

## MALI 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 three programs across the Greater Mekong Subregion in Southeast Asia to control and eliminate malaria. Mali began implementation as a PMI focus country in FY 2007. Please see the Mali [Malaria Operational Plan](#) for more information on PMI's approach and investments.

### II. CONTEXT

In Mali, malaria remains the leading cause of morbidity and mortality, particularly in children less than five years of age and pregnant women (SLIS 2021). According to data from the district health information system 2, 37 percent of patient consultations and 27 percent of deaths at health facilities were due to malaria in 2022.<sup>1</sup> The entire population of Mali is at risk.

**Table 1: General Demographics and Malaria Situation**

<b>Population</b>	23,222,456 (National Directorate of Population Projection 2024)
<b>Population at risk of malaria</b>	23,222,456
<b>Malaria prevalence</b>	19% (MIS, 2021)
<b>Malaria incidence/1,000 population at risk</b>	172/1,000 (DHIS2, 2022)
<b>Peak malaria transmission</b>	July-December

Malaria prevalence varies across regions, from a minimum of less than 2 percent in Bamako to a maximum of 26.6 percent in Mopti region.<sup>2</sup> *Plasmodium (P.) falciparum* accounts for 85 percent of malaria infection, while the rest are a combination of *P. malariae* (14%) and *P. ovale* (1%). Only a few cases of *P. vivax* infection have been observed. The

<sup>1</sup> DHIS2, Extracted on 4/11/2022 (Percent of deaths = Number of deaths due to malaria / all-cause of deaths)

<sup>2</sup> Data sources include: 2006 Demographic and Health Survey (DHS), 2012-13 DHS, 2015 Malaria Indicator Survey (MIS), 2018 DHS and 2021 MIS.

main malaria vectors are *Anopheles (An.) gambiae* and *An. funestus*.<sup>3</sup>

The government of Mali, in partnership with PMI, the Global Fund to Fight AIDS, Tuberculosis, and Malaria (Global Fund), research institutions, and national and international organizations, has achieved impressive gains in malaria control over the past decade. Malaria prevalence in children under five years of age declined from 47 percent in 2012 to 19 percent in 2021, and all-cause child mortality decreased by 47 percent, from 191 deaths per 1,000 live births in 2006 to 101 deaths per 1,000 live births in 2018. However, between 2018 and 2022, Mali experienced a continued increase in malaria cases. During this period, malaria cases increased from 133 per 1,000 population in 2018 to 172 per 1,000 population in 2022. For children under 5 years of age, malaria cases increased from 224 per 1,000 population to 250 per 1,000 population during the same period.<sup>4</sup> This increase reflects an increasing trend of malaria cases in many African countries. Additional factors for increased cases in Mali could also possibly be due to population movement from low to high malaria endemic areas due to the conflicts in the north of the country, improved reporting system of malaria cases, and the increases in malaria testing by health community workers.

## STRATIFICATION

In 2023, the National Malaria Control Program (NMCP) and its partners conducted a national malaria micro stratification exercise using malaria incidence adjusted for health center attendance rate and ecological determinants. The exercise differentiated four transmission levels based on the World Health Organization (WHO) classification scheme: very low, low, moderate, and high transmission (see Figure 1 below). This new stratification has been used to tailor malaria interventions to the geographical context. It's also used to orient resources and actions to areas with the highest malaria burden, increase efficiency, and guide actions to prevent resurgence where cases have been extremely low.

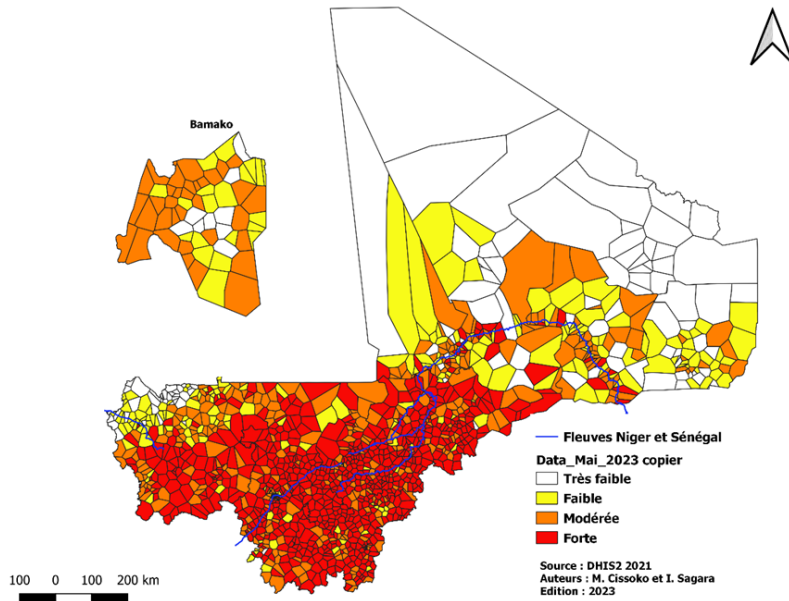
Based on the new malaria classification, the NMCP recommends diagnosis and treatment for case management, insecticide-treated mosquito nets (ITNs), indoor residual spraying (IRS), intermittent preventive treatment in pregnancy (IPTp), and seasonal malaria chemoprevention (SMC) in the areas of low to high malaria transmission. In the very low malaria transmission area, PMI recommends all the interventions combined with mass drug administration, case investigation, and epidemic responses.

