

# PMI

# 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.

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## ZAMBIA

### 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, lifesaving malaria interventions alongside catalytic technical and operational assistance to support Zambia to end malaria. PMI has been a proud partner of Zambia since 2008, helping to decrease child death rates by 49 percent through investments totaling almost \$323 million through FY 2020.

The proposed PMI fiscal year (FY) 2021 planning budget for Zambia is \$28 million. This Malaria Operational Plan (MOP) summary outlines planned PMI activities in Zambia for FY 2021. See accompanying **FY 2021 Budget Tables** (Tables 1 and 2) for activities and budget amounts, available on [pmi.gov](https://www.pmi.gov). Developed in consultation with the National Malaria Elimination Centre (NMEC) 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 Zambia (GRZ) as well as other donors and partners. See [Annex A: Gap Analysis Tables](#) for information on commodities (ITNs, SP, RDTs, ACTs, SMC, and artesunate).

To accelerate the journey to self-reliance, PMI developed a programmatic inventory to assess the strengths and persistent challenges of the Zambia 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 in September 2019, the following new data, updated policy and/or strategic priorities relevant for the FY 2021 MOP have become available:

#### Updated malaria situation:

- **Through the end of CY 2019, case incidence continued to improve.** This was captured in the annual stratification exercise, which incorporated health facility and community case data for classified health facility catchment areas (HFCAs) by epidemiologic level. In 2019, 46% of HFCAs fell into the lower strata (<200 cases/1000 pop/yr) corresponding to 62% of the national population. This represents a significant improvement from 2016, at which time 39% of the population lived in level 1 and 2 HFCAs. Residents of Luapula and North-Western provinces, as well as rural districts on the Copperbelt and the low-lying areas of Eastern, tended to bear the highest malaria risk.
- **In the first half of CY 2020, epidemiologic trends in malaria indicators worsened:** In Q1 and Q2 2020, the NMEC reported a 30-50% increase in malaria cases, malaria deaths,

and test positivity rates nationally, as compared with 2018 and 2019. All 10 provinces have seen worsening trends, but with relative sparing of areas with high intervention coverage from PATH's Malaria Control and Elimination Partnership in Africa (MACEPA), with support from the Bill & Melinda Gates Foundation, or PMI support (e.g. Southern Province, the pre-elimination district in Eastern, and rural Copperbelt). Formal analysis is ongoing, but NMEC and stakeholder deliberations have highlighted likely contributing factors, among which are:

- The historically high rainfall in some provinces. A similar worsening trend in seen for Southern African neighbors, also associated with increased rainfall.
  - Aging ITNs, with the last mass campaign occurring in 2017 and the ongoing PMI-supported ITN durability study showing just 1.5 years of effective net lifespan.
  - IRS operational challenges, particularly in Global Fund/GRZ operational areas. These include late arrival of commodities with late commencement and late conclusion of spraying in the majority of provinces as well as poor household preparation and limited supervision in many areas.
  - Increased case reporting from community case management, reflecting improved access to care.
- **Entomological monitoring findings have continued to be favorable overall:** The Zambia entomological monitoring program continued to collect residual efficacy data despite COVID restrictions. As of August 2020, clothianidin and clothianidin-deltamethrin, which are the two products deployed by PMI-funded operations in 2019 and 2020, have demonstrated full insecticide susceptibility as well as at least 10 months of residual efficacy on sprayed walls. The impact of PMI-funded IRS was suggested by reduced parity rates noted at most monitoring sites. However, absence of significant difference in sprayed versus unsprayed sites was found in several indicators following the 2018-19 and 2019-20 seasons, such as vector densities. In GF/GRZ-funded operational areas, the predominant local vectors generally remain susceptible to deployed pesticides. [Reference: PMI VectorLink entomologic reports on pmi.gov.]
  - **Continued favorable therapeutic efficacy of first-line anti-malarial medications:** Zambia routinely monitors the therapeutic efficacy of artemether-lumefantrine (AL), which is used as first-line malaria treatment and dihydroartemisinin-piperaquine (DHAP), which is reserved for mass drug administration (MDA). Preliminary therapeutic efficacy survey (TES) results suggest continued efficacy of ACTs. According to the NMEC, between 2017 and 2019 there was no change in parasite resistance to these drugs, with adequate clinical and parasitological response still at 100%.
  - **Continued rapid population growth and lack of commensurate funds for malaria:** Zambia's rapid population growth, estimated at 2.9% (World Bank) creates resource challenges for malaria control programming, which relies on achieving high population coverages of key interventions. PMI's funding levels of \$30 million in FY 2017 and \$28 million in FY 2021 translate to a 17% decrease in per-capita spending over four years. Similarly, Global Fund's base funding allocations of \$69 million for 2018-2021 and \$65 million for 2021-24 imply an 18% drop in per-capita support over 6 years. In addition, the Zambian kwacha has faced a sustained devaluation path amid GRZ financing constraints.

