Reporting Plan for the President's Malaria Initiative Strategy 2015 – 2020

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Contents

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I. Introduction and purpose

In February 2015, an updated President's Malaria Initiative (PMI) Strategy for 2015 – 2020 was released. This updated strategy takes into account the progress over the past decade and clearly defines the United States Government's (USG) updated vision, goals, objectives and strategic focus for PMI through 2020. This PMI Reporting Plan describes how progress towards achieving the goal and three primary objectives will be measured and evaluated for PMI during 2015-2020.

PMI was launched in 2005 with the goal to reduce malaria-related mortality by 50% across 15 high-burden countries in sub-Saharan Africa through a rapid scale-up of four proven and highly effective malaria prevention and treatment measures: insecticide-treated mosquito nets (ITNs); indoor residual spraying (IRS); accurate diagnosis and prompt treatment with artemisinin-based combination therapies (ACTs); and intermittent preventive treatment of pregnant women (IPTp). With the passage of the Tom Lantos and Henry J. Hyde Global Leadership against HIV/AIDS, Tuberculosis, and Malaria Act in 2008, PMI developed a U.S. Government Malaria Strategy for 2009–2014. This strategy included a long-term vision for malaria control in which sustained high coverage with malaria prevention and treatment interventions would progressively lead to malaria-free zones in Africa, with the ultimate goal of worldwide malaria eradication by 2040-2050. Consistent with this strategy and the increase in annual appropriations supporting PMI, four new sub-Saharan African countries and one regional program in the Greater Mekong Sub-region of Southeast Asia were added in 2011. The 2015-2020 PMI strategy takes into account the progress over the past decade and the new challenges that have arisen, setting forth a vision, goal, objectives, and strategic approach for PMI through 2020, while reaffirming the longer-term goal of worldwide malaria eradication.

a. PMI strategy 2015-2020

The 2015-2020 PMI strategy continues the USG's commitment to malaria prevention and control and envisions "a world without malaria" requiring a sustained, long-term effort to drive down malaria transmission and reduce malaria deaths and illnesses, leading to country-by-country elimination and eventual eradication by 2040-2050. With this vision in mind, PMI's updated strategy established the following goal and objectives:

Goal: Work with PMI-supported countries and partners to further reduce malaria deaths and substantially decrease malaria morbidity toward the long-term goal of elimination

Objectives: Work with national malaria control programs (NMCPs) and partners to accomplish the following by 2020:

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

Strategic focus areas: To achieve its goals and objectives PMI will concentrate its efforts on five strategic focus areas, namely:

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

b. PMI Reporting Plan

This PMI Reporting Plan will describe selected indicators, data needs, sources and tools to monitor and evaluate progress against the PMI objectives as outlined in the PMI Strategy 2015 – 2020 and is a companion document to the PMI Strategy. The indicators included in this reporting plan are the primary indicators that will be monitored to assess progress against PMI's goal and objectives. For each indicator, the definition, data source, and frequency of reporting are included in Appendix I.

As reflected in the 2015-2020 PMI Strategy, malaria burden in PMI-supported countries has notably changed since PMI's inception in 2005. While some countries have greatly reduced malaria mortality and morbidity, progress in other countries has been slower, resulting in a PMI Strategy that reflects tailored strategies and implementation approaches based on each country's specific malaria epidemiology. These changes in malaria burden require indicators and tools that can measure progress in countries with high prevalence and those moving towards pre-elimination.

II. Measuring PMI objectives

Objective 1: Reduce malaria mortality by one-third from 2015 levels in PMI-supported countries achieving a greater than 80% reduction from PMI's original 2000 baseline levels.

