PMI | U.S. PRESIDENT'S MALARIA INITIATIVE

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

U.S. PRESIDENT'S MALARIA INITIATIVE

RWANDA

Malaria Operational Plan FY 2020

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ABBREVIATIONS

ACT	Artemisinin-based combination therapy
AL	Artemether-lumefantrine
ANC	Antenatal care
AS/AQ	Artesunate-amodiaquine
BMGF	Bill and Melinda Gates Foundation
CDC	Centers for Disease Control and Prevention
CY	Calendar year
DHS	Demographic and Health Survey
FY	Fiscal year
GHI	Global Health Initiative
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
GoR	Government of Rwanda
iCCM	Integrated community case management
IEC	Information, education, communication
IPTp	Intermittent preventive treatment for pregnant women
IRS	Indoor residual spraying
ITN	Insecticide-treated mosquito net
MCP	Malaria Contingency Plan
MIP	Malaria in pregnancy
MIS	Malaria indicator survey
MOH	Ministry of Health
MOP	Malaria Operational Plan
MOPDD	Malaria and Other Parasitic Diseases Division
MPDD	Medical Procurement and Production Division
MPR	Midterm Program Review
MSP	Malaria Strategic Plan
PBO	Piperonyl butoxide
PMI	U.S. President's Malaria Initiative
RDT	Rapid diagnostic test
RBC	Rwanda Biomedical Center
SBC	Social and behavior change
SM&E	Surveillance, monitoring, and evaluation
SP	Sulfadoxine/pyrimethamine
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WHO	World Health Organization

I. INTRODUCTION

The U.S. President's Malaria Initiative (PMI)—led by the U.S. Agency for International Development (USAID) and implemented together with the U.S. Centers for Disease Control and Prevention (CDC)—delivers cost-effective, lifesaving malaria interventions alongside catalytic technical and operational assistance to support Rwanda to end malaria. PMI has been a proud partner of Rwanda since 2007, helping to decrease all-cause child death rates by 67 percent[1] and reduce total malaria-related deaths by 53 percent countrywide from 2016 to 2018 through investments totaling over $217 million.[2]

The proposed PMI fiscal year (FY) 2020 budget for Rwanda is $18 million. This Malaria Operational Plan (MOP) outlines planned PMI activities in Rwanda for FY 2020. Developed in consultation with the national malaria control program, which is called and henceforth referred to as the Malaria and Other Parasitic Diseases Division (MOPDD), 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 Rwanda (GoR) as well as other donors and partners.

Rwanda at a glance

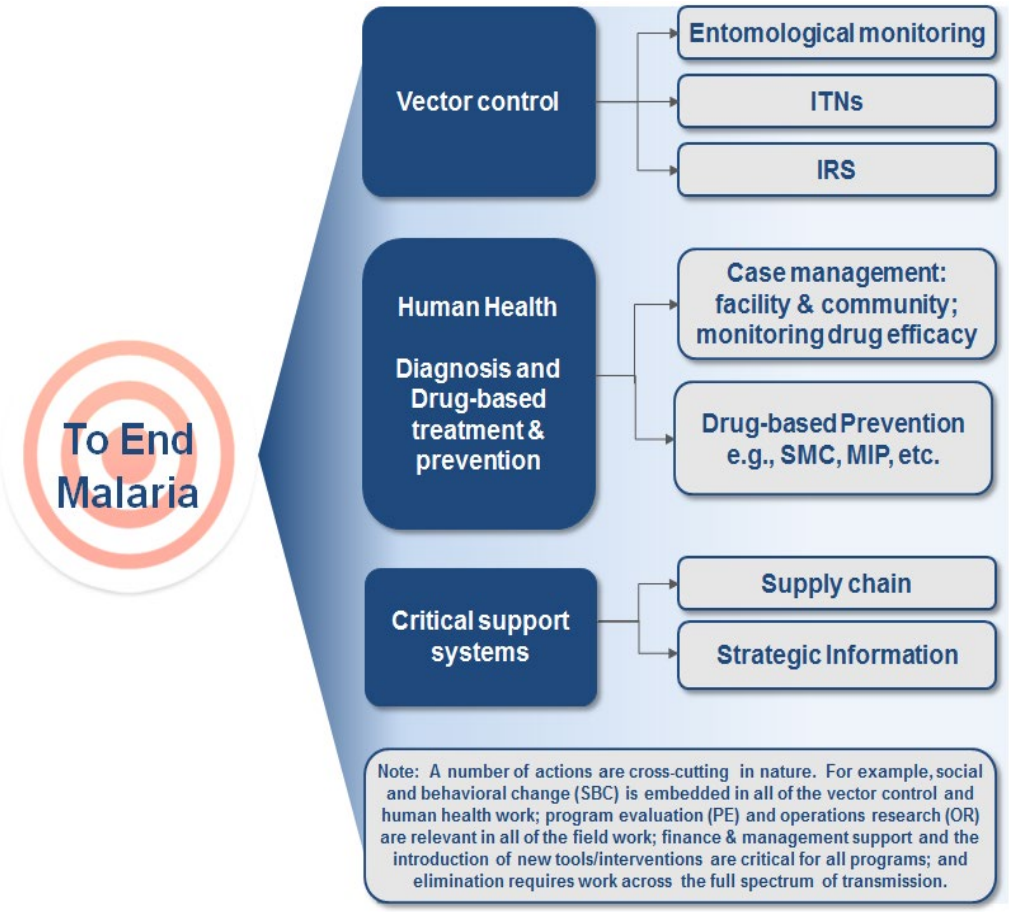
- **Geography:** Landlocked country in central East Africa located a few degrees south of the equator with relatively high altitude (ranging 3,117 to 14,787 feet above sea level)
- **Climate:** temperate tropical highland
- **Population in 2019:** 12,374,398 people (source: Rwanda National Institute of Statistics, 2019 projection from 2012 census)
- **Population at risk of malaria:** entire population (in 2019: 12,374,398) (Rwanda Extended Malaria Strategic Plan 2013-2020 revised March 2017)
- **Principal malaria parasites:** *Plasmodium falciparum* (85%), *P. malariae* (12%), *P. ovale* (3%). (Source: "Malaria Species Distribution in Rwanda: Secondary Analysis of the 2017 Rwanda Malaria Indicator Dataset")
- **Principal malaria vectors:** *Anopheles gambiae* s.l., (90.2%), *An. pharoensis* (5.4%), *An. ziemanni* (3.3%) with a subsample of *An. gambiae* s.l. identified by polymerase chain reaction (PCR) as 66% *An. arabiensis*. Among sporozoite positive mosquitos: *An. gambiae* s.l. (85.7%) and *An. pharoensis* (14.3%). (Source: Rwanda 2019 Entomological Monitoring Report July 2018 – June 2019)
- **Malaria incidence per 1000 population:** 321 per 1,000 population (source: Rwanda Malaria and Neglected Tropical Diseases Annual Report 2018-2019)
- **Under-five mortality rate:** 50 per 1,000 live births (source: Demographic Health Survey [DHS], 2014-15)

[1] PMI 13th Annual Report, May 2019.
[2] PMI 13th Annual Report, through FY 2018).

- **World Bank Income Classification & GDP:** Low income, GDP $9.5 billion USD in 2018, 773.0 GDP per capita in 2018 (current USD), Gini coefficient 43.7 in 2016 (source: https://databank.worldbank.org/)
- **Political system:** unitary presidential system with a bicameral parliament
- **Trafficking in Persons designations, 2016-2018:** Tier 2 (Trafficking in Persons Report June 2019, www.state.gov)
- **Malaria funding and program support partners include (but are not limited to):**
    - Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund)
    - U.S. President's Malaria Initiative (PMI)
    - World Health Organization (WHO)
- **PMI Support of National Malaria Control Strategy:** PMI supports procurement of malaria commodities, indoor residual spraying of insecticides (IRS), entomologic monitoring, case management and MOPDD capacity building among other activities (See III. Overview of PMI's support of Rwanda's Malaria Control Strategy for additional details)
- **PMI Investments:** Rwanda began implementation as a PMI focus country in FY 2007. The proposed FY 2020 PMI budget for Rwanda is $18 million; that brings the total PMI investment to nearly $235 million.

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

Figure 1. PMI's Approach to End Malaria



PMI's approach is both consistent with and contributes to USAID's Journey to Self-Reliance framework. Building and strengthening the capacity of Rwanda's people and institutions – from the central level to communities – to effectively lead and implement evidence-based malaria control and elimination activities remains paramount to PMI. As denoted in Table 2 (the budget table), nearly all of PMI's planned support for FY 2020 in the areas of vector control, human health, supply chain and strategic information contains elements of capacity building and system strengthening. PMI/Rwanda will continue to rely on and engage with local partners such as community health workers, who provide the majority of malaria care, and is expanding its base to reach local governments and community leaders to mobilize their communities in the fight against malaria.

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

II. MALARIA SITUATION AND MALARIA CONTROL PROGRESS IN RWANDA

From 2005 to 2011, with scale up of successful interventions in Rwanda, malaria incidence declined 86 percent, and inpatient malaria deaths declined 74 percent. Similarly, malaria prevalence decreased from 2.6 percent in 2008 to 1.4 percent in 2010 among children under five years of age (Figures 2–4). From 2012 to 2016, however, malaria incidence increased every year in Rwanda from 48 per 1,000 population in 2012 to 403 per 1,000 in 2016. The Malaria Indicator Survey (MIS) in 2017 confirmed the increase in malaria with prevalence (by microscopy) rising to 7.2 percent among children under five years of age as compared with 2.2 percent in the Demographic Health Survey (DHS) in 2014-2015. Notably, prevalence was highest (11.2 percent) among children 5–14 years of age and was 5.4 percent among those aged ≥15 years. An in-depth analysis by the MOPDD of potential contributing factors for increasing malaria burden identified emerging insecticide resistance, inconsistent delivery of IRS, low coverage with insecticide-treated mosquito nets (ITNs) (43 percent coverage of one ITN for every two people), increased rainfall, and agricultural environmental modification among other causes (Rwanda Revised Malaria Contingency Plan 2016-2020). In response to the increase in malaria cases, the MOPDD implemented a Malaria Contingency Plan in 2016 for enhanced strategies to reduce malaria burden which were incorporated into a 2017 revision of the Extended Malaria Strategic Plan (MSP) for 2013–2020. Among the new interventions, in late 2016, Rwanda opened community-based treatment of malaria to also include children over 5 years and adults; the GoR granted free malaria diagnosis and treatment to the most economically vulnerable populations (Ubudehe categories 1 and 2). With expansion of community management of malaria, by early 2017, community health workers (CHWs) accounted for 56 percent of all malaria diagnosis and treatment in Rwanda (Figure 5). In late 2016 and early 2017, the GoR distributed over 5 million ITNs through a mass distribution campaign increasing the proportion of the population with access to an ITN from 64 percent (DHS 2014–2015) to 72 percent (MIS 2017). IRS operations were scaled up from 5 to 12 districts in 2019 with a strategy of district-wide implementation (as opposed to focal spraying). An insecticide resistance management plan was adopted with IRS insecticide preemptively rotated from carbamates to organophosphates in 2016 and then to a neonicotinoid/pyrethroid combination insecticide in 2019. As a result, from 2016 to 2018, malaria cases in Rwanda declined 11.9 percent from 4,794,778 confirmed cases reported in 2016 to 4,222,768 in 2018 (Figure 6), and national incidence reduced 16.6 percent from 416 cases per 1,000 population in 2016 to 347 in 2018. The highest incidence occurs in the Eastern and Southern parts of the country (Figure 7). Severe cases and deaths were reduced by half with severe malaria incidence decreasing from 39.0 per 10,000 cases in 2016 to 19.7 per 10,000 cases in 2018, and malaria-related deaths decreased from 715 in 2016 to 314 in 2018 indicating strong case management.

Figure 2. Trends in Malaria Prevalence by Microscopy and Rapid Diagnostic Test (RDT), ***Percent of Children Age 6-59 Months Who Tested positive for Malaria by Microscopy and RDT***

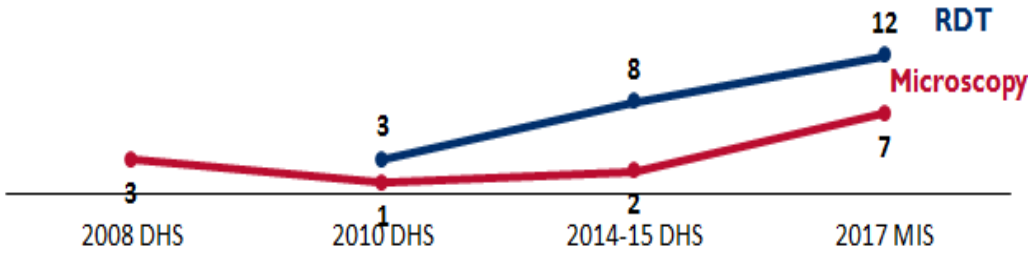


Figure 3. Trends in Prevalence of Low Hemoglobin, ***Percent of Children Age 6-59 Months with Moderate-to-Severe Anemia (hemoglobin <8.0g/dl)***

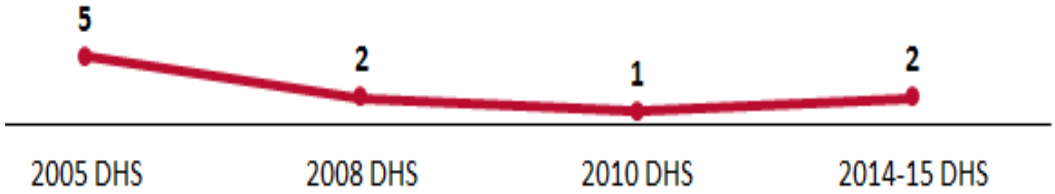


Figure 4. Malaria Parasite Prevalence Among Children Under Five Years of Age by Geographic Area (2017 MIS) ,

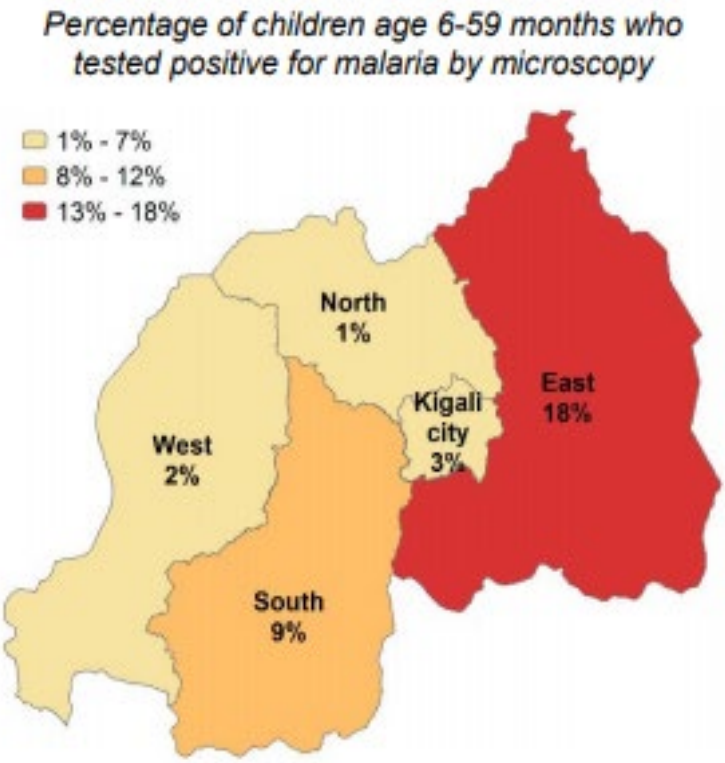


Figure 5. Malaria Treatment by Source of Care, 2014–2018

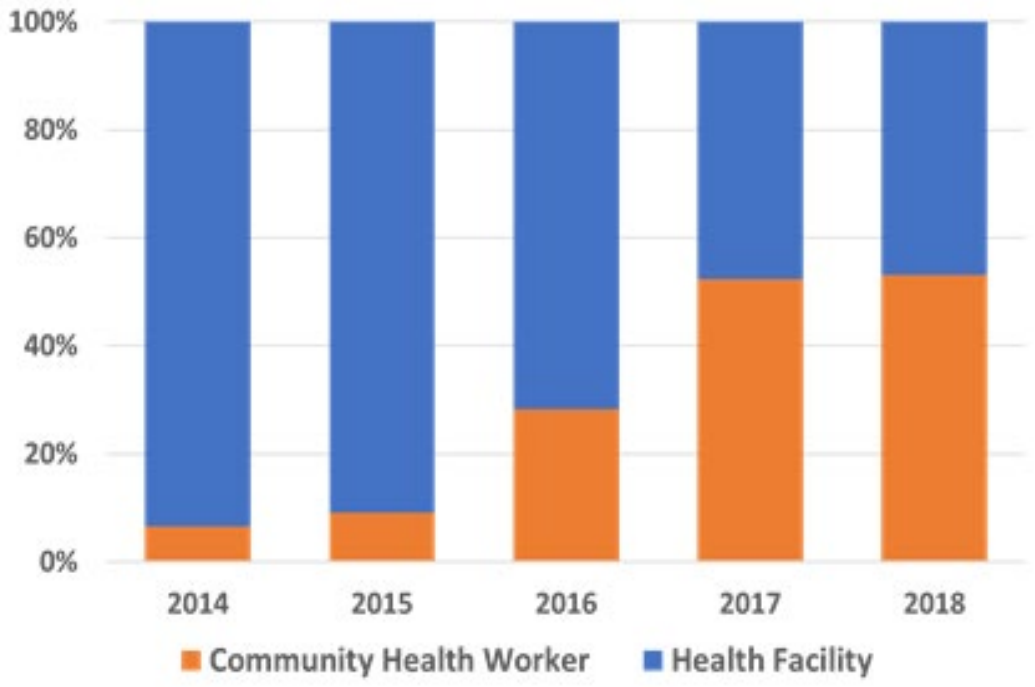


Figure 6. Trends in Malaria Cases and Case Fatality Rate in Rwanda, 2009–2018

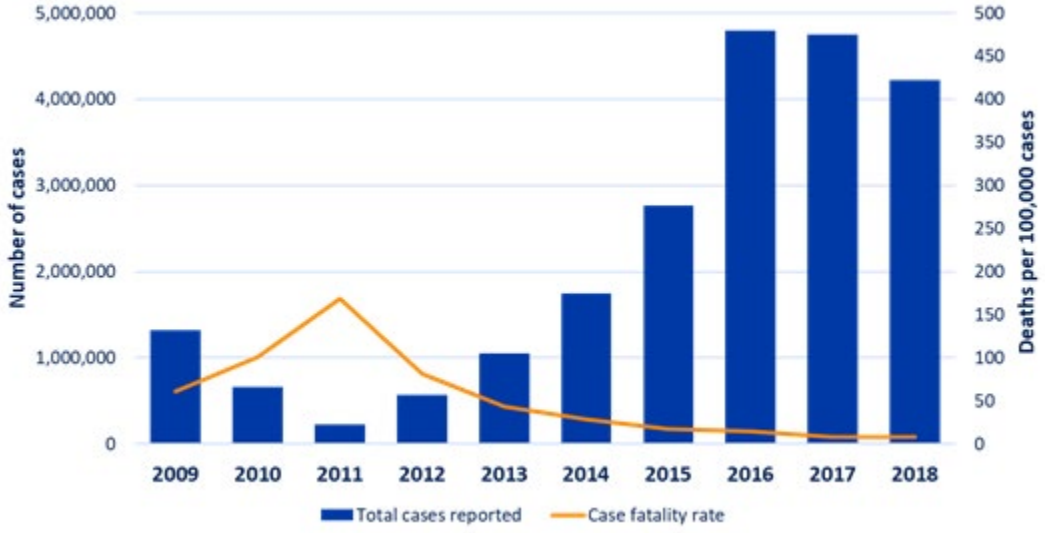


Figure 7. Malaria Incidence by District, *cases per 100 population, 2018*

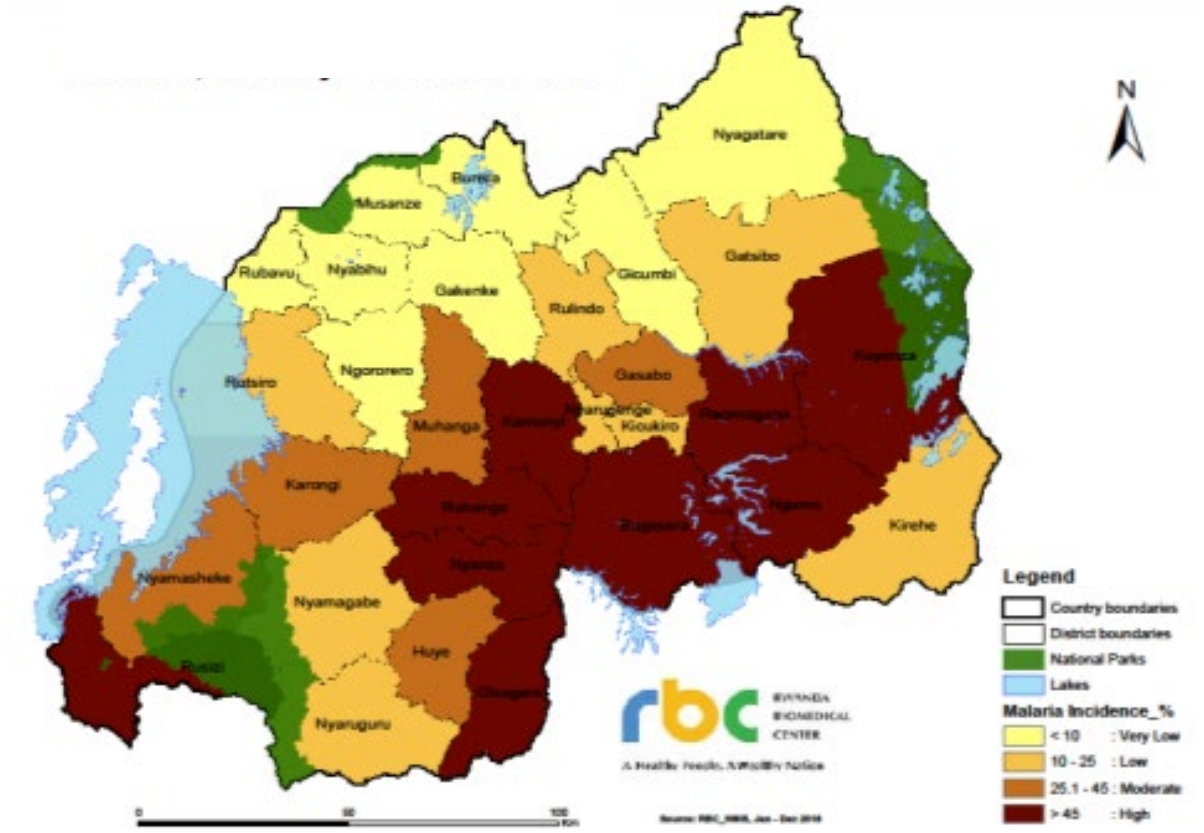


Figure 8. Key Indicators for Malaria Prevention and Treatment Coverage and Impact Indicators from Demographic Health Surveys (DHS) and Malaria Indicator Surveys (MIS) from 2005-2017*

Indicator	2005 DHS	2008 DHS	2010 DHS	2013 MIS	2014-15 DHS	2017 MIS
% Households with at least one ITN	15	56	82	83	81	84
% Households with at least one ITN for every two people	3	16	40	43	43	55
% Population with access to an ITN	9	38	64	66	64	72
% Population that slept under an ITN the previous night	9	40	58	61	61	64
% Children under five years old who slept under an ITN the previous night	13	57	70	74	68	68
% Pregnant women who slept under an ITN the previous night	17	60	72	74	73	69
% Children under five years old with fever in the last two weeks for whom advice or treatment was sought[1]	52	44	50	68	57	56
% Children under five with fever in the last two weeks who had a finger or heel stick	n/a	n/a	21	30	36	38
% Children receiving an ACT among children under five years old with fever in the last two weeks who received any antimalarial drugs	n/a	n/a	37	92	99	99
% Women who received two or more doses of IPTp during their last pregnancy in the last two years	n/a	n/a	n/a	n/a	n/a	n/a

Indicator	2005 DHS	2008 DHS	2010 DHS	2013 MIS	2014-15 DHS	2017 MIS
% Women who received three or more doses of IPTp during their last pregnancy in the last two years	n/a	n/a	n/a	n/a	n/a	n/a
Under-five mortality rate per 1,000 live births	152	103	76	n/a	50	n/a
% Children under five years old with parasitemia (by **microscopy,** if done)	n/a	3	1	n/a	2	7
% Children under five years old with parasitemia (by **RDT**, if done)	n/a	n/a	3	n/a	2	7
% Children under five years old with severe anemia (Hb<8gm/dl)	5	2	1	n/a	2	n/a

*DHS surveys are generally fielded during the dry season, as opposed to MIS surveys, which are deliberately fielded during the high transmission season, which should be taken into consideration when interpreting these indicators.

