

PMI

U.S. PRESIDENT'S MALARIA INITIATIVE

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

U.S. PRESIDENT’S MALARIA INITIATIVE

Thailand, Lao PDR, and Regional

Malaria Operational Plan FY 2020

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ABBREVIATIONS

ACT	Artemisinin-based combination therapy
AL	Artemether-lumefantrine
ANC	Antenatal care
API	Annual parasite incidence
APMEN	Asia Pacific Malaria Elimination Network
ASMQ	Artesunate-mefloquine
BMGF	Bill and Melinda Gates Foundation
BVBD	Bureau of Vector Borne Diseases
CDC	Centers for Disease Control and Prevention
CHAI	Clinton Health Access Initiative
CMPE	Center for Malariology, Parasitology and Entomology
CQ	Chloroquine
CSO	Civil Society Organization
CY	Calendar year
DDC	Department of Disease Control
DHA-PIP	Dihydroartemisinin-piperaquine
DHIS	District Health Information Software
DHS	Demographic and Health Survey
DVBD	Division of Vector Borne Disease
eLMIS	Electronic logistics management information system
EQA	External quality assessment
FTAT	Focused test and treat
FY	Fiscal year
G6PD	Glucose-6-phosphate dehydrogenase
GDP	Gross domestic product
GHI	Global Health Initiative
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
GMS	Greater Mekong Subregion
iDES	Integrated drug efficacy surveillance
IEC	Information, education, communication
IPTp	Intermittent preventive treatment for pregnant women
IRS	Indoor residual spraying
IT	Information technology
ITN	Insecticide-treated mosquito net
KAP	Knowledge, attitudes and practice
Lao PDR	Lao People's Democratic Republic
LMIS	Logistics management information system
LSIS	Lao Social Indicator Survey

MIP	Malaria in pregnancy
MIS	Malaria indicator survey
MMP	Migrant and mobile population
MQ	Mefloquine
MoH	Ministry of Health
MOP	Malaria Operational Plan
MTAT	Mass test and treat
NGO	Non-governmental organization
NMCP	National Malaria Control Program
NSP	National strategic plan
OR	Operational research
PACD	Proactive case detection
PCR	Polymerase chain reaction
PE	Program evaluation
PMI	U.S. President's Malaria Initiative
PR	Principal recipient
QA	Quality assurance
RAI2E	Global Fund regional artemisinin initiative 2 elimination grant
RDMA	Regional Development Mission for Asia
RDT	Rapid diagnostic test
SBC	Social and behavior change
SM&E	Surveillance, monitoring, and evaluation
SP	Sulfadoxine-pyrimethamine
TES	Therapeutic efficacy study
UNICEF	United Nations Children's Fund
UNOPS	United Nations Office for Projected Services
USAID	United States Agency for International Development
VHV	Village health volunteers
VMW	Village malaria worker
WHO	World Health Organization

I. INTRODUCTION

The U.S. President's Malaria Initiative (PMI)—led by the U.S. Agency for International Development (USAID) and implemented together with the U.S. Centers for Disease Control and Prevention (CDC)—delivers cost-effective, lifesaving malaria interventions alongside catalytic technical and operational assistance to support Thailand, Lao People's Democratic Republic (Lao PDR), and the Greater Mekong Sub-region (GMS) to end malaria. PMI has been a proud partner of Thailand, Lao PDR, and GMS countries since 2011, helping to decrease malaria morbidity and mortality through investments totaling almost \$ 44.5 million.

The proposed PMI fiscal year (FY) 2020 budget for Thailand, Lao PDR, and Regional is \$3 million. This Malaria Operational Plan (MOP) outlines planned PMI activities in Thailand, Lao PDR, and Regional for FY2020. Developed in consultation with the National Malaria Control Programs (NMCP) and key stakeholders, proposed activities reflect national and PMI strategies, draw on best-available data, and align with the country context and health system. Proposed PMI investments support and build on those made by the relevant GMS Governments as well as other donors and partners.

Thailand at a glance

- **Geography:** Thailand is at the center of the Southeast Asian Indo-Chinese Peninsula and is composed of 77 provinces. The country is 513,120 million square kilometers (198,120 square miles) in size and shares a border to the north with Burma and Lao PDR, to the east with Lao PDR and Cambodia, to the south with Malaysia, and to the west with the southern portion of Burma.
- **Climate:** Thailand is characterized as tropical wet and dry. The weather is hot all year with three seasons: rainy or southwest monsoon season (mid-May to mid-October), summer or warm season (mid-February to mid-May), and winter season (mid-October to mid-February). The average daily temperature is generally around 30 degrees Celsius (86° Fahrenheit).
- **Population in 2019:** 69.7 million (<http://worldpopulationreview.com/countries/thailand-population/>)
- **Population at risk of malaria:** 13.1 million (including approximately 652,000 migrants and mobile populations residing in A1 and A2 strata) (https://www.who.int/malaria/publications/country-profiles/profile_tha_en.pdf?ua=1)
- **Principal malaria parasites:** *Plasmodium falciparum*, *Plasmodium vivax* (https://www.who.int/malaria/publications/country-profiles/profile_tha_en.pdf?ua=1)
- **Principal malaria vectors:** *Anopheles dirus* and *Anopheles minimus* (Tainchum et al. 2015, Trends Parasitology 109-19)
- **Malaria incidence per 1000 population:** Annual parasite incidence (API) = 0.09 (WHO Regional Surveillance Meeting, Rangoon, Burma, October 30, 2019)

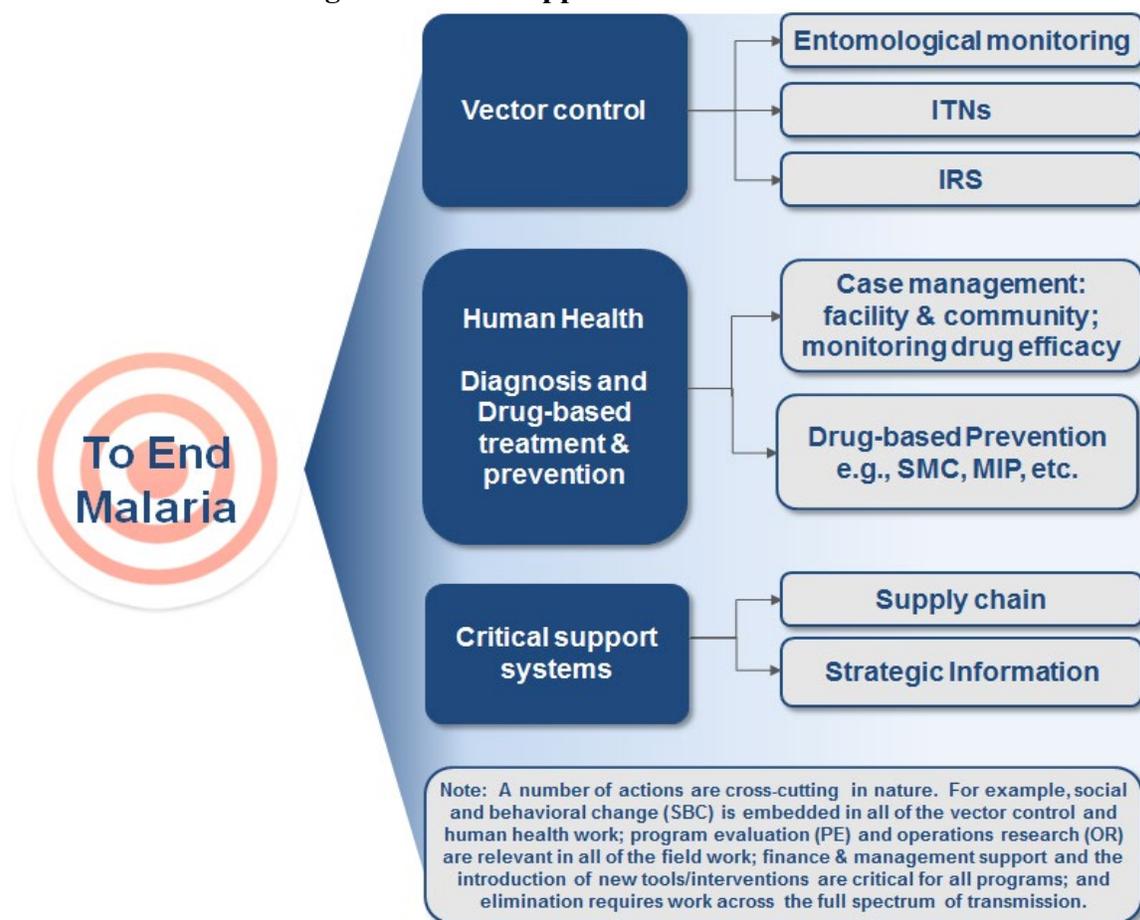
- **Under-five mortality rate:** 9.49 per 1000 live births
(<https://data.unicef.org/country/tha/>)
- **World Bank Income Classification & GDP:** US \$7,274 and annual gross domestic product (GDP) growth = 3.8%
(<https://data.worldbank.org/indicator/NY.GDP.PCAP.KD.ZG?locations=TH>)
- **Political system:** Parliamentary democracy with a constitutional monarch. The administration of the country is carried out by the Council of Ministers headed by the Prime Minister under a bicameral parliamentary system.
- **Trafficking in Persons designations, 2016-2018:** Tier 1 (The Department of State's 2019 Trafficking in Persons Report, June 2019)
- **Malaria funding and program support partners include (but are not limited to):**
 - Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund)
 - U.S. President's Malaria Initiative (PMI)
 - World Health Organization (WHO)
 - Bill and Melinda Gates Foundation (BMGF)
- **PMI Support of National Malaria Control Strategy:** In line with the national malaria strategic plan, PMI supports Thailand in achieving its malaria elimination goal by 2024. PMI supports surveillance for therapeutic efficacy and antimalarial drug resistance, NMCP capacity strengthening in surveillance, monitoring and evaluation, and malaria prevention and control activities to reduce transmission and eliminate malaria. PMI support focuses on strengthening malaria programming at national and sub-national levels and use of strategic information, providing limited commodity support and technical assistance for improved surveillance and response, capacity strengthening, and pharmaceutical management systems.
- **PMI Investments:** Thailand began implementation as a PMI focus country in FY 2011. The proposed FY 2020 PMI budget for Thailand, Lao PDR, and Regional is \$3 million; that brings the total PMI investment to nearly \$44.5 million.

Lao PDR at a glance

- **Geography:** Lao PDR is a landlocked country in Southeastern Asia, sharing borders with Burma, Cambodia, China, Thailand, and Vietnam. The country is 236,800 square kilometers in size.
- **Climate:** Tropical monsoon
- **Population in 2019:** 7,341,236 (National Census 2015)
- **Population at risk of malaria:** 3.6 million (WHO World Malaria Report 2018)
- **Principal malaria parasites:** *P. falciparum* and *P. vivax* (National Strategic Plan for Malaria Control and Elimination 2016-2020)
- **Principal malaria vectors:** *An. dirus*, *An. minimus*, *An. maculatus* and *An. jeyporiensis* (WHO, World Malaria Report 2018)
- **Malaria incidence per 1000 population:** <1 case/1000 population (0.55 as of quarter 3, 2019) (Global Fund Progress Update/Disbursement Request (PUDR) report)
- **Under-five mortality rate:** 45 deaths per 1,000 live births (http://www.wpro.who.int/laos/topics/child_health/en/)
- **World Bank Income Classification & GDP:** income per capita \$2,460 and 6.5% GDP growth rate (<https://www.worldbank.org/en/country/lao/overview>)
- **Political system:** One-party communist state (CIA factbook 2019) <https://www.cia.gov/library/publications/the-world-factbook/geos/la.html>
- **Trafficking in Persons designations, 2016-2018:** Tier 2 Watch List (The State Department's 2019 Trafficking in Persons Report, June 2019)
- **Malaria funding and program support partners include (but are not limited to):**
 - Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund)
 - U.S. President's Malaria Initiative (PMI)
 - World Health Organization (WHO)
 - Armed Forces Research Institute of Medical Sciences (AFRIMS)
 - Bill & Melinda Gates and Melinda Foundation (BMGF)
 - Institute Pasteur of Lao PDR
- **PMI Support of National Malaria Control Strategy:** In line with the Lao PDR's national strategy plan (2016-2020), PMI supports the National Malaria Control Program in achieving its malaria elimination goal by 2030 as part of PMI's overall support to Regional elimination efforts. PMI supports surveillance for therapeutic efficacy and antimalarial drug resistance, NMCP capacity strengthening in surveillance, monitoring and evaluation, and providing limited commodity support and technical assistance for improved surveillance and response and pharmaceutical management systems.
- **PMI Investments:** Lao PDR began implementation as a PMI focus country in FY 2011. The proposed FY 2020 PMI budget for Thailand, Lao PDR, and Regional is \$3 million; that brings the total PMI investment to nearly \$44.5 million.

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

Figure 1. PMI’s Approach to End Malaria



PMI’s approach is both consistent with and contributes to USAID’s Journey to Self-Reliance framework. Building and strengthening the capacity of GMS countries’ people and institutions – from the central level to communities – to effectively lead and implement evidence-based malaria control and elimination activities remains paramount to PMI. As denoted in Table 2 (the budget table), nearly all of PMI’s planned support for FY 2020 in the areas of vector control, human health, supply chain and strategic information contains elements of capacity building and system strengthening. Regional support through the Regional Development Mission for Asia (RDMA) based in Bangkok continues to play an important role in providing specialized malaria expertise to assist NMCPs and partners, including those in non-presence countries, as needed, to address crosscutting, trans-boundary issues that affect all GMS countries, and to build capacity at the regional level for NMCPs to address complex technical and programmatic challenges. PMI provides technical support to Thailand and Lao PDR as the countries develop and implement their plans towards achieving malaria elimination by 2024 and 2030, respectively. In particular, PMI is working to improve technical and programmatic

capacity for use of strategic information and to strengthen national malaria surveillance and monitoring and evaluation (SM&E) systems for malaria control and elimination. PMI support for Vietnam is limited to drug efficacy monitoring and regional capacity training activities.

To accelerate the journey to self-reliance, PMI developed a programmatic inventory to assess the strengths and persistent challenges of each country's program (see Annex B). The activities proposed in this MOP are tailored to draw on these strengths and address the weaknesses, which will be monitored to evaluate the effectiveness of capacity building efforts. In addition, while PMI is cognizant that it will take time before Thailand and Lao PDR are capable of fully financing their development priorities, PMI will work with other partners (e.g., the Global Fund) to jointly track Thailand's and Lao PDR's funding commitments across the malaria portfolio.

II. MALARIA SITUATION AND MALARIA CONTROL PROGRESS IN GMS

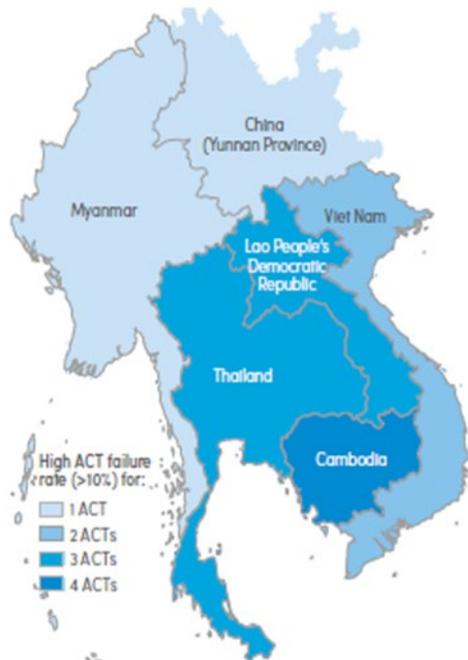
Regional:

The GMS is considered the epicenter of antimalarial drug resistance starting with chloroquine (CQ) resistance in the late 1950s, followed by resistance to Sulfadoxine-pyrimethamine (SP), mefloquine (MQ), and decreased sensitivity to quinine being identified in the 1980s and 1990s. Resistance to these antimalarials eventually spread or developed *de novo* throughout the region and globally. The emergence of artemisinin resistance along the Thai-Cambodia border in the early 2000s occurred in the same geographical area where chloroquine resistance emerged 50 years earlier.

Although considerable progress has been made in malaria control in the GMS over the past 10 years, malaria remains a major concern for the international community, ministries of health, and the people of the region. This is due primarily to the development and spread of resistance to artemisinin drugs, the principal component of the combination therapies for malaria that now are the first-line treatment for malaria throughout the GMS and the world. *Plasmodium falciparum* resistance to artemisinin drugs was first confirmed in western Cambodia; treatment failures to artemisinin-based combination therapy (ACT) including their partner drugs have been reported from multiple sites in the region. PMI has supported the regional therapeutic efficacy study (TES) network to monitor the treatment efficacy of current first-line and potential second-line treatments. All countries in the GMS now recommend ACTs for first-line treatment of *P. falciparum*; however, treatment regimens and drug choice differ from country to country. The most recent TES/integrated drug efficacy surveillance (iDES) results show emergence of resistance to Dihydroartemisinin-piperaquine (DHA-PIP) in Vietnam, Lao PDR, and some provinces of Thailand. See Figures 2 and 3 below for the current situation of drug efficacy and ACT failure rates in the GMS.

Figure 2. Number of ACTs with High Failure Rates

Number of ACTs with high failure rates in the treatment of *P. falciparum* infections Source: Data were derived from the WHO global database on antimalarial drug efficacy and resistance (34).



Currently, five ACTs are recommended by WHO in the Greater Mekong subregion: AL, AS+AM, ASMQ, AS+SP and DP. A sixth ACT, artesunate-pyronaridine, was given a positive scientific opinion by the European Medicines Agency (EMA) under article 58 and is being considered for recommendation by WHO. By default, AS+SP is considered to have a high failure rate in the region because of high treatment failure rates with SP, or because quadruple and quintuple *Pfdhfr* and *Pfdhps* mutations (which are usually fixed) have been reported in the region. The countries are classified by numbers of ACTs failing (>10% treatment failure) after 2010.

Figure 3. Efficacy of ACTs in GMS (2010-2018)

	Year	N of studies	Tx failures min	Tx failures max
Myanmar				
Artemether-lumefantrine	2010-17	24	0.0	6.0
Artesunate-mefloquine	2011-13	5	0.0	2.2
Artesunate-pyronaridine	2017-17	2	0.0	0.0
DHA-piperaquine	2010-17	15	0.0	4.8
Cambodia				
Artesunate-mefloquine	2010-18	16	0.0	1.7
Artesunate-pyronaridine	2014-18	7	0.0	18.0
Lao PDR				
Artemether-lumefantrine	2010-17	9	0.0	17.2
DHA-piperaquine	2016-17	2	13.3	47.4
Viet Nam				
DHA-piperaquine	2010-17	39	0.0	46.3
Artesunate-pyronaridine	2017-18	5	N = 153; TF = 3.9%	



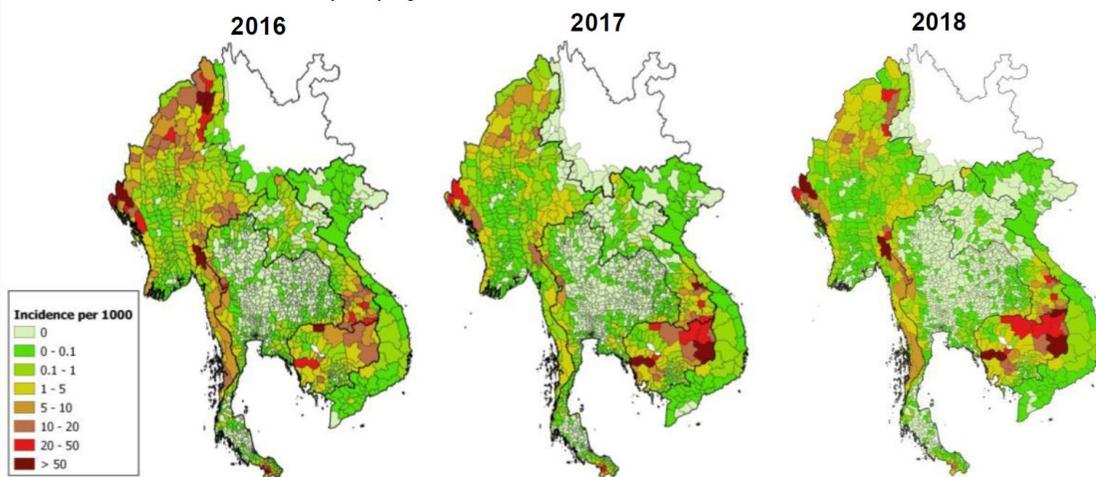
The malaria situation across the GMS is very heterogeneous with some areas having interrupted malaria transmission. Unlike most sub-Saharan African countries, *P. vivax* is a major cause of malaria and is more prevalent than *P. falciparum* in some countries. Furthermore, at least ten species of anopheline mosquitoes (primarily exophilic) are involved in malaria transmission in the GMS. Primary

vectors include *An. dirus*, *An. minimus*, and/or *An. maculatus* mainly found in forest or forest-fringe areas.

During 2012–2018, GMS countries significantly reduced the number of malaria cases- see Figures 4 and 5. In 2018, countries such as Cambodia, Burma, and Thailand made significant progress toward *P. falciparum* malaria elimination. Thailand is nearing *P. falciparum* elimination with only 876 cases reported in 2018.

Figure 4. Annual Parasite Incidence by District in the GMS

Annual Parasite Incidence (API) by District*

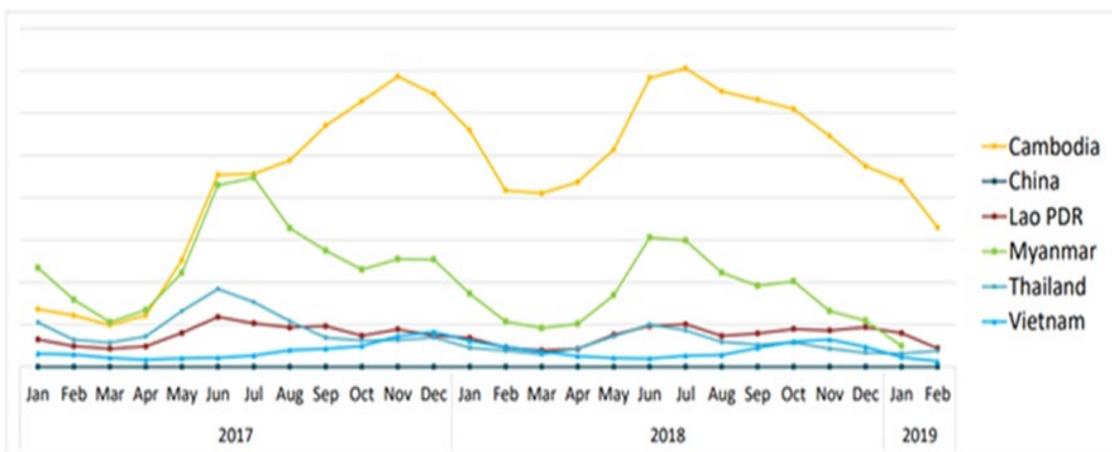


Source: WHO subregional database. *Viet Nam data are provincial level.



Figure 5.

