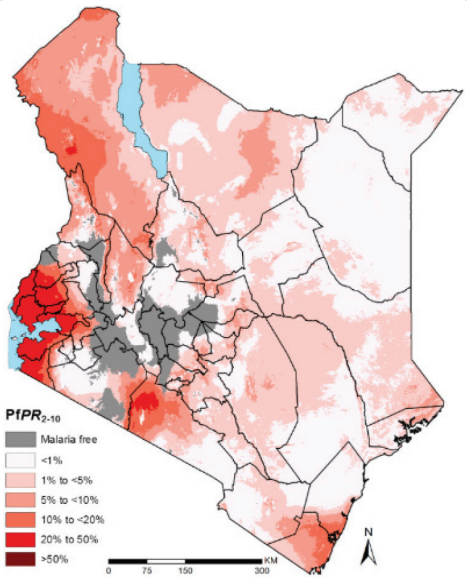
Ministry of Health



A Compendium of the Kenya Malaria Programme Review 2018

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DIVISION OF NATIONAL MALARIA PROGRAMME

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Ministry of Health

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Abbreviations

ACSM	advocacy, communication, and social mobilisation
ACT	artemisinin-based combination therapy
AL	artemether-lumefantrine
AMFm	Affordable Medicines Facility-malaria
AMREF	African Medical Research Foundation
ANC	antenatal care
AQ	amodiaquine
AWP	annual work plan
CCM	community case management
CDC	U.S. Centers for Disease Control and Prevention
CDH	county director for health
CEM	cohort event monitoring
CHE	current health expenditure
CHMT	county health management team
CHU	community health unit
CHV	community health volunteer
CMCC	county malaria control coordinator
DAR	daily activity register
DFID	UK Department for International Development
DHAP	dihydroartemisinin + piperaquine
DHIS2	District Health Information Software, version 2
DMSC	Drug Management Subcommittee
DOMC	Division of Malaria Control
DOT	direct observed therapy
DQA	data quality audit
DSRU	Disease Surveillance and Response Unit
EIR	entomological inoculation rate
EPR	epidemic preparedness and response
ETAT	emergency triage assessment and treatment
FLB	first-line buyer
FY	financial year
GNI	gross national income
GTS	Global Technical Strategy
HCW	healthcare worker

HIS	health information system
IDSR	integrated disease surveillance and response
IPTi	intermittent preventive treatment to infants
IPTp	intermittent preventive treatment in pregnancy
IRM	insecticide resistance management
IRS	indoor residual spraying
ITN	insecticide-treated net
IVM	integrated vector management
KDHS	Kenya Demographic and Health Survey
KEML	Kenya Essential Medicines List
KEMLCL	Kenya Essential Medical Laboratory Commodities List
KEMRI	Kenya Medical Research Institute
KEMSA	Kenya Medical Supplies Authority
KHSSP	Kenya Health Sector Strategic Plan
KMCS	Kenya Malaria Communication Strategy
KMIS	Kenya Malaria Indicator Survey
KMLTTB	Kenya Medical Laboratory Technicians and Technologists Board
KMS	Kenya Malaria Strategy
KNBS	Kenya National Bureau of Statistics
LLIN	long-lasting insecticidal net
LMIS	logistics management information system
LSM	larval source management
M&E	monitoring and evaluation
MCSP	Maternal and Child Survival Program
MEWS	Malaria Early Warning System
MIAS	malaria information acquisition system
MICC	Malaria Interagency Coordinating Committee
MIP	malaria in pregnancy
MIS	Malaria Indicator Survey
MOH	Ministry of Health
MOPHS	Ministry of Public Health and Sanitation
MPR	malaria programme review
mRDT	malaria rapid diagnostic test
MTP	Mid-term Plan
MTR	Mid-term Review

NHIF	National Hospital Insurance Fund
NMCP	National Malaria Control Programme
NMS	National Malaria Strategy
NQCL	National Quality Control Laboratory
OOP	out-of-pocket
PBB	programme-based budgeting
PfPR	Plasmodium falciparum parasite prevalence
PMI	U.S. President's Malaria Initiative
PMLLIN	post-mass long-lasting insecticidal net
PMS	post-market surveillance
PMT	pipeline monitoring tool
PPB	Pharmacy and Poisons Board
PSCM	Procurement and Supply Chain Management
PSM	procurement and supply management
PV	pharmacovigilance
QA	quality assurance
QAACT	quality assured artemisinin-based combination therapy
QOC	quality of care
RDT	rapid diagnostic test
SARA	Service Availability and Readiness Assessment
SARAM	Service Availability and Readiness Assessment Mapping
SBCC	social and behaviour change communication
SMC	seasonal malaria chemoprevention
SMEOR	surveillance, monitoring, evaluation, and operational research
SOP	standard operating procedure
SP	sulfadoxine-pyrimethamine
SWOT	strengths, weaknesses, opportunities, and threats
TPR	test positivity rate
TWG	technical working group
UHC	universal health coverage
USAID	United States Agency for International Development
WHO	World Health Organization

Executive Summary

Kenya conducted a malaria programme review (MPR) at the end of the Kenya Malaria Strategy (KMS) 2009–2018 (revised 2014). The MPR was conducted to assess the progress made during the implementation of the KMS 2009–2018. Recommendations and findings of the MPR informed the development of the KMS 2019–2023. The MPR consisted of nine thematic area reviews formed along the key strategic and intervention areas of the KMS 2009–2018. The thematic area reviews were evidencebased assessments of progress made against the KMS objectives and strategies.

This compendium contains 10 separate reports developed as part of the MPR. Chapter 1 contains the report detailing the process for conducting the MPR and the nine thematic reviews. Chapters 2–10 provide the nine thematic reports, covering these areas: programme management; finance; procurement and supply management (PSM); vector control; malaria in pregnancy; case management; advocacy, communication, and social mobilisation (ACMS); epidemic preparedness and response (EPR); and surveillance, monitoring, evaluation, and operational research (SMEOR). These thematic reviews provided the information used to develop the main findings and recommendations of the MPR, which are included in the final MPR report and detailed below.

Programme Management

Programme management fell under Objective 6 of the KMS: *To improve capacity in coordination, leadership, governance and resource mobilisation at all levels towards achievement of the malaria programme objectives by 2018.*

The thematic review established the existence of legislative, policy, and strategic guidance for the implementation of malaria control in Kenya. However, the Malaria Prevention Act CAP 246 (1929 revised 2012) was noted to be outdated and needed to be reviewed. The review also found that the malaria programme was well integrated and aligned with the overall health sector plans; however, it used to be a division but it is currently a unit in the Ministry of Health (MOH) organogram with reduced powers. It was also established that the National Malaria Control Programme (NMCP) organogram was not function-based and lacked job descriptions. There were undefined roles and responsibilities of country malaria control coordinators, and partners' coordination at both national and county levels was inadequate. In addition, there were inadequate skills sets and competencies for effective programme management and inadequate information on activity monitoring.

The programme has continued to review and apply evidence to guide updates to strategy and targeting of interventions. KMS 2009–2018 was used as a reference document for all programmes and stakeholders in malaria control, along with a four-year costed business plan to guide investments and annual work planning. The review confirmed the availability of guidelines on different interventions, the existence of some county-level communication plans, the availability of consumption data for essential malaria commodities (long-lasting insecticidal nets [LLINs], artemisinin-based combination therapies [ACTs], and rapid diagnostic tests [RDTs]) in District Health Information Software, version 2 (DHIS2), and malariology training of county malaria control coordinators. However, there was a lack of defined mechanisms for dissemination of policy guidelines to the field, and there was a lack of clear national and county engagement mechanism to enhance collaboration between the two levels.

The review recommended the following:

- Raise the visibility of the NMCP within the MOH organogram, and align coordination structures to constitutional mandates and core functions.
- Review the legislative, policy, and regulatory frameworks for malaria control in Kenya to align with current strategic interventions and emerging challenges.
- Advocate for county assemblies to enact appropriate by-laws to support strategic interventions for reduction of the malaria burden in Kenya.

- Review the mandate and membership of the Malaria Interagency Coordinating Committee and malaria technical working groups (TWGs) to strengthen programme and partner coordination.
- Develop and implement guidelines for engagement between the programme implementation at the national and county levels.
- Develop and implement capacity-building, advocacy, and resource mobilisation strategies.
- Anchor the programme implementation monitoring and information repository tool at the programme management level for tracking the implementation of malaria activities.
- Ensure that malaria services are well articulated within the MOH standards and norms in the context of universal health coverage.
- Support gender mainstreaming and human rights approaches to malaria programming to ensure an inclusive reach that focuses on vulnerable and marginalized populations.

Finance

The finance thematic review noted that the allocation to health in the county budget increased steadily, from an average of 21.5 percent in 2014/15 to 27 percent in 2017/18. The aggregate total allocation to health increased, from 7.5 percent in 2014/15 to 8.2 percent in 2017/18, and the government directly contributed towards malaria control through counterpart funding and salaries of health workers. The household contribution to malaria spending was 25 percent in fiscal year (FY) 2016/17, a reduction from a high of 47 percent in FY 2009/10 and 39 percent in FY 2012/13.

The above notwithstanding, county budgetary allocation has been inadequate, with the lack of a specific malaria sub-programme under the programme-based budget in most county budget frameworks. The review found the lack of a mechanism to track financial data at all levels. There was also high out-of-pocket expenditure, which impacted access to care, and households were at risk of catastrophic health spending. At programmatic level, the review showed low absorption capacities across all levels, with an inability to link programmatic targets to funding and financing to outcomes.

The review recommended the following:

- Ensure that county governments include malaria in their annual programme-based budgets as a sub-programme in the preventive and promotive health services programme.
- Increase budgetary allocations and actual disbursements by national and county governments, and ensure efficient use of resources.
- Advocate more resources from all sources, including the government's Universal Health Coverage initiative and the private sector, to move towards financial sustainability.
- Finalise the current draft domestic resource mobilisation strategy, incorporating innovative financing mechanisms, through a consultative process.
- Prepare programme-based budgets and conduct expenditure reviews and analyses that can be used as advocacy and resource mobilisation tools at high levels.
- Develop a sustainable financing framework for malaria control interventions, especially as the country starts to consider malaria elimination.
- Provide technical assistance to county health management teams for planning and budgeting and advocacy for resource allocation.
- Government at national and county levels should promote the expansion of existing pre-payment mechanisms (e.g., the National Hospital Insurance Fund) and support the establishment of new pre-payment mechanisms to reduce the financial burden of and barriers to malaria services.

- Systematically and routinely track financial data pertaining to allocation and spending on malaria at national and county levels to provide information on indicators, including the proportion of the malaria budget to the total health budget and the proportion of the total malaria budget contributed by partners.
- Generate evidence for resource mobilisation purposes that is appropriately packaged for targeted audiences.

Procurement and Supply Management

PSM was fragmented in the KMS, and only clearly indicated in Strategy 6.2: ***Strengthen procurement and supply management systems for malaria drugs and commodities.***

The review found that there was significant improvement in malaria commodity availability and efficiency gains in the procurement of malaria commodities during the period under review and hence value for money. Implementation of a pull system across all malaria commodities improved stock management, and the available expertise in the procurement and supply chain component contributed to improved performance across all interventions.

However, despite procurement and supply chain management being a specific strategy under programme management, it was poorly implemented. There was disjointed oversight and coordination for procurement and supply chain management activities at the national level. The drug management subcommittee under the case management TWG focused mainly on case management commodities (ACTs, RDTs) and sulfadoxine-pyrimethamine (SP). There was poor oversight of activities for the other commodity categories like LLINs. There was inadequate capacity in commodity management at all levels with weak inventory management, poor data management and use, and inadequate oversight by county and sub-county teams. This resulted in stock-outs and over-stocks reported at health facilities.

The review recommended the following:

- Consolidate and strengthen malaria procurement and supply chain management at the national level for effective management of all commodities.
- Enhance existing systems for commodity data analysis and visualisation to ensure end-to-end visibility of the supply chain.
- Establish a malaria commodity logistics and inventory control system that is adaptable to the different endemicity zones.
- Build capacity in commodity management at the county and sub-county levels.

Vector Control

Vector control fell under Objective 1 of the KMS: ***To have at least 80 percent of people living in malaria risk areas using appropriate malaria preventive interventions by 2018.***

The review found that in 2015, 40 percent of households surveyed owned at least one LLIN for every two persons who stayed in the household the night before the survey (universal coverage). Close to 37 million LLINs were distributed to people at risk of malaria in the targeted counties between 2014 and 2018 using various channels. In spite of the massive numbers of LLINs distributed, universal coverage remained low (48%) in 2017. In the areas where indoor residual spraying (IRS) was implemented, high levels of coverage (94%) were achieved, but the scope was limited to only two counties in the lake endemic zone. IRS had a significant impact in reducing the indoor resting densities (97%) and sporozoites prevalence in *An. funestus,* a major vector in Western Kenya.

Resistance to pyrethroids among the major malaria vectors is widespread across the country. Larval source management was not implemented, although a few small-scale trials were conducted. Integrated Vector Management was well articulated in the policy documents, but it was not systematically implemented during the period under review.

The review recommended the following:

- Improve coverage of LLINs to achieve universal coverage through continued mass distribution campaigns and scale-up of continuous net distribution (through maternal and child health initiatives and community initiatives such as community health volunteers).
- Maintain IRS in the counties where it is currently ongoing but target future implementation of IRS to areas where it can more effectively interrupt transmission.
- Strengthen the implementation of insecticide resistance management according to the existing Insecticide Resistance Management strategy.
- Fully embrace Integrated Vector Management approaches for vector control.

Malaria in Pregnancy

Malaria in pregnancy fell under Objective 1 of the KMS: ***To have at least 80 percent of people living in malaria risk areas using appropriate malaria preventive interventions by 2018.***

Fifty-eight percent of pregnant women ages 15–49 slept under an LLIN the night before the survey, an increase from 36 percent reported in the 2010 Kenya Malaria Indicator Survey (KMIS). With regard to intermittent preventive treatment in pregnancy (IPTp), additional efforts are needed to fully attain national and global targets. The Kenya malaria programme achieved IPTp2 of 56 percent in 2015, an increase from 12.5 percent in 2010, and IPTp3 increased from 11 percent (KMIS, 2010) to 38 percent (2015). The review noted that sub-counties bordering lake endemic counties were not implementing IPTp, and generally, there was late first presentation to antenatal care, leading to suboptimal IPTp coverage in the eligible areas.

The review recommended the following:

- Increase uptake of IPTp at antenatal care by promoting it through community health structures, evidenced by pilot studies conducted in four lake endemic counties.
- Scale up malaria in pregnancy activities currently done in four counties to all the targeted areas.
- Revise data capture systems to include capture of IPTp3+ doses.
- Align SP and LLIN provision with the current Division of Reproductive Health guidelines.
- Strengthen the partnership between the NMCP and the National Reproductive Health Programme for ease of scaling up and sustainability of malaria in pregnancy interventions.

Case Management

Case management fell under Objective 2 of the KMS: ***To have 100 percent of all suspected malaria cases presenting to a health provider managed according to the National Malaria Treatment Guidelines by 2018***.

The review found that there has been an increase in the testing rate of suspected malaria cases in public health facilities, from 24 percent (2010) to 64 percent (2017), with 89 percent of all confirmed malaria cases presenting to public health facilities being treated with ACTs. The review also noted increased adherence to national treatment guidelines in public health facilities, from 16 percent (2010) to 59 percent (2017), and 7,350 community health volunteers were trained on community case management for malaria between 2014 and 2017 in 10 counties.

The key issues identified included suboptimal adherence to national guidelines among healthcare workers in the public and private sectors and inadequate implementation of community case management for malaria due to regulatory bottlenecks in the area of malaria diagnosis at the community level. The review also noted weak coordination for community case management and its limited coverage at the county level.

The review recommended the following:

- Enhance capacity building in case management at both the national and county levels, including pre- and in-service training. Incorporate evidence-based behaviour change components in the curriculum and improve tracking of trained health workers.
- Intensify monitoring of the quality of care for improvement of malaria case management at the national and county levels, both in the public and private sectors.
- Strengthen private sector engagement involved in malaria case management to sustain the achievements realised under the ACTs co-payment mechanism.
- Strengthen engagement with counties in low transmission zones to ensure prioritisation of malaria control activities, including surveillance through strengthening of county reference laboratories and quality assurance of malaria diagnosis.
- Ensure the use of the approved guidelines for malaria case management and parasitological diagnosis throughout the country to ensure safe, evidence-based, and harmonised practice in the public and private sectors and at the community level.
- Scale up community case management for malaria in priority areas, and integrate it with other community-level interventions.

Advocacy, Communication, and Social Mobilisation

ACSM fell under the Objective 5 of the KMS: *To increase utilisation of all malaria control interventions by communities in Kenya to at least 80 percent by 2018*.

The review found that the use of key malaria interventions remained below the target of 80 percent, despite the availability of malaria commodities and services at no cost to communities. The KMIS 2010 and 2015 reported that the ownership of LLINs increased, from 57 percent in 2010 to 63 percent in 2015. LLIN use increased, from 32 percent in 2010 to 48 percent in 2015. The percentage of children under five with fewer for whom treatment was sought within 24 hours of onset improved, from 59 percent in 2010 to 72 percent in 2015. In addition, the proportion of women receiving three or more doses of IPTp increased, from 11 percent in 2010 to 38 percent in 2015. However, the communities were not adequately using malaria control interventions due to various socio-cultural reasons. There was also poor healthcare provider-client communication and low investment in advocacy, communication, and social mobilisation as well as inadequate budget allocations to these activities at all levels.

The review recommended the following:

- Scale up malaria advocacy at national and county levels for increased use of malaria interventions.
- Strengthen county-specific social and behaviour change communication planning and implementation.
- Build capacity of healthcare providers in social and behaviour change communication at all levels to improve their interpersonal communication skills with the clients.
- Leverage the community strategy to deliver community-based malaria control activities.
- Update provider knowledge on new guidelines at all levels, while rolling out interpersonal communication to address behavioural barriers for attainment of national targets.
- Develop standard messages for adaptation and contextualisation by the counties and other stakeholders.
- Enhance the engagement of private and non-health sectors to undertake ACSM for malaria with a clear mandate and guidelines.
- Support community engagement for social accountability for malaria.

Epidemic Preparedness and Response

EPR fell under Objective 3 of the KMS: ***To ensure that 100 percent of the malaria epidemic-prone and seasonal transmission sub-counties have the capacity to detect and timely respond to malaria epidemics by 2018.***

The review found that all the seven reported malaria outbreaks were responded to within two weeks as recommended in the guidelines, and all the 26 targeted counties (100%) were trained and developed epidemic preparedness and response plans. However, EPR activities have not been effectively integrated with surveillance activities. It was also noted that there was inadequate coordination at all levels to undertake effective EPR activities. EPR did not have a stand-alone TWG, as it was anticipated that EPR technical issues would be addressed in the other relevant TWGs. The review noted that there was limited capacity for malaria EPR at county and sub-county levels, and there was limited funding and low prioritisation of malaria EPR at all levels. However, the functionality of malaria epidemic detection sentinel health facilities in the highland epidemic-prone zones improved.

The review recommended the following:

- Integrate malaria EPR with surveillance at the national, county, and sub-county levels.
- Revise SMEOR TWG terms of reference, surveillance manuals, and guidelines to include epidemic preparedness and response functions.
- Strengthen the capacity of the sentinel health facilities to improve functionality and to be able to routinely provide timely, accurate, and reliable information, including threshold monitoring.
- Include SMEOR epidemic preparedness and response activities in all national, county, and subcounty annual work plans.

Surveillance, Monitoring, Evaluation, and Operational Research

SMEOR fell under Objective 4 of the KMS: ***Ensure that all malaria indicators are routinely monitored, reported and evaluated in all counties by 2018.***

The review found that the reporting rates of malaria cases improved from 70 percent during the mid-term review in 2013–2014 to 88 percent in 2017. The routine use of surveillance data and development of malaria monitoring and evaluation products at the national level and in select counties was achieved. Entomological surveillance was conducted in more than 80 percent of the counties in 2016 and 2017. Community-level reporting through the health information system has been implemented.

The review also found that not all malaria cases were counted for both inpatient and outpatient services. In general, there was suboptimal quality of health information for improved malaria programming. There is inadequate SMEOR capacity at the county and sub-county levels. The review found that there was weak collaboration between the programme and research community in terms of sharing of findings for use in public health decision making, as well as inadequate programme implementation reporting and feedback to and from the counties and the central level.

The review recommended the following:

- Regularly conduct epidemiological and entomological stratification to guide targeting of intervention deployment.
- Strengthen malaria surveillance, including the development of guidelines and revision of available health information system tools, to guide implementation in the context of changing epidemiology.

- Advocate for increased investments in surveillance at both the national and county levels to achieve better quality information for decision making.
- Enhance data ownership and use of information for decision making at the national and subnational levels.
- Establish a network of health facilities to enhance the availability of inpatient morbidity and mortality data.
- Strengthen the collaboration between the programme and the research community to allow for the sharing of research findings for public health use.
- Develop capacity at the national and subnational levels for data demand and use to inform programmatic decisions.

Chapter 1:
Process Report

Key Messages from This Chapter

- Chapter 1 describes the four stages of the malaria programme review: planning, thematic desk review, field validation, and the development of the Kenya Malaria Strategy 2019–2023.
- The main purpose of the 2018 malaria programme review was to conduct an overall assessment of the programme performance against the Kenya Malaria Strategy 2009–2018 (revised 2014) goal and objectives.
- The review was a joint participatory process, spearheaded by the National Malaria Control Programme and the Ministry of Health, that involved a wide range of local and international stakeholders, including World Health Organization external reviewers, country representatives, local consultants, and key partners.
- The thematic area reviews were evidence-based assessments of progress made against the objectives and strategies outlined in the Kenya Malaria Strategy 2009–2018. The nine thematic areas were as follows: vector control; malaria in pregnancy; malaria case management; epidemic preparedness and response; surveillance, monitoring, evaluation, and operational research; procurement and supply management; costing and finance; advocacy, communication, and social mobilisation; and programme management.

Introduction

Malaria programme reviews (MPRs) are structured to allow the programme and all thematic areas to regularly gauge their effectiveness and efficiency. Each cycle of the programme review process begins with planning and is followed by an extensive self-study. For the MPR, the self-study comprises the following: (1) a description and review of performance and progress in accomplishing previous goals and objectives delineated in the programme's strategic plan and addressed in recent annual reports; (2) an analysis of current priorities and objectives within the context of the programme's current long-range plan; and (3) an analysis of the strengths, weaknesses, opportunities, and threats (SWOT). This is done concurrently with a desk review and followed by an external review, during which an external consultant reviews departmental documentation, visits the counties, and prepares a report with recommendations. The outcome of this process is a comprehensive MPR report that then informs the development of a new malaria strategy.

Background to MPR

MPR is a periodic joint programme management process for reviewing progress and performance of country programmes, with the aim of improving performance and refining or redefining the strategic direction and focus.

The Ministry of Health (MOH), through the National Malaria Control Programme (NMCP), in collaboration with partners, decided to undertake a comprehensive review of the progress and performance of the malaria programme for the period 2014-2018. The decision was made in the context of the development of a new National Malaria Strategy because the existing version expired in June 2018. The findings of this review fed into the development of the Kenya Malaria Strategy (KMS) 2019-2023 and its accompanying monitoring and evaluation (M&E) plan.

Purpose of MPR

The main purpose of the 2018 MPR was an overall assessment of the programme performance against the KMS 2009-2018 (revised 2014) goal and objectives.

MPRs are management tools for evidence-based appraisal of a country's malaria situation and programme performance, they help strengthen the programme for better results and impact, evaluate the systems used to deliver interventions, encourage success, and propose solutions for bottlenecks and barriers. They are meant to help countries and partners set or reset the malaria agenda in the medium or short term.

Through cyclic programme reviews, malaria programmes can analyse and reflect on their performance across a specified time period. Considerations of strengths and needs should occur both prior to and following external review. Recommendations and the department responses to those recommendations form the foundation for optimal future planning and development of the KMS.

MPR Calendar in Kenya

There are three types of malaria reviews:

Comprehensive MPR: Final assessment of programme performance conducted at the end of the malaria strategic plan cycle (end-term evaluation). MPRs inform the development of the next malaria strategic plan.

Mid-term review: Assessment of the implementation of the malaria strategic plan halfway through the duration of the strategic plan. The findings and lessons are used for mid-course revision of the malaria strategic plan.

Annual work plan review: An output-level programme stock-taking process aimed at assessing the progress of implementation of the annual work plan. The outcome of an annual work plan review is a set of recommendations for enhanced implementation and impact. The recommendations will be the basis for the development of a new annual work plan for the ensuing year.

The NMCP developed its initial strategy 2001–2010 based on the principles of Roll Back Malaria and the Abuja Declaration of 2000 and structured into achieving key milestones and subsequent maintenance of gains. In 2009, a comprehensive programme review embedding the development of the 2009–2017 National Malaria Strategy was conducted. A mid-term review was undertaken in 2014 to re-orient the programme for better outcomes. This included aligning the programme to the Kenya Health Sector Strategic Plan 2009–2018 and the 2010 Constitution in the context of a devolved system of government. The KMS 2009–2018 (revised 2014) came to an end in June 2018, raising the need to conduct an endterm programme review and develop a new strategy.

MPR 2018 Timelines

The programme review process was led by the head of the programme, Dr. Waqo Ejersa, and coordinated by the deputy head of the programme, Dr. Rebecca Kiptui.

The 2018 MPR was conducted in four phases:

1. Phase 1: Preparation and planning (March 2017)
2. Phase 2: Desk review, external validation, and field visits(July 2018)
3. Phase 3: Kenya National Malaria Forum and finalisation of MPR report (August–September 2018)
4. Development of the new KMS and M&E Plan

The following sections describe the processes undertaken during the Kenya 2018 MPR.

Planning of MPR

The NMCP, which implements the KMS, had scheduled the mid-term review in 2013 and the end-term review in 2017. The reviews were designed to provide an opportunity to evaluate the programme against its goals and objectives.

The mid-term review was undertaken in 2014 and led to several changes in the strategy. The period of the strategy was extended by one year to 2018 as part of the alignment to the Kenya Health Sector Strategic Plan 2014–2018. The objectives of the strategy were amended for better performance and incorporated the devolved status of the healthcare delivery in accordance with the new constitutional requirements.

Consensus Building to Conduct the Review

In March 2017, the NMCP assembled an internal team to plan the MPR as the end-term assessment of the strategy. The key outcomes for the team were the MPR concept note, roadmap, and budget. The development of concept note was guided by the World Health Organization (WHO) operational manual for MPRs and mid-term reviews. The senior management of the MOH was consulted, and the Malaria Interagency Coordinating Committee (MICC) held a meeting to endorse the process and the expected outcomes. The three phases of the MPR were outlined, the budget was developed, and resource mobilisation efforts were undertaken. The start of the MPR process was delayed for more than a year due to limitations in the availability of funding.

Establishment of an Internal Review Secretariat and Task Force

In March 2018, an MPR secretariat was established, drawn from NMCP personnel. The members of the secretariat were Dr. Rebecca Kiptui, Andrew Wamari, Deborah Ikonge, and James Sang.

The team was led by the programme manager, whose role was to plan, organize the review, and coordinate the participation of internal and external reviewers. The MPR was anchored under the broader oversight of the Surveillance, Monitoring, Evaluation, and Operational Research (SMEOR) technical working group (TWG).

The roles and responsibilities of the secretariat were as follows:

- Develop the overall concept note for the review
- Prepare the MPR proposal and budget
- Develop the MPR roadmap
- Prepare and gather background literature for the desk review
- Provide a platform for information sharing across various thematic areas
- Prepare and review key MPR presentations
- Coordinate the finalisation of the review outputs and final report

This team worked closely with the MPR taskforce. The members of the MPR task force were drawn from the MPR secretariat and key partner organisations. The roles of the task force were as follows:

- Ensure availability of funds required for the MPR
- Identify suitable thematic consultants
- Provide oversight and feedback for the review process
- Review the final MPR report
- Follow up on the recommendations made throughout the MPR process

The taskforce met every two weeks to review progress and guide and provide oversight to the review teams.

Identification of Local and External Review Teams

A team of both local (national) and external (international) experts was selected. The local team had a variety of competences and included a lead consultant to coordinate and guide the MPR process and strategy development. A co-lead consultant was identified to work closely with the lead consultant to consolidate reports from the different thematic review teams and compile the final MPR report and strategy.

The lead consultants appointed were:

- Dr. Willis Akhwale, Lead Consultant
- Dr. Josephine Karuri, Co-lead Consultant

Local expert consultants were identified to lead the following nine thematic areas of the review:

- Vector control
- Malaria in pregnancy (MIP)
- Malaria case management
- Epidemic preparedness and response (EPR)
- SMEOR

- Procurement and supply management (PSM)
- Costing and finance
- Advocacy, communication, and social mobilisation (ACSM)
- Programme management

Table 1.1: List of consultants and their thematic areas

	Consultant	Thematic area
1	Ambrose Agweyu	Case management
2	Ben T. Adika	ACMS
3	Cecilia Muiva	PSM
4	Evan Mathenge	Vector control
5	Hellen Gatakaa	SMEOR
6	Peter Ouma	MIP
7	Stephen Munga	EPR
8	Daniel Mwai	Costing and finance
9	Willis Akhwale	Programme Management
10	Geoffrey Lairumbi	Coordinator for the Kenya National Malaria Forum
11	Esther Kinyeru	MPR process documentation

External consultants were recruited by WHO to complement the local experts. The external consultants were:

- Dr. Gausi Khoti Managwa—team lead
- Dr. Lyda Ozor
- Dr. Charles Katureebe
- Dr. Michael Kayange
- Dr. Daniso Mbewe
- Prof. Tuoyo Okorosobo
- Dr. Emmanuel Temu

Selection of Counties for Field Validation Visits

The task force determined the focus counties that were invited for the desk review consolidation workshop and later visited for field validation by local and external review teams. Two counties were selected in each of the five malaria epidemiological zones, as shown in Table 1.2.

Table 1.2: Counties selected for desk review consolidation and field validation

County	Epidemiological zone
Kisumu	Lake endemic
Kwale	Coast endemic
Kilifi	Coast endemic
Kisii	Epidemic prone
Busia	Lake endemic
Uasin Gishu	Epidemic prone
Isiolo	Seasonal transmission
Turkana	Seasonal transmission
Makueni	Low transmission
Kirinyaga	Low transmission

Thematic Desk Reviews

The second phase of MPR involved desk reviews based on the nine thematic areas identified in the preparatory phase. The thematic desk reviews were conducted from 18 June 2018 to 15 July 2018. The aim of the desk reviews was to assess performance in each thematic area, document successes made and challenges experienced during the implementation period of the revised KMS 2009–2018, and make recommendations of strategies to be included in the next KMS. Key activities undertaken in the desk review phase included the following:

- Assembling relevant literature (i.e., policy documents, reports, and peer-reviewed publications)
- Reviewing assembled literature
- Planning for field validation

Assembling Relevant Literature

The MPR secretariat created a library on a Google Drive folder dedicated to managing and sharing documents relevant to the MPR process. The information folder was subdivided to include a folder for core reference documents, separate folders for each thematic area, and a folder for meeting reports and presentations. Stakeholders who were invited to participate in the MPR inception workshop were requested to share relevant literature for the various thematic areas on the shared Google Drive. A followup request for materials was made at subsequent TWG meetings.

The information assembled included MOH policy and strategy documents, Kenya NMCP policy and strategy documents, financing and funding documents, and other published and grey literature relevant to the review.

Reviewing Assembled Literature

Desk Reviews

Thematic desk reviews were conducted by the consultants in each focal area, the NMCP focal point person in the respective thematic area, and members of the TWGs in the different review areas. Each thematic review team was led by a chairperson (thematic area consultant) and a rapporteur (NMCP focal point person).

The literature reviews focused on the documenting the following information:

- Programme activities in each thematic area; achievements made, best practices, and lessons learnt
- Status of programme indicators; coverage, outcome, equity, quality, impact
- Trends in the prevalence of infection and morbidity, mortality, and disability due to malaria
- Changes in malaria risk factors
- Progress towards set targets
- Major challenges, bottlenecks, and barriers to implementation and scale-up

The desk review process started with a meeting on 6 June 2018, which included the NMCP secretariat, the MPR task force, and lead consultants. During this meeting, the team came to a consensus on the processes to be followed in the MPR process and prepared for an MPR inception workshop.

The inception workshop was held on 18 June 2018 (Annex 1.2) and brought together all the local thematic consultants, NMCP staff, and other key malaria stakeholders. Members were introduced to the MPR process and roadmap. The thematic consultants were sensitised on their roles, responsibilities, and expected outputs. The MPR coordination structure was discussed and agreed upon during the workshop, and the methodology for the desk review was defined. Three main activities were outlined:

- Literature review
- Completion of an adapted Microsoft Excel-based technical performance assessment tool developed by WHO
- SWOT analysis

Participants were taken through the technical performance tool used to assess programme performance and guided on stakeholder engagement through the respective TWGs. The local consultants were provided with a standard outline for the thematic reports and an information extraction framework (Annex 1.3) to guide them in the literature review. The local consultant leading each thematic group undertook an online literature search for additional published documents using relevant keywords in both Google and the academic databases, PubMed, and the Cochrane Library in addition to what was in the MPR library and prepared a draft of the desk review report. The draft thematic reports were reviewed by the respective NMCP focal persons and circulated to the members of the relevant TWGs for additional inputs. The NMCP focal persons convened a series of TWG meetings to discuss the draft thematic reports, conduct the SWOT analyses, and make recommendations (Table 1.3). The meetings were facilitated by the respective thematic area consultants and followed the WHO operational manual for MPRs. The local consultants summarised the main findings of the draft thematic reports in a presentation that was made during a desk review consolidation workshop held in July 2018.

Table 1.3: TWG meetings held during the 2018 desk review process

Thematic area	First meeting	Second meeting	Third meeting
Case management	19 June	4 July	
SMEOR	20 June	27 June	05 July
ACSM	21 June	3 July	05 July
MIP	21 June	28 June	04 July
Vector control	22 June	03 July	
EPR	03 July	04 July	05 July
Costing and finance	02 July		
PSM	19 June	05 July	
Programme management	25 June	26 June	28 June

Evaluation of the Performance Against the Log Frame

Each review team used the technical performance tool (Annex 1.4) to assess the level of achievement of the KMS strategies linked to the respective thematic area. The performance tool was populated through a transparent participatory appraisal process that assigned scores to the different strategies in the KMS 2009–2018. The process took place in two phases:

- Quantitative review phase, in which scores were assigned for planned activities against achievements over the review period. To ensure the objective assignment of scores, evidence of performance in the form of reports or minutes was required to confirm achievement of each activity. If documented evidence was not available, a tentative score was assigned for validation.
- Qualitative review phase, in which a score (1 of 5) was assigned based on group consensus on how well the activity was implemented.

After the scores for all activities were populated, the tool automatically computed a composite score for each strategy and objective and assigned a colour code: green for high scores (≥90%), yellow for moderate scores (75–90%), and red for low scores (below 75%). A summary of scores for KMS strategies is presented in Annex 2.1.

SWOT Analysis

The thematic teams conducted a SWOT analysis by brainstorming and documenting the strengths, weaknesses, opportunities, and threats for the respective thematic areas.

Desk Review Consolidation Workshop

A final thematic review and consolidation workshop was held between 9 and 13 July at Nokras Riverine Hotel, Sagana (Annex 1.5). Participants included NMCP officers, local consultants for the nine thematic areas, other MOH departments, representatives from 10 counties, and partners. The local consultants presented the key findings from the desk review based on the draft thematic reports. The 10 counties (Table 1.2) invited to the workshop completed a survey questionnaire to assess performance of the malaria programme at the county level, its achievements, and challenges faced in implementation. Plenary discussions gave additional inputs to the presentations. The thematic teams worked on the comments and additional inputs given in the plenary and presented the final report that was sent to the external reviewers. A consolidated MPR report with the key findings from each thematic area was prepared at the end of the workshop.

Planning for Field Validation

During the planning phase, consultations were held between the NMCP and WHO country and regional offices for technical support in the MPR process. A team of seven WHO external consultants was identified and communication on their availability and travel timelines established. The NMCP secretariat finalised the logistical plans for the field validation and communicated to the 10 selected counties on the planned external reviews. A two-week detailed programme of activities during the external validation phase was prepared and shared with the relevant stakeholders at the end of the desk review consolidation workshop.

Field Validation and the Kenya National Malaria Forum

The purpose of the field validation phase was to enable the internal and external reviewers to get an overview of the policy environment, advocacy, standards, guidance, capacity building, technical support, and financing of malaria at the national level. At the county level, the field visits allowed the teams to observe how malaria services were delivered and to verify the information provided in the thematic desk review reports. The visits also gave an opportunity to stakeholders at both national and county levels to talk about critical matters affecting programme performance to a neutral team and suggest possible solutions.

Planning Meeting

A two-day preparatory meeting with the external and local thematic review teams was held. The external reviewers gave their feedback on the thematic review reports submitted to them after the desk review consolidation workshop. Key gaps that needed to be addressed in the reports were addressed and consensus built on the major findings and recommendations to be documented in the consolidated MPR report. Six field teams were formed, each consisting of an NMCP focal person, a local thematic consultant, a WHO external reviewer, and key partners (Annex 1.8). Five teams were to visit the counties, and one team remained to interview national-level stakeholders. The teams reviewed and adapted the data collection tools before going to the field.

Field Visits

The central-level field team interviewed the heads of relevant national institutions, departments, and organisations on malaria control, including best practices and challenges. The county-level field teams interviewed the county health management team members responsible for malaria programming. The review teams interviewed health workers at the county/sub-county referral hospital and two lower-level health facilities (a health centre and a dispensary), community health volunteers, and community members. A record review was done at all the health facilities visited to assess data capture processes. A debrief session was held at the county level to provide feedback on the key findings from the field visits.

Presentation and Review of Findings from the Field Visits

The review teams reconvened to present the main findings on the performance of the malaria programme, major successes and challenges, and key recommendations from the areas visited. This information was synthesised and incorporated into the respective thematic and consolidated MPR reports.

MPR Consensus Workshop

A one-day workshop was held to disseminate the findings of the MPR to the 47 counties and build consensus on the recommendations of the review. County health directors from all 47 counties were invited to attend the consensus workshop held on 2 August 2018; 40 county health directors attended. The inputs from the consensus workshop

were incorporated into the MPR thematic and consolidated reports. After the consensus workshop, both the local and external review teams met to finalise the validation phase and agree on future strategic orientations, which would give a thrust to enhanced implementation of malaria control interventions for better and sustained impact.

Kenya National Malaria Forum

The third Kenya National Malaria Forum was held on 18–19 September 2018 at Hotel Intercontinental Nairobi. The forum brought together more than 150 stakeholders from a broad spectrum of society, including research and academic institutions, MOH departments, other government ministries, partners, civil society, and nongovernmental organisations from Kenya and beyond.

The 2018 Kenya National Malaria Forum was specially tailored to contribute towards the MPR process by providing an opportunity to present new and emerging evidence that could inform the development of the next KMS. The topics presented were identified by the focal persons at the NMCP in consultation with respective TWGs. Themed "Malaria Control in Devolved Kenya: Optimizing Efforts towards Elimination," the forum addressed malaria control under Kenya's devolved system of governance, established under the 2010 Constitution. The forum was the second of its kind held since county governments assumed responsibility for implementing malaria control activities, with the national government providing technical support. The forum adopted a mixture of plenary sessions involving all participants and concurrent breakout sessions of different thematic areas. The first plenary session focused on emerging issues in malaria control, and the second one dwelt on programmatic aspects and financing. The concurrent sessions focused on the following strategic areas:

- Malaria case management and vaccines
- Vector control
- SMEOR
- EPR
- ACSM
- MIP
- Accountability for malaria control at the community level

At the end of the two-day forum, key emerging ideas were identified and translated into recommendations to be considered in the next KMS.

Development of the KMS 2019–2023

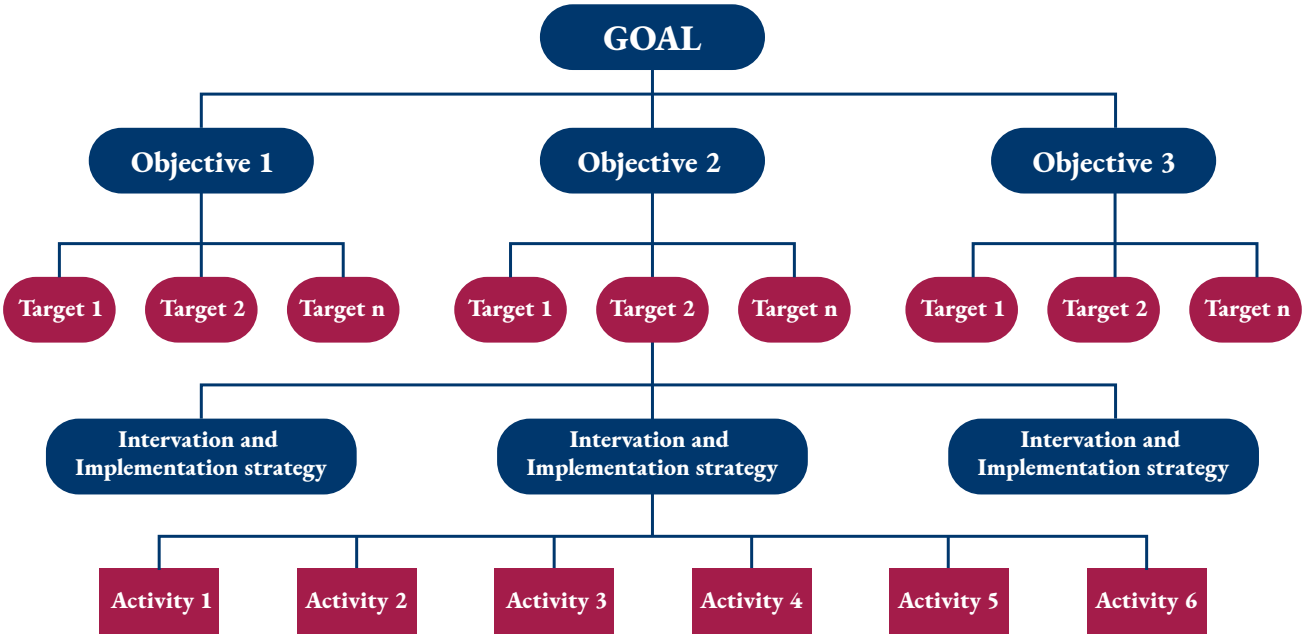
Strategic planning is a process of organising decisions and actions to achieve particular goals and objectives within a policy. It sets precise priorities and activities as well as the means to achieve them. It helps the malaria programme to do the following: clarify future directions; make evidence-based decisions in light of their future consequences; solve major organisational problems and improve performance; contribute to solving health system problems; adapt to changing environments and epidemiology; build partnerships, team work, and expertise; and provide a framework for collaboration with other programmes. The development of the KMS was guided by the findings and recommendations of the MPR. The process ran from October 2018 through December 2018.

Strategy Development Workshop

A five-day workshop was held to develop the first draft of the strategy (Annex 1.9). The workshop brought together the malaria control programme, key partners, the local consultants who facilitated the MPR, and a WHO technical expert. The workshop started with a brief summary of the key findings, conclusions, and recommendations of the

MPR. The WHO technical expert facilitated the process, guiding the participants to define the goal and objectives of the strategy. Participants were further guided to identify strategies and activities under each objective based on the recommendations of the MPR. Targets, baselines, and indicators to monitor progress in implementation were set based on the findings of the MPR. Figure 1.1 shows the hierarchy followed in developing the strategic plan.

Figure 1.1: Hierarchy of the key elements of a strategic plan



Goal

The goal was formulated in terms of malaria burden aimed at reducing malaria incidence and number of deaths. Consensus was reached to use the 2016 baseline on malaria incidence because routine data for 2017 were unreliable, given a prolonged industrial action by health workers. Participants set the KMS goal as follows: **To reduce malaria incidence and deaths by at least 75% of the 2016 level by 2023.**

Objectives

The KMS objectives focused on the following areas:

- Service delivery areas, prevention, diagnosis and treatment
- Supportive activities: health promotion, institutional capacity building (national and county level), surveillance, M&E, medicine, and commodity supply system
- Elimination of malaria in targeted counties
- Leadership, management, coordination, and partnerships

Following the MPR recommendations, an objective on elimination was introduced, and EPR was merged into SMEOR.

Table 1.4 shows the objectives of the previous KMS 2009–2018 (revised 2014) and the objectives proposed for the new KMS 2019–2023.

Table 1.4: Objectives of KMS 2009–2018 compared to the proposed objectives of the new strategy

	Old objectives	New objectives
Objective 1	To have at least 80% of people living in malaria risk areas using appropriate malaria preventive interventions by 2018	To protect 100% of people living in malaria risk areas through access to appropriate malaria preventive interventions by 2023
Objective 2	To have 100% of all suspected malaria cases who present to health provider managed according to national treatment guidelines by 2018	To manage 100% of suspected malaria cases according to the Kenya malaria treatment guidelines by 2023
Objective 3	To ensure that 100% of the malaria epidemic prone and seasonal transmission sub-counties have the capacity to detect and timely respond to malaria epidemics by 2018	To establish systems to accelerate malaria elimination in targeted counties by 2023
Objective 4	To ensure that all key malaria indicators are routinely monitored, reported, and evaluated in all counties by 2018	To increase utilisation of appropriate malaria interventions in Kenya to at least 80% by 2023
Objective 5	To increase utilisation of all malaria control interventions by communities in Kenya to at least 80% by 2018	To strengthen malaria surveillance and use of the information to improve decision-making for programme performance
Objective 6	To improve capacity in coordination, leadership, governance, and resource mobilisation at all levels towards achievement of the malaria programme objectives by 2018	To provide leadership and management for optimal implementation of malaria interventions at all levels, for the achievement of all objectives by 2023

After defining the goal and objectives, participants broke into six groups to formulate specific strategies under each objective and set targets and indicators.

Indicators, Strategies, Targets

Each group formulated the outcome and output indicators, strategies, and baselines and targets for each implementation year. The group sessions were facilitated by the local thematic consultant, assisted by the NMCP focal person in the respective area. The indicators, targets, and strategies were presented in plenary sessions. Then feedback was given, and more group sessions were held for further refinement.

Strategies primarily involved the following areas:

- Conducting integrated vector management (IVM)
- Sustaining scale up of long-lasting insecticidal nets (LLINs) and indoor residual spraying (IRS)
- Intensifying environmental management and larviciding where feasible
- Scaling up diagnosis using microscopy and rapid diagnostic tests (RDTs) and treatment with effective antimalarials
- Intensifying social mobilisation and behaviour change communication
- Establishing elimination platforms
- Strengthening existing malaria surveillance, M&E systems
- Enhancing strong leadership and coordination

The groups defined the key outcome and output indicators. For each indicator, a baseline was identified based on most recent available and reliable data and targets for each implementation year set based on estimated trends. Data sources for each indicator were identified, frequency of reporting defined, and responsible entities for collecting the data stated.

Performance Framework

The M&E performance framework was developed after the goals, objectives, targets, and indicators were agreed upon. This performance framework will guide the overall M&E of the strategic plan. It involved organising the inputs, process, output, and outcomes in a logical hierarchy. The teams identified the data sources and data collection methods as well as the responsible entities. The purpose of the performance framework was to guide the development of the M&E plan**.**

At the end of the five-day workshop, participants came up with a draft 0 of the KMS 2019–2023, which was presented to the county teams for further inputs and subsequently to the TWGs for validation.

Presentation to County Malaria Control Coordinators and County Directors of Health

The NMCP, in conjunction with other stakeholders, organised a two-day workshop (Annex 9) with the county malaria control coordinators (CMCCs) on 24 and 25 October 2018, at Nokras Hotel. The workshop brought together 94 stakeholders, including the malaria programme, other MOH departments and divisions, CMCCs, research institutions, and partners.

The objectives of the workshop were to:

- Review and update KMS goals, objectives, strategies and activities
- Review and update proposed M&E plan indicators

The meeting consisted of plenary and group sessions organised around the six strategic objectives. The group sessions reviewed the objectives and strategies in the draft KMS. The CMCCs gave inputs on proposed activities in the KMS based on their experience as the primary implementers of malaria control interventions in their respective counties. Following the inputs of the CMCCs, a one-day workshop for county directors of health was held on 8 November 2018. The county directors of health critically reviewed the draft strategy and gave further inputs on areas that needed to be tightened in the strategy.

Costing of the KMS

A costing workshop was held from 12 to 16 November 2018 (Annex 1.12). An activity-based approach was applied, in which the costs of all inputs required for each activity were factored in for the entire duration of the strategy 2018/19 to 2022/23. The workshop was facilitated by Health Policy Plus, the U.S. President's Malaria Initiative (PMI) partner that supports programme financing. A predesigned costing template with costing assumptions was shared with the participants. As in the previous workshops, participants divided into six teams and costed all the activities under their respective strategic objective. Budget summary was done for each strategy and by the six objectives. The deliverables of the costing workshop were costed inputs and budget assumptions by activity and for the entire five-year strategic plan.

Consensus Meetings

TWG meetings were held from 3 to 7 December 2018 to review and validate the draft costed KMS. The TWGS were attended by NMCP programme officers and focal persons, local thematic consultants, technical partners, and other key stakeholders, most of whom had participated in the MPR and KMS development process. The technical experts gave inputs on improvements that needed to be made in the document. The inputs were incorporated into the draft KMS and the cost implications factored into the overall budget. All five NMCP TWGs reviewed and validated their respective sections of the draft KMS. The updated draft KMS was then presented to the MICC for final ratification and adoption.

Ratification by MICC

An MICC meeting was held on 11 December 2018 to review and officially adopt the KMS. The lead consultant presented the KMS goal, objectives, strategies, activities, and key indicators. Each section of the draft KMS was discussed, and modifications were incorporated at the meeting. At the end of the meeting, the updated KMS was ratified and adopted.

The document will then be edited, fine-tuned, and printed and shared with all stakeholders.

Finalisation of the Kenya Malaria Strategy

The MPR 2018 was successfully conducted in Kenya. During the review, each of the objective strategies and activities was thoroughly assessed, and the gains and achievements of the programme, as well as the gaps and challenges, were documented.

The findings, recommendations, and conclusions of the review processes provided the sufficient background to develop the next level strategic plan. The thematic reports and recommendations refined the strategic direction and the revision of the objectives, strategies, and activities. The development of the new goal, objectives, and strategies was continuously refined during the various review and writing meetings. The document was then handed over to MEASURE Evaluation, the lead PMI partner supporting the MPR and development of KMS, for editing, design, and layout. The edited draft was reviewed by the NMCP and handed back to MEASURE Evaluation for design and layout. The covers of the two documents were designed by Population Services Kenya, the PMI partner for health communication, and approved by the NMCP.

The final KMS and M&E plan were forwarded to the MOH for signing. The documents were signed off by the cabinet secretary, chief administrative, and the permanent secretary. The launch of the KMS and its accompanying M&E plan was held on 25 April 2019, during the World Malaria Day celebrations in Siaya County.

