This Malaria Operational Plan has been approved by the U.S. Global Malaria Coordinator and reflects collaborative discussions with the national malaria control programs and partners in country. The final funding available to support the plan outlined here is pending final FY 2018 appropriation. If any further changes are made to this plan it will be reflected in a revised posting.

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BURMA

Malaria Operational Plan FY 2018

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ABBREVIATIONS and ACRONYMS

3DF	Three Disease Fund
3MDG	Three Millennium Development Goal Fund
ACT	Artemisinin-based combination therapy
AL	Artemether-lumefantrine
ANC	Antenatal care
API	Annual parasite incidence
CDC	Centers for Disease Control and Prevention
CQ	Chloroquine
DFDA	Department of Food and Drug Administration
DHS	Demographic and Health Survey
DHA-Pip	Dihydroartemisinin-piperaquine
DHIS-2	District Health Information System 2
FY	Fiscal year
G6PD	Glucose-6-phosphate dehydrogenase
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
GMS	Greater Mekong Subregion
HMIS	Health management information system
IFETP	International Field Epidemiology Training Program
IPC	Interpersonal communications
IPTp	Intermittent preventive treatment for pregnant women
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito net
JICA	Japan International Cooperation Agency
LLIN	Long-lasting Insecticide-treated mosquito net
K13	Kelch 13 propeller
MARC	Myanmar (Burma) Artemisinin Resistance Containment Project
M&E	Monitoring and evaluation
MIP	Malaria in pregnancy
MIS	Malaria indicator survey
MMP	Mobile and migrant populations
MOHS	Ministry of Health and Sports
MOP	Malaria Operational Plan
NFM	New Funding Model
NHP	National Health Plan
NGO	Non-governmental organization
NMCP	National Malaria Control Program
NSP	National Strategic Plan
OR	Operational research
PCR	Polymerase chain reaction
PMI	President’s Malaria Initiative
PSI	Population Services International
RAI	Regional Artemisinin Initiative
RAI2E	Regional Artemisinin Initiative 2 Elimination
RDMA	Regional Development Mission Asia

RDT	Rapid diagnostic test
SBCC	Social and behavior change communication
SM&E	Surveillance, monitoring, and evaluation
TSG	Technical and Strategic Group
UNOPS	United Nations Office for Project Services
USAID	United States Agency for International Development
VBDC	Vector-borne Disease Control Program (Burma)
VMW	Village Malaria Worker
WHO	World Health Organization

I. EXECUTIVE SUMMARY

When it was launched in 2005, the goal of the President's Malaria Initiative (PMI) was to reduce malaria-related mortality by 50% across 15 high-burden countries in sub-Saharan Africa through a rapid scale-up of four proven and highly effective malaria prevention and treatment measures: insecticide-treated mosquito nets (ITNs); indoor residual spraying (IRS); accurate diagnosis and prompt treatment with artemisinin-based combination therapies (ACTs); and intermittent preventive treatment of pregnant women (IPTp). With the passage of the Tom Lantos and Henry J. Hyde Global Leadership against HIV/AIDS, Tuberculosis, and Malaria Act in 2008, PMI developed a U.S. Government Malaria Strategy for 2009–2014. This strategy included a long-term vision for malaria control in which sustained high coverage with malaria prevention and treatment interventions would progressively lead to malaria-free zones in Africa, with the ultimate goal of worldwide malaria eradication by 2040-2050. Consistent with this strategy and the increase in annual appropriations supporting PMI, four new sub-Saharan African countries and one regional program in the Greater Mekong 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 takes into account the progress over the past decade and the new challenges that have arisen. Malaria prevention and control remains a major U.S. foreign assistance objective and PMI's Strategy fully aligns with the U.S. Government's vision of ending preventable child and maternal deaths and ending extreme poverty. It is also in line with the goals articulated in the Roll Back Malaria Partnership's second generation global malaria action plan, *Action and Investment to defeat Malaria (AIM) 2016-2030: for a Malaria-Free World* and the World Health Organization's 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 2011, PMI support extended to the Greater Mekong Sub-region (GMS) comprised of six countries: Burma, Cambodia, China (Yunnan Province), Lao People's Democratic Republic (PDR), Thailand, and Viet Nam. PMI support for Burma began in fiscal year (FY) 2011 through the Regional Development Mission for Asia (RDMA) platform and has since shifted to the provision of bilateral United States Agency for International Development (USAID) funding for PMI activities in Burma beginning in FY 2014.

This FY 2018 Malaria Operational Plan presents a detailed implementation plan for Burma, based on the strategies of PMI and the National Malaria Control Program (NMCP). It was developed in consultation with the NMCP and with the participation of national and international partners involved in malaria prevention and control in the country. The activities that PMI is proposing to support fit in well with the 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. They also align with the principles and directions outlined in Burma's new National Health Plan for 2017-2021, which prioritizes the roll-out of an essential package of health services to all parts of the country. This document briefly reviews the current status of malaria control policies and interventions in Burma, describes progress to date, identifies challenges and unmet needs to achieving the targets of the NMCP and PMI, and provides a description of activities that are planned with FY 2018 funding.

The proposed FY 2018 PMI budget for Burma is $9 million. PMI will support the following intervention areas with these funds:

Entomologic monitoring and insecticide resistance management: Malaria transmission in the GMS is closely associated with two malaria vectors that inhabit the forest and forest fringe, *Anopheles dirus* and *An. minimus*. Countries have made progress in monitoring vector distribution and insecticide resistance, which to date has not been a major problem in the GMS area. In Burma, PMI will focus geographically on supporting entomological surveillance in targeted areas with an emphasis on improved insecticide resistance monitoring and foci investigations, where epidemiologically appropriate. PMI will also provide support for entomological training in the region, in response to the changing vector ecology.

Insecticide-treated nets (ITNs): Most studies suggest that insecticide-treated nets (ITNs) provide protection even with significant outdoor and early evening biting. There is a strong culture of bed net use in Burma affirmed in the recent Malaria Indicator Survey noting 99.6% net ownership, but many of those nets are untreated. Per the recent Demographic Health Survey (DHS), 16% of the household population, 19% of children under five years of age and 18% of pregnant women slept under an ITN the night before the survey. Considerable numbers of long-lasting ITNs (LLINs) targeted for high-risk populations and areas in Burma are included in the Global Fund grants. With FY 2016 funding, PMI is procuring approximately 516,000 ITNs for migrant and vulnerable populations in targeted focus areas. With FY 2017 funding, PMI will procure an additional 456,000 ITNs to address any remaining gaps in PMI target areas.

With FY 2018 funding, PMI will procure approximately 300,000 nets to contribute to potential LLIN gaps at the household level in endemic areas, targeting villages and townships in the PMI focus areas and those that are not supported under the new Global Fund agreement (e.g., northern townships in Rakhine, non-state areas in Kayin, potential new areas within the three PMI target states/region), including reaching internally displaced and migrant and mobile populations with LLINs.

Indoor residual spraying (IRS): IRS is mostly limited to outbreak response and focal control and is not a key activity in Burma. Therefore, PMI funds will not be targeted for IRS.

Malaria in pregnancy (MIP): Given the low prevalence of malaria in Burma, intermittent preventive treatment for pregnant women (IPTp) is not part of the national strategy. However, PMI will support promotion of universal LLIN coverage and prompt diagnosis and treatment of clinical cases of malaria in pregnant women as they remain a vulnerable group. PMI supported a rapid assessment of malaria in pregnancy to identify programmatic areas for strengthening in Burma, Cambodia, Thailand, and Lao PDR in 2015. With FY 2016 funding, PMI is building on

the assessment findings and recommendations to ensure that malaria prevention and case management components are included in the new antenatal package. With FY 2017 resources, PMI will support procurement of LLINs, training and supervision of facility staff, and updating training materials and job aids to strengthen malaria case management and prevention activities provided through antenatal clinics in targeted areas of Burma. Although no specific FY 2018 funding is allocated to MIP, PMI will continue to strengthen case management practices for MIP and ensure technical support to NMCP and reproductive health programs.

Case management: Diagnosis of malaria is based on laboratory tests with microscopy or rapid diagnostic tests (RDTs) in Burma. Three ACTs, artemether-lumefantrine, dihydroartemisinin-piperaquine, and artesunate-mefloquine, are currently recommended for the treatment of *Plasmodium falciparum* cases along with a single dose of primaquine (0.75 mg/kg) prescribed on the first day without a prior glucose-6-phosphate dehydrogenase deficiency test. With FY 2016 and FY 2017 funding, PMI has supported training and equipping of community health and malaria volunteers and health facility staff in targeted project areas, in malaria case management including ensuring sufficient stocks of RDTs and treatment with an ACT.

The majority of RDT and ACT needs in Burma will be met by the country's Global Fund grants through 2020. With FY 2018 funding, PMI will procure some quantities of RDTs to fill gaps and strengthen laboratory capacity in targeted areas. PMI will also procure small quantities of ACT treatments to fill any gaps and respond to urgent needs. PMI will support in-service training, accreditation of microscopy trainers, development of a national slide bank, and quality assurance of the parasitological diagnosis of malaria. In addition, PMI will continue to support drug quality assurance efforts by helping the national pharmaceutical reference laboratory in Burma maintain international accreditation. PMI will continue to support therapeutic efficacy and drug resistance monitoring at 8-10 sites (alternating every other year) in Burma.

Health systems strengthening and capacity building: PMI interventions are occurring in the broader context of significant changes in the health system, with the Ministry of Health and Sports (MOHS) rolling out a new 5-year National Health Plan (NHP) in March 2017 focused on expanding universal access to an essential package of health services, including malaria-related services. In recent years, the MOHS had focused on rebuilding the NMCP's health workforce with different skill sets to improve management at various levels of field operations, and increasingly grappling with the challenge of sustaining a cadre of malaria volunteers in the face of declining incidence and increased need for integration with other services. A key aim remains to improve health staff capacity in 284 malaria-endemic townships in planning, implementation, and M&E of malaria control activities as national approaches and systems adapt to declining prevalence. These efforts will be supplemented with a strengthened health management information system, evidence-based planning, research and policy development, and increasing access to malaria commodities such as LLINs, quality drugs, and diagnostics. With FY 2015 and FY 2016 funding, PMI supported international training opportunities for NMCP staff as well as building in-country capacity to train state/regional and township level malaria staff in epidemiology, entomology, and malaria surveillance and response. Recognizing that human capacity is lacking in Burma and well-trained staff are critical for successful malaria control and eventual elimination particularly as malaria incidence becomes increasingly localized, PMI will continue to support the Burma public health staff to participate in the International Field Epidemiology Training Program. In addition, PMI will continue to support the building of in-

country capacity for data collection and epidemiology by training NMCP staff as well as state and township level staff responsible for malaria control activities in the field through in-country technical training courses led by the Central Epidemiology Unit. In order to build more malaria management and field operations (MMFO) capacity, PMI will adapt the regional MMFO course to the local needs and develop an in-country course. PMI will also continue to support the MOHS in the roll-out of a new National Supply Chain strategy calling for a more unified and efficient public health supply chain capable of distributing malaria and other products.

Social and behavior change communication (SBCC): As Burma moves from malaria control to elimination, SBCC interventions need to be tailored and targeted for hard-to-reach populations that remain at risk, including forest goers, and mobile and migrant populations. PMI supports integration of SBCC activities in the delivery of malaria services (e.g., distribution of LLINs, MIP and case management). PMI supports a comprehensive approach for SBCC interventions emphasizing interpersonal communication, sustained community involvement, support for promotion of healthy behaviors, and reduced risk-taking in the context of malaria exposure. PMI will continue to provide technical support to national programs to facilitate development and use of effective communication strategies and appropriate SBCC approaches. With FY 2018 funding, PMI will support development of effective SBCC approaches for control and elimination in PMI target areas, and ensure standardized and harmonized key SBCC materials and messages are delivered at the community level.

Surveillance, monitoring, and evaluation (SM&E): In the context of malaria elimination, accurate and timely data are essential to identify cases, mount a timely response, inform policy decisions, and focus resources to areas of ongoing malaria transmission. A new five-year National Strategic Plan (NSP) for Intensifying Malaria Control and Accelerating Progress towards Malaria Elimination (2016-2020) has been developed and endorsed by the MOHS. The ultimate goal of the NSP is to reduce malaria morbidity and mortality by 85% and 75%, respectively, by 2020 (relative to 2015 baseline figures). The target is to eliminate *P. falciparum* malaria by 2025 and ultimately all forms of malaria by 2030. With FY 2016 and FY 2017 funding, PMI is supporting strengthening and scale-up of surveillance systems in Burma, including transitioning to District Health Information System 2 (DHIS-2) for routine reporting, supported national surveys including Demographic Health Survey and Malaria Indicator Survey, and supporting collection and reporting of routine surveillance and survey data in PMI target areas.

With FY 2018 funding, PMI will support technical assistance to strengthen routine surveillance systems at national, state/region and township levels in Burma towards a comprehensive, integrated system that includes data from public, private, and community sectors. PMI will support scaling up of the national web-based system used by the Ministry for broader health reporting to include malaria (DHIS-2), and strengthen NMCP capacity for data management and use. PMI will also continue to support the National Monitoring and Evaluation (M&E) Plan and assist in the identification of NMCP SM&E needs to move from control to elimination.

Operational research (OR): PMI has supported key operational research activities in the GMS in the past including: addressing outdoor transmission to assess the acceptability and entomological efficacy of insecticide-treated clothing in Burma and the safety of low-dose primaquine in those with glucose-6-phosphate dehydrogenase deficiency and infected with *P.*

falciparum in Cambodia. With FY 2016 funding, PMI will support the evaluation of the performance of a highly-sensitive RDT versus conventional RDT, compared with polymerase chain reaction (PCR) as the gold standard, in reactive case detection of malaria in a low transmission area of Burma. No OR activities are currently planned with FY 2017 and FY 2018 funding, but PMI will continue to keep abreast of key programmatic bottlenecks and plan for OR to address those gaps as necessary.

Pre-elimination: In response to the tremendous progress made in malaria control and the threat of artemisinin resistance, Burma's National Strategic Plan for Intensifying Malaria Control and Accelerating Progress Towards Malaria Elimination (2016-2020) has set a vision of a malaria-free Burma by 2030, consistent with the regional commitment made by all Asia Pacific Leaders at the 9th East Asia Summit in November 2014. Burma's plan includes reducing the incidence of malaria to less than one case per 1,000 population at-risk in all states/regions by 2020; interrupting transmission of and eliminating indigenous *P. falciparum* by 2025; eliminating all indigenous malaria in a phased manner by 2030; and preventing the re-establishment of local malaria transmission due to importation in all areas where it has been eliminated. In support of these national objectives, PMI will continue to support implementation of malaria prevention and control interventions and ensure comprehensive coverage in all target malaria endemic villages in three focus states/regions (Kayin, Rakhine, and Tanintharyi). With FY 2017 and FY 2018 funding, PMI will assist the NMCP with piloting case-based reporting and investigation as well as foci investigations in malaria eliminating villages to better define transmission risk and additional approaches needed for malaria elimination.

II. STRATEGY

1. Introduction

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

In 2015, PMI launched the next six-year strategy, setting forth a bold and ambitious goal and objectives. The PMI Strategy for 2015-2020 takes into account the progress over the past decade and the new challenges that have arisen. Malaria prevention and control remains a major U.S. foreign assistance objective and PMI's Strategy fully aligns with the U.S. Government's vision of ending preventable child and maternal deaths and ending extreme poverty. It is also in line with the goals articulated in the Roll Back Malaria Partnership's second generation global malaria action plan, *Action and Investment to defeat Malaria (AIM) 2016-2030: for a Malaria-Free World* and World Health Organization's 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 2011, PMI support extended to the Greater Mekong Sub-region (GMS) comprised of six countries: Burma, Cambodia, China (Yunnan Province), Lao People's Democratic Republic (PDR), Thailand, and Viet Nam. PMI funding support for Burma began in fiscal year (FY) 2011 through the Regional Development Mission for Asia (RDMA) platform and has since shifted to the provision of bilateral United States Agency for International Development (USAID) funding for PMI activities in Burma beginning in FY 2014.

This FY 2018 Malaria Operational Plan (MOP) presents a detailed implementation plan for Burma, based on the strategies of PMI and the National Malaria Control Program (NMCP) strategy. It was developed in consultation with the NMCP and with the participation of national and international partners involved in malaria prevention and control in the country. The activities that PMI is proposing to support fit in well with the 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 Burma, describes progress to date, identifies challenges and unmet needs to achieving the targets of the NMCP and PMI, and provides a description of activities that are planned with FY 2018 funding.