[1]Note that this indicator has been recalculated according to the newest definition, care or treatment from any source excluding traditional practitioners

Figure 9. Evolution of Key Malaria Indicators Reported through Routine Surveillance Systems

	2014	2015	2016	2017	2018
# Suspect malaria cases[1]	4,352,952	6,451,285	9,510,898	9,808,473	9,389,458
# Patients receiving diagnostic test for malaria[2]	4,352,952	6,451,285	9,510,898	9,808,473	9,389,458
Total # malaria cases[3] (confirmed and presumed)	1,749,711	2,763,956	4,794,778	4,746,958	4,222,768
# Confirmed cases[4]	1,749,711	2,763,956	4,794,778	4,746,958	4,222,768
# Presumed cases[5]	0	0	0	0	0
% Malaria cases confirmed[6]	100%	100%	100%	100%	100%
Test positivity rate (TPR)[7]	29%	37%	42%	50%	45%
Total # <5 malaria cases[8]	119,563	216,423	310,905	444,198	653,501
% Cases under 5[9]	21%	21%	18%	16%	14%
Total # severe cases[10]	11,115	12,973	18,219	11,303	8,293
Total # malaria deaths[11]	499	489	715	376	336
# Facilities reporting[12]	n/a	n/a	n/a	545	561
Data form completeness (%)[13]	n/a	n/a	n/a	97%	96%

Data sources and comments: N/A = not available

Definitions:

[1] Number of patients presenting with signs or symptoms considered to be possibly due to malaria

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

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

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

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

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

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

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

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

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

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

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

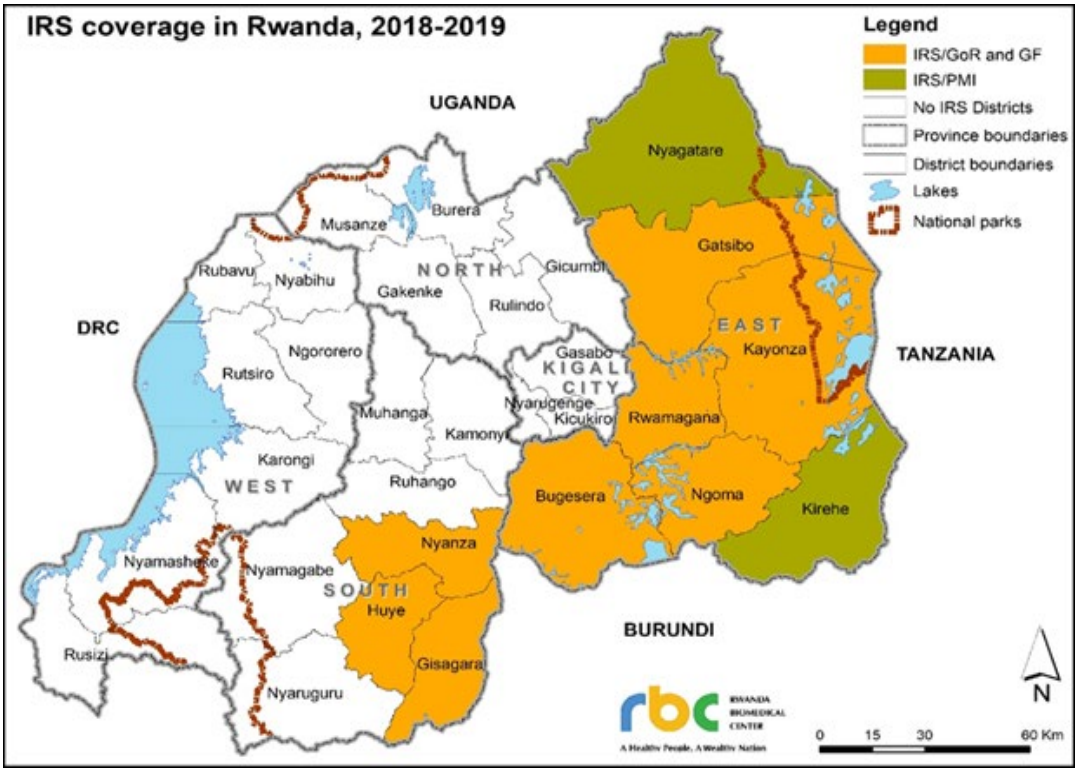
[13] Data completeness: Number of monthly reports received from health facilities/Number of health facility reports expected

III. OVERVIEW OF PMI'S SUPPORT OF RWANDA'S MALARIA CONTROL STRATEGY

Malaria control efforts in Rwanda are guided by the Rwanda Malaria Control Extended National Strategic Plan 2013–2020 and the Revised National Malaria Contingency Plan 2016–2020 which describe an ambitious strategy to accelerate malaria burden reduction even in the face of rising malaria incidence from 2012 to 2016. PMI's approach is closely aligned with the MOPDD's strategic plans and builds on investments contributed by the Global Fund and the GoR. In general, comprehensive support for Rwanda is organized by functional areas with implementation countrywide. For example, PMI has typically provided ITNs for routine distribution while Global Fund supported ITN mass campaigns; however, PMI and Global Fund have recently joined forces on a combined plan to distribute two different types of new generation ITNs in defined districts as part of a joint mass distribution campaign followed by net durability study. PMI and Global Fund-supported commodities such as rapid diagnostic tests (RDTs) and artemisinin-based combination therapy (ACT) are distributed nationally as are PMI-provided tools for CHWs. PMI supports some technical assistance at the central level such as supportive supervision to districts by central level staff and participation in the PMI-supported Antimalarial Resistance Monitoring in Africa (PARMA) initiative to conduct therapeutic efficacy studies and build national laboratory capacity. Other investments occur in geographically limited areas such as PMI's support for health service delivery targeted to the twenty districts in which the integrated health service delivery activity are conducted (Figure 10), and support for IRS occurs in two districts in Eastern Province (Figure 11). PMI has and will continue to prioritize reducing disease burden in line with the priorities of the MOPDD.

Figure 10. PMI-Supported Districts for Improved Malaria and Maternal Child Health Services

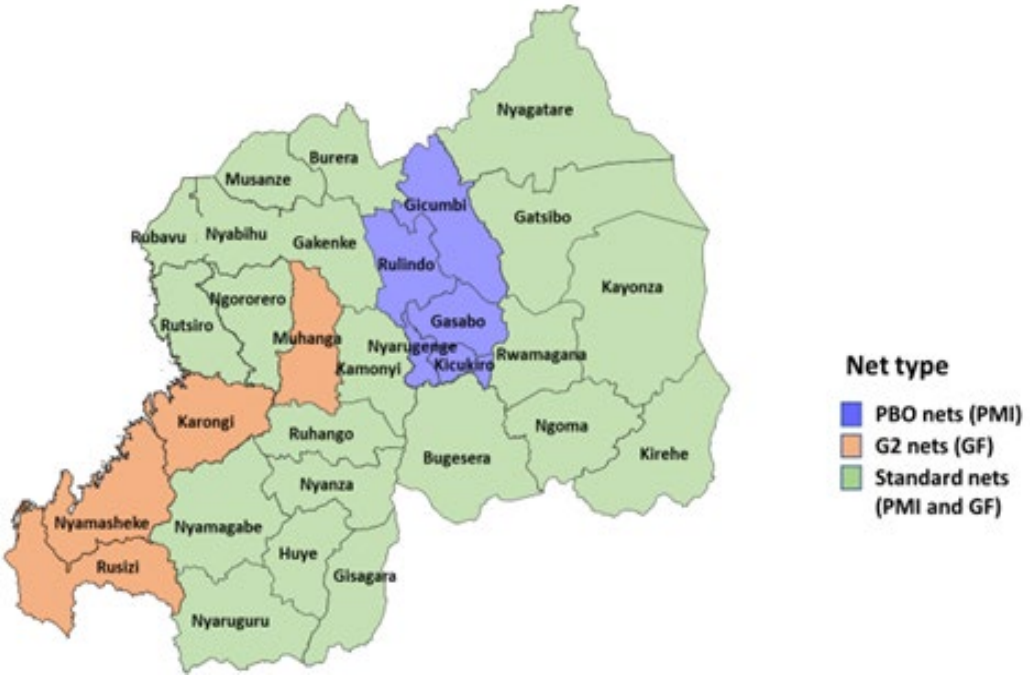
Figure 11. Rwanda IRS Coverage by District, July 2018–June 2019*



*Note: IRS also to be conducted in Kamonyi and Ruhango Districts in late 2019

Distribution of new generation ITNs (Piperonyl butoxide, or PBO, and dual active ingredient, or dual AI ITNs) are planned for 2019–2020 in Rwanda in areas of moderate to high malaria burden that are not receiving IRS (Figure 12), and standard ITNs will be distributed in IRS districts and low burden districts.

Figure 12. Proposed Districts for ITN Mass Distribution in Rwanda 2019–2020 by Net Type

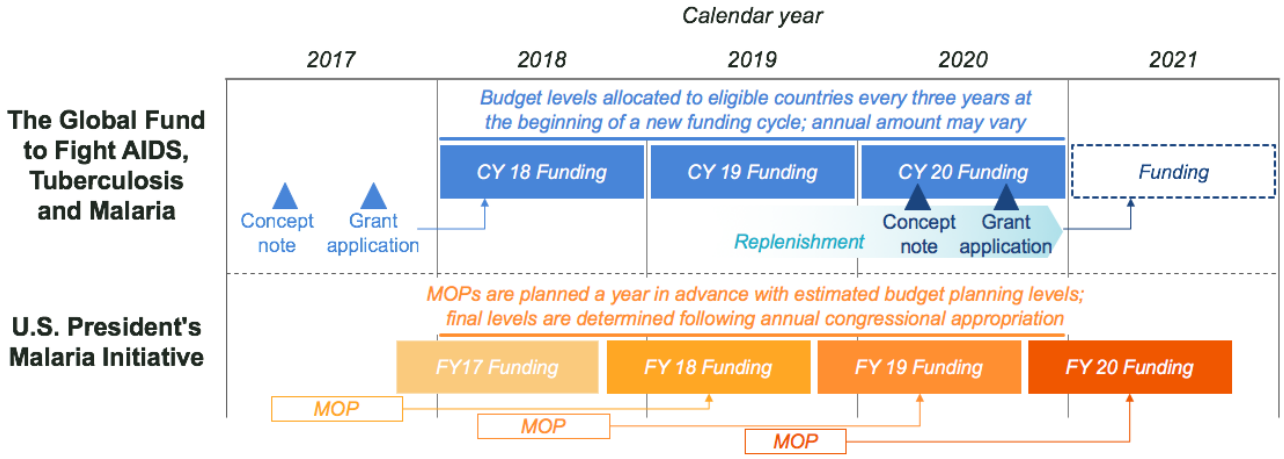


IV. PARTNER FUNDING LANDSCAPE

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

Figure 13 visualizes the annual cycle of PMI funding and the MOP implementation year. As the figure illustrates, any given FY MOP funds activities that take place during the next FY. For example, a FY18 MOP funds implementation during FY19. Whereas Global Fund funding (and often, other partners and host country governments) is based on a three-year grant cycle on a calendar year (CY) timeframe during which activities were implemented. Annual PMI country budget allocations depend largely on the U.S. Congress' total overall malaria funding appropriation to USAID in a given fiscal year, as well as other considerations (e.g. previous funding levels, activity and program pipelines, other donor contributions, known commodity needs/gaps, progress on ongoing PMI-supported activities, clear evidence of continued government commitment to malaria control).

Figure 13. PMI and Global Fund Funding Cycle Alignment



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

Figures 14, 15, and 16below summarize contributions by external partners and host country government in calendar years 2018-20, with the goal of highlighting total country investments. For Rwanda, data is available for PMI (FY 17) and Global Fund (CY 2018-20). As the Global Fund 2021-23 grant funding cycle is not yet underway at the time of this PMI FY20 MOP development, Global Fund country investments for the 2021 implementation period and beyond are not yet known. Note that the host country government invests substantial funding into the national-to-local infrastructure and service delivery for malaria and many other programs. However, there has not been a standardized method for attributing those investments to malaria specifically. Thus, it may not yet be possible in the FY 2020 MOP cycle to attribute funding from the Rwanda government. There may be similar challenges for other partners.

In 2014, the Global Fund and Government of Rwanda entered into an agreement to pilot a result-based financing model for the Fund's three grants in the country named "National Strategy Financing" (NSF). This agreement establishes a more flexible approach to the country's grants by transferring grant management responsibility from the Fund to the Government and increased reliance on national financial systems and controls, with greater reprogramming flexibility for the Rwanda CCM and principal recipients. The pilot process in Rwanda has generally shown promise, and is being continued into Rwanda's current grant cycle, which began in January 2018.

Figure 14. Annual Budget by Level 1 category

Year[1]	Funder	Vector Control	Case Management	Drug-Based prevention[2]	Supply Chain[3]	Monitoring, Evaluation & Research	Other Cross-Cutting and Health Systems Strengthening	Total
FY17/CY18	PMI	$11.0M	$3.8M	$0.1M	$0.9M	$0.6M	$1.6M	**$18.0M**
	Global Fund	-	-	-	-	-	$8.4M	**$8.4M**
	Total	**$11.0M**	**$3.8M**	**$0.1M**	**$0.9M**	**$0.6M**	**$10.0M**	**$26.4M**
FY18/CY19	PMI	$9.9M	$4.1M	$0.1M	$1.4M	$0.6M	$1.9M	**$18.0M**
	Global Fund	-	-	-	-	-	$36.1M	**$36.1M**
	Total	**$9.9M**	**$4.1M**	**$0.1M**	**$1.4M**	**$0.6M**	**$38.0M**	**$54.1M**
FY19/CY20	PMI	$10.3M	$4.3M	$.1M	$.9M	$.7M	$1.7M	**$18.0M**
	Global Fund	-	-	-	-	-	$10.5M	**$10.5M**
	Total	**$10.3M**	**$4.3M**	**$0.1M**	**$0.9M**	**$0.7M**	**$12.2M**	**$28.5M**

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

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

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

Note:

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

Figure 15. Annual Budget by Level 3 Category, Detailed Breakdown for PMI and Global Fund[3]

Level 1 Category	Level 3 Category	FY17/CY18		FY18/CY19		FY19/CY20	
		PMI	Global Fund	PMI	Global Fund	PMI	Global Fund
Vector Control	Procure ITNs for Continuous Distribution	$4.5M	-	$3.2M	-	$3.0M	-
	Distribute ITNs via Continuous Distribution	$0.5M	-	-	-	-	-
	Procure ITNs for Mass Campaigns	-	-	-	-	-	-
	Distribute ITNs via Mass Campaigns	-	-	-	-	-	-
	Other ITN Implementation*	-	-	-	-	-	-
	IRS Implementation[4]	$5.5M	-	$6.3M	-	$7.0M	-
	Procure IRS Insecticide	-	-	-	-	-	-
	Other IRS*	-	-	$0.04M	-	-	-
	Entomological Monitoring	$0.5M	-	$0.4M	-	$0.4M	-
	SBC for Vector Control[5]	-	-	-	-	-	-
	Other vector control measures	-	-	-	-	-	-
	Removing human rights- and gender-related barriers to vector control programs**	-	-	-	-	-	-
Case Management	Active Case Detection**	-	-	-	-	-	-
	Community-based case management	-	-	-	-	-	-
	Facility-based case management	-	-	-	-	-	-
	Private-sector case management	-	-	-	-	-	-
	Procure ACTs	$2.0M	-	$2.6M	-	$2.3M	-
	Procure Drugs for Severe Malaria	$0.3M	-	$0.1M	-	$0.3M	-
	Procure Other Diagnosis-Related Commodities	-	-	-	-	-	-

3 In Rwanda, Global Fund operates on a different model where funds are managed at the country level, thus the detailed data for these tables is not available. Procurement data is shown in the gap tables.

Level 1 Category	Level 3 Category	FY17/CY18		FY18/CY19		FY19/CY20	
		PMI	Global Fund	PMI	Global Fund	PMI	Global Fund
	Procure Other Treatment-Related Commodities	-	-	-	-	-	-
	Procure RDTs	$0.6M	-	-	-	$0.5M	-
	Therapeutic Efficacy	-	-	$0.1M	-	-	-
	SBC for Case Management[5]	-	-	-	-	-	-
	Other Case Management	$1.0M	-	$1.3M	-	$1.2M	-
Drug-Based Prevention[2]	Procure SMC-Related Commodities	-	-	-	-	-	-
	SMC Implementation	-	-	-	-	-	-
	Prevention of Malaria in Pregnancy Implementation	$0.1M	-	$0.1M	-	$0.1M	-
	Procure IPTp-Related Commodities	-	-	-	-	-	-
	IPTi**	-	-	-	-	-	-
	SBC for Drug-Based Prevention[5]	-	-	-	-	-	-
	Other Prevention**	-	-	-	-	-	-
Supply Chain[3]	In-Country Supply Chain[3]	$0.7M	-	$0.5M	-	$0.6M	-
	Supply Chain Infrastructure	-	-	-	-	-	-
	Ensuring Quality	-	-	-	-	-	-
	Pharmaceutical Management Systems Strengthening	$0.3M	-	$0.9M	-	$0.3M	-
	Supply Chain System Strengthening	-	-	-	-	-	-
Monitoring, Evaluation & Research	Reporting, Monitoring, and Evaluation	$0.5M	-	$0.4M	-	$0.3M	-
	Program and data quality, analysis and operations research	-	-	-	-	$0.1M	-
	Surveys	-	-	$0.2M	-	$0.3M	-
	Other Data Sources**	-	-	-	-	-	-

Level 1 Category	Level 3 Category	FY17/CY18		FY18/CY19		FY19/CY20	
		PMI	Global Fund	PMI	Global Fund	PMI	Global Fund
	Support for Field Epidemiology Training Program (FETP)*	$0.1M	-	$0.1M	-	$0.1M	-
Other Cross-Cutting and Health Systems Strengthening	Integrated service delivery, quality improvement, and national health strategies**	-	-	-	-	-	-
	Financial management systems**	-	-	-	-	-	-
	Community responses and systems**	-	-	-	-	-	-
	Support for PCV and SPAs*	$0.02M	-	$0.02M	-	$0.02M	-
	Cross-Cutting Human Resources for Health**	-	-	-	-	-	-
	Central and Regional Program management[6]	$0.3M	-	$0.4M	-	$0.2M	-
	In-Country Staffing and Administration*	$0.9M	-	$1.1M	-	$1.1M	-
	Other Program Management**	-	$8.4M	-	$36.1M	-	$10.5M
	SBC Unspecified[5]	$0.4M	-	$0.4M	-	$0.4M	-
Total		**$18.0M**	**$8.4M**	**$18.0M**	**$36.1M**	**$18.0M**	**$10.5M**

Footnotes:
Note: Categories shown reflect the harmonized financial taxonomy (Levels 1-3) developed by BMGF, Global Fund, and PMI in 2019, as part of a broader data harmonization initiative; potential for categories to continue to evolve through FY 2020 MOP process, as well as for additional donors and host country governments to adopt and reflect funding using same categories.
* Category currently funded by PMI only
** Category currently funded by Global Fund only. As noted in the narrative of Section IV: Partner Funding Landscape, responsibility for grant management was given directly to the Government of Rwanda. Therefore, disaggregated amounts are not available from the Global Fund.

Figure 16. Annual Budget, Breakdown by Commodity

Year[1]	Funder	ITNs for Continuous Distribution	ITNs for Mass Distribution	IRS Insecticide[3]	ACTs	RDTs	Severe Malaria	SMC-Related	IPTp-Related	Total
FY17/CY18	PMI[2]	$4.5M	-	-	$2.0M	$0.6M	$0.3M	-	-	**$7.3M**
	Global Fund	-	-	-	-	-	-	-	-	**-**
	Total	**$4.5M**	**-**	**-**	**$2.0M**	**$0.6M**	**$0.3M**	**-**	**-**	**$7.3M**
FY18/CY19	PMI[2]	$3.2M	-	-	$2.6M	-	$0.1M	-	-	**$5.9M**
	Global Fund	-	-	-	-	-	-	-	-	**-**
	Total	**$3.2M**	**-**	**-**	**$2.6M**	**-**	**$0.1M**	**-**		**$5.9M**
FY19/CY20	PMI[2]	$3.0M	-	-	$2.3M	$0.5M	$0.3M	-	-	**$6.1M**
	Global Fund	-	-	-	-	-	-	-	-	**-**
	Total	**$3.0M**	**-**	**-**	**$2.3M**	**$0.5M**	**$0.3M**	**-**	**-**	**$6.1M**

Footnotes

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

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

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

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

V. ACTIVITIES TO BE SUPPORTED WITH FY 2020 FUNDING

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

ANNEX A: INTERVENTION-SPECIFIC DATA

1. VECTOR CONTROL

MOPDD objective
• Rwanda's goal for ITNs is to maintain universal coverage. • For IRS, the MOPDD targets high burden districts in accordance with WHO guidelines and as part of a comprehensive insecticide resistance mitigation strategy. • By 2020, at least 90 percent of the population at risk will be effectively protected with locally appropriate preventive and vector control interventions.
MOPDD approach
• The most recent mass net distribution campaign occurred in 2016–2017, and distributed one net per sleeping space. For the next mass campaign planned for 2019–2020, quantification is based on one net per 1.8 people, and ITNs are to be distributed by number of persons in the household. • Continuous distribution of ITNs occurs through ANC and EPI clinics. Recent policy changes include distributing ITNs to all pregnant women at first ANC visit (as opposed to primigravida only). • IRS is conducted as funding permits, with an emphasis on prioritizing those districts with the highest burden of malaria and those that have previously received IRS (to prevent a rebound of malaria). • Community mobilization and SBC accompanies PMI-funded IRS activities to motivate acceptance of IRS for household structures.
PMI objective, in support of MOPDD
• PMI supported IRS for two districts with plans to expand coverage to a third district in February 2020. Spray operations were also conducted at a relatively large refugee camp in one of the PMI-supported districts. • PMI supports the central insectary, entomology laboratory, and six entomological monitoring sites that contribute to understanding mosquito vector population dynamics, and the entomological impacts of IRS. • PMI has procured PBO ITNs and standard pyrethroid ITNs to contribute to the countrywide mass ITN campaign for 2019–2020. Technical assistance has also been planned for net durability monitoring.
PMI-supported recent progress (past ~12-18 months)
• Trained 2,128 people to deliver IRS in 2019.

- Delivered IRS to two districts in September 2019 which targeted 214,325 structures and protected 855,752 people, to include 119,047 children under 5 years of age, 11,600 pregnant women, and 59,295 residents of Mahama refugee camp.
- IRS spray quality was assessed to evaluate efficacy which provided data illustrating effective treatment and protection greater than 9 months for the 2018 IRS campaign.
- Mosquito vector species distribution, host preferences, and insecticide resistance patterns were analyzed at the central insectary and entomology lab. Results were reported and presented at PAMCA in September 2019.
- Procured 1.2 million standard ITNs and 1.5 million PBO ITNs in 2019 for planned mass distribution 2019–2020.
- Assisted in the development of protocols for net durability monitoring.
- Facilitated transition of IRS community mobilization activities to GoR for sustainability and reduced costs.
- Transitioned spray database from MS Access to DHIS2/VL Collect, thereby improving management of spray campaign operations with more reliable and real-time data.
- There were SBC activities aimed at creating awareness and acceptance of IRS in targeted districts
- Provided capacity strengthening training for 135 District & Sector Leaders for spray operations.

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

- IRS support will be continued for Nyagatare and Kirehe Districts in September 2020, which is anticipated to cover 307,167 total structures. PMI also plans to support IRS for one more additional District, which will be Ngoma in February 2020.
- PMI will continue to support the central insectary, entomology lab and IRS monitoring sites.
- PMI plans to continue to support procurement of ITNs for routine distribution through ANC and EPI clinics.
- Technical assistance will continue to be provided for the following:
    - Net durability monitoring following mass net distribution.
    - Bio-efficacy of IRS treatments, to include wall bioassays.
    - Support for the central insectary and laboratory.
    - Maintain and increase capacity of MOPDD entomology sentinel site technicians by providing refresher training and up to date best practices.

1.A. ENTOMOLOGICAL MONITORING

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

Do you propose expanding, contracting, or changing any entomological monitoring activities? If so, why and what data did you use to arrive at that conclusion?
PMI will continue its current and steady support of the central insectary/entomology laboratory and IRS entomology monitoring sites. As it currently stands, established sentinel sites are providing the necessary data to support decision making for PMI activities. Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

Key Question 1

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

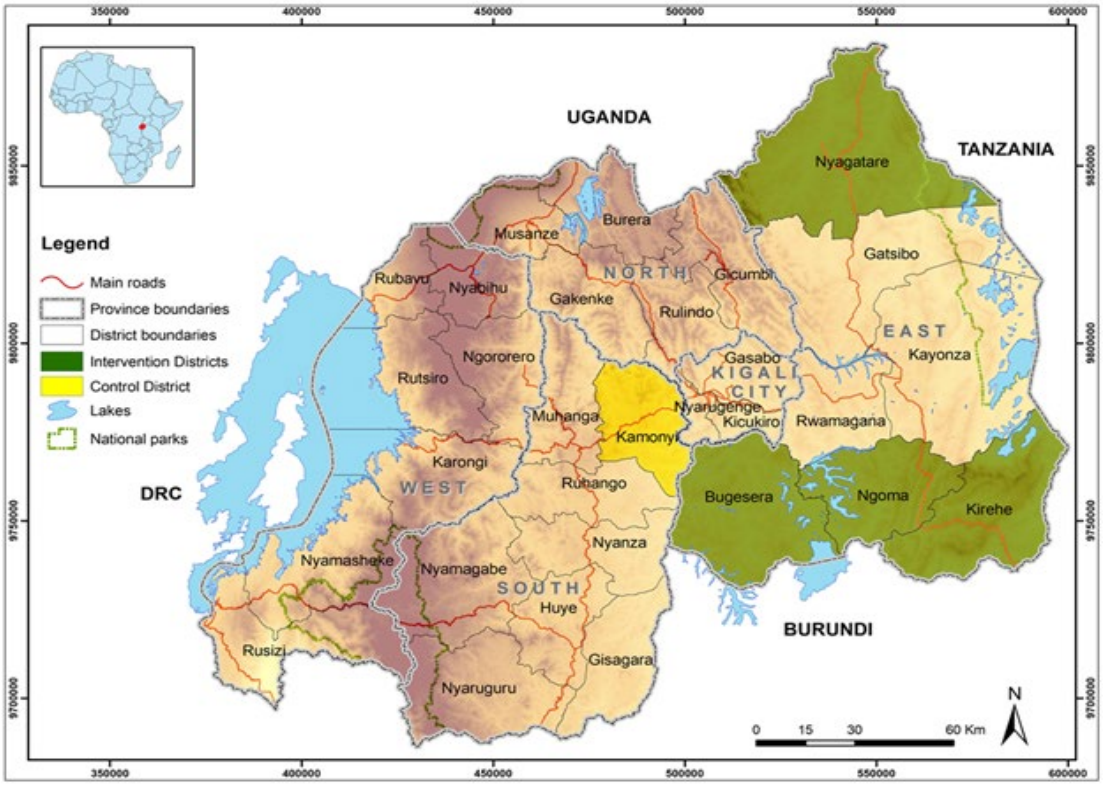
Supporting Data

PMI-supported 7 sites in 2019 for monitoring IRS quality and entomological surveillance (including one control site that transitioned from Ngoma to Kamonyi District during 2019). The MOPDD has determined that the current entomological surveillance is adequate to provide information including resistance and bionomics which is needed to inform programming.

