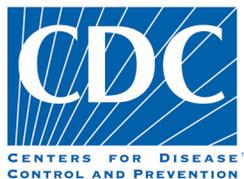


This Malaria Operational Plan has been approved by the U.S. Global Malaria Coordinator and reflects collaborative discussions with the national malaria control programs and partners in country. The final funding available to support the plan outlined here is pending final FY 2019 appropriation. If any 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



PRESIDENT'S MALARIA INITIATIVE

NIGERIA

Malaria Operational Plan FY 2019

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ABBREVIATIONS AND ACRONYMS

ACSM	Advocacy, communication, and social mobilization
ACT	Artemisinin-based combination therapy
AL	Artemether-lumefantrine
ANC	Antenatal care
AS/AQ	Artesunate-amodiaquine
CDC	U.S. Centers for Disease Control and Prevention
DfID	United Kingdom Department for International Development
DHIS	District health information system
DQA	Data Quality Assessment
TES	Therapeutic efficacy studies
EPI	Expanded Program on Immunization
EUV	End-use verification
EQA	External quality assurance
FANC	Focused antenatal care
FMoH	Federal Ministry of Health
FY	Fiscal year
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
GoN	Government of Nigeria
HMIS	Health management information system
iCCM	Integrated community case management
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
MIP	Malaria in pregnancy
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
NIMR	Nigeria Institute for Medical Research
NMEP	National Malaria Elimination Program
NMIS	Nigeria Malaria Indicator Survey
NMSP	National Malaria Strategic Plan
NSCIP	Nigeria Supply Chain Integration Project
NSTOP	National Stop Transmission of Polio
OR	Operational research
PBO	Piperonyl butoxide
PHC	Primary healthcare
PMI	U.S. President's Malaria Initiative
PPMVs	Proprietary patent medicine vendors
QA	Quality assurance
QC	Quality control
RBM	Roll Back Malaria

RDT	Rapid diagnostic test
SBCC	Social and behavior change communication
SMC	Seasonal malaria chemoprevention
SME	Surveillance, monitoring, and evaluation
SMEP	State Malaria Elimination Program
SOML	Saving One Million Lives
SP	Sulfadoxine-pyrimethamine
SP-AQ	Sulfadoxine-pyrimethamine + amodiaquine
UNICEF	United Nations Children's Fund
USAID	U.S. Agency for International Development
WHO	World Health Organization

I. EXECUTIVE SUMMARY

When it was launched in 2005, the goal of the U.S. President's Malaria Initiative (PMI) was to reduce malaria-related mortality by 50 percent 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 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 Subregion 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 considers 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 Partnership's second generation global malaria action plan, *Action and Investment to Defeat Malaria 2016-2030: For a Malaria-Free World* and the World Health Organization's (WHO's) updated *Global Technical Strategy: 2016-2030*. Under the PMI Strategy 2015-2020, the U.S. Government's goal is to work with PMI-supported countries and partners to further reduce malaria deaths and substantially decrease malaria morbidity, towards the long-term goal of elimination.

In 2017, consistent with an increase in annual appropriations, PMI again launched new country programs in Cameroon, Côte d'Ivoire, Niger, and Sierra Leone, and expanded an existing program in Burkina Faso to PMI focus country status. With the addition of these new focus countries, PMI now has programs in 24 countries in sub-Saharan Africa, in addition to two bilateral programs and targeted support in the Greater Mekong Subregion in Asia.

Nigeria began implementation as a PMI focus country in fiscal year (FY) 2011.

This FY 2019 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 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 NMCP and PMI, and provides a description of activities that are planned with FY 2019 funding.

The proposed FY 2019 PMI budget for Nigeria is \$65 million. PMI will support the following intervention areas with these funds:

Entomologic monitoring and insecticide resistance management: The Nigerian National Malaria Strategic Plan (NMSP) 2014-2020 calls for the establishment of at least three vector surveillance sentinel and insecticide resistance monitoring sites in each of the six geopolitical zones (within five ecological zones) to inform insecticide selection. PMI began supporting entomological monitoring in 2011 in Nasarawa State, and expanded monitoring activities to six states across all of Nigeria's five ecological zones in 2013. Entomological monitoring provides monthly data on vector density and annual data on insecticide susceptibility. In FY 2018, PMI continued longitudinal entomological surveillance in eight sites located in seven PMI-supported states and intensified insecticide resistance monitoring. In each state four local government areas were sampled for insecticide resistance monitoring with longitudinal monitoring of abundance, species composition, and infection status carried out in one local government area in each site.

With FY 2019 funding, PMI will continue to monitor key entomological indicators in these sites to guide further PMI interventions in the country. Insecticide resistance monitoring will be implemented in all PMI-supported states to inform ITN procurement decisions. PMI will also 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: 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 mass ITN campaigns every three to four years, as well as the strengthening of continuous distribution channels, including antenatal care (ANC) and immunization clinics. From December 2013 to May 2018, the NMEP and its partners distributed more than 72 million ITNs through mass campaigns, including over 35.7 million ITNs in all 11 PMI-supported states.

Data from two Nigeria Malaria Indicator Surveys (NMIS) show ownership of at least one ITN in a household increased substantially from 8 percent nationally in 2010 to 69 percent 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 percent in 2010 to 37 percent in 2015.

With FY 2019 funds, PMI will procure approximately 2.1 million ITNs to fill the gap for the mass campaign distribution in Oyo State, and distribute 6.3 million ITNs through mass campaigns in Benue and Zamfara. If additional resources are made available, PMI will support continuous distribution in the 11 PMI-supported states.

Indoor residual spraying: 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 percent of areas with high malaria transmission, IRS is currently only carried out in a limited number of LGAs in some states with local funds. Due to the cost and the limited government investment, the consensus from the development partners is not to encourage the government to prioritize this activity. PMI has no plans to support IRS activities in Nigeria with FY 2019 funding.

Malaria in pregnancy: The NMSP 2014-2020 reflects the WHO policy of: (1) providing IPTp at every ANC visit after the first trimester with four weeks between doses, (2) providing an ITN during the first

ANC visit, and (3) prompt appropriate management of malaria illness during pregnancy. The 2015 NMIS reported an increase in the percentage of pregnant women who received two or more doses of sulfadoxine-pyrimethamine (SP) from 13 percent in 2010 to 37 percent in 2015; 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 ANC, non-availability of SP, restrictions that limit non-pharmacy health workers' ability 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 part of focused ANC 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 processes for addressing missed opportunities for IPTp delivery.

With FY 2019 funding, PMI will procure 2 million SP treatments for PMI-supported states. PMI will also continue to support capacity building for health workers, advocate for states to address missed opportunities for IPTp, advocate for state domestic resources to procure SP, and focus on interpersonal communication innovations for health workers.

Seasonal malaria chemoprevention: The NMSP 2014-2020 recommends seasonal malaria chemoprevention in nine states in the Sahel region. With funding from the GiveWell Foundation, the Malaria Consortium is supporting seasonal malaria chemoprevention implementation in Sokoto, Jigawa, Katsina, and Zamfara States.

With FY 2016 funds, PMI procured 1,689,300 treatments of sulfadoxine-pyrimethamine + amodiaquine (SP+AQ). PMI is partnering with the Malaria Consortium to implement 2018 seasonal malaria chemoprevention in Sokoto and Zamfara. PMI will provide 844,650 treatments and the Malaria Consortium will support implementation using other donor funds. PMI will carry over the remaining doses for implementation in 2019. The partnership will continue in 2019 with an additional 1,689,300 treatments procured with FY 2018 funding, for a total of 2,533,950 treatments.

With FY 2019 funding, PMI will build upon activities already supported in Sokoto and Zamfara States and procure an additional 2.5 million SP+AQ treatments. PMI will support state-level implementation of these activities, targeting 633,000 children (30 percent of those eligible). If additional support becomes available, PMI will support expansion to all eligible children (2,111,553) in the two states. PMI will also advocate for states to fund all state-level implementation costs.

Case management: The Nigerian National Guidelines for Diagnosis and Treatment of Malaria aligns with 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; and (3) implementation of quality assurance systems for malaria diagnostics. Since 2011, PMI has supported the scale-up of quality-assured case management for malaria across supported states through collaboration with the NMEP and other donors. High priority was given to increasing diagnostic testing rates and adherence to test results, as ACT is available at most service delivery points. PMI supported case management implementation through procurement and distribution of about 22.8 million rapid diagnostic tests and 51.7 million ACTs to public health facilities. PMI also supported enhanced capacity of service providers in malaria parasitological diagnosis. Improving quality assurance was a focus for PMI while strengthening quality of microscopy at secondary and tertiary facilities. PMI also supported

improvements 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 2019 funding, PMI will scale up malaria case management from 3,977 to 5,942 health facilities representing 64 percent coverage within focus states with provision of malaria commodities and laboratory reagents, case management training/refreshers training, supportive supervision, and diagnostic quality assurance/quality control. PMI will procure and distribute approximately 20 million rapid diagnostic tests and 20 million ACTs to help meet the projected need in PMI-supported states for management of uncomplicated malaria. PMI will also procure 500,000 injectable artesunate vials for treatment of severe malaria, support therapeutic efficacy studies, and work to prevent commodity stockouts through routine health information and logistic systems.

Pharmaceutical management: The fifth objective of NMSP 2014-2020 is to ensure the timely availability of appropriate antimalarial medicines and commodities that are required for the prevention and treatment of malaria. PMI has supported a logistics system for distribution of malaria commodities. The support included quantification and procurement planning, procurement and storage of commodities, distribution to state and health facilities, and end-use verification surveys to monitor stock levels and decrease the risk of stockouts, excesses, and leakages. To address supply chain challenges, Nigeria, in collaboration with donors, has rolled out the Nigeria Supply Chain Integration Project, under the National Product Supply Chain Management Program, Food and Drug Services Department of the Federal Ministry of Health. PMI funding has supported the establishment of logistics management coordination units in the 11 PMI-supported states.

With FY 2019 funding, PMI will continue to distribute malaria commodities (excluding ITNs) through regional/axial stores of the Nigeria Supply Chain Integration Project, while strengthening the capacities of state logistics management coordination units. PMI will support the roll out and operations electronic logistics management information systems and further integrate those systems and district health information systems for improved data quality for decision-making and forecasting needs. PMI will also support a track and trace pilot for ACTs using GS1 data standards. FY 2019 funding will continue to support laboratories associated with the National Agency for Food and Drug Administration and Control and quality monitoring of antimalarial medicines. PMI Nigeria plans to transition secondary hospitals in selected states back to drug revolving funds for ACTs.

Social and behavior change communication: Nigeria's Advocacy, Communication, and Social Mobilization Guidelines for malaria recommend various channels of communication based on target audience. Malaria educational messages generally reach households using radio, television, 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 social and behavior change communication across all key malaria interventions.

With FY 2019 funds, PMI will continue to support an overarching national "malaria-free" communications campaign, as well as other integrated health campaigns to increase the utility of malaria control interventions at the national, state, and local levels. State and local government activities will focus on transmitting malaria messages in local languages through the use of radio and community volunteers to reinforce messages and address barriers to behavior change among priority sub-populations. PMI social and behavior change communication activities will also prioritize healthcare

worker behaviors, especially those within the public sector, to identify opportunities for improving attitudes, norms, and malaria case management practices.

Surveillance, monitoring, and evaluation: Surveillance, monitoring, and evaluation 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 surveillance, monitoring, and evaluation system that provides good quality data. PMI supports strengthening the routine health information system at various levels. Both periodic population-based surveys, such as the Malaria Indicator Survey (2015 NMIS), and facility-based surveys are used to measure the status of key malaria indicators. Since 2011, PMI has supported health management information system strengthening at national and state levels, which has led to significant improvement in completeness and timeliness of routine data reported in 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 saw a marked decrease in malaria prevalence measured by microscopy in children age 6-59 months (42 percent in 2010; 27 percent in 2015; a relative difference of 36 percent).

With FY 2019 funds, PMI Nigeria's surveillance, monitoring, and evaluation activities will continue to rely on a combination of routine malaria data collected through the health management information system and logistics management information system, household surveys, health facility surveys and assessments, and information from partners. PMI will also continue to strengthen the routine health information system at the health facility, local government area, state, and national levels through a harmonized health management information system (the District Health Information Software version 2 [DHIS2] application). There will be an increased focus on data analysis through triangulation and mapping, and a move towards targeting interventions based on the results.

Operational research: The NMSP 2014-2020 proposed earmarking funding from the NMEP monitoring and evaluation budget for operational research. In 2014, the NMEP and development partners held a scientific meeting to identify priority areas across the core interventions. PMI will work with the NMEP and other development partners to analyze and use health management information system, NMIS, and Demographic and Health Survey data, as well as revisit the NMEP operational research prioritized list to identify areas for PMI support. The responsibility for resource mobilization lies with the NMEP. No FY 2019 funds are requested for operational research.

Other Health Systems Strengthening: PMI supports a broad array of health system strengthening activities that cut across integrated vector management, case management, procurement and supply management, and surveillance, monitoring, and evaluation.

With FY 2019 funds, PMI will work with other development partners to strengthen capacities at the 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 malaria in pregnancy; entomological monitoring; and surveillance, monitoring, and evaluation. In addition, PMI will continue to provide support for the Nigeria Field Epidemiology and Laboratory Training Program, which builds capacity of health workers in epidemiology and disease outbreak investigations. To increase domestic investment in malaria and primary health care, PMI, through the USAID Health, Population, and Nutrition Office is developing a memoranda of understanding with state governments that specifies increasing inputs required from state governments annually, with clear benchmarks and a process for reviewing progress against these agreements every six months, initiating the path to sustainability and self-reliance.

II. STRATEGY

1. Introduction

When it was launched in 2005, the goal of the U.S. President's Malaria Initiative (PMI) was to reduce malaria-related mortality by 50 percent 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 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 Subregion 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 considers 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 2016-2030: For a Malaria-Free World* and the World Health Organization's (WHO's) updated *Global Technical Strategy: 2016-2030*. Under the PMI Strategy 2015-2020, the U.S. Government's goal is to work with PMI-supported countries and partners to further reduce malaria deaths and substantially decrease malaria morbidity, towards the long-term goal of elimination.

In 2017, consistent with an increase in annual appropriations, PMI again launched new country programs in Cameroon, Côte d'Ivoire, Niger, and Sierra Leone, and expanded an existing program in Burkina Faso to full PMI focus country status. With the addition of these new focus countries, PMI now has programs in 24 countries in sub-Saharan Africa, in addition to two bilateral programs and targeted support in the Greater Mekong Subregion in Asia.

Nigeria began implementation as a PMI focus country in fiscal year (FY) 2011.

This FY 2019 Malaria Operational Plan (MOP) 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 the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund) malaria grants. This document 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 NMCP and PMI, and provides a description of activities that are planned with FY 2019 funding.

2. Malaria situation in Nigeria

Nigeria is the most populous country in Africa, with a projected total population of approximately 209 million for 2019 and 216 million for 2020 (National Population Commission, 2006, projected with an estimated annual growth rate of about 3.2 percent). 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 270,000 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 on the 2016 United Nations Development Program Human Development Index¹. According to the 2016 report, Nigeria maintained the same status as 2015. The 2015 ranking data represents only a two-point positive change from the 2014 ranking data. Under-5 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 are significantly better in the south of the country, than in the north. For example, under-5 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-5 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 a 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 percent of the population living in high transmission areas and 24 percent in low transmission areas². Five ecological zones define the intensity and seasonality of transmission and mosquito vector species: mangrove swamp, 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 rainforest. These climatic patterns affect vegetation and most flora and fauna are differentiated across the ecological zones. The National Malaria Strategic plan recommends at least three entomological sentinel sites, which will generate data on vector bionomics and insecticide susceptibility, per geopolitical zone (in relation to the five ecological zones). 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 *Anophele (An.) gambiae s.s.* The data from the 2017 Nigeria Entomology Report showed that *An. gambiae s.s.* was the predominant member of the *An. gambiae* complex, varying from 48 percent in the arid/semi-arid Sahel to 89 percent in the mangrove swamps on the coast. *An. arabiensis* was the other member of the complex identified by polymerase chain reaction but was absent in the Ebonyi sentinel sites. Overall, 66 percent of mosquitoes with sporozoites that tested positive with polymerase chain reaction were *An. gambiae s.s.*, while *An. arabiensis* represented 16 percent, indicating that both species transmit malaria in Nigeria.

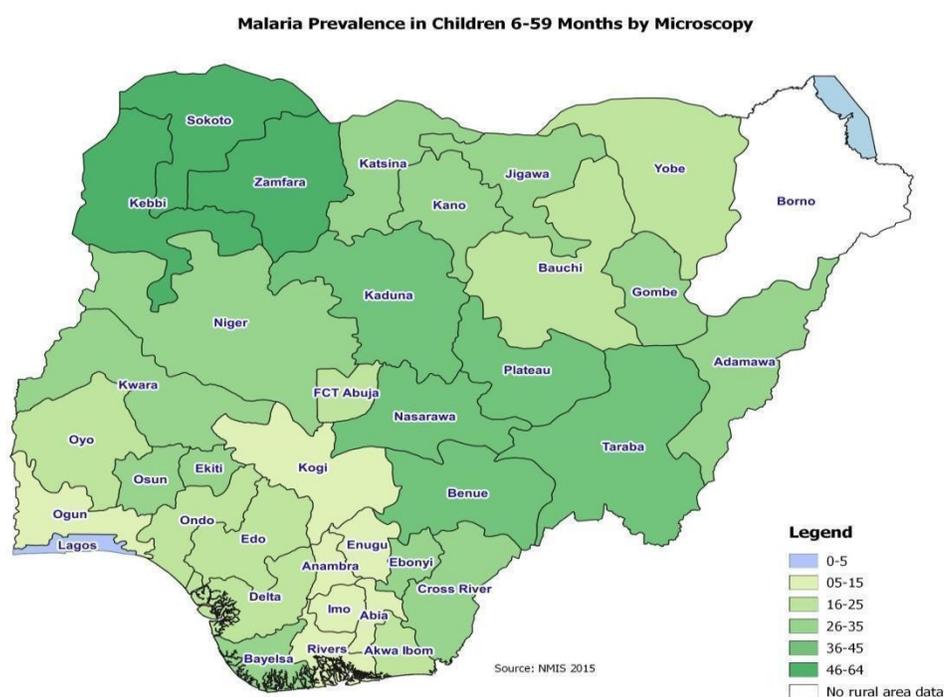
¹ Human Development Report 2016: http://hdr.undp.org/sites/default/files/2016_human_development_report.pdf

² World Malaria Report 2017, Geneva, World Health Organization 2017

According to the WHO World Malaria Report 2017, Nigeria contributed to 27 percent of global malaria burden in 2016 and accounts for 23 percent of the global estimated malaria deaths. The Verbal Autopsy/Social Autopsy Survey³ 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 (NMIS) reported a fever prevalence of 41 percent in children in the two weeks before the survey. Of those with fever, 66 percent sought advice or treatment, and among those with fever who sought care, only 30 percent went to the public sector.

Microscopy data from the 2015 NMIS show that the prevalence of malaria parasitemia in children under-5 years of age is 27 percent, with wide regional differences (Figure 1). Parasite prevalence ranges from 14 percent in the South East Zone to 37 percent in the North West Zone. The prevalence of malaria parasitemia in rural populations is three times that in urban populations (36 percent vs. 12 percent) and when compared to the highest socioeconomic group, the prevalence among children in the lowest socioeconomic group is 10 times higher (43 percent vs. 4 percent).

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



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.

3. Country health system delivery structure and Ministry of Health 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 healthcare. 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, while state health budgets pay for secondary care and LGA or National Primary Health Care Development Agency budgets cover primary healthcare. 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 percent 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 from international donor partners, as well as other sources. The act 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 facilities, 3,992 secondary facilities, and 83 tertiary facilities. The private sector constitutes approximately 33 percent of all health facilities in Nigeria. Private health facilities include private, not-for-profit and private, for-profit organizations.

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 different levels of health care;
- Weak logistics systems for commodities depending on donor funding and contractors to operate the system;
- Poorly maintained infrastructure, with many buildings and equipment in need of repair and/or maintenance;
- Corruption, including through 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;
- Limited availability of health workers, and poor deployment in the rural health facilities.
- Insufficient financial investment by the Government of Nigeria at both the federal and state level, as investments made are largely through loans from the World Bank, the African Development Bank, and the Islamic Development Bank.

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 has a State Malaria Elimination Program, with a coordinator and staff, and each LGA has a Malaria Program Officer (a local civil servant), who oversees malaria activities in his or her area.

The private healthcare system provides care for a substantial proportion of the Nigerian population. It consists of tertiary, secondary, and primary healthcare facilities, as well as pharmacies, proprietary patent medicine vendors (PPMVs), and unregistered drug sellers. Approximately 76 percent of all secondary facilities and about 28 percent of primary healthcare 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 provided at full-cost, as in for-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 2017, the total number of public health facilities in the 11 PMI-supported states was around 8,689, of which PMI has supported 3,534 facilities (41 percent). 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 Government of Nigeria (GoN). The focus and level of funding of PMI support in each state is guided by the availability of other donors and the capacity of the state and national governments to provide resources for malaria. PMI works closely with each state, as well as other partners to assess needs and set priorities, which vary from state to state.

4. National malaria control strategy

The National Malaria Strategic Plan (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 healthcare cadre/level relative to malaria control and case management across all healthcare 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 at least 80 percent of targeted populations with appropriate preventive measures by 2020.
- Test all care-seeking persons with suspected malaria using rapid diagnostic tests (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 percent 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 the prevention and treatment of malaria in Nigeria wherever they are needed by 2018.
- Ensure at least 80 percent of health facilities in all LGAs report routinely on malaria by 2020, that progress is measured, and that evidence is used for program improvement.