Annex 1.1: Performance of the KMS 2009–2018 Objectives per Strategy

Objective 1: To have at least 80% of people living in malaria risk areas using appropriate malaria preventive interventions by 2017		**32%**
Strategy 1.1	Universal distribution of LLINs through appropriate channels (1 LLIN for 2 people)	80%
Strategy 1.2	Indoor residual spraying in the targeted areas	68%
Strategy 1.3	Larval source management where it is feasible and appropriate in the context of IVM	0%
Strategy 1.4	Support malaria-free school initiative	40%
Strategy 1.5	Provision of IPTp to pregnant women at antenatal clinics and promotion of its use at community level	34%
Objective 2: To have 100% of all suspected malaria cases who present to health workers managed according to National Treatment guidelines by 2018		**49%**
Strategy 2.1	Capacity building of health workers in malaria diagnosis and treatment at health facilities	48%
Strategy 2.2	Access to affordable malaria medicines and diagnostics through the private sector	36%
Strategy 2.3	Strengthening community case management of malaria using the community health strategy	67%
Strategy 2.4	Ensure commodity security of malaria medicines and diagnostics in the public sector	50%
Strategy 2.5	Strengthen quality assurance of diagnosis of malaria	45%
Objective 3: To ensure that 100% of the malaria epidemic prone and seasonal transmission sub-counties have the capacity to detect and timely respond to malaria epidemics by 2017		**27%**
Strategy 3.1	Strengthen early detection systems for malaria epidemics in epidemic prone and seasonal transmission areas	34%
Strategy 3.2	Strengthen capacity for malaria epidemic preparedness and response	23%
Objective 4: To strengthen surveillance, monitoring, and evaluation systems so that key malaria indicators are routinely monitored and evaluated in all counties by 2017		**60%**
Strategy 4.1	To strengthen malaria monitoring and evaluation systems	58%
Strategy 4.2	Conduct health facility surveys	50%
Strategy 4.3	Conduct and support community surveys	76%
Strategy 4.4	Strengthen school-based malaria sentinel surveillance (malariometric surveys)	0%
Strategy 4.5	Facilitate operational research and translation to policy	43%
Strategy 4.6	Strengthening malaria data management systems	0%
Strategy 4.7	Human resource capacity building in monitoring and evaluation	76%
Strategy 4.8	Entomological surveillance for malaria vectors	68%
Objective 5: To increase utilisation of all malaria control interventions by communities in Kenya to at least 80 % by 2017		**55%**
Strategy 5.1	Strengthen structures for the delivery of ACSM interventions at all levels	32%
Strategy 5.2	Strengthen programme communication for increased utilisation of all malaria interventions	88%
Strategy 5.3	Advocate for inter-sector collaboration for malaria ACSM	30%
Strategy 5.4	Strengthen community-based social and behaviour change communication activities for all malaria interventions	75%

Objective 6: To improve capacity in coordination, leadership, governance, and resource mobilisation at all levels towards achievement of the malaria programme objectives by 2017		42%
Strategy 6.1	Develop/update and disseminate policy and strategic documents, lobby for legislation/ regulations to guide malaria control in Kenya	32%
Strategy 6.2	Strengthen procurement and supply management systems for malaria drugs and commodities	29%
Strategy 6.3	Strengthening capacity for planning, partnerships, coordination, and implementation at all levels	56%
Strategy 6.4	Strengthen resource mobilisation capacity to improve malaria control financing	34%

Annex 1.2: Timetable for the Inception Meeting, 18 June 2018

Time	Activity	Responsible person	Moderator
8.30 am–9.00 am	Registration		Dr. Kiptui
9.00 am–9.15 am	Introductions	Deborah Ikonge	
9.15 am–9.45 am	Expectations	James Sang	
9.45 am–10.00 am	The MPR Roadmap	Waqo	
10.00 am–10.10 am	Q&A	Dr. Waqo	
10.10 am–10.20 am	The Coordination Structure	Dr. Akhwale	
10.20 am–10.30 am	Q&A	Dr. Akhwahle	
10.30 am–11.00 am	**Tea Break**	**ALL**	
11.00 am–11.20 am	The Reporting Outline	Josephine Karuri	
11.20 am–11.30 am	Q&A	Josephine Karuri	
11.30 am–11.45 am	TWG Preparations	Dr. Akhwale	
11.45 am–12.30 pm	Group Work	ALL	
12.30 pm–1.00 pm	Presentations	Group 1,2,	
1.00 pm–2.00 pm	**Lunch**	**All**	
2.00 pm–3.00 pm	Group Presentations	Groups 3, 4, 5, 6	Andrew Wamari
3.00 pm–3.30 pm	Closing Remarks	Dr. Waqo/Dr. Akhwale	

Notes on MPR Agenda Items for TWGS

1. MPR Roadmap
2. Information sources in terms of publications, grey literature, and suggestions of key people to be interviewed
3. Dates for thematic group workshops

Annex 1.3: Information Extraction Framework for Malaria Programme Review Phase 2

Name of MPR Thematic Area:

	Title [author(s), date]	Literature type [published, grey, policy doc, etc.]	Study focus area	Relevance to the MPR thematic area	Key findings from the document reviewed	Lessons learnt and recommendations for MPR
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						

Annex 1.4: Adapted Kenya Technical Performance Tool

Current Strategic Plan 2009–2018

Strategies	Activities	Malaria strategic plan activities				MPR technical performance					Remarks
		2014/15	2015/16	2016/17	2017/18	# of activities planned (2014 to 2017)	# of activities implemented (2014 to 2017)	% of activities implemented	Scoring of the activity completeness implementation	Implementation performance rating (proxy)	(i)-Provide all activities products; (ii)-summarize enabling and unabling factors; (iii)-Summarize the challenges and recommend ways forward; (iv)-Summarize any comments about the achievements, issues and way forward for the remaining period of the malaria strategic plan
Malaria strategic plan technical implementation performance						118					
Objective 1: To have at least 80 percent of people living in malaria risk areas using appropriate preventive interventions by 2018						24					
Strategy 1.1: Universal distribution of LLINs through appropriate channels (1 LLIN for 2 people)						6					
Activity 1.1.1	Conduct a mass LLIN distribution campaign to achieve universal access	x			x						
Activity 1.1.2	Micro-planning at sub-county level	x	x		x						
Activity 1.1.3	Mapping and registration of households	x	x		x						
Activity 1.1.4	Routine distribution of LLIN through ANC and child welfare clinics	x	x	x	x						
Activity 1.1.5	Distribution of LLINs through social marketing	x	x	x	x						
Activity 1.1.6	Pilot community continuous net distribution	x									
Strategy 1.2: Indoor residual spraying in targeted areas						6					
Activity 1.2.1	Conduct IRS in epidemic prone and fringe endemic counties	x	x								
Activity 1.2.2	Conduct IRS in endemic counties	x	x								

Strategies	Activities	Malaria strategic plan activities				MPR technical performance					Remarks
		2014/15	2015/16	2016/17	2017/18	# of activities planned (2014 to 2017)	# of activities implemented (2014 to 2017)	% of activities implemented	Scoring of the activity completeness implementation	Implementation performance rating (proxy)	(i)-Provide all activities products; (ii)-summarize enabling and unabling factors; (iii)-Summarize the challenges and recommend ways forward; (iv)-Summarize any comments about the achievements, issues and way forward for the remaining period of the malaria strategic plan
Activity 1.2.3	Capacity building for IRS	x	x		x						
Activity 1.2.4	Procurement and distribution of IRS commodities and equipment	x	x		x						
Activity 1.2.5	Develop GPS mapping system for planning and monitoring IRS activities				x						
Activity 1.2.6	Supervision, monitoring and evaluation of IRS operations	x	x		x						
Strategy 1.3: Larval source management						3					
Activity 1.3.1	Capacity building for Larval source management	x	x		x						
Activity 1.3.2	Larval source management in targeted areas	x	x	x	x						
Activity 1.3.3	IVM (Environmental management)	x	x	x	x						
Strategy 1.4: Support malaria free initiatives						2					
Activity 1.4.1	Development of malaria content for school curriculum	x		x							
Activity 1.4 2	Dissemination and adoption of the developed content by stakeholders	x		x							
Strategy 1.5: Provision of IPTp at ANC and promotion of its use at the community level						7					
Activity 1.5.1	Update and disseminate IPTp guidelines		x	x							
Activity 1.5 2	Procurement and distribution of effective medicines for IPTp	x	x	x	x						

Strategies	Activities	Malaria strategic plan activities				MPR technical performance					Remarks
		2014/15	2015/16	2016/17	2017/18	# of activities planned (2014 to 2017)	# of activities implemented (2014 to 2017)	% of activities implemented	Scoring of the activity completeness implementation	Implementation performance rating (proxy)	(i)-Provide all activities products; (ii)-summarize enabling and unabling factors; (iii)-Summarize the challenges and recommend ways forward; (iv)-Summarize any comments about the achievements, issues and way forward for the remaining period of the malaria strategic plan
Activity 1.5.3	Capacity building for provision of IPTp-SP (Service Providers, community health extension workers, CHVs, private sector, and faith-based organisations	x	x	x	x						
Activity 1.5.4	Supportive supervision of MIP activities (facility and community) by CHMTs and SCHMTs with mentorship by NMCP/ RMHSU	x	x	x	x						
Activity 1.5.5	Conducting advocacy and mobilisation activities (e.g., community outreach activities; sensitisation of pregnant women to start early ANC attendance)	x	x	x	x						
Activity 1.5.6	Holding quarterly MIP TWG meetings	x	x	x	x						
Activity 1.5.7	Conduct a review of IPTp implementation in 2016 to inform next KNMS	x		x							

Strategies	Activities	Malaria strategic plan activities				MPR technical performance					Remarks
		2014/15	2015/16	2016/17	2017/18	# of activities planned (2014 to 2017)	# of activities implemented (2014 to 2017)	% of activities implemented	Scoring of the activity completeness implementation	Implementation performance rating (proxy)	(i)-Provide all activities products; (ii)-summarize enabling and unabling factors; (iii)-Summarize the challenges and recommend ways forward; (iv)-Summarize any comments about the achievements, issues and way forward for the remaining period of the malaria strategic plan
Objective 2: To have 80% of all self-managed fever cases receive prompt and effective treatment and 100% of all fever cases who present to health workers receive parasitological diagnosis and effective treatment by 2018						24					
Strategy 2.1: Capacity building for malaria case management at health facilities						6					
Activity 2.1.1	Review print and disseminate malaria diagnosis and treatment guidelines and training curricula		x		x						
Activity 2.1.2	Train health workers on integrated case management	x	x		x						
Activity 2.1.3	Monitor and supervise case management trainings and practice	x	x		x						
Activity 2.1.4	Review print and disseminate guidelines and training material for ETAT+	x	x	x	x						
Activity 2.1.5	Train health workers on ETAT+	x	x	x	x						
Activity 2.1.6	Monitor and supervise ETAT+ trainings and practice	x	x	x	x						
Strategy 2.2: Access to affordable malaria medicines and diagnostics through the private sector						3					
Activity 2.2.1	Develop private sector case management implementation plan	x		x							

Strategies	Activities	Malaria strategic plan activities				MPR technical performance					Remarks
		2014/15	2015/16	2016/17	2017/18	# of activities planned (2014 to 2017)	# of activities implemented (2014 to 2017)	% of activities implemented	Scoring of the activity completeness implementation	Implementation performance rating (proxy)	(i)-Provide all activities products; (ii)-summarize enabling and unabling factors; (iii)-Summarize the challenges and recommend ways forward; (iv)-Summarize any comments about the achievements, issues and way forward for the remaining period of the malaria strategic plan
Activity 2.2.2	Conduct biannual planning and coordination meetings with private sector	x	x	x	x						
Activity 2.2.3	Procure ACTs and ensure availability of RDTs in the private sector	x	x	x	x						
Strategy 2.3: Strengthening Community case management of Malaria using the community strategy through community health volunteers						3					
Activity 2.3.1	Review print and disseminate malaria community case management training curriculum	x		x							
Activity 2.3.2	Train Community health volunteers and community health extension workers	x	x	x	x						
Activity 2.3.3	Supervise and Monitor community case management trainings and practice	x	x	x	x						
Strategy 2.4: Ensuring commodity security of antimalarials and diagnosis in the public sector						7					
Activity 2.4.1	Ensure inclusion of antimalarial drugs and diagnostics in relevant guidelines and essential drugs list as per the national treatment guidelines	x	x	x	x						
Activity 2.4.2	Develop and disseminate specifications for antimalarial drugs and diagnostics	x	x	x	x						

Strategies	Activities	Malaria strategic plan activities				MPR technical performance					Remarks
		2014/15	2015/16	2016/17	2017/18	# of activities planned (2014 to 2017)	# of activities implemented (2014 to 2017)	% of activities implemented	Scoring of the activity completeness implementation	Implementation performance rating (proxy)	(i)-Provide all activities products; (ii)-summarize enabling and unabling factors; (iii)-Summarize the challenges and recommend ways forward; (iv)-Summarize any comments about the achievements, issues and way forward for the remaining period of the malaria strategic plan
Activity 2.4.3	Ensure a conducive regulatory environment for antimalarials and diagnostics	x	x	x	x						
Activity 2.4.4	Conduct forecasting and quantification of malaria medicines and diagnostics	x	x	x	x						
Activity 2.4.5	Procure and distribute antimalarials and malaria diagnostics	x	x	x	x						
Activity 2.4.6	Strengthen Logistic Management Information Systems (LMIS)	x	x	x	x						
Activity 2.4.7	Conduct Post Market Surveillance of antimalarials and diagnostics	x	x	x	x						
Strategy 2.5: Strengthen quality assurance (QA) for malaria diagnostics						5					
Activity 2.5.1	Review and disseminate malaria laboratory guidelines and curricula	x		x							
Activity 2.5.2	Review malaria diagnosis QA implementation plan	x		x							
Activity 2.5.3	Train lab personnel on QA of microscopy and RDTs	x	x	x	x						
Activity 2.5.4	Supervise and monitor QA training and implementation	x	x	x	x						
Activity 2.5.5	Support county and national reference laboratories	x	x	x	x						

Strategies	Activities	Malaria strategic plan activities				MPR technical performance					Remarks
		2014/15	2015/16	2016/17	2017/18	# of activities planned (2014 to 2017)	# of activities implemented (2014 to 2017)	% of activities implemented	Scoring of the activity completeness implementation	Implementation performance rating (proxy)	(i)-Provide all activities products; (ii)-summarize enabling and unabling factors; (iii)-Summarize the challenges and recommend ways forward; (iv)-Summarize any comments about the achievements, issues and way forward for the remaining period of the malaria strategic plan
Objective 3: To ensure that 100% of malaria epidemic prone and seasonal transmission sub counties have the capacity to detect, prepare for and timely respond to malaria epidemics by 2018						9					
Strategy 3.1: Strengthen early detection systems for malaria epidemics in epidemic prone and seasonal transmission areas						3					
Activity 3.1.1	Set-up sentinel surveillance in the seasonal transmission areas	x									
Activity 3.1.2	Strengthening existing sentinel surveillance sites in the epidemic prone areas.	x	x	x							
Activity 3.1.3	Install infrastructure for climate-based malaria early warning systems	x									
Strategy 3.2: Strengthen capacity for malaria epidemic preparedness and response						6					
Activity 3.2.1	Develop/review/update sub-county and county malaria EPR plans	x	x	x	x						
Activity 3.2.2	Disseminate malaria epidemic preparedness guidelines	x									
Activity 3.2.3	Conduct risk mapping at sub-counties annually to identify hot spots and respond appropriately	x	x	x	x						
Activity 3.2.4	Maintain adequate buffer stock of malaria commodities and contingency funds for early response	x	x	x	x						

Strategies	Activities	Malaria strategic plan activities				MPR technical performance					Remarks
		2014/15	2015/16	2016/17	2017/18	# of activities planned (2014 to 2017)	# of activities implemented (2014 to 2017)	% of activities implemented	Scoring of the activity completeness implementation	Implementation performance rating (proxy)	(i)-Provide all activities products; (ii)-summarize enabling and unabling factors; (iii)-Summarize the challenges and recommend ways forward; (iv)-Summarize any comments about the achievements, issues and way forward for the remaining period of the malaria strategic plan
Activity 3.2.5	Establish and maintain rapid response teams at county and sub-county levels	x	x	x	x						
Activity 3.2.6	Conduct post-epidemic evaluation (Based on the occurrence of epidemic-hence the activities are simply indicative)	x	x	x	x						
Objective 4: Ensure that all malaria indicators are routinely monitored, reported and evaluated in all counties by 2018						25					
Strategy 4.1: To strengthen malaria monitoring and evaluation systems						6					
Activity 4.1.1	Review and disseminate M&E framework and plan	x		x	x						
Activity 4.1.2	Support M&E technical working group	x	x	x	x						
Activity 4.1.3	Support scale up of malaria surveillance and monitoring in collaboration with DSRU and HIS	x	x	x	x						
Activity 4.1.4	Develop malaria surveillance guidelines and tools										
Activity 4.1.5	Malaria surveillance monitoring and supervision	x	x	x	x						
Activity 4.1.6	Conduct DQA to counties, sub-counties and selected health facilities in collaboration with HIS and DSRU	x	x	x	x						

Strategies	Activities	Malaria strategic plan activities				MPR technical performance					Remarks
		2014/15	2015/16	2016/17	2017/18	# of activities planned (2014 to 2017)	# of activities implemented (2014 to 2017)	% of activities implemented	Scoring of the activity completeness implementation	Implementation performance rating (proxy)	(i)-Provide all activities products; (ii)-summarize enabling and unabling factors; (iii)-Summarize the challenges and recommend ways forward; (iv)-Summarize any comments about the achievements, issues and way forward for the remaining period of the malaria strategic plan
Strategy 4.2: Conduct and facilitate health facility surveys						4					
Activity 4.2.1	Conduct and support the monitoring of the quality of malaria case management in sampled health facilities	x	x	x	x						
Activity 4.2.2	Conduct drug availability survey in the private sector	x		x							
Activity 4.2.3	Conduct countrywide health provider and health facility inventory for malaria diagnosis and treatment			x	x						
Activity 4.2.4	Support pharmacy and poisons board to undertake pharmacovigilance for malaria medicines	x	x	x	x						
Strategy 4.3: Conduct and support community surveys						4					
Activity 4.3.1	Conduct malaria drug efficacy monitoring studies every 2 year	x		x							
Activity 4.3.2	Conduct malaria indicator surveys	x			x						
Activity 4.3.3	Conduct impact evaluations for malaria interventions		x								
Activity 4.3.4	Conduct re-analysis of KDHS malaria data	x		x							
Strategy 4.4: Strengthen school-based malaria sentinel surveillance						1					
Activity 4.4.1	Facilitate malariometric surveys	x	x	x	x						

Strategies	Activities	Malaria strategic plan activities				MPR technical performance					Remarks
		2014/15	2015/16	2016/17	2017/18	# of activities planned (2014 to 2017)	# of activities implemented (2014 to 2017)	% of activities implemented	Scoring of the activity completeness implementation	Implementation performance rating (proxy)	(i)-Provide all activities products; (ii)-summarize enabling and unabling factors; (iii)-Summarize the challenges and recommend ways forward; (iv)-Summarize any comments about the achievements, issues and way forward for the remaining period of the malaria strategic plan
Strategy 4.5: Facilitate operational research and translation to policy						3					
Activity 4.5.1	Hold quarterly meetings of the OR TWG	x	x	x	x						
Activity 4.5.2	Provide research grants to research institutions		x		x						
Activity 4.5.3	Hold national malaria research to policy conference once every two years	x		x							
Strategy 4.6: Strengthen malaria data management systems						1					
Activity 4.6.1	Update and upgrade MIAS	x	x	x	x						
Strategy 4.7: Human resource capacity building in monitoring and evaluation						4					
Activity 4.7.1	Develop and implement a system for monitoring improvements in M&E capacity	x	x	x	x						
Activity 4.7.2	Train NMCP on M&E	x	x	x	x						
Activity 4.7.3	Capacity building of county teams on M&E	x	x	x							
Activity 4.7.4	Develop and disseminate national data demand and use strategy	x	x	x							
Strategy 4.8: Conduct and support entomological surveillance						2					
Activity 4.8.1	Malaria vector surveillance	x	x	x	x						
Activity 4.8.2	Conduct insecticides susceptibility studies	x	x	x	x						

Strategies	Activities	Malaria strategic plan activities				MPR technical performance					Remarks
		2014/15	2015/16	2016/17	2017/18	# of activities planned (2014 to 2017)	# of activities implemented (2014 to 2017)	% of activities implemented	Scoring of the activity completeness implementation	Implementation performance rating (proxy)	(i)-Provide all activities products; (ii)-summarize enabling and unabling factors; (iii)-Summarize the challenges and recommend ways forward; (iv)-Summarize any comments about the achievements, issues and way forward for the remaining period of the malaria strategic plan
Objective 5: To increase utilisation of all malaria control interventions by communities in Kenya to at least 80 % by 2018						23					
Strategy 5.1: Strengthen structures for the delivery of ACSM interventions at all levels						7					
Activity 5.1.1	Review and disseminate ACSM policy and guidelines	x									
Activity 5.1.2	Scale up the capacity of implementers at county, sub-county and partners on ACSM and develop county communication plans	x	x	x							
Activity 5.1.3	Hold quarterly meetings of malaria ACSM TWGs at national level	x	x	x	x						
Activity 5.1.4	Support quarterly meetings of ACSM TWGs at county levels	x	x	x	x						
Activity 5.1.5	Undertake support supervision for malaria ACSM activities at county level.	x	x	x	x						
Activity 5.1.6	Identify and support national malaria ambassador	x	x	x	x						
Activity 5.1.7	Support the counties to identify and support malaria ambassador	x	x								

Strategies	Activities	Malaria strategic plan activities				MPR technical performance					Remarks
		2014/15	2015/16	2016/17	2017/18	# of activities planned (2014 to 2017)	# of activities implemented (2014 to 2017)	% of activities implemented	Scoring of the activity completeness implementation	Implementation performance rating (proxy)	(i)-Provide all activities products; (ii)-summarize enabling and unabling factors; (iii)-Summarize the challenges and recommend ways forward; (iv)-Summarize any comments about the achievements, issues and way forward for the remaining period of the malaria strategic plan
Strategy 5.2: Strengthen programme communication for increased utilisation of all malaria interventions						3					
Activity 5.2.1	Develop, disseminate and distribute ACSM package to promote utilisation of all malaria interventions at household level	x	x	x	x						
Activity 5.2.2	Scale up of routine multi-media activities (mainly interactive radio programs) to support ACSM at county /sub-county and community level	x	x	x	x						
Activity 5.2.3	Support national multi-media activities	x	x	x	x						
Strategy 5.3: Advocate for inter-sector collaboration for malaria ACSM						4					
Activity 5.3.1	Hold bi-annual consultative meeting with relevant sector partners for malaria ACSM	x	x	x	x						
Activity 5.3.2	Support priority ACSM implementing partners with information, education, and communication/behavior change communication materials	x	x	x	x						
Activity 5.3.3	Commemorate World Malaria Day	x	x	x	x						
Activity 5.3.4	Publication of bi-annual malaria information and advocacy bulletin	x	x	x	x						

Strategies	Activities	Malaria strategic plan activities				MPR technical performance					Remarks
		2014/15	2015/16	2016/17	2017/18	# of activities planned (2014 to 2017)	# of activities implemented (2014 to 2017)	% of activities implemented	Scoring of the activity completeness implementation	Implementation performance rating (proxy)	(i)-Provide all activities products; (ii)-summarize enabling and unabling factors; (iii)-Summarize the challenges and recommend ways forward; (iv)-Summarize any comments about the achievements, issues and way forward for the remaining period of the malaria strategic plan
Strategy 5.4: Strengthen community based social and behavior change communication activities for all malaria interventions						9					
Activity 5.4.1	Support community health workers to actively map out households for targeted malaria interventions	x	x								
Activity 5.4.2	Support counties to identify community own resource persons in areas without community units, train and facilitate them to undertake promotion of malaria interventions at household level	x	x								
Activity 5.4.3	Support community health units to conduct community dialogues to identify and address barriers to uptake and utilisation of malaria interventions	x	x	x	x						
Activity 5.4.4	Support the community health units to conduct community malaria action days.	x	x	x	x						
Activity 5.4.5	Support communities to form malaria advocacy groups comprising community-based organisations, faith-based organisations, Ward representatives to advocate for malaria at various locations and villages	x	x								

Strategies	Activities	Malaria strategic plan activities				MPR technical performance					Remarks
		2014/15	2015/16	2016/17	2017/18	# of activities planned (2014 to 2017)	# of activities implemented (2014 to 2017)	% of activities implemented	Scoring of the activity completeness implementation	Implementation performance rating (proxy)	(i)-Provide all activities products; (ii)-summarize enabling and unabling factors; (iii)-Summarize the challenges and recommend ways forward; (iv)-Summarize any comments about the achievements, issues and way forward for the remaining period of the malaria strategic plan
Activity 5.4.6	Support counties to undertake monitoring and supervision of net use promotion activities at household level	x	x	x	x						
Activity 5.4.7	Support counties to engage school pupils to malaria interventions at household level	x	x	x	x						
Activity 5.4.8	Support counties to use local interactive radio programs on malaria in local dialects	x	x	x	x						
Activity 5.4.9	Document and disseminate lessons learnt on innovative malaria ACSM promotion in selected counties		x		x						
Objective 6: To improve capacity in coordination, leadership, governance and resource mobilisation at all levels towards achievement of the malaria programme objectives by 2018											
Strategy 6.1 Develop/Update and disseminate policy and strategic documents, lobby for legislation/ regulations to guide malaria control in Kenya						6					
Activity 6.1.1	Update and disseminate malaria policy			x							
Activity 6.1.2	Develop/update Strategic and M&E plan			x							
Activity 6.1.3	Review Malaria Prevention Act			x							
Activity 6.1.4	Mainstream malaria into national health plan			x							

Strategies	Activities	Malaria strategic plan activities				MPR technical performance					Remarks
		2014/15	2015/16	2016/17	2017/18	# of activities planned (2014 to 2017)	# of activities implemented (2014 to 2017)	% of activities implemented	Scoring of the activity completeness implementation	Implementation performance rating (proxy)	(i)-Provide all activities products; (ii)-summarize enabling and unabling factors; (iii)-Summarize the challenges and recommend ways forward; (iv)-Summarize any comments about the achievements, issues and way forward for the remaining period of the malaria strategic plan
Activity 6.1.5	Develop/Update risk management plan and operations manual	x		x	x						
Activity 6.1.6	End-term review of the strategic and M&E plan			x	x						
Strategy 6.2: Strengthen procurement and supply management systems for malaria drugs and commodities						7					
Activity 6.2.1	Develop and review the guidelines and SOPs for Malaria Commodity Quantification, forecasting and inventory management	x	x	x							
Activity 6.2.2	Develop and review the annual PSM plan within the context of devolution to counties	x	x	x	x						
Activity 6.2.3	Evaluation of malaria commodity distribution system (LLINs; ACTs and RDTs)	x	x	x	x						
Activity 6.2.4	Provide support to expand storage facilities	x	x	x							
Activity 6.2.5	Strengthen and enhance monitoring and reporting of PSM	x	x	x	x						
Activity 6.2.6	Build capacity for procurement supply chain at county levels		x								
Activity 6.2.7	Support supervision for commodity security	x	x	x	x						

Annex 1.5: Agenda for the Malaria Programme Review Consolidation Workshop

Malaria Programme Review Workshop			
9–13 July 2018			
Day 1: 9 July 2018	**Activity**	**Facilitation**	**Session Chair**
4:00 PM	Arrival of Delegates	NMCP and PS-Kenya	
Day 2: 10 July 2018	**Review of MPR Processes and Update on Thematic Desk Review**		
8:30 AM–9:00 AM	Registration and Welcome	NMCP and PS-Kenya	NMCP
9:00 AM–9:10 AM	Introduction of Participants	NMCP	
9:10 AM–9:20 AM	Objectives and Expected Outcomes	NMCP	
9:20 AM–9:30 AM	Opening Address	Head - NMCP and Lead Consultant	
9:30 AM–9:40 AM	MPR Overview and Current Status	NMCP	
9:40 AM–10:20 AM	Thematic Presentations from Malaria Prevention 1 - Vector Control 2 - Malaria in Pregnancy	Consultants	
10:20 AM–10:45 AM	**Tea Break**		
10:45 AM–11:25 AM	Thematic Presentation from 3 - Diagnosis and treatment 4 - Procurement and Supply Management	Consultants	
11:25 AM–11:45 AM	Plenary Discussions		
11:45 AM–1:00 PM	Thematic Presentations from 5 - Epidemic Preparedness and Response 6 - Advocacy Communication and Social Mobilisation 7 - Monitoring and Evaluation	Consultants	
1:00 PM–2:00 PM	**Lunch**		
2:00 PM–2:30 PM	Thematic Presentation from 8 - Programme Management 9 - Finance and Costing	Consultants	LEAD CONSULTANT
2:30 PM–3:00 PM	Plenary Discussions and Group Selection	Focal Persons and Consultants	
3:00 PM–5:00 PM	County Presentation and Discussion		
Day 3: 11 July 2018	**Group Work on Thematic Desk Review**		
8:30 AM–10:30 AM	Group Work on Thematic Reports	Focal Persons and Consultants	LEAD CONSULTANT
10:30 AM–11:00 AM	**Tea Break**		
11:00 AM–1:00 PM	Group Work on Thematic Reports	Focal Persons and Consultants	
1:00 PM –2:00 PM	**Lunch**		
2:00 PM–5:00 PM	Group work on Thematic Reports	Focal Persons and Consultants	

Day 4: 12 July 2018	**Thematic Desk Review Presentation**		
8:30 AM–9:30 AM	Presentations on Thematic Areas 1 - Vector Control 2 - Malaria in Pregnancy 3 - Diagnosis and Treatment 4 - Procurement and Supply Management	Consultants	LEAD CONSULTANT
9:30 AM–10:15 AM	Plenary Discussions		
10:15 AM–10:45 AM	**Tea Break**		
10:45 AM–12:00 PM	Presentations on Thematic Areas 5 - Epidemic Preparedness and Response 6 - Advocacy, Communication and Social Mobilisation 7 - Monitoring and Evaluation 8 - Programme Management 9 - Finance and Costing	Consultants	
12:00 PM–1:00 PM	Plenary Discussions		
1:00 PM–2:00 PM	**Lunch**		
2:00 PM–3:00 PM	Group work on Thematic Reports	Focal Persons and Consultants	
3:00 PM–4:00 PM	Plenary on Thematic Reports and Way Forward		NMCP
4:00 PM–4:30 PM	Submission of Draft Thematic Reports Closing Remarks for Workshop	NMCP and Lead Consultant	
Day 5: 13 July 2018			
9:00 AM	Departure of the Delegates		

Annex 1.6: Malaria Programme Review Questionnaire for Counties

National Malaria Control Programme (Malaria Programme Review)

The Kenya Malaria Strategy (KMS 2009-2018) has been implemented by National Malaria Control Programme (NMCP) in conjunction with all stakeholders including county governments. This strategy has now come to an end and a comprehensive malaria programme review (MPR) has begun.

The MPR entails a comprehensive evaluation of the achievements of the programme against the set targets, documenting the enabling factors and the challenges encountered. The review will also inform the strategic and implementation direction for the next KMS.

As our key implementation partners, counties are important in the review process and thus we request for your inputs. This is the first of several interactions in the review process that we will be engaging the counties. The information provided will enhance the overall review outcomes and inform the strategic and implementation direction for malaria control in the years to come.

Your Responses may include the following areas of Malaria control:

Malaria prevention; diagnosis and treatment; malaria epidemic preparedness and response (Where applicable); advocacy and Behaviour Change Communication; Monitoring and Evaluation; overall coordination of Malaria control activities at county level and Financing for malaria control activities at County level.

Name of County: _____

Name and Designation of respondent_____

1. Vector control

NMCP aimed to have 90% of households in malaria endemic areas owning more than one insecticide treated net by 2018. To what extent do you feel the Programme achieved this goal in your county over the past 5 years?

☐ Strongly Agree	☐ Agree	☐ Neutral	☐ Disagree	☐ Strongly Disagree

Please explain your response, highlighting any facilitating factors and challenge

2. Malaria in pregnancy

NMCP aimed to have at least 80% of people living in malaria risk areas using appropriate malaria preventive interventions by 2018. The strategy for malaria prevention in women was to provide IPTp at antenatal clinics (ANC) and promotion of its use in the community. To what extent do you feel the Programme achieved this goal in your county over the past 5 years?

☐ Strongly Agree	☐ Agree	☐ Neutral	☐ Disagree	☐ Strongly Disagree

Please explain your response, highlighting any facilitating factors and challenges.

3 **Case management**

NMCP aimed to have 100% of all suspected malaria cases who present to health workers managed according to

national treatment guidelines by 2018. To what extent do you feel the Programme achieved this goal in your county over the past 5 years?

☐ Strongly Agree	☐ Agree	☐ Neutral	☐ Disagree	☐ Strongly Disagree

Please explain your response, highlighting any facilitating factors and challenges.

4 **Procurement and Supply Management**

To what extent do you feel that there has been malaria commodities security in your county over the past 5 years?

☐ Strongly Agree	☐ Agree	☐ Neutral	☐ Disagree	☐ Strongly Disagree

Please explain your response, highlighting any facilitating factors and challenges.

5 **Epidemic Preparedness and Response**

The current Malaria Strategic Plan stipulated a target of 100% of the malaria epidemic prone and seasonal transmission sub-counties to have the capacity to detect and timely respond to malaria epidemics by 2018. To what extent do you feel this goal was achieved in your county?

☐ Strongly Agree	☐ Agree	☐ Neutral	☐ Disagree	☐ Strongly Disagree

Please explain your response, highlighting any facilitating factors and challenges.

6 **Advocacy Communication and Social Mobilisation**

- The current Kenya Malaria Strategy aimed at increasing utilisation of all malaria control intervention [LLIN, case management, IPT] to at least 80 percent by 2018. To what extent do you feel this goal was achieved in the past 5 years?

☐ Strongly Agree	☐ Agree	☐ Neutral	☐ Disagree	☐ Strongly Disagree

Please explain your response, highlighting any facilitating factors and barriers to increased utilisation.

LLIN (where applicable) _____

Case Management [Diagnosis & treatment] _____

IPTp [*where applicable*] _____

7 **Surveillance, Monitoring and Evaluation**

Do you feel that malaria-specific data has been available to the county leadership to inform decision making?

Please explain your response, and comment on the quality of the data available.

8 List 3 key achievements in malaria control by your county during the last 5 years

- Training of staff on malaria case management
- Training staff on malaria surveillance
- Distribution of malaria commodities on time

9 List 3 key challenges that hindered malaria control in your county during the last 5 years

10 What are the **top three** issues that you wish to see prioritized in the next Malaria Strategic Plan?

11 The Malaria strategic plan advocates for resource mobilisation. Which one of the statements below reflects the budget situation in your county during the last 5 years?

☐ A reduction	☐ No change	☐ Up to 20% increase	☐ Up to 40% increase	☐ Up to 50% increase	☐ More than 50% increase

Please explain your response, highlighting facilitating factors and challenges.

12 During the last financial year 2017/18. Provide the data for allocated budget and expenditure

County Government budget Kshs _____ Expenditure Kshs _____

Donor support budget Kshs._____ Expenditure Kshs _____

What were the malaria strategic interventions that were funded?

NOT able to provide the information _____

Please briefly explain your responses to the question above

Annex 1.7: Programme for the Validation Workshop and Field Visits

WEEK 1							
	Sun, 22 July	**Mon, 23 July [D1]**	**Tue, 24 July [D2]**	**Wed, 25 July [D3]**	**Thurs, 26 July [D4]**	**Fri, 27 July [D5]**	**Sat, 28 July [D6]**
Early Morning	Arrival of external reviewers	Courtesy call with WR 9 a.m.: Introduction and welcome: with NMCP and all external reviewers- Head of Programme, Khoti Gausi Update on MPR from NMCP 9:30 a.m.: Discussions by thematic area on key findings including performance framework/KMS objectives 1 and 2 and PSM (30 min each)	Discussion on compilation of the final report and division of roles and contributions Improvement of write-ups based on discuss-ions and feed-back (by thematic groups)	Travel to the field	Courtesy call to County Governments [depending on the county each team should visit a sub-county hospital, a peripheral health centre, and the community]. As much as possible use the guidance in the MPR manual.	Field visit	Travel back to Nairobi

WEEK 1							
	Sun, 22 July	**Mon, 23 July [D1]**	**Tue, 24 July [D2]**	**Wed, 25 July [D3]**	**Thurs, 26 July [D4]**	**Fri, 27 July [D5]**	**Sat, 28 July [D6]**
Late Morning	Arrival of external reviewers	Presentations by thematic area/ KMS objectives	Review of tools and methods for the field work Review of what to look for in the field Logistics of travel to the field	Travel to the field	Field visit	Field visit	Travel back to Nairobi
Early Afternoon	Arrival of external reviewers	Presentations by thematic area/ KMS objectives Progress on KMS line by line	Review of tools and methods for the field work Review of what to look for in the field Logistics of travel to the field	Travel to the field	Field visit	Debrief with the county officials	Teams rest
Late Afternoon	All external reviewers hold a 1-hour meeting to discuss conduct of the MPR [time to be advised]	Progress on KMS line by line Discussion on compilation of the final report and division of roles and contributions	Review of tools and methods for the field work Review of what to look for in the field Logistics of travel to the field	Travel to the field	Field visit	Debrief with the County officials Travel back to Nairobi	Teams rest

WEEK 1							
	Sun, 22 July	**Mon, 23 July [D1]**	**Tue, 24 July [D2]**	**Wed, 25 July [D3]**	**Thurs, 26 July [D4]**	**Fri, 27 July [D5]**	**Sat, 28 July [D6]**
Evening	All external reviewers hold a 1-hour meeting to discuss conduct of the MPR [time to be advised]	Meeting of MPR core team with external reviewers: (output: dates, locations, and county focal persons of field visits per team)	Meeting of MPR core team with external reviewers	All teams confirm arrival in the provinces A small team of people should remain behind at the centre to start working on compilation of aide memoire and report	Report writing of field work	Field report writing Travel back to Nairobi	Teams rest
WEEK 2							
	Sun, 29 July [D7]	**Mon, 30 July [D8]**	**Tue, 31 July [D9]**	**Wed, 1 Aug [D10]**	**Turs, 2 Aug [D11]**	**Fri, 3 Aug [D12]**	**Sat, 4 Aug [D13]**
Early Morning	Teams rest	Meeting to share and review field findings in view	Finalise aide memoirea in plenary Agree and send document to immediate bosses of DOH and WR for review before meeting on Wednesday with Chief Director	Debrief with WR Report compilation	Report writing PowerPoint presentation finalisation	Plenary meeting	External reviewers depart
Late Morning	Teams rest	Meeting to share and review field findings in view	Review of draft report Compilation of presentation	Report compilation	Report writing PowerPoint presentation finalisation	Presentation of aide memoire to MOH top management and key partners	

WEEK 2							
	Sun, 29 July [D7]	**Mon, 30 July [D8]**	**Tue, 31 July [D9]**	**Wed, 1 Aug [D10]**	**Turs, 2 Aug [D11]**	**Fri, 3 Aug [D12]**	**Sat, 4 Aug [D13]**
Early Afternoon	Finalise field report	Integrating of field findings in thematic reports for insertion into final report	Review of draft report Compilation of presentation	Presentation of draft aide memoire for review and improvement at MOH Report compilation	Report writing PowerPoint presentation finalisation	Meeting of NMCP and external reviewers to plan next steps	
Late Afternoon	Finalise field report External reviewers meet	Finalisation of aide memoire Report Writing PowerPoint presentation compilation in line with aide memoire; presentation to have graphics and some details Core team meets with external reviewers	Review of draft report Compilation of presentation	Improvement of aide memoire based on feedback Report writing PowerPoint presentation finalisation	Report writing PowerPoint presentation finalisation	Left blank to make manage possible overflow	
Evening	Finalise field report External reviewers meet Finalise drafting of aide memoire	Finalisation of draft aide memoire	Review of draft report Compilation of presentation				

A summary of key findings was prepared in place of an Aide memoire. The key findings were presented in a consensus meeting held with county health directors on 2nd August 2018.

Annex 1.8: Composition of the Field Validation Teams

Region	Counties/institutions visited	Team members
Nation-level institutions	National-level institutions, including key partners, research and affiliate programmes, and departments	Agneta Mbithi Andrew Wamari Hellen Gatakaa Jacinta Opondo Josephine Karuri Khoti Gausi Rebecca Kiptui Welby Chimwani Regina Karonji Samuel Kigen Solomon Karoki Theresa Ndavi Tuoyo Okorosobo Willis Akhwale
Lake endemic	Kisumu Busia	Ambrose Agweyu Caroline Njoroge Lyda Ozor Peter Njiru Peter Ouma
Coast endemic	Kwale Kilifi	Ahmeddin Omar Emmanuel Temu Evan Mathenge James Mwai
Highland epidemic	Kisii Uasin Gishu	Charles Katureebe James Sang Stephen Munga
Seasonal low transmission	Turkana	Ben T. Adika Charles Chege Daniso Mbewe
Low risk	Makueni Kirinyaga	Cecilia Muiva Deborah Ikonge Josephine Njoroge Michael Kayange Sophie Githinji

Annex 1.9: Programme for Kenya Malaria Strategy Development Workshop with County Malaria Control Coordinators

Kenya Malaria Strategy and Development Workshop NOKRASS-SAGANA			
23–26 October 2018			
Day 1: 23 October 2018	**Activity**	**Facilitation**	**Session Chair**
4:00 PM	Arrival of Delegates	NMCP and PS-Kenya	
Day 2: 24 October 2018	**Updates of MPR Processes, Findings, and Recommendations**		
8:30 AM–9:00 AM	Registration and Welcome	NMCP and PS-Kenya	NMCP
9:00 AM–9:10 AM	Introduction of Participants	NMCP	
9:10 AM–9:20 AM	Objectives and Expected Outcomes	NMCP	
9:20 AM–9:30 AM	Opening Address	Head - NMCP	
9:30 AM–10:20 AM	MPR Findings and Recommendations	NMCP	
10:20 AM–10:45 AM	**Tea Break**		
10:45 AM–12:00 PM	Plenary Discussions	NMCP	
12:00 PM–1:00 PM	Introduction and Discussions on KMS Goal and Impact Indicators	NMCP	
1:00 PM–2:00 PM	**Lunch**		
2:00 PM–3:00 PM	Presentation of Objectives, Strategies, and Indicators per Objective Area	Lead Consultant	LEAD CONSULTANT
3:00 PM–3:15 PM	Introduction to Group Work	NMCP	
3:15 PM–5:00 PM	Group Work per Objective Area (Activities)	Focal Persons and Consultants	
Day 3: 25 October 2018	**Group Work on KMS Development**		
8:30 AM–10:30 AM	Feedback from the Group Work	Focal Persons and Consultants	LEAD CONSULTANT
10:30 AM–11:00 AM	**Tea Break**		
11:00 AM–1:00 PM	Plenary Discussions	Lead Consultant	
1:00 PM–2:00 PM	**Lunch**		
2:00 PM–5:00 PM	CMCCs Meetings with NMCP	NMCP	

Annex 1.10: Agenda for the Development of the Kenya Malaria Strategy 2019–2023

Objective: Draft zero of the KMS

Outcomes: Draft:

Goal, objectives, strategies

Activities, their log frame, and indicators

Guiding principles and implementation framework

Agreed methods of costing to be employed

Day	Time	Suggested activity	Form of meeting
Monday 01/10/2018	AM	Recap of the recommendations from MPR and formulation of goal and objectives	Plenary
	PM	Continue formulation of the objectives and indicators	
Tuesday 02/10/2018	AM	Formulation of the strategies and indicators	Group work
	PM	Discussion on the strategies and indicators	
Wednesday 03/10/2018	AM	Review of strategies and indicators based on feedback	Group work
		After tea, agreement on the strategies and indicators	Plenary
	PM	Formulation of key activities under each strategy and indicators	Group work
Thursday 04/10/2018	AM	Agreement on key activities under each strategy and indicator	Plenary
	PM	Discuss and agree on the guiding principles	Plenary
Friday 05/10/2018	AM	Implementation arrangements and costing	Plenary
	PM	Way forward	Plenary

- AM will start at 8.30 am each day
- PM will start at 2 pm each day

Annex 1.11: Programme for County Directors for Health Meeting

Kenya Malaria Strategy Development Meeting

8 November 2018

Crowne Plaza Hotel, Nairobi

Time	Activity	Facilitation	Session Chair
8:30 AM–9:00 AM	Arrival and Registration	NMCP and MEASURE Evaluation	Co-Chairs Dr. Rebecca Kiptui and County TBD
9:00 AM–9:15 AM	Introduction and Welcome	NMCP	
9:15 AM–9:30 AM	Objectives and Expected Outcomes		
9:30 AM–9:40 AM	Opening address	NMCP	
9:40 AM–10:00 AM	KMS Goal and Indicators		
10:00 AM–10:30 AM	Tea Break		
KMS—Objectives, Strategies, and Activities (20 minutes presentation and discussions per objective)			
10:30 AM–11:00 AM	Malaria Prevention (Vector Control and Malaria in Pregnancy)	Lead Consultant - Josephine Karuri	
11:00 AM–11:30 AM	Diagnosis and Treatment		
11:30 AM–12:00 PM	Malaria Surveillance		
12:00 PM–12:30 PM	Malaria Elimination Select Counties		
12:30 PM–1:00 PM	Malaria SBCC		
1:00 PM–2:00 PM	Lunch Break		
2:00 PM–2:30 PM	Programme Management and Coordination	Josephine Karuri	
2:30 PM–3:00 PM	Conclusions and Next Steps		

Annex 1.12: Agenda Costing Workshop

KENYA MALARIA STRATEGY 2019–2023 COSTING RETREAT

DATE: 12–16 November 2018

VENUE: Serena Beach Resort & Spa, Mombasa County

Day 1: Sunday, 11 November 2018	**ARRIVAL**	
Day 2: Monday, 12 November 2018		
Time	**Activity**	**Facilitator**
8.00 am–8.30 am	Registration	Health Policy Plus
8.30 am–8.50 am	Opening Remarks and Introductions	
8.50 am–9.00 am	Meeting Objectives and Expected Outputs Logistics	Health Policy Plus
9.00 am–10.00 am	Presentation of Progress by Objective—Activities Identification	NMCP
10.00 am–10.30 am	Presentation of Activity Template	Health Policy Plus
10.30 am–11.00 am	Formation of Groups	DNMP
11.00 am–11.30 am	TEA BREAK	
11.30 am–1.00 pm	GROUP WORK Activities by intervention	TEAMS
1.00 pm–2.00pm	LUNCH	
2.00 pm–4.30 pm	GROUP WORK Activities by intervention	TEAMS
4.30 pm–5.00 pm	TEA BREAK	
Day 3: Tuesday, 13 November 2018		
Time	**Activity**	**Facilitator**
8.00 am–8.30 am	Registration	Health Policy Plus
8.30 am–9.30 am	Plenary Progress	
9.30 am–11.00 am	GROUP WORK Cost Inputs by Activities	TEAMS
11.00 am–11.30 am	TEA BREAK	
11.30 am–1.00 pm	GROUP WORK Cost Inputs by Activities	TEAMS

1.00 pm–2.00pm	LUNCH	
2.00 pm–4.30 pm	GROUP WORK Cost Inputs by Activities	TEAMS
4.30 pm–5.00 pm	TEA BREAK	
Day 4: Wednesday, 14 November 2018		
Time	**Activity**	**Facilitator**
8.00 am–8.30 am	Registration	Health Policy Plus
8.30 am–9.30 am	Plenary Progress	
9.30 am–11.00 am	GROUP WORK Cost Inputs by Activities	TEAMS
11.00 am–11.30 am	TEA BREAK	
11.30 am–1.00 pm	GROUP WORK Cost Inputs by Activities	TEAMS
1.00 pm–2.00pm	LUNCH	
2.00 pm–4.30 pm	GROUP WORK Cost Inputs by Activities	TEAMS
4.30 pm–5.00 pm	TEA BREAK	
Day 5: Thursday, 15 November 2018		
Time	**Activity**	**Facilitator**
8.00 am–8.30 am	Registration	Health Policy Plus
8.30 am–9.00 am	Presentation on Outputs	
9.00 am–11.00 am	GROUP WORK Costing	TEAMS
11.00 am–11.30 am	TEA BREAK	
11.30 am–1.00 pm	GROUP WORK Costing	TEAMS
1.00 pm–2.00pm	LUNCH	
2.00 pm–4.30 pm	GROUP WORK Costing Group Feedback	TEAMS
4.30 pm–5.00 pm	TEA BREAK	
Day 6: Friday, 16 November 2018		
Time	**Activity**	**Facilitator**
8.00 am–8.30 am	Registration	Health Policy Plus
8.30 am–9.00 am	Presentation on Costing Template	
9.00 am–11.00 am	GROUP WORK Costing	TEAMS

11.00 am–11.30 am	TEA BREAK	
11.30 am–1.00 pm	GROUP WORK Costing	TEAMS
1.00 pm–2.00pm	LUNCH	
2.00 pm–4.30 pm	Feedback on Costing Way Forward and Closure	NMCP
4.30 pm–5.00 pm	TEA BREAK	
Day 7: Saturday, 1	**DEPARTURE**	

Deliverables

Day 1:Completed activities by interventions.

Day 2:Cost inputs and budget assumptions by activities

Day 3:Cost inputs and budget assumptions by activities

Day 4:Costing

Chapter 2:
Programme Management Report

Key Messages from This Chapter

- Chapter 2 documents the findings of the programme management thematic area review conducted as part of the malaria programme review 2018. Programme management formed the sixth objective of the Kenya Malaria Strategy 2009–2018 and was aimed at improving capacity for coordination, leadership, governance, and resource mobilisation at all levels towards the achievement of all strategic objectives by 2018.
- Key findings from the thematic review are as follows:
- There was a supportive policy environment for the malaria programme in Kenya, but the legislative and regulatory framework needed to be updated.
- Strategies adopted in the Kenya Malaria Strategy were not aligned to the global targets that aimed to eliminate malaria by 2030.
- Partnership coordination, multi-sectoral collaboration, and engagement with the private sector was weak.
- Engagement between the national and county governments was weak and poorly defined.
- Key capacities and skills for effective programme management were lacking at both the national and country levels.
- There was reduced prioritisation of malaria and declining funding for the malaria programme, with only 47 percent of the resources needed to implement the Kenya Malaria Strategy 2009–2018 mobilised.

Introduction

Background

The Kenya Malaria Strategy (KMS) 2009–2018 aimed to improve capacity in coordination, leadership, governance, and resource mobilisation at all levels towards the achievement of malaria programme management objectives by 2018.This section provides information on the governance and programme management structure and systems for malaria control: policy formulation; organisational structure; stakeholder participation; coordination and partnership arrangements; health system responsiveness, including health sector priority, national development agenda, and regulatory framework in support of malaria control; accountability; human resource capacity development; technical support; and systems for monitoring and evaluating performance.

The vision of the KMS 2009–2018 (revised 2014) of a malaria-free Kenya was in line with the global vision of a world free of malaria stated in the Global Technical Strategy for Malaria Control 2016–2030. The Kenya Health Policy 2014–2030 provides guidance to ensure significant improvement in the overall health status in Kenya and aligns with the Constitution of Kenya 2010 and global commitments. It demonstrates the health sector's commitment, under the government's stewardship, to ensure that the country attains the highest possible standards of health, in a manner responsive to the needs of the population. The policy is designed to be comprehensive and focuses on the two key obligations of health:

- Fundamental human rights, including the right to health as stated in the Constitution of Kenya 2010
- Contribution to economic development, as described in the country's long-term development agenda, Vision 2030

The policy focuses on ensuring equity, people centeredness, participatory approach, efficiency, a multi-sectoral approach, and social accountability in the delivery of healthcare services. It takes into account the functional responsibilities between the two levels of government (national and county) with their respective accountability, reporting, and management lines.

The Kenya Health Sector Strategic Plan (KHSSP) 2014–2018 had six strategic objectives and included the elimination of communicable conditions. Of note, the KHSSP was coming to an end at the same time as the KMS 2009–2018. At the time of this thematic review, a new KHSSP was being developed, guided by the Mid-term Plan (MTP) III (2018–2022) priorities. The government was in the third draft of the MTP (2018–2022) for Vision 2030. The MTPs set forth strategies to increase human resources in highly specialized areas of healthcare, investments in equipment and automation of healthcare, and dissemination of human resource skills across the country.

The Government of Kenya listed Universal Health Coverage (UHC) as one of its "Big Four" agenda for socio-economic transformation. Prevention and control of malaria needed to be included in financing and service delivery of essential services as part of the UHC agenda.

Policy and Guidance

Policy

The Malaria Prevention Act CAP 246 (Revised 2012) is a legislative framework that empowers authorities to take measures for the prevention of malaria. The National Malaria Policy 2010 provides malaria control partners and stakeholders with a single framework for malaria control in Kenya, with strategic orientations for its implementation. These orientations include the following:

- Malaria prevention
- Prompt diagnosis and treatment of malaria
- Surveillance, monitoring, evaluation, and operational research
- Advocacy, communication, and social mobilisation
- Project management

Through the malaria policy, the government commits to the following:

- Ensuring country ownership of malaria control activities
- Building effective and inclusive partnerships for malaria control in Kenya
- Holding all partners are accountable in delivery and reporting the progress of implementation
- Ensuring that capacities for managing the malaria control programme are strengthened at all levels of healthcare
- Ensuring that procurement and supply chain management systems and capacities are strengthened to eliminate disruptions in commodity supplies

The Malaria Prevention Act was outdated, and the legislation did not tackle emerging challenges in malaria control, such as counterfeits and substandard medicines. The Health Act 2017 stipulates that all health providers in public and private facilities provide malaria data to the national government for reporting into the countrywide District Health Information software, version 2 platform. There were no specific requirements for counties to report malaria outbreaks, however.

Financing for Malaria Control and UHC

Financing malaria control at the national level was done through the development of a three-year malaria business plan and annual work plans (AWPs). Counties developed county integrated development plans and AWPs to guide activity implementation and resource mobilisation at their level.

Overall, Kenya lacked a clear financing framework for malaria control. Government expenditures for the health sector had been below 10 percent since 2002, compared to the Abuja target of 15 percent (Anyona & Courten, 2014). Despite evidence that malaria reduction and elimination had returns on investments of more than 1,000 percent (Purdy, et al., 2013; Action and Investment to Defeat Malaria 2016-2030), the government budgetary allocation for malaria programmes had not matched the policy commitments. The funding to the National Malaria Control Programme (NMCP) did not match requirements to implement priority strategic interventions for an optimal malaria control response, including addressing the factors that may cause a rebound of malaria in areas under control. Counties did not provide specific budgets for malaria interventions and had no costed work plans to guide implementation.

According to a four-year malaria business plan developed in 2014, the key funders of the malaria programme included the Global Fund, the U.S. President's Malaria Initiative, the Government of Kenya, and the World Bank. There was no evidence of diversification of funders at the time of this review.

A key policy recommendation was for the country to put in place a health financing strategy. The Ministry of Health was working closely with the National Hospital Insurance Fund (NHIF) to provide medical coverage for Kenyans as part of the UHC through a multi-tiered benefit package. The government had also created an advisory panel to define the benefit packages. The review team recommended that malaria control and management to be included in those benefit packages. At the time of the review, the NHIF SUPA which is a comprehensive benefit package provided by NHIF covered inpatient and outpatient care and management of malaria but did not support the provision of preventative and promotional malaria interventions. The overall financing mechanism for UHC was still under development at the time of this review.

Following devolution of health services, the coordination between the national and county governments experienced challenges in resource mobilisation and funds disbursements. The NMCP had not developed a resource mobilisation strategy, guidelines, or tools for national and county level responses.

Guidance

Malaria is part of the Sustainable Development Goals Goal 3 agenda, which aims at ending epidemics due to communicable diseases and UHC by 2030. The global malaria community has therefore set a more ambitious target of reducing the burden of malaria by 90 percent by 2030 (Roll Back Malaria Partnership Strategic Plan 2018-2020).

Kenya's malaria policy was implemented through the KMS. The KMS was aligned to the relevant provisions in the Constitution of Kenya 2010, which listed the attainment of the highest quality of healthcare service as a right for all Kenyans. KMS was also informed by the Kenya Health Policy (2012–2030) and aligned to the KHSSP (2014–2018), which set the goal for malaria elimination.

The overall goal of the KMS 2009–2018 (revised 2014) was to reduce morbidity and mortality caused by malaria by two-thirds of the 2007 levels by 2017. It had six strategic objectives, as follows:

- To have at least 80% of people in malaria risk areas using appropriate malaria preventive interventions by 2018.
- To have 100% of all suspected malaria cases presenting to a health provider managed according to the National Malaria Treatment Guidelines by 2018.
- To ensure that 100% of malaria epidemic prone and seasonal transmission sub-counties have the capacity to detect and timely respond to malaria epidemics by 2018.
- To ensure that all malaria indicators are routinely monitored, reported, and evaluated in all counties by 2018.
- To increase utilisation of malaria control interventions by communities to at least 80% by 2018.
- To improve capacity in coordination, leadership, governance, and resource mobilisation at all levels towards achievement of the malaria programme objectives by 2018.

The KHSSP 2014–2018, to which the KMS was aligned, was also coming to an end. Despite revisions in 2014, the KMS still referred to old administrative structures before devolution. It was not aligned to the ambitious global targets and did not have subnational targets based on the four Kenya epidemiological zones. There was no specific strategy targeting malaria elimination in low transmission zones, and the role of integrated vector management was not explicit.

Several guidelines were available for the different interventions implemented by NMCP and stakeholders. These included:

- Malaria Communication Strategy (2016–2021)
- National Treatment Guidelines for the Diagnosis, Management and Prevention of Malaria, 5th edition (2016)
- Insecticide Resistance Management Strategy 2016
- Kenya Malaria Monitoring and Evaluation (M&E) Plan 2014
- Therapeutic Efficacy Testing, adopted World Health Organization (WHO) protocol 2016

However, some key guidelines were not available or were yet to be revised. These included the following:

- Resource mobilisation strategy, guidelines, and tools (reported to be under development).
- Laboratory quality assurance/quality control training manual (reported to be under development)
- Community health workers for community-based diagnostic testing and treatment.
- Risk management plan
- County malaria control coordinator (CMCC) operation manual
- Pharmacovigilance guidelines 2012 (not yet revised)
- Integrated vector management policy guidelines 2009 (not yet revised)

There was no structured plan for the dissemination of policy guidelines and strategies to the counties and the private sector. Job aids, manuals, and treatment protocols were also lacking.

The review noted that project management was key to health systems strengthening, but the strategies adopted in the KMS had not been aligned to the WHO health systems building blocks. In addition, the health information systems building block that was key to providing data for evidence-based decision making was not explicitly stated in the KMS, and mechanisms of engagement with counties on data sharing were lacking.

Methodology

Organisation of Service Delivery

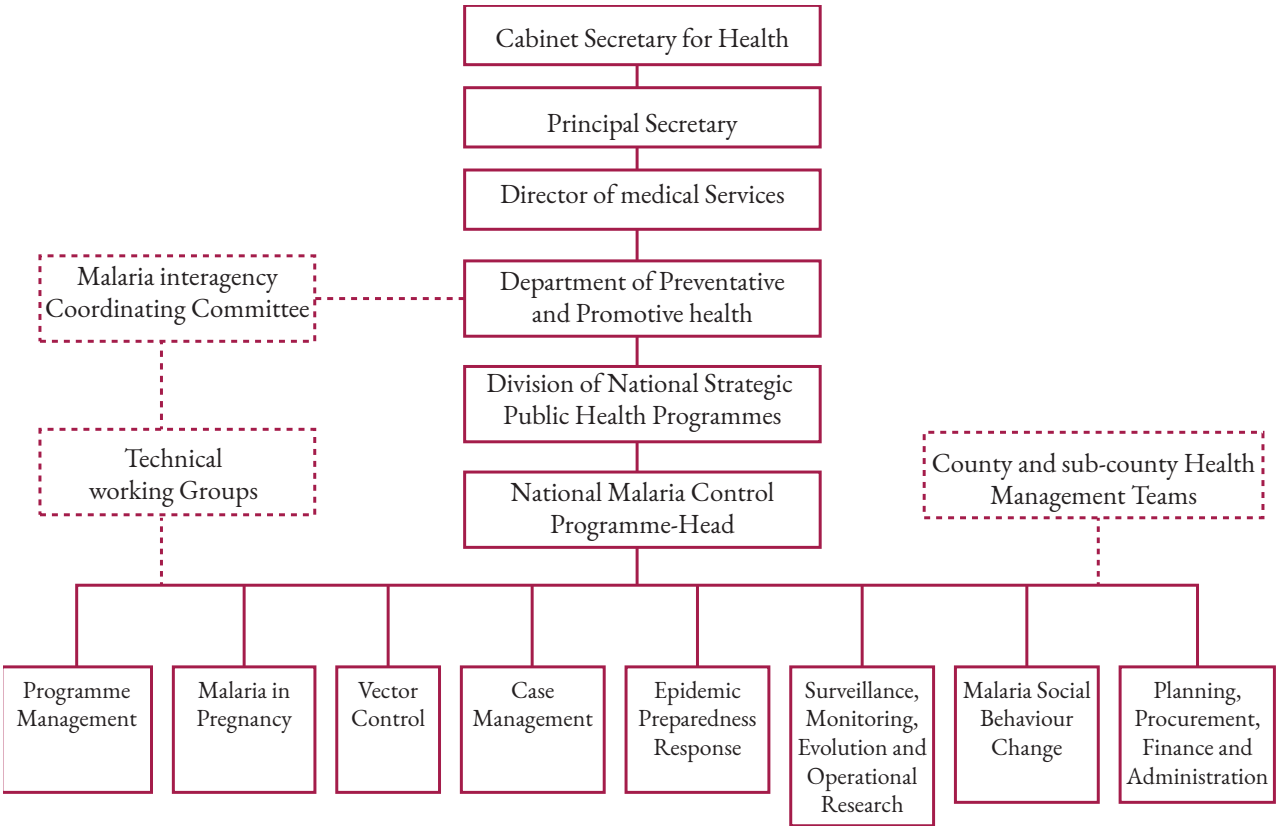
The fourth schedule of the 2010 Constitution spelled out functions between the two levels of government:

- National level: policy formulation, national referral hospitals, norms and standards, capacity building, and technical assistance to counties
- County level: service delivery

Within the Ministry of Health (MOH), the NMCP was strategically housed in the Department of Preventive and Promotive Health Services under the Division of Strategic Programs. It was led by a programme manager who was also the head of the Malaria Control Unit. This placed the head of the Malaria Control Unit two levels below the Director of Medical Services and four levels below the Principal Secretary (Figure 2.1). The programme manager supervised and provided oversight to nine focal point persons in charge of the following:

- Vector control
- Case management
- Malaria in pregnancy
- Epidemic preparedness and response
- Surveillance, monitoring, evaluation and operational research
- Advocacy, communication, and social mobilisation
- Partnership coordination planning
- Procurement
- Finance and administration

Figure 2.1: MOH organisation chart with NMCP position



The NMCP worked with partners in formulating supportive evidence-based policies, providing capacity building and technical assistance, and formulating a technically sound and results-oriented business plan for resource mobilisation. Counties ensured implementation and service delivery of interventions and activities in line with the KMS through strategic partnerships.

The NMCP worked with other units and divisions at the MOH, including the following:

- Vector Borne Disease Unit on vector control
- Disease Surveillance and Response Unit on surveillance
- Division of Health Promotion on social and behaviour change communication

Multi-sectoral collaboration with other government ministries was established through collaborative mechanisms. The coordination of donors, nongovernmental organisations, civil society organisations, the private sector, United Nations agencies, and research and academic institutions was done through technical working groups (TWGs) and the Malaria Interagency Coordinating Committee (MICC). The MICC was chaired by the Principal Secretary and had representation from MOH departments, nongovernmental organisations, faith-based organisations, civil society organisations, development partners, and funders. There were six TWGs chaired by head of NMCP and other heads of collaborating divisions and units at MOH. MICC and TWG meetings were scheduled to be held quarterly. The MICC was active and met regularly.

Some TWGs were not active. The epidemic response TWG had not met during the last five years of the strategy. The resource mobilisation TWG had been inappropriately placed under the ACSM TWG and was not operational based on its terms of reference. The case management TWG provided guidance and supported the NMCP on all matters related to malaria management. the surveillance, monitoring, evaluation, and operational research TWG advised

on policy recommendations based on routine M&E and research findings, and the vector control TWG advised on vector management, including entomological surveillance. The drug management TWG took responsibility for case management commodities but left out other malaria control commodities, including long-lasting insecticidal nets (LLINs), insecticides, and larvicides.

The NMCP organisational chart described positions based on strategic interventions and was not functions based. The functional roles of the NMCP listed in the KMS were to:

- Provide technical assistance to implementing partners
- Produce and disseminate national guidelines
- Monitor and evaluate implementation and impact
- Build capacity through training
- Advocate for malaria as a priority disease

There were no job descriptions for the positions of focal points describing the required qualifications, skills, and competencies. The supervisory roles were stretched beyond recommended management practices.

At the county level, the county director for health (CDH) was the chair of the county health management team. The CDH was usually a medical doctor and some had postgraduate training but without emphasis on public health specialisation. The CDHs worked with the malaria focal persons designated as CMCCs in the planning and implementation of malaria control activities. Most CMCCs were of varied backgrounds and often undertook other tasks, including clinical duties. However, CMCCs did not have a supportive team with the requisite skills mix dedicated to malaria control. As at national level, there were no job descriptions for CMCCs. Some counties had malaria control stakeholders' forums and partnerships, but overall, multi-sectoral collaboration at the county level was not well defined.

Health services in Kenya were integrated and delivered through a four-tier system:

- Tier 1: Community health services (Level 1)
- Tier 2: Primary health services (dispensaries Level 2 and health centres Level 3)
- Tier 3: Secondary health services (primary referral Level 4 and secondary referral Level 5)
- Tier 4: National teaching and referral facilities (Level 6)

In Kenya, malaria was managed across all the six levels of healthcare, including the community. The Kenya Health Infrastructure Norms and Standards (2017) aimed to accelerate the attainment of UHC. These norms did not adequately capture malaria interventions by service at both the community and facility levels.