Number of Monthly Cases in GMS countries (2017-2019)



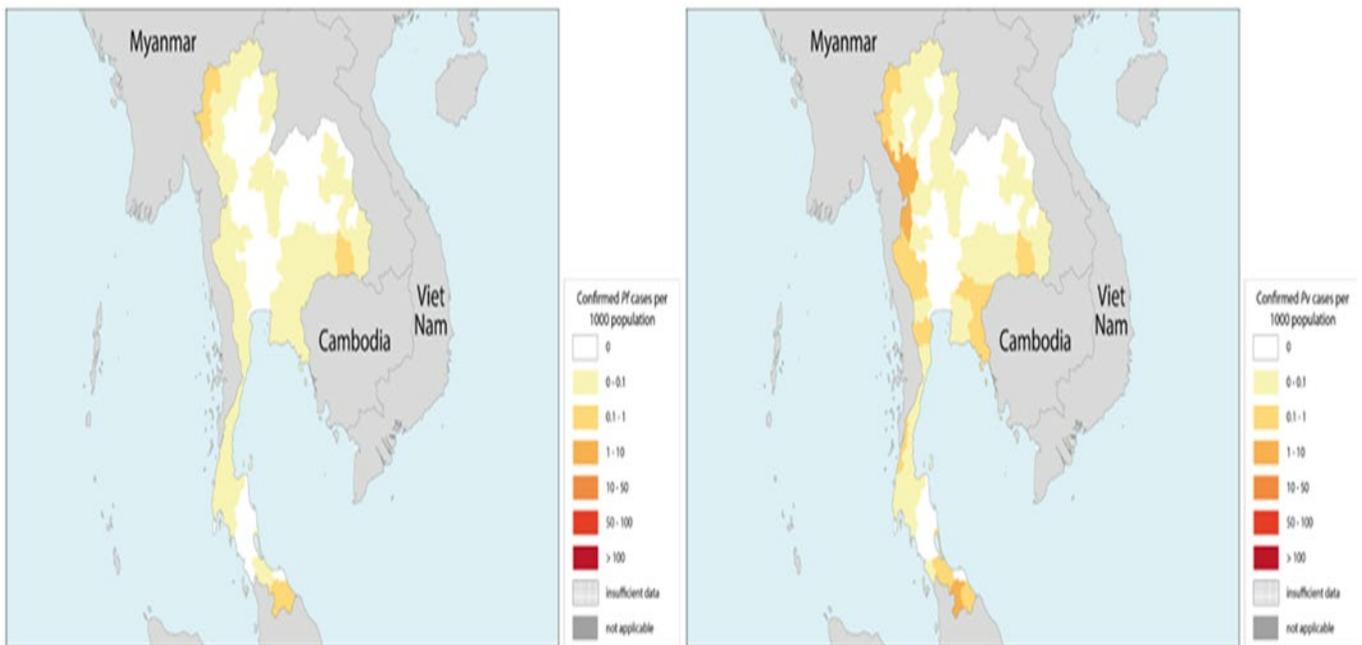
Source: WHO subregional database. Myanmar cases only include public sector data.



Thailand

Malaria cases in Thailand mainly occur in the provinces bordering Burma, Cambodia, and Malaysia (Figure 6). The groups at risk for malaria in Thailand consist of refugees in camps, workers in rubber plantations and fruit orchards, people who spend the night in the forest (including the military), and ethnic minority groups living along the Thai-Burma border. The introduction of rubber plantations in many parts of the country during the past ten years and movement of workers has resulted in emergence of sporadic new foci. Conflict in southern Thailand has also contributed to a dramatic increase of malaria cases reported in 2016-2019.

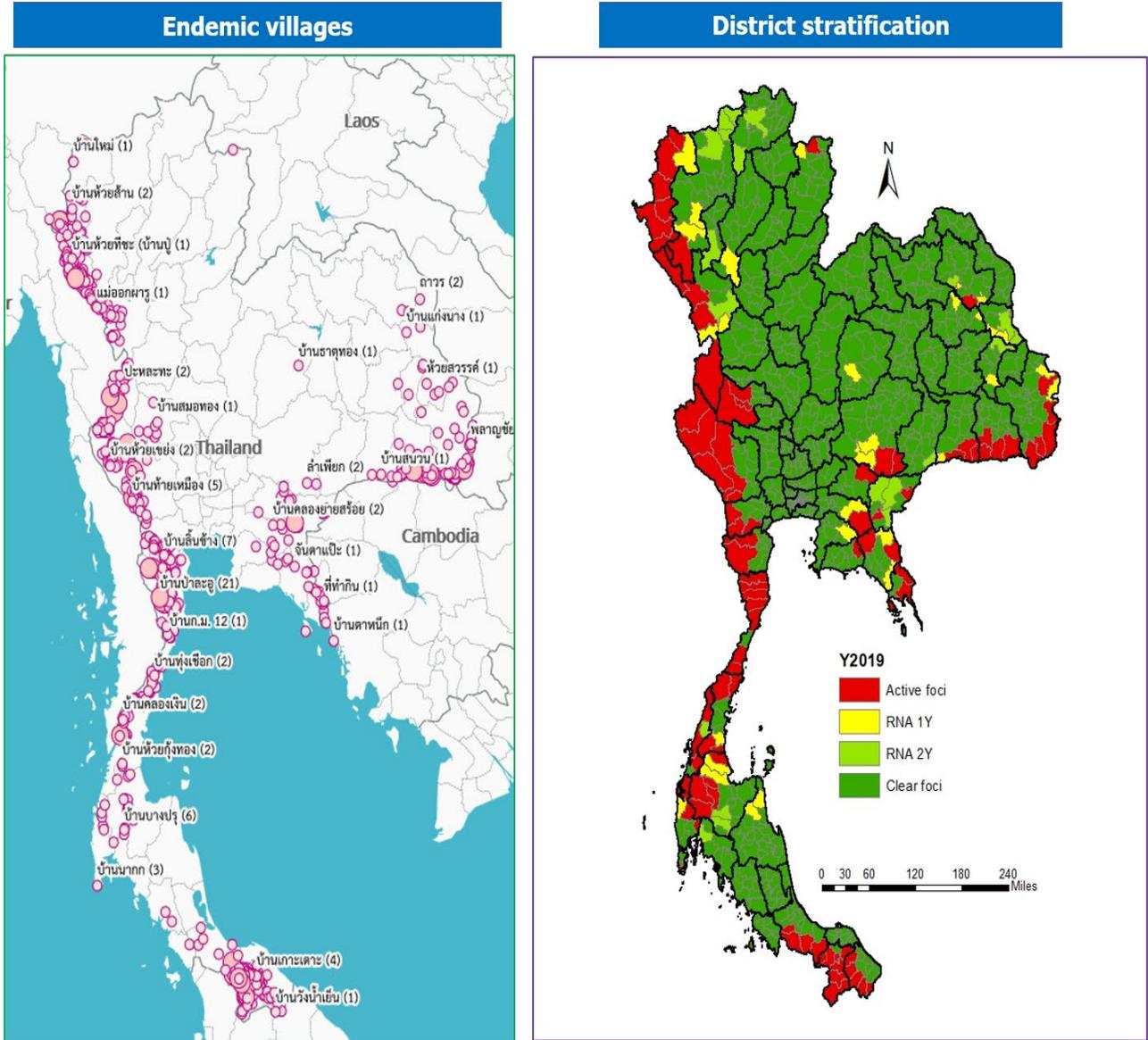
Figure 6. Incidence of Malaria in Thailand, *P. falciparum* (left) and *P. vivax* (right)



Source: WHO World Malaria Report, 2018

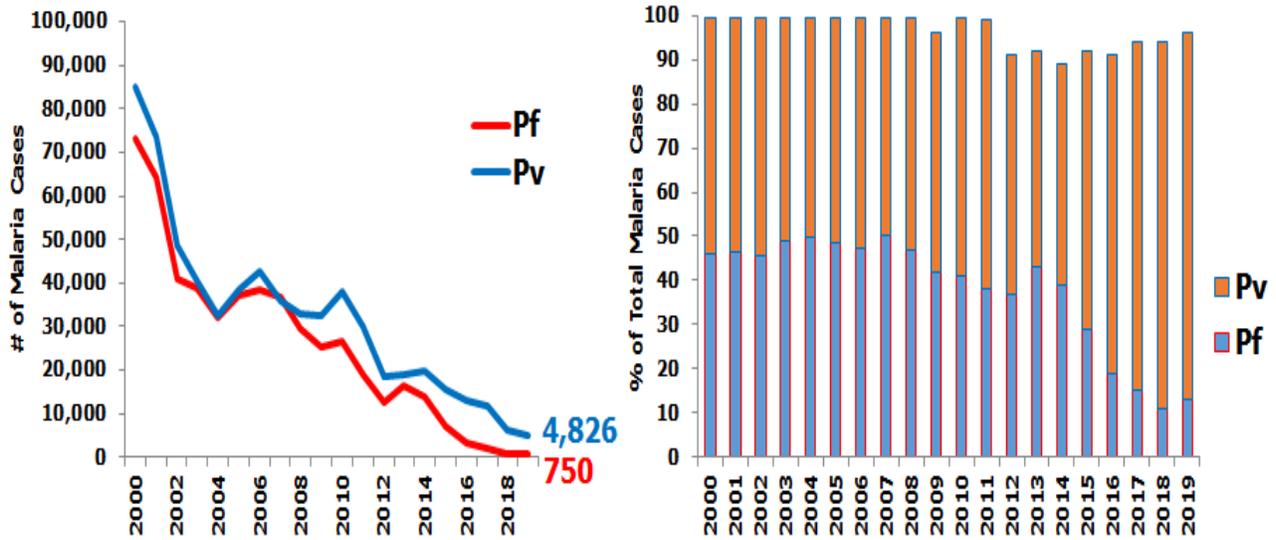
Due to labor shortages, Thailand has been drawing large numbers of migrant workers from Burma, Cambodia, and Lao PDR. These migrant workers live and work along the border districts and provinces where malaria is still endemic while others move back and forth between home communities and various work destinations in Thailand. Though national malaria incidence is decreasing, recent demand for expensive hardwood has precipitated illegal logging in the forests in the northeastern province adjacent to southern Lao PDR and north of Cambodia, leading to recent spikes in malaria cases in the area (Figure 7). The number of malaria cases among Thais and non-Thais (migrants residing in Thailand for six months or longer (M1) and cases among migrants living less than six months in Thailand (M2)) is illustrated in the below graph. These cases included those who crossed the border and sought treatment at malaria posts and health facilities in Thailand. Mortality due to malaria has also declined from 33 deaths in 2015 to 9 deaths in 2019. The increasing proportion of *P. vivax* malaria cases is observed with the proportion attributable to *P. vivax* steadily increasing from 72 percent in 2016 to 83 percent in 2019 (Figure 8).

Figure 7. Thailand Malaria Foci Stratification



Source: Bureau of Vector Borne Diseases, (BVBD) Oct 12, 2019
 Abbreviation: RNA- residual non-active

Figure 8. Thailand Malaria Cases and Proportion by Primary Species, FY 2000-2019



Source: BVBD 12 Oct 2019

Source: BVBD 12 October 2019

Thailand has made rapid progress in targeting and reducing the number of active foci of transmission in the country from 1,108 in 2016 to 701 in 2019. The total number of reported confirmed malaria cases has decreased from 43,939 in 2011 to 5,819 in FY2019. Despite the tremendous progress in reducing the number of active foci and residual non-active foci to cleared foci, two provinces (Phuket and Chaiyaphumout) out of a total of 35 provinces nationwide that were declared as malaria-free in 2018, reverted their status to active-foci provinces in 2019 due to reported cases. Further analysis and investigation into these cases are ongoing. Remaining active foci are clustered in three border areas: in the west with Burma and in the east with Cambodia, where high population mobility associated with importation of malaria parasites complicates surveillance, and in the south with Malaysia, where civil unrest disrupts service delivery.

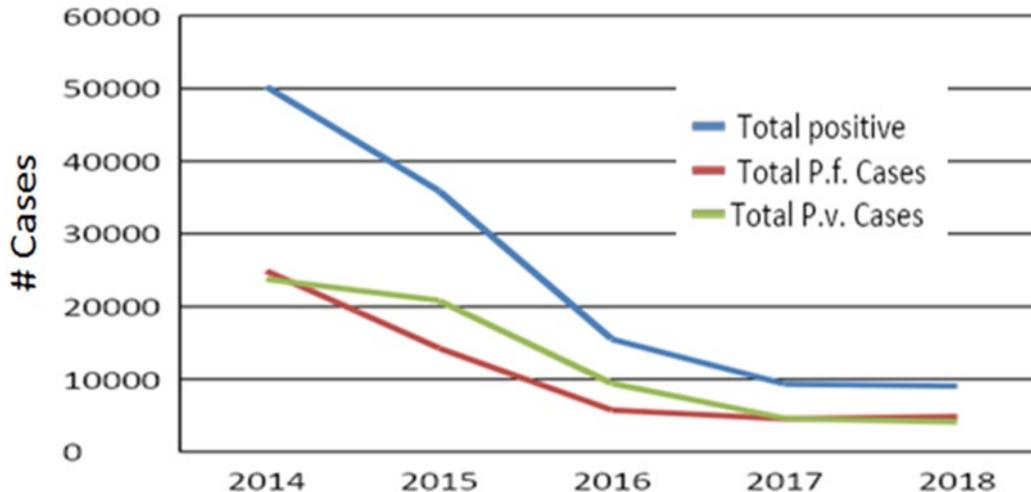
Thailand implements the 1-3-7 strategy aimed to eliminate malaria cases by 2021. The 1-3-7 reporting system indicates that 82 percent of cases are reported within one day; 84 percent of cases are investigated within three days, and 72 percent of reported cases are responded to within seven days with prevention and control interventions. The national program review of malaria indicators conducted in June 2019 recommended areas for improvement, including developing a system to monitor treatment adherence to ensure effective radical treatment of *P. vivax* malaria and strengthening application of real-time reporting and monitoring for implementation of 1-3-7 strategy at all levels.

Lao PDR

In Lao PDR, the intensity of malaria transmission varies between different ecological zones: from very low transmission in the plains along the Mekong River and in areas of high altitude, to intense transmission (API>30) in remote, forested areas of the south. *Plasmodium falciparum* (*Pf*) has been the

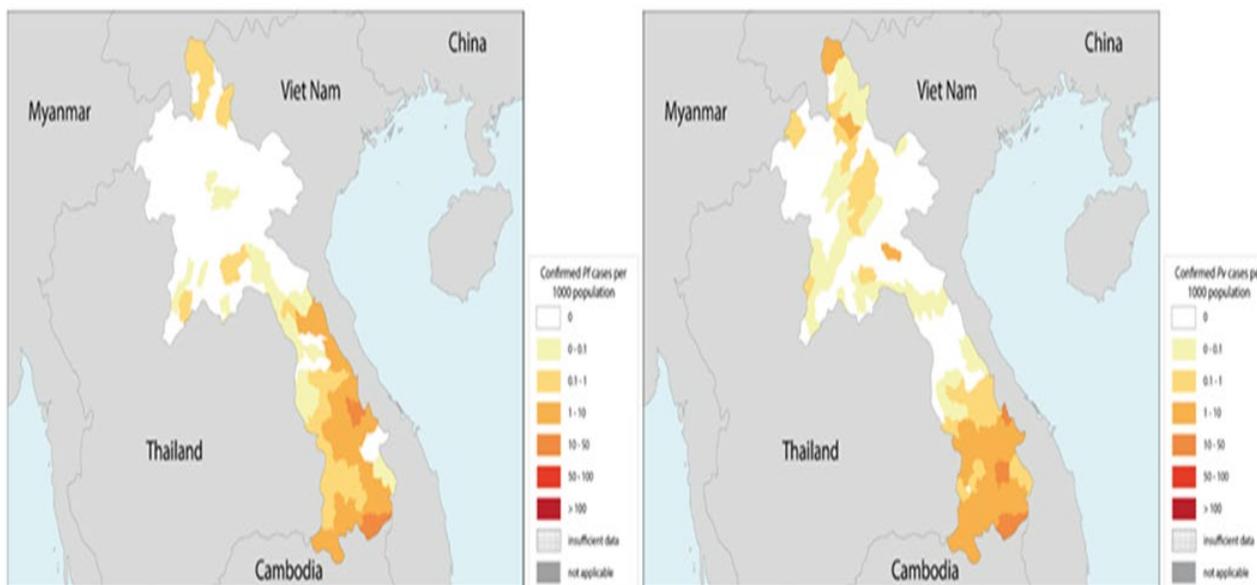
predominant species but has significantly decreased, accounting for only 50 percent of all recorded malaria cases and *P. vivax* (*Pv*) accounting for 49 percent (Figure 9). Both *Pf* and *Pv* are found concentrated in the southern part of the country (Figure 10). The primary vectors in Lao PDR are *Anopheles dirus*, *A. minimus s.l.*, and *A. maculatus*, all of which can be found in forested areas.

Figure 9. Lao PDR Total Positive Malaria, *P. falciparum* and *P. vivax* cases, 2014-2018



Source: Lao PDR 2019 MPR Epidemiology and Surveillance Brief

Figure 10. Incidence of Malaria in Lao PDR, *P. falciparum* (left) and *P. vivax* (right)



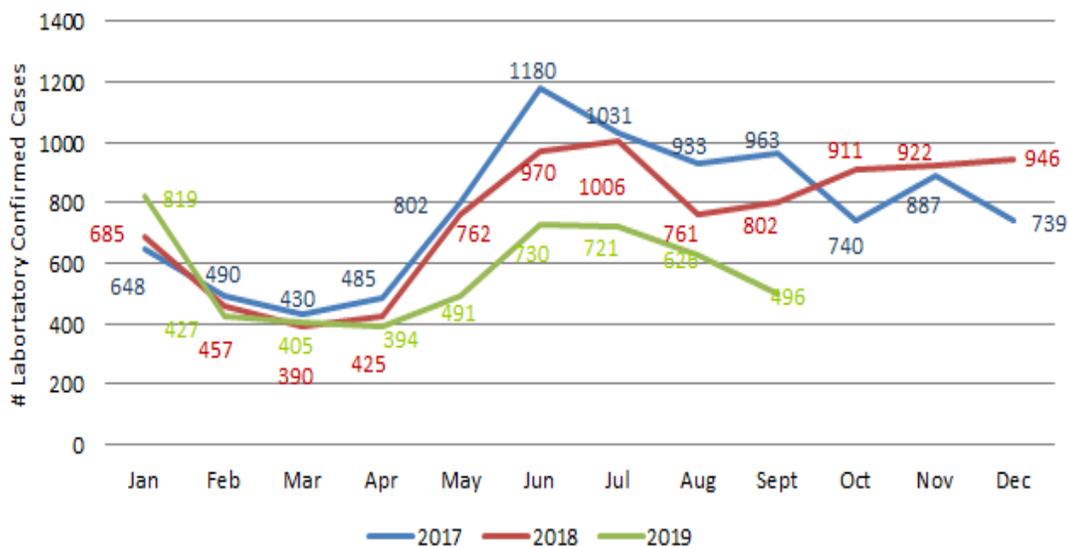
Source: WHO World Malaria Report, 2018

Most transmission has been found to occur in forested areas and those most at risk are ethnic minorities, and mobile populations, including forest workers, who are usually males between 15 and 45 years of age. In addition to the cross-border and local population movement, development projects and deforestation increases human-vector interaction. These at-risk populations are isolated, have

limited access to healthcare, and can display different healthcare-seeking behavior—highlighting the importance of community engagement and targeted case management initiatives.

Despite an outbreak of cases in 2014 in the southern provinces, Lao PDR has made significant progress in reducing the malaria burden, resulting in an API of less than 1 per 1,000 population. A total of 122 districts out of 148 districts nationwide (or 82 percent of districts) reached an API of less than 1 per 1,000 population. The number of reported malaria cases in Lao PDR has declined precipitously from 46,153 cases reported in 2012 to 9,336 cases in 2017, and 8,920 cases including 6 deaths in 2018. An investigation of the 2014 outbreak found that late health care-seeking behavior and access to diagnosis may have affected case outcomes. The graph below (Figure 11) shows the trend in decreasing malaria cases during 2017-2019.

Figure 11 Lao PDR Confirmed Malaria Cases 2017-2019



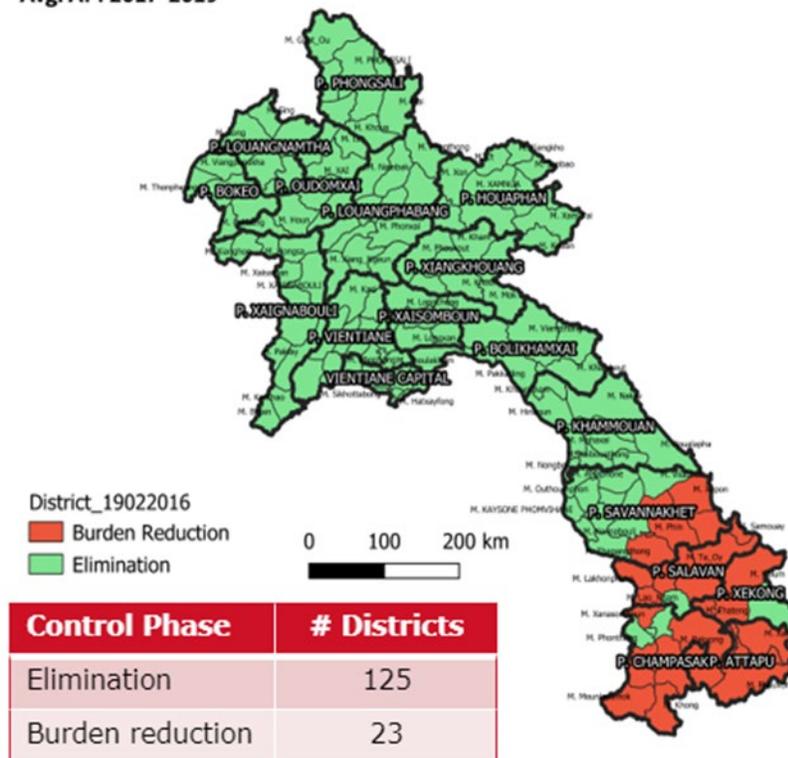
In 2018, 13 out of 18 provinces were identified as elimination provinces (those located in the northern part of the country). As of June 2019, a total of 15 provinces have been designated as elimination provinces.

The transmission heterogeneity in this country, illustrated by the difference in transmission between the northern and southern provinces and by particularly high transmission intensity in forested and forest-fringe areas, has become stronger in recent years (2017 and 2018). The five southern provinces accounted for 95 percent of the burden in 2017 and 97 percent in 2018. When looking into district case distribution, 60 of 148 districts (41 percent) did not report a malaria case in 2017, compared to 79 districts (53 percent) in 2018, which means the 2018 malaria burden was concentrated only in 69 districts across 16 provinces. Hotspots of transmission are more evident when looking at the distribution of cases by health center. In 2017, 287 (26.4 percent) of 1,089 health centers in the country reported a malaria case. In 2018, this number decreased to only 219 (20 percent) health centers. From

January to April 2019, this trend showed a continued decrease, with only 96 (9 percent) of health centers reporting a malaria case. Figure 12 below shows that most of the country is at the elimination phase and only 23 districts are at the burden-reduction phase.

Figure 12. Lao PDR Malaria Control Phase Stratification

Avg. API 2017-2019



Source: CMPE presentation at Surveillance meeting in Yangon, October 30, 2019.

Males continue to carry the largest malaria burden in Lao PDR. Recently, however, the proportion of female cases has risen, accounting for 20-30 percent of cases between 2016 and 2018. This demographic change indicates that more women may be undertaking high-risk behaviors, such as more forest-work or more frequent transmission occurring within villages, requiring further investigation. Nonetheless, predominantly male mobile populations (73 percent of malaria cases during January to April 2019), especially forest-goers and slash-and-burn farmers, are still an important target population and considered as a “bridging population” of sorts that helps maintain a parasite reservoir in some village settings. To maintain the momentum of malaria reduction efforts, more innovative and tailored mechanisms to delivering core interventions to high-risk forest going populations and novel approaches to address this group’s health-seeking behavior and acceptance of and access to healthcare will be required. Recent unpublished, operational research done by the University of California San Francisco (UCSF) in collaboration with CMPE sought to determine the feasibility of targeted malaria interventions among high-risk populations. Two interventions, peer navigator focal test and treat (FTAT) and village-based mass test and treat (MTAT), were tested in Champasack Province. The

results showed a higher yield amongst peer navigators, and T peer navigator FTAT for forest workers is now being deployed in Laos by WHO.