## Updated Policy and Strategic Context:

### **General Strategy:**

- Zambia's *National Malaria Elimination Strategic Plan (NMESP) 2017-21* continues to provide the overall strategic framework. The strategy will undergo its routine End Term Review (ETR) in 2021, which is expected to be supported by PMI, MACEPA, WHO, and other partners. The country strategy is generally consistent with PMI and WHO technical guidelines. Some deviations are noted on an operational level such as the current MOH plan to conduct MDA in 15 high-burden districts once resources are available, using non-PMI and non-Global Fund resources.
- The NMEC continues to count on close support for the NMESP from various malaria partners "through technical assistance, commodity procurement, and operations. These partners include, among others: WHO, ALMA, the South African Development Community Malaria Elimination 8 (SADC/E8), The Global Fund, PMI, PATH/MACEPA, Isdell:Flowers Foundation, the World Bank, Rotarians, and Mobilising Access to Maternal Health Services (MAMaZ) Against Malaria; mines, plantations and other private sector partners; research and academic institutions; and local civil society organizations (CSOs)."
  - The Global Fund invited Zambia to submit a "continuation grant" request, with emphasis on strategic continuity with the 2018-20 grant, but with operational improvements to reflect various lessons learned. The within grant allocation amount offered was \$65 million, a decrease from \$69 million. In light of the GRZ's continued highly constrained fiscal situation, Zambia is effectively counting on approximately \$35 million in an above-allocation request (PAAR) to cover anticipated implementation gaps. At the time of this MOP exercise the Global Fund Funding Request for 2021-23 had reached the grant-making stage.
  - There are as-yet undefined plans for increased technical assistance from the Chinese government, potentially in technical areas such as surveillance, lab capacity, MDA, and a possible focus on urban geographies such as Lusaka and Copperbelt provinces.
  - Reflective of global trends, some partners in Zambia are putting increased emphasis on high burden/high impact areas of the country. For example, it is expected that future support from the Gates Foundation to MACEPA may allow for more direct collaboration with PMI in geographies such as Eastern Province and Luapula.
  - Zambia's End Malaria Council has formally set up provincial-level councils and a national End Malaria Fund as part of its effort to mobilize domestic resources. Contributions from members have been innovative and demonstrate great potential, if limited in financial scope to date.

### **Vector Control - Entomological Monitoring**

- The *National Insecticide Resistance Management and Monitoring Plan*, last revised in 2018, continues to guide resistance monitoring and the deployment of insecticides for malaria control. Given documented widespread pyrethroid resistance, especially in *Anopheles gambiae* s.l., Zambia's policy is to: 1) use non-pyrethroid pesticides in IRS

campaigns and implement a mosaic approach at district or provincial level that includes clothianidin only/clothianidin-deltamethrin formulations, DDT, and, other emerging insecticides once available (i.e. chlorfenapyr) and, 2) switch from standard ITNs to PBO ITNs when resources permit. Fixed-point entomological sentinel sites increased from 12 in 2017 to 22 in 2019, with plans to expand to 39 sites by 2022.

