

KENYA 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 274 countries in Sub-Saharan Africa and three programs across the Greater Mekong Subregion in Southeast Asia to control and eliminate malaria. Kenya began implementation as a PMI partner country in fiscal year (FY) 2007. Please see the [Kenya Malaria Operational Plan](#) for more information on PMI's approach and investments.

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, life-saving malaria interventions alongside catalytic technical and operational assistance to support Kenya's efforts to end malaria. PMI has been a proud partner of Kenya since 2006, supporting indoor residual spraying (IRS) in select counties with a high malaria burden in western Kenya, increasing ownership of insecticide-treated nets (ITNs), investing in microscopy and rapid diagnostic tests (RDT) to improve malaria diagnosis, and providing life-saving antimalarial drugs. PMI investments since 2006 total \$528 million, which has contributed to the estimated 55 percent decrease in child deaths since 2003.

The proposed PMI FY 2024 budget for Kenya is \$31 million. This Malaria Operational Plan (MOP) outlines planned PMI activities in Kenya using FY 2024 funds. Developed in consultation with the Division of the National Malaria Program (DNMP) and key malaria stakeholders, proposed activities reflect national and PMI strategies, draw on the 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 Kenya as well as other donors and partners.

II. CONTEXT

Kenya is situated in the eastern part of Africa, bordering Ethiopia to the north, Somalia to the northeast, Tanzania to the south, Uganda to the west, South Sudan to the northwest, and the Indian Ocean to the southeast. The country is administratively divided into 47 counties and 302 subcounties. Eighty percent of the land area is arid or semiarid, and only 20 percent is arable. The country has two main regions: lowlands and highlands.

Kenya's 2023 population is projected to be 51.5 million, according to estimates released in September 2022 by the Kenya National Bureau of Statistics (KNBS). Children under five years of age account for 12 percent of the total population. Kenya has approximately 42 ethnic groups, and its economy is predominantly agricultural but with a strong industrial base. Kenya is ranked 152 out of 191 countries on the 2021–2022 United Nations (UN) Human Development Index, which measures life expectancy, adult literacy, and per capita income. Total expenditures on health increased slightly from 5.5 percent of gross domestic product in 2016/2017 to 5.6 percent in 2018/19. Per capita health expenditures by the Kenyan government also increased by 9 percent over this period, from \$97.4 to \$105.8 in 2018/19. The mortality rate in children under five years of age declined by 64 percent, from 115 deaths per 1,000 live births according to the 2003 Kenya Demographic and Health Survey (KDHS) to 41 deaths per 1,000 as observed in the 2022 KDHS.

Malaria remains a major public health problem in Kenya, accounting for an estimated 8 percent of outpatient consultations in Kenya in 2022, according to the Kenya Health Information System (KHIS). The 2020 Malaria Indicator Survey (MIS) indicated that the national prevalence of malaria by microscopy among children under five years of age decreased from 8 percent in 2015 to 6 percent in 2020, and from 27 to 19 percent in the western and Nyanza lake endemic zones where the disease burden is greatest. Modeling of the MIS, school surveys, and malaria vaccine and climate data conducted for the period 2000–2020 suggests that all counties in the lake endemic region have transitioned from high to low-to-moderate transmission based on the prevalence of malaria parasites in children under five years of age. According to KHIS, the annual incidence for confirmed outpatient malaria has decreased over time, from 113 per 1,000 population in 2017 to 93 per 1,000 in 2022.

Malaria risk in Kenya is heterogeneous, and its epidemiology is influenced by altitude, rainfall patterns, and temperature. Malaria prevalence therefore varies considerably by season and geographic region. All four species of *Plasmodium* that infect humans occur in Kenya. *Plasmodium falciparum* (*P. falciparum*), which causes the most severe form of the disease, is the most common, contributing to an estimated 95 percent of all malaria infections in the country. The primary malaria vectors in Kenya include members of the *Anopheles gambiae* complex (*An. gambiae* s.s., *An. arabiensis*, and *An. merus*), as well as *An. funestus*.

The malaria vector distribution in the country is not uniform due to variation in climatic factors, particularly temperature and rainfall. Among the *An. gambiae* complex, *An. arabiensis* is predominant in much of the country due to its higher tolerance for arid conditions.

An. arabiensis has also become the most common member of the *An. gambiae* complex in western Kenya, particularly within the Lake Victoria basin. *An. gambiae* s.s. remains the predominant vector in more highland areas of western Kenya, particularly in counties bordering Uganda. *An. merus* is found only along the coast. *An. funestus* is widespread throughout Kenya but has emerged as the predominant vector in counties bordering Lake Victoria in western Kenya. *An. stephensi* was discovered in Marsabit County in Northern Kenya in December 2022 and later in Turkana County in northwestern Kenya in February 2023.

Kenya's 2020 population-adjusted *P. falciparum* prevalence map (Figure 1) depicts malaria prevalence, with the highest *P. falciparum* prevalence in the dark-shaded areas of the lake endemic counties. The country is divided into six epidemiological zones:

- **Counties with high transmission rates:** Comprises Busia and Siaya counties in western Kenya with a predicted population-adjusted *P. falciparum* prevalence in children aged 2–10 years (PAPfPr) greater than 30 percent. Based on population projections for 2022, 4 percent of the total population (2.1 million people) lives in this zone.
- **Counties with moderate transmission rates:** Comprises four counties—Bungoma, Kakamega, Kisumu, and Migori—all in western Kenya. The PAPfPr for these counties is 10–30 percent. Based on population projections for 2022, 12 percent of the total population (6.4 million people) lives in this zone.
- **Counties with low to moderate transmission rates:** Three counties fall in this category; Vihiga in western Kenya, Mombasa along the coast, and Turkana in northwestern Kenya. The PAPfPr for these counties ranges from 5 to 10 percent. The three counties had an estimated population of 3 million people in 2022, accounting for 6 percent of the total population.
- **Counties with low transmission rates:** Three counties—Homa Bay in western Kenya and Kilifi and Kwale along the coast—fall into this category. The PAPfPr in this zone is 1–5 percent, and the three counties had an estimated population of 3.8 million in 2022, accounting for 7 percent of the total population.
- **Very low transmission counties:** The remaining 35 counties fall into this category. The PAPfPr is below 1 percent, and the estimated 2022 population in these counties was 37 million, representing 71 percent of the total population. Nairobi, which falls into this category, was classified as malaria-free in the 2021 stratification exercise.

