

## SENEGAL 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 24 countries in sub-Saharan Africa and three programs across the Greater Mekong Subregion in southeast Asia to control and eliminate malaria. Senegal began implementation as a PMI partner country in FY2008. Please see the [Senegal Malaria Operational Plan](#) for more information on PMI's approach and investments.

### II. CONTEXT

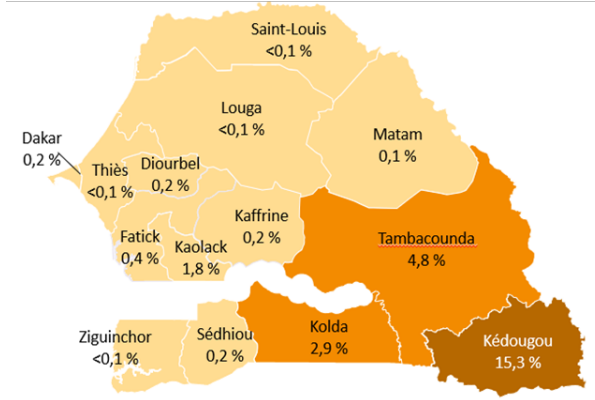
**Table 1: General Demographics and Malaria Situation**

<b>Population</b>	17,205,297 (National Statistics and Demography Agency [ <i>Agence Nationale de la Statistique et de la Démographie</i> or <i>ANSD</i> ], 2021)
<b>Population at risk of malaria</b>	100% (World Malaria Report, 2020)
<b>Malaria prevalence</b>	1% National Continuous Demographic and Health Survey (Cdhs), 2017, 5% KKT Regions (Malaria Indicator Survey [MIS], 2020)
<b>Malaria incidence/1,000 population at risk</b>	31.2 (Senegal Annual Malaria Epidemiological Bulletin, 2021)
<b>Peak malaria transmission</b>	September to December

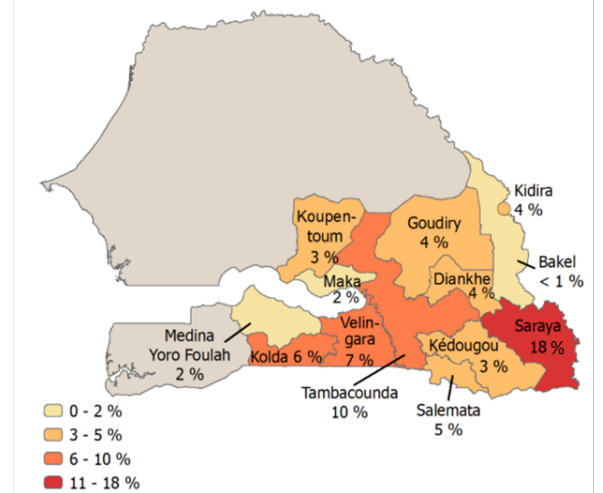
# STRATIFICATION

## Figure 1: Prevalence Maps

Percent children 6-59 months who tested positive for malaria by RDT (2017 cDHS)

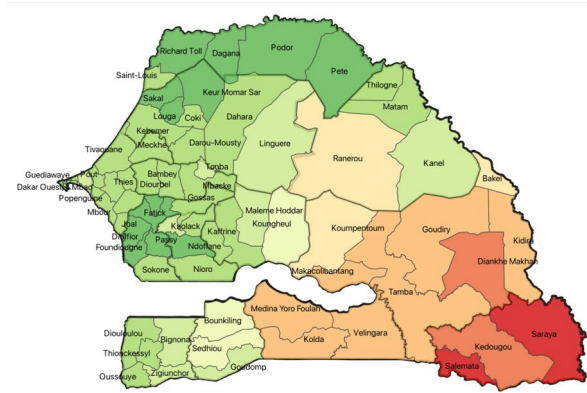


Percent children 6-59 months who tested positive for malaria by RDT (2020 MIS) at health district level