Figure A1. PMI-Supported Entomological Surveillance, 2019

District	Total sentinel sites	Activities	Supported by
Kirehe	**2** (Gatore, Nyamugali)	Entomological surveillance and IRS QC (Bioassays)	PMI
Bugesera	**2** (Musenyi, Nyarugenge)	Entomological surveillance and IRS QC (Bioassays)	PMI
Nyagatare	**2** (Nyagatare, Rukomo)	Entomological surveillance and IRS QC (Bioassays)	PMI
Control site	**1** (Ngoma then Kamonyi)	Entomological surveillance and Resistance monitoring	PMI

Figure A2. Districts with PMI-supported Entomologic surveillance and IRS Quality Monitoring*



*Note: during 2019 control sentinel site changed from Ngoma to Kamonyi District after Ngoma received IRS for first time in March 2019.

Figure A3. Global Fund-Supported Sentinel Sites for Monitoring Insecticide Resistance and Entomological Surveillance.

District	Sentinel sites	Activities	Supported by
Kigali	Kicukiro	Entomological surveillance, Resistance monitoring	Global Fund
Nyagatare	Mimuli	Entomological surveillance, Resistance monitoring	Global Fund
Rusizi	Mashesha	Entomological surveillance, Resistance monitoring	Global Fund
Ruhango	Karambi	Entomological surveillance, Resistance monitoring	Global Fund
Nyanza	Busoro	Entomological surveillance, Resistance monitoring	Global Fund
Burera	Bungwe	Entomological surveillance, Resistance monitoring	Global Fund
Kirehe	Bukora	Entomological surveillance, Resistance monitoring	Global Fund
Musanze	Rwaza	Entomological surveillance, Resistance monitoring	Global Fund
Rutsiro	Kivumu	Entomological surveillance, Resistance monitoring	Global Fund
Kayonza	Rukara	Entomological surveillance, Resistance monitoring	Global Fund
Karongi	Mubuga	Entomological surveillance, Resistance monitoring	Global Fund

Figure A4. Global Fund-Supported Sentinel Sites for Monitoring Insecticide Resistance, 2018–2019.

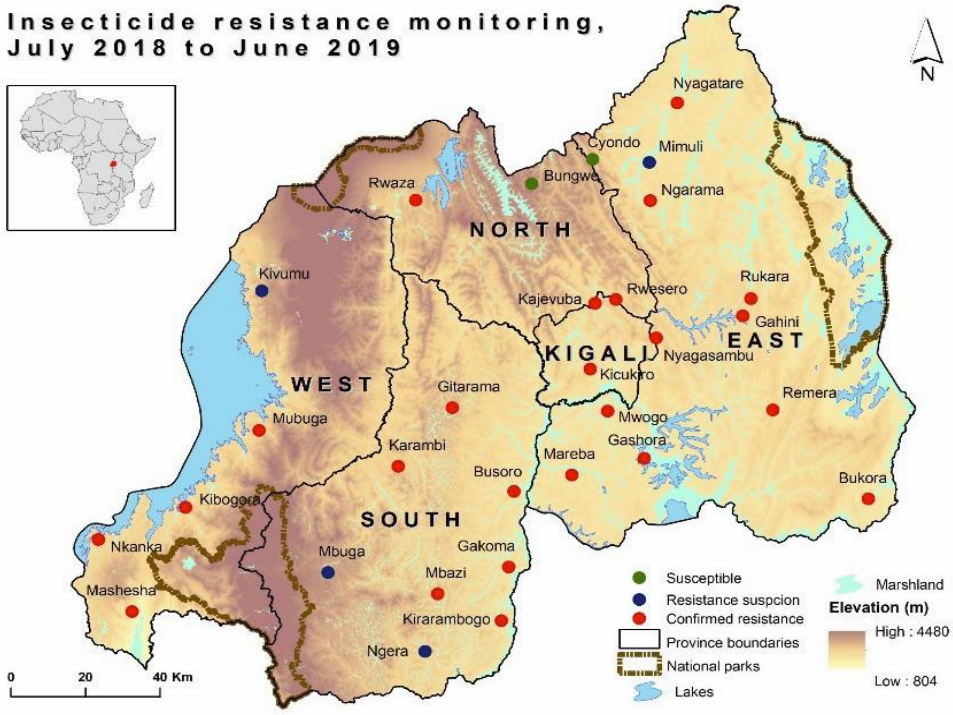


Figure A5. Entomologic Monitoring Sites July 2018-June 2019 (Rwanda 2018-2019 Entomology Annual Report)

District	Major Vector	Minor Vector	Peak Abundance	Preferred Biting Location	Avg. indoor resting density per house per day	Preferred Host	Peak Monthly Sporozoite Rate	Peak monthly EIR
Nyagatare	*An. arabiensis*		Apr - Jun Aug - Oct 18:00-19:00	Outdoors	0.29	Bovine	1.6% (Dec.)	2.7% (Dec.)
Kirehe	*An. arabiensis*	*An. gambiae* s.s.	Mar- May Aug - Oct 18:00-20:00	Outdoors	0.17	Bovine	2.5% (Nov.)	1.3% (March)
Bugesera*	*An. arabiensis*	*An. gambiae* s.s.	Mar Indoor: 21:00-22:00 Outdoor:	Outdoors	0.40	Human	1.1% (Aug)	0.7% (Aug)

District	Major Vector	Minor Vector	Peak Abundance	Preferred Biting Location	Avg. indoor resting density per house per day	Preferred Host	Peak Monthly Sporozoite Rate	Peak monthly EIR
			00:00-01:00					
Ngoma**	*An. gambiae* s.s.	*An. arabiensis*	Mar Aug - Oct 01:00-03:00	Outdoors	0.47	Human	1.4% (Dec)	0.5% (Dec)
Kamonyi**	*An. gambiae* s.s.		Mar- May Aug - Oct 01:00-05:00	Outdoors	4.6	Human	0%	0%

*Bugesera dropped as a sentinel site in April 2019.

**Ngoma served as the control site for nine months (July 2018-March 2019) but was replaced by site in Kamonyi when Ngoma District received IRS for the first time in March 2019.

Conclusion

An. arabiensis was the most prevalent vector captured, and displayed an affinity for outdoor biting and bovine and human hosts based on blood-meal analysis. This is particularly evident where IRS has been consistently sprayed (Nyagatare and Kirehe Districts). However, the highest peak EIRs are also found in these districts indicating the continued need for IRS to prevent transmission. There is also the need to consider potential interventions that address the outdoor biting behavior of the vector.

Key Question 2

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

Supporting Data

Figure A6. Confirmed and Suspected Insecticide Resistance and Restoration of Susceptibility with PBO.

Susceptibility status	Insecticide Tested						
	Deltamethrin	Permethrin	Alpha-cyhalothrin	Pirimiphos methyl	Bendiocarb	Clothianidin	Chlorfenapyr
	# sites (%)	# sites (%)	# sites (%)	# sites (%)	# sites (%)	# sites (%)	# sites (%)
Confirmed resistance	14 (47)	23 (77)	23 (77)	3 (10)	1 (3)	0 (0)	0 (0)
Suspected	9 (30)	3 (10)	1 (3)	3 (10)	6 (20)	0 (0)	0 (0)

Susceptibility status	Insecticide Tested						
	Deltamethrin	Permethrin	Alpha-cyhalothrin	Pirimiphos methyl	Bendiocarb	Clothianidin	Chlorfenapyr
	# sites (%)	# sites (%)	# sites (%)	# sites (%)	# sites (%)	# sites (%)	# sites (%)
resistance							
Susceptible	7 (23)	4 (13)	6 (20)	24 (80)	23 (77)	13 (100)	4 (100)
PBO confirmed resistant	0	0	1 (4)	n/a	n/a	n/a	n/a
PBO suspected resistance	1 (7)	4 (17)	2 (9)	n/a	n/a	n/a	n/a
PBO susceptible	14 (93)	19 (83)	19 (83)	n/a	n/a	n/a	n/a

Source: Rwanda Malaria Annual Report 2018–2019.
Note 1: Resistance sampling was carried out across 30 sites from July 2018 to June 2019 (shown in Figure 18).
Note 2: For PBO testing, n=15 for deltamethrin and n=23 for both permethrin and cyhalothrin with one result missing for cyhalothrin.

Conclusion

Resistance to pyrethroids is widespread in Rwanda but a relatively high level of susceptibility is restored with the addition of PBO. No resistance to clothianidin or chlorfenapyr has been yet detected with their introduction scheduled in late 2019.

Key Question 3

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

Supporting Data

Scale-up of IRS has been a high priority for the MOPDD during 2019, increasing district-wide IRS from about 5 districts per year previously to 12 districts during 2019. Impact of expanded IRS on malaria cases and incidence will be assessed. The MOPDD's goal is to cover 15 high burden districts with IRS annually.

Conclusion

PMI will continue to support the MOPDD in entomological monitoring and ensure that the data is used to inform programming.

1.B. INSECTICIDE-TREATED NETS (ITNs)

PMI Goal
• Achieve high ITN coverage and usage of effective ITNs in endemic PMI-supported areas (in the context of the current insecticide resistance). • Maintain high coverage and use with consistent ITN distribution (via campaigns and/or continuous channels in a combination that is most effective given country context). • Determine the geographic distributions, bionomics, and insecticide resistance profiles of the primary malaria vectors in the country to inform vector control decision-making and interventions.

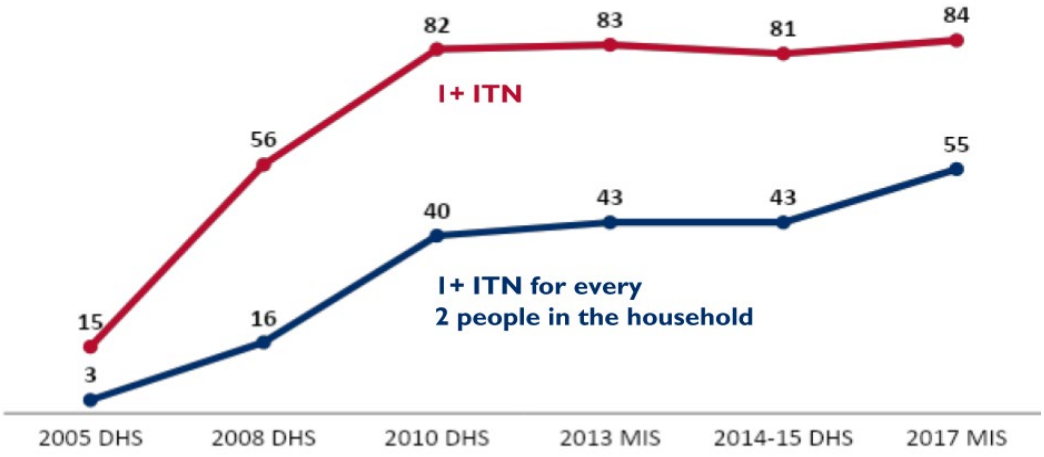
Do you propose expanding, contracting, or changing any ITN activities? If so, why and what data did you use to arrive at that conclusion?
An ITN mass campaign is planned for 2019-2020 with combined PMI and Global Fund support. PMI has procured 2,700,000 ITNs which will be distributed during this campaign. PMI/Rwanda plans to continue supporting routine net distribution through ANC and EPI clinics with FY 2020 funding. Rwanda is currently part of a multi-country study that is evaluating the efficacy of dual AI ITNs. The results of the multi-country study will be used to inform future ITN procurements. Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

Key Question 1

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

Supporting Data

Figure A7. Trends in ITN Ownership, *Percent of Households*



Conclusion

After initial rapid gains in ITN ownership from 2005 to 2010, incremental progress slowed through 2015 from lack of countrywide mass distribution. Following the mass net campaign in 2016-2017, MIS 2017 showed some gains particularly in universal coverage (increasing from 43 percent to 55 percent). A mass campaign is planned in 2019-2020 and it is expected that the overall coverage will increase. In addition, the MOPDD has changed its previous approach to ITN distribution which focused on sleeping spaces rather than the current WHO guidance of one ITN for every two people. This change is aimed at improving net access and use.

Key Question 2

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

Supporting Data

Figure A8. Trends in ITN Access and Use, *Percent of Household Populations with Access to an ITN and Who Slept Under an ITN the Night Before the Survey*

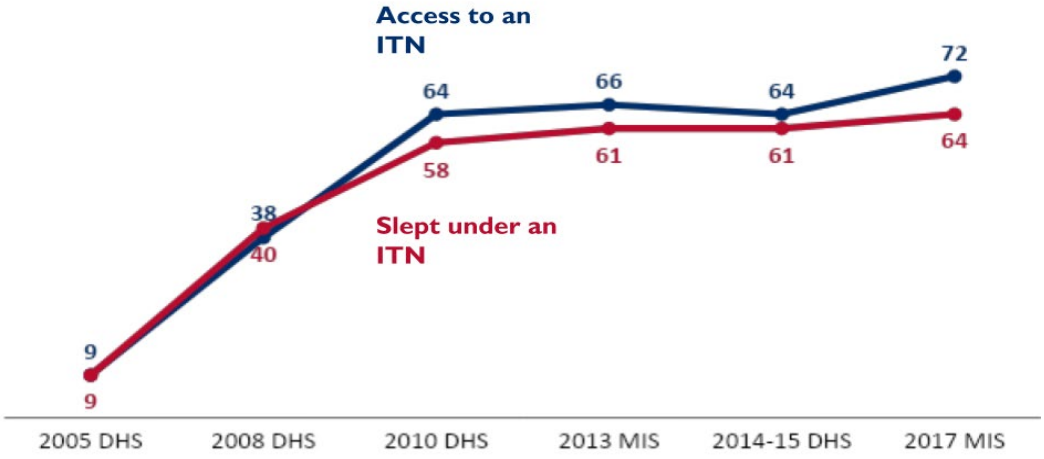
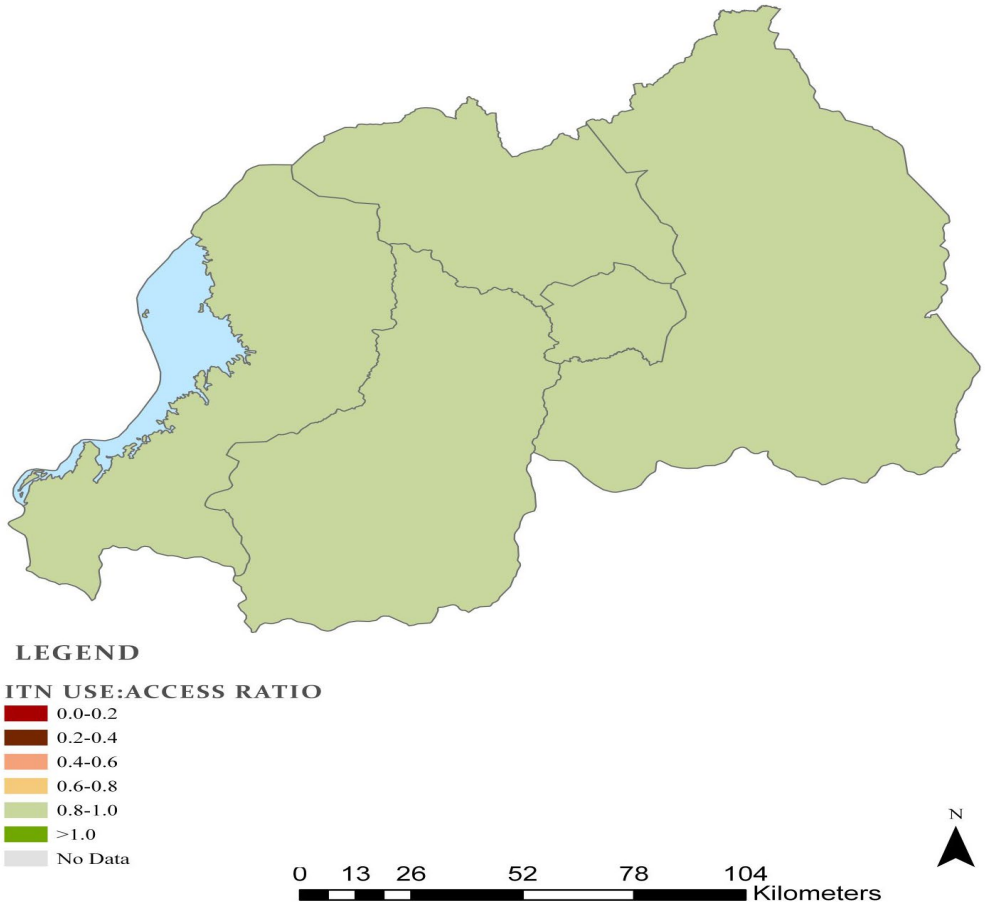


Figure A9. ITN Use: Access Ratio



Source: MIS 2017

Conclusion

Country-wide mass net distribution planned for 2019-2020 is expected to increase net ownership and improve net access. The MOPDD will also continue to use continuous distribution channels including ANC and EPI. Given that the data shows net usage generally follows trends in net ownership, it is expected that increasing coverage will also increase use.

Key Question 3

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

Supporting Data

Figure A10. Key Barriers and Facilitators to ITN Use

Facilitator	Type of Factor	Data Source	Evidence
Awareness of ITN as malaria prevention measure	Internal	2017 Knowledge, attitude and Practice (KAP)* survey	97% of respondents reported that sleeping under a bed net every night is the best way to avoid getting malaria
Net meets preferences	Internal	2017 KAP* survey	66% of respondents preferred the polyester net material that was provided
Net use by pregnant women considered normative	Social	Formative Research Report 2019	"Pregnant women are given priority when ITNs are being used in the household—this practice was clearly seen as **normative** and expected in both urban and rural areas, and very much enforced and enabled by CHWs and nurses, respectively"
Barrier	**Type of Factor**	**Data Source**	**Evidence**
Lack of net access	Environmental	MOPDD Formative Research Report 2019**	Limited net distributions: prior to 2016-2017, MOPDD conducted mainly geographically targeted distribution to higher burden areas; Survey indicated perceived lack of sufficient ITNs for older children and men
Perceived discomfort in warm weather	Internal	2017 KAP survey	42% of respondents agreed with the statement that "it is difficult to sleep well under a bed net when the weather is warm"
Multiple barriers to school-aged children not using nets	Internal	Formative Research Report 2019	Low risk perception for malaria in older children, caregiver attention greater for young children than older children, greater emphasis on ITN use by pregnant women and children less than 5 years old, older children resistant to sleeping under nets
Nets perceived to attract or excite nuisance insects such as bed bugs	Internal/environmental	Formative Research Report 2019	Because of resistance to pyrethroids, there is a perception that bed bugs hide in the nets and bite people at night thereby discouraging net use in some households.

Men not independently using nets	Internal	Formative Research Report 2019	"men are less likely than women do attend community mobilization events where malaria sensitization is occurring. Also, although CHWs conduct regular household supervision, single men are said to often not be at home at those times"
Preference for conical shaped nets	Internal/environmental	Formative Research Report 2019	"A notable **preference for conical shaped nets** was expressed, especially in rural areas, because such nets are easier to hang, and they fit in small spaces. Where families shared living spaces, rectangular nets were seen as more complicated to hang and to find adequate hanging space for."

*KAP: Malaria Knowledge, Attitudes and Practice Survey, 2017
** SBC Formative Research, 2019

Conclusion

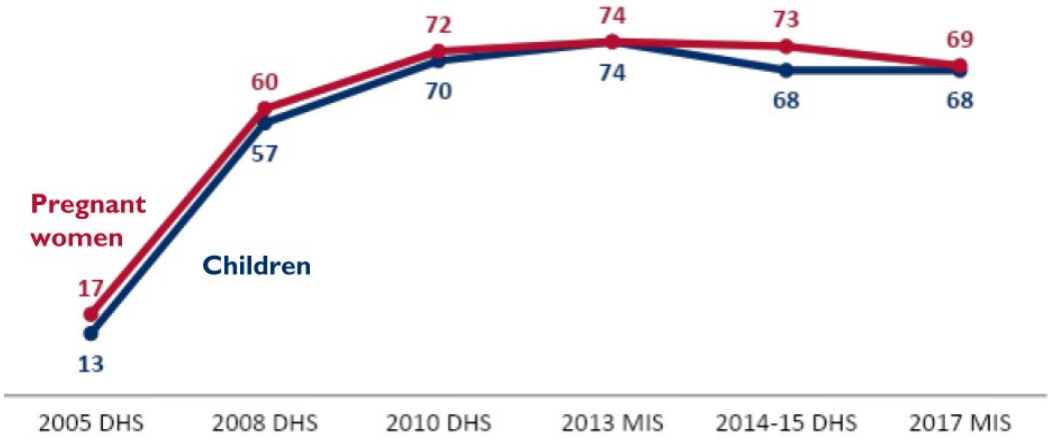
While there are many factors that may limit net use, the main limiting factor for net use seems to be having access to a net. Upcoming mass net distribution planned for 2019-2020 (with countrywide scope and with ITNs provided according to number of residents in household) should improve both access and use. Preference for conical ITNs will need to be addressed in SBC approaches accompanying mass distribution to ensure acceptance and use of rectangular ITNs. In addition, SBC approaches will continue to emphasize the importance of correct and consistent use of ITNs.

Key Question 4

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

Supporting Data

Figure A11. Trends in ITN Use among Children and Pregnant Women, *Percent of Children under 5 and Pregnant Women age 15-49 Who Slept Under an ITN the Night Before the Survey*



Conclusion

According to the MIS 2017 data ITN usage among pregnant women was 69 percent and children (68 percent) which is slightly higher than that of the general population (64 percent) and is expected to

improve as more ITNs become available through upcoming mass distribution and providing ITNs to all pregnant women at first ANC visit. A detailed analysis of the MIS 2017 showed increased use of ITNs in households that had at least one ITN where 78 percent of children under age 5 and 82 percent of pregnant women were reported to have slept under an ITN the night before the survey (data not shown in graphs above).

Key Question 5

What channels are used to distribute ITNs?

Supporting Data

According to MIS 2017, the majority of ITNs (92 percent) were obtained from mass distribution campaigns; another 4 percent were from immunization visits, 2 percent from routine antenatal care (ANC) visits, and 2 percent from other sources. ITNs will be distributed to boarding schools.

Figure A12. ITN Distribution Channels

Channel	2015	2016	2017	2018	2019	2020	2021
EPI			215,132	261,380	213,326*	472,430	316,090
ANC			73,034	84,704	182,836*	472,430	316,090
Boarding Schools			n/a	n/a	n/a	250,000	n/a
Community			n/a	n/a	n/a	n/a	n/a
Mass Campaign			2,459,733	628,763	0	6,740,302	0

*For 2019, distribution data reported for January to September, HMIS

Conclusion

ANC distribution of ITNs is expected to increase as the new policy is implemented of distributing ITNs to all pregnant women at first ANC visit as opposed to only primigravida women. EPI distribution will also continue focusing on children. The MOPDD is also looking at possible additional channels to increase net distribution and motivate use by older children (such as school-based distribution). PMI will continue to support the procurement of nets for routine distribution.

Key Question 6

What was the estimated need for ITNs during calendar year 2019? What are the estimated ITN needs over calendar years 2020 and 2021? What volume of ITNs are available from partners and the public sector for the next three calendar years?

Supporting Data

Figure A13. Estimated ITN Need for 2019 - 2021

Calendar Year	2019	2020	2021
GOR Fiscal year	**2018-2019**	**2019-2020**	**2020-2021**
Total Targeted Population[1]	12,132,544	12,432,365	12,955,768
Continuous Distribution Needs			
Channel #1: ANC[2]	461,037	472,430	316,090
Channel #2: EPI [3]	461,037	472,430	316,090
Channel #3: *Public and private boarding school and others*		*250,000*	
Channel #4:			
Estimated Total Need for Continuous Channels	922,074	1,194,860	632,180
2018/2019/2020 mass distribution campaign(s)	6,740,302	0	0
Estimated Total Need for Campaigns [4]	6,740,302	0	0
Total ITN Need: Routine and Campaign	**7,662,376**	**1,194,860**	**632,180**
Partner Contributions			
ITNs carried over from previous year	*0*	*135,950*	*352,458*
ITNs from MOH			
ITNs from Global Fund	5,127,452		0
ITNs from other donors			
ITNs planned with PMI funding [5]	2,670,874	1,700,000	632,180
Total ITNs Available	**7,798,326**	**1,835,950**	**984,638**
Total ITN Surplus (Gap)	**135,950**	**641,090**	**352,458**

Footnotes: Add any additional explanations/footnotes in this section to clearly explain the entries in your table. Remember to explain how numbers are derived and specify data sources.

[1.] The population projection is from the national census 2012. Based on the 20 year-growth projection of 46.9%, an annual growth rate of 2.3% was applied to population figure of 2020 to obtain projected population of 2021.

[2.] Pregnant women represent 3.8 percent of the general population as per the Census 2012

[3.] Children under one year old represent 3.8 % of the general population as per the Census 2012.