Under the strategic plan, the GoN supports the provision of ITNs, IRS, larval source management, IPTp, seasonal malaria chemoprevention (SMC), and diagnosis and treatment of uncomplicated malaria

through routine health services and integrated community case management (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 planned collaborations with corporate organizations in the implementation of IRS and IPTp, the integration of the commodity logistics system, the improvement of malaria case management in private health facilities, including proprietary patent medicine vendors (PPMVs), and the procurement of locally produced ITNs. In 2017, the GoN expressed renewed interest in procuring 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

In March 2016, the framework for the second National Strategic Health Development Plan 2017-2021 was initiated at the fifty-eighth National Council for Health, the highest coordination body for the health sector in Nigeria. The framework, which focused on 15 priority areas, was used by the government at both state and federal levels to develop plans which were then consolidated into a single national strategy. The National Strategic Health Development Plan 2017-2012 has been validated and will be endorsed at the sixty-first National Council for Health in June 2018.

The NMEP and Partners look to start the development of a new NMSP in 2019. The new NMSP should be completed in 2020, and will align with the National Strategic Health Development Plan 2017-2012.

PMI coverage

PMI began in 2011 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. In 2017, PMI transitioned out of Kogi and began activities in Plateau. Table 1 provides a detailed description of PMI investment areas for the current 11 PMI-supported states.

Table 1: PMI-Supported States by Start-up Year and Planned Interventions for 2019

State	Start-Up Year	PMI Interventions								
		ITNs	EM ²	IPTp	SMC	CM ¹	PSM	iCCM	SBCC	Surv ³
Cross River	2011	X		X		X	X		X	X
Nasarawa	2011	X	X	X		X	X		X	X
Zamfara	2011	X		X	X	X	X		X	X
Bauchi	2012	X	X	X		X	X	X	X	X
Sokoto	2012	X	X	X	X	X	X		X	X
Benue	2012	X		X		X	X	X	X	X
Ebonyi	2012	X	X	X		X	X	X	X	X
Oyo	2012	X	X	X		X	X		X	X
Akwa Ibom	2013	X	X	X		X	X		X	X
Kebbi	2013	X		X	X	X	X	X	X	X
Plateau	2017	X	X	X		X	X		X	X

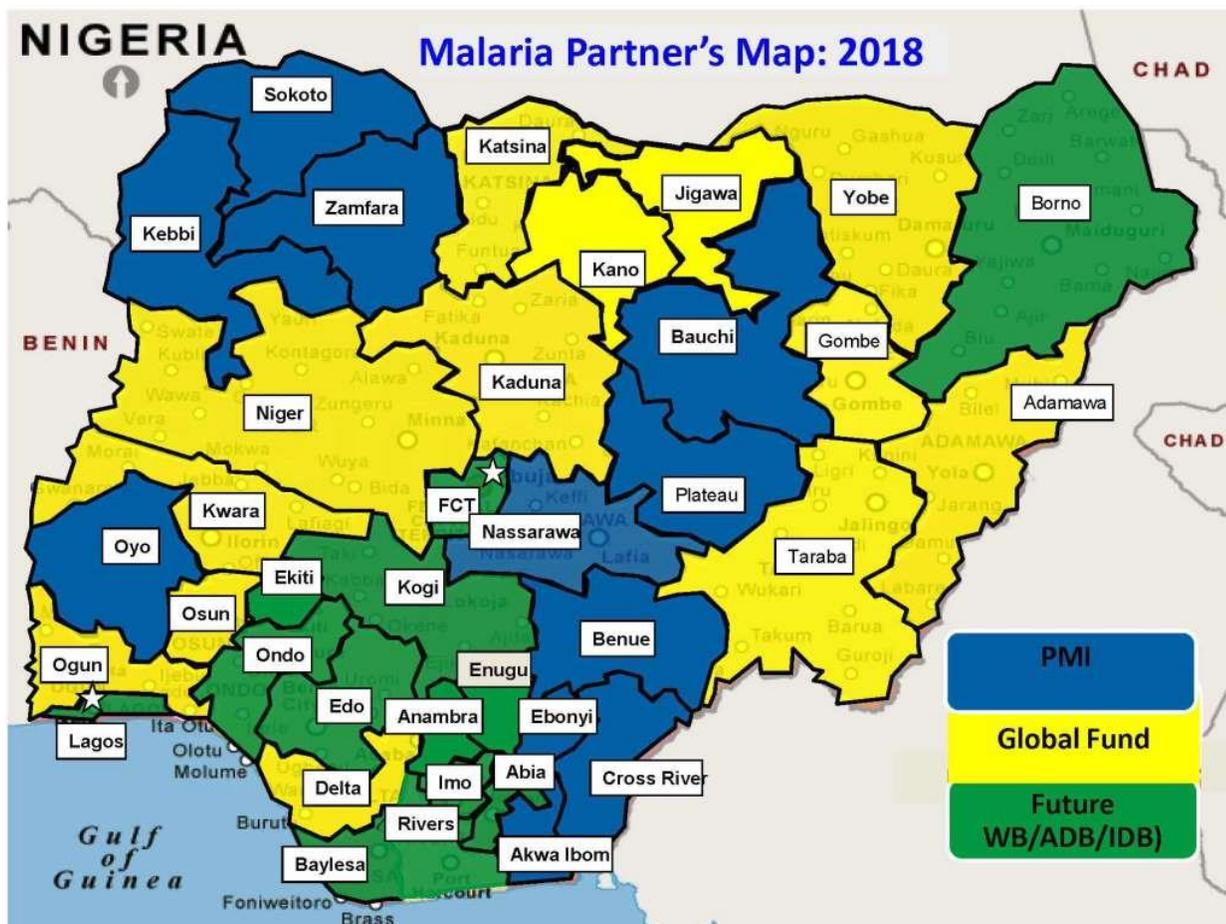
¹ CM - Case management

² EM - Entomological monitoring

³ Surv - Strengthening HMIS/DHIS

PMI previously overlapped with the Global Fund in 8 of the 11 states. However, beginning in 2018, the Global Fund grant focused its support to 13 non-PMI-supported states. The projected population for 2020 in the 11 PMI-supported states is 59.6 million.

Figure 2: PMI- and Global Fund-Supported States in 2018



The total estimated number of public health facilities in the 11 PMI-supported states is 8,689. PMI, coordinating with State Malaria Elimination Programs (SMEPs) and other partners, will support approximately 4,000 health facilities in 2018 and 4,800 in 2019 with FY 2017 and FY 2018 funding, respectively (Table 2). The expansion plan addresses the addition of health facilities previously supported by the Global Fund, as well as 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 funded Saving One Million Lives (SOML) project.

Table 2: Health Facility Coverage Plan in PMI-Supported States

State	Total LGAs	Health Facilities		PMI-Supported Health Facilities							
		Total	Total Public	2014	2015	2016	2017	2018	2019	2020	% *
Akwa-Ibom	31	583	482	452	461	442	481	481	481	481	100%
Bauchi	20	1,127	1,050	415	165	206	210	210	275	425	40%
Benue	23	1,367	1,096	184	247	282	302	302	410	550	50%
Cross River	18	1,266	1,043	144	235	377	384	384	425	470	45%
Ebonyi	13	646	523	104	163	349	352	352	450	495	95%
Kebbi	21	730	675		165	270	305	480	570	575	85%
Nasarawa	13	1,034	790	105	186	494	516	516	516	516	65%
Oyo	33	1,523	783	132	176	178	182	182	250	350	45%
Plateau**	17	1,141	850	.	.	.	254	350	500	635	75%
Sokoto	23	760	693	161	161	267	282	370	500	520	75%
Zamfara	14	740	704	112	130	267	266	350	425	525	75%
Total	226	10,917	8,689	1,809	2,089	3,132	3,534	3,977	4802	5,542	64%

* Percent of public health facilities slated to receive PMI support by 2020.

** PMI support for Plateau State started in calendar year 2017.

6. Integration, collaboration, and coordination

Government of Nigeria Contribution to Malaria

There are federal and state-level contributions to malaria programming in Nigeria. At the federal level, the government contributed \$10 million as counterpart financing for the Global Fund Round 8 Grant and supported IRS in five states. At the state level, governments cover salaries, provide warehousing for ITNs, procure commodities, and support community mobilization to varying degrees by state. Health runs on the concurrent list in the Nigerian constitution, which implies that local, state, and federal governments all have a responsibility to contribute to health funding. However, funding from local governments is extremely limited, while state governments budget for and procure some malaria commodities. In order to access additional resources from the Global Fund for the 2014-2016 funding cycle, the GoN made a payment of required counterpart funding in the amount of \$18.8 million. With the payment to the Global Fund, Nigeria will now access to the total funds available in the 2017-2019

funding cycle. The GoN is also pursuing negotiations for additional loans from the World Bank, the African Development Bank, and the Islamic Development Bank

To further support the transition to full government ownership, PMI, through the USAID Health, Population, and Nutrition Office, is developing a memoranda of understanding with state governments. These agreements specify the roles and responsibilities of both partners, including financial obligations. State-level financial contributions are established as a baseline and are increased at a realistic rate each year until the transition to full government ownership is complete. Benchmarks to measure progress are included in the memoranda of understanding, and reviews are scheduled every six months.

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 UNICEF and WHO. There is also corporate sector support for malaria control, including ExxonMobil, Chevron, Royal Dutch Shell, the 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 and leverage the strengths 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 Grant, totaling over \$400 million for two years. The approved grant for Nigeria under the New Funding Model was \$400,253,346 to cover the period of February 2015 to December 31, 2016. The NMEP (\$308,577,343) and the Society for Family Health (\$91,676,003) were designated 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 for the 2014-2016 Global Fund New Funding Model Grant; in late April 2018, Nigeria met this counterpart obligation.⁴

In 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). The grant was to implement ITN mass campaigns in six states and continue implementation of other malaria program activities through December 2017.

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: (1) to attain universal coverage of ITNs through mass campaigns and continuous distribution channels; (2) improve coverage for malaria in pregnancy (MIP), especially with IPTp; (3) to increase ACT roll-out in the public and private sectors; and (4) to increase malaria diagnosis using microscopy and RDTs in public and private health facilities. The grant also supports broader health system activities, such as logistics management, the health management information system, and social and behavioral change communication.

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 was approved in November 2017 in the

⁴The previous 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. Late April 2018, the GoN provided \$ 18,685,000 of matching funds for Malaria to the Global Fund bank account. This remains an unprecedented achievement despite being \$28,022 short from outstanding of \$18,713,022.

amount of \$283 million with the NMEP and Catholic Relief Services as the principal recipients.

UNITAID invested \$67.4 million over three years (September 2014-August 2017) through its *Achieving Catalytic Expansion of SMC 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 worked in 37 LGAs across two Nigerian states: Sokoto and Zamfara. UNITAID is now funding the *Transforming IPTp for Optimal Pregnancy Project* in Ebonyi State. UNITAID no longer funds SMC in Nigeria.

The World Bank is supporting integrated health program implementation through performance-based financing options, private-sector strengthening, and health governance support. The World Bank has three-tiered funding to assist the GoN:

- The Saving One Million Lives (SOML) Initiative Program-for-Results Project, a five-year, \$500 million, GoN-led initiative which started implementation in 2016 and is designed to support at-scale delivery of evidence-based reproductive, child, maternal, newborn, and nutrition interventions and human 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.
- The Nigeria State Health Investment Project, which has two phases: (1) a \$170 million, 100 percent results-based financing initiative with two arms— performance based-financing and decentralized facility financing—effective since August 2013 and currently implemented in Adamawa, Nasarawa and Ondo States; and (2) a \$145 million scale-up of performance-based financing implemented in the five northeast states of Bauchi, Taraba, Yobe, Gombe and Borno;
- A Multi- Phased Programmatic Approach Project, a long-term, not yet approved (up to ten year), \$1 billion operation focused on the reduction of under-5 mortality through 2029. The latter will include a \$200 million Innovative Malaria Control Project anticipated to start around March 2019 in support of the 12 states and the Federal Capital Territory that are not supported by PMI and Global Fund. The GoN and World Bank are also engaged with the African Development Bank and the Islamic Development Bank to mobilize an additional \$100-150 million to meet the country request to the World Bank for support for malaria.

DfID supported a £89 million project (about \$140 million) called Support for the National Malaria Program 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. DfID provided approximately \$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 has yet to be awarded.

The WHO supports an Abuja-based malaria Surveillance, Monitoring, and Evaluation (SME) Technical Officer and a National Malaria Program Officer in each of the six geopolitical zones of Nigeria. They assist the states in the 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. A midterm review of the NMSP was also conducted in 2017 with support from WHO and technical partners. All PMI activities are coordinated with these efforts.

Donor coordination occurs at various levels. Overall, through NMEP coordination mechanisms PMI, the Global Fund, DfID, and the World Bank hold periodic update meetings to discuss implementation, share best practices, and address challenges. There is also good coordination with UN systems (WHO, UNICEF, etc.) and other donors through the Development Partners Group for Health.

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.

The Global Fund's Affordable Medicines Facility-Malaria program has transitioned into the Private Sector Co-Payment Mechanism. With funding from DfID, Nigeria received approval to continue implementation of the ACT co-payment for 2015-2016 in the amount of \$82 million under the Global Fund's New Funding Model.

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. However, the role that the private sector will play as a result of 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, a 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. The annual technical forum in Nigeria aims to mobilize the resources, skills, and capacity of the private sector in support of the NMSP 2014-2020. The Corporate Alliance on Malaria in Africa also 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.

Within the U.S. Government

PMI has identified opportunities to integrate investments with other U.S. Government program activities, including within the USAID Health, Population, and Nutrition team, and with other USAID teams, the U.S. Department of Defense; and the U.S. President's Emergency Plan for AIDS Relief. The goal of Global Health Security Agenda is to prevent, detect, and respond to public health threats such as infectious disease outbreaks. To achieve this, the U.S. Government is supporting efforts to strengthen health systems in the areas of capacity building, laboratories, and surveillance. It is anticipated that these efforts will also positively impact malaria control.

In 2015, PMI Nigeria, CDC Nigeria, the NMEP, and Nigeria Field Epidemiology and Laboratory Training Program (NFELTP)/National Stop Transmission of Polio (NSTOP) initiated an NSTOP/Malaria Frontline project to expand the reach of the U.S. Government's investments in Nigeria in order 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 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.

Support for improved malaria diagnostics has been built on the foundation established by the U.S. President's Emergency Plan for AIDS Relief's Department of Defense-Walter Reed Program to improve 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 the U.S. President's Emergency Plan for AIDS Relief are working to support Nigeria's integrated HMIS.

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 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 percent reduction from PMI's original 2000 baseline levels.
2. Reduce malaria morbidity in PMI-supported countries by 40 percent from 2015 levels.
3. Assist at least five PMI-supported countries to meet 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; and
5. Building capacity and health systems towards full country ownership.

To track progress toward achieving and sustaining scale of proven interventions (the first area of strategic focus), PMI will continue to track key household survey indicators recommended by the RBM Monitoring and Evaluation Reference Group, as listed below:

- Proportion of households with at least one ITN.
- Proportion of the population with access to an ITN. [[See here](#) for a description of this indicator.]
- Proportion of children under-5 who slept under an ITN the previous night.
- Proportion of pregnant women who slept under an ITN the previous night.
- Proportion of the population that slept under an ITN the previous night.
- Proportion of children under-5 with a fever in the last two weeks for whom advice or treatment was sought.

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

- Proportion of children under-5 with fever in the last two weeks who had a finger or heel stick.
- Proportion receiving an ACT among children under-5 with a fever in the last two weeks who received any antimalarial drugs.
- Proportion of women who received two or more doses of IPTp for malaria during antenatal care (ANC) visits during their last pregnancy.
- Proportion of women who received three or more doses of IPTp for malaria during ANC visits during their last pregnancy.

8. Progress on coverage/impact indicators to date

Table 3: Evolution of Key Survey Based Malaria Indicators in Nigeria from 2008 to 2016

Indicator	2008 NDHS	2010 NMIS	2013 NDHS	2015 NMIS	2016 MICS
% Households with at least one ITN	8%	42%	50%	69%	64%
% Population with access to an ITN	.	.	.	55%	50%
% Children under-5 who slept under an ITN the previous night	6%	29%	17%	44%	49%
% Pregnant women who slept under an ITN the previous night	5%	34%	16%	49%	40%
% Population that slept under an ITN the previous night	.	23%	13%	37%	41%
% Population that slept under an ITN the previous night among households with at least one ITN	.	49%	.	50%	60%
% Children under-5 years old with fever in the last two weeks for whom advice or treatment was sought	33%	49%	70%	66%	63%
% Children under-5 with fever in the last two weeks who had a finger or heel stick	.	5%	11%	13%	14%
% Children receiving an ACT among children under-5 years old with fever in the last two weeks who received any antimalarial drugs	2%	12%	18%	38%	21%
% Women who received two or more doses of IPTp during their last pregnancy in the last two years	5%	13%	15%	37%	31%
% Women who received three or more doses of IPTp during their last pregnancy in the last two years	2%	5%	6%	19%	15%
Under-5 mortality rate per 1,000 live births	157	.	128	.	120
% children under-5 with parasitemia (by microscopy , if done)	.	42%	.	27%	.
% children under-5 with parasitemia (by RDT , if done)	.	52%	.	45%	.

Table 4: Evolution of Key Malaria Indicators Reported through Routine Surveillance Systems in Nigeria from 2012 to 2017

	2012	2013	2014	2015	2016	2017
Total # of Cases (Confirmed and Presumed) ¹	12,407	3,293,937	16,115,850	14,733,292	15,935,066	18,118,061
# Confirmed Cases ²	6,901	1,395,025	8,239,134	8,216,722	10,719,693	13,170,255
# Presumed Cases ³	5,506	1,898,912	7,876,716	6,516,570	5,215,373	4,947,806
Total # <5 Cases ⁴	4,348	1,425,200	6,953,305	6,460,393	6,535,939	7,224,489
Total # Malaria Deaths	NA	NA	NA	NA	NA	NA
Data Completeness (%) ⁵	20%	44%	63%	65%	77%	83%
Test Positivity Rate ⁶	63%	71%	72%	72%	72%	72%

¹ Total Number of Cases: Total number of reported malaria cases - all ages, outpatient, confirmed and unconfirmed.

² Number of Confirmed Cases: Total diagnostically confirmed cases - all ages, outpatient.

³ Number of Presumed Cases: Total clinical/presumed/unconfirmed cases - all ages, outpatient.

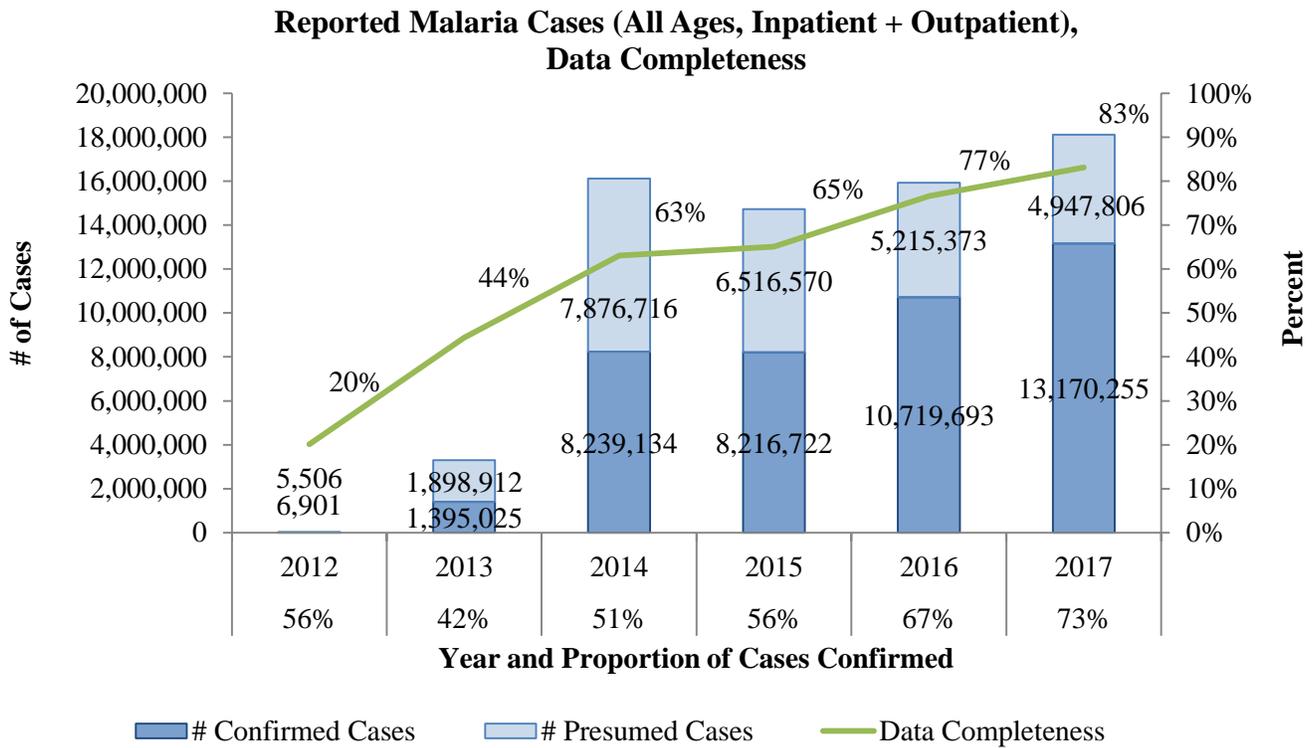
⁴ Total Number of <5 Cases: Total number of <5 cases - outpatient, confirmed, and unconfirmed.