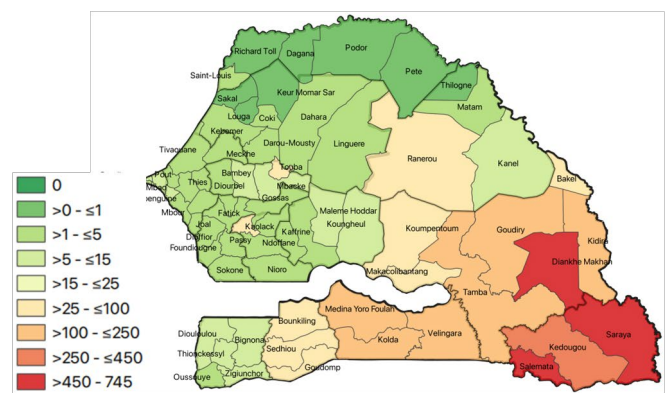


## Figure 2: Incidence Maps

2020



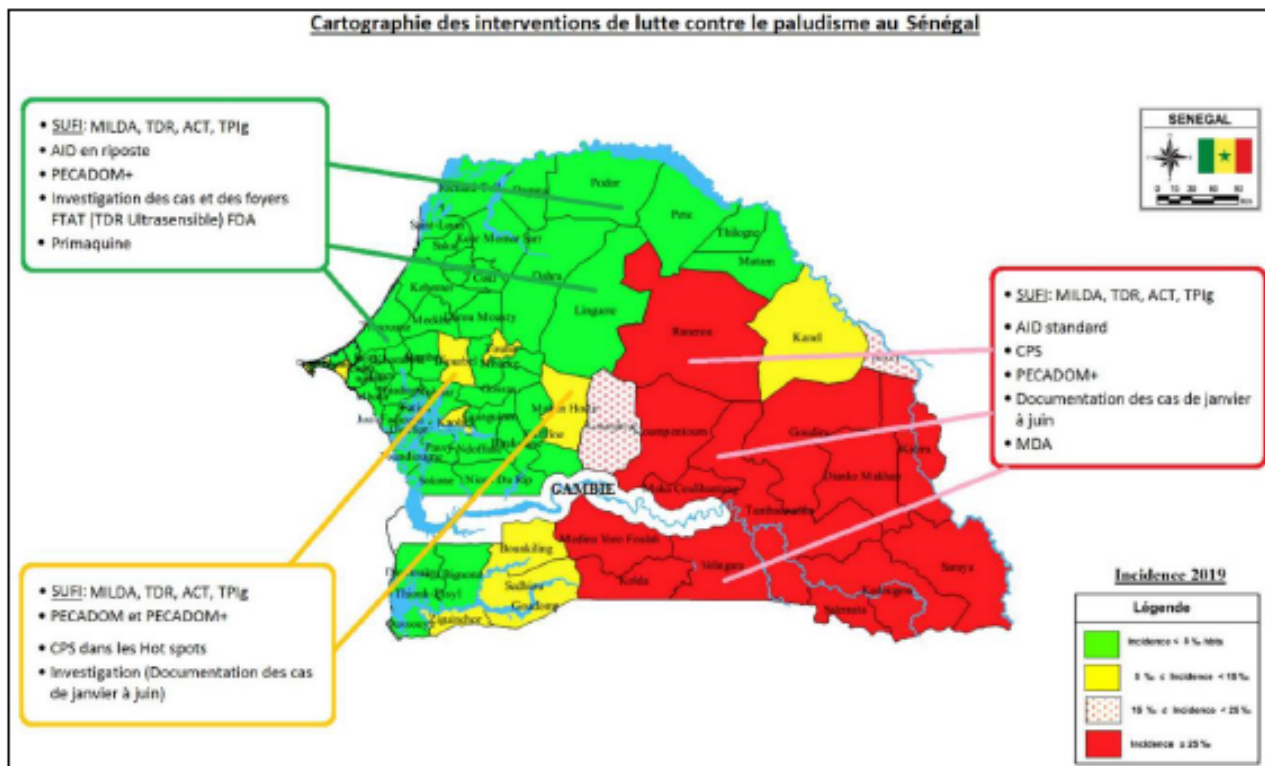
2021



Data Source: Annual 2021 Senegal Malaria Epidemiological Bulletin

Source: Annual 2021 Malaria Epidemiological Bulletin

**Figure 3: Senegal National Malaria Control Program (NMCP)-Supported Malaria Interventions Across Transmission Zones, in 2019**



