

RWANDA MALARIA PROFILE

I. ABOUT

Launched in 2005, the [U.S. President's Malaria Initiative \(PMI\)](#) supports implementation of malaria prevention and treatment measures as well as cross-cutting interventions. PMI's 2021–2026 strategy, [End Malaria Faster](#), envisions a world free of malaria within our generation, with the goal of preventing malaria cases, reducing malaria deaths and illness, and eliminating malaria in PMI partner countries. PMI currently supports 27 countries in Sub-Saharan Africa and 3 programs across the Greater Mekong Subregion in Southeast Asia to control and eliminate malaria. Rwanda began implementation as a PMI focus country in FY 2007. Please see the [Rwanda Malaria Operational Plan](#) for more information on PMI's approach and investments.

II. CONTEXT

Table 1. General Demographics and Malaria Situation

Population	13,246,394 (Rwanda National Institute of Statistics, 2023: RPHC5 Main Indicators Report)
Population at risk of malaria	13,246,394
Malaria prevalence	1% among children 6 to 59 months of age by microscopy (RDHS 2019–2020)
Malaria incidence/1,000 population at risk	76 in FY 2022 (Rwanda Malaria and Neglected Tropical Diseases Annual Report 2021–2022)
Peak malaria transmission	Two peak transmission periods: May to June and November to December each year

In response to a marked increase in malaria cases in 2016, the Rwanda Malaria and Other Parasitic Diseases Division (MOPDD) conducted an epidemiological stratification study, which is included in the Rwanda Malaria Strategic Plan 2020–2024¹ (see Figure 1). There are four main malaria epidemiological zones based on the annual parasite incidence (API) per district: (1) high endemicity zone: > 450 API per 1,000 population; (2) moderate endemicity zone: 250–450 API per 1,000 population; (3) low endemicity zone: 100–250 API per 1,000 population; and (4) very low endemicity zone: < 100 API per 1,000 population.

rbcc Rwanda Biomedical Centre
Healthy People, Healthy Nation

MALARIA STRATIFICATION
Rwanda, 2016

LEGEND

PY Resistance:

- Confirmed
- Resistance Suspicion
- Not Monitored
- Susceptible

Rice Plantation

Malaria Incidence per 1,000

- <100
- 100 – 250
- 250 – 450
- > 450

0 10 20 40 mi
0 15 30 60 km

¹ Rwanda Ministry of Health. 2020. *Rwanda Malaria Strategic Plan 2020–2024*.