⁵ Data completeness: Number of monthly reports received from health facilities/number of health facility reports expected).

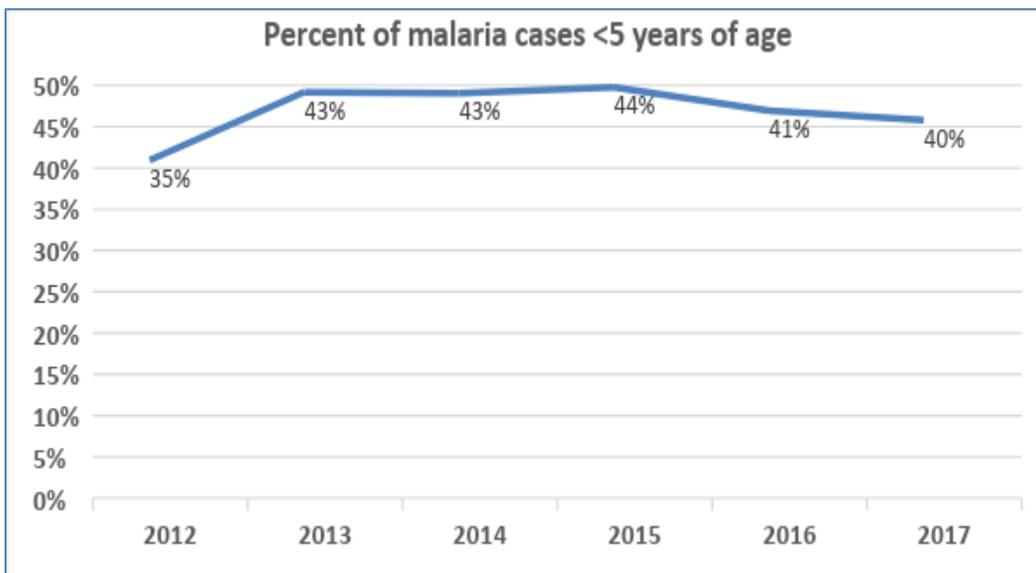
⁶ Test Positivity Rate: Number of confirmed cases/number patients receiving a diagnostic test for malaria (RDT or microscopy).

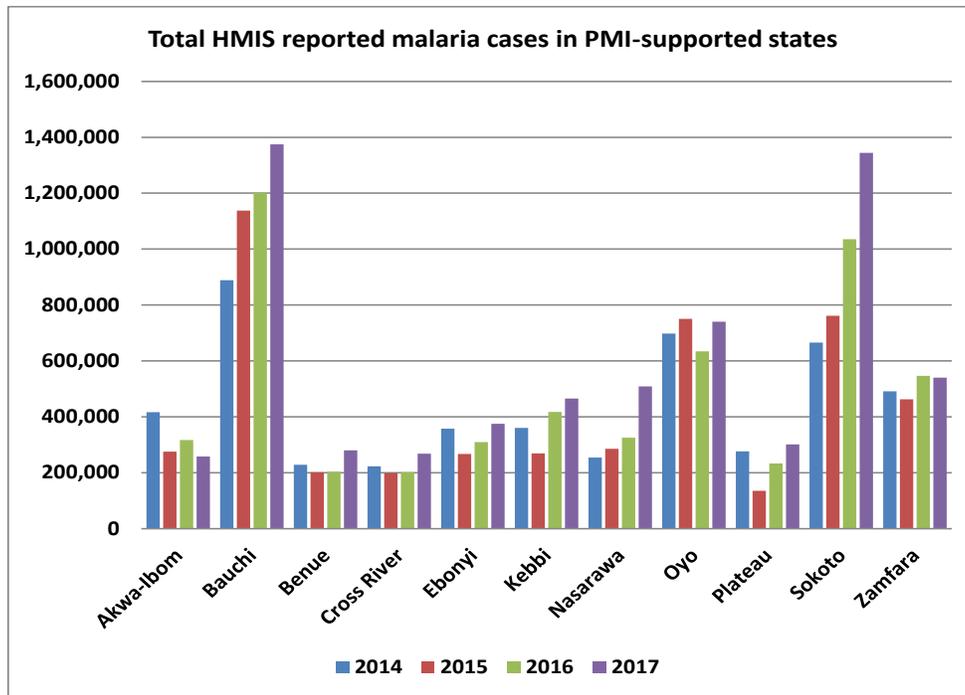
Note: Prior to 2013, tools were not harmonized and reporting was paper-based with challenges with quantifying the number of health facilities expected to report and incomplete reporting on all data elements. However, after 2013, harmonized tools significantly improved reporting rates, which partly explains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

Figures 3, 4, and 5: Trends in Key Malaria Indicators Reported in Routine Surveillance Systems



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 is increasing while the number of clinically diagnosed cases is declining—an indication of programmatic success.





Note: Data from DHIS2. Total HMIS reported malaria cases include confirmed and unconfirmed cases. 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

Not applicable

III. OPERATIONAL PLAN

This FY 2019 MOP presents a detailed implementation plan for Nigeria, based on the strategies of PMI and the 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 of supporting critical elements of the NMSP 2014-2020 in 11 of Nigeria's 37 states. PMI will benefit the general population of Nigeria with special attention paid to underserved populations in PMI target areas, including women and children under-5 years of age.

1. Vector control

NMEP/PMI objectives

Vector control is categorized under the prevention section of the NMSP 2014-2020. The first objective of the NMSP 2014-2020 states: "At least 80 percent of targeted population utilizes appropriate preventive measures by 2020." The prevention strategy includes the following three strategies:

1. Integrated vector management
2. Prevention of MIP; and
3. SMC

The integrated vector management strategy includes entomologic sentinel surveillance and insecticide resistance monitoring; universal access to ITNs; expanding IRS in targeted areas; and complementing ITNs and IRS with larval source management, if appropriate. In the 11 PMI focus states, PMI supports all the NMEP vector control interventions based on the NMSP 2014-2020 strategy except larval source management.

Specifically, the NMSP 2014-2020 targets for vector control are:

1. At least 80 percent of households with at least one ITN for every two persons (universal coverage).
2. At least 80 percent of children under-5 years of age sleep under an ITN.
3. At least 80 percent of pregnant women sleep under an ITN.
4. At least 40 percent of households in IRS targeted areas will be protected by 2020.
5. At least 85 percent 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.

ITNs are the primary vector control method in Nigeria as IRS is not widely implemented. This section will discuss integrated vector management. In the context of Nigeria, integrated vector management consists almost entirely of ITN distribution. With availability of both piperonyl butoxide (PBO) and Interceptor G2 nets, as well as increasingly detailed data on resistance intensity patterns, Nigeria is in a position to better match state-level resistance patterns with the most cost-effective ITN product. Prevention of MIP and SMC are discussed under the MIP and SMC sections, respectively.

a. Entomologic monitoring and insecticide resistance management

The NMSP 2014-2020 calls for the establishment of at least three vector surveillance sentinel and

insecticide resistance monitoring sites in each of the six geopolitical zones. Key challenges identified were inadequate infrastructure for effective and routine entomological and insecticide resistance monitoring, and a lack of systematic coordination for insecticide resistance monitoring at the national level. This is compounded by a lack of coordinated vector surveillance planning throughout the country.

In January 2017, the NMEP finalized the National Plan for Insecticide Resistance Management 2017-2020. The overall objective of this plan is to provide guidance for effective monitoring and management of vector resistance as well as quality of vector control interventions.

Progress since PMI was launched

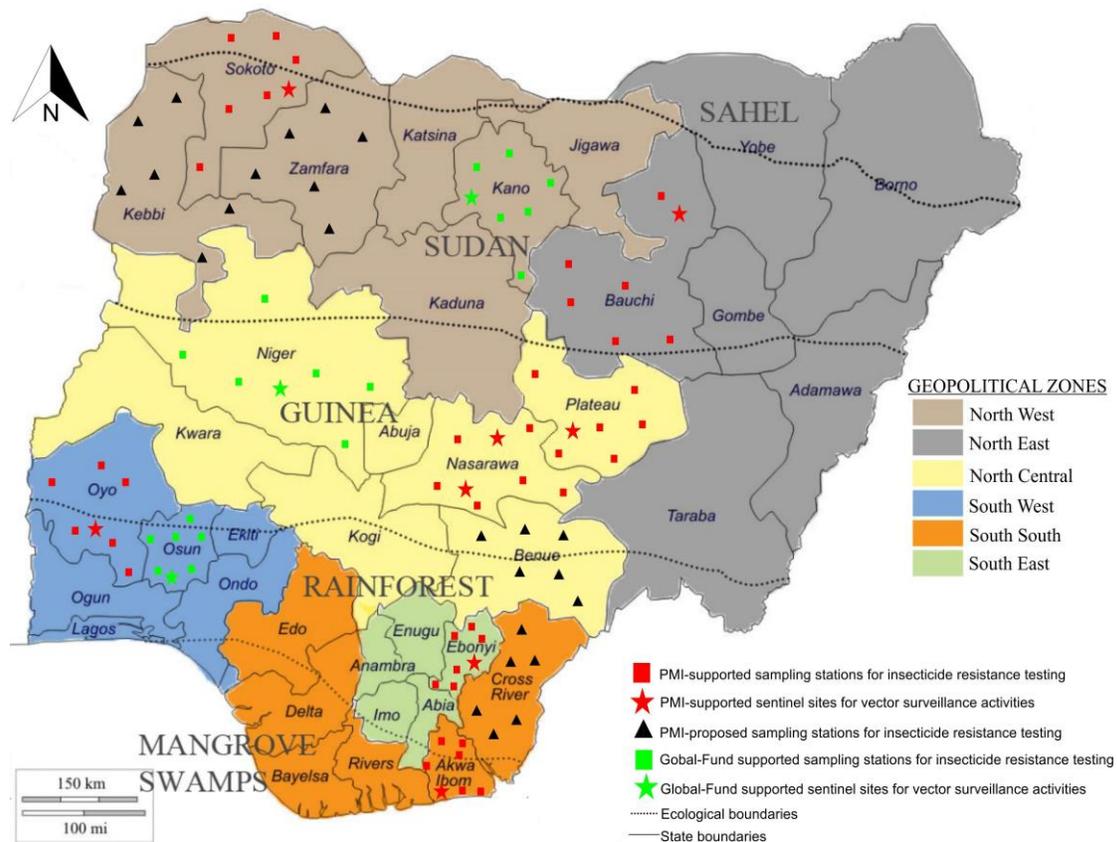
PMI has been supporting longitudinal malaria entomological surveillance and insecticide resistance monitoring in seven sites within six states (Figure 6). The sites were selected based on the five ecological zones and are associated with universities/research institutions located in the same states. In 2018, PMI re-established support for the Plateau State sentinel site, increasing the number of PMI-supported sites to eight in seven states. Vector density, distribution, seasonality, and feeding behavior are conducted monthly, while vector susceptibility studies, resistance mechanism analysis, and intensity are conducted annually. No other entomological sites are functioning currently.

PMI has supported monitoring of insecticide decay rates, indoor and outdoor mosquito collections using US Centers for Disease Control and Prevention (CDC) light traps, biting activity, pyrethrum spray catch 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. The insecticides tested are organochlorines, organophosphates, pyrethroids, and carbamates. CDC bottle intensity bioassays, oxidase enzyme testing for resistance mechanisms, and vector bionomics monitoring began in late 2014.

In 2013, PMI established an insectary at 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.

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 and the Nigeria Institute for Medical Research (NIMR) to strengthen coordination of entomological surveillance, adequately assess surveillance sites, engage in advocacy and engagement with state health authorities, and develop policies, standard operating procedures, and guidelines for entomological surveillance.

Figure 6: National and PMI-Supported Entomological Sentinel Sites, 2018

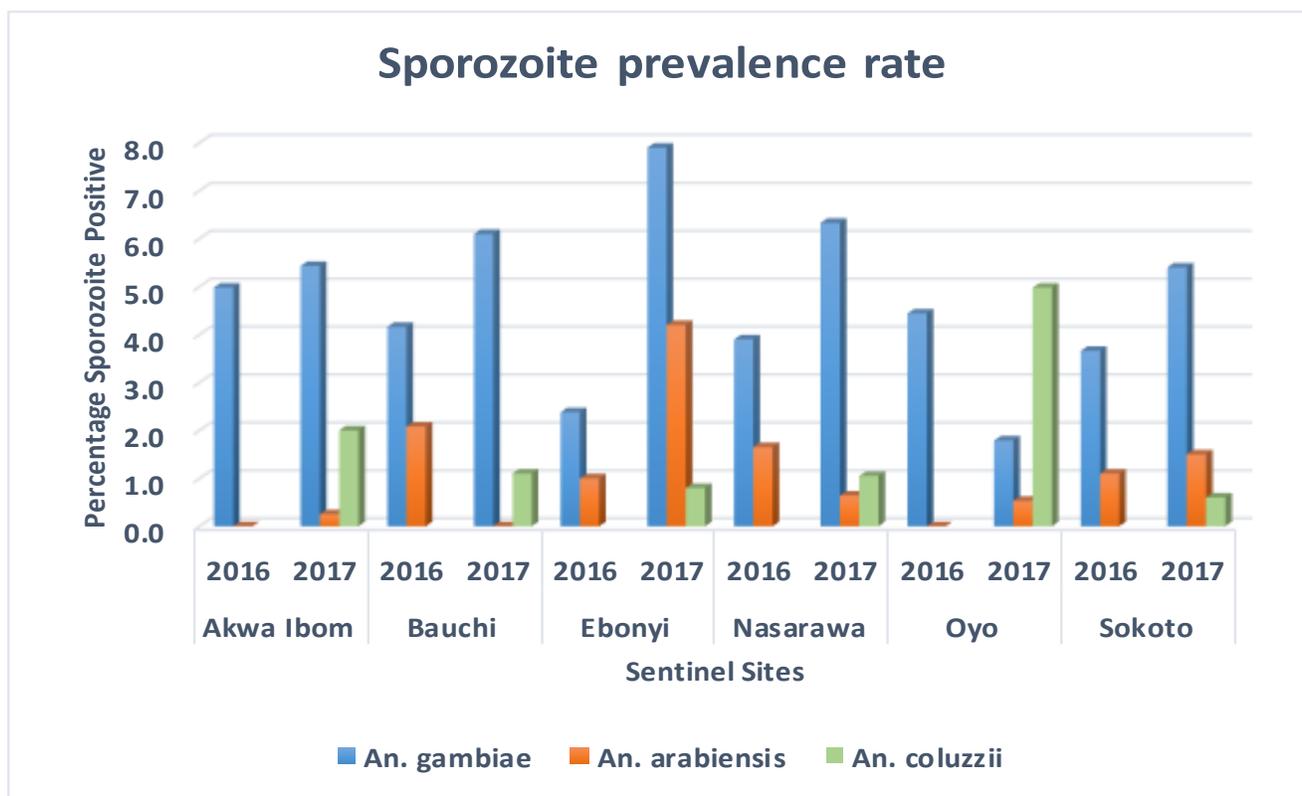


Progress during the last 12-18 months

PMI-supported mosquito surveillance included indoor resting densities with pyrethrum spray catch and CDC light/human-baited traps to conduct speciation and to determine mosquito-biting time. A total of 21,459 *Anopheles* (*An.*) mosquitoes were collected in 2017: 93.7 percent *An. gambiae s.l.*, 0.5 percent *An. funestus*, 3.1 percent *An. coustani*, and 2.5 percent other species. A significantly higher number of *An. gambiae s.l.* were collected indoors than outdoors in four sentinel sites, with Sokoto reporting more outdoor collection (53 percent vs. 47 percent).

Overall, the indoor resting density remained below ten *An. gambiae s.l.* mosquitoes per house per day throughout the year, with two peaks in Sokoto of 21.8 and 23.1 in May and August, respectively.

Figure 7: Proportion of *An. Gambiae*, *An. Grabiensis*, and *An. Coluzzii* Infected with *Plasmodium Falciparum*



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 5). The local mosquitoes (*An. gambiae s.l.*) showed resistance to DDT (organochlorine) across the seven sentinel sites. *An. gambiae s.l.* showed resistance to the pyrethroids (lambda-cyhalothrin, deltamethrin, and permethrin) in most of the sites, except in Oyo where there is sensitivity to deltamethrin. Sokoto reported resistance for pirimiphos-methyl.

According to the National Plan for Insecticide Resistance Management Plan 2017-2020, the most commonly used pesticide in agriculture is Lindane (Gamma BHC), which is 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; the rest 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 decade, pyrethroid insecticides namely alphacypermethrin, bifenthrin, lambda-cyhalothrin, deltamethrin, and bendiocarb have been used in IRS and ITN to control malaria.

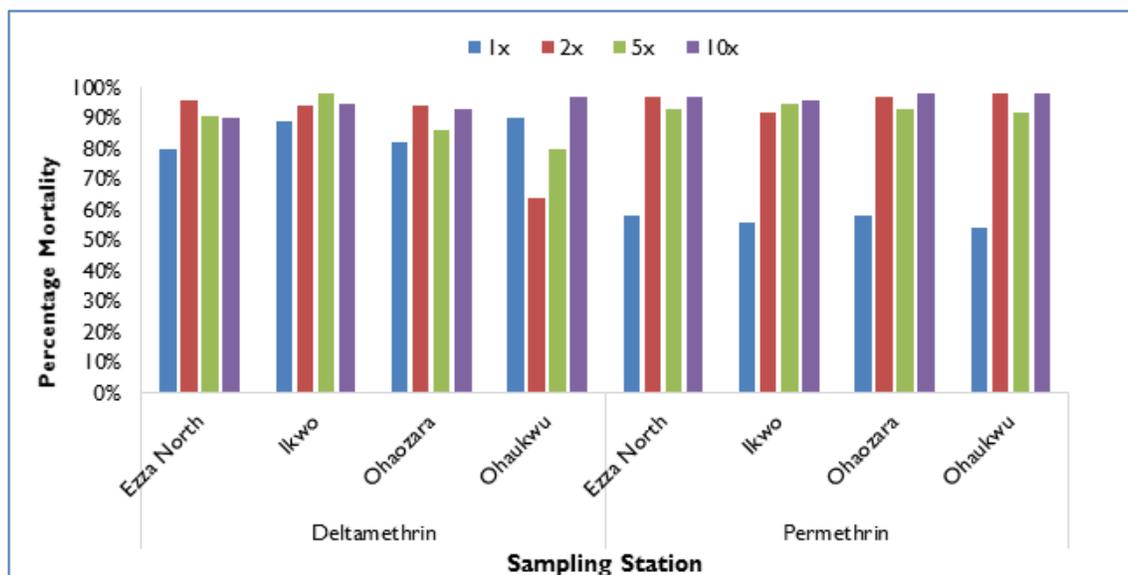
Table 5: *Anopheles Gambiae s.l.* Mean Mortality Rates (%) Using the WHO Tube Bioassay Method to Eight Insecticides from Six Locations in Nigeria, 2017

Insecticide	Class*	Akwa Ibom	Bauchi	Ebonyi	Nasarawa	Oyo	Sokoto
Lambda-cyhalothrin	P	83%	86%	77%	90%	28%	74%
Permethrin	P	57%	87%	58%	85%	41%	79%
Deltamethrin	P	75%	87%	88%	92%	48%	78%
α -cypermethrin	P	85%	84%	71%	96%	21%	90%
Bendiocarb	C	100%	99%	100%	100%	98%	97%
Propoxur	C	100%	99%	100%	98%	92%	100%
Pyrimiphos-methyl	OP	100%	99%	95%	100%	100%	87%
DDT	OC	77%	82%	87%	66%	11%	41%

* P - Pyrethroid, C - Carbamate, OC - Organochlorine, OP - Organophosphate
 Source: AIRS Nigeria 2017 Final Entomology Report, January-December 2017

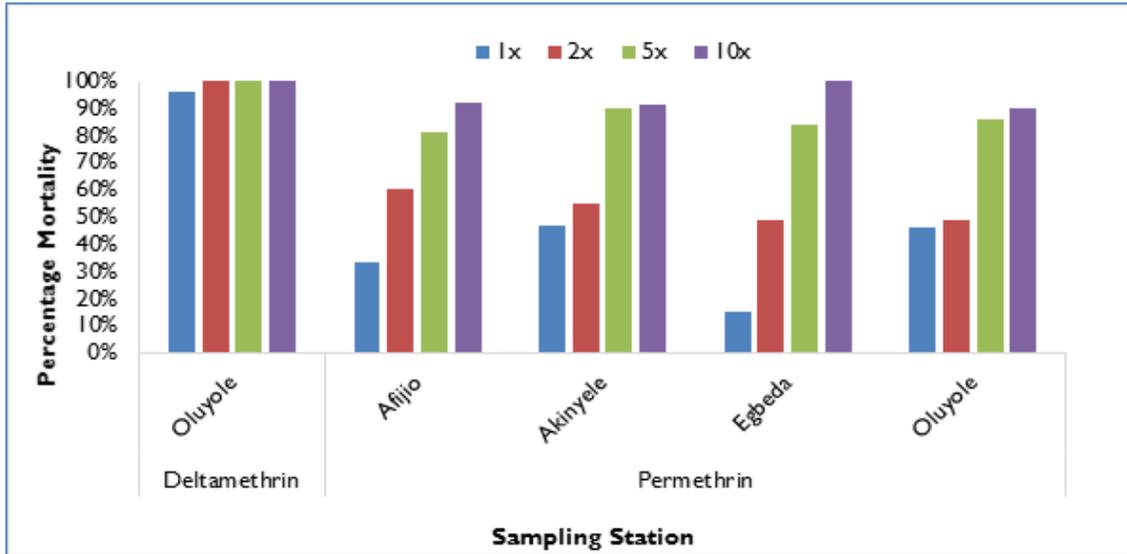
In Ebonyi State, 5x resistance to both deltamethrin and permethrin was observed in four LGAs, as shown in the figure below. For deltamethrin, mortality without PBO exposure ranged from 80-90 percent in four LGAs; pre-exposure with PBO resulted in 100 percent mortality in all LGAs. For permethrin, mortality without PBO exposure ranged from 54-58 percent in four LGAs; pre-exposure with PBO resulted in 97-100 percent mortality in these LGAs. These results are sufficient to justify use of next generation ITNs (PBO or a duo net) in Ebonyi State for the upcoming mass campaign.

