additionally, PMI has supported the training of over 4,600 health workers in MIP, and distributed over 400,000 ITNs through the ANC clinics as part of the FANC package. To improve coverage and performance of MIP interventions in Nigeria, PMI supports capacity building and supervision of service providers to improve delivery of FANC services in the 11 PMI-supported states. The training includes IPC to improve behavior and attitudes of service providers towards IPTp. Community-level SBCC activities are being implemented across states to improve ANC attendance by pregnant women.

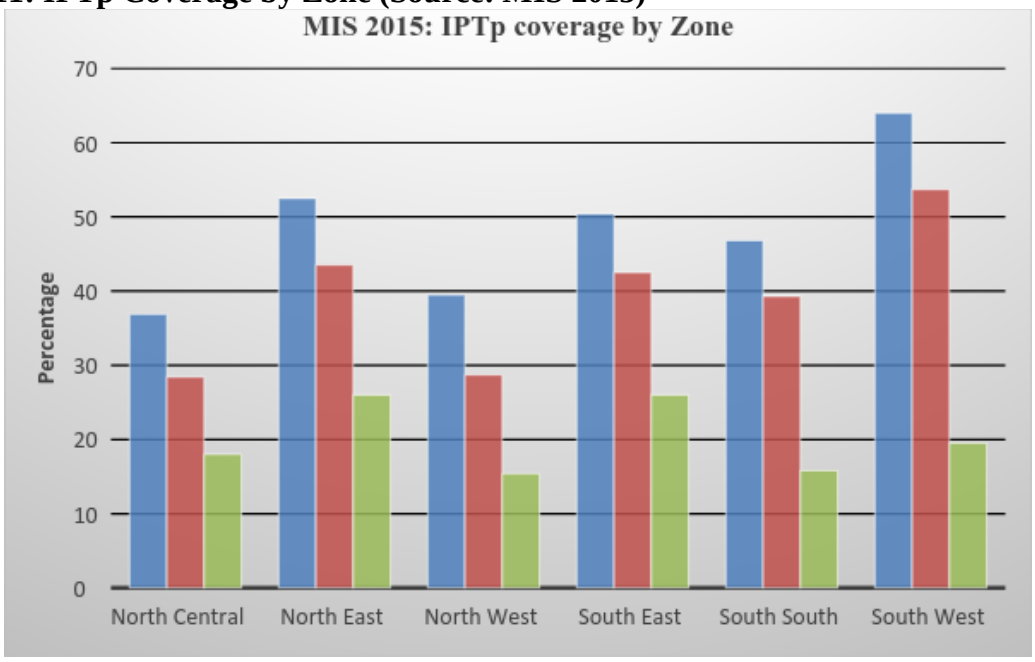
Investments in MIP by PMI and other partners over the years are yielding results. Nigeria has increased ITN ownership at household level, with a corresponding increase in use by pregnant women. According to the 2015 NMIS, more households own at least one ITN – 69% (compared to 42% in 2010), and 49% of pregnant women age 15-49 in all households slept inside an ITN the night before the survey; in 2010, only 28% of pregnant women age 15-49 slept inside a treated net.

The 2013 NDHS showed that 61% of pregnant women attended ANC with a skilled health worker and 51% of pregnant women had four or more ANC visits. However, the ANC attendance was relatively low in states located in northern Nigeria. The 2015 NMIS showed that 46% of pregnant women received any IPTp compared to 15% in 2010 (NMIS), 37% received two or more doses of IPTp compared to 13% in 2010, and 19% received three or more doses of SP as compared to 6% in 2013 (NDHS).

The 2015 NMIS also showed women in urban areas were more likely to have received three or more doses of IPTp (24%) than women in rural areas (16%). A mother's education, wealth

quintile, and urban or rural residence have been identified as factors affecting IPTp uptake. Pregnant women with a secondary or higher education and those in the fourth wealth quintile were more likely to receive IPT during an ANC visit than other women (2015 NMIS).

Figure 11: IPTp Coverage by Zone (Source: MIS 2015)



Routine HMIS data over the last three years have shown improvements in the rate of IPTp uptake among pregnant women visiting the health facilities. Figure 12 below shows the proportion of ANC re-visits at which IPTp2 was received as reported through the national DHIS2 platform. This shows a general increase in the proportion of women who receive IPTp2 in PMI focus states.

Although data show improvements in uptake, MIP outcome indicators are still low. Average ANC4+ attendance is 51% (2013 NDHS) while IPTp1 coverage is 47% and IPTp2 coverage is 37% (2015 MIS). As observed during field visits to some hospitals, health workers who are not working in the pharmacy are not allowed to dispense SP, as such, SP may not be available at ANC clinics. A combination of service delivery gaps result in missed opportunities for IPTp DOT, ITNs, and proper management of malaria for the pregnant women.

Progress during the past 12-18 months

In 2015, PMI supported the dissemination of the new IPTp guidelines of providing IPTp at every scheduled ANC visit after the first trimester, with four weeks between doses. PMI and State Malaria Elimination Programs (SMEP) used the dissemination of the new IPTp guidelines as a catalyst to set up MIP TWGs, and strengthen the implementation of MIP activities in states. With FY 2016 funding, PMI procured 6 million SP doses and 430,000 ITNs for routine distribution through health facilities.

Based on the new IPTp policy and guidelines, there was a need to increase the knowledge and capacity of health workers. PMI supported a rapid scale up of training of health workers specifically on the IPTp new policy. With FY 2016 funding, PMI trained over 1,641 ANC service providers on prevention and management of MIP. PMI continued to train all relevant health workers in the 11 PMI-supported states, irrespective of whether they work at PMI or Global Fund supported facilities. The HMIS reporting forms and the DHIS2 application are yet to be updated to allow reporting of additional IPTp doses beyond IPTp2. There has been no evidence of training for private sector health workers by the government and other development partners in the country.

PMI is working with NMEP, the Pharmacy Council of Nigeria, the States, and other malaria partners to allow health workers other than the pharmacists and pharmacy technicians to dispense SP at ANC clinics, and capture the data in the health facility HMIS.
In 2016, PMI supported the implementation of outreach services that helped health facility workers deliver IPTp services to women in communities that had very low ANC attendance in the states of Zamfara and Kebbi. The strategy included using color-coded cards to track women that were given IPTp and referred from the communities to the primary health care centers. These cards served the dual purposes of appointment cards to remind pregnant women when to visit the clinic and to assist the health worker to track the numbers of IPTp treatments the women received. Monitoring data showed an increase in ANC attendance. Previously, 62% of the pregnant women reached had never attended ANC in a health facility. During the six months of the pilot, 22,577 women received at least one dose of IPTp.

In 2017, UNITAID awarded the Transforming Intermittent Preventive Treatment for Optimal Pregnancy (TIPTOP) project to expand access to quality-assured SP for IPTp through community delivery channels while increasing ANC attendance. This is a five-year $49.6 million project that will be implemented in four African countries: Democratic Republic of Congo (DRC), Madagascar, Mozambique, and Nigeria.

Table 12: SP Gap Analysis for Malaria in Pregnancy (2017-2019)

Calendar Year	2017	2018	2019
Total country population	199,220,487	205,595,542	212,174,599
Total targeted population	54,317,658	56,039,139	57,796,013
SP Needs			
Total number of pregnant women* (5%)	2,715,883	2,801,957	2,889,801
Total number of pregnant women attending ANC **	1,551,879	1,600,789	1,651,251
Public Sector**	1,097,769	1,132,512	1,168,362
Total SP Need Public Facilities***	2,358,604	2,433,579	2,510,953
SP need for community outreach (10%)****	235,860	243,358	251,095
Total SP Need (in treatments)	**2,594,465**	**2,676,937**	**2,762,048**
Partner Contributions			
SP carried over from previous year	1,480,500	2,464,963	2,788,026
SP from Government*****	0	0	0
SP from Global Fund	1,578,928	0	0
SP from other donors	0	0	0
SP planned with PMI funding	2,000,000	3,000,000	2,000,000
Total SP Available	**5,059,428**	**5,464,963**	**4,788,026**
Total SP Surplus (Gap)	**2,464,963**	**2,788,026**	**2,025,978**
SPs needed to fill the pipeline (10 months)****	**2,162,054**	**2,230,781**	**2,301,707**

The expected number of pregnant women in Nigeria is 5% of the total population.
**Average of 57% ANC attendance in PMI supported states, with average 71% in public sector. Calculated using state-specific ANC coverage by skilled provider - DHS 2013.
***Plan for 100% SP1, 77% SP2, and 50% SP3.
****Plan for 10% expansion of coverage through community outreach
***** To date, the GON has not procured SP—responsibility for the procurement of these commodities lies with the state and local (LGA) government, very few of which procure any primary health care commodity. USAID/Nigeria is advocating to the state and local governments in focus states that they assume responsibility for procuring at least some of the SP needed for their population.
****** Even taking into account PMI and other sourced commodities, the country will experience a shortage of SP for the number of pregnant women expected to need the drug in Nigeria. USAID/Nigeria is advocating to the GON that they work to fill this gap and simultaneously the Promoting Quality Medicines project is working to improve local production of SP so that it is available for purchase in country when states and LGAs decide to procure.

Plans and justification:

PMI's strategy in Nigeria is to support NMEP and the 11 PMI-supported states to raise ANC attendance and IPTp coverage, and minimize the missed opportunities among women who attend ANC in specific states. PMI will collaborate with other partners to advocate for the availability of low-dose folic acid in the PMI focus states. Efforts will focus on increasing IPTp coverage through provision of free SP to pregnant women, implementing the WHO IPTp policy, expanding ITN distribution to pregnant women during the first ANC visit, and testing and promptly treating pregnant women with confirmed malaria. With FY 2018 funds, PMI will identify LGAs in three states (Sokoto, Kebbi, and Zamfara) to support health facility outreach for ANC and MIP services that include IPTp.

Proposed activities with FY 2018 funding: ($1,840,000)

- *Procure 3 million SP* treatments to support implementation of IPTp as part of FANC across the 11 PMI-supported states. *($540,000)*
- *Capacity building and scale-up for MIP*: Strengthen capacity and integrated supportive supervision for MIP service delivery within the FANC platform in 9 PMI-supported states. Support includes in-service training, introducing new guidelines in medical training institutions and professional associations, expanding IPTp in health facilities and through outreach services. Private sector health providers will benefit from training on IPTp during malaria case management training. *($1,000,000)*
- *Capacity building and scale-up for MIP:* Strengthen capacity and integrated supportive supervision for MIP service delivery within the FANC platform in two PMI-supported states (Bauchi and Sokoto). Support includes in-service training, introducing new guidelines in medical training institutions and professional associations, expanding IPTp in health facilities and through outreach services. Private sector health providers will benefit from training on IPTp during malaria case management training. *($300,000)*
- *ITN continuous distribution channel*: PMI will support routine distribution of ITNs to pregnant women during the first ANC visit. (Costs covered under the ITN section)
- *SBCC activities to promote IPTp and net use*: PMI will continue to promote ANC uptake 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

NMEP/PMI objectives

The Nigerian National Guidelines for Diagnosis and Treatment of Malaria are aligned with the WHO recommendations on universal diagnostic testing and treatment with an artemisinin-based combination therapy (ACT). The NMSP 2014-2020 outlines Nigeria's priorities in the area of case management. The objectives for case management are:

- To test all care-seeking persons with suspected malaria using a rapid diagnostic test (RDT) or microscopy by 2020
- To treat all individuals with confirmed malaria seen in public or private facilities with effective antimalarial drugs by 2020

These objectives are to be achieved through the following strategies:

- Create demand for utilization of parasitological confirmation of malaria
- Ensure availability of and access to equipment and supplies for parasitological confirmation of malaria, and commodities and supplies for treatment of uncomplicated and severe malaria
- Build capacity of personnel for malaria case management in public and private health facilities, and at the community level through integrated community case management (iCCM)
- Strengthen capacity of public and private facilities for management of severe malaria
- Implement a comprehensive national strategy for effective participation of the private sector in malaria case management
- Strengthen systems for QA and QC of malaria diagnostic services
- Conduct drug therapeutic efficacy testing (DTET)

Table 13: Status of Case Management Policy in Nigeria

Status of Case Management Policy in Nigeria according to National Guideline for Diagnosis and Treatment of Malaria; Third Edition, 2015.	
What is the first-line treatment for uncomplicated *P. falciparum* malaria*?	Artemether -Lumefantrine is medicine of choice with Artesunate – Amodiaquine as alternate
What is the second-line treatment for uncomplicated *P.falciparum* malaria*?	+Guideline does not state a second line but Artesunate-Amodiaquine is alternate medicine
What is the first-line treatment for severe malaria?	Artesunate Injection
In pregnancy, what is the first-line treatment for uncomplicated *P. falciparum* malaria in the first trimester*?	Quinine + Clindamycin
In pregnancy, what is the first-line treatment for uncomplicated *P. falciparum* malaria in the second and third trimesters*?	Artemisinin-based Combination Therapy (Artemether-Lumefantrine or Artesunate Amodiaquine)
In pregnancy, what is the first-line treatment for severe malaria?	Artesunate Injection
Is pre-referral treatment of severe disease recommended at peripheral health facilities? If so, with what drug(s)?	Artesunate Injection (Intramuscular) Artemether Injection Quinine Injection Rectal Artesunate
Is pre-referral treatment of severe disease recommended for community health workers? If so, with what drug(s)?	Rectal Artesunate
If pre-referral rectal artesunate is recommended, for what age group? (note: current international guidelines do not recommend administrating to those ≥ 6 years)	Guideline not specific but recommends children <12 months to >13 years.

Note:
*No recommended treatment for *P. vivax* in the national Guideline
+ Guideline does not state a second line but Artesunate Amodiaquine is the alternate medicine for treatment

The NMEP receives technical assistance and coordinates partners through the case management technical sub-committee. PMI is an active member and also assisted in the development of a diagnostic expert working group that reports to sub-committee.

Malaria microscopy requires laboratory scientists who are highly trained and requires continuous capacity building to maintain accurate diagnostic skills. The NMEP considers secondary and tertiary hospitals, and large health centers with inpatient beds, as the facilities where microscopy should be available. The NMEP expects RDTs to be used at all facilities where microscopy is not available, to complement microscopy in secondary facilities, and in certain outpatient clinics of

tertiary facilities. The target for parasitological diagnosis is 100% in the public sector and 80% in the private sector and community (where iCCM is implemented) by 2018.

Artemether-lumefantrine (AL) and artesunate-amodiaquine (ASAQ) are the two recommended first-line treatments of uncomplicated malaria in Nigeria, including for children weighing less than 5 kg with appropriate dosing. In 2012, the NMEP changed the first-line treatment of severe malaria from quinine to injectable artesunate (IAS), consistent with WHO treatment guidelines. The National Guideline for Diagnosis and Treatment of Malaria 2015 specifies that pregnant women with uncomplicated malaria should receive oral quinine + clindamycin in the first trimester and an ACT in the second and third trimesters, while severe malaria should be treated with IAS (or intravenous quinine, if IAS is not available). The recommended pre-referral treatment of severe malaria is intramuscular or rectal artesunate, intravenous quinine, or intravenous artemether. The target for malaria treatment is that 80% of persons with a parasite-based diagnosis of malaria will receive prompt antimalarial treatment according to the national treatment policy by 2017, and 100% by 2020.

The 2015 NMIS found that 66% of children under five years of age with fever were taken for advice or treatment (urban 71% and rural 64%); but of these, only 30% were taken to a public health facility. The final 2015 NMIS report found that 57% of household members first sought treatment for children under five years with fever at a pharmacy, chemist's store, or private patent medicine vendor (PPMV). Most PPMVs receive some informal on-the-job training as apprentices on the recognition of basic symptoms of uncomplicated malaria and are empowered to provide treatment. In January 2015, the Pharmacists Council of Nigeria approved registered PPMVs and community pharmacists to perform t RDTs before providing antimalarial drugs. A Global Fund supported pilot study of malaria RDT feasibility and use among Nigerian PPMVs, completed in June 2014, showed that more than 90% of the PPMVs adhered to correct RDT techniques. The pilot sought to increase testing and treatment among PPMVs as first points of contact, strengthen the quality of diagnosis and treatment and maintain it, and promote the use of these services to caregivers in the community.

The NMEP intends to expand access to malaria case management through iCCM. Although led by the Child Health Division in collaboration with NMEP, iCCM is an important component of the national malaria policies. Coordination of iCCM implementation is done through the iCCM Task Force which has three sub-committees namely Advocacy, Implementation and Monitoring & Evaluation Sub-committees. The National Guideline for iCCM, approved in 2013, clearly states the importance of iCCM to increase access to effective management of childhood illnesses. The target was to ensure that at least 80% of children under five living in selected communities (in hard to reach areas) had access to quality care through iCCM by 2015. This was not achieved due to a delay in starting and the challenge of commodities.

ICCM has been implemented in Nigeria since 2014, but has been implemented on a relatively small scale. The Canadian International Development Agency supports implementation of iCCM in two states (Abia and Niger) as part of the WHO Rapid Access Expansion (RAcE) program in five countries including Nigeria. Intervention covers all LGAs in Abia and nine LGAs in Niger State. The Global Fund supported the rollout of the malaria component in the remaining 21

LGAs in Niger, while WHO funds the additional non-malaria commodities. USAID-Nigeria, through maternal, neonatal and child health funding, is implementing national-level advocacy support to the FMoH, and landscaping the different models of community-level case management to determine a sustainable model for Nigeria. Community health workers (CHWs) currently do perform RDTs in health center settings. PMI-Nigeria will use lessons learned from the RAcE iCCM project, landscape activity, and the PPMV/case management pilots to implement iCCM in PMI-supported states.

Following the WHO recommendation of SMC for children aged between 3 and 59 months in areas of highly seasonal malaria transmission across the Sahel sub-region, the NMEP included SMC in its new strategic plan. The NMEP strategy recommends SMC in nine states in the Sahel region: Sokoto, Kebbi, Zamfara, Bauchi, Katsina, Kano, Jigawa, Yobe, and Borno. This translates to 227 LGAs and a population of 10.9 million children under the age of five years. Within the three PMI-supported Sahelian states targeted for SMC (Kebbi, Sokoto, and Zamfara), there are 2,815,505 children between 3-59 months of age (eligible for SMC) projected for 2018.

Progress since PMI was launched

Since PMI began in Nigeria, case management support has been directed at the following key areas: 1) procurement and distribution of diagnostic and treatment commodities; 2) training and supervision of laboratory and clinical care personnel in accurate malaria diagnostics and appropriate treatment; 3) implementation of QA systems for malaria diagnostics.

Since 2011, PMI has procured 21 million RDTs and distributed 19.7 million; procured 63.3 million ACTs and distributed 48.7 million; and procured and distributed 120,000 vials of IAS (including malaria commodities procured by other donors and distributed with PMI funds).

PMI has supported states in developing detailed training plans on case management (including diagnostics) that have incorporated input from each state's MoH, local health care institutions, development partners, and implementing partners. Each plan identified the number of facilities, the cadre of health workers to be trained, and the implementing partner responsible for training in a particular area. Because partners other than PMI (e.g. UNICEF, Global Fund) also supported this large-scale training initiative—often with many partners in the same state—activities were coordinated to avoid duplication. For each state, trainers (consisting of physicians, nurses, pharmacists, and laboratory scientists) were trained in the fundamentals of malaria case management. These trainers subsequently conducted training in LGAs throughout the state. Separate sessions targeted specific providers, ranging from CHWs to physicians. Microscopy training for laboratory technicians was also provided in each of the PMI-supported states. Trainings were followed by on-the-job mentoring by trainers and project staff, and supportive supervision by the MoH staff.

By the end of FY 2016, PMI had supported the training of 12,001 health workers in malaria diagnostics (RDT and microscopy) out of the 44,546 targeted; and 22,922 health workers in treatment with ACTs at health facilities and in the community, out of the 39,040 targeted. These trainings covered 27% and 59% of the health workers targeted by the states for diagnostics and

treatment, respectively.

PMI has been a driving force behind the development of a malaria diagnostic QA system. In collaboration with the DoD-Walter Reed Program and other partners, PMI supported the NMEP in developing and finalizing a QA framework and the Malaria Diagnostic External Quality Assurance (EQA) Operational Guidelines for parasite-based confirmation of malaria in 2012. In 2013, before the QA documents were finalized, PMI began piloting the QA system in two supported states. In addition to supporting the operational guidelines, PMI assisted in creating supervisory tools, standard operating procedures (SoP), and work plans. Guidelines call for quarterly facility visits for lab supervision, slide validation, and on-the-job mentoring. During these on-site supervisory visits, evaluators and local microscopists read slides together and discuss discrepancies. PMI has supported the roll out of EQA in 10 out of the 11 PMI-supported states (Plateau State will be added in 2017). A total of 90 QA officers have received training in malaria diagnostics and QA supervision. The trained QA officers were drawn from national level institutions and PMI-supported states.

Since the NMEP changed the first-line treatment of severe malaria in 2012, PMI has trained over 500 senior health providers in clinical care of severe malaria using IAS. PMI has also procured 120,000 vials of IAS for use in PMI-supported states. With UNITAID funding, Malaria Consortium and Clinton Foundation Health Access Initiative (CHAI) have trained 645 health workers across the country to manage severe malaria with IAS. Medicines for Malaria Venture, Global Fund, and the GoN have also procured IAS.

NMEP policy supports the use of pre-referral rectal artesunate in suspected cases of severe malaria presenting to community health workers (CHWs) or peripheral health facilities. However, cultural and operational barriers—namely, poor referral linkages to the formal health system, limited availability of rectal artesunate, and poor supervision and reporting—have prevented the implementation of this activity.

The NMEP has established 14 sentinel sites throughout the country to monitor the efficacy of the first-line treatments. The sites utilize the WHO standardized protocol and are scheduled to conduct the studies biannually. Drug therapeutic efficacy testing (DTET) conducted in 2009/10 and published in 2014 demonstrated greater than 95% PCR-corrected cure rates at 28 days for both first-line ACTs.[8] In 2014, another DTET commenced, with the final report still pending. Additional molecular analysis including K13 genotyping was conducted (results pending).