Figure 2. Prevalence Maps

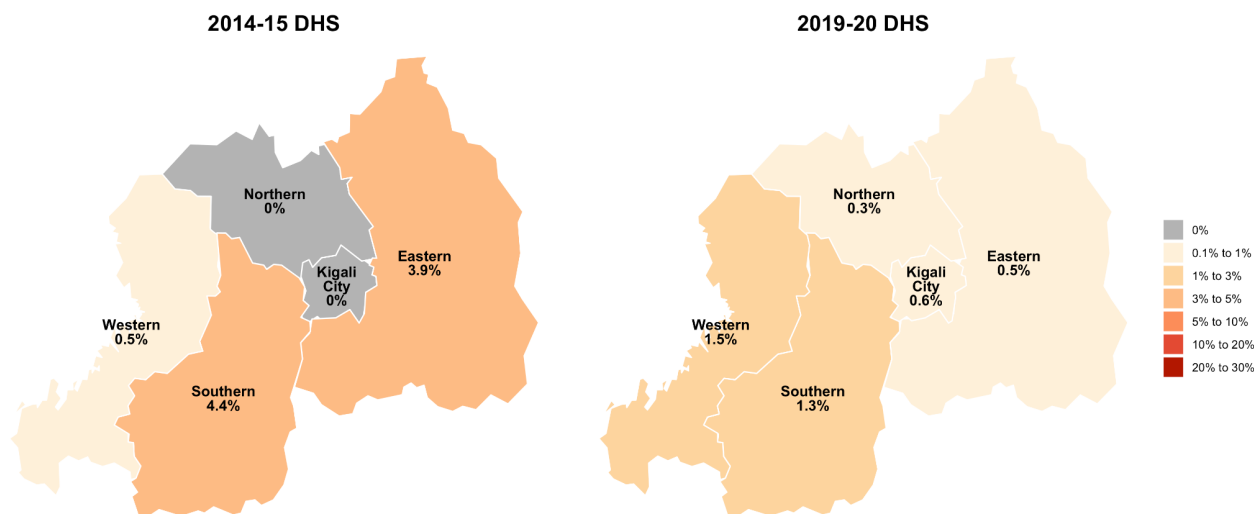


Figure 3. Incidence Maps

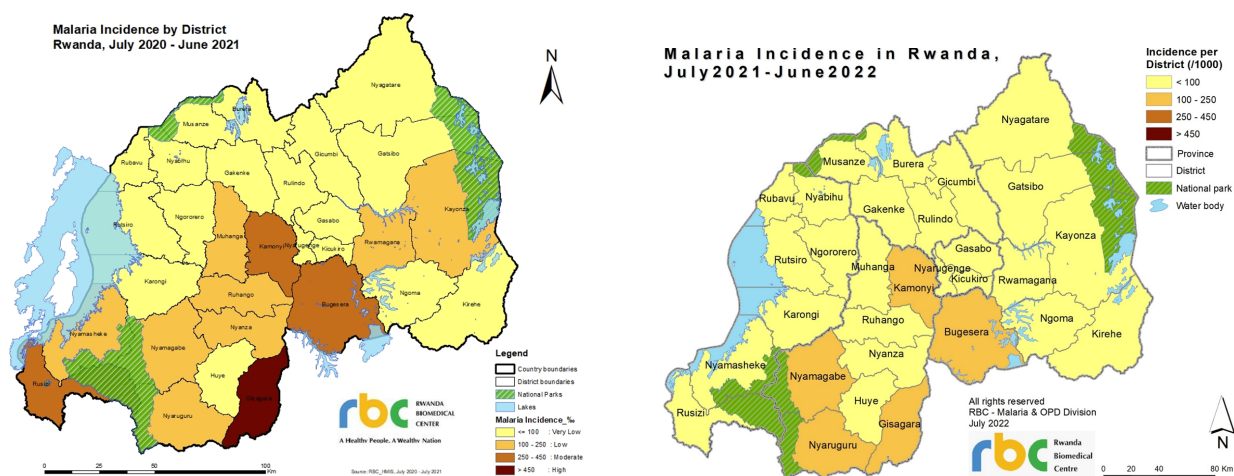


Table 2. Malaria Parasites and Vectors

Principal malaria parasites	<i>Plasmodium falciparum</i> (97 percent), <i>P. malariae</i> (1–2 percent), <i>P. ovale</i> (1–2 percent). ²
Principal malaria vectors ²	<i>Anopheles arabiensis</i> , <i>An. gambiae</i> s.s. and <i>An. funestus</i> . <i>An. arabiensis</i> remains the predominant species in IRS districts (68%) while <i>An. gambiae</i> s.s. is the primary malaria vector in non-IRS districts. Insecticide resistance in Rwanda, tested using <i>An. gambiae</i> s.l., is: bendiocarb 0.1%, fenitrothion 1%, pirimiphos methyl 0.25%, DDT 4%, permethrin 0.75%, deltamethrin 0.05%, and lambdacyalothrin 0.05%. ³ Resistance to alpha-cypermethrin has also been reported.

¹ See the entomological monitoring section of the MOP for more details on vector bionomics and insecticide resistance

and the indoor residual spraying section for details on residual efficacy. ² Source: Rwanda Malaria Strategic Plan 2020–2024.

³ Source: Rwanda Malaria Strategic Plan, 2020–2024.