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<sup>3</sup> Keïta M, Baber I, Sogoba N, Maïga HM, Diallo M, Doumbia S, et al. Transmission vectorielle du paludisme dans un village du bord du fleuve Niger et son hameau de pêche (Kéniéroba et Fourda, Mali). *Bull Soc Pathol Exot.* 2014;107:356–68.

<sup>4</sup> DHIS2, Extracted on 4/11/2023.

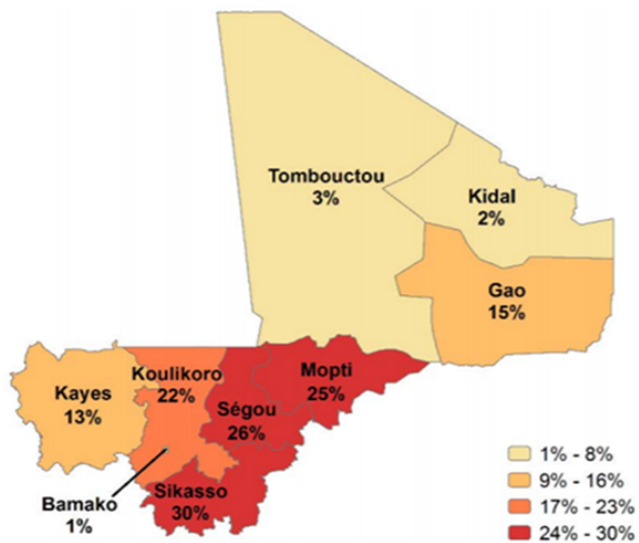
**Figure 1. Malaria Micro Stratification Adjusted by Health Facility Attendance Rate, 2023**



Source: 2023 NMCP Malaria Micro Stratification in Mali

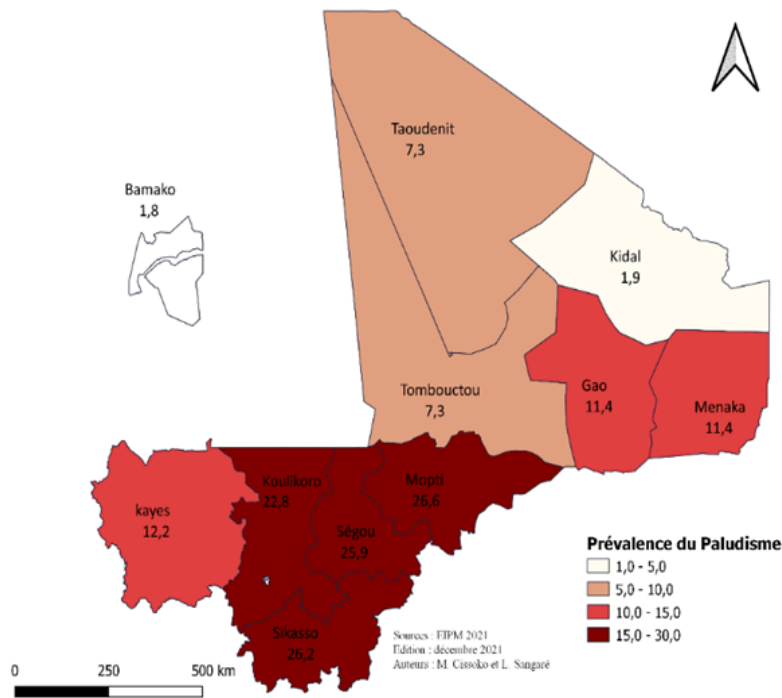
Figures 2a and 2b below illustrate the changes in malaria prevalence from recent national surveys (DHS 2018 and MIS 2021). The national prevalence of malaria in children under five remained at 19 percent.