Figure 8: Intensity of Resistance to Deltamethrin and Permethrin in Four LGAs in Ebonyi State, 2017



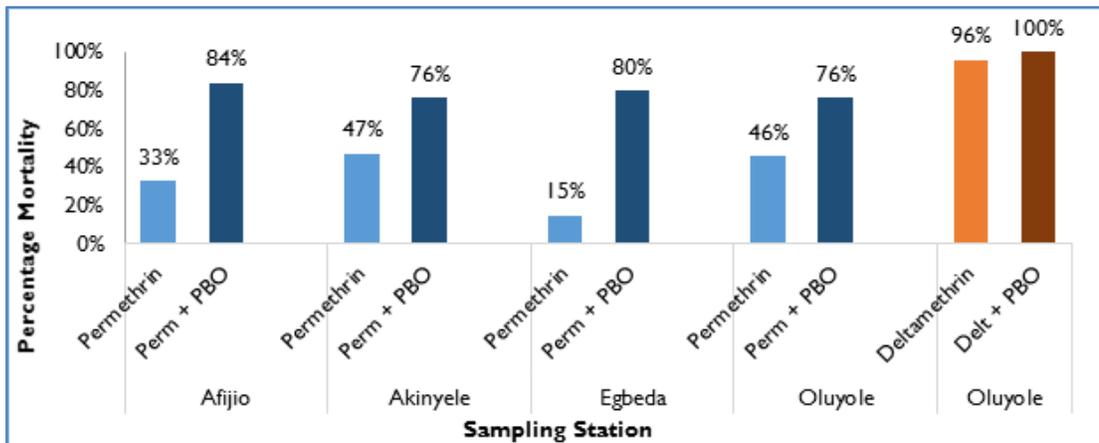
A different pattern was observed in Oyo State, as shown in Figures 9 and 10, below. In this state, deltamethrin remains effective, while permethrin shows high-intensity resistance.

Figure 9: Intensity of Resistance to Deltamethrin and Permethrin in Oyo State, 2017



PBO did not restore susceptibility to permethrin in Oyo, suggesting that either deltamethrin-based nets or a PBO-deltamethrin combination are suitable in this state, but neither a permethrin-based net nor a PBO-permethrin combination are suitable (Figure 10).

Figure 10: Results of Synergist Bioassays in Oyo State, 2017



Plans and justification for proposed activities with FY 2019 funding

With FY 2019 funds, PMI will continue to support longitudinal entomologic surveillance and insecticide resistance monitoring in seven states and resistance monitoring in two additional states (Zamfara and Benue), which are expected to conduct ITN mass campaigns in 2020. PMI also plans to conduct insecticide resistance testing in Cross River and Kebbi States to guide subsequent ITN selection for mass campaigns in these states.

PMI will provide technical assistance to the NMEP to carry out coordination and monitoring activities. FY 2019 funds will strengthen capacity at eight surveillance sites. In each state, one LGA will be the site of longitudinal sampling, while the number of LGAs carrying out insecticide resistance monitoring will be increased from four to six. In two new states (Zamfara and Bauchi), insecticide resistance monitoring will be carried out, given that patterns vary among states.

PMI support to the NMEP for entomological monitoring 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 technical assistance to the NMEP. Laboratory tests for mosquito infection rates will be conducted using polymerase chain reaction at the NIMR in Lagos. Essential molecular analysis of resistance markers in Oyo and Ebonyi will be carried out by the NIMR.

Starting with 2018 surveillance activity and with PMI support, the NIMR will begin to take on roles for capacity building, supervision, data management and coordination of all entomological activities in the country. The support to the NIMR will include training on entomological data management and molecular analysis. The NIMR will also support establishment of three additional entomologic surveillance sites (Niger, Osun and Kano States) in 2018 with Global Fund support. PMI will continue to coordinate with the Global Fund to ensure adequate funding and effective implementation of surveillance activities at sites funded by the Global Fund. This will include joint capacity building and supervision and review meetings aimed at ensuring protocol and implementation across all sites. PMI is also assisting with international procured consumables for the Global Fund supported sites. This support will continue with FY 2019 funds.

Acting upon the insecticide resistance data obtained from Ebonyi State, PMI plans to deploy PBO ITNs in 2019. PMI will expand collection stations to all LGAs in the state to obtain baseline entomologic and insecticide resistance data prior to the mass campaign.

Please see Table 2 for a detailed list of proposed activities with FY 2019 funding.

b. Insecticide-treated nets

Progress since PMI was launched

PMI Nigeria has supported ITN distribution through universal mass campaigns and continuous distribution channels. Mass ITN distribution is implemented through state-level campaigns, while the majority of continuous ITNs distribution is done through ANC and immunization clinics. Some ITNs have been distributed through school and community channels but these have been difficult to maintain.

Since 2011, PMI has procured a total of 40 million ITNs for mass campaigns and continuous channels, and distributed approximately 38 million ITNs, including more than 21.5 million ITNs procured by other partners. From December 2013 to December 2018, the NMEP and its partners distributed more than 72 million ITNs through mass campaigns, including over 35.7 million ITNs in all the eleven PMI-supported states. As detailed in the “Progress on Coverage/Impact Indicators” section, data from national surveys shows that ownership of at least one ITN in a household increased substantially from 8 percent (2008 NDHS) to 69 percent (2015 NMIS).

The average number of ITNs per household doubled from 0.8 in the 2010 NMIS to 1.6 in the 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 two states that had lower ITN ownership than the national average were Benue and Oyo. Benue and Oyo conducted mass ITN campaigns in 2016.

PMI Nigeria, with the NMEP, conducted a secondary analysis of the NMIS 2015 data to investigate why improved access to ITNs did not result in increased ITN use. However, the results did not explain this contradiction. 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 rural populations, as compared to southern Nigeria and urban populations. The 2015 NMIS data also show higher ITN ownership among low-wealth quintiles, as compared to high-wealth quintile (86 percent vs. 58 percent).

Figure 11: Trends in ITN Ownership by Residence (Percent of Households with at Least One ITN)

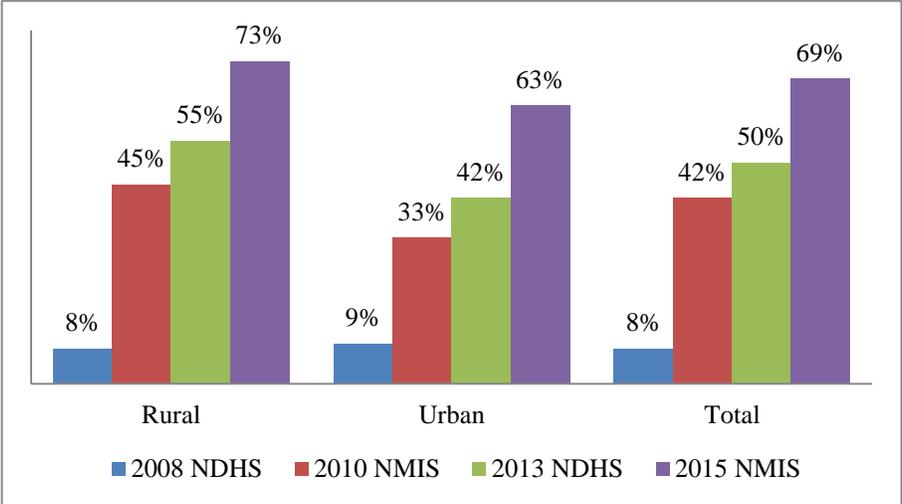
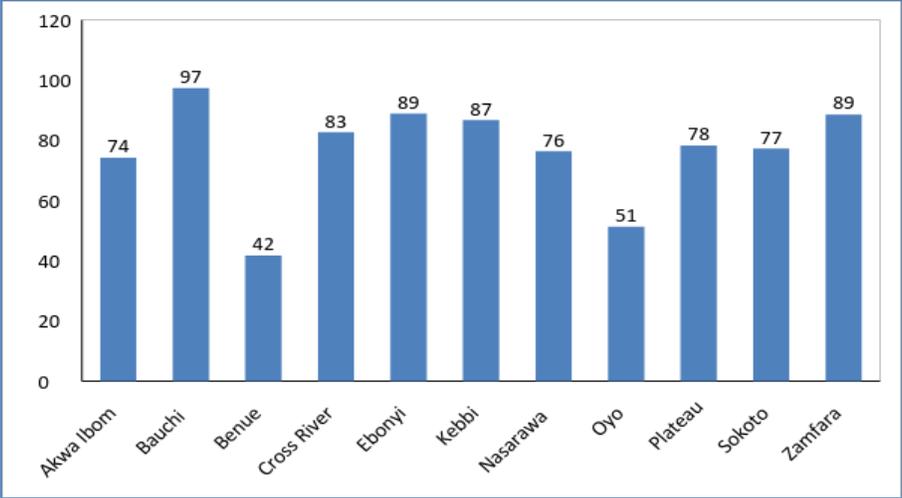


Figure 12: Percentage of Households With at Least One ITN in the 11 PMI-Focus States



Source: 2015 NMIS

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 more than 55,000 ITNs among four grade levels in 192 primary schools, reaching 95 percent of eligible children. An end-line evaluation survey in March 2014 showed that population access in households increased from 34 percent to 55 percent in the two pilot LGAs, versus decreasing access from 38 percent to 26 percent in a control LGA.

PMI initiated a community-based distribution system through Community Drug Distributors in 52 health facilities of Nasarawa State in 2013. A household survey conducted in April 2014 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.⁶

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 a comprehensive communication intervention improved attitudes and behaviors about the care and repair of nets, there was no significant effect on overall net lifespan, implying that efforts should focus on promoting behaviors that prevent net damage rather than repair.

Progress during the last 12-18 months

With FY 2016 funds, PMI procured 7.9 million ITNs, out of which 6.9 million were designated for mass campaigns, more than 700,000 for continuous distribution, and 300,000 for IDPs. PMI distributed 9.3 million ITNs through mass campaigns in Kogi, Sokoto, Kebbi and Nasarawa States from 2017 to April 2018, with more than 95 percent of registered households receiving a net. PMI provided 2.5 million ITNs to NMEP for a mass campaign in Adamawa State: distribution cost was funded by the Global Fund and implemented through its principal recipient.

PMI distributed more than 500,000 ITNs through ANC/immunization continuous distribution channels in public health facilities in all 11 PMI-supported states. In previous years, PMI supported distribution via school-based and community channels. However, these have not been used in the past year due to limited availability of ITNs for continuous distribution and the well-documented effectiveness of mass campaigns. PMI will focus on ensuring that mass campaigns are done well and are supplemented by routine distribution through ANC and immunization clinics. PMI will not support school-based or community distribution, as these require parallel administrative costs and offer little chance of synergist effects, unlike ANC and immunization clinics, which have self-supporting administrative structures, and whose service coverage may be improved by the magnet effect of ITN distribution.

PMI supported durability monitoring in three states (see Table 6). ITNs in Zamfara show better durability than the other two states. PMI Nigeria will continue to monitor net durability for another year. If the Zamfara trend continues, an adjustment in the timeline for a repeat mass campaign in Zamfara may be possible.

Table 6: PMI ITN Durability Monitoring in Ebonyi, Zamfara, and Oyo States from 2016-2018

State	Percent Attrition Rates of ITNs			Physical Survival Rate (%)	Median Survival (Years)
	6 Months	12 Months	24 Months		
Zamfara	4%	5.3%	14%	92%	5.6
Ebonyi	13%	21.8%	38%	76%	3.3
Oyo*	9.2%	32%	N/A**	92%*	2.7

* Oyo Campaign occurred one year after initial planned date, which is why there is no 24-month data. Overall physical survival for Oyo is 12 months; ** Not available

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.

Commodity gap analysis

Table 7: ITN Gap Analysis 2018-2020

Calendar Year	2018	2019	2020
Total Targeted Population	56,039,139	57,796,013	59,587,689
Continuous Distribution Needs			
Channel #1: ANC	1,133,952	1,169,502	1,205,757
Channel #2: EPI	399,279	411,797	424,562
<i>Estimated Total Need for Continuous Channels</i>	1,533,231	1,581,299	1,630,319
Mass Campaign Distribution Needs			
Nasarawa State	1,600,000	-	-
Kebbi State	2,600,000	-	-
Akwa Ibom State	3,200,000	-	-
Bauchi State	-	4,000,000	-
Plateau State	-	2,500,000	-
Cross River State	-	2,300,000	-
Ebonyi State	-	1,700,000	-
Zamfara State	-	-	2,800,000
Benue State	-	-	3,500,000
Oyo State	-	-	5,000,000
<i>Estimated Total Need for Campaigns</i>	7,400,000	10,500,000	11,300,000
Total ITN Need: Routine and Campaign	8,933,231	12,081,299	12,930,319
Partner Contributions			
ITNs Carried Over from Previous Year	4,200,000	0	0
ITNs from MOH	50,000		
ITNs from Global Fund	0	0	0
ITNs from Other Donors	0	0	0
ITNs Planned with PMI Funding	3,300,000	11,000,000	11,300,000
Total ITNs Available	7,550,000	11,000,000	11,300,000
Total ITN Surplus (Gap)	-1,383,231	-1,081,299	-1,630,319

*The expected number of pregnant women in Nigeria is 5 percent of the total population. Average of 57 percent ANC attendance in PMI-supported states, with average 71 percent 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 percent of the total population. Average of 57 percent measles vaccine coverage in PMI supported states, with assumed 25 percent implementation coverage. Estimates for ITN mass campaigns are obtained by dividing the population in PMI states due for campaigns in 2018, 2019, and 2020 by 1.8 (to achieve 1 net per 2 people ratio).

Plans and justification for proposed activities with FY 2019 funding:

PMI will support the distribution of ITNs through mass campaigns and ANC/immunization continuous channels. FY 2019 funds will support mass campaigns in three states in 2020 and procurement of ITNs for three other states in 2021. FY 2019 funds will procure ITNs for ANC/immunization continuous distribution channels.

PMI Nigeria will use results from insecticide resistance monitoring to influence ITN procurement. Moderate to high levels of pyrethroid resistance have been identified over the last two years in two entomologic surveillance sites (Ebonyi and Oyo). PMI Nigeria plans to procure 1.7 million next-generation or PBO ITNs for Ebonyi State (2019 campaign). PMI Nigeria will work closely with PMI to design and implement an entomologic and epidemiologic evaluation of these nets. In Oyo State, PBO did not fully restore permethrin susceptibility, but did for deltamethrin. The next mass campaign in Oyo will occur in 2020. PMI Nigeria would like to procure next-generation or deltamethrin-based PBO ITNs for Oyo; however, with a need of five million ITNs next generation nets would require a subsidy or additional resources.

PMI Nigeria has been successful in requiring states to provide warehousing for ITNs during mass campaigns and contributing to other distribution costs, resulting in a lower cost per ITN budgeted for PMI support to mass campaigns.

PMI will support ITN durability monitoring following mass campaigns that occur in 2019.

Please see Table 2 for a detailed list of proposed activities with FY 2019 funding.

c. Indoor residual spraying

Progress since PMI was launched

From 2011-2013, PMI supported IRS in two LGAs in Nasarawa State to demonstrate best practices for IRS implementation. During the two years, 120,000 households were sprayed, protecting more than 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 and in a total of 14 LGAs. The World Bank Booster program ended in March 2014 and most states did not have domestic resources to continue IRS activities.

Among 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.

In November and December 2016, the GoN and the Public Private Partnership implemented IRS using alphacypermethrin. The GoN provided funds for piloting IRS in selected LGAs in six states: Nasarawa, Bauchi, Jigawa, Lagos, Rivers, and Anambra.

Table 8: 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 last 12-18 months

Not applicable

Plans and justification for proposed activities with FY 2019 funding:

PMI has no plans to directly support IRS activities in Nigeria. PMI is available to provide technical assistance in environmental compliance and microplanning to the NMEP and states that plan to conduct IRS with their own resources.

2. Malaria in pregnancyNMEP/PMI objectives

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

- Use of long-lasting ITNs;
- IPTp with sulfadoxine-pyrimethamine (SP); and
- Prompt diagnosis and effective treatment of malaria illness.

The NMSP 2014-2020 emphasizes that MIP interventions are a component of the focused antenatal care (FANC) services delivered by Reproductive, Maternal, and Child Health Units within the FMoH. However, coordination of MIP activities is the responsibility of the NMEP through the MIP Technical Working Group in collaboration with the Family Health Department, both located within the FMoH.

The NMSP 2014-2020 targets for MIP are:

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

Intermittent preventive treatment for pregnant women

In 2014, Nigeria adopted the updated the WHO IPTp policy of providing IPTp with SP starting as early as possible in the second trimester for all pregnant women at each scheduled ANC visit until the time of delivery, provided that the doses are given at least one month apart. IPTp-SP is to be administered as directly observed therapy 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 (Table 9).

Iron/folate

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-helminthic drugs 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 high-dose folic acid should be withheld for one week after SP administration. The NMEP and partners continue to advocate for the procurement of low-dose folic acid.

ITNs

Under the NMSP 2014-2020, ITNs are to be provided through the ANC continuous channel during a pregnant woman's first 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 malaria in the first trimester is quinine + clindamycin, and ACT in 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

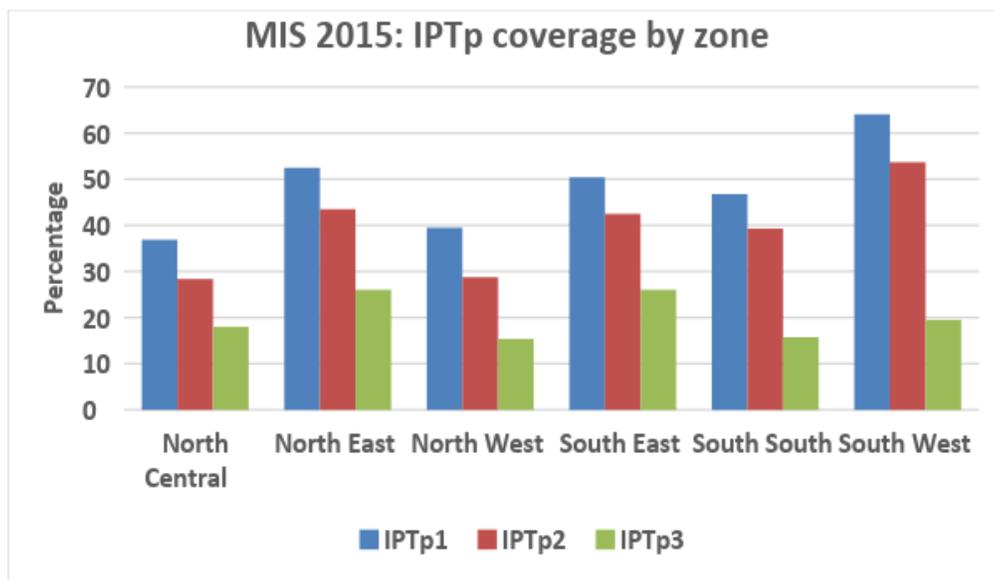
PMI Nigeria has supported ITNs through ANC, IPTp, and prompt case management of malaria during pregnancy. Efforts have focused on supporting distribution of ITNs to pregnant women during their first ANC visit, increasing IPTp coverage through the provision of free SP and the training of healthcare providers, and testing and promptly treating pregnant women with confirmed malaria. The national dissemination of the MIP guidelines took place in June 2015. PMI helped update the training materials and algorithms. PMI supported the dissemination of the new 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 technical working groups and strengthen the implementation of MIP activities in states.

Based on WHO's new ANC guidelines, which call for one visit before 12 weeks followed by visits at 20, 26, 30, 34, 36, 38 and 40 weeks' gestation, PMI and the Global Fund will support the NMEP and its partners to work closely with the Reproductive Health Unit of the FMoH to adopt the new recommendations and revise national MIP guideline to allow for early initiation of IPTp-SP administration.

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 more than 4,600 health workers in MIP.

Investments in MIP by PMI and other partners over the years are yielding results. Nigeria has increased ITN ownership at the household level, with a corresponding increase in use by pregnant women. According to the 2015 NMIS, 49 percent of pregnant women ages 15-49 in all households slept inside an ITN the night before the survey; in 2010, only 28 percent of pregnant women ages 15-49 slept inside a treated net. The 2015 NMIS showed that 46 percent of pregnant women received any IPTp compared to 15 percent in 2010 (NMIS), 37 percent received two or more doses of IPTp compared to 13 percent in 2010, and 19 percent received three or more doses of SP as compared to 6 percent in 2013 (NDHS).

Figure 13: IPTp Coverage by Zone



Source: MIS 2015

Routine HMIS data over the last three years has shown improvements in the rate of IPTp uptake among pregnant women visiting health facilities. Although data show improvements in uptake, MIP outcome indicators are still low. As observed during field visits to some hospitals, health workers who are not working in the pharmacy are not allowed to dispense SP. As a result, SP may not be available at ANC clinics. A combination of service delivery gaps result in missed opportunities for IPTp, ITNs, and proper management of malaria for the pregnant women.