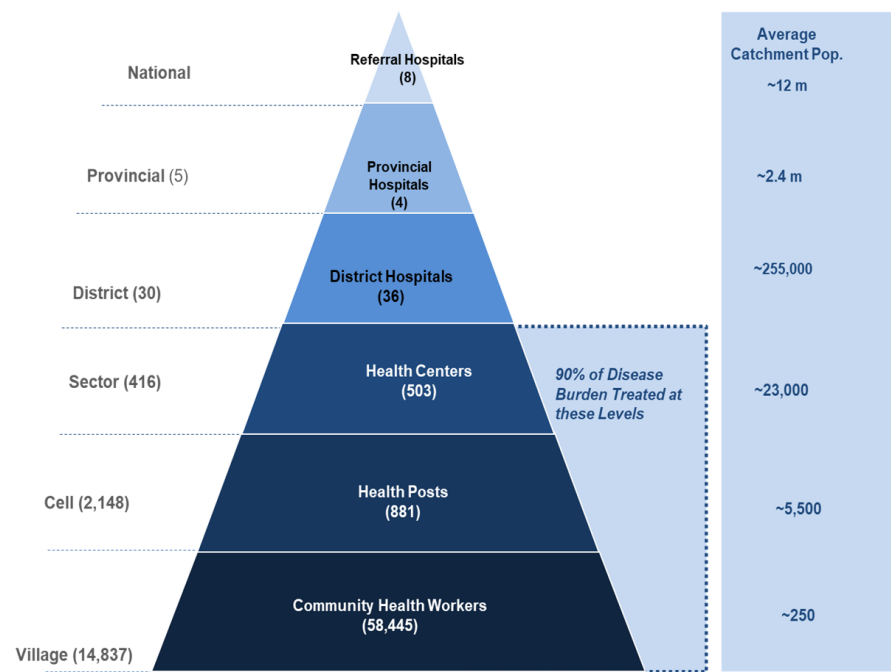
COUNTRY HEALTH SYSTEM

The country's health system is well summarized in the Rwanda Malaria Strategic Plan 2020–2024. Health services in Rwanda are provided through the public sector, government-assisted health facilities, and the private sector. The public sector has three levels: central, intermediate, and peripheral. The Ministry of Health (MOH) and the referral health facilities it manages comprise the central level. Provincial and district hospitals comprise the intermediate level. Health centers, health posts, and community health workers (CHWs) comprise the peripheral level.

The MOH oversees, coordinates, and regulates all programs aimed at improving the health status of the population. The ministry is responsible for the formulation of health policies, strategic planning, high-level technical supervision, monitoring and evaluation of the health situation, and the coordination of resources at the national level. MoH is made up of the core ministry and affiliated institutions, including the Rwanda Biomedical Center (RBC) and the Food and Drugs Authority. The RBC coordinates health services provided primarily through the biomedical services department and the Institute of HIV/AIDS, Diseases Prevention and Control, which includes MOPDD.

Rwanda's health development strategy calls for a decentralized management and district-level care approach. Financial and logistical resource management has also been decentralized. The main role of each district is to improve the quality of hospitals, enhance general hygiene, assist sectors to promote better nutrition, and establish a health insurance scheme within its area. Rwanda has made progress toward the goal of ensuring equality and universal access to health services by introducing community-based health insurance. Health insurance coverage is relatively high: there is at least one family member with health insurance in 79 percent of households, according to the 2014–2015 DHS; and 97 percent of those with health insurance have community-based health insurance.

Figure 4. Rwanda Health System Structure



Source: Rwanda Malaria and Other Parasitic Diseases Division.

For case management activities, it is estimated that public health facilities represent approximately 65–70 percent of the total number of health facilities, while private dispensaries and private medical clinics account for about 20 percent and 10 percent, respectively. All suspected malaria cases receive parasitological testing with health facilities, which rely on microscopy, accounting for approximately 40–45 percent of all diagnoses of malaria, and community health workers using malaria rapid diagnostic tests (RDTs) accounting for approximately 55–60 percent of all diagnoses of malaria.

The Rwandan Maternal Child and Community Health Division, in coordination with the MOPDD and with support from PMI and other partners, developed antenatal care (ANC) guidelines in 2020 that recommended an integrated approach to deliver quality health care to pregnant women. The ANC guidelines were harmonized with the Rwanda National Malaria Treatment Guidelines (2020) and also extended the number of ANC contacts from four to eight. In Rwanda, each health center has an ANC unit. CHWs who focus on maternal health (*Agents de Santé Maternelle*) identify pregnant women in their villages, distribute iron, low-dose folic acid, and mebendazole for anemia prevention; promote insecticide-treated net (ITN) use; and encourage women to go early and regularly for their scheduled ANC visits. Early ANC attendance is also encouraged by providing targeted social and behavior change activities. The MoH, with the support of partners, has worked to improve the quality of services for case

management at health facilities through training/mentorship and capacity building efforts at the national and district level.

Rwanda, through the Rwanda Medical Supply Limited (RMS Ltd.), operates an integrated health commodities supply chain. The objective of RMS is to ensure the availability of quality medicines, medical supplies, and consumables to customers and consumers in a timely manner. RMS has 30 branches to manage the procurement, forecasting, planning, storage, and distribution of all health commodities for all program products, including nonprogram products. RMS has the capability to process procurement of health products for public health facilities in the country, including referral hospitals, district hospitals, specialized hospitals, health centers, and health posts. The MoH takes ownership of the pharmaceutical supply chain, leading strategic functions, such as policy formulation, stewardship, and quality assurance, driving major operational functions and overseeing the funds required for procurement and policy implementation. The RBC under the leadership of the MoH is responsible for implementation of policy and guidelines, planning, quantification, and supply planning for health commodities.