Overall, malaria remains a burden in Lao PDR, especially in the five southern provinces. Transmission has become more and more focalized as advancements have been made, leaving isolated and mobile populations at the highest risk of infection. Targeting these at-risk populations and areas is one of the keys to achieving malaria elimination; to be able to target them, these populations and focal areas need to be identified. In addition, integrating entomological data with case management data in the DHIS2 will be a focus to help target the at-risk populations and stop the transmission. This approach will also allow for a more complete picture when planning activities and interventions. In Lao PDR, entomological data will not be the only data completing the picture; DHIS2 will also store results from TES and iDES, which is being piloted later in 2019. Furthermore, DHIS2 is tailored to the country's two contrasting surveillance strategies: the northern elimination strategy and the southern burden-reduction strategy. It includes a tracker system for case and foci investigation for northern provinces and an epidemic alert dashboard for each southern province.

Figure 13. Key Indicators for Malaria Prevention and Treatment Coverage and Impact Indicators from Surveys from 2012-2017.

Indicator	2012, TMS ¹	2015, KAP ²	2017, MMP ³
% Households with at least one ITN	47%	51%	39%
% Households with at least one ITN for every two people	29%	23%	n/a
% Population with access to an ITN	n/a	n/a	n/a
% Population that slept under an ITN the previous night	29%	39%	37% ⁴
% Children under five years old who slept under an ITN the previous night	33%	32%	n/a
% Pregnant women who slept under an ITN the previous night	36%	n/a	n/a
% with reported fever in the last two weeks	4%	7%	15% ⁵
% Children under five years old with fever in the last two weeks for whom advice or treatment was sought	12%	18%	n/a
% Children under five with fever in the last two weeks who had a finger or heel stick	n/a	n/a	n/a
% Children receiving an ACT among children under five years old with fever in the last two weeks who received any antimalarial drugs	n/a	n/a	n/a
% Women who received two or more doses of IPTp during their last pregnancy in the last two years	n/a	n/a	n/a
% Women who received three or more doses of IPTp during their last pregnancy in the last two years	n/a	n/a	n/a
Under-five mortality rate per 1,000 live births	n/a	n/a	n/a
% Children under five years old with parasitemia (by microscopy , if done)	0%	n/a	n/a

Indicator	2012, TMS ¹	2015, KAP ²	2017, MMP ³
% Children under five years old with parasitemia (by RDT, if done)	n/a	n/a	n/a
% Children under five years old with severe anemia (Hb<8gm/dl)	n/a	n/a	n/a

¹Thailand Malaria Survey,

² Knowledge, Attitude, and Practice,

³ Mobile and Migrant Population Survey,

⁴Every night in the last week (including previous night),

⁵Reported fever in the last three months;

RDT: rapid diagnostic test

Figure 14. Evolution of Key Survey-Based Malaria Indicators in Lao PDR from 2006 to 2017

Indicator	2006, MICS ¹	2012, LSIS ²	2017, LSIS-2 ³
% Households with at least one ITN	45%	50%	61%
% Households with at least one ITN for every two people	n/a	n/a	38%
% Population with access to an ITN ⁴	n/a	n/a	52%
% Population that slept under an ITN the previous night	n/a	n/a	51%
% Children under five years old who slept under an ITN the previous night	41%	43%	50%
% Pregnant women who slept under an ITN the previous night	n/a	46%	52%
% Children under five years old with fever in the last two weeks for whom advice or treatment was sought	15%	14%	60%
% Children under five with fever in the last two weeks who had a finger or heel stick	n/a	9%	9%
% Children receiving an ACT among children under five years old with fever in the last two weeks who received any antimalarial drugs	0.1%	0.2%	4%
% Women who received two or more doses of IPTp during their last pregnancy in the last two years	1%	n/a	3%
% Women who received three or more doses of IPTp during their last pregnancy in the last two years	n/a	n/a	1%
Under-five mortality rate per 1,000 live births	n/a	79	46
% Children under five years old with parasitemia (by microscopy , if done)	n/a	n/a	n/a
% Children under five years old with parasitemia (by RDT , if done)	n/a	n/a	n/a
% Children under five years old with severe anemia (Hb<8gm/dl)	n/a	n/a	n/a

¹Multiple Indicator Cluster Survey,

²Lao Social Indicator Survey,

³Lao Social Indicator Survey-2,

⁴Percentage

of household population who could sleep under an ITN if each ITN in the household were used by up to two people;

RDT: rapid diagnostic test

Figure 15. Evolution of Key Surveillance-Based Malaria Indicators in Thailand from 2014 to 2018

	FY2014	FY2015	FY2016	FY2017	FY2018
# Suspect malaria cases ¹	NC	NC	NC	NC	NC
# Patients receiving diagnostic test for malaria ²	NC	NC	NC	NC	NC
Total # malaria cases ³ (confirmed and presumed)	24,330	17,594	14,954	7,366	5,834
# falciparum cases ⁴	7,184	3,347	2,188	821	754
# Presumed cases ⁵	0	0	0	0	0
% Malaria cases confirmed ⁶	100	100	100	100	100
Test positivity rate (TPR) ⁷	n/a	n/a	n/a	n/a	n/a
Total # <5 malaria cases ⁸	1,610	1,249	1,032	407	313
% Cases under 5 ⁹	7%	7%	7%	6%	5%
Total # severe cases ¹⁰	880	382	487	264	97
Total # malaria deaths ¹¹	38	33	26	15	9
# Facilities reporting ¹²	n/a	n/a	n/a	n/a	n/a
Data form completeness (%) ¹³	n/a	n/a	n/a	n/a	n/a

Data sources and comments:

NC=Not collected; N/A = not available

Definitions:

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

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

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

⁴ # confirmed cases: Total diagnostically confirmed cases. All ages, outpatient, inpatient.

⁵ # presumed cases: Total clinical/presumed/unconfirmed cases. All ages, outpatient, inpatient.

⁶ % Malaria Cases confirmed: # confirmed cases (#4 above) / Total # cases (#3 above)

⁷ Test Positivity Rate (TPR): Number of confirmed cases (#4 above)/Number of patients receiving a diagnostic test for malaria (RDT or microscopy) (#2 above)

⁸ Total #<5 cases: Total number of <5 cases. Outpatient, inpatient, confirmed, and unconfirmed.

⁹ Total # <5 cases (#8 above) / Total # of cases (# 3 above)

¹⁰ As there may not be a standard definition across countries, please specify if there is such a variable available and the definition that is used; if “severe malaria” is not used or collected but “hospitalized for malaria” is a standard in the country, please insert that label and the relevant data by year.

¹¹ Total # Malaria Deaths Reported: All ages, outpatient, inpatient, confirmed, and unconfirmed.

¹² Total # of health facilities reporting data into the HMIS/DHIS2 system for that year.

¹³ Data completeness: Number of monthly reports received from health facilities/Number of health facility reports expected (i.e., number of facilities expected to report multiplied by the number of months considered).

Figure 16. Evolution of Key Surveillance-Based Malaria Indicators in Lao PDR from 2014 to 2018

	2014	2015	2016	2017	2018
# Suspect malaria cases ¹	n/a	n/a	n/a	n/a	n/a
# Patients receiving diagnostic test for malaria ²	313,859	284,361	240,505	234,365	287,950

	2014	2015	2016	2017	2018
Total # malaria cases ³ (confirmed and presumed)	50,674	36,078	15,509	8,435	9,037
# falciparum cases ⁴	24,889	14,261	5,725	4,598	4,823
# Presumed cases ⁵	0	0	0	0	0
% Malaria cases confirmed ⁶	100%	100%	100%	100%	100%
Test positivity rate (TPR) ⁷	16.0	12.9	5.7	3.6	
Total # <5 malaria cases ⁸	n/a	n/a	n/a	n/a	n/a
% Cases under 5 ⁹	n/a	n/a	n/a	n/a	n/a
Total # severe cases ¹⁰	n/a	n/a	n/a	n/a	n/a
Total # malaria deaths ¹¹	4	4	1	2	6
# Facilities reporting ¹²	n/a	n/a	n/a	n/a	n/a
Data form completeness (%) ¹³	n/a	n/a	n/a	n/a	n/a

Data sources and comments:

N/A = not available

Definitions:

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

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

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

4 # confirmed cases: Total diagnostically confirmed cases. All ages, outpatient, inpatient.

5 # presumed cases: Total clinical/presumed/unconfirmed cases. All ages, outpatient, inpatient.

6 % Malaria Cases confirmed: # confirmed cases (#4 above) / Total # cases (#3 above)

7 Test Positivity Rate (TPR): Number of confirmed cases (#4 above)/Number of patients receiving a diagnostic test for malaria (RDT or microscopy) (#2 above)

8 Total #<5 cases: Total number of <5 cases. Outpatient, inpatient, confirmed, and unconfirmed.

9 Total # <5 cases (#8 above) / Total # of cases (# 3 above)

10 As there may not be a standard definition across countries, please specify if there is such a variable available and the definition that is used; if “severe malaria” is not used or collected but “hospitalized for malaria” is a standard in the country, please insert that label and the relevant data by year.

11 Total # Malaria Deaths Reported: All ages, outpatient, inpatient, confirmed, and unconfirmed.

12 Total # of health facilities reporting data into the HMIS/DHIS2 system for that year.

13 Data completeness: Number of monthly reports received from health facilities/Number of health facility reports expected (i.e., number of facilities expected to report multiplied by the number of months considered).

III. OVERVIEW OF PMI’S SUPPORT OF THAILAND AND LAO PDR MALARIA CONTROL STRATEGIES

Thailand

Thailand’s National Malaria Control Strategy (2017-2023) calls for the elimination of all malaria cases by 2024. The NSP objectives are:

1. To reduce malaria morbidity to not more than 0.20/1000 pop by 2021;
2. To reduce malaria mortality to not more than 0.01/100,000 pop by 2021;

3. To eliminate malaria transmission in at least 95 percent of total districts/regions by 2021 (882 out of 928 districts/regions); and
4. To prevent reintroduction of transmission in malaria free areas.

Four strategies guide the elimination goal and objectives including: scaling-up malaria elimination activities in Thailand, developing technology, innovation, measures and models that are appropriate for malaria elimination; developing partnerships among stakeholders at national and international levels in order to enable malaria elimination; and promoting/empowering the community to take an active role in malaria prevention. To this end, the DVBD is undertaking the development of a standardized surveillance system that is able to rapidly and efficiently respond to the malaria situation; increase capacity and coverage of services in diagnosis and treatment at all levels and sectors and for all populations at risk of malaria based on the principle of equity; scale-up detection of symptomatic and asymptomatic malaria patients, including submicroscopic parasitemia cases; scaleup coverage of prevention of malaria transmission through vector surveillance, vector control and personal protection among the target populations; and develop a system to eliminate drug resistant malaria parasites. PMI supports the DVBD's goals and objectives by supporting strengthening malaria programming at national and sub-national levels and use of strategic information, providing limited commodity support and technical assistance for improved surveillance and response, capacity strengthening, and pharmaceutical management systems.

The National Strategic Plan for Malaria Elimination in Thailand utilizes the district as the unit of analysis for malaria elimination. As proposed in the Global Fund Regional Artemisinin Initiative 2 Elimination (RAI2E) grant, DVBD aims to focus its resources and strategy on the identification and response to the remaining active and non-active residual foci in the country.

The Global Fund RAI2E supports the majority of Thailand's malaria commodity needs, including rapid diagnostic tests (RDTs), ACTs, and ITNs. The RAI2E malaria grant also supports the delivery of diagnostics and case management services through malaria health posts and the engagement of civil society organizations for implementation of community mobilization and SBC activities in targeted communities and migrant and mobile populations. In light of the Global Fund RAI2E grant support as well as Thailand's socioeconomic improvements over the past decade, PMI support to Thailand has transitioned from malaria commodity procurement and distribution to an overall health systems strengthening approach which focuses on expanding the role of malaria surveillance and response, improving existing supply chain management systems, and ensuring informed decision-making based on evidence and strategic information at all levels. PMI's support in Thailand has also focused on domestic resource mobilization and advocacy for malaria elimination at national and subnational levels – leveraging partnerships and resources from domestic local government sources, private and corporate sectors, and other non-health sectors

As malaria incidence has declined over the years in Thailand, it has increasingly become more difficult to enroll patients for the standard WHO TES to monitor drug efficacy and resistance. As a result, through PMI support, WHO has provided technical assistance to DVBD to pilot the iDES initially in

three sites with the aim of scaling up throughout the country where feasible. In the context of malaria elimination, the iDES approach ultimately aims to ensure that every malaria case has achieved effective treatment outcomes. Evaluated in Thailand, this approach could serve as a model for other malaria-eliminating countries that are unable to enroll sufficient numbers of patients to conduct the standard WHO TES.

Lao PDR

The 2016-2020 National Strategic Plan has set its goal to eliminate all forms of non-zoonotic human malaria in Lao PDR and includes strengthened interventions targeted to the southern part of the country to reduce the primary malaria burden while beginning efforts to eliminate malaria in the remaining focal areas in central and northern Lao PDR. The first five years of the strategy sets out to reduce the burden of malaria in the southern provinces below 5 cases per 1,000 population while eliminating *P. falciparum* malaria in primarily Northern provinces. By 2025, the country targets elimination of *P. falciparum* malaria and *P. vivax* from all Northern provinces and elimination of *P. falciparum* in the four southernmost provinces, and national malaria elimination is envisioned by 2030. Objectives for the first phase (2016-2020) are the following:

- Establish effective program management and coordination at all levels of the health system to efficiently deliver a combination of targeted interventions for malaria burden reduction and elimination.
- Achieve universal coverage of case management by 2018 to ensure 100 percent parasitological diagnosis of all suspected cases and prompt and effective treatment of all confirmed cases.
- Protect at least 90 percent of all populations in burden reduction provinces with an appropriate vector control intervention by 2017.
- Strengthen the surveillance system to detect, immediately notify, investigate, classify, report, and respond to all outbreaks and foci to move toward malaria elimination.
- Implement a comprehensive information, education, and behavior change and communication approach to ensure that 90 percent of people seek treatment within 24 hours at an appropriate health facility or with a qualified care provider and at least 90 percent of the population residing in burden reduction areas utilize an appropriate protection tool by 2017.

The Lao PDR Malaria Program Review was conducted in September and October 2019 to review the progress achieved under the current NSP (2016-2020) and guide the development of the next national strategic plan. Although findings are still pending, the overall review indicated that Lao PDR is on track to achieve its malaria elimination targets by 2030.

The majority of programming needs, including commodities such as RDTs, ACTs and ITNs, are met by the country's Global Fund RAI2E malaria grant. PMI supports working with the national malaria program and in-country partners to assist the country to reach elimination nationally by 2030. PMI provides limited technical support to Lao PDR to improve technical and programmatic capacity for use

of strategic information and strengthen national malaria SM&E systems for malaria control and elimination.

IV. PARTNER FUNDING LANDSCAPE

Thailand

Under the Global Fund RAI2E grant proposal for implementation in 2018-2020, Thailand has been allocated a total of \$23.3 million over three years, which supports expansion of malaria services for mobile and migrant populations at all levels of the public health system, particularly through civil society organizations (CSOs) in hard-to-reach areas. Thailand will strengthen active case detection and case investigation of all malaria cases, as well as integrating drug resistance monitoring as part of the routine treatment follow-up surveillance system.

Figure 17. Non-PMI Funding Landscape in Thailand

Funding Source	Total Budget in \$	Duration	Key Implementing Partners	Key Activities
Domestic	2,200,000	Annually	BVBD	Malaria Elimination Strategy
Global Fund RAI2E (country component)	23,300,000	2018-2020	BVBD, DDC, UNOPS (PR)	Accelerating to malaria elimination; targeting transmission foci

BVBD: Bureau of Vector Borne Diseases; DDC: Department of Disease Control; UNOPS: United Nations Office for Project Services; PR: Principal recipient

Lao PDR

The CMPE has in the past received funds from various donors which include the World Bank, Japan International Cooperation Agency, the European Union, and WHO. Commencing in 2004, the Global Fund has been the sole source of external funding for the program that accounts for more than 90 percent of total program funds. With Global Fund grant management structures, there has been a gradual improvement in the financial management system with the establishment of the principal recipient, sub-recipients, and sub-sub-recipients at provincial levels. As a landlocked country sharing borders with all GMS countries, any resurgence of malaria in Lao PDR will inevitably affect its neighbors and jeopardize the region's goals for malaria elimination.

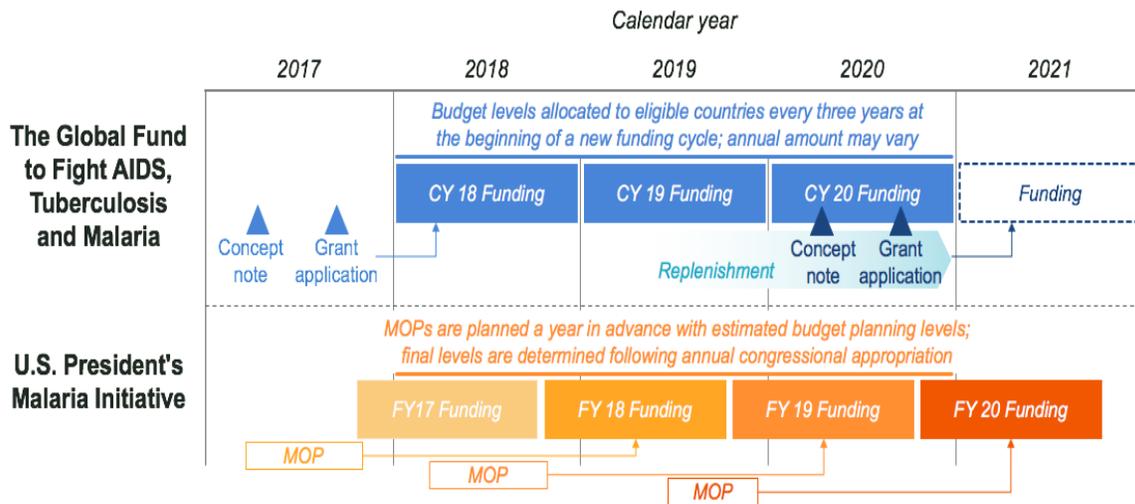
Figure 18. Non-PMI Funding Landscape in Lao PDR

Funding Source	Total Budget in \$	Duration	Key Implementing Partners	Key Activities
Domestic	1,122,915	Annually	CMPE	Treatment services
Global Fund RAI2E (country component)	13,300,000	2018-2020	TBD	Scale up case management for hard-to-reach populations

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

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

Figure 19. PMI and Global Fund Funding Cycle Alignment



Footnote: In some cases, Global Fund’s funding may come in partway through the calendar year. Funding levels in "Section IV - Partner Funding Landscape" and commodity procurement amounts listed in "Annex A - Intervention Specific Data" may differ given the lag between the year that funding was planned and the year when procurement orders were placed. Differences may be a reflection of timing and/or based on changes in commodity consumption levels at country level, changes in commodity costs, or other donor orders.

Figures 17 and 18 aim to summarize contributions by external partners and host country government in calendar years 2018-20. For Thailand and Lao PDR, data are available for PMI (FY 17-19) and Global Fund (CY 2018-20). Under the Global Fund RAI2E grant proposal for implementation in 2018-2020, Thailand has been allocated \$23.3M and Lao PDR \$13.3M over three years, which supports accelerating malaria elimination and scaling up case management to reach hard-to-reach populations, respectively.

In addition, as the Global Fund 2021-23 grant funding cycle is not yet underway at the time of this PMI FY 2020 MOP development, Global Fund country investments for the 2021 implementation period and beyond are not yet known. Note that the host country government invests substantial funding into the national-to-local infrastructure and service delivery for malaria and many other programs. However, there has not been a standardized method for attributing those investments to malaria specifically.

Figure 20. Annual Budget by Level 1 Category, Thailand

Year ¹	Funder	Vector Control	Case Management	Drug-Based prevention ²	Supply Chain ³	Monitoring, Evaluation & Research	Other Cross-Cutting and Health Systems Strengthening	Total
FY 17	PMI	\$0.03M	\$.2M	-	\$0.1M	\$0.4M	-	\$.7M
	Total	\$0.03M	\$.2M	-	\$0.1M	\$0.4M	-	\$.7M
FY 18	PMI	\$.5M	\$.3M	-	\$0.2M	\$0.5M	\$0.1M	\$1.6M
	Total	\$.5M	\$.3M	-	\$0.2M	\$0.5M	\$0.1M	\$1.6M
FY 19	PMI	\$.7M	\$.6M	-	\$.4M	\$.4M	\$.8M	\$2.8M
	Total	\$.7M	\$.6M	-	\$0.4M	\$0.4M	\$0.8M	\$2.8M

Footnotes:

¹ Each year's figures represent the FY for PMI and CY for GFATM that most closely align. Global Fund budget data accurate as of July 1, 2019. PMI budget data accurate as of Sept 1, 2019.

² Drug-based prevention, including SMC and MIP where relevant;

³ Covers management of in-country warehousing & distribution of malaria commodities, except for ITNs which are separately captured under "Vector Control"

Note: Categories shown reflect the harmonized financial taxonomy (Levels 1-3) developed by BMGF, Global Fund, and PMI in 2019, as part of a broader data harmonization initiative; potential for categories to continue to evolve through FY 2020 MOP process, as well as for additional donors and host country governments to adopt and reflect funding using same categories.

Figure 21. Annual Budget by Level 3 Category, Detailed Breakdown for PMI, Thailand

Level 1 Category	Level 3 Category	FY17 ¹ PMI	FY18 ¹ PMI	FY19 ¹ PMI
Vector Control	Procure ITNs for Continuous Distribution	-	\$0.5M	\$0.5M
	Distribute ITNs via Continuous Distribution	-	-	\$0.2M
	Procure ITNs for Mass Campaigns	-	-	-
	Distribute ITNs via Mass Campaigns	-	-	-
	Other ITN Implementation*	-	-	-
	IRS Implementation ⁴	-	-	-
	Procure IRS Insecticide ⁴	-	-	-

Level 1 Category	Level 3 Category	FY17¹ PMI	FY18¹ PMI	FY19¹ PMI
	Other IRS*	-	-	-
	Entomological Monitoring	\$0.03M	\$0.1M	\$0.05M
	SBC for Vector Control ⁵	-	-	-
	Other vector control measures	-	-	-
	Removing human rights- and gender-related barriers to vector control programs**	-	-	-
Case Management	Active Case Detection**	-	-	-
	Community-based case management	-	-	-
	Facility-based case management	-	-	-
	Private-sector case management	-	-	-
	Procure ACTs	-	-	\$0.05M
	Procure Drugs for Severe Malaria	-	-	-
	Procure Other Diagnosis-Related Commodities	-	-	-
	Procure Other Treatment-Related Commodities	-	-	-
	Procure RDTs	-	-	\$0.02M
	Therapeutic Efficacy	\$0.2M	\$0.1M	\$0.5M
	SBC for Case Management ⁵	-	-	-
	Other Case Management	\$0.03M	\$0.3M	-
Drug-Based Prevention²	Procure SMC-Related Commodities	-	-	-
	SMC Implementation	-	-	-
	Prevention of Malaria in Pregnancy Implementation	-	-	-
	Procure IPTp-Related Commodities	-	-	-
	IPTi**	-	-	-
	SBC for Drug-Based Prevention ⁵	-	-	-
	Other Prevention**	-	-	-

Level 1 Category	Level 3 Category	FY17 ¹ PMI	FY18 ¹ PMI	FY19 ¹ PMI
Supply Chain³	In-Country Supply Chain ³	-	-	-
	Supply Chain Infrastructure	-	-	-
	Ensuring Quality	-	-	-
	Pharmaceutical Management Systems Strengthening	\$0.1M	\$0.2M	\$0.4M
	Supply Chain System Strengthening	-	-	-
Monitoring, Evaluation & Research	Reporting, Monitoring, and Evaluation	\$0.4M	\$0.5M	\$0.4M
	Program and data quality, analysis and operations research	-	-	-
	Surveys	-	-	-
	Other Data Sources**	-	-	-
	Support for FETP*	-	-	-
Other Cross-Cutting and Health Systems Strengthening	Integrated service delivery, quality improvement, and national health strategies**	-	-	-
	Financial management systems**	-	-	-
	Community responses and systems**	-	-	-
	Support for PCV and SPAs*	-	-	-
	Cross-Cutting Human Resources for Health**	-	-	-
	Central and Regional Program management ⁶	-	\$0.1M	\$0.1M
	In-Country Staffing and Administration*	-	-	\$0.7M
	Other Program Management**	-	-	-
	SBC Unspecified ⁵	-	-	-
Total		\$0.7M	\$1.6M	\$2.8M

Footnotes:

- ¹ Each year's figures represent the FY for PMI and CY for Global Fund that most closely align. Global Fund budget data accurate as of July 1, 2019. PMI budget data accurate as of Sept 1, 2019;
- ² Drug-based prevention, including SMC and MIP where relevant;
- ³ Covers management of in-country warehousing & distribution of malaria commodities, except for ITNs which are separately captured under "Vector Control";
- ⁴ May include cost of IRS insecticides if full cost of IRS implementation including commodities was bundled within single line in prior year's Table 2;
- ⁵ SBC was not historically split in the PMI budget across intervention areas, hence the row "SBC (unspecified)" for the FY2020 MOP cycle. Going forward, SBC proposed activities will be categorized across vector control, case management, and prevention (new categories).
- ⁶ PMI Proposed Activity "National-level support for case management" rolls up under "Case Management" Level 1

Note: Categories shown reflect the harmonized financial taxonomy (Levels 1-3) developed by BMGF, Global Fund, and PMI in 2019, as part of a broader data harmonization initiative; potential for categories to continue to evolve through FY 2020 MOP process, as well as for additional donors and host country governments to adopt and reflect funding using same categories.