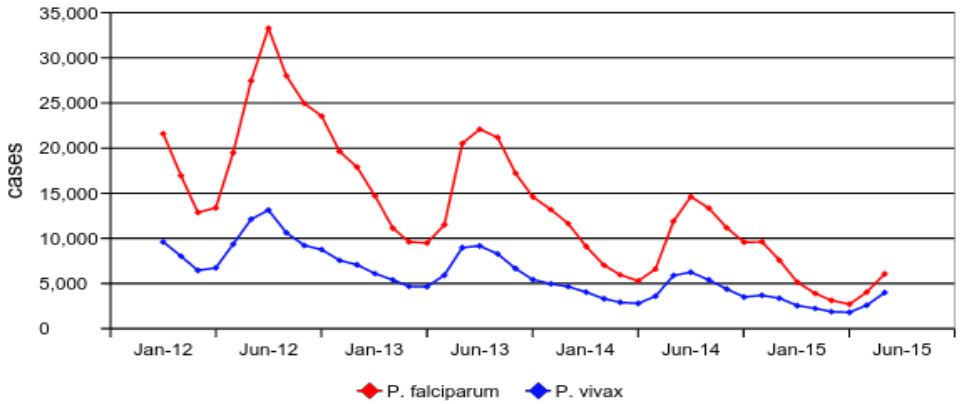
2. Malaria situation in Burma

Although significant progress has been made in recent years, the malaria burden in Burma remains the highest among the six countries of the GMS. The NMCP reported 333,871 malaria cases in 2013; 205,658 malaria cases in 2014; and, 182,452 malaria cases in 2015 which represents about 75% of the total malaria cases in the GMS. The number of deaths attributed to malaria has progressively fallen in the past ten years from 1,261 in 2007 to 21 in 2016. The reported cases represent only the public sector and do not include those using self-treatment or seeking care in the private sector, which are estimated to represent about 50% of the total although the estimate is uncertain due to lack of reporting. Several malaria-endemic areas, particularly in the non-state actor areas and those bordering Thailand and China, have limited accessibility to government health services and international organizations, further contributing to under-reporting.

The NMCP estimates that 284 out of the total 330 townships are located in malaria endemic areas, and that approximately 43% of the population lives in areas where malaria transmission occurs (7% in high transmission, 12% in moderate transmission, and 24% in low transmission areas), according to the 2015 stratification[1].

Plasmodium falciparum and *P. vivax* are the major species, with occasional reports of *P. malariae* and *P. ovale*. The proportion of cases due to *P. falciparum* has slightly declined over the past decade, and in 2014, it accounted for 67% of cases, non-*P. falciparum* for 30% and mixed infections for 3%. Recent trends of the *P. falciparum* and *P. vivax* caseload in Burma are reported in Figure 1.

Figure 1: Trends of *P. falciparum* and *P. vivax* cases from January 2012 to April 2015



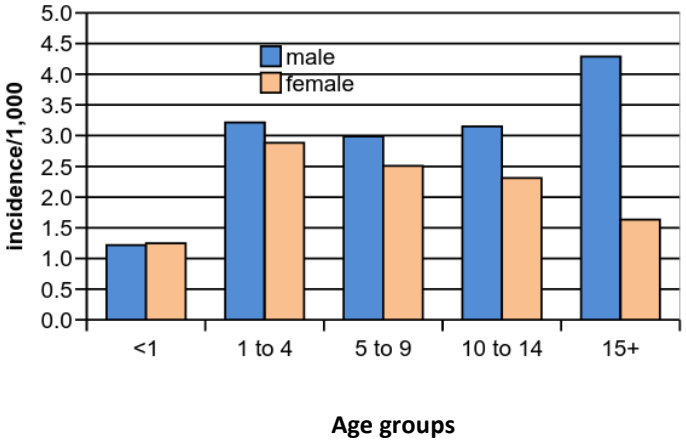
Source: NMCP

[1] Draft of the National Strategic Plan for Intensifying Malaria Control and Accelerating Progress towards Malaria Elimination 2016-2020. Department of Public Health, Ministry of Health, Republic of the Union of Myanmar

Out of 37 species of *Anopheles* recorded in the country, ten species are malaria vectors and have been classified as primary vectors (*An. dirus s.l.* and *An. minimus)* and secondary vectors (*An. aconitus, An. annularis, An. philippinensis, An. Sundaicus s.l., An. culicifacies, An. maculatus,* and to a lesser extent *An. sinensis* and *An. jeyporiensis*). The peak malaria transmission period is generally between July and October for the majority of the country and rainfall peaks between June and August.

Analysis of the age and sex distribution of national reported cases in 2014 (see Figure 2 below) indicates an over-representation of adult males, reflecting the risk attributed to occupations such as mining, forest-related activities, rubber tapping, construction, etc.

Figure 2: Incidence of malaria in Burma in 2014, by age group and sex



Areas of concern for artemisinin resistance have been identified within Burma through ongoing drug resistance monitoring. In 2009-2010, the early signs of *P. falciparum* resistance to artemisinins characterized by prolonged parasite clearance time were reported in at least three states/regions (Bago-East, Mon, and Tanintharyi); and evidence of suspected artemisinin resistance was reported in Kachin, Kayah, and Kayin States.

As an emergency response, a strategic framework to contain artemisinin-resistant *P. falciparum* was developed and endorsed in 2011 along with the commencement of the Myanmar (Burma) Artemisinin Resistance Containment (MARC) Project supported by the Three Disease Fund (3DF), the predecessor to the current Three Millennium Development Goal (3MDG) Fund. Following the principles outlined by the World Health Organization's (WHO) Global Plan for Artemisinin Resistance Containment, the MARC framework aimed to halt the spread of artemisinin resistance from eastern Burma to the western part of the country and beyond. However, these containment efforts were unable to stop the emergence of resistant parasites beyond the containment areas. Furthermore, recent studies[2] based on multi-country analysis of

[2] Independent emergence of artemisinin resistance mutations among *P. falciparum* in Southeast Asia. The Journal of Infectious
Diseases 2015; 211: 670–9

the genetic mutations associated with artemisinin resistance have suggested that these mutations originated independently in multiple locations of Southeast Asia. More recently, a survey[3] conducted in Burma from January 2013 to September 2014 in ten states/regions and along the Thailand and Bangladesh borders found *Kelch* 13 propeller (K13) mutations in 371 (39%) of 940 malaria patients tested. Therefore containment or elimination efforts targeting drug resistant parasites in one small area will likely have limited or no effect on preventing the emergence of resistance in other areas, without broader progress toward elimination of malaria.

In September 2014, the WHO declared the elimination of *P. falciparum* malaria from the GMS technically feasible and the recommended response to address the challenge of artemisinin resistance. In November 2014, during the 9th East Asia Summit, the Government of Burma adopted the goal of malaria elimination by 2030 along with the rest of the Asia Pacific region. To support this long-term endeavor, the Ministry of Health and Sports (MOHS) established a new "Malaria Elimination Committee" in August 2015 with the task of providing the necessary institutional, technical and financial support needed to achieve this historical goal.

3. Country health system delivery structure and MOHS organization

According to the last census, conducted in 2014, the total population of Burma is estimated at 51,486,253. The 2015 mid-year population estimate is 52,006,261 as referenced in the National Strategic Plan (NSP). The country is divided administratively into Nay Pyi Taw Territory, the capital city, and 14 states and regions (Figure 3), and comprises of 74 districts, 330 townships, and 64,134 villages.

Figure 3: Administrative States and Regions of the Republic of the Union of Myanmar

[3] Spread of artemisinin-resistant *Plasmodium falciparum* in Myanmar (Burma): a cross-sectional survey of the K13 molecular marker. Lancet Infectious Disease, 2015. Published Online, February 20, 2015.

Following Burma's dramatic political transition in 2015 and new civilian leadership that took office in 2016, the MOHS launched a new National Health Plan (NHP) in March 2017 focused on scaling up essential services and advancing Universal Health Coverage as part of its Vision 2030 for a healthier and more productive population. In contrast to previous NHPs, the new NHP for 2017-2021 was developed with significant input from external stakeholders - including donors, development partners, civil society, and ethnic health organizations. The new NHP also focuses on advancing Universal Health Coverage through expanded access to essential services across the country, taking a dramatically more open view toward the private sector and working with ethnic health organizations. The new policy directions of the MOHS present significant opportunities for stronger collaboration with the MOHS to build sustainable systems, and bridge longstanding divides between the public health system and the private sector and service delivery systems run by civil society and ethnic health organizations. Under the 2017-2021 NHP, the MOHS prioritizes the provision of an essential package of health services focused on promoting health, preventing diseases, providing effective treatment, and rehabilitation working with various sectors. The private sector which has played a major role in service delivery contains a range of delivery platforms and practices, including traditional healers to general practitioners that mainly provide ambulatory care in urban settings. Other ministries (e.g. Ministry of Defense) also provide limited health care services, mainly curative, for their personnel and families.

The MOHS structure was reorganized in April 2015 into six different departments: Public Health, Medical Services, Medical Research, Health Professional Development and Management, Food and Drug Administration, and Traditional Medicine. Malaria control activities are led by the Vector Borne Disease Control (VBDC) program and housed in the newly established Department of Public Health, with the collaboration of partners from public and private sectors. At central level, the VBDC is mandated to formulate national strategies, policies, standards and norms related to malaria control, provide training, conduct operational research (OR), control outbreaks, and provide consultative and advisory services to implementing agencies.

With the rapid development and change of the health priorities and structure of the MOHS, it is promising that Burma has significantly increased its national budget for health from 1% of the total national budget in 2010 to 3.4% in 2015, and has made human resource capacity strengthening one of its priorities. For example, in April 2015, the Government nearly doubled the salary of government employees.

4. National malaria control strategy

A five-year (2016-2020) NSP for Intensifying Malaria Control and Accelerating Progress towards Malaria Elimination was developed in June 2016. The ultimate goal of the NSP is to eliminate *P. falciparum* malaria by 2025 and all forms of malaria from Burma by 2030.

The NSP has four intermediate objectives:

1. To reduce reported incidence of malaria to less than 1 case per 1,000 population in all states/regions by 2020.
2. To interrupt transmission of *P. falciparum* malaria in at least 5 states/regions by 2020 (Bago, Magway, Mandalay, Mon, and Yangon).

3. To prevent the emergence of multi-ACT resistant *P. falciparum*.
4. To prevent the re-establishment of malaria in areas where transmission has been interrupted.

The NSP identifies three key intervention areas with priority activities:

1. Case detection and effective management:
   - Provide universal coverage for diagnosis and treatment in health facilities and at community level;
   - Reduce the parasite reservoir through effective radical treatment of all cases;
   - Focus on detecting, protecting, and providing access to diagnosis and treatment for priority population groups (e.g. mobile and migrant populations (MMPs))
   - Detect and treat asymptomatic parasite carriers by screening appropriate populations using rapid and highly sensitive diagnostic tools;
   - Reinforce and scale up quality microscopy and access to quality assured rapid diagnostic tests (RDTs);
   - Strengthen malaria program management, to ensure that it is operating optimally at all levels of the health system;
   - Engage formal and informal private sectors to improve the availability of quality-assured products;
   - Strengthen drug regulatory agency functions to eliminate artemisinin monotherapy and prevent the sale of substandard and falsified drugs;

2. Disease prevention:
   - Universal coverage of at-risk populations with LLINs or IRS and supplementary vector control measures where appropriate;
   - Deliver preventive measures appropriate to local vector biology, transmission settings and populations characteristics to accelerate the impact on transmission;
   - Empower at-risk populations by ensuring they understand the disease through culturally appropriate and gender sensitive communication;
   - Ensure participation of at-risk communities and population groups in malaria prevention activities.

3. Malaria case and entomological surveillance:
   - Strengthen the malaria case surveillance system as a core intervention to efficiently gather, use, and disseminate data;
   - Rapidly detect and treat cases through intensified surveillance and response;
   - Maintain adequate epidemiological and entomological capabilities with an effective OR component, to determine risk and underlying causes of transmission;
   - Establish an early warning system to monitor malaria risk factors in terms of vulnerability and receptivity in order to predict and prevent re-establishment of malaria transmission.

The National Malaria Control Program (NMCP) also developed the National Plan for Malaria Elimination in Myanmar (2016-2030) and the Monitoring & Evaluation Plan.

Implementation of the NSP is guided by the new epidemiological stratification indicated below. It no longer relies on socio-ecologic risk factors only, but is based primarily on level of transmission estimated by annual parasite incidence (API). Table 1 summarizes a breakdown of the Burmese population by strata based on the new stratification criteria.

Table 1: Breakdown of Burma's population (2015) by transmission level strata (Source: VBDC)

Stratum	Transmission level	Criteria	Population size (%)
1	Malaria free	API: 0 No transmission	8.1 million (16%)
2	Potential transmission	API: 0 Possibility of vector presence, receptivity and vulnerability	21.4 million (41%)
3a	High transmission	API: >5	3.5 million (7%)
3b	Moderate transmission	API: 1-5	6.3 million (12%)
3c	Low transmission	API: <1	12.7 million (24%)
Total			52.0 million (100%)

Two main phases are identified on the path to malaria elimination:

- The transmission-reduction phase, where a combination of interventions is applied in all endemic areas to bring malaria incidence down to a level at which elimination can be considered (below 1 case per 1,000 people at risk per year);
- The elimination phase, where these measures are targeted to remaining foci and surveillance intensified with measures to rapidly detect and cure every case.

PMI supports the NMCP's strategy and the broader NHP for 2017-2021, contributing support both at national and peripheral levels. At national level, PMI provides support for capacity building, particularly in the field of entomology and epidemiology, monitoring therapeutic efficacy of antimalarial drugs, strengthening malaria surveillance, antimalarial drug quality assurance systems, supply chain management for health commodities, and quality assurance for malaria diagnosis.

At peripheral level, PMI supports comprehensive, community-based malaria services for at-risk populations with vector control and case management interventions, involving public and private sectors including civil society and ethnic health organizations. With FY 2016 and FY 2017 funding, PMI implementing partners are reaching nearly 29 townships, consolidated to focus in three states/regions (Kayin, Rakhine, and Tanintharyi). With FY 2018 funding, PMI will focus on potentially expanding to a total of 33 townships covering a population of 3 million, in close coordination with the NMCP, other partners, and donors operating in these areas, to ensure comprehensive coverage in well-defined administrative areas. This approach will allow PMI to focus malaria interventions in priority areas and to provide comprehensive assistance at all levels

of the health system, as well as expand coverage to more remote communities and to reach at-risk MMPs.

Figure 4: PMI-supported States and Regions

5. Updates in the strategy section

- ***New President, new government, and new Ministry of Health.*** Following the historic parliamentary elections of November 2015, with Aung San Su Kyi's National League for Democracy winning 78% of the seats, a new President of the Republic of the Union of Myanmar was selected on March 30, 2016. The new civilian-led government announced a new MOHS on April 1, 2016.

- ***Restructuring of Ministry of Health.*** As of 2015, the NMCP now falls under the restructured Department of Public Health that oversees activities on communicable diseases, nutrition, school health, environmental health, and other public health initiatives. It is anticipated new staff will be recruited to fill these new positions within the new MOHS structure and departments.

- ***Launch of a new National Health Plan***. A new NHP for 2017-2021 was launched in March 2017, focused on expanding Universal Health Coverage through scale-up of an essential package of health services to all areas of the country.

- ***National Strategic Plan, 2016-2020.*** A five-year (2016-2020) NSP for Intensifying Malaria Control and Accelerating Progress towards Malaria Elimination was developed in June 2016,

together with the National Plan for Malaria Elimination in Myanmar (2016-2030) and the Monitoring & Evaluation Plan.

- ***Malaria Indicator Survey (MIS) and Demographic Health Survey (DHS).*** For the first time in the history of the country, both a DHS and a MIS were conducted in 2015. The MIS was conducted in the malaria transmission season during a period of 11 weeks between August and October, 2015. A total of 4,731 households and 20,638 household members from 144 clusters were included in the survey, with blood samples collected and analyzed from 13,726 individuals. The final results were released in February 2017 and the official report is being finalized (more information on the MIS is included in the Surveillance, Monitoring and Evaluation (SM&E) section). PMI and 3MDG provided funding support for the MIS.

  The DHS was led by the MOHS with data collection taking place between December 2015 to June 2016 and funding provided by USAID and 3MDG. The final report was presented on March 24, 2017, during an official ceremony chaired by the Minister of Health.