### **Vector Control - IRS and ITNs:**

- The national goal for intervention coverage is universal access to either IRS or ITNs, complemented by larval source management where local resources permit.
  - Recognizing operational challenges in achieving full vector control coverage, the program is taking deliberate efforts to deploy IRS and ITNs in a more efficient and complementary way. For example, to optimize population coverage while minimizing gaps at sub-district level, the program is conducting detailed planning exercises using innovative mapping systems to target interventions.
- Since 2017, IRS has been the preferred primary vector control method, and all 117 districts in Zambia continue to be targeted for IRS campaigns (except for the swampy Lunga District in Luapula). However, as articulated in the June 2020 Global Fund Funding Request, the NMEC plans a “tactical” shift, where universal access to ITNs would be prioritized in high-burden areas, and focal/targeted IRS would be provided elsewhere. Following three-to-four consecutive years (2019-2022) of effective IRS coverage, the NMEC expects a reduction in malaria burden to levels that will allow for transitioning to ITNs.
  - PMI/Zambia is supportive of this shift and has advocated a return to universal ITN coverage in high-burden areas for some time. The plan is to follow international best practice for withdrawal of IRS, including strengthened entomological monitoring, epidemiological surveillance, case management, commodity (i.e. ACTs and RDTs) monitoring, and increased provision of malaria commodities (i.e. ITNs, ACTs and RDTs) for potential rebound.
- To reduce operational bottlenecks and associated delays, the NMEC is aiming to increase local government involvement in IRS management. Beginning in 2021, local government will increasingly take over several functions from the MOH such as local financing, planning, and implementation and monitoring. Following vetting during the 2021 End Term Review exercise, the approach will be pilot tested in a small number of districts. The NMEC will retain the technical oversight, coordination, and policy guidance for IRS. This implementation approach is consistent with the national decentralization policy, as it will involve devolution of primary health care to local government.

### **Case Management - Community Case Management**

- The NMEC and partners continue to prioritize further expansion of community case management to improve access to prompt diagnosis and treatment.
  - Zambia’s extensive recent expansion of community case management of malaria—undertaken largely in the context of integrated community case management (iCCM)—is based on a revised and harmonized national curriculum for CHW training. This includes provision of a standard enabling package (bicycles,

commodities kit, t-shirt, phone) and coordinated operations. In 2019 and 2020, the NMEC partners have continued to rally behind this approach, minimizing duplication of effort.

- Although PMI resources have recently boosted selected districts, most in PMI focus provinces of Luapula, Northern and Muchinga have yet to scale up iCCM. The program aims to build on recent momentum to expand iCCM, especially in high-burden and hard-to-reach areas.
- In lower-strata HFCAs, CHWs are also deployed to conduct reactive case detection (RCD) to generate surveillance data and suppress transmission hot spots. Prior to May 2020, CHWs in higher-level strata also undertook RCD on a limited basis to maintain skills, but this has been reduced to conserve limited RDT and ACT resources.
- Following a pilot in Serenje, which demonstrated improved severe malaria outcomes (*Bull. WHO* Dec 2019), Zambia has accumulated additional experience with the use of rectal artesunate (RAS) by CHWs for initial management of severe malaria during urgent referral to health facilities. As documented in Serenje, and during recent PMI-supported scale up in Chama district, the approach appears feasible when it builds on village-level emergency transport systems linked to safe motherhood investments. The NMEC is calling for further scale up.

#### **Case Management - Commodity Insecurity**

- Due to a combination of under-investment in procurement during 2019 and COVID-related supply chain disruptions during 2020, the country suffered central-level stockouts of RDTs from May to July 2020, as well as scattered stockouts of ACTs at the facility level. This scaled back iCCM in many districts and contributed to a modest rise in unconfirmed malaria cases. This prompted the NMEC and partners to focus on improving national resilience through:
  - Enhanced monitoring and partner coordination, including institution of weekly commodity review meetings at the NMEC since April 2020
  - Restoration and maintenance of 6-month buffer stocks
  - Maintenance of capacity for microscopic diagnosis to reduce dependence on international RDT supply chain

#### **Cross-Cutting Areas**

- *SBC*:
  - An assessment in December 2019 highlighted a need for support in developing tailored SBC activities as Zambia begins to implement a stratified malaria strategy with a varied mix of interventions in high and low transmission settings. Support is also needed to strengthen donor coordination at the provincial and district level and ensure SBC activities target barriers to behavior change in the areas of early care seeking, ITN use, and early ANC attendance.

- *Surveillance, Monitoring, Evaluation, and Operational Research (SMEO):*
  - Zambia’s next malaria indicator surveys (MIS) are planned for 2021 and 2024. There is no need for MIS funding from the FY 2021 MOP as funding has already been provided by PMI.
  - The PMI-supported pilot of malaria surveillance using the ANC platform has gone well in terms of feasibility, cost-effectiveness, and generation of useful data on parasitemia trends and intervention coverage. Formal validation is pending the implementation of a household survey in May-June 2021, which was delayed due to COVID-19. Prospects seem good for rolling out ANC-based surveillance in future years at a set of sentinel sites that is still to be determined.

For more information about the malaria situation, malaria control progress, and intervention-specific data in Zambia, please refer to the FY 2020 MOP available on [pmi.gov](https://pmi.gov).