**Figure 2a: Map of Malaria Prevalence by Region, 2018**



Note: Children 6 to 59 months of age who tested positive for malaria by RDT (2018 DHS)

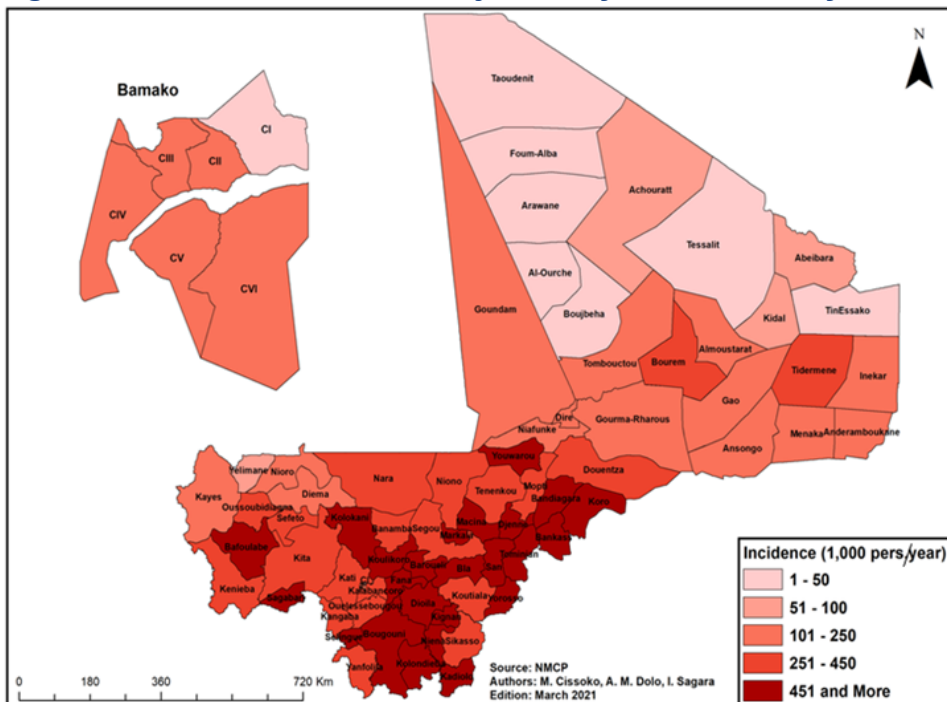
**Figure 2b: Map of Malaria Prevalence by Region, 2021**



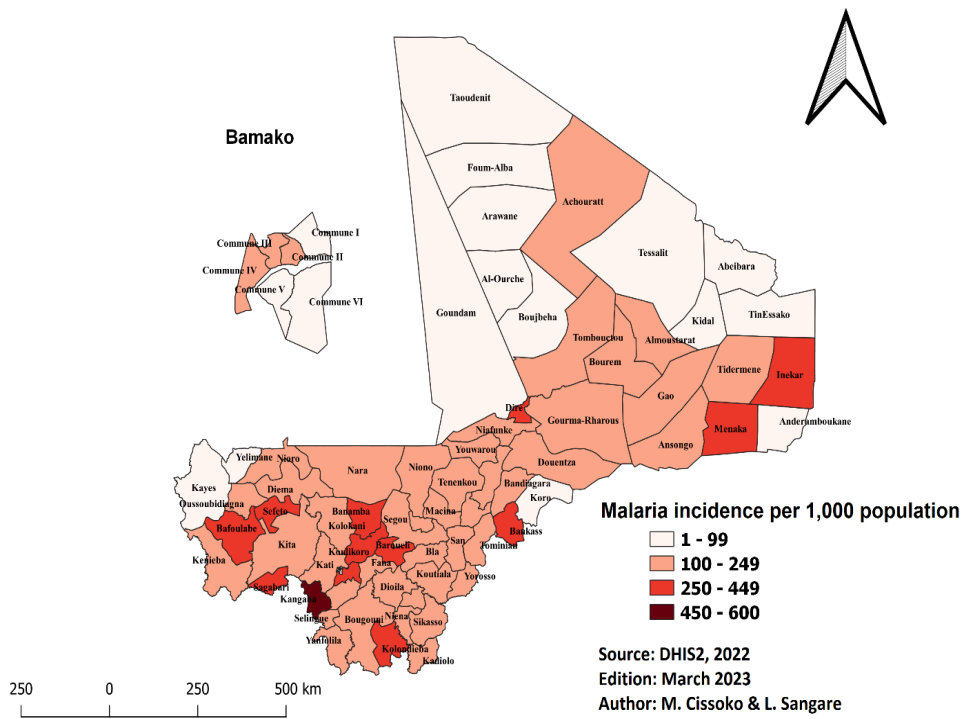
Note: Children 6 to 59 months of age who tested positive for malaria by RDT (2021 MIS)

