

The following document is an abbreviated malaria operational plan. The principles guiding development of this document—country-led, inclusive, consultative with a broad audience, and transparent—are consistent with best practices that the U.S. President’s Malaria Initiative (PMI) has instituted since its inception. While an in-depth background of malaria in this country can be found in the detailed [FY 2018 malaria operational plan](#) on [pmi.gov](#), this abbreviated document provides a high-level overview of PMI’s program in this country, including key strategic updates, country data and progress updates, and a detailed list of activities to be supported with FY 2019 U.S. Government PMI funding.

This abbreviated malaria operational plan has been approved by the U.S. Global Malaria Coordinator and reflects collaborative discussions with the national malaria control programs and partners in country. The final funding available to support the plan outlined here is pending final FY 2019 appropriation. If any further changes are made to this plan it will be reflected in a revised posting.



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PRESIDENT'S MALARIA INITIATIVE

Thailand, Lao PDR, and Regional

Abbreviated Malaria Operational Plan FY 2019

TABLE OF CONTENTS

ABBREVIATIONS AND ACRONYMS.....	3
I. INTRODUCTION	4
II. OVERVIEW OF PMI IN THAILAND, LAO PDR, AND REGIONAL.....	4
III. STRATEGY UPDATES	4
IV. DATA UPDATES AND EVIDENCE OF PROGRESS.....	6
V. NEW OR EXPANDED ACTIVITIES AND KEY CHANGES.....	9

ABBREVIATIONS and ACRONYMS

ACT	Artemisinin-based combination therapy
AL	Artemether-lumefantrine
API	Annual parasite incidence
BVBD	Bureau of Vector-Borne Diseases (Thailand)
CDC	Centers for Disease Control and Prevention
CHAI	Clinton Health Access Initiative
CMPE	Center for Malariology, Parasitology, and Entomology (Lao PDR)
DHA-PIP	Dihydroartemisinin + piperazine
DHIS2	District Health Information System 2
ECA	External competency assessment
FDA	Food and Drug Administration
FY	Fiscal year
G6PD	Glucose-6-phosphate dehydrogenase
Global Fund	Global Fund to Fight AIDS, Tuberculosis, and Malaria
GMS	Greater Mekong Subregion
iDES	Integrated drug efficacy surveillance
ITN	Insecticide-treated net
KAP	Knowledge, Attitude, and Practice
Lao PDR	Lao People's Democratic Republic
LLIHNs	Long-lasting insecticide treated hammock nets
LLIN	Long-lasting insecticidal nets
LSIS	Lao Social Indicator Survey
MICS	Multiple Indicator Cluster Survey
MMP	Mobile and Migrant Population
MOH	Ministry of Health (Lao PDR)
MOP	Malaria Operational Plan
MOPH	Ministry of Public Health (Thailand)
NGO	Non-governmental organization
NMCP	National Malaria Control Program
PMI	President's Malaria Initiative
PSI	Population Services International
PSM	Procurement and Supply Management
RAI	Regional Artemisinin-resistance Initiative
RAI2E	Regional Artemisinin-resistance Initiative 2 Elimination
RDMA	Regional Development Mission Asia
RDT	Rapid diagnostic test
SBCC	Social and behavior change communication
SM&E	Surveillance, monitoring and evaluation
TES	Therapeutic efficacy studies
TMS	Thailand Malaria Survey
TPR	Test positivity rate
UCSF	University of California San Francisco
USAID	United States Agency for International Development
WHO	World Health Organization

I. INTRODUCTION

This abbreviated fiscal year (FY) 2019 Malaria Operational Plan (MOP) presents an implementation plan for Thailand, Lao People’s Democratic Republic (Lao PDR), and Regional based on the strategies of the U.S. President’s Malaria Initiative (PMI) and National Malaria Control Programs (NMCPs) and building on investments made by PMI and other partners to improve and expand malaria-related services. It was developed in consultation with the NMCPs of Thailand and Lao PDR and with the participation of national and international partners involved in malaria prevention and control in the country. The [FY 2018 MOP](#) contains a more detailed and comprehensive description of the malaria situation in Thailand and Lao PDR country health system delivery structure, Ministry of Health (MOH) organization, and PMI’s progress through April/May of 2017. This abbreviated MOP describes critical changes/updates to overall NMCP and PMI strategic approaches, as well as newly proposed activities under each technical area to be supported with FY 2019 funds.