Within the MoH, the Coordinated Procurement and Distribution System (CPDS) unit under the Clinical Services Department directs and coordinates supply chain functions. Functions of the CPDS include formulating health sector policy for all areas of pharmaceutical supply chain management, stewarding logistics management systems, and coordinating the functions across the supply chain system. CPDS currently manages 594 public health facilities, with the RMS serving as a central warehouse, supplying health commodities directly to the public health facilities through its 30 branches located in 30 administrative districts, 4 provincial hospitals, 8 referral hospitals, and 3 teaching hospitals. Through strategic collaborations with the largest private procurement agencies in Rwanda, BUFMAR (*Bureau des formations Medicals agrees au Rwanda*) and MEDIASOL (Medical and Allied Service Solutions), RMS has successfully managed to supply essential and vital pharmaceutical needs to public health facilities. Since its establishment in August 2020, RMS has been able to supply 95 percent of all essential medicines needed to public health facilities.

The MoH built the Rwandan health management information system (HMIS) with the support of partners, and rolled it out nationally in 2012. Using District Health Information System-2 (DHIS2), a web-based software platform that is both free and customizable, the Rwanda HMIS allows health centers to enter their information directly into the national database and view charts and graphs showing data trends. By simplifying and automating monthly reporting of service data, completeness of reporting increased from a national average of 88 percent in 2008 to 99 percent in 2019. This trend has continued to date.

Each facility reports data monthly through the DHIS2. Since the successful launch of the Rwanda HMIS, many new reporting modules have been integrated into the DHIS2 platform, including reporting on all diseases. The data are entered electronically by data managers at the health centers, and at the district and provincial hospitals. At the community level, data are collected and reported through a paper-based system to the health centers. The data from community health workers is entered into the CHW information system—*Système d'information sanitaire des communautés*, or SISCOM), which is interoperable with the DHIS2 platform. The MOH has a fully functional health information management system and all programs, including the MOPDD, have access to data to use on a regular basis to inform programing.

III. NMCP STRATEGIC PLAN

The main goal of the Rwanda Malaria Strategic Plan 2020–2024 is to reduce malaria morbidity and mortality by at least 50 percent from 2019 levels by 2024. The five main objectives of the plan are:

1. By 2024, at least 85 percent of population at risk will be effectively protected with preventive interventions;
2. All suspected malaria cases are promptly tested and treated in line with national guidelines;
3. By 2024, surveillance and reporting is strengthened to provide complete, timely, and accurate information for appropriate decision making at all levels;
4. Coordination, collaboration, procurement, supply management, and effective program management are strengthened at all levels; and
5. By 2024, 85 percent of the population at risk will have correct and consistent practices and behaviors toward malaria control interventions.