[4.] There will be a mass campaign in 2019/20. The request for ITNs in 2021 is for routine distribution.

Notes:

As Rwanda is distributing some G2 and PBO nets in 2019/20, they have calculated and earmarked/set aside nets for routine distribution. G2 and PBO will be distributed through EPI and ANC in selected districts receiving similar type nets through the mass campaign. These are estimated as nets carried over from previous year in 2021;

No ITNs are required for boarding schools in 2021 as schools will receive nets as part of the mass campaign in 2019/2020

In 2019 PMI is procuring 1,523,078 PBO and 1,176,922 standard pyrethroid ITNs while the Global Fund is procuring 3,627,453 standard pyrethroid ITNs and 1,200,000 dual AI ITNs for the mass campaign. During this distribution, all the net needs for universal coverage will be met with these procurements. In addition, during the mass distribution, boarding schools will also receive ITNs. The estimated need for ITNs in calendar year 2021 will be for routine distribution through ANC and EPI. MOPDD will most likely include requests for ITNs for the mass campaign in their Global Fund Concept Note in 2020 for 2023 distribution.

Conclusion

The MOPDD has earmarked PBO and dual AI ITNs for 2020-2022 to be distributed as part of routine distribution in the districts which will have received these two kinds of ITNs during the mass campaign. In 2021, the request is for routine ITNs for ANC and EPI. Given that there is an OR impact study as part of the dual AI ITN distribution - depending on the results of the study - the MOPDD plans to request dual AI ITNs for routine distribution in 2021 or reprogram to procure different types of ITNs as necessary.

Key Question 7

What is the current status of durability monitoring?

Supporting Data

Net durability monitoring is planned to follow the mass ITN distribution in 2019-2020. In coordination with PMI and aligned with internationally recognized guidelines, the MOPDD has developed a net durability monitoring protocol that has been approved by the Rwanda National Ethics Committee for the monitoring of four ITN brands in four districts for 36 months post distribution. Brands to be tested include two new generation net types (PBO-containing ITNs and Interceptor G2 ITNs) and two standard pyrethroid net types from different sources (deltamethrin and permethrin). Proposed sites and brand of ITN indicated in Figure A14.

Figure A14. Planned ITN Durability Monitoring for 2019 - 2020

Campaign Date	Sites	Brands	Baseline	12-month	24-month	36-month
2020	Burera (Northern Province)	Olyset Standard ITN				
2020	Karongi (Western Province)	G2 Interceptor				
2020	Kicukiro (Kigali City)	PermaNet 3.0 PBO ITN				
2020	Ruhango (Southern Province)	Yahe Standard ITN				

*Net durability monitoring planned following upcoming mass campaign

Conclusion

ITN durability monitoring is to be initiated in early 2020 following the mass net distribution - conclusions will be presented at the end of the monitoring activity and will influence policy decisions on the type of ITNs that the country should consider procuring.

Key Question 8

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

Supporting Data

PMI will provide pertinent data to support durability monitoring and impact assessments by the New Nets Project. Collaboration concerning new net types and malaria cases/incidence will inform future net procurements. Pricing per unit for future procurements will depend on net type(s) deemed most appropriate in the Rwanda context.

Conclusion

Results of new generation net pilots with the 2019-2020 net campaign will inform future net choices for Rwanda.

1.C. INDOOR RESIDUAL SPRAYING (IRS)

Key Goal
Ensure high spray coverage with an appropriate and effective insecticide in targeted endemic PMI-supported areas.

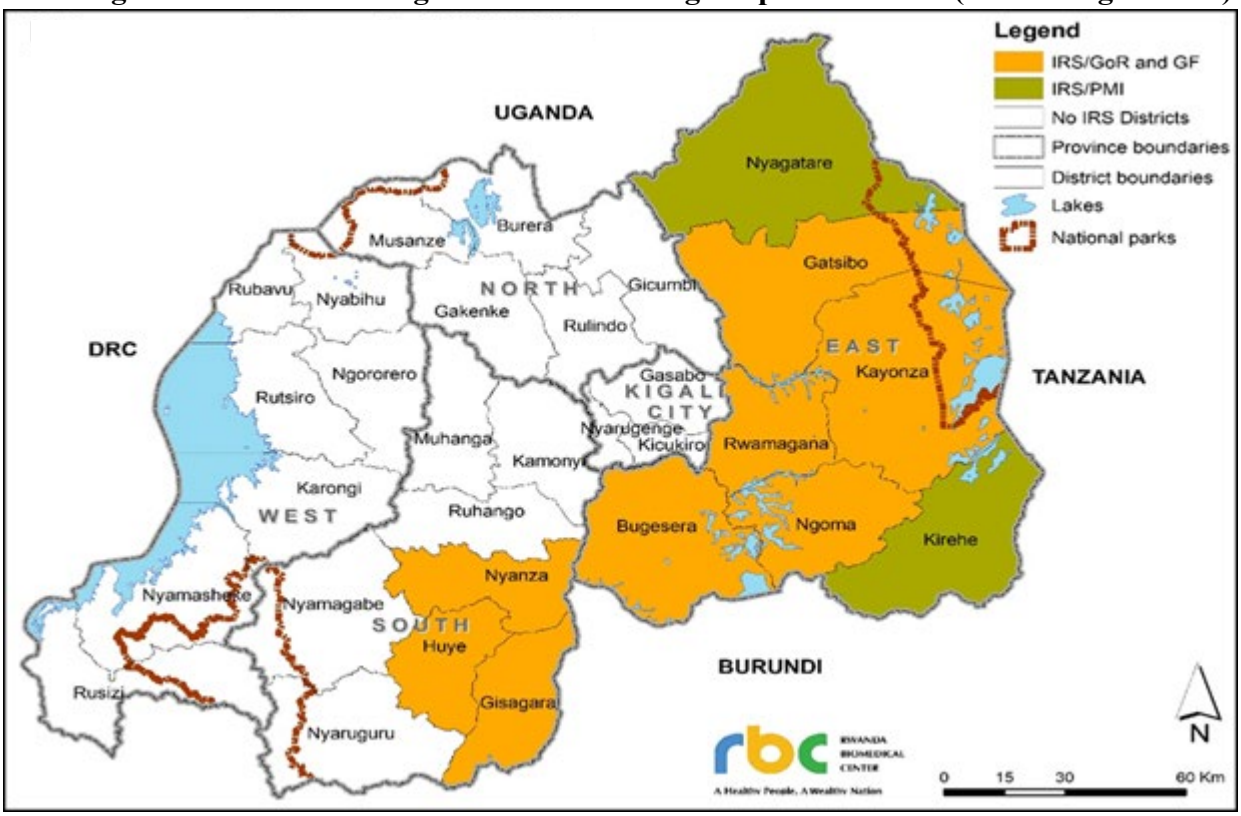
Do you propose expanding, contracting, or changing any IRS activities? If so, why and what data did you use to arrive at that conclusion?
PMI has previously supported IRS in two districts. Beginning in February 2020, PMI will support a third district. The MOPDD intends to scale up IRS to a total of 15 districts annually so any additional PMI resources could be used to assist in expanding this impactful intervention. Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

Key Question 1

What areas are targeted for IRS and why?

Supporting Data

Figure A15. IRS Coverage in Rwanda through September 2019 (all funding sources)*



*Two additional districts (Kamonyi and Ruhango) planned for IRS in late 2019, and PMI to support IRS in Ngoma as third PMI-supported district in 2020.

In 2019, PMI sprayed Nyagatare and Kirehe districts (shown as green in map above), including the Mahama Refugee Camp in Kirehe District, while Global Fund and GoR supported IRS in 10 additional districts (8 already sprayed shown in orange plus 2 districts pending IRS in late 2019: Kamonyi and Ruhango). PMI plans to spray Ngoma District in early 2020 as a third PMI supported district. The September 2019 PMI-funded spray campaign introduced for the first time a dual insecticide product, Fludora Fusion (clothianidin+deltamethrin).

Conclusion

In line with MOPDD goals, additional resources will be needed to expand or at least maintain scaled up IRS.

Key Question 2

In PMI-supported areas, what spray coverage rates have been achieved in the past 5 years?

Supporting Data

Figure A16. PMI-Supported IRS Districts, 2016–2020

Calendar Year	Number of Districts Sprayed	District Names**	Number of Structures Sprayed	Coverage Rate	Population Protected
2016 Round 1 (Feb-Mar)	2	Nyagatare, Kirehe	147,947	98%	618,696
2016 Round 2 (Sep-Oct)	2	Nyagatare, Kirehe	198,970	99%	812,714
2017	3	Nyagatare, Kirehe, Gisagara	231,258	99%	919,735
2018	2	Nyagatare, Kirehe	208,026	100%	840,773
2019	2	Nyagatare, Kirehe	214,325	98%	855,752
2020*	3	Nyagatare, Kirehe, Ngoma	298,018	TBD	1,215,859

*Denotes targets

Figure A17. All IRS districts including PMI-supported IRS areas and Global Fund/ GoR-supported IRS areas, 2016–2020

Calendar Year	Number of Districts Sprayed	District Names**	Number of Structures Sprayed	Coverage Rate	Population Protected
2016	5	Bugesera, Gatsibo, Gisagara, Kirehe, Nyagatare	464,665	99.5%	1,913,776
2017	5	Gisagara, Huye, Kirehe, Nyagatare, Nyanza	441,883	99.2%	1,753,230
2018	4	Bugesera, Gatsibo, Kirehe, Nyagatare	403,086	99.5%	1,621,955

Calendar Year	Number of Districts Sprayed	District Names**	Number of Structures Sprayed	Coverage Rate	Population Protected
2019*	12	Bugesera, Gatsibo, Gisagara, Huye, Kamonyi, Kayonza, Kirehe, Ngoma, Nyagatare, Nyanza, Ruhango, Rwamagana	951,645	99.4%	3,816,687
2020**	15	2019 districts + 3 additional districts (Muhanga, Nyamasheke and Rusizi)	TBD	TBD	TBD

*Incomplete data because two districts are still implementing IRS for 2019: Kamonyi and Ruhango. Additional number of structures expected to be covered is 182,739 with a population of 785,778 to be protected.

**Denotes targets for 2020.

Conclusion

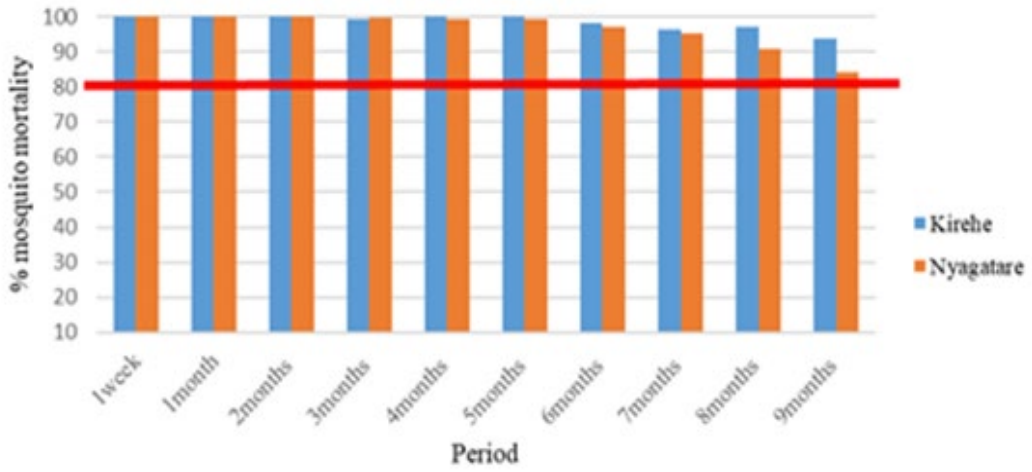
In addition to PMI-funded IRS, there is Global Fund supported IRS, and the GoR also conducts its own funded IRS. Acceptance by communities is very high. In 2019, approximately 30 percent of the population in Rwanda will be covered by IRS.

Key Question 3

What is the residual efficacy of the insecticides used for IRS in PMI-supported areas?

Supporting Data

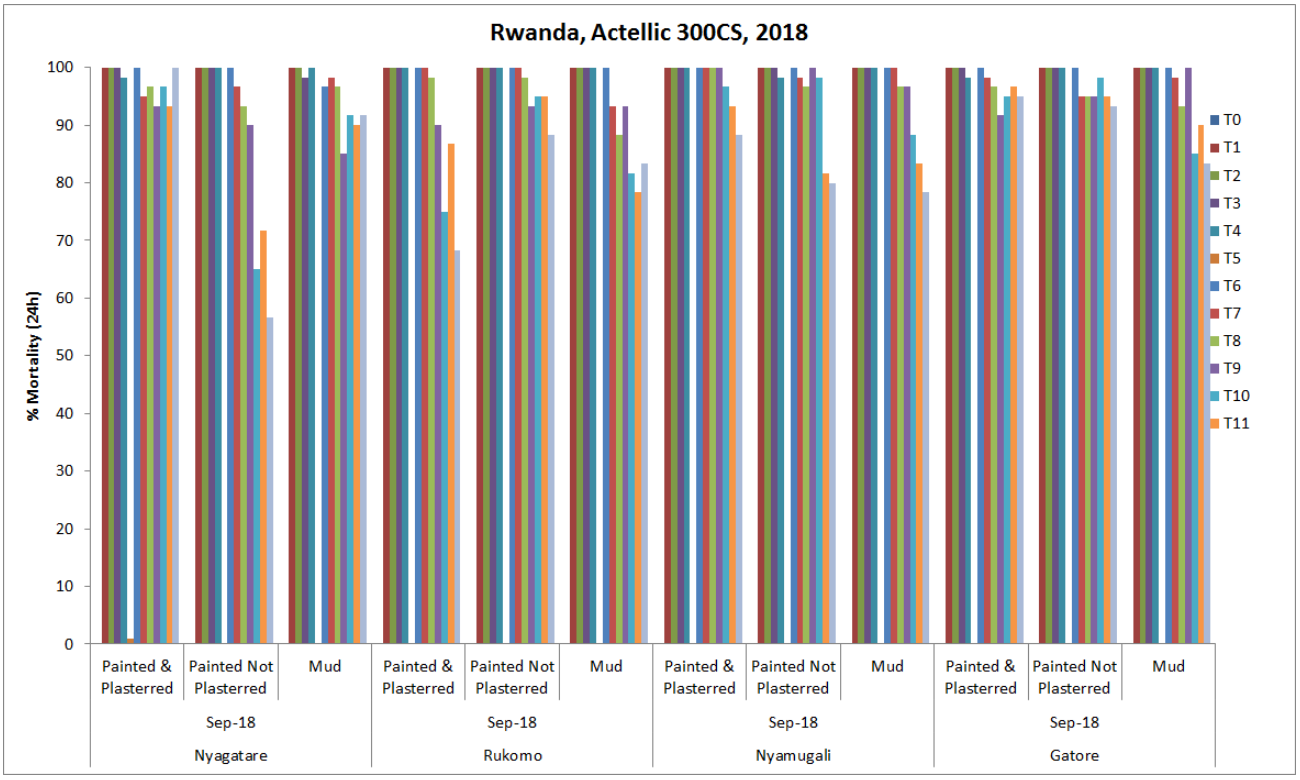
Figure 18. Overall Residual Efficacy by Month Post-IRS Bioassay in Two Districts, Sept 2018 to June 2019



Following the September 2018 IRS campaigns, bio-efficacy tests were conducted on the organophosphate Pirimiphos-methyl (Actellic 300CS) in the two PMI-supported districts (Nyagatare and Kirehe). The above figure displays results of post-spray wall bioassays indicating that the insecticide was effective for at least nine months after application. The lowest mosquito mortality rate recorded in either district was 84.2 percent which remains above the threshold of 80 percent effectiveness. With residual efficacy of up to nine months (in the context of Rwanda), only one cycle of IRS is required per year to cover the two annual malaria transmission peaks (November–December and May–June).

Previous testing following the 2017 spray campaign with Pirimiphos-methyl CS is shown below stratified by different wall types. Residual efficacy data indicated that the insecticide generally lasted for at least 9–11 months post-spray on different surfaces.

Figure A19. Residual Efficacy of Insecticide by Wall Surface Type Following the 2017 PMI-Supported IRS Campaign in Nyagatare and Kirehe Districts



Conclusion

Residual efficacy of the organophosphate insecticide used in 2017 and 2018 generally lasted at least nine months in the context of Rwanda indicating that only one cycle of IRS is needed per year to cover the two annual malaria transmission peaks. Monitoring is ongoing following transition in 2019 to the use of a new insecticide containing clothianidin and deltamethrin.

Key Question 4

What is the plan for insecticide rotation? What insecticide will be used next in PMI-supported areas?

Supporting Data

Figure A20. Insecticide Rotation Plan 2017 -2020

Year	Nyagatare	Kirehe	Gisagara	Ngoma
2017	organophosphate	organophosphate	organophosphate	n/a
2018	organophosphate	organophosphate	n/a	n/a
2019	neonicotinoid+pyrethroid	neonicotinoid+pyrethroid	n/a	n/a
2020*	neonicotinoid+pyrethroid	neonicotinoid+pyrethroid	n/a	neonicotinoid+pyrethroid

*Denotes planned insecticide classes.

All IRS districts and insecticide for 2019 are described in figure A21, and include Global Fund/GoR-supported IRS. All are planned to be covered again in 2020 along with three additional districts as funding allows using clothianidin+deltamethrin. In the past two years, resistance monitoring activities have noted some developing resistance to bendiocarbs and even less to Pirimiphos-methyl at a few sites in the country. Therefore, MOPDD and the GoR made the switch to a new dual action insecticide (Fludora Fusion) for the upcoming campaigns of IRS as a proactive strategy, rather than to wait for resistance to keep increasing to previously used insecticides. There is currently no remaining stock of either bendiocarb or Pirimiphos-methyl for IRS. However, patterns of resistance to prior and current insecticides of choice for IRS will continue to be assessed, and either bendiocarbs or Pirimiphos-methyl could be reintroduced in the future as part of an effective rotation strategy. Currently, in the majority of cases, Pirimiphos-methyl is still effective.

Figure A21. IRS Districts and Insecticide for 2019

No	District	Year	Insecticide used
1	Huye	2019	Pirimiphos methyl 300CS and Bendiocarb (1 sector)
2	Nyanza	2019	Pirimiphos methyl 300CS
3	Gisagara	2019	Pirimiphos methyl 300CS
4	Bugesera	2019	Pirimiphos methyl 300CS
5	Gatsibo	2019	Pirimiphos methyl 300CS
6	Ngoma	2019	Pirimiphos methyl 300CS and FF in 2 sectors
7	Rwamagana	2019	Fludora Fusion
8	Kayonza	2019	Fludora Fusion
9	Nyagatare	2019	Fludora Fusion
10	Kirehe	2019	Fludora Fusion
11	Kamonyi	2019	Fludora Fusion
12	Ruhango	2019	Fludora Fusion

Conclusion

Rwanda introduced a dual action insecticide (Fludora Fusion = clothianidin+deltamethrin) in mid-2019 and plans to use the same for all IRS campaigns in 2020 as part of a preemptive rotation strategy to mitigate insecticide resistance. Previous organophosphate insecticide has been in use for 3 years (since Sept 2016).

Key Question 5

Are the MOPDD and PMI considering withdrawing IRS from any PMI-supported? If so, what programs are in place to cover anticipated increases in malaria cases and promote consistent net use and care-seeking behaviors?

Supporting Data

The MOPDD is not currently considering withdrawal of IRS from any district, but if resources are insufficient to continue IRS operations following the scale up in 2019 to 12 total districts, then some districts might be withdrawn by necessity due to funding gaps. PMI plans to increase support from two districts sprayed in 2019 to three districts in 2020.

Conclusion

In line with MOPDD goals and strategies, support for IRS should be prioritized. Dual action insecticide will continue to be the choice for the next two to three-years depending on results of ongoing residual efficacy field assays and resistance monitoring.

Key Question 5

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

Supporting Data

n/a

Conclusion

n/a

2. HUMAN HEALTH

2.A CASE MANAGEMENT in health facilities and communities

MOPDD objective
• Provide malaria diagnosis to all suspected malaria cases at all levels of the health system. • Provide prompt and correct treatment for malaria cases at all levels
MOPDD approach
• MOPDD policy of universal diagnosis with either microscopy (at health facility) or RDT (in community) for all suspected malaria cases • The NRL has established the Laboratory Malaria Diagnosis External Quality Assurance (EQA) program for blinded slide retesting, proficiency testing, and on-site supervision; program includes quarterly evaluation of the quality of thick and thin smear practices, Giemsa staining, and microscopy reading in health facilities across Rwanda

- Quality assurance of microscopy is by a cascade approach in which central level technicians train and monitor district-level technicians who in turn train and supervise health facility lab technicians
- Treatment of uncomplicated malaria: artemether-lumefantrine (AL) recommended as the first-line treatment; oral quinine plus clindamycin recommended for pregnant women during the first trimester; AL recommended for pregnant women in the second and third trimesters
- Treatment of severe malaria: parenteral artesunate recommended; intravenous quinine recommended in pregnant women during the first trimester
- Rwanda Integrated Malaria Control Guidelines to be updated, including antimalarial recommendations for uncomplicated and severe malaria in pregnant women during the first trimester, pending the release of the updated WHO treatment guidelines
- Community case management provided by CHWs through complementary programs of integrated community case management (iCCM) and home based management of malaria (HBM)
- iCCM refers to the integrated approach for diseases (including malaria, diarrhea, and pneumonia) among children aged 5 years or less
- HBM is management of only malaria in community among children aged more than 5 years and adults
- The countrywide cadre of 45,000 CHWs is being expanded to 60,0000 with 2 CHWs per village focused on delivering iCCM and providing diagnosis and testing of malaria for persons of all ages in the community
- 57 percent of all diagnosis and treatment of malaria in Rwanda occurs at the community level
- The MOPDD introduced a new rapid, secure short message service (SMS) system in late 2018 for coordination of severe case referral from CHWs to health facilities
- From MIS 2017, among children seeking care for fever, 14 percent were seen in the private sector representing only 8 percent of all children with fever; and among women who reported treatment source for malaria care, 88 percent listed a health center/post, 42 percent a community health worker, 13 percent a hospital, and 7 percent a private health facility
- Private sector health care follows the same national guidelines as in the public health sector

PMI objective, in support of MOPDD

- PMI procures RDTs and ACTs for national needs
- PMI supports cascade training and supportive supervision of laboratorians for microscopy
- PMI supports CHWs in 20 districts with training, supportive supervision and tools such as patient registers and job aids

- PMI supported studies including the 2018 therapeutic efficacy study (TES) to monitor for emergence of antimalarial drug resistance and a study of intermittent screening and treatment of malaria in pregnancy (ISTp)

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

- During FY19: 3,956,060 ACT treatments and 142,104 doses of artesunate were procured and delivered
- With PMI support, during the past year, 51 central and district level microscopists were trained as well as 75 health facility microscopists
- Trained 200 new Community Environment and Health Officers (CEHOs) in charge of CHWs in 13 districts on iCCM
- Trained 648 CHWs from 20 districts in malaria prevention messages and interpersonal communication for message delivery
- 162 district-based mentors supported providers in 400 health centers
- Began printing and distribution of current malaria treatment guidelines for health facilities and job aids for CHWs
- Collaborated with MOPDD to develop malaria integrated supervision tools with MiP component
- PMI collaborated with the MOPDD on the 2018 TES which indicated that the current first-line antimalarial remains effective in Rwanda; testing of molecular markers was also conducted
- PMI support SBC activities to increase awareness and importance of prompt care seeking in case of fever
- Through the PARMA network, PMI supported training of two NRL laboratorians in specimen testing and analysis for the TES studies
- PMI supported a field trial of a strategy of intermittent screening and treatment of malaria in pregnancy in two districts; results showed no benefit of ISTp over routine care for reduction in maternal malaria prevalence or improvement in newborn outcomes; findings used to inform national MIP policy

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

- PMI will continue to procure commodities in collaboration and coordination with MOPDD and Global Fund

- Recently trained District Hospital lab technicians to train health center microscopists in their catchment area as part of cascade strategy; and will also continue quality monitoring for microscopy diagnostics
- PMI will continue to support CHW training, supportive supervision and tools with further development of e-learning platform and approach
- CEHOs in 7 districts to be trained
- Through the PARMA network, PMI plans ongoing collaboration to include building NRL capacity for TES studies and onsite TA/mentorship; next TES (2020) will include 4-6 sites and additional testing for parasite clearance time

PMI Goal
Improve access to and utilization of timely, quality, and well-documented malaria testing and treatment by providing facility- and community-based health workers with training, supervision, and malaria commodities to be able to provide high quality, effective care.

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

- Maintain current support for ACT and artesunate procurement; continue CHW case management supervision and mentorship at monthly HC meetings and quarterly visits onsite by in-charge Community Environment and Health Officer (CEHO)
- Diagnostics: extend cascade training of microscopists from District Hospitals to additional supported health centers (20 DH technicians already trained can now train average of 15 HC microscopists for a total of about 300 HC technicians to be trained); accreditation of national lab and referral hospital technicians by external evaluator to be supported by WHO
- Expansion of CHW cadre to a fourth CHW per village for WASH/nutrition with feasibility study of training the fourth CHWs to also provide malaria diagnosis and treatment
- Next TES to be begin in late 2020 with addition of parasite clearance time testing
- Capacity building of Rwanda National Reference Laboratory for TES specimen testing (equipment, technician training and mentorship)

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

Key Question 1

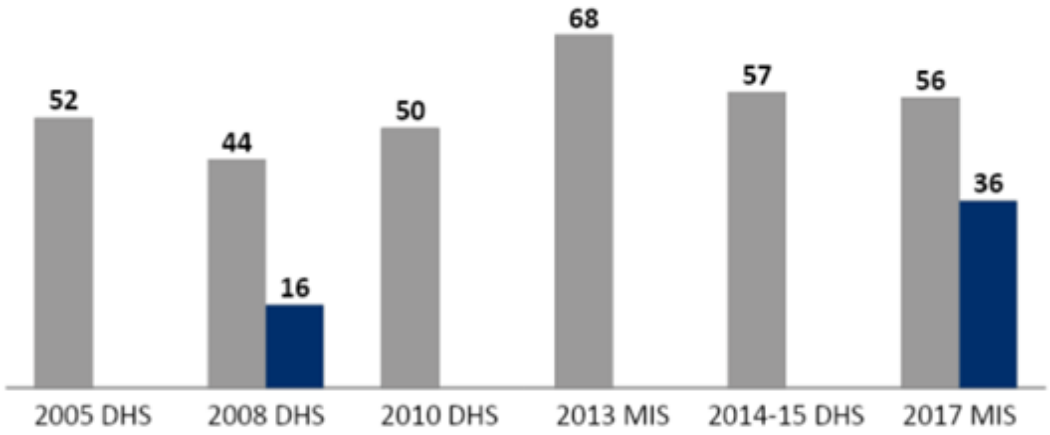
What is the status of care-seeking?