Progress during the past 12-18 months

In FY 2016, PMI ordered 5 million and distributed 9.4 million RDTs (from both PMI and Global Fund sources), and ordered 4.3 million and distributed 15.4 million ACTs to PMI- and Global Fund-supported health facilities in the 11 PMI-supported states. Case management training

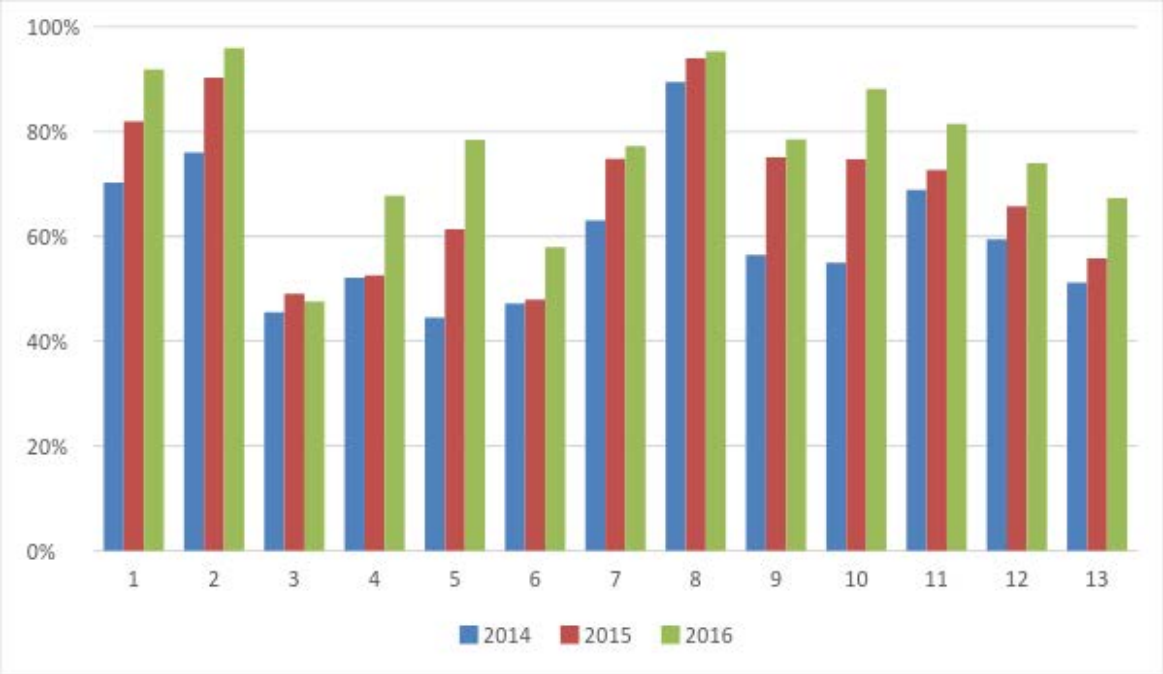
[8] Oguche S, Okafor HU, Watila I, Meremikwu M, Agomo P, Ogala W, et al. Efficacy of artemisinin-based combination treatments of uncomplicated falciparum malaria in under-five year-old Nigerian children. Am J Trop Med Hyg. 2014; 91:925–935. doi: 10.4269/ajtmh.13-0248

continued in FY 2016 with 8,176 health workers (1,414 at health facility and 6,763 CHWs) trained in case management with ACTs, and 1,713 trained in malaria laboratory diagnostics in the 11 PMI-supported states.

The 2015 NMIS reported that only 13% of children under five years with fever had blood taken for testing. While this denotes an increase from 5% (2010 NMIS), it is still very low. The HMIS and end-use verification (EUV) survey provide further background on Nigeria's progress in malaria case management at the health facility level in the public sector.

According to HMIS reports the national confirmation rate (by microscopy and RDTs) for uncomplicated malaria cases in public health facilities increased from 51% in 2014 to 67% in 2016. Figure 13 shows that the confirmation rate for PMI-supported states increased from 59% (2014) to 74% (2016), ranging from a low of 48% in Plateau to a high of 96% in Nasarawa in 2016. Although the increase is modest, all of the PMI-supported states show an increasing trend in malaria testing except Plateau, where support has yet to start.

Figure 13: Percentage of all reported fever cases confirmed by a malaria diagnostic test (confirmation rate) for uncomplicated malaria cases reported through the HMIS, by PMI-Nigeria focus state: 2014-2016



The DHIS2 can be used to improve targeting of malaria case management interventions. Akwa Ibom has had a confirmation rate in the seventy percent range over the past two years. Drilling down into the data, four LGAs accounted for 48% of clinically diagnosed malaria in 2016. In one of those LGAs, Ikot Abasi, one health facility (Operational Base Primary Health Center) was the source for 77% of the clinically diagnosed malaria. This information can help PMI be more efficient by focusing efforts on those LGAs and facilities that are not performing well due to health care provider behavior or supply chain issues.

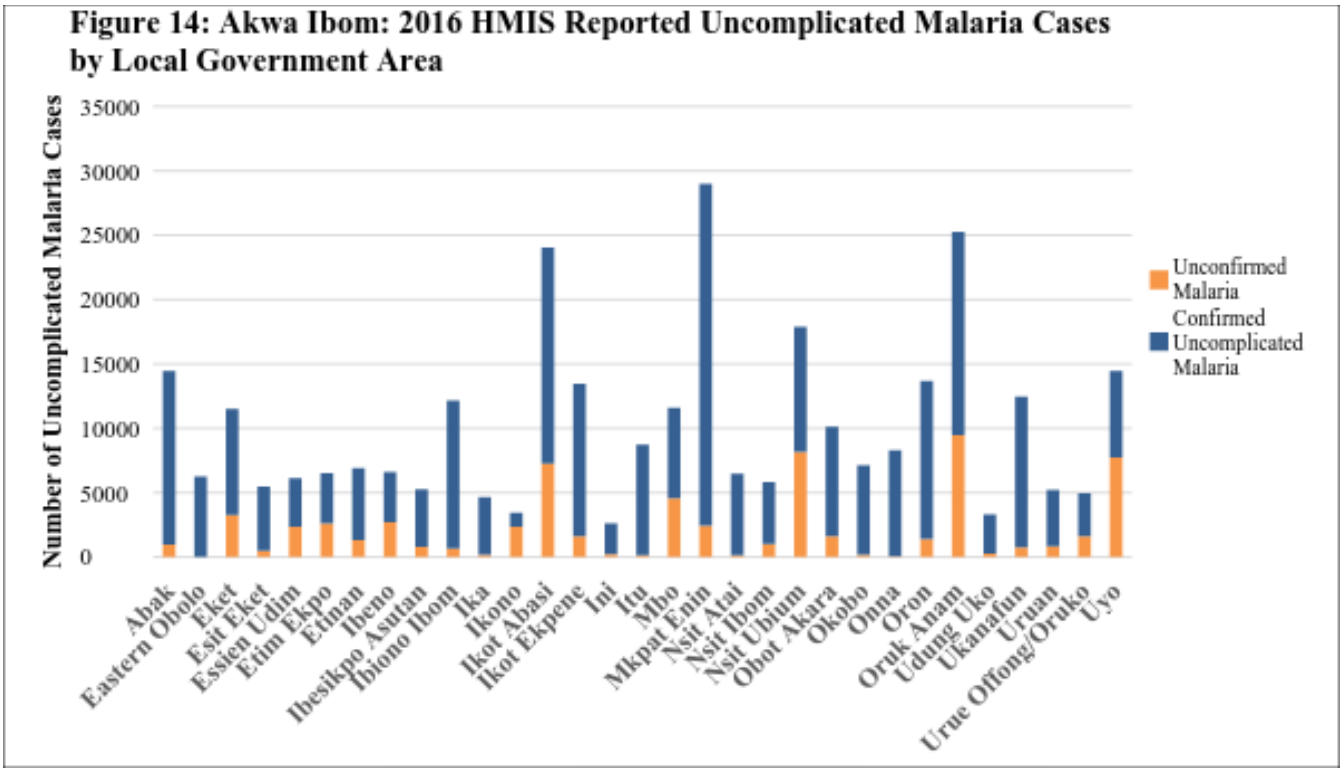
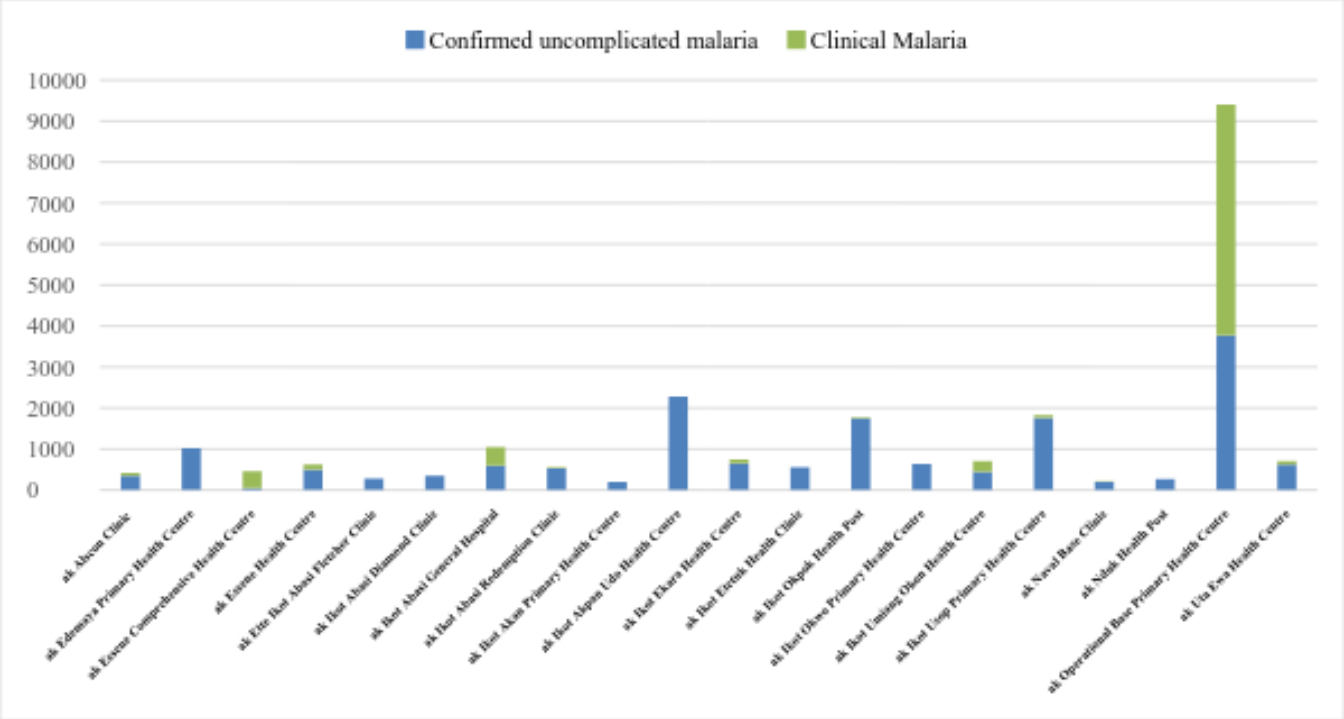


Figure 15: Ikot Abasi LGA: 2016 HMIS Reported Uncomplicated Malaria Cases by Facility



PMI continued to support malaria diagnostic QA. In 2016, two EQA visits occurred in each of seven PMI-supported states of Benue, Cross River, Ebonyi, Kogi, Nasarawa, Oyo, and Zamfara. Public sector health worker strikes and logistic challenges prevented the conduct of quarterly EQA in these seven states. External QA systems are in development in two additional states. Key findings from the EQA visits were absence of SOPs, inadequate documentation, lack of basic consumables and equipment, and poor storage conditions for RDTs. QA capacity was further strengthened through WHO certification of two Level 1 and nine Level 2 expert microscopists trained in country. These expert microscopists serve as trainers, constitute the core of the QA program, and provide support for malaria research including DTET.

Private sector integrated community case management

In order to examine an approach to reaching the large percentage of Nigerians who seek malaria care in the private sector, PMI supported a pilot study of PPMVs in two LGAs in Ebonyi State (Ikwo and Onicha). The study had intervention and control arms focusing on PPMVs and their corresponding catchment areas. The baseline data showed that caregivers' top two preferences for seeking treatment of childhood illnesses were a PPMV (40%) and a public health facility (23%).[9] The End of Project and Evaluation Report noted that PPMV performance showed improvement on key indicators: ability of a PPMV to recognize a client that required an RDT increased from nine to 76 percent; correctly diagnosing all three illnesses increased from 16 to 89 percent; and correct treatment and referral if signs of severe illness increased for all three illnesses from 16 to 88 percent. The end line evaluation found better performance in proper diagnosis, treatment, and adherence to national guidelines for malaria by PPMVs, better knowledge and use of RDTs, and better knowledge on diagnosis, treatment and adherence to government guidelines for all three conditions in intervention arms compared to control areas. Although originally designed as an intervention without subsidies, some of the commodities were provided to PPMVs at no cost to facilitate the implementation of the pilot.

Case management surveys

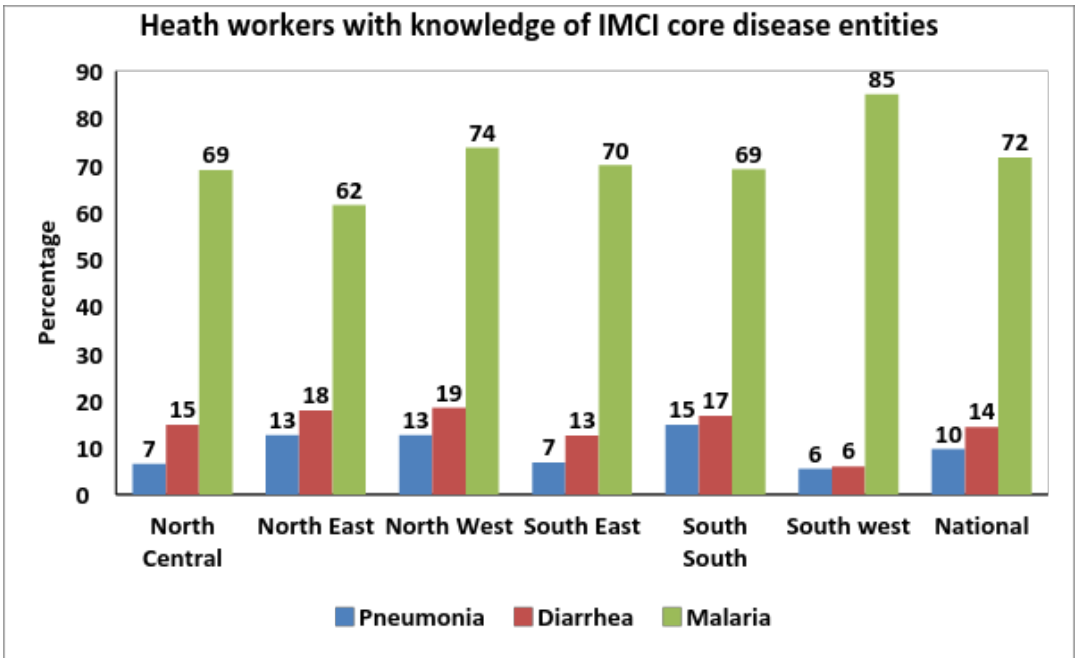
A PMI EUV survey was conducted in PMI-supported states in December 2016 assessing 110 health facilities per state. The survey showed stockout rates of 5% for RDTs and 16% for SP; 98% of facilities had some form of ACT available for treatment of malaria. Eighty percent of fever cases were diagnosed as malaria, with 34% under age five years. Of those children diagnosed with malaria, 88% were diagnosed by RDT and 1% by microscopy, and 88% were treated with an ACT.

The Saving One Million Lives Program for Results (SOML-PforR) conducted a National Health Facility Survey in 2016 collecting data on healthcare availability and readiness. In regards to health worker knowledge of integrated management of childhood illnesses (IMCI), malaria knowledge was far above pneumonia and diarrhea throughout the country (Figure 16). The

[9] (USAID/MalariaCare Project, February 2016): *Improved Community Case management of Childhood Illnesses by patent Proprietary Medicine Vendors: Baseline Evaluation Report*

findings from the health facility surveys will guide the design of new malaria activities including mentoring and on-the job capacity building as well as support to quality assurance and control of malaria diagnosis.

Figure 16: Health Workers with Knowledge of IMCI Core Disease Entities



ACT Watch communicated the results of the Nigeria 2015 Outlet Survey. Public sector findings were:
1. 90% of facilities stocked antimalarials, with 90% of those having ACTs in stock
2. Less than half of facilities had SP available for IPTp
3. Less than a third of facilities had any severe malaria treatment
4. Most of the antimalarials in public facilities were quality assured (QA) ACTs or SP
5. Availability of malaria testing (RDT or microscopy) had increased from 50% in 2013 to 80% in 2015

While the results in the private sector were:
1. Availability of ACTs had increased to 85% by 2015
2. Half of private sector outlets had no QA ACTs in stock
3. One third of private outlets stocked oral artemisinin monotherapy
4. Only 1 in 3 antimalarials distributed in 2015 were QA ACTs
5. The private sector price for QA ACTs has declined with each survey
6. Most private sector outlets did not have malaria testing

<u>Seasonal malaria chemoprevention (SMC)</u>
To date, PMI/Nigeria has not supported SMC given other program priorities. Funding from other donors including DfID, Dangote Foundation, UNITAID, Malaria Consortium, BMGF, and

CHAI has supported SMC in Jigawa, Katsina, Kano, Sokoto and Zamfara states. Ongoing SMC is funded by UNITAID (Access SMC) and GiveWay Foundation. Access SMC, implemented by Malaria Consortium, began in 2015, supports all LGAs in two states (Sokoto and Zamfara), reached 1.8 million children in 2016, and will end in December 2017. GiveWay Foundation will implement SMC in Jigawa and Katsina in 2017 and 2018. PMI will begin SMC support in 2018 building on work that was started in Kebbi, Sokoto, and Zamfara.

Commodity gap analysis

Table 13: RDT Gap Analysis (2017-2019)

Calendar Year	**2017**	**2018**	**2019**
RDT Needs			
Total country population	199,220,487	205,595,543	212,174,600
PMI-targeted at-risk population	54,317,658	56,039,139	57,796,013
Total number of projected fever cases	93,171,556	96,089,621	99,099,589
Total number of projected fever cases seeking care public sector (includes community)	25,301,882	26,094,212	26,911,480
Fevers receiving diagnostic test	16,685,385	17,730,624	18,825,049
Percent of fever cases tested with an RDT	84%	84%	84%
Total RDT Needs public sector (includes community)	**14,015,723**	**14,893,724**	**15,813,042**
Partner Contributions			
RDTs carried over from previous year	985,925	0	1,668,776
RDTs from Government*	0	0	0
RDTs from Global Fund	2,900,000	0	0
RDTs from other donors**	0	0	0
RDTs planned with PMI funding	10,000,000	16,562,500	17,000,000
Total RDTs Available	**13,885,925**	**16,562,500**	**18,668,776**

Total RDT Surplus (Gap)* **	**(129,798)**	**1,668,776**	**2,875,734**
RDTs needed to fill the pipeline (6 months)	**7,007,862**	**7,446,862**	**7,906,521**

(a) Projected fever cases estimated at an average of 1.7 fevers per person per year in PMI focus states.
(b) Average 66% care seeking for fever, with 33% public health facility (2015 MIS) and 2% community based.
(c) Diagnostic testing rates were estimated by state (ranging from 65% to 85%) with plans to increase 5% per year.
(d) Average 84% RDT use (HMIS)
* RDT procurement is the responsibility of state governments but to date these commodities have not been procured in any PMI focus state. The MOUs that will be negotiated between state governments and USAID/Nigeria will propose initiation of GON procurement of these commodities.
** PMI and the Global Fund deliberately divided the states of Nigeria starting in 2018, ensuring support to state programs is more effective and eliminating duplication of effort between the donors. No other donor is working in malaria in focus states.
*** Surplus RDTs are purposefully planned to prevent stockouts if bottlenecks occur during international procurement processes.

Table 14: ACT Gap Analysis (2017-2019)

Calendar Year	**2017**	**2018**	**2019**
ACT Needs			
Total country population	199,220,487	205,595,543	212,174,600
PMI-targeted at-risk population	54,317,658	56,039,139	57,796,013
Total number of projected fever cases seeking care public sector (includes community)	25,301,882	26,094,212	26,911,480
Total projected number of confirmed malaria cases	11,179,005	11,526,004	11,862,237
Total projected number of unconfirmed treated fever cases	9,112,072	8,859,958	8,573,827
Total ACT Needs public sector (includes community)	**20,291,077**	**20,385,962**	**20,436,064**
Partner Contributions			
ACTs carried over from previous year	3,903,237	0	0
ACTs from Government	0	0	0
ACTs from Global Fund	2,900,000	0	0
ACTs from Other Donors	0	0	0
ACTs planned with PMI funding	10,500,000	15,100,000	12,000,000
Total ACTs Available	**17,303,237**	**15,100,000**	**12,000,000**
Total ACT Surplus (Gap)	**(2,987,840)**	**(5,285,962)**	**(8,436,064)**
ACTs needed to fill the pipeline (6 months)	**10,145,538**	**10,192,981**	**10,218,032**

(a) Projected fever cases estimated at an average of 1.7 fevers per person per year in PMI focus states.
(b) Average 66% care seeking for fever, with 33% public health facility (2015 MIS) and 2% community based.
(c) Diagnostic testing rates were estimated by state (ranging from 65% to 85%) with plans for 5% increase per year.
(d) TPR estimates by state obtained from WHO (75% ave. in PMI states) and applied to those tested with plans for 2% decrease per year.
(e) All those not tested are expected to be presumptively treated with an ACT.
(f) Non-adherence to negative tests planned for 9% in 2017 and decreasing 1% per year.
* ACT procurement is the responsibility of state governments; to date these commodities have been procured only in very small quantities and without adequate planning on the part of those governments. It is therefore impossible at this point to rely on GON procurement of ACTs to meet the need in the states. The MOUs that will be negotiated between state governments and USAID/Nigeria will propose increased GON procurement of these commodities.
** PMI and the Global Fund deliberately divided the states of Nigeria starting in 2018, ensuring support to state programs is more effective and eliminating duplication of effort between the donors. No other donor is working in malaria in focus states.
*** PMI anticipates a gap in the amount of ACTs procured; donor funding is insufficient to meet the full demand for this commodity in Nigeria. This gap analysis will be used as an advocacy tool to encourage state governments to procure ACTs.