**Green region activities:** Insecticide-treated mosquito nets (ITNs), rapid diagnostic tests (RDTs), artemisinin-based combination therapies (ACTs), intermittent preventive treatment for pregnant women (IPTp), indoor residual spraying (IRS), *Prise en charge à domicile* (home-based management of malaria) (PECADOM+), Case investigations, Primaquine

**Yellow region activities:** ITNs, RDT, ACTs, IPTp, PECADOM, and PECADOM+, Seasonal malaria chemoprevention (SMC) in hot spots, Case investigations

**Red region activities:** ITNs, RDTs, ACTs, IPTp, IRS, SMC, PECADOM+, Case reporting, Mass drug administration (MDA)

**Table 2: Malaria Parasites and Vectors**

<b>Principal Malaria Parasites</b>	<i>Plasmodium falciparum</i>
<b>Principal Malaria Vectors*</b>	<i>Anopheles gambiae sensu strictu</i> and <i>An. coluzzii</i> predominate in the humid zones of the south, and <i>An. arabiensis</i> predominantly in the dry seven zones of the north and central regions. Other vectors include <i>An. melus</i> , <i>An. funestus</i> , <i>An. nili</i> , and <i>An. Pharoensis</i> .

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

## COUNTRY HEALTH SYSTEM

Administratively, the country is divided into 14 regions and 46 departments. The administration of the health sector is also structured along three levels: central (Ministry of Health and Social Affairs – MOHSA), intermediate (regions) and peripheral (79 health districts, which may be all or part of a department). Health districts are led by the district chief medical officer who, together with the district health management team, oversees care and treatment activities, as well as prevention activities. Health districts have at least one health center — a secondary health facility — and health posts, staffed by a nurse or midwife, which generally serve as the first point of care for the population. Health posts oversee a number of community-level health huts (see below). Tertiary facilities include hospitals that provide specialized care. These hospitals, which are found at the regional, departmental or communal level, typically cover approximately 150,000 residents. There are also seven national hospitals in Dakar. There were a total of 1,983 health facilities in 2021: 1,798 health posts, 147 health centers, and 38 hospitals.

The public health care system is complemented by a growing private sector. This private sector is primarily concentrated in urban areas (70 percent of the private sector services are located in urban areas).

Although not a formal part of the health system, Senegal's health care pyramid rests on a foundation of approximately 2,283 functional health huts (in 2022) that are established and managed by local communities and cover approximately 50 percent of the country's population. A functional health hut is defined as one that has a trained community health worker (CHWs) (literacy is preferred but not required), regular supervision by the chief nurse of the health post, and the basic structure and equipment needed to provide services. Malaria case management has been offered at health huts for many years, and free RDTs and ACTs were introduced in 2008. The CHWs offer an integrated package of preventive and curative services or referral for more advanced medical care. Additional community health staff includes *matrones*, who are trained birth attendants, and *relais*, who are health educators and communicators.

Since 2008, a new type of health worker, the village malaria worker (*dispensateur de soins à domicile* or *DSDOM*), provides testing with RDTs and treatment with ACTs through the home-based management of malaria program (*PECADOM*), now active in 4,143 villages nationwide where health services are difficult to access (as of 2021). Management of pneumonia and diarrhea were added to the package in 2012. Also in 2012, an active model of the home-based management of malaria — *PECADOM Plus* — was implemented. During the high malaria transmission period, the CHW visits every household in his/her village weekly, actively looking for suspected cases and providing RDT diagnosis and subsequent treatment or referral, as needed. In 2021, *PECADOM*

Plus was implemented in the 16 districts in the south/southeast of the country and the NMCP plans to expand to central districts, for a total of 40 districts. The NMCP has also developed a customized PECADOM Plus model for informal koranic schools, called *PECADaara*, to address a high number of cases among their residential students, considered a vulnerable population. By 2021, 320 *PECADaara* sites were active in seven districts. The NMCP further developed other customized PECADOM models such as *PECAEcole* for conventional schools and *PECAFerlo* for northern elimination areas, which specifically includes nomadic pastoralists (*transhumants*) as a target population.