Human Resources, Training, and Capacity Development

At the national level, the NMCP was headed by a programme manager who was a medical doctor with a master's degree in public health. There was no deputy programme manager, but there were other public health specialists with various backgrounds, such as pharmacists, clinical officers, public health officers, entomologists, and laboratory technologists, who served as focal persons of the different intervention areas. The NMCP had supported counties to train CMCCs for a six-week course in basic malariology, programme leadership, and management.

At the facility level, health workers provided a package of health interventions and were therefore not necessarily "malaria staff"; however, provision was made to improve their competencies in malaria control interventions through training and refresher trainings. The Kenya Health Strategic Investment Plan 2014-2018, which provides for human resources standards and norms, calls for the prioritisation of a minimum number of health workers in each facility based on expected services to deliver the Kenya Essential Package of Health. A staffing norm has been defined for each level to outline the minimum number of health workers by cadre, needed to ensure the provision of the Kenya

Essential Package of Health. The majority of Levels 2 and 3 facilities, which provide primary healthcare services, including malaria interventions, were staffed by nurses and clinical officers.

Given the staff shortfalls cited in the 2013 Service Availability and Readiness Assessment Mapping report (MOH, 2013), service delivery for malaria interventions is likely to be impacted by the shortfall.

At the community level, Kenya had set up community health units (CHUs) per population area. CHUs had community health volunteers (CHVs) who were trained to offer some basic services to the community members, including the community integrated management of childhood services, through which community-based diagnosis and management of malaria and vector control were delivered. Although community groups were willing to participate in control operations, their lack of government and technical support was a barrier (Kibe, et al., 2006). There was a need to strengthen the organisational capacities of CHUs, provide training for CHVs, and clarify government policy on malaria vector control responsibilities in the communities.

Results

Achievements on Implementation and Targets

Performance in Implementing Objective 6 and Strategies

The NMCP's performance in implementing Objective 6 and its strategies are show in Table 2.1.

Table 2.1: Project management achievements and challenges

Strategy	Score	Main achievements	Key challenges
Develop/update and disseminate policy and strategic documents, lobby for legislation/ regulations to guide malaria control in Kenya	31.7%	Enabling policy environment with a revised KMS and monitoring and evaluation plan Several guidelines developed and available, including the following: Malaria Communication Strategy (2016–2021) National Treatment Guidelines for the Diagnosis, Management and Prevention of Malaria 5th edition (2016) Insecticide Resistance Management Strategy 2016, Kenya Malaria M&E Plan 2014 Identification and training of CMCCs Development of a costed four-year business plan to guide investment and AWP	Lack of defined mechanism for dissemination of policy guidelines Lack of resource mobilisation strategy Lack of key strategic malaria documents, namely laboratory quality assurance/quality control training manual, CHV manual for community-based diagnostic testing and treatment, risk management plan, and county malaria manual Lowered NMCP hierarchically at MOH Lack of a curriculum for CMCC trainings and training strategy Lack of partner coordination structure (national and county)
Strengthen procurement and supply management systems for malaria drugs and commodities	28.6%	Consumption data for essential malaria commodities (insecticide-treated nets, artemisinin-based combination therapies, and rapid diagnostic tests) was available in District Health Information Software, version 2	Stock-outs from stock status reports and quality of care surveys Overstocks and supply of short expiry commodities Some counties not getting commodities on time Dihydroartemisinin (second line for uncomplicated malaria) was not procured—funds not allocated Shortage of hard copy community-level logistics management information system reporting tools Three of the post-market surveillance reports not disseminated, although available on the Pharmacy and Poisons Board website; one post-market surveillance report not completed

Strategy	Score	Main achievements	Key challenges
Strengthening capacity for planning, partnerships, coordination, and implementation at all levels	55.7%	Active MICC and TWGs	Lack of clear national and county engagement mechanisms Undefined roles and responsibilities of CMCCs and lack of county organograms Lack of programmatic data on activity implementation Inadequate skills sets and competencies for effective programme management (e.g., trainings, data management, monitoring and evaluation)
Strengthen resource mobilisation capacity to improve malaria control financing	34%	Development of a costed four-year business plan to guide investment and AWP	Lack of financial indicator to measure programme financing

Performance in Implementing Mid-Term Review Recommendations

The National Malaria Strategy 2009–2017 was to be reviewed midway through its implementation period to be updated on changes in international policy guidance and in malaria epidemiology in Kenya and to align it with the constitution and the country's Vision 2030. The ultimate outcome from this mid-term review (MTR) was the revised KMS 2014–2018.

The review yielded recommendations across all the objectives for improved delivery of results in the context of the constitutional provision for right to health and devolution of health services delivery to counties. Table 2.2 summarises these MTR recommendations and how they have been implemented between 2014 and 2018.

Table 2.2: Performance on implementing MTR recommendations

Malaria Strategic Plan objectives	MTR recommendations	Proportion implemented:			Enabling/constraining factors
		Fully	Partially	Not at All	
To improve capacity in coordination, leadership, governance, and resource mobilisation at all levels towards achievement of the malaria programme objectives by 2018	▪ Rename and realign strategy to incorporate the county health teams and strengthen county capacity in programme and performance management, including holding semi-annual review meetings ▪ National level to continue holding semi-annual review and planning meetings ▪ Build capacity for programme management at the national level ▪ Provide technical assistance and capacity building at the county level ▪ Conduct focused and more frequent assessment of performance against the targets and tracking of M&E indicators annually ▪ Develop the resource mobilisation strategy ▪ Drop strategy on strengthening human resources for health capacities in malaria endemic areas ▪ Separate the broader system issues on procurement and handle them under the Objective 6. The other procurement issues specific to Objectives 1 and 2 should be left within the specified areas for ease of coordination. The strategy needs to be managed by a procurement and supply management focal person.	53%	17%	29%	Enabling factors: ▪ Malaria policy that articulates interventions across different epidemiological zones ▪ Availability of a four-year costed business plan ▪ Availability of guidelines for key interventions ▪ Availability of M&E plan with performance indicators for all strategic interventions Constraints: ▪ Inadequate dissemination of policies and guidelines ▪ Lack of a resource mobilisation strategy and tools ▪ Lack of a CMCC manual ▪ Lack of a risk management strategy ▪ Lack of defined skills and competencies for key staff at national and county levels ▪ Lack of an updated Malaria Prevention Act ▪ Weak partner engagement at MICC and TWGs

Key Performance Indicators and Targets

Four outcome indicators were selected to monitor progress in the implementation of the four programme management strategies. The indicators were narrowly focused and were not sufficient to determine good outcomes in the broad mandate of the programme management objective. The four indicators are as follows:

- Proportion of counties with malaria work plans aligned to the National Malaria Strategy
- Proportion of counties with malaria activities in their health plans
- Proportion of annual national malaria business plan funded
- Proportion of county malaria focal persons trained in malaria control programme management

Most of the outcome indicators were not met. The main challenges were attributed to devolution of health services in 2013. Mandates and roles between national and county governments regarding activity implementation were not clearly defined.

Leadership structures at the county level were not well defined, and county capacities for programme implementation were poor. Only half of the county coordinators were trained. Only 46 percent of the malaria business plan was funded. Most counties did not have malaria-specific budgets.

The counties that provided specific budgets for malaria had inadequate amounts, which were not readily available. Prioritisation of malaria control is weak, and not all county work plans were fully aligned to the KMS.

Successes, Best Practices, and Facilitating Factors

The successes, best practices, and facilitating factors that were identified during this review are as follows:

- Availability of a four-year costed business plan
- Strong partnerships at the national level
- Availability of an up-to-date strategy aligned to KHSSP
- A malaria policy that articulates interventions across different epidemiological zones
- Availability of an M&E plan with performance indicators for all strategic interventions
- Availability of many guidelines for key intervention areas

Strengths, Weaknesses, Opportunities and Threats

Table 2.3: SWOT analysis

Strengths	Weaknesses
▪ Availability of up-to-date strategy aligned to KHSSP ▪ Malaria policy that articulates interventions across different epidemiological zones ▪ Availability of a four-year costed business plan ▪ Availability of M&E plan with performance indicators for all strategic interventions ▪ Availability of many guidelines ▪ Strong partnerships at the national level—TWGs and MICC	▪ Inadequate dissemination of policies and guidelines ▪ Lack of a resource mobilisation strategy and tools ▪ Lack of a CMCC manual to guide county leadership ▪ Lack of a risk management strategy ▪ Lack of a defined skills and competencies for key staff at national and county levels ▪ Lack of an updated Malaria Prevention Act ▪ Weak partner engagement at MICC and TWGs
Opportunities	**Threats**
▪ Planned implementation of UHC ▪ Partnerships with other MOH programs and departments (e.g., Disease Surveillance and Response Unit) ▪ Vibrant private sector and civil society ▪ Potential investments for malaria control by county governments ▪ Improved efficiencies of resources—exit strategy across interventions ▪ Continued realignment to health sector strategic plans and national development policies ▪ Prioritisation of community health services	▪ Overdependence on external donor funding for policy and implementation of strategic activities ▪ Lack of a clear malaria control financing mechanism and sustainability plan ▪ Tedious and bureaucratic processes for the national and county engagements ▪ Lack of a roles and responsibility implementation matrix between national and county governments ▪ Frequent staff turnover of key personnel at the county level ▪ Bottlenecks in funds flow mechanisms for activity implementation ▪ Reduction in external donor support for malaria control ▪ Low visibility of NMCP in the MOH structure

Key Issues and Challenges

The following are key issues and challenges identified:

- Advocacy for malaria control both at national and county level is limited.
- The Malaria Prevention Act is outdated.
- Malaria policy and KMS strategic objectives and targets are not aligned to the current global ambitious targets.
- Coordination, partnership, and collaboration systems and structures are not well defined, especially national and county engagement implementation mechanisms.
- Provision of malaria services is not aligned with the current Kenya Health Infrastructure Standards and Norms (2017) that advocate for integration of services across levels of healthcare to accelerate attainment of UHC (e.g., LLINs provision is not listed as one of the services at the community level).

- Data and information management for programme management decision making is weak. The Malaria Information Acquisition System is not being used.
- Resource mobilisation and funding diversification has not been addressed despite reduced donor funding.
- Accountability mechanisms are not well spelt out in the KMS.
- Membership to the MICC and TWGs is not well-defined, and some membership is inappropriate.
- Policy and guidelines dissemination strategies are lacking.
- County-level malaria leadership is weak and not well defined.

Conclusions

The review made the following conclusions:

- Current KMS strategies are not aligned with current ambitious global targets that aim for malaria elimination by 2030. Some of the strategic objectives are too broad to be measured and communicated.
- Advocacy for the continued prioritisation and funding for malaria control at national and county levels is weak, and there is no clear malaria control financing mechanism and sustainability framework.
- The legislative and regulatory framework is not up-to-date for addressing emerging challenges, such as fake and sub-standard malaria control commodities and use of rapid diagnostic tests by CHVs.
- Dissemination of policy and strategic guidelines is limited to the counties and across levels of healthcare, hindering effective implementation.
- Partner engagement mechanisms for capacity building and provision of technical assistance by NMCP to partners and counties were not well defined.
- The NMCP organisational chart does not capture key functions of the NMCP, and positions lack job descriptions.
- County leadership for malaria control is not well defined.
- Partner engagement and coordination through TWGs and the MICC at the national level needs improvement and enhanced private sector participation.

Recommendations

From this review, the following recommendations were made:

- Revise the current KMS strategies to take into account current global targets aimed at malaria elimination.
- Lobby for higher visibility of the NMCP and the development of malaria control financing mechanism and sustainability plan by aligning malaria services with Kenya Health Infrastructure Standards and Norms (2017) and leveraging on NHIF benefits packages aimed at UHC.
- Develop a resource mobilisation strategy and tools aimed at diversification of funding sources and invest in the advocacy for the prioritisation of malaria control and funding at both levels of government.
- Revise the NMCP organisational chart to be functions based with clear job descriptions to accommodate skills mix.
- Define malaria control leadership at the county level with clear job descriptions aimed at skills mix and teamwork to include sub-counties.

- Review the legislative, policy, and regulatory framework for malaria control in Kenya to align with current evidence based strategic interventions and emerging challenges of sub-standard rapid diagnostic tests used by CHVs.
- County assemblies should be encouraged to enact appropriate by-laws to support strategic interventions for reduction of the malaria burden in Kenya.
- Strengthen partner coordination by reconstituting MICC and TWGs with appropriate membership and alignment to core interventions. The TWGs on resource mobilisation and procurement and supply management should be moved to programme management, and the emergency preparedness and response TWG can be merged with surveillance to constitute a surveillance and response TWG. Private sector engagement should be streamlined and enhanced.
- Develop and implement guidelines for national and county-level engagement, policy dissemination, capacity building, advocacy, and provision of technical assistance by the NMCP and partners.
- Strengthen programmatic data and information use, including use of scorecards and the Malaria Acquisition and Information System for tracking of implementation.
- Community-level engagement through the community health strategy should be enhanced, including multi-sectoral collaboration at the county level, especially the use of schools in advocating for malaria control.

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Chapter 3:
Finance

Key Messages from This Chapter

- Chapter 3 describes the programme financial analysis of the revised Kenya Malaria Strategy from fiscal year 2014/15 to fiscal year 2017/18. The analysis documented the level of financing of malaria programmes and provided recommendations towards sustainable financing. A literature review of several documents on health and malaria financing was also conducted.
- Key findings are as follows:
- There was a steady increase in the allocation towards health in Kenya, with 2017–2018 recording 8.2 percent to health. However, this was still below the recommended 15 percent stipulated in the 2001 Abuja Declaration.
- There was an increase in the domestic investment in malaria, with the government allocating resources under the Ministry of Health budget and also through counterpart funding.
- Household spending for malaria still played an important role in malaria financing, which should be a cause for concern because it means that there is still a significant level of out-of-pocket expenditure.
- Donor funding for malaria has decreased, and overall funding for malaria has decreased over the last four years, which, if persistent, may threaten the gains already made in controlling malaria.

Introduction

Background

The health sector in Kenya relies on several sources of funding: public (government), private firms, donors, and households. The government is the leading contributor of funds towards health and has been steadily increasing funding over the years. The second-largest contributor to health are households, mainly through out-of-pocket (OOP) payments, excluding cost sharing, which limits access and could contribute to catastrophic health expenditures. Some programmes, such as malaria, tuberculosis, and HIV, are heavily dependent on donor support. Decreasing donor contribution to the sector may affect key programmes and activities that are heavily donor dependent. Contributions from private firms have increased but marginally over the years.

In Kenya, the main challenges affecting financing of the health sector include inadequate funding from government and external sources, remaining significant financing gaps, and over-dependence of the programme on external support. It should therefore be noted that "reversing the trends" is not only the responsibility of the government but also other players that have a stake in healthcare provision.

The health sector in Kenya recognizes malaria as a health and socioeconomic burden. Malaria is responsible for 30 percent of outpatient consultations, 19 percent of hospital admissions, and 3–5 percent of inpatient deaths (Ministry of Health [MOH], n.d.). Further, 70 percent of Kenya's population lives in malaria-endemic areas.

The budget is the most explicit statement of a government's national and county priorities. Budgets express government commitment to a policy and indicate the level of priority assigned to it. The budget process is defined by the Constitution and elaborated in the Public Finance Management Act of 2012. Ministries, departments, and agencies of the national and county governments develop budgets following set guidelines, which are then approved by the respective legislative bodies. Beginning in the 2013–14 and 2014–15 financial years, the national and county governments were required to adopt a programme-based budgeting (PBB) approach. The budgeting process is expected to be transparent and should involve public participation to ensure that budget policies, allocations, and outcomes that benefit the poor are considered and enhanced. Given this process, it is expected that health is prioritised in the budget. Furthermore, given the contribution of malaria to the disease burden, malaria should be prioritised in the health budget.

Domestic resource mobilisation at national and county levels aims at ensuring predictability, adequacy, and sustainability of funding of Kenya's health sector and, more specifically, programmes that are heavily donor dependent like malaria. This is achieved through strengthening planning and budgeting, harnessing the existing sources of support, advocating for additional support, and strengthening accountability. In addition, to strengthen district resource mobilisation at the county level, there is need to build the capacity of the county governments, with a focus on PBB, in which malaria will be one of the sub-programmes. The PBB approach is recommended by the Public Finance Management Act of 2012 and places emphasis on outputs and outcomes to assess achievements.

The Universal Health Coverage (UHC) agenda urges countries to focus on primary healthcare services as an entry point. Counties, as the implementing entities of healthcare in Kenya, are therefore encouraged to include malaria as a sub-programme under the preventive and promotive programme. This would subsequently provide the evidence considering that the PBB approach links resources to outputs and outcomes.

Literature Review

There are four health care financing functions: revenue raising, strategic purchasing, pooling resources, and benefits package design. This literature review focuses on these functions for the health sector, with particular interest on how they affect malaria.

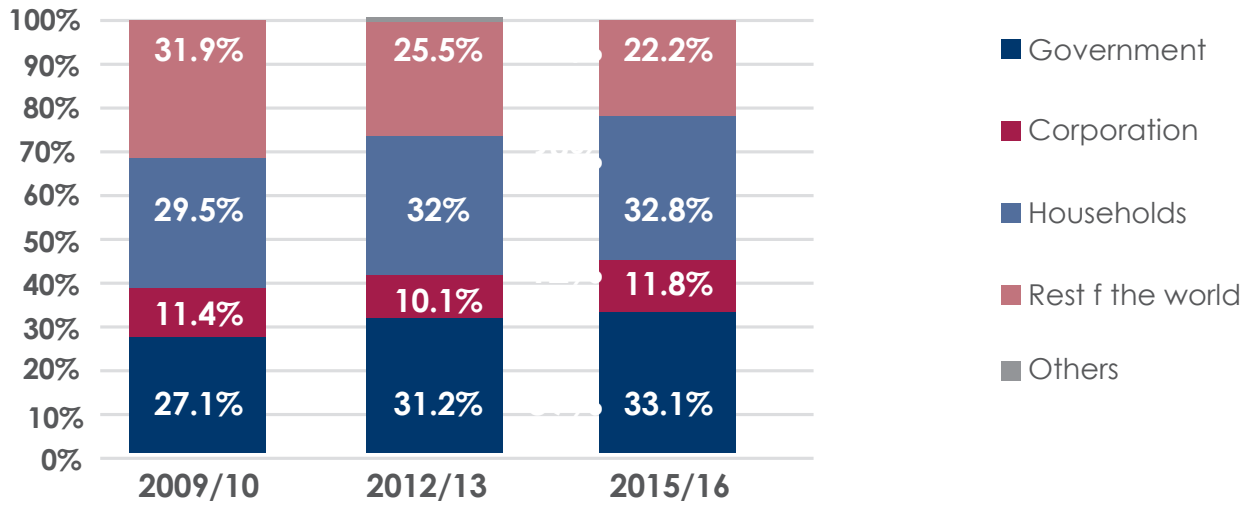
Revenue Raising

Healthcare is generally financed through public sources, donors, private firms, and households through OOP spending. The government was the major financier of health, contributing 33 percent of the current health expenditure (CHE) in 2015–16, up from 27 percent in 2009–10. The household contribution to CHE was 32.8 percent in 2015–16, an increase from 29.5 percent in 2009–10. The donor contribution was 22 percent of CHE in 2015–16, down from 32 percent in 2009–10 (Figure 3.1) (National Health Accounts, 2015/16).

Strategic Purchasing

As a result of the high OOP expenditures, the poor continue to disproportionately experience hardships in accessing quality healthcare services. The Commission on Macroeconomics and Health deduced that with just a 10 percent improvement in the life expectancy at birth, economic growth would be increase 0.3–0.4 percent (World Health Organization [WHO], 2001). Health financing in UHC calls for revenue raising, mainly through the public sector (United Nations, 2015).

Figure 3.1: Distribution of CHE by institutions providing revenues for financing schemes



Source: Draft National Health Accounts 2015/16

Pooling Resources

Discussions on financing for malaria should focus primarily on linking programmatic targets to funding and health outcomes. In their research paper, Snow et al. (2008) concluded that without a selective epidemiological–economic targeting of global malaria control investment, it seemed unlikely to achieve international goals to halve disease burdens by 2015. A study by Head et al. (2017) noted that the current trend in funding for malaria is deemed to be inadequate for achieving World Health Organization global targets in burden reduction by 2030. The study also noted that investments are typically highest in countries where funding for malaria control is also high, such as in Tanzania, Uganda, Kenya, Malawi, and Ghana, and most nations receiving little or no research investment for malaria also received scarce funding for malaria control, as was experienced in Botswana, Cape Verde, Central African Republic, Chad, Congo (Brazzaville), Djibouti, Mauritania, and Sierra Leone (Head, et.al, 2017).

Countries, including Kenya, need to move in the direction of sustainable financing for malaria. One reason is because donor funding is declining. External aid is on the decline, and multilateral and bilateral donor funds are increasingly shifting away from disease-specific financing or are being targeted towards low-income, high-burden countries. At the same time, domestically there is mounting competition for limited resources from other pressing disease priorities

(Shretta, et al., 2016). In October 2014, Kenya, with a Gross National Income (GNI) per capita of $1,160, was reclassified as a lower middle-income country when it surpassed the then World Bank GNI per capita threshold of $1,036. The 2016 GNI per capita for Kenya was recorded as $1,380 (World Bank, World Development Indicators, 2017). This new classification implies that donor support will decrease.

To achieve UHC, Kenya needs to look into other sources of funding for sustainable financing. There are several challenges to financing healthcare, including a decrease in the national government's commitment to health (MOH, 2017; MOH, 2016), large OOP expenditures by households, which may lead to catastrophic health spending, off-budget donor funding, and limited pre-payment for insurance. Under improving financial protection within the UHC agenda, issues that need to be looked into include fine-tuning the National Hospital Insurance Fund, providing health insurance subsidies for the poor (such as in the case of Makueni County through the Makueni-care programme), and speeding up enrolment of the informal sector on an insurance scheme.

Benefits Package Design

Kenya is currently undertaking an exercise that looks at adopting a tailor-made UHC benefits package. It is expected that malaria interventions will be covered in this package. However, with the limited allocation towards malaria, counties may find it a challenge to raise the required revenue to support the UHC agenda. This is because at the moment counties are not able to determine how much is allocated for malaria and how much is spent. Without this information on absorption capacity, talk of sustainable financing at the county level may remain but only a dream. Moreover, the national and county governments run the risk of a reduction in funding towards malaria and health in general if the funding is included in the UHC agenda.

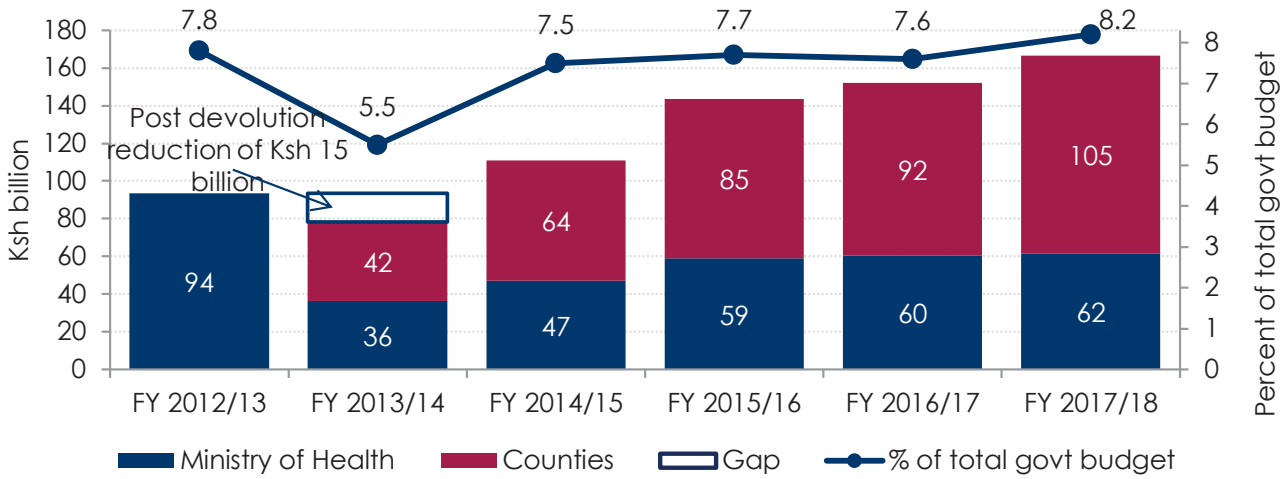
The benefits package that is currently being developed is the total of health services that a member is entitled to for the premium paid to the National Hospital Insurance Fund, which will benefit many people. The hope is that this benefits package will cover the majority, if not all, of the diagnostics and treatment related malaria interventions. This will allow both the national and county governments to focus the scarce financial resources for malaria towards primary healthcare, by allocating more funding in preventive and promotive health care services. Insurance coverage in Kenya improved from 9.7 percent in 2003 and 10 percent in 2007, to 17.1 percent in 2013 (MOH, 2014).

Methods

Budget Allocation to Health Sector and Malaria Programme

Over the past five years, government allocation for funds to the health sector has stabilised, with marginal decline from a high of 4 percent in 2014–15 to 3.1 percent in 2017–18 (MOH, 2017). One reason for this could be the devolvement of the health function to the county level. On the other hand, the allocation to health in the county budget has increased steadily, from an average of 21.5 percent in 2014–15 to 27 percent in 2017–18. In aggregate, the total allocation to the health sector both at the national and county levels for the past five years under review has increased from 7.5 percent in 2014–15 to 8.2 percent in 2017–18. This is still below the recommended 15 percent stipulated in the Abuja Declaration (Figure 3.2 and Table 3.1).

Figure 3.2: Proportional budgetary allocation to the health sector



Source: National and county budget analysis 2016/17 and 2017/18

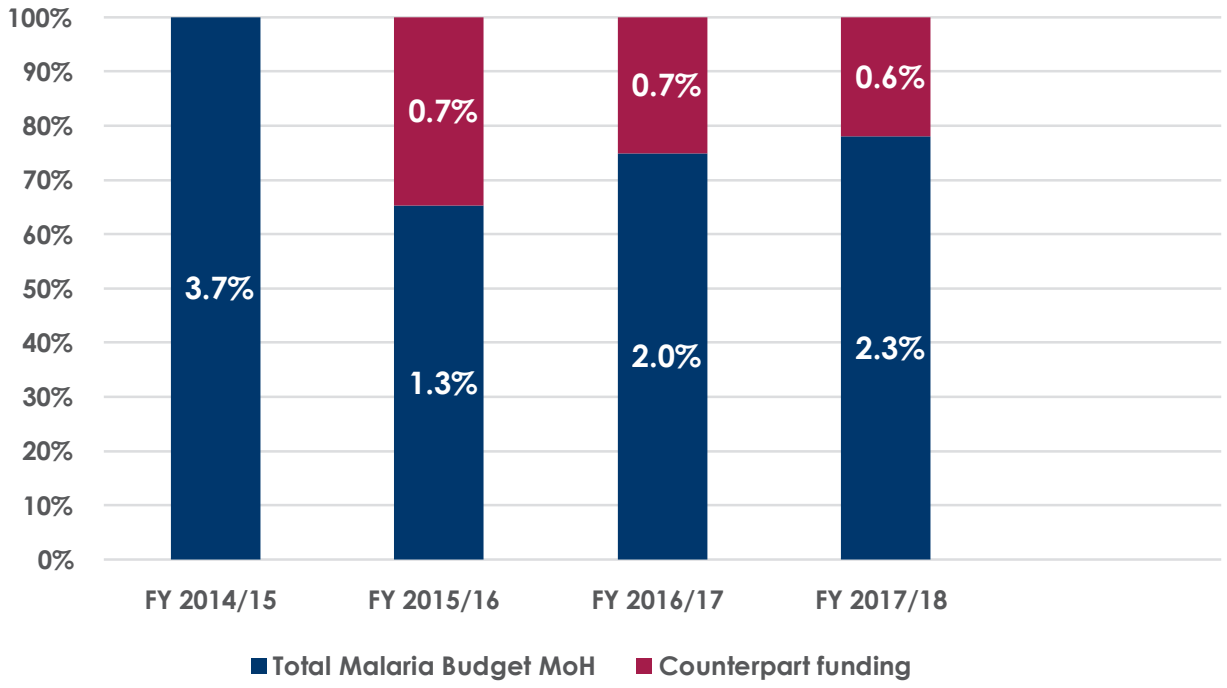
Table 3.1: Proportional budgetary allocation to the health sector

	2014/15	2015/16	2016/17	2017/18
Within national budget	4.0%	3.9%	3.7%	3.1%
Within county budget	21.5%	23.4%	25.2%	27.0%
Combined county and national	7.5%	7.7%	7.6%	8.2%

Source: National and county budget analysis 2016/17 and 2017/18

The government allocated about 2.3 percent of the health budget of Ksh 167 billion to the malaria programme in 2017–18, up from 1.3 percent in 2015–16 (Figure 3.3). The highest allocation was in financial year (FY) 2014–15, when the national government allocated 3.7 percent to the malaria programme. The government also directly contributes towards the malaria programme through counterpart financing based on a conditional grant from the Global Fund to Fight AIDS, Tuberculosis and Malaria, which covers strategic commodities, beyond the salaries of health workers. The counterpart allocation for malaria commenced in 2015–16 with an allocation of Ksh 415.7 million, which has been maintained with a marginal decrease to Ksh 412.2 million in 2017–18. Overall, counterpart financing from the national government towards the three diseases has increased by more than 40 percent, from Ksh 7 billion in FY 2015–16 to Ksh 10 billion in FY 2017–18.

Figure 3.3: Ministry of Health budgetary allocation and counterpart funding to malaria programme as proportion of total Ministry of Health budget



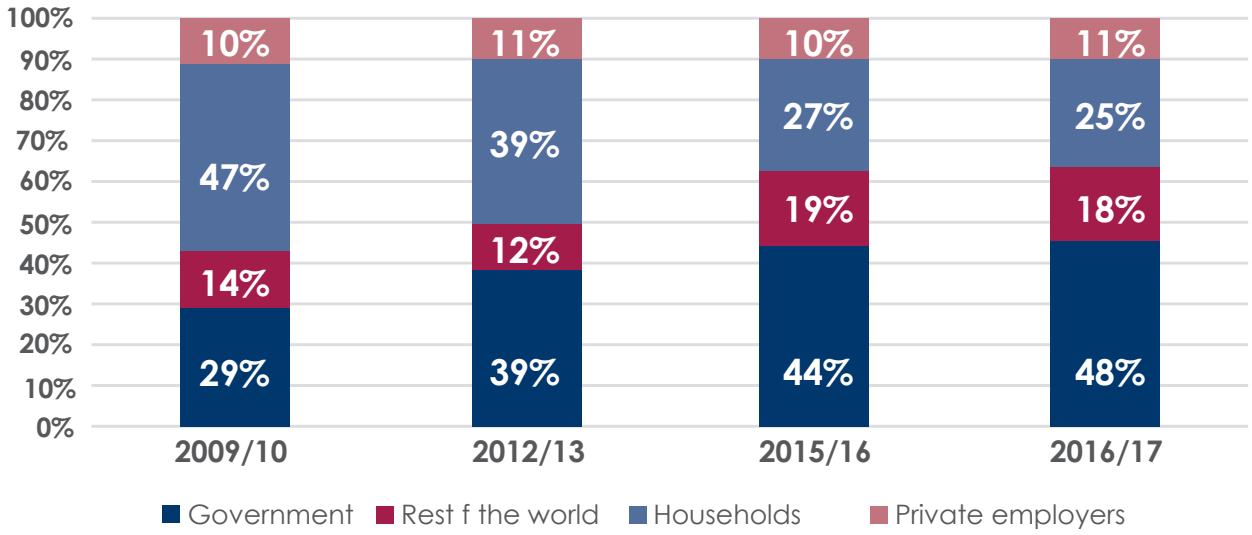
Source: National Budgets. The National Treasury

Malaria Spending from All Revenue Sources

Over the implementation period of the revised Kenya Malaria Strategy (KMS), 2009–2018, revenue to finance malaria programmes over the next five years has largely come from two major sources, the government and households. Donor contribution has remained small and fairly stable over the entire period. The government was the major financier of malaria, contributing 46 percent of total malaria spending (including capita investment) in FY 2016–17, up from 39 percent in 2012–13 and 44 percent in 2015–16 (Figure 3.4).

The household contribution to malaria spending was 25 percent in FY 2016–17, a reduction from a high of 39 percent FY 2012–13 and 27 percent in 2015–16. From this, 23 percent was spent through OOP expenditures at the point of service, and the remaining 2 percent was through a pooling mechanism. The donor contribution to malaria was 18 percent of total malaria spending in FY 2016–17, down marginally from 19 percent in FY 2015–16.

Figure 3.4: Revenue sources for financing malaria programme



Source: National Health Accounts 2015/16; Authors' calculations. Resources spent in 2016/18.

In terms of current spending for malaria, government hospitals and government health centres and dispensaries consumed most of the resources for malaria. Government hospitals consumed 23 percent of current health expenditure for malaria, down from 26.3 percent in FY 2015–16 , and government health centres and dispensaries consumed 18.7 percent FY 2015–16 and 20 percent in FY 2012–13.

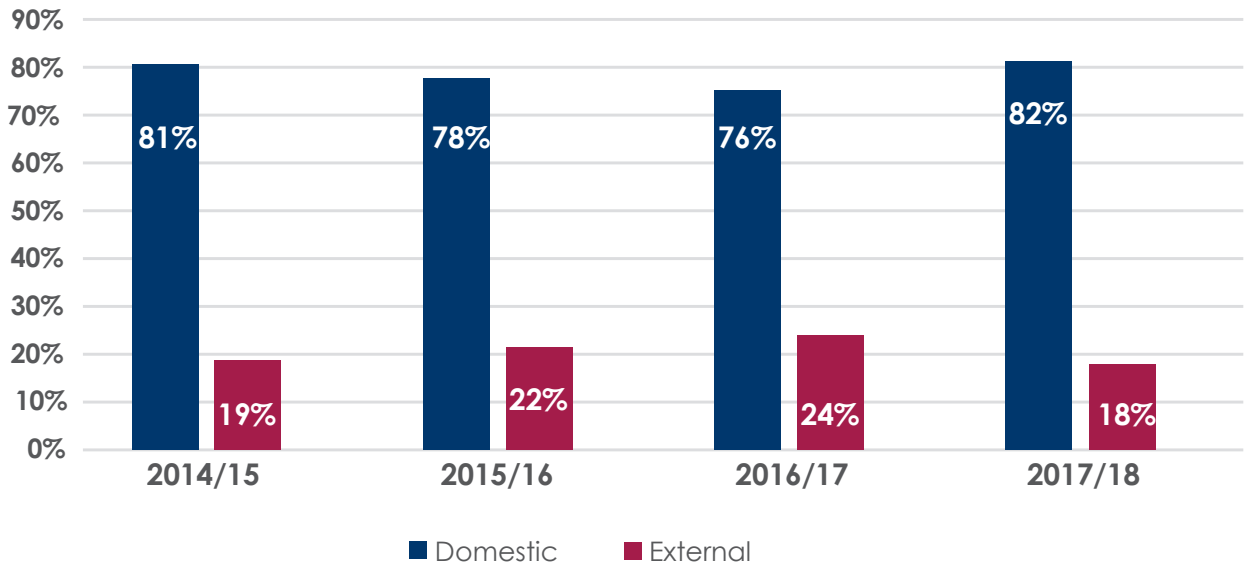
Private providers, hospitals, and clinics combined consumed 35 percent of current health expenditure for malaria (National Health Accounts Disease Sub-accounts 2015-16).

In FY 2015–16, outpatient curative care (39.4%), inpatient curative care (26.5%), and preventive care (19.6%) used the largest share of current spending for malaria. This shows that malaria outpatient services consume the majority of funds, and less prioritisation is seen for malaria prevention.

A look at the sustainability of malaria programming shows domestic financing of the malaria programme plays a major role, compared to external funding. In this respect, domestic funds are sourced from households, government, and the private sector (Figure 3.5). Domestic funding, however, has the potential to lead to catastrophic spending and impoverishment because the share of household OOP spending in domestic financing is substantial (23.8%).

Donor funds are crucial for supporting key strategic commodities and preventive interventions, more so at the community level. The major donors for malaria control over the period included the Global Fund, the U.S. President's Malaria Initiative, UNICEF, and the World Health Organization. For FY 2014–15 to FY 2017–18, the Global Fund contributed a total of Ksh 13.6 billion, and the President's Malaria Initiative contributed a total of Ksh 12.9 billion over the same period.

Figure 3.5: Sources of funding for malaria programme



Source: National Health Accounts 2015/16; Authors' calculations.

Financial Need, Availability, and Gap Analysis for Malaria Programme

A gap analysis conducted based on the resource need and allocation across various malaria focus areas for the years 2014 to 2018 formed the core of the resource need estimate. The main cost headings were the focus areas identified in the KMS: vector control; malaria in pregnancy; case management; epidemic preparedness and response (EPR); surveillance, monitoring, evaluation, and operational research (SMEOR); advocacy, communication, and social mobilisation (ACSM); and programme management.

The external resources available were determined for malaria-specific line items in the Development Partners for Health in Kenya database for the period 2012–13 to 2016–17 and the funding information provided by donors and government expending per specific malaria focus areas. For Global Fund grants, the resources available were estimated based on the yearly spending for both the state and non-state principle recipient.

Table 3.2 shows total resources needed and resources available for malaria programming in Kenya for four years by focus area from 2014–15 to 2017–18. The total financial need for malaria for the period 2014–15 to 2017–18 was Ksh 57.39 billion. Vector control accounted for the highest proportion of the total need for malaria programming at 47 percent, followed by case management at 32 percent and programme management at 14 percent.

Resource availability for malaria programming for the four years was Ksh 26.96 billion. In line with the need, vector control (61%) and case management (30%) absorbed the highest proportions of the available resources. This analysis takes into account a major campaign for distribution of long-lasting insecticidal nets (LLINs) that is conducted every three years. The campaign increased the costs of the long-lasting insecticidal net intervention by 7.3 times, compared to non-campaign years.

Table 3.2: Kenya malaria programme resource need and availability analysis by focus area, 2014/15–2017/18

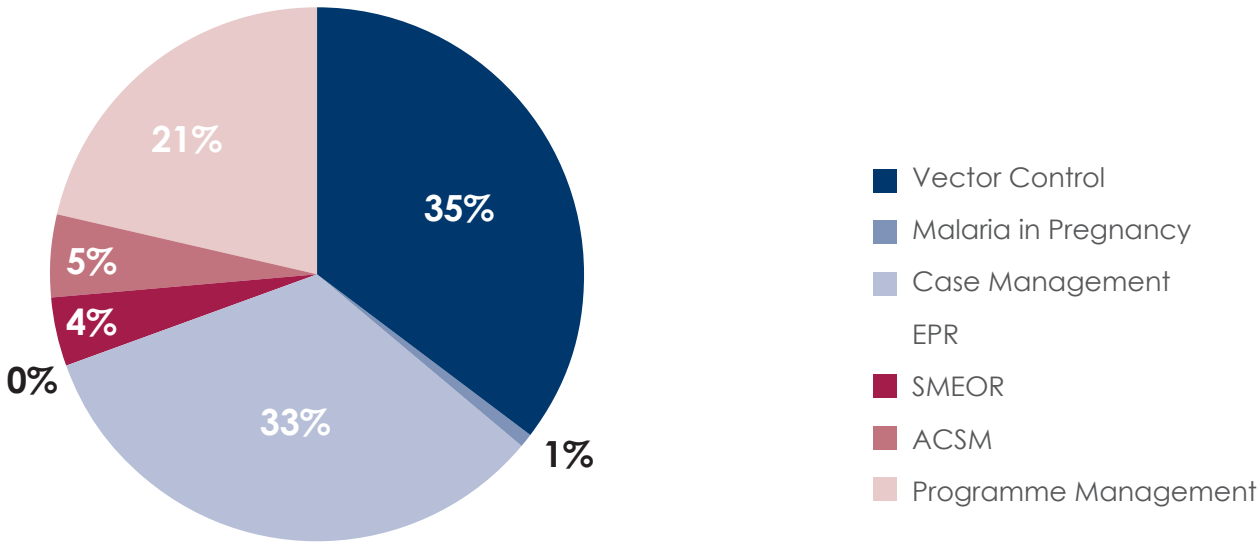
Focus areas	Need		Available	
	Ksh billions	Percentage of total need	Ksh billions	Percentage of total available
Vector control	26.90	47%	16.37	61%
Malaria in pregnancy	1.02	2%	0.80	3%
Case management	18.33	32%	8.18	30%
EPR	0.10	0%	-	0%
SMEOR	1.31	2%	0.01	0%
ACSM	1.95	3%	0.32	1%
Programme management	7.78	14%	1.28	5%
Total	57.39		26.96	

Source: Authors' calculations

The total net financial gap over the period 2014/15 to 2017/18 was Ksh 30.4 billion, based on a need estimation of Ksh 57.39 billion and availability of Ksh 26.96 billion. The strategy was not able to mobilise all the resources to finance malaria focus areas.

There was a variance in the distribution of the financial gap by focus areas. The major financial gaps by focus areas were vector control (35%), case management (33%), and programme management (21%) (Figure 3.6). The annual gaps were due to a marked decrease in expected donor financing from 2014–15.

Figure 3.6: Kenya malaria programme financial gap analysis by focus area, FY 2014–15 to 2017–18

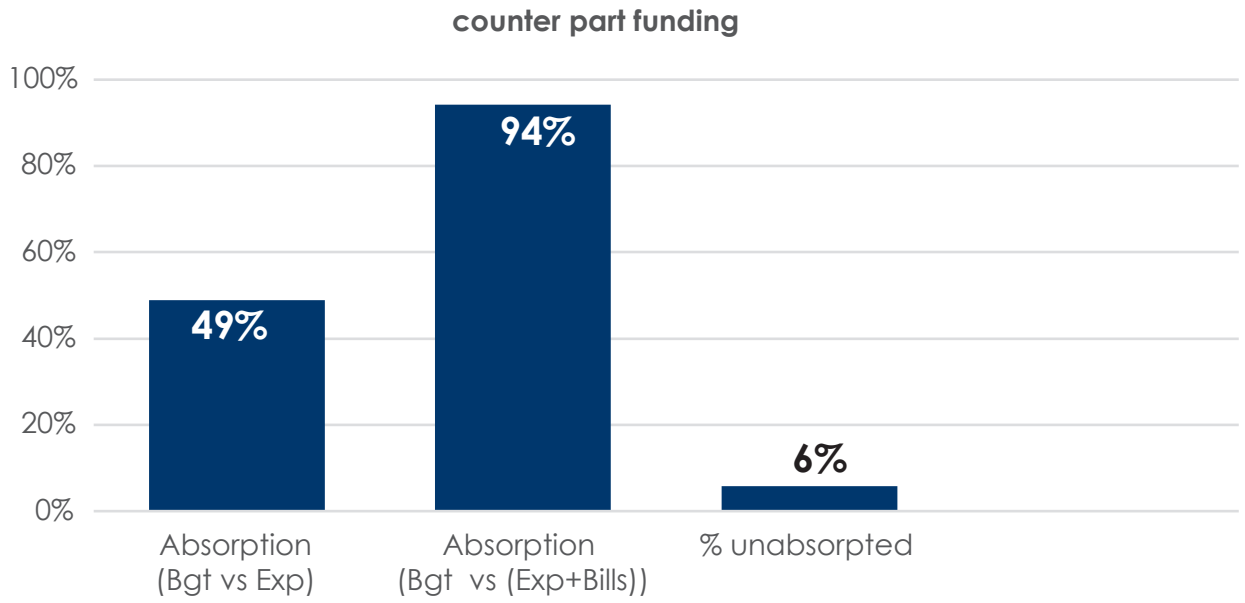


Source: Authors' calculations. Resources available in 2016–17 and 2017–18.

Absorption Capacity

Given the government allocation for the malaria programme under the counterpart financing, key strategic commodities absorb a low amount of allocated finances. Figure 3.7 shows average absorption for Global Fund counterpart financing. The absorption of budget compared to expenditure incurred is 49 percent; if pending bills are included, the absorption level rises to 94 percent, with 6 percent of the funds neither spent nor pending as bills. This is attributable to lags in the procurements process over the years.

Figure 3.7: Absorption rate for Global Fund counterpart financing FY 2015–16 to 2017–18

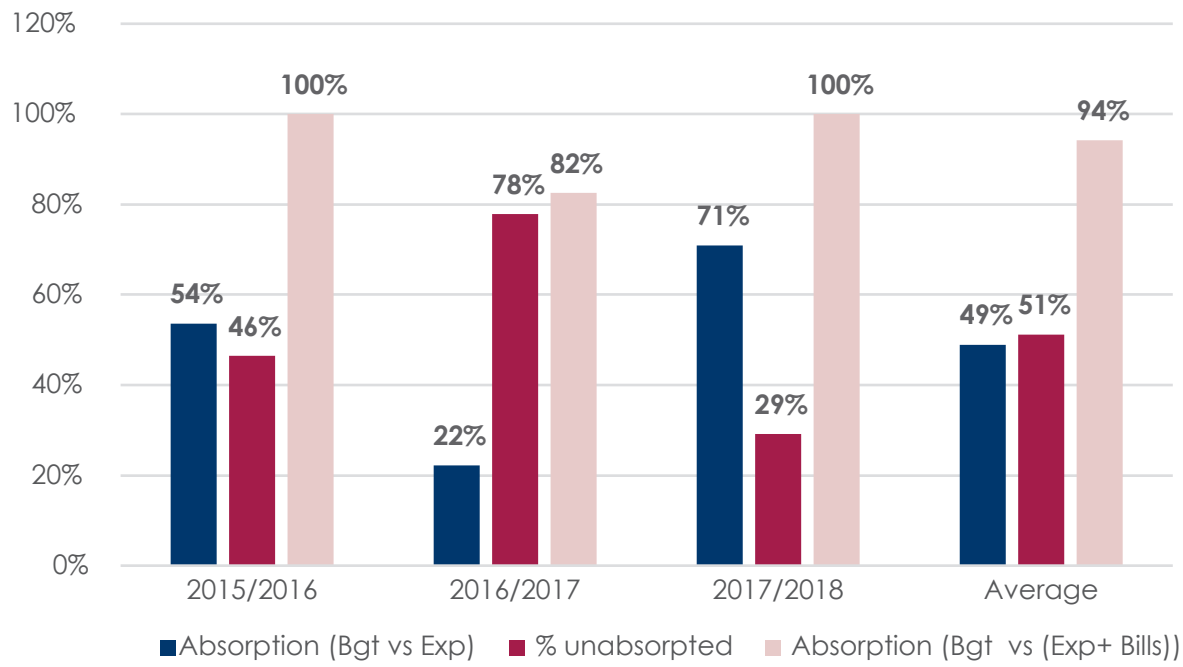


Source: The National Treasury

The trend across the three years shows that the malaria programme was able to absorb 54 percent of the counterpart funding in FY 2015–16. The absorption rate dropped to 22 percent in FY 2016–17 but picked up in FY 2017–18 with 71 percent. The unabsorbed funds, which include pending bills, represented 46 percent of the funding in FY 2015–16.

This increased significantly to 78 percent in FY 2016–17 before dropping to 29 percent in FY 2017–18. Figure 3.8 shows the trend in the absorption rates for counterpart funding over the three financial years.

Figure 3.8: Trends in absorption rate for global fund counterpart financing



Source: The National Treasury

SWOT Analysis of Malaria Programme Financing

This section details the internal strengths and weakness of malaria programme financing as well as the external opportunities and threats

Table 3.3: SWOT analysis

Strengths	Weaknesses
▪ There was a notable increase in domestic funding towards malaria in Kenya. ▪ In the annual national government budget, there was presence of budget lines for malaria both in the recurrent and the development budgets (i.e., Control of Malaria and the Global Fund special fund for Malaria).	▪ Majority of malaria interventions at the national level were largely donor supported. ▪ Challenges were experienced in tracking financial information, including information on allocation and spending. ▪ There was an inability to link targets to funding and financing to outcomes. ▪ The government's direct allocation was linked to a conditional grant, which meant that the government allocated money based on a requirement from the donor.
Opportunities	**Threats**
▪ There was an increase in several domestic resource mobilisation efforts for malaria that could see a further increase in domestic funding. ▪ The National Hospital Insurance Fund benefits package was expected to cover most of the diagnostic and treatmentrelated interventions thereby allowing both county and national governments to invest more in primary health care (i.e., prevention in malaria). ▪ It was envisioned that selected malaria interventions would be covered under the UHC agenda that was being developed at the time of the review, which would allow for the interventions to be allocated funding. ▪ County governments had the chance to include a budget line for malaria in their annual budgets, preferably as a subprogramme under the preventive and promotive health services programme, ensuring sustainable financing for malaria.	▪ Decrease in donor funding and investment for malaria due to changing priorities within the donor community. ▪ Classification of Kenya as a lower middleincome country may result in lower donor support. ▪ Counties experienced difficulties in accessing funds. ▪ Donors did not report to counties on investment and spending in malaria, making it a challenge for the counties to track donor investment. ▪ Limited budget allocation for malaria at the county level. ▪ Counties may have challenges in raising money to support the UHC agenda. ▪ UHC agenda—counties/national government might reduce the allocation to malaria programme because it is included in the UHC package.

Results

Key Issues and Challenges

The review noted the following challenges experienced in the financing of malaria in the revised KMS:

- Although there was a need to be more efficient in the use of available resources, the financing gap showed that there were inadequate finances for programme interventions.
- There was a high level of dependence on external sources of finances for the key commodities.
- It was noted that although prioritisation was done, there was low allocation to some of the programmatic areas, such as SMEOR, malaria in pregnancy, ACSM, and EPR, by the government, funding agencies, or other entities.
- There was limited information on overall partner funding, particularly at the county level, which meant that county governments were not able to determine where their funding for malaria came from and the amount.
- There was a lack of process, output, and outcome indicators to capture financial sustainability and accountability at both the national and county levels.

- There was inadequate linkage between programmatic targets and funding and between funding and outcomes.
- There were insufficient advocacy tools for domestic resource mobilisation for malaria at the national and county levels.
- There was low absorption capacity, particularly for key commodities. This could have been attributed to a lag in the procurement processes.
- Challenges were experienced with the flow of donor funds to counties, which meant that counties were not able to receive funding for their malaria interventions.
- There was limited allocation at the county level and difficulties in accessing the limited resources for malaria. In the annual county budgets, malaria was usually lumped together with other diseases rather than a sub-programme on its own. This provided a challenge in the counties' knowing how much was allocated specifically for malaria. This in turn brought about problems in accessing and subsequently spending the funds.
- There was no information on cost per person per intervention for malaria. This information would have been very useful in better guiding both national and county governments in planning and budgeting.

Recommendations

The programme financing thematic area made the following recommendations:

Increase allocation of resources for malaria.

National and county governments were encouraged to increase allocations to malaria to regularise funding and move towards financial sustainability. Both levels were encouraged to advocate for more resources, especially for prevention, to ensure that the gains made were sustained and there was a move towards sustainable financing. County-level programme-based budgets, expenditure reviews, and analyses can be used as advocacy and resource mobilisation tools at the high level.

Provide consistent financial tracking at both national and county levels.

The need for consistent financial tracking of data pertaining to allocation and spending of malaria in the national and county governments was recommended. The review recommended inclusion and reporting on of the following indicators at all levels for the purposes of sustainability and accountability: proportion of malaria budget to total health budget and proportion of total malaria budget contributed by partners.

Finalise the resource mobilisation strategy.

The review recommended finalising the draft domestic resource mobilisation strategy through a consultative process. Development of other tools to facilitate lobbying for more funding was recommended, together with dissemination and capacity building on the same. An in-depth look at involving the private sector for more funding for malaria and using other innovative financing methods were highly recommended.

Develop a sustainable financing framework.

The need for a sustainable financing framework and guidelines for malaria control interventions, especially when considering matters of pre-elimination and elimination, was recommended. Increased technical assistance to county health management teams for planning, budgeting, and advocacy for resource allocation was recommended. This would allow counties to also source for more funds for malaria.

Include malaria as a sub-programme.

County governments were strongly encouraged to include malaria in their annual programme-based budgets as a sub-programme in the preventive and promotive health services programme. Counties were also encouraged to conduct public expenditure reviews and analyses that could be used as advocacy and resource mobilisation tools at high levels.

Generate evidence for resource mobilisation.

The review recommended generating evidence for resource mobilisation purposes and appropriately packaging the information for targeted audience. It was also recommended that Malaria Indicator Surveys include a component on household expenditure and the National Health Accounts with a malaria subaccount, to be conducted every five years.

The review recommended that economic evaluations, including cost-effectiveness and cost benefit analyses, be conducted to better link programmatic targets to funding and funding to outcomes. The review also recommended determining the unit cost of providing the different malaria interventions.

These findings and recommendations were presented at the third Kenya National Malaria Forum, held as part of the broader malaria programme review. The recommendations were validated and proposed for consideration and inclusion in the consequent KMS.

Conclusions

The analysis presented in this chapter reviewed the financing for malaria over the last four years, during the period of implementing the revised KMS 2009–2018.

There was a steady increase in the allocation towards health in Kenya, with FY 2017–18 allocating 8.2 percent to health. However, this was still below the recommended 15 percent stipulated in the 2001 Abuja Declaration. The review noted that there had been an increase in domestic investment in malaria, with the government allocating resources under the Ministry of Health budget and also through counterpart funding. Household spending for malaria still played an important role in malaria financing. This was a cause for concern because this meant that there a significant level of OOP expenditure.

Donor funding for malaria has decreased over the last four years, which may have led to the increase in the household's role in financing malaria. An increase in public investment in malaria can benefit sustainable financing. However, an increase in household spending through OOP payments (excluding cost sharing) could cause catastrophic health spending, which would be far cry from reaching financial protection as is envisioned in the UHC agenda.

Overall, funding for malaria has decreased over the past four years which, if persistent, may threaten the gains already made in controlling malaria. Although prioritisation was done, allocation by the government, funding agencies, and other entities was low. There were no process, output, and outcome indicators to capture financial sustainability and accountability at both national and county levels. There were inadequate linkages between programmatic targets and funding and between funding and outcomes.

Resource allocation for malaria at the county level was limited, and accessing the allocated resources funds was difficult. There was no information on cost per person per intervention for malaria. This information would be very useful in better guiding both national and county governments in planning and budgeting.

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Chapter 4:
Procurement and Supply Management

Key Messages from This Chapter

- Chapter 4 describes the procurement and supply management system for the Kenya malaria programme. Procurement and supply management is fragmented in the Kenya Malaria Strategy and only clearly indicated in Strategy 6.2, Strengthen procurement and supply management systems for malaria drugs and commodities.
- There was significant improvement in malaria commodity availability and efficiency gains in the procurement of malaria commodities during the period under review and hence value for money.
- Implementation of a pull system across all malaria commodities improved stock management, and the available expertise in the procurement and supply management component contributed to improved performance across all interventions.
- Despite procurement and supply management being a specific strategy under programme management, it was poorly implemented. There was disjointed oversight and coordination for procurement and supply management activities at the national level.
- There was inadequate capacity in commodity management at all levels, with weak inventory management, poor data management and use, and inadequate oversight by county and sub-county teams. This resulted in stock-outs and over-stocks reported at health facilities.

Introduction

This desk review describes the procurement and supply management (PSM) system for the Kenya malaria programme; analyses the situation at the end of the Kenya Malaria Strategy (KMS) 2009–2018 (revised 2014); identifies successes and achievements, best practices, weaknesses, gaps, and challenges; and lists issues and recommends a way forward for the next KMS. The aim of PSM is to ensure continuous availability of commodities for malaria case management, diagnosis, and prevention.

Background

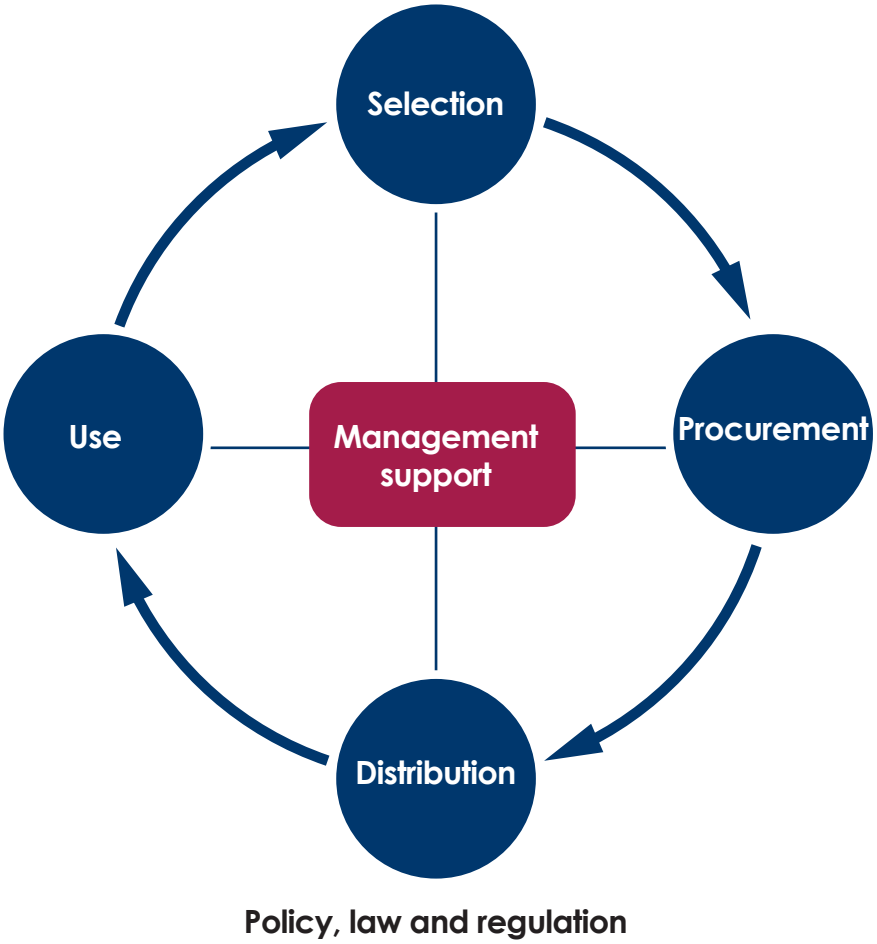
A supply chain includes the stages through which a health product flows from its point of manufacture to its point of use or consumption by an end user. Such entities include the manufacturer; suppliers, importers, or distributors; and stores at the central level, county level, and facility level. A reliable supply chain system delivers quality health products to end users whenever and wherever required in a reliable and timely manner, aligning and balancing their supply and demand so that appropriate health services are delivered. Three different types of items flow along within the supply chain: health products and health products stock, information, and funds.