Quantification of IAS for the treatment of severe malaria is estimated on the assumption that 5% of all malaria cases will be severe and—averaging the amount required for the different ages and treatment durations—that a case will require 5.5 ampules for a full treatment course. For 2019, the total need for IAS at public health facilities is estimated to be 2.6 million vials based on approximately 4% of 11.8 million confirmed malaria cases (472,000) being referred from the community or health facility in PMI-supported states.

Plans and justification

With FY 2018 funding, PMI will build on the progress to date in strengthening case management, through the further scale up of malaria diagnostic testing, appropriate treatment, and QA systems. PMI will continue to support the NMEP's malaria case management policy through provision of malaria commodities, case management training/refresher training, supportive supervision, and diagnostic QA/QC.

PMI supports national and state level malaria commodity quantification exercises to improve the accuracy of RDT and ACT forecasts. PMI expects the RDT need will continue to increase as case management implementation and iCCM expand. PMI will procure and distribute approximately 17 million RDTs and 12 million ACTs to help meet the projected need in PMI supported states. In addition, PMI will continue to procure microscopy supplies when necessary. Historically, the priority for commodity distribution was the health facilities where PMI had conducted training of health workers and was supporting on-the-job training and supervision. Other facilities received commodities based on availability and need, especially in support of the vision of the Nigerian MoH of at least one well-performing health facility per ward. Going forward, PMI will continue to work with other donors and the state governments to more effectively pool supplies to ensure that all facilities in PMI supported states will experience a smoother supply chain with fewer stockouts.

PMI will build on its experience and progress to date to further improve case management

practices. A core component of this will be the on-the-job training and supervision of health care providers to continue to improve capacity at the community, facility, and state levels. This ongoing support will strengthen diagnostic and treatment services at all levels of the health care system by identifying areas that require improvement and providing on-site feedback and technical advice.

PMI will use routine malaria data reported through the DHIS2 system to monitor case management performance at the health facility level (e.g. stockouts, percentage of malaria cases confirmed, over-prescription of ACTs, etc.). At the state level, PMI's implementing partners will assist LGAs in using HMIS to monitor health facility case management performance (confirmation rates, ACT treatments) to complement supportive supervision and direct efforts to where support is most needed. Based on performance, the routine quarterly supervision visits will be adjusted so that well-functioning health facilities would require fewer visits, and lower performing facilities might need visits more than quarterly.

PMI will continue to support the strengthening of QA for malaria diagnostics. This support will assist in the implementation of the Malaria Diagnostic External Quality Assurance Operational Guidelines that includes both microscopy and RDTs in PMI-supported states. This activity is closely linked with the on-the-job training and supervision of health care providers at the facility level. In-country QA lot testing also takes place on RDTs in use throughout the country. These QA activities are expected to build confidence in RDT results among health care providers.

With the 2015 NMIS showing persistently high prevalence of malaria parasitemia in children under five years of age in the North West Zone despite high levels of ITN ownership and use, PMI plans to add support to SMC efforts targeted at children under the age of five years beginning in 2018. PMI will build upon iCCM activities already supported and procure drugs recommended for SMC (SP plus AQ). Since ASAQ is one of Nigeria's first-line treatments, PMI has already started switching completely over to AL in the SMC targeted states. The procurement of ASAQ has already been markedly reduced nationally due to provider and patient preferences. PMI will also make adjustments at the state level for the slight increase in RDT and ACT needs during SMC for children presenting with fever. For FY 2018, PMI proposes to continue to cover 15% of the SMC-eligible children in the three Sahelian states it currently supports (Kebbi, Sokoto, and Zamfara). The estimated target is approximately 422,326 children between 3-59 months of age, receiving four doses of SP-AQ at monthly intervals over the 4-month malaria transmission season at a total estimated cost per child of $3.00.

The role of the private sector to increase access to malaria case management will be explored. PMI understands the fact that mission strategy for engaging the whole private sector is under development. Learning from the iCCM pilot in Ebonyi state, PMI will identify in a few states in the south of Nigeria, PPMVs who serve as the primary service provider in communities. These will be trained and supported to increase access to high quality malaria case management.

PMI will continue to support DTET to monitor efficacy of first-line antimalarial drugs including PCR correction and K-13 analysis.

PMI will support SBCC to increase patient awareness and demand for appropriate testing and treatment through media and community level activities. PMI will place a higher emphasis on SBCC targeted at health care providers to increase diagnostic testing and adherence to results and guidelines through activities directed at health facilities (see description in the SBCC section).

Proposed activities with FY 2018 funding: ($29,054,745)

1. *Procure RDTs and microscopy supplies:* Procure 17 million RDTs to fill gaps and help prevent stockouts of malaria diagnostic tests in the public sector in 11 PMI-supported states. *($5,440,000)*

2. *Procure ACTs:* Procure 12 million ACTs to fill gaps and help prevent stockouts of antimalarial medications in the public sector in 11 PMI-supported states. *($10,440,000)*

3. *Procure sulfadoxine/pyrimethamine plus amodiaquine (SP+AQ):* Procure 1,689,300 treatments of SP+AQ for SMC in several LGAs in the states of Kebbi, Sokoto, and Zamfara. *($850,000)*

4. *Strengthen malaria diagnosis, including QA/QC system:* Conduct training of trainers for malaria diagnostics QA; conduct EQA visits in 11 states; and support an additional state reference laboratory for malaria diagnostics QA/QC. *($300,000)*

5. *Build capacity, and strengthen service delivery for case management at public health facilities (including iCCM) in nine states:* Refresher training of health care workers in approximately 5,000 health facilities at all levels on malaria case management; training/refresher training of laboratory staff in malaria diagnosis (RDT and microscopy); training of trainers on diagnostics QA; support states to conduct supportive supervision and on-the-job capacity building; and providing basic tools and job aids for malaria case management.*($9,154,995)***.**

   Specifically, the activities to be conducted in each state will include:
   - Train/refresh the different categories of health workers in approximately 5,000 health facilities on case management in the public sector in nine PMI-supported states *($3,650,150)*.
   - Conduct on-the-job training and supportive supervision for staff in approximately 5,000 health facilities in nine PMI-supported states *($3,450,150)*.
   - Provide basic tools such as printed or online guidelines and job aids in the form of guideline summaries and wall charts for rapid reference on the job, for malaria case management in approximately 5,000 health facilities *($420,105)*.
   - Train and supervise CHWs in targeted LGAs in all aspects of malaria case management *($1,634,590)*.

6. *Build capacity, and strengthen service delivery for case management at public health*

facilities (including iCCM) in two states (Bauchi and Sokoto) where PMI expects to leverage funds from the integrated primary health care interventions mechanism): Refresher training of health care workers at all levels on malaria case management; training/refresher training of laboratory staff in malaria diagnosis (RDT and microscopy); trainer-of-trainers on diagnostics QA; support states to conduct supportive supervision and on-the-job capacity building; and providing basic tools and job aids for malaria case management. *($500,000*)

7. *SMC implementation:* Implementation of SMC in Kebbi and Zamfara States, including microplanning, training, drug administration, supervision, monitoring, and reporting. Costs for advocacy and creating demand for SMC are under SBCC section. *($951,750)*

8. *SMC implementation:* Implementation of SMC in Sokoto State, including microplanning, training, drug administration, supervision, monitoring, and reporting. Costs for advocacy and creating demand for SMC are under SBCC section.*($317,000)*

9. *Build case management capacity in the private sector:* Support private sector activities to expand appropriate case management in the private sector in up to two southern states. *($841,000)*

10. *DTET:* Support DTET in four sentinel sites at a cost of $60,000/site to monitor efficacy of first-line antimalarial drugs. This will include the K-13 analysis. *($240,000)*

11. *Technical assistance:* Two CDC technical visits to provide technical support for malaria diagnostics and QA. *($20,000)*

12. *SBCC:* Implementation of SBCC activities targeted at health care providers to increase diagnostic testing and adherence to results and guidelines as well as to improve health care provider adherence to case management guidelines through activities directed at health facilities increase patient awareness and demand for appropriate testing and treatment through media and community level activities. (*Budget under the SBCC section*).

b. Pharmaceutical management

NMEP/PMI objectives

The NMSP 2014-2020 objective is to ensure the timely availability of appropriate antimalarial medicines and commodities required for prevention and treatment of malaria in Nigeria wherever they are needed by 2018, through the following strategies:

1. Strengthen procurement-related processes.
2. Develop efficient distribution systems for antimalarial medicines and commodities (storage, transport distribution, and inventory management).

3. Strengthen logistics management.
4. Implement policies on QA and pharmacovigilance.
5. Operationalize and update where necessary existing policies for malaria case management in the private sector.
6. Increase access to antimalarial prevention and management commodities in the private sector.
7. Strengthen collaboration with the National Agency for Food and Drug Administration and Control (NAFDAC) to put in place regulatory requirements for distribution including storage and transportation of antimalarial products in the private sector.

Health commodities management in the public sector is weak and fragmented. There are multiple supply chains based on disease and donor support. Frequent stockouts of all commodities, including ACTs and RDTs, occurred at all levels, and negatively affect the quality of care given at public health facilities. NMEP and states programs recognize the chronic supply issues; hence pharmaceutical management is the fifth objective of the NMSP 2014-2020.

Commodities for management of malaria cases come from a various sources. They may be donated or procured at various levels of the government health system. Donors, the federal government, states, and LGAs all can procure ITNs, ACTs, SP, and RDTs. The states, LGAs, and individual health facilities can supplement donated and federal government-procured commodities by using revolving drug funds and/or revenues. Due to the multiple sources of malaria medicines in Nigeria, it is critical that the NAFDAC and federal and state ministries of health address issues surrounding quality of medicines to combat counterfeit and substandard quality drugs. It also requires significant coordination across the supply channels especially at the state level to ensure that there is sufficient product to meet malaria needs but not too much, which may result in expiries.

Distribution systems of commodities vary. Historically, essential medicines procured by donors and government have flowed either through the Federal Medical Stores or the state central medical store (CMS). States often have difficulties delivering commodities to the facility level. The distribution of Global Fund- and other donor-procured ACTs experiences challenges at times, resulting in stockouts in some health facilities. This has led facilities to acquire medicines from local pharmacies that may not meet the required quality. More than half of all Nigerians use the private sector and local pharmacies for health care.

In order to address some of these challenges, Nigeria, in collaboration with partners, is rolling out a new logistic system (warehousing and transportation) project, Nigeria Supply Chain Integration Project (NSCIP), under the National Product Supply Chain Management Program (NPSCMP), Food and Drug Services Department of FMoH. The new system will have federal- and donor-procured commodities flow from two national warehouses (Abuja and Lagos) to regional stores and then directly from the regional stores to health facilities. The system bypass state warehouses that tend to have poor storage conditions and limited inventory management capacity. The management of the warehouses and distribution will be outsourced to private logistics providers, which bring expertise in operating a pharmaceutical grade supply chain. The

NSCIP strategy was endorsed by the national health council and efforts are underway to get state level approval as well. The NSCIP has the support of the NMEP, as well as the NACA, PEPFAR, and other development partners in Nigeria including significant support from Global Fund. The FMOH views the integrated system as a midterm solution. As states procure malaria and other health commodities to meet their population's needs and provide pharmaceutical grade warehousing, they will not need to participate in NSCIP.

The NAFDAC is responsible for the registration of medicines. The agency is also responsible for QC of antimalarials at the point of entry for internationally procured drugs or at the factory gate for locally produced ones. Although Nigeria has almost 40 registered ACTs that are manufactured in Nigeria, to date, there is no producer that is WHO-prequalified. Additionally, products from nonqualified foreign manufacturers, as well as artemisinin monotherapies, SP, and chloroquine exist in the private sector. Given the scope and size of the private sector market and its common use by many Nigerians, NAFDAC has a difficult task providing quality control measures in this sector. NAFDAC and the NMEP collaborate to conduct post-marketing surveillance of malaria medicines. Before the accreditation of the NAFDAC laboratories, there was no WHO prequalified QC laboratory in Nigeria, so the NMEP had to send Global Fund-procured medicines to outside laboratories for testing.

Progress since PMI was launched

Despite the numerous challenges, PMI funding has helped the GoN establish a malaria commodities logistics system for distribution of malaria commodities that include ACTs, RDTs, SP, IAS, and ITNs. The support has included quantification and procurement planning, procurement and storage of commodities, distribution to states and health facilities or communities in the case of ITNs for mass campaigns, and EUV surveys to monitor stock levels and decrease the risk of stockouts, excesses, and leakage.

PMI funding has supported the establishment of a logistics management coordination unit (LMCU) in the 11 PMI-supported states. The LMCU leads the implementation of the Logistics Management Information System (LMIS). The LMIS generates data for quantification and procurement planning, and effective management of malaria commodities to prevent excesses and expiries. PMI funding has also been used to train health workers on the LMIS and the malaria commodities logistics system. PMI does not support every health facility in every state, thus, the LMIS has not been rolled out to every facility particularly at health facilities without any donor support. The system is primarily paper-based, with continued challenges in timely and quality reporting and use of the data for decision-making.

PMI is part of the Development Partners Group for Health (DPGH) supply chain TWG at the national level aimed at enhancing effective coordination of supply chain activities in the country. PMI supported and participated in the national forecast for malaria commodities 2015-2020. The forecast identified the malaria commodities needs and gaps for each state and the national summaries. PMI has assisted the national and state malaria elimination programs on pharmaceutical supply management working groups at the national level and in all the 11 PMI-supported states. As a result, state-specific quantifications and gap analyses have been

developed and used to inform commodity planning by partners and as advocacy tools for resource mobilization. All PMI-supported states currently report consumption data for decision-making. Such data help state and national malaria control staff to conduct more accurate quantification (forecast and supply planning), and are used to advocate with local governments for support with commodities procurement and management.

There is no public sector pharmaceutically-compliant storage facility in any of the PMI supported states. Many PMI-supported states lack sufficient storage space and, in some cases, have no warehouses capable of storing malaria commodities according to standard pharmaceutical guidelines (i.e., ample space, acceptable storage conditions and standard storage procedures, explicit QA mechanisms, and adequate product security). Despite these challenges, PMI-supported facilities have been appropriately stocked, including through *ad hoc* redistribution of stocks between states, as needed. PMI has leased on average 165 pallet positions in a pharmaceutically-compliant store in Abuja. Some state governments have provided storage space for malaria commodities, but of all the PMI-supported states, only Cross River and Sokoto have sections of stores that are pharmaceutically-compliant and managed by a private warehouse operator.

In four states— Bauchi, Ebonyi, Sokoto, and Zamfara—PMI has supported distribution of malaria commodities using a direct delivery and information capture (DDIC) system. This is a direct delivery of commodities from the state CMS to facilities via trucks. At the time of delivery, a trained State MoH staff member on the truck checks the facility's stock, determines need using an inventory control software package, and immediately provides the needed commodities. This model is designed to be an informed push or vendor-managed inventory system that is based on regular data collection, bimonthly distribution, and real-time reporting. The goal is to enhance effective distribution of commodities with real-time logistics data collection for decision-making. Importantly, DDIC frees health facilities' staff time to concentrate on their core clinical duties, and has reduced stockout rates below 5% for commodities in full supply. The remaining seven PMI-supported states have operated a pull inventory control system where health facilities are resupplied after submission of logistics data using private logistics providers.

PMI has also supported the strengthening of QA/QC of antimalarials. A gap analysis of the QA/QC of medicines was conducted to help support NAFDAC and the NMEP in developing a QA/QC policy for antimalarial medicines and diagnostics. The QA/QC policy document, stipulating the roles and responsibilities of the various government procurement and regulatory agencies, has been finalized and approved by the national council on health. PMI supported the ISO 17025 accreditation of the Central Quality Control Laboratory of NAFDAC in Oshodi, Lagos in 2015, Agulu zonal laboratory in 2016, and Kaduna zonal laboratory in 2017. These labs manage the QA/QC testing for medicines produced by Nigerian manufacturers and those imported into the country. In addition, PMI supported the procurement of basic equipment including Minilabs® and consumables for monitoring quality of antimalarial medicines. PMI supported NAFDAC to carry out a post-marketing surveillance of malaria medicines. Incidences of substandard and fake malaria medicines are reducing in all the political zones of the country.

PMI supported the establishment and operations of the Logistics Management Coordination Units (LMCUs) in all 11 PMI-supported states. The setup of LMCUs within the Directorate of Pharmaceutical Services, in the state MoH is at various levels of operationalization. The LMCU is comprised of state employees and logistics management advisors from the implementing partners in the states. Employees of the state lead the LMCUs. The LMCUs carry out all logistics activities (forecasting, supply planning, budgeting, pipeline monitoring, monitoring and supportive supervision, distribution plans and activities, inventory management, and stock status analysis) within the state. They harmonize and foster collaborations across the health commodities supply chain systems in the states, and build capacity of local government and health facilities personnel in supply chain and logistics management. LMCUs have remained integral to reinforce and improve supply chain management best practices at the health facility level. NSCIP is building on this capacity, with the LMCUs responsible for developing distribution plans and management of the distribution contracts from the regional warehouses to the facilities in their states. Global Fund is also providing support to the LMCUs as part of its support to NSCIP. PMI's support to the NMEP, states and NAFDAC has improved the availability of quality assured ACTs and reduced the availability of chloroquine as demonstrated by data from ACTWatch (Figures 17 and 18).

Figure 17: Availability of quality assured (QA) ACT

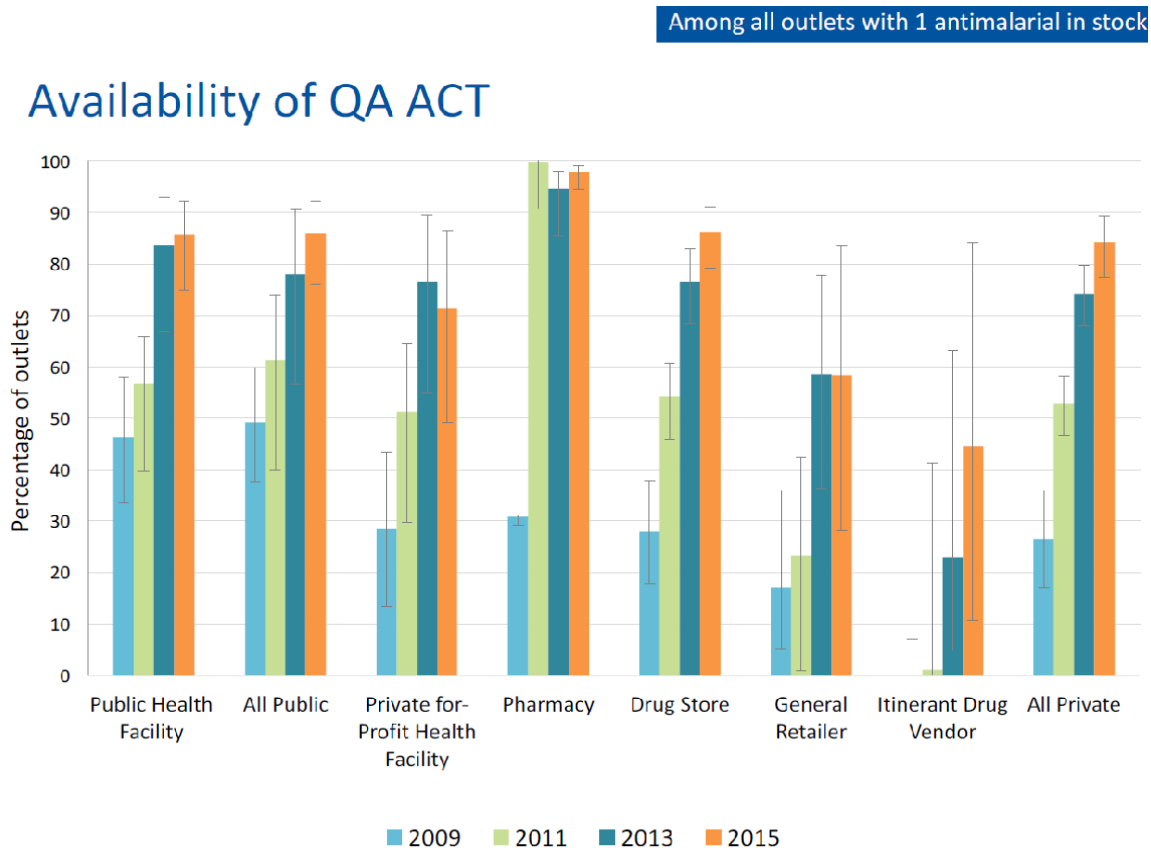
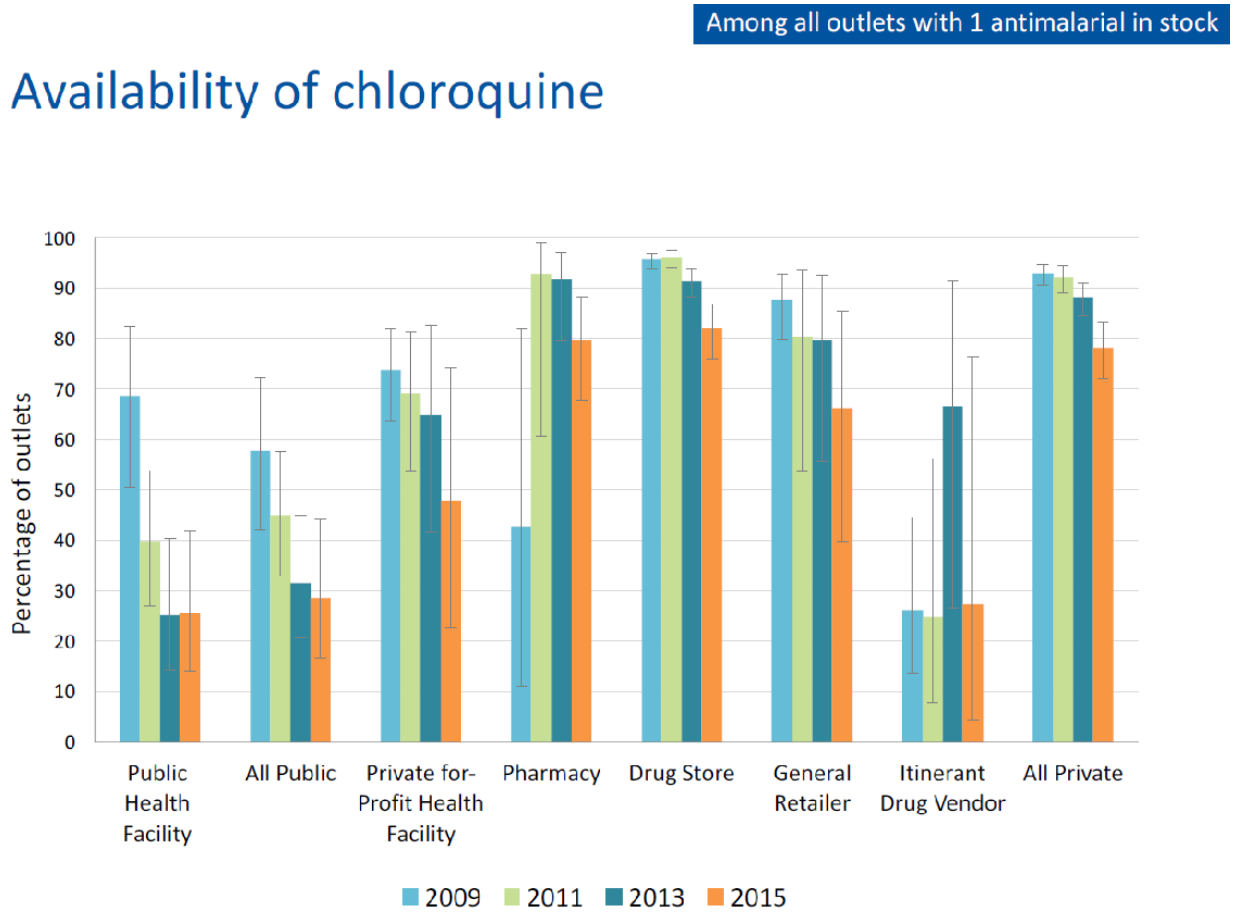


Figure 18: Availability of Choloroquine



Note: Availability of chloroquine is decreasing as the program intends, but its continued availability is still a problem. The primary reason patients report choosing chloroquine over more suitable treatments (ACTs) is due to cost and availability in the private/informal sector. USAID/Nigeria is working to improve patients' knowledge and practices around malaria treatment through a large-scale social and behavior change activity that will be implemented in our focus states.