II. OVERVIEW OF PMI IN THAILAND, LAO PDR, AND REGIONAL

The FY 2019 MOP for Thailand, Lao PDR, and Regional was developed with the Regional Development Mission for Asia (RDMA) during a planning visit in March 2018 by representatives from United States Agency for International Development (USAID), the Centers for Disease Control and Prevention (CDC), and the national malaria control programs of Thailand and Lao PDR with the participation of other major donors and partners working on malaria in the region.

The FY 2019 MOP supports regional/cross-cutting activities, such as surveillance for therapeutic efficacy and antimalarial drug resistance, NMCP capacity strengthening, 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. The activities proposed using FY 2019 funding are in line with the national malaria program strategies of Thailand and Lao PDR and are intended to complement ongoing Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund) malaria grants and contributions from other donors.

The proposed FY 2019 PMI budget is \$3 million to support activities for Thailand, Lao PDR, and Regional malaria programming with particular focus on surveillance, monitoring and evaluation (SM&E), and capacity strengthening.

III. STRATEGY UPDATES

Thailand

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-resistance Initiative 2 Elimination (RAI2E) grant, Bureau of Vector-Borne Diseases (BVBD) aims to focus its resources and strategy on the identification and response of the remaining active and non-active residual foci in the country.

PMI’s strategy in Thailand is to support the national malaria elimination strategy which aims to achieve malaria elimination by 2024. As Thailand’s socioeconomic standing has improved rapidly, PMI support

to Thailand has transitioned from project implementation and malaria commodity procurement and distribution to an overall health systems strengthening approach. The focus has shifted to 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 is increasingly aimed at strengthening domestic resource mobilization and advocacy for malaria elimination at national and sub-national levels through the generation and use of strategic information for decision-making – leveraging partnerships and resources from domestic local government sources, private and corporate sectors, and other non-health sectors. PMI provides technical assistance to BVBD to identify and plan for domestic resource mobilization and advocacy for malaria elimination at national and sub-national levels. For example, PMI supported a Cost Benefit Analysis of the malaria elimination strategy in Thailand with the aim of advocating for domestic resources for malaria at national level. In 2017, the government of Thailand committed to a 28 percent increase in their domestic budget for malaria. PMI contributed to Thailand's transition planning at national level in preparation for post-2020 when Global Fund resources will likely cease as well as creating a framework for resource mobilization at local levels.

As malaria incidence has declined over the years in Thailand, it has increasingly become more difficult to enroll patients for the standard World Health Organization (WHO) Therapeutic Efficacy Studies (TES) to monitor drug efficacy and resistance. As a result, through PMI support, WHO has provided technical assistance to BVBD to pilot the integrated drug efficacy surveillance (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. A description of the iDES approach can be found in the [report](#) from the Fifth Meeting of the Greater Mekong Subregion (GMS) TES Network as well as the recently released [Malaria Surveillance, Monitoring and Evaluation Reference Manual](#).

Lao PDR

Subsequent to an upsurge of malaria cases due to an outbreak in southern Lao PDR in 2014-2015, the national malaria program has made tremendous progress in reducing malaria morbidity and mortality. The strategy of the national malaria program has not changed since the FY18 MOP, but it is noteworthy that a few key areas that are now prioritized: 1) improving data quality and staff capacity to analyze data, 2) rolling out case-based surveillance and investigation in the northern provinces while supporting the higher burden, and southern provinces to transition from aggregated reporting to line listing, 3) strengthening the integration of the supply chain management system at national and sub-national levels, and 4) increasing the engagement of the private sector through the public-private mix strategy.

Lao PDR has made significant progress in policy development with strong political engagement from the highest levels of government. For example, Lao PDR has instituted a ban on timber exports since September 2016, which has likely contributed to the reduction of malaria infections acquired from forest-related activities. The government of Lao PDR has also stepped up domestic contributions for malaria control by committing to the purchase of 300,000 long-lasting insecticidal nets (LLINs) in 2018. With regard to updating case management policy through WHO and PMI support, Lao PDR has begun to introduce the use of single dose primaquine for the treatment of *Plasmodium falciparum* and has received Food and Drug Administration (FDA) approval for the use of primaquine in radical treatment of *P. vivax* following glucose-6-phosphate dehydrogenase (G6PD) testing.

