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U.S. PRESIDENT'S MALARIA INITIATIVE

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This FY 2021 Malaria Operational Plan has been approved by the U.S. Global Malaria Coordinator and reflects collaborative discussions with national malaria control programs and other partners. Funding available to support outlined plans is pending final FY 2021 appropriation. Any updates will be reflected in revised postings.

U.S. PRESIDENT’S MALARIA INITIATIVE

ANGOLA

Malaria Operational Plan FY 2021

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, life-saving malaria interventions alongside catalytic technical and operational assistance to support Angola to end malaria. PMI has been a proud partner of Angola since 2005, helping to decrease child death rates by 40 percent through investments totaling almost \$341 million.

The proposed PMI fiscal year (FY) 2021 planning budget for Angola is \$19 million. This Malaria Operational Plan (MOP) summary outlines planned PMI activities in Angola for FY 2021. See accompanying **FY 2021 Budget Tables** (Tables 1 and 2) for activities and budget amounts, available on pmi.gov. Developed in consultation with the National Malaria Control Program (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 Government of the Republic of Angola (GRA) as well as other donors and partners. See **Annex A: Gap Analysis Tables** for information on commodities.

To accelerate the journey to self-reliance, PMI developed a program inventory to assess the strengths and persistent challenges of the PMI Angola program. See **Annex B: Program Inventory**. The activities proposed in this MOP are tailored to draw on strengths and foster improvements.

Since the FY 2020 MOP was developed, the following new data, updated policy and/or strategic priorities relevant for the FY 2021 MOP have become available:

- Angola’s continued reliance on oil revenue, combined with a fall in the price of oil by over half, has continued to make it challenging in recent years for the GRA to follow through on its commitments to procure commodities for all health interventions, including malaria. The effects of the COVID-19 pandemic have exacerbated this ongoing challenge at a time when these commodities are needed most.
- Planning for a mass insecticide-treated nets (ITNs) campaign has entered the preliminary phases, with distribution anticipated to be in calendar year 2022. Fifty-five percent of ITN needs for PMI target areas will be procured by the GRA and 45 percent will be funded by PMI. The first phase of the mass ITN distribution campaign will target the six focus provinces where PMI provides technical assistance. ITN will be procured with FY 2020 MOP funds and the distribution will occur with MOP FY 2021 funds. PMI Angola will be in constant contact with the NMCP to ensure commodities are procured on time, supported by ongoing technical assistance provided by our supply chain and logistics implementing partner the USAID Global Health Supply Chain Procurement and Supply

Management (GHSC PSM). Any national gaps will be discussed with other donors and addressed, and, if absolutely necessary, PMI stock from continuous distribution can be diverted to the mass campaign.

- PMI continues to support the rollout of the District Health Information System (DHIS2) in the six focus provinces in an effort to support the Ministry of Health (MoH) to improve data quality and data use for decision-making. During the first quarter of FY 2020, DHIS2 completeness on the malaria quarterly reports submitted to the platform reached 84.7 percent in PMI-supported provinces (while in non-PMI provinces completion rate was 56.2 percent); DHIS2 timeliness in PMI-supported provinces was 71.7 percent (versus 42.9 percent in non-PMI provinces).
- The NMCP, with support by the World Health Organization (WHO), conducted a formal program review in August 2020 which is informing the next National Malaria Strategic Plan currently under development for 2021-2025 which should be ready by the end of 2020.
- Ongoing/pending activities:
 - A therapeutic efficacy study was performed in three provinces (Benguela, Lunda Sul, and Zaire). Data was processed in Angola and in the U.S. in Atlanta. Drug efficacy of <90 percent for AL was identified in one of three provinces surveyed (Lunda Sul province). A manuscript describing the results is under peer review.
 - Entomologic monitoring with PMI funding was re-established in Angola in 2019. Evaluations were performed in two provinces (Huambo and Lunda Sul) for the first time in four years. An insectary was reactivated and significant efforts were made on sustainable capacity building, including training technicians from the MoH to perform evaluations in-country. A regularly updated database was created which shows location of collection, collection method, and species of mosquito identified during field collections and is shared with government stakeholders. A final report of results from the first year of monitoring has been completed, but there was a small number of mosquitoes collected due to unforeseen complications related to weather and COVID-19 restrictions. Continued insecticide susceptibility evaluations in the coming fiscal year will be prioritized to create a robust data set that can better inform future net procurements.
 - A study was conducted in 2019 examining health seeking behaviors for malaria among Asian workers who began migrating to Angola during the post-civil war construction boom. This group is at risk of malaria infections with anti-malarial resistance in some of their home countries. Before this study, no data existed about malaria prevention behaviors or infection prevalence among this specific group in Angola. The results of the study suggest that there is low prevalence of malaria among the Asian migrant population, they prefer to receive care in hospitals and private clinics, and messages for malaria prevention and care-seeking may only be retained from their country of origin, not Angola. Data from the laboratory component confirm that although Asian migrant workers are highly exposed to malaria during their stay in Angola and many had evidence of previous infection with malaria, very few cases of malaria were found in the group studied and no resistant strains of malaria were identified. A total of 396 (55 percent) showed antibodies to a least one antigen of *P. falciparum*, 8 (1 percent), seropositivity to *P. vivax* antigen; 30 (4 percent) seropositive to *P.*

falciparum and *P. vivax*; and 3 (0.4 percent) seropositive to only *P. malariae* antigen. A dissemination workshop discussing the results and recommendations for employers and healthcare providers has been delayed due to the COVID-19 pandemic.

- A severe malaria study was performed by Medicines for Malaria Venture (MMV)/Clinton Health Access Initiative (CHAI) in order to assess the status of care of severe malaria in Angola and inform improvements in programmatic implementation. The study was carried out in Luanda, Cuando Cubango and Uíge provinces. The main results were presented to NMCP and partners, describing gaps in severe malaria case management training, including healthcare provider knowledge about preparation of injectable artesunate and where and when to administer rectal artesunate; stockouts of necessary commodities; late care-seeking behaviors; and omissions in severe malaria surveillance. Only 22 percent of healthcare providers had training in severe malaria. The data are helping to inform the next National Malaria Strategic Plan and improve severe case management training and delivery.