## **Annex A. Gap Analysis Tables**



ACT Gap Analysis			
Calendar year	2020	2021	2022
Population of Zambia based on CSO <sup>1</sup>	17,885,422	18,400,556	18,952,573
Population at risk for malaria	17,885,422	18,400,556	18,952,573
PMI-targeted at-risk population	17,885,422	18,400,556	18,952,573
<i>Total ACT needs - annual patient need only <sup>2</sup></i>	<i>13,212,735</i>	<i>15,844,981</i>	<i>16,739,941</i>
ACT quantity needed for desired inventory level		7,922,491	8,369,970
<b>Total ACT needed</b>		<b>23,767,472</b>	<b>25,109,911</b>
<b>Partner contributions</b>			
ACTs carried over from previous year	0	9,262,858	3,526,185
ACTs from Government	2,615,385	0	
ACTs from Global Fund MOH <sup>3</sup>	7,583,610	7,787,148	
ACTs from Global Fund CHAZ <sup>3</sup>	661,295	5,443,651	
ACTs planned with PMI funding <sup>4</sup>	11,615,303	4,800,000	5,332,500
<b>Total ACTs Available</b>	<b>22,475,593</b>	<b>27,293,657</b>	<b>8,858,685</b>
<b>Total ACT surplus/gap</b>	<b>9,262,858</b>	<b>3,526,185</b>	<b>-16,251,226</b>

1. Data based on 2019 F&Q assumptions. 2020 annual F&Q scheduled for October 2020 and no changes made to the data during the June 2020 F&Q review meeting.

2. Buffer equivalent to 6 months of stock to end the year with full pipeline. This was added for years 2021 - 2023, which increases the total need for the three years.

3. GF commitments indicative only based on inputs into the 2021 application. May change as the application is reviewed and approved.

4. Quantities for 2021 for PMI funding were determined by total MOP funding (per commodity category) and latest consultation with PSM HQ regarding unit cost and freight. These may vary from quantities delineated in the MOP and are subject to change.

RDT Gap Analysis			
Calendar year	2020	2021	2022
Total country population <sup>1</sup>	17,885,422	18,400,556	18,952,573
Population at risk for malaria	17,885,422	18,400,556	18,952,573
PMI-targeted at-risk population	17,885,422	18,400,556	18,952,573
OPD attendance <sup>2</sup>	6,971,830	7,018,227	7,066,987
Estimated attendance at community-level <sup>3</sup>	2,987,927	3,007,812	3,028,709
Patients presenting with fever at OPD <sup>4</sup>	3,485,915	3,509,114	3,533,494
Patients presenting with fever at Community level <sup>5</sup>	472,093	475,234	478,536
Estimated Fever Cases in zonal levels 0, 1, and 2 - 32% (based on 2018 MIS)	1,266,562	1,274,991	1,283,849
Index follow-up in the zonal levels 0, 1, and 2; and 20 individuals per index case tested <sup>6</sup>	3,039,750	3,059,979	3,081,239
Index follow-up in zonal levels 3 & 4 - 60 index tests/CHW/year <sup>7</sup>	1,946,640	0	0
Adjustment for retests, training and QA/QC - 10%	894,440	704,433	709,327
Number of mRDTs Required (estimates *3 expected test/person)	29,516,512	23,246,279	23,407,785
<i>Total Patient RDT Need - Adjusted for program growth <sup>9</sup></i>	<i>33,943,989</i>	<i>26,733,221</i>	<i>26,918,952</i>
RDT quantity needed to maintain desired inventory level		13,366,610	13,459,476
<b>Total ACT needed including quantity needed to maintain desired inventory level</b>		<b>40,099,831</b>	<b>40,378,429</b>
<b>Partners contributions (to PMI target population if not entire area at risk)</b>			
RDTs carried over from previous year <sup>10</sup>	0	6,866,658	0
RDTs from Government	0	0	0
RDTs from Global Fund MOH	22,075,692	7,184,713	13,180,633
RDTs from Global Fund CHAZ	0	7,184,713	6,590,317
RDTs planned with PMI funding <sup>12</sup>	18,734,955	7,530,000	8,048,837
<b>Total RDTs</b>	<b>40,810,647</b>	<b>28,766,083</b>	<b>27,819,787</b>
<b>Total RDT surplus/gap</b>	<b>6,866,658</b>	<b>-11,333,748</b>	<b>-12,558,642</b>

1. Geographic coverage: Annual population estimates reflect the 2010 Census of Population and Housing projections by the Zambian Central Statistical Office. The population of people at risk of malaria is 100% as it is assumed that malaria elimination is still low.