6. Integration, collaboration, and coordination

Funding

In recent years, Burma has seen a dramatic increase in both external and domestic funding for health. Following the initial withdrawal of the Global Fund in Burma in 2005, the 3DF (2006-2011 was one of the first consortia of donors to support malaria control through the MARC framework. Since then, Burma has received funding from the following:

- **The Global Fund/ Regional Artemisinin Initiative 2 Elimination (RAI2E) (2018-2020):** Following a successfully implemented Regional Artemisinin Initiative (RAI) project (2015-2017), the Global Fund Board has decided to consolidate malaria funding for GMS countries into a single regional grant, where the activities covered under the New Funding Model (NFM) and RAI grants would form a "country component" with the regional grant. The RAI2E program grant period is January 2018 through December 2020. The grant is for $242 million for all five GMS countries, including a cross-cutting regional component for $34 million. To maximize efficiencies and to reduce management burden for countries, management of the regional grant will be implemented by the United Nations Office for Project Services (UNOPS). Based on disease burden and income level, Burma has been allocated a total of $96 million of the $242 million for the implementation period of 2018-2020. The Burma grant will primarily focus on vector control, community and private sector case management supported with regular monitoring, social and behavior change communication (SBCC) and stakeholder coordination. Although Burma has been allocated the largest proportion of the grant, it is facing reduced funding from Global Fund across all three diseases for 2017-2021, which has been a key consideration driving reforms in the way the three disease programs are managed, including increasing the push for integration of community volunteers.

- **3MDG Fund:** This is a $300 million initiative primarily focused on strengthening the national health system and improving maternal and child health services. The initiative

also contains funding allocated for malaria ($16.1 million for the period 2014-2017, with a costed extension through December 2017). Several donors including the U.S., Sweden, Switzerland, and the U.K. are currently in the process of designing a proposed follow-on fund estimated at approximately $150 million over five years, with reduced funding owing to the withdrawal of several bilateral donors from the health sector in Myanmar.

- **The Artemisinin Monotherapy Replacement Project:** The project is funded with £11.3 million from the UK's Department for International Development, $1 million from Good Ventures, and other funds from the Bill and Melinda Gates Foundation. It is implemented by Population Services International (PSI) and focuses on replacing artemisinin monotherapy and other substandard antimalarial drugs available in the informal private market sector with subsidized quality-assured ACTs. The project started in 2012 and ends in December 2017.

- **Japan International Cooperation Agency's (JICA):** A 10-year project which provided funding for health and malaria programs, ended in March 2015. A new five-year malaria project focusing on elimination in Bago Region started in January 2016.

- **Asian Development Bank**: In 2016, the Asian Development Bank began funding a multi-year project for malaria surveillance, laboratory quality assurance, and malaria services for MMPs.

- **Other donors:** Other regional donors supporting malaria activities that impact Burma are the Australia's Department of Foreign Affairs and Trade and the Bill and Melinda Gates Foundation which jointly supported the WHO's regional Emergency Response to Artemisinin Resistance hub, 2013-2015, based in Phnom Penh.

Coordination

The NMCP coordinates activities implemented by over 25 different international and national organizations through a technical and strategic group (TSG) for malaria. The malaria TSG comprises of technical experts from the MOHS, United Nations agencies, national and international non-governmental organization (NGOs), and donors, including PMI. As the Secretariat for the TSG, WHO organizes periodic meetings for improved coordination and discussion of technical topics on an *ad hoc* basis. There are two sub-working groups (Monitoring and Evaluation (M&E) and Program Implementation) under the TSG.

Private Sector

PSI supports the "Sun Quality Health Network," a franchise of licensed general practitioners serving low-income populations. As mentioned above, PSI is also implementing the Artemisinin Monotherapy Replacement Project, which provides quality-assured ACTs to the private market sector.

Similarly, the Myanmar Medical Association, with support from the Global Fund, 3MDG, USAID, and WHO, has a network of private general practitioners under its "Quality Diagnosis

and Standard Treatment of Malaria" Project. The private general practitioners receive training and logistics support to deliver quality-assured diagnostics and treatment for malaria. Approximately 330 private providers in 113 townships and 360 Village Health Volunteers in 12 fixed and mobile clinics are part of the network.

Growing support for malaria control activities is also provided by the corporate private sector:

- 28 Burmese companies, members of Myanmar Health & Development Consortium and Myanmar Business Coalition on AIDS, have signed a corporate commitment to provide education on malaria testing, diagnosis, and treatment;
- Total Exploration and Production supports a comprehensive malaria program in 33 villages (population 38,000) surrounding their pipeline in Tanintharyi Region, in addition to collaboration with NGOs on outreach activities;
- Shwe Taung Group ensures health insurance and malaria prevention program to all its 3,304 employees;
- Dagon International provides testing and treatment for 100 permanent staff and 500 seasonal laborers on their palm oil plantation;
- South Dagon and Yuzana provide assistance to health facilities and malaria programs at their plantations in Tanintharyi.

Other United States Government

PMI is collaborating with USAID/Burma's "Project for Local Empowerment" by providing technical assistance in the training of ethnic group volunteers and distribution of ACTs, RDTs and LLINs. The Project for Local Empowerment is funded by USAID for the period 2011-2017 ($8-$10 million per year) and covers six Thai provinces on the Thai-Burma border, including nine Burmese refugee camps.

Another example of U.S. Government collaboration is the "Shae Thot Project", which is funded by USAID and implemented by a consortium of international NGOs in the central dry-zone of Burma. This is a comprehensive community development project, which also includes health and malaria control components.

PMI is also collaborating with USAID's Maternal and Child Survival Program to address malaria integration within ANC platforms.

U.S. Peace Corps started its programs in Burma in 2016, and PMI will explore opportunities for collaboration to strengthen malaria control and prevention activities in communities supported by both organizations.

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

Under the PMI Strategy for 2015-2020, the U.S. Government's goal is to work with PMI-supported countries and partners to further reduce malaria deaths and substantially decrease malaria morbidity, towards the long-term goal of elimination. Building upon the progress to date

in PMI-supported countries, PMI will work with NMCPs and partners to accomplish the following objectives by 2020:

1. Reduce malaria mortality by one-third from 2015 levels in PMI-supported countries, achieving a greater than 80% reduction from PMI's original 2000 baseline levels.
2. Reduce malaria morbidity in PMI-supported countries by 40% from 2015 levels.
3. Assist at least five PMI-supported countries to meet the WHO criteria for national or sub-national pre-elimination.[4]

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

1. Achieving and sustaining scale of proven interventions
2. Adapting to changing epidemiology and incorporating new tools
3. Improving countries' capacity to collect and use information
4. Mitigating risk against the current malaria control gains
5. Building capacity and health systems towards full country ownership

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

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

8. Progress on coverage/impact indicators to date

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

Table 2: Evolution of Key Survey Based Malaria Indicators in Burma from 2012 to 2016

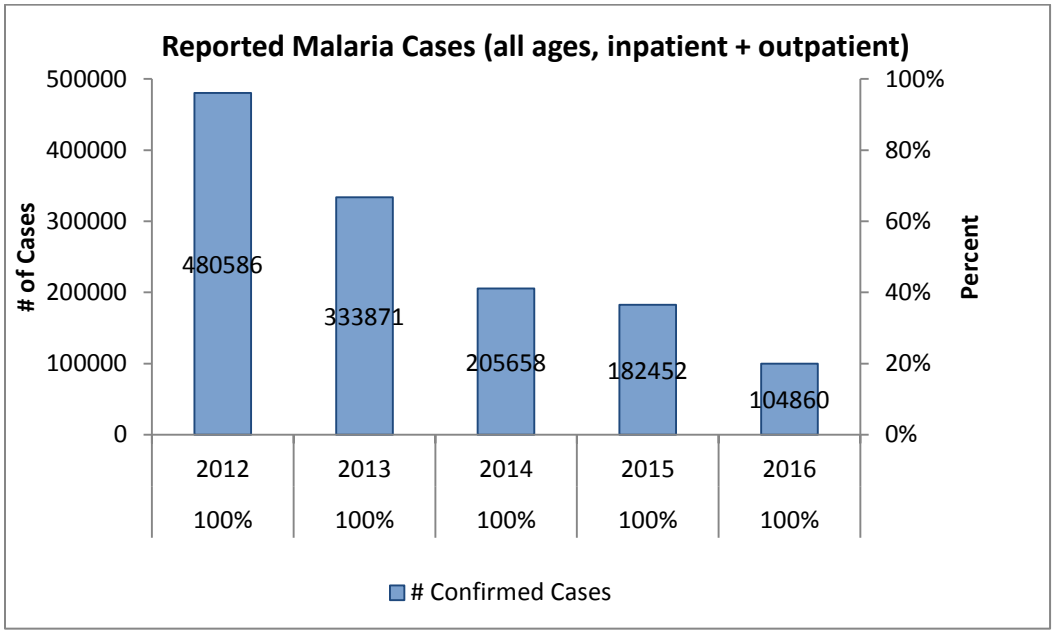
Indicator	2012 Baseline MARC survey	2013 CAP-Malaria Tanintharyi Rakhine Kayin	2012-13-14 Global Fund Implementing Partners	2013-14 CAP-Malaria Project	2015 MIS	2015-2016 DHS
% Households with at least one net of any type	97.4%	82%	2013: 99.3% 2014: 97.2%	NA	99.5%	97.2%
% Households with at least one ITN	35.1%	37.8%	2013: 68%	2013:97.6% 2014:97.3%	18.7% (52% D1; 65% D4)*	26.8%
% Households with at least one ITN for every two people	NA	NA	NA	NA	10.7%	14.1%
% Household members who slept under an ITN the previous night	15.9%	20.7%	2013: 86% 2014: 62.7%	2013: 61% 2014: 82%	10.4%	15.6%
% Children under five who slept under an ITN the previous night	19.4%	NA	2013: 58.5% 2014: 44.6%	NA	16%	18.6%
% Pregnant women who slept under an ITN the previous night	20.3%	NA	2013: 56.5% 2014: 42.4%	NA	17.1%	18.4%
% Households in targeted districts protected by IRS	NA	NA	NA	NA	NA	NA
% Children under five years old with fever in the last two weeks for whom advice or treatment was sought	NA	NA	2013: 11.6% 2014: 7.5%	NA	70.5%	65%
% Children under five with fever in the last two weeks who had a finger or heel stick	NA	NA	NA	NA	4.3% (all ages)	3%
% Children receiving an ACT among children under five years old with fever in the last two weeks who received any antimalarial drugs	NA	NA	NA	NA	NA	NA
% Women who received two or more doses of IPTp during their last pregnancy in the last two years	NA	NA	NA	NA	NA	NA
Test Positivity Rate**	NA	NA	2012:23.4% 2013:19.1% 2014: 8.1%	2013:7.5% 2014:4.7% 2016: 2.3%	NA	NA
Under-five mortality rate per 1,000 live births	NA	NA	NA	NA	NA	50
% of people with parasitemia	NA	NA	NA	NA	0.74 (by PCR)	NA

* Stratified by domains where domain 1 sampled clusters with API>5 and domain 4 sampled hard-to-reach (e.g. conflict) clusters

**Based on both symptomatic and asymptomatic cases

NA=not available

Figure 5: Trends in Key Routine Based Malaria Indicators



* 2016 data are preliminary and may not be complete

9. Other relevant evidence on progress

N/A

III. OPERATIONAL PLAN

PMI's overall aims are to support the MOHS's national strategies for malaria interventions including the NSP and the NHP by scaling up access and coverage of malaria prevention and control interventions to populations who need them including in remote and conflict-affected areas, while strengthening the health system to advance toward elimination of malaria in the Mekong Region by 2030.

1. Vector monitoring and control

NMCP/PMI objectives

The NSP (2016-2020) aims to achieve universal coverage of at-risk populations through two primary interventions: 1) effective diagnosis and treatment through village malaria workers (VMWs) and 2) distribution and use of LLINs. Determination of the location of at-risk populations is primarily via township or village-based stratification, but this approach is less effective for mobile populations and those living on lands classified by the government as forested. Supplemental vector control measures may be considered, but their deployment will depend upon local context, under the framework of integrated vector management.

The NMCP supports the provision of free LLINs to those at risk for malaria. LLINs are delivered to established villages via mass distributions every three years. Township officials conduct microplanning for bednet distribution as part of their routine duties and will take into consideration which members of a household share a sleeping space to ensure complete coverage. Reaching populations outside the purview of routine administrative system remains a challenge. The International Organization for Migration estimates that 9.4 million Burmese, or 20% of the country's population, were internal migrants in 2014. While no formal estimates are available, it is likely that substantial numbers of these migrants are at risk for malaria. Internal migrants cannot be easily classified – fisherman may migrate along the coast seeking better markets, villagers may migrate seasonally to make bricks, others work as laborers on road construction in rural areas, and others migrate seasonally to forests to cut bamboo, make charcoal, or harvest trees. People at risk for malaria in forested areas may migrate to forests temporarily, using a nearly registered village as a home base, or they may live in the forest for years, outside the purview of the health system. As the number of cases of malaria in sedentary, rural populations declines in Burma, a larger proportion of cases will be in these MMPs.

In parts of the country, including some areas covered by PMI, the health system is now sufficiently strong and cases sufficiently low to allow investigation of reported foci of transmission. PMI will support piloting of integrated foci investigation, whereby validity of the epidemiological data will be evaluated, coverage and quality of the two primary interventions (VMWs and LLINs) assessed, human behavioral factors associated with malaria risk documented, and entomological risk measured. This will be done in the context of foci identified via passive case reporting and for foci where case investigation has previously been done. The assessments will identify interventions to strengthen in indigenous foci areas and new foci will be identified through tracing of the origin of imported cases. In this reactive way, the problem of identification of transmission foci outside areas formally served by the health system can be at

least partly addressed. By understanding the rationale and patterns of human behaviors associated with malaria risk, VMWs may be utilized in active foci to deliver additional LLINs as needed and conduct additional case finding and treatment measures as appropriate. Finally, by identifying the vector species involved in transmission, possible larval control interventions may be designed and implemented or excluded from consideration.

a. Entomologic monitoring and insecticide resistance management

Progress since PMI was launched

Over the past five years, PMI has carried out routine longitudinal surveys of malaria vectors in the target states/region supported by PMI. This information has provided a valuable baseline on transmission patterns, confirming the role of *An. dirus* s.l. (likely *An. baimai)* as the major monsoon and post monsoon vector, *An. minimus* as the major pre-monsoon and monsoon vector in hilly areas, and *An. sundaicus* as a vector in some coastal areas. Basic information on insecticide resistance has been obtained, and central level staff are generally proficient in field collection methods and basic laboratory techniques, including sprorozoite ELISA testing.

Progress during the last 12-18 months

During the past year, the insectary at the NMCP became functional with establishment of colonies of both *Aedes aegypti* and *An. minimus,* with the former used for bioassays in support of the LLIN durability monitoring being carried out in Tamu Township in Sagaing Region. The ELISA laboratory is also functional and will support future testing of collected samples, including those supported by PMI. Molecular analysis identified the primary vector of malaria in eastern Burma as *An. baimai*, where heretofore it had been designated as *An. dirus* s.l. Insecticide resistance monitoring continues to be supported by both PMI and the Global Fund with no indication of operationally significant resistance to date. PMI supported development of entomological surveillance and monitoring guidelines and has provided technical support to the laboratory and insectary at the NMCP. Guidelines for entomological monitoring were finalized by the NMCP in collaboration with WHO and PMI and await formal adoption by the NMCP.

In 2015 and 2016, PMI supported surveys for insecticide resistance in Tanintharyi Region and Rakhine State. Multiple species were tested including the major vectors *An. minimus* and *An. maculatus,* and the minor vectors *An. kochi, An. aconitus, An. jamesii, An. philippinensis, An. annularis,* and *An. hyracanus*. Susceptibility tests were conducted for deltamethrin, permethrin, lambdacyhalotrin, cyfluthrin, etofenprox, and DDT. In all cases except for one, species tested were completely susceptible. The exception was for *An. hyrancanus* in Ann Township in Rakhine State where only 75% mortality was observed upon exposure to deltamethrin.

Plans and justification

A recent WHO review concluded that the weak entomological capacity in the NMCP is a key gap in Burma's malaria control program. The report presented a comprehensive and ambitious plan for strengthening national entomological capacity. PMI, working closely with JICA and in coordination with WHO and the Thai entomology program, aims to strengthen both laboratory and field capacity for basic entomological monitoring, building on the WHO recommendations.