Supporting Data

A 2017 report on knowledge, attitudes and practices (KAP) in Rwanda showed that 91.3 percent of respondents are aware that fever is among the major malaria symptoms (Rwanda Malaria Knowledge, Attitudes and Practices Survey, 2017). Most respondents said that when their child has a fever, they almost always worry that it is malaria (90.9 percent), and nearly 80 percent indicated they do not wait to seek care since 88 percent were aware that a case of malaria can potentially lead to death. In addition, 93.6 percent of respondents acknowledged that a health provider is always the best person to talk to when they think their child may have malaria.

Figure A22. Trends in Care-Seeking for Fever

Among children under 5 with fever in the 2 weeks before the survey for whom:



*Note: this indicator has been recalculated according to the newest definition, care, or treatment from any source, excluding traditional practitioners

Also noted in MIS 2017, care seeking varied by wealth index with 67 percent of those in the wealthiest group seeking care vs. 44 percent in the poorest group. (MIS 2017)

Conclusion

Although the 2017 KAP report noted high levels of knowledge about malaria and intended care seeking, the 2017 MIS found that the proportion of children with recent fever seeking care (56 percent) and seeking care early (36 percent) was lower. The discrepancy between intended care seeking and reported care seeking may be influenced by several factors including access to care. Notably, there was a policy change to expand access to community care by opening community care to all ages and reducing financial barriers in late 2016, which has resulted in an increased proportion of patients being diagnosed and treated through community case management (see Figure 5). The impact of this programmatic change should be reflected in the DHS 2019-2020.

Key Question 2

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

Supporting Data

Figure A23. Key Barriers and Facilitators to Care Seeking

Facilitator	Type of Factor	Data Source	Evidence
Availability of community-level diagnosis and treatment	Environmental	HMIS/SISCOM Formative Research Report 2019	Expansion of community care to all ages led to >50% of all malaria diagnosis and treatment being delivered by CHWs Availability of care from CHWs perceived as accessible and straightforward for those with community-based health insurance
Free access to malaria care for lower socioeconomic classifications	Social	HMIS/SISCOM	Reducing financial barriers to care led to >50% of all malaria diagnosis and treatment being delivered by CHWs
Health insurance for those in higher socioeconomic classification	Social	HMIS/SISCOM	Reducing financial barriers to care led to >50% of all malaria diagnosis and treatment being delivered by CHWs
Barrier	**Type of Factor**	**Data Source**	**Evidence**
Attributing illness to cause other than malaria	Internal	Death audits Formative Research Report 2019	Some audited families report attributing illness to another cause
Consulting traditional healer before seeking care from health system	Social	Death audits Formative Research Report 2019	Some audited families report seeking traditional healing

Conclusion

Reducing financial barriers to care and opening community care to persons of all ages led to dramatic increase in proportion of care sought at the community level, increasing to over 50 percent of all malaria diagnosis and treatment.

Key Question 3

How have malaria testing and treatment practices evolved over time?

Supporting Data

Figure A24. Trends and Diagnosis and Treatment of Children with Fever

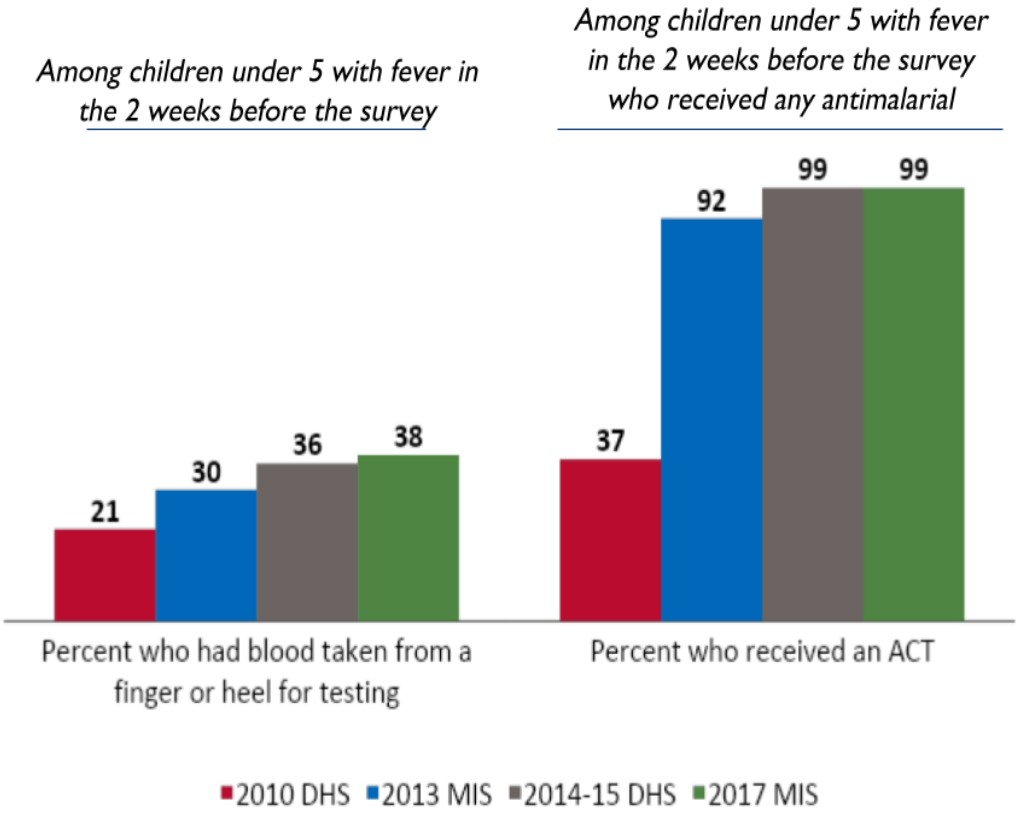


Figure A25. Care-Seeking and Case Management Indicators among Children Aged Less than 5 Years and Adults Managed by Community Health Workers, 2018–2019*

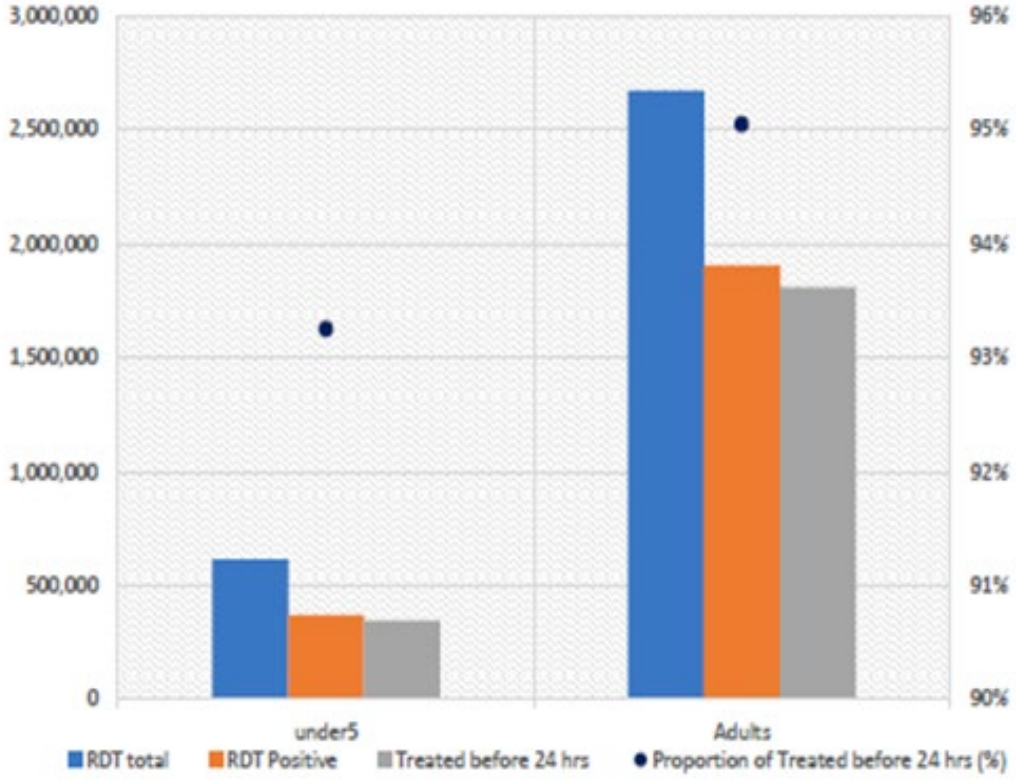


Figure A26. Proportion of Malaria Cases of All Ages Diagnosed and Treated Through Community Care (HBM) and Total Number of Severe Malaria Cases, July 2014–June 2019*

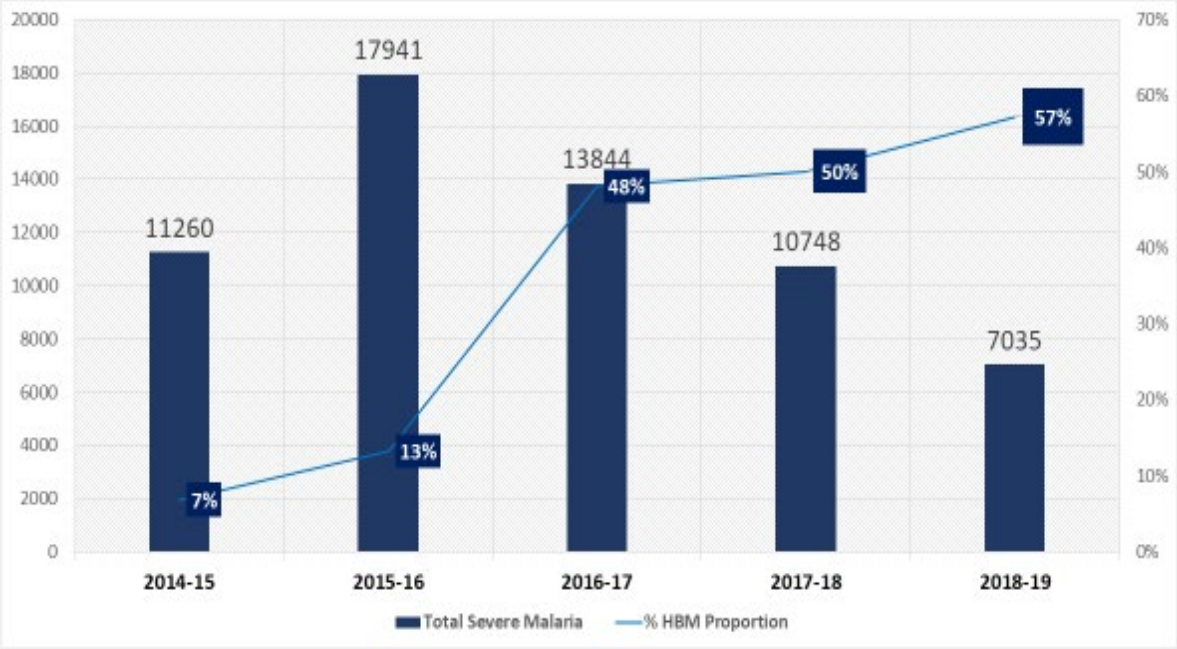
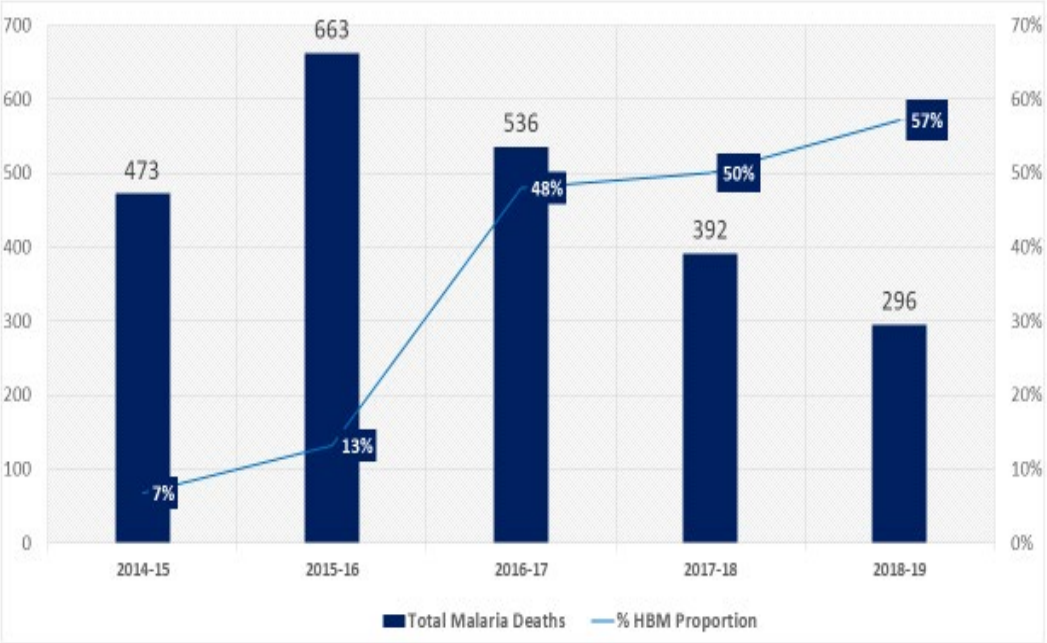


Figure A27. Proportion of Malaria Cases of All Ages Diagnosed and Treated Through Community Care (HBM) and Total Number of Malaria Deaths, July 2014–June 2019*



*From Rwanda Malaria Annual Report 2018-2019

Conclusion

Over 93 percent of all children and >95 percent of adults who sought care and had malaria confirmed received treatment within 24 hours of illness onset. Caregivers of nearly 100 percent of children under 5 years of age who were treated for malaria reported that the child received an ACT. Increasing proportion of care is being delivered at the community level. Early treatment in the community has led to a reduction in severe malaria cases and malaria-related deaths.

Key Question 4

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

Supporting Data

In the 2017 KAP survey among the general population, only 14.2 percent of those interviewed said that a provider would give malaria treatment even when a fever is found not to be caused by malaria (Rwanda Malaria Knowledge, Attitudes and Practices Survey, 2017) indicating that health care providers are generally compliant with the policy of treating only parasitologically confirmed malaria cases.

Figure A28. Key Barriers and Facilitators to Appropriate Testing and Treatment Practices

Facilitator	Type of Factor	Data Source	Evidence
Committed health care providers at health facilities	Social	Supervision reports	During supervision it has been noted that health providers are dedicated and committed to their work and sometimes the limitations are more structural (lack of equipment for example) than individual
Committed and dedicated community health workers diagnosing and treating malaria in all age groups	Environmental	HMIS and SISCOM	About 57% of all malaria cases in 2019 were diagnosed and treated by community health workers. This has brought care closer to the population increasing access to malaria care
Barrier	**Type of Factor**	**Data Source**	**Evidence**
Health care provider workload	Environmental	Anecdotal	Providers not able to provide adequate time for consultation with patients and to explain about malaria treatment due to heavy workload

Conclusion

Limited data exists on provider practices, but a survey of the general public indicated that providers comply with the national guidelines to treat only confirmed malaria. There is also anecdotal information on the dedication and commitment of health care providers in providing quality health care including the treatment of malaria both at the health facilities and at the community level.

Key Question 5

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

Supporting Data

Please see Figure 10 for more information on PMI-supported districts for improved malaria and maternal/child health services

PMI provides support, including training, tools and job aids, and supportive supervision, to the health system at all levels, including CHWs, in 20 districts. National guidelines are reinforced in initial and refresher training for health facility providers and CHWs. Quarterly supervisory visits allow for on-the-job mentorship to follow training.

PMI also supports central level planning, policy development and supportive supervision to districts.

Conclusion

Case management support in terms of training, supportive supervision and tools are provided at all levels of the health system. In addition, PMI supports central level case management policy development and dissemination.

Key Question 6

What was the estimated need for RDTs during calendar year 2019 (and were those needs met, if not why)? What are the estimated RDT needs over calendar years 2020 and 2021?

Supporting Data

Figure A29. Gap Analysis for RDTs 2019 - 2020

Calendar Year	2019	2020	2021
GOR Fiscal year	**2018-2019**	**2019-2020**	**2020-2021**
RDT Needs			
Total country population	12,132,544	12,432,365	12,955,768
Population at risk for malaria [1]	12,132,544	12,432,365	12,955,768
PMI-targeted at-risk population	12,132,544	12,432,365	12,955,768
Total number of projected fever cases [2]	10,778,468	10,999,477	11,462,555
Percent of fever cases tested with an RDT [3]	57%	70%	70%
Total RDT Needs [4]	**6,143,727**	**7,699,634**	**8,023,789**
Minimum stock needed to remain at the end of the year [5]			**6,017,842**
Partner Contributions (to PMI target population if not entire area at risk)*			
RDTs carried over from previous year	*6,623,430*	*7,607,673*	*6,538,786*
RDTs from Government		*0*	
RDTs from Global Fund	7,127,970	5,640,747	5,320,800
RDTs from other donors			
RDTs planned with PMI funding [6]		990,000	
Total RDTs Available	**13,751,400**	**14,238,420**	**11,859,586**
Total RDT Surplus (Gap)	**7,607,673**	**6,538,786**	**-2,182,044**

Footnotes:

[1]Geographic coverage: The country's population is at risk of malaria

[2.] Total number of projected fever cases: Projected trend is based on historical number of fever cases from HMIS which represent 88 percent of the population at risk of malaria cases

[3.] Percent of fever cases tested with an RDT: The trend in RDT use shows the average annual increase of approximately 5 percent over the past three years. The same percentage increase when applied to 57 percent of 2018-2019 give 62 percent for 2020. However, the program target is to increase the projected RDT coverage to 70 percent starting with July 2019 (Source: 2018-2019 Malaria annual report dissemination and priority setting workshop).

[4.] The total RDT needs represent the estimated consumption for three years by applying the percentage of fever cases tested by RDTs to all fever cases. To cater for the amount of stock that needs to be sitting in warehouses along the supply chain to avoid stock outs at the facility level, a minimum of stock of 9 months at all SC levels (6 at central, 2 at District pharmacy and 1 at health facility) was considered in the calculation of the total needs.

[5.] Minimum stock needed to remain at the end of the year: A minimum stock of 9 months at all SC levels (6 at central, 2 at District pharmacy and 1 at health facility) is considered when estimating the total need for 2021 to prevent from stock out at the end of the year.

[6.] The PMI planned contribution for 2019 was reprogramed to procure ACTs.

Conclusion

In Rwanda, RDTs are used only with community case management. The gap analysis accounts for the expansion of CCM, which now accounts for 57 percent of all malaria diagnosis (see Figure 5). In the most recent report dissemination and priority setting workshop, the program target is to increase the projected RDT coverage to 70 percent starting with July 2019. With a new Global Fund allocation cycle starting in FY 2020, it is not yet known how many RDTs the MOPDD will request through their Global Fund grant. PMI/Rwanda plans to support the MOPDD during the Global Fund grant application process, and will work with the MOPDD and the Global Fund to adjust accordingly the amounts that PMI/Rwanda procures.

Key Question 7

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

Supporting Data

Figure A30 Gap Analysis for ACTs 2019 - 2020

Calendar Year	2019	2020	2021
GOR Fiscal year	**2018-2019**	**2019-2020**	**2020-2021**
ACT Needs			
Total country population	12,132,544	12,432,365	12,955,768
Population at risk for malaria	12,132,544	12,432,365	12,955,768
PMI-targeted at-risk population [1]	12,132,544	12,432,365	12,955,768
Total projected number of malaria cases [2]	3,932,553	3,539,298	3,008,403
Total ACT Needs [3]	**4,398,150**	**3,818,763**	**3,333,888**
Minimum stock needed to remain at the end of the year [4]			**2,500,416**
Partner Contributions (to PMI target population if not entire area at risk)			
ACTs carried over from previous year [5]	*3,369,472*	*5,661,342*	*6,007,297*
ACTs from Government	*0*	*0*	*0*
ACTs from Global Fund	2,733,960	1,864,718	1,453,303
ACTs from other donors			
ACTs planned with PMI funding [6]	1,772,273	2,300,000	
Additional ACTs procured with PMI funding [7]	2,183,787		
Total ACTs Available	**10,059,492**	**9,826,060**	**7,460,600**
Total ACT Surplus (Gap)	**5,661,342**	**6,007,297**	**1,626,296**

[1]Geographic coverage: The total needs covers the total country needs.

[2] Total projected number of malaria cases were updated based on the total number of malaria cases recorded from January to December 2018. The quantification team assumed that this number would reduce by 5% ,10% and 15% in 2019, 2020 and 2021 respectively (Source: National quantification report, 2018)

[3] Total ACT Needs : These are forecasted consumption as per the consumption based forecast whereby the team assumed a decrease in consumption from the baseline of 2018 by 5% ,10% and 15% in 2019, 2020 and 2021 respectively (Source: National quantification report,

2018). Since both logistic and consumption data accuracy were good and the service based forecast uses many assumptions than consumption based, the quantification team preferred to consider the consumption based forecast to reduce possible forecast errors that might be linked to assumptions used for service based forecast. Therefore, the consumption based method was used for this gap analysis.

[4.] Minimum stock needed to remain at the end of the year: A minimum stock of 9 months at all SC levels (6 at central, 2 at District pharmacy and 1 at health facility) is considered when estimating the total need for 2021 to prevent from stock out at the end of the year.

[5] Carryover: the stock carried over for 2019 were extracted from the pipeline database. This represent the stock at the beginning of FY 2018/2019, which is stock end June 2018.

[6] ACTs planned with PMI funding: These are MOP18 and MOP19 planned ACTs

[7] Additional ACTs procured with PMI funding: These are additional ACTs procured using RDTs reprogramed funds and previous MOPs carryover funds

Conclusion

The Rwanda quantification team used two methods (i.e., reported malaria cases, prior ACT consumption) to estimate ACT need; both estimates assumed that the estimated ACT need would decrease by fiver percent,10 percent and 15 percent in 2019, 2020 and 2021, respectively. Although both logistic and consumption data accuracy were good and used many of the same assumptions, the quantification team preferred the consumption based forecast. As with RDT procurement, it is not yet known how many ACTs the MOPDD will request through their Global Fund grant in their new Global Fund application starting in FY 2020. PMI/Rwanda plans to support the MOPDD during the Global Fund grant application process, and will work with the MOPDD and the Global Fund to adjust accordingly the amounts that PMI/Rwanda procures.

Key Question 8

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

Supporting Data

Figure A31. Gap Analysis of Injectable Artesunate Needs

Calendar Year	2019	2020	2021
GOR Fiscal year	2018-2019	2019-2020	2020-2021
Injectable Artesunate Needs			
Projected Number of Severe Cases[1]	19,663	17,696	15,042
Projected # of severe cases among children	7,865	7,079	6,017
Projected # of severe cases among adults	11,798	10,618	9,025
Total Injectable Artesunate vials Needs based on number of malaria cases [2]	**150,701**	**135,630**	**115,286**
Total Injectable Artesunate vials Needs based on consumption [3]	**196,013**	**186,212**	**167,591**
Minimum stock needed to remain at the end of the year [4]			**125,693**
Partner Contributions			
Injectable artesunate vials carried over from previous year	*296,769*	*153,273*	*209,166*
Injectable artesunate vials from Government	*52,517*		
Injectable artesunate vials from Global Fund		100,000	
Injectable artesunate vials from other donors			

Calendar Year	2019	2020	2021
GOR Fiscal year	**2018-2019**	**2019-2020**	**2020-2021**
Injectable artesunate vials planned with PMI funding		80,000	
Additional Injectable artesunate vials procured with PMI funding [5]		62,104	
Total Injectable Artesunate vials Available	**349,286**	**395,377**	**209,166**
Total Injectable Artesunate vials Surplus (Gap)	**153,273**	**209,166**	**-84,118**

Footnotes:

[1] This number is both severe cases and simple malaria with minor digestive symptoms that require injectable. It represent 0.5% of total malaria cases, the actual percentage from 2018 HMIS data. The same decrease of 5%,10% and 15% was also applied as for the other malaria products

[2] Total Injectable Artesunate vials Needs based on number of malaria cases. Key assumptions are that for the cases requiring injectable 4% use Quinine and 96% artesunate. For Artesunate injections, we have four categories based on the weight band: <25kg, 26-50kg, 51-70kg and above 70kg which take in average 4,8,12 and 16 vials approximately. Data by such weight bands are not available, the quantification team used the estimate of 40%, 20% , 25% and 5% respectively for <25kg, 26-50kg, 51-70kg and above 70kg. as this method used many assumptions, the team did not consider this method rather preferred to use the consumption data that shows the real quantities consumed by patients.