2. OPD attendances captured by HMIS represent 80% of National coverage for 2019 and 70% for 2020-2021

3. This assumes that 20% of attendances for 2019 are seen at the community-level and a further assumption was made that this covers both patients presenting with fever and index follow ups. For 2020-2021, this assumes that 30% for attendances are seen at the community level. These assumptions are based on the Malaria Rapid Reporting System.

4. This assumes 30.7% of patients present with fever at OPD for 2019. For 2020-2021, this assumes 50% of patients present with fever at OPD. This is based on an NMEP-supported study from Chongwe Rural Health Center by Chanda et al.

5. This assumes 15.8 % based on the 2018 Malaria Indicator Survey (MIS)

6. This assumes every positive will be followed up for index testing and will attract 20 follow-ups each.

7. This assumes 32,444 CHWs planned to be trained in total in 2020 and are expected to grow in total based on the 2.8% population growth in 2021 to 2022.

8. This is based on the 2014 MIS.

9. A 20% growth rate was estimated for 2019 and a 15% growth rate was estimated for 2020 to 2021. 18,076,944 was adopted from the 2017 final forecasts of the F&Q exercise, while the team recommended the service-based forecast estimate of 33,943,989 mRDTs for 2020. The increase in mRDT needs in 2019 to 2020 is being driven by the new elimination focused strategy that calls for increased community-level index case identification and index case follow-up. As part of this elimination strategy, the program is currently focused on training community health workers (CHW) to perform the index case testing and follow-up. The training program has increased the number of CHW from 5000 at the beginning of this year to about 11000. The NMEC is expecting have 28000 trained CHW by April 2020.

10. The monthly forecast is about 2.8 million tests. Therefore, the expected carry over is only about 1.8 months of stock (MOS), compared to the expected 6 MOS safety stock desired at the end of any given year.

11. The figure includes both the CHAZ and MOH/PMU contributions.

12. The quantity includes MOP 19 and MOP 18 reprogrammed funds.

ITN Gap Analysis			
Calendar year	2020	2021	2022
Total targeted population <sup>1</sup>	17,885,422	18,400,556	18,952,573
Household registration population <sup>2</sup>	22,929,111	23,571,126	24,278,260
<b>Continuous distribution needs</b>			
Channel #1: ANC <sup>3</sup> represents 4.5% of total population	1,031,810	1,060,701	1,092,522
Channel #2: EPI <sup>4</sup> represents 4.0% of 2017 house hold registration survey	917,164	942,845	971,130
Channel #3: School distribution	0	0	0
<i>Estimated Total ITN need for continuous channels</i>	<i>1,948,974</i>	<i>2,003,546</i>	<i>2,063,652</i>
<b>Mass campaign distribution needs</b>			
Mass distribution campaigns	5,324,655	0	0
<i>Estimated total ITN need for campaigns</i>	<i>5,324,655</i>	<i>0</i>	<i>0</i>
<b>Total ITN Need</b>	<b>7,273,629</b>	<b>2,003,546</b>	<b>2,063,652</b>
<b>Partner Contributions</b>			
ITNs carried over from previous year	0	624,989	745,535
ITNs from MOH	0	0	0
ITNs from Global Fund (CHAZ) - ANC/EPI	297,761	1,524,092	0
ITNs from PMI - school-based distribution	30,000	30,000	30,000
ITNs planned with PMI funds - routine	570,000	570,000	570,000
ITNs planned with PMI funds - mass campaign MOP 19	2,128,000	0	0
Proposed Against Malaria Foundation - mass campaign	0	0	0
Proposed Global Fund - routine	0	0	0
Proposed Global Fund - mass campaign	4,872,857	0	0
<b>Total ITNs available</b>	<b>7,898,618</b>	<b>2,749,081</b>	<b>1,345,535</b>
<b>Total ITN surplus/gap</b>	<b>624,989</b>	<b>745,535</b>	<b>-718,117</b>

1. Annual population estimates reflect 2010 Census of Population and Housing projections by the Zambian Central Statistical Office (CSO).

2 Figures are based on a 2017 household registration survey, which showed a 28.2% variance with the CSO population of 17,381,168 and 17,885,422 for 2019 and 2020 respectively.