Part of the supply chain management includes core logistics activities that are the operational part of supply chain management, from quantification, procurement, inventory management, storage and warehousing, distribution, and health products and health product stock, to product use data collection and reporting (John Snow, Inc. 2017). Disposal of used, expired, poor quality, or obsolete items is also included, which may be by aggregating them at a location from where they can be discarded safely and effectively.

In addition to the logistics activities, supply chain management also includes proper selection of the health products, ensuring their appropriate use in line with standard treatment guidelines, testing algorithms, and management support, including oversight and coordination, management information systems, human resources management, financial management, and monitoring and evaluation. All of this occurs in an environment with appropriate policy, legal framework, and quality assurance.

All these supply chain management functions may be depicted as per the diagram shown in Figure 4.1 of the pharmaceutical management cycle, also similarly depicted in the National Guidelines for the Diagnosis, Treatment and Prevention of Malaria in Kenya (National Malaria Control Programme, Ministry of Health, 2016).

Figure 4.1: The pharmaceutical management cycle



Source: Management Sciences for Health. 2012. MDS-3: Managing access to medicines and health technologies.

PSM activities can be defined as "all activities required to ensure the continuous and reliable availability of sufficient quantities of quality-assured, effective products to end-users, procured at the lowest possible prices in accordance with national and international laws" (The Global Fund, 2009). Staff undertaking PSM activities should manage the supply chain, planning activities in good time and addressing any arising problems so as to avoid stock-outs and treatment disruption. A supply chain that is well functioning supports the malaria programme in ensuring commodity security.

Policy and Guidance

Policies, Strategic Plans, Guidelines, and Legal Environment Affecting Malaria Commodities

The National Malaria Policy (Ministry of Public Health and Sanitation [MOPHS]/Division of Malaria Control [DOMC], 2010) indicated that there should be universal access to prompt malaria diagnosis and effective treatment, and universal coverage of at-risk populations with preventive interventions, including vector control and intermittent preventive treatment in pregnancy.

The Kenya Health Sector Strategic and Investment Plan July 2014–June 2018 indicated that malaria diagnosis should be available from Level 1, at the community, and management of malaria from Level 2, at the dispensary facilities (Ministry of Health [MOH], 2014).

There were guidelines for case management (MOH/National Malaria Control Programme [NMCP], 2016). For vector control, there is an indoor residual spraying (IRS) business plan (MOH/NMCP, 2015), the Integrated Vector

Management Policy guidelines (MOPHS, 2009), and the Insecticide Resistance Management Plan (MOH, 2014) as well as the Free Long-lasting Insecticidal Net (LLIN) Distribution Standard Operating Procedures (Population Services Kenya, n.d.). For community case management, there were no guidelines and no relevant supervision manuals. There was an integrated malaria support supervision manual (MOPHS/DOMC, 2011, 2012) for guidance in supportive supervision.

There were also training packages for case management (MOH, 2016) and community case management as well as IRS (MOPHS, 2011) that have commodity management content.

There were technical specifications guiding procurement of antimalarial medicines, rapid diagnostic tests (RDTs), LLINs, and IRS commodities.

With respect to legislation, the Kenya Medical Supplies Authority (KEMSA) had the mandate for procuring, warehousing, and distributing essential medicines and medical supplies under the KEMSA Act 2013 (Republic of Kenya 2013). Procurement of malaria health products was guided by the Public Procurement and Asset Disposal Act No. 33 of 2015 (Republic of Kenya 2015). The Pharmacy and Poisons Act Cap 244 aims for better provision for the control of the profession of pharmacy and the trade in drugs and poisons (Government of Kenya 2012).

PSM in the Mid-term Review and Kenya Malaria Strategy

The KMS 2009–2018 (revised 2014)1 was a product of the mid-term review (MTR) of the National Malaria Strategy 2009–2017. As priority actions for 2014–2018, the KMS 2009–2018 had procurement and supply chain management be a standalone strategy to iron out the PSM challenges. One of the strategies under the KMS 2009–2018 (revised 2014) was for an annual procurement and supply chain management (PSCM) plan to be developed within the context of devolution to counties.

The KMS indicated that PSM needed to have a standalone strategy: Strategy 6.2: Strengthen procurement and supply management systems for malaria drugs and commodities. However, the PSCM plan was not available, although segments of it were available as separate documents (e.g., the supply plan produced during the national quantification and work plans for case management activities, rather than one crosscutting PSCM plan document).

Successes

There were fairly comprehensive policy and guidance documents, either directly for malaria or cross-cutting for the MOH.

Challenges and Weaknesses

- There were no overall national MOH guidelines that were specific to PSM issues.
- For the malaria programme, certain guidelines were lacking (e.g., community case management and quantification); and others required additional content (e.g., the integrated supervision manual had limited content to aid the supervisor in addressing commodity management-focused supportive supervision issues at county and facility levels).
- Policy and guidance for PSM were scattered across various thematic areas (case management, vector control, malaria in pregnancy [MIP]). There was a need to have one harmonised document.

Methods

Organisation of Service Delivery and Governance of Advocacy, Communication, and Social Mobilisation

This was analysed using the pharmaceutical management cycle.

Product Selection

Malaria health products and technologies were regulated through the Pharmacy and Poisons Board (PPB) for medicines and diagnostics; the Pest Control Products Board regulates insecticides under IRS and LLINs; and the Kenya Bureau of Standards contributes to regulation of LLINs, IRS equipment, and spraying equipment for larviciding. PPB and the Kenya Medical Laboratory Technicians and Technologists Board (KMLTTB) regulate RDTs; however, it was found that there was lack of clarity on regulation of RDTs between PPB, which gives a certificate of listing only, and KMLTTB, which gives a registration certificate to companies that sell RDTs and also a validation certificate for a particular RDT .

International standards affecting health products includes The World Health Organization's (WHO) prequalification and WHO Pesticide Evaluation Scheme. WHO publishes a list of health products that have undergone its prequalification process. Its website states that the lists contains products to manage HIV/AIDS, tuberculosis, malaria, other diseases, and reproductive health, that have been assessed by WHO and found to be acceptable, in principle, for procurement by the United Nations, other international agencies, and countries. There are WHO prequalification lists for antimalarial medicines, diagnostics, LLINs, and vector control products. The main challenge observed in product selection was that artemether-lumefantrine (AL) 40/240 mg and 60/360 mg tablets and rectal artesunate suppositories were yet to be included in the Kenya Essential Medicines List (KEML) (Ministry of Health 2016b).

The KEML 2016 lists the essential medicines in Kenya, and the Kenya Essential Medical Laboratory Commodities List (KEMLCL) lists the essential laboratory products (Ministry of Health 2014). Table 4.1 summarises the findings.

Table 4.1: Malaria commodities in the national treatment guidelines and the KEML

Category	Product in guidelines	Status in KEML/KEMLCL and comments
Case management	▪ AL ▪ Dihydroartemisinin + piperaquine (DHAP) ▪ Artesunate (parenteral) ▪ Artesunate (rectal) ▪ Quinine	▪ Listed AL products: AL tablet 20 mg + 120 mg, AL tablet 20 mg + 120 mg (dispersible), and AL 80 mg + 480 mg ▪ Other listed medicines: artesunate injection 30 mg vial, artesunate injection 60 mg vial, dihydroartemisinin + piperaquine (DHA+PPQ) tablet 40 mg + 320 mg, quinine (sulphate or bisulphate) tablet 300 mg ▪ Missing/yet to be listed: AL 40/240 mg and 60/360 mg tablets, and rectal artesunate suppositories
Malaria in pregnancy	▪ Sulfadoxine + pyrimethamine	▪ Listed: sulfadoxine + pyrimethamine tablet 500 mg + 25 mg
Case management	▪ mRDTs	▪ Rapid diagnostic kit, HRP2Ag, PLDHAg, PAN Ag. kit with controls

Quantification

At the national level, the National Malaria Control Programme (NMCP) carried out an annual quantification and supply planning exercise to determine the requirements of the malaria commodities for the following three years.

The NMCP also planned the delivery of those commodities to ensure that a stable supply chain was maintained in line with activities highlighted in the strategy. In addition, the NMCP conducted a review of the quantification and supply plan six months after the annual quantification process.

The process used the most recent consumption data to adjust the forecasted quantities and facilitate adjustment of the procurement quantities and delivery dates. The most recent consumption data were also used to adjust the call-down dates and procurement quantities as necessary for the pending shipments. The quantification review exercise was led by the Drug Management Subcommittee (DMSC) of the Case Management Technical Working Group (TWG) of the NMCP. The DMSC's key function was to advise the NMCP on matters relating to case management of the security of malaria commodities and supply chain strengthening. However, given the lack of an overall PSM group dealing with all malaria commodities, the quantification exercise organised by the DMSC was at the time of the review used to support quantification of only a few other commodities, such as sulfadoxine + pyrimethamine (SP) and RDTs.

In the 2017/18 quantification review report the consumption-based method was performed using consumption data from the District Health Information Software, version 2 (DHIS2) to generate forecasts for AL tablets, artesunate injection, and SP tablets. Morbidity-based methods (and morbidity data) were used to generate requirements for malaria RDTs. Supply plans were generated using a spreadsheet-based pipeline monitoring tool (PMT) (Ministry of Health 2018), and these were used to inform the procurement process. Other important data elements that feed into the quantification were: stock on hand, receipts and issues data from KEMSA, data on pending supplies that had been ordered but not yet received, peripheral stock on hand, adjusted average monthly consumption data (based on the facility reports from DHIS2), and commodity prices from most recent procurements.

There was a quantification guide and an integrated vector control commodities forecasting tool for IRS commodities (Ministry of Health 2017). Spreadsheet tools were used for forecasting the other commodities. For the commodities procured with funding support through the Global Fund, a list of health products with quantities to be procured over the funding period was generated.

There were technical specifications for antimalarial medicines and diagnostics, for most vector control commodities, with some yet to be developed, and for larviciding commodities. For laboratory reagents for microscopy, the programme used specifications provided by the National Public Health Laboratory Services.

Successes with Quantification Processes

The PSM thematic review identified the following successes with quantification during the period of implementation of the revised KMS 2009–2018:

- Quantification was undertaken annually. Reports for both annual quantification and quantification review were available. A supply plan that covered quantities of commodities to be procured through the different funding sources (U.S. President's Malaria Initiative [PMI], Global Fund, and Government of Kenya) and the proposed time of supply was developed during the quantification, using the spreadsheet-based PMT, and these were used to inform the procurement process.
- There was high availability of malaria commodities, as evidenced in the Service Availability and Readiness Assessment (SARA) (Ministry of Health 2016c) and the Service Availability and Readiness Assessment Mapping (SARAM) (Ministry of Health 2013).

The thematic review also identified the following challenges and weaknesses in the quantification processes:

- There was a lack of a comprehensive guideline for quantification (forecasting and supply planning) that covered all malaria commodities.

- DMSC's focus was mainly on case management commodities; hence other commodities, such as vector control, were not specifically quantified in the annual national quantification but relied on specific funding stream quantifications such as the Global Fund.
- There were large errors in accuracy for forecasting. Measurement of forecast error in the 2017/18 quantification review report (Ministry of Health 2018) showed that the forecast error percentages were 65 percent for artemisinin-based combination therapies (ACTs), 150 percent for RDTs, -8 percent for injectable artesunate, and -55 percent for SP tabs. This was largely due to the health worker strikes that reduced service delivery at the facility level, which limited consumption.
- The technical specifications had been developed in "silo" fashion by each NMCP intervention area. There was a lack of annual updating of the specifications and a comprehensive specifications document did not exist.
- Use of technical specifications that exceed WHO requirements caused challenges in RDT procurement. For example, the programme had raised the PDS requirement for RDTs from 90 percent to 95 percent in an attempt to procure the best; however, it was later argued that this was not favourable to suppliers, forcing the programme to revert back to 90 percent. Community case management and RDTs: Community health volunteers (CHVs) would see a limited number of clients during a month; however, the specifications at the time of review stated procurement of a pack of 25 RDT tests with only one assay buffer included. This buffer could be affected by poor storage or contamination. In such situations, a single use test with single buffer pack would be advantageous.
- SP technical specifications required review in light of high potential for contamination during handling (e.g., counting tablets) for the 1000s pack specified at the time.

The PSM thematic review made the following recommendations:

- Undertake one annual national-level quantification exercise with semi-annual review, incorporating all malaria commodities, from vector control to MIP and case management.
- Compile one comprehensive technical specifications document, which covers all malaria commodities and which should be regularly updated, for example, during the annual quantification process. It should be disseminated to relevant stakeholders engaged in commodity procurement, including counties.
- Undertake annual assessment of forecast error to determine need for adjustments in supply plans.
- Edit technical specifications for RDTs to include a special pack for those targeted for use at community level (i.e., to allow for a single use test with single buffer pack). The WHO had prequalified products containing single-use buffer vials based on satisfactory demonstration of stability (WHO, 2018).
    - Edit the technical specifications for SP to reduce pack size to 100s, preferably blister packed.

Procurement

The PSM thematic team reviewed procurement across the public and private sectors and documented the challenges found.

Public Sector

Across the country, the procurement of health products in the public sector was guided by the Public Procurement and Asset Disposal Act No. 33 of 2015 (Republic of Kenya 2015). Procurement of commodities under support from the Government of Kenya and the Global Fund was through KEMSA, and procurement of PMI commodities was through the United States Agency for International Development's (USAID) Global Health Supply Chain-Procurement and Supply Chain Management programme. Procurement of microscopes, routine consumables, and related diagnostic items was largely supported by the national government as part of direct investment to malaria control, and procurement of products for diagnosis through microscopy, accessory commodities such as chlorine solution for disinfection of cups after taking SP, disinfecting buckets, and cups, was funded by the county governments and partners through UNICEF and PMI funding.

Following devolution, health services were devolved, including the funding that the government previously used to procure medicines. Counties were expected to put aside some funding to contribute to provision of malaria commodities, as per a MOH circular on county support for malaria commodities of January 2015. However, this had not been well coordinated with the NMCP, as evidenced with SP, where procurement was assigned to the counties as per the circular but was not undertaken in timely fashion. As a result, there was an overstock of SP where NMCP procured SP stock through government and donor support in 2014, and some counties also procured it without consulting the NMCP. The situation was compounded by low consumption during the 2016–2017 health workers strikes, resulting in high facility stock levels. It was reported in an MIP TWG in June 2018 that 900,000 tablets of SP were at risk of expiry in March 2019 due to the mass procurement of 6 million doses of SP in 2014 by the government, UNICEF, and PMI.

Antimalarial medicines, malaria rapid diagnostic tests (mRDTs), and vector control products must appear on the WHO pre-qualification list of products for procurement to be conducted through Global Fund support.

Private Sector

Provision of antimalarial medicines for the private sector was undertaken through the Global Fund-supported private sector co-payment mechanism. The mechanism aimed to increase availability and affordability of quality-assured ACTs through the private sector.

Procurement of ACTs is through private importers of drugs, called first-line buyers (FLBs). The FLBs sign an agreement with the principal recipient (in Kenya, this is the National Treasury), which specifies their obligations with regards to participating in the private sector co-payment mechanism for ACTs. Through the co-payment mechanism, grant funds are used to make a co-payment towards procurement, which is carried out by private sector FLBs, from eligible manufacturers with signed agreements with the Global Fund at or below the maximum prices negotiated by the Global Fund (The Global Fund 2018). The principal recipient is responsible for quantification of the ACTs, allocating resources for post-shipment inspection, and quality monitoring for products co-paid on behalf of private sector FLBs.

Annual quantification and procurement for private sector was done, and NMCP data show that FLBs began to receive stock in late 2015 up to December 2017. Delivery in-country was based on commodity call-downs agreed between manufacturer and FLBs. From 2015 to 2017, 10,315,920 doses were delivered (Unpublished private sector ACT delivery data, National Malaria Control Programme

Ten FLBs were identified: Lords Healthcare Limited, Phillips Pharmaceuticals Limited, Surgipharm Limited, SAI Pharmaceuticals Limited, Harleys Limited, Laborex Kenya Limited, Medox Pharmaceuticals Limited, Unisel Pharma (K) Limited, Universal Corporation Limited, and Highchem (The Global Fund 2016). Of the 10 FLBs, only Highchem procured in late 2016 and Universal in late 2016 and early 2017.

The FLBs were expected to comply with the following co-payment mechanism requirements: register with the PPB, non-distribution of monotherapies, provide individual and hospital packs, avoid diversion of products, use of ACTm logo and storage practices, and apply a reasonable margin on the co-paid ACT prices sold by the FLB so that the end-user prices could be expected to be competitive with those of other malaria treatments (Price Waterhouse Coopers 2017). The Global Fund's local fund agent assessment in October 2017 found that most of the then eight FLBs selling Global Fund-approved co-paid ACTs met the requirements. However, the margins for each of the FLBs varied and were not reasonable. The local fund agent recommended a joint review of the margins and reference prices by the principal recipient (i.e., the National Treasury), NCMP, and the FLBs.

The local fund agent also noted that the FLBs did not report on the quantities consumed (sales to wholesalers and retailers) for the principal recipient (National Treasury)/NMCP to track consumption. This may have contributed to why commodity stocks forecasted to last until August 2018 ran out in December 2017.

Challenges and Weaknesses in Procurement

The PSM thematic review found the following challenges and weaknesses in procurement of malaria commodities:

- Poor alignment of procurement processes to Government of Kenya budgetary cycles led to delays in procurement with counterpart funding.
- Lack of updated technical specifications from the NMCP led to delays in procurement.
- Litigation by some suppliers delayed awarding of procurement contracts (e.g., RDTs in 2016).
- Lengthy process required to obtain a waiver for importation of products supported through PMI products in 2018 also caused delays in procurement.
- There was no central level procurement of dihydroartemisinin + piperaquine (DHAP) due to inadequate funding (funds reserved for first-line treatment); counties were free to procure this item if in need.
- There was a lack of a PSCM plan to guide coordination between different funding agencies and counties on procurement.
- The FLBs do not report on consumption to the NMCP; hence there was suboptimal stock monitoring (price and stock availability) for the private sector.

Inventory Management, Warehousing, and Storage

For the public sector, at the central level, KEMSA was the main warehouse storing commodities. Nets for routine distribution were stored by Population Services Kenya in a central warehouse and regional warehouses in the various epidemiological zones (Eldoret, Kisumu, and Mombasa).

For IRS, after procurement was finalised, local insecticide agent companies contracted by manufacturers transported the product from the port of entry to a central store in Kisumu. The products were then distributed to the respective county central store, from where they were distributed to the ward stores just before the spray season began. All stores were under a trained warehouse manager employed by the project implementing agency. The store was overseen by the local public health officer. Modified cargo containers were used to store IRS commodities and equipment if there were no existing storage buildings in health facilities. There were ward-based IRS stores for ease of transporting the insecticide and spray equipment to the actual spray sites. Supplies to and from the store to the spray areas, requisitions, and transactions at the warehouses were documented. At the end of the spray season, an audit was done for used-up and leftover stocks and storage in preparation for the next season.

For community case management, a community unit was linked to a Link Health Facility (a government-owned dispensary, health centre, or hospital) from where the trained CHVs were supposed to obtain malaria RDTs and medicines, use/dispense these in the community, and submit a report at the end of the month.

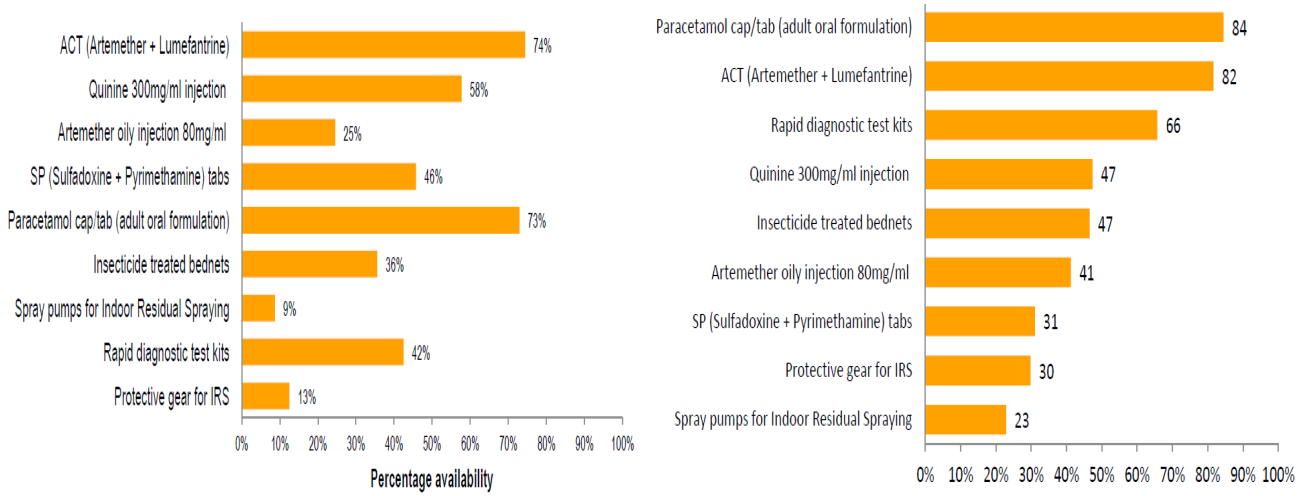
For commodities provided through the private sector co-payment mechanism, unlike for Global Fund-supported commodities for public sector, all direct in-country supply chain costs, including distribution and storage, were borne by FLBs, not by the Global Fund grant. The FLBs channelled the medicines supply through registered wholesalers, retailers, private hospitals, clinics, and non-clinical settings in the country for final consumption by patients (Price Waterhouse Coopers 2017).

General Status of Inventory Management and Storage

A 2016 mini SARA survey conducted in a nationally representative sample of 250 health facilities across 19 counties found that only half (50%) of the facilities sampled offered malaria services (Ministry of Health 2016c). Facilities that reported offering malaria services had, on average, 54 percent of the assessed items available (i.e., paracetamol

cap/tab [adult oral formulation], AL, RDTs, quinine 300 mg/ml injection, LLINs, SP tabs, protective gear for IRS, and spray pumps for IRS). More than 70 percent of facilities by level of care had the first-line treatment (i.e., ACT) for treatment of malaria, with 84 percent of hospitals and 85 percent of dispensaries having first-line treatment of malaria (Figure 4.2). The 54 percent availability of malaria products was slightly lower than the 2013 SARAM, (Ministry of Health 2013) in which the mean availability of malaria products was 55 percent at primary healthcare facilities and 65 percent at hospitals.

Figure 4.2: Mean availability of malaria health products in health facilities in 2013 and 2016



Sources: (i) SARAM, (ii) 2016 SARA survey report

Table 4.2: Percentage availability of malaria products by type of health facility and managing authority

Type of Medicine	Facility type					Managing authority				Urban/Rural		Over all%
	Hosp	H/C	Disp	clinic/ Stand-alone VCT	Maternity/N ursing home	Public	Private, not-for-profit	Private, for-profit	Others	Urban	Rural	
ACT (AL)	84	79	85	71	86	85	83	74		85	83	**82**
Quinine 300mg/ml injection	56	35	30	50	86	34	72	64		34	72	**47**
Artemether oily injection 80mg/ml	54	24	20	45	79	33	47	56		33	47	**41**
SP tabs	38	24	20	26	57	27	39	36		27	39	**31**
Paracetamol cap/tab (adult oral formulation)	90	85	78	79	86	83	97	80		83	97	**84**
Insecticide treated bednets for patients, their families & households	59	53	43	13	50	55	42	32		55	42	**47**
Spray pumps for IRS	39	29	5	3	21	27	19	17		27	19	**23**
RDTt kits	74	71	63	42	71	66	83	55		66	83	**66**
Protective gear for IRS (goggles, boots, gloves)	49	32	8	3	50	31	28	29		31	28	**30**
Total number of facilities	99	34	60	38	14	143	36	66	0	120	125	**245**

Source: 2016 SARA survey report

Inventory Record Keeping

Table 4.2 summarises the inventory management tasks and records at the health facilities. Standard stock cards were used at KEMSA and in facilities to track commodity receipts, issues, and stock on hand. Facilities were expected to maintain stock cards, and use S11 for stock movements and maintain all stock records (S11, stock card, delivery notes from suppliers) in organised files.

Table 4.3: Inventory management tasks and records

Task	Inventory record/form	Comments
Receiving and storing commodities	▪ Delivery notes ▪ Stock/bin cards, stock ledger ▪ S13	Confirmation of delivery; receipt of commodities; recording of stocks
Issuing	▪ Stock/bin cards ▪ Stock ledger ▪ S11/S12	Issues to dispensing area or other facilities

A survey of 479 health facilities across 8 malaria-endemic counties in the lake region and western Kenya in FY 2017 (USAID Afya Ugavi 2017) found the following gaps in inventory management:

- Lack of updated stock cards: The county with the lowest had only 71 percent of facilities with updated records.
- Only 44 percent of the instances assessed had matching actual closing stock on hand with expected stock on hand.
- Overall variance of 5 percent between number of malaria test-positive cases and number of ACT doses dispensed (ranging from +78% in Migori to -7% in Busia).
- Overall variance of -12 percent of number of people reported as tested for malaria using RDTs and the number of RDTs reported as consumed.

The survey also examined accountability for commodities, comparing opening stocks, receipts from KEMSA, stocks dispensed, and closing stock on hand. In general, the accountability for AL commodities across the 47 counties decreased, from an average of 81 percent in FY 2015, to 72 percent in FY 2016, to 67 percent in FY 2017.

County-Level Data on Inventory Management

Table 4.3 summarises 2017–2018 data on availability of stock-keeping records and their accuracy, from the Afya Ugavi project data obtained from the eight lake endemic counties.

Table 4.4. Inventory management in the lake endemic counties in 2017 and 2018

(n=1,109 health facilities)

County	Denominator (# of instances assessed)	% of instances with		
		Stock cards available	stock cards updated regularly	Stock card balance=actual stock
Bungoma	831	93%	14%	65%
Busia	506	93%	18%	70%
Homa Bay	785	85%	5%	58%
Kakamega	1,089	96%	8%	66%
Kisumu	549	90%	2%	53%
Migori	955	92%	14%	51%
Siaya	618	90%	2%	60%
Vihiga	421	96%	2%	60%
Total	5,754	92%	8%	60%

Source: USAID| Afya Ugavi project data

It was noted that stock cards were generally available, but there was very low updating of the cards (average 8%) and moderate matching of the stock card closing stock to the actual inventory. These findings showed weak inventory management documentation practices at the county level.

County-Level Inputs on Inventory Management

Nine counties were invited to participate in a workshop to consolidate findings of the malaria programme review (MPR) desk review in July 2018. Table 4.4 summarises inputs from the nine counties on malaria commodity supply and management.

Table 4.5: Feedback from nine counties on malaria commodity availability and management

County	Zone	Feedback: Successes	Feedback: Weaknesses, challenges
Busia	Endemic	KEMSA supplied commodities as ordered Partner support available for commodity redistribution when required	
Kilifi	Endemic	KEMSA supplied commodities "free of charge"	Sometimes commodities with short shelf life were supplied, leading to expired commodities and stock-outs Delay in supply of commodities
Kirinyaga	Low risk	No stock-outs reported	Commodity expiry in health facilities due to absence of malaria cases
Kisii	Endemic	Good commodity security	Sometimes commodities with short shelf life were supplied, leading to expired commodities and stock-outs
Kisumu	Endemic	Good commodity security	-
Kwale	Endemic	Good commodity security with pull system	Data quality challenges

County	Zone	Feedback: Successes	Feedback: Weaknesses, challenges
Makueni	Low risk	Improved commodity storage (renovation done) Staff trained on commodity supply	-
Turkana	Seasonal	Sub-county managers trained in commodity management	Short expiry commodities supplied
Uasin Gishu	Epidemic prone	Timely consistent supply to health facilities	

In general, there was positive feedback from counties, with the greatest concern on the supply of short expiry commodities, potentially leading to expired stock and stock-outs if adequate consumption did not occur. The following measures were taken to address the short expiry commodities:

- In March 2018, through advocacy by the NMCP, the MOH released a circular informing counties of short expiry RDTs, AL, and artesunate resulting from a long health worker industrial action in 2016–2017, which reduced consumption of the commodities and led to increased risk of expiry.
- KEMSA was authorised to distribute the products with less than six months shelf life so as to minimise losses to expiry.
- KEMSA urged the counties to inform their health facilities to accept and use the products.

Monitoring of Stock Status at the National Level

A spreadsheet-based PMT was used by DMSC to update the status of the national commodity pipeline with the latest downstream and upstream data, including consumption, stock, and procurement data, and to adjust procurements to align with the demand. An additional spreadsheet-based tool, the Expiry Risk Tracker, was used to track potential expiries in the in-country stock so that the DMSC could raise the alarm for suitable action to be taken by the national and county levels.

Successes of Inventory Management:

- National pipeline management was in place through routine monthly monitoring by the DMSC.
- Counties were engaged in inventory management through biannual county forums and use of relevant circulars.
- Additional storage space for LLINs during mass distribution had been explored through use of containers (National Malaria Control Programme and Population Services Kenya 2015).

Challenges of Inventory Management:

- When counties were in debt to KEMSA, distribution of malaria commodities was affected, leading to low availability or stock-outs of commodities at health facilities, even though there was adequate stock at the central warehouse level (ACT Watch 2017).
- There were weak health facility-level inventory management practices, partly attributed to limited skills capacity.
- There were reports of frequent shortage of mRDTs and ACTs at the community level due to poor inventory management and weak coordination with link facilities.

Logistics Management Information System

The logistics management information system (LMIS) tracked selected malaria commodities for the public sector using facility-level data collection LMIS tools that health facilities were expected to report on a monthly basis. A system was in place for transmission of the data to the national level. Each LMIS tool had an instruction section that guided the user on how to fill it.

Table 4.6: Malaria commodity LMIS reporting tools

Name of LMIS tool	Purpose of the tool	Comments
Daily activity register (DAR) for malaria commodities	Record daily transactions at facility level for antimalarial medicines (AL, quinine, SP, artesunate) and mRDTs	Version Nov 2016 ▪ To be updated with the new formulations yet to be added to the KEML 2016 and guidelines.
Health facility monthly summary for malaria commodities	Monthly reporting of antimalarial medicines and mRDTs by facilities. Data reported includes stock on hand, quantity dispensed, medicines with less than six months to expiry. The tool was also an ordering form where the order quantity was calculated using a stated formula.	As above. Version 2016. ▪ There was some confusion in the past on which reporting tool was to be used to report mRDTs between the lab personnel and NMCP. ▪ mRDTs were laboratory products, which, according to the malaria guidelines, were only used at lowerlevel health facilities and community level. NMCP officially requested facilities to report mRDT usage via the malaria commodity form rather than in the MoH 643 (F-CDRR for Laboratory commodities).
Community unit DAR for malaria commodities	Recorded daily transactions at facility level for only AL and mRDTs. Filled by CHVs/ community health workers.	Version 2018. ▪ Printing of hard copies was ongoing through AMREF (Global Fund support). Users were using photocopies in the interim.
Community unit monthly summary for malaria commodities	Monthly reporting of AL and mRDTs. Filled by CHVs/ community health workers.	As above.
DHIS2	Used to upload monthly reports by sub-county pharmacists so that data are available upstream for facility resupply and national quantification, and for decision making at county level.	▪ DHIS2 platform was managed by the Health Information System (HIS)unit. ▪ NMCP provided updates of any tools for upload and the Monitoring and Evaluation section provided inputs to HIS unit on malaria indicators that were tracked through DHIS2.

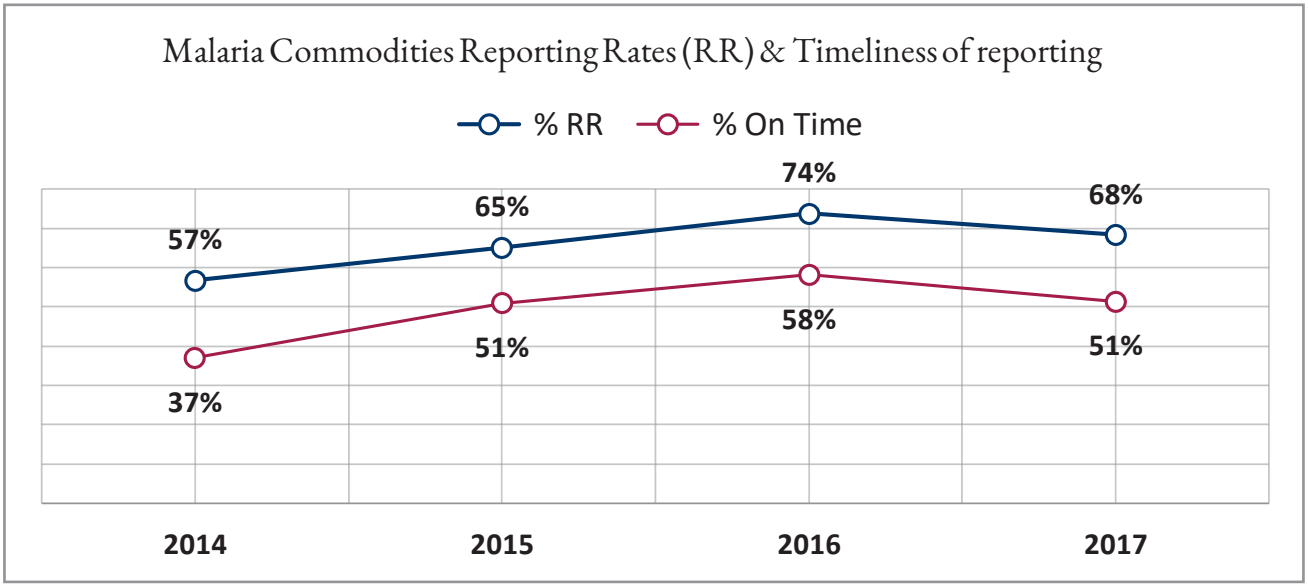
There were no current national LMIS reporting forms for commodities under vector control. However, for routine LLIN distribution, Population Services Kenya had instituted a data collection and reporting system in which a free net pack record was used to record daily issues of nets at health facilities and stock movements tracked using S11, delivery notes, and stock cards; at month end, sub-county malaria coordinators prepared monthly consumption reports with orders (based on facilities' free net pack record and requisition), which were forwarded to the regional programme officer to summarize into regional orders. This was noted in the standard operating procedures (SOPs) governing inventory management and data collection and reporting (Population Services Kenya n.d.).

Monthly monitoring of the reporting rates in DHIS2 was done and the trends shown in the monthly national stock status reports that were presented and discussed in the drugs management subcommittee meetings.

Of the 12 commodities on the malaria commodity form, reporting rates and timeliness of reporting were best for ACTs (80%) and RDTs (70%) during the review period.

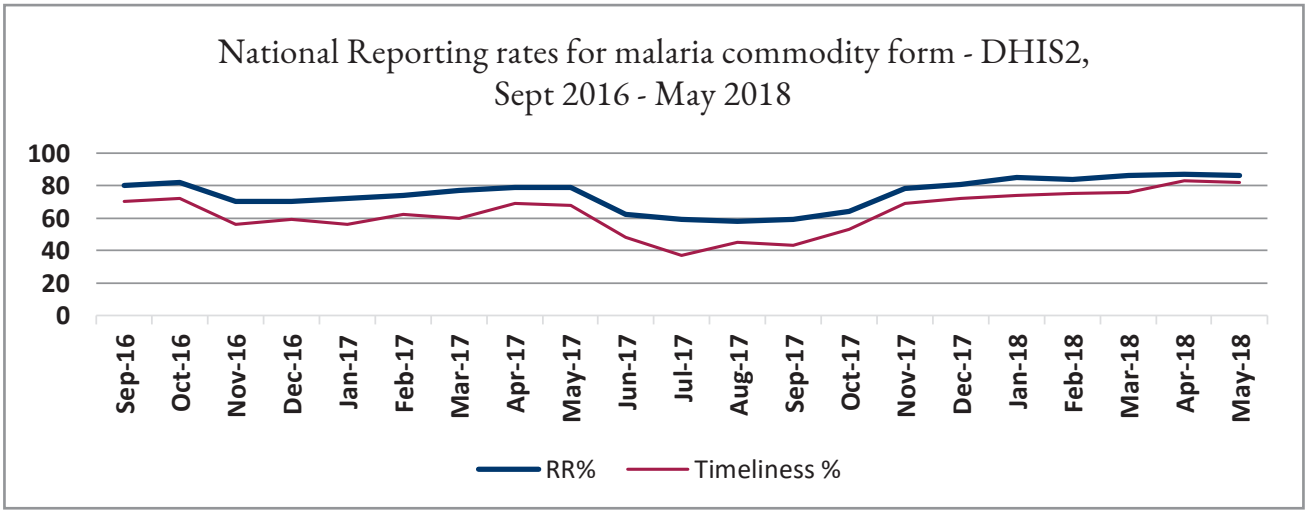
Annual data for the overall malaria commodity form provided by the programme showed an overall increase in the annual average for reporting rates and timeliness of reporting across the KMS duration (2014 to 2017) (Figure 4.4).

Figure 4.4: Average annual national reporting rates for malaria commodity form in DHIS2, 2014–2017



From September 2016 to June 2018, reporting rates for the malaria commodity form were more than 80 percent, until the health workers strike started in late 2016. Reporting rates fell to a low of 58 percent in August 2017 and rose again with the end of the strike, reaching more than 80 percent by December 2017. At the time of the review, commodity reporting rates were above 80 percent. Timeliness of reporting had been a challenge, falling below 70 percent at the start of the strike and rising to 70 percent and higher from December 2017.

Figure 4.5: National reporting rates for malaria commodity form—DHIS2, September 2016–May 2018



Reliable, timely, and complete data are essential for national planning, quantification, forecasting and supply planning, procurement planning, and stock monitoring at national and county levels. It is important for the NMCP to aim for a reporting rate of 90 percent and above so that there is greater accuracy in tracking demand and balancing it with adequate commodity supplies.

Data from the lake endemic counties show that this is possible. The June 2018 national stock status report (Ministry of Health/ National Malaria Control Programme 2018) noted that the average reporting rate for the lake endemic counties exceeded the set reporting rate target of 95 percent, with 99.7 percent in April 2018 and 99.3 percent in May 2018.

County-Level Data on LMIS

Table 4.6 summarises 2017–2018 data on the availability of stock-keeping records and their accuracy from Afya Ugavi project data in the eight lake endemic counties in 1,109 facilities.

Table 4.7: Concordance of commodity LMIS tools in the lake endemic counties in 2017 and 2018

(n=1,109 health facilities)

County	Denominator (# of instances assessed)	# (%) of instances where		
		DAR cons=MSF cons	MSF cons=DHIS2 cons	MSF stock on hand=DHIS2 stock on hand
Bungoma	1,648	1,001 (61%)	1,481 (91%)	1,495 (92%)
Busia	855	407 (48%)	787 (94%)	772 (92%)
Homa Bay	1,603	946 (59%)	1,274 (81%)	1,220 (83%)
Kakamega	1,769	890 (50%)	1,689 (96%)	1,705 (97%)
Kisumu	878	368 (42%)	670 (79%)	671 (79%)
Migori	1,747	790 (45%)	1,109 (66%)	1,051 (70%)
Siaya	1,131	632 (56%)	986 (87%)	934 (85%)
Vihiga	684	317 (46%)	645 (94%)	641 (94%)
Total	10,315	5,351 (52%)	8,641 (85%)	8,489 (86%)

DAR=daily activity register; MSF=monthly summary form

Generally, there was poor correlation between DARs and monthly summary forms (average 52%), but higher correlation (more than 80%) between monthly summaries and district health information system content. There was high availability of malaria LMIS tools (97% for DAR, 96% for the monthly summary form) in the assessed facilities.

Quality of Care (QOC) surveys conducted in 2017 showed that DARs were available at 87.4 percent of facilities and monthly summary forms were available at 89.0 percent of facilities, but less than half of the facilities (46.7%) had updated DARs, and 77.1 percent of facilities submitted monthly summary reports for antimalarial medicines for the period three months prior to the survey (Machini et al 2017).

Successes and Challenges of LMIS

National LMIS is available with online reporting through DHIS2 and standardised LMIS data collection and reporting tools. The tools cover most malaria commodities. However, the following challenges were identified with the existing LMIS:

- There is a lack of a national guidance document consolidating the LMIS and inventory management systems for all the malaria commodities.
- There were no current national LMIS reporting forms for commodities under vector control.
- There was limited visibility of routine LLIN stocks at the facility level.
- There is a lack of institutionalised LMIS for LLINs.
- Reporting rates and timeliness were not maintained above 80 percent, except for the lake endemic regions.

- There is a lack of LMIS tools for the community level.
- Sustaining the cost of printing and dissemination of hard copy LMIS tools for all the health facilities remained a challenge.

The PSM thematic review recommended enhancing the existing mechanism for commodity data analysis and visualisation to ensure end-to-end visibility of the supply chain. The review recommended setting up seamless interoperability between various commodity data sources, such as DHIS2 and KEMSA's LMIS. This would assist the NMCP to achieve visibility of the whole supply chain.

Facility Orders Management

NMCP used a pull system for ACTs, RDTs, SP, and other malaria medicines. Health facilities requested malaria commodities based on demand for services and commodity consumption (Ministry of Health 2014). There were clear instructions available to counties for determining health facility order quantities.

The sub-county pharmacists received all health facility commodity LMIS reports and requests (i.e., via the malaria commodity form), finalised the facility orders, and uploaded the reports into DHIS2. The subcounty pharmacists prepared the sub-county order and sent it to the county pharmacists, who aggregated the orders for all facilities in the county and approved them. Frequency of ordering was quarterly but in case of emergencies and increased usage, the county could order more frequently.

County pharmacists referred to the LMIS reports in DHIS2 to generate orders for their county's facilities, which were then input into the KEMSA web-based ordering platform (also called KEMSA LMIS). KEMSA sent the county orders to the NMCP commodity logistician for rationalisation, then the NMCP, in consultation with the county pharmacist and county medical lab coordinator, agreed on the final quantities to be supplied.

Challenges and Weaknesses of Facility Order Management

Stock-outs and overstocks were reported at facilities, partly due to challenges with the distribution system and unreliable consumption data. NMCP's guidance for commodity resupply to facilities had assumed one standard inventory control system across the country, not taking into consideration that there were different consumption levels of antimalarial commodities in the different epidemiological (endemicity) zones. This forced ordering method (based on use of maximum-minimums) works well for areas with regular predictable consumption but not for low-risk (low consumption) or epidemic-prone (unpredictable consumption) zones. The PSM review recommended establishment of a malaria commodity logistics (inventory control) system adapted for the different epidemiological (endemicity) zones.

The PSM review also found that there was erratic ordering by private for-profit or faith-based facilities, such as university clinics. However, these facilities did not necessarily report on usage. It was also found that counties sometimes made erratic orders separated only by short time periods and for different commodities. Some counties sent orders for facilities with no Master Facility List code, making it difficult to supply and track these facilities.

NMCP lacked adequate access to KEMSA's web-based ordering platform (KEMSA-LMIS tool) and could therefore not track progress of orders made by counties.

Distribution of Malaria Commodities

Malaria commodities were mainly distributed through KEMSA. However, routine distribution of LLINs was undertaken by Population Services Kenya.

Both hospitals and lower-level health facilities were supplied quarterly by KEMSA, based on their submitted orders, with provision for supply of emergency orders.

Distribution by KEMSA direct to facilities leveraged on deliveries for essential medicines and medical supplies. The facilities were expected to receive the commodities, verify against the delivery note, sign the delivery note as proof of delivery, and send the proof of delivery back to KEMSA. Any discrepancies on quantity and quality of supplied items were addressed with KEMSA.

Monthly distribution data and stock data were provided to NMCP for use in routine stock status monitoring by both KEMSA and Population Services Kenya. Reports from teams that undertook field visits to counties during the MPR external validation and field validation phase in July 2018, showed that in some of the visited counties, there was no review of the malaria caseload and LMIS data to inform the facility orders. Some of the visited counties also reported delays in commodity supply from KEMSA after ordering.

KEMSA provided monthly distribution and stock data to NMCP for use in routine stock status monitoring. Distribution data was also available from Population Services Kenya for the routine LLINs.

Challenges and Weaknesses in Commodity Distribution

The following challenges were found in the commodity distribution system

- There were no formally documented SOPs for procurement and distribution, although there was some documentation of SOPs for routine LLINs distribution.
- Stock-outs and overstocks were reported at facilities, partly due to challenges with the distribution system and unreliable consumption data, among other reasons.
- Some counties reported delays in commodity supply.
- Debt by counties (to KEMSA) for essential medicines supply affected timely distribution of malaria commodities, which rode on the essential medicines supply. County delays in payment to KEMSA delayed commodity delivery, hence increasing occurrences of suboptimal stock levels of malaria commodities at the peripheral level.
- There was limited use by county commodity focal persons of the malaria caseload and LMIS data to adjust the health facility orders.
- The Global Fund reports showed that during the mass LLIN distribution of 2017/18, there were delays in delivery of nets from suppliers, mainly attributed to a delay by NMCP in providing distribution lists to KEMSA (The Global Fund 2018). The report also documented that counties were not involved in receipt and verification of nets and hence they had an inadequate county-level view of the mass net distribution exercise.
- Some of the counties visited by teams during the MPR external validation and field validation phase in July 2018 complained of supply of commodities with short expiry shelf life. As documented under the inventory management, warehousing and storage section, an MOH circular of March 2018 informed counties of short expiry RDTs, AL, and artesunate (originating from the health worker labour force strike 2016-17, that resulted in reduced consumption of the commodities and enhanced expiry risk). The circular noted that KEMSA was authorised to distribute the products with less than six months shelf life so as to minimise losses to expiry, and urged the counties to inform their health facilities to accept and use the products. Some counties did not understand the full implication of this information and did not adjust their orders to minimise risk of expiry.

Recommendations for Commodity Distribution

- NMCP should continue advocacy to counties to make timely payments to KEMSA to ensure timely distribution of commodities. The funding request to the Global Fund noted that NMCP planned to undertake "continuous advocacy with the Council of Governors and County health management teams on PSM and promotion of integrated distribution channels of essential commodities." This would hopefully result in counties making timely payments to KEMSA.

Use of Malaria Commodities

Use of malaria commodities was governed by the national treatment guidelines. Findings from a survey undertaken by ACTwatch Group et al. 2017 indicated that for the public sector, 78.3 percent of all screened public health facilities (2,271) stocked both malaria diagnostic testing and quality-assured ACTs (QAACT), and SP for intermittent preventive treatment for malaria in pregnancy (IPTp) was available in 70 percent of public health facilities in endemic areas where it was recommended for use in prevention of malaria in pregnant women.

In the private sector, the survey noted that 46.7 percent of the outlets stocked QAACT and 20.8 percent had malaria diagnostics available, yet the sector catered to 70.6 percent of the national market share. In addition, more than 40 percent of antimalarials were distributed by unregistered pharmacies and general retailers. Total antimalarial market share was divided between QAACT (58.2%), non-QAACT (15.8%), and SP (24.8%), with 74.9 percent of distributed antimalarials in endemic areas, 49.4 percent in endemic-prone areas, 33.2 percent in seasonal transmission areas, and 37.9 percent in low-risk areas.

Product Quality and Patient Safety

Introduction

The aim of pharmacovigilance (PV) for medicines is to prevent medicines-related adverse effects in humans, ensure patient safety, and promote rational use of medicines. Post-market surveillance (PMS) is the continuous process of monitoring the quality, safety, and efficacy of all medical products and health technology on the market. Cohort event monitoring (CEM) is an intensive method of PMS to assess safety of medicines, which has been adapted by WHO for monitoring the safety of medicines used in public health programmes. CEM aims to capture all adverse events that occur in a defined group of patients after starting treatment with a specific medicine during the course of routine clinical practice (Suku et al 2015).

The revised KMS 2009–2018 stated that the NMCP and relevant institutions would conduct PV of antimalarials and build capacity of health workers to report suspected adverse drug reactions.

Rather than a standalone malaria programme PV system, NMCP rides on the national PV system managed by PPB.

National PV system guidelines that covered all medicines were developed in 2009, with inputs from the NMCP (Ministry of Medical services & Ministry of Public Health and Sanitation 2009). The guidelines were under review at the time of this thematic review, and the NMCP had been invited to contribute.

The national PV system had reporting tools that included the yellow form (PV 1) for reporting suspected adverse drug reactions, the white card (PV 4) alert card, and the pink form (PV 6) for reporting poor quality medicinal products. There was an online PV electronic reporting system, accessible from www.pv.pharmacyboardkenya.org/, through which the filled forms could be uploaded at the sub-county or facility level, depending on internet access.

The case management training curriculum had a PV module to train health workers on how to report adverse drug reactions and poor quality medicines.

Successes Noted with PV, PMS (including CEM)

- Review of literature showed that CEM had helped build PV capacity in the country and at the participating monitoring (sentinel) sites. Healthcare providers were generally willing to participate in implementing the CEM method (Suku et. al. 2015).
- Three PMS using MiniLab were conducted in 2014, 2015, 2016. One joint PMS (undertaken jointly by malaria, tuberculosis, HIV, and family planning programs) was done in 2017. The joint PMS report was incomplete. None of PMS reports had been disseminated, although some reports were available on the PPB website.

- Reports for the first three PMS were available on the PPB website and accessible to the public. However, only a draft report for the fourth joint PMS was available. There was also a protocol for the 2018 joint PMS, which was planned to start in July 2018.

The revised KMS 2009–2018 stated that a drug availability survey in the private sector should be conducted every two years if malaria commodities availed through private sector were quality assured. This had been done through the QOCs. There were reports for 2014 and 2016/7 and the protocol was available. Key findings for the QOC 2017 showed that ACTs were available in 67 percent of the private retail outlets and mRDTs in 82 percent; the availability of quality and non-quality assured ACT was 85 percent (Machini et al 2016).

Challenges and Weaknesses Noted with PV, PMS (including CEM)

- There were few reports in the PV database related to malaria commodities, showing the need to emphasize to facilities to report.
- The QOC 2017 for the private sector showed low availability of pink and yellow forms in retail outlets ("9.4% had pink forms and 7.9% of the outlets had yellow forms"), possibly due to online reporting.
- The CEM activity, which was undertaken in 2012, had taken long to be concluded in terms of final report writing. This was attributed to inadequate funding, a change in the WHO tool (CEMFlow) that had been used to collect data so that the collected data were analysed based on PPB guidance, and a change in/exit of NMCP focal staff over time. The report required finalisation and dissemination.
- CEM data entry took a long time and was also expensive—necessitating the use of contractual data clerks under PPB who had to be paid.
- The joint PMS 2017 had not been completed.
- A PMS for RDTs was yet to be done. A conversation with National Quality Control Laboratory staff highlighted that they were not aware of specific quality standards that could be used for such a purpose.

Disposal of Old Nets and Packaging Material

The MOH's healthcare waste management strategic plan 2015-2020 provides guidance in planning, implementing, and monitoring the activities of healthcare waste management in health facilities in Kenya (Ministry of Health 2015). The plan stresses the need to have high standards of healthcare waste management to reduce the risk of exposure to infections, hazards, and environmental pollution and improve the safety of patients, healthcare workers, and the general public.

WHO has provided guidance on disposal of old nets, noting that best option for disposal is high-temperature incineration (WHO, 2014).

Challenges and Weaknesses of Net Disposal and Packaging Material

- The revised KMS 2009–2018 noted that there was no proper disposal mechanism for LLINs and no local solution for disposal of old nets had been developed. Collection of the old nets entailed costly reverse logistics, and disposal through incineration or burial.
- Kenya put a ban on plastic carrier bags in August 2017 to help protect the environment. A report by the Global Fund reported that during the 2017/18 mass net distribution campaign, personnel at the distribution post were not aware of the disposal plans for the plastic gunny bags. There was therefore a need to review the packaging of nets in light of the ban on the use of plastic.
- The Global Fund recommended that future mass net distribution campaigns include a section on waste management. NMCP should ensure adequate sensitisation of distribution posts personnel on the disposal plans for the gunny bags and other waste materials associated with the mass LLIN distribution (The Global Fund 2018).

Organisation and Management

Oversight and coordination of PSM functions were mainly addressed through the DMSC of the Case Management TWG. Unfortunately, this covered only ACTs, RDTs, and SP. The membership of the DMSC included NMCP, donors and the National Treasury (the principal recipient for the Global Fund), implementing partners, and KEMSA, among others.

The DMSC was expected to hold monthly meetings and circulate the minutes. However, a review of minutes provided from 2017 to June 2018 showed that in 2017, only three meeting minutes were documented, and in 2018, minutes of six meetings were provided up to the time of writing this report. This showed a low meeting rate in 2017. Another gap was that DMSC mainly discussed ACT, SP, and RDT commodity-related issues, but other vector control commodities and the programme management activities indicated in the KMS 2009–2018 were left out. LLINs and IRS commodities were mainly tracked by the Vector Management TWG. The PSM functions therefore needed to be streamlined and consolidated.

The NMCP was expected to hold biannual county forums with county commodity managers, specifically county pharmacists and county medical laboratory coordinators. The purpose was to review progress on implementation of the malaria programme activities, provide updates, identify gaps and best practices, and obtain consensus between the national and county levels on key programmatic objectives as per the national Malaria Strategic Plan. The forums determined action points for the county staff and nationallevel staff.

County-level engagement had improved with county forums. However, there was no evidence provided to show the forums occurred twice a year, as stipulated in the strategy. NMCP provided only three reports for one forum per year held in August 2015, February 2016, and May 2017 (Ministry of Health/National Malaria Control Programme, 2015, 2016, 2017).

During one such forum held in May 2017, (Ministry of Health, 2017) agenda items included planning for intra- and inter-county redistribution of malaria commodities, reviewing commodity reporting rates and data quality issues, and discussing malaria commodities stock status at national and county levels.

Successes and Best Practices of PSM Organisation and Management

- There was national-level oversight and coordination of PSM functions through the DMSC for commodities under the Case management TWG (i.e., ACTs, RDTs).
- Meetings with the county commodity focal leads (pharmacists, laboratory technologists) enhanced linkages and coordination between national and county levels on commodity management.

Challenges and Weaknesses with PSM Organisation

- The DMSC had no terms of reference, and the focal lead at the time of the review doubled up as the lead for the Case Management TWG. Lack of terms of reference meant that there was a lack of guidance on the scope, membership, reporting, and schedule of meetings for the DMSC. It was unclear whether there was any provision for other relevant stakeholders (e.g., private sector, FLBs, county representatives) to be co-opted on an ad hoc basis to discuss emerging PSM issues.
- The focus of the DMSC was mainly on case management-related commodities (ACTs, RDTs) and on SP. There was limited oversight for vector control commodities through the DMSC and poor performance on PSM activities listed under the programme management objective in the KMS.
- Full and timely circulation of DMSC meeting minutes was lacking.
- Lack of regular biannual forums limited sharing of PSM related successes and challenges between NMCP and the county managers, as well as the opportunity for NMCP to provide capacity building. No report was provided for the most recent biannual meeting with county focal staff reportedly held in May 2018, or the expected second forums in 2015, 2016, and 2017.

Human Resource Training and Capacity Building

Human Resources

With respect to staffing for PSM at the NMCP, there was a case management focal lead and one logistician officer addressing PSM issues, who lacked a formal job description. The case management focal lead at the time of the review was a pharmacist who addressed case management commodity management issues as they arose. Focal persons in vector control, MIP, and laboratory addressed commodity issues related to those areas. There was no identified PSM focal lead or function.

At the subnational level, every county was supposed to have malaria commodity focal staff, namely pharmacist, medical laboratory coordinator and malaria coordinator. The NMCP had a list of the county pharmacists, county medical laboratory coordinators, and county malaria coordinators for each of the 47 counties.

Capacity Building

As part of its role as a national disease programme under the MOH and the new Constitution, the NMCP was supposed to provide capacity building and technical assistance to the counties. The programme had undertaken some capacity-building activities, especially in providing training materials, data capture and reporting tools, and guidelines.

There was a malaria case management curriculum for health workers that had a module on malaria commodity management (basic techniques in managing malaria commodities). The curriculum was updated in June 2016. It took participants through basic inventory management, data collection, and reporting. The malaria case management also had a module on PV that provided basic concepts on safe use of medicines and an introduction on PV tools and reporting systems.

The outpatient QOC survey of November 201740 reported that 69 percent of health workers had been exposed to the in-service training on the new case management policy. The QOC survey for private sector conducted in 201745 reported that 17percent of retail pharmacy attendants providing services had been trained on malaria case management in the years 2013–2016 (compared to 9% in 2010–13), and 20.7 percent had been trained on mRDTs.

Population Services Kenya provided commodity management trainings and on-the-job training to health workers handling routine LLINs (Ministry of Health/National Malaria Control Programme, 2014). There was an LLIN commodity management training curriculum. There was a curriculum on IRS for malaria control that had content on inventory management for IRS commodities (Ministry of Public Health and sanitation, 2011).

One of the priority action points from the MTR of the National Malaria Strategy 2009–2017 was to ensure commodity security and integrate home management of malaria into community case management. As a result, a community case management curriculum had been developed to build the capacity of CHVs to manage malaria at the community level, including managing commodities such as mRDTs.

Challenges and Weaknesses with Human Resources for PSM

- There was inadequate capacity in commodity management at all levels. At the national level, there was no specific PSM focal lead; hence commodity management issues were addressed in fragmented ways. The NMCP logistics officer lacked a job description. Capacity building on commodity management skills at the county and sub-county commodity manager levels had not yet been undertaken.
- Commodity management training materials were scattered among different NMCP sections. There was no one training package covering commodity management for all malaria commodities.
- The training materials were mainly oriented to facility level, and not to county and sub-county level commodity manager level. There were no PSM training materials for the county and sub-county managers.

- Comprehensive commodity management guidelines or SOPs were unavailable. There was limited content in existing documents for quantification, inventory management, and other commodity management areas.

Results

Achievements on Implementation and Targets

Performance in Implementing PSM Strategies

Performance was assessed using an adapted MS Excel-based performance tool developed by WHO for MPR.

In general, during the KMS period, the implementation of most activities under the PSM (Strategy 6.2 under programme management objective) was not undertaken; and there were no clear PSM functions. Table 4.7 shows the performance rating of the PSM strategy, main achievements, and key challenges. See also Annex 4.1.

Table 4.8: Performance analysis for the KMS strategy related to PSM

Strategy	Performance score	Main achievements	Key challenges
Strengthen procurement and supply management systems for malaria drugs and commodities	15.71%	Expansion of storage partially met through the joint Global Fund-supported tuberculosis, HIV, and malaria funding of renovation of county stores. 16 stores out of the 32 targeted stores had been renovated.	▪ Lack of PSM focal person ▪ Lack of annual PSCM plan within the context of devolution to counties ▪ Lack of various commodity management guidelines ▪ Lack of an evaluation system for commodity distribution ▪ Lack of training materials specific to PSM capacity building for county managers ▪ Limited content in integrated support supervision manual for commodity management issues

Note: The rating provided was based on what was agreed in a meeting of the DMSC and with focal persons in vector control and MIP and related to the PSM aspect only. It may not have been the rating for all the activities in the overall strategy.