For more information about the malaria situation, malaria control progress, and intervention-specific data in Angola, please refer to the FY 2020 MOPs available on pmi.gov.

Annex A. Gap Analysis Tables

Insecticide-treated Net (ITN) Gap Analysis			
Calendar Year	2020	2021	2022
PMI-targeted at-risk population ¹	5,862,488	6,037,631	6,216,815
Continuous Distribution Needs			
Channel #1: ANC ²	274,364	282,561	0
Channel #2: EPI ³	194,107	199,906	0
<i>Estimated Total Need for Continuous Channels ⁴</i>	468,471	482,467	0
Minimum pipe-line continuous distribution (6 months)	234,236	241,234	0
Mass Campaign Distribution Needs			
2020/2021 mass distribution campaign in PMI-focus provinces ⁵	0	0	3,453,786
ITN Needs	702,707	723,701	3,453,786
Buffer stock 10%	0	0	0
Total ITN Need	702,707	723,701	3,453,786
Partner Contributions			
ITNs carried over from previous year ⁶	15,427	750,000	3,525,882
ITNs from MoH ⁷	0	1,899,582	0
ITNs from Global Fund ⁸	0	0	0
ITNs from other donors	0	0	0
ITNs planned with PMI funding ⁹	1,000,000	1,600,000	245,000
Total ITNs Available	1,015,427	4,249,582	3,770,882
Total ITN Surplus (Gap) ¹⁰	312,720	3,525,882	317,096

¹ Entire population in PMI-focus provinces which represents approximately 20% of the entire country's population. Projected growth rate of 3.04% (INE) applied every year (data source: census report 2014).

² 5.2% of the population is made up of pregnant women (Reproductive Health Program). Proportion of women expected to attend antenatal care (ANC)1 at 13 weeks or greater increases from 85% in 2019 to 90% in 2020 and 2021.

³ Expanded Program on Immunization (EPI) projection: The proportion of children under 1 year old is 4.3%. Angola DTP3 / immunization coverage in 2018 was estimated to 77%. Data source: Angola Multiple Indicator and Health Survey (IIMS): Access to health centers were projected to be 58% in 2019, 60% in 2020, and 62% in 2021.

⁴ This amount does not reflect the needs required to fill the pipeline. The minimum combined amount of continuous distribution ITN stock required at the central and provincial level warehouses to avoid stockouts at the facility level at the end of each year should be the equivalent of 6 months of needs according to the 2019 malaria quantification.

⁵ 1 net for 1.8 persons in endemic areas (WHO recommended) in 6 PMI-focus provinces for campaign planned for 2022.

⁶ Quantity of ITNs carried over from 2020 could be as much as 75% of the amount procured in 2020 depending on arrival date of continuous distribution ITNs procured for CY 2020.

⁷ Government's national contribution projected to be approximately 55% of ITN commodities requirements for tentative mass campaign in 6 PMI-focus provinces in 2022. However, there is no assurance of this commitment being met.

⁸ Global Fund national contribution to PMI-focus provinces involved in the tentative national campaign of 2022 is indicated as zero as there was no indication at the time of the MOP FY 2020 product that ITNs would be funded under future grants. Subsequently the notional amount to cover national campaign gaps in PMI-focus provinces is assigned to the Government of the Republic of Angola (GRA).

⁹ PMI commitment covers 100% of continuous distribution channel requirements in 6 PMI-focus provinces and 45% of ITN requirements for 2022 tentative mass campaign in the same 6 PMI-focus provinces.

¹⁰ National surplus in 2022 assumes standard procurement timelines facilitates mid-year delivery of PMI's 2021 contribution. National surplus figure is approximately 14 months of inventory requirements for PMI-focus provinces. Actual surplus in excess of 6 months equivalent (possible up to 300,000 ITNs) inventory may be allocated towards continuous distribution requirements in non-PMI-focus provinces in 2021 or 2022 depending on delivery date. Should PMI contributions for 2020 arrive late in the year, the amount of surplus will be greater and after this quantity was factored into continuous distribution requirements for PMI-focus provinces, the remaining amount would be factored into contributing to the requirements for continuous distribution in non-PMI-focus provinces or towards the requirements of the tentative national campaign in 2022.

Rapid Diagnostic Test (RDT) Gap Analysis			
Calendar Year	2020	2021	2022
RDT Needs			
Total country population	31,127,674	32,097,671	33,086,278
Population at risk for malaria ¹	31,127,674	32,097,671	33,086,278
PMI-focus province at-risk population ²	18.86%	18.86%	18.86%
Non-PMI-targeted at-risk population ²	25,256,994	26,044,050	26,846,206
PMI-targeted at-risk population ²	5,870,679	6,053,621	6,240,072
Total number of projected fever cases in non-PMI-focus provinces ³	17,889,529	18,447,001	19,015,168
Total number of projected fever cases ³	22,047,715	22,734,764	23,432,508
Number of projected fever cases in PMI-targeted at-risk population ³	4,158,187	4,287,764	4,417,340
Targeted population with fever accessing diagnosis within the public sector	70%	75%	80%
Percent of fever cases tested with an RDT ⁴	55%	56%	57%
RDTs Needed for PMI-targeted At-risk Population	1,600,902	1,800,861	2,014,307
6 Month Pipeline Quantities	800,451	900,430	1,007,154
Quantity of RDTs needed in non-PMI-focus provinces	6,887,469	7,747,740	8,670,916
Total National RDT Needs ⁵	8,488,370	9,548,601	10,685,224
Partner Contributions to National Needs			
RDTs carried over from previous year ⁶	2,065,972	0	851,399
RDTs from Government ⁷	0	5,400,000	0
RDTs from Global Fund ⁸	1,218,350	0	0
RDTs from other donors	0	0	0
RDTs planned with PMI funding ⁹	5,000,000	5,000,000	4,600,000
Total RDTs Available	8,284,322	10,400,000	5,451,399
Total RDT Surplus (Gap) ¹⁰	(204,048)	851,399	(5,233,825)

¹ Geographic coverage: the entire country is at risk of malaria.

² PMI-targeted area of 6 focus provinces is 18.6% of total country population.