Figures 3a and 3b below show the changes in malaria incidence by health district from 2021 to 2022, using data from the national health information system.

**Figure 3a: Malaria Incidence Adjusted by Health Facility Attendance Rate, 2021**



**Figure 3b: Malaria Incidence by district, 2022.**



**Table 2: Malaria Parasites and Vectors**

<b>Principal Malaria Parasites</b>	<i>Plasmodium falciparum</i> , <i>Plasmodium malariae</i> , <i>Plasmodium vivax</i> and <i>Plasmodium ovale</i> .
<b>Principal Malaria Vectors*</b>	<i>An. gambiae</i> s.l <i>An. funestus</i> , <i>An. pharoensis</i> , <i>An. rufipes</i>

\*See Entomological Monitoring section of the MOP for more details on vector bionomics and insecticide resistance and Indoor Residual Spraying section for details on residual efficacy.

**COUNTRY HEALTH SYSTEM**

The health system in Mali is made up of all the public, private, and community-based sectors, as well as professional health orders. The administrative head of the health system is the Ministry of Health and Social Development (MHSD). The NMCP falls under the MHSD. Mali’s public health system is structured by levels, each with a defined technical and administrative platform:

- 1) The operational level consists of Health Districts, which have an administrative office, a Referral Health Center (CSRef), community health centers (CSComs), and community health worker (CHWs) programs. There are a total of 62 CSRefs, each managed by a doctor. CSRefs offer specialized services and serve as the first level of patient care referred from CSComs. A total of 1,534 CSComs are estimated to be functional and are managed by a doctor-in-charge, with assistance from nursing and administrative staff. The number of functional CHWs’ sites is estimated to be 3,041. CHWs provide integrated

community case management (iCCM) services for children less than 5 years of age nationwide, and conduct activities to address malaria in communities. Malaria diagnosis is performed using RDTs at the community level while microscopy is used at the district health facility level.

- 2) The regional level consists of eight hospitals, which provide technical support to the first level and serve as the next level of referral facilities, including for severe malaria cases.
- 3) At the central level, there are seven public and university clinics which provide support to the second level hospitals and serve as the next level of referral facilities.
- 4) The MHSD is based at the central level and is primarily responsible for defining health policy, providing overall strategic and technical direction, investments, and operations.

As of January 2023, there were 3,017 functioning private health facilities—including 1,408 care facilities, 247 clinics, and 14 polyclinics—all able to provide malaria diagnosis and treatment.<sup>5</sup>

Recent studies indicate that geographic distance, quality and cost of health services, and social and cultural factors continue to constrain access to care for women living in rural communities.<sup>6</sup> In Mali, more than 41 percent of the population lives more than five kilometers from a health facility.<sup>7</sup> The NMCP works closely with other MHSD and national entities to address challenges limiting access to malaria prevention and treatment services. For example, the NMCP in coordination with the National Reproductive Health Sub-Directorate and the Health Facilities and Regulations Unit have opted for the administration of IPTp by CHWs once a pregnant woman has initiated antenatal care (ANC), malaria case detection and essential cares services in community. Currently, the MHSD is working with the other malaria stakeholders for the expansion and the training of CHWs in Mali. A national strategic plan for essential community healthcare (2021 – 2025) has been developed to help improve access to care, particularly where the population is hard to reach.

The objective of the National Pharmaceutical Policy is to make medications accessible and promote their rational use. The Central Medical Store (*Pharmacie Populaire du Mali, PPM*) is responsible for supplying, storing, and distributing essential medicines (including malaria commodities) throughout the country. It works in close collaboration with the drug regulatory authority and the NMCP.