Performance in Implementing 2013 MTR recommendations

Table 4.8 shows the status of implementation against the 2013 MTR. Because PSM is fragmented in the Kenya Malaria Strategy, and only clearly indicated in Strategy 6.2, only that strategy is indicated below.

Table 4.9: Assessment of the status of implementation of the recommendations of 2013 MTR

No.	MTR recommendation	Implemented?	Comments
1	PSCM will be a standalone strategy to iron out the PSM challenges. Separate the broader system issues on procurement and handle them under Objective 6.	Yes	The KMS had a strategy devoted to PSM (Strategy 6.2). Constraints: Low implementation of PSM activities listed in KMS

No.	MTR recommendation	Implemented?	Comments
2	Community case management: Supply of the commodities should be addressed.	Yes	ACTs and RDTs distributed by facilities in 10 counties of Nyanza and western regions of Kenya to CHVs. CHVs trained on commodity management using community case management curriculum. Constraints: High facility staff turnover and lack of confidence in CHVs may have affected distribution.
3	Bring PSM under one focal person for all malaria commodities.	No	Not yet implemented
4	The other procurement issues specific to Objectives 1 and 2 should be left within the specified areas for ease of coordination.	Yes	PSM issues specific to case management, vector control, IPTp, and EPR were retained in their respective thematic areas.

In general, most of the recommendations (75%) were implemented, except bringing all commodities under one identified PSM focal person—this had an adverse implication on Strategy 6.2, most of which was not implemented.

Key Performance Indicators and Targets: Analysis of Appropriateness, Baseline, and Targets

Two PSM-related outcome indicators were included in the KMS monitoring and evaluation plan (MOH/NMCP, 2014). The indicators were appropriate and had targets but lacked baselines. Table 4.9 indicates performance against the outcome indicators listed in the KMS.

Table 4.10: Performance against programme PSM outcome targets

Outcome indicator	Source	Baseline (KMS)	Target (end KMS)	Performance and comments
Proportion of public health facilities having no stock-out of ACTs for 7 consecutive days in past 3 months (for ALL ACT weight bands)	QOC survey	None	100%	40.2% The QOC report documenting progress from January 2010 to February 2017 reported that 59.8% of assessed facilities reported stock-outs of at least 7 consecutive days 3 months prior to the survey for 1 or more AL packs. Hence proportion of public facilities having no stock-outs of ACTs for 7 consecutive days in past 3 months (for ALL ACT weight bands) was the difference (i.e., 40.2%). Performance below target.
Proportion of private facility outlets stocking QAACTs	Drug availability survey	None	55% (2016)	46.7% The 2016 ACT watch survey indicated that availability of QAACTs was 46.7% in the anti-malaria stocking private sector outlets. Performance below target.

The required data were available in the drug availability survey and QOC survey reports.

Baselines were not provided for both indicated, but the QOC survey of February 2014 had data for the first indicator (43.9%).

The lumping together of all ACT packs in one indicator meant that the first PSM was not specific. Availability of at least one of the pack sizes of AL could be checked because with either AL 6s or 12s in stock, the other packs for18s and 24s could be compiled. It was therefore recommended that for the first indicator, the desired programmatic information could be obtained with a rephrased indicator that checks the availability of at least one of the pack sizes of AL, preferably the 6s due to ease of administration.

The outpatient QOC round 3 of 2017 showed that the stock-out levels averaged 19 percent for AL (all packs) across the period 2014–2017 at the facility level, and 10 percent in 2017 for diagnostics (absence of any malaria diagnostic capacities).

There were no central level warehouse stock-outs for LLINs for routine distribution over the period 2014–2017 (Population Services Kenya LLIN Planner, 2014–2018).

Regarding private facility outlets stocking QAACTs, the 2016 ACT watch survey revealed that the availability of QAACTs was 46.7 percent in the anti-malaria stocking private sector outlets, short of the expected target of 55 percent.

Strengths, Weaknesses, Opportunities, and Threats Analysis

Inputs for the strengths, weaknesses, opportunities, and threats (SWOT) analysis were received from the DMSC and were found in the reviewed literature and references.

Table 4.11: SWOT analysis

Strengths	Weaknesses
▪ Coordination mechanisms for commodities available through the DMSC under the Case Management TWG ▪ Good coordination between NMCP and partners ▪ Malaria commodity dashboard assisted counties to view their stock status and undertake relevant distribution ▪ PSM included in the broader Kenya Malaria Strategy ▪ Quality technical and financial support and capacity building from partners ▪ Funding support for commodities from donors and government ▪ Availability of routine commodity data from DHIS2 and KEMSA ▪ Distribution system that guaranteed the last mile distribution to facilities	▪ PSCM plan not developed ▪ Lack of dedicated unit and person for PSM for health commodities ▪ The DMSC's mandate was limited to medicines and test kits and lacked terms of reference ▪ Poor documentation of PSM processes and lack of guidelines, hence lack of standardisation of PSM practices at all levels ▪ Poor inventory management at the facilities ▪ Lack of technical specifications for some malaria commodities ▪ Weak engagement with resilient sustainable system in health component (for joint activities) ▪ For some activities in the KMS, tasks were not well articulated and hence difficult to implement

Opportunities	Threats
▪ Existence of a fully automated malaria commodity dashboard for use of supply chain data for decision making (by all the counties) ▪ Leverage on UHC agenda to enable greater access to malaria commodities ▪ Leverage on the national PV system to ensure product quality and improve patient safety ▪ Increased county allocations to the health budget (increase allocate funding for commodities and PSM-related activities) ▪ Expanding access through the community platform	▪ Dwindling donor funding ▪ Insufficient domestic investment ▪ Debts by counties to KEMSA affected stock levels of malaria commodities at peripheral level ▪ Poor coordination of procurement of medical supplies between NMCP and counties

Successes, Best Practices and Facilitating Factors

The following were identified by this review:

- At the national level, there was coordination of PSM functions of mainly case management commodities through the DMSC of the Case Management TWG.
- Commodity procurement was informed by the existing national quantification system for malaria commodities, through which a supply plan was generated and semi-annual review undertaken. Quantification was based on consumption data from facilities and NMCP plans.
- Commodity distribution was based on a pull system with clear instructions available to counties for determining health facility order quantities.
- National LMIS was available with online reporting (DHIS2) and standardised LMIS data collection and reporting tools. It covered most malaria commodities. Reporting rates (80%) and timeliness of reporting (70%) had both been fairly high for ACTs and RDTs.
- National-level stock status and pipeline monitoring with sharing of status to partners through DMSC provided the programme with national-level experience in commodity oversight and ensured commodity security, mainly for ACTs and RDTs.
- County-level engagement improved through biannual county forums.
- Riding on national systems (such as for PV, procurement, warehousing, and the distribution system to the last mile run by KEMSA) enabled efficiencies without heavy parallel investment.

Key Issues and Challenges

- Overdependence on and dwindling external funding may affect the sustainability of commodity supplies if there is inadequate domestic funding to procure commodities to meet programme requirements.
- There is a fragmented approach to PSM and the lack of a comprehensive PSCM plan against which to monitor PSM performance.
- Stock-outs and overstocks were reported at facilities, partly due to inadequate capacity in inventory management (skills and staffing) at facilities, with the distribution system and unreliable consumption data.
- Guidance for commodity resupply to facilities assumed one standard inventory control system across the country, not taking into consideration that there are different consumption levels in the different epidemiological (endemicity) zones.

- Debt by counties to KEMSA for essential medicines supply affects timely distribution for malaria commodities, which ride on the essential medicines supply. County delays in payment to KEMSA delays commodity delivery, increasing occurrences of suboptimal stock levels of malaria commodities at the peripheral level.
- There is a lack of comprehensive commodity management guidelines or SOPs and limited content in existing documents for quantification, inventory management, and other commodity management areas.
- There is inadequate individual capacity in commodity management at all levels (no specific PSM focal lead at national level, capacity building of county and sub-county levels on commodity management skills not yet undertaken).
- There is weak coordination and harmonisation of procurement for malaria commodities between national and county levels.
- Lack of LMIS tools for the community level and sustaining printing and dissemination of hard copy LMIS tools remains a challenge.
- There is limited visibility of routine LLIN stocks at facility level (lack of institutionalised LMIS for LLINs).

Recommendations

- Consolidate and strengthen malaria PSM at national level for effective management of all commodities.
- Strengthen the PSM function at the NMCP level in the following ways:
  - Develop and implement a PSCM plan.
  - Consolidate management of all malaria health commodities under one PSM function, with dedicated focal lead and unit under the Malaria Strategy objective for programme management.
  - Establish a PSM working group with appropriate representation that has the mandate to cover PSM for all malaria commodities.
- Build capacity in commodity management at the county and sub-county levels:
  - Develop and disseminate PSM-related guidelines, tools, and SOPs that cover all malaria commodities.
  - Undertake capacity-building activities in commodity management at the county and subcounty levels.
- Establish a malaria commodity logistics (inventory control) system that is adaptable to the different endemicity zones.
- Enhance existing systems for commodity data analysis and visualisation to ensure end-to-end visibility of the supply chain:
  - Set up seamless interoperability between various commodity data sources and tools, such as DHIS2 and KEMSA's LMIS.

Conclusions

Over the duration of the KMS under review, there were significant improvements in malaria commodity availability and efficiency gains in procurement of malaria commodities, and hence value for money. Implementation of a pull system across all malaria commodities improved stock management, and the available expertise in the PSM component contributed to improved performance across all interventions.

However, despite having a specific strategy under programme management, PSM was poorly implemented. There were unclear responsibilities for the PSM strategy and limited implementation. This resulted in the "disconnect" noted in the MTR still continuing.

There was disjointed oversight and coordination for PSM activities at the national level. The DMSC under the Case Management TWG focused mainly on case management related commodities, ACTs, RDTs, and SP, and there was poor oversight of PSM activities for the other commodity categories.

There was inadequate capacity in commodity management at all levels, with weak inventory management, poor data management and use, and inadequate oversight by county and sub-county teams. This resulted in stock-outs and overstocks being reported at facilities.

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Annex 4.1: Performance Analysis for KMS Activities Related to PSM

#	Strategy/Activity No.	Implementation performance rating (proxy)	Comments
Strategy 1.1: Universal distribution of LLINs through appropriate channels (1 LLIN for 2 people)			
1	1.1.1 Conduct a mass LLIN distribution campaign to household for universal access (1 LLIN for every 2 people at risk every three years)	80%	15.1 million LLINs distributed in 23 endemic and epidemic counties during the 2017/2018 LLIN mass campaign Two procurements undertaken: 2014/15, 2016/17 for the mass net distribution that occurred in 2014/15 and 2017/18 Mop-up of uncollected nets occurred. Updated technical specifications for nets (from 210cm to 180 height); however, LLIN technical specifications required review in light of several emerging issues, including need to change packaging from plastic due to the ban on plastics
2	1.1.2 Routine distribution of LLIN	80%	Procurement done annually No central level warehouse stock-out of LLINs over 2014-2017 (source: PS-Kenya LLIN planner, 2014-2018)
Strategy 1.2: Indoor residual spraying in the targeted areas			
3	1.2.4 Procurement and distribution of IRS commodities and equipment	100%	IRS activity in Migori and Homa Bay counties done as per plan
Strategy 1.3: Larval source management where it is feasible and appropriate in the context of Integrated Vector Management			
4	1.3.3 Procurement of larvicides, spraying equipment, and larviciding	0%	No funding available No procurement occurred
Strategy 1.5: Provision of IPTp to pregnant women at antenatal clinics and promotion of its use at community level			
5	1.5.3 Procurement and distribution of IPTp medicines	80%	SP available in the 14 focus counties Over-stock of SP and potential for expiry of some stock due to poor synchronisation of procurement between national and county levels SP technical specifications required review in light of high potential for contamination for the currently specified 1000s pack; recommendation to reduce to 100s pack, if possible blister packed

#	Strategy/Activity No.	Implementation performance rating (proxy)	Comments
Strategy 2.2 Access to affordable malaria medicines and diagnostics through the private sector			
6	2.2.3 Procure ACTs and ensure availability of RDTs in the private sector	53.3%	Annual quantification and procurement for private sector done No mRDTs had been procured and distributed to private sector as was specified in the KMS Sub-optimal QAACT pipeline stock monitoring (price and stock availability) due to poor reporting by private sector players (lack of sales data from the firstline buyers)
Strategy 2.4 Ensure commodity security of malaria medicines and diagnostics in the public sector			
7	2.4.1 Inclusion of antimalarials and diagnostics in relevant guidelines and essential drugs list as per the national treatment guidelines	80%	Antimalarials and diagnostics were included in relevant guidelines and KEML and KEMLCL as per the national treatment guidelines Some commodities missing in the 2016 KEML edition and needed to be included in the next edition—AL 40/240 mg, AL 60/360 mg, rectal artesunate
8	2.4.2 Develop and disseminate specifications for antimalarials and diagnostics	30%	Ad hoc review of technical specifications; should be reviewed annually during annual quantification for all malaria commodities Dissemination to counties and partners not done Need for one consolidated specifications manual across all malaria commodities, updated regularly
9	2.4.3 Ensure a conducive regulatory environment for antimalarials and diagnostics	30%	AL and artesunate registered at PPB; information gathered by case management focal lead from PPB indicated that registration number for AL was1148 and for artesunate is 2687 Lack of regularly scheduled meetings between NMCP and PPB Lack of clarity in regulation of mRDT (between PPB and KMLTTB)
10	2.4.4 Conduct forecasting and quantification of malaria medicines and diagnostics	60%	Annual quantification and semi-annual quantification review undertaken DMSC meetings held to monitor supply chain Lack of reliable consumption data affected accuracy of forecast for some commodities (e.g., RDTs)

#	Strategy/Activity No.	Implementation performance rating (proxy)	Comments
11	2.4.5 Procure and distribute antimalarials and diagnostics for public sector	60%	Procurement undertaken through support from PMI and Global Fund Stock-outs from stock status reports and QOC surveys; over 2014-2017, incidences of central level stock-out for AL12s, 18s, 6s, RDTs Overstocks and short expiry for RDTs, AL6s Some counties did not get commodities on time; soft copy of delivery note should be sent by KEMSA to counties in advance so that they know quantities expected Stock-outs among CHVs Dihydroartemisinin + piperaquine (second line for uncomplicated malaria) not procured Need to space procurements better between funding agencies, counties, with lead from NMCP
12	2.4.6 Strengthen LMIS	60%	Biannual meetings with pharmacists held Lack of printed community level LMIS tools Lower reporting rates for mRDTs compared to AL
13	2.4.7 Conduct PMS of antimalarials and RDTs	30%	3 PMS (Minilab) and 1 joint PMS (undertaken jointly by malaria, tuberculosis, HIV, and family planning programmes) done. The joint PMS report was incomplete. None of PMS reports had been disseminated, although some reports were available on the PPB website Recommendations: Complete pending report. Undertake dissemination of report findings. Undertake PMS for RDTs.
Strategy 3.2 Strengthen capacity for malaria epidemic preparedness and response			
14	3.2.4 Maintain adequate buffer stock of malaria commodities and contingency funds for early response	30%	National monthly stock status reports showed evidence of max-min ICS and measurement of adequacy of stocks National and county data on stock status show that central max-min levels are not always met therefore inadequacy of stock levels
Strategy 4.2 Conduct and Health facility Surveys			
15	4.2.2 Conduct drug availability survey in the private sector	80%	Drug availability survey report for 2014 and 2016 was available Protocol for undertaking drug availability survey was available (2016) Report dissemination required

#	Strategy/Activity No.	Implementation performance rating (proxy)	Comments
16	4.2.4 Support PPB to undertake PV for malaria medicines	60%	National PV guidelines and tools were available from PPB but last updated in 2009 Tasks listed for this activity suggested NMCP to have its parallel system rather than collaborate with the national effort led by PPB Incomplete and un-disseminated CEM report
Strategy 6.2 Strengthen procurement and supply management systems for malaria drugs and commodities			
17	6.2.1 Develop and review the guidelines and SOPs for malaria commodity quantification, forecasting and inventory management	0%	No such guidelines and SOPs for malaria commodity available
18	6.2.2 Develop and review the annual PSCM plan within the context of devolution to counties	0%	No PSCM plan available Noted variance in understanding of the meaning of a PSCM plan Note: The Global Fund provided guidance for a PSCM plan.1 It outlined how the principal recipient will adhere to the Global Fund's procurement policies and measure performance during implementation. The PSCM plan should: Indicate which entity or entities will implement relevant procurement and supply management activities Describe how the principal recipient will ensure adherence to each of the Global Fund's procurement policies Include a list of health products with their respective estimated quantities, cost, registration status, and patent status Include details about technical assistance requested Encompass two years of implementation As per these specification, there was no one cross-cutting PSCM plan available, although there were segments of it (e.g., the list of health products, work plans for case management). Recommendations: Adapt the Global Fund guidance to NMCP needs and integrate all the scattered components into one PSCM plan document.
19	6.2.3 Evaluation of malaria commodity distribution system (LLINs, ACTs, and RDTs)	0%	There was no real distribution system evaluation system and no protocol. Recommendation: This to be developed under next KMS because this activity is important in light of challenges facing distribution.

#	Strategy/Activity No.	Implementation performance rating (proxy)	Comments
20	6.2.4 Provide support to expand storage facilities	60%	No specific activity taking place directly under NMCP A joint HIV, tuberculosis, and malaria programme activity of renovation of county stores had been taking place under the second principal recipient(i.e., AMREF [Global Fund support through tuberculosis grant). Of planned renovations in 32 counties, 16 county stores were renovated, and the rest were in progress. NMCP to follow up with the National AIDS and STI Control Programme and AMREF on progress of renovation of county stores and ensure that checks on adequacy of storage were included in supportive supervision exercises.
21	6.2.5 Strengthen and enhance monitoring and reporting of PSM	0%	No PSCM plan in place against which to judge performance
22	6.2.6 Build capacity for procurement supply chain at county levels	10%	Absence of a curriculum specific to PSM capacity building for county managers. No evidence of training. Some partners (e.g., Population Services Kenya) conducted commodity management trainings that included county managers.
23	6.2.7 Support supervision for commodity security (captured under integrated supervision)	40%	The DMSC meeting of 06 July 2018 noted that adequate commodity support supervision was difficult to meet under the integrated NMCP support supervision because commodity management issues may not be adequately addressed by staff who normally go to the field unless they are commodity focal persons. The current integrated (malaria) support supervision manual was weak in commodity management content. There was joint support supervision between MOH (county teams) and Population Services Kenya for routine LLINs. Two joint programme supervisions undertaken in 2016 and 2017. Some partners undertook support supervision that was commodity management related (e.g., 534 health facilities across 8 malaria endemic counties in western Kenya and the lake region were reached through supportive supervision during FY 2017 by the USAID-supported partner Afya Ugav)i.2

Chapter 5:
Vector Control

Key Messages from This Chapter

- Chapter 5 describes vector control thematic desk review, aimed at assessing the current policy environment for malaria vector control and the performance of the programme against set targets, and highlighting the enabling and constraining factors over the period under review.
- The Kenya Malaria Strategy (KMS) 2009–2018 (revised 2014) aimed at reducing the morbidity and mortality caused by malaria in the various epidemiological zones by two-thirds of the 2007/2008 level by 2017. The National Malaria Control Programme had planned to achieve universal coverage with long-lasting insecticidal nets (LLINs) for all age groups in malaria-endemic and epidemic-prone counties. Deployment of indoor residual spraying (IRS) was prioritised for disease burden reduction in highly endemic counties.
- Findings of the review include the following:
- Despite the use of various channels of LLIN distribution, universal coverage remained low (48%) in 2017.
- Although there was high coverage and great impact in areas where IRS was implemented, its scope was limited to having a meaningful disease burden reduction in high-endemic areas.
- Integrated Vector Management is well articulated in the policy documents, but it was not systematically implemented during the period under review.
- Resistance to pyrethroids among the major malaria vectors is intense and widespread.

Introduction

Background

Vector control is an essential component of malaria control and elimination. Vector control is reemerging as an essential component in the fight against vector-borne diseases, after several decades of neglect. The World Health Organization (WHO) recommends integrated vector management (IVM) as a vector control approach (WHO, 2017). IVM is a rational decision-making process for the optimal use of resources for vector control.

The two core, broadly applicable vector control interventions are long-lasting insecticidal nets (LLINs) and indoor residual spraying (IRS). Where feasible and practical, larval source management (LSM) is recommended as a supplementary measure to further drive down malaria transmission. LLINs have played an important role in the remarkable success of reducing the global malaria burden over the past decade. They are a core prevention tool widely used by people at risk of malaria. IRS is recognized as a tool that drastically brings down malaria burden in endemic areas as well as a rapid response tool to contain malaria epidemics.

Ensuring universal coverage of all people at risk of malaria with LLINs or IRS forms part of pillar 1 of the Global Technical Strategy for Malaria 2016–2030. Universal coverage is defined as 100 percent access to, and use of, either of these interventions by populations at risk of malaria. LLINs and IRS have been highly effective interventions in reducing the malaria burden in developing countries, but they have some fundamental limitations. Because these tools are insecticide based, they are vulnerable to selection for insecticide resistance among local vectors that may lead to reduced efficacy.

Other limitations include their reliance on population-wide human compliance for operational effectiveness, considerable cost, and important biological constraints to their efficacy caused by mosquitoes that feed on humans or animals outdoors, rest outdoors, or enter houses but then rapidly exit from them without being exposed to insecticides.

Therefore, the choice of vector control interventions must be based on local epidemiological and entomological data. It is important to regularly conduct entomological and epidemiological studies to generate data that will inform the selection of the most appropriate vector control interventions.

Policy and Guidance

Vector control activities in Kenya are guided by various country policy documents and guidelines. These include the National Malaria Policy (2010), Kenya Malaria Strategy (KMS) (2009–2018), IVM Guidelines (2009), Insecticide Resistance Management (IRM) Strategy (2015–2018), IRS Business Plan (2015–2018), as well as other WHO guidance documents.

In the national malaria policy, the Government of Kenya, in collaboration with partners, commits to support all elements of IVM. In the KMS, the objective is to have at least 80 percent of people in malaria risk areas using appropriate malaria preventive interventions by 2018 through distributing LLINs using mass and routine distribution channels, conducting IRS in targeted areas, implementing LSM where feasible, and supporting the malaria-free school initiative.

In the IRS business plan, four broad activities are identified: conduct IRS in the targeted endemic counties to reduce the burden of malaria disease; conduct focused IRS in epidemic-prone areas for epidemic preparedness and early response; undertake routine epidemiological, entomological, and insecticide resistance monitoring in relation to IRS; and strengthen advocacy, communication, and social mobilisation to support implementation of IRS activities.

The IVM policy guidelines recommend that all vector control interventions be planned and implemented within the broad context of IVM. The IRM strategy clearly outlines the strategies and activities to be undertaken for the management of insecticide resistance.

Situational Analysis

Kenya is classified as being in the malaria control phase, according to the global malaria elimination programme. Vector control is a key component of Kenya's malaria strategy. The deployment of vector control interventions in Kenya is based on the prevailing malaria epidemiology across the various ecoepidemiological zones. The objective in the KMS for the period under review was to have at least 80 percent of people in malaria risk areas using appropriate malaria preventive interventions by 2018. Under this objective, there were four strategies:

- Universal distribution of LLINs through appropriate channels
- Indoor residual spraying in targeted areas
- Implementation of LSM where it is feasible and appropriate in the context of IVM
- Support of the malaria-free school initiative

In the revised KMS 2009–2018, the indicators and targets for vector control outcomes were as follows:

- 90 percent of households owning more than one insecticide-treated net (ITN)/LLIN by 2017
- 80 percent children under five years sleeping under an ITN/LLIN on the night before a survey by 2017
- 80 percent of pregnant women sleeping under an ITN/LLIN on the night before a survey by 2017
- 80 percent of community members sleeping under an ITN/LLIN on the night before a survey
- 90 percent of the population in targeted areas protected by IRS by 2017
- Proportion of targeted larval habitats appropriately managed
- Proportion of targeted counties with vector larval habitat maps
- Number of schools implementing the malaria-free school initiative

During the current KMS, the National Malaria Control Programme (NMCP) planned to achieve universal coverage with LLINs (i.e., one net for every two people) for all groups in malaria-endemic and epidemic-prone counties. Currently in Kenya, LLINs are distributed through mass campaigns and the health facility-based (antenatal care and child welfare clinics) and retail points that sell full-price LLINs. Population Services Kenya has distributed LLINs at a subsidized price through social marketing channels since 2008, but this ended in 2016 when the UK Department for International Development stopped funding this distribution channel.

The mass distribution campaigns carried out every 3 years targets the 23 malaria-endemic and epidemic-prone counties and 5 sub-counties with large irrigated areas. The routine distribution through antenatal care and child welfare clinics targets 36 malaria-prone counties, including the 23 mass campaign counties where free LLINs are provided to all pregnant women who visit antenatal clinics for the first time, new-borns delivered in hospitals, and children under two years whose mothers present them to registered health facilities for immunisation or child welfare clinic services. The NMCP, in collaboration with Population Services Kenya, conducted a pilot project on continuous community LLINs distribution in Samia Sub-County. By distributing LLINs through the community, there was notable improvement in both access to and use of the nets in Samia Sub County (Samia pilot report). During the period under review (2014–2018), a total of 36,998,283 LLINs were distributed through various channels (Table 5.1).

Table 5.1: Distribution of nets through various channels

Distribution channel	2014	2015	2016	2017	2018	Total distributed by channel
Routine distribution	1,805,495	2,170,670	2,030,150	1,669,035	7,134,23	7,675,350
Mass distribution	12,679,657	-	357,171	13,720,294	1,852,388	28,609,510
Total distributed by year	14,485,152	2,170,670	2,387,321	15,389,329	2,565,811	36,998,283

There were no gaps in LLIN routine distribution. LLIN quantities for mass distribution were based on the target population, plus a 10 percent contingency. However, during distribution, the number of nets fell short. A systematic mop-up campaign was not implemented to offset the gaps after mass distribution.

LLIN Ownership and Use

Progress on vector control indicators was captured by the Malaria Indicator Surveys (MIS) of 2010 and 2015 and the Post-Mass Long-Lasting Insecticidal Net (PMLLIN) Survey conducted in 2017 (PMLLIN, 2017). The trend in these indicators is shown in Table 5.2.

Access to LLINs and proportion of households with one net per two people ranged from 45 percent to 50 percent in three epidemiological zones in Kenya, which is significantly below the target of 80 percent. In 2015, the use of LLINs was below the target (<80%) in the all endemic regions of Kenya. Only the lake endemic region achieved net usage above the target.

Table 5.2: LLIN coverage and use by malaria endemicity in Kenya

Outcome indicator	MIS 2010			MIS 2015			PMLLIN 2017		
	Highland	Lake	Coast	Highland	Lake	Coast	Highland	Lake	Coast
Proportion of households with at least one LLIN	49%	54%	57%	73%	87%	73%	76%	83%	63%
Proportion of households with more than one LLINs	23%	26%	32%	54%	60%	39%	55%	62%	40%
Proportion of household with at least 1 LLIN for every 2 persons	-	-	-	46%	54%	45%	49%	50%	50%
Proportion of pregnant women sleeping under LLIN	35%	51%	48%	62%	78%	84%	-	-	-
Proportion of U5 sleeping under ITN/ LLIN	43%	42%	50%	61%	73%	72%	78%	84%	67%
Proportion of people sleeping under ITN/ LLIN	31%	33%	41%	54%	67%	59%	74%	78%	62%

In 2015, only 40 percent of the households surveyed had attained universal coverage, although there was a slight improvement to 48 percent in 2017. These figures fall short of the KMS objective of reaching at least 80 percent of persons at risk with appropriate malaria preventive interventions. Consistent net use is a key determinant in the prevention of malaria infection. In 2015, nearly half of the household population (48%) slept under an LLIN the night before the survey.

Of note, there was an encouraging increase in net usage in 2017, during which 76 percent of household members slept under an LLIN the night before the survey, which almost reached the revised National Malaria Strategy 2009–2018 target of 80 percent.

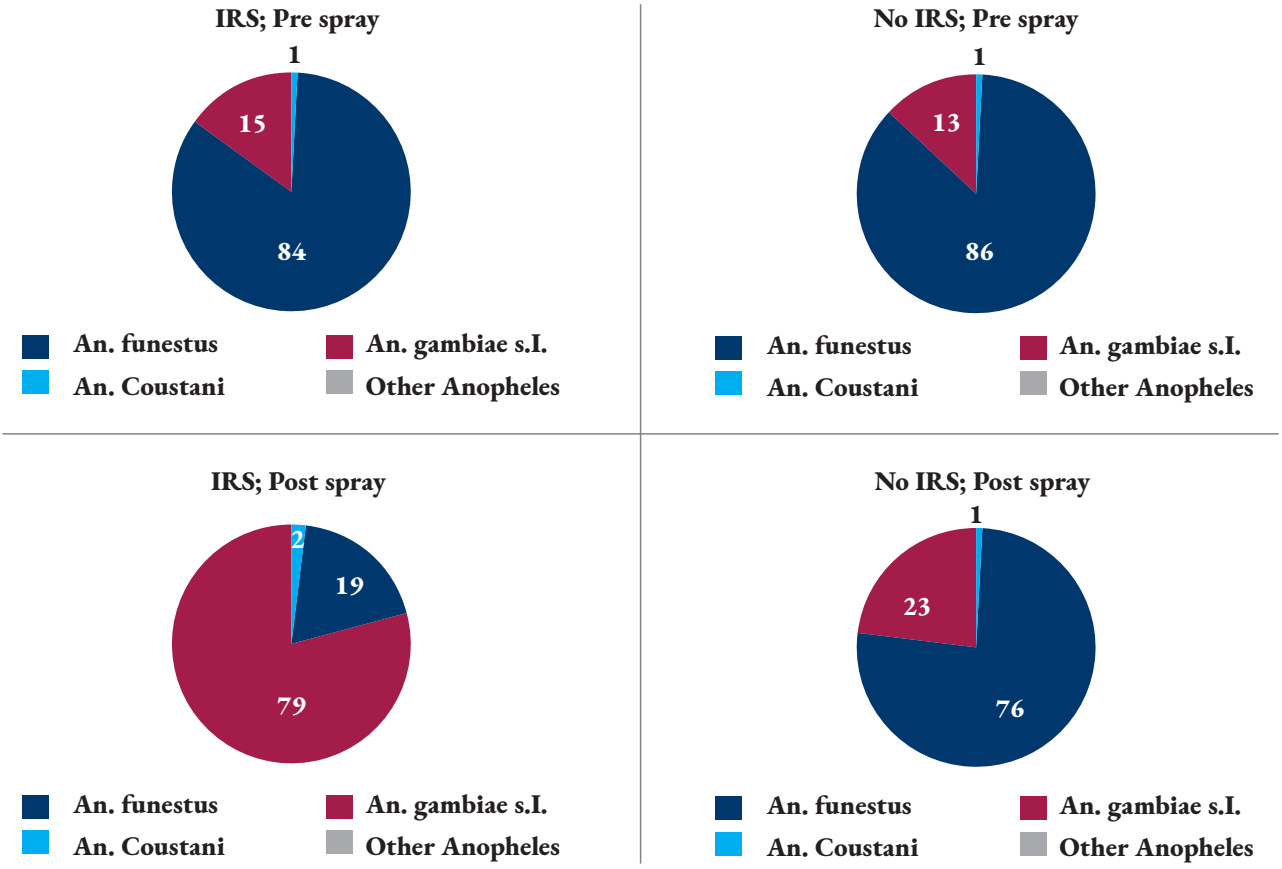
IRS Coverage and Entomological Monitoring

The revised KMS and the NMCP IRS Business Plan have prioritised IRS for burden reduction in endemic counties, beginning at the periphery of the endemic zone and moving inwards, with additional support for capacity building and focal IRS in epidemic-prone counties to prevent outbreaks. With the emergence of intense pyrethroid resistance throughout much of western Kenya, no spraying took place from 2012 to 2016 because there was no registered non-pyrethroid insecticide for use as an indoor residual spray. In 2017, the U.S. President's Malaria Initiative supported IRS in Migori County using a long-acting organophosphate (Actellic 300CS) and protected 906,388 people living in 212,029 structures. In 2018, IRS was extended to Homa Bay County and protected a total of 1,833,766 people living in 440,939 of the structures sprayed, achieving a coverage of 94.1 percent of the targeted structures.

Entomological monitoring in relation to IRS application undertaken from 2015 to 2018 reported great impact on malaria transmission indicators. In addition, the NMCP has conducted entomological monitoring in 44 out of the 47 counties since 2016. *An. funestus s.l.* was the predominant malaria vector before the spray campaign, representing 84 percent of *Anopheles* mosquitoes caught in IRS-designated sites and 86 percent in non-IRS sites. Molecular species identification by polymerase chain reaction showed those mosquitoes identified as *An. gambiae s.l.* to be mostly *An. Arabiensis* (99%); only 1 percent were *An. gambiae s.s* (Figure 5.1).

The mean indoor resting density of *An. funestus* was not significantly different between the IRS and non-IRS sites before IRS. Implementing IRS reduced the indoor densities of *An. funestus* by 95 percent. There was no such profound reduction in the densities of *An. Arabiensis* following IRS.

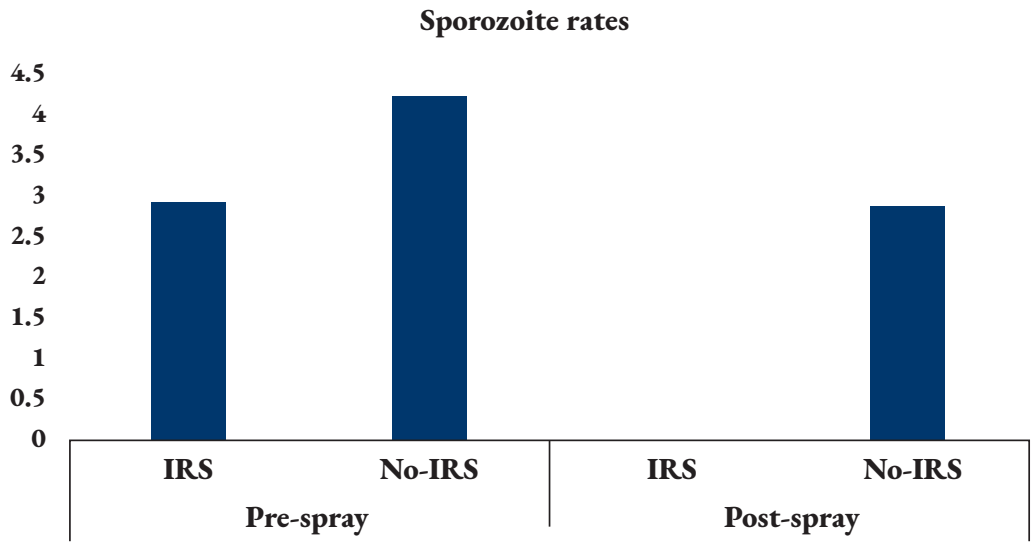
Figure 5.1: Vector species composition pre-IRS (December 2015 to February 2017) and postIRS (March to September 2017) in IRS and unsprayed sites



Source: AIRS Kenya entomological monitoring report

IRS also had a profound impact in reducing sporozoites prevalence in *An. funestus* (Figure 5.2) in the sprayed areas.

Figure 5.2: Sporozoite infection rates in *An. funestus* (%) in IRS and non-IRS sites before and after spraying



Source: AIRS Kenya entomological monitoring report

The introduction of IRS in Migori has had a great impact in reducing indoor resting densities and sporozoite prevalence in *An. funestus* and thus greatly driving down the entomological inoculation rate (EIR). A question that one may ask is if sporozoite prevalence was reduced to zero by the application of IRS, do we still need to continue applying IRS in this area or do we exit, given the high costs associated with this intervention? The answer to this question is not easy.

To make informed decisions, there is a need to put in place a more robust epidemiological and entomological monitoring system to determine the impact of IRS on malaria burden as well as regularly monitor malaria case trends to detect any upsurges. In addition, before ceasing IRS, there is a need to ensure universal LLIN ownership and use. In addition, other additional vector control tools such as LSM should be deployed in the context of IVM. It is also worthy to note that the Kenyan insecticide resistance management strategy recommends rotation of the insecticide used for IRS in endemic areas every two years.

LSM, which was planned in the KMS 2009–2023, was not implemented by the NMCP. However, there has been small-scale community-based LSM either as pilot projects or larvicide trials with encouraging results (Fillinger & Lindsay, 2006; Fillinger, et al., 2009; Mwangangi, et al., 2011; Afrane, et al., 2016). During the last decade, scale-up of vector control tools such as LLINs and IRS has contributed to the reduction of malaria morbidity and mortality across Africa, including in Kenya.

Because these first line interventions are now affected by many challenges, such as insecticide resistance, change in vector feeding and biting behaviour, outdoor malaria transmission, and adaptation of the mosquito to polluted environments, WHO recommends the use of integrated control approaches to improve, control, and eliminate malaria. Larviciding is one of these approaches, which, if well implemented in the context of IVM, could help control malaria in areas where this intervention is suitable.

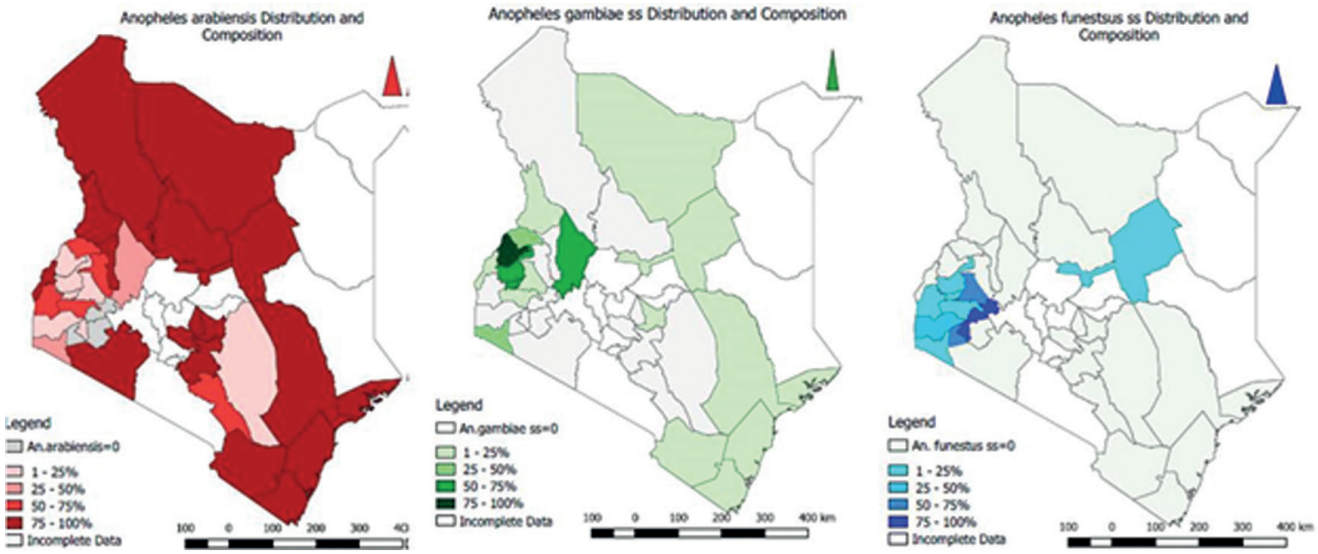
The NMCP is planning to implement LMS interventions in the high malaria burden counties in the lake endemic regions.

For the malaria-free schools initiative, curriculum content was developed and disseminated to some schools in western Kenya. Schools are good entry points into the wider community, in addition to children being good agents of change, so there is a need to repackage this strategy to make it more robust and focused.

Literature Review

The major malaria vectors in Kenya include the *An. gambiae* complex (mainly *An. gambiae s.s., An. arabiensis,* and to a lesser extent *An. merus*), and *An. funestus* complex (Okara et al., 2010). The malaria vector distribution, abundance, and diversity is not even across the country due to variations in climatic factors, particularly temperature and rainfall patterns.

Figure 5.3: Distribution of the major malaria vectors in Kenya (2016–2018)



Source: NMCP Vector Surveillance Reports

In the highland epidemic-prone areas, *An. funestus* is emerging as the main vector (NMCP surveillance data). There has been a genetic evolution of *A. funestus* in Kenya that tends to mirror the distribution pattern of malaria in Kenya (Tchouassi, personal communication). In western Kenya and coast endemic regions, a marked decline in mosquito vector densities has been documented and attributed to increased LLIN coverage. In addition, a switch in the relative species composition has been attributed to sustained LLIN use, with *An. arabiensis* replacing *An. gambiae s.s* as the dominant species (Bayoh, et al., 2010; Mwangangi, et al., 2013).

In the recent past, *An. funestus* has been reported as the dominant malaria vector species in the lake endemic counties, due probably to pyrethroid resistance (McCann, et al., 2014; AIRS Kenya Annual Entomological Monitoring Report, December 2015–September 2016). In the recently sprayed endemic county of Migori, *An funestus,* which was the dominant species, comprising 84 percent of malaria vectors before IRS in 2017, was reduced to less than 20 percent of the vectors surveyed after IRS with the organophosphate actelic CS, with a reported 95 percent reduction in indoor resting densities (AIRS Kenya Entomological Monitoring Annual Report, December 2015–September 2017). In the coastal endemic region, studies have shown that *An. arabiensis* and *An. merus* have replaced *An. gambiae s.s.* and *An. funestus* as the major mosquito species. Over the last decade, there has been a steady decline in the densities of the major malaria vectors and a shift from human to animal feeding, which might have contributed to the decreased burden of malaria along the Kenyan coast (Mwangangi, et al., 2013). In other areas with high LLIN coverage, *An. Gambiae,* which is traditionally highly anthropophilic, has been found to feed both on human and animals, with only 25 percent feeding purely on humans (Ndenga, et al., 2017). In many areas, *An. arabiensis* has replaced *An. gambiae* as the major malaria vector (Bayoh, et al., 2010).

This has important implications for malaria epidemiology and control, given that this vector predominately rests and feeds on humans outdoors. Further, in some areas, *An. coustani,* a secondary vector, is now becoming a major vector and contributing substantially to malaria transmission (Mbogo, et al., unpublished report).

EIR is used to assess the impact of vector control interventions on malaria parasite transmission and elimination. EIR is the most reliable indicator for evaluating the impact of any malaria transmission control effort because it is a direct reflection of the effectiveness of vector control interventions and anti-gametocytocidal drugs. Analysis of several studies has shown that annual EIRs must be reduced to less than one infectious bite per person per year to substantially reduce the prevalence of malaria infection (Killeen, et al., 1999).

In Kenya, EIRs vary across the different malaria eco-epidemiological zones (Shililu, et al., 1998; Lindblade, et al., 2004). However, it is difficult to establish trends in EIR in Kenya due to a lack of standard guidelines and indicators established for this purpose, resulting in variability in methodologies used and difficulties in making temporal or spatial comparisons. In Kenya, only two studies (Lindblade, et al., 2004; Beach, et al., 1993) have used EIR as a parameter to document the impact of vector control interventions on malaria transmission. This situation therefore calls for adapting the WHO Malaria Surveillance, Monitoring and Evaluation Reference Manual. Resistance to pyrethroids among the major vectors is widespread in Kenya (Figure 5.4) and well documented (Ochomo, et al., 2014; Ondeto, et al., 2017).

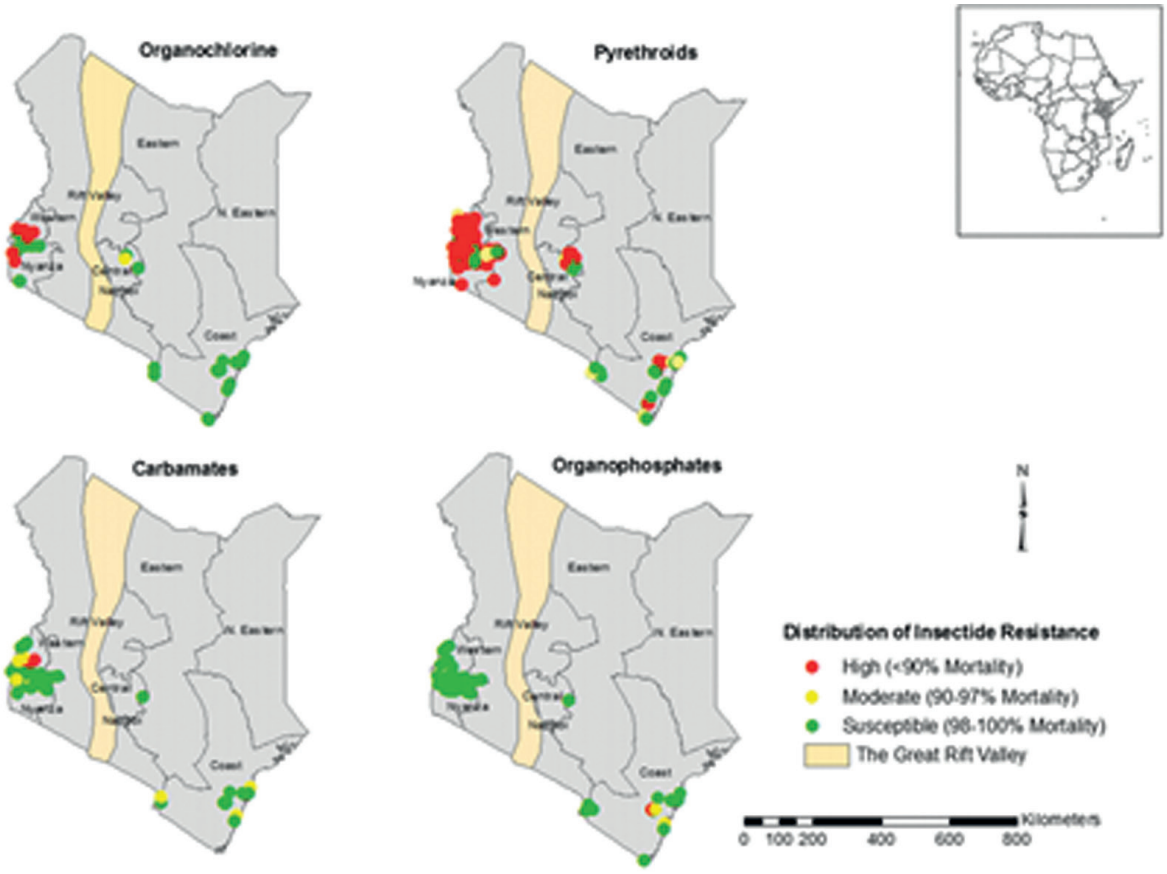
There is also documented resistance to DDT and to some extent to carbamates and organophosphates in isolated places in the county (Ochomo, et al., 2014). In summary, vector populations are largely susceptible to both carbamates and organophosphates, and they are largely resistant to pyrethroids.

Threats of Insecticide Resistance

Significant reductions in malaria over the past decade and a half can be largely attributed to massive scaleup of interventions using insecticides. Unfortunately, the frequency and intensity of insecticide resistance is increasing.

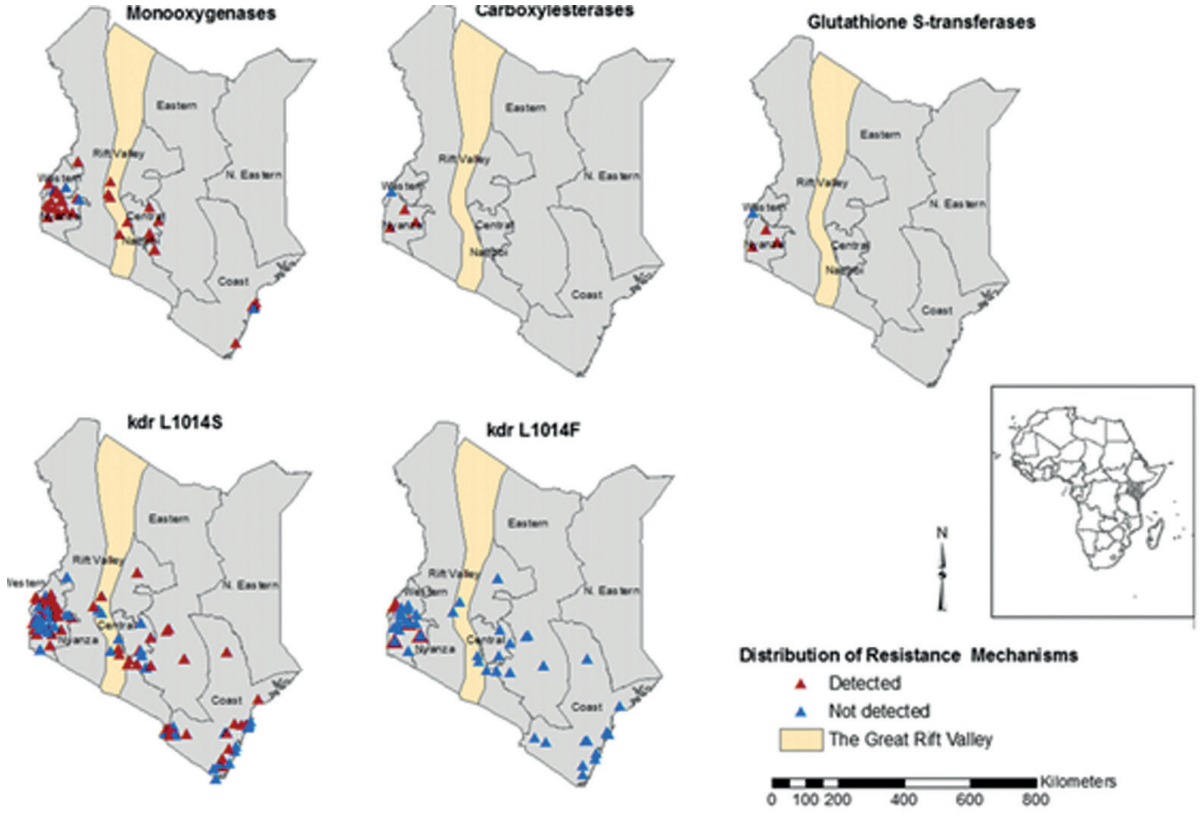
High levels of pyrethroid resistance have been found in western Kenya, around Lake Victoria, and resistance is spreading to other regions in Kenya (Figure 5.4) with several mechanisms responsible for the observed resistance (Figure 5.5). A WHO coordinated study to determine whether mosquito resistance was undermining the impact of these tools, was conducted in five countries including Kenya.

Figure 5.4: Insecticide resistance profile for Kenya 1994–2015



Source: Ondeto, et al., 2017

Figure 5.5: Distribution of resistance mechanisms in Anopheles in Kenya 1994–2015



Source: Ondeto, et al., 2017

The overall conclusion was that pyrethroid LLINs continue to be effective against malaria in areas with moderate levels of resistance to pyrethroids.

The NMCP is advised to develop and implement IRM plans. The WHO recommends rotational and combination use of insecticides with different modes of action. Kenya should consider deploying, in rotation or combination, alternative active ingredients with modes of action different to pyrethroids.

The pipeline of new malaria prevention tools exists, and after new tools are available for public health use, necessary measures should be taken by relevant regulatory authorities to fast-track country registration and use.

Due to the high cost of innovation, the new prevention tools will be more expensive than what is currently available. As such, greater efforts are needed to better target the use of new tools.

Methods

Organisation of Vector Control Interventions Service Delivery

LLINs

For mass distribution of LLINs, there is macro-planning at the national level under a steering committee. The planning is based on the projected population in the target counties from the last population census. Budgeting for commodity and logistics is done at the national level. Procurement of LLINs is also done at the national level. After the nets are in the country, they are distributed directly to counties at designated drop-off points (warehouses) identified by the counties' health teams.

At the county level, several activities are undertaken by the county health teams:

- Development of county LLINs distribution plans
- Development of county-specific budgets (based on population estimates)
- Household enumeration (listing)
- Training of health workers and key community members
- Advocacy and community mobilisation

After the LLINs arrive in the county, the county health teams, trained health workers, and community members are ready to implement the following activities:

- Move nets from warehouses to distribution points
- Issue nets to household members based on household lists
- Tally distributed LLINs

At every step, there are stakeholders' meetings and feedback.

For routine LLINs distribution, standard operating procedures (Figure 5.6) are used to deliver the nets to the end user.

Figure 5.6: Standard operating procedures for routine LLIN distribution

NATIONAL LEVEL TARGET SETTING	HEALTH FACILITY LEVEL	SUB-COUNTY LEVEL	REGIONAL	AT THE WAREHOUSE	AT THE HEALTH FACILITY STORE	AT THE HEALTH FACILITY MCH CLINIC
Based on the endemicity regions, the number of nets required for routine distribution through ANC and CWC is determined	Quantify the monthly LLIN need based on average monthly consumption plus one month buffer Send the figure to a sub-county malaria coordinator	Malaria coordinator consolidates individual requisitions into one sub-county requisition. The sub-county requisition is then sent to the PS Kenya field staff for further processing	Regional officer rationalises the requisition and ensures correct details are captured and sends the requisition through the online system (julisha) for approval by programme coordinator	The warehosue manager receives the online requisition and invoices the particular health facility accordingly. Nets are loaded to a truck for onward distribution to the health facilities	Receive the LLINs and complete relevant documentation for stock management Issue LLINs to the distribution points (CWC and ANC) Ensures proper storage of the LLINs	Issue LLIN to caregivers of infants receiving the BCG vaccine or upon their first contact with a child welfare clinic (CWC)/ health facility Issue LLIN to pregnant women at 1st ANC visit Document LLIN issued in the health facility register and also in the pregnant woman's ANC card and the child's road to health card Tally the number of LLIN distributed at ANC to pregnant women at first visit (using MOH 405) and at EPI clinics to children receiving BCG vaccines respectively

IRS

In Kenya, IRS is delivered by AIRS project (now Vector Link) through trained community spray teams. Entomological and insecticide resistance is monitored routinely.

Human Resource Training and Capacity Building

At the national (NMCP) level, there is adequate human capacity to implement vector control interventions. This is augmented by close collaboration among the NMCP, other programmes within the Ministry of Health, research organisations, and universities. However, there is a need for well-trained personnel in vector control.

The appointment of the various thematic focal persons should be based on a mix of competencies and skills. At the county level, there are no trained vector control specialists, although in-service training in malaria entomology and vector surveillance has been cascaded to all 47 counties. For specific activities related to vector control (net distribution and IRS), health workers and community members are trained based on need.

Results

Achievements on Implementation and Targets

Several targets were set for the various strategies in vector control. The performance against the targets and the challenges encountered are summarized in Table 5.3.

Table 5.3: Performance in implementing vector control objective and strategies

Strategy	Performance score* (%)	Main achievements	Key challenges
Universal distribution of LLINs through appropriate channels	80	▪ A total of 36,998,283 nets were distributed during the period under review. ▪ Improvement in LLIN use—access and usage as universal coverage increased. ▪ For those with access to LLIN, use increased from 71% in 2015 to 88% in 2017.	▪ Attainment of universal coverage is still low. ▪ Quantification was based on projected population census, but gaps ware observed during distribution despite a 10% buffer. ▪ Process of LLIN distribution and registration—incomplete information. ▪ Timing of 2017 LLIN distribution coincided with election year. ▪ Incomplete mop-up campaign—majority of counties did not do mop up.

Strategy	Performance score* (%)	Main achievements	Key challenges
IRS in targeted areas	68.3	▪ In the areas where IRS was implemented, high levels of coverage were achieved. ▪ Two high-endemic counties sprayed at >94% coverage in 2017–2018, protecting approximately 2 million people.	▪ Lack of appropriate IRS chemicals registered in Kenya to address pyrethroid resistance. This caused a delay in IRS implementation until 2017 ▪ Due to inadequate resources, only 2 out of 8 counties with high malaria endemicity were sprayed. ▪ High levels of pyrethroid resistance ▪ Quality assurance of spray was done by the implementer and counties—the aim is to have independent monitoring of quality of IRS.
Implement LSM	0.0	▪ LSM bilateral agreement signed between Kenya and Cuba	▪ Lack of LSM implementation strategy/plan for larviciding, limited resources ▪ No LSM business plan and guidelines

The overall performance score was discussed and agreed by the vector control thematic group.

Strengths	Weaknesses
▪ Availability of policy documents and guidelines ▪ Availability of technical assistance from research institutions (Kenya Medical Research Institute, Centers for Disease Control and Prevention, Wellcome Trust) ▪ Trained personnel in entomological surveillance in all 47 counties ▪ Availability of basic entomological equipment at the county level ▪ Availability of strong entomology research teams as well as highly trained entomologists in the country ▪ Well-established technical working groups (Vector Control and Surveillance, Monitoring, Evaluation, and Operational Research) ▪ Close collaboration between NMCP, the Vector Borne Disease Unit, and the Kenya Medical Research Institute	▪ No systematic approach in the implementation of IVM ▪ Lack of LSM implementation plan ▪ Lack of established standardised entomological impact indicators at the national level ▪ Lack of a national schedule or work plan for obtaining such indicators
Opportunities	**Threats**
▪ Tap into county resources ▪ Renewed interests in LSM ▪ In country funding under Universal Health Coverage ▪ Use of school children as change agents (schools as entry points to the wider community) (i.e., the malaria-free school initiative)	▪ Emerging insecticide resistance, causing need to use more expensive insecticides ▪ Changing malaria vector bionomics ▪ Decreased funding ▪ Only one registered non-pyrethroid insecticide for IRS

Successes, Best Practices, and Facilitating Factors

Success, best practices, and facilitating factors identified were as follows:

- Many partners intrested in malaria vector control
- Very good coordination of malaria vector control partners through the various technical working groups
- Close collaboration between NMCP and research bodies in generating, sharing, and using information
- Available evidence in deploying vector control interventions across the country

Key Issues and Challenges Identified

Key issues and challenge identified in this review were as follows:

- Despite the use of various channels of LLIN distribution, universal coverage has not been achieved.
- Although the IVM approach is well articulated at the policy level, the end users do not seem to understand it.
- The current scope of IRS is not sufficient to rapidly reduce malaria in the high-burden counties.
- Registration of new insecticides for IRS in Kenya has been slow.