³ The total # of fever episodes per year is based on the following population breakdown: a. <5 years (17% of population) - 1.5 fevers/year; b. 5-9 years (17% of population) - 1 fever/year; c. 10-14 years (13% of population) - 0.63 fevers/year; d. >14 years (53% of population); 0.38 fevers/year.

⁴ Data Source: NMCP monitoring and evaluation (M&E) database: Proportion with access to diagnosis in the public sector and percent of those fevers accessing public sector that are diagnosed with an RDT.

⁵ This is the quantity required to meet testing needs. It does not include the amount required to fill the pipeline with a minimum of 6 months of stocks to avoid stockouts at the facility level.

⁶ No quantity of RDTs will be carried over for 2021. 2021 amounts are expected early January 2021.

⁷ National GRA contribution for 2021 (if realized) will amount to 70% of national need.

⁸ Global Fund procures RDTs but these are generally not allocated to PMI provinces to avoid stockouts elsewhere. No order has been placed for the quantity indicated here as of May 2020.

⁹ PMI contribution will first cover 100% of PMI-focus province requirement which will include quantities to maintain minimal levels of stock. Remaining quantities will be allocated to meet approximately 40% of the needs in the remaining provinces.

¹⁰ For 2020 and 2021 the gap figure contributes towards pipeline requirements. National surplus in 2021 assumes GRA contribution and amounts to the minimum (6 months) stock holding level recommendation for Angola.

Sulfadoxine-Pyrimethamine (SP) Gap Analysis			
Calendar Year	2020	2021	2022
Total population (national)	31,127,674	32,097,671	33,086,278
Total population at risk	31,127,674	32,097,671	33,086,278
SP Needs			
Total number of pregnant women ¹	1,618,639	1,669,079	1,720,486
Total SP Need (in treatments) ²	5,454,814	5,624,796	5,798,039
SP Needs (in treatments) for PMI-focus Provinces	1,028,778	1,060,837	1,093,510
Partner Contributions			
SP carried over from previous years ³	2,679,551	815,700	1,628,261
SP from Government ⁴	1,090,963	3,937,357	4,058,628
SP from Global Fund	0	0	0
SP from Other Donors	0	0	0
SP planned with PMI funding	2,500,000	2,500,000	2,000,000
Total SP Treatments Available ⁵	6,270,514	7,253,057	7,686,889
Theoretical Buffer Requirement of 6 months ⁶	2,727,407	2,812,398	2,899,020
Total SP Treatment Surplus (Gap) ⁷	815,700	1,628,261	1,888,849

¹ 5.2% of the national population is made up of pregnant women through 2021 (Reproductive Health Program). PMI contributes to national requirement.

² Projected ANC attendance rates for 2020-2022: ANC1 (90%), ANC2 (90%), ANC3 (90%), ANC4 (80%) to receive intermittent preventive treatment for pregnant women (IPTp).

³ Procurement Planning and Monitoring Report (malaria) Q1 FY 2020.

⁴ Government's previous commitment to contribute 70% of the quantified commodities is maintained.

⁵ One treatment of IPTp is comprised of 3 SP tablets.

⁶ This amount does not reflect the needs required to fill the pipeline. The minimum combined amount of stock required at the central and provincial level warehouses to avoid stockouts at the facility level at the end of each year should be the equivalent of 6 months of needs according to the 2019 malaria quantification.

⁷ Projected surplus in 2020 and 2021 are the quantities required to keep the pipeline with a minimum of 6 months of inventory.

Artemisinin-based Combination Therapy (ACT) Gap Analysis			
Calendar Year	2020	2021	2022
ACT Needs			
Total country population	31,127,674	32,097,671	33,086,278
Population at risk for malaria ¹	31,127,674	32,097,671	33,086,278
PMI-targeted at-risk population ²	5,870,657	6,053,598	6,240,049
Total number of fever cases in PMI-targeted at-risk population ³	4,158,187	4,287,764	4,417,340
Total number of projected fever cases ³	22,047,715	22,734,764	23,432,508
Estimated population with fever accessing diagnosis within the public sector in PMI-targeted area	70%	75%	80%
Percent of fever cases tested with an RDT	55%	56%	57%
Fever cases tested with RDT	1,600,902	1,800,861	2,014,307
Percent of fever cases tested via microscopy	45%	44%	43%
Fever cases tested via microscopy	1,309,829	1,414,962	1,519,565
RDT positivity rate	53%	52%	51%
Microscopy positivity rate	44%	43%	42%
Estimated number with access to diagnosis in public sector in PMI-targeted area	2,910,731	3,215,823	3,533,872
Total projected number of diagnosed malaria cases ^{3,4}	7,395,733	7,947,324	8,572,717
Projected number of diagnosed malaria cases in PMI-targeted at-risk population ⁴	1,424,803	1,544,881	1,665,514
ACTs needed for PMI-targeted At-risk Population ⁵	1,424,803	1,544,881	1,665,514
Total National ACT Needs ⁵	7,395,733	7,947,324	8,572,717
Partner Contributions to National Needs			
ACTs carried over from previous year ⁶	243,730	1,652,809	0
ACTs from Government ⁷	0	0	0
ACTs from Global Fund ⁸	87,170	0	0
ACTs from other donors	0	0	0
ACTs planned with PMI funding ⁹	3,653,108	2,500,000	2,500,000
Total ACTs Available	3,740,278	4,152,809	2,500,000
Total ACT Surplus (Gap) ¹⁰	(3,655,455)	(3,794,515)	(6,072,717)

¹ Geographic coverage: the entire country is at risk of malaria

² PMI-targeted area of 6 focus provinces is 18.6% of total country population.

³ The total # of fever episodes per year is based on the following population breakdown: a. <5 years (17% of population) - 1.5 fevers/year; b. 5-9 years (17% of population) - 1 fever/year; c. 10-14 years (13% of population) - 0.63 fevers/year; d. >14 years (53% of population); 0.38 fevers/year.

⁴ Data Source: NMCP: Proportion of fevers with access to diagnosis in the public sector: % of fevers accessing public sector that are diagnosed with a RDT/Microscopy: Positivity rates for RDT/microscopy.

⁵ This is the quantity required to meet annual treatment needs. It does not include the quantity required to fill the pipeline with a minimum of 6 months of stocks to avoid stockouts at the facility level.