IV. DATA UPDATES AND EVIDENCE OF PROGRESS

Thailand

Thailand has made rapid progress in targeting and reducing the number of active foci (villages) of transmission in the country from 1,542 in 2015 to 1,116 in 2016 to 952 in 2017 and 415 active foci reported in early 2018. Approximately 20 percent of districts currently have active or non-active residual foci (Figure 1). The total number of confirmed malaria cases has reduced from 43,939 in 2011 to 13,974 in 2017 (a 68 percent reduction). Despite the tremendous progress in reducing the number of active foci and residual non-active foci to cleared foci, there were 408 out of the 64,233 clusters (i.e., sub-village or hamlets) that had reverted status in 2017. Further analysis and investigation into these cases are ongoing. Remaining active foci are primarily located in three border areas: in the west with Burma; in the east with Cambodia where high population mobility is associated with importation of malaria parasites complicates surveillance, and in the south with Malaysia where civil unrest inhibits service delivery. Given the low prevalence of malaria, Thailand has moved away from conducting large-scale surveys; however, available trends on some LLIN coverage and use indicators through specialized surveys are tracked (Table 1). Furthermore, key malaria indicators reported through the routine surveillance system underpin the tremendous progress in driving down malaria burden in Thailand (Table 2).

Lao PDR

Lao PDR has recently completed the second Lao Social Indicator Survey (LSIS) which aims to track progress made since the initial survey in 2011/2012. The LSIS-II is a nationwide household-based survey with a sample size of 23,400, covering all of the country's 18 provinces. It aims to generate data at the provincial level, disaggregated by age, residence, sex, wealth quantile and ethnic group and will serve as the baseline for the country's eighth National Socio-Economic Development Plan. Data analysis is ongoing and the results are expected to be released soon but preliminary results are shown in Table 3. Key malaria indicators reported through the routine surveillance system also highlights the progress made since 2011 (Table 4).

With the exception of the malaria outbreak in 2014, 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. The majority of malaria cases continue to be reported from the five southern provinces (Figure 2). Case investigations are not conducted routinely but pilots have been initiated in northern Lao PDR with support from University of California San Francisco as well as in Champasack and Savannakhet under the Regional Artemisinin-resistance Initiative (RAI) project. The most recent data from the progress update of the RAI (July to December 2017) showed that 31 out of 35 *P. falciparum* cases were fully investigated in 9 low malaria endemic provinces. Nonetheless, more emphasis is needed to support the rollout of case investigations wherever feasible.

Figure 1: Stratification of districts with active and residual non-active foci in Thailand, 2017

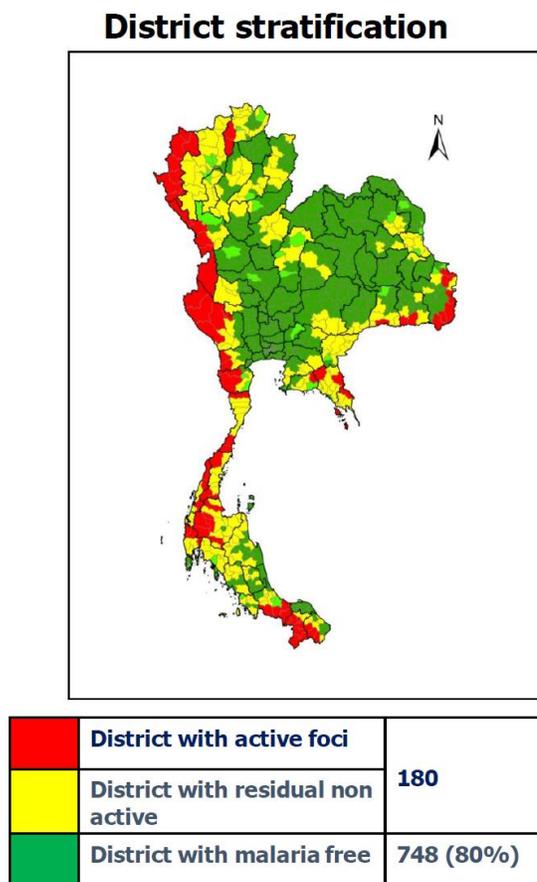


Figure 2: Stratification of districts by annual parasite incidence (API) in Lao PDR (2015) (Source: CMPE)