Both health huts and DSDOMs are linked to their supervising health post by the commodity supply chain and the health information system (i.e., they receive supplies from and submit data to the health post). In 2014, the Ministry of Health adopted a National Strategic Plan for Community Health to improve linkages between the community level and the formal health system, to increase ownership by communities, and to improve coordination of activities to make Senegal a model for community health.

The health system has a network of regional pharmacies that supplies the districts of the corresponding regions. These regional pharmacies receive supplies from the national pharmacy.

There are three reporting systems in Senegal that include malaria data: the Health Management Information System (HMIS), Integrated Disease Surveillance And Response System (IDSR), and the Malaria Surveillance, Monitoring, And Evaluation System. The HMIS is on the District Health Information System 2 (DHIS 2) platform. The reporting system uses a combination of paper registers for collecting information and electronic entry and reporting through DHIS 2 from facility to district to the national level. The NMCP widely disseminates routine bulletins through email that include information on the coverage of intervention activities (e.g., seasonal malaria chemoprevention (SMC) and vector control activities), entomological monitoring activities, and epidemiologic data from sentinel sites. There is also an annual malaria epidemiological bulletin that summarizes key indicators, routine and surveillance data as well as outcomes and coverage of key anti-malarial campaigns.

## **OTHER CONTEXTUAL INFORMATION**

Senegal's health system is frequently debilitated by general staff or data strikes. In 2022, a nationwide strike by the association of nurses and midwives, later joined by the medical doctors association, significantly impacted access to health services.

### III. NMCP STRATEGIC PLAN

Senegal's goal is to reach elimination by 2030 as stated in the country's 2021–2025 National Strategic Plan (NSP). With this vision in mind, three main objectives are stated in the current NSP:

- Reduce the incidence of malaria by at least 75 percent compared to 2019.
- Reduce malaria mortality by at least 75 percent compared to 2019.
- Interrupt local transmission in at least 80 percent of eligible districts.

To achieve these objectives, several areas of implementation have been identified, including vector control, malaria in pregnancy, drug-based prevention, surveillance and response, case management, and program management. The plan includes the following targets:

- Achieve 80 percent of the population sleeping under an ITN.
- Protect 90 percent of the population with IRS in target areas.
- Protect at least 80 percent of pregnant women with IPTp.
- Protect 98 percent of children from 3 to 120 months of age with SMC in the target zones.
- Introduce molecular analyses in the investigations of all districts in pre-elimination zones.
- Ensure MDA coverage of 95 percent of the target population in the areas concerned.
- Have at least 80 percent of embassies, airports, hotels, and port officials share information on traveler malaria chemoprophylaxis according to NMCP guidelines to reinforce the drug prevention strategy for travelers coming into the country.
- Detect, within one week, 100 percent of epidemics and emergencies with an early warning system.
- Control 100 percent of epidemics and emergencies within one week of detection.

The NSP also includes some innovative approaches, especially to reach high risk populations in specific zones (nomadic and mining areas, koranic schools), digitization of community data, an MDA pilot project in Tambacounda, and the creation of integrated coordination units to strengthen surveillance and response.

In addition, Senegal is developing a malaria elimination acceleration action plan for 2022 to 2025 to boost the NSP’s elimination objective. In the short term, the elimination objectives will be aligned with those of the NSP 2021–2025, including interrupting malaria transmission in at least 80 percent of the eligible districts and reducing malaria morbidity and mortality by at least 75 percent, compared to 2019. In the long term, to 2030, the country plans to move towards an effective interruption of local transmission throughout the country. Surveillance in particular will have to be strengthened and the notification of all cases will have to be effective in all public and private structures, but also at the community level. A phasing approach is developed to illustrate the targets through the 2030 elimination threshold.

**Table 3. Targets for Malaria Elimination Plan**

Year	Number of Districts Targeted		
	Control	Pre-Elimination	Elimination
2019	28	47	4
2025	14	37	28
2028	0	19	60
2030	0	0	79

#### **IV. KEY MALARIA DATA**

Beginning in 2012, PMI has supported the implementation of an annual cDHS. As the country strategy continues to push towards elimination in the low burden, northern areas of the country, a district-level MIS in 2020–2021 was supported by the Global Fund in the three highest burden regions of the country (Kedougou, Kolda, and Tambacounda or KKT) to provide more granular coverage estimates in those target regions while also providing a national estimate for the key indicators listed in Table 4.