[3] Total Injectable Artesunate vials Needs based on consumption: These needs are forecasted as per the consumption from the baseline of 2018 by reducing 5% ,10% and 15% in 2019, 2020 and 2021 respectively (Source: National quantification report, 2018). Since both logistic and consumption data accuracy were good and the service based forecast uses many assumptions than consumption based, the quantification team preferred to consider the consumption based forecast to reduce possible forecast errors that might be linked to assumptions used for service based forecast. Therefore, the consumption based method was used for this gap analysis.

[4.] Minimum stock needed to remain at the end of the year: A minimum stock of 9 months at all SC levels (6 at central, 2 at District pharmacy and 1 at health facility) is considered when estimating the total need for 2021 to prevent from stock out at the end of the year.

[5.] Additional contribution by carry-over funding from previous MOPs

Figure A32. Gap Analysis of Artesunate Suppository Needs

Calendar Year	2019	2020	2021
GOR Fiscal year	**2018-2019**	**2019-2020**	**2020-2021**
Artesunate Suppository Needs			
Number of severe cases expected to require pre-referral dose at community level		5,161	4,874
Total Artesunate Suppository Needs [2]		**9,031**	**8,529**
Minimum stock needed to remain at the end of the year			**6,397**
Partner Contributions			
Artesunate suppositories carried over from previous year			*404,546*
Artesunate suppositories from Government		*13,577*	
Artesunate suppositories from Global Fund			
Artesunate suppositories from other donors			
Artesunate suppositories planned with PMI funding		400,000	
Total Artesunate Suppositories Available	**0**	**413,577**	**404,546**
Total Artesunate Suppositories Surplus (Gap)	**0**	**404,546**	**396,017**

Footnotes:

[1] This is the number of children under five years of age projected to have severe malaria. The same decrease of 5%,10% and 15% were also applied to the baseline number of cases of 2018 which was 5,734 cases

[2] This is the number of suppositories needed as per the projected number of cases. we have two categories based on the age: under 3 years taking one suppository and above 3 years taking 2 suppositories; under 3 years were assumed to be 25% and the remaining are above 3 years.

[3] Minimum stock needed to remain at the end of the year: A minimum stock of 9 months at all SC levels (6 at central, 2 at District pharmacy and 1 at health facility) is considered when estimating the total need for 2021 to prevent from stock out at the end of the year.

Conclusion

PMI/Rwanda plans to continue to support the procurement of injectable artesunate, and will work with the MOPDD and the Global Fund to adjust accordingly the amounts that PMI/Rwanda procures.

Key Question 9

Are the first-line ACTs effective and monitored regularly?

Supporting Data

Figure A33. Recently Completed and Ongoing Antimalarial Therapeutic Efficacy Studies

Year	Sites	Treatment arms	PCR-corrected ACPR>90%?	Where molecular resistance work was completed or the plan, if any, for molecular resistance work
2018	Rukara, Masaka, Bugarama	AL	Yes	CDC Laboratory Unit through PARMA
2020	TBD	AL, +/-DP	NA	TBD

Footnotes - ACPR: adequate clinical and parasitological response; AL: artemether-lumefantrine; PARMA: PMI-supported Antimalarial Resistance Monitoring in Africa

Conclusion

Current evidence suggests that AL continues to be effective in Rwanda.

Key Question 10

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

Supporting Data

- Plans are underway to strengthen the capacity of the Rwanda National Reference Laboratory for TES testing
- MOPDD will update and adapt case management guidelines and medications based on WHO recommendations as they are released

Conclusion

PMI will continue to support the NRL for enhanced TES capacity through the PARMA network. Case management guidelines will be refined when new international recommendations are released.

Key Question 11

Are there any other considerations that impact your funding allocation in this category? If there is a specific budget line item in Table 2 that is not covered by the above questions, please address here.

Supporting Data

N/A

Conclusion

N/A

2.B. DRUG-BASED PREVENTION

MOPDD objective
Rwanda does not conduct SMC or IPTp
MOPDD approach
• Treatment of malaria in pregnancy includes encouraging early and regular ANC attendance, provision of ITN at first ANC visit, and screening for symptoms of malaria at each ANC encounter • IPTp-SP was discontinued in 2008 because of documented resistance to SP
PMI objective, in support of MOPDD
PMI does not currently support any drug based prevention strategies in Rwanda
PMI-supported recent progress (past ~12-18 months)
PMI supported a field trial of intermittent screening and treatment of malaria in pregnancy (ISTp) in two districts; results showed no benefit of ISTp over routine care for reduction in maternal malaria prevalence or improvement in newborn outcomes; findings used to inform national MIP policy
PMI-supported planned activities (next ~12-18 months, supported by currently available funds)
• No drug based prevention activities are currently planned • A policy review will be completed with stakeholder consultation to evaluate opportunities to strengthen the GoR policy on prevention of malaria in pregnancy

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

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

Do you propose expanding, contracting, or changing any MIP activities? If so, why and what

data did you use to arrive at that conclusion?
PMI's support to MIP has not changed substantially in FY2020. • Rwanda has not provided IPTp since 2008 because of documented resistance to SP • High-level SP resistance documented in samples collected from two sites in 2015 • Field study of ISTp strategy in two districts did not demonstrate added benefit over usual care for either malaria detected at delivery or in newborn outcomes • Awaiting formal WHO recommendation to determine if change indicated in national guidelines for antimalarial medication recommended during first trimester of pregnancy • GoR has adopted WHO guideline of eight ANC visits Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

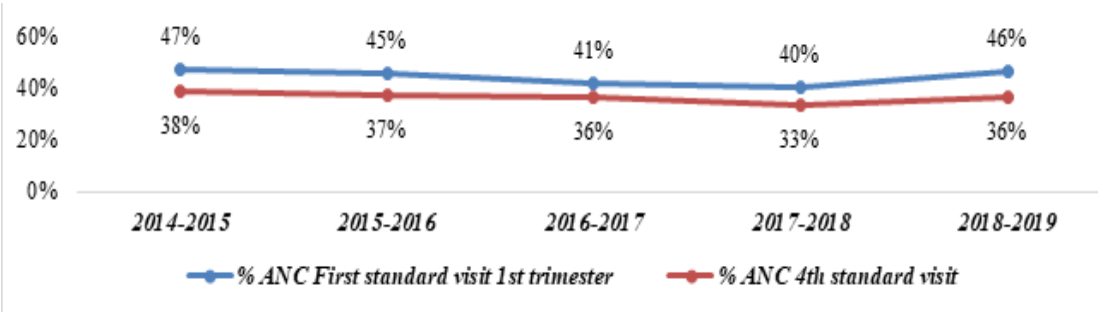
Key Question 1

What proportion of pregnant women are receiving ANC early and frequently (as recommended by national and/or WHO strategies) during their pregnancy?

Supporting Data

To be most effective, antenatal care (ANC) should be sought early during the pregnancy, preferably in the first trimester; more importantly, it must continue regularly through to delivery. The figures below describe the trend of antenatal care service use from 2014 to 2019. As of June 2019, 46 percent of pregnant women initiated ANC during the first trimester and 36 percent attended at least 4 ANC visits.

Figure A34. Trend of ANC 1st Standard Visit and ANC 4th Standard Visit, July 2014 – June 2019



Source: Rwanda Maternal Child and Community Health Annual Report 2018-2019

Figure A35 Key Barriers and Facilitators to ANC Attendance

Facilitator	Type of Factor	Data Source	Evidence
Favorable view of need for ANC	Internal	2017 KAP survey	92% of respondents felt that once a woman thinks she may be pregnant, she should see a health provider as soon as possible
Trust in ANC providers	Internal	2017 KAP survey	96% of respondents reported that healthcare providers will only give a pregnant woman medicine if they know for certain that it is not harmful to her or to her baby
Support from CHW / health worker	Social, environmental	Formative research report 2019	CHW support / promotion of ANC attendance motivates early ANC care seeking Familiarity with health worker achieved during ANC visits allays concerns around the time of delivery
Barrier	**Type of Factor**	**Data Source**	**Evidence**
Pregnant women required to be accompanied by partner to go to first ANC / lack of partner support	Internal, social, environmental	Formative research report 2019	"*…male accompaniment, while no longer mandatory at the policy level, is still often perceived as a requirement at the practice level.*" .
Stigma / apathy related to primi-/multi-gravid status	Internal, social	Formative research report 2019	Embarrassment at having yet another pregnancy or at being young / unmarried and pregnant

Conclusion

Late initiation of ANC care (with less than half of women initiating ANC care during the first trimester) results in lower proportion of women receiving at least the recommended minimum of 4 ANC visits during pregnancy. Available survey results indicate favorable attitudes towards ANC care, but several psychosocial factors contribute to late initiation. GoR has adopted ANC8 policy recommending 8 antenatal care visits.

Key Question 2

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

Supporting Data

Rwanda has not provided IPTp since 2008 because of documented resistance to SP

Conclusion

There are no current plans for resuming IPTp in Rwanda. Consideration is being given to test samples from the Intermittent Screen and Treat study collected in 2017-2018 for SP resistance to provide more recent data. A policy review will be completed with stakeholder consultation to evaluate opportunities to strengthen the GoR policy on prevention of malaria in pregnancy.

Key Question 3

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

Supporting Data

N/A

Conclusion

N/A

Key Question 4

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

Supporting Data

Data is not available because data from outpatient clinics are not stratified by pregnancy status. The only available indicator is all suspected malaria cases who are tested, which is not stratified by pregnancy status.

Conclusion

Available data is not stratified by pregnancy status.

Key Question 5

What was the estimated need for IPTp commodities during calendar year 2019 (and were those needs met, if not why)? What is the estimated need for IPTp commodities over calendar years 2020 and 2021?

Supporting Data

N/A

Conclusion

N/A

Key Question 6

Are there any other considerations that impact your funding allocation in this category? If there is a specific budget line item in Table 2 that is not covered by the above questions, please address here.

Supporting Data

N/A

Conclusion

N/A

3. CROSS-CUTTING AND OTHER HEALTH SYSTEMS

3.A. SUPPLY CHAIN

MOPDD objective
Procure and distribute malaria commodities to ensure quality malaria case management and prevention
MOPDD approach
• Conduct annual quantification of antimalarial drug, test kits and ITNs • Procure and quality assure malaria commodities • Conduct quarterly supply plan review of antimalarial drugs and other commodities • Monitor the distribution of antimalarial medicines and commodities by district pharmacies and conduct quarterly meetings on malaria supply chain management • Introduce system for better monitoring of commodities at the community level
PMI objective, in support of MOPDD
The MoH, through the MOPDD and the Medical Procurement and Production Division (MPPD), conducts annual quantifications for malaria medicines and RDTs to meet the needs of the public sector facilities in the country. PMI's commodities and supply chain logistics partner provides technical assistance in both an annual quantification exercise as well as quarterly supply plan re-assessments relative to the quantification findings. Rwanda's malaria supply chain is part of an integrated system with a harmonized and recently rolled-out electronic LMIS (fully replacing the now defunct paper-based LMIS). More specifically PMI: • Procures ACTs, injectable artesunate, RDTs and ITNs • Provides technical assistance for improvements to supply chain management including quantification • Printing and distributing tools to facilitate supply management at the community level.
PMI-supported recent progress (past ~12-18 months)
Over the last year, the MOPDD has been working with partners to strengthen malaria control through supply chain strengthening. Malaria supply chain performance has also been a central focus by the MOH and the Rwanda Biomedical Center (RBC). PMI, through their supply chain and logistics partner, has contributed to these malaria control efforts through supporting an annual seasonality-based quantification, which included forecasted consumption for antimalarials and RDTs from FY 2018 through FY 2024, and the subsequent development of a FY2018-2019 supply plan,

evaluated quarterly and updated based on actual consumption and reported malaria cases. Additionally, the frequency of supervisory site visits to district-level pharmacies and health facilities increased, focusing not only on malaria case management but also supply chain function and performance (and stock status) to help ensure an uninterrupted supply of good quality antimalarials and RDTs.

During FY 2019, PMI:

- Procured and distributed 1,772,273 ACT treatment courses and 142,104 doses of injectable artesunate
- Procured 1,523,078 PBO-containing nets and 1,176,922 standard ITNs for distribution during 2019-2020 mass campaign and through routine distribution channels;
- Printed and distributed CHW commodity supply tools:
  - Drug request registers – 1,447
  - Store cards – 152,784
  - RDT Store cards - 38,196

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

PMI/Rwanda will continue to support:

- Procurement of malaria treatment medications (e.g., ACTs, injectable artesunate) and RDTs to meet country needs for case management in the coming months
- Procurement of ITNs for routine net distribution through ANC and EPI clinics
- Strengthening of the supply chain in terms of quantification, reporting and supervision

PMI Goal

Ensure continual availability of quality products needed for malaria control and elimination (e.g., ACTs, RDTs, parenteral artesunate, ITNs) at health facilities and community level.

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

The MOPDD is considering including rectal artesunate for pre-referral treatment of severe malaria at the community level while pending transfer of patient to health facility, but is concerned about cost effectiveness with decreasing numbers of severe cases, particularly among children under five. PMI will provide technical assistance during policy development and implementation. PMI will continue to procure the requisite commodities as planned.

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

Key Question 1

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

Supporting Data

Figure A36. Central Stock Levels for ACTs

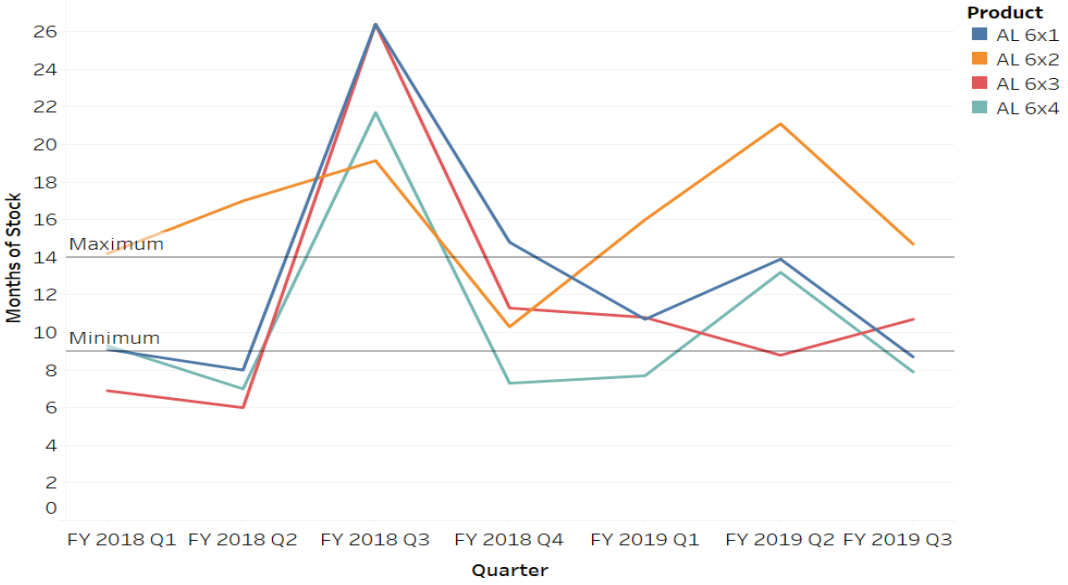
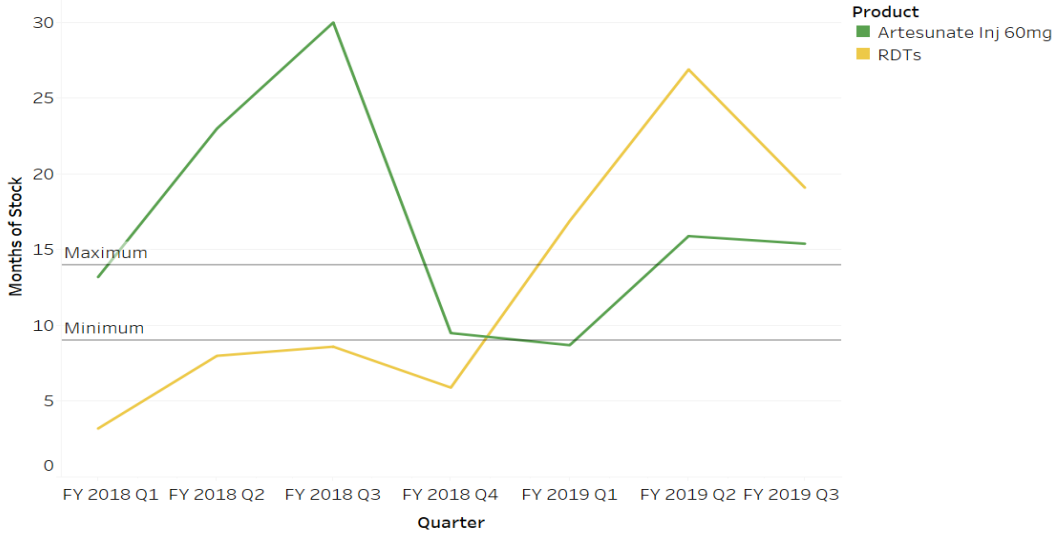


Figure A37. Central Stock Levels for RDTs and Injectable Artesunate, 60mg



Conclusion

The MOPDD continues to strengthen capacity for forecasting and monitoring of stock at all levels. This effort has been facilitated by staff training and by a fully integrated eLMIS. In 2018-2019, the MOPDD trained 55 staff members in quantification of malaria commodities across both the MOPDD division and the procurement division to enhance the availability of central and district-level stocks of malaria commodities.

Key Question 2

What are the trends in facility- and community health worker-level stock out rates for ACTs (including AL ability to treat), RDTs, and SP over the last year (if tracked)? Is there a seasonal or geographic difference in stock out rates?

Supporting Data

Figure A38. ACT Stockout Rates

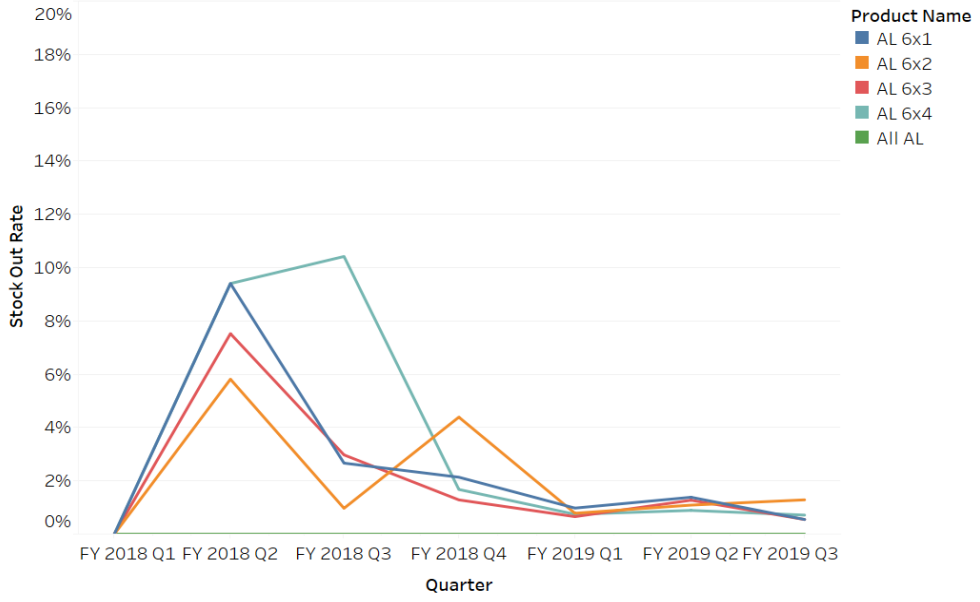
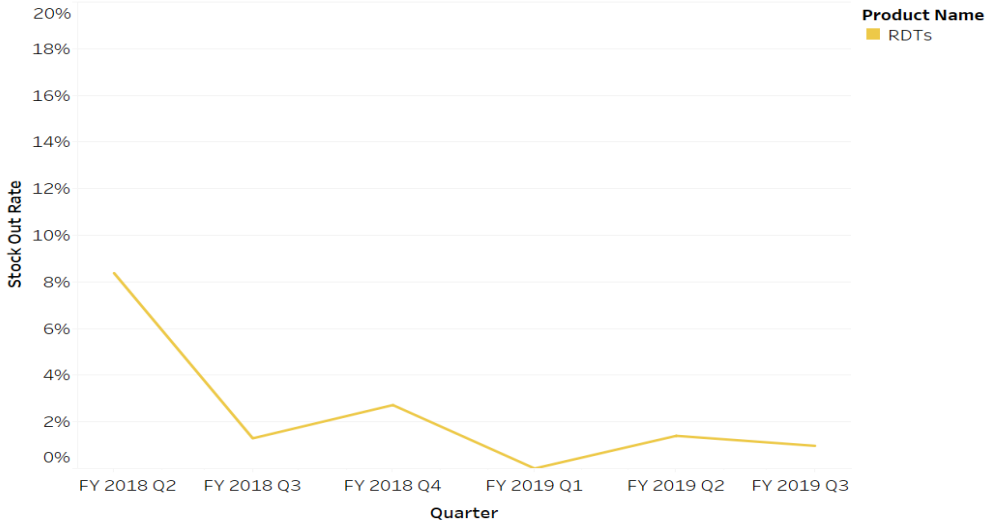


Figure A39. SP and RDT Stockout Rates



The MOPDD reports that the availability of stocks (no stockouts >7 days) at health facilities was 99.3 percent for ACTs and 98.1 percent for RDTs between July 2018 and June 2019. This is an improvement over baseline 2015-2016 availability of 96 percent for both ACTs and RDTs. Stockouts were likely highest in FY18 quarter 2 because the seasonal peak in malaria cases occurred before completed rollout of stock management tools to the community level. In September 2018, the

MOPDD introduced the real time notification of impending stockout by CHWs through a rapid secure short messaging system (Rapid SMS). Over 500 health center directors, data managers, and CEHOs as well as 42,000 CHWs in all 30 districts were trained in notification by Rapid SMS of risk for stockouts.

Conclusion

Transition over the last two years to the eLMIS platform has reduced stockouts at the facility level and recent rollout of a Rapid SMS notification system through the use of text messages is intended to improve stock availability at the community level even if a localized unexpected rise in malaria cases occurs.

Key Question 3

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

Supporting Data

The Malaria Quantification report and associated presentation from December 2018, examined the relationship between consumption of ACTs reported by eLMIS compared to consumption as reported by HMIS during the period from January to October 2018 finding 1.5 percent discrepancy between the data sources with the eLMIS value slightly lower than that from HMIS. Consumption of ACTs reported by HMIS was 4 percent higher than the number of cases and eLMIS consumption was three percent greater than cases. The difference between data sources in reported consumption was greatly improved from the 59 percent discrepancy for consumption in 2017 as eLMIS was just being scaled up hence underreported compared with HMIS during that year.

The reported RDT consumption for 2018 was seven percent greater than RDT tests performed per HMIS.

Conclusion

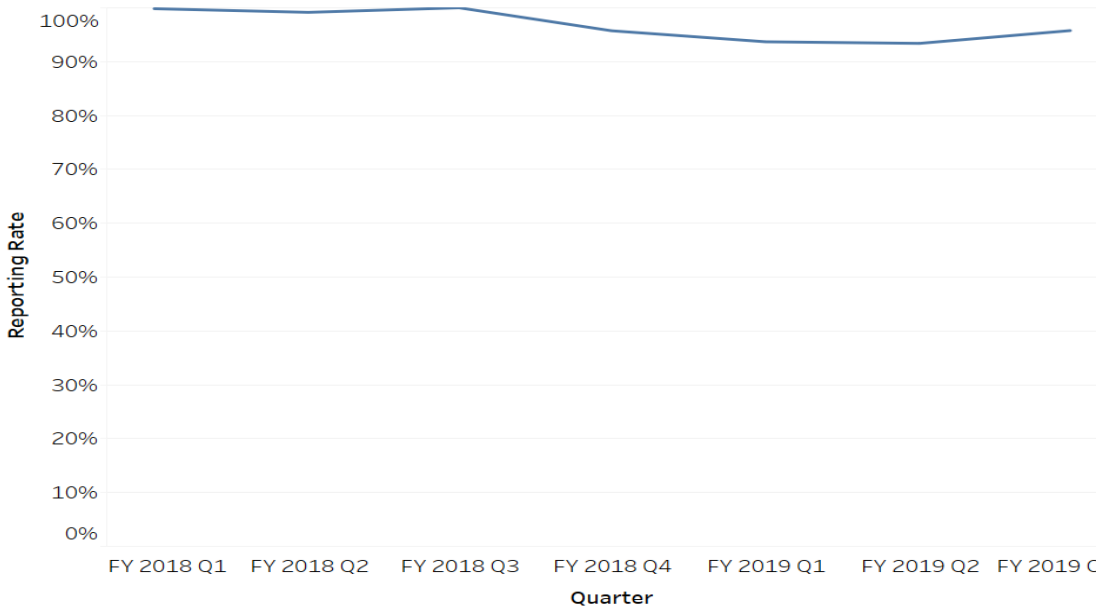
ACT consumption in eLMIS now aligns more closely with HMIS reporting as eLMIS was more fully implemented by 2018. PMI is also supporting MOPDD through the implementing partner to strengthen malaria commodity reporting at the community level and health facilities.

Key Question 4

What are the trends in LMIS reporting rates?

Supporting Data

Figure A40. LMIS Reporting Rate



Conclusion

The eLMIS reporting rates have remained consistently high and relatively stable during the reporting period. Based on the supply chain partner supervision reports in 2019, 95 percent of facilities were using eLMIS to manage inventories, estimate needs and request commodities online including those for malaria while 85 percent of facilities using all functions of eLMIS. As a result of the improvements in the eLMIS, 79 percent of facilities were reporting accurate data and the Procurement, Planning and Monitoring Reporting (PPMR) for malaria has improved.