Recommendations

- Re-align the vector objective, strategies, and targets with the current global targets (WHO, Global Technical Strategy, and Sustainability and Development Goals) in the next strategy.
- Adopt the WHO standardized entomological impact indicators and develop a schedule or work plan for obtaining such indicators.
- To move towards achieving universal LLIN coverage and use, there is a need to scale up community-based continuous LLIN distribution.
- To manage insecticide resistance, and in line with the Kenyan IRM strategy:
  - Deploy piperonyl butoxide nets or any other new IRM tools in areas with high pyrethroid resistance in line with WHO guidance.
  - Fast-track the registration of new vector control products for resistance management.
- Build capacity for vector control at county levels (minimum package for vector control).
- To actualize IVM approach in vector control, revitalize the IVM technical working group. In addition, IVM should be a standing agenda in all Vector Control technical working group meetings.
- Create awareness on IVM across the country.
- Ensure the implementation of LSM measures where appropriate:
  - Develop LSM business/operational plan.
  - Develop LSM implementation guidelines and field manuals.
- Explore using a mix of malaria prevention measures (chemoprevention, LLIN, LSM, IRS, house improvement, and vaccines) to bring down the malaria burden, particularly in the lake endemic region.

Conclusions

- In the National Malaria Strategy, the vector control objective targets were not based on the prevailing global guidance.
- There are no standardized entomological impact indicators at the national level or a national schedule or work plan for obtaining such indicators.
- The LLIN universal coverage target was not achieved.
- The threat of insecticide resistance is widespread and intense in Kenya.
- There are very few non-pyrethroid IRS insecticides registered for use in Kenya.
- In areas where it was implemented, IRS had a profound impact in reducing both the indoor resting densities and sporozoites prevalence in *An. funestus.*
- LSM was not implemented at the national level.
- There was no systematic approach in the implementation of IVM.
- Specific human capacity for vector control is not sufficient at the county level.
- Despite the deployment of vector control interventions in targeted areas, the disease burden in the lake endemic region remains relatively high (KMIS, 2015).

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Chapter 6:
Malaria in Pregnancy

Key Messages from This Chapter

- Chapter 6 assesses achievements made against the targets set in the revised Kenya Malaria Strategy 2009–2018. Malaria in pregnancy fell under the first strategic objective, which stated that, "80% of the population should be covered by the appropriate preventive strategies by 2018."
- This review found a steady increased uptake of intermittent preventive treatment in pregnancy with sulfadoxine-pyrimethamine (IPTp-SP) between 2015 and 2017, but this achievement fell short of reaching the national and global targets of 80 percent.
- The main drivers of this achievement were as follows: strong programme support, which ensured adequate supply of medicines; community involvement through the use of community health volunteers; and the use of circulars, memos, and job aids delivered directly at the point of care for ease of reference. Adequate funding in United States Agency for International Development/U.S. President's Malaria Initiative-supported counties led to full implementation of interventions, yielding better results in programme outcomes. Regular technical working group meetings facilitated timely decision making, resulting in the quick adoption of three or more doses of IPTp-SP (IPTp3+) and in addressing gaps in SP commodity procurement.
- Major barriers to the delivery of IPTp were erratic supply of SP, especially in the 2014/2015 period, poor adherence to national guidelines for malaria in pregnancy case management, and lack of healthcare provider knowledge on when to give IPTp-SP. Other health systems barriers were poor health worker-client communication, long distances to health facilities, and lack of functional places to administer IPTp-SP directly observed therapy at antenatal care.

Introduction

Background

Malaria in pregnancy (MIP) is an important public health problem in sub-Saharan Africa, affecting approximately 30 million pregnancies annually (World Health Organization [WHO], 2017; Dellicour, et al., 2010). It is associated with considerable morbidity and mortality for pregnant women and their new-borns (Mene´ndez, et al., 2010). Malaria infection during pregnancy may be symptomatic or asymptomatic, depending on the endemicity spectrum. *Plasmodium falciparum*-infected erythrocytes accumulate in the vascular area of the placenta to much higher densities than in the peripheral circulation, resulting in the pathogenesis of the placenta. The alteration of the placental integrity results in low birth weight, which is an important predictor and etiology of infant mortality, especially in the first year of life.

In Kenya, an estimated 1.3 million pregnant women live in malaria endemic areas and are exposed to the risk of MIP (Dellicour, et al., 2010). Recent estimates show that among women coming for their first antenatal care (ANC) booking, the prevalence of peripheral parasitaemia is 1 out of 5 and anaemia is 7 out of 10 (Ouma, et al., 2007). Despite the paucity of data on the prevalence of placental parasitaemia, previous studies reported that 17.2 percent of women delivering at large county referral hospitals in western Kenya were positive for placental malaria (Perrault, et al., 2009). Thus, MIP remains an important public health problem in Kenya.

Consistent with the WHO policy, the Kenya Malaria Strategy (KMS) employs a three-pronged approach for malaria prevention and control:

- Use of long-lasting insecticidal nets (LLINs)
- Intermittent preventive treatment in pregnancy with sulfadoxine-pyrimethamine (IPTp-SP)
- Prompt parasitological diagnosis and treatment of symptomatic cases with an effective antimalarial medication

For malaria prevention, the IPTp-SP strategy has been shown to significantly reduce maternal morbidity and poor birth outcomes associated with malaria in pregnancy (Kuile, et al., 2003) and remains a key strategy for malaria prevention in pregnant women, despite the rapid spread and intensification of mutations associated with SP resistance (Kuile, et al., 2003). In addition, a recent study showed that IPTpSP protects against curable sexually transmitted diseases and respiratory tract infections, resulting in a significant reduction in adverse birth outcomes (Chico, 2017). These additional benefits, the sustained effectiveness, the ease of administration at the programmatic level, and the relative cost-effectiveness (Sicuri, et al., 2010), make IPTp-SP a particularly attractive strategy to be continued.

In Kenya, women have continued to get LLIN through multiple channels, including ANC, mass net distribution campaigns to households in malaria risk areas conducted every three years, and other social marketing avenues. Although coverage is high (80%), use remains below the national targets (Guyatt, et al., 2004).

The National Malaria Strategy 2009–2017 updated through a multi-stakeholder consultative mid-term review in 2014, outlines the operational framework for the malaria control interventions in Kenya. As the current strategy approaches expiry, the National Malaria Control Programme (NMCP) seeks to pinpoint achievements and challenges and to identify emerging priorities.

This review reports on the current policy and guidance for MIP, assesses the performance of the NMCP against the targets defined in the KMS 2009–2018 (revised 2014), and highlights enablers and constraints encountered over the period under review. The report also provides a summary of recommendations based on these findings to be considered in developing the next malaria strategy.

Policy and Guidance

MIP is covered under the overall KMS 2009–2018 (revised in 2014), Kenya Malaria Monitoring and Evaluation Plan, and the national Guidelines for Diagnosis, Treatment, and Prevention of Malaria in Kenya. The KMS is aligned to the Kenya Health Sector Strategic Plan, which articulates interventions to be implemented in all malaria epidemiological zones in the country. In 2014, a decision was made to limit implementation of the IPTp-SP strategy to 14 malaria-endemic counties, a departure from the blanket application in all parts of the country. This strategic shift not only resulted in prudent use of resources but also led to greater focus in areas where this intervention was needed.

In Kenya, MIP-specific implementation tools are regularly developed and disseminated. These include the standard-based management and recognition MIP tool (15 MIP standards), job aids, brochures, and circulars to facilitate ease of use at the point of care. For example, in 2015, the director of medical services wrote a memo that was circulated to all counties where IPTp-SP is indicated. The memo simplified potential health system's barriers on the optimal delivery of IPTp-SP and the change from the 2-dose to 3+ doses of IPTp-SP regimen, given its superiority over the latter in preventing adverse birth outcomes.

For technical direction and implementation, the MIP technical working group (TWG) is chaired by the Reproductive Maternal, Neonatal and Child Health Services Unit, and the NMCP acts as the secretariat. The close collaboration between the two units and regular joint technical working group meetings enables smooth operation and delivery of MIP services at the point of care.

Literature Review

As part of this programme review, relevant published and grey literature were searched to provide current information to enrich and inform the next strategy. The areas earmarked for literature searches included the following:

- Continued effectiveness and suitability of IPTp-SP
- Case management of MIP
- Use of LLINs by pregnant women
- Health systems and client behavioural factors affecting use of MIP interventions
- Community-based or community delivery of IPTp-SP
- More information on the use of artemisinin-based combination therapies (ACTs) in the first trimester of pregnancy

Literature searches with key thematic words were conducted using Google Scholar, OVID, and academic databases such as PubMed and the Cochrane Library. Additional searches from the MIP Consortium Library were performed. Review of relevant reports, policy documents, and recent surveys from Kenya was also done. Annex 1 shows the compendium and results of this review.

Continued Use of IPTp

WHO recommends the continued use of IPTp-SP based on a review of six recent studies showing that IPTp-SP remains effective for MIP prevention, even in areas of high *P. falciparum* resistance The shift from 2-dose to 3-dose regimen is supported by recent studies that have demonstrated the superiority of 3-dose regime, compared to the 2-dose, with no difference in adverse events (Diakite, et al., 2013; Riley, et al., 2016). Finally, a recent study found that SP exhibits a dose-response protection against adverse birth outcomes related to malaria, sexually transmitted infections, and respiratory tract infections, as well as greater benefits for women who take 3 or more doses. This provides evidence for the continued use of SP among pregnant women (Chico, et al., 2017).

MIP Case Management

In the current strategy, MIP case management is covered under the overall malaria case management trainings. However, in this report, MIP-specific areas that may need additional attention outside the general malaria case management were highlighted. Currently, the national guidelines recommend different treatments in the first trimester, oral quinine, and in the second and third trimesters of pregnancy, artemether-lumefantrine (AL) for uncomplicated malaria. This could lead to confusion in the management of MIP.

Two recent studies in western Kenya have highlighted inadequacies and incorrect prescribing practices in the management of MIP (Kioko, et al., 2016). In these studies, inaccuracies in the diagnosis and treatment of MIP were more pronounced in pharmacies and other drug outlets, compared to government health facilities. In general, there was poor adherence to national guidelines. For example, correct MIP case management knowledge in 45 percent of health facilities and 0 percent of drug outlet encounters, and correct MIP case management practice was observed in 31 percent of health facilities and 3 percent of drug outlet encounters. Moreover, providers consistently failed to assess for pregnancy. These studies noted the existence of a large gap in the ability of healthcare workers (HCWs) to effectively diagnose and treat MIP.

Use of LLINs by Pregnant Women

The use of LLINs has been a core malaria control strategy for more than two decades and is poised to remain so in the coming years. When used by pregnant women, an LLIN contributes to improving maternal, neonatal, and infant health, with lasting benefit to the developing child. Although IPTp-SP is not recommended until after quickening, an earlier start of insecticide-treated net use and iron and folate supplementation, even before pregnancy, may be beneficial (Ouma et al., 2007). Routine ANC services constitute an important delivery channel that ensures that pregnant women get LLIN once and are covered with an LLIN from their first ANC visit in each pregnancy. This plays an important role in maintaining population-level coverage between campaigns, especially among women who become pregnant and for children born outside the campaign years.

Across sub-Saharan Africa, use of LLINs remains below national and international targets; the median use of LLIN the previous night among pregnant women across 37 countries for 2009 and 2011 was 35.2 percent (Boene, et al., 2014). In Kenya, LLINs are distributed through multiple channels, including mass campaigns, routine ANC, and social marketing. In spite of these channels, coverage has not reached the national target of 80 percent. Only 58 percent of pregnant women ages 15–49 slept under an LLIN the night before the survey in 2015. A post-LLIN survey was done in 2017; however, the use of LLINs by pregnant women was not captured. Nets play an important role in malaria prevention, especially in this segment of the population. Because malaria and anaemia are established problems by the time of the first ANC visit (Ouma et al., 2007), mechanisms to deliver LLIN to women of child-bearing age before they become pregnant need to be explored. Distribution of LLINs through ANC can help, but this does not address the effects of malaria before the first ANC visit.

Other Health System Issues

Behavioural and socio-cultural factors have been described in many studies as one of the determinants of the uptake of MIP interventions. In Mozambique, low awareness of the risks and adverse consequences of malaria in pregnancy did not seem to affect acceptability or uptake of the different malaria preventive interventions. However, findings from recent studies in Kenya and Mali contrast sharply with these findings. A systematic review of social and cultural factors affecting uptake of MIP interventions in Africa concluded that, although malaria risk is associated with pregnancy, women's vulnerability is often considered less disease-specific, and MIP is interpreted in locally defined categories. Furthermore, local discourses and health workers' ideas and comments influence concerns about MIP interventions. They concluded that understanding of ANC, health worker-client interactions, household decision making, gender relations, cost, and distance to health facilities affect pregnant women's access to MIP interventions, and lack of appropriate healthcare infrastructure limits provision of interventions.

In Kenya, a recent qualitative study conducted under Population Services Kenya highlighted many client-related perceptions and behaviours that may influence uptake of MIP interventions. The study found that client-related barriers included myths and misconceptions, risk perceptions, adolescent stigma, attitude from healthcare providers, especially in public hospitals, financial constraints, costs (cannot afford transport costs to health facilities for appointments), disparagers and peer pressure (women get influenced by their peers), preference for traditional birth attendants, and delays at ANC.

Strategies to Improve Access to and Use of IPTp—Community Delivery of IPTp

Recent experimental community delivery of IPTp-SP has been shown to increase coverage in many settings, including Uganda, Burkina Faso, Malawi, and Nigeria, but reservations about the possible impact of this approach on ANC attendance remain. The most recent community IPTp interventions in Kenya have been implemented by the Maternal and Child Survival Program (MCSP)/U.S. President's Malaria Initiative (PMI) in Bungoma, Kisumu, Migori, and Homa Bay Counties and by the PATH/MACEPA project in Kisumu County.

The MCSP/PMI project only used community health volunteers (CHVs) to encourage pregnant women during their routine household visits to attend ANC early to get timely IPTp-SP. In the PATH/MACEPA project, CHVs actually administered IPTp directly observed at the household and entered this into the ANC booklet, often when the pregnant woman did not attend or receive IPTp-SP at ANC. Both approaches reported increased IPTp-SP uptake and increased ANC attendance.

In Uganda, community sensitisation and IPTp-SP delivery by drug shop vendors and traditional birth attendants resulted in 68 percent IPTp-SP coverage, compared to 40 percent in the control villages, with an unexpected increased in ANC attendance. Health education messaging and IPTp-SP delivery by community drug distributors resulted in the attainment of 68 percent IPTp-SP, coverage compared to the control villages. This study also demonstrated that using community resource people is an effective and feasible option to deliver IPTp-SP because it uses existing community structures and volunteers, creating easy access to the intervention, complementing IPTp-SP issued at ANC.

In Burkina Faso, community and outreach delivery of IPTp-SP attained 83 percent coverage, compared to 46 percent coverage in the control villages with sustained ANC attendance. In Malawi, training of community health workers resulted in increased IPTp-SP coverage but recorded a decline in ANC attendance in the intervention communities. In Nigeria, a community-based distribution of IPTp-SP increased coverage by 33.3 percent while increasing attendance of at least one ANC visit.

Although this approach has not been previously tested in Kenya in a large scale, it remains a viable way to address missed opportunities at ANC, which might lead to increased IPTp-SP uptake.

However, the general consensus of the programme review panel was to sustain the current strategic objective of delivering IPTp-SP at ANC and promoting its use at the community level. It was observed that more studies were needed in the country to provide more data if this approach was to be implemented.

Use of AL in the First Trimester of Pregnancy

Recent studies have examined the existing published evidence on the relationship between artemisinin compounds and adverse pregnancy outcomes (Dellicour, et al., 2015) and considered published evidence with regard to the safety of these compounds when administered during pregnancy (Moore, et al., 2016). Dellicour et al. (2015) observed that artemisinins are effective and unlikely to be the cause of foetal loss or abnormalities when used in early pregnancy.

However, none of these studies had adequate power to rule out rare serious adverse events in the second and third trimesters. There is not enough evidence to effectively assess the risk-benefit profile of artemisinin compounds for pregnant women, particularly for first trimester exposure. Interestingly, analysis of secondary data actually showed that quinine had even more adverse events compared to ACTs. Studies by Moore et al. (2016) noted no evidence of

an increased risk of miscarriage or of major congenital malformations associated with first-line treatment with an artemisinin derivative compared to quinine. They recommended that ACTs should now be considered for use in the first trimester, especially in view of the low efficacy and poor compliance of quinine and wide availability of highly effective ACTs.

In an observational study in Zambia, Mayando et al. (2015) concluded that exposure to AL and SP in the first trimester was not associated with particular safety risks, such as peri-natal mortality, preterm deliveries, or low birth weights. Such outcomes, as well as infant neuro-developmental parameters up to 12 months, were similar between the two arms. These findings add to the body of data suggesting that randomized clinical trials could now be the way forward to assess safety and efficacy of ACT in the first trimester of pregnancy.

These observational studies pointed to some measure of safety in the use of ACTs in the first trimester but no explicit recommendation has been made by the WHO or the Kenyan Ministry of Health. Therefore, the recommendation in the Kenyan national guidelines advising HCWs to use ACTs in the first trimester of pregnancy when it is the only drug available remains valid and should be continued until further guidance from the WHO.

Seasonal Malaria Chemoprevention

Seasonal malaria chemoprevention is defined as the intermittent administration of a full treatment course of an antimalarial medicine to children in areas of highly seasonal transmission during the malaria season (Okel, et al., 2017). The provision of an effective antimalarial drug at monthly intervals during this period has been shown to be 75 percent protective against uncomplicated and severe malaria in children under five years of age.

Across the Sahel sub-region, most childhood malarial morbidity and mortality occur during the rainy season, generally three to four months. Thus, maintaining therapeutic antimalarial drug concentration in the blood throughout the period of greatest malarial risk results in reduced episodes of malaria.

WHO recommends seasonal malaria chemoprevention with SP+amodiaquine (AQ) in areas with highly seasonal malaria transmission in the Sahel sub-region of sub-Saharan Africa, where *P. falciparum* is sensitive to both antimalarial medications.

A complete treatment course of AQ+SP is given to children between the ages of 3 and 59 months at monthly intervals, beginning at the start of the transmission season to a maximum of four doses during the malaria transmission period.

The age-based recommended dosing schedule is as follows:

- Infants <12 months old: AQ—half of a 153 mg tablet given once daily for three days and a single dose of SP—half of a 500/25 mg tablet
- Children 12–59 months: AQ—a full tablet of 153 mg given once daily for three days and a single dose of SP—a full tablet of 500/25 mg

The single dose of SP is given only on the first day together with the first dose of AQ. The following areas are targeted for implementation:

- Regions where majority of clinical malaria cases occur during a short period of about four months
- The clinical attack rate of malaria is greater than 0.1 attack per transmission season in the target age group
- AQ+SP remains effective (>90% efficacy)

Although intermittent preventive treatment in infants and pregnant women (IPTp) with SP is recommended by the WHO in areas of moderate-to-high malaria transmission in sub-Saharan Africa, wide regional variations in drug resistance critically influence the success of this interventions (Guyatt, et al., 2004).

In the East and Southern African regions, *P. falciparum* resistance to SP remains high; thus the potential benefits of this strategy would be grossly undermined. In addition, the administration of a partially effective drug could in fact exacerbate the transition of malaria from uncomplicated to severe forms. In view of these facts, Kenya does not meet the threshold set by the WHO for the application of this strategy.

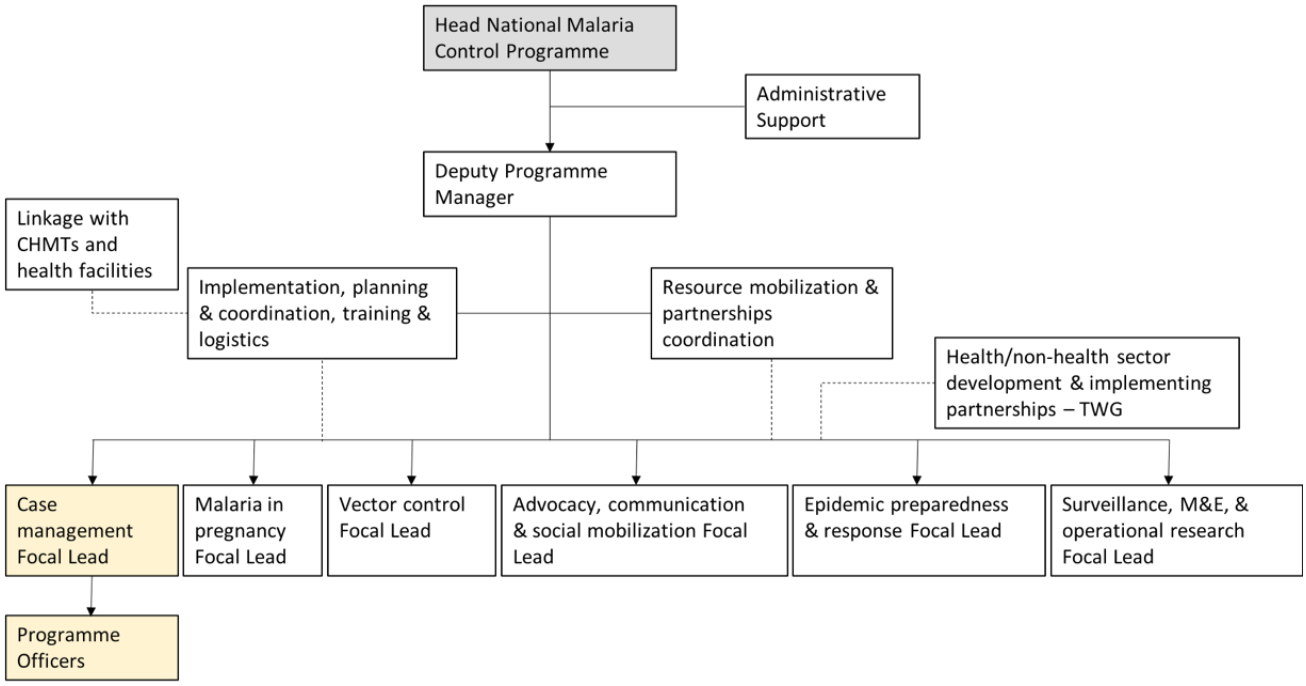
For the same reason, the review concluded that intermittent preventive treatment of malaria in infants cannot be feasibly deployed in Kenya.

Human Resources, Training, and Capacity Development

MIP interventions are implemented by the HCWs at the peripheral health facilities. Since these activities are carried out at the antenatal clinic platform the day-to-day activities rely on the human resources available in this platform. Their skills are regularly updated through in-service training from the combined NMCP and Reproductive Maternal Neonatal and Child Services Unit (RMNCSU).

Figure 6.1 shows the organisation of the malaria control programme at the national level. There is a focal person for MIP at the NMCP. In-depth analysis of personnel issues around the positions shown is fully articulated by the programme management thematic group.

Figure 6.1: National malaria control programme organogram



Adapted from National Malaria Strategy 2009–2017

Achievements on Key Performance Indicators and Targets

MIP fell under the first strategic objective of the revised KMS 2009–2018 which aimed to have at least 80 percent of people living in malaria risk areas using appropriate malaria preventive interventions by 2018. Strategy 1.5 outlined the MIP activities to be implemented. A Microsoft Excel-based tool developed by WHO for the malaria programme review (MPR) was adapted and used to assess achievements of the MIP strategy and activities. Table 6.1 shows the overall performance of MIP strategy and its activities.

Table 6.1: Achievements against key performance indicators and targets

Strategy	Performance score	Main achievements	Key challenges
Strategy 1.5: Provision of IPTp to pregnant women at antenatal clinics and promotion of its use at community level	57.6%	Increased IPTp uptake	HCW uncertainty around when to give IPTp
1.5.1: Update and disseminate IPTp guidelines	30.0%	Dissemination only done in four counties	Insufficient funding to disseminate in all counties
1.5.2: Procurement and distribution of effective IPTp medicines	60.0%	Was accomplished with some hitches	Poor coordination among counties, national government, and procurement agencies
1.5.3: Capacity building for the provision of IPTp	80.0%	Done in all counties as part of the overall case management training	No major challenge
1.5.4: Supportive supervision of MIP activities	68.1%	In 2017 all (47) counties were supervised; in 2016, 33 out of the 47 were supervised	Was not done in all counties in 2016
1.5.5: Conducting advocacy and mobilisation activities	80.0%	Multiple channels (TV, radio spots, HCW training and CHVs used for sensitisation and delivery of messages	Estimates of viewership not available
1.5.6:Holding quarterly MIP TWG meetings	65.0%	2014 (all 4 scheduled TWG meetings held); 2015 (all 4 TWGs); 2016 (3 TWGs); 2017 (2 TWGs)	Not accomplished in 2016/2017 due to competing activities
1.5.7: Conducting review of IPTp implementation	20.0%	No special review but Kenya Malaria Indicator Survey conducted in 2015 as a representative review	Not accomplished due to competing activities

Methods

Detailed Implementation, Achievements, and Challenges

This section elaborates the achievements under each activity, evidence used to assess performance, and enabling and constraining factors.

Table 6.2: Key activities

Activity	Details	Evidence	Constraining factors	Enablers
Update and disseminate IPTp guidelines	▪ NMCP managed to do the required revision of the MIP guidelines, which included one-off revision of two job aids and one brochure. ▪ However, dissemination was only done in 4 MCSP/PMI-supported counties (Bungoma, Kisumu, Homa Bay, and Migori), missing out in the other targeted 10 counties. ▪ The overall score for this activity was 30%.	End of PMI/United States Agency for International Development (USAID) MCSP project report, 2017	Limited funding for MIP activities was cited as the main reason for incomplete dissemination as funds available were only sufficient to cover four counties.	Development and dissemination of new job aids for SPdirectly observed therapy corners within the four project counties.
Procurement and distribution of effective medicines for IPTp	▪ This meant that if nothing was done, the gains that had been achieved earlier would be lost. ▪ Around the same time, donors/partners (USAID/PMI and UNICEF) responded to the situation by procuring additional SP. ▪ In the same period, counties that had acknowledged the situation and factored in a budget line in their work plans for SP started to procure the commodity, which lead to the unfortunate situation of over-procurement and possible expiry. ▪ Other contributing factors to this under-achievement were prolonged civil strife, which resulted in closure or partial operation of some health facilities due to limited staff availability to prescribe the medicine. ▪ This activity scored 60%.	The director of medical services circular to counties advising counties to procure SP and American Society of Tropical Medicine and Hygiene abstract 2015	Poor coordination between the national and county governments resulted in erratic procurement of SP. In 2013, health services were devolved and counties were expected to procure SP, which they did not do immediately.	The director of medical services wrote a reminder letter to the counties requesting them to prioritise procurement of SP, but there was still a long delay, leading to stock-outs. Based on this, the national government assisted counties in procuring SP.
Capacity building for IPTp	▪ MIP training was conducted in all counties as a component of malaria case management training supported by the Global Fund. ▪ Additional training was done in MCSP/PMI project areas (Bungoma, Kisumu, Homa Bay, and Migori Counties) and at the community by the African Medical Research Foundation (AMREF). ▪ A score of 80% was achieved for this activity.	Case management training reports and MCSP reports		

Activity	Details	Evidence	Constraining factors	Enablers
Supportive supervision of MIP activities (facility and community) by CHMTs and SCHMTs with mentorship by NMCP/ Reproductive Maternal Neonatal and Child Services Unit (RMNCSU)	▪ In 2017, all 47 counties and their sub-counties were supervised; in 2016, only 33 counties received supervision. ▪ Fourteen counties were not supervised during the health facility supervision support, including Mombasa, Busia, Nyadarua, Isiolo, Mandera, Garissa, Machakos, Embu, Tharaka Nithi, Makueni, Meru, Wajir, and Samburu. ▪ Additional supervision was done during MIP trainings organized by the MCSP project in the four MCSP project counties: Bungoma, Kisumu, Homa Bay, and Migori. ▪ Although the strategic objective stated that the planned supervision will be done with the support of the national level government, this was not the case. Instead, supervision at the county level was organised and executed by the county government alone. ▪ In retrospect, this was the right thing to do as counties are now constitutionally mandated to plan and conduct health service activities independently. ▪ Going forward, the national government may only commit to providing technical support rather than supervision of what should otherwise be the function of an independent entity. ▪ A score of 68.1% was achieved for this activity.	Health facility supervision support reports and MCSP supervision reports	Mombasa and Busia were not supervised because of issues between the Global Fund principal recipient (PR2) and the sub-recipient for this activity, which have since been resolved.	

Activity	Details	Evidence	Constraining factors	Enablers
Conduct community advocacy and mobilisation for MIP activities	▪ Using a multimedia approach, this activity was continuously implemented during the period under review. The channels used included television and radio spots, healthcare worker trainings, and interpersonal communication using CHVs. World Malaria Day was also used as a major forum for dissemination. ▪ The messages were crafted and reviewed for soundness of content by the Advocacy Communication, and Social Mobilisation TWG. To ensure value for money, NMCP also contracted an independent audit firm to document reports of the responsible media channels. ▪ The major TV stations in Kenya (KTN, NTV, CITIZEN, and KBC) were contracted to air these messages at the national level. In addition, local vernacular radio stations (Lolwe, Mulembe, Change, and Kaya) were also contracted to air these messages in all regions and sub-regions. Population Services Kenya remained an important producer and disseminator of these important messages at the national level, while AMREF continued to implement community level and school health education messaging. ▪ However, a qualitative study conducted by Population Services Kenya in 2017 indicated that very few respondents mentioned that they had seen or heard about IPTp campaigns. Those who knew about them mentioned that the main message communicated to pregnant women was to go for SP drugs to prevent malaria, as the following quote illustrates: ▪ "...Last month I saw one by safe Pwani telling pregnant women to take SP when pregnant..." —Decision maker, Kwale ▪ Respondents at the qualitative study mentioned that sources of information about IPTp included television, radio, word of mouth from friends, village elders, doctors at the health facility, chiefs who addressed crowds at gatherings and CHVs, as illustrated in the following quote: ▪ "...I have heard the Chief encourage women during barazas and even in funerals to seek antenatal treatment..." —Decision maker, Kwale, Lungalunga ▪ However, documentation and availability of estimates of viewership was necessary and was recommended for consideration in the next strategy. ▪ This activity had a high score of 80%.			

Activity	Details	Evidence	Constraining factors	Enablers
Holding quarterly MIP TWG meetings	▪ In 2014 and 2015, all scheduled TWG meetings were held. ▪ In 2016, three out of the four scheduled TWG meetings were held; in 2017, only two of the four scheduled TWG meetings were held. ▪ The declining number of scheduled meetings, particularly in 2017, did not bode well for programme monitoring and needed improvement. ▪ This activity had an average core of 65%.	Minutes of MIP TWG meetings		
Conduct review of IPTp implementation	▪ No special reviews were conducted in the entire period spanning 2014–2017. The only activity close to a review was the 2014 Kenya Demographic and Health Survey and the 201 Kenya Malaria Indicator Survey. ▪ It was noted that the substance and form of the intended review was not clearly spelt out in the strategy. This made it difficult to implement and assess this outcome. ▪ The review recommended this activity to be made more specific and measurable in the next strategy. ▪ The activity received a performance rating of 65%.			

Assessment of the Status of Implementation of the Recommendations of Last MPR

This section provides the estimated proportion of implemented recommendations from the mid-term review of the KMS. The 2014 mid-term review of the strategy recommended the following:

- Assessment of IPTp coverage through the Kenya Malaria Indicator Survey (KMIS) and the Kenya Demographic and Health Survey
- Sensitisation of communities
- Review of IPTp implementation to be conducted in 2014
- Faith-based organisations and urban health facilities in malaria-endemic areas to be supplied with effective medicine
- Free administration of IPTp to pregnant women and reported through District Health Information Software, version 2 (DHIS2)

At the time of this thematic review, four out of the five recommendations had been fully implemented and one was partially implemented.

Strengths, Weaknesses, Opportunities, and Threats Analysis

In a review of the existing information and assessment of the national MIP landscape and of the relevant health partners, major strengths, weaknesses, opportunities, and threats (SWOT) to effective programme implementation were identified. The major strengths were as follows:

- Availability of SP
- Strong donor support
- Government commitment, with health being one of the four agenda items the government has identified as a priority area for strategic investment in the next five years
- Community strategy for health
- Research institutions that generate information to inform policy as well as a strong TWG that facilitates the translation of the results of research into policy

Important opportunities identified included possibly leveraging resources of the newly devolved system of government, using civil society resources in the country to lobby the government to allocate adequate domestic funding for health activities and to mobilise communities to take an active role in health promotion activities, and investing in technology and information platforms to further health agenda in general, particularly MIP.

The following weaknesses were identified:

- Poor data capture systems
- Limited funding for MIP interventions (county investments in MIP, especially in social and behaviour change communication [SBCC], remained low)
- Inadequate dissemination of changes in policy guidelines and inadequate knowledge among healthcare workers on MIP prevention and treatment guidelines, which requires regular retraining and updates.

Associated threats were also identified. SP was the only antimalarial drug recommended for IPTp and was threatened by rapid spread and intensification of *P. falciparum* resistance. This threat is exacerbated by evidence from clinical trials assessing possible drug replacements for IPTp, including chloroquine-azithromycin and mefloquine.

Other strategies, such as intermittent screening and treatment, have not been successful. Other threats identified were heavy reliance on donor funding and vector resistance threatening effectiveness of LLINs. Table 6.3 shows the detailed SWOT analysis.

Table 6.3: SWOT Analysis

Strengths	Weaknesses
▪ Availability of SP ▪ Strong donor support ▪ Harmony between RMNCSU and NMCP (MIP programming) ▪ Strong and active MIP TWG with experienced and technically competent members ▪ Government commitment, health among the four big agenda for strategic investment ▪ Government initiatives (e.g., Beyond Zero campaign, Linda Mama initiative, and Universal Health Coverage) ▪ Policy documents, including policies, strategies, guidelines ▪ Decentralised health services (if optimally implemented) ▪ Competent private sector and faith-based organisations in provision of health services ▪ Community health strategy initiative ▪ Conducive political climate ▪ Established research institutions generating relevant information for decision making	▪ Poor data capture systems ▪ Inadequate skilled health personnel in counties to implement health interventions ▪ Competing tasks that take away staff from core duties ▪ Limited funding for MIP interventions (county investments in MIP, especially SBCC) ▪ Weak commodity supply systems—poor synchronisation of SP supply between national government and county governments ▪ Inadequate dissemination of changes in policy guidelines ▪ Inadequate MIP knowledge among HCWs ▪ Insufficient MIP training for HCWs ▪ Bureaucracy in the devolved system
Opportunities	**Threats**
▪ Competent implementing partners ▪ Leverage of resources from other departments and partners ▪ Many pre-service training centres ▪ Strong partnerships with health development partners ▪ Leveraging on county resources in the devolved health system ▪ Existence of civil society organisations ▪ Technology and innovation (e.g., M-health, social media, community media for communication and service delivery) ▪ County role models and champions (e.g., first ladies, MPs, MCAs, women reps)	▪ Heavy reliance on donor funding ▪ Inadequate pre-service training as a threat to quality of care ▪ Potentially future fragile political climate ▪ Emergence of drug resistance ▪ Emergence of vector resistance ▪ Myths and misconceptions among community members ▪ Lack of harmony between RMNCSU and MIP guidelines thus confusing the HCWs at the point of care ▪ Inflexibility of health information system procedures on data management

Achievements Specific to IPTp-SP

This section describes the progress made towards the attainment of the MIP strategy and use of LLINs among pregnant women.

Uptake of IPTp

The IPTp-SP strategy was first introduced nationally in Kenya in 1998 and was consistent with WHO policy recommendations at the time, which stated that at least two doses of IPTp-SP should be administered in the second and third trimester of pregnancy to all pregnant women regardless of malaria endemicity (WHO, 2004). Surveys

immediately after IPTp-SP policy implementation in Kenya showed disturbingly low coverage levels. In 2000, only 5 percent of women in four rural districts of Kenya had received two or more doses of IPTp-SP (Guyatt, et al., 2004). Subsequent national surveys also showed low IPTp-SP coverage, ranging from 4 percent in 2003 to 25 percent in 2012–2013.

In 2009, Kenya adopted the revised national guidelines consistent with WHO recommendations that pregnant women receive at least two doses of IPTp-SP in malaria-endemic areas only (WHO, 2004). Although the IPTp-SP strategy should be administered as part of the ANC package, there have been a number of major operational challenges to optimal IPTp-SP delivery, including staff shortages, irregular medication supply, and poor health worker practices (By Hill & Kazembe, 2006). In western Kenya, suboptimal IPTp-SP coverage has largely been attributed to poor health worker performance associated with unclear policy guidelines(Ouma, et al., 2007). To address the unclear policy guidance and improve IPTp-SP coverage in the 14 malaria-endemic counties in Kenya, the NMCP, in coordination with the Reproductive Health Programme in the Ministry of Health, drafted a memorandum with simplified IPTp-SP guidance in 2009.

The memo was first introduced as a pilot in the Kenya Medical Research Institute (KEMRI) and U.S. Centers for Disease Control and Prevention (CDC) Health and Demographic Surveillance System in Siaya County, western Kenya in 2009. In 2012, the official Ministry of Health IPTp-SP memo was distributed to all public and private health facilities offering ANC services in the 14 malaria-endemic counties. In late 2012, the NMCP introduced a pilot malaria community case management programme in Bungoma County, western Kenya. This programme implemented the full MIP standards that aimed at creating ideal conditions for optimal delivery of IPTp-SP.

During the 2014 MPR, the main achievements recorded were targeting IPTp implementation exclusively in regions of moderate to high malaria transmission, revising MIP guidelines, integrating MIP interventions in the "focused antenatal care package," providing adequate supply of SP, and integrating MIP indicators in the DHIS2 platform.

Kenya has 14 counties classified epidemiologically as malaria-endemic: 8 counties in the Lake Victoria basin area of western Kenya and 6 counties in the coastal region. IPTp-SP is officially implemented in these 14 counties. Approximately, one-quarter of the Kenyan population or 11 million people live in these malaria-endemic counties.

Subsequent evaluations were done by KEMRI/CDC, with the support of USAID, to assess the outcomes of these interventions. An additional evaluation of IPTp-SP coverage was reported by the Kenya Malaria Indicator Survey in 2015. Figure 6.2 shows the step-wise programmatic approaches implemented by the NMCP that resulted in increased IPTp-SP coverage using three sequential cross-sectional surveys in two Health and Demographic Surveillance System sites (Siaya and Webuye) located in malaria-endemic counties of western Kenya. Figure 6.3 shows periodic programme evaluation through repeat cross-sectional surveys and the final Kenya Malaria Indicator survey in 2015. The results show an increasing IPTp-SP uptake over the years. Importantly, in areas where routine ANC implementation was augmented with community strategies, such as in Bungoma, IPTp coverage increased and even surpassed the 50 percent targets set for the 2014 mid-term MPR. The subsequent sections describe programme achievements in this thematic area against the set objectives. Figure 6.3 shows progress made in IPTp-SP coverage between 2015 and 2017.

Figure 6.2: Achievements in IPTp coverage in the lake endemic region 2015–2017

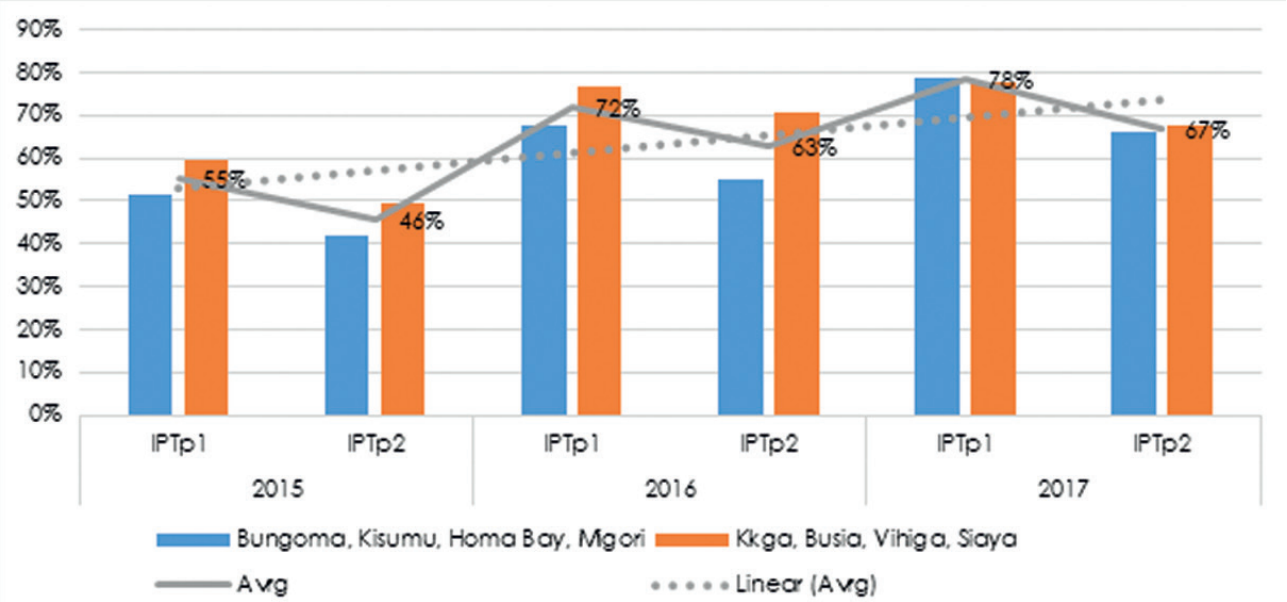


Figure 6.3: Achievements of IPTp-SP in all malaria-endemic counties 2015–2017

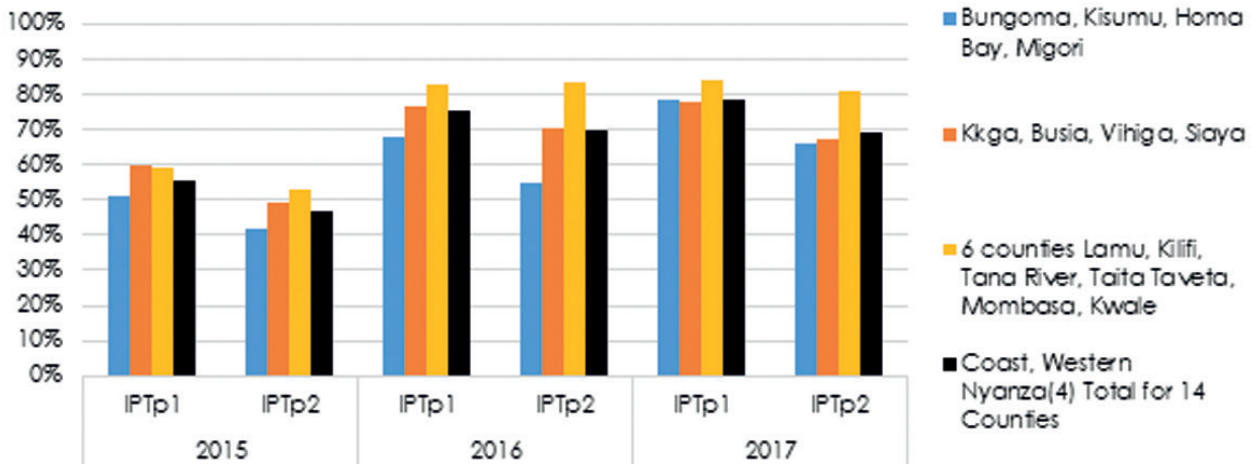
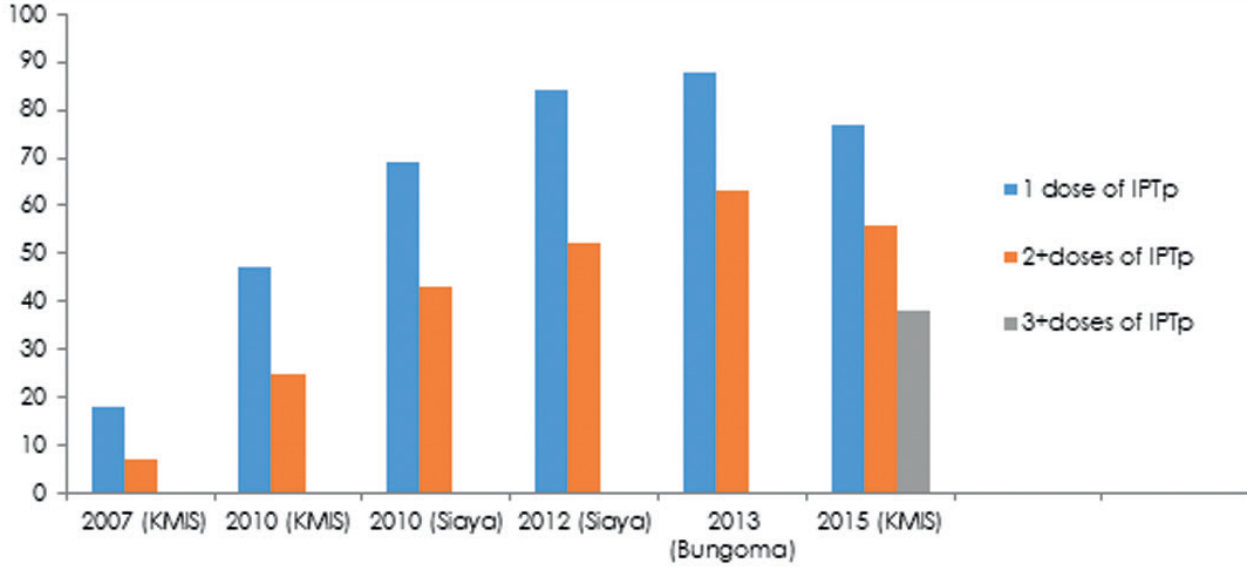


Figure 6.4: Incremental IPTp-SP uptake by national and regional surveys 2007–2015



Achievements, by National Survey Data

IPTP:

- IPTp2: 12.5 percent (KMIS 2007) to 56 percent (KMIS 2015)
- IPTp3: 11 percent (KMIS 2010) to 38 percent (KMIS 2015)

LLINs, pregnant women ages 15–49 who slept under an LLIN:

- 40 percent in 2007 to 58 percent in 2015 (KMIS, 2015).

Although IPTp uptake fell short of reaching the national target of 80 percent in the period under review, a gradual but steady increase was observed over the years, the greatest increase being realized in the 2015–2017 period.

Comparison with Other Countries in the Region

According the World Malaria Report (WHO, 2017), 36 African countries had adopted a policy of providing three or more doses of IPTp to pregnant women as of 2016. Progress adhering to this policy has increased marginally: among 23 countries that reported in 2016, an estimated 19 percent of eligible pregnant women received three or more doses of IPTp, compared with 18 percent in 2015 and 13 percent in 2014.

In 2016, at least 50 percent of pregnant women reportedly received one or more doses of IPTp in 20 countries, two or more doses in 13 countries, and three or more doses in two countries. In 2015, only one country reported that at least 50 percent of pregnant women received three or more doses of IPTp.

Results

Key Findings

Continued Use of IPTp-SP Strategy

Recent studies in East and Central Africa have demonstrated that the efficacy of SP to clear peripheral parasites and prevent new infections during pregnancy is compromised in areas with more than 90 percent prevalence of *Plasmodium falciparum* dihydropteroate synthase mutations. Nonetheless, in these high-resistance areas, IPTp-SP use remains beneficial, as shown by increases in birth weight and maternal haemoglobin (Kayentao, et al., 2013).

A systematic review and meta-analysis by Kayentao et al. (2013) showed that two doses of IPTp-SP may not provide protection during the last 4 to 10 weeks of pregnancy, a pivotal period for foetal weight gain, and concluded that among pregnant women in sub-Saharan Africa, intermittent preventive therapy with three or more doses of SP was superior to the previously standard two-dose regimen.

Recent findings that IPTp-SP has the added advantage of further reducing adverse birth outcomes by its effectiveness against respiratory and sexually transmitted infections provides further evidence for its continued use. These data provide support for the new WHO recommendations to provide at least three doses of IPTp during pregnancy at each scheduled ANC visit in the second and third trimesters of pregnancy.

Thus, consistent with WHO recommendations, the IPTp-SP strategy will continue to be implemented in Kenya.

Interventions

Regarding IPTp uptake, the review found a steady increased uptake between 2015 and 2017, but this achievement fell short of reaching the national and global targets of 80 percent. Therefore, additional efforts may be needed in the next strategy to attain the national targets. Below is the estimated IPTp-SP uptake obtained from routine DHIS2 data and periodic national surveys:

- IPTp 1: 56–79 percent between 2015 and 2017 (DHIS2 data)
- IPTp2: 47–69 percent between 2015 and 2017 (DHIS2 data)
- IPTp3: 11–38 percent (KMIS, 2010/2015)

ANC Attendance Compared to IPTp-SP Doses Received

There remains a gap between ANC attendance and IPTp-SP doses received at ANC. Overall, the ANC register does not currently provide space to enter 3+ IPTp-SP doses. In Busia County, for example, the thematic review team found that 79 women made first ANC visit in the month of January 2018, but only 69 received IPTp1. The missed opportunity of 10 women was accounted for by those who were not eligible (HIV+, gestational age below threshold, and those who got antimalarial treatment in their first ANC booking). However, there were missed opportunities in the second visit, which lacked adequate explanation.

A recent national survey highlights this gap:

- 92 percent of women made first ANC visit but only 70 percent received one dose of IPTp-SP.
- 63 percent of women made the recommended four ANC visits.
- 56 percent received two doses, and 38 percent received the recommended three or more doses of IPTp (KMIS, 2015).

The review also found out that the use of simplified guidelines and circulars in the form of memos improved IPTp-SP uptake. Women who made the previously recommended four ANC visits also had a higher probability of

receiving IPTp-SP, compared to their counterparts who made fewer visits (KMIS, 2015). Importantly, the use of community delivery systems or referrals by CHVs increased IPTp-SP uptake, as demonstrated in Bungoma County (KEMRI/CDC surveys, unpublished data; MCSP report, 2017).

There was abundant evidence on HCW confusion on when to give IPTp-SP. In addition, the review also found disturbing inadequacies in MIP case management and nonadherence to national guidelines for MIP case management, which necessitates investment in HCW training specific to MIP treatment.

Health Systems Barriers

The main health systems barriers identified were as follows:

- Poor health worker-client communication
- Inconsistent commodity supply
- Inadequate HCW knowledge of national guidelines/policy
- Long distance to health facilities
- Lack of functional SP direct observed therapy (DOT) corners

Other barriers of note were as follows:

- Ineffective communication and coordination of stakeholders in the procurement of SP led to situations of shortage or overstocking and risk of commodity expiry.
- Inadequate counselling and information at ANC affected uptake of IPTp-SP.
- Documentation of IPTp3+ data is not possible because the summary portion of the ANC register does not provide space for it.

Recommendations

The MIP thematic review involved in-depth review of the programme performance, relevant literature from surveys, discussions with the MIP focal person at the NMCP and the coordinator of the MCSP/PMI programme in western Kenya, plenary discussions, and contributions from the counties implementing IPTp-SP strategy. Based on the findings of the review, the following recommendations were made:

- Continue to provide IPTp-SP at the ANC and promote its use at the community level.
- Allocate resources to facilitate full implementation of MIP activities in all 14 malaria-endemic counties. (At the time of the review, only four counties were fully supported through PMI/USAID).
- Invest in MIP prevention and treatment using circulars, memos, job aids, and clinical algorithms at the point of care.
- Adopt a facility-based mentorship approach to ensure transfer of requisite knowledge and skills.
- Continue quarterly MIP TWG meetings and encourage counties to establish similar TWGs.
- Emphasize early initiation of IPTp (early second trimester) and subsequent scheduled visits.
- Strengthen the MIP standards for service delivery (e.g., SP-DOT corners).
- Develop and disseminate MIP targeted and localised messaging.
- Target the private health sector for mentorship on national MIP guidelines because the review identified them as the weakest point in MIP case management.

- Strengthen data capture systems to include all IPTp doses. Spaces for entry of doses were inadequate, leading to non-documentation of IPTp3+.
- Adopt use of IPTp in the fringe areas (border of Kisii and Homabay Counties) in addition to the 14 malaria-endemic counties currently implementing this strategy.
- Align SP and LLIN provision with the latest WHO recommendations based on the new ANC model, "*WHO recommendations on antenatal care for a positive pregnancy experience,*" which recommends four focused ANC visits.

Lessons Learnt

Using circulars, memos, and job aids delivered directly to the point of care improves performance and results in health workers' understanding of the guidelines and performance. Adequate funding meant comprehensive coverage in training and outreach activities. Adequate funding that ensured comprehensive training and outreach activities contributed to better programme outcomes (IPTp-SP uptake). Community involvement was identified as a key driver towards increased IPTp coverage.

Future Strategic Direction

Based on deliberations during the review, there was an overwhelming consensus to retain the MIP strategy of providing IPTp at ANC and promoting its use in the community under Objective 1. The alternative strategy of giving IPTp-SP in the community was shelved pending more country-specific data in support of community delivery of IPTp through CHVs. However, implementation of IPTp in fringe areas (i.e., border areas between low and high malaria transmission, such as Kisii and Homa Bay) was approved.

Conclusions

Key Issues for Incorporating County Contributions

Contributions from counties implementing IPTp identified the following key issues:

- Fringe areas at the time of the review not implementing IPTp despite having malaria cases that met the threshold for implementing IPTp.
- Health workers' uncertainty on when to give IPTp-SP and inadequate data capture systems. IPTp3 was not captured in the ANC register despite policy adoption of the same.
- Sub-optimal IPTp coverage due to late ANC attendance and insufficient HCW-client communication.
- Inadequate financial support to implement IPTp in all 14 endemic counties and poor adherence to MIP treatment guidelines.

Final Recommendations for the Next KMS

The MIP thematic review made the following recommendations for consideration in the next KMS:

- Re-stratify regions to enable IPTp implementation in fringe areas (areas at the border of low and high malaria transmission).
- Provide IPTp-SP in the community.
- Use CHVs to identify IPTp missed opportunities for referral to ANC.

- Foster strong partnership between the NMCP and the National Reproductive Health Programme for ease of scaling up and sustainability of MIP interventions.
- Update provider knowledge on new guidelines at all levels, while rolling out interpersonal communication to address behavioural barriers for attainment of national targets.

IPTp Strategies to be Included in the Next KMS

The MIP thematic review recommended the following strategies to be included in the next KMS:

Provision of IPTp to pregnant women at antenatal clinics and promotion of its use at the community

The following activities were proposed under this strategy:

- Activity 1.5.1: Update IPTp guidelines
- Activity 1.5.2: Disseminate IPTp guidelines in 14 malaria-endemic counties and others that may be added after re-stratification
- Activity 1.5.3: Re-train HCWs on MIP in the malaria-endemic counties
- Activity 1.5.4: Provide technical support during MIP supervisory visits by county health management teams in malaria-endemic counties
- Activity 1.5.5: Conduct community advocacy and mobilisation for MIP activities in malariaendemic counties
- Activity 1.5.6: Schedule and hold quarterly MIP TWG meetings
- Activity 1.5.7: Convene a review meeting of MIP activities in all malaria-endemic counties

Strengthen adherence to national guidelines for MIP case management

- Activity 1.6.1: Update clinical algorithms for management of malaria in pregnancy
- Activity 1.6.2: Disseminate clinical algorithms for MIP in all health facilities, target private HF
- Activity 1.6.3: Re-train all health workers on management of malaria in pregnancy

Promote use of LLINs

- Activity 1.7.1: Implement counselling for LLIN use as a core ANC activity.
- Activity 1.7.2: Promote use of LLINs at community level (social and behaviour change communication)

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Chapter 7:
Case Management

Key Messages from This Chapter

- Chapter 7 assesses the current policy and guidance for malaria case management and performance of the National Malaria Control Programme (NMCP) against the targets defined in the National Malaria Strategy. Case management falls under Objective 2 of the Kenya Malaria Strategy. This objective seeks to have 100 percent of all suspected malaria cases who present to health workers managed according to national treatment guidelines by 2018.
- NMCP launched the fifth edition of the National Guidelines for the Diagnosis, Treatment and Prevention of Malaria in Kenya in 2016. The key updates to the previous guideline relate to the dosing recommendations for antimalarial treatments for young children.
- Bi-annual quality of care surveys indicate improvements in the quality of malaria case management in health facilities. However, performance has reached a plateau and the use of quality of care surveys for decision making at the county level is limited. NMCP engagement of the private sector in malaria control activities remains weak and unstructured. This gap is reflected in the disparity between performances of case management, with the private sector lagging behind the public sector. Among the challenges identified are high staff turnover and inadequate support for supervision and mentorship following training.
- The challenges of availability of commodities and reporting tools have limited reaching the targets for this strategy. The national reference laboratory has received support from the NMCP, and county reference laboratories have been successfully established in various regions. However, operationalisation of quality assurance activities in low transmission zones has lagged, due to lack of support in the face of competing priorities. There is also currently no guidance on the appropriate levels of care or epidemiological zones for which malaria diagnostics (rapid diagnostic tests and microscopy) should be used.

Introduction

Background

Malaria remains a leading cause of morbidity and mortality accounting for 445,000 annual deaths globally (World Health Organization [WHO], 2017). The WHO African Region carries a disproportionately large share of the global malaria burden. In 2016, the region accounted for 90 percent of malaria cases and 91 percent of malaria deaths. Some 15 countries, including Kenya, accounted for 80 percent of the global malaria burden (WHO, 2017). Although there appears to be a declining trend in incidence of malaria since 2010, recent data suggest that overall progress has stalled.

Case management using appropriate diagnostics and efficacious antimalarial treatments is one of the key strategies that has been credited with reducing the burden of malaria in low- and middle-income countries. This strategy aims at ensuring that mild cases of malaria do not develop into severe disease or death. High levels of access to effective malaria case management may also help reduce the pool of individuals who can contribute to onward transmission (WHO, 2015).

Administering antimalarial treatments only to patients with confirmed malaria is necessary to prevent the emergence of drug resistance, limit unnecessary use of antimalarial drugs, and better identify other causes of febrile illness against the backdrop of changing malaria epidemiology. Universal access to parasitological diagnosis of malaria is now possible with the use of quality-assured rapid diagnostic tests (RDTs), which are also appropriate for use in primary healthcare and community settings. In 2010, the WHO revised its case management policy to recommend universal parasitological testing for all suspected malaria cases prior to treatment. Kenya subsequently adopted these recommendations in the third edition of the national guidelines (Ministry of Public Health and Sanitation [MOPHS], 2010a).