Table 1. Malaria Epidemiological Zones in Kenya

Endemicity Class (PAPfPR ₂₋₁₀)	Total Projected Population 2022	% of Total Population	Cumulative % of Total Population
High transmission ($\geq 30\%$) ¹	2,062,561	3.9%	3.9%
Moderate transmission (10% to 30%) ²	6,415,712	12.3%	16.2%
Low to moderate transmission (5% to <10%)	3,020,334	5.8%	21.9%
Low transmission (1% to < 5%) ⁴	3,827,281	7.3%	29.2%
Very low transmission (< 1%) ⁵	37,040,662	70.7%	100.0%
Total	52,366,550	100.0%	

¹ High transmission: Busia and Siaya (two counties); ² moderate transmission: Bungoma, Kakamega, Kisumu, and Migori (four counties); ³ low to moderate transmission: Mombasa, Turkana, and Vihiga (three counties); ⁴ low transmission: Homa Bay, Kilifi, and Kwale (three counties); ⁵ very low transmission: Baringo, Bomet, Elgeyo-Marakwet, Embu, Garissa, Isiolo, Kajiado, Kericho, Kiambu, Kirinyaga, Kisii, Kitui, Laikipia, Lamu, Machakos, Makeni, Mandera, Marsabit, Meru, Murang'a, Nairobi, Nakuru, Nandi, Narok, Nyamira, Nyandarua, Nyeri, Samburu, Taita Taveta, Tana River, Tharaka-Nithi, Trans Nzoia, Uasin Gishu, Wajir, and West Pokot (35 counties).

Table 2. General Demographics and Malaria Situation

Population	51,525,576 (KNBS 2022)
Population at risk of malaria	15,236,784 (calculated based on the County Malaria Epidemiology and Control Profiles, 2020) ¹
Malaria prevalence	5.6% (KMIS 2020)
Malaria incidence/1,000 population at risk	93 (KHIS 2022)
Peak malaria transmission	May–July (after the long rains); November–December (after the short rains)

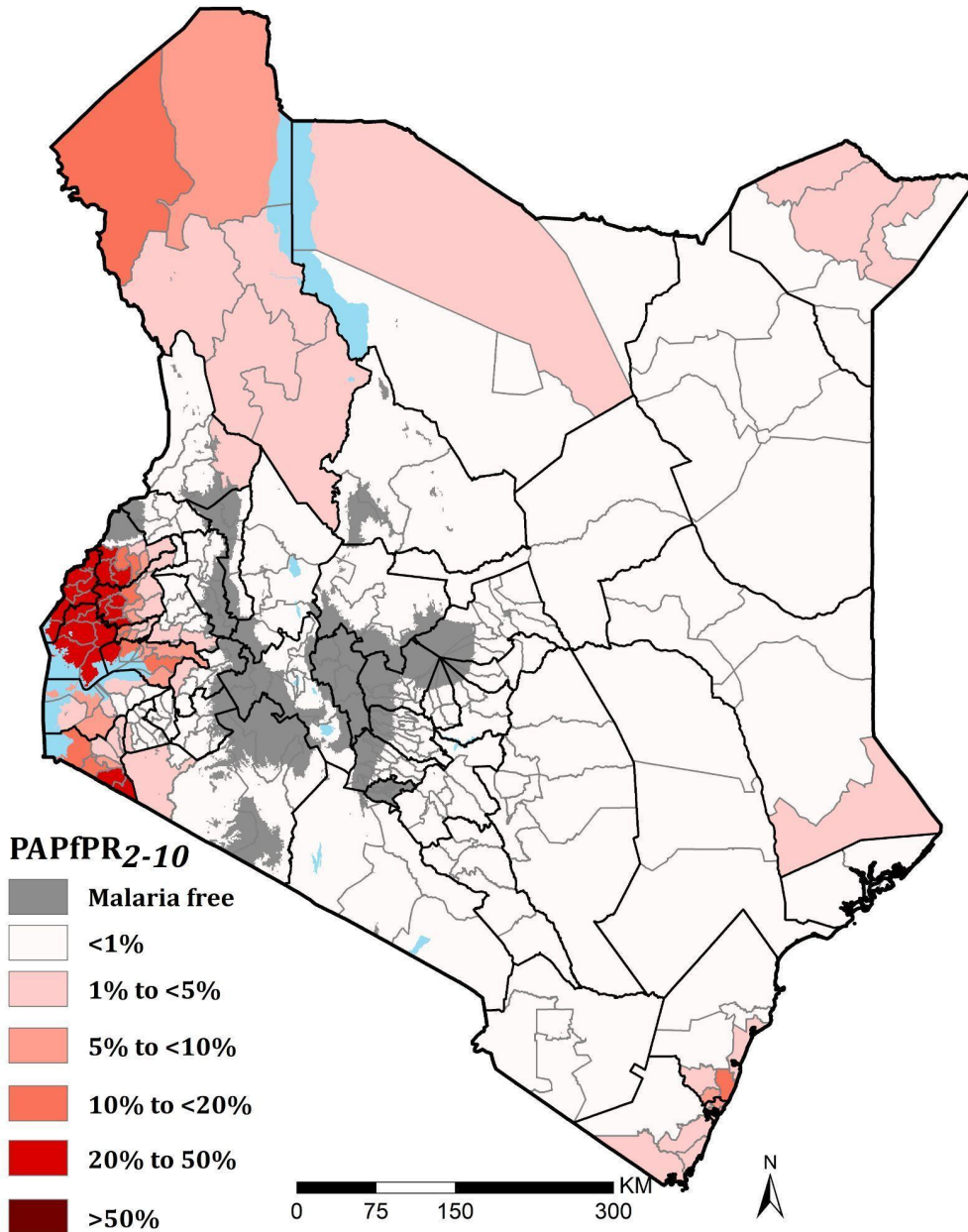
KHIS: Kenya Health Information System; KMIS: Kenya Malaria Indicator Survey.

¹ According to the County Malaria Epidemiology and Control Profiles 2020, about 29.6 percent of the Kenyan population lives in areas with *P. falciparum* prevalence of over 1 percent and therefore considered to be at risk of malaria. However, it is estimated that about 70 percent of the population lives in areas where vector receptivity for malaria still exists and therefore would be at risk of malaria if vector control measures were withdrawn.

STRATIFICATION

Malaria prevalence modeling was conducted using the Kenya MIS 2020 data and supplemental data from KHIS, school surveys, and climate data. However, the geographic and temporal classification of malaria risk and its determinants into meaningful categories to inform the tailored targeting of interventions is still underway. The data used for decision making for the FY 2024 MOP are from prevalence modeling and county profiles derived from the 2020 Kenya Malaria Indicator Survey (KMIS).

Figure 1. Malaria Prevalence Map, 2020



Since 2013, PMI has prioritized support in the areas of Kenya with the highest burden of malaria to complement funding from the Kenyan government and other partners to achieve the greatest reduction in malaria morbidity and mortality. The eight counties of Bungoma, Busia, Homa Bay, Kakamega, Kisumu, Migori, Siaya, and Vihiga, with a total estimated population of 9.8 million in 2019, form the lake endemic zone and have the highest malaria burden. PMI has focused its support for vector control; case management; supply chain management; malaria in pregnancy; social and behavior change; and surveillance, monitoring, and evaluation in these eight counties.