IV. KEY MALARIA DATA

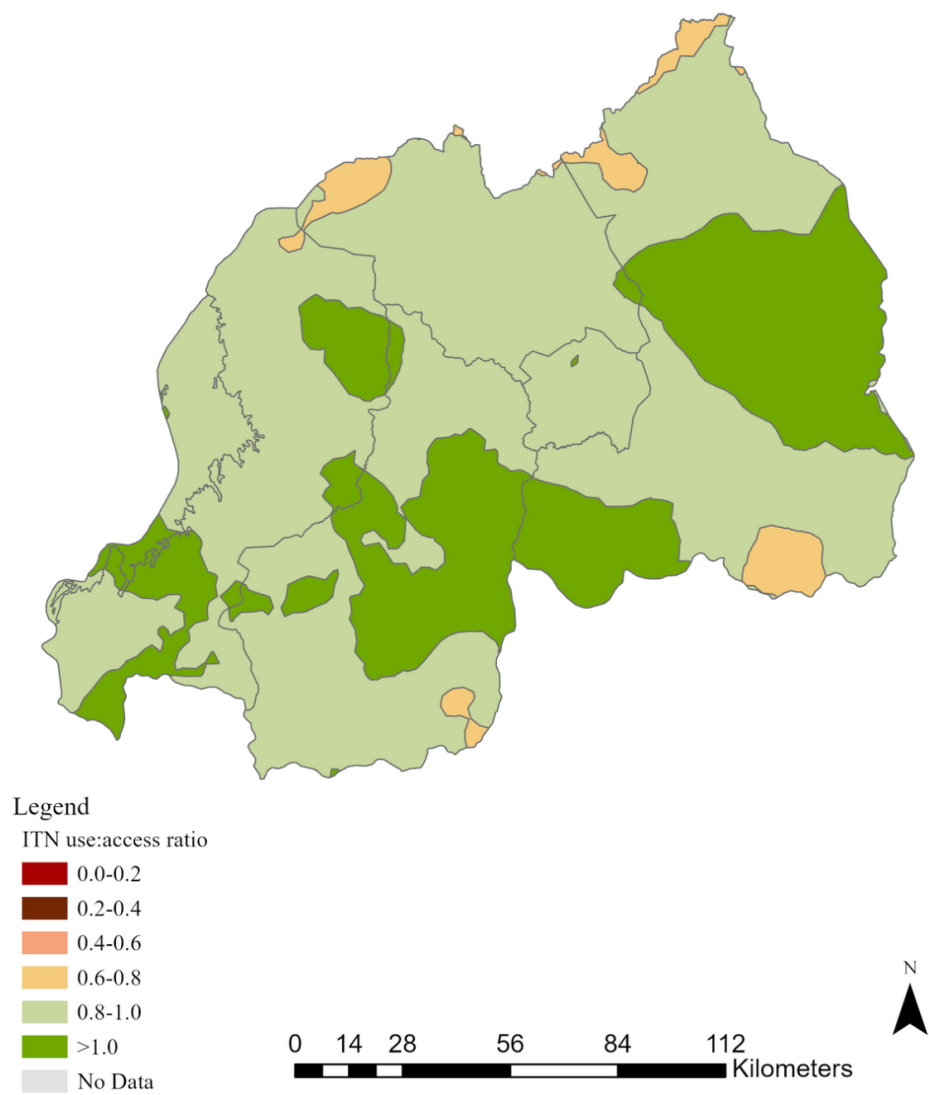
EVOLUTION OF KEY SURVEY-BASED MALARIA INDICATORS

Table 3. Key Survey Indicators

Indicator	MIS Feb.–April 2013	DHS Nov. 2014– April 2015	MIS Nov.–Dec. 2017	DHS Nov 2019– July 2020
% of households with at least one ITN	83	81	84	66
% of households with at least one ITN for every two people	43	43	55	34
% of population with access to an ITN	66	64	72	51
% of population that slept under an ITN the previous night	61	61	64	48
% of children under the age of five who slept under an ITN the previous night	74	68	68	56
% of pregnant women who slept under an ITN the previous night	74	73	69	57
% of children under the age of five with a fever in the last two weeks for whom advice or treatment was sought	68	57	56	62
% of children under the age of five with a fever in the last two weeks who had a finger or heel stick	30	36	38	41
% children receiving an ACT among those under the age of five with a fever in the last two weeks who received any antimalarial drug	92	99	99	92
% of women who attended four ANC visits during their last pregnancy	N/A	44	N/A	47
% of 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
Under-five mortality rate per 1,000 live births	N/A	50	N/A	45
% of children under the age of five with parasitemia by microscopy	N/A	2	7	1
% of children under the age of five with parasitemia by RDT	N/A	N/A	12	N/A

ACT: artemisinin-based combination therapy; DHS: Demographic and Health Survey; IPTp: intermittent preventive treatment for pregnant women; ITN: insecticide-treated net; MIS: Malaria Indicator Survey; RDT: rapid diagnostic testing.

Figure 5. ITN Use-to-Access Ratio Map, DHS 2019–2020



Source: DHS 2019–2020.

Table 4. Evolution of Key Malaria Indicators Reported through Routine Surveillance Systems