PMI will work with the NMCP and partners to analyze and publish the results of entomological monitoring efforts to inform programmatic decisions and operations. PMI will work to ensure that appropriate entomological surveillance and monitoring guidelines are put in place, including piloting the integrated surveillance and entomological assessment described above. Malaria transmission in Burma is increasingly heterogeneous with fewer cases occurring in clusters in specific populations. To better target interventions both in geographic clusters and in populations at increased risk, PMI will support comprehensive foci investigations whereby malaria cases are interviewed to determine the locus of transmission followed by assessment of LLIN coverage and use and access to and capacity of VMWs in the identified areas where transmission is occurring. Programmatic action will include optimizing diagnosis and treatment via either VMW deployment or refresher training of existing VMW and LLIN top-up, with the objective being interruption of transmission, whether from mosquito to human or vice-versa. Should transmission persist, application of additional measures, such as larval control or drug-based interventions would then be considered likely in the context of OR. If particular populations are found to be at increased risk, then context-specific inventions targeting these populations will be devised, as feasible.

PMI will support development of basic entomological capacity at central level, including basic techniques for field collections, proper mosquito rearing methods in the insectary, and bioassay methods for insecticide activity linked to LLIN durability monitoring. These activities will require continued technical support from Centers for Disease Control and Prevention (CDC) entomologists in Atlanta in close coordination with WHO and JICA.

Proposed activities with FY 2018 funding: ($168,000)

- **Entomological monitoring and surveillance:** PMI will support rollout of integrated assessment of transmission foci to allow identification of active foci in forests and identification of groups at risk. Effective implementation of this activity will require capacity building at the state and regional level as well as continued support at central level for the entomology laboratory, particularly for species identification via PCR, ELISA to detect sporozoites, and insectary support. ($110,000)

- **Technical support for entomology:** PMI will support a total of four TDYs for technical assistance from CDC/Atlanta to strengthen entomological surveillance and rollout of integrated assessment and classification of transmission foci. Two TDYs are anticipated for integrated assessment of transmission foci. Another two TDYs are planned to support entomological trainings on insecticide resistance monitoring, maintaining the insectary's capacity, and to assist on updating of national policies, if necessary, based on the LLIN durability monitoring results. ($58,000)

b. Insecticide-treated nets

Progress since PMI was launched

According to the 2016–2020 NSP, LLINs are a core malaria prevention measure in Burma,

widely used to reduce transmission and provide personal protection. Like many areas in the Mekong, Burma has a "net culture," with many families already using mosquito nets, but usage rates are highly variable and many nets are untreated. A 2008 survey by the Myanmar (Burma) Council of Churches conducted in 160 malaria-endemic and hard-to-reach villages in Chin State, Kachin State, and Sagaing Division showed that 91% of households owned any type of mosquito net (treated and untreated) with an average of two nets per household. However, coverage of insecticide-treated nets (e.g., ITNs or LLINs) was very low, with only an estimated 5.6% of the total population protected by any ITN. Similarly, the MARC survey (2011-12) found household ownership of nets was 97%, but ITN and LLIN use was only 35% and 18%, respectively. A post-campaign rapid survey in Northern Shan State in 2015 showed that only about half of households were using their LLINs, preferring to use untreated nets. In contrast, data from PMI target areas in Rakhine State showed overall high use of LLINs.

Results from the recent 2015 MIS conducted across 4,731 households in Burma during the high transmission season show an uneven level of use of LLINs: high rates of net ownership among households – 99.57% of households owned at least one net of any type and ownership of sufficient nets (one net per two people in the household) of any type was 88%. However, when considering treated nets only, 19% of households owned at least one LLIN and 11% of households had sufficient LLINs. There was no difference in ownership by households that contained visitors, travelers or pregnant women; however, households with forest goers had higher ownership of at least one LLIN at 48%. Overall usage was very high, with 93% of households using any type of net the previous night; however, only 9% of households used an LLIN the previous night. In households where access to an ITN was 100%, usage of an ITN increased to 69%, which indicates if households had enough ITNs to cover all household members, usage would significantly increase. Among respondents in hard-to-reach areas, who are considered especially vulnerable, 65% reported having slept under any net the previous night, of which 42% slept under an ITN.

Burma's LLIN needs are met primarily through the Global Fund NFM and the RAI grants, which cover 14 of the 17 states and regions, with most of the targeted townships in the eastern and southern part of the country. In 2013, the Global Fund, JICA, 3MDG, and PMI contributed 1.9 million LLINs, and in 2014 their contribution totaled 1,082,626 LLINs.

Progress during the last 12-18 months

PMI procured a total of 793,500 LLINs with FY 2015 funding. Of these, 553,500 LLINs were used to fill gaps identified by the NMCP in moderate-risk areas located outside of PMI's target areas. PMI supported the shipment, warehousing at central level, transport at peripheral level, and distribution of these nets to 47 townships in 11 states/regions, in collaboration with the NMCP. The distribution was successfully accomplished from July to December 2015. The additional 240,000 LLINs were distributed in PMI target areas to resident populations, MMPs, and communities in non-state actor areas. With FY 2016 funding, PMI is procuring 516,000 LLINs with 300,000 of these nets arriving in May 2017 for households and MMPs in PMI project areas.

PMI is also supporting an LLIN durability monitoring assessment of LLIN survivorship, attrition, physical durability, and insecticidal activity. This assessment is especially important for LLIN need projections as the current NSP is based on replacement after three years. In December 2015, PMI distributed 14,000 LLINs in Tamu Township for the three-year monitoring and durability assessment. The NMCP participated in the protocol development and selection of the study sites. Data was collected at baseline (6 months after distribution) and at 12 months (analysis is pending). The insectary which is now functional provided support for bioassays associated with the LLIN durability study in Tamu Township.

Commodity gap analysis

Table 3: LLIN Gap Analysis

Calendar Year	2017	2018	2019
Total targeted population[1]	16,779,667	16,949,142	17,120,328
Continuous Distribution Needs			
Estimated Total Need for Continuous (through ANC channels)	0	1,100,000	514,000
Mass Distribution Needs			
Estimated Total Need for Campaigns[2]	5,105,000	300,000	5711,000
Total ITN Need	**5,105,000**	**1,400,000**	**6,225,000**
Partner Contributions			
ITNs carried over from previous year	0	95,000	0
ITNs from Global Fund: NFM and RAI	2,900,000	1,000,000	5,925,000
ITNs from 3MDG	2,000,000	0	0
ITNs planned with PMI funding	300,000	300,000	300,000
Total ITNs Available	**5,200,000**	**1,395,000**	**6,225,000**
Total ITN Surplus (Gap)	**95,000**	**(5,000)**	**0**

Note: The new Global Fund RAI2E grant will start in January 2018. 3MDG has been extended through December 2017. LLIN procurements will be closely coordinated with other donors and large gaps are not currently expected. The Global Fund will start continuous distribution of nets through ANC channels in 2018-2019.

[1] Risk population is based on the census conducted in 2014 and the updated micro-stratification data estimated by NMCP in 2016. Targeted population includes at-risk population in strata 3a, 3b, and 3c. Annual population growth rate (1.01%).

[2] Total campaign distribution need calculated as (population at risk / 1.8) – (# of nets previously distributed to target areas). Global Fund targets areas in strata 3a, 3b, and an estimated 50% of population residing in 3c; PMI targets strata 3a, 3b, and 3c in three target states/regions (Kayin, Rakhine, and Tanintharyi), including migrant and mobile populations.

Plans and justification

Although Burma has funding from the various donors in specific areas, there remain gaps in LLIN coverage in the country. The primary channel for LLIN distribution in Burma is through geographically focused, sub-national mass campaigns implemented on a rolling basis. PMI coordinates annually with the MOHS and Global Fund on net quantities and distributes PMI LLINs in PMI-supported areas to resident populations as well as MMPs living in these areas. PMI estimates LLIN needs for MMPs based on prior year's consumption and the quantities distributed by various outreach distribution channels mainly through workplaces.

Proposed activities with FY 2018 funding: ($1,155,400)

- **Procurement of LLINs:** PMI will procure approximately 300,000 LLINs to fill coverage gaps at the household level in endemic areas, targeting villages and townships in the PMI target areas and those that are not supported under the new Global Fund agreement (e.g., northern townships in Rakhine, non-state areas in Kayin, and other potential new areas within the three PMI focus states/region), including reaching internally displaced and MMPs with LLINs. ($855,400)

- **Distribution of LLINs:** PMI will support distribution and delivery of LLINs through mass distribution to reach households and migrant populations with SBCC to promote use of LLINs through trained VMWs. PMI will target ITN distribution to townships in focus areas depending on existing gaps. ($300,000)

2. Malaria in pregnancy

In Burma, PMI supports a two-pronged approach to reduce the burden of malaria infection among pregnant women including: 1) provision of LLINs and 2) effective case management of malaria, especially amongst the most vulnerable populations including migrant workers, refugees, and other hard-to-reach populations. Because of the low prevalence of malaria as measured nationally, IPTp is not part of any national strategy in the GMS, including Burma. However, since malaria transmission in Burma is highly heterogeneous, there are likely pockets of medium to high prevalence of malaria in pregnant women. The NMCP strategy supports free distribution of LLINs to all households in areas of high and moderate risk. Although LLINs have not traditionally been distributed through ANC in Burma, the NSP mentions ANC as a possible strategy for continuous distribution in order to improve access and ensure high LLIN coverage. According to the recent 2015-2016 DHS, although 84% of pregnant women slept under any net the night before the survey, only 18% of pregnant women slept under an ITN. In households with at least one ITN, 62% of pregnant women slept under an ITN the night before the survey. Moreover, pregnant women in rural areas are more likely than those in urban areas to sleep under an ITN (21% versus 10%). In Burma, most pregnant women attend ANC at least once: the 2015-16 DHS revealed that four in five women age 15-49 (81%) received at least one ANC visit with skilled providers during their pregnancy and many pregnant women complete the recommended four visits (59%).

Burma's national malaria treatment policies for pregnant women follow WHO recommendations: quinine is used in the first trimester (which may be combined with clindamycin) and ACTs in the second and third trimester (as stated in the national treatment guidelines). Treatment for severe malaria is with IV or IM artesunate. Although *P. vivax*-infected women should receive weekly chloroquine during pregnancy and radical cure after delivery, this is not yet policy in Burma. Although the new NSP (2016-2020) recommends introducing quarterly RDT-based malaria screening for pregnant women at ANC in stratum 3a (API>5) communities, the details of how this approach will be supported in practice have not been worked out pending updated WHO ANC guidance, including what should be included in the overall ANC package of services. PMI will focus support on strengthening case management practices and ensuring LLIN use for pregnant women.

Data on the burden of malaria in pregnancy (MIP) in the region is limited. A 2002 review of 17 studies on malaria during pregnancy in Burma reported a low prevalence of clinically suspected malaria among pregnant women (1-2% of total outpatient and inpatient burden). A separate 2005 study found that 11% of pregnant women attending ANC and 12% of all women delivering in Eastern Shan State and Mon State were infected with malaria. Data on the critical outcomes of maternal anemia, placental parasitemia, and low birth weight associated with malaria infection in pregnancy are not available for Burma. The states/regions reporting the highest incidence are Rakhine, Kachin, and Kayah. Wide variations in prevalence of malaria parasitemia in women attending ANC services were reported, ranging from 3% in Tanintharyi Division to 37% elsewhere along the Thai-Burma border, where the majority of women were asymptomatic and infected with *P. falciparum*. The role of female migrants may also be underestimated in the region; small studies conducted by PMI partners in Burma found that more than 50% of migrants in their catchment areas are women.

Progress since PMI was launched

With FY 2013 funding, PMI assisted the NMCP to update its policies especially for areas with confirmed artemisinin resistance, ensuring integration of MIP guidelines across relevant national programs (e.g. Maternal and Reproductive Health Division of the MOHS). With FY 2014 funding, PMI supported the development of a malaria module which addresses MIP as part of the national training for auxiliary midwives. PMI also supported the development of ethnically appropriate SBCC materials and messages directed to the prevention and early treatment-seeking for suspected cases of MIP for use by village malaria volunteers at the community level and nurse midwives at Rural Health Units.

PMI piloted the NSP strategy of testing all pregnant women in Stratum 3a. The pilot tested a total of 4,008 pregnant women attending ANC services from October 2014 to September 2015 with an RDT and found only three were malaria-positive. However, during the same period RDT testing for 230,317 people through mobile outreach and community mobilization activities in project areas, including remote villages, found a 6% prevalence among pregnant women (total tested was 1,382 of which 83 were positive for malaria) as compared to 2.2% prevalence among non-pregnant women of reproductive age (15-49 years, total women tested was 26,063 of which 585 were positive). It was concluded that screening through routine ANC was not an appropriate approach for detecting malaria infection among pregnant women, and that focusing instead on

improved case finding and management by VMWs and enhanced surveillance by mobile outreach teams is a better approach.

Progress during the last 12-18 months

With FY 2015 funding, PMI supported an observational assessment of ANC services at 18 facilities in Yangon Region, Mon State, and Kayin State to better understand what ANC services are offered and the extent to which MIP is addressed. The purpose of the MIP assessment was to better understand health worker knowledge and skills related to ANC, in general, and MIP, specifically. Forty-nine health workers were observed as they provided care to 96 ANC clients. The study results described inconsistencies among national guidelines for prevention and treatment of MIP, especially in terms of promotion and distribution of LLINs and counseling about their use in ANC. The recommendations include support of a systematic approach to focused ANC with emphasis on history taking, physical examination and counselling as well as the need for additional training, both in-service training for midwives serving in medium to high endemic areas and pre-service training as part of a revised midwifery curriculum. The report findings were disseminated and gained support from the MOHS to develop national ANC and MIP guidelines which PMI will support in FY 2017.

With the new global WHO ANC guidelines released in December 2016, Burma MOHS plans to develop new national ANC guidelines based on the WHO policy recommendations. PMI has supported coordination of these efforts at the national level to ensure that MIP is adequately addressed in the context of the new ANC guidelines.

Plans and justification

PMI will continue to support strengthening of MIP activities particularly on case management in Burma to ensure that malaria and maternal health programs implement coordinated strategies and that their guidelines and supervision and training activities are consistent among both malaria and maternal health programs. With the MOHS working to update existing policies and guidelines for all health services as well as developing new national ANC guidelines, PMI will re-emphasize the partnership between the NMCP and the Maternal and Reproductive Health/ Child Health Divisions of the MOHS and ensure completeness and consistency among all policies and guidelines, and proper implementation of case management guidelines by midwives and auxiliary nurses.

Proposed activities with FY 2018 funding: ($0)

- **Support strengthening of case management of malaria in pregnancy:** Support for training of facility health workers and VMWs in malaria diagnosis and treatment, including specific guidance on the treatment of malaria during pregnancy and continue to ensure reproductive, maternal child health and NMCP guidelines are consistent among health provider staff including midwives and auxiliary nurses. (see Case Management section)

3. Case management

a. Diagnosis and treatment

NMCP/PMI objectives

In April 2015, a workshop was convened to update the national treatment guidelines[5]. Artemether-lumefantrine (AL) is currently recommended for the first-line treatment of *P. falciparum* cases along with a single dose of primaquine (0.75 mg/kg) prescribed on the first day, without a prior glucose-6-phosphate dehydrogenase (G6PD) deficiency test. The higher primaquine dose was national policy before the more recent WHO recommendation of the lower 0.25 mg/kg dose. The two additional ACTs, dihydroartemisinin-piperaquine (DHA-Pip) and artesunate-mefloquine, are recommended for second-line treatment.

Artemisinin monotherapy use in both formal and informal sectors is strictly prohibited and has been banned. Adherence to the national malaria treatment policy among health care providers is not uniform in part due to approximately 30% of suspected malaria patients receiving treatment from the private sector[6]. First-line treatment for *P. vivax* is chloroquine and primaquine for radical cure; however, there is a reluctance to use primaquine especially in the private sector, as well as poor adherence to the 14-day regimen. For severe malaria, parenteral artesunate is recommended and although three pre-referral drugs are recommended, parenteral artesunate is mainly available in-country (Table 4).

The national diagnostic policy is confirmatory testing with either microscopy or RDT before treatment for malaria is prescribed. In hospitals and higher-level health facilities, microscopy is the preferred diagnostic method. RDTs are being scaled up in lower-level facilities and at the community level through VMWs. Microscopy availability is limited primarily to townships. Records indicate that presently there are about 1,000 health centers with malaria microscopy nationwide, 330 of them located in township hospital laboratories: however, it is estimated that only about 60% are fully functional and their quality needs further strengthening.