⁶ 2020: From FY20 Q1 Procurement Planning and Monitoring Report for malaria (PPMRm).

⁷ Government's contribution (if any) will not be allocated to PMI-focus provinces in order to contribute to national needs.

⁸ GF procures ACTs but these are generally not allocated to PMI provinces to avoid stockouts elsewhere. CY 2020 GF procures 62,7180 treatments.

⁹ 2020; PMI contribution covers 100% of PMI-focus area needs and approximately 12% of the needs for the remaining provinces.

¹⁰ For 2020 and 2021 the projected gaps would be realized in non-PMI-focus provinces

Injectable Artesunate Gap Analysis			
Calendar Year	2020	2021	2022
Injectable Artesunate Needs			
Projected number of severe cases (nationally)	369,787	397,366	428,636
Projected number of severe cases in PMI-targeted area ¹	99,842	107,289	115,732
Projected # of severe cases among children ²	46,926	50,426	54,394
Projected # of severe cases among adults ²	52,916	56,863	61,338
Total Injectable Artesunate Vials Needs for PMI Provinces ³	698,897	751,022	810,122
Partner Contributions			
Injectable vials carried over from previous year ⁴	0	283,320	184,954
Injectable vials from Government ⁵	582,217	252,656	486,073
Injectable vials from Global Fund ⁶	320,430	0	0
Injectable vials from other donors	0	0	0
Injectable vials planned with PMI funding	400,000	400,000	400,000
Total Injectable Artesunate Vials Available	982,217	935,976	1,071,027
Total Injectable Artesunate Vials Surplus (Gap) ⁷	283,320	184,954	260,905

¹ PMI supports requirements for larger health centers in 6 PMI-focus provinces (27% of national fevers): National Quantification: % of all diagnosed malaria cases projected to be severe malaria; 5% for 2020-2022.

² Proportion of severe malaria cases in children; 47%; 53% in adults. 2019 NMCP quantification.

³ Estimates of 7 vials per course from National Malaria protocol (ed:2017): The needs to fill the pipeline with minimum of 6 months of stock are not included. This quantity is factored into the calculations of any surplus.

⁴ 2020: A prorated amount of the national stock for PMI-focus provinces. In 2021, the surplus is the amount required to maintain minimum buffer stock of 6 months.

⁵ 2020: Prorated portion of GRA procurements for PMI-focus provinces: Government's commitment is projected to be 60% of the quantified needs in 2020 for non-PMI-focus provinces.

⁶ GF procures this, but it is generally not allocated to PMI provinces to avoid stockouts elsewhere.

⁷ Projected surplus in 2020 and 2021 is equivalent to 6 months consumption which is the minimum stock holding recommended in Angola.

Rectal Artesunate Suppository (RAS) Gap Analysis			
Calendar Year	2020	2021	2022
Artesunate Suppository Needs			
Projected number of severe cases (Nationally) ¹	369,787	397,366	428,636
Number of severe cases expected to require pre-referral dose at community level ²	55,468	59,605	64,295
Total Artesunate Suppository Needs ³	110,936	119,210	128,591
Partner Contributions			
Artesunate suppositories carried over from previous year	0	240,187	120,977
Artesunate suppositories from Government ⁴	77,655	0	0
Artesunate suppositories from Global Fund	0	0	0
Artesunate suppositories from other donors	0	0	0
Artesunate suppositories planned with PMI funding ^{5,6}	273,468	0	0
Total Artesunate Suppositories Available	351,123	240,187	120,977
Total Artesunate Suppositories Surplus (Gap)	240,187	120,977	-7,613

¹ PMI has supported pre-referral requirements nationwide: national quantification: % of all diagnosed malaria cases projected to be severe malaria; 6% for 2019, 5% for 2020 and 2021.

² 15% of severe malaria cases require referral - National Malaria Commodities Quantification Report (2018-19). The MoH policy for rectal artesunate currently supports its use in children under 6 years of age in peripheral health facilities.

³ An average of 2 suppositories per case - national malaria protocol (2017). This amount does not include the quantity required to maintain a minimum stock balance equivalent to 6 months of requirements as per minimum suggested national program recommendations.

⁴ Procured by GRA with national essential drugs kits but not allocated to PMI-focus provinces.

⁵ 2020 PMI amount is a 2019 procurement slated to arrive in 2020.

⁶ At present there have been maintained high level of stock of rectal artesunate at district warehouses and health facility levels. Little usage of RAS by health workers has been observed, likely because of a lack of training on its administration. We intend to encourage enhanced training in management of severe malaria and ensure protocols are in place for use, then reassess the need for ordering rectal artesunate, but at the moment, it was agreed that there is no need for additional stock of RAS.

Annex B. Program Inventory

Figure B1. Category: Vector Control

Activity	Metrics/Criteria	Relative Continuum					Estimate Level
		1	2	3	4	5	
Vector Control	Coverage with vector control intervention(s) with appropriate insecticide(s) given country's insecticide resistance profile	No coverage of malaria endemic areas with a vector control intervention	1-25% of the geographic area of malaria endemic regions covered	26-50% of the geographic area of malaria endemic regions covered	51-75% of the geographic area of malaria endemic regions covered	>75% of the geographic area of malaria endemic regions covered	4
Entomological Monitoring	Insecticide resistance monitoring	No monitoring	Limited monitoring conducted ad hoc	Annual monitoring conducted in limited number of sites, not covering all administrative units; occasional monitoring of molecular mechanisms	Annual monitoring conducted in a greater number of sites with some collaboration with other partners; routine monitoring of some resistance mechanisms	Regular high-quality monitoring in multiple sites per administrative unit considering molecular mechanisms and bioassay data and collaborating with other partners and NMCP	3
Entomological Monitoring	Insectary	No functioning insectaries	Insectary present, but frequent ruptures in rearing and contamination of strains; frequent challenges in meeting needs	Insectary present with full-time staff; some capacity for strain verification; some challenges to get enough mosquitoes and occasional contamination	One or more insectary present; regular verification; rare challenges to get enough mosquitoes; some capacity for strain verification	Highly functioning insectaries with verification of strains, capacity for rearing wild strains, and quality controls in place	3