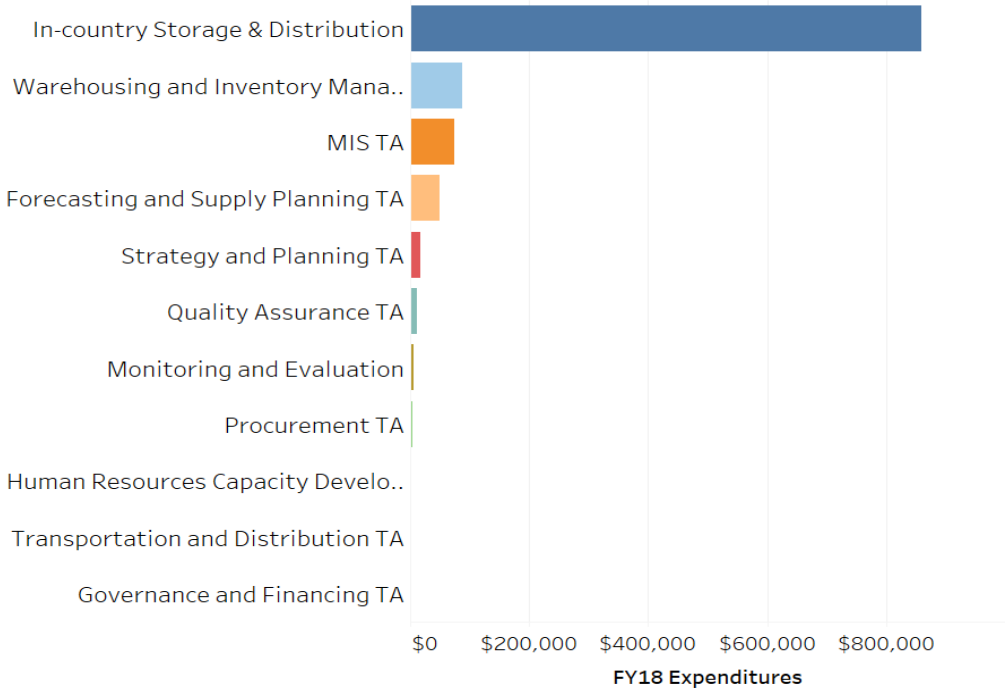
Currently, the validation process of requisition for malaria commodities is based on data from the eLMIS. The eLMIS has reduced data quality issues and the system providing the end to end data visibility to MoH leads the MOPDD to take accurate decisions in a timely manner especially in the redistribution of ACTs from the health facilities with decreased malaria cases (overstock) to health facilities in need. Thus, reducing the risk of expiry and stock out at service delivery points. Current eLMIS performance shows that stock out rates of malaria commodities reduced from 2.3 percent in quarter four 2018 to 1.2 percent in quarter four 2019. The Ministry of Health and partners continue to work toward strengthening the eLMIS system.

Key Question 5

What are the main supply chain functions supported by PMI? For areas that are not as strong is there additional investment that PMI should make? In areas performing well, is it dependent on PMI/donor funding and so should be maintained?

Supporting Data

Figure A41. PMI Supply Chain Investments in FY18



Conclusion

In addition to supporting warehousing and distribution costs for malaria commodities, PMI has provided technical assistance for commodity quantification, forecasting of needs, and strategic planning to maintain commodity availability. The MOPDD conducts antimalarial drug quality control annually with the support of the pharmacy department of National University of Rwanda, where drugs collected at all levels of health care are sampled and sent for drug analysis. There has been limited PMI support for quality assurance and monitoring and evaluation.

Key Question 6

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

Supporting Data

The MOPDD has also rolled out Rapid SMS in the event of stockout or impending stockout at the community level. The reporting system is being used by all community health workers and has reduced stockouts. PMI funding has not been used to support this system.

Conclusion

Continue current PMI support for commodity quantification and stock management as is currently the case. It is not expected that this will have implications for programming.

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

MOPDD objective
All health facilities and community providers will provide complete reporting to strengthen surveillance and allow for monitoring and evaluation of malaria interventions
MOPDD approach
• Sustain robust DHIS2-based system for malaria surveillance in health facilities and the SISCom system at the community level for timely reporting of all cases. These two systems are aggregated at the district level for national reporting • Maintain high quality data that is timely, complete and accurate • Analyze and use data to guide the continuous design and delivery of appropriate interventions and to prompt actions and response when indicated • Enhance inclusion of private sector reporting • Increase capacity for data analysis and use at the decentralized level • Introduce real time reporting of severe malaria cases • Develop revised guidelines and plan for malaria epidemic surveillance and response
PMI objective, in support of MOPDD
To support robust reporting into the DHIS-2 and SISCom systems, and data analysis and use for decision-making at the central level, although the majority of donor support for DHIS2 rollout and maintenance comes from sources other than PMI
PMI-supported recent progress (past ~12-18 months)

• PMI provided support for recent MIS 2017 which included for the first time prevalence estimates for all age groups
• PMI is providing limited support to the DHS 2020 for malaria components
• PMI provided support and technical assistance for secondary analysis of MIS 2017 data on the dynamics of malaria parasite species
• PMI supported printing and distribution of registers for tracking community cases:
  o Registers for malaria in adults (HBM) – 69,543
  o Registers for iCCM – 19,098
  o Registers for compilation of iCCM & HBM - 19,098
  o Monthly reports – 10,996

PMI-supported planned activities (next ~12-18 months, supported by currently available funds)
• Preparation underway to support malaria components of DHS 2019-2020 survey • Support for 5 MOPDD staff to attend the District Health Information System (DHIS) 2 academy training • Technical and financial support for meetings to assess malaria trends and develop national malaria control strategies and plans: Malaria TWG, Malaria Program Review (as Malaria Strategic Plan 2013-2020 wraps up) and annual malaria review meeting

PMI Goal
To support the MOPDD to build their capacity to collect and use surveillance as a core malaria intervention using high quality data from both surveys and routine health information systems.

Do you propose expanding, contracting, or changing any SM&E activities? If so, why and what data did you use to arrive at that conclusion?
No changes are anticipated. Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

Key Question 1

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

Supporting Data

Figure A42. Available Data Sources and Collection Activities 2015 - 2023

Data Source	*Data Collection Activities*	*Year*								
		2015	*2016*	*2017*	*2018*	*2019*	*2020*	*2021*	*2022*	*2023*
Household Surveys	*Demographic Health Survey (DHS)*	*X*				*X*				
	Malaria Indicator Survey (MIS)			*X*					*(X)*	
	Multiple Indicator Cluster Survey (MICS)									
	EPI survey									

Data Source	Data Collection Activities	Year								
		2015	2016	2017	2018	2019	2020	2021	2022	2023
Health Facility Surveys	Service Provision Assessment (SPA)				X*					
	Service Availability Readiness Assessment (SARA) survey									
	Other Health Facility Survey									
Other Surveys	EUV									
	School-based Malaria Survey									
	Other (Knowledge, Attitudes and Practices Survey, Malaria Behavior Survey)		X							
	Other (Malaria Impact Evaluation)									
Malaria Surveillance and Routine System Support	Support to Parallel Malaria Surveillance System									
	Support to HMIS	X*	X*	X*	X*	X*	X*	(X*)	(X*)	(X*)
	Support to Integrated Disease Surveillance and Response (IDSR)									
	Other (Electronic Logistics Management Information System (eLMIS)				X*	X*	X*	(X*)	(X*)	(X*)
	Other (Malaria Rapid Reporting System)				X*	X*	X*	(X*)	(X*)	(X*)

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

Conclusion

PMI supports population-based surveys (for malaria prevalence estimates and intervention coverage) and provides data collection materials to facilitate reporting of community cases. Rwanda introduced in late 2018 the real-time reporting of severe malaria cases through Rapid SMS, which aids in tracking patients with severe malaria through the referral process to higher levels of care. Infectious disease surveillance and response is housed in a different division from the MOPDD and does not currently include data from the community level.

Key Question 2

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

Supporting Data

Figure A43. HMIS-Supported Activities in Rwanda

Intervention	PMI-Funded? (X)			Does Global Fund plan to fund this? (X)	Does another donor plan to fund this? (X)
	FY 18	FY 19	FY 20		
Central Level					
Register, tools (e.g. checklists, indicator glossary), job aids (design, indicators, definition of data elements, data dictionary, system support)	X	X	X	X	
Data quality assessments (separate from supervision – funding for travel to lower levels)				X	
Program monitoring and technical assistance (funding for travel to lower levels)	X	X	X	X	
Training (funding for central level to conduct training at lower levels, capacity building, i.e., on the job training for central level staff)	X	X	X		
Human Resources (secondment of person in MOPDD for SM&E, office/team for SM&E)	X	X	X	X	
Data Use (analysis, interpretation, visualization (dashboards, bulletins, dissemination/feedback to lower levels, decision-making)	X	X	X	X	
Policy guidelines and coordination (updating policies, guidelines, supporting sub-committee meetings, supporting participation in sub-committee meetings)	X	X	X	X	
External relations/Communications/Outreach (support travel to international meetings and publications)	X	X	X		
Support to annual operational plans for national malaria program	X	X	X	X	
Desk review to catch "logic errors system" (provide TA to catch logic errors)				X	
District Level. PMI supports activities in 30 regions while Global Fund supports activities in 30 regions.					

Intervention	PMI-Funded? (X)			Does Global Fund plan to fund this? (X)	Does another donor plan to fund this? (X)
	FY 18	FY 19	FY 20		
Registers (warehousing, printing, distribution)	X	X	X	X	
Data quality assessments (separate from supervision – funding for travel to lower levels)				X	
Program monitoring and technical assistance (funding for travel to lower levels)	X	X	X	X	
Training (funding for District staff to conduct training at lower levels, capacity building (i.e. on the job training for health facility level staff)	X	X	X	X	
Human Resources (secondment of person for malaria SM&E, office/team for SM&E)					
Data Use (analysis, interpretation, visualization (dashboards, bulletins), dissemination/feedback to lower levels, decision-making)	X	X	X	X	
Adaptation of national policy guidelines and coordination (adapting policies, guidelines, supporting sub-committee meetings, supporting participation in sub-committee meetings)					
Adaptation of checklists and job-aides					
Participation in national meetings (support for travel costs)	X	X	X	X	
Support to Annual Operational Plans for District Malaria Program					
Facility Level					
Data collection/entry, summary, and transmission (training, re-training, computers, internet, tools)	X	X	X	X	
Supervision of CHWs (training, traveling, administering supervision tools/checklists of community health workers)	X	X	X		
Data use (analysis, interpretation, visualization (dashboards), dissemination/feedback to CHWs, decision-making)	X	X	X		
Monthly/Quarterly data quality review meetings(support for travel)	X	X	X		
Community Level					

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

Conclusion

PMI supports central and district level staff to provide supervision and mentorship in a cascade approach for data management and use at all levels of the health system. Global Fund has taken the lead on strengthening data quality with routine assessments.

Key Question 3

What are the outcomes of HMIS strengthening efforts?

Supporting Data

Figure A44. HMIS Strengthening Efforts

		2017	2018
Timeliness	% of reports received on time	93%	96%
Completeness	“Confirmed malaria cases for children under 5 years of age" was reported in X% of facility-months	97%	96%
Accuracy	Populate with most recent DQA data	n/a	n/a

Conclusion

Rwanda has strong surveillance and reporting systems. Malaria surveillance data includes reporting from an extensive CHW network - in 2018, 57 percent of confirmed malaria cases were reported from the CHWs. Efforts are being made to enhance reporting from the private sector and to integrate across programmatic divisions for enhanced collaboration on infectious disease outbreak detection and response.

Key Question 4

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

Supporting Data

No other considerations

Conclusion

n/a

3.C. SOCIAL AND BEHAVIORAL CHANGE (SBC)

MOPDD Objective
The objective of Rwanda's malaria SBC strategy is to provide the framework and guiding principles for malaria SBC interventions in order to increase the use of malaria interventions. The overall objective of the malaria SBC strategy is to increase malaria awareness, knowledge and correct practices and behaviors towards malaria prevention and control.
MOPDD Approach
Rwanda's SBC approach is guided by the Social and Behavior Change Communication (SBCC) strategy 2017-2020 . The strategy articulates the interventions and approaches that will be used for the prevention and control of malaria. Similarly, Rwanda's national SBC policy for the health sector aims to strengthen the implementation of overall development objectives in Rwanda. This national policy emphasizes enabling the population to make informed health behavior choices through providing appropriate information, using quality messages and methods, including the use of media and interpersonal communication. The MOPDD communication approach stresses the importance of interpersonal communication within the community as the cornerstone of any malaria intervention in Rwanda by building on an "enabling environment" and strengthened health services. The coordination of SBC activities in the Ministry of Health are under the auspices of the Rwanda Center for Health Communication within the MoH. Based in the Rwanda Biomedical Center, the activities of the Center for Health Communication are implemented through the health promotion technical working group in which the MOPDD is a member. This center coordinates, integrates, and harmonizes health messaging across the MoH, working specifically with the MOPDD, partners and other GOR programs. PMI is the main partner supporting malaria SBC activities in Rwanda.
PMI Objective in Support of MOPDD
PMI contributes to the country's SBC strategy through an implementing partner who works closely with the MOPDD. Some of the PMI supported SBC activities are at a national level using mass media to create awareness and behavior change in the prevention and treatment of malaria. In addition to the national focus, PMI has been supporting SBC activities in ten districts where communication approaches used include community drama, mobile videos and interpersonal communication. PMI support to SBC focuses broadly on prevention and prompt diagnosis and treatment of malaria.

PMI-Supported Recent Progress *(Past 12-18 Months)*
PMI has supported SBC activities including promoting ITN use, improving malaria case management, and supporting acceptance of IRS. To promote ITN use and improve case management nationwide, multi-channel approaches stressing the importance of prevention and prompt diagnosis and treatment of malaria were used. These included interpersonal communication, mobile video sessions, drama shows on malaria in towns and villages and community events. During this period, mass media campaigns were able to reach a large part of the population through national and regional radio broadcasts with the airing of two radio spots with integrated messages including malaria. These were aired 152 times during the year. Over 25,119 people were reached with malaria messages through mobile video units, and about 24,492 persons were reached through drama sessions on malaria in 10 districts. SBC will continue to emphasize the use of interpersonal communication channels to reach community members with prevention and prompt diagnosis and treatment of malaria messages. Formative research was conducted in late 2018-early 2019 to describe facilitators and barriers to malaria prevention and care-seeking behaviors (along with other MNCH issues), addressing antenatal care, malaria risk perception, ITN use, and care seeking behavior. Malaria-related behaviors were varied, and these will inform future SBC approaches and interventions. One of the key challenges to implementing SBC activities currently is the lack of a focal point staff at the MOPDD (recruitment process will start soon). This has created a gap in the implementation of SBC activities. There has also been a general decline in funding for SBC activities for malaria control.
PMI-Supported Planned Activities *(Next 12-18 Months Supported by Currently Available Funds)*
• PMI will continue to support implementation of the MOPDD's SBC strategy working in collaboration with partners. This will include the implementation of SBC activities at the national and community levels to strengthen the capacity of MOPDD and implementing partners to develop, implement and monitor SBC interventions. Through its implementing partners, PMI will continue malaria messaging through the use of existing channels such as the *umudugudu* (village) and *umuganda* networks (community work and messaging days) and the recently launched Interfaith and Girl Guides Association initiative to create awareness on malaria prevention. • Preparations are ongoing for the mass ITNs campaign that is planned for 2019-2020. Rwanda uses conical ITNs, and this will be the first time since 2012 that there will be a large distribution of rectangular ITNs nationally. SBC interventions will focus on ensuring acceptance of rectangular ITNs among a population that has largely used conical ITNs. • Other SBC activities will include central level support for strengthening capacity through the Health Communication Center and MOPDD to implement Rwanda's national SBC strategy,

and to continue supporting MOPDD to shape SBC approaches in malaria control. The support will focus on designing, implementing, monitoring and evaluating SBC activities.

- At the community level, PMI support will continue to focus on ensuring adoption of appropriate behaviors relating to use of ITNs and case management. It is expected that a large part of the PMI support will focus on interpersonal communication channels at the community level with some limited mass media activities at the national level. There are already knowledge on malaria that SBC interventions can build on. For example, data from a KAP survey in 2017 showed that 95.2 percent of those interviewed knew that mosquitoes cause malaria, 91 percent identified fever as a key symptom while 72 percent noted that sleeping under an ITN can prevent malaria.

PMI Goal

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

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

Though there is a small proposed increase in the SBC budget, it is expected that this funding will enable the MOPDD to sustain the gains already made and if possible, expand SBC for correct and consistent use of ITNs with the planned mass distribution 2019-2020. There will also be SBC activities on IRS and prompt and effective treatment of malaria.

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

Key Question 1

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

Supporting Data

Figure A45. Prioritized Behaviors with FY 2020 Funds

Behavior	Target Population	Geographic Focus	Justification
Correct and consistent use of ITNs	General population	National and targeted districts	The MIS 2017 showed that there was a gap between access to ITNs and the population sleeping under a net. Although 72% had access to an ITN, 64% slept under an ITN the night before the

Behavior	Target Population	Geographic Focus	Justification
			survey. The MIS also showed geographic variations in net use ITN among pregnant women ranging from 86% in North province to 47% in East province. Additionally, ITN use among children under age 5 ranged from 76% in Kigali city and North province to 59% in the East province - suggesting the need for SBC message targeting. As Rwanda will have a mass campaign distribution of ITNs in 2019-2020, SBC interventions will focus on the "acceptance" of rectangular ITNs and importance of behavior change in ensuring correct and consistent use of ITNs.
Prompt care seeking in case of fever	General population	National with emphasis on endemic districts	The MIS 2017 showed that only 56% of children received prompt care seeking in the case of a fever in the two weeks preceding the survey. Anecdotal evidence suggests that this number seeking care promptly may be higher with the scale up and strengthening of integrated community case management through community health workers for all age groups. However, SBC interventions will continue to emphasize the importance of prompt diagnosis and treatment of malaria to sustain the gains already made and to improve health outcomes.

Conclusion

With FY 2020, PMI Rwanda proposes a slight increase in the funding for SBC. This funding is however not substantial enough to change scope or interventions. Data from the MIS 2017 showed a decrease in knowledge on the use of ITNs as a preventive measure among women from 66 percent in 2013 to 54 percent in 2017. This may in part be due to lack of sustained SBC activities countrywide due to decreased SBC funding. With the distribution of rectangular ITNs in 2019-2020, it will be important to continue SBC interventions on ITN use to prevent malaria. SBC will also emphasize the availability of diagnostics and treatment for all age groups being provided by Community Health Workers (CHWs) and the importance of prompt diagnosis and treatment in improving disease outcomes. MOPDD will need to seek additional resources for SBC from partners such as the Global Fund and others.

Key Question 2

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

Supporting Data

Figure A46. Summary of Determinants and Gaps for FY2020 Prioritized Behaviors

Behavior	Key Facilitators	Key Barriers	Knowledge Gaps
Correct and consistent use of ITNs	• Availability of ITNs (universal coverage) • Perceived risk of malaria • Knowledge on importance of ITNs in preventing malaria	• Perception that it is difficult to sleep under a net when the weather is warm • Preference for conical ITNs (See also ITN section)	More information on the most critical/important SBC strategies that would motivate, increase and sustain net use
Prompt care-seeking -diagnosis and treatment of malaria	• Knowledge and belief that seeking treatment in case of a fever is important • Desire to have healthy children and family	Belief that malaria is not a serious life threatening disease. (See also care seeking section)	Identify the key facilitators and barriers to prompt care seeking with the availability of free community care for malaria for all age groups.

Conclusion

Although some level of knowledge exists on the importance of using ITNs as a preventive measure against malaria, there is a need to increase the knowledge and practices for correct and consistent use of ITNs. A study on the effects of user preferences on ITNs and use analyzing Rwanda DHS 2014 and MIS 2013 showed that there was a relationship between net preference (conical nets) and use. With the mass campaign planned in 2019-2020 to distribute millions of rectangular ITNs, SBC will need to focus on the importance of ITN use irrespective of shape and promote correct and consistent use. A formative study in 2018-19 also identified unique barriers for ITN use among school-aged children and men. SBC interventions will target the general population - with targeted interventions in high burden malaria districts. In terms of care seeking, the 2017 KAP survey showed that 79 percent of the respondents were aware of the importance of seeking prompt care for suspected malaria cases in children under five. Based on the recently completed Malaria Program Review (MPR) in 2019 and recommendations, the MOPDD will need to develop an Operational Research agenda to better understand the key facilitators, barriers and knowledge gaps to guide SBC interventions for impact.

Key Question 3

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

Supporting Data

A malaria SBC strategy exists in Rwanda to guide the implementation of activities. However, over the last several years, the MOPDD has not had a focal person to support SBC activities. In addition, there

are also weak structures at the decentralized levels for effective SBC. The MPR 2019 report noted that inadequate funding for SBC resulted in limited implementation of many SBC activities. There were also gaps with the lack of SBC materials with standard messages for use by all implementers. To address these gaps the MPR report noted that:

- Increased funding to support implementation of SBC activities by all partners is necessary.
- Production and distribution of appropriate, technically sound and adequate SBC tools and materials with standard messages for use at all levels is needed.
- Human resource capacity for SBC at all levels needs to be strengthened - but more so at the national level to provide needed leadership for malaria SBC.

Conclusion

To increase and sustain the impact of SBC interventions, it will be necessary to have additional funding for SBC and have qualified and technically dedicated staff at the MOPDD and at decentralized levels. Although there is no funding earmarked in MOP FY 2020 to address this issue, there is a general consensus that the MOPDD will need to advocate for staff and earmark financial and human resources for SBC in order to increase knowledge on malaria and increase uptake of interventions. This will also entail sourcing for funding from other key partners such as the Global Fund.

Key Question 4

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

Supporting Data

N/A

Conclusion

N/A

3.D. PROGRAM EVALUATION AND OPERATIONAL RESEARCH

MOPDD objective
Assure delivery of effective malaria prevention and control interventions and mitigate against threats to malaria control
MOPDD approach
Data-driven review of impact of interventions and assessment of program gaps and potential threats to successful implementation

PMI objective, in support of MOPDD
PMI provides support and technical assistance for program evaluation activities that fit within the scope of PMI guidance
PMI-supported recent progress (past ~12-18 months)
• The study of intermittent screening and treatment of malaria in pregnancy completed data collection in 2018 with data analysis, MIP policy discussions and report drafting in 2019 • An antimalarial therapeutic efficacy study was completed in late 2018 to monitor for emergence of drug resistance; data analysis workshop and drafting of policy brief were conducted in 2019 and presentation planned for ASTMH 2019
PMI-supported planned activities (next ~12-18 months, supported by currently available funds)
PMI plans to support net durability monitoring as part of the Global Fund/IVCC/PATH field trial of new generation ITNs anticipated to start in early 2020

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

Do you propose expanding, contracting, or changing any program evaluation and operational research activities? If so, why and what data did you use to arrive at that conclusion?
The MOPDD is working with IVCC/PATH on the protocol development and planning for assessment of epidemiological and behavioral impact of a field trial of dual AI nets, which will be deployed in early 2020. PMI will participate by providing funding and technical assistance for the net durability monitoring component. Please see Table 2 for a detailed list of proposed activities with FY 2020 funding.

Key Question 1

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

Supporting Data

The MOPDD is concerned with insecticide resistance as a threat to malaria control and plans to field test newer generation nets (PBO and dual AI nets) in certain non-IRS districts as an insecticide resistance mitigation strategy. Epidemiological impact of the newer generation nets and net durability (physical and chemical) are to be conducted with support of donors.

Figure A47. PE/OR Currently Conducted in Country with USG, Global Fund, Multilaterals or Other Major Donors.

Source of Funding	Implementing institution	Research Question/Topic	Current status/ timeline
IVCC	PATH	Impact of dual insecticide ITNs	In planning phase to start early 2020

Conclusion

PMI plans to support the net durability monitoring aspect of field trials of newer generation ITNs.

Key Question 2

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

Supporting Data

N/A

Conclusion

N/A

Key Question 3

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

Supporting Data

N/A

Conclusion

N/A

3.E. OTHER HEALTH SYSTEMS STRENGTHENING

MOPDD objective
Rwanda has devoted significant resources to strengthening its health system, leveraging resources from its national budget, the Global Fund, the USG, and other donors. With these resources, Rwanda has achieved worldwide recognition for its innovative health financing programs, such as

performance based financing and community based health insurance. These programs, as well as current efforts to determine the costs of essential health services and the use of eLMIS which was launched in 2014 and scaled nationwide in 2018 are supported by the USG and other development partners. Health systems that allow accessibility to quality affordable health services are critical, as is a strong disease surveillance system to monitor, detect, and respond to disease outbreaks (e.g., malaria and neglected tropical diseases).

The MOPDD has engaged new stakeholders to collaborate on malaria prevention and control.

MOPDD approach

- The MOPDD has engaged in intersectoral collaboration with other governmental agencies on common issues such as with the Ministry of Agriculture to address insecticide resistance and larval source management
- The MOPDD has developed small public-private partnerships such as the larviciding project with AGROPY in Kamonyi
- The MOPDD initiated collaboration with neighboring countries in the nascent Great Lakes Malaria Initiative involving member nations of the East African Community and the Democratic Republic of the Congo

PMI objective, in support of MOPDD Infrastructure

- PMI supports a broad array of health system strengthening activities which cut across intervention areas, such as training of health workers, supply chain management and health information systems strengthening, drug quality monitoring, and provider capacity building.
- PMI also supports capacity building of MOPDD staff

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

- PMI supported MOPDD staff to attend ASTMH in 2018 and provided technical assistance for development of presentations
- Two laboratorians from the National Reference Laboratory (NRL) attended 6-week training at CDC/Atlanta on specimen testing and data analysis for therapeutic efficacy studies (TES)

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

- PMI will support 3 MOPDD staff to attend ASTMH, present work done in collaboration with PMI and participate in the PMI NMCP Director's forum
- PMI is supporting the MOPDD Case Management Director to tour CDC/Atlanta laboratories for TES testing and discuss ongoing plans for PARMA collaboration and building capacity of Rwanda NRL
- PMI supports MOPDD staff to receive DHIS-2 training.