Although diagnosis and treatment of malaria is free in the public sector, a significant proportion of persons with malaria-like symptoms first seek treatment from private sector providers, where diagnostic testing may not be available or may be of poor quality. The UK's Department for International Development and other donors have supported the subsidized monotherapy replacement project that has been successful in reducing artemisinin monotherapy from many retail outlets. Rapid replacement of oral artemisinin monotherapy with Supa Arte, a quality-assured and subsidized ACT, has occurred in the informal private sector and the availability of the quality-assured ACT in the outlets of the intervention areas has increased from 4% in 2012 to 62% in 2015, whereas the presence of artemisinin monotherapy has decreased from 70% to 30% during the same period.

[5] Guidelines for Malaria Diagnosis and Treatment in Myanmar. NMCP, Department of Public Health, MOHS of Myanmar

[6] Results of the national Malaria Indicator Survey carried out in 2015

In response to the declining burden of malaria and decreasing external funding for HIV, TB, and malaria, the MOHS has begun to consider integrated approaches to delivering community level case management services. Malaria Consortium conducted a study in three townships in Sagaing Region to evaluate integrated community case management of diarrhea, malaria, pneumonia, and acute malnutrition. Their initial six-month assessment preliminarily showed that the community health volunteers were effective in delivering this package of interventions; however, the study was extended to collect follow-up results at one year prior to full review and consideration by the MOHS. An alternative platform of integrated community malaria volunteers is also being discussed to deliver services across HIV, TB, leprosy, and malaria.

Table 4: Status of Case Management Policy in Burma

Status of Case Management Policy in Burma according to "Guidelines for Malaria Diagnosis and Treatment in Myanmar" 2015	
What is the first-line treatment for uncomplicated *P. falciparum* malaria?	*P. falciparum:* Artemether-lumefantrine for 3 days plus primaquine single dose *P. vivax*: Chloroquine for 3 days plus primaquine (14 days)
What is the second-line treatment for uncomplicated *P. falciparum* malaria?	Artesunate-mefloquine or Dihydroartemisinin-piperaquine
What is the first-line treatment for severe malaria?	Parenteral artesunate
In pregnancy, what is the first-line treatment for uncomplicated *P. falciparum* malaria in the first trimester?	Quinine plus clindamycin for 7 days
In pregnancy, what is the first-line treatment for uncomplicated *P. falciparum* malaria in the second and third trimesters?	Artemether-lumefantrine for 3 days
In pregnancy, what is the first-line treatment for severe malaria?	Parenteral artesunate
Is pre-referral treatment of severe disease recommended at peripheral health facilities? If so, with what drug(s)?	Yes, IM injection of artesunate or artemether, or artesunate suppository
Is pre-referral treatment of severe disease recommended for community health workers? If so, with what drug(s)?	Yes, artesunate suppository, but it is not available in the country
If pre-referral rectal artesunate is recommended, for what age group? (note: current international guidelines do not recommend administrating to those ≥ 6 years)	For children less than 6 years of age

Progress since PMI was launched

PMI has invested in improving diagnostic capacity through strengthening microscopy services as well as equipping and training community-level volunteers to utilize RDTs for parasitological

confirmation. PMI has supported regular training and technical assistance to strengthen the diagnostic quality assurance system.

Since the launch of PMI, 1,080,300 RDTs and 153,420 ACTs have been procured and distributed. PMI began supporting community-level malaria case management in 2011 in Kayin and Tanintharyi and then expanded to 29 townships to include villages in Bago, Kayin, Kayah, and South Rakhine. In FY 2016, PMI consolidated its support and efforts to focus on supporting three states and regions, reaching a total of 33 townships. A total of 1,264 VMWs are operational in 1,456 villages and work sites, providing free malaria case management services, including diagnostic testing.

In non-state actor areas, an Ethnic Health Organization called the Back Pack Health Worker Team has promoted increased access to health services for vulnerable populations in South-East Burma. Through mobile health teams, Back Pack Health Worker Team provides primary health care including malaria diagnosis with RDTs and treatment with ACTs and community health education and prevention for internally displaced persons and other vulnerable populations in conflict-affected and rural areas of Burma. PMI has provided commodities as well as case management training to support their activities.

Since 2009, therapeutic efficacy monitoring sites in Burma are assessing the efficacy of AL, DHA-Pip, and artesunate-mefloquine for the treatment of uncomplicated *P. falciparum* infections and of chloroquine for the treatment of *P. vivax* infections in 8-10 sentinel sites on a rotating basis, with half of the sites enrolling each year. In 2014, new molecular methods were introduced into the routine monitoring of drug efficacy to detect genetic mutations associated with artemisinin resistance. Although these and other studies have found a significant prevalence of K13 mutants along the borders of Burma with Thailand, China, and India, therapeutic efficacy monitoring results from both Burma and China continue to show high ACT efficacy.

Progress during the last 12-18 months

In the 15 months from October 2015 to December 2016, 33 basic health staff and 1,079 VMWs, of whom 236 newly recruited, attended training courses on malaria case management. Through this large network of health providers, 131,908 people were tested for malaria through different approaches (VMWs, screening points, mobile clinics, and intensified case detection), of which 3,258 were found positive for malaria (test positivity rate=2.5%): 1,880 *P. falciparum*, 1,341 *P. vivax*, and 37 with mixed infections.

PMI continued to strengthen with training and supervision the private provider network of 384 community health service providers and 18 private physicians in 17 townships. Through support to the private sector franchise, a total of 56,581 suspected malaria cases were tested with 340 positive cases (test positivity rate=0.6%) identified and treated between September 2015 and August 2016.

PMI also supported strengthening of the quality assurance system for malaria microscopy, including support for an external competency assessment of 12 microscopists in August 2016.

Based on the assessment, 10 of the 12 assessed microscopists achieved level 1 certification, the highest WHO competency level.

Since August 2016, the geographic coverage of PMI-supported interventions has been consolidated and concentrated in the three states/regions of Kayin, Rakhine, and Tanintharyi and to avoid fragmentation of interventions in scattered areas and ensure comprehensive assistance in well-defined administrative areas. As a result of this adjustment, which has been coordinated with the NMCP and other malaria partners, the coverage expanded from 29 to 33 townships with an estimated beneficiary population of about 3 million persons.

Table 5: PMI-funded TESs

Completed TESs		
Year	**Site name**	**Treatment arm(s)**
2015	Muse, North Shan State	AL and DHA-Pip for *P. falciparum* CQ for *P. vivax*
2015	Myitkyina, Kachin State	AL and DHA-Pip for *P. falciparum* CQ for *P. vivax*
2015	Paletwa, Chin State	AL and DHA-Pip for *P. falciparum* CQ for *P. vivax*
2016	Tamu, Sagaing Region	AL and DHA-Pip for *P. falciparum* CQ for *P. vivax*
2016	Tabeikyin, Mandalay Region	AL and DHA-Pip for *P. falciparum* CQ for *P. vivax*
Ongoing TESs		
Year	**Site name**	**Treatment arm(s)**
2017	Buthidaung, Rakhine State	AL and DHA-Pip for *P. falciparum* CQ for *P. vivax*
2017	Beelin, Mon State	AL and DHA-Pip for *P. falciparum* CQ for *P. vivax*
2017	Thandaung, Kayin State	AL and DHA-Pip for *P. falciparum* CQ for *P. vivax*
Planned TESs FY 2018		
Year	**Site name**	**Treatment arm(s)**
2018	TBD	AL, DHA-Pip, and pyronaridine-artesunate for *P. falciparum* CQ for *P. vivax*

Commodity gap analysis

Table 6: RDT Gap Analysis

Calendar Year	2017	2018	2019
RDT Needs			
Total country population	52,977,480	53,507,255	54,042,328
Population at risk for malaria	22,763,437	22,993,348	23,223,281
PMI-targeted at-risk population*	1,000,000	1,500,000	1,500,000
Total number of projected fever cases	3,169,990	3,196,406	3,671,935
Percent of fever cases tested with an RDT	98%	98%	98%
Total RDT Needs**	**3,106,590**	**3,132,477**	**3,598,496**
Partner Contributions (to PMI target population if not entire area at risk)*			
RDTs carried over from previous year	0	0	508,928
RDTs from Government	0	0	0
RDTs from Global Fund	2,632,990	3,124,406	3,134,935
RDTs from Other Donors (JICA)	72,000	72,000	72,000
RDTs planned with PMI funding	270,000	445,000	300,000
Total RDTs Available	**2,974,990**	**3,641,406**	**4,015,863**
Total RDT Surplus (Gap)	**(131,600)**	**508,928**	**417,367**

* Risk population is calculated based on the population estimate from the draft malaria national strategic plan (2016-2020) using the recent population census conducted in 2014. At-risk population includes Strata 3; Annual population growth rate (1.01%)
**RDT needs are calculated based on the assumption that 98% of fever cases will be tested with an RDT.

Table 7: ACT Gap Analysis

Calendar Year	2017	2018	2019
ACT Needs			
Total country population	52,977,480	53,507,255	54,042,328
Population at risk for malaria	22,763,437	22,993,348	23,223,281
PMI-targeted at-risk population*	1,000,000	1,500,000	1,500,000
Total projected number of malaria cases	90,000	80,000	70,000
Total ACT Needs**	**54,000**	**48,000**	**42,000**
Partner Contributions (to PMI target population if not entire area at risk)*			
ACTs carried over from previous year		19,748	89,663
ACTs from Government	0	0	0
ACTs from Global Fund	53,748	77,915	56,978
ACTs from Other Donors	-	-	-
ACTs planned with PMI funding	20,000	40,000	7,000
Total ACTs Available	**73,748**	**137,663**	**153,641**
Total ACT Surplus (Gap)	**19,748**	**89,663**	**111,641**

* Risk population is calculated based on the population estimate from the draft malaria national strategic plan (2016-2020) using the recent population census conducted in 2014. At-risk population includes Strata 3; Annual population growth rate (1.01%)
**ACT needs are calculated based on the assumption that 60% of cases will be due to *P. falciparum*
Note: Although the national *P. vivax* treatment needs are assumed to be 40% of the total number of malaria cases, PMI will procure chloroquine and primaquine for the treatment of about 3,200 *P. vivax* cases per year for our target townships based on previous morbidity and consumption data. Single-dose primaquine is also used for the gametocytocidal treatment of *P. falciparum* cases.

Plans and justification

Ensuring the availability of quality-assured diagnostics and antimalarials is critical to PMI programming. PMI will coordinate with the NMCP and the Global Fund to contribute to annual

supplies of malaria commodities, particularly to ensure availability of commodities in focus project areas with trained VMWs. PMI will continue supporting scale-up of diagnostic testing and treatment at community and primary care levels, in the private sector, and in non-state areas through the provision of commodities, refresher training of existing laboratory staff and health workers in the performance and use of malaria microscopy and RDTs, case management, and strengthening quality assurance systems in PMI targeted areas. PMI plans to support a network of more than 2,000 VMWs and private providers, covering communities and work sites in 33 townships of Kayin, Rakhine, and Tanintharyi. This support will include: 1) provision of training of newly recruited VMWs, annual refresher training for all existing VMWs, and regular supportive supervision; 2) participation at monthly meetings at health facilities for data reporting, review of work plans, and restocking of RDTs/antimalarials; 3) piloting and possible expansion of an integrated disease specific package of services, with PMI supporting malaria prevention and control activities, as part of a broader national initiative of integrating malaria into the delivery of an essential package of health services; 4) mobile outreach teams used to reach at-risk and hard-to-reach populations including forest goers and MMPs to ensure comprehensive access and coverage; 5) strengthening of case management practices of health center staff and auxiliary midwives to facilitate their support and supervision of the VMWs; and 6) promoting the engagement of private companies, state-owned enterprises, and business organizations, collaborating in the implementation of training courses, health education activities, and facilitating data collection and reporting.

In addition, as the MOHS and NMCP consider the challenges of sustaining a cadre of dedicated malaria volunteers in the face of declining incidence of malaria in most parts of the country, PMI will provide technical support in developing strategies and approaches to inform programmatic decisions. Based on outcomes of an integrated Community Case Management pilot and efforts of the MOHS to define an integrated community malaria volunteers package of services (possibly to include HIV, TB, leprosy, and malaria), PMI will participate in national discussions and provide technical support into one service delivery package for VMWs.

Proposed activities with FY 2018 funding: ($4,446,600)

- **Procure RDTs and microscopy supplies**. PMI will procure approximately 300,000 conventional RDTs and microscopy supplies for use by health facility and community based service providers. ($222,000)

- **Procure antimalarials**: PMI will procure approximately 7,000 ACTs and single-dose primaquine for *P. falciparum* and other antimalarials, in particular chloroquine and primaquine for the treatment of about 3,200 *P. vivax* cases, for use by health facility and community-based service providers in PMI-supported townships. ($20,000)

- **Support strengthening of national diagnostics quality assurance/quality control system**: In coordination with other donors, PMI will provide technical assistance and training of key staff to improve malaria diagnostic capacity at the central level and in PMI-targeted areas. This will include support to the national malaria reference laboratory including the slide bank. ($100,000)

- **Case management at the community level, including implementation, training, and supervision in PMI-target areas**: PMI will ensure that the partner network of 2,000 VMWs and private providers in project areas is fully operational, including provision of training and refresher training, supportive supervision, and participation at monthly meetings at health facilities for data reporting, review of work plans, and restocking of RDTs/ACTs. PMI will also strengthen case management practices of health center staff and auxiliary midwives in project areas in order to facilitate their support and supervision of the VMWs. To ensure comprehensive access and coverage, mobile outreach teams will be used to reach at-risk and hard-to-reach populations including forest goers and MMPs. PMI will also help support the broader national priorities of integrating malaria and other community health volunteers into the health system and national health plan. This may include support of an integrated disease specific package of services provided by VMWs and other community health volunteers, with PMI supporting malaria prevention and control activities. ($3,884,600)

- **Therapeutic efficacy surveillance**: PMI will continue to support eight to ten designated therapeutic efficacy monitoring sites in Burma (on a rotational basis) and to convene annual meetings to review and update treatment guidelines as appropriate. ($220,000)

b. Pharmaceutical management

NMCP/PMI objectives

Ensuring the availability and use of antimalarial medicines, diagnostics, and preventive commodities is a high priority for the NMCP and PMI. Malaria health commodities are procured and distributed in Burma in three ways: through the VBDC; the Central Medical Store Depot; and the various implementing partners.

The VBDC distributes laboratory supplies and antimalarial drugs to township hospitals and health departments throughout Burma. The second system managed by the Central Medical Store Depot is within the Medical Care Services of the Department of Health and is in charge of the distribution of antimalarial drugs to all township hospitals and health departments. Among the implementing partners, a key role is played by the two Principal Recipients of the Global Fund (Save the Children and UNOPS), which ensure procurement and distribution of ACTs, RDTs, and other malaria commodities for all areas under their coverage.

PMI support for pharmaceutical management to Burma has primarily consisted of monitoring availability of commodities (medicines, diagnostics, and LLINs) in the target areas and facilitating procurement and distribution of PMI-funded commodities to fill gaps not addressed by the Global Fund and other donors. PMI will support broader USAID efforts to support integration and strengthening of the national public health supply chain systems while focusing on strengthening systems for malaria commodities. Coordination of commodities management among donors and partners is a critical area of support that is needed in Burma with vertical programs and projects.

One of the specific objectives of the Malaria NSP is to address counterfeit and substandard drugs. The Department of Food and Drug Administration (DFDA) is a key player in fulfilling this objective and takes responsibility in monitoring drug quality as well as upgrading its quality assurance laboratory and building the capacity of inspectors. The DFDA currently has offices in Nay Pyi Taw, Yangon, and Mandalay and plans to establish branch offices in 14 districts and to set up laboratories at 14 more border trade zones over the next few years.

Similar to the vision of the DFDA, PMI has a focus on improving the quality of antimalarial drugs in Burma, and has contributed to building the country capacity to monitor drug quality and curtail the availability of substandard or counterfeit drugs.

Progress since PMI was launched

The USAID Mission has supported a strategic review and assessment of the national supply chain system with the MOHS and has helped to improve coordination among the NMCP, donor agencies, NGOs, and United Nations agencies on commodities management and logistics. USAID is also supporting the MOHS to complete and launch a new national supply chain strategy in 2016, and is supporting institutional reforms and capacity-building to support its implementation.

Building the capacity of DFDA toward meeting international standards has always been a main objective of PMI technical assistance, and for this purpose DFDA staff in Nay Pyi Taw and Mandalay have been trained on compendia testing methods. In addition, PMI has procured essential equipment including a dissolution tester, a high-performance liquid chromatography system, and other necessary laboratory and personal safety supplies for use by the DFDA laboratories.