Entomological Monitoring	Data-based vector control decision-making	No consideration of entomological data	Limited data review; reliance on outdated data; uncoordinated data analysis with limited collaboration with partners	Irregular and incomplete data review from multiple partners, sometimes in collaboration with research and funding partners	Collaborative but irregular review of entomological data, sometimes providing timely evidence for decisions	Collaborative regular review of entomological data from multiple sources for vector control decisions	2
Entomological Monitoring	Vector bionomics monitoring or research	No longitudinal monitoring or research done in country	Limited longitudinal monitoring and research done in country	Regular vector bionomics monitoring and vector control research done in country, but weaker role in decision-making	Regular vector bionomics and vector control research done in country but insufficient to respond to all major needs of the national program	Regular monitoring driven by program priorities alongside research done in country to provide timely data on the best malaria vector control	2
Entomological Monitoring	Institutionalization of funding	No resources	Supported by external partners; no host government funding	Some host country government funding	>50% funded by host country government	Fully funded by host country government	3
ITNs	Consistent distribution channels, in accordance with national strategy	Infrequent campaigns; no continuous distribution	Regular campaigns; no continuous distribution	Regular campaigns; inconsistent continuous distribution	Regular campaigns; at least one well-managed continuous distribution channel	Regular, well-executed campaigns; well-managed continuous distribution channels	3
ITNs	Regular supervision of routine ITN distribution (e.g. HFs, schools, communities)	No regular supervision	0-25% of sites regularly supervised	26-50% of sites regularly supervised	51-75% of sites regularly supervised	>75% of sites regularly supervised	2

ITNs	ITN distribution reporting capabilities	ITNs distributed not reported into LMIS (or other system)	Some ITNs distributed reported routinely	Some ITNs distributed reported routinely but cannot be disaggregated by channel	ITNs distributed reported routinely and disaggregated by channel	All ITNs distributed captured routinely, disaggregated, and reported electronically	3
IRS	Host country government's IRS implementation capacity	N/A, no host country government implemented spray campaign	Very limited capacity to implement minor aspects of spray campaign	Capacity to implement some aspects of spray campaign	Capacity to implement most aspects of spray campaign	Implements spray campaign independently	3
IRS	Institutionalization of funding	N/A, no IRS conducted in country	No host country government funding, only supported by external sources	Limited host country government funding in addition to external sources	>50% funded by host country government in addition to external sources	Fully funded by host country government, no external sources	3
IRS	Coverage of government-implemented spray campaign	N/A, no government-implemented spray campaign	Spray coverage not reported	≥85% coverage in some government-sprayed areas	≥85% coverage in most government-sprayed areas	≥85% coverage in all government-sprayed areas	3
IRS	Host country government and local institution IRS monitoring capacity: IRS quality/residual efficacy	N/A, no IRS conducted in country	No capacity (i.e. no staff hired or trained)	Limited ability to monitor IRS (i.e. staff hired, but need training and rely heavily on external assistance)	Occasional ability to monitor IRS (i.e. staff hired and trained, limited reliance on external assistance)	Independent monitoring for IRS quality/residual efficacy (i.e. fully trained staff without need for external assistance)	3
IRS	Host country government IRS monitoring capacity: environmental compliance	N/A, no IRS conducted in country	No capacity	Limited ability to monitor EC (i.e. staff hired, but need training and rely heavily on external assistance)	Occasional ability to monitor EC (i.e. staff hired and trained, limited reliance on external assistance)	Independent EC monitoring	3

Figure B2. Category: Case Management

Activity	Metrics/Criteria	Relative Continuum					Estimate Level
		1	2	3	4	5	
Community-Based	Coverage of CHWs trained in and providing CM (geographic or numerical target)	No CHWs conducting CM	0-25% of national target met	26-50% of national target met	51-75% of national target met	76-100% of national target met	4
Community-Based	Regular supervision of CHWs in CM as per national QA/QC guidelines	No CHWs regularly supervised in CM	0-25% of CHWs regularly supervised in CM	26-50% of CHWs regularly supervised in CM	51-75% of CHWs regularly supervised in CM	76-100% of CHWs regularly supervised in CM	2
Community-Based	CHW reporting	CHW-managed cases not reported into HMIS	Some CHW-managed cases routinely reported into HMIS	Cases routinely reported into HMIS but not disaggregated from facility-reported cases	Cases routinely reported into HMIS and can be disaggregated from facility-reported cases	All CHW case data routinely captured and reported electronically	2
Community-Based	Institutionalization of funding (salaries and/or other support)	No resources	Only supported by external partners, no host country government funding	Some host country government funding	>50% funded by host country government	Fully funded by host country government	3

Facility-Based	Access to care (within 5 km of a health facility or as per national definition)	0-20% of population has access	21-40% of population has access	41-60% of population has access	61-80% of population has access	>80% of population has access	3
Facility-Based	Regular supervision of public facilities in CM	No regular supervision in CM	1-25% of facilities regularly supervised in CM	26-50% of facilities regularly supervised in CM	51-75% of facilities regularly supervised in CM	>75% of facilities regularly supervised in CM	2
Facility-Based	Drug resistance monitoring	No TES performed in last 3 years	TES performed in last 3 years but results not available	Recent TES results available (within last 3 years) but no training in molecular testing	Recent TES results available (within last 3 years) and in-country staff trained in molecular testing	Recent TES results available (within last 3 years) and in-country capability for molecular testing	4

Figure B3. Category: Drug-Based Prevention

Activity	Metrics/Criteria	Relative Continuum					Estimate Level
		1	2	3	4	5	
MIP	National MIP policy	No policy	Policy exists but is not comprehensive (does not cover all aspects of MIP: ITN, CM, and if applicable IPTp)	Comprehensive policy exists, but not all WHO recommendations included	Policy meets current WHO recommended MIP prevention	Comprehensive, WHO-aligned policy is actively implemented	4