Due to limited availability and low quality of malaria-specific mortality data and the challenges of differentiating deaths caused by malaria from deaths caused by other severe febrile illnesses, PMI assesses the direct and indirect impact of malaria by measuring all-cause child mortality (ACCM), consistent with global consensus. In most high-burden countries a substantial number of malaria-related deaths occur outside of health services and often are neither recorded nor reported. Prior to the scale up of rapid diagnostics, even deaths in health facilities that were recorded as malaria may not have had a diagnostic test to confirm this diagnosis (or, in some cases, malaria parasitemia was not the primary cause of death). Thus, the Roll Back Malaria (RBM) Monitoring and Evaluation Reference Group (MERG) recommended using ACCM as the most consistent and reliable metric to measure impact of malaria control across countries and over time. The data used to estimate ACCM is collected through household surveys (such as Demographic and Health Surveys [DHS] and Multiple Indicator Cluster Surveys [MICS]) at periodic intervals and has been collected in this way for over 30 years, allowing for analysis of trends over time and comparability across countries. Historically, prior to malaria intervention scale-up, malaria accounted for a sizeable proportion of child mortality in PMI-supported countries, thus making the indicator sensitive to tracking changes resulting from scale up of malaria control interventions.

However, with the success of malaria control in some PMI-supported countries, the fraction of deaths attributed to malaria is decreasing to the point where other causes of death are more likely to drive

changes in ACCM. Therefore, in those countries, there is an increased need to rely on other tools to measure malaria-specific and/or malaria-associated mortality. In countries with more advanced information systems, direct measurement from inpatient data may be possible. In countries where routine data are not as reliable at this time, modeling approaches may be more suitable for estimating malaria-specific and/or malaria-associated mortality. PMI will always use the best available data to measure the impact of country program efforts. These data and accompanying methods will vary across countries dependent on their epidemiology and the status of their routine health information systems. PMI will continue to monitor ACCM through nationally representative household surveys in all focus countries.

The baseline measurement of ACCM for each PMI country will be based on the household survey implemented on or near the year 2015 (see Appendix II). Based on the countries' national M&E plans, PMI will support, along with other partners, household surveys for an ACCM estimate every 3-5 years. The baselines for malaria-specific mortality will be based on country reported inpatient malaria deaths and estimates from malaria-specific mortality models nearest to 2015, which will incorporate data from multiple sources including routine health surveillance data and household and facility survey estimates of vector control interventions, access to care, and effective case management. PMI will continue to work with global partners to refine existing models and improve the quality of data underlying the model parameters.

Table 1: Objective 1 Indicators

- All-cause, under-5 mortality
- Malaria-specific mortality
  - Inpatient malaria deaths
  - Malaria-specific mortality model

Objective 2: Reduce malaria morbidity in PMI-supported countries by 40 percent from 2015 levels.

PMI has used population-based household surveys to measure malaria parasitemia prevalence in children less than five years of age, in addition to intervention coverage estimates. Such estimates are usually only collected every 2-3 years. The prevalence measures have been useful to provide general indications of national and regional malaria burden among children under five. However, the cross-sectional nature of surveys makes it difficult to assess seasonal and geographic trends. In low-prevalence areas, the sample size of these surveys is not sufficient to precisely measure small, but significant changes.

While continuing to collect parasitemia prevalence estimates from household surveys in order to better understand big-picture changes in malaria burden estimates, PMI will increasingly incorporate routine data collected by the Ministries of Health and the NMCPs through national routine health information systems (e.g., Health Management Information Systems [HMIS]) to monitor trends in the number of reported malaria cases. These systems typically collect monthly data on symptomatic individuals of all ages rather than just children less than five years, and provide measures of malaria incidence occurring throughout the year.

Historically, weaknesses in routine health information systems have limited their usefulness in monitoring malaria morbidity. However, with technical support from PMI and other partners, and the expansion of web-based data platforms, routine health data reporting has become more complete, timely, and visible in a number of PMI countries, particularly those that have made the most progress in reducing malaria mortality and morbidity. In addition, the increased availability of point-of-care diagnostics (microscopy/RDTs) has strengthened the validity of such data, making it more feasible to monitor malaria morbidity in health facilities and at community level. Although further strengthening will be needed, routine health information systems will be critical to monitoring malaria incidence in order to measure progress in reducing malaria morbidity.

The baseline measurement of parasitemia prevalence for each PMI country will be based on a household survey that included parasitemia testing implemented on or near the year 2015 (see Appendix II). Based on the countries' national M&E plans, PMI will support household surveys with parasitemia testing every 2-3 years. The baseline measurement for the number of malaria cases for a specific time period (i.e., incident cases) will be based on reported cases. Incorporating modeling approaches may help to address some of the inherent weaknesses of routinely reported data (e.g., problems with completeness and representativeness). PMI will use both sources of data, as they are made available, to measure and report progress in achieving PMI's second objective.