Progress during the past 12-18 months

PMI FY 2015 funding contributed to strengthening the malaria commodities logistics system and the LMIS through training and tools for data collection. It supported two rounds of EUV surveys in 110 health facilities in 11 PMI-supported states. The most recent EUV survey in December 2016 shows that of those surveyed, 54% of health facility staff were trained in stock management. Through these trainings, PMI expects a cascading effect in which non-PMI supported health facilities will experience indirect benefits from this capacity building. The survey showed stockout rates of 5% for RDTs and 16% for SP; 98% of facilities had some form of ACT available for treatment of malaria.

PMI funding supported the distribution of ACTs, RDTs, and SP to between 3574 to 3722

health facilities, including 345 Global Fund-supported health facilities, every two months in the 11 PMI-supported states. The numbers of supported health facilities varies with each re-supply cycle because of inactive health facilities (health facilities that have no trained health personnel to render services- staff transferred or retired). PMI has taken over the distribution of malaria commodities to all health facilities previously supported by the Global Fund in Ebonyi and Nasarawa states. In FY 2016, PMI supported the distribution of more than 15 million ACTs, 9 million RDTs, 3 million SP treatments, 4 million nets, and 40,000 vials of IAS.

Plans and justification

With the numerous challenges of disjointed procurement, supply, and distribution system, PMI remains committed to strengthening pharmaceutical and commodity management systems at the state, health facility, and community levels. To align with the new logistics system under the NSCIP, PMI will begin transitioning its last mile distribution system support to the integrated system. PMI will be able to leverage warehousing and transportation costs with other partners as the system becomes operational. The NSCIP will take time to roll out. Two Regional warehouses are already in operation so the integration will be phased beginning in FY 2018. It is anticipated that all the regional warehouses will be operational by 2019. As the new system bypasses state warehouses, on the focus will shift from strengthening warehousing at the state level to strengthening the capacity of the state LMCUs and supporting the warehousing and distribution costs.

LMCUs will remain integral to reinforce and improve supply chain management best practices. Within the NSCIP, the LMCUs will continue to carry out logistics activities (forecasting, supply plan, budgeting, pipeline monitoring, monitoring and supportive supervision, distribution plans, and stock status analysis) within the state. They will build capacity of local government and health facilities personnel in supply chain and logistics management.

FY 2018 funds will be used to support states to move from paper-based to electronic databases on the Navision platform for the integrated LMIS system for Nigeria. The system will link with the warehouse management software at the national and regional warehouses to provide end-to-end visibility of malaria products in the system. PMI will further integrate the LMIS and DHIS2 for better data for decision-making and forecasting needs at the facility level.

PMI funding will also be used to increase the proportion of health facilities benefiting from PMI support within the 11 PMI-supported states given Global Fund withdrawal from PMI states in 2018. It is anticipated that in 2018 PMI will support distribution to about 2,000 additional facilities that had previously received support from Global Fund. For now this increased number of facilities is a target, and in the event of an expansion not all facilities will necessarily receive the same package of services. With the transition to NSCIP where costs are shared across multiple disease groups and donors, it is anticipated that the expansion will be possible with the same level of funding as when PMI alone covered the costs of delivering to its supported facilities.

PMI will continue building the capacity of the government to conduct logistics monitoring and supervisory visits for post-distribution verification. EUV surveys will continue to be carried out, but will be integrated into the routine monitoring and supervision visits (MSV) led by the state LMCUs. PMI funding will continue to support training of facility staff on the LMIS and build the capacity of the state LMCUs to manage, analyze, and use the data. In this way, facilities and states will improve their ability to generate reliable data on consumption, supply, needs, and distribution of pharmaceuticals and commodities.

Proposed activities with FY 2018 funding: ($4,800,000)

1. *Strengthen the pharmaceutical and commodity management system* by:
    a. Strengthening the LMIS for better forecasting and management;
    b. Conduct EUVs in PMI-supported states through routine monitoring and supervision visits;
    c. Improving the capacity of LMCU's to oversee the distribution of pharmaceuticals, RDTs, and supporting the NSCIP distribution costs to mitigate the risk of stockouts of malaria commodities; and
    d. Supporting the storage of malaria commodities in NSCIP national and regional warehouses. *($4,000,000)*

2. *Provide support to strengthen NAFDAC's capacity:* Strengthen NAFDAC's capacity for drug QC including the procurement of necessary equipment and supplies. Support will include expanding the use of Minilabs® to perform key tests for drug quality in the field. Activities include post-market surveillance in priority states to detect counterfeit antimalarial drugs and use of monotherapies in the public and private sectors. The support will also include technical assistance for maintenance of the accredited QC laboratories at Agulu, Kaduna, and Lagos. *($800,000)*

4. Health system strengthening and capacity building

PMI supports a broad array of health system strengthening activities that cut across intervention areas, such as strengthening human capacity development through training of health workers, improving supply chain management, HMIS strengthening, drug quality monitoring, and capacity building for NMEP, states, and LGAs. Currently, the capacity building activities are limited to only the public sector and the private not-for-profit health facilities. PMI is helping to build entomologic capacity by supporting entomology trainings and implementation of entomology monitoring system, including insecticide resistance monitoring.

NMEP/PMI objectives

The main objective for health system strengthening under the NMSP 2014-2020 is captured under the program management objective. The overall objective is strengthening governance and coordination of stakeholders for effective program implementation. The six strategies for accomplishing this objective include the following:

1. Build capacity at national, state, and LGA levels to deliver malaria control/elimination interventions
2. Strengthen program coordination at national and sub-national levels
3. Improve unified annual operational planning
4. Strengthen malaria resource mobilization and financial management mechanisms
5. Develop a comprehensive strategy for private sector engagement
6. Strengthen timely reporting of malaria control activities at all levels and promote dissemination of all reports to relevant stakeholders

To support these strategies, PMI, WHO, and the Global Fund provide assistance to the national, state, and LGA malaria programs; strengthen program management; and provide operational and technical guidance through training, supervision, and coordination meetings. The DfID-funded SuNMaP project provided day-to-day capacity building to NMEP and ten states; however, the program ended in March 2016. DfID is currently working on a follow on project expected to be awarded later in 2017.

PMI and other development partners participate in various national-level technical and program management working groups, which develop policy, strategic documents, implementation guidelines, SOPs, as well as provide operational and scientific guidance. Because Nigeria is operating a federal system, PMI and other partners have paid special attention to supporting key components of the health systems at the state and LGA levels but with special emphasis on strengthening malaria program management, technical expertise, and SM&E capacity.

Progress since PMI was launched

From its inception in Nigeria, PMI has supported a variety of capacity building activities to improve delivery of malaria interventions through health facilities and, more recently through community level PPMVs and CHWs. Specifically, PMI has supported short-term trainings and technical assistance to the NMEP; trained health workers at various service delivery points and the LGA in supported states; and engaged in improving routine monitoring and data collection at state and LGA levels. The training of health workers includes modules on malaria diagnosis using RDTs and microscopy, treatment of uncomplicated and severe malaria, prevention of MIP, SBCC, program management, and SM&E, including HMIS/DHIS2 and surveillance. Capacity building includes providing monitoring, supportive supervision, and mentorship from NMEP to the states, from the states to the LGAs, from LGAs to the health facilities, from the health facilities to the community. The program management capacity building includes providing mentorship and supportive supervision within the different service delivery points in the health facility. Since 2011, PMI has supported training of 2,897 health facility in-charges in program management. PMI's support also included production and distribution of job aids and SOPs to health facilities to enable quick and easy access to information to improve quality of service delivery.

In the 11 PMI-supported states, PMI has strengthened the management and planning for the SMEP staff. PMI has supported SMEP staff to develop state malaria implementation guidelines, annual costed work plans, and training and supervision plans. At the national level, PMI has

supported NMEP to review malaria control policies and strategic plans, to develop implementation guidelines, to design systems for monitoring, supportive supervision, and training, and to develop the capacity for commodity forecasting, quantification, procurement planning, and commodity logistics management. PMI has worked with other development partners to develop capacities for data collection through routine health information systems and data use.

PMI has faced enormous challenges in supporting capacity building. Program coordination at all levels remains difficult given overlapping partner support and gaps in some states. State and LGA-level capacity in management and technical oversight varies considerably among the PMI-supported states. Health workers reassignments and health facility workers strikes have occurred frequently even at the national level. Commodity stockouts impede health workers' ability to implement the training they have received, and to provide critical services. In 2015, the several national and state wide health worker strike actions that lasted several months led to closure of health facilities, expiration of health commodities, and lack of reporting to state levels.

Using the Office of the U.S. Global AIDS Coordinator funds, PMI had supported strengthening of the NMEP's management capacity through assigning an SM&E specialist and logistician at NMEP, and SM&E officers in six PMI-supported states. The long-term technical assistance provider for logistics has developed the capacity of NMEP PSM to forecast and quantify commodities for Global Fund. They also developed procedures for third party logistics for distribution of Global Fund procured commodities from the Lagos national warehouse to the states; and from the states to the service delivery points. The long-term technical assistance providers have participated in developing the concept papers for the Global Fund malaria grant.

Through its Abuja-based resident advisors, local senior program experts and partners, PMI has provided significant on-the-job management and technical support to all government levels. In addition to supporting the working groups, the PMI team has worked closely with the NMEP to develop Global Fund concept notes, provide technical guidance for all PMI-supported malaria interventions, advise the NMEP on disseminating such guidance to the state and local levels, and develop the protocols for PMI-funded surveys such as the NMIS, and OR studies.

Since its inception in 2008, the Nigeria Field Epidemiology and Laboratory Training Program (NFELTP) has recruited 9 successive cohorts of trainees (residents) for a total of 374. The latest cohort was recruited in March 2017 with a total of 56 residents. Eight cohorts have successfully completed the two-year training. Of the 374 residents that have gone through the program 67 (18%) have been supported through PMI funding. All 37 malaria residents currently in training have been posted to malaria programs in either the NMEP or states for their current or upcoming field assignments.

The NFELTP has focused on providing experiential epidemiological training. The two-year training focuses on epidemiological investigations, outbreak investigations, and SM&E of malaria. Residents have engaged in malaria related activities including support for data analysis, research, HMIS, and surveillance.

In September 2013, a NFELTP scientific seminar was held in Abuja, entitled "Strengthening NFELTP Malaria-Related Research," in order to develop malaria-related research projects to address identified gaps in NMEP research needs. Participants created an inventory of relevant research projects that they could implement and drafted research proposals on those topics. These were developed in line with the prioritized NMEP OR list. A second NFELTP scientific seminar was held at the end of May 2016. In July 2015 a hands-on writing skills workshop was held to support residents develop their thesis into publishable manuscripts. So far, eight of the manuscripts were completed and submitted for publication in peer-reviewed journals.

Graduates of the program are now supporting NMEP (2 graduates), university (1), state commissioner (1), state malaria coordinators (1), while 13 are state epidemiologists. To date, NFELTP trainees have worked on 23 research projects that include case management (5), MIP (7), ITNs/IRS (7), and laboratory/diagnostics (4). Currently, 10 Cohort 7 residents have been supported to develop full research proposals on malaria. Thirteen Cohort 8 residents are being supported to develop draft research proposals for university thesis on malaria.

The NSTOP/Malaria Frontline project began implementation in 2016 to strengthen Nigeria's public health capacity to reduce malaria and to prevent, detect, and respond to possible increases in malaria transmission in Zamfara and Kano states. As collaboration among NMEP, PMI, NFELTP and other partners, the project aims to strengthen the capacity at the health facility, LGA, and state levels to analyze and use malaria surveillance data for local and state-level decision making to help optimize malaria prevention and case management interventions. This collaborative effort uses a modular approach of classroom training followed by field-based practical exercises (one exercise and presentation following each classroom training – 5 total) for 34 LGA-level Frontline and MoH malaria workers in 34 LGAs (14 in Zamfara and 20 in Kano), supportive supervision for approximately 2000 health facility staff across both states, and dissemination of data and results to key malaria stakeholders at the state level.

Progress during the past 12-18 months

PMI has supported refresher trainings, supportive supervisions, provision of job aids, and other activities to improve delivery of malaria interventions in primary health care and secondary health facilities in 11 PMI-supported states.

In the last 18 months, the NFELTP program deployed residents at NMEP, states, and PMI implementing partners to serve in various capacities. They supported case management units in Ebonyi and Oyo States; assisted in evaluation of surveillance systems for NMEP and Benue, Ondo, and Oyo States; supported analysis of routine and survey data for decision making for NMEP and Benue, Ondo, and Oyo States; analysis of rapid health facility assessment data for Kogi State; and, participated in cascade training on harmonized HMIS tools in Kogi, Oyo, and Zamfara States. PMI is supporting NFELTP to design a 3-month malaria short course that focuses on building capacity of malaria program managers and other relevant eligible officers to better understand malaria control and the requirement for effective supervision, implementation, monitoring and evaluation. The course incorporates malariology, epidemiology, training on

communication, program management, budgeting operation planning, training on use of Microsoft Office® Suites and Epi-info®.

PMI supported NSTOP in finalizing a protocol for the baseline survey in Kano and Zamfara and final report dissemination activities across malaria stakeholders. To ensure sustainability of data validation activities in Zamfara, PMI has assisted in the planning of monthly data validation meetings while DfID has provided support in Kano. To further enhance data analysis and use, PMI has supported the Frontline Project in the development of a data management training module and DHIS2 dashboard to be used at the State and National level for tracking of key malaria data elements and indicators.

The project has developed a health facility assessment protocol including geo-mapping with a GPS application in project areas which will be used to help update the Master Facility List established by the FMoH in 2013. This list assigned unique identifiers to health facilities to overcome identification issues and support health facility management; however, the list has not been updated since it was established. As a result, there have been reports of duplication of health facility names in DHIS2 by malaria program officers and users of the DHIS2 platform, listing of facilities that are no longer functional leading to serious challenges in correctly identifying health facilities, accurately analyzing health facility data submitted into DHIS2 and efficiencies in service delivery. Additionally, assessing the functionality of health facilities will give an accurate picture of the magnitude of health facility needs, resources redistribution and maintenance of integrity of health information system architecture. PMI is supporting this activity and collaborating with the Frontline Project to facilitate FMoH updating the facility list and DHIS2 platform.

Plans and justification

Given Nigeria's large population, decentralized health systems, and multiple donors in the malaria space, the NMEP must coordinate its own activities and those of partners to ensure efficiency, consistency and high program impact. Although Nigeria is operating a decentralized health system, the NMEP has retained the functions of policy-setting; developing strategies, implementation guidelines, and training materials; standardizing training and SBCC materials; and training health workers. Responding to emergencies such as malaria outbreaks also remains a core responsibility of the NMEP. Given these responsibilities, in addition to coordinating all malaria control activities in the country, strengthening the NMEP's technical and management capacity continues to remain a top priority for PMI. PMI investment will include supporting the national level to develop policy and strategic documents, revising training and SBCC guidelines, developing standard operating procedures, conducting monitoring visits, and supporting coordination meetings, and trainings.

At the same time, the states and LGAs are the operational levels of the malaria elimination program in Nigeria where implementation and service delivery happens. The most important program outcomes occur at the state level, making strengthening of state and LGA-level management and technical capacity absolutely essential to any programmatic success. Consequently, PMI will continue such support at all three levels—national, state, and LGA—to

effectively and efficiently plan, implement, coordinate, monitor, and evaluate malaria control program interventions. At the state level, PMI will support malaria coordination at state and LGA level, training of health workers, supportive supervision, and data validation and use meetings. A key component of this work will be using the routine DHIS2 data collected from the state health facilities to guide programmatic decision-making in addition to routine indicator reporting. Capitalizing on this opportunity will play a major role in PMI's ability to improve service provision in its focus states.

Table 15: Health Systems Strengthening Activities

HSS Building Block	Technical Area	Description of Activity
Health Services	Case Management	● Expand training/refresher training of health workers in malaria case management to more health facilities in each state. ● Strengthen the capacity for QA and quality control for malaria diagnostic services through training and supervision. ● Strengthen malaria policy through support for Drug Therapeutic Efficacy Testing studies in five sites. ● Improve service quality for malaria diagnosis in the private sector.
Health Workforce	Prevention of MIP	● Training of health workers in prevention of MIP and new IPTp policy. ● Scale up the implementation of IPTp. ● Strengthening the capacity for delivery of IPTp DOT and proper recording of IPTp and ITNs in HMIS register. ● Develop capacity for using data to monitor IPTp coverage and dropout rates for IPTp2and IPTp3.
Health Information	Health Systems Strengthening	● Build, through training and technical assistance, host country managerial and leadership capacity for effective malaria control. ● Support training of NMEP and SMEP staff on M&E, data analysis, reporting, and use. ● Support for training of epidemiologists under the NFELTP program.
	M&E	● Strengthen disease surveillance systems to improve decision-making, planning, forecasting and program management. ● Develop capacities for data analysis and use of data for decision making.
Essential Medical Products, Vaccines, and Technologies	Operational Research	● Develop capacities for identifying operational research questions, writing concept papers, developing protocols, and writing manuscripts.
Health Finance	Case Management, MIP, and ITNs	● Strengthen NMEP and state capacities for forecasting and quantification, procurement planning, and storage of malaria commodities. ● Provide technical assistance for developing LMCUs and use of

		LMIS for management of stocks. ● Reinforce capacities for stores management, including record keeping. ● Develop the capacity for management of electronic data base at state ware house and electronic LMIS.
Leadership and Governance	Health Systems Strengthening	● Provide technical assistance to leverage financial contributions and services from private sector partners (i.e. extractive industries) for malaria prevention and control. ● Support NMEP and states to participate in national and regional forums with private sector and work with private sector health alliances.

Proposed activities with FY 2018 funding: ($1,600,000)

1. *Strengthen technical capacity of NMEP.* Support NMEP's role as the lead coordination body through meeting support, monitoring support, and training. Support will include NMEP technical assistance to states. *($300,000)*
2. *Support for capacity building to the states and LGAs.* Strengthen the capacity for planning, management, and delivery of malaria interventions at state and LGA levels. The capacity building under HSS is targeting the top-level and midlevel managers at the state and LGA, as well as the professional and regulatory bodies. The capacity building interventions will include pre-service training, supportive supervision, and SM&E capacity of state and LGA health workers. The capacity building activities will be extended to the medical, laboratory, pharmaceutical, nursing/midwifery, and PPMV professional regulatory bodies and associations, and will include providing MIP and case management guidelines and SOPs. *($800,000)*
3. *Support for the NFELTP:* Support training for ten NMEP and SMEP personnel for the two-year NFELTP course. The cost of training per trainee $50,000/year. *($500,000)*

5. Social and behavior change communication

NMEP/PMI objectives

Social and behavior change communication (SBCC) is a core component of the NMSP 2014-2020 and outlines the NMEP's priorities for this period. At the NMEP, the SBCC strategy is managed by the ACSM branch. The ACSM branch serves as the secretariat for the ACSM subcommittee which consists of Roll Back Malaria partners, including PMI and the ACSM branch of the NMEP. The subcommittee supports the ACSM branch of the NMEP to coordinate and provide technical oversight to SBCC activities in malaria at the national and state level.. In PMI focus states, the state malaria focal persons are supported by state-level ACSM technical committees, which were established with PMI support.

The NMEP ACSM strategy aims to maintain high coverage of malaria prevention and treatment practices, increase demand for these services, improve use and delivery of malaria control

interventions, enhance political will and an enabling environment for malaria control activities, and improve ACSM coordination at national, state, and local government levels.

The NMEP ACSM objective and target is to provide adequate information to all Nigerians such that at least 80% of the populace habitually takes appropriate malaria preventive and treatment measures as necessary by 2020.

ACSM Strategies:
1. Maintain high knowledge (over 94% awareness) of malaria prevention and treatment practices.
2. Scale up demand for, and use of malaria prevention and management services.
3. Enhance political will and enabling environment for malaria control/elimination activities.
4. Scale up facilities-based dissemination of appropriate information for malaria prevention and management practices.
5. Improve ACSM coordination at all levels.