MIP	Country policy adoption/adaptation of 2016 WHO ANC guidelines	No policy	Country has started discussions for adopting guidelines but still implements FANC	Country has policy with 2016 guidelines but no provision for early delivery of IPTp	Country policy is aligned with 2016 guidelines and has provision for delivery of IPTp at 13-16 weeks	Country policy is aligned with 2016 guidelines, has a provision for delivery of IPTp at 13-16 weeks, and is implemented at facility level	5
MIP	Tracking ANC contacts in the HMIS	Not tracked	First ANC visits tracked in the HMIS	1-3 ANC visits tracked in the HMIS	Up to 4 ANC visits tracked in the HMIS	All ANC visits in line with 2016 guidelines tracked in HMIS	4
MIP	National MIP working group established and coordinating effectively	No working group	Working group formed and meets ad hoc, TORs established	Working group engages in regular coordination but lacks mechanisms to ensure integration across technical areas	Working group coordinates at national level only with malaria and maternal health with limited mechanisms to ensure integration across technical areas	Working group coordinates regularly at national and sub-national level with malaria and maternal health and ensures integration across technical areas	3
MIP	Supportive MIP supervision in health facilities	No regular supervision	1-25% of facilities regularly supervised	26-50% of facilities regularly supervised	51-75% of facilities regularly supervised	>75% of facilities regularly supervised	2
MIP	Routine SP resistance monitoring via biomarkers	No SP resistance monitoring	SP resistance monitoring done in the last 6-10 years	SP resistance monitoring done in the last 4-5 years	SP resistance monitoring done in the last 3 years	SP resistance monitoring done in the last 3 years and results published or being published	1

Figure B4. Category: Supply Chain

Activity	Metrics/Criteria	Relative Continuum					Estimate Level
		1	2	3	4	5	
Supply Chain	Forecasting and Procurement Planning	Forecasts created ad hoc with no corresponding supply plans developed	Forecasts and supply plans overly reliant on assumptions or outdated/limited data, developed annually, and not necessarily used to inform initial procurements	Forecasts and supply plans incorporating service and/or consumption data are updated semi-annually and inform ongoing procurement actions	With donor support forecasts and supply plans incorporate near real-time services, consumption data, and seasonality; quarterly updates with corresponding changes made to procurement actions	Independent forecasts incorporating near real-time service, consumption data, and seasonality are updated quarterly; supply plans are updated monthly to inform ongoing procurement actions	3
Supply Chain	Storage	Quantity and quality of infrastructure, as well as operations at all stock holding levels (central, sub-central/facility), compromise ability to ensure commodities, including ITNs, are adequately protected from damage, deterioration, and loss	Quantity and quality of infrastructure, as well as operations in at least one stock holding level ensure that commodities, including ITNs, are adequately protected from damage, deterioration and loss	Quantity and quality of infrastructure, as well as operations in at least two stock holding levels ensures that commodities, including ITNs are adequately protected from damage, deterioration and loss	With donor support, host country can scale infrastructure requirements, including for routine and campaign ITNs, via outsourced warehousing and ensure quality of infrastructure and operations at all stock holding levels, even those provided through the private sector, adequately protect commodities from damage, deterioration and loss	With very limited or no donor support, host country can scale infrastructure requirements, including for routine and campaign ITNs, via outsourced warehousing and ensure quality of infrastructure and operations at all stock holding levels, even those provided through the private sector, adequately protect commodities from damage, deterioration and loss	1

<p>Supply Chain</p>	<p>Inventory Management</p>	<p>SOPs for inventory management non-existent, outdated or unable to be routinely adhered to</p>	<p>Updated SOPs for paper-based inventory management system in place but discrepancies between virtual and actual stock figures are common</p>	<p>SOPs for paper-based inventory management system at lower levels and use of an electronic inventory management at central level (WMS) maintain inventory count accuracy but data on expiration or lot/batch insufficiently tracked</p>	<p>Inventory data, incorporating multiple commodity attributes (quantity, expiration, lot/batch) is digitized in at least two stock holding levels with inventory records considered to be reliable</p>	<p>All inventory data attributes digitized at all stock holding levels with near real-time stock visibility, validated for accuracy, available across all stock holding points</p>	<p>3</p>
<p>Supply Chain</p>	<p>Logistics Management Information System</p>	<p>No LMIS available for aggregating, analyzing, validating and displaying logistics data from lower levels of the logistics system</p>	<p>Paper-based LMIS that aggregates and displays logistics data from lower levels of the logistics system is available and used primarily to inform facility level resupply; poor LMIS reporting completeness and timeliness</p>	<p>Paper-based LMIS that aggregates and displays logistics data from lower levels of the logistics system used to inform facility level resupply, produce metrics for performance monitoring, and process improvement initiatives; adequate LMIS reporting completeness and timeliness</p>	<p>LMIS with digitized facility-level inventory and consumption data visible across some supply chain levels used to inform resupply, performance monitoring, process improvement initiatives and strategic planning; good LMIS reporting completeness and timeliness</p>	<p>LMIS with digitized facility-level inventory and consumption data visible across all supply chain levels is operational and integrated with other MIS platforms; excellent LMIS reporting completeness and timeliness</p>	<p>2</p>

Supply Chain	Transportation Management	Higher level resupply points irregularly allocate resources for resupplying lower level facilities; lower level facilities often required to provide own transport to retrieve commodities from resupply points; ITN distribution unorganized and inadequately resourced	System exists for transportation from higher to lower stock holding levels but is irregularly executed due to limited planning, lack of funding or incapacitated vehicles; significant donor-supplied transport resources including for ITN distribution	Transportation consistently undertaken per schedule, capacity exists to use third-party transporters, routes are regularized, proofs of delivery reviewed and reconciled; significant donor-supplied transport resources including ITN distribution	Transportation planning regularized and optimized with third-party transport used often, tracking of vehicles via regular check-ins or GPS, paper proofs of delivery reviewed and reconciled, key performance indicators tracked; some donor funding for transportation resources	Transportation scheduling and routing optimized, third-party transporter use regularized, GPS vehicle tracking, electronic proofs of delivery reviewed and reconciled, key performance indicators tracked and 3PL assignments/lanes allocated based on best value; no donor funding	2
Supply Chain	Routine Distribution and Resupply	No routine requisition and resupply schedule between stock holding levels	Routine requisition and resupply between at least two stock holding levels according to a schedule but not well informed by consistently accurate demand and inventory figures	Routine resupply between all stock holding levels, informed by adequate demand and inventory accuracy, conducted according to a schedule, validated by malaria program personnel and routinely monitored	Donor-supported routine resupply between all stock holding levels, informed by accurate, near real-time demand signals and validated by malaria program staff, done according to a schedule and routinely monitored	Routine resupply between all stock holding levels, informed by accurate, timely, and near real-time demand signals, done with limited or no donor support according to a schedule shared with all levels; malaria program management has visibility into planning, execution and results	2