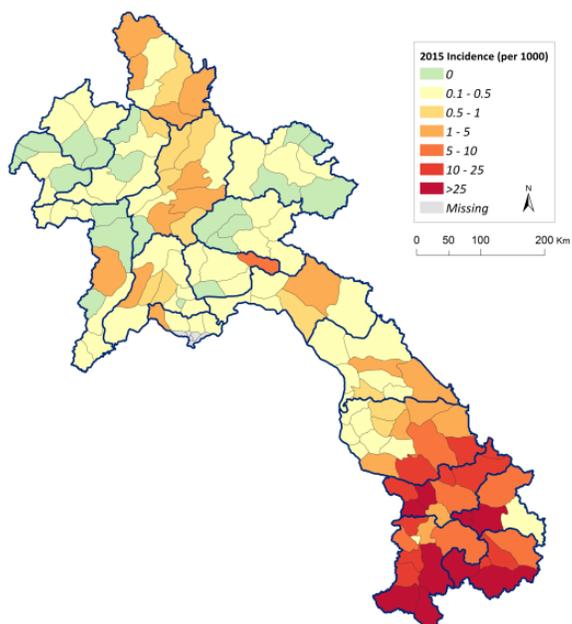


Table 1: Evolution of Key Survey-Based Malaria Indicators in Thailand from 2012 to 2017

Indicator	2012, TMS*	2015, KAP**	2017, MMP***
% Households (respondents) with any nets	90%	90%	94%
% Households (respondents) with at least one ITN	47%	51%	39%
% Children under five 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
% Forest goers who slept under an ITN	26%	n/a	13%
% Population (respondents) that slept under an ITN the previous night	29%	39%	n/a

*Thailand Malaria Survey, ** Knowledge, Attitude, and Practice, *** Mobile and Migrant Population Survey (preliminary data)

Table 2: Evolution of Key Malaria Indicators Reported through Routine Surveillance Systems in Thailand from 2011 to 2017

	2011	2012	2013	2014	2015	2016	2017
Total # Cases (Confirmed)	43939	48109	52808	37209	24850	17779	13974
Total # <i>P. falciparum</i>	18912	17569	23283	15691	9143	4717	3145
% of <i>P. falciparum</i>	43%	37%	44%	42%	37%	27%	23%
Total # Malaria Deaths	43	37	47	38	33	27	10
Annual blood examination rate	2.8	2.6	2.8	2.6	2.2	2.1	1.8
Test Positivity Rate (TPR)	2.0	2.1	2.1	2.0	1.8	1.3	1.2

Table 3: Evolution of Key Survey-Based Malaria Indicators in Lao PDR from 2006 to 2017