Figure 22. Annual Budget, Breakdown by Commodity, Thailand

Year ¹	Funder	ITNs for Continuous Distribution	ITNs for Mass Distribution	IRS Insecticide ³	ACTs	RDTs	Severe Malaria	SMC-Related	IPTp-Related	Total
FY 17	PMI ²	-	-	-	-	-	-	-	-	-
	Total	-	-	-	-	-	-	-	-	-
FY 18	PMI ²	\$0.5M	-	-	-	-	-	-	-	\$0.5M
	Total	\$0.5M	-	-	-	-	-	-	-	\$0.5M
FY 19	PMI ²	\$0.5M	-	-	\$0.05M	\$0.02M	-	-	-	\$0.6M
	Total	\$0.5M	-	-	\$0.05M	\$0.02M	-	-	-	\$0.6M

Footnotes:

¹ PMI budget data accurate as of Sept 1, 2019 ;

² PMI commodity costs are fully loaded, including costs for the ex-works price of the commodity, quality control, freight, insurance, and customs.

³ IRS insecticide; for PMI, IRS insecticide commodity costs may be inextricable from IRS implementation costs in historical data – field left blank where this is the case.

Note: Categories shown reflect the harmonized financial taxonomy (Levels 1-3) developed by BMGF, Global Fund, and PMI in 2019, as part of a broader data harmonization initiative; potential for categories to continue to evolve through FY 2020 MOP process, as well as for additional donors and host country governments to adopt and reflect funding using same categories.

Figure 23. Annual Budget by Level 1 Category, Lao PDR

Year ¹	Funder	Vector Control	Case Management	Drug-Based prevention ²	Supply Chain ³	Monitoring, Evaluation & Research	Other Cross-Cutting and Health Systems Strengthening	Total
FY 17	PMI	-	-	-	-	-	\$0.1M	\$1M
	Total	-	-	-	-	-	\$0.1M	\$1M
FY 18	PMI	\$0.0M	\$0.1M	-	\$0.1M	\$0.1M	\$0.1M	\$0.4M
	Total	\$0.0M	\$0.1M	-	\$0.1M	\$0.1M	\$0.1M	\$0.4M
FY 19	PMI	-	-	-	-	-	-	-
	Total	-	-	-	-	-	-	-

Footnotes:

¹ PMI budget data accurate as of Sept 1, 2019.

² Drug-based prevention, including SMC and MIP where relevant;

³ Covers management of in-country warehousing & distribution of malaria commodities, except for ITNs which are separately captured under "Vector Control"

Note: Categories shown reflect the harmonized financial taxonomy (Levels 1-3) developed by BMGF, Global Fund, and PMI in 2019, as part of a broader data harmonization initiative; potential for categories to continue to evolve through FY 2020 MOP process, as well as for additional donors and host country governments to adopt and reflect funding using same categories.

Figure 24. Annual budget by Level 3 Category, Detailed Breakdown for PMI, Lao PDR

Level 1 Category	Level 3 Category	FY17 ¹ PMI	FY18 ¹ PMI	FY19 ¹ PMI
Vector Control	Procure ITNs for Continuous Distribution	-	\$0.05M	-
	Distribute ITNs via Continuous Distribution	-	-	-
	Procure ITNs for Mass Campaigns	-	-	-
	Distribute ITNs via Mass Campaigns	-	-	-
	Other ITN Implementation*	-	-	-
	IRS Implementation ⁴	-	-	-
	Procure IRS Insecticide	-	-	-
	Other IRS*	-	-	-
	Entomological Monitoring	-	-	-
	SBC for Vector Control ⁵	-	-	-
	Other vector control measures	-	-	-
Removing human rights- and gender-related barriers to vector control programs**	-	-	-	
Case Management	Active Case Detection**	-	-	-
	Community-based case management	-	-	-
	Facility-based case management	-	-	-
	Private-sector case management	-	-	-
	Procure ACTs	-	-	-
	Procure Drugs for Severe Malaria	-	-	-
	Procure Other Diagnosis-Related Commodities	-	-	-
	Procure Other Treatment-Related Commodities	-	-	-
	Procure RDTs	-	-	-
Therapeutic Efficacy	-	\$0.1M	-	

Level 1 Category	Level 3 Category	FY17 ¹ PMI	FY18 ¹ PMI	FY19 ¹ PMI
	SBC for Case Management ⁵	-	-	-
	Other Case Management	-	\$0.20M	-
Drug-Based Prevention²	Procure SMC-Related Commodities	-	-	-
	SMC Implementation	-	-	-
	Prevention of Malaria in Pregnancy Implementation	-	-	-
	Procure IPTp-Related Commodities	-	-	-
	IPTi**	-	-	-
	SBC for Drug-Based Prevention ⁵	-	-	-
	Other Prevention**	-	-	-
Supply Chain³	In-Country Supply Chain ³	-	-	-
	Supply Chain Infrastructure	-	-	-
	Ensuring Quality	-	-	-
	Pharmaceutical Management Systems Strengthening	-	\$0.1M	-
	Supply Chain System Strengthening	-	-	-
Monitoring, Evaluation & Research	Reporting, Monitoring, and Evaluation	-	\$0.1M	-
	Program and data quality, analysis and operations research	-	-	-
	Surveys	-	-	-
	Other Data Sources**	-	-	-
	Support for FETP*	-	-	-
Other Cross-Cutting and Health Systems Strengthening	Integrated service delivery, quality improvement, and national health strategies**	-	-	-
	Financial management systems**	-	-	-
	Community responses and systems**	-	-	-

Level 1 Category	Level 3 Category	FY17 ¹ PMI	FY18 ¹ PMI	FY19 ¹ PMI
	Support for PCV and SPAs*	-	-	-
	Cross-Cutting Human Resources for Health**	-	-	-
	Central and Regional Program management ⁶	\$0.1M	\$0.1M	-
	In-Country Staffing and Administration*	-	-	-
	Other Program Management**	-	-	-
	SBC Unspecified ⁵	-	-	-
Total		\$0.1M	\$0.4M	-

Footnotes:

¹ PMI budget data accurate as of Sept 1, 2019;

² Drug-based prevention, including SMC and MIP where relevant;

³ Covers management of in-country warehousing & distribution of malaria commodities, except for ITNs which are separately captured under "Vector Control";

⁴ May include cost of IRS insecticides if full cost of IRS implementation including commodities was bundled within single line in prior year's Table 2;

⁵ SBC was not historically split in the PMI budget across intervention areas, hence the row "SBC (unspecified)" for the FY2020 MOP cycle. Going forward, SBC proposed activities will be categorized across vector control, case management, and prevention (new categories).

⁶ PMI Proposed Activity "National-level support for case management" rolls up under "Case Management" Level 1

Note: Categories shown reflect the harmonized financial taxonomy (Levels 1-3) developed by BMGF, Global Fund, and PMI in 2019, as part of a broader data harmonization initiative; potential for categories to continue to evolve through FY 2020 MOP process, as well as for additional donors and host country governments to adopt and reflect funding using same categories.

* Category currently funded by PMI only

** Category currently funded by Global Fund only

Figure 25. Annual Budget, Breakdown by Commodity, Lao PDR

Year ¹	Funder	ITNs for Continuous Distribution	ITNs for Mass Distribution	IRS Insecticide ³	ACTs	RDTs	Severe Malaria	SMC-Related	IPTp-Related	Total
FY 17	PMI ²	-	-	-	-	-	-	-	-	-
	Total	-	-	-	-	-	-	-	-	-
FY 18	PMI ²	\$0.05M	-	-	-	-	-	-	-	\$0.05M
	Total	\$0.05M	-	-	-	-	-	-	-	\$0.05M
FY 19	PMI ²	-	-	-	-	-	-	-	-	-
	Total	-	-	-	-	-	-	-	-	-

Footnotes:

¹ PMI budget data accurate as of Sept 1, 2019 ;

² PMI commodity costs are fully loaded, including costs for the ex-works price of the commodity, quality control, freight, insurance, and customs.

³ IRS insecticide; for PMI, IRS insecticide commodity costs may be inextricable from IRS implementation costs in historical data – field left blank where this is the case.

Note: Categories shown reflect the harmonized financial taxonomy (Levels 1-3) developed by BMGF, Global Fund, and PMI in 2019, as part of a broader data harmonization initiative; potential for categories to continue to evolve through FY 2020 MOP process, as well as for additional donors and host country governments to adopt and reflect funding using same categories.

V. ACTIVITIES TO BE SUPPORTED WITH FY 2020 FUNDING

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

ANNEX A: INTERVENTION-SPECIFIC DATA

1. VECTOR CONTROL

NMCP objective
<p>Thailand:</p> <ul style="list-style-type: none"> • The Thai DVBD NSP (2017-2023) targets one insecticide-treated mosquito net (ITN) for every 1.8 resident, migrant, and military personnel based in malaria-endemic villages. ITNs are to be replaced every three years. • Long-lasting insecticide-treated hammock nets are distributed in endemic villages of targeted provinces where ITNs cannot be used (e.g., migrants and soldiers spending nights in the forest and on the Thai-Cambodia border). <p>Lao PDR:</p> <ul style="list-style-type: none"> • The NSP (2016-2020) has set out to protect 90 percent of the all the populations in burden reduction provinces with appropriate vector control interventions including ITNs. • The NMCP’s primary distribution channel is through mass distribution campaigns every three years and targeting high-risk rural populations.
NMCP approach
<p>Thailand:</p> <ul style="list-style-type: none"> • Thailand supports both focal ITN distribution and focal IRS in active foci and in outbreak response. Thailand also supports mass distribution of ITN to mobile and migrant populations (MMPs), with an aim of reaching 80 percent coverage. • Thailand also supports targeted distribution to forest goers and other mobile and migrant workers, primarily on its borders with Burma, Cambodia, and Malaysia. <p>Lao PDR:</p> <ul style="list-style-type: none"> • Lao PDR primarily uses ITN distributed via mass campaigns, targeted at areas with ongoing malaria transmission, primarily in the south of the country. • In Lao PDR, ITN distribution is in line the Global Fund RAI2E grant, which aims for one ITN per two people in at areas with ongoing malaria transmission. IRS is not at present carried out, though the country wishes to develop IRS capacity for outbreak response. • The Lao PDR NMCP has requested support for strengthening entomology. PMI has discussed with the Thai national program, which has expertise in entomology, whether such

support can be provided by Thai experts. Given the close similarity of the Thai and Laotian languages, such an approach makes sense.

PMI objective, in support of NMCP

- In Lao and in Thailand, PMI has provided funding for purchase of ITNs, but provides no support for IRS.
- PMI will continue to engage with Asia Pacific Malaria Elimination Network (APMEN) Vector Control Working Group to ensure training related to comprehensive, integrated epidemiological and entomological foci investigations.

PMI-supported recent progress (past ~12-18 months) N/A

PMI has been able to fill unanticipated ITN gaps for both Thailand and Lao PDR.

Thailand:

- In 2018, PMI procured 40,000 ITNs for distribution in the southern provinces bordering Malaysia where there had been an increase in malaria cases detected. These southern provinces are conflict areas and the national program is coordinating with local authorities and CSOs to ensure that malaria commodities are available for those populations affected.
- In 2019, PMI procured 80,000 ITNs for targeted distribution to migrant and mobile populations residing in A1 and A2 strata.

Lao PDR:

- PMI procured and distributed 120,000 ITNs for the five southern provinces of Lao PDR in advance of transmission season in 2018.
- PMI procured 174,000 ITNs contributing to the national 2019 mass ITN distribution campaign reaching all households in Lao PDR.

PMI-supported planned activities (next ~12-18 months, supported by currently available funds)

Thailand:

- PMI will procure and distribute 160,000 ITNs to fill gaps in Thailand with focus on forest goers and migrant and mobile populations.

Lao PDR:

- There are no ITN gaps anticipated in Lao PDR for the current period.

1.A. ENTOMOLOGICAL MONITORING

Key Goal

Determine the geographic distribution, bionomics, and insecticide resistance profiles of the main malaria vectors in the country to inform vector control decision-making

Do you propose expanding, contracting, or changing any entomological monitoring activities? If so, why and what data did you use to arrive at that conclusion?

No changes are proposed with FY2020 funding.

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

Key Question 1

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

Supporting Data

PMI has provided no support for entomological monitoring in Lao PDR or Thailand. The following summary is based upon a review of the published literature as well as on resistance data available on irmapper.com and the WHO Malaria Threats database. The latter includes otherwise unpublished grey literature provided by the NMCP. The primary vectors in both Lao PDR and Thailand are *Anopheles dirus*, the larvae of which thrive in shaded forest pools; *An. minimus*, which lives in small shaded puddles on the sides of slow flowing streams; and *An. maculatus*, which lives in sunny pools on the fringes of streams in hilly and forested areas. The behavior of adults is variable, but biting may occur either indoors or outdoors, and may occur during crepuscular periods during times when people are not using ITNs. Therefore, prevention of residual ‘outdoor transmission’ remains a challenge in both countries.

Conclusion

In terms of reduction of outdoor transmission, the efforts should be made to equip MMPs with ITNs or hammock nets, and rapid and effective access to diagnosis and treatment to prevent transmission from humans to mosquitoes. In remaining foci, additional bite prevention interventions need to be explored.

Key Question 2

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

Supporting Data

Thailand:

For Thailand, more published data are available, providing a somewhat more detailed picture. On the border with Burma, Chaumeau et al. 2017, *Parasites and Vectors*, 10: 165, found deltamethrin

resistance in *An. maculatus* and suspected resistance in *An. dirus*. *An. minimus* was susceptible to permethrin. In the same region, Pemo et al. 2012, Southeast Asian Journal of Public Health, found that both *An. dirus* and *An. minimus* were susceptible to the pyrethroids tested. In east Thailand, on the border with Cambodia, Sumarnrote et al. 2017, Malaria Journal found that both *An. dirus* and *An. minimus* were susceptible to permethrin and deltamethrin. In contrast, the rice field secondary vector, *An. hyracanus*, showed high level of resistance to these insecticides. The only published data available for the south of Thailand are for the secondary vector, *An. epiroticus* (member of the *An. sudaicus* group), which showed susceptibility to pyrethroids, though with some evidence of behavioral avoidance of insecticides in one of three sites (Rittison et al. 2014, Journal of Vector Ecology). The reports available on the WHO Threats database show little evidence of resistance in any of three primary vectors in either the west or east of the country. This is in line with personal communication with the Chief Entomologist for Thailand, who confirms that most resistance in *Anopheles* mosquitoes in Thailand is not in primary vectors, but in rice-field breeding secondary vectors likely exposed to agricultural pesticide use.

Lao PDR:

For insecticide resistance in Lao PDR, the most comprehensive report is that of Marcombe, et al. 2017 in Plos One. With support from Institute Pasteur, this group surveyed resistance in *An. minimus* and *An. maculatus* in ten provinces in Lao PDR along a north-south transect. They found no resistance to either permethrin or deltamethrin in these two primary vectors. They did not evaluate resistance in *An. dirus*. Some tolerance to pyrethroids was found in secondary vectors. Data from the NMCP available through the WHO website, show a somewhat contrasting picture. As only the bare results are given, it is impossible to assess the quality of these reports. Three reports on *An. dirus* in the south of the country show no resistance to deltamethrin but some tolerance to permethrin. Interestingly, two reports -- one from the north and another on the border with Cambodia in the south -- show high levels of resistance in both *An. maculatus* and *An. minimus*. The sites sampled are very close in both time and space to those sampled by Marcombe et al 2017.

Conclusion

Resistance monitoring should continue only in foci with residual transmission.

Key Question 3

Are there any other considerations that impact your funding allocation in this category?

Supporting Data

No additional considerations are noted.

Conclusion

PMI aims to take a regional approach, working with BMGF on entomological aspects of foci investigation, the APMEN Vector Control Working Group, and the training group Asian Collaborative Training Network for Malaria (ACTMalaria) for regional workshops on foci investigation.

1.B. INSECTICIDE-TREATED NETS (ITNs)

PMI Goal

Achieve high ITN coverage and usage of effective nets in endemic PMI-supported areas (in the context of the current insecticide resistance); and maintain high coverage and use with consistent ITN distribution (via campaigns and/or continuous channels in a combination that is most effective given country context).

Do you propose expanding, contracting, or changing any ITN activities? If so, why and what data did you use to arrive at that conclusion?

No changes in programming of ITN activities are proposed.

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

Key Question 1

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

Supporting Data

Figure A1. Trends in ITN Ownership, *Percent of Households with One or More ITN, Thailand*

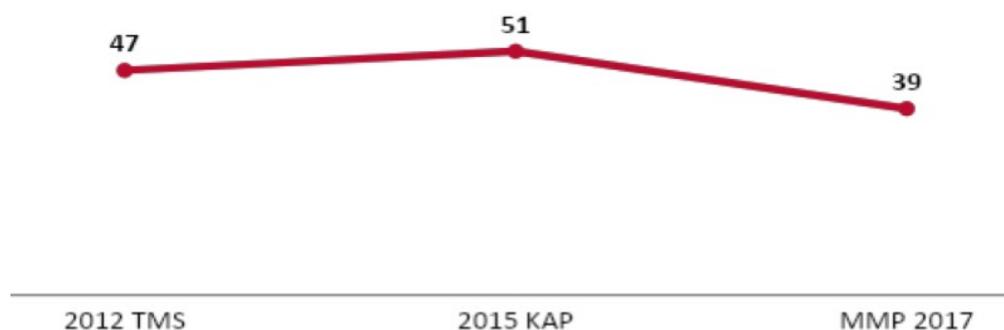
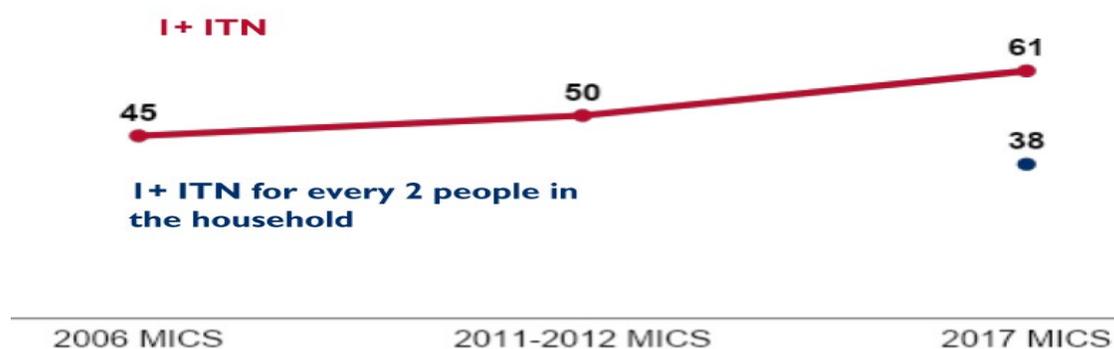


Figure A2. Trends in ITN Ownership, *Percent of Households with One or More ITN, Laos PDR:*



Conclusion

Because ITNs and hammock nets are targeted to residual foci, forest goers and MMPs, standard metrics do not apply; in both Thailand and Lao PDR, ITN ownership is expected to decline as malaria is gradually limited. The primary challenge is the estimation of a rapidly changing denominator based upon remaining villages with transmission in a residential context (“active foci”) and numbers of forest going people, which shifts rapidly in response to market factors. Traditional cross-sectional surveys are ill-designed to accurately assess ITN coverage in this context.