<p>Supply Chain</p>	<p>Health Commodity Regulations and Policy</p>	<p>Legal basis for a medicine (and other health commodity) regulatory agency to function is absent or inappropriate; formal organizational structure for in-country stakeholders and relevant agencies with delegated authority absent or inadequate (e.g., up-to-date organogram of MOH); human and financial capacity to enable regulation weak or absent</p>	<p>Medicines framework exists and is sufficient to support basic regulatory functions including clinical dossier review (licensing) and marketing authorization with registration; documented domestic financial support to enable regulatory activities, including HR</p>	<p>All SDP levels have policies that address STG, quality assurance and HR; no consistent approach to pharmacovigilance or a standard reporting structure for pharmacovigilance events; overall quality management system in place to support interface of product licensing, registration, manufacturing, post-marketing surveillance</p>	<p>Strong policy and strategic leadership by government with firm grasp of budgets and financial sustainability; robust implementation plans, and supportive supervision, capacity building and guidance to managers within the system</p>	<p>MOH leads strategic functions such as policy formulation, quality assurance and oversight of policy implementation funds; ability to ensure product quality, automated drug registration, clear/transparent importation process, robust post-market surveillance system, and track and trace regulations developed or in process of implementation</p>	<p>2</p>
<p>Supply Chain</p>	<p>Supply Chain Strategy and Governance</p>	<p>Human, organizational and financial capacity to develop or execute a supply chain strategic plan incorporating malaria SC specifics absent or inadequate</p>	<p>Human, organizational and financial capacity sufficient to develop and execute portions of a supply chain strategic plan incorporating malaria SC specifics</p>	<p>Approved, up-to-date supply chain strategic plan (with clear roles and responsibilities for all SC levels, stakeholder mapping, costs); includes risk mitigation and workforce development plans</p>	<p>Approved, up-to-date supply chain strategic plan (with clear roles and responsibilities for all SC levels, stakeholder mapping, costs); implementation of workforce development and risk mitigation plans with significant donor support</p>	<p>Human, organizational and financial capacity to execute and maintain a supply chain strategic plan incorporating malaria SC specifics present and maintained with minimum donor support</p>	<p>2</p>

Figure B5. Category: Strategic Information

Activity	Metrics/Criteria	Relative Continuum					Estimate Level
		1	2	3	4	5	
Data, Surveillance, Monitoring & Evaluation	Overall HMIS reporting rate (CY 2019)	<60%	60-69%	70-79%	80-89%	90%+	4
Data, Surveillance, Monitoring & Evaluation	Element-specific reporting rate: “Confirmed malaria cases among children under age 5” (CY 2019)	<60%	60-69%	70-79%	80-89%	90%+	4
Data, Surveillance, Monitoring & Evaluation	HMIS data quality assurance and quality control	Few standards exist for data collection, assembly, and analysis; ad hoc data quality reviews and audits for specific needs; no data-quality assurance plan and national coordinating body exist	Standards used for data collection, assembly and analysis in limited settings; some electronic tools used for data quality review and audit; data-quality assurance plan available	Standards defined and implemented nationally for data collection, assembly, analysis; data quality reviews and audits scheduled and include remediation process for identified issues; SM&E staff seconded to NMCP	Data reviews and audits integrated in strategic plans and conducted on a regular schedule; national data-quality governing body meets regularly; issues identified addressed via established remediation process	Continual review and audit (automated and manual) to ensure defined levels of data quality; data quality metrics used for ongoing improvement; national governing body and key stakeholders review data-quality assurance plan periodically	2

<p>Data, Surveillance, Monitoring & Evaluation</p>	<p>Reporting Systems</p>	<p>Data collection tools not standardized and procedures inconsistently followed; unstructured data collection and storage; no NMCP access to HMIS malaria data</p>	<p>Data systems support longitudinal health data (clinical, surveillance, M&E) in limited settings; data available for centrally mandated reporting; parallel malaria reporting system may exist</p>	<p>Most platforms/applications ensure data availability at all levels for decision support and M&E for authorized users; no parallel malaria reporting system; NMCP has access to HMIS malaria data</p>	<p>Data systems ensure reliable and appropriate access to data at all levels for authorized users; reporting requirement changes accommodated with minimal disruption to data availability; data systems support secondary data use; NMCP has access</p>	<p>Data availability monitored for continual improvements and to meet emerging health sector needs; reporting available from private facilities and community-level providers and can be disaggregated</p>	<p>4</p>
<p>Data, Surveillance, Monitoring & Evaluation</p>	<p>Data collection</p>	<p>Data not collected at community level (CHWs) and irregular or inaccurate at rural and more central health facilities; system is entirely paper based, but registers may be absent</p>	<p>Collection well managed at health facility level, but incomplete at community level; most collection and aggregation is paper based; registers generally available; timeliness and completeness remain challenges</p>	<p>Collection well managed at health facility and community level; most collection is paper based, aggregation is electronic; registers available; timeliness and completeness >80%, feedback to collectors limited</p>	<p>Collection at all levels; collection is electronic and sometimes paper based, aggregation is electronic; registers hold all program critical data; timeliness and completeness >80%, feedback to collectors standardized</p>	<p>Data collection occurs at all levels and is transmitted in real time with timely feedback to collectors and users of data; data checks exist at point of collection; electronic transmission is the norm, including to data collectors</p>	<p>2-3; Note: Aggregation is done electronically, but timeliness and completeness is less than 80% in some areas.</p>