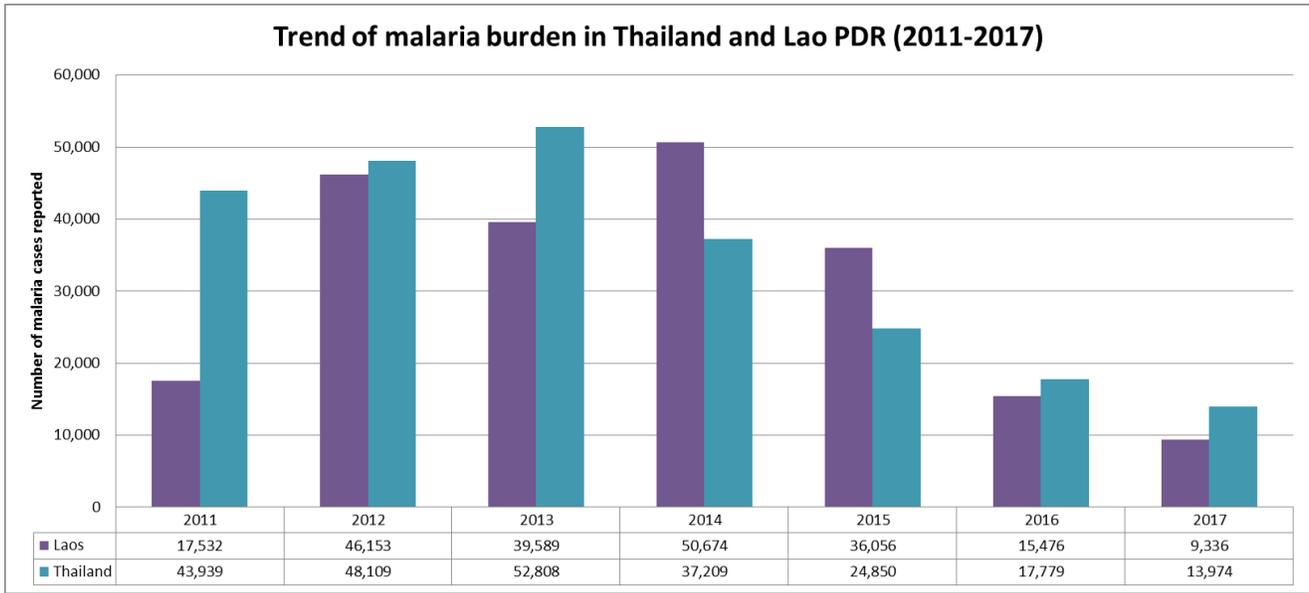
Indicator	2006, MICS*	2012, LSIS**	2017, LSIS- 2***
% Households (respondents) with any nets	94%	94%	93%
% Households (respondents) with at least one ITN	45%	33%	61%
% Children under five who slept under an ITN the previous night	41%	43%	50%
% Pregnant women who slept under an ITN the previous night	n/a	43%	52%
% Forest goers who slept under an ITN	n/a	n/a	n/a
% Population (respondents) that slept under an ITN the previous night	n/a	n/a	51%

* Multiple Indicator Cluster Survey, ** Lao Social Indicator Survey, *** Lao Social Indicator Survey-2 (preliminary data)

Table 4: Evolution of Key Malaria Indicators Reported through Routine Surveillance Systems in Lao PDR from 2011 to 2017

	2011	2012	2013	2014	2015	2016	2017
Total # Cases (Confirmed)	17532	46153	39589	50674	36056	15476	9336
Total # of <i>P. falciparum</i>	16553	37673	25436	24889	14260	5733	4554
% of <i>P. falciparum</i>	94%	82%	64%	49%	40%	37%	49%
Total # Malaria Deaths	17	44	28	4	4	1	2
Annual blood examination rate	3.8	5.2	5.4	4.6	4.4	4.1	3.9
Test Positivity Rate (TPR)	7.2	13.7	11.0	16.0	12.9	5.7	3.6

Figure 3: Trends in Key Malaria Indicators Reported in Routine Surveillance Systems of Thailand and Lao PDR



* Note: Population of Thailand (68m) is 10 times greater than Lao PDR (6.8m)

V. NEW OR EXPANDED ACTIVITIES AND KEY CHANGES

1. Vector control

a. Entomologic monitoring and insecticide resistance management

No new activities or significant changes are proposed. Thailand continues to rely primarily upon LLINs for vector control in active and residual foci. During foci investigations, entomological and epidemiological assessments are combined, with assessment of LLIN coverage and mapping of larval habitats for possible intervention. Thailand has entomological capacity at provincial-level to investigate intensity of insecticide resistance in persistent foci of transmission. Training in monitoring of insecticide resistance intensity was provided by PMI in collaboration with the Ministry of Public Health (MOPH) to regional entomologists in late 2017.