## EVOLUTION OF KEY SURVEY-BASED MALARIA INDICATORS

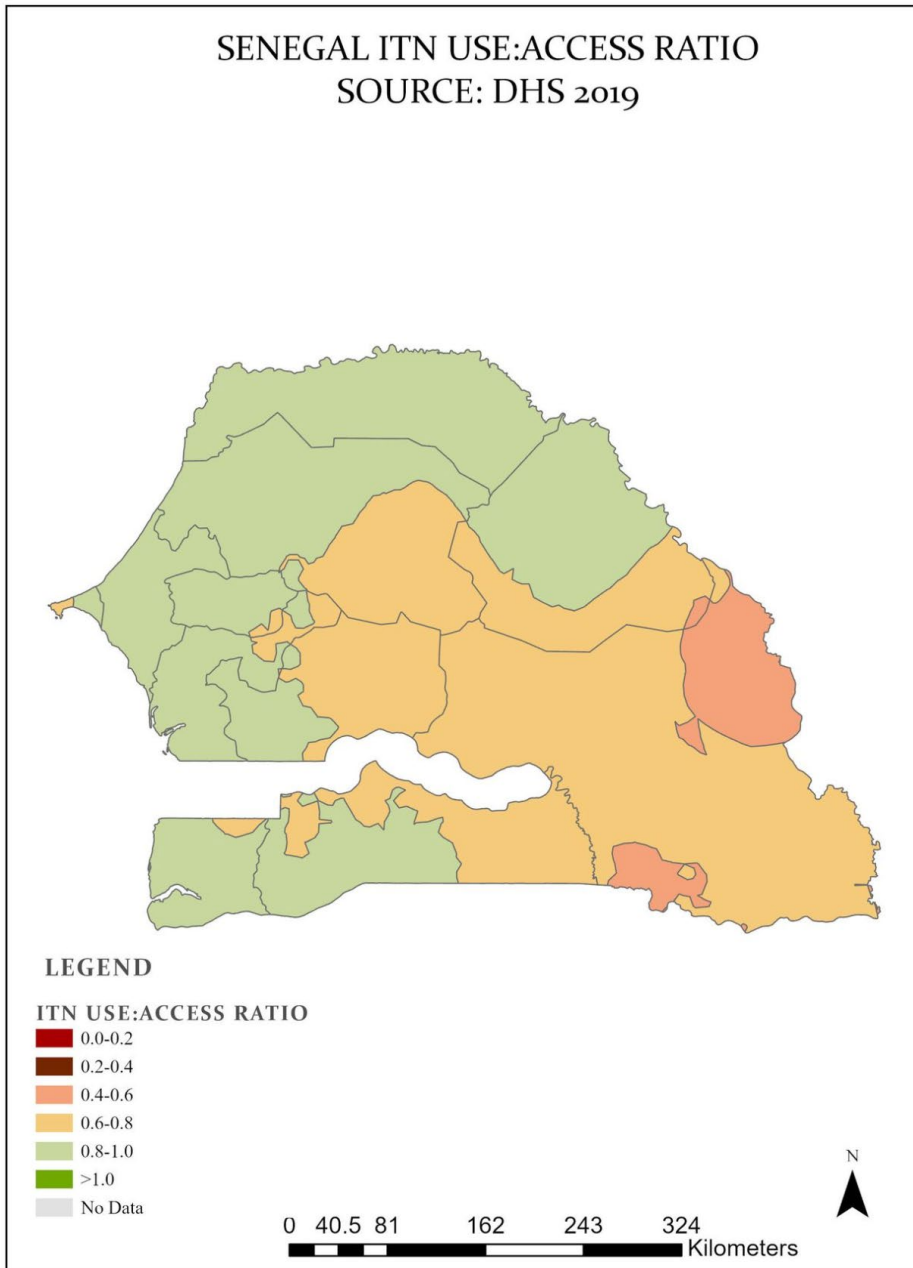
**Table 4: Key Survey Indicators**

Indicator	2005, DHS	2010, DHS	2019, cDHS	2020-21, MIS
% Households with at least one ITN	20	63	82	75
% Households with at least one ITN for every two people	3	17	57	34
% Population with access to an ITN	10	38	74	58
% Population that slept under an ITN the previous night	6	29	63	46
% Children <5 years of age who slept under an ITN the previous night	7	35	65	47
% Pregnant women who slept under an ITN the previous night	9	37	68	53
% Children <5 years of age with a fever in the last two weeks for whom advice or treatment was sought	40	49	50	63
% Children <5 years of age with a fever in the last two weeks who had a finger or heel stick	N/A	10	16	22
% Children receiving an ACT among children <5 years of age with a fever in the last two weeks who received any antimalarial drug	N/A	41	n/a	n/a
% Women who attended 4 ANC visits during their last pregnancy	N/A	50	56	n/a
% Women who received three or more doses of IPTp during their last pregnancy in the last two years	N/A	13	20	38
<5 mortality rate per 1,000 live births	121	72	37	N/A
% Children <5 years of age with parasitemia by microscopy	n/a	3	n/a	N/A
% Children <5 years of age with parasitemia by RDT	n/a	3	n/a	KKT regions only: 5.3

cDHS: continuous DHS; DHS: Demographic and Health Survey; MICS: Multiple Indicator Cluster Survey; MIS: Malaria Indicator Survey



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



**Table 5: Evolution of Key Malaria Indicators Reported through Routine Surveillance Systems**

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

Indicator	2017	2018	2019	2020	2021
# All-cause patient consultations	12,149,509	10,950,250	11,689,076	11,693,409	13,874,728
# Suspect malaria cases <sup>1</sup>	2,035,693	2,096,124	2,010,398	2,206,842	2,632,540
# Patients receiving diagnostic test for malaria <sup>2</sup>	2,033,022	2,090,323	2,005,860	2,199,171	2,621,617
Total # malaria cases <sup>3</sup>	398,377	536,745	359,246	452,984	547,773*
# Confirmed cases <sup>4</sup>	395,706	530,944	354,708	445,313	536,850
# Presumed cases <sup>5</sup>	2,671	5,801	4,538	7,671	10,923
% Malaria cases confirmed <sup>6</sup>	99%	99%	99%	98%	98%
Test positivity rate (TPR) <sup>7</sup>	19	25	18	20	20