PMI Goal
Additional health systems strengthening ● PMI has supported two Field Epidemiology Training Program (FETP) malaria residents since FY 2012 ● PMI supports Peace Corps Response in Rwanda ● PMI provides some support for the World Health Organization malaria program officer in Rwanda

Key Question 1

What recent progress has been made for additional health system strengthening with PMI support?

Supporting Data

- The fifth FETP cohort enrolled in January 2019 included two residents who will undertake malaria-related projects; to date, five cohorts (11–17 residents each) of FETP residents have initiated the two-year program and three cohorts have completed (44 graduates). Of the 44 graduates, 34 are employed by the MoH
- Structure of FETP changed February 2018 to fall under a department within Rwanda Biomedical Center to allow greater opportunities for collaboration, epidemiologic capacity building, and sustainability; five MoH technical staff have been officially appointed to support supervision and mentorship of FETP trainees.
- Two of the FETP malaria projects were presented by trainees during the 2018 African Field Epidemiology Network conference held in Maputo, Mozambique in November 2018.
- Peace Corps STOMP initiative held training for incoming volunteers and their counterparts.
- Peace Corps Volunteers (PCVs) organized a Malaria Month event (April 25-May 25, 2019) with over 100 activities, trained >55 malaria prevention providers and informed >5,600 community leaders and partners on malaria prevention.
- PCVs partnered with schools to reduce absenteeism related to malaria, empowered CHWs to deliver malaria prevention messages, and informed communities about IRS campaigns.
- The WHO program officer serves as liaison from the WHO regional office to the RBC/MOPDD, provides malaria-specific technical assistance, leads or participates in malaria/subgroup TWGs, assists with development of malaria program reviews and elaboration of malaria strategic plans with RBC/MOPDD and capacity building for data use

Conclusion

PMI will continue current support to FETP residents, PCVs focused on malaria, and the WHO national program officer for malaria

Key Question 2

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

Supporting Data

N/A

Conclusion

N/A

ANNEX B: COUNTRY PROGRAM INVENTORY

The MOP seeks to facilitate a consultative, collaborative process between PMI, the MOPDD, and other partners, where relevant. This section outlines a high-level program inventory along key intervention areas, and is intended to structure discussions around the relative strengths and challenges facing a program, as well as prioritization and opportunities to drive catalytic impact with specific investments.

Key:

Example score

Figure B1. Category: Vector Control

Activity	Metrics/ Criteria	Relative Continuum, for discussion purposes				
		1	2	3	4	5
Entomological Monitoring	Insecticide Resistance monitoring	No insecticide resistance monitoring conducted	Limited insecticide resistance monitoring conducted on an ad-hoc basis	Insecticide Resistance monitoring conducted on an annual basis in a limited number of sites, not covering all administrative units. Occasional monitoring of molecular mechanisms	Insecticide resistance monitoring conducted in a greater number of sites on an annual basis with some collaboration with other partners, routine monitoring of some resistance mechanisms	Regular high quality insecticide resistance monitoring done in multiple sites per administrative division, consideration of molecular mechanisms and bioassay data, collaboration with other partners and NMCP
	Insectary	No functioning insectaries in country	Insectary present, but frequent ruptures in rearing and contamination of strains, frequent challenges in meeting needs	Insectary present, full-time staff present, some capacity for strain verification, sometimes challenges to get enough mosquitoes, occasional contamination	One or more insectary present, regular verification, rare challenges in getting sufficient mosquitoes, some capacity for strain verification	Highly functioning insectaries with verification of strains, capacity for rearing wild strains, quality controls in place
	Data-based vector control decision making	No consideration of entomological data when making decisions	Limited review of data, reliance on outdated data, uncoordinated analysis of data with limited collaboration with partners	Irregular and incomplete review of data 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 when making decisions about vector control
	Vector bionomics monitoring or research	No research or longitudinal monitoring done in country	Limited longitudinal monitoring and research done in country	Regular vector bionomics monitoring, and vector control research done in country, but generally not having an important role in decision making	Regular vector bionomics and vector control research conducted in country but not sufficient to respond to all major needs of the national program	Regular monitoring driven by program priorities conducted alongside research done in country to provide timely data on the best malaria vector control
	Institutionalization of funding	No resources	Only 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

Activity	Metrics/ Criteria	Relative Continuum, for discussion purposes				
		1	2	3	4	5
ITNs	Consistent distribution channels, in accordance with national strategy	Infrequent campaigns with no continuous distribution	Regular (e.g., every 3 years) campaigns, no continuous distribution	Regular campaigns, inconsistent continuous distribution	Regular campaigns, plus at least 1 well- managed continuous distribution channel	Regular, well- executed campaigns and well-managed continuous distribution channels
	Regular supervision of routine ITN distribution (e.g. HFs)	No HFs regularly supervised in ITN distribution	0-25% of HFs regularly supervised in ITN distribution	25-50% of HFs regularly supervised in ITN distribution	50-75% of HFs regularly supervised in ITN distribution	75-100% of HFs regularly supervised in ITN distribution
	ITN distribution reporting capabilities	Quantities of ITNs distributed not reported at all into LMIS (or other system)	Some quantities of ITNs distributed reported routinely	Some quantities of ITNs distributed reported routinely but cannot be disaggregated by channel	Quantities of ITNs distributed reported routinely and disaggregated by channel	All ITNs distributed captured routinely, disaggregated, and reported electronically
	Capacity to use data to appropriately target and rotate new types of nets	N/A	No capacity	Limited capacity	Some capacity	Good capacity
IRS	Host country government's IRS implementation capacity	N/A, no host country government implemented spray campaign	Host country government has very limited capacity to implement minor aspects of spray campaign	Host country government has capacity to implement some aspects of spray campaign	Host country government has capacity to implement most aspects of spray campaign	Host country government implements independent spray campaign
	Institutionalization of funding	N/A, no IRS conducted in country	No host country government funding, only supported by external sources (e.g. PMI, GF, mining companies)	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
	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

Figure B2. Category: Case Management

Activity	Metrics/ Criteria	Relative Continuum, for discussion purposes				
		1	2	3	4	5
Community-based CM, if in national strategy	Coverage of CHWs trained in and providing CM (geographic or numerical target)	No CHWs conducting CM	0-25% of national target met	25-50% of national target met	50-75% of national target met	75-100% of national target met
	Regular supervision of CHWs in CM (regular defined as per national QA/QC guidelines)	No CHWs regularly supervised in CM	0-25% of CHWs regularly supervised in CM	25-50% of CHWs regularly supervised in CM	50-75% of CHWs regularly supervised in CM	75-100% of CHWs regularly supervised in CM
	CHW reporting capabilities	CHW-managed cases not reported into HMIS	Some CHW-managed cases routinely reported into HMIS	Cases routinely reported into HMIS but cannot be disaggregated from HF-reported cases	Cases routinely reported into HMIS and can be disaggregated from HF-reported cases	All CHW case data routinely captured and reported electronically
	Institutionalization of funding (salaries and/or other support)	No resources	Only 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
Facility based CM	Access to HF-based care (within 5 km of a health facility or as per national definition)	0-20% of population has access to HF	20-40% of population has access to HF	40-60% of population has access to HF	60-80% of population has access to HF	>80% of population has access to HF
	Regular* supervision of public HFs in CM	No HFs regularly supervised in CM	0-25% of HFs regularly supervised in CM	25-50% of HFs regularly supervised in CM	50-75% of HFs regularly supervised in CM	75-100% of HFs regularly supervised in CM
	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

Figure B3. Category: Drug-Based Prevention

Activity	Metrics/ Criteria	Relative Continuum, for discussion purposes				
		1	2	3	4	5
SMC (where applicable) **Not applicable in Rwanda	Geographic scope	No eligible districts receiving SMC		50% eligible districts receiving SMC		All eligible districts receiving SMC
	Coverage in targeted areas (% of eligible children 3-59 months who received complete SMC courses for all 4 rounds)	<60%	60-69%	70-79%	80-89%	90%+
	Institutionalization of funding	No resources	Only 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
MIP	National policy exists for malaria prevention in pregnancy	No policy	Policy exists but is not comprehensive (does not cover all aspects of MIP: ITN, IPTp and case management)	Comprehensive policy exists for prevention (ITNs, IPTp) and case management but not all WHO recommendations are included	Policy meets current WHO recommended MIP prevention	Comprehensive, WHO-aligned policy is actively implemented
	Country policy adoption/adaptation of ANC guidelines with at least 4 recommended contacts	No policy	Country has started discussions and consultations for adopting the new ANC guidelines and recommendations	Country has policy specifying ANC contacts but no provision for early delivery of IPTp and is not able to systematically track ANC visits in HMIS	Country policy specifies ANC contacts and has provision for delivery of IPTp at 13-16 weeks but cannot track all ANC visits in HMIS	Country policy specifies the number of contacts be delivered during pregnancy and has a provision for delivery of IPTp at 13-16 weeks and is able to track ANC visits in HMIS. *No IPTP in Rwanda, otherwise meets
	National MIP working group established and coordinating effectively	No working group established	Working group formed and meets on an ad hoc basis, TORs are established	Working group engages in regular coordination but does not have mechanisms to ensure programmatic integration across technical areas	Working group coordinates at the national level only with Malaria and Maternal Health and has limited mechanisms for ensuring	Working group engages in regular coordination at national and sub-national level with Malaria and Maternal Health and has mechanisms to ensure programmatic integration across technical areas.

Activity	Metrics/ Criteria	Relative Continuum, for discussion purposes				
		1	2	3	4	5
					programmatic integration across technical areas	
	Supportive MIP supervision conducted	No HFs regularly supervised in MIP	0-25% of HFs regularly supervised in MIP	25-50% of HFs regularly supervised in MIP	50-75% of HFs regularly supervised in MIP	75-100% of HFs regularly supervised in MIP
	Routine SP resistance monitoring via biomarkers conducted	No SP resistance monitoring conducted	SP resistance monitoring conducted in the last 6-10 years	SP resistance monitoring conducted in the last year 4-5 years	SP resistance monitoring conducted in the last year 3 years	SP resistance monitoring conducted in the last 3 years and results published or being published.

Figure B4. Category: Supply Chain

Activity	Metrics/ Criteria	Relative Continuum, for discussion purposes				
		1	2	3	4	5
Supply Chain	Forecasting and Procurement Planning	Ad hoc forecasting based on poor, inadequate, or inaccessible data Insufficient skills for selecting and implementing appropriate forecasting methodologies. Procurement plans are not developed from forecasts No coordination among procurers	Annual forecasting and supply planning done but is based on poor, inadequate, or inaccessible data Locally based skills in quantification are developing Review of procurement plans is irregular. Coordination among procurers is limited	Annual forecasts incorporate service and/or/consumption data Supply plans updated semi-annually and incorporate review/revisions of available funding Coordinated procurement planning done at the national level (and regional level, if the health system is decentralized) and among procurers	Semi-annual forecasts incorporate service and/or/consumption data, account for seasonality Supply plans updated quarterly and incorporate review/revisions of available funding Coordinated procurement planning done at the national level (and regional level, if the health system is decentralized). Identified commodity gaps effectively communicated to stakeholders for purposes of resource mobilization	Near real-time demand/consumption, enhanced with additional programmatic contributions, drives monthly forecasting Forecasting and supply planning-specific software used and outputs visible across networks. Supply plans updated monthly and incorporate review/revisions of available funding Coordinated procurement planning done at the national level (and regional level, if the health system is decentralized). Identified commodity gaps effectively communicated to stakeholders for purposes of resource mobilization. Outputs shared through global platforms

Activity	Metrics/ Criteria	Relative Continuum, for discussion purposes				
		1	2	3	4	5
	Warehousing/ Storage	Quality of infrastructure and operations at all stock holding levels (Central, Sub-central/facility) compromises ability to ensure commodities are adequately protected from damage, deterioration and loss. Unable to locate stock by batch in central/mid-level stores/warehouses.	Quality of infrastructure and operations in at least one stock holding level (Central, Sub-central/facility) ensures that commodities are adequately protected from damage, deterioration and loss. Paper-based inventory management system. No SOPs.	Quality of infrastructure and operations in at least two stock holding levels (Central, Sub-central/SDP) ensures that commodities are adequately protected from damage, deterioration and loss. Warehousing SOPs exist. Able to track inventory level with central level WMS but information is not routinely shared across warehouses. Some maintenance occurring Limited ability to scale storage capacity	Quality of infrastructure and operations at all stock holding levels (Central, Sub-central/SDP) ensures that commodities are adequately protected from damage, deterioration and loss Stock data is digitized in at least two stock holding levels Some routine maintenance occurring Storage capacity scaled through contracting of third party logistics providers (3PLs)	Quality of infrastructure and operations at all stock holding levels (Central, Sub-central/SDP) ensures that commodities are adequately protected from damage, deterioration and loss. Storage infrastructure and operations adhere to Good Warehousing Practices and/ or meet in-country compliance standards Stock data is digitized at all stock holding levels and near real-time stock visibility available across networks Routine and predictive maintenance budgeted for and institutionalized Storage capacity is logically located and can be effectively scaled with 3PLs

Activity	Metrics/ Criteria	Relative Continuum, for discussion purposes				
		1	2	3	4	5
	Routine distribution/ resupply between stock holding levels	No routine requisition and resupply schedule between stock holding levels No resources routinely available and allocated for transportation from higher to lower stock holding levels	Routine requisition and resupply between at least two stock holding levels according to a schedule Resources for transportation from higher to lower stock holding levels provided on ad hoc basis	Routine resupply between all stock holding levels according to a schedule Allocated resources for transportation from higher to lower stock holding levels provided on an irregular basis and resupply often achieved through unplanned means Resupply performance monitored post-activity	Routine resupply between all stock holding levels according to a schedule shared with all levels and informed by accurate demand signals Allocated resources for transportation provided on a regular basis and augmented with 3PLs Resupply performance monitored real-time	Routine resupply between all stock holding levels according to a schedule shared with all levels and informed by accurate, timely, demand signals Robust emergency and inter-facility resupply mechanisms are in place Allocated resources for transportation available internally or outsourced with 3PLs. Resupply transaction data is digitized for all stock transfers Near real-time visibility into upstream and downstream activities Resupply operations adhere to GDP and or meet in-country compliance standards for maintaining quality during distribution

Activity	Metrics/ Criteria	Relative Continuum, for discussion purposes				
		1	2	3	4	5
	Logistics Management Information System	System to aggregate, analyze, validate and display data (from all levels of the logistics system) that can be used to make logistics decisions and manage the supply chain not institutionalized or followed No facility level records or not maintained. Low reporting rates. No visibility into CHW supplies. No visibility by central level on facilities and none by facility level on central level.	Stand-alone, program specific LMIS processes and structures defined but no formal or ongoing monitoring or measurement protocol exists. Some visibility of facility level inventory and consumption, low reporting rates, mostly paper-based	The country has documented LMIS processes and structures. The structures are functional. Metrics for performance monitoring, quality improvement, and evaluation are systematically used. Migration of data collection and reporting from a paper system to an electronic system at the district level and above. A documented mechanism is in place for maintaining data quality throughout the data supply chain.	Government and stakeholders use the national LMIS systems for key performance monitoring and follow standard practices. Facility inventory and consumption data is digital at facility level, upstream data available to facilities, System alerts for low stock/expiry, use of master product list and master facility list Interoperability with other information systems (e.g., warehouse management, medical records, laboratory management, enterprise resource planning systems, and health information management systems)	Near real time visibility into inventory and consumption data at all levels, data from multiple systems feed into common platform/control tower (automated process), predictive analytics. The government and stakeholders routinely review interoperability activities and modify them to adapt to changing conditions. Compliance with standards for data exchange, messaging, and security is regularly reviewed. The regulatory framework is reviewed and updated to reflect best practices for data exchange, messaging, and systems security.

Activity	Metrics/ Criteria	Relative Continuum, for discussion purposes				
		1	2	3	4	5
	Regulatory, Policy and Governance	Legal basis to enable a medicines (and related health commodities - e.g., devices, vaccines, etc.) regulatory agency to function is absent or inappropriate Formal organizational structure regarding in-country stakeholders and relevant agencies to whom authority is delegated, is absent or inadequate (e.g., up-to-date organogram of MOH). Human and financial capacity to enable regulatory functionality, weak or absent No approved supply chain strategic plan	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 human resources Approved supply chain strategic plan but not updated recently. Poorly implemented strategic plan	All SDP levels have in place policies that address STG, quality assurance and HR. Management policies for the supply chain system are in place at the MOH level. Policy and strategic leadership is not always translated into robust implementation plans, and supportive supervision, capacity building and guidance to managers within the system. 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. Approved (and up to date) supply chain strategic plan. Partially implemented	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. Regulatory and policy bodies in alignment to support quality product availability National and standardized Pharmacovigilance or a standard reporting structure for pharmacovigilance events in place, not fully functional. Approved (and up to date) supply chain strategic plan (contains clear roles and responsibilities, stakeholder mapping, costs).	The MOH leads strategic functions such as, policy formulation, quality assurance and overseeing the funds required for policy implementation. Ability to ensure product quality, automated drug registration process, clear/transparent importation process, robust post-market surveillance system and, track and trace regulations developed and/or in the process of implementation. Approved (and up to date) supply chain strategic plan (contains clear roles and responsibilities, stakeholder mapping, costs). Includes risk mitigation plan.

Figure B5. Category: Strategic Information

Activity	Metrics/ Criteria	Relative Continuum, for discussion purposes				
		1	2	3	4	5
Data, Surveillance, Monitoring & Evaluation	Overall HMIS reporting rate (CY 2018)	<60%	60-69%	70-79%	80-89%	90%+
	Element specific reporting rate: "Confirmed malaria cases among children under 5" (CY 2018)	<60%	60-69%	70-79%	80-89%	90%+
	HMIS data quality assurance and quality control	Few standards exist for data collection, assembly, & analysis. Data quality reviews and audits are ad hoc for specific data needs. No data-quality assurance plan and national coordinating body exist.	Standards used for data collection, assembly & analysis in limited settings. Some electronic tools used for data quality review and audit. Data-quality assurance plan is available.	Standards defined and implemented for data collection, assembly, analysis, and used nationally. Data quality reviews and audits scheduled and include a remediation process to address identified issues. SM&E staff are seconded to NMCP	Data reviews and audits are integrated in strategic plans, conducted on a regular schedule. Regular meetings held by national data-quality governing body; issues identified are addressed through an established remediation process.	Continuous review and auditing through automated and manual processes, to ensure defined levels of data quality. Data quality metrics are used for continuous improvement. The data-quality assurance plan is reviewed periodically by a national coordinating body and appropriate stakeholders.

Activity	Metrics/ Criteria	Relative Continuum, for discussion purposes				
		1	2	3	4	5
	Reporting Systems	Data collection tools are not standard, and procedures are not consistently followed; data are collected and stored in an unstructured format. NMCP does not have access to malaria data from HMIS.	Data systems support longitudinal health data (clinical, surveillance, M&E) in limited settings. The data are available for centrally mandated reporting. A parallel malaria reporting system may exist.	Most data platforms/applications ensure data availability at all levels for decision support and M&E for authorized users. No parallel malaria reporting system exists. NMCP has access to malaria data from HMIS.	The data systems in use ensure reliable and appropriate access to data at all levels for authorized users. Changes in reporting requirements are accommodated with minimal disruption to data availability. Data systems support secondary use of data and NMCP has access.	Data availability is monitored for continuous improvements and to meet emerging health sector needs. Reporting is available from private facilities and community-level providers and can be disaggregated.
	Data collection	Data collection is not done at the most peripheral level (CHWs) and is irregular and inaccurate at rural and more central health facilities. System is entirely paper based, but registers may be absent	Data collection is well managed at HF level, but incomplete at community level (CHWs); most collection is paper based, and aggregation is paper based; registers generally available; timeliness and completeness remain challenges	Data collection is well managed at HF level and at community level (CHWs); most collection is paper based, aggregation is electronic; registers available; timeliness and completeness >80%, feedback to collectors limited	Data collection at all levels); collection is electronic and sometimes paper based, aggregation is electronic; registers include all program-critical data; timeliness and completeness >80%, feedback to collectors is standardized	Data collection occurs at all levels, is transmitted in real time with timely feedback to those collecting and those using the data; data checks exist at point of collection; electronic transmission is the norm, including to data collectors

Activity	Metrics/ Criteria	Relative Continuum, for discussion purposes				
		1	2	3	4	5
	Data use	Activities (analysis, interpretation, visualization) to ensure data use are rarely implemented	Limited data use activities are implemented (bulletin has been developed but analysis and interpretation for decision- making needs to be strengthened)	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 their own high- quality dashboard to facilitate data use, and data-informed decision making is evident at all levels, on a frequent basis.
OR/PE	PMI in-country OR experience	No previous PMI OR experience in country	PMI team has prepared concept notes (CNs) but has not completed protocols or conducted OR	PMI team has completed protocols and received approval for OR; studies in planning, underway, or recently completed	PMI team and/or other country partners have completed a OR study and prepared and shared reports	Multiple OR studies completed in country that address malaria program implementation bottlenecks with publication and sharing of results, with involvement from MOH co-investigators
	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; no previous PMI in-country OR experience	Processes in place for research and IRB review with federal-wide assurance approval; previous PMI in-country OR experience	Full complement of research review, approval, oversight processes including data safety and monitoring boards and systems for results sharing
	In-country partnerships for OR	No in-country partners (academic, NGO, or other) with OR experience	1-2 in-country partners with OR experience, but no malaria specific experience	3+ in-country partners with OR experience; 1+ with some malaria expertise; no current PMI-linked OR work	3+ in-country partners with OR experience; 1+ with malaria expertise; current or recent work with PMI OR	Multiple in-country partners with specific malaria experience in PMI OR, including completed past work and reporting on malaria OR

Activity	Metrics/ Criteria	Relative Continuum, for discussion purposes				
		1	2	3	4	5
	Conceptualization of problems needing scientific evaluation	No experience	Some but limited experience in identifying programmatic problems and prioritization	Experience with identifying program problems and prioritizing PE and OR	Experience with identifying problems needing PE or OR and developing study approaches with partners	Extensive experience with problem identification, prioritization, proposal development and conducting PE or OR

Figure B6. Category: Support Systems

Activity	Metrics/ Criteria	Relative Continuum, for discussion purposes				
		1	2	3	4	5
SBC	National Malaria SBCC Strategy used to guide design and implementation of malaria SBC activities	No strategy exists.	Strategy exists but there is no evidence that it has been used to guide design or implementation.	Strategy exists and is used from time-to-time to guide design and implementation, but is of poor quality and does not include any of the key elements identified in the RBM SBCC Working Group National Malaria SBCC Strategy Template.	Strategy is used from time-to-time to guide design and implementation, but lacks alignment with the broader National Malaria Strategy and only incorporates a couple of the key elements identified in the RBM SBCC Working Group National Malaria SBCC Strategy Template.	Strategy is well aligned with the broader National Malaria Strategy, includes the key elements identified in the RBM SBCC Working Group National Malaria SBCC Strategy Template, and is used to guide design and implementation.*Strategy not fully implemented
	SBC Technical Working Group coordinates effectively	No technical working group exists.	The SBC Technical Working Group exists on paper, but has not been operationalized.	The SBC Technical Working Group has significant resource and staffing gaps and does not have clear pathways for coordination.	The SBC Technical Working Group lacks some needed resources/staff and generally only coordinates at the national level only.	The SBC Technical Working Group is well resourced and staffed and engages in regular coordination at both the national and sub-national level.

Activity	Metrics/ Criteria	Relative Continuum, for discussion purposes				
		1	2	3	4	5
	High-quality formative assessments used to inform intervention design	No high-quality, formative assessment conducted in the last five years.	Formative assessment conducted, but significant quality issues in the design and no evidence that data was used to inform intervention design.	High-quality, formative assessment conducted, but no evidence that data was used to inform intervention design.	Data from prior projects used exclusively to guide intervention design; no new data collected.	High-quality, formative assessment conducted, and data used to inform intervention design.
Elim (relevant only for countries actively pursuing elimination ****Not Applicable to Rwanda**	Elimination planning to implementation	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	Elimination activities implemented fully in targeted areas
	Surveillance system readiness to track all cases	Monthly, aggregate data from public sector only	At least monthly, aggregate data from public, private, and community levels	Case-based reporting initiated	Real-time, case-based surveillance inclusive of all sectors and levels in targeted areas	Real-time, case-based reporting and response activities implemented
Additional Health Systems Strengthening	Staffing	No staff	Manager and a few technical staff; not all intervention areas are 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 to optimize their effectiveness; limited plans and opportunities for such training	Fully staffed with personnel with relevant training and experience; complete plan for professional development

Activity	Metrics/ Criteria	Relative Continuum, for discussion purposes				
		1	2	3	4	5
	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 not covering all needs 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 covers most needs.	Office space is fully adequate for current staff and technical needs (lab, insectary, meeting space, etc.) and some growth and well positioned in the MOH; Transport is fully available for needed purposes -- trucks and 4-wheel drive vehicles where needed - all maintained and managed.
	Internet connectivity	No Internet connectivity	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
	NMCP placement within Ministry of Health	NMCP exists but is barely visible in the MOH structure	NMCP is visible in the MOH structure but NMCP manager reports to supervisor who is still low in the MOH system	NMCP is visible and manager reports to high level leader in MOH (e.g., Director of Public Health or Permanent Secretary for Health)	NMCP (or NMEP) is highly visible and reports at a high level in MOH and has some access to other ministry leadership (e.g., education, agriculture, community development)	NMCP (or NMEP) is highly visible within MOH and with all other relevant ministries and has ready access to country leadership (e.g., the president/prime minister; and parliament)