Indicator	2018	2019	2020	2021	2022
# of all-cause patient consultations	18,884,158	15,268,491	18,982,964	20,195,633	22,703,371
# of suspect malaria cases ¹	9,389,458	8,808,464	6,879,911	5,611,038	5,115,210
# of patients receiving diagnostic test for malaria ²	9,389,458	8,808,464	6,879,911	5,611,038	5,115,210
Total # of malaria cases ³	4,222,768	3,609,323	1,866,421	1,152,439	844,032
# of confirmed cases ⁴	4,222,768	3,609,323	1,866,421	1,152,439	844,032
# of presumed cases ⁵	0	0	0	0	0
% of malaria cases confirmed ⁶	100	100	100	100	100
Test positivity rate (TPR) ⁷	15	13	15	21	17
Total # of malaria cases in children under the age of five ⁸	538,310	475,784	275,092	193,139	137,829
% of cases in children under the age of five ⁹	13	13	15	17	16
Total # of severe cases ¹⁰	8,293	6,249	3,423	1,915	1,740
Total # of malaria deaths ¹¹	336	218	148	69	74
# of facilities reporting ¹²	561	550	551	556	592
% of data completeness ¹³	96	99	99	99	98

¹ Number of patients presenting with signs or symptoms possibly due to malaria—all fever cases are treated as suspected malaria cases. ² RDT or microscopy, all ages, outpatient and inpatient. ³ Total reported malaria cases; all ages, outpatient and inpatient, confirmed and unconfirmed cases. ⁴ Diagnostically confirmed; all ages, outpatient and inpatient.

⁵ Clinical/presumed/unconfirmed; all ages, outpatient and inpatient. ⁶ Number of confirmed cases divided by the total number of cases. ⁷ Confirmed cases divided by the number of patients receiving a diagnostic test for malaria (RDT or microscopy).

⁸ Outpatient and inpatient, confirmed and unconfirmed. ⁹ Total number of cases in children under the age of five divided by the total number of cases. ¹⁰ Severe malaria cases are reported in the inpatient registers at district, provisional, and referral hospitals, and the data are reported in the HMIS on a monthly basis. ¹¹ All ages, outpatient, inpatient, confirmed, and unconfirmed. ¹² Total number of health facilities reporting data into the HMIS/DHIS2 system that year. ¹³ The number of monthly reports from health facilities divided by the number of health facility reports expected (average for the calendar year).

Table 5. Disaggregated Community-Level Data

Indicator	2019	2020	2021	2022
# of patients receiving diagnostic test for malaria from a CHW	3,113,049	1,673,349	1,355,931	1,134,041
Total # of malaria cases reported by CHWs ¹	2,103,465	1,014,593	651,572	480,831
% of CHW reported cases (among total malaria cases) ²	58	54	56	57

¹ Includes all ages, confirmed and unconfirmed. ² Total number of malaria cases reported by CHWs divided by the total number of malaria cases in the previous table.

V. Other Implementation Information

ITN durability monitoring is ongoing and with an estimated date of completion of the 36-month monitoring period in June 2023.

Table 8. Summary of Completed Therapeutic Efficacy Studies

Year	Site	Treatment arm(s)	Efficacy (PCR-corrected adequate clinical and parasitological result) for Each Drug at Each Site
2018 ¹	Rukara	AL	94% (90, 100)
2018 ¹	Masaka	AL	97% (88, 100)
2018 ¹	Bugarama	AL	97% (91, 100)

Source: Uwimana, A., et al. 2021. "Association of Plasmodium falciparum kelch13 R561H Genotypes with Delayed Parasite Clearance in Rwanda: An Open-Label, Single-Arm, Multicentre, Therapeutic Efficacy Study." *The Lancet. Infectious Diseases* 21 (8), 1120–28.

Note: AL has therapeutic efficacies above the 90 percent World Health Organization (WHO) recommended threshold and are well tolerated in Rwanda. PCR: polymerase chain reaction; AL: artemether-lumefantrine.