The Health Management Information System (HMIS) is used to collect routine data for the country's health statistics. The transmission, storage, and analysis of data is done through the DHIS2 platform. Routine malaria data are disseminated through monthly bulletins, malaria annual reports, and visualization dashboards. Data from mass campaigns (ITNs, SMC) are

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<sup>5</sup> HMIS, 2023

<sup>6</sup> Hill et al, 2014 Webster et al, 2013 and Breakthrough Research, 2020.

<sup>7</sup> HMIS, 2023

collected through DHIS2-specific systems. Data quality control is done through data reviews, semi-annual data quality audits, and supervision at regional and national level. The Integrated Disease Surveillance and Response system is used to collect data on specific diseases, including malaria, from health facilities on a weekly basis to allow a prompt reaction in case of an epidemic situation.

## **OTHER CONTEXTUAL INFORMATION**

Socio-political challenges, including three coups d'état in ten years, climate related shocks, and increasing insecurity in large parts of the country, have led to a significant number of internally displaced persons. The number of food-insecure people remains very high. Terrorism in the northern and central regions of the country continue to hamper health service provision, access to care and quality of care, routine data collection and quality control. Sanctions imposed by the Economic Community of West African States in response to the coup affected revenue, commercial investments, and cross-border transactions.

## **III. NMCP STRATEGIC PLAN**

In 2023, the Mali NMCP revised its national malaria strategic plan (NMSP). The NMSP 2023-2027 provides a framework for the government, development partners, private sector, and other stakeholders to integrate different strategies and interventions to accelerate the reduction of malaria burden in line with global objectives. The NMSP aims to reduce malaria mortality and incidence rates by at least 75 percent by 2027 compared to 2015 levels.

The plan's strategic interventions include: program management and coordination; integrated vector management; malaria in pregnancy; seasonal malaria chemoprevention; diagnosis and case management; social mobilization and advocacy; malaria epidemic response; surveillance, monitoring, evaluation; and operations research.

Guiding principles for achieving the NMSP's objectives include: ensuring equity in access to quality care, ensuring appropriate targeting of interventions using routine data collected, improving health governance, ensuring synergy with other ministries for more integrated control, ensuring inclusive support from all malaria partners, leveraging community health services, and ensuring effective involvement of communities in malaria control.



## IV. KEY MALARIA DATA

### EVOLUTION OF KEY SURVEY BASED MALARIA INDICATORS

**Table 3: Key Survey Indicators**

Indicator	2006, DHS	2015, MIS	2018, DHS	2021, MIS
% of Households with at least one ITN	50	93	90	91
% of Households with at least one ITN for every two people	16	39	55	44
% Population with access to an ITN	30	70	75	72
% Population that slept under an ITN the previous night	21	64	73	73
% of Children under five years of age who slept under an ITN the previous night	27	71	79	74
% of Pregnant women who slept under an ITN the previous night	29	78	84	76
% of Children under five years of age with a fever in the last two weeks for whom advice or treatment was sought	56	49	53	60
% of Children under five years of age with a fever in the last two weeks who had a finger or heel stick	N/A	14	16	24
% of Children receiving an ACT among Children under five years of age with a fever in the last two weeks who received any antimalarial drug*	N/A	29	31	15
% of Women who attended four ANC visits during their last pregnancy	35	37	43	n/a
% of Women who received three or more doses of IPTp during their last pregnancy in the last two years	6	21	28	35
Mortality rate per 1,000 live births among children under five years of age	191	N/A	101	N/A
% of Children under five years of age with parasitemia by microscopy	N/A	36	N/A	N/A
% of Children under five years of age with parasitemia by RDT	N/A	32	19	19