3. This represents 4.5% ANC of the total population of 22,282,657 (2019) and 22,929,111 (2020) based on the 2017 household registration survey. This assumption was guided by NMEP.

4. This represents 4.0% EPI of the total population of 22,282,657 (2019) and 22,929,111 (2020) based on the 2017 household registration survey. This assumption was guided by NMEP.

SP Gap Analysis			
Calendar Year	2020	2021	2022
Total country population <sup>1</sup>	17,885,422	18,400,556	18,926,743
Method	Demographic	Demographic	Demographic
Expected pregnancies in the population - 5.4% <sup>2</sup>	965,813	993,630	1,022,044
77% of pregnant women will come for the 1st ANC	743,676	765,095	786,974
62% of 1st ANC attendance will return for 2nd ANC	461,079	474,359	487,924
52% of 1st ANC attendance will return for 3rd ANC	386,711	397,849	409,226
23.3% of 1st ANC attendance will return for 4th ANC	173,276	178,267	183,365
10.8% of 1st ANC attendance will return for 5th ANC	80,317	82,630	84,993
Total expected ANC attendances	1,845,060	1,898,201	1,952,482
Adjustment for 30% missed IPT <sup>3</sup>	2,398,578	2,467,661	2,538,227
<i>Total SP needs - Annual patient need only <sup>4</sup></i>	<i>7,195,733</i>	<i>7,402,984</i>	<i>7,614,681</i>
SP quantity needed to maintain desired inventory level		3,701,492	3,807,341
<b>Total SP needed</b>		<b>11,104,476</b>	<b>11,422,022</b>
<b>Partner Contributions</b>			
SP carried over from previous years	0	4,624,967	17,796,491
SP from Government	0	0	0
SP from Global Fund	7,196,000	18,776,000	0
SP from CHAI	0	0	0
SP planned with PMI funding	4,624,700	5,500,000	0
<b>Total SP available</b>	<b>11,820,700</b>	<b>28,900,967</b>	<b>17,796,491</b>
<b>Total SP surplus/gap</b>	<b>4,624,967</b>	<b>17,796,491</b>	<b>6,374,469</b>

1. Annual population estimates reflect the 2010 Census of Population and Housing projections by the Zambian Central Statistical Office (CSO).

2. The total number of pregnant women is estimated at 5.4% of the total CSO population.

3. This is a positive adjustment to account for the potential impact of the prolonged stockout of SP and other essential medicine stockouts on ANC attendance. It was noted that SP has been stocked out at central level since 2017 (or earlier) and facility-level stockouts averaged about 30% over the year.

4. The 2019 forecast assumed that each pregnant woman would receive 6 IPTp treatment doses as recommended in the current NMEC policy. The visits per pregnancy per year for 2019 was guided by the revised MOH 2018 ANC policy. During the quantification review, it was determined that the assumption on the number of visits was unrealistic as of the time of the review, as the data showed pregnant women receiving a maximum of 3 IPTp treatment doses. This led to the change in the quantification method for 2020 and 2021.

<b>Injectable Artesunate Gap Analysis</b>			
<b>Calendar year</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
Projected number of complicated cases <sup>1</sup>	59,741	41,785	23,830
Projected # of severe cases	59,741	41,785	23,830
Percentage allocated to artesunate injectable	59,741	41,785	23,830
<i>Total injectable artesunate vials needs (patient need only) <sup>2</sup></i>	<i>496,456</i>	<i>347,233</i>	<i>198,030</i>
Artesunate injection quantity needed to maintain desired inventory level		173,617	99,015
<b>Total injectable artesunate needed</b>		<b>646,205</b>	<b>368,535</b>
<b>Partners contributions</b>			
Injectable artesunate vials carried over from previous year	214,974	251,082	12,885
Injectable artesunate vials from government	200,000	0	0
Injectable artesunate vials from Global Fund	100,000	187,008	0
Injectable artesunate vials from other donors	0	0	0
Injectable artesunate vials planned with PMI funding	232,564	221,000	226,244
<b>Total injectable artesunate vials available</b>	<b>747,538</b>	<b>659,090</b>	<b>239,129</b>
<b>Total injectable artesunate vials surplus/gap</b>	<b>251,082</b>	<b>12,885</b>	<b>-129,407</b>

1. The data was calculated using quarterly cases and a linear projection of service statistics method from HMIS data. Severe malaria cases in children below one year old were considered negligible.