Progress during the last 12-18 months

With FY 2016 funding, PMI procured 3.3 million SP doses and 700,000 ITNs for routine distribution through health facilities. 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 and the Global Fund 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, while ensuring that doses are four weeks apart and low-dose folic acid is available at health facilities. A committee was set up in early 2018 to develop a framework and guide for integrating certain malaria interventions with the Reproductive, Maternal, Newborn, and Child Health Project.

PMI is working with the 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 to capture the data in the health facility HMIS. The HMIS reporting forms and the District Health Information Software (DHIS2) application have yet to be updated to allow reporting of additional IPTp doses beyond IPTp2. 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. It is a five-year, \$49.6 million project that will be implemented in four African countries: Democratic Republic of Congo, Madagascar, Mozambique, and Nigeria.

Table 9: Status of IPTp Policy in Nigeria

Status of Training on Updated IPTp Policy		Number and Proportion of HCW Trained on New Policy in Last Year if Training Not Yet Completed	Updated IPTp Guidelines Available at Facility Level?	ANC Register Updated to Capture Three Doses?	HMIS/DHIS2 Updated to Capture Three Doses?
Completed/ Not Completed	Date <i>(If completed, when, if not completed, when expected)</i>				
Not Completed	Activity is continuous.	Cumulatively, 60 percent of ANC healthcare workers in 11 PMI states (except Plateau) over the last two years.	Guidelines are available in PMI-supported health facilities.	No, estimated completion date is December, 2018.	No, estimated completion date is December, 2018.

Table 10: Status of ANC Guidelines in Nigeria

Status of 2016 WHO ANC Guidelines Adoption		Number and Proportion of HCWs Trained in New ANC Guidelines in Last Year	Updated Adopted ANC Guidelines Available at Facility Level?	Additional IPTp Contact Added to ANC Schedule at 13 Weeks?	ANC Register Updated to Capture 8-9 ANC Contacts?	HMIS/DHIS2 Updated to Capture 8-9 ANC Contacts?
Started/ Completed/ Not Completed	Date completed <i>(or Expected)</i>					
Started	To be determined.	None in PMI-focus states.	No	No	No	No

Commodity gap analysis

Table 11: SP Gap Analysis for Malaria in Pregnancy, 2018-2020

Calendar Year	2018	2019	2020
Total Targeted Population ¹	56,039,139	57,796,013	59,587,689
SP Needs			
Total Number of Pregnant Women Attending ANC in Public Health Facilities*	1,133,952	1,169,502	1,205,757
Total SP Need (in Treatments)**	2,574,071	2,654,770	2,737,068
Partner Contributions			
SP Carried Over from Previous Years	-	5,776,679	6,121,909
SP from Government	-	-	-
SP from Global Fund	-	-	-
SP from Other Donors	-	-	-
SP Planned with PMI funding	8,350,750	3,000,000	2,000,000
Total SP Available	8,350,750	8,776,679	8,121,909
Total SP Surplus (Gap)	5,776,679	6,121,909	5,384,841
Pipeline Need	814,526	836,984	862,930

¹ The expected number of pregnant women in Nigeria is 5 percent of the total population.

* Average of 57 percent ANC attendance in PMI-supported states, with average 71 percent in public sector. Calculated using state-specific ANC coverage by skilled provider (DHS 2013).

** Plan for 100 percent SP1, 77 percent SP2, and 50 percent SP3.

Plans and justification for proposed activities with FY 2019 funding

PMI plans to support the NMEP and the 11 PMI-supported states to minimize the missed opportunities among women who attend ANC. PMI will collaborate with other partners to advocate for the availability of low-dose folic acid. Efforts will focus on increasing IPTp coverage through the 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. Currently, PMI is the only malaria partner procuring SP and receives requests from the NMEP and other partners to support with SP when state governments fail to procure as planned. The excess commodities provide opportunities for PMI to respond to these requests in order to minimize stockouts and improve IPTp coverage across the country

Please see Table 2 for a detailed list of proposed activities with FY 2019 funding.

3. Drug-based prevention

a. Seasonal malaria chemoprevention

NMEP/PMI objectives

Following the WHO recommendation of SMC for children between the ages of 3 and 59 months in areas of highly seasonal malaria transmission across the Sahel sub-region, the NMEP adopted SMC in its

strategic plan in 2013. The NMEP strategy recommends SMC in nine states in the Sahel region: Sokoto, Kebbi, Zamfara, Bauchi, Katsina, Kano, Jigawa, Yobe, and Borno (four doses of sulfadoxine-pyrimethamine + amodiaquine [SP-AQ] at monthly intervals over the for-month malaria transmission season). There are 227 LGAs and a population of approximately 11 million children under the age of five years in these states. With funding from the Bill and Melinda Gates Foundation (BMGF), Nigeria commenced implementation of SMC in 2013, where 150,000 children were protected in Katsina State. Subsequently DfID, UNITAID, the Dangote Foundation, and the GiveWell Foundation have supported SMC in Jigawa, Katsina, Kano, Sokoto, and Zamfara States. Malaria Consortium has led the implementation of SMC in Nigeria providing technical support to the NMEP and states. ACCESS SMC, the largest SMC activity in Nigeria, funded by UNITAID, began in 2015. It supported all LGAs in two states (Sokoto and Zamfara) and reached 1.8 million children in 2016, and it ended in December 2017.

Progress during the last 12-18 months

With funding from the GiveWell Foundation, the Malaria Consortium is supporting SMC implementation in Sokoto, Jigawa, Katsina and Zamfara States. PMI will collaborate with the Malaria Consortium to provide additional commodities for SMC implementation in Sokoto State, while the GiveWell Foundation provides the operational costs to distribute the addition commodities.

With FY 2016 funds, PMI procured and prepositioned 1,689,300 treatments of SP+AQ. For the 2018 SMC campaign, PMI will provide 844,650 treatments for implementation through the Malaria Consortium in Sokoto State and distribute the remaining doses for implementation in 2019. The Malaria Consortium will continue implementation support in the PMI-supported states of Sokoto and Zamfara in 2019. PMI will procure 1,689,300 treatments with FY 2017 funding, for a total of 2,533,950 treatments for implementation in 2019.

Table 12: PMI-Supported SMC activities, 2018-2020

Calendar Year	Number of Districts¹ Targeted for SMC	Number of Children <5 Targeted²	Coverage Rate (from Program Records)³
2018	44	2,005,652	-
2019	44	2,067,724	-
2020	44	2,131,720	-

¹ PMI targets 44 LGAs in states of Sokoto and Zamfara.

² Number of children under-5 in all LGAs in the two states.

³ There are no coverage reports as PMI has not implemented SMC.

Commodity gap analysis

Table 13: SP+AQ Gap Analysis

Calendar Year	2018	2019	2020
SMC Drug (SP+AQ) Needs			
Population Targeted for SMC ¹	11,926,894	12,308,682	12,702,732
PMI-Targeted Population for SMC ²	2,005,652	2,067,724	2,131,720
Total SP+AQ Needs	8,022,608	8,270,896	8,526,880
Partner Contributions (to PMI target population if not entire area at risk)			
SP+AQ Carried Over from Previous Year	0	844,650	0
SP+AQ from Government	0	0	0
SP+AQ from Global Fund	0	0	0
SP+AQ from Other Donors (GiveWell through MC)	300,000	300,000	0
SP+AQ planned with PMI funding	1,689,300	1,689,300	2,533,950
Total SP+AQ Available	1,989,300	2,833,950	2,533,950
Total SP+AQ Surplus (Gap)	-6,033,308	-5,436,946	-5,992,930

¹ Population targeted: Total under-5 children in nine states in the Sahelian region where SMC is recommended.

² PMI target: Total under-5 children in two PMI-supported states of Sokoto and Zamfara.

³ Nigeria malaria guideline recommends four rounds of SMC per year.

⁴ PMI procured 1.69 million doses of SP-AQ in 2018 and plans to distribute only 50 percent.

⁵ Malaria Consortium (with GiveWell Foundation funds) will target 300,000 in the two states in 2018 and 2019.

Plans and justification for proposed activities with FY 2019 funding:

With the 2015 NMIS showing persistently high prevalence of malaria parasitemia in children under-5 years of age in the North West Zone despite high levels of ITN ownership and use, PMI is adding support to SMC efforts targeted at children under the age of five years. Since artesunate-amodiaquine (AS/AQ) is one of Nigeria's first-line treatments, PMI has already switched completely over to artemether-lumefantrine (AL) in the SMC targeted states. PMI also supports the NMEP and advocates to the state government and private sector to prevent the distribution and sales of AS/AQ to health facilities in these states. The estimated cost per child is approximately \$3.00 for four treatment courses of SP-AQ.

Within the three PMI-supported Sahelian states targeted for SMC (Kebbi, Sokoto, and Zamfara), there are about 3 million children between 3-59 months of age (eligible for SMC) projected for 2020.

With FY 2019 funding, PMI will continue SMC activities in Sokoto and Zamfara States previously supported by other donors. At current funding levels, PMI can target 633,000 children (30 percent of those eligible). If additional support becomes available, PMI will support the expansion to all eligible children (2,111,553) in the two states.

Please see Table 2 for a detailed list of proposed activities with FY 2019 funding.

4. Case management

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 ACTs. 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 an 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 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 quality assurance and quality control (QA/QC) of malaria diagnostic services.
- Conduct antimalarial therapeutic efficacy studies (TES).

The NMEP receives technical assistance and coordinates partners through the case management technical sub-committee. PMI is an active member and assisted in the development of a diagnostic expert working group that reports to the 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: (1) be used at all facilities where microscopy is not available, and (2) complement microscopy in secondary facilities and in certain outpatient clinics of tertiary facilities. The target for parasitological diagnosis is 100 percent in the public sector and 80 percent in the private sector and community (where iCCM is implemented) by 2018.

The NMEP, with support from PMI and in collaboration with the Department of Defense-Walter Reed Program developed and finalized a QA framework and the Malaria Diagnostic External Quality Assurance (EQA) Operational Guidelines for parasite-based confirmation of malaria in 2012. Guidelines call for quarterly facility visits for lab supervision, slide validation, and on-the-job mentoring.

AL and AS/AQ are the two recommended first-line treatments for uncomplicated malaria in Nigeria, including for children weighing less than 5 kilograms with appropriate dosing. In 2012, the NMEP changed the first-line treatment for severe malaria from quinine to 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 for severe malaria is intramuscular or rectal artesunate, intravenous quinine, or intravenous artemether. The target for malaria treatment is that 80 percent of persons with a parasite-based diagnosis of malaria will receive prompt antimalarial treatment according to the national treatment policy by 2017, and 100 percent of persons with a parasite-based diagnosis of malaria will receive prompt antimalarial treatment according to the national treatment policy by 2020.

Table 14: Status of Case Management Policy and Implementation in Nigeria

Status of Case Management Policy in Nigeria According to National Guideline for Diagnosis and Treatment of Malaria (Third Edition, 2015)	Currently Being Implemented? Plans to Modify Recommendations?
What is the first-line treatment for uncomplicated <i>P. falciparum</i> malaria?*	Artemether-lumefantrine (AL) and Artesunate-amodiaquine (AS/AQ)
What is the second-line treatment for uncomplicated <i>P. falciparum</i> malaria?*	Nigeria has two first-line choices (see above)
What is the first-line treatment for severe malaria?	Injectable artesunate
In pregnancy, what is the first-line treatment for uncomplicated <i>P. falciparum</i> malaria in the first trimester*?	Quinine + Clindamycin
In pregnancy, what is the first-line treatment for uncomplicated <i>P. falciparum</i> malaria in the second and third trimesters*?	Artemether-lumefantrine or Artesunate-amodiaquine
In pregnancy, what is the first-line treatment for severe malaria?	Injectable artesunate
Is pre-referral treatment of severe disease recommended at peripheral health facilities? If so, with what drug(s)?	Artesunate- intramuscular or rectal Intramuscular artemether Intravenous quinine
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 administering to those ≥ 6 years)	All age groups

*No recommended treatment for *P. vivax* in the national guideline

The 2015 NMIS found that 66 percent of children under-5 years of age with fever were taken for advice or treatment (71 percent in urban areas and 64 percent in rural areas); 30 percent were taken to a public health facility, while 57 percent of household members first sought treatment for children under-5 years of age with fever at a pharmacy, chemist's store, or proprietary patent medicine vendor (PPMV).

The NMEP intends to expand access to malaria case management through iCCM or CCM. Coordination of iCCM implementation is done through the iCCM Task Force, which has three sub-committees namely Advocacy, Implementation, and Monitoring and Evaluation. The National Guideline for iCCM, approved in 2013, clearly states that iCCM is important for increasing access to effective management of childhood illnesses. ICCM has been implemented in Nigeria since 2014, but on a relatively small scale. Community health workers currently do perform RDTs in health center settings, and any incentives are donor specific.

PPMVs are drug retailers that receive some on-the-job training on the recognition of basic symptoms of uncomplicated malaria and are authorized to provide treatment. In January 2015, the Pharmacists Council of Nigeria approved registered PPMVs and community pharmacists to perform RDTs before providing antimalarial drugs.

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 27.6 million RDTs and distributed 22.8 million; procured 61.8 million ACTs and distributed 51.7 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). 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. Microscopy training for laboratory technicians was also provided in each of the PMI-supported states. Trainings were followed up with on-the-job mentoring by trainers and project staff, as well as supportive supervision by MoH staff.

By the end of FY 2017, 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 percent and 59 percent 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 that includes microscopy and RDT. In addition to supporting the operational guidelines, PMI assisted in creating supervisory tools, standard operating procedures, and work plans. PMI has also supported the rollout of EQA in 10 of the 11 PMI-supported states (Plateau State will be added in 2018). A total of 90 QA officers have received training in malaria diagnostics and QA supervision.

Since the NMEP changed the first-line treatment for severe malaria in 2012, PMI has trained more than 500 senior health providers in clinical care of severe malaria using IAS. With UNITAID funding, the Malaria Consortium and the Clinton Foundation Health Access Initiative have trained 645 health workers across the country to manage severe malaria with IAS. Medicines for Malaria Venture, the 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 or peripheral health facilities. However, 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.

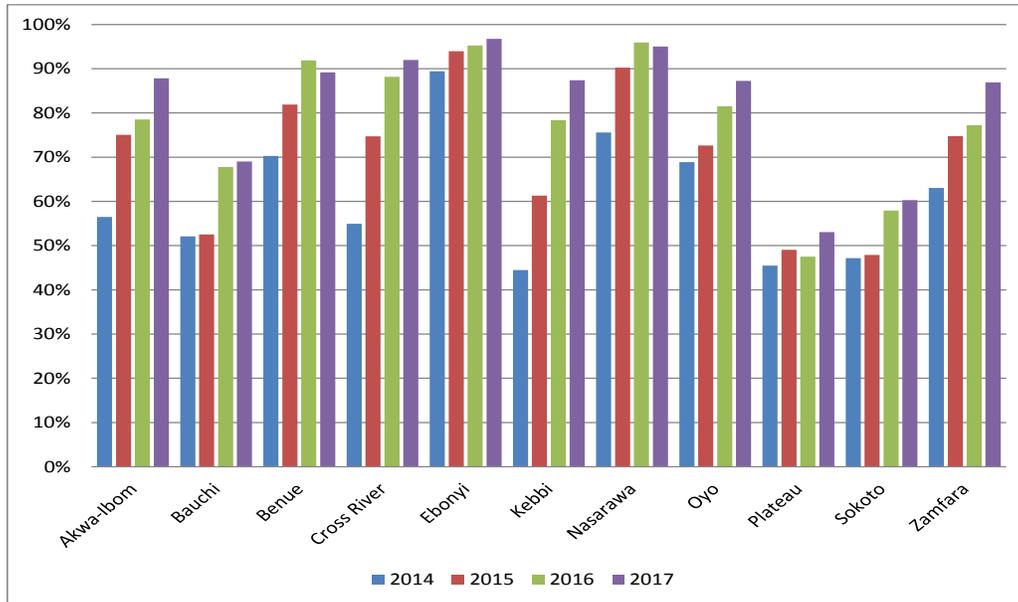
Progress during the last 12-18 months

In FY 2017, PMI ordered 6.7 million, and distributed 2.4 million, RDTs (from both PMI and Global Fund sources) and ordered 9.4 million, and distributed 6.5 million, ACTs to PMI-supported health facilities in the 11 PMI-supported states.

According to HMIS reports, the national confirmation rate (by microscopy and RDTs) for uncomplicated malaria cases in public health facilities increased from 51 percent in 2014 to 67 percent in 2017. The confirmation rate for PMI-supported states increased from 59 percent (2014) to 74 percent (2017), ranging from a low of 48 percent in Plateau to a high of 96 percent in Nasarawa in 2016 (Figure

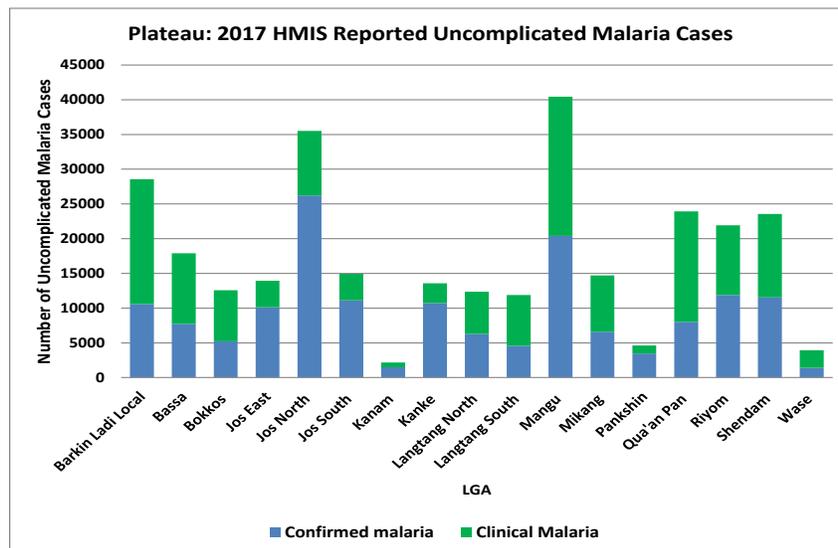
14). Although the increase is modest, all PMI-supported states show increasing trends in malaria testing.

Figure 14: Percentage of All Reported Malaria Cases Confirmed by a Diagnostic Test (Confirmation Rate) for Uncomplicated Malaria Cases Reported through the HMIS in PMI-Nigeria Focus States, 2014-2017



The DHIS2 can be used to improve targeting of malaria case management interventions. PMI Nigeria will begin supporting case management training/re-training and supportive supervision in Plateau State. Drilling down into the data, three LGAs accounted for 39 percent of clinically diagnosed malaria in 2017. In one of those LGAs, Mangu, four health facilities were the source of 41 percent of the clinically diagnosed malaria. This information can help PMI Nigeria be more efficient by focusing efforts on those LGAs and facilities that are not performing well due to healthcare provider behavior or supply chain issues.

Figure 15: Plateau State: 2017 HMIS Uncomplicated Malaria Cases



PMI continued to support malaria diagnostic QA. In 2017, EQA visits occurred in eight PMI-supported states: Akwa Ibom, Benue, Cross River, Ebonyi, Kebbi, Nasarawa, Oyo, and Zamfara. PMI also supported a rapid assessment of malaria diagnosis in Plateau State and the development of facility-specific standard operating procedures. Key findings from the EQA visits were the absence of standard operating procedures, 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. These expert microscopists serve as trainers, constitute the core of the QA program, and provide support for malaria research, including TES.

Case management surveys

A PMI end-use verification (EUV) survey, assessing 110 health facilities per state, was conducted in PMI-supported states in December 2017. The survey showed stockout rates of 14 percent for RDTs and 40 percent for SP, while 99 percent of facilities had some form of ACT available for treatment of malaria. Seventy-nine percent of fever cases were diagnosed as malaria, with 35 percent under-5 years of age. Of those children diagnosed with malaria, 90.6 percent were diagnosed by RDT, 0.5 percent by microscopy, and 82.6 percent were treated with an ACT.

PMI supported four rounds of post-market surveillance for ACTs in the last 18 months. From a baseline⁷ in 2013 of 20 percent of samples (from public and private sectors) not passing quality testing, the last round of post-market surveillance in 2017 found that only 1.9 percent of samples did not pass quality testing. In round one, 617 out of 800 samples were collected from private sector.

Therapeutic Efficacy Studies

The NMEP identified 14 sentinel sites throughout the country to monitor the efficacy of first-line treatments. The sites utilize the WHO standardized protocol and are scheduled to conduct the studies biannually. TES, which was conducted in seven sites in 2009-2010 and published in 2014, demonstrated polymerase chain reaction-corrected cure rates at 28 days of 96.9 percent for AL and 98.3 percent for AS/AQ, respectively.⁸ In 2014-2015, another TES was conducted in eight sites and showed polymerase chain reaction-corrected cure rates of 97.7 percent at 28 days for both AL and AS/AQ and of 99.5 percent for dihydroartemisinin-piperaquine (DP) at 42 days.⁹ Additional molecular analysis including K13 genotyping was conducted (results pending).

The NMEP is planning a TES for three sites in 2018 and for four sites in 2019. Both first-line drugs (AS/AQ and AL) will be tested including K13 analysis, along with DP in one site per year. Each site will be managed by a different principal investigator to ensure adherence to the protocol and standard operating procedures. The Global Fund will finance the TES in 2018 and PMI in 2019, using a harmonized protocol. In addition, the NIMR will play an oversight role for the various sites and will develop a common database for the TES results.