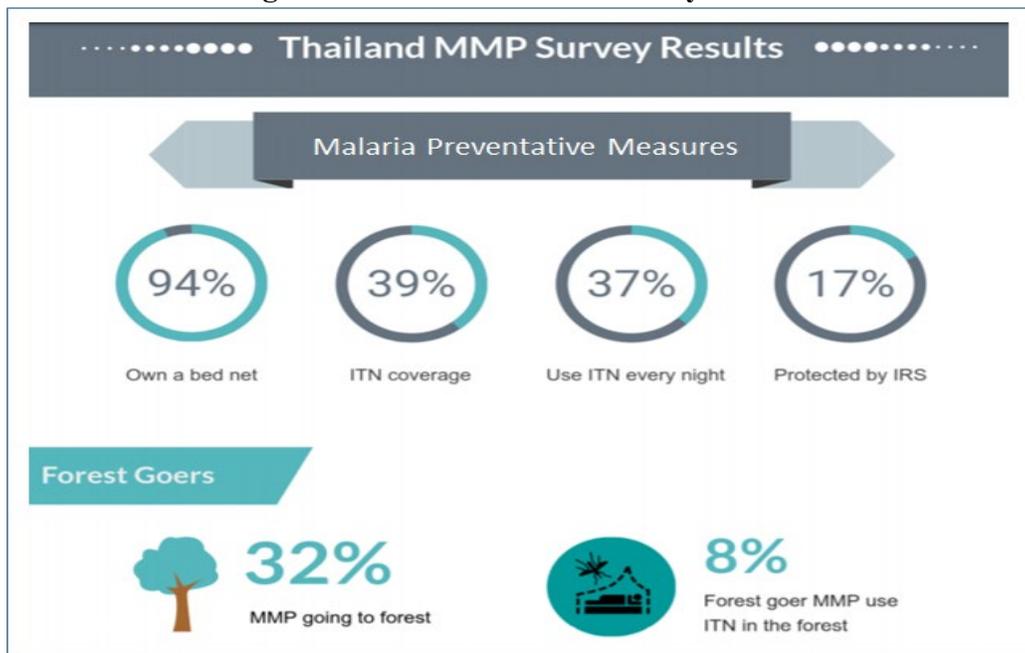
Key Question 2

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

Supporting Data

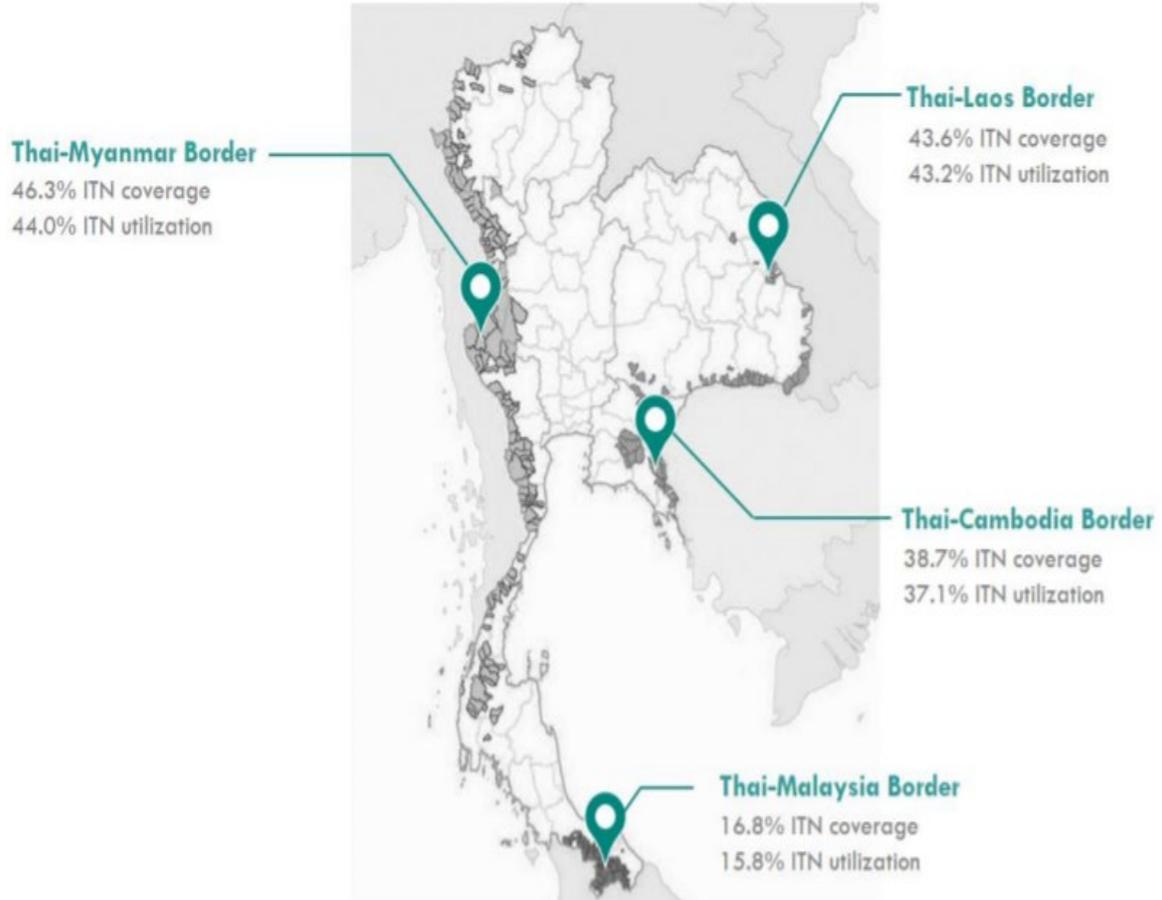
Thailand:

Figure A3. Thailand MMP Survey Results



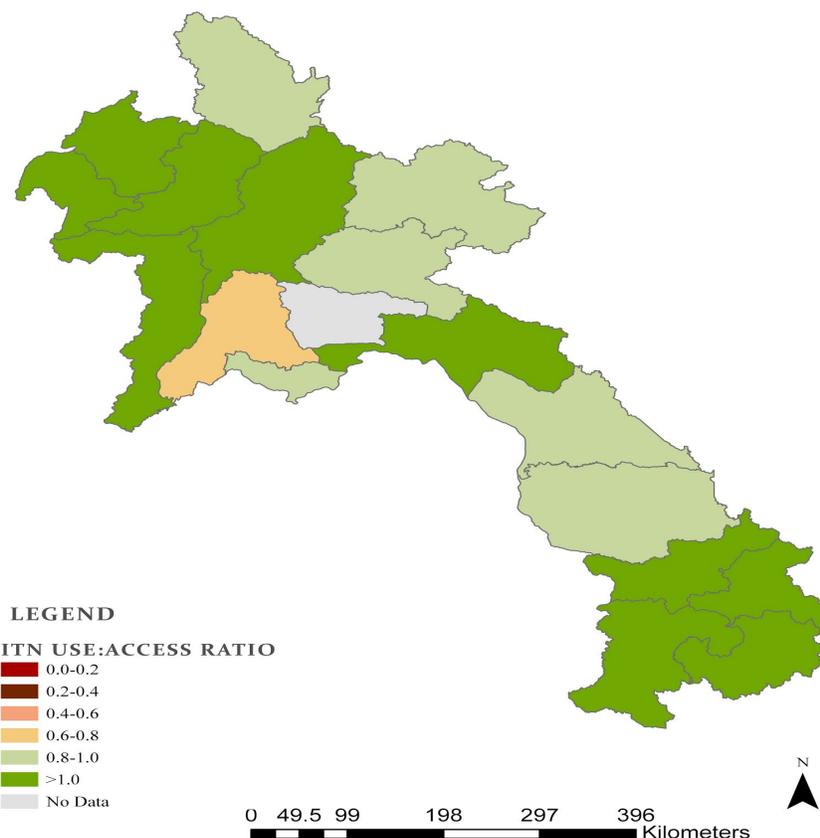
Modified from Thailand MMP survey, 2017

Figure A4. ITN Coverage and Use in Four Border Regions



Lao PDR:

Figure A5. Lao PDR ITN: Use Access Ratio



Source: MICS, 2011-2012

Figure A6. Lao PDR Key Indicators for Malaria Prevention and Treatment Coverage and Impact Indicators

Indicator	2017, LSIS-2
% Households with at least one net	93%
% Households with at least one ITN	61%
% Households with at least one ITN (Northern)	60%
% Households with at least one ITN (Southern)	82%
% Households with at least one ITN for every two people	38%
% Population with access to an ITN	52%
% Population that slept under a net the previous night	88%
% Population that slept under an ITN the previous night	51%

Conclusion

Thailand:

In Thailand, bednet ownership is very high (94 percent of the population), but most are untreated. A survey conducted in 2017 shows that the Thai population has very low ITN coverage (39 percent) and use (37 percent). However, these surveys do not adequately target at-risk areas or forest going populations. The protection of IRS is also low (17 percent) though this reflects the fact that IRS is used primarily for outbreak response. Data from the survey also showed low coverage (15 percent -46 percent) of ITNs in high transmission border areas. The lowest ITN coverage is in the Thai-Malaysia border where continuing transmission is associated with civil unrest.

Lao PDR:

Overall, the use: access ratio is high throughout the country, particularly in the southern provinces with the highest malaria burden. The more recent Social Indicator Survey from 2017 noted maintained high conventional net ownership and use and improving ITN ownership and use since the 2012 survey. The ITN ownership is higher in the southern provinces where the burden of malaria is higher. The northern part of the country has, at present, little transmission; and therefore, ITN distribution is being phased out.

Key Question 3

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

Supporting Data

In Thailand and Lao PDR, as in much of southeast Asia, ownership and use of untreated nets is common although ITN ownership and use is improving. In some instances, people will only use ITNs after their untreated nets are worn out and unusable. Untreated nets are often decorative, colorful, and viewed as household furniture offering rather than as a disease prevention intervention.

Conclusion

PMI will support procurement of ITNs to fill gaps to ensure that access is not a primary barrier to ITN use.

Key Question 4

What percent of pregnant women and children under 5 report sleeping under an ITN?

Supporting Data

Figure A7. Thailand: Trends in ITN Use among Children and Pregnant Women, Percent of Children under 5 Years of Age and Pregnant Women Age 15-49 Who Slept Under and ITN the Night Before the Survey

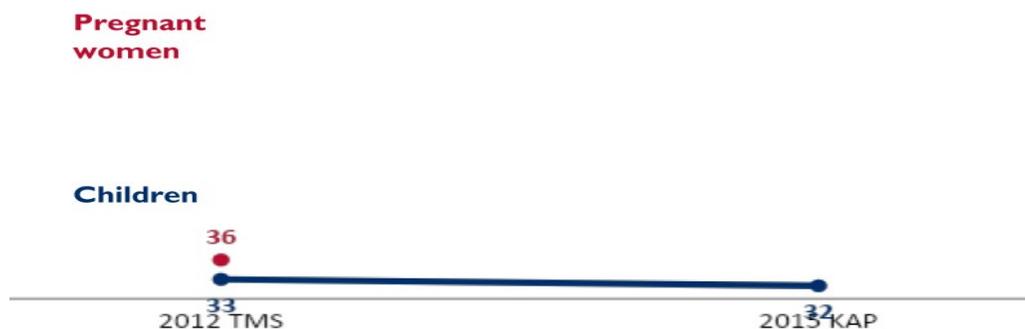
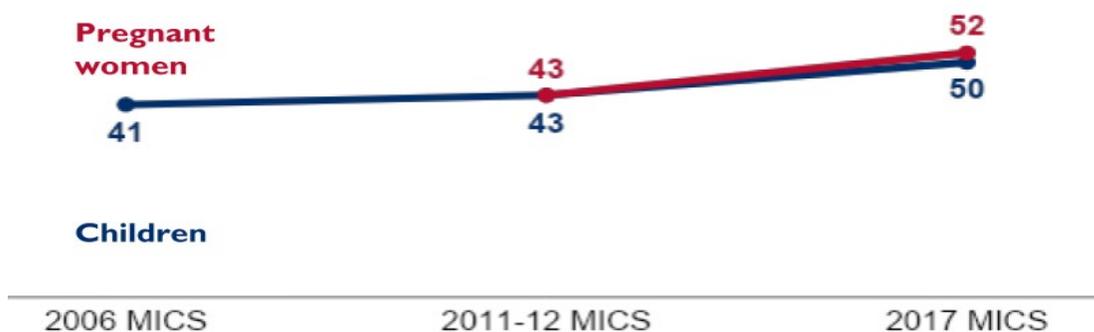


Figure A8. Lao PDR: Trends in ITN Use among Children and Pregnant Women, Percent of Children Under 5 Years of Age and Pregnant Women Age 15- 49 Who Slept Under and ITN the Night before the Survey



Conclusion

There is limited data available in Thailand and Lao PDR on ITN use by pregnant women and children under five. In Lao PDR, 52 percent and 50 percent of pregnant women and children under five reported using an ITN according to the 2017 MICS survey. The primary targets of ITN use in Lao PDR are MMPs as well as forest goers, for which limited survey data exists.

Key Question 5

What channels are used to distribute ITNs?

Supporting Data

Figure A9: Thailand: ITN Distribution Channels

Distribution Channel	2015	2016	2017	2018	2019	2020	2021
EPI							
ANC							
Schools							
Community*	x	x	x	x	x	x	x
Mass Campaign	x	x	x	x	x	x	x

*Targeting recent migrants and forest-goers

Figure A10. Laos PDR: ITN Distribution Channels

Distribution Channel	2015	2016	2017	2018	2019	2020	2021
EPI							
ANC							
Schools							
Community	x	x	x	x	x	x	x
Mass Campaign		x			x		

Conclusion

The primary channels for ITN distribution in Thailand and Lao PDR are targeted community-based distribution channels that reach MMPs, forest goers and in some areas in high transmission provinces in Lao PDR. PMI procures ITNs to fill gaps among the at-risk target populations in Thailand and Lao PDR, based on NMCP estimation of needs for MMPs and active foci of transmission.

Key Question 6

What was the estimated need for ITNs during calendar year? What are the estimated ITN needs over calendar years 2020 and 2021? What volume of ITNs are available from partners and the public sector for the next three calendar years?

Supporting Data

Please see Table 2 for ITN Commodity Gap Analysis Tables.

Conclusion

ITN needs for both Laos and Thailand were met for CY 2019. With FY 2020 funding, PMI will procure 50,000 ITNs for Thailand and 88,000 ITNs for Lao PDR to contribute to fill identified

commodity needs/gaps, reaching vulnerable at-risk populations including migrant and mobile populations.

Key Question 7

What is the current status of durability monitoring?

Supporting Data

N/A

Conclusion

Neither Thailand nor Laos have carried out durability monitoring and have no plans to do so in the future, as the expectation is that the need for ITNs will greatly diminish as both countries approach elimination.

Key Question 8

Are there any other considerations that impact your funding allocation in this category?

Supporting Data

No additional considerations at this time.

Conclusion

N/A

2. HUMAN HEALTH

2.A CASE MANAGEMENT in health facilities and communities

NMCP objective
<p>Thailand:</p> <ul style="list-style-type: none">• In order for Thailand to be malaria-free by 2024, the country has the following objectives related to case management:<ul style="list-style-type: none">○ Increase capacity and coverage of malaria case management at all levels, all sectors, and all population groups based on equity.○ Scale-up detection of asymptomatic and low-parasitemic patients through active case detection in malaria transmission areas and among populations at-risk, military bases, and refugee camps by using microscopy and molecular technique.○ Develop a system to rapidly eliminate drug resistant parasites.

Lao PDR:

Achieve universal coverage of case management to ensure 100 percent parasitological diagnosis of all suspected cases and prompt, efficacious treatment of all confirmed cases.

NMCP approach**Thailand:**

- Thailand has a long history of administering single dose primaquine as part of its treatment regimen for *P. falciparum*. The current treatment guidelines (2015) specify that a single dose (30mg) of primaquine is administered with an ACT for the treatment of uncomplicated *P. falciparum* malaria without the need for G6PD testing. Thailand uses a higher dose than is currently recommended by WHO as Thailand's policy predates the WHO recommendation of 15mg and countries with prior policies were encouraged to not lower their dose. Thailand recommends G6PD testing, where possible, prior to administration of radical treatment for *P. vivax* (0.25mg/kg for 14 days) although administration of primaquine without G6PD testing has been long practiced and still continues where testing is not available.
- The first line ACT for *P. falciparum* in Sisaket and Ubon Ratchathani provinces is pyronaridine-artesunate (PyraMax™) as of July 2019; in the rest of the country it remains Dihydroartemisinin-piperaquine (DHA-PIP). The change to PyraMax™ was prompted by decreased DHA-PIP efficacy (80 percent) in Sisaket.
- Directly observed treatment is recommended for all days of treatment for both *P. falciparum* and *P. vivax*.
- In non-transmission areas, diagnosis and treatment only occurs in hospitals (not in the community).
- In transmission areas, diagnosis and treatment occurs both in the community (RDTs and microscopy) and in hospitals (microscopy only). In perennial transmission areas (active foci) two rounds per year of pro-active case detection (PACD) are conducted. In periodic transmission areas (residual non-active foci), PACD is done once per year.

Lao PDR:

- In Lao PDR, per the national treatment guidelines (2016), low dose primaquine was introduced following WHO recommendations. A single dose of 0.25mg/kg of primaquine is given with AL for *P. falciparum* patients without the need for G6PD testing. For the radical treatment of *P. vivax* 14 days of primaquine is provided after testing for G6PD. This policy is being rolled out in phases first starting at the hospital level. For patients with *P. vivax* or *P. ovale* with an abnormal G6PD result, weekly primaquine is given for 8 weeks.

- A new testing algorithm in 2018 calls for testing of all febrile cases and high-risk populations, which, if implemented, will greatly increase malaria testing.
- There is a robust community health worker network with a recent expansion of village malaria workers (VMWs) to nearly 2000 villages.
- Approvals for two new second line drugs (ASMQ + PyraMax™) have been submitted.
- Lao PDR is expanding both its PPM network and its provision of malaria services in military hospitals and camps. As of 2018, there were 525 pharmacies and clinics included in the PPM network.
- Focal test and treat (FTAT) of high-risk populations has been piloted in high burden villages in 2019.
- Quality assurance (QA) of drugs is conducted in collaboration with the Food and Drug Department twice a year, and new QA guidelines are being developed in 2019.
- A slide bank was established in 2016 but is not yet complete. For external quality assessments, slides are sent to Lao PDR twice a year for reading; and for internal assessment, the districts and province send their slides to CMPE for parasite count validation and assessment.
- Providing malaria services to the mobile-migrant population (MMPs) has been a challenge as it is in other countries in the region.

PMI objective, in support of NMCP

In the region, PMI supports gap-filling for malaria case management commodities, iDES/TES to monitor drug efficacy, and quality microscopy. PMI does not support health facility or community level case management implementation.

PMI-supported recent progress (past ~12-18 months)

Thailand:

PMI supported iDES (see details below), drug policy reviews, and related meetings. PMI also supported the development of a dashboard, standard operating procedures, analytics, and presentations to improve iDES and routine use of generated data. The annual regional TES meeting was conducted in October 2019 in Burma.

Lao PDR

- PMI procured and delivered ten microscopes and 100,000 RDTs.
- PMI supported TESs (see details below), drug policy reviews, and related meetings. iDES was piloted in Luang Prabang because of difficulty reaching target sample sizes in the north.

PMI-supported planned activities (next ~12-18 months, supported by currently available funds)

- PMI will help fill gaps in RDTs (~60,000) for Laos and drugs for severe malaria (6,000 vials of artesunate) for Thailand.
- PMI will conduct TES/iDES in Vietnam, Thailand, and Lao PDR; provide technical assistance and monitoring visits by WHO to all five GMS countries; support drug policy review; and convene annual meetings.
- PMI will support microscopy training and accreditation (external competency assessments) in the region; maintenance of regional and national slide banks; and training of trainers for microscopy.

PMI Goal

PMI's overall goal of improving access to and utilization of timely, quality, and well-documented malaria testing and treatment by providing facility- and community-based health workers with training, supervision, and malaria commodities to be able to provide high quality, effective care, are supported by the programs in the region through domestic and Global Fund resources.

Do you propose expanding, contracting, or changing any Case Management activities? If so, why and what data did you use to arrive at that conclusion?

No changes are proposed.

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

Key Question 1

What is the status of care-seeking?

Supporting Data

Figure A11. Trends in Care-Seeking for Fever in Thailand

Among children under 5 with fever in the 2 weeks before the survey for whom advice or treatment was sought

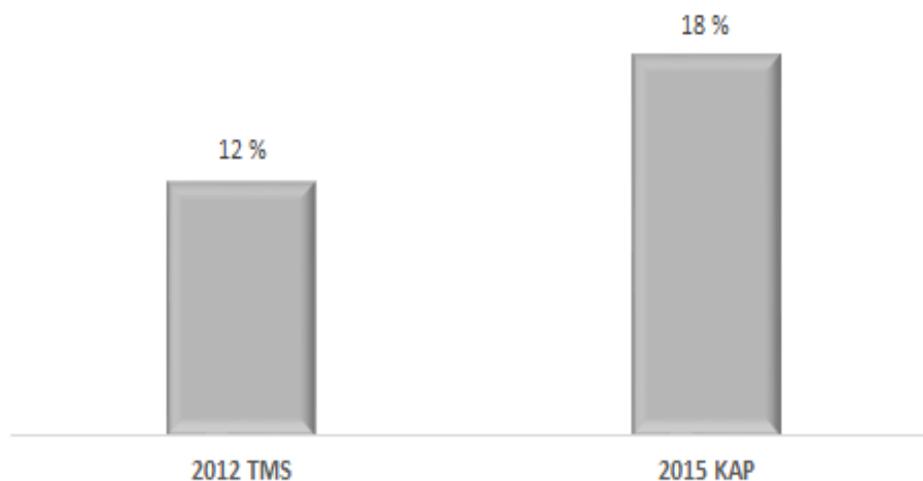
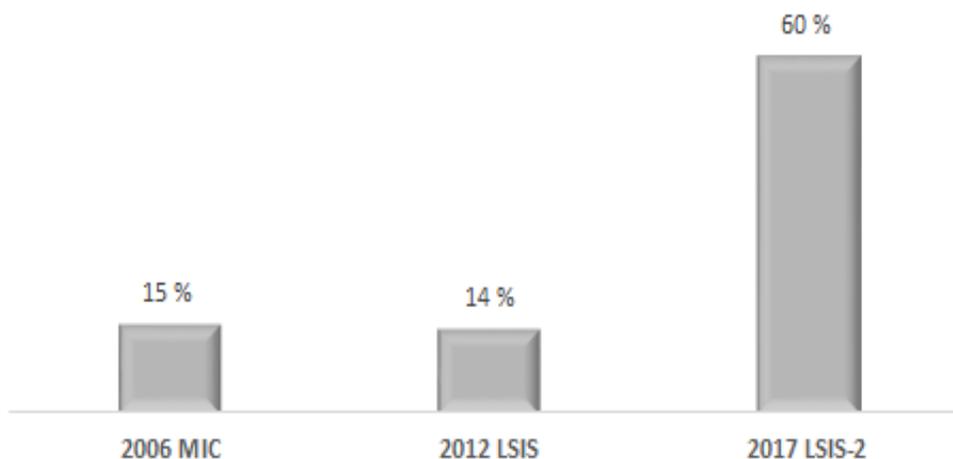


Figure A12. Trends in Care-Seeking for fever in Lao PDR

Among children under 5 with fever in the 2 weeks before the survey for whom advice or treatment was sought



Conclusion

Thailand:

According to 2012 and 2015 surveys, 12 percent and 18 percent of children under five years of age, respectively, sought medical attention for fever. While health-seeking behavior improved in 2015 from

the 2012 baseline, more current data is not available. Of the 5,819 confirmed cases of malaria between October 2018 and September 2019, 72 percent were over the age of 15 years¹.

Lao PDR:

According to 2006, 2012, and 2017 surveys, 15 percent, 14 percent and 60 percent of children under five years of age, respectively, sought medical attention for fever. Health-seeking behavior improved dramatically in this age group in 2017. Of those with fever, 4 percent received an ACT in 2017. The majority of malaria cases in Lao PDR occur in males between the ages of 15 and 45 years, with this demographic accounting for 86 percent of cases in 2014 and 73 percent of the cases January to April in 2019².

Key Question 2

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

Supporting Data

Figure A13. Key Barriers and Facilitators to Care Seeking in the GMS

Facilitator	Type of Factor	Data Source	Evidence
Increased access to malaria services	Environmental	2017-2016 Thailand Malaria Elimination Strategy	Active case detection through mobile malaria clinic (MMC) in malaria transmission areas.
Barrier	Type of Factor	Data Source	Evidence
Misconception on cause of malaria	Internal	Thailand Mobile Migrant Population study, 2017	The 2017 Thailand Mobile Migrant Population (MMP) study demonstrated that 27% of MMP had never heard of malaria and 47% had low knowledge of malaria.
Low comprehensive knowledge on signs of severe malaria	Internal	Thailand Mobile Migrant Population study, 2017	The 2017 Thailand Mobile Migrant Population (MMP) study demonstrated that 60% of participants did not know one sign or symptom of severe malaria and 47% had low knowledge of malaria.
Foreign migrant workers at risk for malaria	External	Pongvongsa et. al., 2019 ³	A large majority (89%) of foreign workers in Lao PDR reported not seeking healthcare services from public health centers.

¹ Update on Malaria Elimination in Thailand, Division of Vector Borne Diseases, Department of Disease Control, Ministry of Public Health, Thailand, Oct. 15, 2019.

² Lao PDR 2019 Malaria Program Review Epidemiology and Surveillance Brief.

³ Pongvongsa T, Nonaka D, Iwagami M, et al. Malaria among foreign migrant workers in Savannakhet Province, Lao People's Democratic Republic. *Trop Med Health.* 2019;47:10.