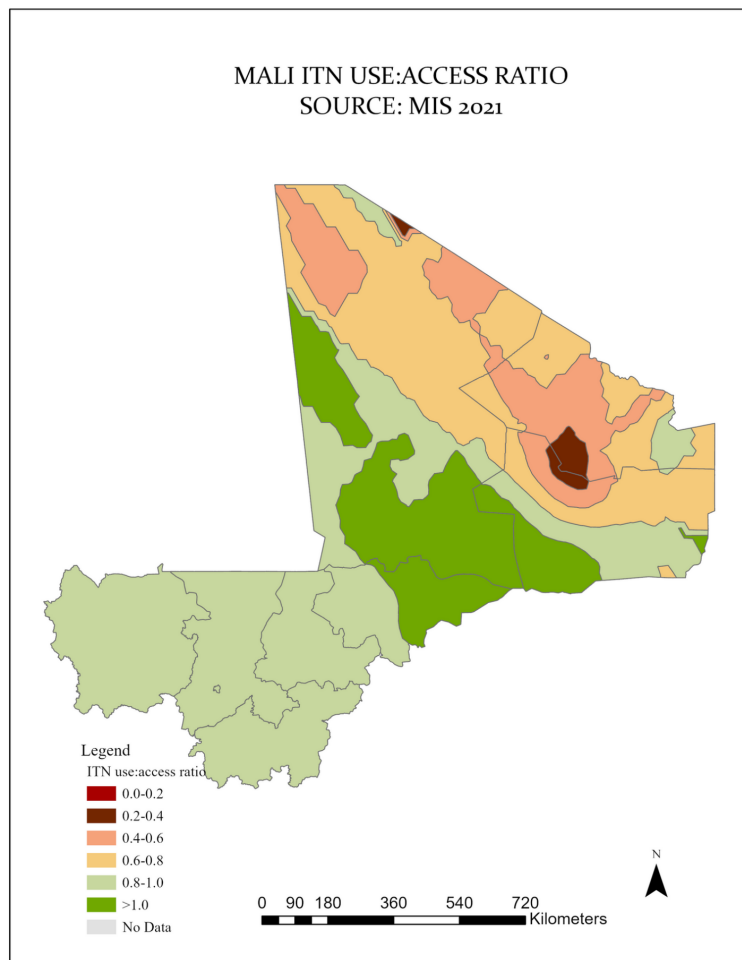
DHS: Demographic and Health Survey; IPTp: intermittent preventive treatment of malaria during pregnancy; ITN: insecticide-treated mosquito net; MIS: Malaria Indicator Survey; RDT: rapid diagnostic test.

\* The issue of data quality of these case management indicators has been raised at various fora.

Figure 4 below shows the ITN use:access ratio from the 2018 DHS. This is an estimate of the proportion of the population using nets, among those that have access to one within their household. The predominance of green shows that Mali has a strong culture of net use.



**Figure 4. ITN Use: Access Ratio Map**



Source: Koenker, H., Olapeju, B., Toso, M., Millward, J., & Ricotta, E. Insecticide-Treated Nets (ITN) Access and Use Report. Breakthrough ACTION and PMI VectorWorks projects, Johns Hopkins Center for Communication Programs. Published August 2019. Updated April 2020.

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

Indicator	2018	2019	2020	2021	2022
# of All-cause patient consultations	7,896,873	8,440,595	8,332,091	8,912,319	9,602,147
# of Suspected malaria cases <sup>1</sup>	3,572,794	4,500,669	4,335,950	4,849,246	5,548,625
# of Patients receiving diagnostic test for malaria <sup>2</sup>	3,456,601	4,251,656	3,664,852	4,551,537	5,326,498
# of Malaria cases <sup>3</sup>	2,613,592	3,270,384	3,373,227	3,561,574	4,004,297
# of Confirmed cases <sup>4</sup>	2,613,592	2,884,372	2,667,070	3,204,488	3,771,426
# of Presumed cases <sup>5</sup>	N/A	386,014	706,095	357,086	232,871
% of Malaria cases confirmed <sup>6</sup>	100%	88%	79%	90%	94%
Test positivity rate <sup>7</sup>	76%	68%	73%	70%	71%
Total cases of children under five years of age with malaria <sup>8</sup>	1,015, 778	1,060,424	912,376	1,076,156	1,210, 218
% of Cases in children under five years of age <sup>9</sup>	44%	37%	38%	33%	30%
# of severe cases <sup>10</sup>	756,404	877,213	849,086	1,229,414	1,203,414
# of malaria deaths <sup>11</sup>	1,001	1,454	1,708	1,480	1,484
# of Facilities reporting <sup>12</sup>	1,376	1,455	1,535	1,533	1,678
0% Data completeness <sup>13</sup>	97%	99%	98%	98%	98%

<sup>1</sup> Number of patients presenting with signs or symptoms possibly due to malaria (fever or history of fever);

<sup>2</sup> RDT or microscopy, all ages, outpatient and inpatient;

<sup>3</sup> Total reported malaria cases; all ages, outpatient and inpatient, confirmed and unconfirmed cases;

<sup>4</sup> Diagnostically confirmed; all ages, outpatient and inpatient;

<sup>5</sup> Clinical/presumed/unconfirmed; all ages, outpatient and inpatient;

<sup>6</sup> # confirmed cases divided by total # cases;