⁷ National Agency for Food AND Drug Administration and Control, Abuja-Nigeria. April 2015. Medicines Quality Monitoring of Antimalarial Medicines: Round One

⁸ Oguche, S. *et al.* 2014. Treatments of Uncomplicated Falciparum Malaria in Under-Five-Year-Old Nigerian Children. *Am J Trop Med Hyg* 91(5): 925–935.

⁹ National Malaria Elimination Program. Preliminary Report of 2014 Drug Therapeutic Efficacy.

Table 15: PMI-funded Therapeutic Efficacy Studies

Completed TESs			
Year	State Sites	Treatment Arm(s)	Plans for k13 Genotyping
2014 / 2015	Oyo, Sokoto, Kano, Anambra, Imo, Cross River, Bayelsa, Adamawa	AL, AA, DP	Pending
Ongoing TESs*			
Year	State Sites	Treatment Arm(s)	
2018	Kano, Plateau, Enugu	AL, AS/AQ, DP	Through Redeemer's University (Osun state, Nigeria)
Planned TESs (Funded with Previous or Current MOP)			
Year	State Sites	Treatment Arm(s)	
2019	Adamawa, Cross River, Lagos, and Sokoto	AL, AS/AQ, DP	Through PARMA

* The 2018 TES will use Global Fund financing and the 2019 TES PMI financing, but the protocol will be the same and the procedures very similar.

Commodity gap analysis

Table 16: RDT Gap Analysis, 2018-2020

Calendar Year	2018	2019	2020
RDT Needs			
Total Country Population	202,499,607	208,979,594	215,666,941
PMI-Targeted At-Risk Population	56,039,139	57,796,013	59,587,689
Total Number of Projected Fever Cases	96,089,621	99,099,589	102,204,370
Total Number of Projected Fever Cases Seeking Care Public Sector (includes Community)	34,805,769	35,890,382	37,008,979
Fevers Receiving Diagnostic Test	27,349,755	28,919,695	30,561,074
Percent of fever cases tested with an RDT	90%	90%	90%
Total RDT Needs	24,614,780	26,027,726	27,504,967
Partner Contributions (to PMI Target Population if Not Entire Area at Risk)			
RDTs Carried Over from Previous Year	0	0	0
RDTs from Government	.	.	.
RDTs from Global Fund	.	0	0
RDTs from Other Donors	0	0	0
RDTs Planned with PMI Funding	12,054,675	17,000,000	20,000,000
Total RDTs Available	12,054,675	17,000,000	20,000,000
Total RDT Surplus (Gap)	-12,560,105	-9,027,726	-7,504,967
RDTs Needed to Fill the Pipeline (6 Months)	12,307,390	13,013,863	13,752, 483

Notes: Projected fever cases estimated at an average of 1.7 fevers per person per year in PMI-supported states. Average 66 percent care-seeking for fever, with 53 percent public health facility or community based in PMI-supported states. Diagnostic testing rates were estimated by state (ranging from 76 to 86 percent) with plans to increase 2 percent per year.

Table 17: ACT Gap Analysis, 2018-2020

Calendar Year	2018	2019	2020
ACT Needs			
Total Country Population	202,499,607	208,979,594	215,666,941
PMI-Targeted At-Risk Population ¹	56,039,139	57,796,013	59,587,689
Total Number of Projected Fever Cases Seeking Care Public Sector (includes Community)	34,805,769	35,890,382	37,008,979
Total Projected Number of Confirmed Malaria Cases	19,809,754	20,368,137	20,912,599
Total Projected Number of Unconfirmed ACT Treated Fever Cases	8,380,718	7,848,558	7,245,533
Total ACT Needs	28,190,472	28,216,695	28,158,132
Partner Contributions (to PMI target population if not entire area at risk)			
ACTs Carried Over from Previous Year	0	0	0
ACTs from Government	.	.	.
ACTs from Global Fund	.	0	0
ACTs from Other Donors	0	0	0
ACTs planned with PMI Funding	18,197,180	20,000,000	20,000,000
Total ACTs Available	18,197,180	20,000,000	20,000,000
Total ACT Surplus (Gap)	-9,993,292	-8,216,695	-8,158,132
ACTs Needed to Fill Pipeline (6 Months)	14,095,236	14,108,347	14,079,066

Notes: Projected fever cases estimated at an average of 1.7 fevers per person per year in PMI-supported states. Average 66 percent care seeking for fever, with 53 percent public health facility or community based. Diagnostic testing rates were estimated by state (ranging from 76 percent to 86 percent) with plans for 2 percent increase per year. TPR estimates by state ranged from 65 to 78 percent in PMI-supported states and applied to those tested with plans for 2 percent decrease per year. All those not tested are expected to be presumptively treated with an ACT. Non-adherence to negative tests planned for 9 percent in 2017 and decreasing 1 percent per year.

Quantification of microscopes

PMI Nigeria does not plan to procure microscopes. However, with the continued challenges in achieving and maintaining quality microscopy in health facilities with inpatient beds, PMI Nigeria plans to again procure microscopy consumables for diagnostic QA centers and targeted facilities. A list of consumable supplies has been costed with an upper estimate of \$3000 per facility, per year.

Quantification of IV artesunate/IM artemether

Quantification of IAS for the treatment of severe malaria is estimated on the assumption that 3 percent of all confirmed malaria cases will be severe and that a case will require 5.5 ampules for a full treatment course (averaging the amount required for the different ages and treatment durations). For 2020, the total need for IAS at public health facilities in PMI-supported states is estimated to be 3.4 million vials based on approximately 3 percent of 20,912,599 confirmed malaria cases (627,377).

Quantification of rectal artesunate

Not applicable.

Plans and justification for proposed activities with FY 2019 funding

With FY 2019 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 for both microscopy and RDTs.

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 20 million RDTs and 20 million ACTs to help meet the projected need in PMI supported states for uncomplicated malaria. PMI will also procure 500,000 injectable artesunate vials for the treatment of severe malaria. In addition, PMI will continue to procure microscopy consumable supplies to increase the quality of diagnostics.

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. PMI will work with the State Primary Health Development Agency, who will lead in supervision of primary health care staff, and the Secondary Hospital Management Board, who will lead the supervision of secondary hospital staff. 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 and logistics management information system (LMIS) 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) in order to complement supportive supervision and direct efforts where support is most needed. Based on performance, routine quarterly supervision visits will be adjusted so that well-functioning health facilities will 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 EQA, which includes both microscopy and RDTs in PMI-supported states. PMI will support establishment of QA centers within each state for diagnosis especially to support building trust of RDT results. This activity is closely linked with the on-the-job training and supervision of healthcare 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 healthcare providers.

PMI Nigeria plans to support iCCM/CCM through a manageable, targeted approach. The key to targeting will be increasing access to care in high malaria burden communities that can be linked to functional health care facilities for commodity supply chain, supervision, and data reporting.

Although PMI will prioritize its efforts in the public sector, aiming to increase testing and adherence to test results, the program also plans to engage the private sector through: (1) the incorporation of private facilities and labs into malaria diagnostic QA; (2) the use of PPMVs in rural, hard to reach communities to implement iCCM/CCM; (3) assistance to secondary facilities in identifying quality ACTs to procure

for drug revolving funds; and (4) support for local manufacturing of quality ACTs through PMI implementing partners.

PMI will continue to support TES to monitor efficacy of first-line antimalarial drugs including polymerase chain reaction 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 healthcare providers to increase diagnostic testing and adherence to results and guidelines (see description in the SBCC section).

Please see Table 2 for a detailed list of proposed activities with FY 2019 funding.

5. Cross-cutting and other health systems strengthening

In order to successfully implement the aforementioned activities, PMI Nigeria supports a suite of activities that cut across and benefit insecticide- and drug-based prevention and case management activities. For example, availability of high-quality commodities is necessary to ensure high ITN coverage and effective case management, and health-seeking behavior of individuals and communities is necessary to improve coverage of all interventions. In addition, the gains achieved in malaria control in Nigeria can only be sustained if there are strong health systems and local capacity. Hence, systems strengthening, and capacity building are intrinsic in all PMI intervention-specific activities previously mentioned (e.g., training and supervision of health workers, technical assistance for planning and monitoring interventions, etc.). Non-intervention specific or cross-cutting health systems strengthening activities are described below.

a. Pharmaceutical management

NMEP/PMI objectives

The fifth objective of NMSP 2014-2020 is to ensure the timely availability of appropriate antimalarial medicines and commodities required for prevention and treatment of malaria in Nigeria. NMSP has the following strategies to achieve the objective:

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.

Malaria commodities come from various sources: donors, federal and state governments, LGAs, and health facilities. Some of the commodities are imported and some are produced locally. The states, LGAs, and individual health facilities can supplement donated and GoN-procured commodities by using revolving drug funds and/or revenues. Storage and distribution systems for

health commodities vary. Historically, essential medicines procured by donors and the government have flowed either through the Federal Medical Stores or the state Central Medical Store. States often have difficulties delivering commodities to the facility level.

PMI is part of the Development Partners Group for Health Supply Chain Technical Working Group, which is aimed at effective coordination of supply chain activities at the national level. PMI supported the integrated national forecast for malaria commodities for 2015-2020. PMI has also supported pharmaceutical supply management technical working groups at the federal level and in all 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

NAFDAC is responsible for the regulation and registration of medicines. The agency is also responsible for QC of antimalarial medicines at the point of entry for internationally procured drugs or at the factory gate for locally produced ones. Although Nigeria has more than 50 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.

Progress since PMI was launched

PMI has supported a logistics system for distribution of malaria commodities. The support included quantification and procurement planning, procurement and storage of commodities, distribution to health facilities or communities in the case of ITNs for mass campaigns and continuous distributions, and EUV surveys to monitor stock levels and decrease the risk of stockouts, excesses, and leakages.

To address supply chain challenges, Nigeria, in collaboration with donors, has rolled out the Nigeria Supply Chain Integration Project (NSCIP), under the National Product Supply Chain Management Program in the Food and Drug Services Department of FMoH. The NSCIP was endorsed by the National Health Council and has the support of the NMEP and other development partners in Nigeria, including the Global Fund.

PMI had supported distribution of malaria commodities using a direct delivery and information capture system in four states—Ebonyi, Bauchi, Sokoto, and Zamfara. This was a direct delivery of commodities from the state Central Medical Store to facilities via trucks. The direct delivery and information capture ended with full implementation of NSCIP.

PMI funding has supported the establishment of logistics management coordination units (LMCU) in the 11 PMI-supported states. The LMCUs, set up within the Directorate of Pharmaceutical Services in the state MoH, are at various levels of operationalization. The unit leads the coordination of supply chain activities (forecasting, supply plan, budgeting, pipeline monitoring, monitoring and supportive supervision, distribution plans and activities, inventory management, and stock status analysis) within the state. The LMCU also implements the LMIS. The LMIS generates data for quantification and procurement planning, and effective management of malaria commodities to monitor excesses and expiries. The state drives the processes with PMI support. PMI funding has also been used to train health workers on LMIS and the malaria commodities logistics system.

Given the scope and size of the private sector market, 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. PMI has supported the strengthening of QA/QC of malaria

medicines. PMI Nigeria supported the development of QA/QC policy for medicines and diagnostics. The QA/QC policy document, which stipulates the roles and responsibilities of various government procurement and regulatory agencies, has been 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 and Agulu Zonal laboratory in 2016. With PMI support, the scope of the laboratories has been increased. The laboratories now carry out microbiological and sterility testing for medicines and injectables. These laboratories manage the QA/QC testing for medicines produced by Nigerian manufacturers and those imported into the country. 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 laboratories in other countries for testing.

Progress during the last 12-18 months

Since January 2018, PMI commodities flow through NSCIP rather than through state warehouses. PMI supports NSCIP activities at all levels. The new system will have following components:

Coordination: Supply chain activities will be coordinated at the national level by the NPSCMP, at the state level by LMCU, and at the LGA by the local government LMCU.

Storage and distribution: GoN- and donor-procured commodities flow from two national pharmaceutical grade warehouses (Abuja and Lagos) to regional/axial stores and then directly to health facilities, bypassing state warehouses. USAID has integrated distribution of malaria, HIV/AIDS, and family planning commodities across all supported states. Comprehensive financial analysis will be completed after 3-4 cycles of distribution. Significant contribution from each program element is decreasing with economies of scale. The warehouse management and distribution is outsourced to private logistics providers. The regional distribution system is meant to be a medium-term solution. As states upgrade to pharmaceutical grade warehouses, distributions can again take place from the state level to health facilities, coordinated by the state LMCU.

Data management: A new electronic logistics management information system (eLMIS) is currently being rolled out in two phases across all levels. In Phase One (completed in June 2018), LMCUs will enter the data electronically at the state level. In Phase Two (July-December 2018), health facility personnel will enter data electronically. The eLMIS is on a Navision platform and is interoperable with the DHIS 2. This will improve timeliness, quality of reporting, and use of the data for decision-making.

There are no public sector, pharmaceutically-compliant storage facilities in any PMI-supported state. PMI procured commodities (except ITNs) are currently stored at the national and regional/axial warehouses. This has improved inventory management and maintained quality of the commodities received at the health facilities. All PMI-supported states 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 for federal and state level commodities procurement.

PMI FY 2016 funding contributed to strengthening the NSCIP, LMCUs, and LMIS through technical assistance, training, supervision, and tools for data collection. PMI funding provided logistics technical assistance for the implementation of mass ITN campaigns in four states (Kogi, Sokoto, Nasarawa, and Kebbi). PMI also supported the training of 1,935 state-level officers in basic supply chain management and malaria commodities logistics system trainings. PMI expects a cascading effect in which non-PMI supported health facilities will experience indirect benefits from the capacity building.

FY 2016 funding supported two rounds of EUV surveys. PMI funding also supported the routine bimonthly distribution of ACTs, RDTs, and SP to 3,546 health facilities. In the last 12 months, PMI supported the distribution of more than 9.2 million ITNs, 10 million ACTs, 6.3 million RDTs, 1.5 million SP treatments, and 148,000 vials of injectable artesunate. PMI has been linking DHIS2 data with LMIS consumption data to analyze overconsumption of ACTs in PMI-supported states. In 2016, Bauchi State received 5.3 million PMI-procured ACTs, while only reporting 1.2 million malaria cases through the HMIS. After raising this issue with Bauchi State in 2016, ACT consumption declined in 2017. Under reporting of malaria cases contributes to this variance. The number of reported malaria cases and ACT consumption data in 2017 in PMI-supported states is as follows:

- Akwa Ibom 232,555/640,920
- Bauchi 1,309,258/ 2,487,290
- Benue 251,016/506,165
- Cross River 227,040/390,890
- Ebonyi 358,161/983,878
- Kebbi 432,599/671,120
- Nasarawa 423,738/ 897,420
- Oyo 507,154/357,795
- Sokoto 1,142,981/2,593,245
- Zamfara 536,978/1,374,540

PMI intends to use malaria commodity support as an incentive for accurate HMIS reporting.

PMI will also use HMIS data to plan and implement expansion to additional health facilities. As of January 2018, the Global Fund no longer provides support to any PMI-supported states. This requires PMI support to expand within states. With available resources, health facilities need to be prioritized. HMIS malaria data is being used to identify high volume facilities previously supported by the Global Fund.

PMI supported the ISO 17025 accreditation of Kaduna Zonal laboratory in 2017, bringing the total number of accredited NAFDAC laboratories to three. Catholic Relief Services (Global Fund principal recipient in Nigeria) signed a memorandum of understanding with NAFDAC for the QC analysis in October 2017. Other donors, private organizations, and countries in the African sub-region are using the accredited NAFDAC laboratories for QC analysis.

In addition, PMI supported the procurement of basic equipment, including Minilabs® and consumables for monitoring quality of antimalarial medicines. The support has greatly reduced the circulation of substandard and fake malaria medicines in all the political zones of the country. PMI supported NAFDAC to carry out a post-market surveillance of malaria medicines. The results have showed decreasing rates of circulating substandard and fake medicines (4.3 percent in 2016, 1.4 percent in February 2017, and 1.9 percent in November 2017; NAFDAC Post-Market Surveillance Report).

Plans and justification for proposed activities with FY 2019 funding

Given the numerous challenges with the procurement, supply, and distribution system, PMI remains committed to strengthening pharmaceutical and commodity management systems. With FY 2019 funding, PMI will continue to distribute malaria commodities (excluding ITNs) through the NSCIP regional/axial stores, while strengthening the capacities of state LMCUs. With the Global Fund out of

PMI-supported states, PMI funding will be used to increase the number of health facilities benefiting from PMI commodity support within the 11 PMI-supported states.

PMI will also support the roll-out and operation of the eLMIS, and will also look to further integrate the eLMIS and DHIS 2 systems for improved data quality for decision-making and forecasting needs. With the strength of the eLMIS, PMI will support a track and trace pilot for ACTs using GS1 data standards (global standards for barcodes). If successful, this would end the current requirement for the mobile authentication scheme code, which adds cost and limits the ability to access the emergency stockpile.

Please see Table 2 for a detailed list of proposed activities with FY 2019 funding.

b. Social and behavior change communication

NMCP/PMI objectives

SBCC is a core component of the NMSP 2014-2020, which outlines the NMEP's priorities for this period. In 2014, with PMI support, the NMEP developed and rolled-out the national strategic framework and implementation guide for Malaria Advocacy, Communication and Social Mobilization (ACSM). The ACSM strategy serves as a guide for the design and implementation of malaria SBCC interventions at the national, state, and LGA level, and to other malaria donors, partners and stakeholders. The strategy aims to:

- Maintain high knowledge (> 94 percent) of malaria prevention, diagnosis, and treatment practices, and the benefits of prevention and treatment;
- Increase demand for these services;
- Sustain promotion of positive attitudes, desirable norms, values and behavior change regarding malaria and the recommended measures for its prevention and treatment;
- Sustain promotion of desirable behavior for malaria prevention and treatment at the community, household, and individual levels;
- 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 percent of the populace habitually takes appropriate malaria preventive and treatment measures as necessary by 2020.

At the NMEP, the ACSM branch serves as the secretariat for the ACSM subcommittee, which consists of RBM partners, including PMI. The subcommittee supports the ACSM branch to coordinate and provide technical oversight to SBCC activities at the federal and state level. In PMI-supported states, malaria focal persons are supported by state-level ACSM technical committees, which were established with PMI support.

At the FMoH, the Health Promotion Division houses the secretariat of the National Behaviour Change Communication Consultative Group, which was constituted in 2017. This group is charged with coordination of SBCC activities related to reproductive, maternal, newborn, child health and nutrition, as well as liaison with other health area specific coordination committees such as malaria and TB. The Health Promotion Division is a member of the NMEP ACSM subcommittee and has a focal staff that actively participates and supports the NMEP ACSM subcommittee.

Table 18: Behavioral and Communication Objectives for Key Malaria-Related Behaviors

Behavioral Objective One	Baseline	Target
Maintain and deepen high knowledge of malaria prevention and treatment practices	87.3%*	100%**
Communication Objectives	Baseline	Target
Increase proportion of targeted audience ¹⁰ who name only mosquito bites as the cause of malaria	87.8%*	100%**
Increase proportion of targeted audience who feel that consequences of malaria are serious	31.1%***	+10%
3. Increase proportion of targeted audience who know that the correct treatment for malaria is ACTs	26%*	50%**
Behavioral Objective Two	Baseline	Target
Individuals consistently ¹¹ sleep inside and practice proper care of ITN	35%* ¹²	+3%
Communication Objectives	Baseline	Target
Increase proportion of targeted audience who know that sleeping inside an ITN prevents malaria	33%*	+10%
Increase proportion of targeted audience who believe in the efficacy and safety of ITNs to prevent malaria	38%***	+10%
Increase proportion of target audience who believe friends and community members consistently sleep inside/under a ITN	57.9***	+10%
Behavioral Objective Three	Baseline	Target
Pregnant women take at least three or more doses of IPTp during ANC visits	19%*	+3%
Communication Objectives	Baseline	Target
Increase proportion of targeted audience who know that IPTp protect mother and baby from malaria in pregnancy	21.4%*	+10%
Increase proportion of targeted audience who belief in the efficacy and safety of IPTp to prevent malaria in pregnancy	28.7***	+10%
Increase proportion of targeted audience who believe they can go to ANC as soon as they think they might be pregnant.	NA	+10%
Behavioral Objective Four	Baseline	Target
Caregivers seek prompt ¹³ and appropriate care for signs and symptoms of malaria	35.4*	+10%
Communication Objectives	Baseline	Target
Increase proportion of target audience with knowledge that early presentation for malaria treatment leads to better outcomes	NA	
Increase proportion of target audience with improved perceptions of facility and/or community based malaria treatment services	NA	

¹⁰ Audience categories require finer-grained segmentation.

¹¹ Consistent use is defined as sleeping under a treated bed net, every night, all night long, and all year round.

¹² Proportion of individuals who sleep inside LLIN only, not practice proper care.

¹³ Prompt care is defined as care sought within 48 hours from onset of fever.