ACSM Targets:
- To reach 100% of Nigerians aged five years and above with sustained information, education, and communication about prevention and management of malaria by 2020.
- To advocate to at least 80% of targeted political leaders, policy-makers and the private sector leaders for adequate, timely, and sustained funding of malaria control activities by 2020.
- To ensure that at least 80% of individuals visiting health facilities receive information for malaria prevention and management by 2020.
- To ensure that at least 80% of individuals visiting health facilities receive information at the community level (schools, community and faith-based organizations, etc.) on malaria prevention and management by 2020.
- To set up functional ACSM core groups in all the states and the Federal Capital Territory by 2016.
- To ensure that 80% of pregnant women and children under five years of age use ITNs by 2018.

Progress since PMI was launched

Since its inception in 2011, PMI/Nigeria has supported a variety of SBCC activities aimed at increasing demand and uptake of key interventions and strengthening the capacity of the ACSM branch of the NMEP. In 2014, the PMI SBCC program was reviewed to strategically focus on segmented target audiences, channels, and specific behavioral goals. The program developed a results framework that provided a defined strategy for monitoring and tracking of implementation and outcomes. PMI consolidated all SBCC interventions into one mechanism. This approach provided cross-cutting SBCC interventions to complement malaria prevention and case management interventions.

In the 11 PMI-supported states, SBCC activities were implemented through various channels including mass and mid media, community groups and interpersonal activities to specifically,

motivate population-based positive behaviors relevant for malaria control. These largely focused on ITN use and care, improving ANC attendance, and instilling prompt case management-seeking behavior. All 11 PMI-supported states benefitted from mass and mid media activities, but only five (Akwa Ibom, Benue, Kebbi, Nasarawa, and Zamfara) states benefitted from complementary community based interpersonal activities.

Global Fund investments in SBCC rely heavily on community mobilization as a channel to increase ITN use during the post-campaign period. In the nine states where Global Fund overlaps with PMI investment, the community level activities occur in separate LGAs and communities. This strategy allows more communities to be reached with SBCC activities, thereby increasing the scale and coverage of community mobilization. The NMEP partners including PMI, through the ACSM subcommittee, ensure that all SBCC investments are coordinated to avoid duplication of efforts in states where activities overlap. This is done annually by ensuring that all NMEP partners produce maps of partner-level SBCC activities, and then the NMEP develops a national map of all activities with state and LGA level details.

Mass media

A National "Malaria-Free" Nigeria campaign was launched in 2014 and was designed to respond to the results of the 2010 NMIS survey which showed that low perception of malaria risk and poor practices related to malaria are common in Nigeria. The mass media campaign broadly employed mass media communication channels (television and radio) to create general awareness of malaria, promote awareness of the burden by raising the perception of risk of infection. The campaign reinforced key behavior change messages for prevention and treatment including sleeping inside a mosquito net every night; promptly testing all fevers with RDTs; taking an ACT if a malaria test is positive; and urging women to attend ANC centers during pregnancy. According to a June 2017 Omnibus survey, approximately 8.5 million people were reached through this campaign across the 11 PMI-supported states. This survey, whose data sets are currently being analysed, will provide additional data, including intermediate outcome data. While the Omnibus survey does not capture information on non-behavioral intermediate outcomes such as self-efficacy, response efficacy, risk, severity, etc., the PMI team will work with the new SBCC project to ensure it is captured and monitored on a routine basis.

Community mobilization and interpersonal communication

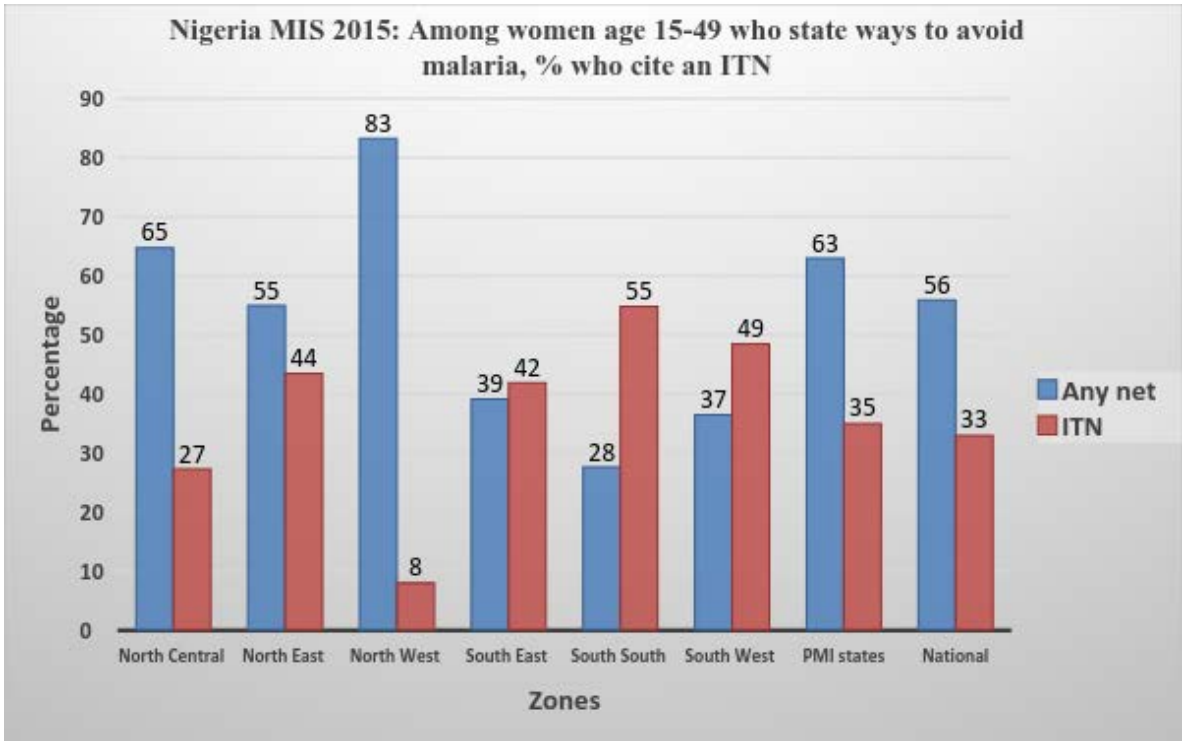
PMI supported mass/mid media campaigns are reinforced at the community level with IPC through volunteers to motivate, raise awareness, and encourage positive care seeking and prevention behaviors. PMI's community intervention strategy has used different structures to facilitate IPC sessions through household visits, compound meetings and community dialogues with emphasis placed on community-focused sessions (rather than on individual sessions) to increase coverage. Trained volunteers used flip-cards to keep messaging consistent and provide visual aids to reinforce messages in the "Malaria-Free" campaign. IPC is also used to address health worker behaviors (e.g., compliance with test results) and works to increase the frequency and quality of information provided by facility-based staff and CHWs to clients.

ITN campaign support

PMI implemented specific SBCC activities to improve ITN uptake, use and care behaviors in three focus PMI-supported states (Benue, Oyo and Kogi) that implemented ITN mass campaigns. State-wide mass media messages were aired through radio channels; communities were mobilized by using Town Announcers (individuals whose role in the community was to relay messages to the people), traditional and religious leaders. SBCC activities continued for a period of six weeks post-campaign through house-to-house visits in communities identified as having low hanging rates from the post campaign end-process evaluation.

According to the 2015 NMIS, 36% of women surveyed had heard a message about malaria in the previous six weeks to the survey. Three common sources of messages were radio (70%), television (32%) and community workers (17%). However, only three percent of respondents heard malaria messages from a church or mosque. Seeing or hearing a message on malaria was associated with education level and higher wealth quintiles. The 2015 NMIS indicates that knowledge among women on "any net" use to prevent malaria was higher in the north than the south (Figure 19).

Figure 19: Among Women Age 15-49 who State Ways to Avoid Malaria, % who Cite an ITN (Source: NMIS 2015)



Capacity building for national and state malaria programs

PMI provided support to update the NMEP ACSM guide to reflect current SBCC priorities, and to guide states in planning and implementing SBCC programs in line with the NMSP 2014-2020. Nine of 11 PMI-supported states (except Bauchi and Sokoto) have constituted SMEP ACSM sub-committees. All 9 states have also adopted/adapted the national ACSM strategy as a basis

for state-level operations. In the remaining two states, Bauchi and Sokoto, PMI will also be supporting NMCP to ensure that these SMEP ACSM sub-committees are constituted and are functional. This effort will be supported by integrated health project to be implemented by the Mission in these states. PMI continued to support quarterly meetings of the state-level ACSM committees and Ward Development Committees to improve the quality and sustenance of these meetings as well as of SBCC activities in communities. PMI has supported the NMEP ACSM branch to develop an annual advocacy plan that provides more methodology and structure to advocacy activities in the country. PMI funds were used to develop the SBCC capacities of state and national program staff through short-term training and technical assistance.

Progress during the past 12-18 months

PMI FY 2015 funds were used to continue support of the 'Malaria-Free Nigeria' campaign that was launched in 2014. To maximize and deepen traction gained through investments in national-level campaign, emphasis was put on state-level implementation. Centrally designed centerpiece radio and TV magazine programs, created to raise general awareness of malaria, sensitize the public on the benefits of seeking and/or demanding a confirmatory test for fever and reinforce key behavior change messages, were translated into major local Nigerian languages and aired through selected radio and TV stations across all 11 PMI-supported states. Through creative partnerships with local radio stations, PMI started to invest in the capacity of local radio producers to design and produce 21 state-specific episodes of weekly radio magazine programs to address malaria prevention and treatment seeking behaviors.

Using FY 16 funds, PMI supported SBCC interventions to improve health worker behavior in the use of, trust in and compliance with malaria Rapid Diagnostic Test (RDT) results in line with the national 3T (Test, Treat and Track) approach to malaria case management.

The campaign tagged "Not every fever is Malaria" was implemented in three PMI-supported states (Kebbi, Benue and Akwa Ibom). The communication objectives of the "not every fever is malaria" campaign, as related to provider behaviors, were to increase frequency of the use of mRDTs for case diagnosis; increase trust in the test results; increase provider perception that peers and community members expect them to treat according to the test result; and increase provider ability to explain (febrile) non-malarial cases to patients.

While this provider targeted campaign is important for all PMI supported states, the states where this campaign was implemented were selected based on the following criteria: prevalence of malaria--and low malaria testing rates; presence of a critical mass of trained providers on RDTs that other PMI implementing partners have worked with; a reliable stock of RDTs; and presence of partner field consultants to provide leadership and technical assistance. The states that best fit these criteria (across three geopolitical zones) were Akwa Ibom, Benue and Kebbi states, with Kebbi having the highest malaria parasitemia levels in the country.

The campaign employed trainings to build provider efficacy to discuss benefits and results of RDT with clients, RDT-themed radio (mass media) magazine episodes were also used and

featured provider testimonials to encourage building of peer norms around RDT use. The project reached a total of 180 health facility workers and 168 PPMVs.

PMI has supported malaria prevention (net use), case management, and IPTp uptake activities through community mobilization, community dialogue compound meetings, and house-to-house visits by trained community volunteers in the five focus PMI-supported states. These activities resulted in the following:

- over 821,000 households were visited in five PMI-supported states.
- over 2.5 million people out of a population of an estimated[10] 23 million people were reached through IPC with messages on ITN ownership and use, prompt care-seeking for fever, severe malaria, and on prevention and management of MIP.
- over 28,000 pregnant women were referred to attend ANC through the community mobilization efforts.
- over 8,000 opinion leaders (religious and traditional leaders) were sensitized on malaria prevention and care.
- Net redemption rate of 98% and average hanging rate of 71.2% in Oyo state following an end process evaluation conducted after a mass net campaign.

PMI FY16 funds were used to build capacity for national and state malaria programs through support for the development of training manuals (e.g., National Social Mobilization Training Manual – a national standardized training manual on community mobilization and interpersonal communication for malaria for all cadres of community based volunteers) and launch of the Private Sector Engagement Strategy – a roadmap to harness domestic resources through the private sector towards malaria elimination in Nigeria. Within the ACSM subcommittee, PMI funds were used to support the creation and training of CDTs who were tasked with reviewing all malaria-related communication materials to ensure message harmony and compliance with the National ACSM guidelines.

To monitor activities, PMI uses the DHIS2 platform to monitor SBCC outcome indicators like IPTp coverage, malaria test rates, and ACT use on a regular basis. In addition to monitoring routine data PMI collaborated with the White House / Social Behavioral Science Team to evaluate the use of CHWs to improve ANC attendance and IPTp coverage in Kebbi State. The study examined the impact of providing pregnant women with a card to track their IPTp doses in 7 LGAs of Kebbi State. With a total of 8,401 pregnant recruited and assigned into control and treatment groups, preliminary results revealed a 41% ANC attendance rate amongst women in the treatment group compared to 38% in the control group. Final study results are expected by September 2017 and will provide valuable information on the effectiveness of focused SBCC interventions in improving ANC attendance and uptake of IPTp at the health facilities.

Using FY 2016 funds, PMI/Nigeria is conducting secondary analysis of the 2015 MIS with the aim to identify most effective channels of communication, barriers to desired behaviors and

[10] Total 2017 Projected Population of five states Akwa Ibom, Benue, Kebbi, Nasarawa, and Zamfara) is 23,348,616

effectiveness of interventions by comparing intervention states to states without SBCC interventions.

Plans and justification

SBCC efforts will continue to focus on increasing consistent use and proper care of ITNs, IPTp uptake, testing for malaria before treatment, compliance to test results, correct treatment for positive tests, and care-seeking behavior. PMI will place a higher emphasis on SBCC targeted at health care providers to increase diagnostic testing and adherence to results and guidelines through closer collaboration between SBCC and case management partners. PMI will determine the extent to which the campaign will be expanded and identify the communication objectives. This will be done in close collaboration with the service delivery partner, through (but not limited to) data review from various sources, review of lessons learned from the previous campaign, review of capacity and existing resources in PMI states.

SBCC messages will continue to be delivered through various channels although PMI will better direct interventions based on evidence from the 2015 NMIS and the routine HMIS data, which will help to identify LGAs and health facilities' catchment areas that are under-performing in malaria control activities. These areas will then benefit from more targeted and intensive SBCC activities. As part of PMI's support to SMC implementation in targeted states, SBCC will be a key component to facilitate community acceptance of the intervention amongst caregivers of children 0-5 years. Specific activities will use community mobilization strategies.

Mass media campaigns will use analysis of media penetration data to determine and reach largest possible proportion of target audience, maintain high intensity and exposure rates (dose-response effects) to messages, estimate health impact of messages using appropriate mathematical models and prioritize highest-impact messages, as part of continuous project cycle monitoring, learning and adaptation.

As Global Fund support to malaria community mobilization is pulled out of PMI supported states, PMI will scale up intra-state coverage of malaria interventions including SBCC community mobilization and IPC activities, but will identify specific target areas of need using well analyzed NDHS, MIS and HMIS facility data. Additionally, PMI will increase use of existing community based organizations, community volunteer personnel structures (including non-traditional volunteer actors), leverage opportunities to design programs to address co-occurring health behaviors (and outcomes), and apply best practices in the design, quality assurance, implementation and supportive supervision of IPC activities

Proposed activities with FY 2018 funding: ($4,300,000)

1. *NMEP/SMEP ACSM capacity strengthening*: PMI will continue to support NMEP ACSM branch to coordinate, assure quality and provide oversight to malaria SBCC activities at national level. At the state level, PMI will support quarterly meetings of state SMEP ACSM branches and strengthen capacities for the implementation of the national ACSM guidelines through short trainings and technical assistance. *($250,000)*

2. *Mass media based "Malaria-Free" messaging at state level*: PMI will continue to support integrated advocacy and social mobilization for state malaria communication activities in the 11 PMI-supported states. The National 'malaria–free campaign' will utilize the national malaria song, educational radio, and television drama shows. *($600,000*)
3. *Community mobilization and interpersonal communication through community outreach and engagement:* PMI will support community and household engagement using IPC in the 11 PMI-supported states using community leadership structures and local champions. This will reach approximately 5 million people and focus on delivering messages to promote net usage, preventative care, ANC attendance, the risks of MIP and correct care-seeking behavior. IPC activities and messages will re-enforce mass media activities to create the surround-sound effect. PMI will leverage committed MCH/FP funds for SBCC in three states (Bauchi, Ebonyi, and Sokoto) where malaria/MCH/FP programs overlap. (*$900,000)*
4. *SBCC for SMC:* PMI will support focused community mobilization and communication activities to promote sustained adherence to SMC amongst caregivers of children 0-5 years old through the campaign period in selected PMI states. *($300,000)*
5. *SBCC to improve provider adherence to case management guidelines:* SBCC aimed to improve service providers' testing of fevers with RDTs and compliance with test results. With a focus on public health sector, FY 2018 resources will be used to explore factors that influence provider adherence to malaria case diagnosis and treatment guidelines and will design effective SBCC activities that use IPC to reach and address elements (knowledge, attitudes, perceived efficacy, self-efficacy etc.) among targeted providers trained and equipped by PMI service delivery program. *($1,000,000)*
6. *Strengthening of MIP and health worker compliance with MIP guidelines:* In selected PMI-supported states, IPC activities will be carried out with ANC health workers to promote uptake of IPTp 1, 2, and 3+. SBCC activities will emphasize activities to increase provider efficacy, and address barriers to administering IPTp as DOT. During community mobilization activities and routine ANC outreach, traditional birth attendants and private midwives will be encouraged to refer clients for IPTp in health facilities. The SBCC activities will be integrated into the outreach IPTp campaigns in selected states in Nigeria. *($350,000)*
7. *ITN uptake and use during mass distribution campaigns:* SBCC activities will support the demand creation and communication aspects of ITN mass distribution campaigns. Activities will include use of mass media, town announcers, and advocacy through religious and traditional leaders. PMI will explore innovative ways of sustaining post ITN campaign behavior change messaging especially through ongoing state-wide mass media and/or community based IPC activities. *($600,000*)
8. *Support for continuous distribution of ITNs:* PMI will support school-based campaigns to engage primary school students in four PMI-supported states in order to generate discussions around positive behaviors necessary for malaria prevention, diagnosis, and treatment. PMI will use school enrollment and related data from DHS to prioritize states where school based mass ITN campaigns and targeted SBC activities will be rolled out. At present, school distributions occur in Cross River and Oyo. Expansion of this continuous channel will be through a phased approach, subject to availability of funds and the degree of progress in Cross River and Oyo. *($300,000)*

6. Surveillance, monitoring, and evaluation

NMEP/PMI objectives

Surveillance, monitoring, and evaluation (SM&E) is an integral part of the NMSP 2014-2020, with one of the primary objectives focusing on routine collection and reporting of malaria data, and use of such data for program improvement. In 2009, the NMEP developed the National M&E Plan for Malaria Control in Nigeria. The M&E plan was reviewed in 2014 to align with the NMSP 2014-2020. The NMEP SM&E TWG led the process for developing the M&E plan, with support and participation from a broad group of partners including PMI, Global Fund, WHO, World Bank, UNICEF, DfID, and local NGOs.

The NMEP M&E plan covers three main areas: 1) strengthening routine malaria information systems; 2) supporting periodic household surveys; and 3) improving OR to ensure that new intervention strategies are evidence-based. The primary objective of the M&E Plan for Malaria Control in Nigeria is to establish a sound and continuously updated database that monitors progress towards agreed targets, evaluates outcomes and impact, and is used to effectively manage and adjust interventions based on evidence. Strategies of the M&E plan include:

- Improve collection, quality and utilization of routine data to monitor the implementation of malaria related interventions to feed into the HMIS.
- Periodically evaluate the progress of malaria control with respect to outcome and impact indicators through appropriate data collection processes.
- Strengthen links between the research community and NMEP, and its development and implementation partners in order to ensure that ongoing research is oriented towards the key operational questions and can provide the necessary evidence to continuously improve interventions for malaria control.
- Provide a road map for coordination of malaria–related SM&E among partners.

PMI is the co-chair of the M&E technical sub-committee of NMEP which: (1) coordinates efforts for strengthening the HMIS, (2) oversees the planning and implementation of various surveys and assessments, and (3) coordinates SM&E activities with other partners.

Progress since PMI was launched

The PMI SM&E approach in Nigeria contributes to the NMEP M&E plan 2014-2020. Specifically, PMI supports strengthening the routine HMIS at various levels of the health system; periodic population-based surveys such as the Nigeria Malaria Indicator Survey (2015 NMIS), the Nigeria Demographic and Health Survey (2013 NDHS), and the 2015 facility-based malaria implementation assessment (MIA) that are used to measure the status of key malaria indicators; and OR to guide programmatic decisions (see Table 16).

Table 16: Malaria Data Sources, Nigeria, 2010-2019

Data Source	Survey activities	Year									
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Household surveys	Demographic and Health Survey (DHS)**				X					X	
	Malaria Indicator Survey (MIS)	X					X				
	National Nutrition and Health Survey (SMART)*				X		X				(X)
	Multiple Indicator Cluster Survey (MICS)*		X					X			
	Media Impact Surveys*					X					
	Omnibus Surveys**	X	X	X	X	X	X	X	(X)	(X)	(X)
	National AIDS and Reproductive Health Survey (NARHS)*			X							
Health facility and other surveys	ACT Watch Surveys (Outlet)*		X		X		X				
	Rapid Impact Assessment (RIA)*				X	X					
	Malaria Implementation Assessment (MIA)							X			
	End-use verification (EUV)	X	X	X	X	X	X	X	X	(X)	(X)
	Service Delivery Index (SDI)*					X					
	SOML HFS*							X			
Malaria surveillance and routine system support	NMEP malaria parasite sentinel surveillance (MPSS) system*								(X)	(X)	(X)
	Support to HMIS**	X	X	X	X	X	X	X	X	(X)	(X)
Therapeutic efficacy monitoring	*In vivo* efficacy monitoring				X			X		(X)	(X)

Entomology	Entomological surveillance and resistance monitoring			X	X	X	X	X	X	(X)	(X)
Net durability monitoring	ITN monitoring							X	X	(X)	

Notes:

1. Surveys with an asterisk (*) are not funded by PMI but some may receive other U.S. Government funding. The MICS and SMART receive USAID funding.
2. Surveys with double asterisks (**) are partially funded with PMI funds.
3. The MPSS is to happen in 2016, 2017 and 2018. The HMIS is for all facilities, while the MPSS will be for sentinel health facilities to provide real time quality data on malaria testing, positivity rates, and ACT use.