Figure 2. Confirmed Malaria Cases by County per 1,000 Population in 2022

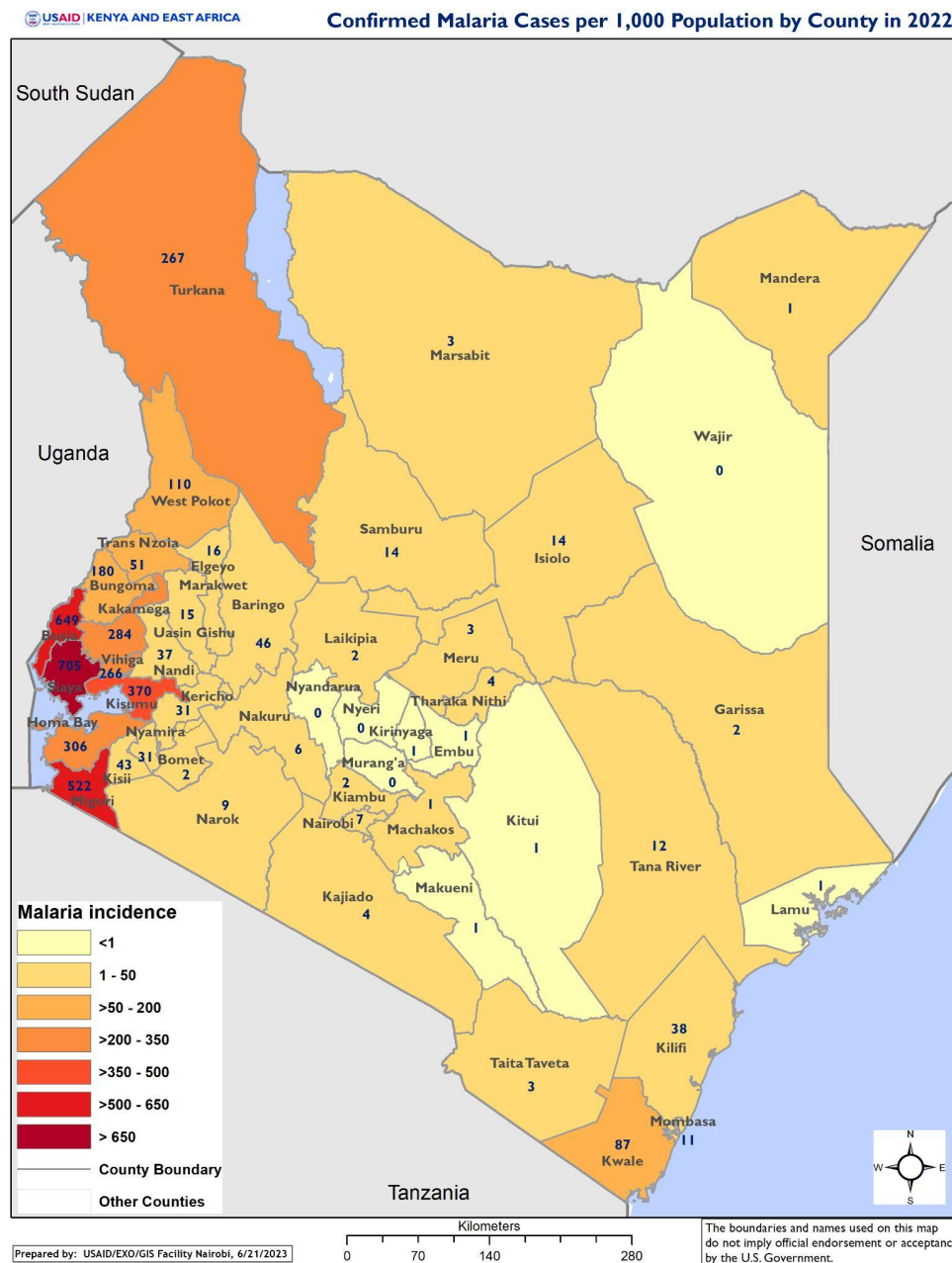


Figure 3. Confirmed Malaria Cases by Subcounty per 1,000 Population in 2022 in the Lake Endemic Counties and Turkana County