<sup>7</sup> Confirmed cases divided by # patients receiving a diagnostic test for malaria (RDT or microscopy);

<sup>8</sup> Outpatient and inpatient, confirmed and unconfirmed;

<sup>9</sup> Total # <5 cases divided by total # of cases;

<sup>10</sup> Number of patients with confirmed malaria and at least one clinical sign or symptom of severe malaria;

<sup>11</sup> All ages, outpatient, inpatient, confirmed, and unconfirmed;

<sup>12</sup> Total # of health facilities reporting data into the HMIS/DHIS2 system that year;

<sup>13</sup> # monthly reports from health facilities divided by # health facility reports expected (average for the calendar year)

Community-level data are integrated into the broader HMIS, and these numbers are inclusive of both community- and health facility-level data.

**Table 5: Disaggregated Community-Level Data**

Indicator	2020	2021	2022
# of Patients receiving diagnostic test for malaria from a CHW	343,131	376,809	453,548
# of Malaria cases reported by CHWs <sup>1</sup>	380,052	389,668	344,158
% of CHW reported cases (among total malaria cases) <sup>2</sup>	16%	11%	9%

<sup>1</sup> Includes all ages, confirmed, and unconfirmed.

<sup>2</sup> Total # of malaria cases reported by CHWs/Total # malaria cases in the previous table.

CHW: community health worker.

## V. Other Implementation Information

**Table 6: Results of Durability Monitoring**

Site/Net Type	Survey and Time Since Distribution (months)	Attrition to Wear and Tear (%)	Nets in Serviceable Condition (%)	Optimal Insecticidal Effectiveness in Bioassay (%)
Kenieba/ Yorkkool	6 (baseline)	0.0	99.1	66.6
	12	1.7	84.9	70
	24	10.7	70.3	70
	36	45.3	48.8	31
Kita/ PermaNet 2.0	6 (baseline)	0.0	100	66.6
	12	0.0	95.4	76.6
	24	17.2	91.8	56.6
	36	22.4	77.7	20

**Table 7: 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
2015-2016 <sup>1</sup>	Selingue	AL	91%
2015-2016 <sup>1</sup>	Selingue	ASAQ	97.1%
2017 <sup>2</sup>	Selingue	AL	98.6%
2017 <sup>2</sup>	Missira	ASAQ	100%
2017 <sup>2</sup>	Missira	AL	100%
2017 <sup>2</sup>	Selingue	ASAQ	97.1%
2020-2021 <sup>3</sup>	Dioro	AL	97.3%

2020-2021 <sup>3</sup>	Missira	AL	98.5%
2020-2021 <sup>3</sup>	Selingue	AL	100%
2020-2021 <sup>3</sup>	Dioro	DP	94.4%
2020-2021 <sup>3</sup>	Missira	DP	98.2%
2020-2021 <sup>c</sup>	Selingue	DP	100%

AL = artemether-lumefantrine; ASAQ = artesunate-amodiaquine; DP = dihydroartemisinin-piperaquine.

<sup>1</sup> Diarra, Y., Koné, O., Sangaré, L., Doumbia, L., Haidara, D., Diallo, M., Maiga, A., Sango, H. A., Sidibé, H., Mihigo, J., Nace, D., Ljolje, D., Talundzic, E., Udhayakumar, V., Eckert, E., Woodfill, C. J., Moriarty, L. F., Lim, P., Krogstad, D. J., Halsey, E. S., ... Koita, O. A. (2021). Therapeutic efficacy of artemether-lumefantrine and artesunate-amodiaquine for the treatment of uncomplicated Plasmodium falciparum malaria in Mali, 2015-2016. *Malaria journal*, 20(1), 235. <https://doi.org/10.1186/s12936-021-03760-9>