Behavioral Objective Five	Baseline	Target
Caregivers demand test before treatment of malaria	NA	+10%
Communication Objectives	Baseline	Target
Increase proportion of target audience who know the correct way to diagnose malaria is with a test; RDT or microscopy	NA	
Increase proportion of targeted audience who believe in the efficacy of RDTs to diagnose malaria	NA	
Behavioral Objective Six	Baseline	Target
Caregiver seeks appropriate malaria treatment for child when sick.	35%*	+3%
Communication Objectives	Baseline	Target
Increase proportion of target audience who get the appropriate treatment for the child when s/he has malaria	78.3%***	+3%
Increase proportion of target audience who make sure the child takes the full dose of medicine that s/he is prescribed	NA	
PROVIDER BEHAVIOUR		
Behavioral Objective 1	Baseline	Target
Providers adhere to national malaria case management (diagnosis and treatment) guidelines	NA	
Communication Objectives – CO	Baseline	Target
Increase proportion of providers who know the only way to accurately diagnose malaria is with a test (rapid diagnostic test [RDT] or microscopy)	NA	
Increase proportion of providers who trust/belief in the efficacy of RDT to diagnose malaria	NA****	
Behavioral Objective Two	Baseline	Target
Providers adhere to national malaria in pregnancy guidelines	NA	
Communication Objective (s) – CO	Baseline	Target
Increase proportion of providers who know the national guidelines for IPTp dosing (timing and frequency)	NA	
Notes		
<p>* Source: Nigeria MIS 2015; new baseline data likely available by 2019 re: DHS/MIS 2018 survey. 2015 MIS baseline figures quoted are national estimates – this masks wide variations across PMI states.</p> <p>** Source: National Malaria ACSM guidelines, 2014.</p> <p>*** Source: PMI-funded malaria baseline ideational survey in PMI states only (sample size not nationally representative, limited to 3,616 Households in Nasarawa, Kebbi and Akwa Ibom States).</p> <p>**** In addition to health facility surveys that measure this, proxy service delivery indicators to measure this include proportion of fever cases receiving a malaria diagnostic test (or proportion of malaria cases diagnostically confirmed) and proportion of tested cases treated/not treated according to test results (or proportion of confirmed positive cases receiving ACT).</p>		

Progress since PMI was launched

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 (see above). 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—mass and

mid-media across all 11 PMI-supported states and complementary community, household, and interpersonal activities in 5 PMI-supported states—to complement malaria prevention and case management interventions.

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 low perception of malaria risk and poor practices related to malaria. The mass media campaign broadly deployed television and radio channels to promote key behavior change messages for the prevention and treatment of malaria, with emphasis put on state-level implementation. Centrally designed centerpiece radio and TV magazine programs were translated into major, local languages and aired 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, produce, and air 21 state-specific episodes of weekly radio magazine programs. According to a June 2016 Omnibus survey, approximately 8.5 million people (about 14.3 percent of target population¹⁴) were reached through this campaign across the 11 PMI-supported states.

Community mobilization and interpersonal communication

PMI supported mass/mid-media campaigns are reinforced at the community level with interpersonal communication (IPC) through volunteers, who help to motivate, raise awareness, and encourage positive care-seeking and prevention behaviors across 5 of 11 PMI-supported states. PMI’s community intervention strategy deployed different approaches—household visits, compound meetings, and community dialogues—to complement IPC sessions. IPC was also used to address health worker behaviors (e.g., compliance with test results) and to increase the frequency and quality of information provided by facility-based staff and community health workers.

These activities resulted in the following:

- More than 821,000 households were visited in five PMI-supported states;
- More than 2.5 million people out of an estimated¹⁵ 23 million were reached through IPC with malaria messages;
- More than 28,000 pregnant women were referred to attend ANC through the community mobilization efforts with an average referral completion rate of 4 percent (about 11,760 women);
- More than 8,000 opinion leaders (religious and traditional leaders) were sensitized on malaria prevention and care. Of these, 89 percent self-reported speaking at least once every week on the cause of malaria and the three key steps to being malaria-free as part of a religious sermon or community event.

ITN campaign support

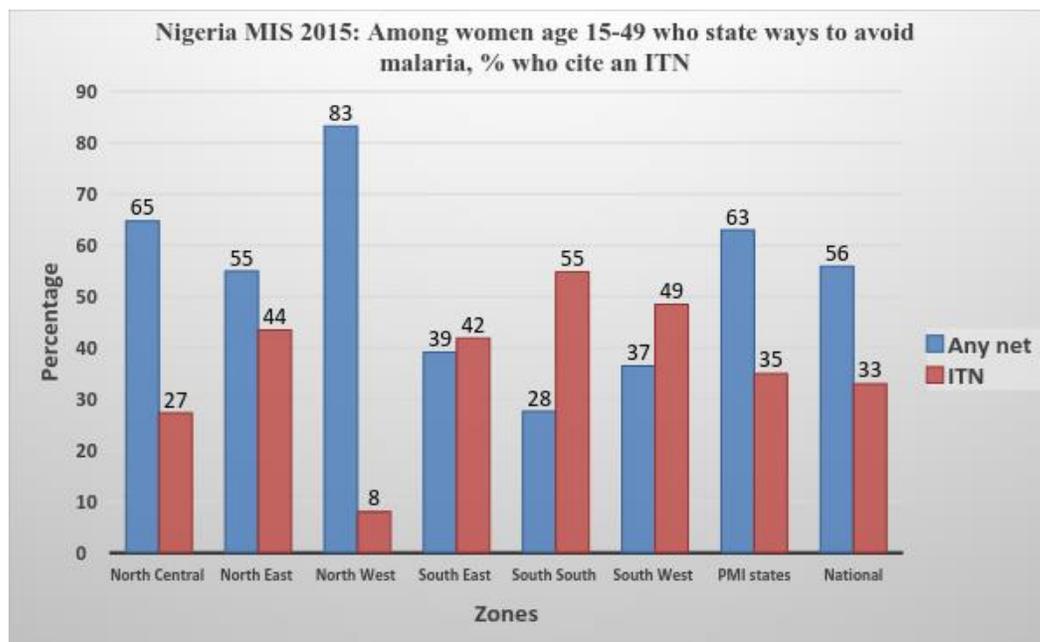
PMI implemented specific SBCC activities to improve ITN uptake, use, and care behaviors in three PMI-supported states (Benue, Oyo and Kogi) that implemented mass campaigns. State-wide mass media messages were aired through radio channels, while communities were mobilized using Town Announcers and traditional and religious leaders. SBCC activities continued for a period of six weeks post-campaign in the form of house-to-house visits to communities identified as having low hanging rates. According to the 2015 NMIS, 36 percent of women surveyed had heard a message about malaria

¹⁴ Projected population of all 11 PMI supported states is 59.6 million.

¹⁵ Total 2017 Projected Population of five states Akwa Ibom, Benue, Kebbi, Nasarawa, and Zamfara) is 23,348,616

in the previous six weeks to the survey. Three common sources of messages were radio (70 percent), television (32 percent) and community workers (17 percent). 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 16: Among Women Age 15-49 Who State Ways to Avoid Malaria, Percent 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 the 11 PMI-supported states (all, but 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. PMI has supported quarterly meetings of the state-level ACSM committees and Ward Development Committees. PMI has also 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 federal program staff through short-term training and technical assistance.

Progress during the last 12-18 months

FY 2016 funds continued to support the “Malaria-Free Nigeria” mass media campaign, with an intentional focus on building state-level capacity and partnerships for the adaptation, production, and airing of mass media campaign materials. PMI trained 24 (radio and TV) content producers and supported the creation of 28 context-appropriate suites of mass media centerpiece materials, which were aired at least 29,799 times across 37 radio and TV stations. An omnibus survey fielded in April 2017 found that 52 percent of respondents¹⁶ reported exposure to at least one of the PMI-supported mass

¹⁶ Total of 2,144 respondents aged 18 to 70 years (50 percent male and 50 percent female) across 11 PMI focal states.

media interventions. Exposure to mass media messages was positively associated with improved knowledge and perceptions, as well as with increased practice of malaria behaviors. The survey found that persons exposed were 1.69 times more likely to have slept inside an ITN the night before; 1.95 times more likely to know that malaria should be diagnosed by RDT or microscopy before treatment; and 2.82 times more likely to know the three key steps to be malaria free.¹⁷ Access to nets in a household was the single strongest predictor of net use (OR = 2.84, p<0.001). The second strongest predictor of net use was exposure to PMI-supported malaria campaign messages, which further increased the likelihood of net use, even in households with full access to nets. PMI also supported community level IPC activities to reinforce mass media campaigns across 5 of the 11 PMI-supported states (Akwa Ibom, Benue, Kebbi, Nasarawa, and Zamfara).

Table 19: Reach of IPC Activities by Targeted Audience in 2017

Reach of IPC Activities by Targeted Audience	Timelines		Totals
	January-December 2017	January 2014-December 2016	
Households (HHs)	443,792	821,430	1,265,222
Individual contacts within HHs	1,285,152	2,511,284	3,796,436
Pregnant Women ¹⁸	17,898	28,507	46,405
Opinion Leaders	0	8,451	8,451

Note: Coverage of total persons reached by IPC activities estimated at 41.6 percent using 2017 population projections of total population in 45 intervention LGAs¹⁹ across 5 PMI-targeted states.

With FY 16 funding, PMI supported SBCC activities to improve ITN uptake, use, and care behaviors in four states that implemented mass ITN campaigns (Kogi, Sokoto, Nasarawa, and Kebbi). Statewide mass media messages were aired through radio channels and communities were mobilized by using Town Announcers and traditional and religious leaders. End process evaluations conducted in Sokoto and Nasarawa found net redemption rates of 98 percent. SBCC activities continued for a period of six weeks post-campaign through house-to-house visits in communities identified as having low-hanging rates.

PMI FY 2016 funds supported SBCC interventions targeted at healthcare providers to improve use, trust in, and compliance with RDT across three PMI states (Kebbi, Akwa Ibom, and Nasarawa). Interventions included: RDT themed radio magazine programs; state professional association engagement to create and reinforce peer norms around malaria testing and treatment; provider recognition campaigns; development of, and training on, job aids; and periodic texts messages and phone calls to serve as reminders and cues to action. This campaign continued to reach the initially enrolled 180 health facility workers and 168 PPMVs. An ongoing analysis of this campaign will explore trends and lessons learnt from this combination of approaches on provider norms and attitudes around malaria testing using RDTs and compliance with results for treatment.

¹⁷Steps include sleeping inside an ITN; test and treat confirmed malaria with ACT; and go for antenatal care when pregnant

¹⁸ Referrals for ANC only

¹⁹ Total Population of 45 LGAs is estimated at 12.

PMI provided support to the midterm review of the ACSM section of the NMSP. The midterm review had the following recommendations:

- Strengthen advocacy to policymakers at the highest levels both at federal and state levels, so that stakeholders take ownership and prioritize funding for SBCC activities.
- NMEP and partners should fully implement the actions points highlighted in the Private Sector Engagement Strategy and National Malaria Advocacy Plan.
- Leverage digital technology and the availability of media organizations to expand the reach of malaria SBCC messages.
- Include additional SBCC indicators in the NMSP performance framework and monitoring and evaluation (M&E) plan.

At the state level, funds continued to support quarterly ACSM coordination meetings across nine states. In Bauchi and Sokoto, PMI supported the constitution of SMEP ACSM subcommittees.

Using FY 2016 funds, PMI/Nigeria conducted secondary analysis of the 2015 MIS. The analysis found a positive relationship between maternal exposure to malaria-related prevention messages and children under-5's use of ITNs and care-seeking behavior for fever; and between women's exposure to malaria-related messages and their uptake of malaria prevention behaviors in pregnancy. Specifically:

- Children whose mothers were exposed to at least one ITN-related message were 2.1 times more likely to use an ITN than those whose mother were not exposed.
- Pregnant women who were exposed to at least one ITN-related message were 2.4 times more likely to use an ITN than non-exposed pregnant women.
- Children whose mothers were exposed to a care-seeking related message were 1.6 times more likely to have sought care for them when they got a fever than children whose mothers were not exposed.
- The odds of exposure to at least one malaria message among women who received IPTp2 was 1.7 times greater than the odds of exposure among women who did not receive IPTp2; and similarly, the odds of exposure to at least one malaria message among women who received IPTp3 was two times greater than the odds of exposure among women who did not receive IPTp3.

Finally, PMI FY 16 funds were also used to field an end-line assessment, which began in August 2017 and was aimed at estimating the effects of programmatic activities. Final results are expected in late 2018 and will help to shape the focus of future SBCC programs.

Plans and justification for proposed activities with FY 2019 funding

PMI Nigeria is prioritizing healthcare provider behavior to improve case management behaviors (e.g., increase diagnostic testing and adherence to results). There will also be a continued focus on increasing consistent use and proper care of ITNs, IPTp uptake, and care-seeking behaviors. Specific activities that will be supported with FY19 funding will include:

- Improving provider behavior for case management. This effort will require closer collaboration between SBCC and case management partners. Activities will focus on two factors that influence provider behavior (opportunities and motivations) where evidence indicates behavior can be influenced.
- Increase the use of existing community-based organizations and community volunteer personnel structures, and apply best practices in the design, QA, implementation, and supportive supervision of IPC activities. The use of existing community structures increases the cost effectiveness of IPC activities. PMI will leverage USAID Maternal Child Health funds for malaria IPC activities in Kebbi, Bauchi, and Sokoto States, where an integrated programming approach will be adopted. Given available resources, PMI will maintain presence in all 11 states but will scale down the number of LGAs covered by IPC interventions. Available data sources will be used to prioritize LGAs.
- Support SBCC activities during mass ITN campaigns for Zamfara, Benue, and Oyo States.
- SBCC for SMC to facilitate community acceptance of the intervention amongst caregivers of children between 0-5 years of age. Specific activities will use community mobilization strategies.
- Strategies and platforms in four PMI-supported states (Bauchi, Sokoto, Kebbi, and Plateau) will take on a combination of inter-related behavior approaches, including life-stage and gateway behavior, umbrella brand and integrated campaign platforms and waves, which will offer an innovative entry point for communicating with priority audiences.
- PMI will continue to support ACSM subcommittees at the federal and state levels. SBCC activities will be monitored and evaluated through the HMIS (case management and IPTp), 2020 MIS, and periodic omnibus and health facility surveys.

Please see Table 2 for a detailed list of proposed activities with FY 2019 funding.

c. Surveillance, monitoring, and evaluation

NMEP/PMI objectives

SME 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 Technical Working Group led the process for developing the M&E plan, with support and participation from a broad group of partners including PMI, the 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, the NMEP, and its development and implementation partners in order to ensure that ongoing research is oriented towards key operational questions and can provide the necessary evidence to continuously improve interventions for malaria control.
- Provide a roadmap for coordination of malaria-related SME among partners.

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

Table 20: Surveillance, Monitoring, and Evaluation Data Sources

Data Source	Survey Activities	Year										
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
Household Surveys	Demographic Health Survey**				X					(X)		
	Malaria Indicator Survey**	X					X					(X)
	Multiple Indicator Cluster Survey*		X					X				
	National Nutrition and Health Survey*				X		X				(X)	
	Nigeria AIDS Indicator and Impact Survey*									(X)		
	Omnibus Survey**	X	X	X	X	X	X	X	X	X	X	X
Health Facility Surveys	Rapid Impact Assessment*				X	X						
	SOML HFS*							X		(X)		(X)
Malaria Surveillance and Routine System Support	Support to HMIS	X	X	X	X	X	X	X	X	X	(X)	(X)
Other Surveys	EUV Surveys			X	X	X	X	X	X	X	(X)	(X)
	Malaria Implementation Assessment							X				

Note: 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. Surveys with double asterisks (**) are partially funded with PMI funds.

Progress since PMI was launched

The PMI SME approach in Nigeria contributes to the NMEP M&E Plan 2014-2020. PMI Nigeria supports: strengthening the routine HMIS at all levels of the health system; periodic population-based surveys (Malaria Indicator Survey [MIS] and NDHS); other surveys (EUV); and operational research (OR) to guide programmatic decisions.

Surveillance:

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 private primary healthcare (PHC) 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. PHC-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 PHC facility within their LGAs. State and national health information officers are unable to enter or modify data in the DHIS2 system.

Secondary health facilities are under state rather than LGA authority, thus many are reluctant to report data to LGAs. Similarly, tertiary facilities are under federal authority, creating additional challenges to incorporating their data into the DHIS2.

The NMEP and malaria partners participated in a process that produced 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, this system is not used for malaria reporting.

One objective of the NMSP 2014-2020 is for 80 percent of health facilities in all LGAs to report routinely on malaria by 2020. With increased DHIS2 implementation, PMI has supported training of 10,668 of 43,321 (25 percent) health workers in SME and provided feedback to data collectors. PMI also supported 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 percent of health facilities submitted their monthly reports, and only 47 percent of health facilities submitted their reports in a timely manner. The national reporting rate for 2017 was 82 percent, a 105 percent increase from 40 percent in 2013. Reporting rates ranged from 41 percent in Borno State to 98 percent in Sokoto State.

Household surveys

In 2010, an NMEP-sponsored NMIS was completed. It 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. Data collection for the 2015 NMIS occurred

from October 2015 through November 2015. The country as a whole reported a marked 36 percent decrease in malaria prevalence measured by microscopy in children age 6-59 months (42 percent in 2010 and 27 percent in 2015). By zones, malaria prevalence varied from 37 percent in the North West Zone to 14 percent in the South East Zone.

Figure 17: Trends in Parasite Prevalence Among Children 6-59 Months

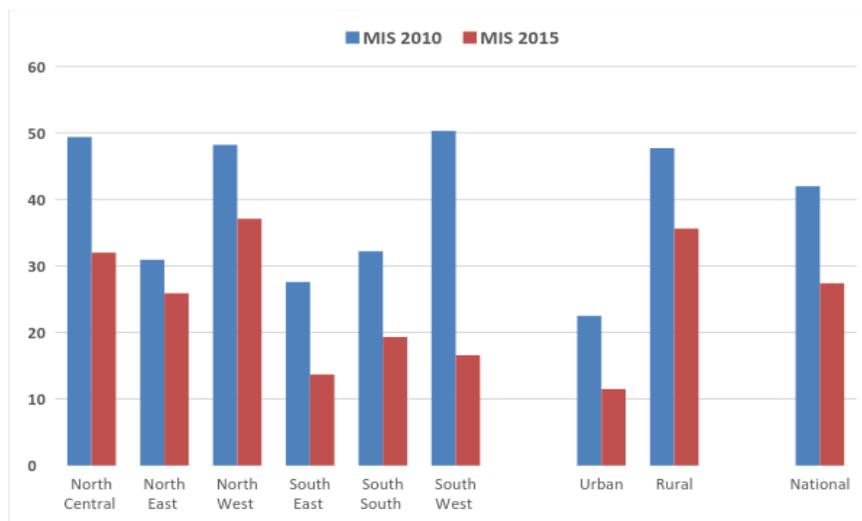
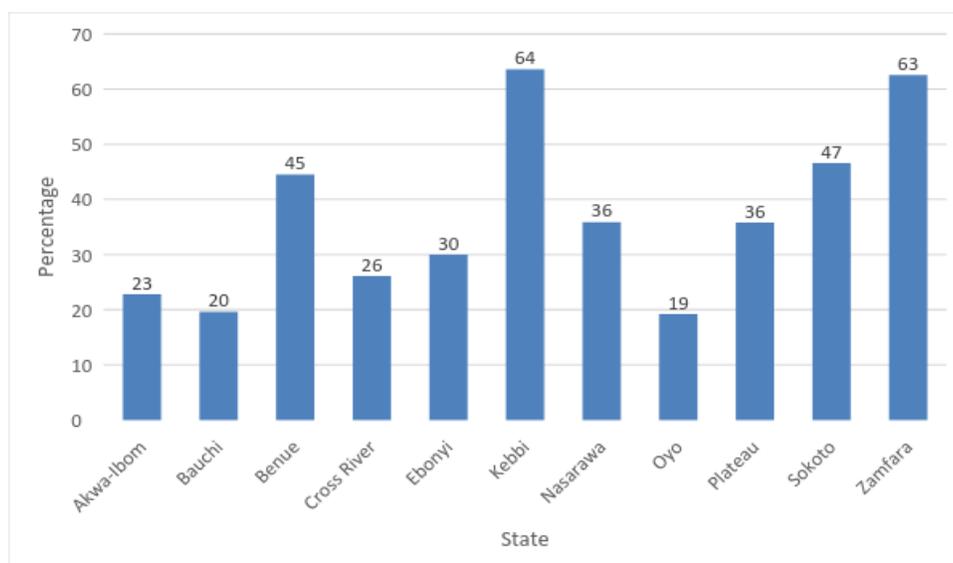


Figure 18: Malaria Parasite Prevalence (Microscopy) in Children for PMI-Supported States



Source: MIS 2015

Health facility surveys

The SOML Initiative Program-for-Results Project conducted a national health facility survey in 2016 based on a standard health facility assessment methodology (Service Availability and Readiness and Service Delivery Indicators). A multistage stratified sampling strategy was used to collect data from 90 health facilities per state. The malaria results found only 17 percent of the records had evidence that women received three or more doses of SP (IPTp3+), and 40 percent had evidence that an ITN or a voucher was given (21 percent in the North East Zone to 57 percent in the South West Zone). With

regard to health worker knowledge of integrated management of childhood illnesses, malaria knowledge was far above pneumonia and diarrhea throughout the country.

Other surveys

With FY 2015 funds, PMI supported the Malaria Implementation Assessment during 2016. The goal of the Malaria Implementation Assessment was to document progress in malaria control interventions between 2008 and 2014 in Cross River, Ebonyi, Nasarawa, and Sokoto States. The Malaria Implementation Assessment found that malaria prevention interventions improved in all four states: ITN household ownership, ITN use in children under-5 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-5 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.

PMI has been supporting EUV surveys from 2012 through 2017. 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. Biannual reports are provided summarizing the EUV activities and findings.

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 performance 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 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 USAID portfolio review, PMI's Annual Report to Congress, and MOP planning.