Progress during the last 12-18 months

USAID has supported an assessment of the national supply chain management system and, based on findings, assisted the MOHS with the development of a national supply chain management strategy and establishment of a dedicated Supply Chain Management Unit at the central level. In discussions with MOHS and NMCP, PMI will build on these efforts to strengthen supply chain management for malaria commodities, including piloting a logistics management information system (LMIS) operated by mSupply in targeted PMI project areas. PMI also participates regularly in national supply chain partners' meetings and coordinates on supply chain forecasting, stock monitoring, and procurement planning for malaria commodities with the NMCP, UNOPS, WHO, and other stakeholders.

In May 2016, 24 inspectors from central and peripheral level DFDA offices attended a training workshop on pharmaceutical supply and distribution chain inspection. On December 2016, the pharmaceutical chemistry laboratory of DFDA in Nay Pyi Taw was assessed by ANSI/ASQ National Accreditation Board (ANAB) from USA and obtained the certificate of International Organization for Standardization 17025:2005. This represents a paramount achievement for DFDA, the only organization in South-East Asia to have obtained recognition from an U.S.-based accreditation board.

Plans and justification

To ensure availability of key commodities in PMI target areas as well as to respond to urgent requests from other areas, PMI will monitor and address potential bottlenecks in procurement and distribution of malaria commodities (including Global Fund-financed commodities). Due to the relatively nascent supply chain system in Burma, PMI will support a local technical advisor to work closely with the NMCP, MOHS, and other stakeholders to address these critical supply chain issues.

PMI will continue to provide technical assistance to the national DFDA Nay Pyi Taw laboratory so that it can maintain its accreditation status. It will also assist the MOHS in building the capacity of the DFDA staff. Additionally, as result of DFDA's expansion, new regional laboratories will be established in Bago Region and Mon State by the end of 2017. These laboratories will be equipped to perform quality testing to reduce the burden on the Nay Pyi Taw laboratory and to facilitate timely testing of post-market surveillance samples. PMI will support maintaining ISO accreditation, capacity building, and advanced training of new laboratory staff based at the national level in Nay Pyi Taw. For regional laboratories, PMI will provide training and capacity strengthening for staff as well as supporting activities to ensure a quality management system.

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

- **Support for supply chain strengthening:** Technical assistance in supply chain management will be provided to Burma's MOHS to strengthen coordination and management of malaria commodities (including pharmaceutical management systems, forecasting, quantification, management, and distribution of pharmaceuticals and RDTs) as part of the broader integrated supply chain. PMI will support piloting a harmonized malaria commodities management system as a part of the integrated supply chain management system operated with mSupply in project areas to ensure timely data collection and reporting. ($600,000)

- **Technical assistance for DFDA laboratories:** Technical assistance and advanced training will be provided to DFDA pharmaceutical laboratories at central and regional levels. ($200,000)

4. Health system strengthening and capacity building

NMCP/PMI objectives

In recent years, the MOHS had focused on rebuilding the NMCP's health workforce with different skill sets to improve management at various levels of field operations, and increasingly grappling with the challenge of sustaining a cadre of malaria volunteers in the face of declining incidence and increased need for integration with other services. With rollout of a new five-year NHP in March 2017, the MOHS is focused on expanding universal access to an essential

package of health services, including malaria-related services, requiring additional training needs and demands on health providers and community health workers. In addition, the NSP strategy also focuses on rebuilding the NMCP's health workforce with different skill sets to improve management at various levels of field operations. Additionally, it aims to improve health staff capacity in 284 malaria-endemic townships on planning, implementation, and M&E of malaria control activities. These efforts will be supplemented with a strengthened health management information system (HMIS), evidence-based planning, research and policy development, and increasing access to malaria commodities such as LLINs, quality drugs, and diagnostics.

The Government of Burma created a Department of Public Health under the Ministry of Health in 2015, employing an increased public health workforce with additional needed skills over the coming years. The International Field Epidemiology Training Program (IFETP) in Thailand has graduated a number of trainees from Burma, and is appreciated by both the NMCP as well as the MOHS's Central Epidemiology Unit. This success has led to the MOHS specifically requesting for a national epidemiology and surveillance course, which will also help strengthen epidemiological skills across diseases at the state/regional and township levels. There is a high level of interest and need for this type of in-country capacity building support as the MOHS has committed to increasing the number of public health staff, and PMI will aim to continue to strengthen this collaboration. The MOHS has plans to continue its in-country FETP training of the 1-2 month basic course as well as an intermediate 6-9 months training.

The NMCP has taken a leadership role in improving key components of the health system with the collaborative support of development partners. As part of the effort to improve the technical capability and quality of health services, the NMCP has set up a series of trainings on malaria prevention, case management, commodities management, program planning and development, and community mobilization. Over the years, the NMCP has trained its key staff at different levels including basic health staff, microscopists, and health care personnel from hospitals, general practitioners and volunteers with the financial and technical support of UNICEF, JICA, and WHO. Later, these efforts were scaled up with the support of PMI, 3DF, 3MDG Fund, and the Global Fund. PMI collaborates closely with NMCP leadership to achieve the goals of a stronger health workforce, strengthened quality health services, reliable health information, and continuous availability of essential medical products.

Progress since PMI was launched

Progress to strengthen the malaria surveillance system is underway. Systematic data collection and data transmission have been reinforced over the year through training of NMCP staff as well as basic health staff in surveillance and computer literacy through provision of computers. Based on the findings of a PMI-supported assessment on the country's surveillance situation in 2013, an implementation plan was drafted to improve the malaria surveillance system. In consultation with the NMCP, PMI supported the development of an electronic database management system. To date, this database system has been scaled up to 106 target townships. As the MOHS plans to operationalize and scale-up the DHIS-2 platform, the NMCP will also transition its database into DHIS-2. PMI will support this transition process as well as support integration of a LMIS into the health information system.

Since 2012, PMI has supported training and capacity building for NMCP staff on specific technical areas on an annual basis such as field epidemiology, malaria field operations management, quality assurance for laboratory diagnostic services, and drug quality testing both at the regional level as well as in-country for regional and township level staff.

PMI continues to support participation of NMCP staff in the IFETP, which began with FY 2013 funding and continued in subsequent fiscal years. Two NMCP staff have completed the IFETP training in 2015, with one staff returning to Burma and the other pursuing a MPH degree in 2016. Three additional NMCP staff have participated in IFETP training since 2014 (2 in 2014 and 1 in 2015), for a total of five IFETP trainees since FY 2013.

Progress during the last 12-18 months

PMI is currently supporting two IFETP fellows. One fellow, currently the Assistant Director for VBDC in Rakhine State, conducted a post LLIN distribution survey and the other fellow, the Assistant Director for Health Services in Ayeyarwady Region, conducted a malaria knowledge, attitudes, and practices survey. Both have successfully designed, conducted, analyzed, and disseminated their study results.

In March-April 2016, PMI supported an in-country MMFO course to train 23 township malaria supervisors on malaria epidemiology as well as program management.

In FY 2014, PMI provided technical assistance to the Department of Health on the development of an in-country six-month national epidemiology and surveillance training course to support long-term capacity building, targeted at different levels of field staff to strengthen capacity on data collection and epidemiological analysis. In FY 2015 and FY 2016, PMI provided training assistance by sending two CDC Atlanta epidemiologists to lead a two-week course.

The PMI-supported routine monitoring of antimalarial drug efficacy has served as a platform for strengthening in-country research capacity. The NMCP has updated the "National Malaria Treatment Guideline" based on the results of these efforts. Moreover, the information gathered from therapeutic efficacy monitoring contributed to resource prioritization for effective malaria interventions.

Plans and justification

PMI will support efforts to address the objectives of the broader NHP by expanding malaria control services to reach hard-to-reach and under-served regions including conflict-affected areas through training a cadre of community health and public health workers. As mentioned, the MOHS is facing a key issue presently; namely to sustain, integrate and motivate the wide range of community volunteer cadres – presently fragmented and often separate across HIV, TB, malaria, and other health priorities. PMI will help support efforts to strengthen and maintain community malaria volunteers, including integration with other cadres where appropriate. Recognizing that human capacity is lacking in Burma and well-trained staff are critical for successful malaria control and eventual elimination, PMI will continue to support Burma NMCP staff to participate in the IFETP. In addition, PMI will continue to support the building of in-

country capacity for data collection and epidemiology by training NMCP staff as well as state and township level staff responsible for malaria control activities in the field through in-country technical training courses led by the Central Epidemiology Unit. In order to build more malaria management and field operations capacity, PMI will continue to conduct annual in-country MMFO courses led by VBDC.

Proposed activities with FY 2018 funding: ($320,000)

- **International Field Epidemiology Training Program (IFETP):** PMI will support two Burmese fellows to participate in the IFETP in Bangkok, Thailand. ($150,000)

- **In-country township level epidemiology training:** PMI will support building epidemiology and surveillance capacity for state/regional and township level malaria staff through participation in a six to nine month in-country epidemiology and surveillance training course. ($100,000)

- **Technical assistance for in-country township level epidemiology training:** PMI will provide technical assistance through two CDC TDYs for the curriculum development and on-site support for the in-country epidemiology and malaria surveillance and response training course. ($20,000)

- **In-country MMFO course:** The regional MMFO training course adapted for mid-level managers will be conducted to train malaria supervisors from selected regions/states and townships. It will focus on malaria program management skills including basic malariology, entomology, and management capacity for the cadre of new malaria managers. ($50,000)

Table 8: Health Systems Strengthening Activities

HSS Building Block	Technical Area	Description of Activity
Health Services	Case Management, Behavior Change Communication	PMI supports training and supervision of malaria case management to improve malaria services provided by VMWs, community health workers, rural health center staff, and auxiliary midwives. PMI has supported the development of standard operating procedures on quality assurance of diagnostics and will continue to support the implementation of these procedures as well as field practices, training and accreditation of malaria microscopists, and establishment of a national slide bank. PMI is also supporting health systems strengthening by expanding coverage and availability of malaria commodities, and creating demand for services through community health education, SBCC, and VMW networks in hard-to-reach areas and to reach

		at-risk, vulnerable MMPs.
Health Workforce	Health Systems, Capacity Building	The MOHS created a Department of Public Health, where the NMCP is housed, to provide focused leadership and technical guidance on public health activities in the country. PMI is supporting the MOHS in building the capacity of its technical staff and health workforce on program management and development. This includes support of two-year long-term international fellowships and a six-month in-country short course on field epidemiology for key NMCP central- and field-level staff. The training will help improve epidemiology skills and capacities at different levels of program management staff for malaria control. PMI continues to support an in-country malaria managers field operations training course adapted from the regional course for mid-level managers from regions/states and townships. PMI will also help the NMCP explore options for integrating the cadre of malaria volunteers with other community volunteers as the country moves towards an integrated package of health services.
Health Information	Monitoring & Evaluation, Surveillance, Operational Research	PMI supports strengthening the HMIS through strengthening the malaria surveillance system. PMI will provide technical assistance to the NMCP and supporting surveillance systems in all sectors (public, private, community). The implementation plan will include scaling up an electronic database system; supporting NMCP capacity for data management and use; and supporting national M&E plan development. These processes will enable the NMCP to transition its implementation from malaria control to elimination in the future. PMI is also contributing towards building in-country research capacity through routine monitoring of the efficacy of antimalarial drugs in ten sentinel sites and through the recent study to evaluate the acceptability and feasibility of using insecticide-treated clothing in Mon State.
Essential Medical Products, Vaccines, and Technologies	Pharmaceutical Management & Logistics, Case Management	PMI will provide technical assistance in supply chain management to the NMCP and strengthen coordination of malaria commodities (including the pharmaceutical management system, forecasting, quantification, management, and distribution of pharmaceuticals and RDTs) and helping to establish a LMIS that includes malaria commodities. PMI is also strengthening the national quality control laboratories

		for malaria in order to improve the quality testing of pharmaceuticals and build the capacity of health and quality laboratory workforce.
Leadership and Governance	Health Systems Strengthening, Capacity Building	PMI will continue to support the coordination among NMCP and development partners to harmonize the strategic efforts in responding to artemisinin resistance in Burma, including participation and technical support for the malaria Technical Steering Group and its technical workstreams. PMI's technical assistance to the NMCP will closely align with national strategies and national responses.

5. Social and behavior change communication

NMCP/PMI objectives

According to the NSP (2016-2020), the NMCP will provide support for elimination of malaria through comprehensive SBCC, community mobilization, and advocacy. Burma's NSP places priority on educating and raising awareness of the target population for malaria prevention and control. The strategy includes working with health authorities and implementing partners to educate target groups on malaria and ensure adequate malaria case management for migrant populations visiting endemic areas on arrival, during their stay, and on their return. With the increased availability of LLINs, RDTs, and ACTs at the health facility and community levels, SBCC activities are relied upon to motivate targeted at-risk populations to access and utilize these interventions. A cadre of about 15,000 VMWs nationwide utilizes interpersonal communications (IPC) to emphasize prevention and promotion activities as well as treatment compliance counseling at the community level (at least one VMW per village). Special high-risk populations targeted with SBCC messages include local forest dwelling residents, new settlers, internal and external migrant workers, and people crossing national border areas. Key behaviors to target include use of ITNs, prompt diagnosis and treatment of fever, adherence to treatments, and avoidance of monotherapies and counterfeit drugs. The VMWs assist with extending the reach of malaria services and messages to MMPs in endemic areas, either by stationing a VMW near the at-risk groups or by identifying a volunteer from among the mobile population who is trained and supplied for malaria case management services on-site. Some of the challenges for SBCC activities include the more than 135 ethnic groups speaking more than 100 languages and dialects, traditional beliefs related to causes of and remedies for malaria, and mobility of key target groups.

The NMCP, in collaboration with WHO and in consultation with agencies working in malaria control, developed a "Communication and Social Mobilization for Malaria Prevention and Control in Burma," which serves as the framework for SBCC activities. While a formal SBCC workgroup has not been established at the national level, SBCC activities are discussed in the TSG within the Program Implementation working group. SBCC activities implemented through PMI partners are aligned with the national strategy, and support efforts at the national, as well as the township and community levels.

Progress since PMI was launched

During the last two decades, the MOHS and partners have trained about 40,000 community health workers in Burma. It is estimated that 50% of these community health workers are still active. They are volunteers and are trained in health education; they treat minor illnesses and assist in the control of various infectious diseases. Among these volunteers are auxiliary midwives who are trained for deliveries and VMWs who are the mainstay of malaria control activities at the village level. PMI supports SBCC efforts through a network of more than 1,200 VMWs based in 29 townships in Kayin, Rakhine, and Tanintharyi States/Regions. PMI conducted advocacy meetings to sensitize the health and administrative officials from state, township, and village levels on the malaria situation and project plans.

In Kayin State, local Karen ethnic groups benefitted from established community-based malaria interventions and community health worker networks that are integrated within the existing local health structure. These Community Health Groups support the work of trained VMWs. Besides administering RDTs and case management, the VMWs have been trained on community mobilization strategies, education sessions, and use of communication tools.

In Tanintharyi Region, target populations included local residents as well as large and small groups of internal migrants working in agricultural plantations and at the Dawei Deep Seaport Project. Mobile malaria education and clinic teams also conduct malaria prevention outreach campaigns with screening and treatment of febrile patients. PMI partners also work with private sector employers to strengthen and improve their malaria services, provide LLINs, and promote awareness among their temporary and seasonal migrant workers.

In Rakhine State, PMI supported malaria control efforts in seven townships, reaching local residents in rural, remote villages with malaria interventions (LLINs, RDTs, and ACTs) through trained VMWs. A number of construction projects have attracted migrant workers from other regions and states within Burma (including non-endemic areas) who are working for extended periods of time in Rakhine and living in temporary migrant camps. PMI supports mobile malaria outreach activities to these migrant workers and their families with SBCC sessions, provides screening for malaria and treating identified cases, and distributes LLINs to new migrants.

Progress during the last 12-18 months

With FY 2016 funding, PMI supported training for 843 VMWs and private providers and 33 Basic Health staff in effective case management of malaria, reached 109,703 people including MMPs with health education and IPC messages, and conducted 560 group health SBCC sessions. In addition, PMI's implementing partners distributed 250,235 pamphlets and 6,315 posters with malaria SBCC messages. In the 18 months from Oct 2015 to Mar 2017, 154,790 people were reached by SBCC activities out of 195,000 targeted, achieving 79% coverage. During the same period, 1,650 VMWs attended initial training courses or refresher training, representing 83% of the targeted 2,000 trainees.