b. Insecticide-treated nets

PMI provides a limited number of LLINs to fill gaps in coverage, but the number required is decreasing as the number of active and residual non-active foci diminishes and reclassified as cleared foci. Thailand follows general guidance of WHO whereby LLIN distribution is stopped after local transmission has not occurred for three consecutive years. Thailand’s annual reclassification of foci will provide useful data to determine practicality of this guidance. Thailand estimates that there are approximately 120,000 migrants who have been in Thailand for less than six months. In addition to these migrant populations, an estimated 19 percent of at-risk populations are forest-goers and considered a targeted risk group for interruption of malaria transmission in Thailand. To cover the identified continuous distribution needs in Thailand, PMI will procure 60,000 LLINs and 100,000 long-lasting insecticide treated hammock nets (LLIHNS) in 2020 for at-risk populations and communities. This reflects a slight downward trajectory of malaria commodity support provided to Thailand compared to FY 2018 funding, while ensuring that adequate coverage of LLINs and LLIHNS among migrants and forest-goers are prioritized, including

pregnant mothers. PMI is supporting BVBD to strengthen overall stock management systems for more accurate quantification and forecasting and will keep abreast of LLIN and LLIHN gaps particularly post-2020 when the Global Fund is expected to withdraw support from Thailand. In addition, PMI will continue to support Thailand's leadership in the malaria response and its ability to leverage its own resources to assume greater responsibility in malaria control, and ultimately malaria elimination.

In Lao PDR, though the bulk of LLINs and other malaria commodities are procured through the Global Fund, PMI will continue to support LLIN gaps identified by the national malaria program particularly as the RAI2E grant comes to an end in 2020 and during the transition to the new grant. At this time, PMI plans to procure 20,000 LLINs annually in 2018, 2019, and 2020, but will be engaged with national quantification and forecasting to determine if LLIN gaps exist that need to be filled. An additional 49,350 LLINs are planned to cover commodity gaps and unanticipated outbreaks in the region.

2. Malaria in pregnancy

Although no new activities or significant changes are proposed, PMI continues to ensure that all individuals in at-risk areas, including pregnant women, are included during LLIN distribution campaigns as well as routine distribution of LLINs through Health Promotion Hospitals in Thailand for pregnant women attending antenatal care (ANC) services. Malaria prevention messages and treatment services are provided for pregnant women through these outlets.

3. Case management

No new activities or significant changes are proposed. PMI's regional programming will continue to procure limited quantities of rapid diagnostic tests (RDTs) and artemisinin-based combination therapies (ACTs) to address any potential gaps that may arise, especially with the cessation of RAI2E funding in 2020. PMI will also continue the regional TES/iDES network support, and training and accreditation for microscopy. As malaria burden continues to decline, microscopists will require additional training and accreditation to maintain their skills since they will be encountering fewer malaria cases. PMI has supported external competency assessments (ECAs) through WHO for a number of years in the region. Primarily these microscopy trainings and external competency assessments are targeted at PMI-supported therapeutic efficacy study sites to ensure high-quality malaria microscopic diagnosis. Accreditations are valid only for a period of 2 years and needs to be renewed. The aim is to maintain at least one Level 1 microscopist in each GMS country.

WHO organized a regional meeting on TES on September 28-29, 2017 in Ho Chi Minh City, Vietnam to share results from TES and iDES pilots among the GMS countries. ACT failures due to resistance to artemisinin and partner drugs remains a challenging issue in GMS countries, with four ACTs failing in Cambodia, and increasing evidence of partner drug failures in more provinces of the Lao PDR, Thailand and Vietnam with confirmed K13 mutations and plasmepsin 2-3 (marker of piperazine resistance). In Burma, the situation remains acceptable with the current first-line ACTs and partner drugs though slightly declining cure rates with artemether-lumefantrine (AL) is being closely monitored. Yunnan, China reported zero indigenous cases in 2017, and efficacy of first-line dihydroartemisinin + piperazine (DHA-PIP) was high among imported cases.

Due to the limited treatment options for some countries, WHO organized an ad-hoc drug policy meeting specifically to address updating treatment guidelines for Cambodia, Lao PDR, and Vietnam in Feb. 26-27, 2018 in Phnom Penh. Artesunate-pyronaridine (Pyramax) has been evaluated in Vietnam with good

efficacy and WHO is working with the country to roll this out in the provinces affected by piperaquine resistance. Pyramax, a promising treatment alternative, will be included in the TES studies in 2018/2019 in all countries in the GMS.

Thailand has a long history of administering low 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.

In Lao PDR, per the national treatment guidelines (2015), low dose primaquine was recently introduced following WHO recommendations. A single dose of 0.25mg/kg of primaquine is given with an ACT 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. However, this policy has not yet been fully implemented at scale and operations research using the Carestart™ qualitative G6PD RDT is on-going.