Total # children <5 years of age malaria cases <sup>8</sup>	53,547	90,098	37,941	47,035	56,765
% Cases in children <5 years of age <sup>9</sup>	13%	17%	11%	10%	10%
Total # severe cases <sup>10</sup>	10,463	13,350	9,352	9,179	12,842
Total # malaria deaths <sup>11</sup>	284	555	260	373	399
# Facilities reporting <sup>12</sup>	1535	1591	1645	1945	1984
% Data completeness <sup>13</sup>	100%	98%	99%	96%	98%

1 Number of patients presenting with signs or symptoms possibly due to malaria (fever); 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 # confirmed cases divided by total # cases; 7 Confirmed cases divided by # patients receiving a diagnostic test for malaria (RDT or microscopy); 8 Outpatient and inpatient, confirmed and unconfirmed; 9 Total # <5 years of age cases divided by total # of cases; 10 Severe cases = total number hospitalized for malaria; 11 All ages, outpatient, inpatient, confirmed, and unconfirmed; 12 Total # of health facilities

reporting data into the HMIS/DHIS-2 system that year; 13 # monthly reports from health facilities divided by # health facility reports expected (average for the calendar year).

\* The increase in the number of malaria cases can partly be attributable to the improvement of data completeness, the enrollment of private facilities that were not reporting their data to the HMIS, and improved case detection with an increase in community-based case management sites.

**Table 6: Disaggregated Community-Level Data**

Indicator	2019	2020	2021
# Patients receiving diagnostic test for malaria from a CHW	258,827	334,485	336,384
Total # of malaria cases reported by CHWs <sup>1</sup>	80,241	119,760	121,514
% of CHW reported cases (among total malaria cases) <sup>2</sup>	22%	26%	22%

1 Includes all ages, confirmed and unconfirmed.

2 Total # malaria cases reported by CHWs/Total # malaria cases in previous table.

**Table 7: Key Elimination Indicators**

Indicator	2019	2020	2021
Total # of districts	77	79	79
# of districts designated for elimination	48	51	43
% of districts pursuing elimination*	20%	19,6%	86%
Annual Parasite Index (API)	2,12%	2,03%	1,94%
Test Positivity Rate (TPR)	2,8%	2,8%	2,32%
Proportion of cases investigated (using FDA approach)	100%	99,8%	81,5%

\* Districts implementing elimination activities including case investigations.