Conclusion

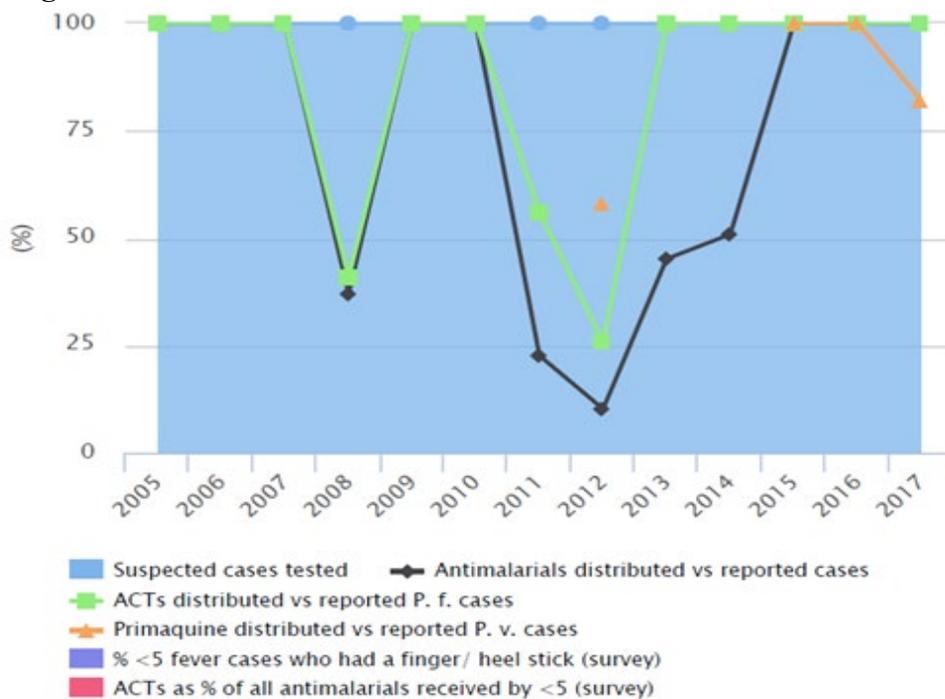
Barriers around low malaria knowledge will increasingly become an issue as malaria transmission decreases. Further research is needed on specific barriers to treatment for more mobile populations, including MMP literacy and language barriers, access to health insurance, and criminalization of border-crossing populations. PMI will provide limited technical support to SBC efforts aimed at targeting remaining foci and tailoring interventions to at risk populations that are often harder to reach, e.g., MMPs and ethnic minority groups.

Key Question 3

How have malaria testing and treatment practices evolved over time?

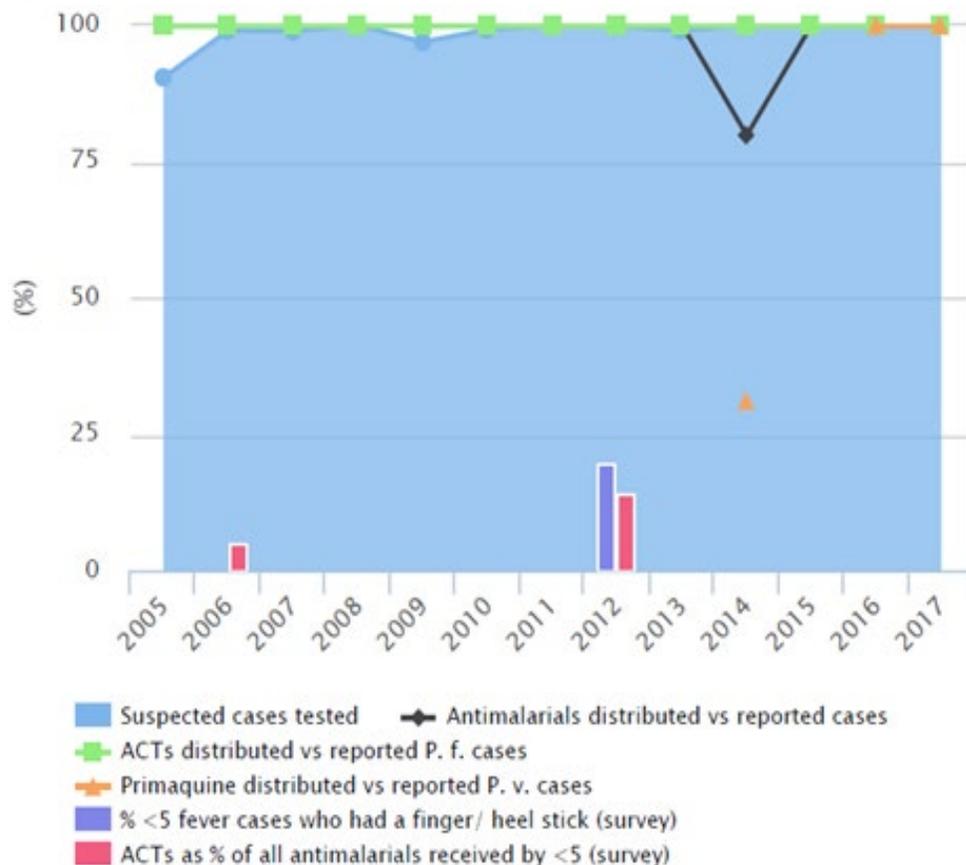
Supporting Data

Figure A14. Thailand Cases Tested and Treated in the Public Sector



Source: WHO World Malaria Report, 2018

Figure A15. Lao PDR Cases and Tested and Treated in the Public Sector



Source: DHIS (est.) 2012, MICS (est.) 2006, 2012; WHO World Malaria Report 2018

Conclusion

Currently, 100 percent of suspected cases are tested and 100 percent of confirmed cases are treated in both Thailand and Lao PDR .

Key Question 4

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

Supporting Data

Data not available.

Conclusion

N/A

Key Question 5

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

Supporting Data

With the focus on elimination objectives, Thailand's support for vertical malaria services through malaria posts and village malaria workers (VMWs) is phasing out and malaria control efforts are becoming integrated into the general health system, and specifically delivered through the Health Promotion Hospitals. This decentralization is increasing the roles of relevant ministries and local authorities through district health boards. The DVBD plans to expand the role of CHWs and CSOs to implement this strategy at the local level.

The Lao PDR National Malaria Program has made significant progress in reducing the burden caused by malaria through a combination of a strong vertical program and the strengthening of village health workers (both generalist village health volunteers (VHVs) and specialized VMWs. VHVs and VMWs have been and will continue to be instrumental in ITN distribution and in early diagnosis and treatment.

Conclusion

PMI does not support health facility and community level case management implementation. CHW, VMW, and VHVs are supported by the NMCPs with Global Fund support in both Thailand and Lao PDR.

Key Question 6

What was the estimated need for RDTs during calendar year? What are the estimated RDT needs over calendar years 2020 and 2021?

Supporting Data

Please see the Excel spreadsheet for Commodity Gap Analysis Tables.

Conclusion

PMI will procure approximately 60,000 RDTs with FY 2020 funding for both Thailand and Lao PDR in anticipation for any delays in transitioning to the next Global Fund grant.

Key Question 7

What was the estimated need for ACTs during calendar year 2019? What is the estimated need for ACTs over calendar years 2020 and 2021?

Supporting Data

Please see Table 2 for Commodity Gap Analysis Tables.

Conclusion

PMI will not procure ACTs for either Thailand or Lao PDR with FY 2020 funding as the national need is anticipated to be covered by the Global Fund and government supplies and large surpluses are currently projected.

Key Question 8

What was the estimated need for severe malaria treatment and any other treatments as applicable during calendar year 2019? What is the estimated need for calendar years 2020 and 2021?

Supporting Data

Please see Table 2 for Commodity Gap Analysis Tables.

Conclusion

With FY 2020 funding PMI will procure 6,000 injectable artesunate vials to meet the national need of Thailand.

PMI will not procure primaquine or chloroquine for either Laos or Thailand with FY 2020 funding as the national need will be covered by the Global Fund and government supplies and large surpluses are currently projected.

Key Question 9

Are the first-line ACTs effective and monitored regularly?

Supporting Data

Figure A16. Recently Completed and Ongoing Antimalarial Therapeutic Efficacy Studies

Year	Sites	Treatment arms	PCR-corrected ACPR>90%?	Where molecular resistance work was completed or the plan, if any, for molecular resistance work
Thailand iDES				
Oct'17 - Sept 2018	Pf and Pv cases in 8 pilot provinces	DHA-PIP (Pf) CQ (Pv)	Srisaket: 81.8% Ubon Ratch: 90% Others: 98-100% Srisaket: 82.8% Others: 95-100%	DBS unfit for PCR; results are not PCR-corrected PCR and molecular genotyping done at DVBD-MOPH, Thailand
Oct'18 - Aug 2019	Pf and Pv cases nationwide	DHA-PIP	Analysis on-going	PCR and molecular assays on-going at DVBD-MOPH, Thailand
Lao PDR				
2017	1. Salavanh 2. Champassak	AL DHA-PIP	83% PCR-corrected 65% PCR-corrected	IPC: All Day 0 DBS were tested for K13, pfmdr copy # and Plasmepsin2

Year	Sites	Treatment arms	PCR-corrected ACPR>90%?	Where molecular resistance work was completed or the plan, if any, for molecular resistance work
2018	1. Salavanh 2. Champassak	AS-PYR ASMQ	100% 100%	IPC: All Day0 DBS were tested for K13, pfmdr copy # and Plasmepsin2
2019	1. Salavanh 2. Savanakhet 3. Champassak	AL AL AL	On-going	Molecular assays to be done in IPC

Footnotes:

AL – artemether + lumefantrine; AS-PYR – artesunate + pyronaridine (PyraMax™); ASMQ – artesunate + mefloquine; CQ – chloroquine; DBS - dried blood spot; DP – Dihydroartemisinin + piperaquine; DVBD - Division of Vector Borne Disease Ministry of Public Health ; K13 – Kelch 13; IPC – Institute Pasteur Cambodia; MOPH – Ministry of Public Health; Pf - *Plasmodium falciparum*; pfmdr – *Plasmodium falciparum* multi-drug resistance transporter gene; PCR – polymerase chain reaction; Pv - *Plasmodium vivax*

Conclusion

As of 2018, ASMQ and AS-PYR remain efficacious in Lao PDR for the treatment of *P. falciparum* and *P. vivax* infection. In 2017, resistance to AL was present and is being reassessed in 2019. In Thailand in 2018 TES indicated some resistance to DHA-PIP, however, PCR from the DBS was unsuccessful therefore the results were not PCR corrected. Studies are ongoing to assess DHA-PIP in Thailand.

Key Question 10

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

Supporting Data

As malaria control efforts become decentralized and the general health services structure or local health facilities are expected to take on more responsibility for malaria activities, the technical expertise across the full range of malaria management in the vertical programs is expected to weaken. Skilled microscopists are essential and a lack of this critical expertise will jeopardize elimination efforts.

Conclusion

PMI will support microscopy training and accreditation in the region and maintenance of regional and national slide banks and training of trainers for microscopy.

Key Question 11

Are there any other considerations that impact your funding allocation in this category?

Supporting Data

N/A

Conclusion

Joint planning of PMI and Global Fund resources helps meet the overall case management needs within the public sector of Thailand and Lao PDR.

2.B. DRUG-BASED PREVENTION

NMCP objective
<ul style="list-style-type: none">Given the very low overall prevalence of malaria, IPTp is not recommended and has not been implemented in GMS countries. Instead, Thailand and Lao PDR provide ITNs to households in high risk areas and ensure prompt diagnosis and treatment of malaria cases during pregnancy.The GMS countries do not implement SMC.
NMCP approach
Thailand: <ul style="list-style-type: none">The NMCP strategy supports distribution of ITNs to households in malaria risk areas.Pregnant women with suspected malaria are referred to the district hospitals for malaria diagnosis and treatment. First-line treatment for <i>P. falciparum</i> is quinine in the first trimester and artesunate-mefloquine (ASMQ) in the second and third trimesters. <i>P. vivax</i> is treated with chloroquine in all trimesters. There is no policy to prevent vivax relapses during pregnancy. Laos PDR: <ul style="list-style-type: none">The NSP supports procurement of small batches of ITNs for continuous distribution via health centers primarily for pregnant women and MMPs, for replacement of damaged ITNs, and for new residents in high-risk areas.Malaria treatment guidelines advise the use of oral quinine in the first trimester of pregnancy but this is rarely found in hospital outpatients or ANCs nor is clindamycin widely available. Artemether-lumefantrine is first-line for management of malaria in the second and third trimesters for both <i>vivax</i> and <i>falciparum</i> malaria. Similar to most countries in the Mekong, there is no policy or strategy to prevent vivax relapses during pregnancy.
PMI objective, in support of NMCP
For Thailand and Lao PDR, PMI supports a two-pronged approach to prevent malaria infection among pregnant women including provision of ITNs and early effective case management of malaria and anemia. In previous years, PMI has supported SBC activities to encourage people at risk to use ITNs rather than conventional bed nets.

PMI-supported recent progress (past ~12-18 months)
<p>Thailand:</p> <p>Previously, PMI supported procurement of distribution of a small number of ITNs to pregnant women at antenatal clinics at Health Promoting Hospitals along with the provision of health education on malaria prevention and risk in pregnancy. Health Promoting Hospital staff also screened pregnant women with fever or signs and symptoms of malaria using RDTs.</p> <p>Laos PDR:</p> <p>PMI supported the procurement and distribution of 174,000 for the national mass ITN distribution campaign in 2019 to households including pregnant women in targeted areas.</p>
PMI-supported planned activities (next ~12-18 months, supported by currently available funds)
<p>Thailand:</p> <p>With the integration of malaria services with the health promotion hospitals (where ANC is provided) in Thailand, there are opportunities to ensure that targeted SBC for MIP is provided through interpersonal communications approaches. PMI will continue to provide technical assistance to the BVBD to ensure that SBC activities are linguistically and culturally appropriate (particularly in cross-border areas) and that SBC approaches for MIP are included in health worker trainings for prevention and case management. PMI's support for MIP in Thailand will focus primarily on support to fill gaps in needed commodities, including ITNs and RDTs. (see ITN and Case Management sections).</p> <p>Lao PDR:</p> <p>Similarly, in Lao PDR, PMI will strive to fill any commodity gaps around ITNs and RDTs needed for case management. As Lao PDR introduces DHIS-2 to all areas, their plans will build upon a piloted maternal and neonatal child health (MNCH) module. PMI will continue to engage in surveillance strengthening at the national level and coordinate, where feasible, to ensure cooperation and cross capacity building between the malaria and MNCH departments.</p>

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

PMI Goal
Support the national strategy for MIP, which includes provision of ITNs at first antenatal care (ANC) visit, and effective case management of malaria, in accordance with WHO recommendations

Do you propose expanding, contracting, or changing any MIP activities? If so, why and what data did you use to arrive at that conclusion?

No changes in MIP activities are proposed. Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

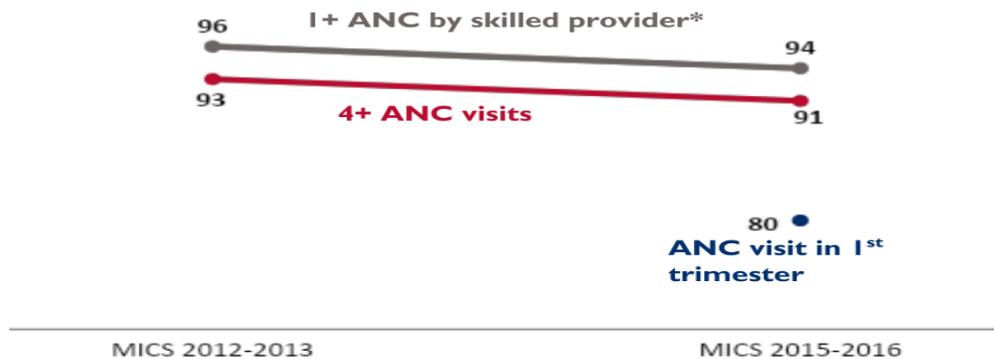
Key Question 1

What proportion of pregnant women are receiving ANC early and frequently during their pregnancy?

Supporting Data

Figure A17. Thailand: Trends in ANC Coverage

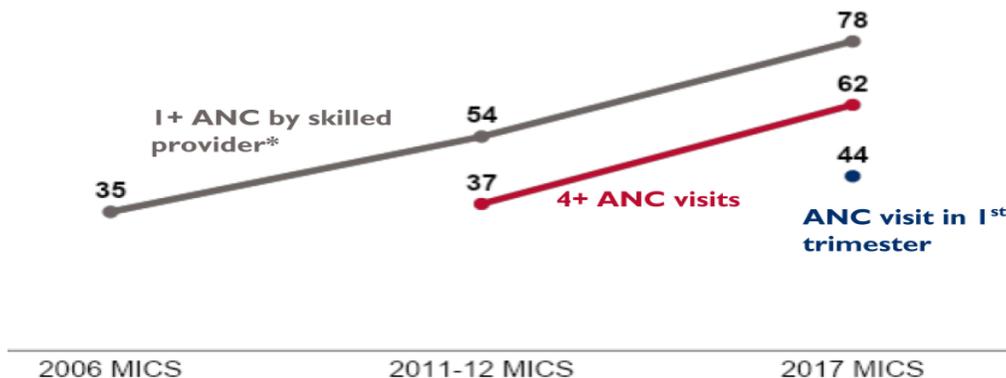
Percent of women age 15-49 with a live birth in the 5 years before the survey for most recent birth



*Skilled provider includes doctor, nurse, midwife or physician assistant

Figure A18. Lao PDR: Trends in ANC Coverage

Percent of women age 15-49 with a live birth in the 5 years before the survey for most recent birth



*Skilled provider includes medical doctor, nurse/midwife, or auxiliary nurse.

Figure A19. Key Barriers and Facilitators to ANC Attendance

Facilitator	Type of Factor	Data Source	Evidence
No data available			
Barrier	Type of Factor	Data Source	Evidence
Access to care	Environmental	Rapid Assessment of Malaria in Pregnancy in the Greater Mekong Sub-Region	Access to care for remote populations remains the greatest challenge in all countries of the GMS region. The risk of malaria infection in pregnancy is highest in areas that are least accessible in all ways to services for prevention diagnosis and case management.
Cost of services	Environmental	Same as above (ibid)	In Thailand, services are available free to Thai and M1s (registered migrants in the country for more than six months), but M2s (unregistered, new or illegal migrants) are charged for services.
Attitudes and cultural beliefs around ANC care	Internal, Social	Sychareun et al. (2016) BMC Pregnancy and Childbirth. 16:245.	In Laos, factors that discourage ANC attendance and giving birth at clinics include: the perceived necessity of giving birth on a “hot bed”; the need for “mother-roasting” after giving birth; the belief that preparing for a birth was a bad omen for the birth; the belief that colostrum is unhealthy for the newborn child; and the preference for cutting the umbilical cord with a piece of sharpened bamboo.

Conclusion

Antenatal care (ANC) attendance is generally high in all GMS countries; however, there are identified environmental barriers related to accessibility and cost of services, particularly among vulnerable populations, including migrant and mobile populations and vulnerable populations residing in geographically remote, isolated areas.

Thailand:

ANC attendance is very high in Thailand (94 percent) and most pregnant women complete the recommended four visits (91 percent). Thailand follows the focused antenatal care guidance including promoting four ANC visits during pregnancy. The MOH is aware of the updated 2016 WHO ANC guidance and considering how to incorporate the new recommendations for Thailand.

Lao PDR:

In Lao PDR, 78 percent of pregnant women complete at least one ANC visit, with 62 percent completing the recommended four visits. The MOH has adopted the 2016 WHO ANC guidance including the recommended eight ANC visits during pregnancy.

Key Question 2

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

Supporting Data

N/A

Conclusion

N/A

Key Question 3

What is the gap between ANC attendance and IPTp uptake? What barriers and facilitators exist, especially among providers?

Supporting Data

N/A

Conclusion

N/A

Key Question 4

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

Supporting Data

Thailand:

The 2012 Thailand Malaria Survey reported an overall PCR malaria prevalence of 0.1 percent and none of the positives were pregnant women.

Lao PDR:

In 2014, only 12 percent (5,893/50,663) of cases were in females greater than five years of age in Laos.⁴ Research conducted by the *Institut de Recherche pour le Développement* showed that malaria prevalence was <1 percent by RDT, but by PCR, 12 percent of adults (positivity among adults was 6 percent for women and 20 percent for men), 0 percent of children, and 6 percent of pregnant women were positive.⁵ Another research study in southern Laos noted that women make up a considerable proportion of the workforce where 31.7 percent of the migrants were women and 75.7 percent of migrants were accompanied by family members including pregnant women and children.

⁴ National Strategic Plan for Malaria Control and Elimination 2016--2020. Health Department of Communicable Diseases Control Centre of Malariology, Parasitology and Entomology. January 2016.

⁵ Rapid assessment of malaria in pregnancy in Lao PDR. Malaria Consortium. October 2015.

Conclusion

There is no available routinely reported data on the number of malaria cases among pregnant women. PMI will consider how to support the NMCPs in Thailand and Lao PDR with capturing this information as part of the routine reporting system.

Key Question 5

What was the estimated need for IPTp commodities during calendar year 2019? What is the estimated need for IPTp commodities over calendar years 2020 and 2021?

Supporting Data

N/A

Conclusion

N/A

Key Question 6

Are there any other considerations that impact your funding allocation in this category?

Supporting Data

No other considerations are noted.

Conclusion

N/A

3. CROSS-CUTTING AND OTHER HEALTH SYSTEMS

3.A. SUPPLY CHAIN

NMCP objective
<p>Thailand:</p> <p>To support Thailand's goal of malaria elimination by 2024, DVBD aims to develop a malaria surveillance system and other relevant databases to reflect the malaria situation in each area. To this extent, they have proposed to develop a logistic and supply chain management system for drugs, insecticides, and other non-drug supplies.</p>
<p>Lao PDR:</p> <p>In order to support Lao PDR's goal of malaria elimination by 2030, CMPE has set as an objective to establish effective program management and coordination at all levels of the health system to efficiently deliver a combination of targeted interventions for malaria burden reduction and elimination. Their aim is to manage procurement and supply for drugs and commodities to ensure continuous supply for all interventions.</p>

NMCP approach

Thailand

- In Thailand, the NMCP delivers commodities to facilities, particularly to the public sector malaria clinics and posts. Although Global Fund support has strengthened DVBD, Provincial Health Offices, and District Health Offices to ensure that commodities are monitored and distributed to provinces and districts, there is no stock status information being reported from health facilities for DVBD to efficiently respond and adapt to malaria incidence or outbreak.
- DVBD has requested Offices of Disease and Prevention Control to identify HUB hospitals that could carry a minimum stock of key malaria commodities to be able to supply health facilities within the vicinity when in need. Shifting to this model would mean that smaller health facilities in regions of low transmission would no longer need to continually carry stock (that ends up expiring unused) yet there would be an efficient system in place to ensure they can access antimalarial drugs swiftly from the HUB upon request.
- Though the principle of “first expired-first out” is applied, nearly expired drugs and nearly expired RDTs are found at malaria posts in border areas. The above system of using HUB hospitals should lead to less expired commodities.

Lao PDR:

- In Lao PDR, health infrastructure and supply chain systems are relatively weak. Generally, the Procurement Unit of the Global Fund Principal Recipient procures most of the malaria commodities, according to a forecast provided by CMPE. The pharmaceuticals are stored with the Medical Products Supply Center (MPSC) within the Ministry of Health. Once these are delivered to a warehouse in the capital, the medications and other supplies are then distributed to the provinces per CMPE’s recommendations. The provinces subsequently supply the districts that supply the health centers that then ultimately provide commodities to the village health workers. This is often delayed due to geographical difficulties, limited logistical support and budget execution.
- There have been reported stock outs of RDTs and ACTs at all levels due to limited capacity in stock management practices including stock monitoring and data utilization.
- MPSC has been working with Clinton Health Access Initiative (CHAI) to pilot and scale up mSupply, a logistics and commodities management tool, in the central warehouse and selected regional warehouses. The mSupply is being piloted for integration into DHIS2 as part of the Global Fund health systems strengthening component which supports establishing an electronic logistics management information system (eLMIS).

PMI objective, in support of NMCP

PMI is providing support to strengthen pharmaceutical management and supply chain systems in the region through the procurement of supplies and strengthening the in-country systems that manage them. Activities have been organized around improving system performance and visibility to ensure that malaria products are available when and where they are needed, strengthening in-country supply systems and enhancing the capacity for effective management of malaria commodity supply chain. PMI has supported strengthening national counterparts' abilities to provide supply chain forecasting and monitoring data through technical assistance.