4. Cross-cutting and other health systems strengthening

a. Pharmaceutical management

No new activities or significant changes are proposed for Thailand and Lao PDR.

PMI will continue to support the NMCP objectives of ensuring availability of high-quality antimalarials and strengthening the national procurement and supply chain management system to support the country and regional malaria elimination goals by 2030.

In Thailand, as the need for malaria commodities has decreased, PMI's focus is shifting to strengthening the national Procurement and Supply Management (PSM) system and capacity building of the PSM team and its functions within the NMCP. Thailand is integrating its vertical malaria services into the National Health Service system to support elimination efforts and in preparation for the phasing out of the Global Fund support by 2020. To assist in this transition, PMI supported a rapid supply chain assessment at the sub-national level in December 2017 to document the current status and function of the PSM system as it relates to malaria and to identify areas for further improvement. The preliminary report 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. Moreover, the recent outbreaks of malaria cases in one eastern province highlighted commodity shortages at facility levels and the lack of attention on strengthening the pharmaceutical and supply chain management systems for the national elimination strategy. The final assessment report is expected by mid-2018 and key recommendations will be shared with stakeholders. This assessment report will also serve as the basis to identify areas of priority for PMI support.

In Lao PDR, the majority of malaria commodities continue to be procured under the Global Fund RAI2E grant with some additional support from PMI to strengthen and expand the logistic management information system to better link with the malaria information system on the District Health Information System 2 (DHIS2) platform to improve the responsiveness of the national PSM system.

b. Social and behavior change communication

No new activities or significant changes are proposed for Thailand and Lao PDR.

In Thailand, social and behavior change communication (SBCC) activities are primarily supported and implemented by BVBD, or through some non-governmental organizations (NGOs) working in hard-to-reach areas supported by the Global Fund. PMI provides technical assistance to integrate SBCC, where possible, in case management and prevention activities, particularly in the integration of SBCC approaches and messaging through the general health services and Health Promotion Hospitals. For example, key messages regarding the use and care of LLINs/LLIHNs are provided during mass campaigns, health education materials, or through volunteers who distribute LLINs/LLIHNs to households. SBCC on malaria prevention and treatment seeking behaviors are also provided for pregnant women attending ANC in Thailand.

In Lao PDR, targeted SBCC messages are integrated with LLIN packaging and distribution campaigns. PMI will continue to advocate the use of interpersonal communication for SBCC. SBCC is integrated in case management and prevention activities implemented by the national malaria program. Particularly in malaria elimination settings, maintaining appropriate behaviors on the consistent use and care of LLINs and LLIHNs will be critical. Migrant populations, particularly forest-goers, are the target groups in Thailand and Lao PDR who are most at-risk, but may perceive malaria to be low-risk, especially if they are coming from areas of low malaria transmission. SBCC messages focus on increasing knowledge about malaria transmission risks in forested areas and the need for these individuals to carry LLINs or LLIHNs with them when spending the night in the forest, as well as to get tested and seek treatment as soon as possible if malaria is suspected.

c. Surveillance, monitoring, and evaluation

No new activities or significant changes are proposed for Thailand. Table 5 notes the major surveillance, monitoring and evaluation (SM&E) activities conducted since 2010 and planned through 2020 by the NMCP. PMI plans to continue providing technical assistance to strengthen case-based reporting through the routine surveillance systems to evaluate malaria elimination interventions and streamlining resource-intensive elimination activities e.g. case investigation, reactive case detection, and foci investigations and response. For example, it is anticipated that by 2020, there will be a need to 1) evaluate the cost-effectiveness of the 1-3-7 strategy in Thailand and 2) ensure quality improvement of malaria elimination activities and approaches (e.g., refining case investigation tools for optimal implementation in Thailand, optimizing the identification and investigation of foci, particularly in areas of residual transmission).