## V. OTHER IMPLEMENTATION INFORMATION

### Results of Durability Monitoring

Senegal has not conducted durability monitoring in recent years and the last round of standard durability monitoring was conducted in 2017/2018 on nets that were distributed in 2014/2015. In the previous study, seven standard pyrethroid net brands (Interceptor and MAGNet: alpha-cypermethrin; LifeNet, Netprotect, PermaNet 2.0, and Yorkool LN: deltamethrin; Olyset Net: permethrin) were monitored in five sites (Kaolack, Kaffrine, Thies, Diourbel, and Fatick). Since this study, widespread pyrethroid resistance has been reported in Senegal. Three net types, Interceptor, PermaNet 2.0, and LifeNet had survival above 80 percent after 24 months. At 36 months, PermaNet 2.0 maintained a survival rate of 79.5 percent. Two net types (PermaNet 2.0 and Interceptor) were more often retained by households than other brands and their median retention time was above 3 years (3.5 years for PermaNet 2.0 and 4 years for Interceptor). Despite good retention, Interceptor had weak physical integrity and its median survival due to wear and tear was below 3 years (median survival time = 2.4 years). For additional information on this study please refer to the [durability monitoring report](#).

**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
2021 <sup>1</sup>	Kolda	AL, ASAQ	100%
2021 <sup>1</sup>	Kaolack	AL, ASAQ	100% / 98%

PCR = polymerase chain reaction; AL = artemether-lumefantrine; ASAQ = artesunate-amodiaquine  
Both AL and ASAQ have therapeutic efficacies above the 90 percent World Health Organization recommended threshold and are well-tolerated in Senegal.

<sup>1</sup> Ndiaye D, Sene D. *Rapport Sur La Surveillance de l'efficacité et de la tolérance des combinaisons Artemether Lumefantrine et Artesunate-Amodiaquine dans la prise en charge du paludisme non compliqué à Plasmodium falciparum* au Sénégal. 2021.

## VI. KEY POLICIES

**Table 9: Policies in Senegal**

<a href="#">National Strategic Plan</a> (2021–2025)	
National SM&E Plan (2021)	
<a href="#">National Digital Health Strategy</a> (2018–2023)	
National Social Behavior Change/Communication Strategy (2016)	
National Supply Chain Strategy/Master Plan (2021)	
<a href="#">National Vector Control Strategy and/or Integrated Vector Management Plan</a> (2017–2020)	
Malaria Case Management Policy (2021)	
What is/are the first-line treatment(s) for uncomplicated <i>P. falciparum</i> malaria*?	According to the national guidelines, Senegal doesn't have first line or second line treatment for uncomplicated <i>P. falciparum</i> malaria. Artesunate-amodiaquine, artemether-lumefantrine, and DHA-PQ can all be used. Currently, DHA-PQ is reserved for case investigations.  Primaquine (single low dose) is also used in pre-elimination settings for the treatment of gametocyte carriage and transmission reduction either with index cases than with secondary cases detected after FTAT strategy
What is/are the second-line treatment(s) for uncomplicated <i>P. falciparum</i> malaria*?	See above
What is the first-line treatment for severe malaria?	Injectable artesunate
In pregnancy, what is the first-line treatment for uncomplicated <i>P. falciparum</i> malaria in the <u>first trimester</u> ?	Oral quinine
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> ?	As above, ASAQ, AL, and DHA-PQ can all be used as first line treatments
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)?	Rectal artesunate suppository
Is pre-referral treatment of severe disease with rectal artesunate recommended for community health workers?	Yes
<b><u>Community Health Policy</u></b> (2014- 2018)	
What is the # of CHWs currently providing integrated community case management (iCCM)?	4,143
What is the country's target for the number of CHWs providing iCCM?	4,500 in 2022 and 5,000 in 2023
What percent of the country's target is met?	92% for 2022
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, except for children under two months old and pregnant women
<b>Prevention of Malaria in Pregnancy Policy</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?	16 weeks
Do the national ANC guidelines reflect the WHO 2016 recommendation of 8 ANC scheduled contacts (plus one additional contact for early initiation of IPTp at 13-16 weeks)? If not, how many ANC contacts are recommended?	Not yet integrated in the guidelines but it is taken into account in the visit booklet
What is the status of training antenatal care (ANC) providers on the WHO recommended 8+ contacts?	ANC providers are not trained on the WHO recommended 8+ contacts
Have HMIS/DHIS2 and ANC registers been updated to include 8+ contacts?	No