<sup>2</sup> Final report of the TES, 2017

<sup>3</sup> Final report of the TES, 2020-2021

## VI. Key Policies

**Table 8: Policies in Mali**

<b>National Strategic Plan (2023–2027)</b>	
<b>National Surveillance, Monitoring &amp; Evaluation Plan (2023–2027)</b>	
<b>National Digital Health Strategy (2021–2027)</b>	
<b>National Social Behavior Change/Communication Strategy (2021)</b>	
<b>National Supply Chain Strategy/Master Plan (2021–2025)</b>	
<b>National Vector Control Strategy and/or Integrated Vector Management Plan (2020–2022)</b>	
<b>Malaria Case Management Policy (2020)</b>	
What is/are the first-line treatment(s) for uncomplicated <i>P. falciparum</i> malaria?	AL
What is/are the second-line treatment(s) for uncomplicated <i>P. falciparum</i> malaria*?	DP or AP
What is the first-line treatment for severe malaria?	Injectable Artesunate, artemether or quinine
In pregnancy, what is the current first-line treatment for uncomplicated <i>P. falciparum</i> malaria in the <u>first trimester</u> ?	Oral quinine
Given the WHO policy change to recommend AL as treatment for uncomplicated malaria in the first trimester, does the MHSD plan to update the policy on treatment of MIP in the first trimester?	Yes
In pregnancy, what is/are the first-line treatment(s) for uncomplicated <i>P. falciparum</i> malaria in the <u>second and third trimesters</u> ?	ACT: AL, DP or AP.

In pregnancy, what is the first-line treatment for severe malaria?	Injectable Artesunate
Is pre-referral treatment of severe disease recommended at peripheral health facilities? If so, with what drug(s)?	Yes, rectal artesunate capsule
Is pre-referral treatment of severe disease with rectal artesunate recommended for community health workers?	Yes
<b>Community Health Policy (2021-2025)</b>	
What is the # of CHWs currently providing iCCM?	3,041
What is the country's target for the number of CHWs providing iCCM?	14,027
What % of the country's target is met?	22%
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
<b>Prevention of Malaria in Pregnancy Policy (2020)</b>	
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?	13 weeks
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 + contacts?	All ANC providers have been trained on the WHO recommended 8+ contacts in PMI focus regions
Have HMIS/DHIS2 and ANC registers been updated to include 8+ 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 6 months prior?	IPTp data are collected as single months
Is ANC/IPTp provided by facility staff conducting ANC outreach to communities?	Yes, however funding is often a challenge
Can CHWs deliver IPTp and if so, which specific cadres and beginning with which dose?	Not now, however, the country is planning a pilot study for community-based IPTp in two health districts where CHWs will be

administering IPTp beginning with the 2nd dose. Results will help to determine if any changes to the implementation plan are necessary before the national roll out.

ACT: Artemisinin-based combination therapy; AL: Artemether Lumefantrine; ANC: antenatal care; AP: artesunate-pyronaridine; CHW: community health worker; DHIS2: district health information software 2; DP: Dihydroartemisinin-pyrimethamine; HMIS: health management information system; iCCM: integrated community case management; IPTp: intermittent preventive treatment during pregnancy; MCH: maternal and child health; SP: Sulfadoxine-pyrimethamine; WHO: World Health Organization.

## VII. PARTNER LANDSCAPE

**Table 9: Partner Landscape**

Partner	Key technical interventions	Geographic coverage	Funding or in-kind contribution	Timeframe
Global Fund	Mass ITN campaign	Nationwide, excluding Bamako	Malaria: \$82 million  Resilient & Sustainable Systems for Health: \$61 million	Malaria: 2022-2024  Resilient & Sustainable Systems for Health: 2021-2023
	SMC	25 districts		
	Training and supportive supervision	Regions of Kayes, Koulikoro, Sikasso, Ségou, and Mopti		
	Malaria community case management	Nationwide		
	SM&E	Nationwide		
	SBC	Nationwide		
Government of Mali	<ul style="list-style-type: none"> <li>• SMC</li> <li>• Case management</li> <li>• ITN</li> </ul>	Nationwide	\$30,438	2022
UNICEF	<ul style="list-style-type: none"> <li>• SMC distribution</li> <li>• iCCM</li> <li>• Case management northern region</li> <li>• Developing strategic documents</li> </ul>	Kéniéba, Mopti, Youwarou, Tenenkou, Diré	\$9 million	2023-2027
WHO	Developing strategic documents	Nationwide	\$200,000	2020-2022
	Training and supportive supervision	Nationwide		
	Epidemiological surveillance activities	Districts with epidemic risk		

SMK (Mining Company)	IRS for employees' homes	Yanfolila health district	\$297,600	2018-2021
SOMILO SA (Mining company)	IRS for employees' homes	Kenieba health district	\$559,415	Each year
BMGF	Malaria molecular surveillance with the University of Bamako		\$470,000	ends 2024

ITN: insecticide-treated mosquito net; iCCM: integrated community case management; SBC: social and behavior change; SMC: seasonal malaria chemoprevention; SM&E: surveillance, monitoring and evaluation..