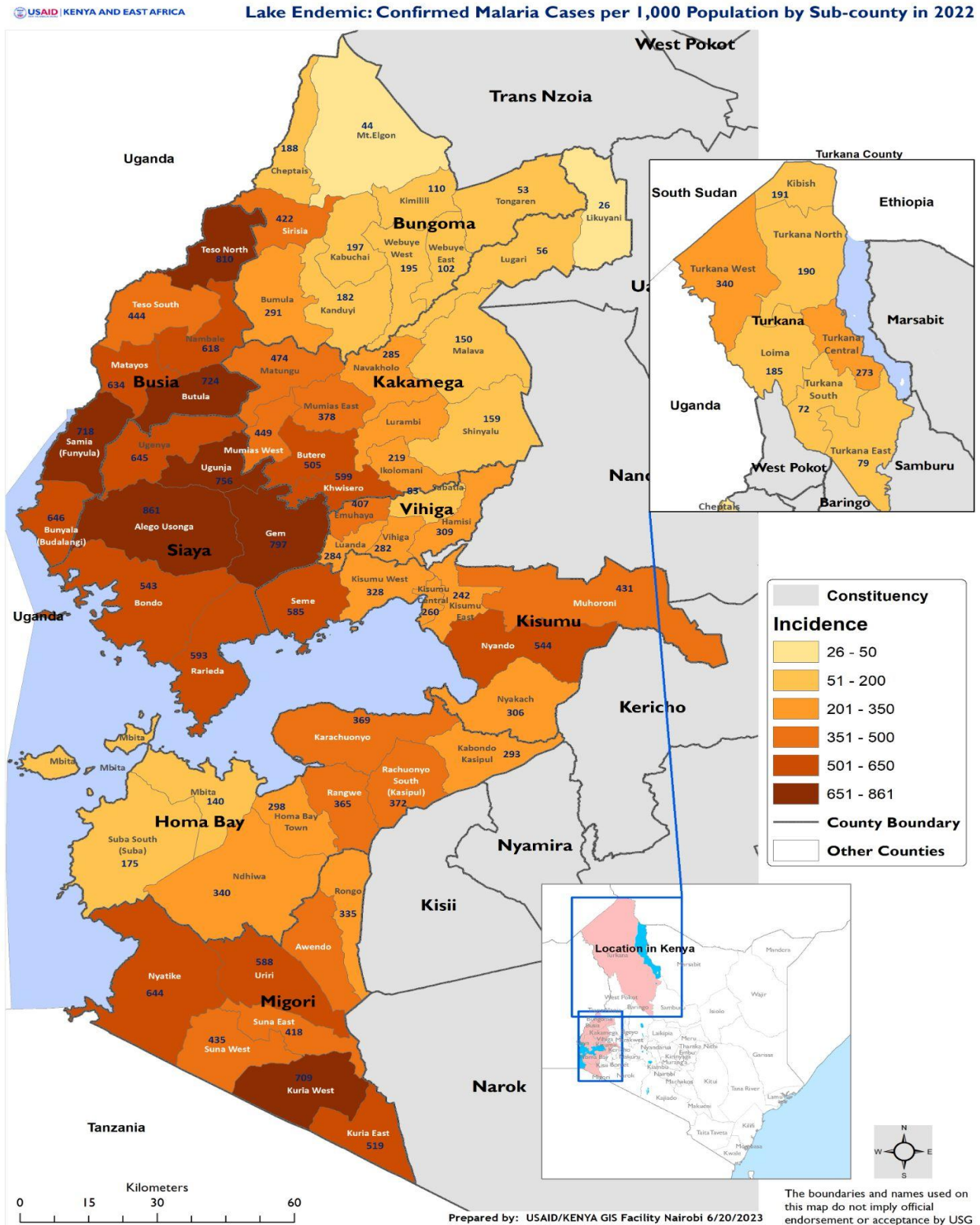


Table 3. Malaria Parasites and Vectors

Principal malaria parasites	<i>P. falciparum</i> (76%), <i>P. malariae</i> (4%), <i>P. ovale</i> (1%), and mixed infections (19%)
Principal malaria vectors¹	Primary: <i>An. funestus</i> (western Kenya, particularly in counties bordering Lake Victoria), <i>An. arabiensis</i> (arid and semiarid areas), and <i>An. gambiae</i> (highland counties and areas bordering Uganda) Insecticide resistance to pyrethroids is widespread among the primary vectors in Kenya

¹ See the 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 strategic focus of the health sector in Kenya is guided by the Constitution of 2010, the Kenya Vision 2030, and the Kenya Health Policy 2014–2030. Over the last decade, Kenya’s health system has undergone significant changes as it aligned itself to the country’s new constitution, which devolved health services and strengthened rights-based approaches to health by recognizing that every citizen has a right to the highest attainable standard of health.

The constitution introduces critical principles related to the right to health and devolution of the management of health services; and the Kenya Vision 2030 agenda is anchored on three pillars: social, political, and economic, with health issues categorized under the social pillar. The Ministry of Health (MOH) has developed the Kenya Health Policy and the Kenya Health Sector Strategic Plan 2018–2023 to guide attainment of the long-term health goals of the country as outlined in Vision 2030. The Kenya Malaria Strategy (KMS) 2019–2023 is the blueprint for malaria prevention and control in the country and aims to reduce the malaria burden and deaths by 75 percent from 2016 levels. The strategies laid out in these health documents focus on the need to improve the number of available health services, scale up their coverage, expand utilization of community health structures to strengthen delivery and improve access to malaria control interventions and other services, and reduce the financial burden associated with using health services.

While the primary responsibility for providing health services to citizens lies with governments, Kenya’s health system is pluralistic, comprising both public and nonstate actors. The public system consists of county governments, the Ministry of Health, other ministries with a role in health, and health-related state corporations. Important nonstate actors include development partners, private for-profit agencies, nongovernmental organizations (NGOs), faith-based organizations (FBOs), and civil society organizations, each of which plays a critical role in shaping Kenya’s health agenda.

The health sector in Kenya is implemented through a devolved system, with distinct functions assigned to the national and county governments (Government of Kenya 2010). The Fourth Schedule of the Constitution vests county governments with the principal role in providing basic health services, while the national government is responsible for national health policies, standard setting, technical support for capacity strengthening, and national health referral services. The two levels of government—comprising one national and 47 county governments—coordinate the health sector through consultative forums outlined in the Intergovernmental Relations Act of 2012. The Health Sector Intergovernmental Forum, which serves as a link between the national and county governments, comprises all 47 County Executive Committee Members for Health and the permanent and cabinet secretaries of the MOH. It meets quarterly to address health issues affecting national and county governments.

The roles of the national and county government are highlighted in the table below:

National government	<ul style="list-style-type: none"> ● Formulates policy, develops strategic plans, and sets priorities ● Formulates budgets and allocate resources ● Regulates, sets standards, and formulates guidelines ● Monitors performance and adheres to the planning cycle ● Mobilizes resources ● Coordinates with all (internal and external) partners ● Provides technical support at the county level ● Strengthens capacity at the county level ● Oversees national health referral services ● Trains health staff (pre- and in-service) and ensures that curricula and training institutions are in place
County government	<ul style="list-style-type: none"> ● Provides leadership and stewardship for overall health management in the county ● Provides strategic and operational planning, monitoring, and evaluation of health services in the county ● Provides a linkage with the national ministry responsible for health ● Collaborates with state and nonstate stakeholders at the county level and between counties in health services ● Mobilizes resources for county health services ● Establishes mechanisms for the referral function within and between counties, and between the different levels of the health system, in line with the sector referral strategy ● Coordinates and collaborates through county health stakeholder forums (with the Community Health Management Board, FBOs, NGOs, civil society organizations, and development partners) ● Supervises county health services at all health facilities (levels 1–5) ● Develops and implements facility health plans ● Supervises and controls the implementation of facility health plans (monitoring and evaluation) ● Trains and develops staff capacity (on-the-job training) ● Maintains quality control and adherence to guidelines

FBO: faith-based organization; NGO: nongovernmental organization.

Health service delivery in Kenya is comprehensively defined under the Kenya Essential Package for Health Services, and malaria has been identified as a disease program area that contributes to the following service delivery objectives:

1. Accelerate the reduction of the burden of communicable conditions;
2. Halt and reduce the burden of noncommunicable diseases;
3. Reduce the burden of violence and injuries;
4. Improve access to and the quality of person-centered, essential health services;
5. Reduce exposure to health risk factors through intersectoral health promotion; and
6. Strengthen collaboration with private and other sectors that have an impact on health.

Health services in Kenya, including malaria services, are delivered through a four-tier system across the six levels of health care, including the community level. Service delivery is provided along a continuum of care beginning at the community level and ending at the country's national referral hospitals through a hierarchy of health-care levels. Malaria services are integrated in the out- and inpatient departments of the health facilities; malaria diagnosis is provided using RDTs at community, dispensary, and health centers without lab services; and microscopy is conducted for suspected malaria cases at health centers with laboratories or at subcounty and county hospitals. Routine distribution of ITNs is provided as an integrated service at antenatal and child welfare clinics in eligible counties.