2. 2019 Artesunate Inj vials determined by cases segmented by age group and dose requirement (children inclusive). An average of 8 vials per case is being estimated based on service statistics for 2021. This was based exclusively on the service statistics method.

<b>Rectal Artesunate Gap Analysis</b>			
<b>Calendar year</b>	<b>2020</b>	<b>2021</b>	<b>2022</b>
Total country population <sup>1</sup>	17,885,422	18,400,556	18,952,573
Rural population 60% <sup>1</sup>	10,731,253	11,040,334	11,371,544
Under 5 population 20% <sup>1</sup>	2,146,251	2,208,067	2,274,309
Population at risk of severe illness 8% (6-72 months) <sup>2</sup>	171,700	176,645	181,945
PMI-targeted at-risk population	17,714	18,210	18,719
Prevalence - % likely to fall ill with severe malaria <sup>3</sup>	90%	70%	70%
Number of severe malaria cases expected to require pre-referral treatment at community level (6 - 72months)	15,942	12,747	13,104
<b>Total artesunate suppository needs <sup>4</sup> (patient need only)</b>	<b>31,885</b>	<b>25,493</b>	<b>26,207</b>
<b>Partners contributions</b>			
Artesunate suppositories carried over from previous year	0	0	170,400
Artesunate suppositories from Government	0	0	0
Artesunate suppositories from Global Fund	22,822	167,893	0
Artesunate suppositories from other donors	0	0	0
Artesunate suppositories planned with PMI funding	8,094	28,000	169,491
<b>Total artesunate suppositories available</b>	<b>30,916</b>	<b>195,893</b>	<b>339,891</b>
<b>Total artesunate suppositories surplus/gap</b>	<b>-969</b>	<b>170,400</b>	<b>313,683</b>

1. Annual population estimates reflect the 2010 Census of Population and Housing projections by the Zambian Central Statistical Office. From this data, it was assumed that approximately 60% of the population is rural and approximately 20% of the population consists of children between 6 months to 72 months.

2. According to "MAMaZ Against Malaria Mid-term Report, November 2017," 8% of the target population is likely to have a severe illness, but not necessarily severe malaria.

3. The likelihood of children developing severe malaria and testing positive for malaria is 90% and 70% for 2020 and 2021 respectively. This assumption is based on the MIS 2018. Based on the 2021 prevalence the team has maintained the 2022 and 2023 at 70%.

4. It was assumed every case will be administered with one suppository while cases are referred to hospitals. However, due to anticipating loss due to diarrhea (one of the symptoms of severe malaria), one more suppository was added.

## **Annex B. Program Inventory**

**Figure B1. Category: Vector Control**

Activity	Metrics/Criteria	Relative Continuum					Estimate Level
		1	2	3	4	5	
<b>Vector Control</b>	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	5
<b>Entomological Monitoring</b>	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	4
<b>Entomological Monitoring</b>	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	5



**Figure B1. Category: Vector Control**

<b>Entomological Monitoring</b>	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	5
<b>Entomological Monitoring</b>	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	5
<b>Entomological Monitoring</b>	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	4
<b>ITNs</b>	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
<b>ITNs</b>	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	5

**Figure B1. Category: Vector Control**

<b>ITNs</b>	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	4
<b>IRS</b>	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	5
<b>IRS</b>	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
<b>IRS</b>	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	5
<b>IRS</b>	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
<b>IRS</b>	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	4

<b>Figure B2. Category: Case Management</b>							
<b>Activity</b>	<b>Metrics/Criteria</b>	<b>Relative Continuum</b>					<b>Estimate Level</b>
		<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	
<b>Community-Based</b>	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	3
<b>Community-Based</b>	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	3
<b>Community-Based</b>	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
<b>Community-Based</b>	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	2

**Figure B2. Category: Case Management**

<b>Facility-Based</b>	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	4
<b>Facility-Based</b>	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	3
<b>Facility-Based</b>	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	
<b>MIP</b>	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	5

**Figure B3. Category: Drug-Based Prevention**

<b>MIP</b>	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
<b>MIP</b>	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
<b>MIP</b>	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	4
<b>MIP</b>	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
<b>MIP</b>	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	
<b>Supply Chain</b>	<b>Forecasting and Procurement Planning</b>	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	4
<b>Supply Chain</b>	<b>Storage</b>	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	3