No new activities or significant changes are proposed for Lao PDR, but PMI will closely monitor for any unaddressed needs or gaps that may arise especially as case investigations are introduced and rolled out. Table 6 notes major surveillance, monitoring and evaluation activities conducted since 2010 and planned through 2020 by the NMCP. Currently, malaria cases are reported in aggregate at district level via the nationally endorsed DHIS2 platform. The Bill and Melinda Gates Foundation is supporting a number of partners including Clinton Health Access Initiative (CHAI), Population Services International (PSI), and University of California San Francisco (UCSF) at national level and sub-national levels. CHAI is providing technical assistance to Center for Malariology, Parasitology, and Entomology (CMPE) for program management and day-to-day program support. PSI is funded to rollout a network of private providers to test and treat malaria through public-private mix strategy. There are currently 359

outlets participating in this network, but plans are in place to expand the network to 2 additional southern provinces (Sekong and Attapeu) and 5 additional northern provinces (Luang Prabang, Luang Namtha, Oudomxay, Xayabury, and Phongsali) in 2018. UCSF is predominately supporting rollout of case-based surveillance tools in the northern provinces of Lao PDR targeted for elimination. PMI is currently in discussion with CMPE about focusing our support for surveillance strengthening to two to three provinces to complement the support provided by other partners in the remaining provinces.

Table 5. Surveillance, Monitoring, and Evaluation Data Sources in Thailand

Data Source	Activities	Year											
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Household surveys	Malaria Indicator Survey (MIS)			X*									
	KAP Survey						X*						
Other surveys	Migrant surveys	X* (RDS, Thai-Cam)		X (RDS, Ranong)						X* (MMP)			
Malaria surveillance and routine system support	Support to malaria surveillance system strengthening	X	X	X	X	X	X	X	X	X	X	(X)	(X)
Therapeutic efficacy monitoring	<i>In vivo</i> efficacy monitoring	X	X	X	X	X	X	X	X	X	X	(X)	(X)
	Routine treatment outcome monitoring									X	X	(X)	(X)
Entomology	Entomological surveillance and resistance monitoring	X	X	X	X	X	X	X*	X*	X*	(X*)	(X*)	

* Not funded by PMI; parentheses indicate planned

Table 6. Surveillance, Monitoring, and Evaluation Data Sources in Lao PDR

Data Source	Activities	Year											
		2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	
Household Surveys	Lao Social Indicator Survey (LSIS)		X*							X*			
Other surveys	Migrant surveys					X* ^β							
Malaria surveillance and routine system support	Support to malaria surveillance system strengthening			X	X	X	X	X	X	X	X	(X)	(X)
Therapeutic efficacy monitoring	<i>In vivo</i> efficacy monitoring	X	X	X	X	X	X	X	X	X	X	(X)	(X)
Entomology	Entomological surveillance and resistance monitoring		X*	X*	X*	X*	X*	X*	X*	X*	X*	(X*)	(X*)
Other data sources	Drug quality monitoring	X	X	X	X	X	X	X	X	X*	X*	(X*)	(X*)

* Not funded by PMI; parentheses indicate planned; ^β Lao-VTN-CAM border screening

d. Operational research

No new activities or significant changes are proposed for Thailand or Lao PDR. PMI will continue to keep abreast of the evolving country and regional operational research priorities and needs, particularly related to malaria elimination efforts led by the NMCPs and potentially assist where appropriate.

e. Other health systems strengthening

No new activities or significant changes are proposed. PMI will continue to support regional capacity building and trainings for participants from the Greater Mekong Subregion National Malaria Control Programs (NMCPs) on integrated vector management, quality assurance for microscopy, and malaria program management and field operations at regional, national, and sub-national levels. The focus of these trainings has shifted in recent years to emphasize malaria elimination and incorporation of new e-learning tools and approaches, where appropriate.

As Thailand's malaria program becomes increasingly decentralized and integrated with the general health services, it will be important to maintain the technical and programmatic capacity to manage core malaria services, including analysis and decision-making, at the sub-national levels. PMI will help to identify and support capacity gaps and needs during this period of transition from a strictly vertical program to an integrated and decentralized program while ensuring that BVBD maintains the necessary technical and advisory role for malaria control and elimination within the MOPH.

No new activities or significant changes are proposed for Lao PDR. PMI will continue to support national and sub-national level trainings for malaria management and field operations as needed.

5. Staffing and administration

PMI programming in Thailand, Lao PDR, and Regional supports staffing and administration that follow PMI policy, as articulated in the FY 2018 MOP.