As of December 31, 2022, data available from the Kenya Master Health Facility List showed a total of 16,523 operational health facilities in the country, with distribution as illustrated in Table 4. Forty-one percent of these are public health facilities managed by various government levels; 48 percent are in the private, for-profit sector; and 11 percent are in the private, nonprofit sector, e.g., FBOs and NGOs. Non-facility-based community health services are offered through community health units—a health service delivery structure within a defined geographic area covering a population of approximately 5,000 people. Services are delivered by community health volunteers (CHVs), now referred to as *community health promoters* (CHPs) following a 2023 presidential directive. County governments are responsible for legislating CHP status, protections, and stipends, although this legislation and the CHP stipend amount varies among counties in the lake endemic region. The establishment of primary care networks to support Universal Health Care—a flagship government project, included the provision of funds to support 50 percent of CHP stipends, with the remaining 50 percent provided by counties. PMI does not provide payments to CHPs but has worked with lake endemic counties to set up county government legislative systems; the Community Health Services Act, which establishes community health units as the entry point of the health system, and the facility improvement fund bill that allows health facilities to manage the funds they generate and ring fence funds for payment of CHP stipends. Private health care facilities and pharmacy outlets such as private pharmacies and chemists also offer malaria diagnosis and treatment services and, according to KDHS 2022, account for 41 percent of patients seeking malaria services.

Table 4. Health Service Delivery Structure

Facility Type (Level)	MOH	FBO	Private	NGO	Public ¹	Total
Dispensaries (2)	5,107 (31%)	915 (6%)	6,319 (38%)	418 (3%)	110 (<1%)	12,869 (78%)
Health centers (3)	1,202 (7%)	233 (1%)	1,129 (7%)	70 (<1%)	13 (<1%)	2,647 (16%)
Subcounty hospitals (4)	372 (2%)	113 (1%)	465 (3%)	14 (<1%)	10 (<1%)	974 (6%)
County hospitals (5)	13 (<1%)	5 (<1%)	8 (<1%)		1 (<1%)	27 (<1%)
Teaching and referral hospitals (6)	5 (<1%)				1 (<1%)	6 (<1%)
Total	6,699 (41%)	1,266 (8%)	7,921 (48%)	502 (3%)	135 (1%)	16,523 (100%)

Source: Kenya Master Health Facility List.

FBO = faith-based organization; MOH = Ministry of Health; NGO = nongovernmental organization.

Commodities form an essential component of malaria prevention and control services. The DNMP conducts forecasting and procurement/supply planning for malaria commodities annually in collaboration with malaria partners such as PMI and the Global Fund. The program develops one malaria procurement and supply plan for order placement and scheduling. Warehousing and distribution for malaria commodities is undertaken by two entities—the Kenya Medical Supplies Authority (KEMSA) for the Global Fund and Kenyan government procured commodities and Mission for Essential Drugs and Supplies (MEDS) for U.S. government-funded commodities, including PMI-funded commodities. Facilities place orders manually using forms on a rolling quarterly basis with a pull system. These orders are consolidated at the subcounty level and uploaded to KEMSA’s order management system. The county pharmacist reviews and approves the orders in the system, after which they are transmitted in the system to the national level for further processing. At the national level, the DNMP procurement and supply management team conducts a final review before giving the go-ahead to KEMSA to process the orders. Any issues with order quantities are resolved by the DNMP and the county pharmacist. KEMSA then either fulfills the orders or forwards them to MEDS for fulfillment—depending on the availability of the items ordered at the two warehouses.

¹ Other government ministries, parastatals.

Data are critical for informed decision making at all levels of the health system and effective malaria programming. Data on all malaria indicators are reported routinely in the KHIS, including supply chain and malaria case management information. These data are reported monthly, with fixed time periods provided for each health-system level. The data in the KHIS can be disaggregated at the community health unit, facility, subcounty, and county level. Data flow up from the lower-level facilities, starting with the community, dispensary, and health facility level, where they are manually captured through various primary reporting and aggregate MOH tools. The subcounty team enters the data from the community health units and health facilities into the KHIS. Once entered, the data are automatically aggregated by ward, subcounty, and county in the KHIS. At the national level, the MOH and the DNMP have access to malaria data through the KHIS and are able to track performance and monitor reporting rates, timeliness, and completeness. The KHIS has a malaria module, a supply chain module, and an epidemic preparedness and response module, which represent data that have been automatically aggregated and analyzed to provide summary charts and tables to inform decision making at all levels. The epidemic preparedness and response module is utilized by epidemic-prone counties for weekly reporting of confirmed malaria cases and threshold setting.

Malaria supply chain data are reported on a monthly basis into the national logistics management information system that is embedded in the KHIS within defined reporting periods. The flow of data is similar to that of the service data described above. The system is linked to KEMSA's order management system, enabling end-to-end visibility of supply chain data for commodities delivered through KEMSA. The system is undergoing enhancements to link it to the MEDS system that distributes U.S. government-funded commodities. The supply chain module is designed to provide data on a set of indicators at the subcounty, county, and national level.

Malaria data are disseminated through various channels, including the KHIS dashboard, quarterly malaria surveillance bulletins developed by the DNMP and shared on the DNMP website, county-level data advocacy information packets, county data-review meetings, and various committee-of-experts quarterly meetings.

OTHER CONTEXTUAL INFORMATION

Attitudes, Perceptions, and Gender Norms Impacting Multiple Intervention Areas

In some areas, community- or individual-level cultural barriers hinder the adoption of positive malaria behaviors, including:

- **Early ANC attendance:** In some communities, pregnant women do not want to reveal their pregnancies early on for fear of being bewitched.
- **Consistent and correct utilization of ITNs:** Some use nets only when they see mosquitoes flying around.
- **Early treatment-seeking behavior among suspected malaria cases:** Some first use traditional herbs before seeking medical help in facilities.

- **Intermittent preventive therapy for pregnant women in malaria-endemic counties:** Some say that the tablets are bitter or the cups used for directly observed therapy are not clean.
- **IRS acceptance:** Some claim that the insecticide stains their walls and has a bad smell.

III. NMCP STRATEGIC PLAN

The Kenyan government is committed to improving health service delivery and places a high priority on malaria prevention and control with eventual elimination listed as one of the strategic objectives of the Kenya Health Policy. The Kenyan government is guided by the KMS and its 2019–2023 monitoring and evaluation plan, which aim to reduce malaria incidence and deaths by at least 75 percent of 2016 levels by 2023. The KMS 2019–2023 outlines six strategic objectives to be reached by 2023:

1. To protect 100 percent of people living in areas with malaria risk through access to appropriate malaria preventive interventions by 2023;
2. To manage 100 percent of suspected malaria cases according to the Kenya malaria guidelines by 2023;
3. To establish systems for malaria elimination in targeted counties by 2023;
4. To increase utilization of appropriate malaria interventions in Kenya to at least 80 percent by 2023;
5. To strengthen malaria surveillance and use of information to improve decision making for program performance; and
6. To provide leadership and management for optimal implementation of malaria interventions at all levels to achieve all objectives by 2023.