The 2015 MIS conducted in 145 villages across Burma during the high transmission season, found that 93% of heads of households surveyed had heard of malaria; however this was significantly lower among the hard-to-reach populations (69%). Of those respondents who had heard of malaria, most named “chills” as the main symptom (59%) but overall there were low levels of awareness of secondary symptoms such as headache, body ache, and sweating. Most respondents (66%) correctly identified mosquitoes as the cause of malaria. Interestingly, most respondents knew malaria could be prevented (73%) but only 4% of residents and migrants in all domains identified ITNs as a prevention method for malaria. The MIS results indicate a need for enhanced awareness and knowledge about malaria and prevention methods among both resident and migrant populations.

The recent 2015-2016 DHS asked about malaria care and treatment-seeking behaviors from among the 13,260 households surveyed nationwide. The report found that 16% of children under age five had a fever in the two weeks before the survey; advice or treatment was sought for 65% of these children with recent fever, and 3% had blood taken from a finger or heel, presumably for diagnostic testing. The majority (57%) of children under the age of five years with a recent fever, a symptom of malaria in endemic areas, received advice or treatment from a public sector source, while 31% received advice or treatment from any private source.

Furthermore, the MIS 2015 conducted during the malaria transmission season reported that of the 862 fever cases in the previous two weeks, 66.9%, 95% CI [56.9-75.7] sought advice and treatment for their fever, and 46.3%, 95% CI [37.4-55.5] sought advice and treatment within 24 hours of onset. There were differences of care-seeking practices between urban and rural respondents. Rural respondents tended to seek treatment from public facilities such as Rural Health Centers while urban respondents were more likely to seek treatment from private providers. The survey also acknowledged that about 9% of respondents in rural areas sought treatment from informal private providers, and this is an area for more intensive SBCC in the communities.

Plans and justification

PMI supports the NMCP strategy of aiming to have at least one village health worker per village in all malaria-endemic villages in Burma. Emphasis is given to interpersonal and group communications comprising up to 70% of SBCC efforts. Support will include training and dissemination of already developed SBCC materials in appropriate languages on malaria prevention, accurate diagnosis, and prompt and effective treatment. As the MOHS and NMCP transition to a more integrated service delivery approach through VMWs and other community health volunteers, PMI will help to support updating materials to ensure malaria prevention and control interventions are harmonized and comprehensively addressed. Moreover, the costs of the distribution and LLIN promotion include SBCC activities to augment malaria prevention efforts implemented by community health/malaria volunteers in the target areas and engaging community members and networks, including employers of migrant and forest workers. PMI will also support routine LLIN monitoring post-distribution by village health workers to reinforce SBCC messages on LLIN use and care.

PMI supports production of SBCC materials and community engagement and comprehensive SBCC activities to ensure access to and awareness of malaria control interventions, in particular early diagnosis, appropriate treatment and regular use of LLINs. Monitoring and Evaluation of SBCC conducted in the CAP-Malaria project (e.g., messages in the buses, school kit) will continue in the Defeat Malaria project. PMI support for SBCC is complementary to the support provided through other donors such as the Global Fund.

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

- **SBCC for malaria control and prevention interventions**: PMI will continue to ensure SBCC materials and messages are standardized, harmonized, and disseminated at the community level and support strengthening IPC approaches through VMWs and private providers. Based on the 2015 MIS findings, PMI will support effective SBCC approaches, in particular through IPCs and community engagement with VMWs, with careful consideration given to special and high-risk target groups, focused on improving knowledge about malaria transmission, coverage and use of malaria prevention measures (e.g., LLINs), and increasing awareness of MIP, dangers of counterfeit drugs, as well as prompt diagnosis and effective treatment. ($300,000)

6. Surveillance, monitoring, and evaluation

NMCP/PMI objectives

A new five-year NSP for Intensifying Malaria Control and Accelerating Progress towards Malaria Elimination (2016-2020) has been developed and endorsed by the MOHS. The ultimate goal of the NSP is to reduce malaria morbidity and mortality by 85% and 75%, respectively, by 2020 (relative to 2015 baseline figures). The goal for states and regions where malaria transmission has been interrupted is to maintain a malaria-free status and prevent re-establishment of local transmission. The target is to eliminate *P. falciparum* malaria by 2025 and ultimately all forms of malaria by 2030. A key intervention prioritized in the NSP is the strengthening of a case-based malaria surveillance system to support investigation and appropriate response. A Monitoring and Evaluation Plan (2016-2020) is also in place to track progress of the program's interventions.

Surveillance, monitoring, and evaluation coordination at the national level is managed through an SM&E Working Group under the TSG. The TSG has not been convening regularly; however, the SM&E Working Group has convened *ad hoc* meetings. Both PMI staff and implementing partners are active members.

Progress since PMI was launched

The first national census in 20 years, completed in April 2014, provided the sampling frame for the first DHS conducted in Burma, completed in 2016. The DHS provided key indicators for population, health, and nutrition, and served to help identify the critical needs in health for the country, as well as a nationally representative baseline to measure and monitor progress.

Although the DHS did not collect malaria biomarkers, the survey did collect information on the availability and use of mosquito nets.

Following an assessment of the malaria surveillance system in Burma, supported by PMI in May 2013, an implementation plan was developed in consultation with the NMCP. The implementation plan recommended the replacement of the Excel® spreadsheets with an Access® database for the reporting and management of malaria data at township level. At the same time, with support from the Global Fund, a pilot of the DHIS-2 platform was introduced in selected townships and has since been endorsed by the MOHS as the surveillance platform for the entire country. PMI is supporting the transition of the malaria information system from Access® to the DHIS-2 platform.

Progress during the last 12-18 months

In 2015, with PMI and 3MDG funding, the first-ever national MIS in Burma was carried out in collaboration with the NMCP, from July 2015 to October 2015 during the peak rainy and malaria seasons. A total of 4,731 households and 20,638 household members were included in the survey, with blood samples collected and analysed from 13,726 individuals. The prevalence of malaria was very low overall (0.74% by PCR) but there was considerable variation between the four domains (Domain 1=control or API >5, Domain 2=pre-elimination or API 1-5, Domain 3=elimination or API<1, and Domain 4=hard-to-reach). Domain 4 had the highest prevalence by PCR at 11% followed by domain 1 (3.5%), domain 2 (1.2%) and domain 3 (0.2%). Any net ownership was high (99%), but only 18.8% of households owned at least one ITN and only 10.4% of respondents used an ITN the previous night. ITN ownership in domains 1 and 4, presumably areas targeted for LLIN distribution, reported higher ownership at 52% and 65%, respectively.

The results from the DHS were finalized and disseminated on March 2017 in Nay Pyi Taw.

Since March 2015, a database manager has been placed in Nay Pyi Taw to support the NMCP on data management and analysis. The NMCP plans to eventually migrate the content of the Access® database to a comprehensive nationwide DHIS-2 platform as the latter becomes more widely deployed, and internet connectivity more widely available. It will allow management and mapping of village-level malaria data and reduce the need for data manipulation at the higher levels. Additionally, this will empower townships to more easily analyze and use their data and to prioritize interventions. To support elimination efforts, the NMCP has standardized case report forms and made an effort to improve data collection at all levels.

Table 9: Surveillance, Monitoring, and Evaluation Data Sources

Data Source	Survey Activities	Year									
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Household surveys	Demographic and Health Survey (DHS)						X*	X*			
	Malaria Indicator Survey (MIS)			X* Sub-national MARC areas			X	X			
	National census					X*					
Health facility and other surveys	Health facility Survey (SARA)						X*				
Malaria surveillance and routine system support	Support to malaria surveillance system					X	X	X	X	X	X
	Support to HMIS					X	X	X	X	X	X
Therapeutic efficacy monitoring	*In vivo* efficacy testing	X	X	X	X	X	X	X	X	X	X
Entomology	Entomological surveillance and resistance monitoring				X	X	X	X	X	X	X

*Not PMI-funded

Table 10: Routine Surveillance Indicators

Indicators	Value in 2015	Comments
Total number of reported malaria cases Data source: NMCP and Implementing Partners		
Total diagnostically confirmed cases	182,452	Only cases reported in the public sector and by volunteers supported by NMCP and implementing partners
Total clinical/presumed/unconfirmed cases	N/A	Since 2012 only confirmed cases are reported
If available, report separately for outpatients and inpatients		
Outpatient number of reported malaria cases	N/A	
Diagnostically confirmed	N/A	
Clinical/presumed/unconfirmed	N/A	
Inpatient number of reported malaria cases	N/A	
Diagnostically confirmed	N/A	
Clinical/presumed/ unconfirmed	N/A	
Total number of reported malaria deaths		
Diagnostically confirmed	37	
Clinical/presumed/ unconfirmed	N/A	
Malaria test positivity rate (outpatients) Data source: NMCP and implementing partners	Less than 10% nationwide	
Numerator: Number of outpatient confirmed malaria cases	170,170	
Denominator: Number of outpatients receiving a diagnostic test for malaria (RDT or microscopy)	2,957,700	
Completeness of monthly health facility reporting		
Numerator: Number of monthly reports received from health facilities	N/A	
Denominator: Number of health facility reports expected (i.e., number of facilities expected to report multiplied by the number of months considered)	N/A	

Plans and justification

Malaria SM&E in Burma remains fragmented, particularly between implementing partners and the national program. A comprehensive and responsive surveillance system will be critical as the NMCP continues to scale-up activities across the country and moves towards the goal of malaria elimination, particularly the identification, classification, investigation of foci (and response). PMI will collaborate with theb NMCP in pilot testing a case-based mobile reporting platform as well as establishing a list of foci in the three states/regions supported by PMI.

PMI, in collaboration with other stakeholders, will continue to support strengthening of SM&E in Burma, particularly integration of malaria data from NGOs and the private sector, into one comprehensive national malaria information system. As described earlier (see Case Management section), PMI has supported the expansion of the private sector network to provide quality malaria diagnosis and treatment services. PMI will emphasize integration of data reporting and use from these private sector health providers with the national surveillance system.

Burma's current SM&E systems are not set up to provide timely and complete information from the periphery. Much of the data available at lower levels are paper-based and timely compilation is a major challenge. Fortunately, the MOHS has made the decision to use DHIS-2 for HIV, TB and Malaria and this will take place over the course of the next several years. The existing case-based malaria Access® database which has been rolled out in 226 malaria endemic townships will be linked to DHIS-2 at central level first and then at state/region and township levels. Under the Global Fund, Save the Children supports nearly 3,000 volunteers and has begun to introduce a customized case-based application (DHIS-2 tracker) which will be piloted initially with 500-800 volunteers. The DHIS-2 tracker includes basic malaria demographics as well as travel history to inform case classification.

With the roll-out of DHIS-2 and eventual integration of malaria data into DHIS-2, high quality surveillance data required for elimination activities will be more readily available and accessible in the next few years. PMI will only support data collection systems that are compatible with the DHIS-2 platform and pilot and scale up electronic data collection tools endorsed and adopted by the NMCP.

Proposed activities with FY 2018 funding: ($910,000)

- **Surveillance and M&E strengthening at national level**: Technical assistance will be provided to strengthen routine surveillance systems at national, state/region, and township levels towards a comprehensive, integrated system that includes data from public, private, and community sectors. PMI will support scaling up of the national web-based system (i.e., DHIS-2) and strengthen NMCP capacity for data management and use. PMI will continue to support the National M&E Plan and assist in the identification of NMCP SM&E needs to move from control to elimination. Supported activities include updating data collection and reporting forms, trainings for SM&E, data quality assurance, etc., including technical assistance support in Nay Pyi Taw. ($300,000)

- **Surveillance and M&E strengthening in PMI-targeted areas:** PMI will require a robust SM&E system to monitor progress in the PMI-targeted areas for eventual malaria elimination, specifically in the 33 townships in three states/regions (Kayin, Rakhine, and Tanintharyi). The expansion areas for enhanced case-reporting will likely be Tanintharyi and possibly Kayin where PMI has been working and incidence is lower. Northern Rakhine, where PMI is expanding to and where the burden of malaria is relatively higher, will likely require more resources and effort in terms of SM&E systems strengthening. Activities will include focus on improved web-based data collection systems, data quality

audits, and use of strategic information in the PMI-targeted areas to inform areas for program improvement. There will also be an increased focus on identifying every single case (case investigation and follow-up), reactive case detection, and tracking of migrant workers in low transmission areas. The mHealth technologies on the DHIS-2 platform endorsed by the NMCP will be used in project areas to improve real-time reporting and response. However, mobile phone-based systems are not meant to replace routine surveillance systems and implementation will be targeted based on need (e.g., in areas without internet access but with mobile phone coverage) and PMI will carefully monitor the cost. ($350,000)

- **External mid-term evaluation:** PMI will support an external mid-term evaluation of the Defeat Malaria project by mid to late 2019 to take stock of progress on the project and to make any necessary improvements and/or modifications. This evaluation may include a targeted and customized population-based survey of households and village malaria workers/private providers to monitor and track coverage and progress. ($250,000)

- **Technical support for Surveillance, Monitoring, and Evaluation:** One TDY from CDC for national or project SM&E including support for evaluating malaria transmission and foci investigation. ($10,000)

7. Operational research

NMCP/PMI objectives

The new NSP promotes the development of research capacity, and the improvement of its quality and relevance to address bottlenecks in operations, to find innovative ways to tackle residual malaria transmission, and effectively deliver services to hard-to-reach populations. The NMCP plans to review research priorities annually and revise them as necessary. The list of priority topics proposed for initial investigation includes, among others, new diagnostic technologies, new antimalarial drugs, validation of the G6PD test kit used at community level, new vector control methods including insecticide-treated clothing, larval source management, the role of sub-patent asymptomatic parasitemia in malaria transmission, and barriers to access for high-risk groups.

Progress since PMI was launched

Along with other development partners, PMI has procured a significant number of LLINs in Burma. However, personal protection against outdoor transmission has not been adequately addressed. PMI has focused its OR support on evaluating additional personal protection measures to address outdoor transmission (i.e. the occupational use of insecticide-treated clothing). A PMI-supported OR study evaluated the acceptability and feasibility of using insecticide-treated clothing amongst rubber tappers in Mon State. The study was implemented from January to November 2015, and the final results presented at a dissemination workshop in Rangoon in March 2016. The study found high levels of adherence and acceptability of insecticide-treated clothing amongst migrant rubber tappers suggesting that treated clothing can be suitable as personal protection. However, cone bioassays on insecticide-treated clothing

showed that mosquito mortality and knockdown with worn insecticide-treated clothing were very low. Despite this, human landing collections showed an 82% reduction in mosquito biting among insecticide-treated clothing users compared to non-users.

Progress during the last 12-18 months

Another priority area recommended for investigation by the NMCP is the testing of more sensitive diagnostic technologies, particularly when used as a screening tool in the active case detection strategy. PMI has recently proposed an OR study to assess the performance of the new highly-sensitive rapid diagnostic test versus conventional RDT, compared with PCR as the gold standard, in detecting malaria infections around index cases identified through passive surveillance in low transmission areas.

Table 11. PMI-funded Operational Research Studies

Completed OR Studies			
Title	**Start date**	**End date**	**Budget**
Preference and acceptability of permethrin insecticide-treated clothing in Mon State	January 2015	March 2016	$127,500
Ongoing OR Studies	**Start date**	**End date**	**Budget**
Title			
Evaluation of the performance of a highly-sensitive RDT versus conventional RDT, compared with PCR as the gold standard, in reactive case detection of malaria in a low transmission area	May 2017	May 2018	$210,000
Planned OR Studies FY 2018			
Title	**Start date (est.)**	**End date (est.)**	**Budget**
N/A			

Plans and justification

PMI will support OR as key programmatic questions arise.

Proposed activities with FY 2018 funding: ($ 0)

There are no proposed OR activities with FY 2018 funds.

8. Pre-elimination

In response to the tremendous progress made in malaria control and the threat of artemisinin resistance, the National Strategic Plan for Intensifying Malaria Control and Accelerating Progress Towards Malaria Elimination 2016-2020 has set a vision of a malaria-free Burma by 2030 which is consistent with the regional commitment made by all Asia Pacific leaders at the 9th East Asia Summit in November 2014.