Routine Health Information System

In 2012, Nigeria adopted a harmonized approach to collecting routine malaria data through the national HMIS that is managed by the FMoH's Department of Planning, Research and Statistics. HMIS data are reported monthly from public and limited private health facilities to the LGA level using standardized facility-level aggregate data tools (paper based). The LGA HMIS focal persons (health information officers) collate and enter malaria data received by health facilities into the DHIS2 application. Health facility level aggregated data are then immediately available for review and analysis by state and national malaria elimination officials. Data quality reviews from state and national levels can prompt LGA verification and if necessary, data correction is done within two months of data entry. LGA health information officers are currently the sole control points for data entry or correction for any health facility within their LGAs. State and national health information officers are unable to enter or modify data in the DHIS2 system.

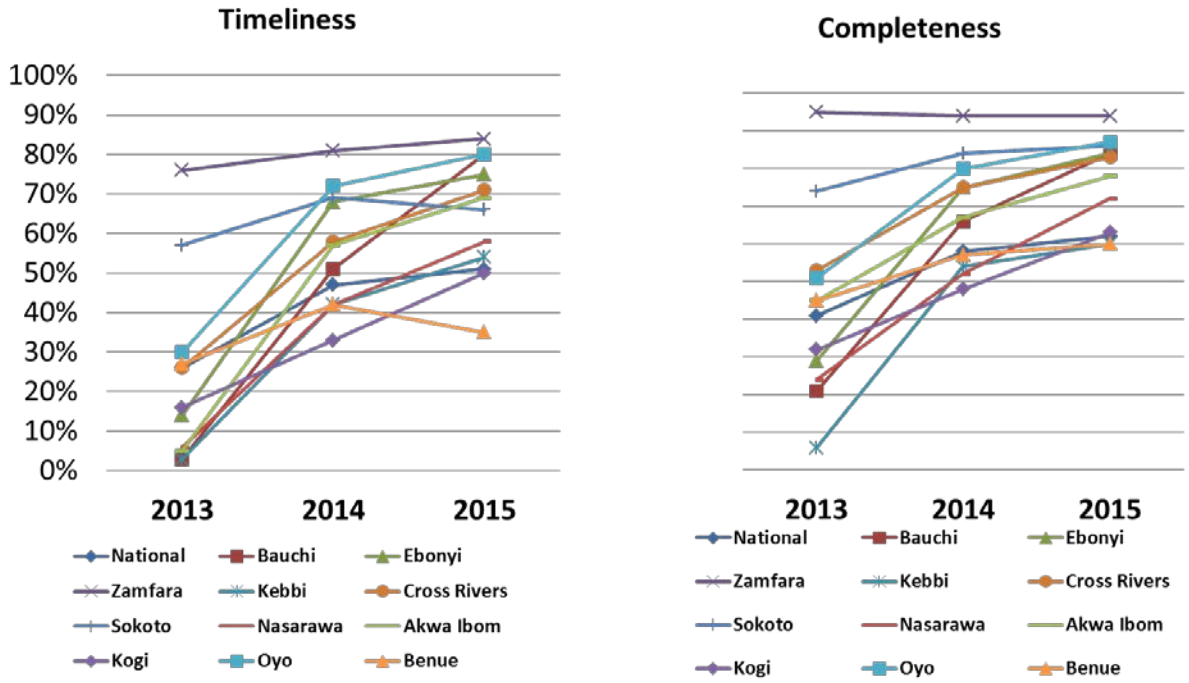
The NMEP and malaria partners participated in the process that produced the standardized HMIS tools for data collection and entry into the DHIS2 application. With partner support, Nigeria started to implement the harmonized HMIS tools in 2013. PMI assisted in developing the instructional manual and the trainer's guide, and supported the national training of trainers in Abuja. Nationwide training was completed in 2014. DHIS2 has since been the sole routine information system used for malaria data in Nigeria. Although Nigeria has an Integrated Disease Surveillance and Response System to report weekly disease counts for epidemic prone diseases, current case definitions for malaria do not align with the NMEP supported definition. Therefore this system is not used for malaria reporting.

One objective of the NMSP 2014-2020 is for 80% of health facilities in all LGAs to report routinely on malaria by 2020, that progress is measured, and that the evidence is used for program improvement. With increased DHIS2 implementation, PMI has supported training of 10,668 of 43,321 (25%) health workers in SM&E and provided feedback to data collectors. PMI also supported Data Quality Assessment (DQA and routine LGA data validation meetings in nine states. As a result, completeness and timeliness have significantly improved in the PMI-supported states. In 2013, only 40% of health facilities submitted their monthly reports, and only 47% of health facilities submitted their reports in a timely manner. The national reporting rate for 2015 was over 60% but ranged from 50% to 95% in individual states. Since 2013, the 11 PMI-

supported states have performed better than the non-PMI states, and better than the national reporting rate (Figure 20).

National level HMIS data does not tell the malaria story for Nigeria. Each state is at a different place in malaria control and progressing at a different pace. Therefore, analysis of routine data at the sub-national level is important. Figures 25 – 33 demonstrates the data that is available and trends over the past four years for three PMI-supported states (Zamfara-NW, Nasarawa-NC, and Cross River-SS). Data reporting and confirmation rates have improved in all three states. The malaria burden is highest in Zamfara, followed by Nasarawa, and then Cross River. Transmission occurs year round in all three states, but has clear seasonal peaks in Zamfara and Nasarawa. The reported malaria cases have remained steady in Cross River State; however, the percent of cases in children under the age of five years has decreased from 46% to 36%. This sub-national data analysis is critical for decision making, particularly in the context of a federated system and state autonomy.

Figure 20: DHIS2 reporting rates National and PMI focus states



National surveys

In 2010, an NMEP-sponsored NMIS was completed and provided pre-PMI baseline estimates for most of the coverage indicators used by PMI. In 2013 PMI supported a NDHS which included a malaria module; however, the NDHS did not collect biomarkers.

With funding from PMI, the Global Fund, DfID, and UNICEF, the NMEP, in partnership with the National Population Council and the National Bureau of Statistics (NBS), implemented the 2015 NMIS from October 2015 through November 2015. PMI provided funding for technical assistance, procurement of supplies, data collection and analysis, production of the preliminary and final reports, and dissemination of the results. The country as a whole reported a marked 36% decrease in malaria prevalence measured by microscopy in children age 6-59 months (42% in 2010; 27% in 2015). By zones, malaria prevalence varied from 37% in the North West Zone to 14% in the South East Zone (Figure 21).

Figure 21: Trends in parasite prevalence among children 6-59 months

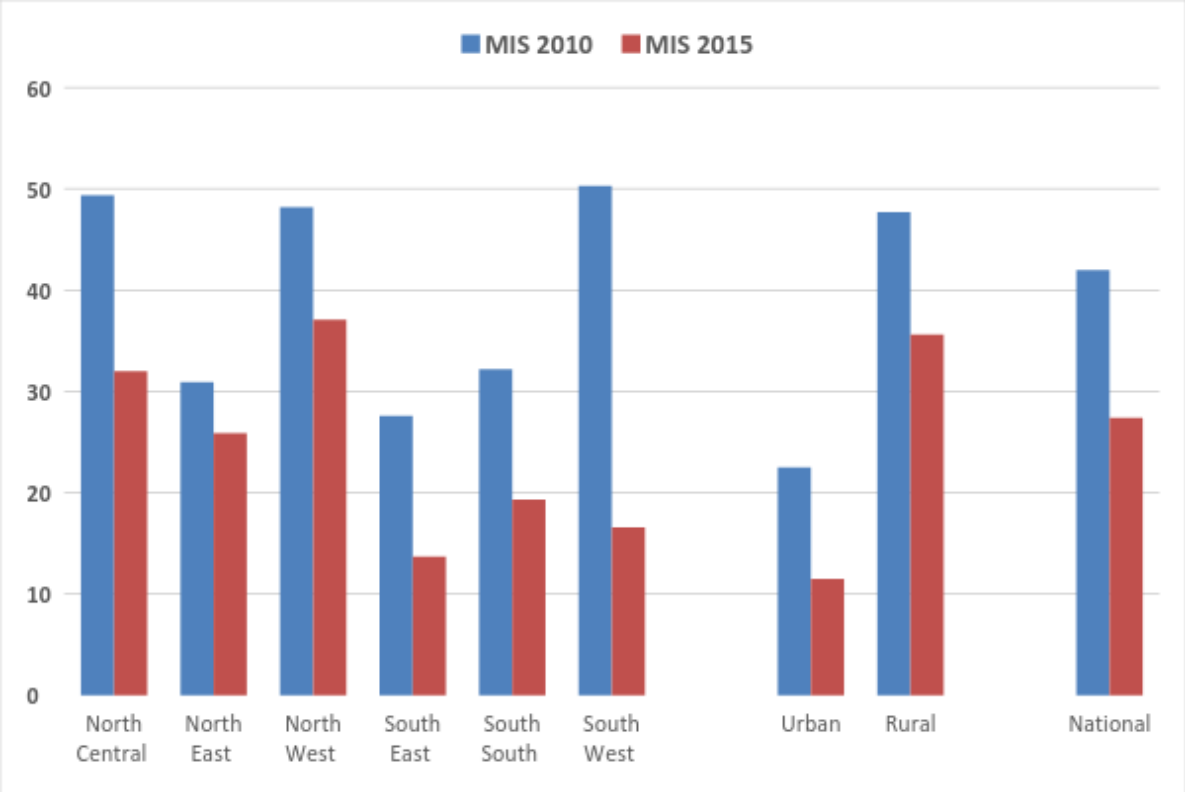
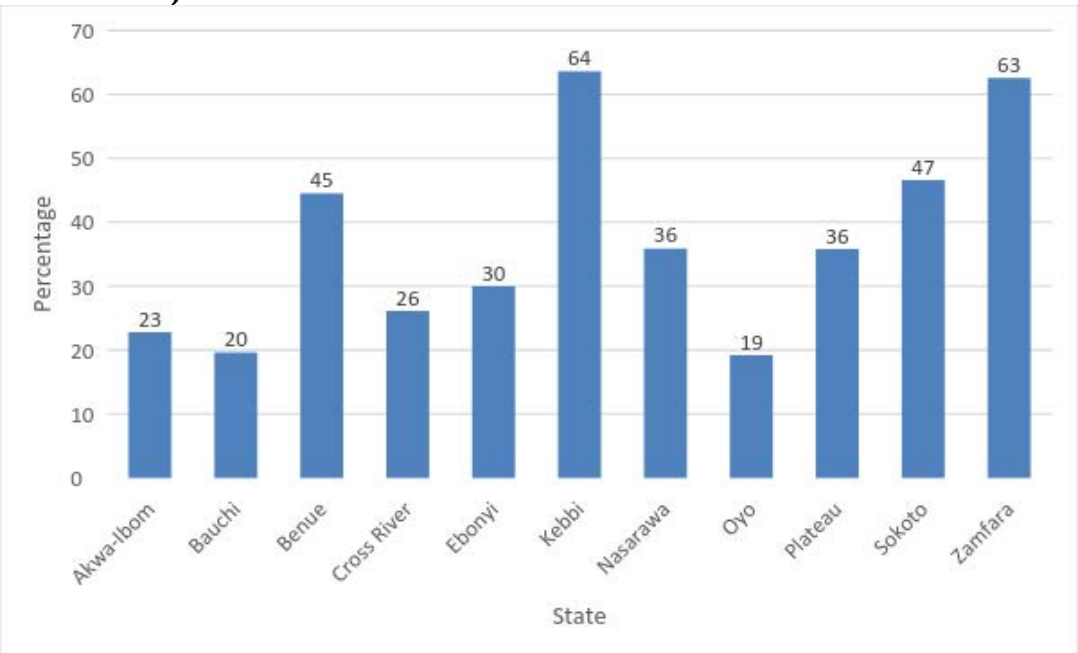


Figure 22: Malaria parasite prevalence (microscopy) in children for PMI-supported states (Source: MIS 2015)



Health facility and other surveys

PMI has been supporting EUV surveys from 2012 through 2016. The EUV surveys are done every six months to assess stock availability of malaria commodities in health facilities and warehouses, testing for malaria before treatment, prescription of ACTs for uncomplicated malaria, storage conditions for malaria commodities, and training of health workers in the various areas they work. Bi-annual reports are provided summarizing the EUV activities and findings. These reports provide key observations, recommendations, and next steps for commodity distribution. However, EUV survey results are not statistically representative.

Program monitoring

Since 2011, PMI has supported the Mission-wide M&E services contract which oversees a broad range of M&E services such as: performance monitoring (via a web-based reporting system); M&E capacity building for Mission staff and implementing partners; DQA for indicators, and performance evaluation of activities. The web-based performance monitoring system collects and stores activity-level indicators, including all required annual PMI output indicators. Implementing partners enter performance data quarterly and upload their narrative reports that serve as data sources. In addition, the PMI country team uses the DHIS2 to monitor implementing partner performance, to make programmatic decisions, and to inform the USAID portfolio review, PMI's Annual Report to Congress, and MOP planning.

Progress during the past 12-18 months

Routine Health Information System

In the past year, PMI has continued the support for HMIS strengthening at national and state levels. This support includes capacity building of health workers at all levels, periodic DQA, and the roll-out of the DHIS2. PMI also supported the coordination of SM&E efforts, including LGA data collection, consolidation and QA meetings to improve completeness and timeliness of HMIS data in PMI-supported states. Furthermore, PMI supported state and federal data consultative meetings as well as the NMEP M&E sub-committee meetings to facilitate standardized malaria data collection across the geo-political zones. HMIS reporting rates have continued to improve in PMI-supported states, nationally, and also in the private sector.

Figure 23: NHMIS monthly summary reporting rates

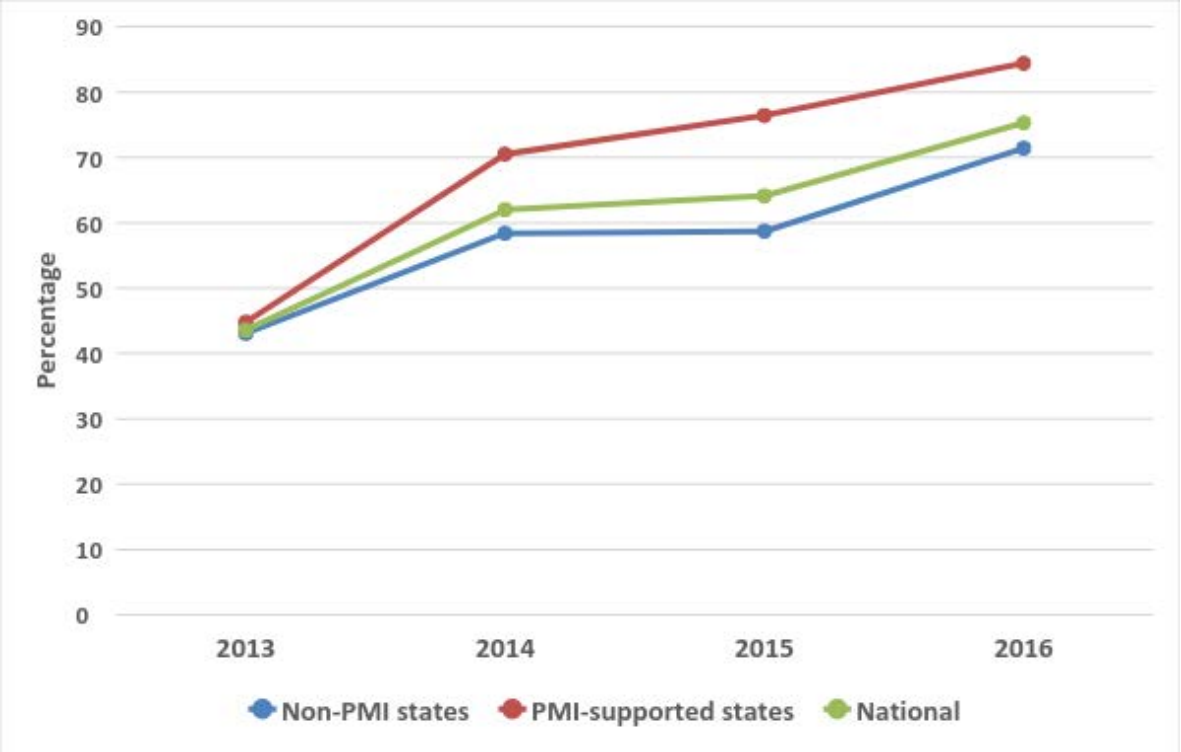
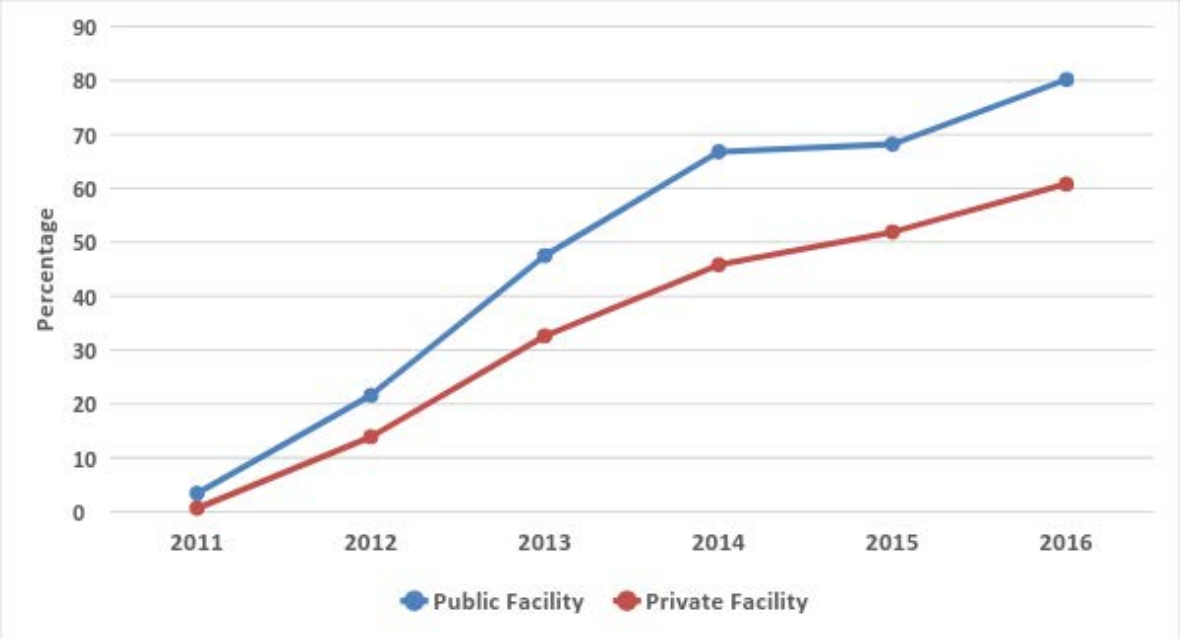


Figure 24: NHMIS monthly summary reporting rate



There is also evidence of increasing use of data for planning the procurement of commodities and other resources. All 11 PMI-supported states have developed Annual Operational Plans for malaria based on some of the data from the HMIS. Timely and complete data reporting on malaria from the health facility to the LGAs, and subsequently to the state and national levels,

has improved in PMI-supported states. However, more work is needed to improve data quality and supportive supervision. Inadequate reporting at the facility level is the result of several factors: insufficient training in data capture, compilation, and storage, lack of motivation, inadequate supportive supervision, and little accountability or feedback. Historically NMEP's ability to make timely programmatic decisions using HMIS has been problematic; however, the use of DHIS2 provides an opportunity to greatly improve the access, availability, and timeliness of consistent malaria information for programmatic decision making. PMI supports SM&E personnel in the 11 PMI-supported states, who facilitate the HMIS harmonization process and national efforts to strengthen the information system.