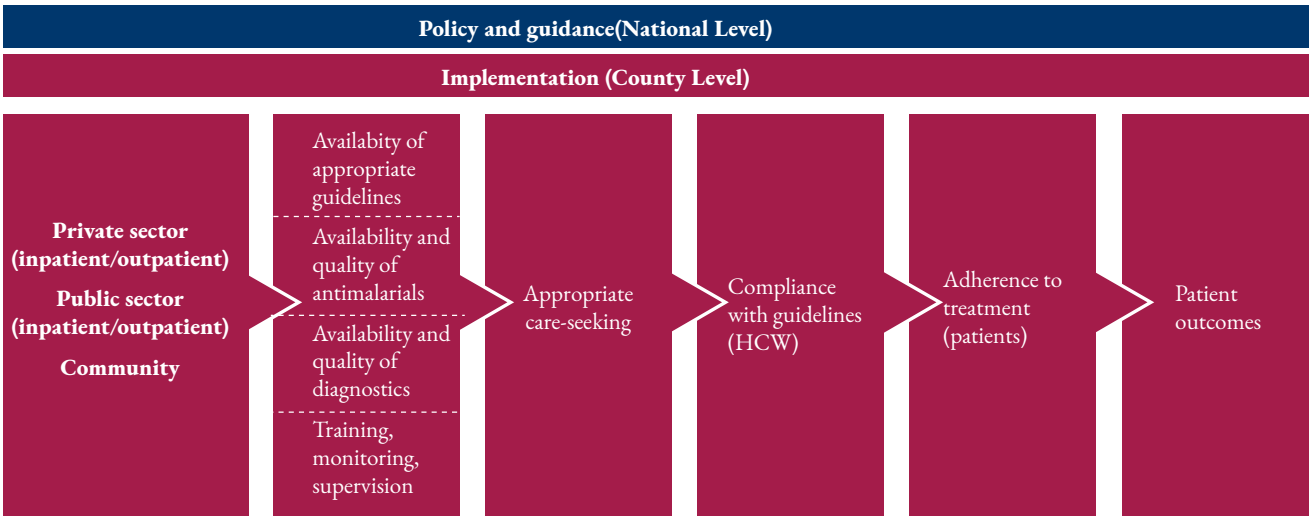
The National Malaria Strategy 2009–2017 (MOPHS, 2009), updated through a multi-stakeholder consultative mid-term review in 2014 (Ministry of Health [MOH], 2014a), outlines the operational framework for the malaria control interventions in Kenya. As the current strategy approaches expiry, the National Malaria Control Programme (NMCP) seeks to account for achievements and challenges experienced and to identify emerging priorities. This report therefore aims to review the current policy and guidance for malaria case management, assess the performance of the NMCP against the targets defined in the Kenya Malaria Strategy, and highlight enablers and constraints encountered over the period under review. The report also provides a summary of recommendations based on these findings to be used in developing the next Kenya Malaria Strategy.

Framework for the Desk Review

Guidance on specific interventions relevant to malaria case management is provided at the national level, based on the prevailing policy environment, and reflected recommendations from the global level (primarily WHO). The strategies under the case management thematic area are delivered through the 47 counties. Implementation occurs at the health facility (outpatient and inpatient service delivery points in both public and private sectors) and community levels.

The overall goal of improving patient outcomes through case management relies on a chain of four interdependent domains, illustrated in Figure 7.1. The first domain (i) represents appropriate care-seeking among suspected cases of malaria. This is then followed by (ii) a combination of availability of appropriate clinical practice guidelines, quality antimalarials, malaria diagnostics, and healthcare workers (HCWs) who are adequately trained, monitored, and supervised. In the presence of these factors, HCWs are able to (iii) apply the recommended guidelines for patient care. Finally, patients' outcomes are determined by (iv) adherence to the prescribed treatment.

Figure 7.1: Framework for the case management thematic area desk review



Methodology

The methodology for the desk review was defined at an inception meeting convened by the NMCP on 18 July 2018. Three main activities were outlined: review of literature; population of a technical performance assessment tool; and analysis of strengths, weakness, opportunities, and threats (SWOT). This section details the approach used to undertake these activities.

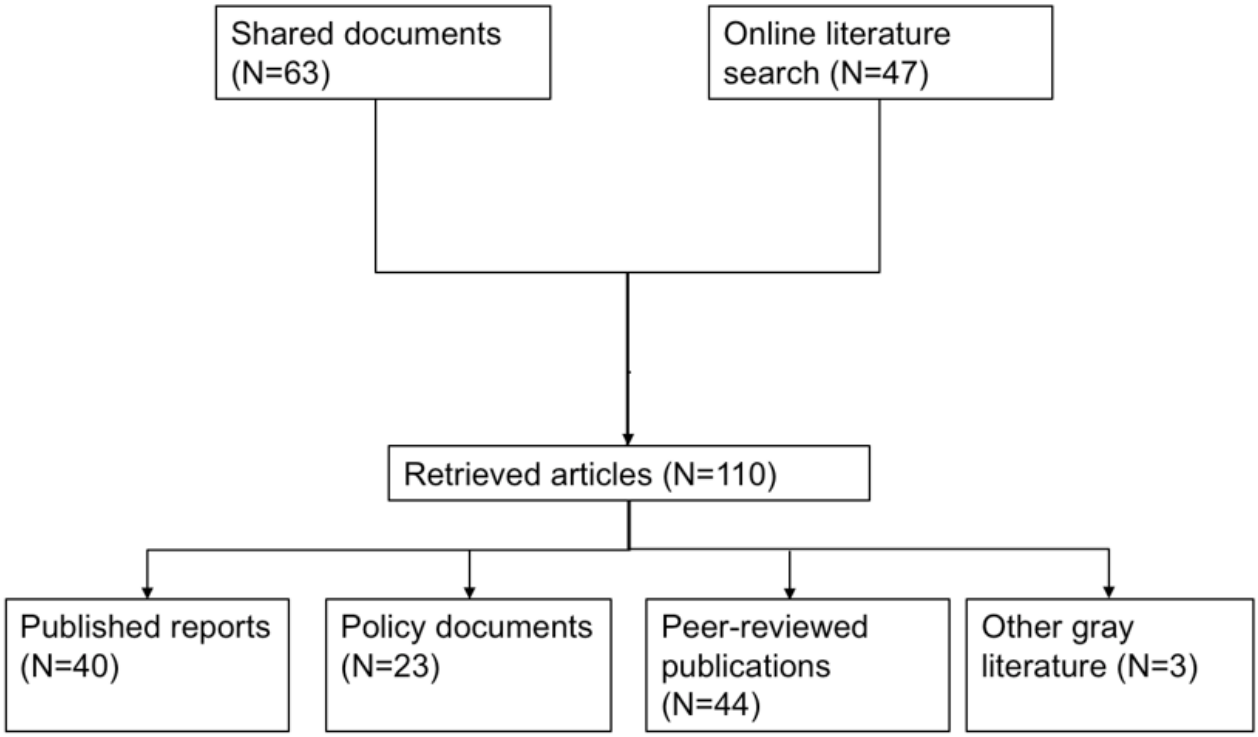
Literature Review

Stakeholders who were invited to participate in the malaria programme review (MPR) desk review inception meeting were requested to share relevant literature for the various thematic areas on a shared online folder (Google Drive) created and administered by the NMCP secretariat. A follow-up request for materials was made at a Case Management Technical Working Group (TWG) meeting on 19 June 2018.

The consultant leading the Case Management Thematic Group undertook an online literature search for additional published documents using relevant keywords in both Google and the academic databases, PubMed, and the Cochrane Library.

A total of 110 articles were reviewed, of which 63 were shared in the online folder by individuals involved in the MPR and 47 were retrieved through online searches. A summary of the process of identifying the literature reviewed is provided in Figure 7.2.

Figure 7.2: Literature retrieved for case management desk review



Population of Technical Performance Assessment Tool

The Technical Performance Assessment Tool was populated through a transparent participatory appraisal of the performance of the malaria programme over the period 2014–2017 against targets outlined in the Kenya Malaria Strategy 2014–2018 (MOH, 2014). The process took place in two phases. The first phase involved an initial "quantitative" review involving the consultant leading the Case Management Thematic Group and NMCP staff responsible for case management.

In this phase, scores were allocated for planned activities against achievements over the review period. To ensure the objective assignment of scores, evidence of performance in the form of reports or minutes was requested to confirm achievement of each activity. If documented evidence was not available, a provisional score was assigned for validation by the wider membership of the thematic group.

The second phase of the population of the tool took place on 4 July 2018. A meeting invitation was sent to a larger group comprising all members of the Case Management Thematic Group, the NMCP secretariat, and other stakeholders involved in the MPR. During the meeting, participants were presented with the scores assigned for each activity during the first phase for discussion and validation. Those present were also tasked with assigning a "qualitative" score (out of 5) to reflect the quality of implementation of each activity. A composite score was computed for each activity by multiplying the qualitative and quantitative scores (Annex 7.2).

SWOT Analysis

Upon completion of the Technical Performance Assessment Tool, the half-day meeting concluded with an exercise in which participants were requested to individually document the programme's strengths, weaknesses, opportunities, and threats. Notes from the exercise were collated and summarised.

Policy and Guidance

This section describes the policy environment within which malaria control activities are implemented in Kenya.

Kenya's overall development framework is outlined in the Kenya Vision 2030, a long-term policy launched in 2008 that aims at creating a "globally competitive and prosperous nation with a high quality of life by 2030" (Republic of Kenya, 2007). To improve the overall livelihoods of Kenyans, the country aims to provide an efficient, integrated, and high-quality affordable healthcare system. Priority is given to preventive care at the community and household levels through a decentralised national healthcare system as defined under the Constitution of Kenya enacted in 2010 (National Council for Law Reporting, 2010). The core function of the Ministry of Health at the national level is to support the attainment of health goals by providing appropriate strategic frameworks and implementation guidance for health interventions. The mandates of the 47 county governments include resource allocation and delivery of preventive, health promotion, and curative services. The Kenya Health Policy 2014–2030 (MOH, 2014b) and National Health Sector Strategic and Investment Plan (MOPHS & Ministry of Medical Services, 2014) are aligned to Vision 2030, which in turn draws its legal mandate from the Constitution of Kenya (National Council for Law Reporting, 2010). Kenya also has a National Malaria Policy (MOPHS, 2010b) that defines the following key malaria control and prevention interventions:

- Provision of prompt diagnosis and effective treatment at all levels of the health care system
- Integrated vector management including use of long lasting insecticidal nets, indoor residual spraying (IRS), and other measures
- Intermittent preventive treatment of malaria in pregnancy
- Surveillance, monitoring, evaluation, and operations research
    - Advocacy, communication, and social mobilisation

The operational framework for the malaria control interventions provided in the Malaria Policy is outlined in the Kenya Malaria Strategy 2009–2018 (revised 2014). Linked to the strategy are national guidelines (MOH, 2015) with supporting job aids and training materials for health workers and laboratory personnel.

Organisation of Service Delivery

In this section, the organisational structure of the case management thematic area in the NMCP is described.

Kenya has four malaria epidemiological zones, with diversity in risk determined largely by altitude, rainfall patterns, and temperature (Noor et al., 2009). The zones are as follows:

- Endemic zone (further subdivided into lake and coast endemic zones)
- Seasonal malaria transmission in the arid and semi-arid areas of northern and south-eastern parts of the country
- Malaria epidemic-prone areas of western highlands of Kenya
- Low-risk areas of the central highlands, including Nairobi

The case management thematic area aims at providing high-quality, safe, and effective diagnostics and treatments for the management of malaria in all age groups, at all levels of the health system, and in all malaria epidemiological zones. Case management falls under Objective 2 of the Kenya Malaria Strategy, which seeks to have **100% of all suspected malaria cases who presented to health workers managed according to national treatment guidelines by 2018.**

To deliver this objective, the following strategies are outlined:

- Build capacity of health workers in malaria diagnosis and treatment at health facilities.
- Ensure access to affordable malaria medicines and diagnostics through the private sector.

- Strengthen community case management of malaria through the community health strategy.
- Ensure commodity security of malaria medicines and diagnostics in the public sector.
- Strengthen quality assurance for malaria diagnostics.

Capacity Building of Health Workers in Malaria Diagnosis and Treatment at Health Facilities

The NMCP revised the treatment guidelines, training modules, and reference materials on malaria diagnosis and treatment in 2016 (MOH, 2015). The documents are intended to serve as a guide to all health professionals both pre- and in-service and include those in the private sector, researchers, trainers in medical training institutions, and all partners involved in the implementation of malaria case management in Kenya These materials have been disseminated from the national level to health workers during trainings and other relevant forums. Training on the national guidelines is coordinated from the national level to health workers in both public and private sectors. NMCP and county health management teams provide supportive supervision to monitor the effectiveness of trainings on malaria case management. This is done using standard checklists developed by the NMCP. Patients and caregivers of febrile children often seek care from private pharmacy outlets. Staff stationed in these outlets receive training on malaria case management, recognition of severe malaria signs, appropriate referral practices, and drug storage. In the endemic zone of the lake region, community health volunteers (CHVs) have been trained on the malaria case management under the community health strategy.

Procurement and Supply Management of Malaria Medicines and Diagnostics

The Ministry of Health procures malaria medicines and commodities through the Kenya Medical Supplies Authority (KEMSA), a medical logistics provider supplying quality and affordable essential health commodities to health facilities and programmes in Kenya. Procurement of commodities under special programmes like the Global Fund follows government procedures. Procurement of malaria commodities by other donor agencies follows rules and regulations of the relevant organisations. The ongoing liaison between the NMCP and KEMSA ensures a continuous supply of high-quality anti-malarial drugs to health facilities. Once purchased, the commodities are supplied to health facilities based on a distribution list generated by the NMCP. The system operates on a pull basis in which health facilities make orders of malaria commodities based on their need. Health facilities have been issued with tools for reporting monthly consumption of malaria commodities. The facilities record individual doses dispensed and at the end of the month give a summary of stock status, consumption, stock-out days, and early expiries. County pharmacists have been supported to do intra-county redistribution by moving the drugs from overstocked facilities to facilities experiencing stock-outs.

Quality Assurance for Antimalarials

Pharmacovigilance for malaria treatments is implemented in partnership with the Pharmacy and Poisons Board (PPB). The NMCP, together with research organisations, monitors the efficacy of recommended anti-malarial treatments every two years. The NMCP undertakes annual surveys on the quality of antimalarials in circulation as part of post-market surveillance in conjunction with the PPB, WHO, and the National Quality Control Laboratories (NQCL).

Quality Assurance for Malaria Diagnostics

To increase diagnostic capacity, the NMCP has introduced RDTs for lower-level health facilities and procured microscopes for the high-level facilities. Quality control for laboratory diagnosis is currently being implemented through trainings and regular support supervision visits at facilities with laboratory services. The NMCP is also establishing county reference laboratories to improve laboratory services to support the appropriate management of malaria cases and detect malaria treatment failures.

Partner Coordination

The NMCP has established strong partnerships that contribute financial, technical, and operational support. Similar partnerships exist at county and community levels. National-level partners are engaged through the thematic TWGs with specified terms of reference and membership. The TWGs contribute to the development of evidence-based policies and guidelines and hold quarterly progress review meetings, whose findings are shared with the Malaria Interagency Coordinating Committee (MICC). Membership of the MICC consists of multilateral and bilateral partners, research institutions, academia, civil society and faith-based organisations, sister divisions and departments within the Ministry of Health, and other ministries and government agencies. The MICC coordinates the development of policy, guidelines, and strategies, advocates for resources, and ratifies TWG outputs.

Engagement with Counties

County health management teams, guided by the NMCP, develop three-year malaria operational plans, which are embedded in their respective county health operational plans. The plans are then reviewed annually. The county malaria control coordinators oversee malaria control efforts in their respective counties and liaise with the NMCP at the national level. The NMCP supports the community health strategy by helping to establish and maintain the community health units. The community health units are responsible for community case management and behaviour change communication for all malaria interventions.

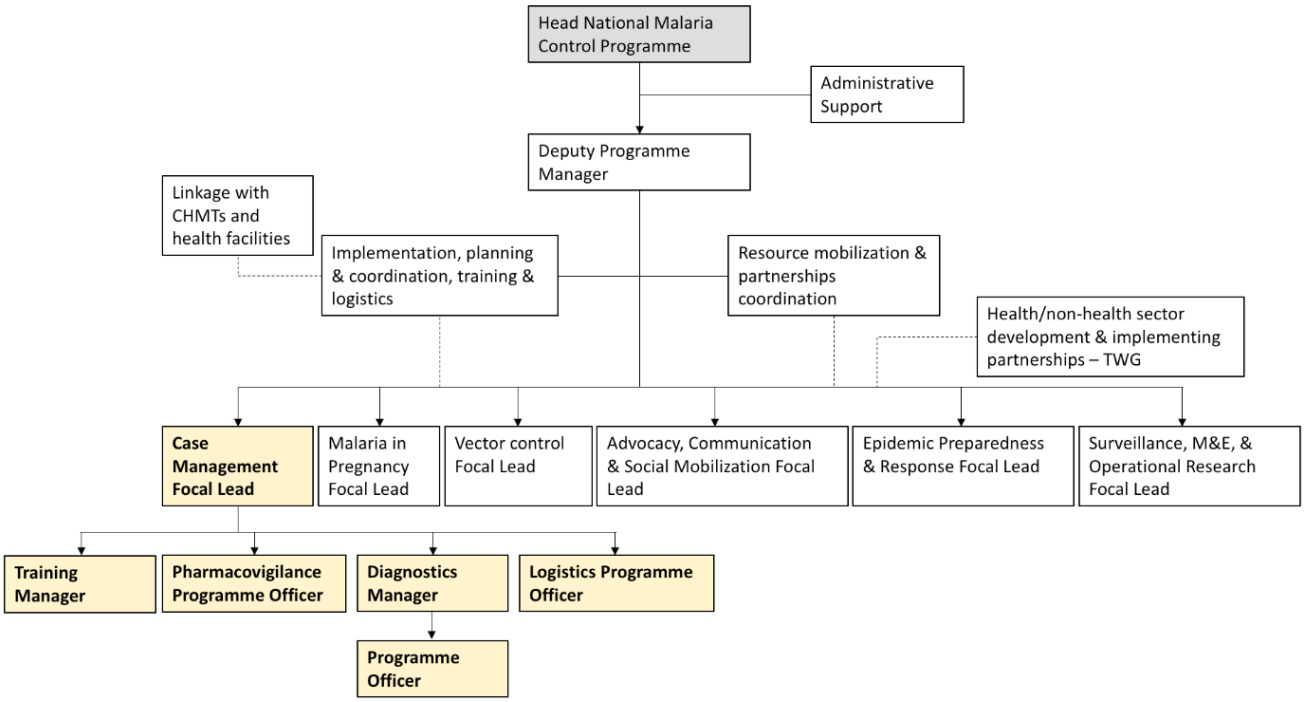
Human Resources Training and Capacity Development

Case management is one of six thematic areas in the NMCP. The other thematic areas are as follows:

- Vector control
- Malaria in pregnancy
- Advocacy, communication, and social mobilisation
- Epidemic preparedness and response.
- Surveillance, monitoring, evaluation, and operational research

Each thematic area is headed by a focal lead who reports to the deputy programme manager, who in turn reports to the head of NMCP. In the case management thematic area, the focal lead is supported by four programme officers overseeing different portfolios as follows: training, pharmacovigilance, diagnostics, and logistics. An organogram illustrating the NMCP organisational structure is provided in Figure 7.3.

Figure 7.3: NMCP organogram



Adapted from National Malaria Strategy 2009–2017 (MOPHS, 2009)

The next section details the achievements of the NMCP against the cascade of processes required for effective case management at all levels.

Care-Seeking for Malaria

Appropriate care-seeking represents the first step of the case management cascade. Early recognition of symptoms allows for prompt initiation of treatment and subsequent favourable outcomes. The 2014 Kenya Demographic and Health Survey (KDHS) (Kenya National Bureau of Statistics & ICF Macro, 2014) and the 2015 Kenya Malaria Indicator Survey (NMCP, Kenya National Bureau of Statics, & ICF International, 2015) captured information on care-seeking for fevers among a nationally representative sample of children under five years of age. Caregivers of under-five children were asked whether their children had a fever in the two weeks preceding the survey and, if so, whether any treatment was sought. In the KDHS, 24 percent of children under five years of age had a fever in the two weeks preceding the survey. In comparison, 36 percent of caregivers reported fever in the Kenya Malaria Indicator Survey. The prevalence of fever was highest in former Nyanza (37%), Western (36%), and Coast (27%) provinces and lowest in North Eastern (9%) province. Advice or treatment was obtained from a health provider for approximately two-thirds of children with a fever in both surveys. This represents an increase from the 49 percent reported in KDHS 2008–2009. The proportion of children for whom advice or treatment was sought from a health provider was lowest in the North Eastern (50%) and Western regions (52%). The likelihood that a child with fever received care or treatment generally increased as the mother's education and wealth increased. In both surveys, approximately 70 percent went to a public health facility, with most visiting a dispensary (33%). At least a quarter went to a private outlet for treatment and advice. The surveys suggest that care-seeking for fever remains suboptimal, despite an improving trend. Marked regional differences highlight priority counties for intensified efforts in social behaviour change communication to encourage caregivers to seek treatment for fevers promptly. Additional gains may be achieved through nationwide implementation of community case management and further scale up in endemic zones. This was echoed by county representatives who were surveyed during a desk review meeting convened in Sagana, Murang'a County by NMCP from 9 to 13 July 2018.

Appropriateness of Case Management Guidelines

The clinical effectiveness of antimalarials medicines is now a major worldwide concern, following reports of artemisinin resistance in *P. falciparum* malaria in Southeast Asia (Kyaw, et al., 2013; Dondorp, et al., 2009).The effectiveness of antimalarial medicines is dependent on the appropriate use of high-quality efficacious treatment. In 2016, the NMCP launched the fifth edition of the National Guidelines for the Diagnosis, Treatment, and Prevention of Malaria in Kenya (MOH, 2015). This revision was made to align with the new third edition of WHO guidelines (WHO, 2015).

The key updates to the previous guideline relate to the dosing recommendations for anti-malarial treatments for young children: (i) parenteral artesunate in young children below 20 kg (from 2.4 mg/kg to 3 mg/kg), (ii) artemether-lumefantrine (AL) for children <5 kg (from half tablet to single tablet), and dihyroartemisinin + piperaquine for children <25 kg (Table 7.1). These changes were based on modelled summaries of systematically collected pharmacokinetic data, to predict drug exposures in people of different body weights, particularly those who are generally under-represented in clinical trials such as young infants (17–20)

Table 7.1: Dosing revisions from updated guidelines

Revision	Guidance
Revised dosing of artesunate for young children	Children weighing <20 kg should receive a higher dose of artesunate (3 mg/kg body weight per dose) than larger children and adults (2.4 mg/kg body weight per dose) to ensure equivalent exposure to the drug.
Revised dosing of AL for children <5 kg	In children below 5kg, if appropriate weight for age, evaluation of other causes of fever including malaria should be undertaken. If malaria is confirmed, the current recommended treatment is one tablet of AL given according to the schedule under close supervision.
Revised dosing of dihyroartemisinin+piperaquine for children <25 kg	Children weighing <25 kg treated with dihyroartemisinin+piperaquine should receive a minimum of 2.5 mg/kg body weight per day of dihydroartemisinin and 20 mg/kg body weight per day of piperaquine daily for three days.

Malaria can be classified as either uncomplicated or severe based on clinical presentation. **Uncomplicated malaria** is characterized by fever in the presence of peripheral parasitaemia. Other features may include chills, profuse sweating, muscle pains, joint pains, abdominal pain, diarrhoea, nausea, vomiting, irritability, and refusal to feed in the absence of signs of severe malaria. **Severe malaria** is a life-threatening presentation and is defined as the detection of *P. falciparum* in the peripheral blood in the presence of any one or more of the following clinical or laboratory features:

- Prostration: inability or difficulty to sit upright, stand, or walk without support in a child normally able to do so, or inability to drink in children too young to sit
- Alteration in the level of consciousness: ranging from drowsiness to deep coma
- Cerebral malaria: unrousable coma not attributable to any other cause in a patient with *falciparum* malaria
- Respiratory distress: acidotic breathing
- Multiple generalized convulsions: two or more episodes within a 24-hour period
- Shock: circulatory collapse, septicaemia
- Pulmonary oedema
- Abnormal bleeding: disseminated intravascular coagulopathy
- Jaundice

- Haemoglobinuria: black water fever
- Acute renal failure: presenting as oliguria or anuria
- Severe anaemia: haemoglobin ≤5 g/dl or haematocrit ≤15 percent
- Hypoglycaemia: blood glucose level <2.2 mmol/l
- Hyperlactatemia

Treatment Recommendations for Uncomplicated *Falciparum Malaria*

WHO recommendation: Treat children and adults with uncomplicated *P. falciparum* malaria (except pregnant women in their first trimester) with an artemisinin-based combination therapy (ACT). The recommended first-line treatment for uncomplicated malaria in Kenya is AL. The advantage of this ACT is that lumefantrine is not available as a monotherapy and has never been used alone for the treatment of malaria.

Evidence: Monitoring the therapeutic efficacy of ACT in *falciparum* malaria involves assessing clinical and parasitological outcomes of treatment for at least 28 days after the start of adequate treatment and monitoring for the reappearance of parasites in blood. Post-treatment follow-up timing is based on the elimination half-life of the partner drug for the ACT being evaluated. Polymerase chain reaction genotyping should be used in therapeutic monitoring of antimalarial drug efficacy against *P. falciparum* to distinguish between recrudescence (true treatment failure) and new infections. Antimalarial medicines that are recommended in the national malaria treatment policy should be changed if the total treatment failure proportion is **≥10 percent**, as assessed in vivo by monitoring therapeutic efficacy. A significantly declining trend in treatment efficacy over time, even if failure rates have not yet fallen to the ≥10 percent cut-off, should alert programmes to undertake more frequent monitoring and prepare for a potential policy change. In Africa, between 2010 and 2016, the overall average efficacy of AL was 97.9 percent, with no evidence of artemisinin resistance (WHO, 2017). Kenyan data from a study on the efficacy of AL and dihydroartemisinin among 454 children with uncomplicated malaria reported adequate clinical and parasitological response rates on day 28 of 97.8 percent for AL and 99.1 percent for dihydroartemisinin (Zaloumis, et al., 2014).

Proposed update: None

Treatment Recommendations for Severe Malaria

WHO recommendation 1: Treat adults and children with severe malaria (including infants, pregnant women in all trimesters, and lactating women) with intravenous or intramuscular artesunate for at least 24 hours. Once a patient has received at least 24 hours of parenteral therapy and can tolerate oral therapy, complete treatment with three days of an ACT.

Evidence: In a systematic review of artesunate for severe malaria, 8 randomized controlled trials with a total of 1,664 adults and 5,765 children directly compared parenteral artesunate with parenteral quinine. The trials were conducted in various African and Asian countries between 1989 and 2010. In comparison with quinine, parenteral artesunate:

- Reduced mortality from severe malaria by about 40 percent in adults
- Reduced mortality from severe malaria by about 25 percent in children
- Was associated with a small increase in neurological sequelae in children at the time of hospital discharge, most of which slowly resolved with little or no difference between artesunate and quinine 28 days later (Sinclair, et al., 2011)

Proposed update: None

WHO recommendation 2: If complete treatment of severe malaria is not possible, but injections are available, give adults and children a single intramuscular dose of artesunate and refer to an appropriate facility for further care. If intramuscular artesunate is not available, use intramuscular artemether or, if that is not available, use intramuscular

quinine. If intramuscular injections of artesunate are not available, treat children <6 years of age with a single rectal dose (10 mg/kg body weight) of artesunate and refer immediately to an appropriate facility for further care.

Evidence: In a systematic review of pre-referral treatment for suspected severe malaria, in a single large randomized controlled trial of 17,826 children and adults in Bangladesh, Ghana, and the United Republic of Tanzania, pre-referral rectal artesunate was compared with a placebo. In comparison with the placebo, the results were:

- Rectal artesunate reduced mortality by about 25 percent in children <6 years of age.
- Rectal artesunate was associated with more deaths in older children and adults (Okebe, 2014).

Proposed update: In view of evidence of potential harm in patients >6 years of age, include a statement explicitly contraindicating rectal artesunate use in older children and adults—in line with the WHO Guideline, Third Edition (WHO, 2015).

Treatment Recommendations for Settings Targeted for Pre-Elimination

WHO recommendation: As the quality of local surveillance data continues to improve, epidemiological mapping of Kenya into zones based on intensity of malaria transmission will become increasingly reliable. Reliable surveillance maps provide a rational basis to support targeted activities aimed at **pre-elimination** in selected counties. In areas of **low malaria transmission,** WHO guidelines recommend the addition of a single dose of primaquine base (0.25 mg/kg body weight) to ACTs to reduce *P. falciparum* transmission.

Evidence: Results from a systematic review including eight randomized controlled trials suggest that single doses of primaquine reduce gametocyte transport at day eight by around by two-thirds (Graves, Gelband, & Garner, 2014). Analysis of observational data from mosquito feeding studies suggests that 0.25 mg/kg body weight may rapidly reduce the infectivity of gametocytes to mosquitoes (White, et al., 2012). People with severe G6PD deficiency are at risk for haemolysis. At the recommended dose (0.25 mg/kg body weight), however, the risk is thought to be small. G6PD testing is therefore not necessary except for pregnant and breastfeeding women and infants <1 year of age (WHO, 2015).

Proposed update: In low-transmission areas, treatment for malaria should include a single dose of 0.25 mg/kg body weight primaquine in addition to ACTs to reduce onward transmission of ***P. falciparum***. G6PD testing is not necessary (except for pregnant and breastfeeding women and infants <1 year of age). This recommendation **excludes high-transmission settings,** because symptomatic patients make up only a small proportion of the total population carrying gametocytes within a community, and primaquine is unlikely to affect transmission. **Proposal conditional on the quality of prevailing epidemiological surveillance data.**

Recommendations for Chemoprevention in Settings with High Seasonal Transmission

WHO recommendation: As the quality of local surveillance data continues to improve, refined epidemiological mapping of Kenya into zones based on intensity of malaria transmission will become increasingly reliable. Reliable surveillance maps provide a rational basis to support targeted activities in selected counties of high seasonal transmission that fall under the "sub-Sahel region of Africa" where malaria transmission is intense only during the three to four months rainy season and relatively low at other times. In such areas, WHO guidelines recommend seasonal malaria chemoprevention (SMC) with monthly amodiaquine + SP for all children 3–59 months of age at monthly intervals, beginning at the start of the transmission season, to a maximum of four doses during the transmission season (WHO, 2015). SMC is defined as intermittent administration of full treatment courses of an antimalarial medicine during the malaria season to prevent illness, with the objective of maintaining therapeutic antimalarial drug concentrations in the blood throughout the period of greatest risk.

Evidence: In a systematic review, SMC was directly compared with no prophylaxis in 7 trials with a total of 12,589 children. All the trials were conducted in West Africa, and six of seven trials were restricted to children <5 years of

age. In comparison with no chemoprophylaxis, SMC prevented up to 75 percent of malaria episodes, prevented up to 75 percent of severe malaria episodes, and may be associated with a reduction in mortality (Meremikwu, et al., 2012).

Proposed update: None

Introduction of SMC requires supporting data to define geographical regions that fall under the sub-Sahel region with high seasonal malaria transmission (the clinical attack rate of malaria is >0.1 episode per child during the transmission season) in Kenya. High prevalence of sulfadoxine-pyrimethamine (SP) resistance, logistic challenges for implementation, and the potential emergence of resistance to ACT partner drugs with mass use may challenge the appropriateness of SMC in the Kenyan population.

Recommendations for Chemoprevention in Settings with High Seasonal Transmission

WHO recommendation: In areas of moderate-to-high malaria transmission in Africa (annual entomological inoculation rate ≥10), where SP is still effective (prevalence of the *Pfdhps* 540 mutation of ≤50%), provide intermittent preventive treatment with SP to infants (<12 months of age) (SP-IPTi) at the time of the second and third rounds of vaccination against DTP and vaccination against measles (Malaria Policy Advisory Committee, 2012).

Evidence: Results from a pooled analysis of six randomized placebo-controlled studies on SP-IPTi conducted in areas of moderate to high transmission of malaria suggest that SP-IPTi delivered through the Expanded Programme on Immunization provides 30 percent overall protection in the first year of life against clinical malaria, 20 percent protection against anaemia, 38 percent protection against hospital admissions associated with malaria parasitaemia, and 23 percent protection against all-cause hospital admissions. SP-IPTi offers a personal protection against clinical malaria for a period of approximately 35 days following the administration of each dose (Aponte, et al., 2009).

In a study of field isolates collected from Kisumu, Kisii, Kericho, and Malindi, genetic polymorphism at various loci within *Pfdhfr* and *Pfdhps* genes were assessed, triple *Pfdhfr* N51I/C59R/S108N had a high prevalence rate of **86.6 percent,** and double *Pfdhps* A437G/K540E had a high prevalence rate of **87.9** percent respectively. The *Pfdhfr/Pfdhps* quintuple, N51I/C59R/S108N/A437G/K540E mutant, which has been shown to be the most clinically relevant marker for SP resistance, was observed in **75.7** percent of the samples (Juma, et al., 2014). These findings suggesting **high prevalence of SP resistance** may challenge the effectiveness of SP-IPTi for chemoprevention in the Kenyan population.

Proposed update: None

Introduction of SP-IPTi in Kenya requires supporting evidence demonstrating SP effectiveness (prevalence of the *Pfdhps* 540 mutation of ≤50%).

Availability and Quality of Case Management Guidelines

Since 2010, NMCP has conducted successive biannual cross-sectional surveys in a representative sample of approximately 170 public health facilities across the country. Findings from these surveys have been used to track the implementation of the "test and treat" policy. During the survey conducted in November 2017 (Machini, et al., 2017), 75 percent of facilities had valid (test and treat) national case management guidelines for malaria, and only 46 percent had the latest 2016 edition. Both guideline indicators increased compared to the previous survey, in which 64 percent had national case management guidelines and 12 percent had the latest edition. The National Guidelines for Parasitological Malaria Diagnosis was found in 51 percent of facilities, and the availability of standard operating procedures for malaria parasitology ranged from 26 percent for the preparation of buffered water, to 49 percent for the staining procedure using Giemsa.

In an NMCP-led cross-sectional survey of 406 private retail drug outlets (60% of which were registered) across 47 counties, only 15.3 percent of the private retail drug outlets had the malaria case management guidelines, of which only 5 percent were the current editions (Machini, et al., 2016).

A review of malaria case management chapters in the clinical guidelines for management and referral of common conditions across the six levels of health care (MOPHS & Ministry of Medical Services, 2009a; MOPHS & Ministry of Medical Services, 2009b; MOPHS & Ministry of Medical Services, 2009c) revealed sections that were obsolete. Malaria case management sections in guidelines from the Newborn Child and Adolescent Health Unit were, however, found to be current (MOH, 2018; MOH, 2016). As the NMCP updates the national guidelines, effort is required to ensure that other units implementing malaria case management are provided with the updates so they can review relevant sections of their documents to avoid confusion among health workers and application of outdated and potentially harmful clinical practices.

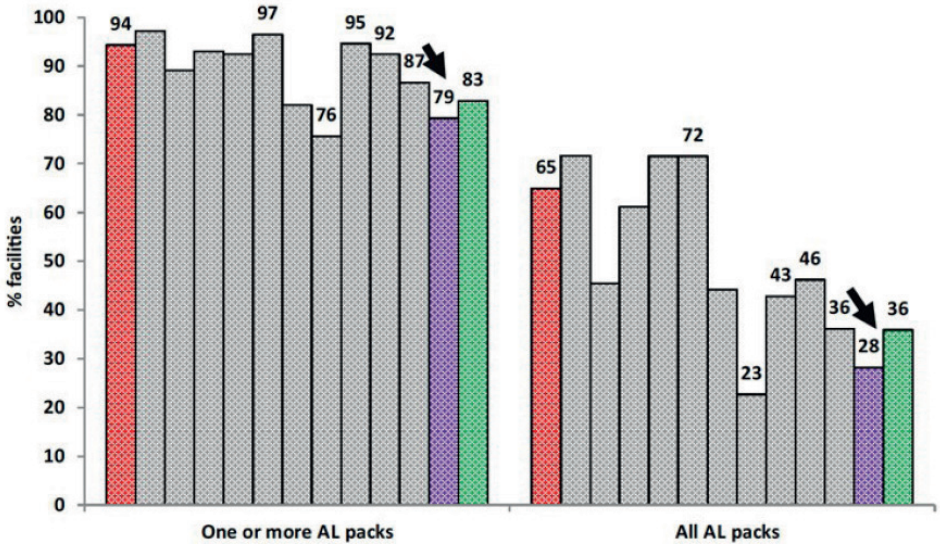
Availability and Quality of Antimalarial Medicines

Quality ACT needs to be available to ensure malaria parasite clearance and protect the efficacy of artemisinin-based therapies. Poor quality antimalarials, containing sub-therapeutic doses of the active pharmaceutical ingredient, may be ineffective at clearing malaria parasites and lead to prolonged illness then progress to severe disease or death. Antimalarials designated as prequalified or granted regulatory approval by global authorities, such as the WHO prequalification programme, the Global Fund, or the European Medicines Agency, may be considered "quality-assured." The Affordable Medicines Facility-malaria (AMFm) was established to improve access to ACTs, particularly in the private sector. The private sector co-pay mechanism hosted by the Global Fund to Fight AIDS, Tuberculosis and Malaria evolved from the AMFm pilot to enable public and private buyers in approved countries to purchase high-quality ACTs at a fraction of the market price. As a result, ACTs are sold at prices similar to or lower than those of monotherapies.

In a recently published large multi-country study on market penetration of non-qualityassured artemisinin combination therapy (QAACT) in eight African countries, including Kenya, non-QAACT was found to be commonly available in the private sector, particularly in urban settings, and was rarely available within the public sector (Newton, Nanson, & Goodman, 2017). The study, however, reported a significant increase in non-QAACT relative market share between 2010 and 2014 in both public and private sectors in Kenya. Low availability of non-QAACT in the public sector is likely related to ACT procurements, supported with donor funding where adherence to global quality-assurance standards is required. The authors called for the design and implementation of context-specific efforts to limit availability of non-QAACT that included aspects of registration, private sector regulation, local manufacturing, and drug importation.

Findings from the NMCP quality of care survey for public health facilities, conducted in November 2017, showed an increase in the availability of AL, where it was declining previously (Machini, et al., 2017). Compared to the previous round, the survey found that the availability of at least one AL pack increased from 79 percent to 83 percent during physical assessments on survey days, and total AL stock-outs three months prior to the surveys decreased from 24 percent to 21 percent. The availability of all weight specific AL packs on survey days increased from 28 percent to 36 percent, and retrospective stock-outs of at least one AL pack decreased from 72 percent to 60 percent. Artesunate availability also increased by 7 percent between the last two rounds, reaching 56 percent.

Figure 7.4: National trends in the availability of AL at health facilities on survey day



Each bar represents a survey round. The red bar is the baseline survey conducted in 2010. The purple and green bars were the two latest surveys before the MPR.

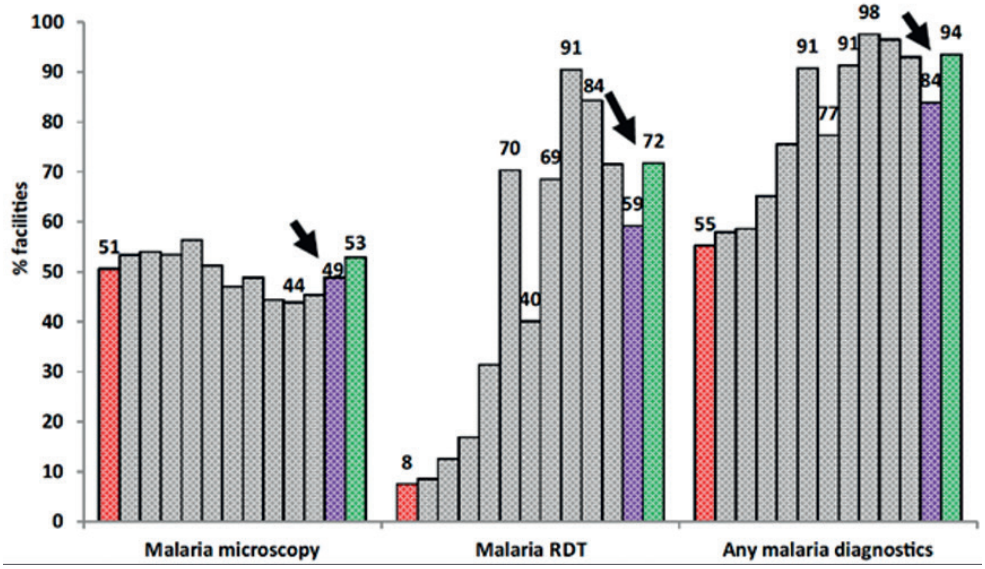
In another NMCP-led cross-sectional survey of 406 private retail drug outlets in December 2016 (60% of which were registered), 67 percent of the sampled outlets had ACTs in stock (Machini, et al., 2016).

Availability and Quality of Malaria Diagnostics

Results from a recent systematic review that included 10 clinical trials (8 in sub-Saharan Africa and 2 in Afghanistan), including 562,368 outpatient encounters, suggest that algorithms incorporating RDTs can substantially reduce antimalarial prescribing if health workers adhere to the test results (Bruxvoort, et al., 2017).

The NMCP quality of care survey for public health facilities conducted in November 2017 indicated an increase in the availability of any parasitological malaria diagnostics (either microscopy or RDTs) to 94 percent on survey days. This represents a 10 percent increase compared to the previous survey and a 38 percent improvement compared to the baseline levels (Machini, et al., 2017).

Figure 7.5: National trends in the coverage of health facilities with malaria diagnostics



Each bar represents a survey round. The red bar is the baseline survey conducted in 2010. The purple and green bars were the two latest surveys before the MPR.

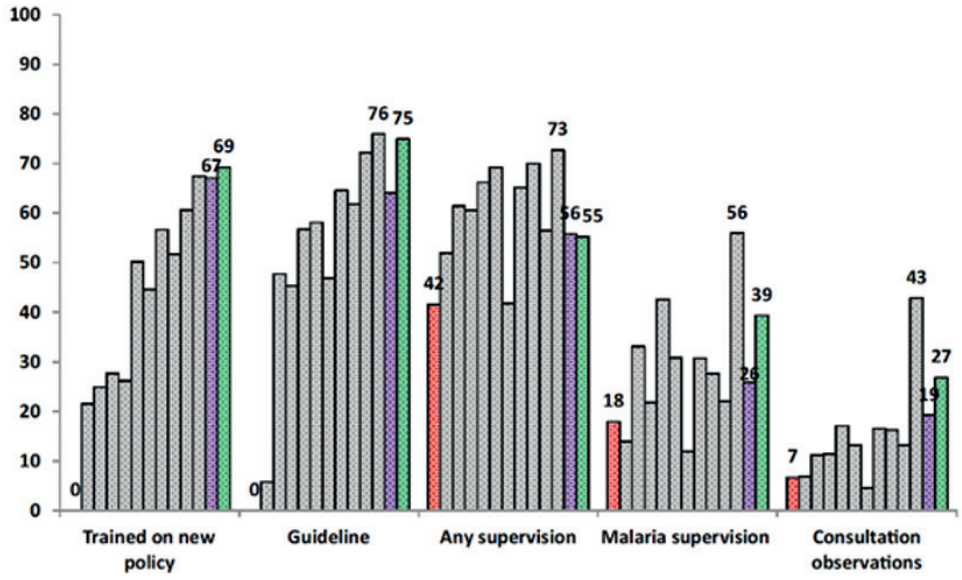
In the NMCP-led cross-sectional survey of private retail drug outlets in December 2016, 82 percent had RDTs in stock. Malaria diagnostic services were available in 31.8 percent of the outlets providing malaria RDTs on the survey day, and 33 percent of the outlets experienced a stock-out of RDTs for seven consecutive days in the three months preceding the survey. The outlet respondents reporting stock-outs cited the cost and the source of the commodity as a contributing factor, and some reported to have ordered them and were waiting for delivery of the commodities.

In a multi-country project to prime the private sector market for the introduction of RDTs, higher rates of testing by any malaria diagnostic test were observed in private health facilities compared to registered pharmacies in two rounds of assessment. The authors of the study concluded that non-laboratory staff working in registered pharmacies in Kenya can follow national guidelines for diagnosis with RDTs when provided with the same level of training and supervision as private health facility staff (Poyer, et al., 2018).

Training, Monitoring and Supervision

According to the quality of care survey for public health facilities conducted in November 2017, 69 percent of health workers had been trained on malaria case management, representing a steady increase over the monitoring period. With respect to malaria supervision, an increase was observed in comparison to the baseline 2010 levels (18% to 39%) as well as to the preceding 2017 results (26% to 39%).

Figure 7.6: National trends in the coverage with in-service training on the new case management



Each bar represents a survey round. The red bar is the baseline survey conducted in 2010. The purple and green bars were the two latest surveys before the MPR.

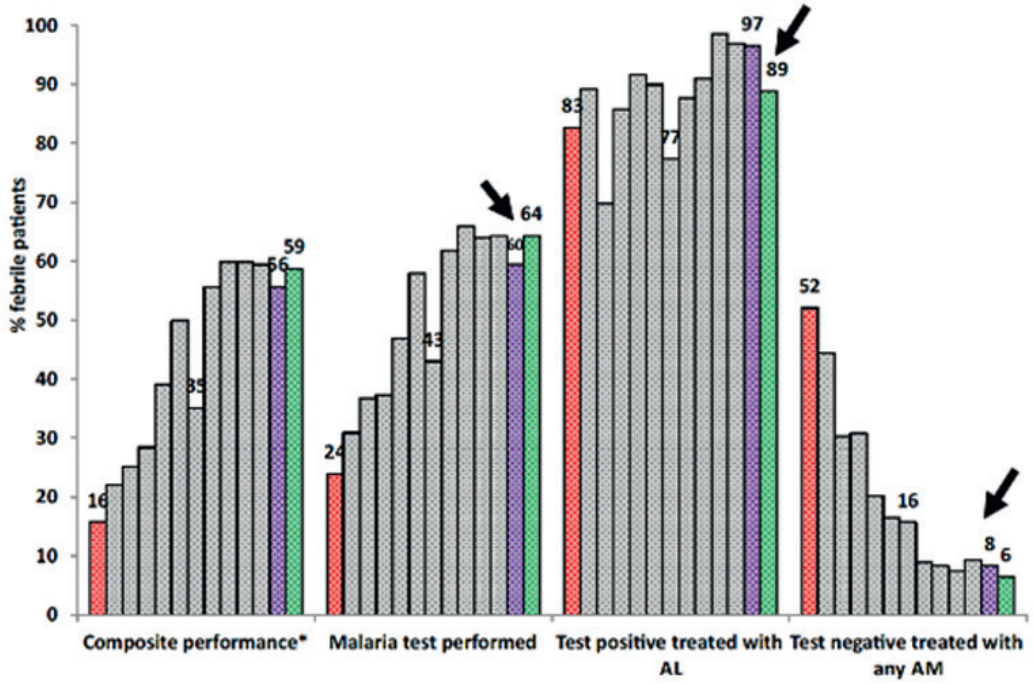
In the NMCP-led cross-sectional survey of private retail drug outlets in December 2016 (60% of which were registered) across 47 counties, only 17 percent of the pharmacy attendants providing services in the outlet were trained on malaria case management in the years 2013–2016, while 20.7 percent were trained on RDTs. This survey enquired whether inspection or supervision visits to the private retail outlets had been done within three months prior to the survey. Almost half (49%) of the private retail outlets had received supervision or inspection visits within the period. The majority of this inspection (88.9%) had been done by the PPB, and the rest had been done by Ministry of Health Public Health Office.

Compliance with Recommended Guidelines

According to the 2015 Kenya Malaria Indicator Survey, 39 percent of children with fever had a blood sample taken from a finger or heel prick for testing. The proportion varied widely across epidemiological zones, with only 22.7 percent testing for malaria in the semi-arid seasonal zone, 25.7 percent in the lowrisk zone, and the highest in the lake endemic zone, where 59 percent of children with fever were tested for malaria (NMCP, Kenya National Bureau of Statistics, & ICF International, 2015).

In the quality of care survey for public health facilities, healthcare providers are assessed for their composite case management performance defined by all of the following steps: tested for malaria; if positive test result, treatment of the patient with AL; and if negative test, result no antimalarial treatment given for the patient. In the survey conducted in November 2017, the composite performance was 58.8 percent, representing a 43.1 percent increase from baseline (15.7%), and a 3.1 percent increase from the previous survey (55.7%) (30).

Figure 7.7: National trends in the diagnostic and treatment performance of the new case management policy



Each bar represents a survey round. The red bar is the baseline survey conducted in 2010. The purple and green bars were the two latest surveys before the MPR.

Similar performance was observed in the NMCP-led survey of private retail drug outlets, where the pooled composite performance at all the outlets sampled was 57.8 percent (Machini, et al., 2016). Among simulated clients with positive test results, 90.1 percent were prescribed AL. In comparison, 52.7 percent of those who tested were not prescribed an antimalarial, 45.9 percent of test negative results were prescribed AL, and 91.6 percent of the clients without a test result were prescribed AL. Approximately two-thirds of the clients (62.5%) received a complete package of dosing instructions both written and verbally.

The findings presented above illustrate some disparities in malaria case management between public and private sectors and over time. The results imply need for strengthened commodity security, and intensified guideline dissemination, training, monitoring, and supervision for HCWs to achieve the target of universal parasitological diagnosis and treatment for suspected malaria cases.

The above conclusions are further supported by results from a cross-sectional survey of 2,065 households in western Kenya, which suggest that health worker nonadherence to negative malaria test results has important implications

for individuals' beliefs about their illness and about treatment. Thus, increasing health workers' adherence to malaria treatment guidelines—for example by reinforcing their trust in the test or by offering training and support on management of non-malarial febrile illnesses—would directly improve ACT targeting and may also raise people's confidence in testing and treatment (Saran, et al., 2017). Alternative approaches that have been shown to enhance compliance with malaria case management guidelines include introducing institutional performance-based incentives to provide extrinsic motivation for behaviour change and enhancing or sustaining the effects of training (Menya, et al., 2015).

Although the NMCP quality of care surveys are currently only conducted in health facilities, various studies at the community level indicate that appropriate case management of malaria can be effectively delivered by community health workers and volunteers with adequate training and supervision (Christopher, et al., 2011; Sunguya, et al., 2017). Evidence shows that community members have more positive perceptions and attitudes towards the role of community health workers in community case management (CCM) for malaria than negative ones (Owek, et al., 2017), and community health workers report high levels of motivation and satisfaction with their role in community-based malaria diagnosis and treatment (Winn, et al., 2018). Locally, CCM for malaria is promoted by the Ministry of Health under the community health strategy as a component of integrated Community Case Management of Childhood Illnesses. CCM is one of the five strategies under the NMCP case management thematic area (MOH, 2014a) currently implemented in the lake endemic epidemiological zone through the African Medical Research Foundation. Other partners implementing CCM for malaria include UNICEF and Living Goods.

In a study of 271 CHVs in Bungoma County, investigators found that community health workers administering RDTs maintain diagnostic testing competency over at least 12 months. Community health workers generally perform RDTs safely and accurately interpret results. Younger age and prior experiences with RDTs were associated with better testing performance (Boyce, et al., 2018). Quality assurance for malaria diagnosis can be further improved through the use of innovative mHealth strategies (Laktabai, et al., 2018).

Performance in Implementing Objectives and Strategies

This section outlines the performance of the NMCP with respect to Objective 2, which represents the case management thematic area. The first section provides highlights of the findings from the assessment conducted using the Technical Performance Tool (Annex 7.2).

Performance Analysis

Overall performance for Objective 2: To have 100 percent of all suspected malaria cases who present to health workers managed according to national treatment guidelines. Achievement in 2018 was 48.7 percent. A summary of the performance analysis describing achievements and challenges under each strategy is provided in Table 7.2.

Table 7.2: Performance analysis for Objective 2

Strategy	Performance score	Main achievements	Key challenges
Strategy 2.1 Build capacity of health workers in malaria diagnosis and treatment at health facilities	47.8%	▪ Copies of guidelines available in 75% of health facilities (quality of care round 13) ▪ Trained 54,582 HCWs, with target of 53,440 ▪ Supervision provided during training ▪ Emergency Triage Assessment and Treatment (ETAT) guidelines and curricula purchased from WHO, national ETAT guidelines updated by Newborn Child and Adolescent Health Unit ▪ ETAT training conducted by Kenya Pediatric Association for 1,238 HCWs in 17 counties	▪ Guidelines available in some health facilities not current ▪ Not all health facilities covered during training ▪ Only 60% of HCWs fully adhering to guidelines ▪ Some training classes larger than the recommended 40 people per class ▪ Minimal oversight on selection of training participants ▪ County training reports missing ▪ Sub-optimal monitoring of practice ▪ Not all recommendations made during supervision were adhered to ▪ NMCP did not facilitate or supervise ETAT+ training
Strategy 2.2 Access to affordable malaria medicines and diagnostics through the private sector	35.9%	▪ Consultative stakeholders meeting and market analysis for development of private sector case management implementation plan completed ▪ Annual quantification and procurement for private sector done	▪ Private sector case management implementation plan not developed due to delay in stakeholder engagement ▪ Biannual planning and coordination meetings with private sector delayed ▪ Sub-optimal stock monitoring in private sector
Strategy 2.3 Strengthen community case management of malaria using the community health strategy	66.7%	▪ CCM curriculum revised and disseminated ▪ 7,350 CHVs trained in CCM for malaria ▪ County supervision and monitoring done	▪ Only 30% CHV coverage in target locations ▪ Frequent stock-outs of mRDTs and ACTs due to poor forecasting and lack of coordination with link facilities ▪ Poor coordination of CCM—some partners using unapproved guidelines and training materials ▪ Shortages of community level reporting tools ▪ NMCP only partly involved in supervision

Strategy	Performance score	Main achievements	Key challenges
Strategy 2.4 Ensure commodity security of malaria medicines and diagnostics in the public sector	45.0%	▪ Antimalarials and diagnostics included in relevant guidelines and essential drugs list as per the national treatment guidelines ▪ Held meetings with PPB on regulation on antimalarials and diagnostics ▪ Quantification and quantification review done annually ▪ Two out of four planned post-market surveillance activities for antimalarials conducted	▪ Some commodities missing in the Kenya essential medicines list: AL 40/240mg, AL 60/360mg, and rectal artesunate ▪ Ad hoc review of antimalarials and diagnostics specification done—no specifications manual ▪ Lack of clarity in regulation of mRDT (PPB vs NQCL) ▪ Over-quantification done due to lack of data in District Health Information Software, version 2 (DHIS2) ▪ Stock-outs from stock status reports and quality of care surveys ▪ Overstocks and short expiry ▪ Some counties not getting commodities on time ▪ DHAP (second line for uncomplicated malaria) not procured—funds not allocated
Strategy 2.5 Strengthen quality assurance of malaria diagnosis	50.0%	▪ Review of malaria diagnosis quality assurance (QA) implementation plan done ▪ 2,000 QA officers trained ▪ Proficiency training for QA officers done ▪ Supervision and monitoring of QA training and implementation done (only lake endemic region covered) ▪ National reference lab is well equipped ▪ 2013 malaria laboratory guidelines disseminated	▪ Review of malaria diagnosis QA implementation plan delayed; document now due for review ▪ Imbalance in numbers of QA officers trained across counties (lower numbers in low-risk zones) ▪ Inadequate personnel to provide QA supervision and monitoring in all counties ▪ Establishment of county reference labs lagging behind, especially in low risk zones. ▪ Malaria laboratory guidelines and curricula not reviewed due to competing tasks

Performance in Implementing Mid-Term Review Recommendations

During the mid-term review, specific areas for improvement were highlighted. The analysis in Table 7.3 indicates the status of implementation of the recommendations made.

Table 7.3: Status of implementation of recommendations from mid-term review

Recommendation	Status of implementation	Comments
Two new strategies introduced to the case management objective: Ensure commodity security of malaria medicines and diagnostics in the public sector Strengthen quality assurance for malaria diagnostics (additional strategy introduced in the 2014 mid-term review).	Partially implemented	Activities under both strategies were implemented but performance was poor (see performance analysis above). Recommendation: Relocate strategies and activities relating to commodity security to strategy under Programme Management.
Inadequate guidance to health workers on the management of patients with fever that have a negative parasitological test result.	Partially implemented	Compliance with guidelines improving since baseline (see Outcome Indicators above). However, performance still not optimal.
No investment for DHAP the second line treatment.	Not implemented	
Sustaining availability of QAACTs in private sector after AMFm.	Partially implemented	Stock-outs reported in private sector surveys Challenge of sustainability given limited funds to support procurement of commodities
Procurement and supply chain management to be a standalone strategy to iron out the procurement and supply management challenges. The programme shall continue to develop a private sector case management strategy building on the success of AMFm	Partially implemented	Procurement and supply management strategy introduced to programme management objective. However, actual implementation not affected.
At community level, there is need to ensure commodity security and to integrate home management of malaria into community case management.	Partially implemented	Challenges with reporting and commodity security at community level. Recent implementation of reporting module for community to DHIS2.

Key Performance Indicators and Targets

In this section, performance is presented against the outcome indicators defined in the Monitoring and Evaluation Plan (NMCP, 2014). The first section describes the appropriateness of the case management indicators and targets, and the second section presents a summary of the performance of the outcome indicators for the five strategies.

Appropriateness of Case Management Indicators and Targets

The revised Kenya Malaria Strategy 2009–2018 lists 14 indicators spanning the 5 strategies under Objective 2.

Strategy 1: Capacity building for malaria diagnosis and treatment at health facilities

There were three outcome indicators under this strategy, and they were generally appropriately phrased and smart, with appropriate baseline and target measures aligned with the objective. The data are, however, not readily available from routine systems, and reporting is dependent on biannual health facility surveys. The review recommends the inclusion of an indicator to capture data on inpatient case management for severe malaria: proportion of inpatients with suspected malaria managed in accordance with national malaria case management guidelines. This indicator was recently introduced among the data collected in the NMCP six-monthly facility-level quality of care surveys. The programme should prioritise adapting current tools and strengthening the quality of reporting with the ultimate goal of enabling routine capture of the above outcome indicators.

Strategy 2: Access to affordable malaria medicines through the private sector

There were three outcome indicators under this strategy. These indicators were not well-aligned to the strategy and are generally phrased to match those under the first strategy, albeit for the private sector. If the indicators are to be retained, rephrasing of the strategy is recommended to "Strengthening quality of malaria diagnosis and treatment in the private sector."

Strategy 3: Strengthening community case management of malaria using the community strategy through community health volunteers

There were four indicators under this strategy. However, the data sources currently available do not report proportions for the outcome indicators under this strategy, due to the lack of reliable denominators. It is recommended that methods used to capture data under Strategy 1 (periodic surveys) be adapted for the community level to allow for reliable tracking of performance. In the long term, the programme should prioritise adapting current tools and strengthening the quality of reporting, with the goal of capturing the above outcome indicators using routine data. It would also add value to include an indicator to track the proportion of CHVs implementing CCM.