Guiding principles for achieving the KMS objectives include ensuring human rights, gender, and equity; adopting a multisectoral approach; ensuring appropriate targeting of interventions using routinely collected data; strengthening malaria control performance and monitoring systems; strengthening linkages between national and county levels; investing in health systems strengthening; leveraging the community health service; systematically managing risks; moving toward sustainable financing; and implementing activities in line with the principles of aid effectiveness.

The goals and principles of KMS 2019–2023 are generally well aligned with PMI-supported interventions. A notable exception is that the KMS 2019–2023 includes larval source management, a vector control approach that PMI does not currently support in Kenya.

Elimination

Notably, the KMS 2019–2023 introduced a new elimination objective, objective 3, to establish systems for malaria elimination in targeted counties by 2023. In view of the shrinking malaria disease burden, especially in areas with low risk, the country aims to establish the requisite structures necessary to guide the implementation of subnational malaria elimination. To achieve this objective, Kenya plans to:

- Establish structures and capacity at the national and county levels to coordinate and drive implementation of the elimination agenda by establishing a coordinating mechanism to provide leadership for the institutionalization of elimination;
- Develop capacity for malaria elimination by developing, disseminating, and providing training to support a malaria elimination business plan, guidelines, training curriculum, and standard operating procedures;
- Establish active case detection, notification, investigation, and response systems for elimination in targeted counties;
- Strengthen quality assurance for diagnosis, treatment, and entomology to enhance surveillance;
- Strengthen social and behavior change for malaria elimination.

IV. KEY MALARIA DATA

Over the past decade, Kenya has made significant gains in reducing the malaria burden among its population. From 2010–2020, the prevalence of malaria decreased by 50 percent, from 38.1 to 18.9 percent in the lake endemic zone with a high burden of malaria, where PMI focuses 70 percent of its investments. Nationwide, the malaria burden decreased 49 percent, from 11.4 to 5.8 percent over this same period.

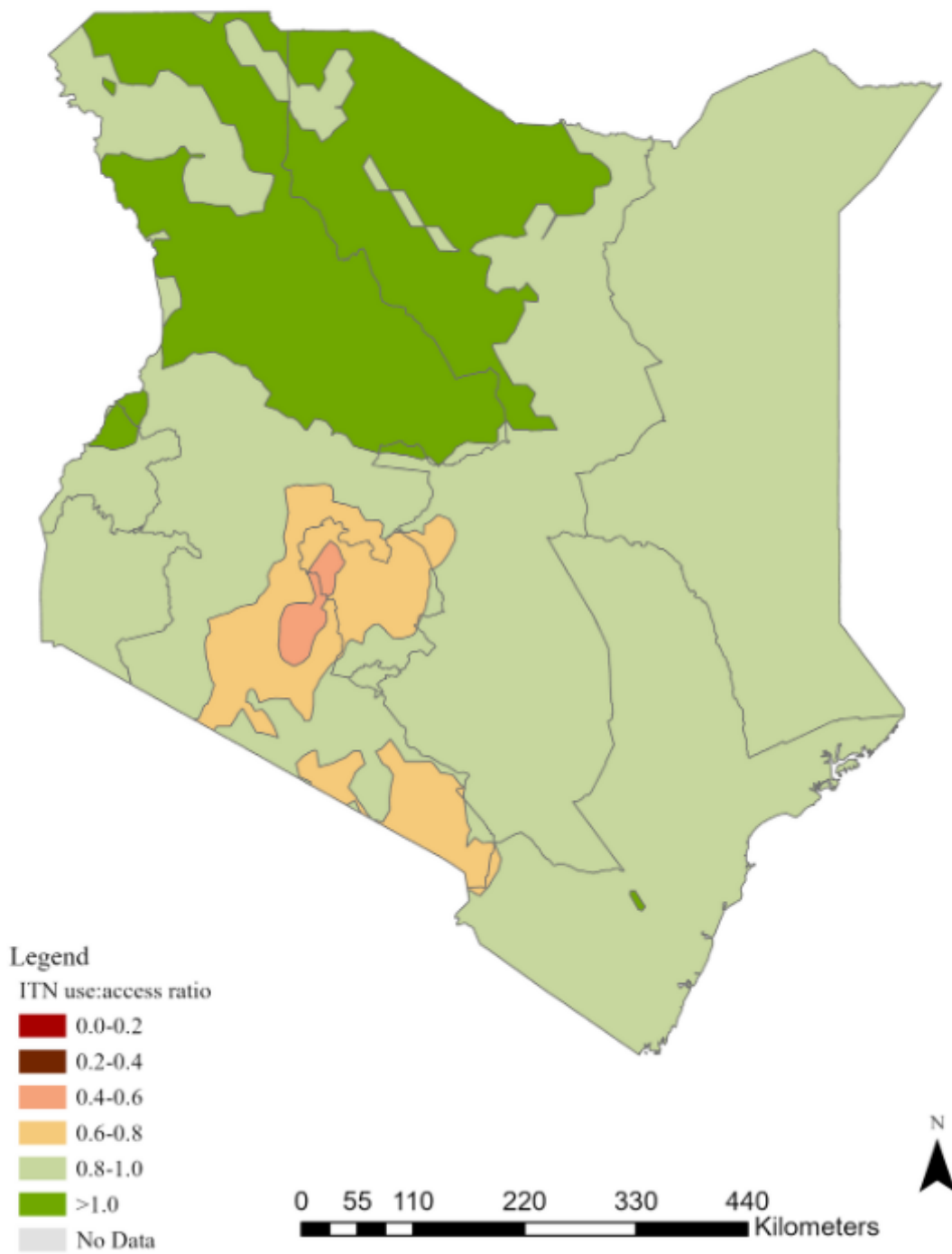
EVOLUTION OF KEY SURVEY-BASED MALARIA INDICATORS

Table 5. Key Survey Indicators

Indicator	2010 KMIS	2015 KMIS	2020 KMIS	2022 KDHS	
% of households with at least one ITN	47.9	62.5	49.0	54.2	
% of households with at least one ITN for every two people	N/A	40.0	28.7	37.1	
% of population with access to an ITN	N/A	52.5	39.6	49.6	
% of population that slept under an ITN the previous night	32.2	47.6	34.9	42.7	
% of children under five years of age who slept under an ITN the previous night	42.2	56.1	42.0	51.2	
% of pregnant women who slept under an ITN the previous night	41.1	57.8	39.8	44.9	
% of children under five years of age with a fever in the last two weeks for whom advice or treatment was sought	58.5	36.1	63.6	69.5	
% of children under five years of age with a fever in the last two weeks who had a finger or heel stick	11.8	39.2	35.5	33.4	
% of children receiving an artemisinin-based combination therapy among children under five years of age with a fever in the last two weeks who received any antimalarial drug	58.0	92.0	91.0	91.0	
% of women who attended four ANC visits during their last pregnancy	N/A	N/A	54.9	66.0	
% of women who received three or more doses of IPTp during their last pregnancy in the last two years	Kenya	N/A	21.9	22.0	12.5
	14 endemic counties	N/A	37.5	47.4	33.8
% of children under the age of five with parasitemia by microscopy	Kenya	11.4	8.2	5.6	NA
	Lake endemic	38.1	26.7	18.9	NA
% of children under the age of five with parasitemia by RDT	Kenya	14.8	13.0	6.8	NA
	Lake endemic	50.4	42.4	22.8	NA

KDHS: Kenya Demographic and Health Survey; KMIS: Kenya Malaria Indicator Survey.