Are 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
Can CHWs deliver IPTp and if so, which specific cadres and beginning with which dose?	Yes, CHWs can deliver IPTp from the second dose of SP

## VII. PARTNER LANDSCAPE

PMI and the Global Fund are the major partners supporting malaria programming in Senegal. The Islamic Development Bank and German Technical Cooperation (GIZ) were funding specific activities in recent years, but those ended in 2021. Negotiations are underway with the Islamic Development Bank for a new grant. The Bill and Melinda Gates Foundation funds a number of activities related to malaria.

**Table 10: Partner Landscape**

Partner	Key technical interventions	Geographic coverage	Funding amount or in-kind contribution	Timeframe
The Global Fund	<ul style="list-style-type: none"> <li>• Support for nationwide mass campaign in 2022</li> <li>• Procurement of national needs for sulfadoxine-pyrimethamine (SP)</li> <li>• Training</li> <li>• Support for malaria acceleration plan</li> <li>• Support for iCCM</li> <li>• Supportive supervision</li> </ul>	<ul style="list-style-type: none"> <li>• National for ITN campaign (except Dakar and Thiès regions), SP procurement, training, iCCM, and malaria acceleration plan</li> <li>• Supportive supervision in 13 regions (not Kedougou)</li> </ul>	\$23,000,000	Current grant covers 2021 to 2023
Government of Senegal	Health sector staff and infrastructure	<ul style="list-style-type: none"> <li>• National</li> </ul>	\$8,016,977*	2022

Partner	Key technical interventions	Geographic coverage	Funding amount or in-kind contribution	Timeframe
Islamic Development Bank	<ul style="list-style-type: none"> <li>Procurement and distribution of ITNs</li> <li>Support for elimination activities in eligible districts: proactive CCM, case investigations, IRS</li> </ul>	<ul style="list-style-type: none"> <li>Northern Senegal</li> </ul>	\$18,700,000	2021 (final year of support)
Bill and Melinda Gates Foundation	<ul style="list-style-type: none"> <li>MACEPA IV: data; subnational targeting; increased coverage of prevention and treatment interventions; Impact evaluation of cross border interventions</li> <li>Emergency Operations Centers</li> <li>Integrating genomic data into real world malaria surveillance and decision-making strategy</li> </ul>	<ul style="list-style-type: none"> <li>Senegal and The Gambia</li> </ul>	\$3,093,000	2021-2023
		<ul style="list-style-type: none"> <li>National (5 regional centers)</li> </ul>	\$3,315,815	2020-2023
		<ul style="list-style-type: none"> <li>National</li> </ul>		2020-2023
PR China via WHO	<ul style="list-style-type: none"> <li>Community-based malaria response in high burden areas</li> </ul>	<ul style="list-style-type: none"> <li>Saraya District</li> </ul>	\$50,000	2022-2024
Bayer	<ul style="list-style-type: none"> <li>Community champions - advocacy, community engagement, communication</li> </ul>	<ul style="list-style-type: none"> <li>Tambacounda District</li> </ul>	\$840,102	2019-2022
Compagnie Sucriere Senegalaise	<ul style="list-style-type: none"> <li>Malaria case management for employees</li> <li>Storage and transportation of ITNs for the NMCP</li> </ul>	<ul style="list-style-type: none"> <li>Richard Toll District</li> </ul>	In kind	ongoing
Association Sopey Naby	<ul style="list-style-type: none"> <li>Community mobilization/education on malaria</li> <li>Advocacy for resource mobilization</li> </ul>	<ul style="list-style-type: none"> <li>Primarily Thienaba District</li> </ul>	In kind	ongoing

\*Government of Senegal contributions per the 2021–2025 NSP