PMI-supported recent progress (past ~12-18 months)

Thailand:

- In FY 2018, PMI conducted a rapid supply chain assessment at the sub-national level to document the current status and function of the procurement and supply management system as it relates to malaria and identify areas for further improvement. Findings identified a fragmented national pharmaceutical supply chain system and a separate malaria supply chain system mainly set up to serve the Global Fund's requirements. The supply chain assessment identified issues with over-stocks, shortages, and expiring stocks of ACTs at selected sites, and a lack of attention on strengthening the pharmaceutical and supply chain management systems for the national elimination strategy.
- PMI provided technical assistance in forecasting and supply planning to DVBD to formalize its quantification methodology and develop a 2019–2020 supply plan for malaria commodities in Thailand.
- PMI helped to identify data limitations (e.g., inventory, distribution, expiry) to be addressed through a logistics and management information system.
- PMI supported an assessment of provincial-level hospitals to analyze current practices in high malaria burden areas, challenges, and readiness for absorbing malaria supply management within the general health system.
- PMI supported a review of the current logistics management information system (LMIS) landscape in Thailand which will inform the subsequent development of a comprehensive LMIS roadmap.

Lao PDR:

- PMI supported efforts to improve data use for forecasting of commodities and to identify and address bottlenecks in data and logistics management at the provincial and district levels.
- PMI supported improvements to the LMIS to strengthen reporting of stocks of malaria commodities. CMPE now receives monthly summary reports from Provincial Anti-Malaria Stations containing aggregated consumption data from all districts, hospitals, health centers

and village health/malaria workers in the province. They also receive stock-on-hand data from Provincial Anti-Malaria Stations using the Open Data Kit platform.

PMI-supported planned activities (next ~12-18 months, supported by currently available funds)

Thailand:

- PMI will provide technical assistance addressing supply chain challenges of ensuring availability while limiting expiry of RDTs and antimalarials in areas that have eliminated malaria.
- PMI will support plans to document the allocation, distribution, monitoring, and data reporting throughout the entire processes from national to village level.
- Through the leveraging of other malaria information system work PMI will support implementation of key recommendations put forward in the supply chain assessment for improving the LMIS in Thailand for end-to-end visibility of malaria supply chain data which is a key priority for the Government of Thailand.

Lao PDR:

- In coordination with UNOPS, CHAI and other partners, PMI will provide technical assistance to the quantification team to review the forecasting methodologies and existing tools, and to identify data needs and capacity gaps for forecasting and quantification for malaria commodities (taking into account epidemiology and seasonality factors).
- The results of the review will inform the quantification team on what and how to address the gaps to ensure continuous availability of needed commodities.

PMI Goal

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

Do you propose expanding, contracting, or changing any supply chain activities? If so, why and what data did you use to arrive at that conclusion?

PMI support for supply chain activities will continue to focus on providing technical assistance at the national level with an increased focus on developing or expanding eLMIS in Thailand and Lao PDR, respectively.

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

Key Question 1

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

Supporting Data [HQ except Mekong Region]

N/A

Conclusion

With rapidly decreasing number of cases, the NMCPs in the region are shifting their procurement strategy away from morbidity-based forecasting to ensure a minimum number of stock-on-hand at all service points. The information needed to determine if the higher levels (central and sub-central) of the supply chains in Thailand and Laos, are stocked according to plan, is typically generated in isolation, and is not comprehensively aggregated for regular review at a program management level.

Furthermore, for both Thailand and Laos, the criteria for determining what is an adequate stock to maintain at higher supply chain levels is shifting away from being based on consumption to instead focus on facility level availability.

Thailand:

The supply chain for malaria commodities in Thailand is very decentralized with hospitals managing their own procurement, and subsequently their own logistics management information, while the BVBD (though temporarily holding malaria commodities at the central level) has no criteria developed for defining what is an appropriate amount of stock to maintain at the highest level of the supply chain.

Lao PDR:

It is unknown if there are planned minimum and maximum stock levels of ACTs and RDTs and their stock status at the central level.

Key Question 2

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

Supporting Data

Data for determining trends in facility-level stock out rates in Thailand is not routinely made available to the central level program personnel or other stakeholders.

In Laos, what is reported to the central level is a unique indicator of “when both RDTs and AL 6x4 are out of stock for at least one day in the last six months.” According to the national program, between July and December 2018, stock outs were reported in 15 percent of facilities and between January and June 2019, stock outs occurred in 12 percent of facilities.

Conclusion

Countries such as Laos and Thailand, in which malaria transmission is very low, must somehow be able to maintain a minimal stock of products at each level of the healthcare system where malaria cases are expected to be managed, so that, if a case presents for care, it can be appropriately treated. In a successful elimination program, it may be understood that in an attempt to be able to provide case management when a case appears, that some small amount of stock may never be used. Determining and maintaining the appropriate quantity of different malaria commodities to keep on hand at the service delivery sites selected to provide malaria case management services in a low transmission setting requires that routine logistics reporting of all service delivery point-managed commodities needs to be maintained so that routine resupply can be well informed through regular reporting. That key PMI data points such as LMIS reporting rates and central/facility level stockout rates cannot currently be produced for either Laos or Thailand reflects either the outright lack of a mechanism to produce key logistics data or, where a system exists that produced logistics data at lower levels, a current inability to access or assess this data at a central level. PMI supports efforts geared towards improving the availability of key logistics data at a central level in partnership with other donors.

The need for more timely routine logistics data to inform resupply and to report out on supply chain performance demand signals indicating an irregular increase in consumption, needing to be responded to outside the routine resupply cycle, will be assessed in the context of scaling up real-time data collection during foci investigations.

Key Question 3

What is the difference between quantities for ACTs consumed and malaria cases, and RDTs consumed and numbers tested? What is driving any differences seen?

Supporting Data

N/A.

Conclusion

The small allocations for RDTs and ACTs for Thailand and Lao PDR are intended to fill unanticipated gaps, particularly for situations where Global Fund or country procurements are delayed, to respond to outbreaks or upsurges in cases, or to reach mobile and migrant populations. As facility consumption data for RDTs and ACTs is not routinely made available to the central level comparisons between logistics and service data cannot be routinely made.

Key Question 4

What are the trends in LMIS reporting rates?

Supporting Data

Thailand:

Thailand lacks a formal and functioning LMIS and inventory control system for malaria commodities. Only stock on hand at the BVBD's central warehouse is available. Thus, once a commodity is delivered from this warehouse there is no traceability.

Lao PDR:

In Lao PDR, there is no single LMIS system. Currently, the country collects supply chain management data from four different sources. Stock facility level status is reported to the central level every six months. Reporting rates are as follows:

- July-December 2018: 92 percent
- January-June 2019: 86 percent

Conclusion

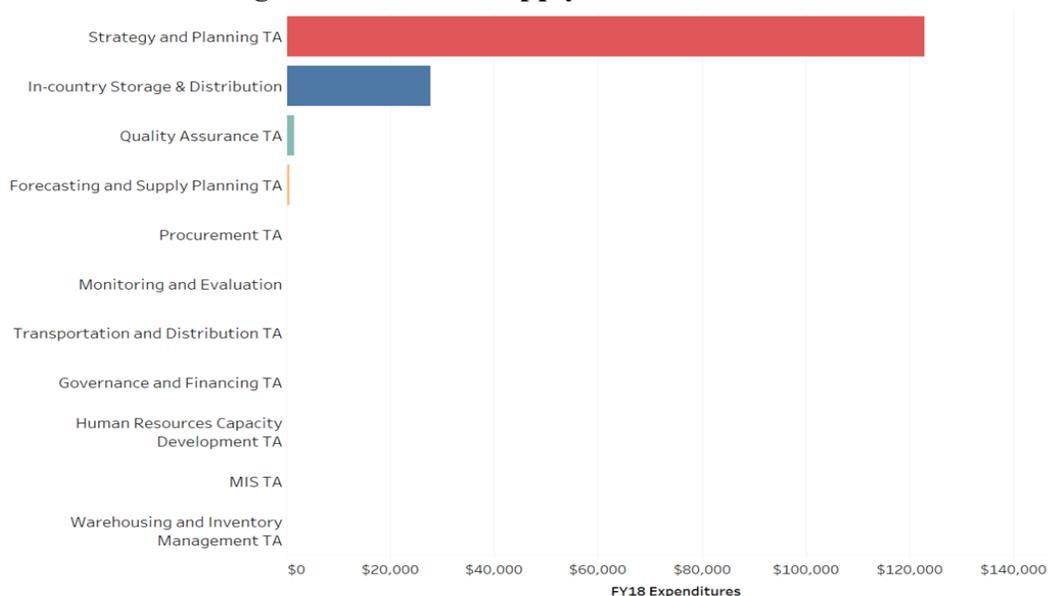
PMI will continue to support limited, targeted activities to strengthen the LMIS systems in Thailand and Laos and in close coordination with NMCPs and Global Fund investments in this area so as to ensure there is no duplication.

Key Question 5

What are the main supply chain functions supported by PMI? For areas that are not as strong is there additional investment that PMI should make? In areas performing well, is it dependent on PMI/donor funding (e.g., PMI and Global Fund pay for warehousing and distribution) and so should be maintained?

Supporting Data

Figure A20. FY 18 Supply Chain Investments



Conclusion

As malaria cases continue to decrease and malaria becomes increasingly focal, the NMCP will need technical assistance to develop improve the availability of logistics data at a coordinating and management level to ensure continuous availability of commodities while limiting expiry of unused products. PMI will continue to focus on providing technical assistance to ensure that malaria information system data can be reviewed alongside the LMIS data while continuing to strengthen the quality of the LMIS data reporting.

Thailand:

In FY 2019, PMI supported conducting an LMIS landscape analysis and stakeholder workshop to develop a roadmap for configuring a new LMIS to assist the MOPH to adaptively manage the malaria epidemic and evolving commodity needs. The LMIS Landscape Analysis identified the need for a mobile app to collect malaria stock information in the short-term and the need for this app to integrate with the MOPH HL7 interoperability layer in the long-term. Based on the landscape analysis, the roadmap reviewed six LMIS software options against the business requirements identified during the LMIS workshop, hardware required to implement and overall costs, and provided recommendations on the solution to adopt given country-related criteria.

Lao PDR:

In FY 2020, PMI will provide some discrete assistance to the country's LMIS endeavors by supporting CMPE address data quality through building the capacity of health care workers' in stock management and logistics data reporting.

Key Question 6

Are there any other considerations that impact your funding allocation in this category?

Supporting Data

No other considerations are noted. .

Conclusion

There are no other considerations at this time pending continued Global Fund support in the region post RAI2E.

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

NMCP objective
<p>Thailand</p> <p>To support the goal of malaria elimination by 2024, Thailand aims to develop a single, responsive malaria elimination surveillance system capable of supporting the certification process while ensuring interoperability with the broader general health system.</p>
<p>Lao PDR</p> <p>The objective is to transform malaria surveillance into a core intervention which emphasizes response, with the aim of eliminating malaria from the country by 2030.</p>
NMCP approach
<p>Thailand</p> <ul style="list-style-type: none">• As a vertical program, malaria surveillance is overseen by DVBD through a network of Malaria Clinics and Malaria Posts, which are spread throughout the malaria-endemic areas of the country. In malaria-free provinces, the Provincial Health Offices report malaria cases to the Department of Epidemiology’s integrated surveillance system.• The NMCP’s approach includes the following:<ul style="list-style-type: none">○ To develop capacity of Surveillance and Rapid Response Teams at all levels and enable them to implement malaria elimination activities○ To conduct annual village-level stratification with four categories as follows: Perennial transmission area (A1) with cases reported in 6 or more months, Periodic transmission area (A2) with cases reported in less than 6 months, Non-transmission – high risk area (B1) with no malaria cases for more than 3 years but vectors present, and Non-transmission – low risk area (B2) with no malaria cases for more than 3 years without vectors.

- To set up a comprehensive and prompt system of reporting, malaria case investigation, and rapid response using the 1-3-7 approach
- To review all reports of malaria deaths

Lao PDR

- Recognizing the heterogeneity of malaria transmission in the country, two surveillance and response guidelines have been developed – surveillance and response in burden reduction areas (Southern Provinces) and surveillance and response in elimination areas (Northern Provinces).
- In burden reduction areas, due to many cases, case reporting is based upon aggregated numbers that are reported monthly in the DHIS2 system; response is taken at population level.
- Due to very low numbers of confirmed cases in the elimination areas, it is possible to respond to individual cases.
- The BMGF has been supporting the development of an Emergency Operating Center for Public Health which sits in Department of Communicable Disease Control, Ministry of Health
- CMPE is trying to include malaria in the National Notifiable Disease Surveillance list.

PMI objective, in support of NMCP

Thailand

PMI supports DVBD's goal for malaria elimination and will focus our support on technical assistance to the national program in the following areas:

- ensuring the collection and use of quality, standardized routine data that feeds into a comprehensive national surveillance system, particularly linking the data flow between the vertical and general health systems;
- supporting DVBD in expanding the various modules of the malaria information system, including capacity for routine case follow-up and monitoring treatment outcomes, foci investigations, and supply chain management; and
- supporting DVBD to document and disseminate lessons learned to the wider malaria community.

Lao PDR

PMI supports surveillance strengthening nationally, but has been primarily focused on individual case reporting and response (1-3-7) in Viengchan Province.

PMI-supported recent progress (past ~12-18 months)

Thailand

- With DVBD, conducted a cost-benefit analysis that showed that every Thai baht invested in malaria elimination yields a return of up to 15 Thai baht, providing evidence to advocate for domestic investment in the National Elimination Strategy.
- PMI worked closely with the national malaria program to improve case notification in the malaria information system, strengthening integration in Thailand's complex and fragmented health information landscape.
- Conducted an assessment to understand malaria information system user profiles and their experiences and challenges with the current system. Key findings included that users were reporting malaria cases via several information systems, including the malaria information system, the fragmented data landscape did not promote nimble use, users have limited bandwidth and research skills to assess quality of and use data, and lack of clarity on how provincial health offices and health promotion hospitals will report malaria data as the malaria vertical program is phased out and malaria services become fully integrated into the general health system. These assessment findings will be presented to stakeholders during Q1-Q2 of FY 2020 for discussion on prioritization of activities.
- PMI supported the development of standard operating procedures, a dashboard, analytics, and presentations to improve iDES system and routine use of data, so the national program can act when first-line drugs show possible signs of failure.
- PMI has been supporting the dissemination of lessons from DVBD's elimination experience through scientific presentations at international conferences (six in 2018 and three in 2019).

Lao PDR

- PMI mapped existing malaria tools for data collection, monitoring, and supervision, and identified which tools require further technical assistance to adapt to Vientiane Province .
- PMI co-hosted a malaria elimination workshop for Vientiane's Province's subnational officers to review the 1-3-7 strategy.
- With CMPE, PMI conducted a joint field assessment and monitoring mission to assess data collection and analysis practices to improve implementation of the 1-3-7 strategy.

PMI-supported planned activities (next ~12-18 months, supported by currently available funds)

Thailand

- PMI will provide technical assistance to improve SM&E, data quality, use of strategic information, and evaluation of malaria elimination models and interventions in Thailand with a focus on analysis and dissemination of information products. For example, as it is crucial

for DVBD to verify that all malaria cases are accurately and comprehensively captured in their database as part of the WHO malaria elimination certification process, PMI will aim to strengthen the currently rudimentary link for case data from various sources (e.g. private hospitals, migrant border camps, etc.) and support DVBD to assess the quality of routine HMIS data to confirm complete and reliable data integration so the MIS is a comprehensive source for malaria case information.

- PMI will support DVBD to standardize Thailand's malaria-free verification process for the provinces.
- PMI will continue to support DVBD as they pilot and roll-out a new mHealth platform (REVEAL) to conduct foci investigations. PMI will conduct a year-end assessment and may also provide epidemiological oversight on IT integration needs and identifying where to link REVEAL data with the Malaria Information System. The Malaria Information System in the long-term will be integrated into a broader Division of Epidemiology's information system.
- PMI will support the on-going data collection, analysis and dissemination of findings from the iDES activities to inform guidelines for first-line treatment.

Lao PDR

- PMI will provide technical assistance to improve SM&E, data quality, use of strategic information, and evaluation of malaria elimination models and interventions in Lao PDR. For example, at the national level, PMI will be supporting the regular review of DHIS2 data to assess data quality (timeliness, completeness, and availability of expected reporting on malaria case notification, identification, and response) and data use. PMI will work with CMPE to develop a protocol outlining how to conduct priority data quality checks, which data to share with subnational levels, and how to address data challenges. At the subnational level with district-level data management challenges, PMI will support CMPE's technical leadership to supervise Provincial and District level staff on data reporting, analysis, and use through mentoring and conducting quarterly data quality site visits.
- Based on results from the monitoring and supervision visits, PMI will also support if needed the refinement of the Malaria Case Investigation and Response Form, supervision tools, and the DHIS2 monthly summary form.

PMI Goal

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

Do you propose expanding, contracting, or changing any SM&E activities? If so, why and what data did you use to arrive at that conclusion?

No significant changes in amount or scope of SM&E activities for Thailand and Lao PDR.

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

Key Question 1

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

Supporting Data

Figure A21. Data Sources and Collection Activities in Thailand, 2015 - 2023

Data Source	Data Collection Activities	Year									
		2015	2016	2017	2018	2019	2020	2021	2022	2023	
Household Surveys	KAP Survey	X*									
Other Surveys	Mobile, Migrant Population Survey			X*							
Malaria Surveillance and Routine System Support	Support to Parallel Malaria Surveillance System	X	X	X	X	X	(X)	(X)	(X)	(X)	
	integrated Drug Efficacy Surveillance (iDES)			X	X	X	(X)	(X)	(X)	(X)	
	Other					(X)	(X)	(X)	(X)	(X)	

*Asterisk denotes non-PMI funded activities; x denotes completed activities and (x) denotes planned activities.

Figure A22. Data Sources and Collection Activities in Lao PDR, 2015 - 2023

Data Source	Data Collection Activities	Year									
		2015	2016	2017	2018	2019	2020	2021	2022	2023	
Household Surveys	Lao Social Indicator Survey (LSIS)			X*							
Malaria Surveillance and Routine System Support	Support to malaria surveillance system strengthening	X	X	X	X	X	(X)	(X)	(X)	(X)	
	integrated Drug Efficacy Surveillance (iDES)						(X)	(X)	(X)	(X)	

*Asterisk denotes non-PMI funded activities; x denotes completed activities and (x) denotes planned activities.

Conclusion

Because of increasing heterogeneity in malaria transmission, in both Thailand and Lao PDR are shifting away from using large-scale surveys and toward using routine surveillance systems and foci investigations to assess coverage of malaria interventions and the epidemiological and entomological situations.

Key Question 2

What surveillance system activities have been supported in your country? What current priorities will be supported with this MOP funding?

Supporting Data

Figure A23. Intervention Activities Supported in Thailand

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

Intervention	PMI-Funded? (X)			Does Global Fund plan to fund this? (X)	Does another donor plan to fund this? (X)
	FY 18	FY 19	FY 20		
Desk review to catch “logic errors system” (provide TA to catch logic errors)					
Admin 1 Level (Province). PMI supports activities in 0 regions while Global Fund supports activities in 12 regions.					
Registers (warehousing, printing, distribution)					
Data quality assessments (separate from supervision – funding for travel to lower levels)				x	
Program monitoring and technical assistance (funding for travel to lower levels)				x	
Training (funding for Admin 2 staff to conduct training at lower levels, capacity building (i.e. on the job training for Admin 2 level staff)					
Human Resources (secondment of person for malaria SM&E, office/team for SM&E)					
Data Use (analysis, interpretation, visualization (dashboards, bulletins), dissemination/feedback to lower levels, decision-making)					
Adaptation of national policy guidelines and coordination (adapting policies, guidelines, supporting sub-committee meetings, supporting participation in sub-committee meetings)					
Adaptation of checklists and job-aides					
Participation in national meetings (support for travel costs)				x	
Support to Annual Operational Plans for Admin 1 Malaria Program					
Admin 2 Level (District)					
Data entry, summary, and transmission (training, re-training, computers, internet, tools)					
Supervision (training, traveling, supervision tools/checklists, create/design system for organized/methodical supervision)					
Data validation (data validation activities before monthly data submission - organize health facilities)					

Intervention	PMI-Funded? (X)			Does Global Fund plan to fund this? (X)	Does another donor plan to fund this? (X)
	FY 18	FY 19	FY 20		
Monthly/Quarterly data quality review meetings (venue, meeting support)					
Data Use (analysis, interpretation, visualization (i.e. dashboards), dissemination/feedback to facilities, decision-making)					
Human Resources (secondment of person for malaria SM&E, office/team for SM&E)					
Annual planning with Admin 1 (support travel)					
Facility Level					
Data collection/entry, summary, and transmission (training, re-training, computers, internet, tools)					
Supervision of CHWs (training, traveling, administering supervision tools/checklists of community health workers)					
Data use (analysis, interpretation, visualization (dashboards), dissemination/feedback to CHWs, decision-making)					
Monthly/Quarterly data quality review meetings(support for travel)					
Community Level					
Data collection/entry and transmission (training, re-training, tools)					
Data use (analysis, interpretation, decision-making)					
Monthly/quarterly data quality review meetings (support for travel)					

Figure A24. Intervention Activities Supported in Lao PDR

Intervention	PMI-Funded? (X)			Does Global Fund plan to fund this? (X)	Does another donor plan to fund this? (X)
	FY 18	FY 19	FY 20		
Central Level					
Register, tools (e.g. checklists, indicator glossary), job aids (design, indicators, definition of data elements, data dictionary, system support)		x			

Intervention	PMI-Funded? (X)			Does Global Fund plan to fund this? (X)	Does another donor plan to fund this? (X)
	FY 18	FY 19	FY 20		
Data quality assessments (separate from supervision – funding for travel to lower levels)	x				
Program monitoring and technical assistance (funding for travel to lower levels)		x	x		x
Training (funding for central level to conduct training at lower levels, capacity building, i.e. on the job training for central level staff)		x			
Human Resources (secondment of person in NMCP for SM&E, office/team for SM&E)					
Data Use (analysis, interpretation, visualization (dashboards, bulletins, dissemination/feedback to lower levels, decision-making)		x	x		
Policy guidelines and coordination (updating policies, guidelines, supporting sub-committee meetings, supporting participation in sub-committee meetings)					
External relations/Communications/Outreach (support travel to international meetings and publications)			x		
Support to annual operational plans for national malaria program				x	x
Desk review to catch “logic errors system” (provide TA to catch logic errors)					
Admin 1 Level (Province). PMI supports activities in 1 region while Global Fund supports activities in 13 regions.					
Registers (warehousing, printing, distribution)					
Data quality assessments (separate from supervision – funding for travel to lower levels)					
Program monitoring and technical assistance (funding for travel to lower levels)					x
Training (funding for Admin 2 staff to conduct training at lower levels, capacity building (i.e. on the job training for Admin 2 level staff)				x	
Human Resources (secondment of person for malaria SM&E, office/team for SM&E)					x

Intervention	PMI-Funded? (X)			Does Global Fund plan to fund this? (X)	Does another donor plan to fund this? (X)
	FY 18	FY 19	FY 20		
Data Use (analysis, interpretation, visualization (dashboards, bulletins), dissemination/feedback to lower levels, decision-making)		x	x		x
Adaptation of national policy guidelines and coordination (adapting policies, guidelines, supporting sub-committee meetings, supporting participation in sub-committee meetings)				x	
Adaptation of checklists and job-aides		x			
Participation in national meetings (support for travel costs)					
Support to Annual Operational Plans for Admin 1 Malaria Program					
Admin 2 Level (District)					
Data entry, summary, and transmission (training, re-training, computers, internet, tools)					
Supervision (training, traveling, supervision tools/checklists, create/design system for organized/methodical supervision)				x	
Data validation (data validation activities before monthly data submission - organize health facilities)					
Monthly/Quarterly data quality review meetings (venue, meeting support)					
Data Use (analysis, interpretation, visualization (i.e. dashboards), dissemination/feedback to facilities, decision-making)					
Human Resources (secondment of person for malaria SM&E, office/team for SM&E)					
Annual planning with Admin 1 (support travel)					
Facility Level					
Data collection/entry, summary, and transmission (training, re-training, computers, internet, tools)					
Supervision of CHWs (training, traveling, administering supervision tools/checklists of community health workers)					

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

Conclusion

PMI continues to provide technical support to the malaria information system to ensure case-based surveillance, investigation, and response activities based on the 1-3-7 strategy in Thailand and in Vientiane Province, Lao PDR. In both countries, significant support is provided through domestic resources and their respective country components of the regional Global Fund grant. As malaria burden continues to decline, the programs will need to ensure capacity at the lowest levels to detect and respond to malaria cases and outbreaks and navigate the integration of the malaria information system into the broader general health system and Emergency Operation Center frameworks.