Figure 4. ITN Use: Access Ratio Map



Source: MIS 2020.

Community-level data are integrated into the broader health management information system in the KHIS, and these numbers are inclusive of both community- and health facility-level data. There are some noted data quality issues in the reporting on the outpatient summary forms.

Table 6. Evolution of Key Malaria Indicators Reported in Routine Surveillance Systems

Indicator	2018	2019	2020	2021	2022
# of all-cause patient consultations	70,794,625	75,550,271	64,036,435	75,821,626	73,096,107
# of suspect malaria cases ¹	NA	8,914,636	7,734,374	10,058,716	11,393,415
# of patients receiving diagnostic test for malaria ²	NA	14,075,680	10,093,136	13,223,367	13,164,444
Total # of malaria cases ³	9,945,475	6,095,963	5,190,945	5,389,143	5,919,774
# of confirmed cases ⁴	3,944,459	5,022,092	4,206,403	4,367,010	4,878,032
# of presumed cases ⁵	6,005,590	1,073,871	984,542	1,022,133	1,041,742
% of malaria cases confirmed ⁶	40%	82%	81%	81%	82%
Test positivity rate (TPR) ⁷	27%	32%	34%	32%	31%
Total # of malaria cases in children under the age of five ⁸	2,824,130	2,249,259	1,871,220	998,413	1,203,739
% of cases in children under the age of five ⁹	28%	29%	29%	21%	25%
Total # of severe cases ¹⁰	161,135	184,756	193,996	187,660	168,550
Total # of malaria deaths ¹¹	NA	1,170	1,376	1,040	769
# of facilities reporting ¹²	8,624	9,096	9,701	10,325	10,747
% of data completeness ¹³	97%	94%	96%	98%	97%

¹ “Suspect malaria case” was first defined by KMS in 2019, and updated data collection tools were rolled out in October 2020. Prior to October 2020, the estimated number of suspect malaria cases was derived from available data for patients presenting with signs or symptoms possibly due to malaria (e.g., fever) collected from tools with different reporting rates, data element completeness, and data accuracy; based on comparisons of patients receiving diagnostic tests, the suspect malaria case indicator is underestimated. ² RDT or microscopy, all ages, outpatient and inpatient; based on microscopy data from MOH 706 and RDT data from the malaria commodity form (MOH 743). ³ Total reported malaria cases; all ages, outpatient and inpatient, confirmed and unconfirmed cases; based on antimalarial doses consumed in faith-based and Kenyan government health facilities, does not include cases treated in private sector, pharmacies, etc. ⁴ Diagnostically confirmed; all ages, outpatient and inpatient; based on confirmed malaria cases captured in outpatient department summaries for all government health facilities and community, regardless of level. ⁵ Clinical/presumed/unconfirmed; all ages, outpatient and inpatient; calculated based on difference between suspected and confirmed. ⁶ Number of confirmed cases divided by 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; based on malaria cases managed in health facilities as reported in KHIS MOH 705 for children under five years of age. ⁹ Total number of cases among children under five years of age divided by total number of cases. ¹⁰ WHO defines “severe” criteria; based on artesunate vials consumed. ¹¹ All ages, outpatient, inpatient, confirmed, and unconfirmed; based on malaria deaths reported in the KHIS tracker. ¹² Total number of health facilities reporting data into the KHIS that year. ¹³ Number of monthly reports from health facilities divided by number of health facility reports expected.

Table 7. Disaggregated Community-Level Data

Indicator	2020	2021	2022
# of patients receiving diagnostic test for malaria from a CHW	229,504	367,781	1,041,306
Total # of malaria cases reported by CHWs ¹	137,814	268,388	725,362
% of CHW reported cases (among total malaria cases) ²	2.7%	5.0%	12.23%

¹ Includes all ages, confirmed and unconfirmed from MOH 748 (community health units monthly summary report).

² Total number of malaria cases reported by community health workers divided by total number of malaria cases in the previous table.

Table 8. Elimination Context: Policy and Scope

Malaria Policy and Implementation	Response		
1. Is malaria elimination part of the current malaria strategy?	Yes		
2. Are individual malaria cases investigated? <i>If yes, please note whether this occurs nationally or subnationally.</i>	No		
3. Are foci investigated? <i>If yes, please note whether this occurs nationally or subnationally.</i>	No		
Elimination scope	2020	2021	2022
4. Total # of counties in the country (admin 2)	47	47	47
5. # of counties that have been verified as having eliminated malaria?*	0	0	0
6. Among counties not verified as having eliminated malaria, how many counties are targeted for elimination efforts?	0	4	4
6A. Among counties targeted for elimination efforts, how many have active elimination activities ?**	0	0	0

* Malaria elimination: interruption of local transmission, i.e. no local malaria cases for three years. This refers to only to subnational verification led by the national malaria program. It is not referring to “elimination certification,” which can only be granted by WHO for an entire country.

**Elimination activities include reactive ITN and/or IRS, reactive case detection, reactive or focal drug administration, procurement and/or strategies for single dose primaquine for *P. falciparum* or radical cure primaquine for *P. vivax*, social and behavior change for hard to reach or migrant populations, case investigation, foci classification, etc.

V. Other Implementation Information

Table 9. 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 (%)
Busia/DawaPlus 2.0	Baseline (5 months)	0.5	97.8	96.7
Busia/DawaPlus 2.0	12 months	2.4	88.3	23.3
Busia/DawaPlus 2.0	24 months	17.7	81.8	82.8
Busia/DawaPlus 2.0	36 months	26.2	68.0	0.0
Kwale/DuraNet	Baseline (5 months)	0.9	98.1	100
Kwale/DuraNet	12 months	7.1	86.4	96.7
Kwale/DuraNet	24 months	27.1	74.8	100
Kwale/DuraNet	36 months	37.0	66.7	13.3

PMI supported ITN durability monitoring of DawaPlus 2.0 (deltamethrin polyester ITN) distributed in Busia County and DuraNet (alphacypermethrin polyethylene ITN) distributed in Kwale County in the 2017 mass campaign.

Baseline data collection was conducted from April 29 to May 15, 2018; the 12-month follow-up survey from November 16 to December 3, 2018; the 24-month survey from November 8 to 26, 2019; and the 36-month end-line survey from November 6 to 23, 2020.