Data, Surveillance, Monitoring & Evaluation	Data use	Activities (analysis, interpretation, visualization) to ensure data use are rarely implemented	Limited data use activities are implemented (bulletin developed but analysis and interpretation for decision-making needs strengthening)	Country conducts regular data use activities (review meetings, bulletin at least quarterly, at least at the central level)	Country conducts regular data use activities at all levels (review meetings, bulletins, dashboard at least quarterly)	Country has developed own high-quality dashboard to facilitate data use and informed decision-making is evident at all levels frequently	3
Operations Research and Program Evaluation	PMI in-country OR/PE experience	No previous PMI OR/PE experience in country	PMI team has prepared concept notes but has not completed protocols or conducted OR/PE	PMI team has completed protocols and received approval for OR/PE; studies in planning, underway, or recently completed	PMI team and/or other country partners have completed a OR/PE study and prepared and shared reports	Multiple OR/PE studies completed that address malaria program implementation bottlenecks; publication and sharing of results, with involvement from MOH co-investigators	3
Operations Research and Program Evaluation	Country mechanisms for OR/PE review	No in-country process for research review, determination or IRB processes	Limited in-country processes for research review, determination and IRB oversight	Processes in place for research and IRB review with federal wide assurance approval, but no previous PMI in-country OR/PE engagement	Processes in place for research and IRB review with federal wide assurance approval with previous PMI in-country OR/PE engagement	Full complement of research review, approval, and oversight processes including data safety and monitoring boards; systems for results sharing	4

Operations Research and Program Evaluation	In-country partnerships for OR/PE	No in-country partners (academic, NGO, or other) with OR/PE experience	1-2 in-country partners with OR/PE experience, but no malaria-specific experience	3+ in-country partners with OR/PE experience; 1+ with some malaria expertise; no current PMI OR/PE work	3+ in-country partners with OR/PE experience; 1+ with malaria expertise; current or recent PMI OR/PE work	Multiple in-country partners with malaria experience in PMI OR/PE, including completed past work and reporting on malaria OR/PE	4
Operations Research and Program Evaluation	MOH capacity for conceptualizing problems needing scientific evaluation	No experience	Some but limited experience in identifying programmatic problems and prioritization	Experience with identifying program problems and prioritizing OR/PE	Experience with identifying problems needing OR/PE and developing study approaches with partners	Extensive experience with identification, prioritization, proposal development and conducting OR/PE	4

Figure B6. Category: Support Systems

Activity	Metrics/Criteria	Relative Continuum					Estimate Level
		1	2	3	4	5	
SBC	National malaria SBC strategy to guide design and implementation of malaria SBC activities	No strategy	Strategy exists, but is low quality and missing key elements from the RBM SBC Working Group National Malaria SBC Strategy Template	High-quality strategy exists, but no evidence it has been used to guide design or implementation	High-quality strategy exists and is sometimes used to guide design and implementation of SBC activities	High-quality strategy exists and is used routinely to guide design and implementation of SBC activities	2

SBC	SBC technical working group	No group	Group exists in theory, but has not been operationalized or institutionalized	Group exists and meets routinely, but lacks clear pathways for coordination	Group exists and has effective pathways for coordination, but generally only coordinates at the national level	Group engages effectively in regular coordination at national and sub-national level	3
SBC	Formative assessments	No assessment of any kind conducted in last five years	No assessment of any kind conducted in last three years	Assessment conducted in last three years, but with significant quality issues	High-quality assessment conducted in the past three years, but results not widely disseminated	High-quality assessment conducted in the past three years and results widely disseminated	3
SBC	SBC interventions (targeted and tailored based on available behavioral, demographic, and epidemiological data)	No evidence available data used to inform intervention design	Available evidence referenced in intervention design; results do not typically inform final design, resulting in broad and unfocused SBC interventions	Available evidence generally used to loosely target SBC interventions to specific populations, but interventions not tailored to address behavioral determinants of those populations	Available evidence used to loosely target SBC interventions to specific populations and interventions somewhat tailored to address behavioral determinants of those populations	Available evidence used to target SBC interventions to specific populations and interventions well tailored to address behavioral determinants of those populations	2

SBC	Capacity to support implementation of SBC activities	Generally weak at central and peripheral levels	Generally strong at the central level with sufficient expertise and resources to deliver high-quality SBC interventions	Generally strong at central and provincial levels with sufficient expertise and resources to deliver high-quality SBC interventions	Generally strong at the central, provincial, and district levels with sufficient expertise and resources to deliver high-quality SBC interventions	Generally strong at the central, provincial, district, and community levels with sufficient expertise and resources to deliver high-quality SBC interventions	1
Additional Health Systems Strengthening	Staffing	No staff	Manager and a few technical staff; not all intervention areas covered	Manager and technical staff for each intervention area; many staff have limited training and experience; limited program support staff	Full staffing of program areas and support systems but some staff need further training; limited plans and opportunities for training	Fully staffed with relevant training and experience; complete plan for professional development	3
Additional Health Systems Strengthening	Office space, transport	No office space or transport	Office space exists but is insufficient for staff; transport available at intervals but limited for program needs	Office space adequate for current staff but no growth possible; office not well positioned for access to MOH leadership; transport available but insufficient and not well managed/maintained	Office space adequate for current staff and some technical areas (e.g., lab) but not fully adequate for growth and all technical services; transport mostly sufficient	Office space fully adequate for current staff and technical needs (lab, insectary, meeting space, etc) and some growth and well positioned in MOH; transport fully available for needs, including trucks and 4-wheel drive vehicles as needed (all maintained and managed)	2

Additional Health Systems Strengthening	Internet connectivity	No internet	Intermittent connectivity; poor bandwidth; challenging maintenance; very little budget	Mostly connected with some outages; ok but not ideal bandwidth; irregular maintenance; modest budget	Generally stable connections, adequate bandwidth for most work, fair to good maintenance and sufficient budget	Fully connected, maintained, good bandwidth for all needs, and sufficient budget including all needed hardware and software	2
Additional Health Systems Strengthening	NMCP placement in MOH	NMCP exists but barely visible in MOH structure	NMCP visible in the MOH structure but NMCP manager reports to supervisor who is low in the MOH system	NMCP visible and manager reports to high-level leader in MOH (e.g., Director of Public Health or Permanent Secretary for Health)	NMCP highly visible and reports at a high level in MOH and has some access to other ministry leadership (e.g., education, agriculture)	NMCP highly visible in MOH and all other relevant ministries with ready access to country leadership (e.g., president/prime minister and parliament)	3