Progress during the last 12-18 months

Surveillance

In the past year, due to a gap in programming, PMI Nigeria support has been limited to SME strengthening at the federal level. PMI is working through the SME subcommittee and the Data Management Expert Group to:

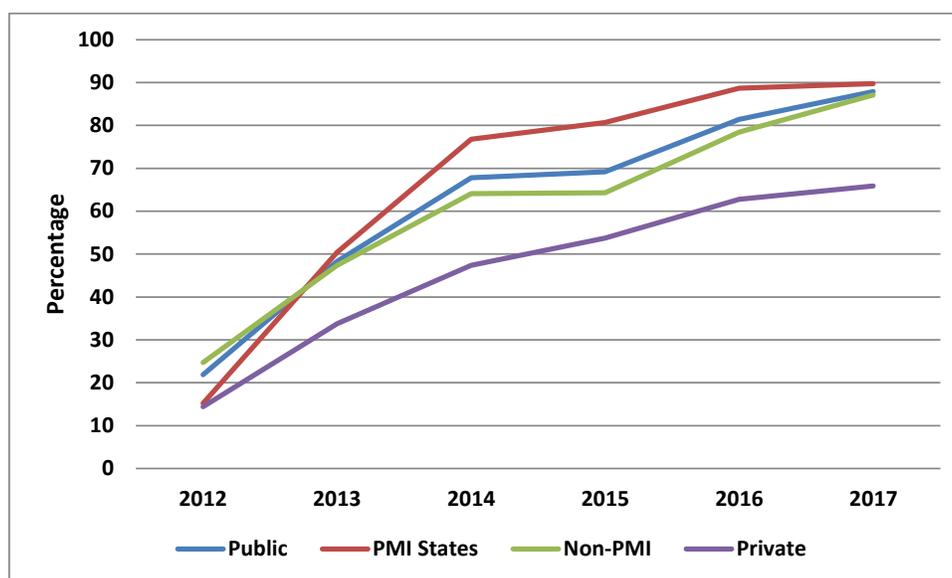
- 1) Update NHMIS tools;
- 2) Ensure data from secondary and tertiary facilities are uploaded into the DHIS2;
- 3) Design a community reporting system to meet the needs of iCCM and malaria surveillance; and
- 4) Ensure consistency of approaches to DQA and surveillance supportive supervision with existing state and LGA structures.

From September 25 to October 6, 2017, Nigeria implemented the first national malaria SME workshop with support from PMI in order to build SME capacity at SMEPs. The two-week workshop targeted 30 public health personnel (malaria program managers and malaria program SME personnel) from 15 states (including representation from all 11 PMI-supported states) and the Federal Capital Territory. The

MEASURE Evaluation regional SME training curriculum was adapted to the Nigeria context to meet the evaluation needs at the state level to include resources needed for planning, monitoring, and assessing malaria achievements. A field visit was included to expose participants to malaria surveillance at the data collection point. In addition, the workshop included surveillance data processing, analysis, interpretation, and use for decision-making. This activity provided a foundation for continued PMI support at the state level to improve the quality and use of malaria surveillance data. The Frontline Project has continued to support data quality improvement in Zamfara and Kano States. Support includes monthly data validation meeting at the ward level, creation of DHIS2 malaria dashboards, and the development and use of quarterly malaria bulletins.

HMIS reporting rates have continued to improve overall, including in the in the private sector. 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.

Figure 19: NHMIS Monthly Summary: Health Facility Reporting Rates



WHO has been supporting a technical officer to strengthen national malaria surveillance systems for generation of strategic information for evidence-based targeting of malaria interventions. The technical officer has been building capacity on the use of surveillance and other health data for malaria-risk mapping at national and sub-national levels. In addition, the NMEP with support from WHO and the Clinton Health Access Initiative, conducted a malaria surveillance landscape assessment. The assessment used a mixed method approach that included a desk review, qualitative analysis, and quantitative analysis in six states. The final report is pending, but preliminary recommendations included: creating a single document for surveillance guidance, clarifying roles and processes for all levels, and simplifying job aids and data capture forms.

National-level HMIS data does not tell the full malaria story for Nigeria. Each state is at a different place in malaria control and is progressing at a different pace. Therefore, analysis of routine data at the sub-national level is important. The figures below demonstrate 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. This sub-national data analysis is critical for decision-making, particularly in the context of a federated system and state autonomy.

Figure 20: Zamfara Total HMIS Reported Malaria Cases by Month in Public Health Facilities, January 2014 to December 2017

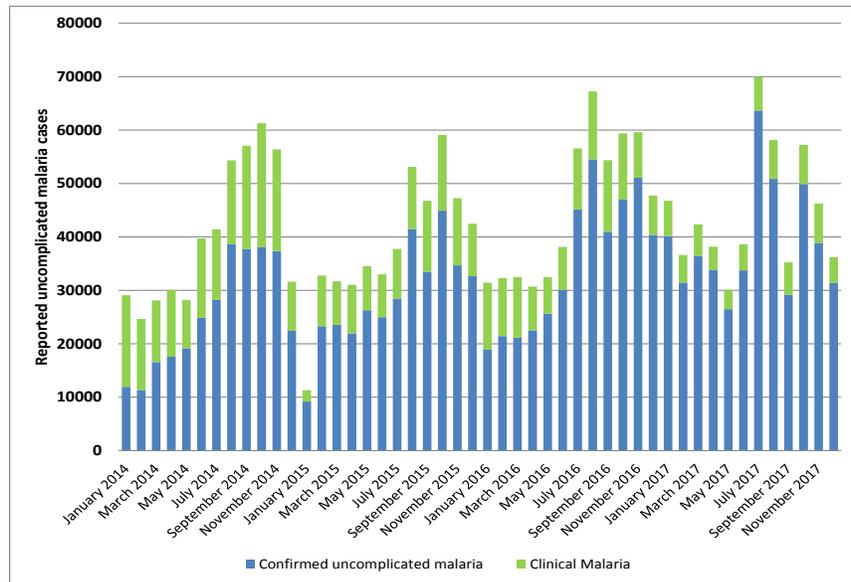


Figure 21: Nasarawa Total HMIS Reported Malaria Cases by Month in Public Health Facilities, January 2014 to December 2017

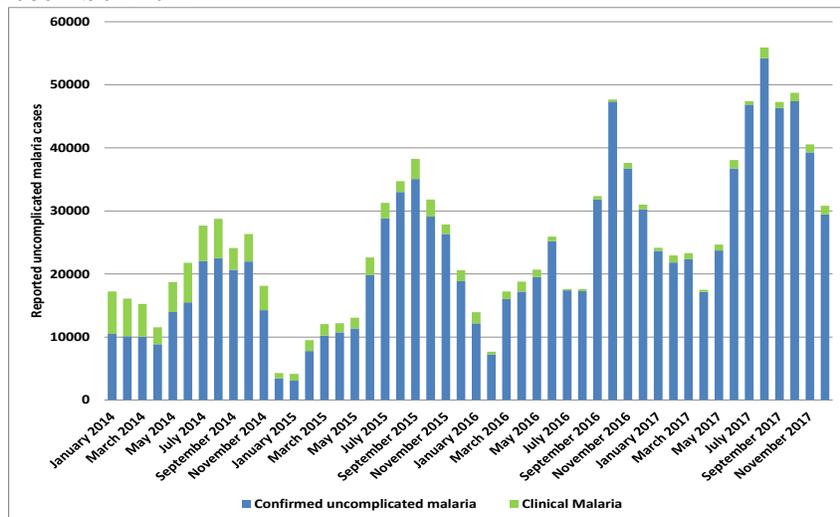
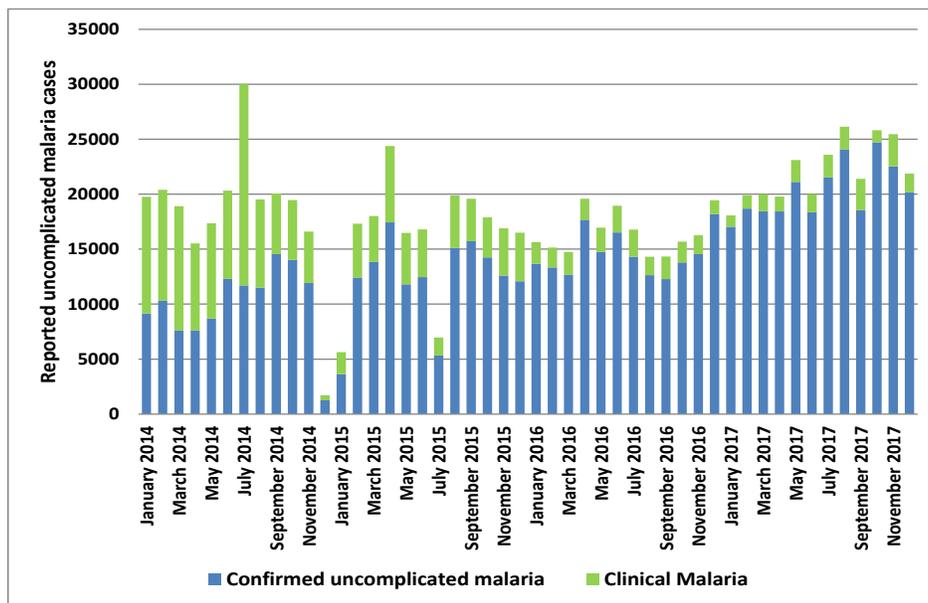
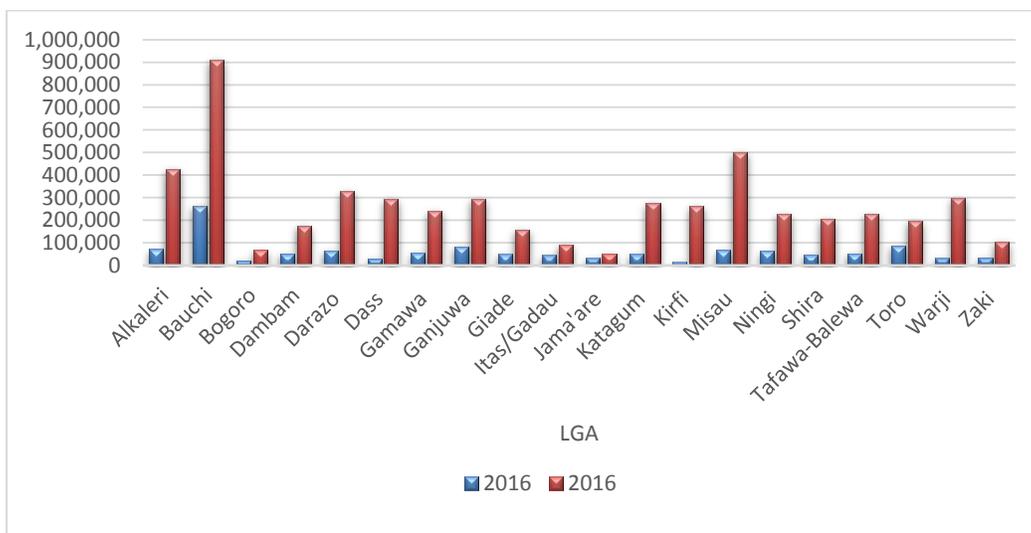


Figure 22: Cross River Total HMIS Reported Malaria Cases by Month in Public Health Facilities, January 2014 to December 2017



PMI Nigeria is using HMIS data to monitor reported malaria cases versus ACT consumption²⁰ from the LMIS. In 2016, Bauchi State reported 1.2 million malaria cases, while consuming 5.3 million ACTs (see figure below). In 2017, after intervening with the state regarding this issue, Bauchi State reported 1.4 million malaria cases versus 2.5 million ACTs. PMI is also using HMIS data to plan for expansion to previously Global Fund-supported health facilities. HMIS reported malaria cases for every health facility in Kebbi State were examined to determine which facilities would be added and the estimated ACT need for those facilities.

Figure 23: Reported Malaria Cases versus ACT Consumption in Bauchi State, 2016



²⁰Assessing the number of reported confirmed malaria cases with ACT distribution data in LMIS..

Household surveys

The results of the 2016 Nigeria Multiple Indicator Cluster Survey became available in 2017. Please see the Key Malaria Indicators Table for results.

Data collection for the 2018 Nigeria DHS is to start in September. The survey will include a malaria module and malaria biomarkers. The timing of the data collection aligns with the peak malaria season.

Health facility surveys

No new health facility surveys were conducted in the last 12 months.

Other surveys

The most recent EUV survey (December 2017) results can be found in the Case Management and Pharmaceutical Management sections. The survey included 110 health facilities (10 in each of the 11 PMI-supported states).

Evaluations

A WHO led midterm review of the NMSP began with Phase One (planning and preparation) in September 2017. Phase Two (thematic desk reviews) ended in October. Phase Three (validation) was completed in November. Overall assessment concluded that at the midpoint of the NMSP, epidemiological impact was varied with a decline in malaria deaths, but little or no changes in malaria morbidity. The MTR made the following recommendations:

- The role of communities and households to be responsible for their own health and perceiving malaria as a serious health problem should be highlighted, so that malaria response is household led.
- NMEP and partners should advocate to the highest levels of government at the national (president, Senate, and House of Representatives) and state level (governors and health commissioners) to prioritize malaria and thus increase budgetary allocation for health in general and malaria in particular.
- With NMEP staff strength of over 80, human resources needs to be optimized by having clearly defined job descriptions to ensure that all the expected roles of NMEP are identified and adequately manned, and this should be replicated at state level for improved implementation of all planned malaria activities.
- NMEP should strengthen the routine surveillance system to ensure that it is able to collect information from both the public and private sector in order to be able to properly measure program performance at the national level, with increased capacity for data analysis and use at all levels, to inform program planning, implementation, and monitoring.

Plans and justification for proposed activities with FY 2019 funding

PMI Nigeria's SME activities will continue to rely on a combination of routine malaria data (HMIS and LMIS), surveys (household, health facility, and other), and information from partners.

With FY 2019 funds, PMI will strengthen the harmonized HMIS (DHIS2) at the health facility, LGA, state, and national levels through training, refresher training, and supportive supervision. Strengthening

data quality at the health facility level through monthly data reviews is a priority, as well as building the capacity of SME officers to supervise and use data at the LGA level. PMI will work at the state level to streamline systems to enter secondary facility data into the DHIS2 and develop quarterly malaria bulletins. At the federal level, PMI will provide support to the SME branch at the NMEP in the harmonization of data collection tools, HMIS strengthening approaches, and monitoring/supervision tools and checklists. PMI will encourage the NMEP to use routine data to monitor malaria trends and programmatic implementation at the state level to more effectively target support.

With FY 2019 funds, PMI will provide support for the 2020 MIS.

PMI contributes to the Program Design and Learning budget for USAID Nigeria. Program Design and Learning 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.

Please see Table 2 for a detailed list of proposed activities with FY 2019 funding.

d. Operational research

NMEP/PMI objectives

The NMSP 2014-2020 incorporated the 2012 midterm program review 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 OR 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 during 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-5 years of age. 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 the 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. 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 2018.

Table 21: PMI-Funded Operational Research Studies

Completed OR Studies			
Title	Start Date	End Date	Budget
Feasibility of continuous distribution of ITNs through schools in Cross River ²¹	September 2012	July 2014	\$341,568
Feasibility of continuous distribution of ITNs through community-based channels in Nasarawa ²²	December 2011	July 2014	\$177,074
Effects of SBCC activities on household net care and repair behaviors ²³	April 2013	July 2014	\$62,700
ITN durability in three eco-geographical zones ²⁴	2012	July 2014	
Improved community case management of childhood illnesses by proprietary patent medicine vendors ²⁵	February 2015	August 2016	**\$1,500,000
Ongoing OR Studies			
Title	Start Date	End Date	Budget
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 a new award.

** PMI contributed \$750,000 of the total funding.

Plans and justification for proposed activities with FY 2019 funding:

No new OR activities are proposed with FY 2019 funding.

Please see Table 2 for a detailed list of proposed activities with FY 2019 funding.

²¹ Acosta, A., Obi, E., Ato Selby, R., Ugot, I., Lynch, M., Maire, M., Kilian, A. (2018). Design, Implementation, and Evaluation of a School Insecticide-Treated Net Distribution Program in Cross River State, Nigeria. *Global Health: Science and Practice*, 6(2), 272–287. <http://doi.org/10.9745/GHSP-D-17-00350>.

²² Kate Kolaczinski and Emmanuel Obi. Community-based distribution of insecticide-treated nets: A short guide based on recent experience. VectorWorks Project, Tropical Health, LLP. 2015.

²³ Hunter GC, Scandurra L, Acosta A, Koenker H, Obi E, Weber R: "We are supposed to take care of it": a qualitative examination of care and repair behaviour of long-lasting, insecticide-treated nets in Nasarawa state. *Nigeria Malar J.* 2014, 13: 320-10.1186/1475-2875-13-320.

²⁴ Kilian, A., Koenker, H., Obi, E., Selby, R. A., Fotheringham, M., & Lynch, M. (2015). Field durability of the same type of long-lasting insecticidal net varies between regions in Nigeria due to differences in household behavior and living conditions. *Malaria Journal*, 14, 123. <http://doi.org/10.1186/s12936-015-0640-4>.

²⁵ https://malariacare.files.wordpress.com/2016/10/nigeria-success-story_final.pdf

e. Other health systems strengthening

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 are:

1. Build capacity at the national, state, and LGA levels to deliver malaria control/elimination interventions;
2. Strengthen program coordination at the 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; and
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.

PMI and other development partners participate in various national-level technical and program management working groups, which develop policy, strategic documents, implementation guidelines, standard operating procedures, as well as provide operational and scientific guidance. Because Nigeria is 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 and placed special emphasis on strengthening malaria program management, technical expertise, and SME capacity. To increase domestic investment in malaria and primary health care, PMI, through the USAID Health Population, and Nutrition Office, is developing memoranda of understanding with state governments that specifies increasing inputs required from the state governments annually, with clear benchmarks and a process for reviewing progress against these agreements every six months, initiating the path to sustainability and self-reliance.

Progress since PMI was launched

From its inception in Nigeria, PMI has supported a variety of capacity building activities at all levels (national, state, LGA, facility, and community) to improve delivery of malaria interventions throughout. At the national level, the PMI team has worked closely with the NMEP through technical working groups, helped to develop Global Fund concept notes, provided technical guidance for all PMI-supported malaria interventions, advised the NMEP on disseminating guidance to the state and local levels, and developed the protocols for PMI-funded surveys and studies, such as the NMIS, TES, and OR.

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 SME, 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, and from the health facilities to the community. 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 the training of 2,897 health facility in-charges in program management. PMI's support has also included the production and distribution of job aids and standard operating procedures 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 SMEP staff. PMI has supported SMEP staff in the development of state malaria implementation guidelines, annual costed work plans, and training and supervision plans. At the national level, PMI has supported NMEP in the review of malaria control policies and strategic plans, the development of implementation guidelines, the design of systems for monitoring, supportive supervision, and training, and the development of capacity for commodity forecasting, quantification, procurement planning, and commodity logistics management. PMI has also worked with other development partners to strengthen capacities for data collection through routine health information systems and data use.

Using funds from the Office of the U.S. Global AIDS Coordinator, PMI supported strengthening of the NMEP's management capacity by assigning an SME specialist and logistician at the NMEP and SME officers in six PMI-supported states. The long-term technical assistance provider for logistics has developed the capacity of the NMEP Procurement and Supply Chain Management to forecast and quantify commodities for the 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 service delivery points. Long-term technical assistance providers have also participated in developing the concept papers for the Global Fund malaria grant.

Since its inception in 2008, the NFELTP has recruited nine successive cohorts of trainees (residents) and has aided in health system strengthening efforts. The latest cohort was recruited in March 2017 with a total of 56 residents with new cohort selection to take place in the next quarter. Eight cohorts have successfully completed the two-year training. Of the 374 residents that have completed the program 67 (18 percent) have been supported through PMI funding. All malaria residents currently in training (from cohorts eight and nine) 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 SME of malaria. Residents have engaged in malaria-related activities including support for data analysis, research, HMIS, and surveillance primarily at the state level to build local capacity for SME.

In addition to NFELTP, 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. Through collaboration between NMEP, PMI, NFELTP, and other partners, the project aims to strengthen 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 – five 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 last 12-18 months

PMI has supported refresher trainings, supportive supervision, the provision of job aids, and other activities to improve delivery of malaria interventions in primary healthcare 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 (routine and survey data for decision-making) for the NMEP and Benue, Nasarawa, Plateau, Ondo, and Oyo States; supported an 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 three-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, and training on the use of key software tools.

The NSTOP/Malaria Frontline project has trained LGA-level staff to analyze state HMIS malaria data to develop quarterly bulletins in Zamfara and Kano States, produce and distributed malaria wall charts to health facilities to help analyze malaria data, and identify gaps and suggest facility solutions to gaps (e.g., improving commodity ordering practices). Data validation activities have been implemented at the ward level to facilitate and improve the quality of data before it is reported into HMIS. Lastly, to help update the FMOH Facility List, the project conducted a health facility service assessment to document actual number of facilities, status of facilities, the number of personnel assigned to facilities, and the geo-location of facility. The report is currently being finalized.

Plans and justification for proposed activities with FY 2019 funding:

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 happen. The most important program outcomes occur at the state level, making strengthening of state and LGA-level management and technical capacity 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 the state and LGA level, training of health workers, supportive supervision, and data validation and use meetings. This will include continued support for the two-year NFELPT course

and the malaria short course. 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 key role in PMI's ability to improve service provision in its focus states.

Please see Table 2 for a detailed list of proposed activities with FY 2019 funding.

6. Staffing and administration

Two health professionals serve as Resident Advisors (RAs) to oversee PMI in Nigeria, one representing CDC and one representing USAID. In addition, one or more Foreign Service Nationals 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, implementation of 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 technical assistance 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.

Please see Table 2 for a detailed list of proposed activities with FY 2019 funding.