VI. Key Policies

Table 9. Policies in Rwanda

National Strategic Plan: Rwanda Malaria Strategic Plan 2020–2024 (May 2020)	
National Digital Health Strategy: National Digital Health Strategic Plan 2018–2023 (Draft, June 20)	
National Social Behavior Change/Communication Strategy: Rwanda Social and Behavior Change Strategy for Malaria Prevention and Control, 2022–2024 (July 2022)	
National Supply Chain Strategy/Master Plan: National Pharmaceutical Sector Strategic Plan (NSP-SP) 2018–2024 (2018)	
National Vector Control Strategy and/or Integrated Vector Management Plan: National Strategic Plan for Integrated Vector Management (IVM) 2020–2024 (July 2020)	
Malaria Case Management Policy National Malaria Treatment Guidelines, 4th edition (2020)	
What is/are the first-line treatment(s) for uncomplicated <i>P. falciparum</i> malaria*?	Artemether-lumefantrine *Primaquine for artemisinin resistance is not in the national treatment guidelines but is being proposed for pilot implementation
What is/are the second-line treatment(s) for uncomplicated <i>P. falciparum</i> malaria*?	Dihydroartemisinin-piperaquine (DP) Quinine if DP is not available
What is the first-line treatment for severe malaria?	Parenteral artesunate
In pregnancy, what is the current first-line treatment for uncomplicated <i>P. falciparum</i> malaria in the first trimester?	Oral quinine
Given the WHO policy change to recommend AL as treatment for uncomplicated malaria in the first trimester, does the MoH plan to update the policy on treatment of MIP in the <i>first trimester</i> ? And if so, what is the status of this policy change and implementation of the new policy?	The MOPDD is aware of the WHO policy change and is currently discussing potential changes in Rwanda, but no decisions have been made on updating policies or plans for implementation or training.
In pregnancy, what is/are the first-line treatment(s) for uncomplicated <i>P. falciparum</i> malaria in the <i>second and third trimesters</i> ?	Artemisinin-based combination therapy (ACT)
In pregnancy, what is the first-line treatment for severe malaria?	Parenteral artesunate
Is prereferral treatment of severe disease recommended at peripheral health facilities? If so, with what drug(s)?	Yes, parenteral artesunate
Is prereferral treatment of severe disease with rectal artesunate recommended for community health workers?	Yes, artesunate suppository
Community Health Policy: National Community Health Strategic Plan, 2013–2018 (May 2013)	

What is the # of CHWs currently providing iCCM?	Approximately 30,000
What is the country's target for the number of CHWs providing iCCM?	Approximately 70,000
What percent of the country's target is met?	43% Currently, there are approximately 60,000 CHWs, half of whom are able to provide clinical services including iCCM. The Rwanda MoH recently proposed a policy change to allow all CHWs to be trained to provide clinical services which, if approved, would greatly facilitate reaching the target number of CHWs able to provide iCCM
Does the country have a policy that enables the routine, regular payment of salaries/stipends for CHWs?	No
Do CHWs have the authority to test and treat all ages for malaria?	Yes
Prevention of Malaria in Pregnancy Policy (not available)	
At what gestational age is the first dose of IPTp-SP to be given to pregnant women according to the national guidelines for malaria and MCH?	IPTp-SP is not policy due to high level of SP resistance
Do the national ANC guidelines reflect the WHO 2016 recommendation of eight ANC scheduled contacts (plus one additional contact for early initiation of IPTp at 13–16 weeks)? If not, how many ANC contacts are recommended?	Yes
What is the status of training ANC providers on the WHO recommended eight or more contacts?	Complete and part of routine supportive supervision and mentoring
Have HMIS/DHIS2 and ANC registers been updated to include eight or more contacts?	Yes
Are ANC/IPTp data collected as single months where the January 2022 data represent the number of doses administered in January 2022, or cohort data, representing the cumulative data from pregnancies which began six months prior?	N/A
Is ANC/IPTp provided by facility staff conducting ANC outreach to communities?	N/A
Can CHWs deliver IPTp and if so, which specific cadres and beginning with which dose? How many districts are targeted for c-IPTp implementation?	N/A

ANC: antenatal care; DHIS2: District Health Information System-2; AL: artemether and lumefantrine; CHW: community health workers; iCCM: integrated community case management; IPTp: intermittent preventive treatment for pregnant women; MIP: malaria in pregnancy; MoH: Ministry of Health; MOPDD: Malaria and Other Parasitic Diseases Division; SP: sulfadoxine-pyrimethamine; WHO: World Health Organization.

VII. PARTNER LANDSCAPE

Table 10. Partner Landscape

Partner	Key Technical Interventions	Geographic Coverage	Funding Amount or In-kind Contribution	Time Frame
Global Fund	• Together with the Rwandan government, support IRS, ITN procurement and distribution for both mass campaign and continuous channels, and entomological monitoring • Procurement of dual antigen RDTs • Support facility-based case management	• National for ITN, RDT, and facility-based case management • Entomological monitoring in 11 sites • IRS in 9 districts	\$35,965,803	FY 2021 to 2022
Government of Rwanda	• Together with the Global Fund, support IRS, ITN procurement, and distribution for both mass campaign and continuous channels, and entomological monitoring • Support facility-based case management • Support innovative interventions such as larviciding	• National for ITN, RDT, and facility-based case management • IRS in nine districts	\$31,378,930	FY 2021 to 2022