**Figure B4. Category: Supply Chain**

<b>Supply Chain</b>	<b>Inventory Management</b>	SOPs for inventory management non-existent, outdated or unable to be routinely adhered to	Updated SOPs for paper-based inventory management system in place but discrepancies between virtual and actual stock figures are common	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	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	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	4
<b>Supply Chain</b>	<b>Logistics Management Information System</b>	No LMIS available for aggregating, analyzing, validating and displaying logistics data from lower levels of the logistics system	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	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	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	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	3

**Figure B4. Category: Supply Chain**

<b>Supply Chain</b>	<b>Transportation Management</b>	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
<b>Supply Chain</b>	<b>Routine Distribution and Resupply</b>	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



**Figure B4. Category: Supply Chain**

<b>Supply Chain</b>	<b>Health Commodity Regulations and Policy</b>	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	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	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	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	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	4
<b>Supply Chain</b>	<b>Supply Chain Strategy and Governance</b>	Human, organizational and financial capacity to develop or execute a supply chain strategic plan incorporating malaria SC specifics absent or inadequate	Human, organizational and financial capacity sufficient to develop and execute portions of a supply chain strategic plan incorporating malaria SC specifics	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	Approved, up-to-date supply chain strategic plan (with clear roles/responsibilities for all SC levels, stakeholder mapping, costs); implementation of workforce development and risk mitigation plans with significant donor support	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	4

**Figure B5. Category: Strategic Information**

Activity	Metrics/Criteria	Relative Continuum					Estimate Level
		1	2	3	4	5	
<b>Data, Surveillance, Monitoring &amp; Evaluation</b>	Overall HMIS reporting rate (CY 2019)	<60%	60-69%	70-79%	80-89%	90%+	5
<b>Data, Surveillance, Monitoring &amp; Evaluation</b>	Element-specific reporting rate: “Confirmed malaria cases among children under age 5” (CY 2019)	<60%	60-69%	70-79%	80-89%	90%+	5
<b>Data, Surveillance, Monitoring &amp; Evaluation</b>	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	5

**Figure B5. Category: Strategic Information**

<b>Data, Surveillance, Monitoring &amp; Evaluation</b>	Reporting Systems	Data collection tools not standardized and procedures inconsistently followed; unstructured data collection and storage; no NMCP access to HMIS malaria data	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	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	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	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	4
<b>Data, Surveillance, Monitoring &amp; Evaluation</b>	Data collection	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	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	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	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	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	4

**Figure B5. Category: Strategic Information**

<b>Data, Surveillance, Monitoring &amp; Evaluation</b>	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	4
<b>Operations Research and Program Evaluation</b>	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	5
<b>Operations Research and Program Evaluation</b>	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	5

**Figure B5. Category: Strategic Information**

<b>Operations Research and Program Evaluation</b>	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	5
<b>Operations Research and Program Evaluation</b>	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	5

**Figure B6. Category: Support Systems**

Activity	Metrics/Criteria	Relative Continuum					Estimate Level
		1	2	3	4	5	
<b>SBC</b>	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	4

**Figure B6. Category: Support Systems**

<b>SBC</b>	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
<b>SBC</b>	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	4
<b>SBC</b>	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	4

**Figure B6. Category: Support Systems**

<b>SBC</b>	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
<b>Elimination</b>	Elimination strategy and planning	No elimination or pre-elimination targets in the national strategic plan	Risk stratification conducted using latest incidence data and interventions targeted	Readiness assessment/capacity inventory conducted	Capacity built and systems in place to initiate elimination activities in target areas	Elimination activities implemented in target areas	4
<b>Elimination</b>	Scope of activities implemented (e.g. active case detection, PQ for Pf, foci investigation and response)	No elimination activities initiated	Elimination activities conducted in <25% of districts	Elimination activities conducted in 25-50% of districts	Elimination activities conducted in >50% of districts	Elimination or prevention of reintroduction activities conducted in all districts	2

**Figure B6. Category: Support Systems**

<b>Elimination</b>	Surveillance system readiness to track all cases	Monthly, aggregate data	Case-based reporting initiated	Real-time, case-based reporting inclusive of all sectors and levels in target areas	Real-time, case-based reporting and response activities implemented	Real-time, case-based reporting and response activities implemented with data open/shared	2
<b>Additional Health Systems Strengthening</b>	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	4
<b>Additional Health Systems Strengthening</b>	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



**Figure B6. Category: Support Systems**

<b>Additional Health Systems Strengthening</b>	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	4
<b>Additional Health Systems Strengthening</b>	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)	4