Table 2: Objective 2 Indicators

- Parasitemia prevalence
- Total number of reported malaria cases per year

Objective 3: Assist at least five PMI-supported countries to meet the WHO criteria for national or sub-national pre-elimination.

WHO defines the pre-elimination phase as a *monthly* test positivity rate (by microscopy or RDT) among all febrile patients of less than 5% throughout the year. Countries approaching pre-elimination must have a highly functioning routine health information system that captures the number of malaria cases managed not only in health facilities, but also by community health workers. Further, to conduct case investigations in the elimination phase, it becomes increasingly important to report timely and accurate individual case-level data. At the elimination phase, all malaria cases must be confirmed by a diagnostic test and individually recorded, along with treatment information.

To measure progress against this pre-elimination objective, PMI will track the number of PMI-focus countries that report a test positivity rate (TPR) less than five percent throughout the year at the national or sub-national level. While the overall annual TPR shows progress toward this pre-elimination objective, as stated above, entering the pre-elimination phase will require a *monthly* TPR of <5%.

Table 3: Objective 3 Indicator

- Test Positivity Rate (TPR) in PMI countries

V. Appendices

Appendix I. Prioritized indicators for measuring progress towards PMI Objectives[1]

Objective 1		Definition	Data Source	Frequency of reporting
	All-cause under-five mortality rate	All-cause child mortality rate, ages 0–4 years, expressed as deaths per 1000 live births, or $_5q_0$	*DHS, MICS*	*Baseline and follow-up, every 3-5 years*
	In-patient malaria deaths	Number of inpatient deaths with a primary diagnosis of malaria	*RHIS, World Malaria Report*	*Annual*
	Malaria-specific mortality (model)	Number of adults and children who have died due to malaria in a specific year, expressed as a rate per 100 000 population[2]	*World Malaria Report*	*Annual*
Objective 2				
	Proportion of children 6-59 months with malaria infection	Number of children aged 6-59 months with malaria infection detected by RDT/Total number of children aged 6-59 months tested by RDT	*MIS*	*Baseline and follow-up, every 2-3 years*
	Total number of reported malaria cases per year	Number of outpatient (all ages, confirmed, clinical) and inpatient malaria cases	*RHIS, World Malaria Report*	*Annual*
Objective 3				
	Test Positivity Rate (TPR) in PMI countries	Number of confirmed cases (all ages, outpatient, inpatient) /Number of febrile patients receiving a diagnostic test for malaria (RDT or microscopy)	RHIS	*Annual*

[1] This is not a complete list of indicators, but a brief, prioritized list for reporting progress.
[2] http://www.who.int/healthinfo/indicators/2015/chi_2015_33_mortality_malaria.pdf

Appendix II. All-Cause Child Mortality and Parasitemia Estimates from Recent Surveys and Test Positivity Rate from Routine Health Data

Country	Survey year	ACCM	Survey year	Parasitemia (RDT)	National TPR
Angola	2015	68/1000	2015	14%	46%
Benin	2014	115/1000	2011	25%	78%
DRC	2013/2014	104/1000	2013/2014	31%	72%
Ethiopia	2016	67/1000	2015/2016	1%	31%
Ghana	2014	60/1000	2014	36%	62%
Guinea	2016	88/1000	2016	30%	70%
Kenya	2014	52/1000	2015	13%	24%
Liberia	2013	94/1000	2016	45%	66%
Madagascar	2008/2009	72/1000	2016	5%	50%
Malawi	2015	64/1000	2014	37%	51%
Mali	2012/2013	98/1000	2015	26%	61%
Mozambique	2011	97/1000	2015	40%	59%
Nigeria	2013	128/1000	2015	45%	72%
Rwanda	2014/2015	50/1000	2014/2015	6%	54%
Senegal	2015	59/1000	2015	1%	34%
Tanzania	2015	67/1000	2015	14%	N/A
Uganda	2016	64/1000	2015	32%	49%
Zambia	2013/2014	75/1000	2012	31%	58%
Zimbabwe	2015	69/1000	2012	1%	28%
Burma	2015/2016	50/1000	2015	0.7% (PCR)	11%
Cambodia	2014	35/1000	2013	0.1%	23%