NMCP/PMI objectives

To provide strategic guidance and technical support for planning and implementing malaria interventions, the National Plan for Malaria Elimination (2016-2020) as well as the Monitoring and Evaluation Plan were developed in 2016. In line with the WHO Global Technical Strategy for Malaria 2016-2030, the Strategy for Malaria Elimination in the GMS 2015-2030, the Asia Pacific Leaders Malaria Alliance Malaria Elimination Roadmap and the National Strategic Plan for Intensifying Malaria Control and Accelerating Progress towards Malaria Elimination 2016-2020, the four objectives of the National Plan for Malaria Elimination Myanmar 2016-2030 are as follows:

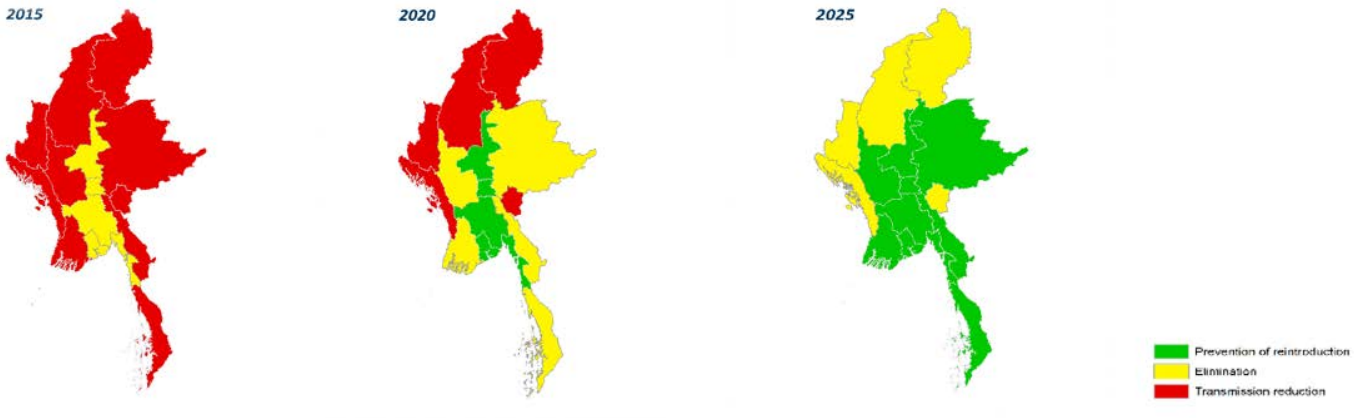
- Reducing the incidence of malaria to less than 1 case per 1,000 population at risk in all states/regions by 2020;
- Interrupting transmission of and eliminating indigenous *P. falciparum* malaria at least in six states/regions (Yangon, Bago, Magway, Mandalay, Nay Pyi Taw Union Territory & Mon) by 2020 and throughout the entire country by 2025, considering the urgent action required against MDR including artemisinin resistance in the country and the GMS as well;
- Interrupting transmission of and eliminating indigenous malaria in a phased manner progressively across the country by 2030; and
- Preventing the re-establishment of local malaria transmission due to importation in all areas where it has been eliminated before and beyond 2030.

The National Plan for Malaria Elimination proposes a phased approach by states/regions. Based primarily on API and other secondary criteria such as political and development priorities of the government, the degree of development of health systems and the extent of the malaria problem within each state/region, the entire country was sub-divided into three malaria categories: transmission-reduction/intensified control, malaria elimination, and prevention of malaria re-establishment. The micro-stratification identified 43% of the population at risk of malaria (Table 12) and a phased state/Region approach maps out the timeline for states/regions to achieve malaria elimination (Figure 6). The estimated cost for the National Plan for Malaria Elimination for 2016-2030 ranged from $1.323-$1.403 million.

Table 12: Population breakdown by malaria setting in relation to transmission level based on micro-stratification, 2015

Stratum	Transmission level	Number of sub-centers	Population at risk	% of population at risk
3a	High	1,026	3,542,647	7%
3b	Moderate	1,461	6,328,845	12%
3c	Low	2,062	12,664,333	24%
2	Potential	4,439	21,354,063	41%
1	Malaria free	1,531	8,116,373	16%
Total		10,519	52,006,261	100%

Figure 6: Projected progress towards malaria elimination by states/regions, 2015-2030



Progress since PMI was launched

To date, PMI's focus in Burma has been on scaling up malaria control interventions to ensure comprehensive, quality coverage of prevention and case management services in PMI target areas in coordination with the VBDC and other donors. Case management support with an elimination focus has included implementing the more recent adoption of single low-dose primaquine for *P. falciparum* and piloting directly observed therapy.

Progress during the last 12-18 months

PMI has provided technical assistance and data to support the nationwide village-level micro-stratification efforts using epidemiological data mainly API. With the recent geographic consolidation and expansion of PMI support in Rakhine, Tanintharyi, and Kayin, initial assessments have identified many villages without malaria cases over the past 1-3 years as well as villages with persistent malaria transmission. Although all three PMI focus states/regions are currently in the transmission reduction phase, many villages within these states/regions are either in the malaria elimination phase or have not had a recent local malaria case. For example, in Rakhine State, only 102 out of 320 villages had reports of recent malaria cases and 218 villages have not reported a malaria case in the past 1-3 years. With the decreasing number of cases in many villages, there is an increasing need for simple case investigation to distinguish local from imported cases and investigation of remaining foci using an integrated epidemiologic and entomologic assessment. These assessments will provide information about the location of foci of transmission outside the purview of the formal surveillance systems and will inform decision-making on possible supplemental means of transmission reduction. PMI will also be supporting operational research to evaluate the role of the HRP2-based highly-sensitive RDT in reactive case detection.

Table 13: Pre-Elimination Activities

Technical Area	Description of Activity	Geographic Coverage
Prevention	Provide LLINs for the static and migrant populations including worksite distribution.	Kayin, Rakhine, Tanintharyi
Case management	Passive case detection through all heath facilities both government and registered private providers and village malaria workers. Case management for *P. falciparum* includes single-dose primaquine and *P. vivax* radical cure with primaquine. Mobile outreach teams to conduct case finding in remote, hard to reach areas. Directly observed therapy recommended.	Kayin, Rakhine, Tanintharyi
SBCC	Conduct interpersonal communication and specific SBCC activities to make sure consistent use of ITNs and prompt treatment seeking in the setting of decreasing malaria burden, and improve adherence with medication.	Kayin, Rakhine, Tanintharyi
SME	Strengthening aggregate monthly reporting with plans to pilot case-based reporting and investigation platform using DHIS-2-Tracker. Piloting of integrated entomological, behavioral, and epidemiological foci investigation. The 1-3-7 approach to monitoring reactive case detection activities has been endorsed by the VBDC.	Kayin, Rakhine, Tanintharyi
OR	Evaluation of test performance of the HRP2-based highly-sensitive RDTs in the context of reactive case detection.	Rakhine

Plans and justification

PMI will support the National Malaria Elimination Plan and continue to support malaria prevention and control measures to ensure comprehensive coverage in all target malaria endemic villages in Kayin, Rakhine, and Tanintharyi while piloting case-based reporting and investigation as well as foci investigations in malaria eliminating villages to better define transmission risk and additional approaches needed for malaria elimination.

Proposed activities with FY 2018 funding: ($0)

These activities are detailed in other sections of the MOP.

9. Staffing and administration

One health professional serves as Resident Advisor (RA) to oversee PMI in Burma, representing USAID. In addition, one Foreign Service National (FSN) works as part of the PMI team. All PMI staff members are part of a single interagency team led by the USAID Mission Director or his/her designee in country. The PMI team shares responsibility for development and implementation of PMI strategies and work plans, coordination with national authorities,

managing collaborating agencies and supervising day-to-day activities. Candidates for RA positions (whether initial hires or replacements) will be evaluated and/or interviewed jointly by USAID and CDC, and both agencies will be involved in hiring decisions, with the final decision made by the individual agency.

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

The PMI lead in country is the USAID Mission Director. The day-to-day lead for PMI is delegated to the USAID Health Office Director and thus the PMI RA and FSN reports to the USAID Health Office Director for day-to-day leadership, and work with the FSN together as a part of a single interagency team. Technical expertise housed in Atlanta and Washington complements PMI programmatic efforts.

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

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

Proposed activities with FY 2018 funding: ($900,000)

- Support for USAID/PMI Resident Advisor (including 100% FSN, in-country support, and administrative costs). ($870,000)

- Travel cost support for RDMA staff. ($30,000)

Table 1: Budget Breakdown by Mechanism

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

Mechanism	Geographic Area	Activity	Budget ($)	%
Defeat Malaria	Nationwide; 33 TSPs in Kayin Rakhine, and Tanintharyi	Entomological surveillance; distribution of LLINs; case management at the community level, including implementation, training, and supervision; in-country township level epidemiology training; SBCC for malaria control and prevention interventions; SM&E strengthening at national and project level	$ 5,344,600	59.4
GHSC-PSM	Nationwide; 33 TSPs in	Procurement of LLINs, RDTs, antimalarials; support for supply chain strengthening	$ 1,697,400	18.9
WHO Consolidated Grant	Sentinel sites	Therapeutic efficacy surveillance	$ 220,000	2.4
WHO Consolidated Grant / ACTMalaria	Nationwide	Strengthening national/sub-national QA/QC for malaria diagnosis; in-country malaria management field operations (MMFO) course	$ 150,000	1.7
USP/PQM	Nationwide	Technical assistance for FDA laboratory	$ 200,000	2.2
TBD	Nationwide; 33 TSPs in Rakhine, Tanintharyi, and Kayin	Mid-term evaluation of the Defeat Malaria project	$ 250,000	2.8
CDC IAA	Nationwide; 33 TSPs in Rakhine, Tanintharyi, and Kayin	4 entomology TDYs; 2 FETP TDYs; 1 SM&E TDY	$ 238,000	2.6
USAID		Staffing and administrative costs; travel costs for RDMA	$ 900,000	10.0
Total			**$ 9,000,000**	100.0

Table 2: Budget Breakdown by Activity

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

Proposed Activity	Mechanism	Budget ($)		Geographic Area	Description
		Total	Commodity		
PREVENTIVE ACTIVITIES					
VECTOR MONITORING AND CONTROL					
Entomologic monitoring and insecticide resistance management					
Entomological monitoring in foci	Defeat Malaria Project	$ 110,000		Foci	Support for entomological monitoring in foci; insectary support in Rangoon (in collaboration with JICA/VBDC) and entomology laboratory; entomological capacity building including one advanced international training.
Technical support for entomology	CDC IAA	$ 58,000		Nationwide	Four TDYs for entomologic support.
Subtotal Ento monitoring		$ 168,000	$ 0		
Insecticide-treated Nets					

Procurement of ITNs	GHSC- PSM	$ 855,400	$ 855,400	33 TSPs in Kayin, Rakhine, and Tanintharyi	Procure 300,000 LLINs for PMI-supported areas and non-state areas including migrants and mobile populations, IDPs.
Distribution of ITNs	Defeat Malaria Project	$ 300,000		33 TSPs in Kayin, Rakhine, and Tanintharyi	LLIN distribution, promotion, and SBCC in PMI target areas. Distribution will target stable populations and special populations including migrants, internally displaced persons, and remote hard to reach areas.
Subtotal ITNs		$ 1,155,400	$ 855,400		
Indoor Residual Spraying					
Subtotal IRS		$ 0	$ 0		
SUBTOTAL VECTOR MONITORING AND CONTROL		$ 1,323,400	$ 855,400		
Malaria in Pregnancy					
Strengthen case management of malaria in pregnancy	Defeat Malaria Project	$ 0			See Case Management section.
Subtotal Malaria in Pregnancy		$ 0	$ 0		
SUBTOTAL PREVENTIVE		$ 1,323,400	$ 855,400		
CASE MANAGEMENT					
Diagnosis and Treatment					

Procurement of RDTs/microscopy supplies	GHSC- PSM	$ 222,000	$ 222,000	33 TSPs in Kayin, Rakhine, and Tanintharyi	Procure 300,000 RDTs for focus areas and non-state areas for use by community level health volunteers or workers, microscopy supplies for health facilities for scale up of complete coverage in three states including all of Kayin, Rakhine, and Tanintharyi.
Procurement of antimalarials	GHSC- PSM	$ 20,000	$ 20,000	33 TSPs in Kayin, Rakhine, and Tanintharyi	Procure 10,000 ACTs and other antimalarials (i.e. CQ and primaquine) for use by community level health volunteers or workers in PMI-supported and non-state areas.
Support strengthening national/subnational QA/QC for malaria diagnosis	WHO Consolidated Grant / ACTMalaria	$ 100,000		Nationwide	Training and accreditation of microscopists, support for national malaria reference laboratory and slide bank.

Case management at the community level, including implementation, training, and supervision	Defeat Malaria Project	$ 3,884,600		33 TSPs in Kayin, Rakhine, and Tanintharyi	Training and supervision of malaria case management including management of malaria in pregnancy through ~2,000 village malaria workers and private providers, rural health center staff, and auxiliary midwives, including integrated community malaria volunteers where appropriate. Ensuring coverage of at risk populations e.g. migrant, mobile population, forest-goers, internally displaced persons, and ethnic groups.
Therapeutic efficacy surveillance	WHO Consolidated Grant	$ 220,000		Sentinel sites	Conducting TES studies at 4-6 sites; technical assistance; annual country TES results review, planning and drug policy review.
Subtotal Diagnosis and Treatment		$ 4,446,600	$ 242,000		
Pharmaceutical Management					
Support for supply chain strengthening	GHSC- PSM	$ 600,000		Nationwide	Continue strengthening LMIS; Technical assistance (local staff) in supply chain management to MOH to strengthen coordination on malaria commodities (including pharmaceutical management systems, forecasting, quantification, management, and distribution of pharmaceuticals and

					RDTs). Continued integration of malaria commodities into the LMIS.
Technical assistance for FDA laboratory	USP/PQM	$ 200,000		Nationwide	Technical assistance and support to strengthen the national FDA quality control laboratory and maintenance of ISO accreditation.
Subtotal Pharmaceutical Management		$ 800,000	$ 0		
SUBTOTAL CASE MANAGEMENT		$ 5,246,600	$ 242,000		
HEALTH SYSTEM STRENGTHENING / CAPACITY BUILDING					
International Field Epidemiology Training Program (IFETP)	CDC IAA	$ 150,000		Nationwide	Support two fellows to participate in the international FETP in Bangkok.
In-country township level epidemiology training	Defeat Malaria Project	$ 100,000		Nationwide	Technical support to the Central Epidemiology Unit/MOPHS to conduct annual in-country township level epidemiology training focusing on surveillance and response for state and township level public health supervisors

Technical assistance for in-country epidemiology training and to mentor IFETP fellows	CDC IAA	$ 20,000		Nationwide	Two technical assistance TDYs to mentor IFETP fellows and for in-country township level epidemiology and malaria surveillance and response training
In-country malaria management field operations (MMFO) course	WHO Consolidated Grant / ACTMalaria	$ 50,000		Nationwide	Strengthen in-country malaria epidemiology, basic entomology, and management capacity.
SUBTOTAL HSS & CAPACITY BUILDING		$ 320,000	$ 0		
SOCIAL AND BEHAVIOR CHANGE COMMUNICATION					
SBCC for malaria control and prevention interventions	Defeat Malaria Project	$ 300,000		33 TSPs in Kayin, Rakhine, and Tanintharyi	Support to standardize, harmonize, adapt to relevant ethnic groups and languages, and disseminate key SBCC materials and messages at the community level and strengthen interpersonal communication approaches with VMWs and private providers; technical support for updating national SBCC strategy.
SUBTOTAL SBCC		$ 300,000	$ 0		

SURVEILLANCE, MONITORING, AND EVALUATION					
Surveillance and M&E strengthening at national level	Defeat Malaria Project	$ 300,000		Nationwide	Strengthen routine surveillance systems at the national level across all sectors (public, private, community), including scaling up of electronic database systems (i.e. DHIS2); support NMCP capacity for data management and use, including TA in NPT; support VBDC M&E needs to move from control to elimination.
Surveillance and M&E strengthening in PMI target areas	Defeat Malaria Project	$ 350,000		33 TSPs in Kayin, Rakhine, and Tanintharyi	Strengthen surveillance, monitoring and evaluation; improve data collection systems to include case-based reporting and investigations (i.e. DHIS2-Tracker), data quality, and use at townships in PMI target areas.
Mid-term evaluation of the Defeat Malaria project	TBD	$ 250,000			Project external, mid-term evaluation including coverage survey of households and village malaria workers/private providers

SM&E TDY	CDC IAA	$ 10,000			TA for national or project SM&E including malaria transmission investigation and monitoring
SUBTOTAL SM&E		$ 910,000	$ 0		
SUBTOTAL OR		$ 0	$ 0		
SUBTOTAL PRE-ELIMINATION		$ 0	$ 0		
IN-COUNTRY STAFFING AND ADMINISTRATION					
USAID	USAID	$ 870,000			USAID Resident Advisor, 100% Malaria FSN, in-country and regional travel, administrative costs.
RDMA TA	USAID	$ 30,000			Technical assistance and TDY support from RDMA PMI staff.
SUBTOTAL IN-COUNTRY STAFFING		$ 900,000	$ 0		
GRAND TOTAL		**$ 9,000,000**	**$ 1,097,400**		