Figure 25: HMIS data from PMI-supported states

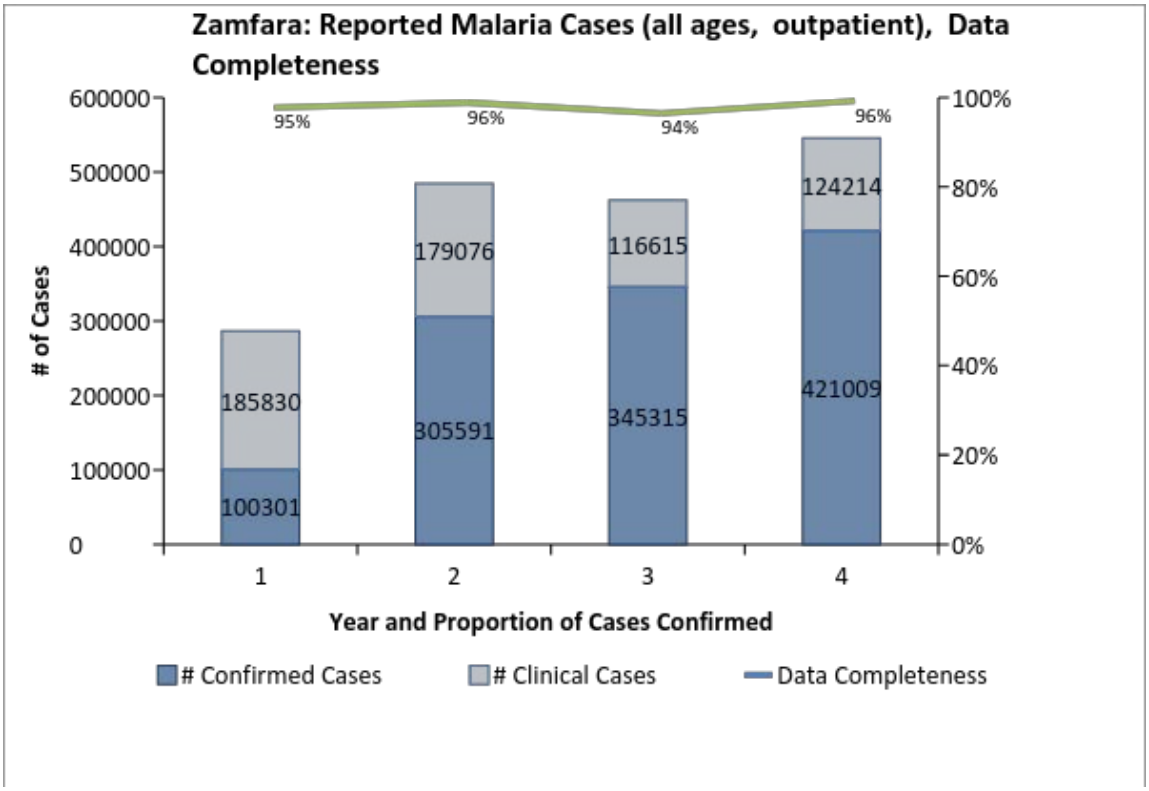


Figure 26: Zamfara: Percent of malaria cases <5 years of age

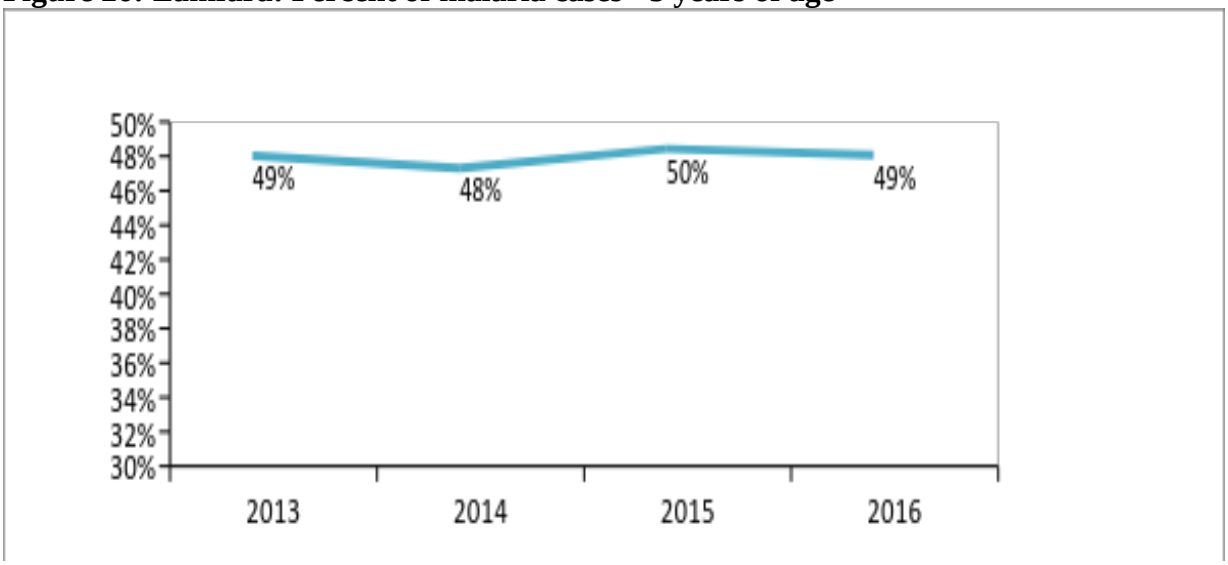


Figure 27: Zamfara Total HMIS reported malaria cases by month Dec 2013 – Mar 2017

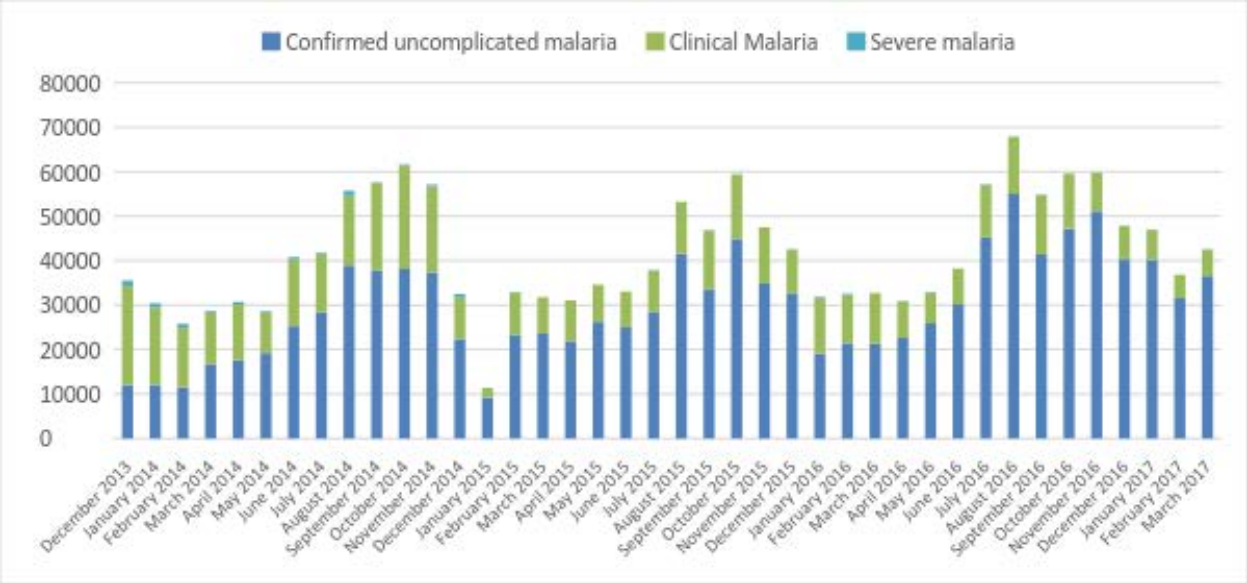


Figure 28: Nasarawa: Reported Malaria Cases (all ages, outpatient), Data Completeness

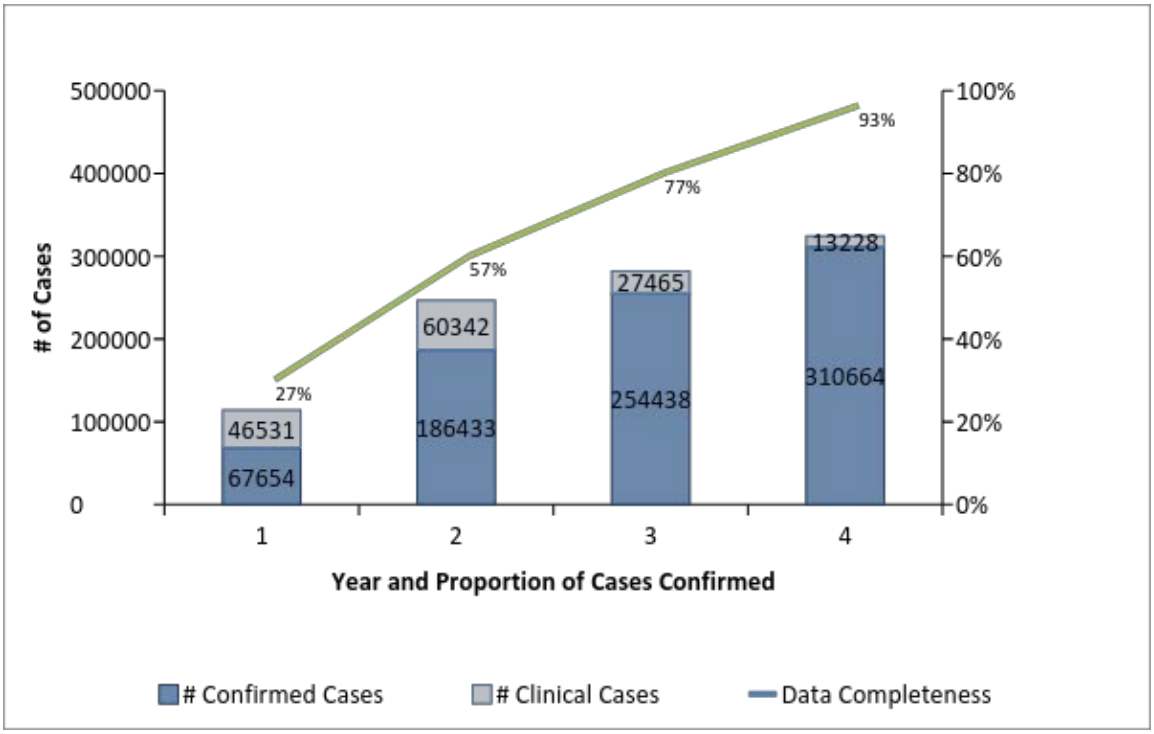


Figure 29: Nasarawa: Percent of malaria cases <5 years of age

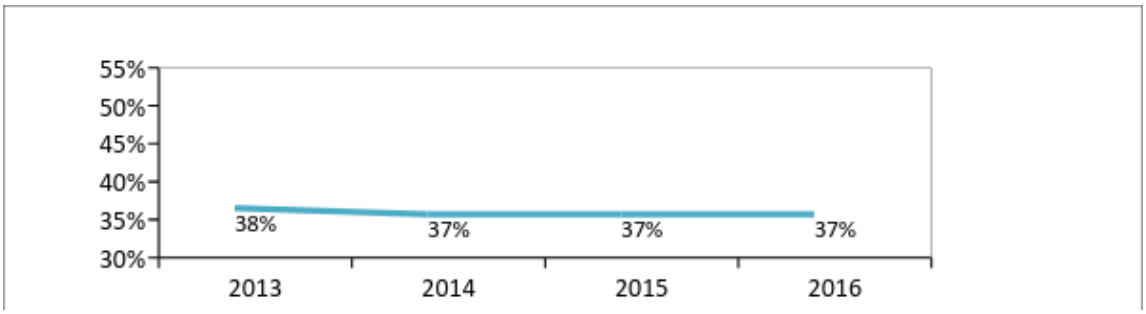


Figure 30: Nasarawa Total HMIS reported malaria cases by month Dec 2013 – Mar 2017

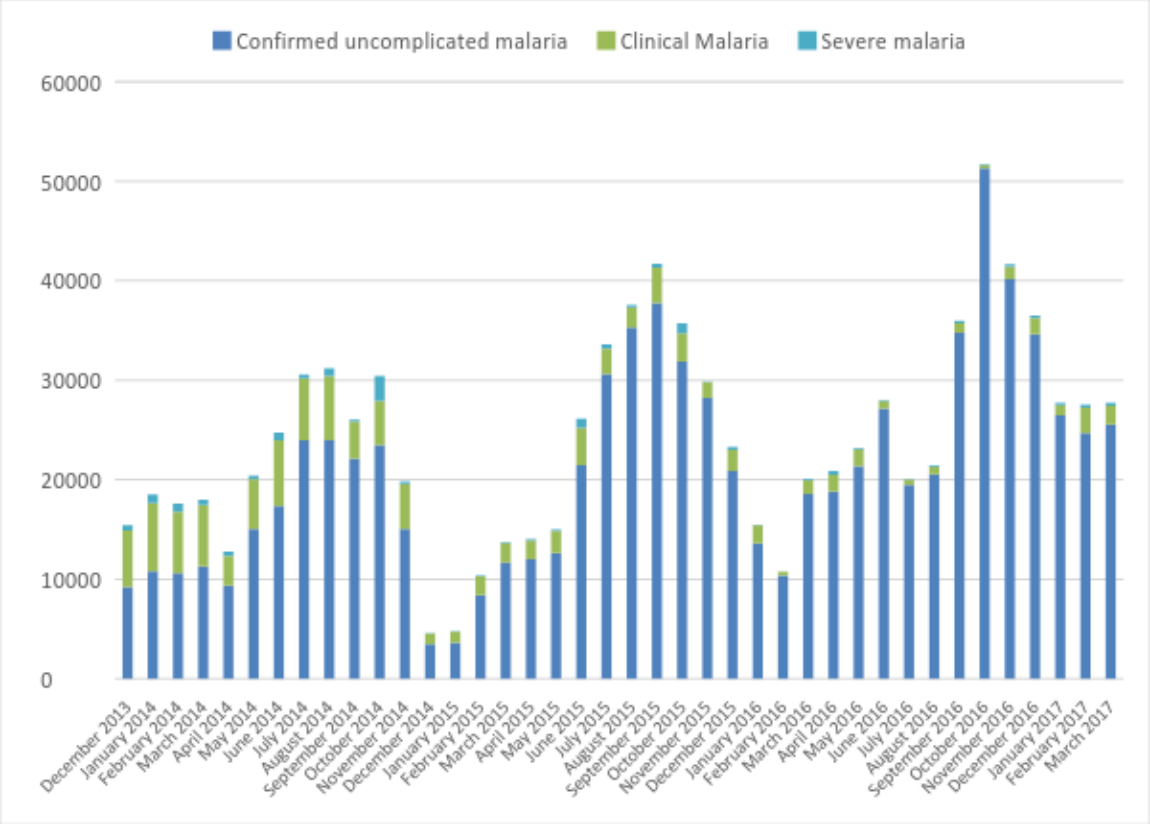


Figure 31: Cross River: Reported Malaria Cases (all ages, outpatient), Data Completeness

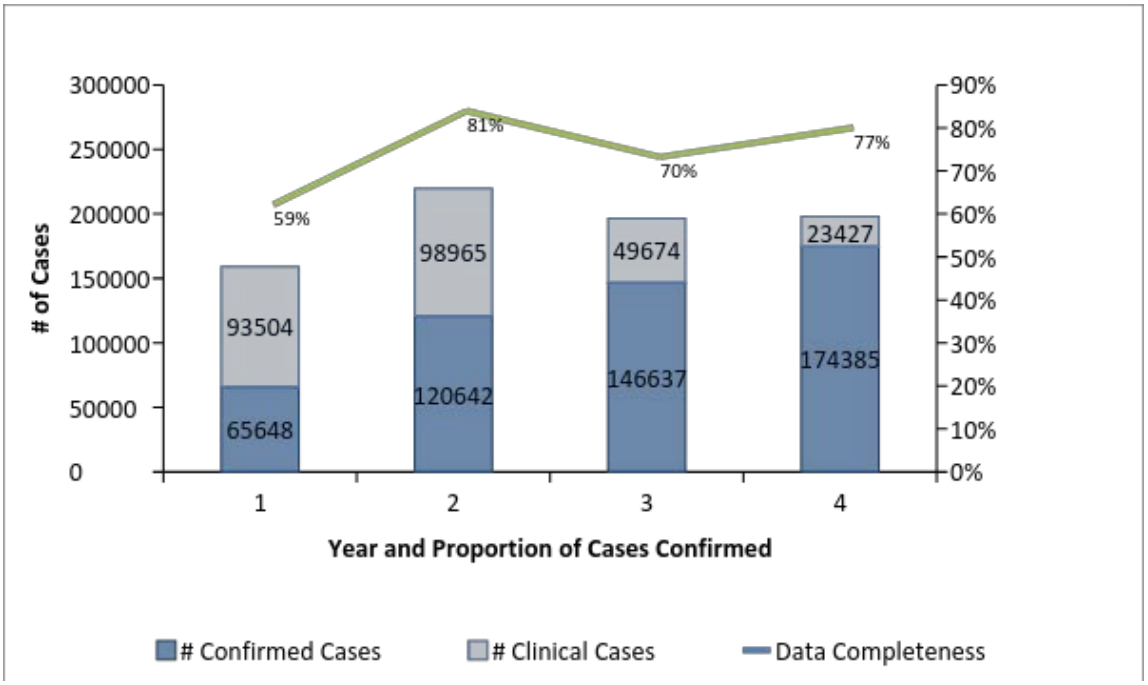


Figure 32: Cross River: Percent of malaria cases <5 years of age

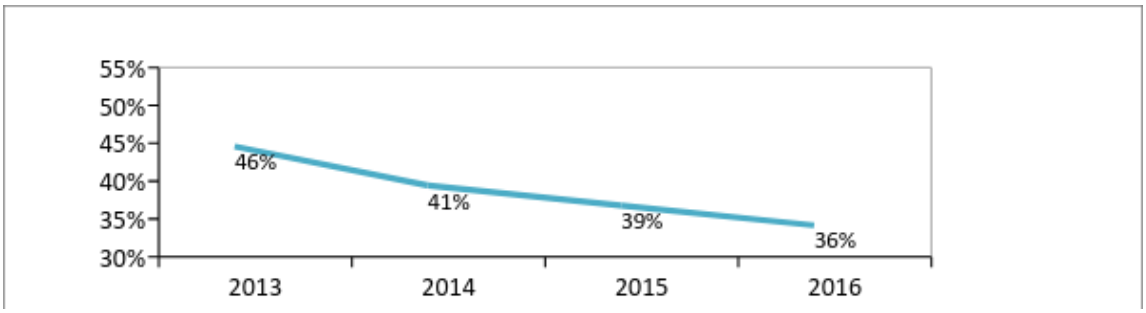
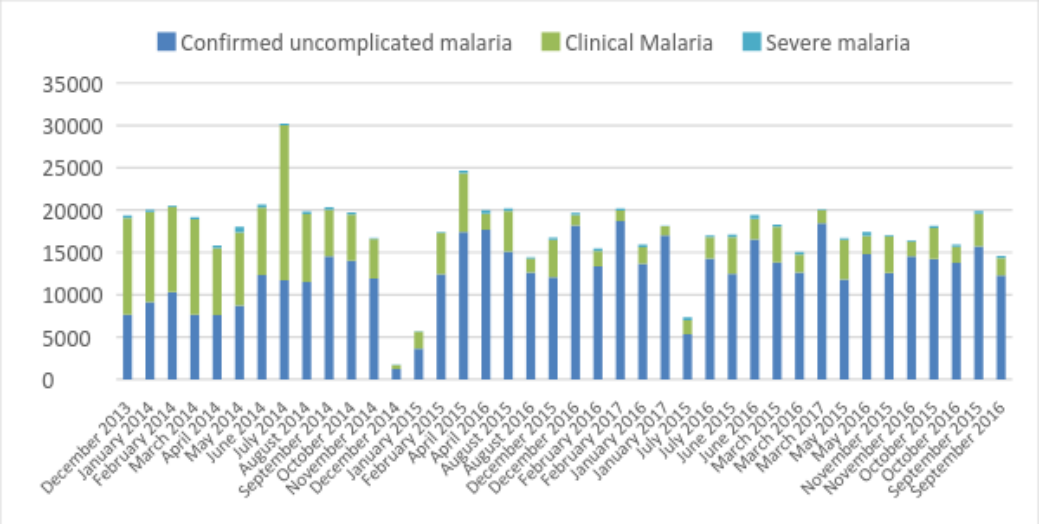


Figure 33: Cross River: Total HMIS reported malaria cases by month Dec 2013 – Mar 2017



Frontline Activities

The Frontline Project is building off the activities previously supported in Zamfara and Kano States by PMI and DFID respectively. Data quality is being improved with monthly data validation meeting at the LGA levels that correct data errors prior to entry in DHIS2. The project is also working with PMI and NMCP to develop a DHIS2 malaria dashboard to facilitate monitoring of malaria data elements and indicators on a regular basis. In an effort to further improve the use of DHIS2, the project will be implementing a health facility assessment with geo-mapping of health facilities with a GPS application in Zamfara. An accurate denominator of health facility indicators (reporting rate, completeness and timeliness of reporting) is not known because of frequent changes in status of functionality of health facilities, duplication of health facility names, and the establishment of new ones. Additionally, assessing the functionality of health facilities will give an accurate picture of the magnitude of health facility needs, resources redistribution and maintenance of integrity of health information system architecture.

The Frontline Project is also supporting the development and use of quarterly malaria bulletins for Kano and Zamfara states. This is the first such activity at the state level in Nigeria. Bulletins will capture HMIS reporting rates; malaria testing, diagnosis and treatment; IPTp and LLIN distribution. Additionally, bulletins will capture various gaps associated with program implementation and indicate those gaps that are at the health facility, LGA and state-level.

Household surveys

Multiple Indicator Cluster Survey (MICS)

The Nigeria MICS was carried out by the NBS. Financial and technical support was provided by USAID, UNICEF, the United Nations Population Fund, and the GoN. MICS is a household survey developed by UNICEF, which provides up-to-date information on the situation of children and women, and measures key indicators that allows countries to monitor progress towards the Millennium Development Goals and the Sustainable Development Goals. Currently, the fifth round of MICS is ongoing, and preliminary findings will be available in mid-2017. Malaria indicators measured by this survey include ITN coverage and use, testing of fever cases for malaria, treatment with ACT, and provision of SP for pregnant women.

Health facility surveys and assessments

MIA

With FY 2015 funds, PMI supported the malaria intervention assessment (MIA) during 2016. The goal of the MIA was to document progress in malaria control interventions between 2008 and 2014 in Cross River, Ebonyi, Nasarawa, and Sokoto States. Data collection for this assessment was completed in June 2016. The MIA used a mixed methods approach, consisting of secondary data collation, primary data collection, document review, and secondary analysis of existing household survey data. Results are available although the final report is still pending. The MIA found that malaria prevention interventions improved in all four states: ITN household ownership, ITN use in children under five and pregnant women, and IPTp coverage (2+ doses). There were also substantial improvements in the availability of malaria commodities. Documenting improvements in coverage of malaria case management among children under five with fever was difficult, although overall, PMI-supported PHCs had higher availability of malaria commodities and trained staff, and provided higher quality of care compared to non-PMI PHCs. In addition, the assessment found better data quality in PHC facilities supported by PMI compared to those that did not receive any direct PMI support. The findings from the assessment, along with other relevant malaria SM&E data, will be used to inform programmatic decisions, identify gaps, and provide information for future program planning.

SOML HFS

The Saving One Million Lives Program for Results (SOML-PforR) conducted a National Health Facility Survey in 2016 based on a standard health facility assessment methodology (Service Availability and Readiness - SARA, and Service Delivery Indicators –SDI). The specific objectives of the survey included collecting baseline health facility data against which progress in subsequent years can be measured, providing information that will help managers assess performance and identify weaknesses, collecting facility based data on healthcare availability and readiness to provide services at PHC facilities, and examining care in a few general hospitals to better understand their ability to deliver PHC services. A multistage stratified sampling strategy was used to collect data from 90 health facilities per state. The malaria results found only 17% of the records had evidence that women received three or more doses of SP (IPTp3+), and 40% had evidence that an ITN or a voucher was given (21% in the North East Zone to 57% in the South West Zone). In regards to health worker knowledge of integrated management of

childhood illnesses (IMCI), malaria knowledge was far above pneumonia and diarrhea throughout the country (see case management section).