Key Question 3

What are the outcomes of surveillance system strengthening efforts?

Supporting Data

Figure A25. Surveillance System Strengthening Efforts in Thailand

		FY2017	FY2018	FY2019
Timeliness	% of reports received on time ¹	24.4%	59.6%	77.2%
Completeness	"Confirmed malaria cases for children under 5 years of age" was reported in % of facility-months ²	100%	100%	100%

Footnotes:

1. Defined as proportion of case notification occurring within 24 hours
2. Defined as proportion of all cases that were reported, in line with MIS definition

Note: Accuracy Data not available.

Figure A26. 1-3-7 Implementation in Thailand, 2016 -2019

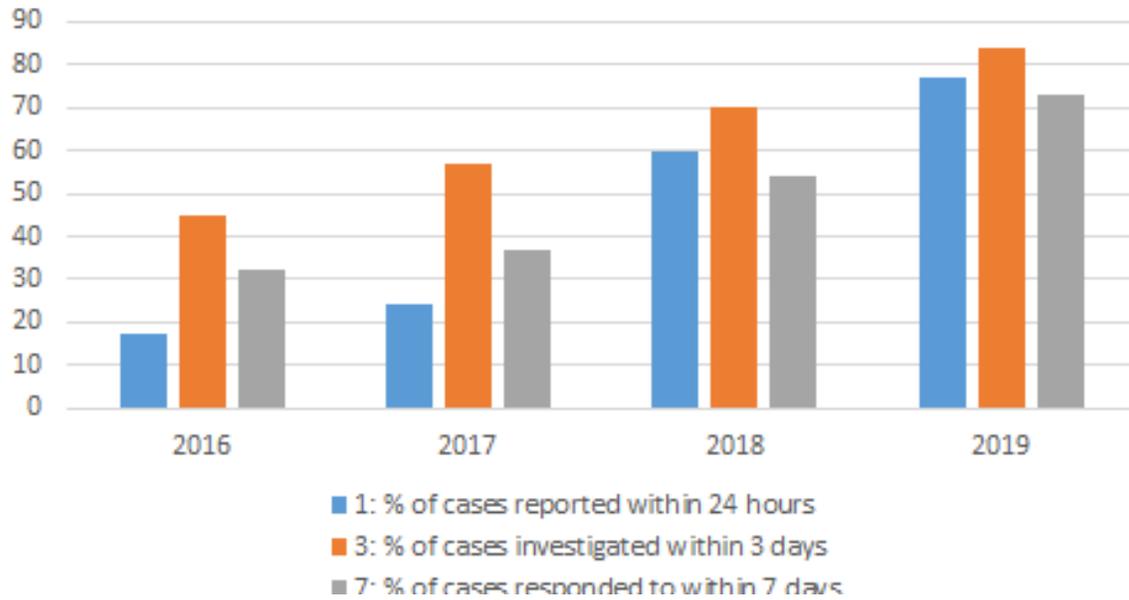


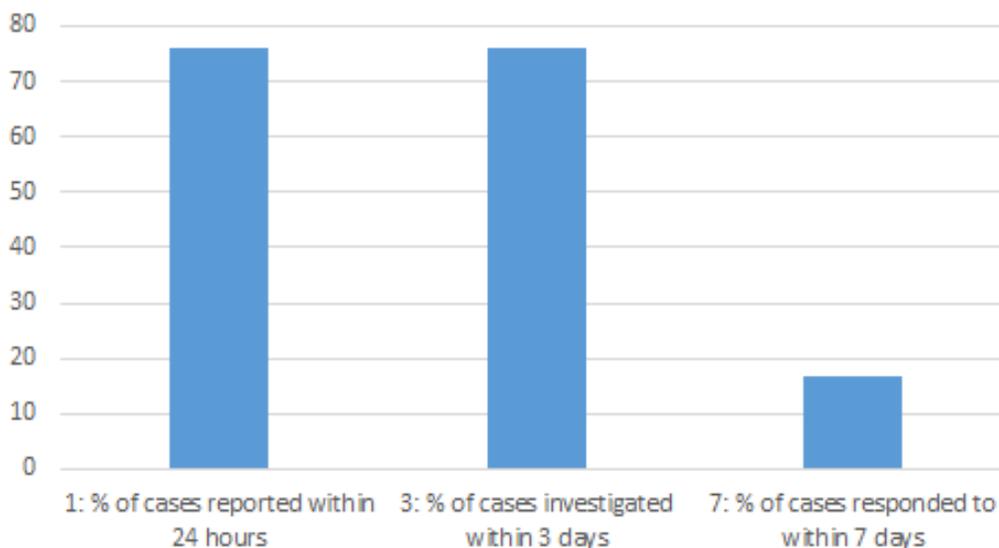
Figure A27. Surveillance System Strengthening Efforts in Lao PDR*

		2017	2018
Timeliness	% of reports received on time	n/a	87%
Completeness	"Confirmed malaria cases for children under 5 years of age" was reported in X% of facility-months	n/a	n/a

Note: Accuracy data not available.

*1-3-7 activities have just been started in northern Lao PDR with just 54 cases assessed to date.

Figure A28. 1-3-7- Implementation in Lao PDR, 2019



Conclusion

Thailand has been scaling up their 1-3-7 strategy nationally with significant improvements noted in timeliness of case notification within 24 hours. Although data reporting has high rates of completeness, the quality of the data needs to be ensured, especially as malaria services transition from being provided and reported by vertical malaria clinics/posts to integrated health promotion hospitals providing broader services. In the meantime, data accuracy is assessed by comparing the case notification form to the case investigation form data. Lao PDR is just initiating their case-based surveillance activities and the routine information system still reports monthly, aggregate data from provinces with higher malaria burden.

Key Question 4

Are there any other considerations that impact your funding allocation in this category?

Supporting Data

N/A- Pending clarifications about support through the next iteration of Global Fund's RAI2E grant, there are no additional considerations for Thailand and Lao PDR at this time.

3.C. SOCIAL AND BEHAVIORAL CHANGE (SBC)

NMCP Objective

- Thailand's national malaria elimination strategy (2017-2026) includes a strategy to promote/empower communities to prevent and control malaria themselves. To this end, the national strategy calls on communities and individuals to participate in malaria control activities.

- The Lao NSP (2016-2020) supports a comprehensive SBC strategy and includes a strategic objective calling for the implementation of a comprehensive SBC approach to ensure that 90 percent of people seek treatment within 24 hours at an appropriate health facility or with a qualified care provider and at least 90 percent of the population residing in burden reduction areas utilize an appropriate protection tool.

NMCP Approach

Thailand:

- Thailand’s Global Fund grants aimed to provide comprehensive SBC, community mobilization, and access to health services for both Thai people and migrants residing in malaria transmission zones in the 44 provinces in Thailand that border with neighboring countries. BVBD developed a framework for SBC for the Thai population that encourages acceptance of IRS, prompt treatment-seeking behaviors for forest-goers and pregnant women, drug adherence, use of ITNs, and use of insecticide-treated hammock nets when staying outdoors. The SBC component targeting displaced Burmese along the Thai-Burma border and other migrant populations in Thailand along border provinces is implemented by non-governmental organizations (NGOs).
- Thailand attracts migrant workers from neighboring countries, particularly from Burma and Cambodia. Approximately half of the malaria cases in Thailand are among migrant workers from neighboring countries. The majority of these workers are laborers in farms, fruit orchards, and plantations. Their employers are important gatekeepers for their movement and access to services. Access to prevention and treatment services has been improved through ITN distribution and community-based services provided by malaria posts along border areas.

Lao PDR:

- The Lao NSP (2016-2020) ensures at-risk populations gain access to and utilize interventions to prevent and/or treat malaria by increasing the populations’ understanding of malaria through targeted messaging and appropriate media, including specific SBC for malaria during pregnancy. To this end, CMPE works with the national Center of Information and Education for Health and key stakeholders to develop the national communication and advocacy plan in line with the NSP, and informed by any community surveys. There is a Technical Working Group for SBCC, which involves key stakeholders, such the Ministry of Forest and Agriculture, the Ministry of Education, Ministry of Labor, Ministry of Defense, Ministry of Information and Culture, Lao Women’s Union, and relevant youth organizations. The technical working group is sensitized to the annual SBC Operational Plan.
- The NSP targets both static and mobile populations for malaria SBC activities. Static populations are defined as people who live in at-risk villages (mainly ethnic minorities) and who live in formal settlements in large-scale development, construction projects, plantations

or army camps. MMPs are defined as any Lao or foreign worker or their family members who migrate or reside for less than six months (mobile people) or between six to 12 months (migrant people) for economic or labor-related reasons within Lao PDR or across borders in neighboring countries. They are a high-risk group for malaria infection due to their heightened exposure in remote or forest-areas, and lack of access to quality public health services among other reasons.

- Under the Global Fund RAI2E, CSOs and local NGOs will assist CMPE with implementing the SBC strategy in Lao PDR. Their activities include annual campaign planning meetings concerning messaging content and means of transmission and ensuring the successful development of SBC messages for malaria control and elimination targeting relevant at-risk populations. Mass communication campaigns for malaria include posters, pamphlets, radio adverts, signs, billboards, and social event involvement. Community mobilization to improve awareness about malaria risk, prevention, diagnosis and treatment are conducted through meetings for community engagement and World Malaria Day annually. CMPE and partners conduct site visits for supervision and monitoring of SBC activities at provincial and district levels.
- CMPE will conduct a KAP survey in 2020 with Global Fund RAI2E support to evaluate community knowledge and behaviors related to malaria.

PMI Objective in Support of NMCP

- In Thailand, PMI has supported the BVBD to increase the availability of multilingual SBC materials appropriate for transnational migrants from other GMS countries to increase health-seeking behaviors and treatment compliance. PMI has also taken advantage of regional cross-border presence by bringing personnel and SBC staff from Burma and Cambodia to assist in training of migrant malaria volunteers in border provinces.
- In Lao PDR, PMI has emphasized the integration of targeted SBC messaging as part of mass campaigns for ITN distribution. Brochures in Lao language were provided with each ITN to reinforce appropriate care and use of ITNs.

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

With the accelerated priority focus on elimination efforts and sufficient support for SBC provided through the Global Fund malaria grants in Thailand and Lao PDR, PMI has not been asked to address specific needs or gaps for SBC. Instead, to the extent possible, PMI staff continued to provide technical support and facilitate communication strategies and use of appropriate SBC approaches among migrant and at-risk populations in Thailand and Lao PDR. The following activities were supported in previous fiscal years:

Thailand:

- PMI-supported regional project staff and malaria volunteers conducted outreach and assisted Thai malaria workers with translation for migrants during case investigations and reinforced messages through interpersonal communications and provided ITNs to those who may not have them. The target audience for these outreach activities were households and communities living in malaria risk villages as well as migrant workers in those areas. Support was also provided for training of health staff and facilitators for bilingual case management. Targeted behavior change focused on prevention and use of ITNs, and seeking appropriate treatment through village volunteers or health workers. PMI trained a network of 67 migrant and bilingual volunteers (Burmese and Khmer) to provide malaria interpersonal communications and health information. The project end-line survey indicated that knowledge and awareness improved among all target groups, including an increase of ITN use among migrant workers from 12 percent to 44 percent over the project period.
- PMI has provided technical assistance for SBC, which included support for translating SBC materials into the appropriate languages of the targeted populations. PMI also supported technical assistance for integrating malaria case management services, including for pregnant women, into routine health services in Thailand. Health promotion hospitals are now providing malaria testing and treatment services. These health promotion hospitals also provide antenatal care and MIP-specific SBC is integrated at this level.

Lao PDR:

- In Lao PDR, MIP-specific SBC activities included ensuring that interpersonal communications and mass campaign activities conducted by the NMCP targeted women of reproductive age.

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

No specific funding is planned for support of SBC activities; however, PMI/RDMA staff continue to stay engaged at the national level and provide technical assistance and support to the Thai and Lao PDR NMCPs with their SBC efforts.

PMI Goal

Through the use of social and behavior change interventions and in alignment with a country's national malaria control communication strategy, PMI supports the uptake and correct and consistent use of malaria interventions, thereby improving the overall quality of malaria control efforts that will contribute to reductions in malaria morbidity and mortality.

Do you propose expanding, contracting, or changing any SBC activities? If so, why and what data did you use to arrive at that conclusion?

No changes in SBC activities are expected for FY 2020.

Key Question 1

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

Supporting Data

PMI will advise the NMCPs in Thailand and Lao PDR and their SBC partners to prioritize focusing on early treatment seeking for all age groups in support of elimination efforts. See below prioritized behaviors table.

Conclusion

Figure A29. PMI-Prioritized Behaviors for SBC Programming

Behavior	Target Population	Geographic Focus	Justification
Prompt care and treatment seeking for febrile illness	Migrant and at-risk populations	Thailand	According to the 2012 TMS and 2015 KAP surveys, 12% and 18% of children under five years of age, respectively, sought medical attention for fever.
Prompt care and treatment seeking for febrile illness	Migrant and at-risk populations	Lao PDR	According to the 2006 MIC, 2012 LSIS, and 2017 LSIS-2 surveys, 15 percent, 14 percent and 60 percent of children under five years of age, respectively, sought medical attention for fever.

Key Question 2

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

Supporting Data

Figure A30. Summary of Determinants and Gaps for FY 2020 Prioritized Behaviors

Behavior	Key Facilitators	Key Barriers	Knowledge Gaps
Seeking timely care and treatment for febrile illness	Specialized malaria service providers and volunteers in the remaining foci areas	Misconception on cause of malaria, low comprehensive knowledge on signs of severe malaria, foreign migrant workers at risk for malaria	Care-seeking decisions among migrant and mobile populations

Conclusion

Further information is needed to understand decisions guiding timely care-seeking for febrile illnesses among at-risk populations, including forest goers and mobile and migrant populations. To the extent possible, PMI staff will provide technical support to NMCPs to facilitate further investigations, as well as the use of appropriate SBC approaches for reaching migrant and mobile populations in Thailand and at-risk populations in Lao PDR.

Key Question 3

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

Supporting Data

SBC activities and capacity at national and sub-national levels in Thailand and Lao PDR are supported through the current Global Fund RAI2E grant.

Conclusion

N/A

Key Question 4

Are there any other considerations that impact your funding allocation in this category?

Supporting Data

No further considerations are noted.

Conclusion

N/A

3.D. PROGRAM EVALUATION AND OPERATIONAL RESEARCH

NMCP objective
<p>Thailand:</p> <p>To support the vision of a malaria free Thailand by 2024, DVBD aims to conduct research to develop technology, innovation, guidelines, and models on malaria elimination for using as guidelines for each geographical area.</p>
<p>Lao PDR:</p> <p>The Lao National Strategic Plan for Malaria Control and Elimination 2016–2020 aims to eliminate malaria by 2030 and includes a strategic intervention area to strengthen operational research (OR) to guide strategic decisions.</p>

NMCP approach
<p>Thailand:</p> <p>The National Malaria Elimination Strategy, 2017-2026, identified several research priorities related to malaria elimination (e.g., detection of asymptomatic cases, use of primaquine and drug toxicity, prevention of outdoor transmission, drug safety and drug resistance, development of information technology (IT) system, application of IT on drug resistance, insecticide resistance, etc.). BVBD identified research topics around reactive case detection, highly sensitive RDT, and long lasting insecticide jacket nets as short-term research priorities.</p> <p>Lao PDR:</p> <p>NMCP approach includes an annual review of available and relevant national and regional research findings convened by CMPE and WHO. Their current prioritized topics include utility of mass drug administration within elimination-targeted provinces, potential opportunities for more sensitive diagnostics, and strategies for improving radical cure for <i>P. vivax</i> and gametocytocidal treatment for <i>P. falciparum</i>.</p>
PMI objective, in support of NMCP
<ul style="list-style-type: none"> • PMI keeps abreast of the evolving country and regional OR priorities, OR results from studies in the region, and development of promising highly sensitive point of care diagnostics or outdoor transmission measures to plan accordingly. • PMI participates in the Global Fund’s RAI2E OR Committee to guide their OR investment decisions for the region.
PMI-supported recent progress (past ~12-18 months)
There were no PMI-supported OR activities in Thailand or Lao PDR during the last 12-18 months.
PMI-supported planned activities (next ~12-18 months, supported by currently available funds)
No OR will be undertaken over the next 12-18 months.

PMI Goal
<p>PMI will conduct OR/program evaluation (PE) that helps: to evaluate coverage of population at-risk, quality of intervention(s), and efficiency in intervention delivery, or study reducing remaining malaria transmission and disease burden, test effectiveness of new or evolved priority interventions and strategies, or explore new metrics and mechanisms to assess the impact of interventions.</p> <p>Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.</p>

Do you propose expanding, contracting, or changing any program evaluation and operational research activities? If so, why and what data did you use to arrive at that conclusion?

No changes are proposed in the FY 2020 MOP. Key OR questions for Thailand and Lao PDR are currently supported through RAI2E and Gates funding.

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

Key Question 1

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

Supporting Data

Although there are overarching questions about how to reach high risk populations and tackle outdoor transmission to eliminate the remaining foci in the region, several current research projects are addressing these issues.

Figure A31. PE/OR Currently Conducted in Country with USG, GF, Multilaterals or Other Major Donors.

Source of Funding	Implementing institution	Research Question/Topic	Current status/timeline
ICEMR	University of South Florida/ MAHIDOL	To improve understanding of how mobile human populations, parasite drug resistance, and mosquito biology contribute to continuous malaria transmission at international borders	Ongoing
BMGF	UCSF	Assessing the effectiveness of targeted active case detection among high-risk populations in Southern Lao PDR	Ongoing
DFID	PATH/UCSF	Perceptions of G6PD deficiency & Use of G6PD quantitative test (usability, use for radical cure)	Ongoing
GF-RSC	Macfarlane Burnet Institute for Medical Research and Public Health	Producing a community-delivered malaria elimination model that is acceptable, operational, pragmatic, effective and cost-effective across GMS countries. The research will comprise two stages: Stage 1 – Stakeholder consultation and model adaptation Stage 2 – Evaluation of the adapted model.	Ongoing
GF-RSC	UCSF	Targeting high-risk populations with enhanced reactive case detection or reactive focal mass drug administration: A study to assess the effectiveness and feasibility for Plasmodium falciparum and P. vivax malaria in Thailand and Southern Lao PDR	Not yet recruiting

Conclusion

No OR studies are proposed for FY 2020 funding.

Key Question 2

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

Supporting Data

Highly-sensitive combo RDTs, G6PD qualitative and quantitative tests, tafenoquine, spatial repellents and ivermectin are either newly or soon to be available interventions that can be evaluated in the region in the future.

Conclusion

There are no other areas for further considerations at this time.

Key Question 3

Are there any other considerations that impact your funding allocation in this category?

Supporting Data

N/A

Conclusion

There are no other in-country considerations at this time.

3.E. OTHER HEALTH SYSTEMS STRENGTHENING

NMCP objective
<p>Thailand:</p> <p>To address human resource challenges as malaria continues to decline, one of the strategies of the Thailand National Malaria Elimination Plan is to promote and empower communities as part of the effort for decentralization. Integration of malaria services with the general health system is considered a priority for the malaria program.</p> <p>Lao PDR:</p> <p>The Lao PDR Government's malaria mission is to collaborate with all related line ministries and departments as well as key implementing partners to empower the health staff at all levels and communities to wage a rigorous battle against malaria until its elimination from the country.</p>

NMCP approach

Thailand:

Among other strategic initiatives, DVBD proposes the following:

- Development of staff capacity on malaria diagnosis in the following areas:
 - Develop/revise training curriculum on malaria diagnosis
 - Develop staff capacity in malaria microscopy
 - Conduct refresher training for microscopists and develop their capacity/proficiency to reach international standards
 - Develop staff capacity in using malaria RDTs
 - Develop staff capacity in testing of G6PD deficiency
- Formulation of a policy for Malaria Elimination as a national agenda and set mechanisms for collaborative implementation

Lao PDR:

The Lao Government has committed to strengthening the health system through focusing on five priorities of the Health Sector Reform Framework. These are

1. strengthening human resource capacity,
2. improving health sector financing,
3. improving the governance, organization and management of the health system,
4. improving health service delivery and hospital management and
5. improving the overall monitoring and evaluation framework and the Health Information System.

Among other strategic initiatives, CMPE proposes the following:

- The Centre for Malariology, Parasitology and Entomology (CMPE) proposes to arrange external quality control evaluations for all microscopists at CMPE and Provincial and District Malaria Control Stations to measure the staff skill level and identify microscopists who need additional training support.
- CMPE will establish a national malaria slide bank and maintain slides for reference and training.

PMI objective, in support of NMCP Infrastructure

- In the GMS, PMI supports a broad array of health system strengthening activities, which cut across intervention areas, such as training of health workers on microscopy, supply chain

management, and health information systems strengthening, and NMCP capacity building through regional and in-country trainings.

- Support national malaria control and elimination program capacity strengthening to adapt, adopt, and implement WHO global norms and standards for malaria control and elimination.

PMI-supported recent progress (past ~12-18 months)

- Implement external quality assessment (EQA) program for national malaria laboratories (Lao PDR, Vietnam, Cambodia, Myanmar). The EQA program assesses the proficiency of laboratories and employ corrective actions, if necessary. EQA includes two rounds of panel testing (composed of 15 blood slides for each round) and a visit to least performing laboratories.
- Curriculum review and course preparation for the sub-national M&E training for Lao PDR has been completed.

PMI-supported planned activities (next ~12-18 months, supported by currently available funds)

- Continue to implement the EQA program for national malaria laboratories.
- Support ECA of malaria microscopists in Thailand and Lao PDR in Q4 2019.
- Support a malaria microscopy refresher training in Lao PDR in Q4 2019
- Conduct a sub-national M&E training in Q4 of 2019 targeting 24 provincial or district level and local staff in Lao PDR.
- Support an international/regional training workshop in Q1/2 of 2020 on malaria elimination to include eight national malaria program managers or key technical staff from the four GMS countries.
- Conduct the 2nd regional training on malaria vector surveillance for elimination in Thailand in Q3 of 2020 aiming to train eight National or Regional/State entomologists from the GMS.

PMI Goal

Building capacity and strengthening health systems is identified in the PMI Strategy 2015-2020 as a core area of strategic focus, which states that successful country-owned and country-led malaria control programs are only possible when country programs possess appropriately-skilled human resources and the necessary infrastructure to plan, implement, and monitor progress of their malaria control activities.

Key Question 1

What other areas are critical for PMI support?

Supporting Data

N/A

Conclusion

Strengthening national program capacity is a critical area of strategic focus within the PMI strategy. Depending on need and evolving epidemiology, PMI will continue to support national and regional capacity building and training efforts on program management, malaria elimination, quality assurance/quality control for diagnostics, SM&E, and entomology.

Key Question 2

Are there any other considerations that impact your funding allocation in this category?

Supporting Data

None.

Conclusion

There are no other considerations at this time.