At 36 months, total ITN attrition was 67.6 percent in Busia and 77.6 percent in Kwale, with attrition due to wear and tear (discarded) and ITNs given away as the main causes of attrition at both study sites. Physical integrity followed the same pattern at the two study sites, with a median proportionate hole index in Kwale that was more than twice that of Busia. Cohort net survival through 36 months was estimated to be 37 percent in Busia (DawaPlus 2.0) and 24.8 percent in Kwale (DuraNet), with estimated median survival time of 2.4 years and 2.0 years, respectively.

Potential reasons for lower survivorship include a higher use of bleach or detergent in Kwale (51.9 percent compared with 13.3 percent in Busia). At 36 months, chemical content results show a mean deltamethrin content of 7.8 mg/m² in DawaPlus 2.0 nets in Busia, corresponding to a 90 percent loss compared with the original dose. In Kwale, DuraNets had a mean alphacypermethrin content of 90.5 mg/m² after 36 months, corresponding to a 65 percent loss compared with the original target dose. In all, survivorship of DuraNet ITN in Kwale was lower than DawaPlus 2.0 ITN in Busia because of attrition due to wear and tear and lower physical

integrity. Estimated median survival for ITNs at both sites was lower than the assumed three years.

Table 10. 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
2016	Siaya	AL DP	AL: 88.5% DP: 93.0%

AL: artemether and lumefantrine; DP = dihydroartemisinin-piperaquine; PCR: polymerase chain reaction.

VI. Key Policies

Table 11. Policies in Kenya

<u>National Strategic Plan</u> (2018)	
National Surveillance, Monitoring and Evaluation Plan (2019)	
<u>Kenya National e-Health Strategy</u> (2011–2017, outdated),	
National Social Behavior Change/Communication Strategy (2022)	
<u>National Supply Chain Strategy/Master Plan</u> (2020)	
National Vector Control Strategy and/ or Integrated Vector Management Plan (2020)	
Malaria Case Management Policy (2020)	
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
What is the first-line treatment for severe malaria?	Injectable 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 malaria in pregnancy in the first trimester? And if so, what is the status of this policy change and implementation of the new policy? (please include any plans for training providers on the new policy)	Yes Plans for policy change in preliminary stages
In pregnancy, what is/are the first-line treatment(s) for uncomplicated <i>P. falciparum</i> malaria in the second and third trimesters ?	AL
In pregnancy, what is the first-line treatment for severe malaria?	Injectable artesunate
Is prereferral treatment of severe disease recommended at peripheral	Yes

health facilities? If so, with what drug(s)?	Injectable artesunate
Is prereferral treatment of severe disease with rectal artesunate recommended for community health workers?	No
<u>Community Health Policy</u> (2021)	
What is the # of CHWs currently providing iCCM?	20,060
What is the country's target for the number of CHWs providing iCCM?	25,560
What percent of the country's target is met?	80%
Does the country have a policy that enables the routine, regular payment of salaries/stipends for CHWs?	Yes, county-specific legislation has been enacted in all eight lake endemic counties.
Do CHWs have the authority to test and treat all ages for malaria?	No, a 2019 court ruling prevents nondiagnostic personnel from conducting diagnostic tests, including malaria RDTs.
Prevention of Malaria in Pregnancy Policy: No standalone policy	
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 or more contacts?	On-going
Have the health management information system/DHIS2 and ANC registers been updated to include eight or more contacts?	KHIS captures four contacts; ANC registers capture all eight contacts.
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?	Single months, where the January 2022 data represent the number of doses administered in January 2022.
Is ANC/IPTp provided by facility staff conducting ANC outreach to communities?	No
Can CHWs deliver IPTp and if so, which specific cadres and beginning with which dose? How many districts are targeted for c-IPTp implementation?	No; n.a.

AL: artemether and lumefantrine; ANC: antenatal care; CHW: community health workers; DP: dihydroartemisinin-piperazine; DHIS2: District Health Information System 2; iCCM: integrated community case management;; IPTp: intermittent preventive treatment for pregnant women; KHIS: Kenya Health Information System; RDT: rapid diagnostic test.

VII. PARTNER LANDSCAPE

The two main donors that support the Kenyan government and the DNMP are PMI and Global Fund. Global Fund grants have two principal recipients in Kenya: (1) the National Treasury (TNT, state), and (2) the African Medical and Research Foundation (nonstate). The current Global Fund grant running from July 2021 to June 2024 has a total allocation of \$86,966,676 for malaria. Principal recipient 1 is allocated \$63,817,901 to provide support for vector control, including:

- ITN mass distribution in 2023–2024 (64 percent);
- Case management (23 percent);
- Malaria in pregnancy; social and behavior change; and malaria elimination (3 percent);
- Program management (5 percent); and
- Monitoring and evaluation (5 percent).

Principal Recipient 2 received an allocation of \$17.2 million to strengthen community health systems for delivery of malaria services and about \$6 million toward resilient and sustainable health systems. Overall, 58 percent of the grant is for malaria commodities, 19 percent for procurement and supply-chain management costs, and 23 percent for support activities.

PMI emphasizes the importance of partner alignment for malaria control, recognizing that different partners bring complementary expertise and resources. In recent years, PMI, the Global Fund, and the Bill & Melinda Gates Foundation have harmonized financial, supply chain, and programmatic data. In particular, PMI and the Global Fund agreed to a harmonized financial taxonomy (i.e., mapping cost categories across organizations) to aid comparison of investments to better identify potential overlap or gaps.

Due to the U.S. government FY budget cycle and approximate timing of annual appropriations, PMI MOP resources fund activities that largely occur during the following fiscal year. For example, this FY 2024 MOP is anticipated to largely fund implementation of activities starting in 2025. Global Fund resources are based on the Kenya government's financial year and follow a three-year grant cycle.

The table below summarizes contributions by key external partners and the Kenyan government for the 2021–2024 period. The partner country government invests substantial funding into the national-to-local infrastructure and service delivery that benefits malaria programs and many others. However, it is not always possible to attribute funding for malaria specifically from the partner country government without a standardized method. There may be similar challenges to attributing other partner funding.

Table 12. Partner Landscape

Partner	Key Technical Interventions	Coverage	Funding Amount	Time Frame
Global Fund			\$86,966,676	July 2021– June 2024
	Malaria case management	Nationwide	\$26,307,009	
	Program management	Nationwide	\$8,392,179	
	Specific prevention interventions	Targeted counties	\$5,025,678	
	Vector control	Targeted counties	\$41,492,528	
	RSSH: Community systems strengthening	National level	\$216,104	
	RSSH: Health management information systems and monitoring and evaluation	National level	\$5,533,178	
Government of Kenya			\$36,873,945	July 2021– June 2024
	GF Counterpart Financing (CPF): Procurement of malaria commodities	National level	\$16,194,624	
	Government malaria budget: Support to vector control interventions	National level	\$20,679,321	

RSSH: Resilient and Sustainable Systems for Health.