EUV

The most recent EUV survey (December 2016) results can be found in the Case Management and Pharmaceutical Management sections,

Plans and justification

PMI/Nigeria's surveillance, monitoring, and evaluating activities will continue to rely on a combination of routine malaria data collected through the HMIS and the LMIS, household surveys, health facility surveys and assessments, and information from partners.
With FY 2018 funds, PMI will continue to strengthen the routine malaria information system at the health facility, LGA, state, and national levels through the harmonized HMIS (using the DHIS2). The objective is to achieve at least 80% on-time reporting of malaria cases by LGAs and 80% by functioning health facilities in PMI-supported states by 2020. PMI will also support training, refresher training, and supportive supervision in HMIS in PMI-supported states with special emphasis on malaria. Strengthening LGA capacity is a priority as the SM&E officers at this level are the only staff able to enter or modify data in the DHIS2. Additionally, PMI will support meetings and data quality reviews to improve use of the data at all levels.

At the national level, PMI support of the HMIS can ensure that malaria data continues to be emphasized in the development of future data collection tools, that these tools are available at all levels, and that malaria is a focus of analysis and dashboard development using DHIS2. Continued investment in HMIS has a direct benefit to PMI and USAID/Nigeria.

PMI will continue to collaborate with the Frontline Project in Zamfara State during 2018. Based on lessons learned, support for certain SM&E activities in Zamfara will be transitioned to PMI as the Frontline Project ends.

The next Nigeria DHS is planned for 2018. The 2018 NDHS will provide an opportunity for Nigeria to collect additional data on outcome indicators that will be used to measure progress in malaria control activities. In addition, the GoN and partners have agreed to move DHS data collection to align with the peak malaria season and add malaria biomarkers to the survey.
Given the increasing availability of malaria data in Nigeria, PMI will support an effort to conduct additional analysis of available data from household surveys and routine data systems. Triangulating various data sources will further the understanding of data gaps, data quality, and provide a platform for directing resources to improve the quality and timeliness of malaria data. PMI will provide initial support for the 2020 MIS with FY 2018 funding to initiate activities in 2019. The bulk of support will be required in FY 2019.

PMI contributes to the Program Design and Learning (PD&L) budget for USAID/Nigeria. The PD&L funds contribute to the Mission-wide M&E services contract that support PMI implementing partners to: develop performance management plans; update activity performance

data on the web-based reporting system; train Mission staff or implementing partner staff on relevant M&E topics; and conduct data quality assessments of PMI indicators.

Proposed activities with FY 2018 funding: ($2,470,000)

1. *Strengthen routine SM&E systems at national and state level*: Strengthen coordination and harmonization of HMIS at the FMoH and NMEP. Strengthen the HMIS at health facility, LGA, and state levels in nine PMI-supported states. Implementation activities will include training and supervision of data clerical staff at selected health facilities, LGAs, and states; completion of unified data collection formats; and improving collection and reporting of routine malaria indicators. (*$1,500,000 for national support and nine PMI-supported states)*
2. *Strengthen routine SM&E systems at state level*: Strengthen the HMIS at health facility, LGA, and state levels in two PMI-supported states. Implementation activities will include training and supervision of data clerical staff at selected health facilities, LGAs, and states; completion of unified data collection formats; and improving collection and reporting of routine malaria indicators. *($300,000 for Bauchi and Sokoto)*
3. *Support 2020 MIS*: support initial activities for the 2020 MIS. The support includes planning and technical assistance for the survey. *($500,000*)
4. *Mission-wide M&E services contract:* PMI contribution to Mission-wide M&E services. Budget is part of USAID PD&L. *($150,000)*
5. *Technical assistance for SM&E strengthening:* Two CDC TDYs to provide technical support for SM&E. *($20,000)*

7. Operational research

NMEP/PMI objectives

The NMSP 2014-2020 incorporated the MPR 2012 recommendation to convene an OR stakeholders meeting, and proposed earmarking funding in the NMEP M&E budget for OR. The earmarked funding would demonstrate the NMEP's commitment to OR. Funding was to include support to strengthen the NMEP Operational Research Unit. There is no information on actual government contributions to malaria OR beyond NMEP staff participation in donor-funded OR activities. Funding sources for malaria OR in Nigeria include DfID, the World Bank, the Bill and Melinda Gates Foundation, and the Global Fund. PMI does not contribute directly to the NMEP OR budget. The PMI contribution to malaria OR is through its implementing partners as shown in Table 17.

Progress since PMI was launched

In 2014, with WHO support, NMEP convened a research symposium, with technical input from PMI, to identify OR priority needs. The NMEP consulted with PMI in August 2014 and identified five OR priority areas for PMI funding.

Progress in the last 12-18 months

In February 2016, the NMEP SM&E Branch, which oversees OR, provided PMI with updated priorities. The following general topic areas represent all activities that are on the current NMEP OR priority list.

1. **ITN category:** Continue and expand field studies on physical integrity and durability of ITNs and refine the definition of a failed net; identify laboratory tests and other accelerated testing methodology, such as resistance to damage scores, that are strongly predictive of field durability *(covered in ITN section).*

2. **ITN category:** Determine under what conditions strategies to promote "care and repair" of ITNs can improve the physical integrity and extend the life of nets *(covered in ITN section).*

3. **Insecticide resistance category:** Conduct field evaluations of new insecticides and other strategies to mitigate or delay the spread of insecticide resistance *(covered in Entomological Monitoring section).*

4. **Case management category:**
   The PPMV OR study was completed in March 2016 with an end line evaluation specifically monitoring the knowledge and practice of PPMVs and households in managing childhood fevers among children under age of five. The findings from the evaluation showed a positive difference in knowledge of trained PPMVs on appropriate management of childhood fever, pneumonia and diarrhea and in that the trained PPMVs were able to recite appropriately, the management of fever, pneumonia and diarrhea. However, the evaluation did not provide evidence of significant changes in PPMV practice and household level management of management of childhood illnesses.
   Evaluate clinician adherence to diagnostic testing and treatment including pregnancy assessment where applicable; specifically, identify factors associated with clinicians' non-adherence to diagnostic testing, and test methods to increase provider adherence at health facility and community level *(concept note approved for funding under FY 2015 MOP).*

To date, PMI has supported a number of OR projects that address key questions (Table 17). PMI continues to work with the NMEP to identify topics for consideration for PMI support.
The committee approved a study on evaluating clinician adherence to diagnostic testing to provide effective case management in Nigeria. Due to administrative delays, the study is expected to start in late 2017.

Table 17: Status of PMI-supported operational research

Completed OR Studies			
Title	**Start date**	**End date**	**Budget**
Feasibility of continuous distribution of ITNs through schools in Cross River	September 2012	July 2014	$341,568
Feasibility of continuous distribution of ITNs through community-based channels in Nasarawa	December 2011	July 2014	$177,074
Effects of SBCC activities on household net care and repair behaviors	April 2013	July 2014	$62,700
ITN durability in three eco-geographical zones	2012	July 2014	
Improved community case management of childhood illnesses by proprietary patent medicine vendors	February 2015	August 2016	**$1,500,000
Ongoing OR Studies			
Title		**End date**	
* Evaluating clinician adherence to diagnostic testing to provide effective case management	To be determined	To be determined	$120,000

* The clinician adherence study is awaiting the new award.
**PMI contributed $750,000 of the total funding..

Proposed activities with FY 2018 funding: ($0)

No FY 2018 funds are requested for operational research.

8. Staffing and administration

Two health professionals serve as Resident Advisors (RAs) to oversee PMI program in Nigeria, one representing CDC and one representing USAID. In addition, one or more Foreign Service Nationals (FSNs) 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 NMEP 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: ($3,171,060)

1. *USAID in-country staff and administrative costs:* FY 2018 funds will be used to provide oversight to PMI malaria activities and technical assistance to the NMEP, and Mission-wide Administration & Oversight (A&O). Allocations for O&A are made based on the funding level and administrative/management burden to the Mission. USAID A&O costs cover salaries, benefits, and associated costs of training and field visits for: four full-time PMI staff (one resident advisor, two technical FSNs, one program assistant); partial salaries and benefits for four USPSC staff working on PMI from Health, Population, and Nutrition (HPN) and contracting offices; and partial salaries and benefits for nine FSNs that contribute to the PMI program from HPN office (SBCC, M&E specialist, Commodities and Logistics Manager, Budget/Operations Manager, Administrative Assistant), the Office of Finance Management, and the Executive Office. *($2,279,060)*

2. *CDC staff and administrative costs:* FY 2018 funding will be used to support oversight for PMI malaria activities and technical assistance to the NMEP. Costs include salaries and associated costs for the CDC PMI resident advisor. *($892,000)*

Table 1: Budget Breakdown by Mechanism

President's Malaria Initiative – NIGERIA
Planned Malaria Obligations for FY 2018

Mechanism	Geographic Area	Activity	Budget ($)	%
GHSC-PSM	11 PMI focus states	Procure, deliver, warehouse, and distribute ITNs, mRDTs, ACTs, and SP for IPTp; and implement mass campaigns in Bauchi and Akwa Ibom States	33,072,385	55%
TBD/US PMI for States	9 PMI focus states	Support malaria service delivery, increase diagnostic and treatment capacity of health workers at facility and community level, including private sector (PPMV); improve MIP service delivery particularly IPTp; strengthen HMIS reporting. Includes support to NMEP to strengthen capacity and leadership role. Support implementation of approved OR activities.	14,787,745	25%
TBD/Integrated Health Program	2 PMI focus states	Support malaria service delivery, increase diagnostic and treatment capacity of health workers at facility and community level; improve MIP service delivery particularly IPTp; strengthen HMIS reporting. Implementation through an integrated program.	1,417,000	2%
TBD/SBCC	11 PMI focus states	Integrated SBCC activities targeting community level (net use, positive care seeking behavior, ANC attendance), health workers (prompt testing and adherence to test results, IPTp), and state level capacity (ACSM strategy, workplan, implementation, and oversight)	4,050,000	7%
TBD/Vector Control	7 PMI focus states	Strengthen entomological monitoring and capacity at federal and state levels. ITN physical integrity monitoring in five monitoring sites	932,810	2%

United States Pharmacopeia	Nationwide	Strengthen NAFDAC capacity for drug quality control including support for Minilabs® for post-market surveillance activities in the field.	800,000	1%
WRAIR	11 focus states	Strengthen capacity for malaria diagnosis including QA/QC activities at national and state levels.	300,000	1%
TBD/DHS Contract	Nationwide	Support Malaria Indicator Survey in 2020.	500,000	1%
TBD/Learning Project	Nationwide	Mission-wide M&E services contract and M&E support to Project.	150,000	0%
CDC IAA	Nationwide	CDC TDYs to support entomology, IRS, SM&E, and case management activities; support for FELTP for five NMEP personnel. This line also includes CDC annual staffing and administration costs of $630,000.	1,461,000	2%
USAID	Nationwide	Support for USAID annual staffing and administration costs.	2,279,060	4%
Total			**60,000,000**	**100 %**

Table 2: Budget Breakdown by Activity

President's Malaria Initiative – NIGERIA
Planned Malaria Obligations for FY 2018

Proposed Activity	Mechanism	Budget ($)		Geographic Area	Description
		Total	Commodity		
PREVENTIVE ACTIVITIES					
VECTOR MONITORING AND CONTROL					
Entomologic monitoring and insecticide resistance management					
Conduct entomological monitoring at select sentinel sites	TBD/Vector Control	817,810	0	7 Sentinel sites	Provide support for vector surveillance and susceptibility monitoring in 6 sentinel sites across 4 ecological zones in the country. Activity will include vector surveillance and insecticidal resistance monitoring.
Strengthen national capacity for entomological surveillance	TBD/ Vector Control	100,000	0	Federal and select States	Strengthen capacity for entomological expertise at federal and state levels with training and equipment support. Specific capacities include WHO cone wall bioassay, light trap collections, and others. The activity also includes maintenance of insectary at Keffi-Nasarawa State.

Supplies for entomological TA	TBD/Vector Control	15,000	15,000	7 Sentinel sites	Bioassays and test kits to supplement insecticide resistance and vector surveillance monitoring
Entomological technical assistance	CDC IAA	29,000	0	Federal and select States	Two trips to provide insecticide resistance training for Nigerian NMEP/Vector Control staff, resistance test kits, and insecticide for Nigerian vector control officers attending training.
Subtotal Ento monitoring		**961,810**	**15,000**		
Insecticide-treated Nets					
Procurement of ITNs	GHSC-PSM	5,234,760	5,234,760	11 PMI focus states	Procure 1,817,625 ITNs and deliver to state warehouses for routine distributions and IDPs. Nets for mass campaigns in 2019 will be procured from reprogramming of FY 2014, FY 2015, FY 2016, and FY 2017 funds and pipelines in GHSC-PSM Project.
Distribution of ITNs	GHSC-PSM	1,817,625	0	11 PMI focus states	Distribute approximately 1.8 million nets from state warehouses to service delivery points for continuous distribution.
Logistics and operational cost for ITN distribution	GHSC-PSM	4,750,000	0	4 focus states	Distribute 9.2 million nets through mass campaign in Cross River, Ebonyi, Plateau, and Zamfara. Costs include technical assistance, training, microplanning, and registration. BCC/Social mobilization costs are reflected separately in the SBCC

					section.
Subtotal ITNs		**11,802,385**	**5,234,760**		
Indoor Residual Spraying					
		0	0		
Subtotal IRS		**0**	**0**		
SUBTOTAL VECTOR MONITORING AND CONTROL		**12,764,195**	**5,249,760**		
Malaria in Pregnancy					
Procurement of SP	GHSC- PSM	540,000	540,000	11 PMI focus states	Procure 3,000,000 treatments and deliver SP to state warehouses.
Support to MIP activities	TBD/US PMI for States	1,000,000	0	National and 9 states	Support implementation of MIP and IPTp activities as part of FANC across the nine PMI-supported states. Support will include training, introducing new guidelines in medical training institutions and professional associations, on-the-job mentoring of health workers and reporting.
Support to MIP activities	TBD/IHP	300,000	0	2 States	Support implementation of MIP and IPTp activities as part of FANC across two PMI-supported states. Support will include training, introducing new guidelines in medical training institutions and professional associations, on-the-job mentoring of health workers and reporting.

Subtotal Malaria in Pregnancy		**1,840,000**	**540,000**		
SUBTOTAL PREVENTIVE		**14,604,195**	**5,789,760**		
CASE MANAGEMENT					
Diagnosis and Treatment					
Procurement of RDTs	GHSC- PSM	5,440,000	5,440,000	11 PMI focus states	Procure 17 million RDTs and deliver to warehouses in 11 states. This will fill gaps and help prevent stockouts of malaria diagnostic tests in the public sector facilities.
Procurement of ACTs	GHSC- PSM	10,440,000	10,440,000	11 PMI focus states	Procure 12 million ACT treatments (80% AL and 20% ASAQ) and deliver to warehouse.
Procure Sulfadoxine/Pyrimethamine +Amodiaquine (SP+AQ) for SMC	GHSC-PSM	850,000	850,000	3 states	Procure 1,689,300 treatments of co-blistered SP+AQ for SMC in select LGAs in Kebbi, Sokoto, and Zamfara States. Monthly treatments for approximately 423,000 children (3-59 months of age) will be administered over the 4-month malaria transmission season.
Strengthen malaria diagnosis, including QA/QC system	WRAIR	300,000	0	Federal and 11 states	Support implementation for QA/QC for malaria diagnosis including support for one existing state laboratory to function as regional reference laboratory. Conduct training

					of trainers for microscopy as needed.
Build capacity, and strengthen service delivery for case management at public health facilities in 9 states.	TBD/ US PMI for States	9,154,995	0	9 States	Training of health care workers at all levels on malaria case management in public health facilities. Also includes conducting supportive supervision, on-the-job capacity building, and providing basic tools and job aids for malaria case management in public sector. (Akwa Ibom, Benue, Cross River, Ebonyi, Kebbi, Nasarawa, Oyo, Plateau, and Zamfara)
Build capacity for case management at public health facilities in the two states.	TBD/Integrated Health Program	500,000	0	2 states	Training of health care workers at all levels on malaria case management in public health facilities. Also includes conducting supportive supervision, on-the-job capacity building, and providing basic tools and job aids for malaria case management in public sector. (Bauchi and Sokoto)
Support implementation of SMC in two states	TBD/ US PMI for States	951,750	0		Implementation of SMC in Kebbi and Zamfara States, including microplanning, training, drug administration, supervision, monitoring, and reporting.
Support implementation of SMC in one state	TBD/Integrated Health Program	317,000	0		Implementation of SMC in Sokoto State, including microplanning, training, drug administration, supervision, monitoring, and reporting.

Build capacity and scale up malaria case management in the private sector facilities including iCCM	TBD/ US PMI for States	841,000	0	2 states	Expand malaria case management in private health sector using lessons from the iCCM pilots. Facilities to be targeted include PPMVs and private clinics in up to two southern states.
Therapeutic efficacy studies	TBD/US PMI for States	240,000	0	4 TES sites located in 4 States	Support DTET in four sentinel sites @ $60,000/site to monitor efficacy to first-line antimalarial drugs. This will include the K-13 analysis.
Technical assistance for case management	CDC IAA	20,000	0	Federal and 11 states	Two CDC TDYs to provide technical support to case management.
Subtotal Diagnosis and Treatment		**29,054,745**	**16,730,000**		
Pharmaceutical Management					
Supply chain strengthening	GHSC PSM	4,000,000	0		Strengthen the pharmaceutical management system, forecasting, management, and distribution of pharmaceuticals and RDTs. Conduct EUVs in PMI-supported states twice a year; provide warehousing and distribution of PMI-procured commodities to the health facilities; including support to data management.
Strengthen regulatory authority (NAFDAC) on drug surveillance	USP/PQM	800,000	0		Strengthen NAFDAC's capacity for drug quality control including the procurement of necessary equipment and supplies. Support will include deployment and use of minilabs for

					field testing of drugs. Activities include post market surveillance in priority states to detect counterfeit and poor quality medicines as well as monotherapies.
Subtotal Pharmaceutical Management		**4,800,000**	**0**		
SUBTOTAL CASE MANAGEMENT		**33,854,745**	**16,730,000**		
HEALTH SYSTEM STRENGTHENING / CAPACITY BUILDING					
Strengthen technical capacity of NMEP	TBD/US PMI for States	300,000	0	National	Support for NMEP's role as lead coordination body through meeting support, monitoring support, and training. Support will include NMCP technical assistance to states and LGAs.
Strengthen capacity of states and LGAs for planning and management of malaria services	TBD/US PMI for States	800,000	0	9 states	Support the PMI-supported states to plan, implement, coordinate, and monitor their malaria control programs. Long-term TA to support SMEP. The nine states are: Akwa Ibom, Benue, Cross River, Ebonyi, Kebbi, Nasarawa, Oyo, Plateau, and Zamfara. Bauchi and Sokoto will be supported with Mission MCH funds under the TBD/Health Integrated Program.

Support for NFELTP	CDC IAA	500,000	0	National	Support training for five fellows for the two-year FELTP course ($50,000/year/trainee). Funds will support 5 new fellows and 5 existing fellows.
SUBTOTAL HSS & CAPACITY BUILDING		**1,600,000**	**0**		
SOCIAL AND BEHAVIOR CHANGE COMMUNICATION					
NMEP/SMEP ACSM Capacity strengthening	TBD/SBCC	250,000	0	National/11 PMI focus states	PMI will continue to support NMEP/state ACSM branches to coordinate, assure quality and provide oversight to malaria SBCC activities at national and state level.
Support to National 'Malaria-free' messaging at state level	TBD/SBCC	600,000	0	National/11 PMI focus states	A nationwide 'malaria–free campaign' will utilize the national malaria song, educational radio, and television drama shows targeted at 20% of population.
Community mobilization and interpersonal communication through community outreach and engagement	TBD/SBCC	900,000	0	11 PMI focus states	Work with community leadership structures and potential champions such as religious and community leaders, civil society organizations, and opinion leaders to reach about 5 million people to mobilize behavior change in communities.
SBCC for seasonal malaria chemoprevention campaign	TBD/SBCC	300,000	0	3 PMI focus states	SBCC activities will be done to promote sustained adherence to SMC throughout the campaign period.

Communication initiatives to improve provider adherence to case management guidelines	TBD/SBCC	1,000,000	0	11 PMI focus states	Using group interactions and health worker engagement to build confidence and trust in malaria diagnostics.
SBCC activities to strengthen malaria in pregnancy including health workers compliance with MIP Guideline	TBD/SBCC	350,000	0	11 PMI focus states	Using multiple channels to strengthen adherence to clinical guidelines and match demand with supply of quality ANC services.
Promote ITN uptake and use during mass distribution campaign in states	TBD/SBCC	600,000	0	4 PMI focus states	Coordinate and implement evidenced SBCC activities in states during mass campaigns.
Support continuous distribution of ITNs	TBD/SBCC	300,000	0	7 PMI focus states	Conduct SBCC activities targeted at schoolchildren especially in states with high school attendance rates.
SUBTOTAL SBCC		**4,300,000**	**0**		
SURVEILLANCE, MONITORING, AND EVALUATION					
Strengthen routine SM&E systems at Federal and State Level	TBD/US PMI for States	1,500,000	0	Federal + 9 states	Strengthen the harmonized HMIS at health facility, LGA, and state levels in nine PMI-supported states.
Strengthen routine SM&E at State level	TBD/IHP	300,000	0	2 states	Strengthen the harmonized HMIS at health facility, LGA, and state levels in Bauchi and Sokoto states.
Conduct a national Malaria Indicator Survey in 2020	TBD/DHS Contract	500,000	0	Nationwide	Support malaria indicator survey in 2020.

Mission-wide M&E services contract	USAID/Learning Project	150,000	0	Federal and 11 states	PMI contribution to Mission-wide M&E services. Budget is part of USAID PD&L.
Technical assistance for SM&E strengthening	CDC IAA	20,000	0	Federal and 11 states	Two CDC TDYs to provide technical support for surveillance, monitoring, and evaluation.
SUBTOTAL SM&E		**2,470,000**	**0**		
OPERATIONAL RESEARCH					
		0	**0**		
SUBTOTAL OR		**0**	**0**		
IN-COUNTRY STAFFING AND ADMINISTRATION					
In-country staffing and administration costs	USAID	2,279,060	0	Nationwide	Support for USAID annual staffing and administration costs. Also includes A&O and PD&L. To include two malaria technical specialists for the PMI program.
In-country staffing and administration costs	CDC IAA	892,000	0	Nationwide	Support for annual CDC staffing and administrative costs.
SUBTOTAL IN-COUNTRY STAFFING		**3,171,060**	**0**		
GRAND TOTAL		**60,000,000**	**22,519,760**		