Strategy 4: Ensure commodity security of antimalarials and diagnostics in the public sector

For the three indicators under this strategy, recommendations are as follows:

- Stock-outs were defined as unavailable commodities (ACTs, RDTs, and injectable artesunate) over a period of seven or more days. This threshold is inappropriate and should be reduced to ensure universal coverage. A proposed revision for the indicators is: "Proportion of health facilities having no stock-outs for the malaria commodities in the 7 consecutive days preceding the survey." The indicator for mRDT availability should be revised to report on availability of any malaria diagnostic test (to incorporate availability of microscopy).
- Currently, the artesunate indicator is only collected from hospitals. This essential treatment should be available in health centres and dispensaries for pre-referral care and should therefore be assessed at all health facilities.

Strategy 5: Strengthen quality assurance of malaria diagnosis

There were two indicators under this strategy. The first outcome indicator under this strategy is appropriately phrased and SMART, with appropriate baseline and target measures aligned with the objective for the thematic area.

It is recommended that reporting for the first indicator be disaggregated by test (microscopy/RDT). The second outcome indicator should be revised to read "Proportion of laboratories enrolled in EQA."

Progress Towards Malaria Strategic Plan Case Management Outcome Indicators

This section provides a summary of the performance of the outcome indicators for the five strategies under Objective 2.

Strategy 1: Capacity building for malaria diagnosis and treatment at health facilities

The proportion of suspected malaria cases presenting to public health facilities who were tested for malaria has risen from 24 percent at baseline (2010) to 64 percent (2017) (Machini, et al., 2017).The increased testing rates have been attributed to increased availability of malaria diagnostics, particularly mRDTs, and training on malaria case management and parasitological diagnosis. This performance contrasts with household survey data from the Kenya Malaria Indicator Survey 2015, indicating that only 39 percent of children under five years of age with fever in the two weeks before the survey received a malaria test (NMCP, Kenya National Bureau of Statistics, & ICF International, 2015). Overall, the quality of facility-level case management was assessed using a composite indicator representing appropriate patient testing for malaria and treatment with an ACT if the test result was positive, or withholding treatment for malaria if the result was negative. Performance of this indicator increased from 16 percent (baseline in 2010) to 59 percent (2017) (Table 7.4).

Table 7.4: Performance of indicators under Strategy 1

Indicator	Baseline	Target	2014	2015	2016	2017
% patients with fever presenting to health facility tested for malaria with RDT or microscopy	24% (2010)	100%	62%	66%	64%	64%
% patients with fever presenting to health facility managed in accordance with national malaria guidelines	16% (2010)	100%	56%	60%	62%	59%
% children <5 with fever in the last 2 weeks who had a finger or heel stick	12% (2010)			39%		

Strategy 2: Access to affordable malaria medicines through the private sector

NMCP conducted nationally representative cross-sectional surveys of private retail outlets in 2013 (Omar, et al., 2013) and 2016 (Machini, et al., 2016). Findings from the surveys indicate that the number of facilities with health workers trained in malaria case management is low but has risen from 9 percent to 17 percent. The proportion of patients with suspected malaria tested for malaria with RDT or microscopy in the private sector has also increased from 21 percent to 79 percent but remains short of the target of 100 percent. Suspected malaria cases managed in accordance with national malaria guidelines has increased from 32 percent to 58 percent against a target of 100 percent (Table 7.5).

Table 7.5: Performance of indicators under Strategy 2

Indicator	Baseline (2013)	Target	2016
% outlets/facilities with at least one trained health worker in malaria case management	9%	100%	17%
% patients with suspected malaria presenting to health facilities in private sector tested for malaria with RDT or microscopy in the private sector	21%	100%	79%
% suspected malaria cases presenting to health facilities in private sector managed in accordance with national malaria guidelines	32%	100%	58%

Strategy 3: Strengthening community case management of malaria using the community strategy through community health volunteers

In 2017, more than two million children with fever presenting to a CHV were tested for malaria using an RDT, compared to approximately 50,000 in 2016. In 2017, approximately 160,000 patients who tested positive by a CHV were treated with ACT, compared to 103,900 patients in 2016. A similar increase was observed for those who tested negative and were not treated with an anti-malarial (93,328 in 2017 compared to 47,140 in 2016) (Table 7.6). Although the performance for these indicators reflected an achievement of the targets defined, coverage of CCM for malaria only covered limited areas of the lake endemic zone and is currently not implemented in other regions of the country.

Table 7.6: Performance of indicators under Strategy 3

Indicator	2015 (Target)	2016 (Target)	2017 (Target)
Number of patients with fever presenting to a CHV who are tested for malaria using an RDT	N/A (20,225)	151,040 (96,580)	2,531,898a (81,805)
Number of patients with fever who tested positive by a CHV who were treated with ACT	36,035 (20,551)	103,900 (88,076)	159,860 (60,621)
Number of patients with fever who tested negative by a CHV who were not treated with an antimalarial		47,140	93,328

a The massive increase in number of fevers treated with antimalarials in 2017 was due to a prolonged industrial action that broke down the public health sector delivery leading to care shifting to the community level.

Strategy 4: Ensure commodity security of antimalarials and diagnostics in the public sector

Stock-outs of ACTs were reported in 73 percent of health facilities in the public sector in 2013, with modest improvement to 79 percent in 2017. Availability of RDTs increased substantially from 53 percent of facilities in 2010 to 90 percent in 2017. A similar improvement was observed in availability of artesunate in hospitals surveyed (Table 7.7).

Table 7.7: Performance of indicators under Strategy 4

Indicator	Baseline	Target	2014	2015	2016	2017
Proportion of health facilities having no stock-out of ACTs for 7 consecutive days in past 3 months (for each ACT weight band)	73% (2010)	100%	76%	88%	86%	79%
Proportion of health facilities having no stock-out of RDTs for 7 consecutive days in past 3 months	53% (2010)	100%	93%	94%	90%	90%
Proportion of health facilities having no stock-out of artesunate injections for 7 consecutive days in past 3 months	53% (Feb 2016)	100%			81% (Sep 2016)	

Strategy 5: Strengthen quality assurance of malaria diagnosis

The proportion of health facilities able to perform malaria parasitological diagnosis (mRDT or microscopy) increased from 55 percent at baseline to 94 percent in 2017. This high performance has been sustained over successive surveys. However, performance of this indicator remains short of the target of 100 percent required to achieve the case management objective (Table 7.8).

Table 7.8: Performance of indicators under Strategy 5

Indicator	Baseline	Target	2014	2015	2016	2017
Proportion of facilities able to perform malaria parasitological diagnosis	55%	100%	77%	97%	93%	94%
Proportion of laboratories enrolled in EQA reporting blood smears correctly	52% (2016)	100%			69%	92%

Enablers and Constraints

The enabling factors contributing to the achievements of the case management strategies include the following:

- Strong support from local and international partners with regular TWG meetings
- Existing coordination and oversight structures at NMCP
- Enabling policies and evidence-based guidelines
- A strong procurement and supply management and pharmacovigilance system
- Regular quality of care surveys that provide data to track performance resulting in enhanced accountability
- Access to routine data through DHIS2
- Political will at the national level evidenced by initiatives such as the Universal Health Coverage (UHC) agenda
- Political will at the county level, with some having committed funds for malaria control activities

Among the constraining factors that the programme faces are the following:

- Inadequate sustainable support for CCM of malaria
- Industrial actions by health workers and high staff turnover
- Poor quality of data to inform programming
- Lack of clarity on mRDT regulation
- Inadequate capacity among malaria coordinators at the county and sub-county levels
- A slow guideline/policy document review process

SWOT Analysis

Table 7.9 below provides a summary of the findings of the strengths, weaknesses, opportunities, and threats for the NMCP as identified by stakeholders in the Case Management Thematic Group.

Strengths	Weaknesses
▪ Strong PSM and pharmacovigilance system ▪ Quality of care surveys ▪ Regular TWG meetings held ▪ Good guidance and policies (e.g., strategic plan, monitoring and evaluation plan) ▪ Access to DHIS2 ▪ Availability of case management commodities ▪ Existing coordination and oversight structures at NMCP ▪ Updated case management guidelines ▪ Good coordination between NMCP and partners ▪ Malaria commodity dashboard has been absorbed by the counties	▪ Poor/low implementation of plans from supervision reports ▪ Overstocking at the facilities due to poor quality of data to inform on consumption ▪ Poor coordination of supplies from various sources, leading to overstocking and expiries ▪ Poor documentation of procurement and supply management processes, hence lack of standardisation of procurement and supply management practices at all levels ▪ Lack of training database ▪ Suboptimal adherence to guidelines ▪ Lack of updated operational plans ▪ Lack of clarity on mRDT regulation ▪ Limited oversight for subcontracted activities like training ▪ Declining quality of case management training ▪ Suboptimal coordination of CCM at the county level ▪ Lack of trainers of trainers curriculum ▪ Lack of clarity in private sector engagement ▪ Limited mentorship to counties ▪ Health worker turnover ▪ Inefficient guideline and policy document review process

Opportunities	Threats
▪ UHC agenda— opportunity to include malaria interventions into the essential package of services provided under UHC ▪ Community health strategy—opportunity to strengthen CCM ▪ Technology and innovations in information management ▪ Budget allocation for malaria activities—counterpart funding under the Global Fund grant, some counties allocating malaria-specific budgets ▪ Strong partner support ▪ Integration with other programs at community levels specially, integrated community case management of malaria ▪ CMIS data already in DHIS2 ▪ Use of county reference laboratories to strengthen quality assurance activities	▪ Inadequate funding: overdependence on donor support, donor fatigue and apathy over dwindling support ▪ Inadequate linkage with county government structure ▪ Poor coordination between counties and national programme ▪ Devolved system—lack of support from the counties ▪ Lack of coordination among partners, leading to duplication of activities ▪ Malaria control not a priority in low-risk zones ▪ Uncoordinated procurement of goods by counties ▪ Debts at KEMSA by counties ▪ Sustainability of CCM of malaria ▪ Lack of new tools for diagnosis and treatment ▪ Existence of gene deletions for RDTs ▪ Industrial actions by HCWs

Results

Successes, Best Practices, and Facilitating Factors

The key successes, best practices and facilitating factors identified were as follows:

- Increased testing for suspected malaria cases in public health facilities: from 24 percent (2010) to 64 percent (2017)
- Up to 89 percent of all confirmed malaria cases presenting to public health facilities treated with ACT
- Increased adherence to national treatment guidelines in public health facilities: from 16 percent (2010) to 59 percent (2017)
- 7,350 CHVs trained on CCM for malaria between 2014 and 2017 in 10 counties providing care to more than two million children with fever in 2017
- Strong internal organisational structure and partnerships to support malaria control activities
- Updated policy, strategy, and guideline documents
- Biannual nationally representative health facility surveys on quality of care

Key Issues and Challenges

The key issues and challenges identified were as follows:

- Suboptimal adherence to national guidelines among HCWs in public and private sector
- Weak coordination with partners, counties, and the private sector
- Reliance on donor support for malaria control activities
- Human resource shortages at the implementation level
- Inadequate implementation of CCM for malaria
- Regulatory bottlenecks for malaria diagnosis at the community level
- Weak coordination for CCM and limited coverage at the county level
- Mismatch between implementation areas vis-a-vis those that are hard to reach

Conclusions and Recommendations

NMCP has registered several achievements over the period under review. As the programme considers the development of a new strategy, there is a need to focus efforts towards areas that are likely to yield greatest results.

The following conclusions are made:

- **Training:** Surveys and field visits indicate that health facilities have staff who are trained on the national treatment guidelines. However, coverage remains suboptimal, and NMCP is currently unable to reliably track the number and distribution of health workers trained.
- **Quality of care:** There has been improved quality of malaria case management in health facilities. However, performance has reached a plateau. Quality of care surveys are not powered to capture county-level indicators and hence have very limited value for county-level decisions. NMCP engagement of the private sector in malaria control activities remains weak and unstructured. This gap is reflected in the disparity between performance of case management, with the private sector lagging behind the public sector.
- **Commodity security:** Commodities are managed centrally at the national level from KEMSA through NMCP, although there is no focal point at NMCP for this important activity. In the private sector, commodity security has been successfully facilitated through a co-payment mechanism whereby the costs of ACTs are subsidised through support from the Global Fund.
- **Quality assurance for malaria diagnosis:** The national reference laboratory is well equipped and staffed to support malaria diagnosis and quality assurance. In the counties, external quality assurance is ongoing through county reference laboratories currently being established in various regions. However, quality assurance for counties in low transmission zones has lagged behind due to lack of support in the face of competing priorities.
- **Guideline development and harmonisation:** NMCP revised and disseminated updated guidelines for malaria case management and malaria parasitological diagnosis. However, unapproved and outdated guidelines for malaria case management were noted to be in use. There is currently no guidance on the appropriate levels of care or epidemiological zones for which malaria diagnostics (RDTs and microscopy) should be used.
- **CCM for malaria:** There is demonstrated support for CCM by counties through the establishment of community health units and the provision of stipends to CHVs, among other incentives. However, CCM for malaria is currently largely supported by partners and, in some counties, lacks integration with other community-based interventions. The current regulatory framework does not provide for use of mRDTs and ACTs by CHVs.

The review makes the following recommendations:

- **Training:** Regularly build capacity in case management at both the national and county levels for universal coverage. To sustain the high number requirements of staff at the county level, training of trainers is proposed as the main focus of capacity building, with NMCP tracking coverage centrally. The training curriculum should be enhanced to incorporate evidence-based behaviour change components.
- **Quality of care:** Continue quality of care surveys at the national level and introduce county-level routine quality of care assessments integrated with supportive supervision in public and private sectors. Progressively work towards the long-term goal of adapting routine reporting tools to capture quality of care indicators. The data from county-level quality of care surveys should be disseminated regularly to the county health management teams and partners to inform prioritisation of quality improvement interventions.
- **Commodity security:** Develop a private sector implementation plan to guide engagement with clinics and outlets involved in malaria case management in the private sector and sustain the achievements realised under the co-payment mechanism.
- **Quality assurance for malaria diagnosis:** Engage counties in low-endemic zones to ensure prioritisation of malaria control activities, including surveillance, through strengthening of county reference laboratories and quality assurance of malaria diagnosis.
- **Guidelines development and harmonisation:** NMCP should approve all guidelines in use for malaria case management and parasitological diagnosis in the country to ensure safe, evidencebased, and harmonised practice in public and private sector and at the community level.
- **CCM for malaria:** CCM for malaria to be scaled up to fully cover high-endemic zones and ultimately to all epidemiological zones integrated with other community-level interventions. Implementation will require adequate support for tools, capacity for monitoring and supervision and engagement with appropriate regulatory authorities. Specifically, NMCP should engage PPB, the Kenya Medical Laboratory Technicians and Technologists Board, and other stakeholders to update the policy for malaria case management to facilitate use of ACTs and mRDTs by all community health workers.

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Annex 7.1: Analysis for Nine Focus Counties

Questionnaires were jointly developed by the NMCP secretariat and the consultants supporting the thematic desk review to solicit views on the status of malaria control in the 47 counties. The questionnaires were piloted among officials representing nine counties purposively sampled from the epidemiological zones to attend at a five-day retreat for the MPR in Sagana, Murang'a County from 9 to 13 July 2018. The counties sampled were Busia, Kisumu, Kisii, Uasin Gishu, Turkana, Makueni, Kirinyaga, Kwale, and Kilifi.

In this annex, a summary of the responses to questions related to case management is provided, alongside cross-cutting areas relevant to malaria control that the respondents felt were priorities for future implementation in their respective counties.

Question: *Under the Kenya Malaria Strategy 2009-2018, the National Malaria Control Programme aimed to have* ***100% of all suspected malaria cases who present to health workers managed according to national treatment guidelines by 2018.***

To what extent do you feel the National Malaria Control Programme achieved this goal in your county over the past 5 years?

(a) Strongly agree

(b) Agree

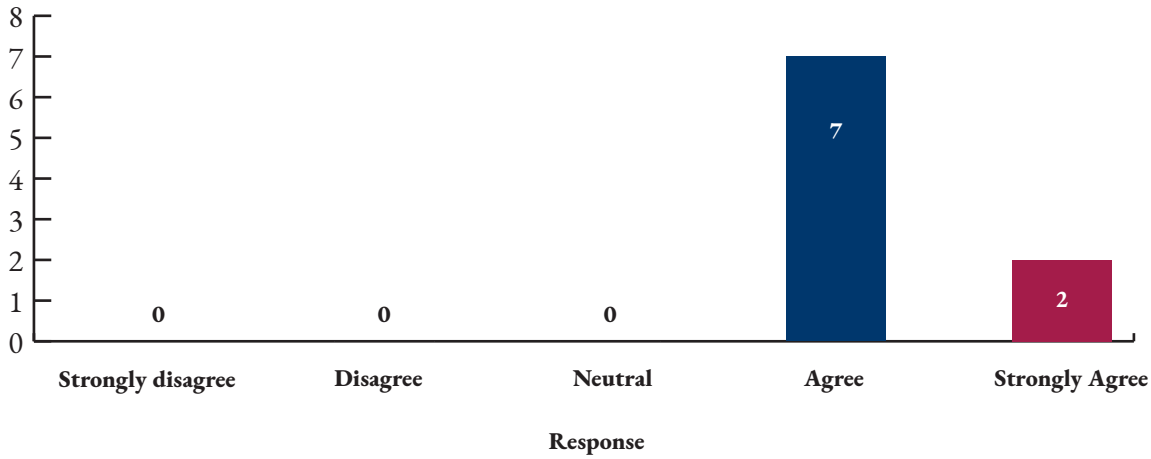
(c) Neutral

(d) Disagree

(e) Strongly disagree

Seven of the nine county officials agreed with the assessment that the NMCP achieved its goal for case management over the past five years. Officials from two counties strongly agreed with the assessment, suggesting that the overall performance of the NMCP was perceived to be high in the sampled counties.

County responses for performance of case management thematic area



Respondents were requested to provide details regarding areas of achievement and challenges relating to the programme thematic areas. The responses from the nine counties for questions relating to case management are summarised below.

County	Achievements	Challenges	Cross-cutting priorities
Busia	▪ Malaria case management training for healthcare workers ▪ Malaria case management training for CHVs ▪ Commodity security for malaria control	▪ Suboptimal coverage of CCM	▪ Scale-up rollout of CCM ▪ Resource mobilisation for malaria control
Kisumu	▪ Investment in case management training for healthcare workers and CHVs ▪ Improved adherence to malaria treatment guidelines ▪ Improved commodity security for antimalarials, mRDTs	▪ Lack of updated information, education, and communication materials	▪ Strengthening of community case management ▪ Resources for social and behaviour change communication
Kwale	▪ Provision of mRDT and case management ▪ Supervision has helped promote tracking of cases to households to determine why prevention failed ▪ Pull system has improved commodity security	▪ Conflict between nurses and laboratory staff regarding testing ▪ Data quality for accurate forecasting and quantification	▪ None reported
Kilifi	▪ Approval of budget for malaria control activities ▪ At least one health worker trained in malaria case management in each health facility ▪ High rate of compliance with guidelines among healthcare workers in public facilities	▪ Compliance to national guidelines in the private sector ▪ Overstocking leading to expiry of commodities	▪ Malaria advocacy ▪ IRS in all endemic areas ▪ Community education on malaria control

County	Achievements	Challenges	Cross-cutting priorities
Kisii	▪ Malaria case management training for healthcare workers ▪ Implementation of CCM	▪ Stock outs of mRDTs in some facilities without laboratories/ laboratory personnel ▪ Poor compliance to case management guidelines among healthcare workers ▪ Limited resources for malaria control from county government	▪ Advocacy for malaria control, especially LLIN use ▪ Capacity building for malaria coordinators and healthcare workers ▪ Supportive supervision at all levels to support data quality ▪ Support for IRS
Uasin Gishu	▪ Availability of mRDTs in facilities without laboratories/laboratory personnel ▪ Commodity security for antimalarials and other supplies in public health facilities ▪ Malaria case management training for healthcare workers	▪ Commodity security in private and faith-based facilities	▪ Commodities for malaria control in private and faith-based facilities ▪ Malaria case management training for healthcare workers
Turkana	▪ Mobilisation of resources from county government for malaria control ▪ Investment in case management training for healthcare workers ▪ Training of sub-county pharmacists on commodity management	▪ Accessing resources allocated for malaria control ▪ Compliance to case management guidelines among healthcare workers remains suboptimal ▪ Inadequate resources for supportive supervision ▪ Overstocking leading to expiry of commodities	▪ Leveraging community health strategy for malaria control
Kirinyaga	▪ Malaria case management training for healthcare workers ▪ Commodity security for malaria control	▪ Poor compliance with national guidelines among healthcare workers in private sector ▪ High staff turnover ▪ Overstocking leading to expiry of commodities ▪ Malaria not regarded as a priority due to low incidence of cases ▪ Shortage of reporting tools	▪ Malaria surveillance ▪ Malaria case management training for healthcare workers ▪ Provision of reporting tools

County	Achievements	Challenges	Cross-cutting priorities
Makueni	▪ Renovated commodity storage facilities ▪ Training of health workers on commodity management ▪ Malaria case management training for healthcare workers ▪ Availability of mRDTs to facilitate malaria diagnosis ▪ Teamwork across cadres	▪ Compliance with case management guidelines among healthcare workers remains suboptimal ▪ Some health workers not trained on malaria case management guidelines ▪ Inadequate resources for supportive supervision ▪ Poor compliance with national guidelines among healthcare workers in private sector	▪ Training of health workers (public and private sector) on malaria case management guidelines ▪ Supportive supervision ▪ Leveraging community health strategy for malaria control

Annex 7.2: Technical Performance Assessment Tool

Performance domain	Comments			Composite score
Objective 2: To have 100% of all suspected malaria cases who present to health workers managed according to national treatment guidelines by 2018				**48.7%**
Strategy 2.1 Capacity building of health workers in malaria diagnosis and treatment at health facilities				**47.8%**
2.1.1 Review print and disseminate malaria diagnosis and treatment guidelines and curricula	Achievements: Copies of guidelines available in 75% of health facilities (QOC 13)	Challenges: Guidelines available are not current guidelines; not all health facilities covered in training	Recommendation: Soft copy downloads to be developed and disseminated outside trainings	**60.0%**
2.1.2 Training of health workers	Achievements: Trained 54,582 HCWs, exceeding the target of 53,440	Challenges: Only 60% of HCWs adhering to current guidelines, but 70% of HCWs trained. Some training classes were more than the recommended 40 people per class. Minimal oversight on selection of participants	Recommendation: Behaviour change component to be included in next training plan (supervision, mentorship) so that HCWs can be supported to new treatment guidelines. Technology to be used for monitoring training impact.	**60.0%**
2.1.3 Supervision and monitoring of case management trainings and practice	Achievements: Supervision provided during training	Challenges: County training reports missing. Suboptimal monitoring of practice. Not all recommendations made during supervision were adhered to.		**80.0%**
2.1.4 Review and disseminate Emergency Triage Assessment and Treatment Plus (ETAT+) guidelines and curricula	Achievements: ETAT guidelines and curricula purchased from WHO. national ETAT guidelines updated by Newborn child and Adolescent Health Unit	Challenges: Limited involvement by NMCP		**66.7%**
2.1.5 Training of health workers on ETAT+	Achievements: Kenya Paediatric Association trained 1,238 HCWs in 17 counties. Target 12,000 HCWs over 4 years; the other partner supporting the training was the Clinton Health Access Initiative.	Challenges: NMCP did not facilitate training. Funds reassigned.		**10.0%**
2.1.6 Conduct supervision and monitoring of ETAT+ trainings and practice	Achievements: Supervision done by Child Health department.	Challenges: No direct involvement from NMCP.		**10.0%**

Performance domain	Comments			Composite score
Strategy 2.2 Access to affordable malaria medicines and diagnostics through the private sector				**35.9%**
2.2.1 Develop private sector case management implementation plan	Achievements: Consultative stakeholders meeting and market analysis done	Challenges: Private sector case management implementation plan was not developed. Delay in stakeholder engagement.		**32.0%**
2.2.2 Conduct biannual planning and coordination meetings with private sector	Achievements:	Challenges: Activity delayed		**22.5%**
2.2.3 Procure ACTs and ensure availability of RDTs in the private sector	Achievements: Annual quantification and procurement for private sector done	Challenges: Suboptimal stock monitoring		**53.3%**
Strategy 2.3 Strengthening community case management of malaria using the community health strategy				**66.7%**
2.3.1 Review print and disseminate malaria community case management curriculum	Achievements: CCM curriculum revised, reviewed and disseminated. Target - print 24,000 copies.	Challenges:		**60.0%**
2.3.2 Training of community health workers	Achievements: Target train 20,000 CHVs, 13,000 CHVs trained. Scale down of targets during implementation to target 7,350 CHVs.	Challenges: 30% CHV coverage in target location. Commodities not available.		**80.0%**
2.3.3 Supervision and monitoring of case management trainings and practice	Achievements: County supervision and monitoring done	Challenges: NMCP only partly involved in supervision		**60.0%**
Strategy 2.4 Ensure commodity security of malaria medicines and diagnostics in the public sector				**50.0%**
2.4.1 Inclusion of antimalarials and diagnostics in relevant guidelines and essential drugs list as per the national treatment guidelines	Achievements: Antimalarials and diagnostics included in relevant guidelines and essential drugs list as per the national treatment guidelines	Challenges: Some commodities were missing in the Kenya essential medicines list. These were AL 40/240 mg, AL 60/360 mg, and rectal artesunate.		**80.0%**
2.4.2 Develop and disseminate specifications for antimalarials and diagnostics	Achievements: Ad hoc review of specification done	Challenges: Dissemination to counties and partners not done	Recommendation: Should be reviewed during annual forecasting and quantification	**30.0%**

Performance domain	Comments			Composite score
2.4.3 Ensure a conducive regulatory environment for antimalarials and diagnostics	Achievements: Held meetings with PPB on regulation of antimalarials and diagnostics. Meetings held in DMSC meetings and no specific meetings between NMCP and PPB.	Challenges: Lack of clarity in regulation of mRDT (PPB or NQCL)		**30.0%**
2.4.4 Conduct forecasting and quantification of malaria medicines and diagnostics	Achievements: Quantification and quantification review done annually	Challenges: Over-quantification done due to lack of data in DHIS2		**60.0%**
2.4.5 Procure and distribute antimalarials and diagnostics for public sector	Achievements:	Challenges: Stock-outs from stock status reports and quality of care surveys. Overstocks and short expiry. Space procurements better. Some counties not getting commodities on time. Soft copy should be sent to counties prior so that they know quantities expected. Stock-outs among CHVs, DHAP (second line for uncomplicated malaria) not procured.		**60.0%**
2.4.6 Strengthen logistics management information system	Achievements:	Challenges: Shortage of community-level reporting tools (scored in Objective 4). Biannual meetings with pharmacists held. Low reporting rates for mRDTs.		**60.0%**
2.4.7 Conduct post-market surveillance of antimalarials and RDTs	Achievements: Two out of four planned post-market surveillance activities for antimalarials conducted	Challenges: Reports were not shared	Recommendation: Heed to PPB advice to conduct annual post market survey and not biannual as it is not feasible	**30.0%**
Strategy 2.5: Strengthen quality assurance of diagnosis of malaria				**45.0%**
2.5.1 Review malaria diagnosis QA implementation plan	Achievements: Review of malaria diagnosis QA implementation plan done	Challenges: Process delayed. Document now due for review.		**40.0%**

Performance domain	Comments			Composite score
2.5.2 Train lab personnel on QA of microscopy and RDTs	Achievements: Target train 2,000 QAO officers, proficiency training for QAO officers done	Challenges: Imbalance in numbers trained across counties (lower numbers in low-risk zones)		**80.0%**
2.5.3 Supervision and monitoring of QA training and implementation	Achievements: Some counties supported by partners	Challenges: Inadequate personnel to cover all counties. Only lake endemic region covered. QA supervision 34%. Delay and began in 2016.	Recommendation: Delegate function to counties	**60.0%**
2.5.4 Support reference laboratories	Achievements: National reference lab is well equipped	Challenges: County reference labs lagging behind, especially in low-risk zones		**45.0%**
2.5.5 Review and disseminate malaria laboratory guidelines and curricula		Challenges: Review not done and old guidelines (2013) disseminated. Curriculum not reviewed due to competing tasks.		**0.0%**

Chapter 8:
Advocacy, Communication, and Social Mobilisation

Key Messages from This Chapter

- Advocacy, communication, and social mobilisation (ACSM) fell under the fifth strategic objective of the Kenya Malaria Strategy 2009–2018.
- The review was guided by the ACSM technical working group, which built consensus on the key achievements of the ACSM performance indicators against the targets. The technical working group examined the organisation of service delivery and reviewed available literature on facilitators and barriers to increased use of malaria interventions. The findings were presented during a desk review consolidation workshop where counties also engaged in assessing the key malaria ACSM achievements and challenges at county level. The ACSM thematic findings were subjected to WHO external review and validated by the counties.
- Overall, the implementation of ACSM activities rated low at 54.4 percent, but programme communication and community-based malaria interventions ranked well. Weak coordination and low investment in malaria advocacy pulled down the ACSM performance rating.
- Knowledge levels on malaria remained high at 95 percent (Kenya Malaria Indicator Survey 2015, but the use of key malaria interventions had not reached the desired target of 80 percent. There was an increase in long-lasting insecticidal net (LLIN) ownership, from 57 percent in 2010 to 63 percent in 2015; LLIN use increased from 32 percent to 48 percent. Seeking treatment within 24 hours increased, from 59 percent to 72 percent, and prevention of malaria in pregnancy increased, from 11 percent to 38 percent of pregnant women receiving three or more doses of intermittent preventive treatment in pregnancy with sulfadoxine-pyrimethamine.

Introduction

Background

Malaria advocacy, communication, and social mobilisation (ACSM) plays a critical role in creating demand for the increased use of all malaria control interventions. The Kenya Malaria Policy 2010 states that "the Government of Kenya shall ensure that everyone has access to appropriate, accurate and culturally accepted information about malaria prevention, and management so that effective behavioral changes and practices are achieved through multiple channels of communication." The Kenya Malaria Policy is implemented through the Kenya Malaria Strategy (KMS). The fifth objective of the revised KMS 2009–2018 was dedicated to ACSM. To further guide the implementation of malaria ACSM activities, the National Malaria Control Programme (NMCP) implemented the Kenya Malaria Communication Strategy (KMCS) (2016–2021). The objective of the strategy was to increase the use of all malaria control interventions by communities in Kenya to at least 80 percent by 2018. The following implementation strategies were outlined towards achieving the ACSM objective:

- Strategy 1: Strengthen structures for the delivery of ACSM interventions at all levels.
- Strategy 2: Strengthen programme communication for increased utilisation of all malaria interventions
- Strategy 3: Advocate for inter-sector collaboration for malaria ACSM
- Strategy 4: Strengthen community-based social and behaviour change communication (SBCC) activities for all malaria interventions

Policy and Guidance

Backed by the Kenya Malaria Policy (2010) and the KMS, the NMCP implemented the KMCS (2016–2021). At the county level, the NMCP disseminated copies of the KMCS to all the 47 counties. The NMCP further built the capacity of 38 counties on SBCC through which they were able to develop county specific malaria communication plans.

In addition, the NMCP implemented several guides to support counties in implementing community-based malaria control activities, including the following: the Essential Malaria Action Guide for Kenyan Families, which outlines the desired key malaria actions at the household level; a community education training manual for malaria prevention and treatment; and a teacher and pupil guide for promoting malaria prevention and control by school children in Kenya.

Methods

Organisation of Service Delivery and Governance of ACSM

At the national level, Kenya had an ACSM technical working group (TWG) with clear membership guidelines and terms of references (Table 8.1). The TWG is chaired by the head of the Health Promotion Unit at the Ministry of Health (MOH), and the NMCP, through its ACSM focal person, serves as the secretariat. Key members of the TWG include the Community Health Unit, the Reproductive and Maternal Health Unit, and the Neonatal, Child and Adolescent Health Unit. Other members outside the MOH include the Kenya NGOs Alliance Against Malaria, representing the civil society, Population Services Kenya, United States Agency for International Development (USAID)/U.S. President's Malaria Initiative (PMI), UNICEF, the World Health Organization (WHO), PATH, and the Clinton Health Access Initiative. The TWG meets on a quarterly basis to advise on ACSM for malaria control interventions while coordinating partner efforts. The ACSM TWG reports to the Malaria Interagency Coordinating Committee.

Table 8.1: ACSM TWG membership and terms of reference

Chairperson	Head, Health Promotion
Secretariat	ACSM focal person at NMCP
Membership	NMCP; Health Promotion Unit; Ministry of Education; Ministry of Information, Communication and Technology; Community Health Unit; Reproductive and Maternal Health Unit; Neonatal, Child and Adolescent Health Unit; Kenya NGOs Alliance Against Malaria; Kenya Red Cross; Population Services Kenya; Public Relations Officer (MOH); PMI/USAID; UNICEF; WHO; African Medical Research Foundation; World Vision; Malaria No More; Clinton Health Access Initiative; MEASURE Evaluation; PATH; Management Sciences for Health; the private sector; Kenya Medical Research Institute
Purpose	Advise on ACSM for malaria control interventions
Terms of References	Advise on all aspects of ACSM to support malaria control interventions, including research, design, production, dissemination, monitoring, and evaluation Contribute to the establishment of a network linking all stakeholders in advocacy and behaviour change communication for malaria Identify best practices in malaria control and provide technical advice on updating and disseminating appropriate messages and best practices Collaborate with health training institutions on life skills curriculum development for students and teachers (Kenya Institute of Curriculum Development) Report regularly to the Malaria Interagency Coordinating Committee

At the county level, the organisation of ACSM activities is not well structured, despite its being the hub of implementing ACSM activities on malaria at the community level.

Human Resource Training and Capacity Building

To oversee and deliver the malaria ACSM activities, the NMCP has designated two staff—an ACSM focal person and a programme officer. The ACSM focal person reports to the head of the NMCP and coordinates activities through the ACSM TWG. The ACSM focal person also draws support from the MOH Health Promotion Unit.

At the county level, a designated county malaria control coordinator coordinates malaria control activities. In some counties there are sub-county malaria control coordinators. Coordination of malaria ACSM activities at this level is not well structured, despite having a county health promotion coordinator, who coordinates implementation of all health promotion activities, and a county community health services coordinator, who works with and supervises community health workers. The community health workers are instrumental in delivering key health interventions and messages (including on malaria), at the household level. All counties have a number of community health extension workers, who support the delivery of health interventions and messages (including on malaria) at the community level.

Achievement on Key Performance Indicators and Targets

Based on the adapted Kenya Malaria Programme Performance Review tool, the overall achievement of ACSM activities was low at 54.8 percent. Achievements and challenges of malaria ACSM are presented in Table 8.2.

Table 8.2: ACSM performance rating, achievements, and challenges

Strategy	Performance score	Main achievements	Key challenges
Strategy 1: Strengthen the structures for the delivery of ACSM interventions at all levels	32.1%	NMCP revised and printed 1,000 copies of the KMCS that was disseminated to all the 47 counties and partners. NMCP built the capacity of 38 counties on SBCC, through which they developed county communication plans. NMCP held 9 out of the planned 16 ACSM TWG meetings at the national level.	Seven TWG meetings were not held due to decline in partner participation. Facilitation of counties to hold ACSM TWG meetings was not possible due to bureaucratic challenges of releasing the available funds through the Global Fund. Failure to appoint a malaria ambassador due to lack of funds. Failure to provide technical assistance in support of the counties to implement community ACSM activities. This was due to the merger of the planned support supervision that was undertaken at facility level.
Strategy 2: Strengthen programme communication for increased utilisation of all malaria interventions	86.7%	NMCP, with support from partners, developed three ACSM packages for long-lasting insecticidal nets (LLINs), case management, and intermittent preventive treatment in pregnancy (IPTp) that were disseminated through national and regional TV and radio stations under different themes and slogans.	A package on epidemic preparedness and response was not developed due to poor coordination of media activities with different partners disseminating messages under different themes using the same radio and TV stations while targeting the same audience.
Strategy 3: Advocate for inter-sectoral collaboration for malaria ACSM	30%	NMCP successfully held events to commemorate the annual World Malaria Day over four years in different locations. Two out of the eight planned malaria information and advocacy bulletins were produced and distributed.	NMCP did not convene biannual consultative meetings with non-health sector due to lack of an advocacy package. Six malaria information bulletins were not produced due to lack of articles.
Strategy 4: Strengthen community-based SBCC activities for all malaria interventions	75%	NMCP, through its partners, supported community-based malaria control activities at county level. Successfully engaged school children to promote malaria prevention and treatment at community level. Disseminated malaria messages through regional stations and documented four success stories.	Weak monitoring and evaluation and communication mechanism of capturing the community-based malaria control implemented at county level by the NMCP

Results

ACSM Outcome Indicators

The revised KMS 2009–2018 outlined six outcome indicators with targets to measure the progress of ACSM objectives (Table 8.3). All six indicators were measured through biennial or triennial surveys. Only three indicators had baseline values. Indicator 1 had three components covering malaria prevention, diagnosis, and treatment, and hence was difficult to measure appropriately. Indicator 6 measured the actions of health workers and was obtained through health facility-based quality of care surveys. It would be important to measure the proportion of people demanding malaria testing. There was no indicator on IPTp. An indicator on knowledge about IPTp should be included for pregnant women living in the 14 malaria-endemic counties.

Table 8.3: KMS 2009–2018 indicators for ACSM

No.	Indicator	Rate as of Kenya Malaria Indicator Survey 2007 (%)	Target (%)
1	Proportion of people with knowledge on malaria prevention, diagnosis, and treatment	38	80
2	Proportion of people who know that they should be tested for malaria before treatment	Unknown	80
3	Proportion of mothers/caregivers who know that artemisinin-based combination therapy (ACT) is the recommended treatment for malaria	39	80
4	Proportion of individuals who slept under an LLIN the previous night	Unknown	80
5	Proportion of children under five years who slept under an LLIN the night before	39.2	80
6	Proportion of suspected malaria cases presenting to health workers who were tested for malaria using rapid diagnostic test or microscopy	Unknown	100

Situation Analysis

The situation analysis considered the strengths, weakness, opportunities, and threats of ACSM (Table 8.4). The analysis also reviewed the political, economic, social, technological environment, and legal aspects that had an implication on the implementation of ACSM in Kenya. As part of the analysis, recommendations made during the previous malaria programme review were reviewed (Annex 8.1).

Table 8.4: Analysis of strengths, weaknesses, opportunities, and threats of ACSM

Strengths	Weaknesses
▪ Availability of an updated KMCS 2016–2021 to guide the implementation of ACSM ▪ Existence of an ACSM focal person and programme officer at NMCP ▪ Existence of a functional ACSM TWG with terms of reference and membership. ▪ 80 percent of the counties have malaria communication plans in place ▪ ACSM well supported by active implementing partners at the national level ▪ A few counties have partner support for ACSM ▪ Access to information on ACSM through Kenya Malaria Indicator Survey (KMIS) reports and USAID/PMI-supported qualitative studies	▪ Inadequate profiling of ACSM, hence low funding allocation ▪ Weak partner engagement ▪ Minimal investment in malaria advocacy and failure to appoint a national malaria ambassador ▪ Inadequate implementation of the ACSM monitoring and evaluation framework ▪ Inadequate support to all malaria interventions, especially epidemic preparedness and response ▪ Weak multi-sectoral collaboration ▪ Insufficient human resources, capacity, and skills at NMCP on ACSM
Opportunities	**Threats**
▪ With the media digital migration, many communication channels have been opened. ▪ Devolution offers an opportunity for focused interventions and advocacy at the county level. ▪ Private sector that can support malaria is available. ▪ The existence of the Community Strategy Unit offers a structure for the delivery of community-based malaria control activities. ▪ There is legislation to support malaria prevention control (Cap 246) and the government's big four agenda that includes health is an opportunity for scaling up delivery of malaria interventions and messages.	▪ Reduction of malaria prevalence poses a threat to future funding and investment on malaria ▪ Competing activities in the NMCP and at the MOH level ▪ Slow and bureaucratic procurement and financial flow process within the government ▪ Negative publicity and sensational stories against malaria by the media

Analysis of Political, Socio-Economic, Technology, and Legal Aspects Affecting Malaria ACSM

During the last election period, delivery of ACSM messages was hampered by politicians booking all the media space, outdoor broadcasting vans, and printing companies. Rising political tension following the post-election resulted in the delay of mass LLIN distribution in parts of the country. Malaria presents a significant social and economic burden, affecting many sectors of the community. This is an opportunity to engage more stakeholders in its control.

The digital migration opened more radio and TV stations and increased ownership in mobile telephones among Kenyans. This increased avenues of reaching the population through social media—through Twitter, Facebook, and Instagram, among others. A Malaria Prevention Act Cap 246 (rev 2012 [1983]) can be used to the benefit of malaria control.

Implementation of ACSM at the County Level

Nine counties selected to represent the five malaria epidemiological zones were involved in the malaria programme review process. These counties ranked implementation of ACSM on a scale of 4 out of 5 and outlined key achievement and challenges, as shown in Table 8.5.

Table 8.5: ACSM scoring, achievement, and challenges at the county level

Scoring	Achievements	Challenges
4 out of 5	▪ Support for community malaria control activities ▪ Commemoration of World Malaria Day	▪ Allocated resources not accessible [the case of 2 counties that secured funding but funds not availed] ▪ Lack of partner support for malaria control ▪ Low coverage of ACSM at the community level ▪ Lack of political buy-in for ACSM ▪ Few stakeholders for ACSM at the subcounty level

Summary of ACSM Enablers and Constrainers

Enablers

The KMCS at the national level and communication plans at the county level guided the implementation of ACSM activities. The government policy of free provision of services and commodities to communities was the most important factor that contributed to the coverage levels achieved in the major interventions of case management (LLINs, indoor residual spraying [IRS], and IPTp). The high antenatal care (ANC) attendance level at 94 percent (KMIS 2015) and availability of sulfadoxine-pyrimethamine (SP) facilitated IPTp uptake, while health workers' practice of Direct Observed Therapy (DOT) led to high levels of IPTp adherence.

The NMCP's collaboration with a range of partners in the MOH, other government ministries and departments, community structures, and community-based and civil society organisations across the country has enhanced advocacy and mobilisation of Kenyans for malaria control at the community level. These collaborations have also increased the engagement with media houses to disseminate malaria messages through various radio stations. The availability of community health extension workers and community health volunteers assisted in conveying key malaria interventions and messages at the household level.

Constrainers

ACSM was hindered by weak coordination at the national and county levels. National TWG meetings were not held regularly, due to decline in partner participation. There was poor facilitation for counties to hold ACSM TWG meetings due to bureaucratic challenges in releasing the available funds. Lack of resources led to failure in appointing malaria ambassadors and minimal financial and technical support for counties to implement community ACSM activities.

Advocacy efforts were not as effective, given that the NMCP did not convene biannual consultative meetings with the non-health sector and could not produce six malaria information bulletins. Monitoring and evaluation of ACSM activities was inadequate because there was no mechanism of capturing the community-based malaria control implemented at county level. Finally, investment in ACSM was quite minimal, with only 1 percent of the total malaria pogramme budget allocated to ACSM.

Barriers to increase use of malaria interventions included the following: socio-cultural factors, myths, and beliefs; sleeping spaces; allergies; and LLIN use fatigue. Alternative inappropriate use of LLINs remained a key challenge. Barriers to IPTp or SP use during ANC included late ANC attendance, with most women seeking ANC services during the second trimester, inadequate access due to transport challenges and distance, fears that the drugs may affect the unborn baby, healthcare providers' attitude, and providers' inability to communicate with their client to inform them why they are administering SP.

Other barriers to seeking care included long waiting time at the health facilities, stock-outs, and preference for self-treatment. Barriers to increased use of malaria interventions varied from county to county; hence the importance of understanding county specific contexts. Table 8.6 elaborates on the facilitators and barriers to increased use of malaria control interventions.

Table 8.6: Facilitators and barriers to increased use of malaria interventions

Intervention	Facilitators	Barriers
LLINs distributed through mass campaigns and routine child welfare and antenatal clinics. Distributed at no cost to the beneficiary.	▪ The Government of Kenya distributed more than 36,998,283 LLINs between 2014 and 2018.3 ▪ The distribution of LLINs at no cost facilitated increased ownership of LLINs at HH level. ▪ Through this distribution, LLIN ownership increased to 63 percent; however, the use of LLINs remained low at 40 percent (KMIS 2015).	▪ Culture, myths, and beliefs; sleeping spaces; allergies; and LLIN fatigue (USAID PMI qualitative study 2017) ▪ On further analysis the reasons varied by counties, for example: ▪ Kwale: LLINs associated with the corpses ▪ Migori: LLINs associated with infertility ▪ Narok: Migration of the pastoralist communities hindered use of LLINs ▪ Alternative use of LLINs—communities had varied alternative uses of LLINs (e.g., fencing, fishing, decorations). Sanctions to mitigate alternative uses were recommended.
IRS: Implemented in few selected counties	IRS is applied at no cost to the beneficiaries, it is generally accepted.	Not identified, although there were complains about bed bugs in structures sprayed.
Prevention of malaria during pregnancy ▪ IPTp: Recommended for pregnant women living in malaria-endemic areas Pregnant women in the designated areas should receive three doses of IPTp using SP ▪ Sleeping under an LLIN use during pregnancy	▪ ANC attendance was 94 percent (KMIS 2015). ▪ However, only 56 percent of pregnant women received at least two doses of IPTp, and 38 percent received at least three doses. ▪ The recommendation and practice to administer SP as DOT promoted adherence. ▪ Generally, there were no stock-outs of SP.	▪ Although DOT was an enabler, pregnant women did not get information on the purpose of the three tablets dispensed (USAID/PMI qualitative study). ▪ Late ANC attendance, with most women seeking ANC services during the second trimester ▪ Inadequate access due to transport and distance factors ▪ Fears that the drugs may affect the unborn baby ▪ Attitude towards healthcare that inhibits women from seeking ANC services
Malaria case management KMS aimed at the following: ▪ 80 percent of all self-managed fevers should receive prompt and effective treatment ▪ 100 percent of all fever cases who present to health workers receive parasitological diagnosis and effective treatment	▪ The government provided malaria diagnostics and treatment to all public health facilities. ▪ Treatment for malaria was offered at no cost at public health facilities. ▪ 72 percent of the respondents sought advice or treatment for children with fever. ▪ 39 percent were tested. ▪ 25 percent were treated with an ACT as recommended. ▪ Only 15 percent were treated with ACT within 24 hours as recommended.	▪ Care-seeking practice varied depending on location. ▪ In predominantly urban settings, care was sought mainly form hospitals. ▪ In predominantly rural settings, traditional healers appeared to be the first point of care mostly for severe symptoms in children. ▪ Barriers to care-seeking included long distances to health facilities, long waiting time at the facilities, stock-outs, and preference for self-treatment. ▪ For malaria diagnosis, it was primarily the action of the health workers that determined whether testing was done.

Lessons Learnt

- There is a great need to strengthen advocacy at the national and county levels by placing it strategically within the programme management for policy, resources mobilisation, and increased use of interventions.
- There is need to strengthen the malaria control programme at county level to guarantee the coordination and delivery of ACSM activities.
- Communication between the NMCP and the counties should be strengthened so that the NMCP can capture and report on the community-based malaria control activities.
- Barriers to increased use of malaria interventions differ in every county. Counties need to identify specific issues and address them appropriately.
- There is limited qualitative information on malaria ACSM, hence need for more qualitative studies on malaria.

Recommendations

As part of the 2018 malaria programme review, the ACSM thematic review made the following recommendations:

Advocacy for malaria at the national and county levels

- Scale up malaria advocacy at the national and county levels for increased domestic resource mobilisation, allocation, and disbursement for increased use of malaria interventions.
- Counties should undertake an analysis of the barriers to increased use of malaria control interventions and tailor their specific ACSM approaches and messages to address their barriers.

ACSM messaging

- Develop standard messages for adaptation and contextualisation by the counties and other stakeholders.
- County-specific SBCC planning and implementation should be strengthened.
- Investments in healthcare provider communication and behaviour change should be increased at all levels.
- Healthcare provider knowledge on new guidelines should be updated at all levels.
- Interpersonal communication should be rolled out to address behavioural barriers for attainment of national targets.

Community engagement

- Leverage the community strategy to deliver community-based malaria control activities.
- Support community engagement for social accountability for malaria.
- Enhance the engagement of private and non-health sectors to undertake ACSM for malaria with clear mandates and guidelines.
- Mainstream gender and human right approaches in ACSM to ensure an inclusive reach that targets vulnerable and marginalised populations.

Conclusions

ACSM Programme Performance

Overall, the implementation of ACSM activities rated poorly at 54.4 percent, and programme communication and community-based malaria interventions ranked well. Weak coordination and low investment in malaria advocacy pulled down the ACSM performance rating.

ACSM Outcome Indicators

Knowledge levels of malaria remained high at 95 percent (KMIS 2015), but the use of key malaria interventions had not reached the desired target of 80 percent. There was an increase in LLIN ownership, from 57 percent in 2010 to 63 percent in 2015; LLIN use increased, from 32 percent to 48 percent; seeking treatment within 24 hours increased, from 59 percent to 72 percent; and prevention of malaria in pregnancy increased, from 11 percent to 38 percent of pregnant women receiving three or more doses of IPTp-SP.

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Annex 8.1: Assessment of Implementation of Previous Malaria Programme Review Recommendations

Recommendation	Fully implemented	Partially implemented	Not implemented	Comment
Conduct an assessment and review of ACSM structures and capacity to profile ACSM as a key intervention for malaria control			X	ACSM is still not highly profiled.
Review, produce, and disseminate ACSM policy guidelines	X			KMCS was reviewed and disseminated to all counties.
Increase investment and support for ACSM to sustain communication		X		Some activities were funded, but others were not funded.
Link malaria control with other development programs. In this manner communities will be sustainably involved.			X	NMCP did not engage the other non-health sectors for increased advocacy.
Leverage the media as a strategic partner in communication for behaviour change		X		Media engagement was visible, with multiple partners airing various messages, although coordination should be improved
Strengthen monitoring and evaluation and social research on ACSM			X	No investment on ACSM research.

Chapter 9:
Epidemic Preparedness and Response

Key Messages from This Chapter

- Epidemic preparedness and response (EPR) falls under the third strategic objective of the revised Kenya Malaria Strategy 2009–2018. The overall performance rating for this objective in the 2018 malaria programme review was very low at 26.3 percent. This objective had only two strategies, which had a performance rating of 34 percent and 23 percent respectively. Only 67 percent of the recommendations made for this objective during the mid-term review were fully implemented.
- The malaria EPR objective was not implemented optimally in the last phase of Kenya Malaria Strategy 2009–2018, due to low investment, weak linkages between EPR and surveillance, inadequate coordination at all levels, and limited capacity to undertake effective EPR activities.
- The EPR thematic review team recommended integrating EPR into surveillance activities at the county, sub-county, and national levels. Further, the NMCP should build the capacity of the health facility staff at EPR sentinel sites to routinely provide timely, accurate, and reliable weekly data and set thresholds to detect epidemics. Surveillance training manuals and terms of reference for surveillance, monitoring, and evaluation technical working groups should also be revised to incorporate EPR functions.

Introduction

Background

Malaria control in epidemic-prone areas presents a different challenge from that in endemic settings. When epidemics occur in non-immune or semi-immune populations, mortality rates are relatively high across all age groups. Epidemics are often sudden and unexpected, and prevention, control, and response strategies need to accurately target the outbreak. The impact of epidemics can be minimised with effective implementation of epidemic preparedness and response (EPR) plans at the local level.

The previous National Malaria Strategy recommended EPR as the strategy for prevention and control of malaria epidemics (Ministry of Health [MOH], 2001). With the vast improvements made in the area of EPR, the indoor residual spraying (IRS) strategy changed to a response tool in the counties at risk of epidemics. With the sustained deployment of malaria vector control tools, the epidemiology of malaria has changed over the years in Kenya. For example, in the period under review (2014–2017), malaria epidemics were significantly reduced (MOH, 2014). The magnitude, severity, and frequency of the epidemics have also decreased. Recently, however, there has been an increase of malaria cases in some of the counties, notably in Meru (Igembe North, 2016), Uasin Gishu (long rainy season, April–June), Baringo, Marsabit, and Turkana (2017). These upsurges were more localised and occasioned by short heavy rains in September 2017.

Although Kenya has made remarkable progress and achievements in the area of malaria EPR, much more effort is still required to meet the desired targets. This review identified the current state of EPR, capacity and structures, and challenges and problems; it also made recommendations for malaria EPR in Kenya.

Policy and Guidance

Policy

Kenya does not have a malaria EPR specific policy. There are, however, EPR-specific policy statements in several documents, notably the National Malaria Policy (2010), revised Kenya Malaria Strategy (KMS) 2009–2018, and the integrated disease surveillance and response guidelines (Ministry of Public Health and Sanitation, 2012). In the revised KMS 2009-2018, the objective for EPR was to ensure that all malaria epidemic-prone counties and sub-counties have strengthened capacity to detect, prepare for, and respond to malaria epidemics by 2018 (MOH, 2014). As a part of the health management information system and integrated disease surveillance, epidemic-prone counties and sub-counties were to establish an effective early warning and detection system.

According to the revised KMS 2009–2018, strategies recommended for management of epidemics included a Malaria Early Warning System (MEWS), improved prevention through timely vector control, and strengthened case management through effective antimalarial medicines and community sensitisation. IRS was recommended for use only in epidemic-prone sub-counties for response to detected epidemics. Use of IRS as an early response measure to malaria epidemics became a policy in 2010. Before this, there was a sustained deployment of vector control tools in areas under risk of epidemics. This significantly reduced malaria epidemics in the epidemic-prone and seasonal transmission counties.

The national malaria policy stipulates that counties and sub-counties prone to malaria epidemics shall establish and maintain effective early warning and detection systems that are part of routine integrated disease surveillance. Further, such sub-counties are to use available data to plan and respond in a timely manner to prevent and contain malaria epidemics. These policy statements are adequate to guide EPR.

Guidelines

Kenya developed comprehensive EPR guidelines in July 2011 (Ministry of Public Health and Sanitation, 2011). These guidelines adequately addressed the different aspects of malaria epidemic management, the roles of the different levels of management of epidemics, and the involvement of other partners. However, when the health functions were devolved to the county level, a number of functions and roles changed. As a result, this document will require revision to align it to the devolved system and reflect the current landscape in terms of EPR. There is no malaria EPR-specific training module; however, there is a training module in the malaria surveillance training curriculum (MOH, 2013a).

Methods

Organisation of Service Delivery

At the national level, emergency-response is a function of the Disease Surveillance and Response Unit (DSRU) and the Health Disaster and Emergency Unit. These entities provide technical capacity and policy guidelines, but the actual work is done by the county health management teams (CHMTs). At the county level, all the functions of malaria EPR are handled by the county malaria coordinator in the CHMT. There is a disease outbreak management team at the county and sub-county levels whose responsibility includes malaria outbreaks. At the national level, a malaria EPR focus area comprises two staff (one focal person and one technical officer). The function of the focus area is to support the overall technical guidelines and policy with respect to malaria EPR in the National Malaria Control Programme (NMCP). The focus area also facilitates technical support to the counties with respect to all EPR-related activities. To perform optimally, there is a need to strengthen the technical composition of the team with a well-trained epidemiologist, public health officers, and technicians. The unit has good training and technical skills in malaria EPR, but it is in need of human resources.

The private sector also plays a critical role in malaria EPR. During malaria epidemics, private hospitals and clinics receive an influx of malaria patients. Private clinics also play a role in surveillance and detection of outbreaks by providing data for the health management information system. Even though it plays a crucial role, the private sector has not been adequately involved in EPR activities like training.

Service Delivery Structures

Service delivery structures in the context of EPR are centred on EPR activities explained as follows:

Forecasting (Prediction)

NMCP can predict the potential for malaria outbreaks using epidemiological and meteorological information. Epidemic-prone counties have been trained on simple analysis of retrospective data using thresholds for epidemic detection. Thresholds were established for some counties and are updated annually. These thresholds show deviations in malaria morbidity patterns from the normal levels established over the years (Kirinyet, Ngetich, & Juma, 2016).

Preparedness

CHMTs in epidemic-prone and seasonal transmission sub-counties have been trained in all aspects of malaria EPR. In the recent past, numerous efforts were directed to capacity development and training at the different levels of management and implementation. Devolution of health functions to the county level has brought challenges in which counties experience high turnover of staff at the county and subcounty levels. This, coupled with limited capacity of the staff at this level, impedes service delivery and calls for continuous training of new officers to implement EPR activities (MOH, 2013b). In addition, commodities and drugs for malaria epidemic response need to be in place at both county and sub-county levels.

The integrated disease surveillance and response guidelines dictate that frequent plotting of malaria cases for trend lines is an important strategy towards epidemic preparedness. Kisii County is one of the areas at high risk of malaria epidemics. Concerted efforts from the county government, NMCP, and partners in terms of control and preparedness has helped reduce the number of malaria cases and actual epidemics reported in these highlands in the recent past. Five members for the CHMT were trained, and the county developed a five-year malaria EPR plan (2014–2018). This county has also appointed malaria focal persons at the sub-county level. However, the sub-county malaria coordinators have not been trained, although mentorship and on-the-job training is conducted. Another county that reported adequate preparedness for malaria epidemics was Kirinyaga, which had adequate commodities (rapid diagnostic tests kits and antimalarials) to respond to any detected malaria cases.

Reporting for malaria data, however, remains a challenge. This is further compounded by low staffing levels, inadequate capacity of the existing staff, and lack of basic equipment and infrastructure (Mbuli, 2016; Onkoba, et al., 2017). Other challenges that impede service delivery include low prioritisation of EPR at levels and limited funding.

Uasin Gishu, another malaria epidemic county, was chosen for in-depth analysis during the 2018 malaria programme review. This county was given technical support for the preparation of a four-year malaria EPR plan (Mulambalah, 2018). However, sub-counties did not prepare their EPR plans due to a lack of funding. Recent sub-county studies in Uasin Gishu showed that reporting for malaria was at 92 percent, with only one-third of the 45 health facilities plotting trend lines for malaria cases (Kirinyet, Ngetich, & Juma, 2016).

Early Warning

In the past when the country experienced several malaria epidemics, specifically in the highlands, several attempts were made to develop a MEWS. However, these attempts proved difficult to consistently run as part of a routine, efficient MEWs. To date, there is no single agreed-upon MEWS in place for use at the national level. The highland malaria project, for example, demonstrated the potential of using weather, entomological, parasitological, and case parameters for malaria epidemic prediction. The operational investments involved made this surveillance system difficult to sustain. Nzioka and Ndegwa (2011) made an attempt to develop a model for malaria early warning. The model used epidemiological data from two health facilities in each of these counties: Trans-Nzoia, Nandi, Kericho, and Kisii. This model relied on climatic and epidemiological variables. It reported that a malaria epidemic was observed three months after the onset of the right climatic conditions. As a result, the project recommended installation of automatic weather stations, deployment of the requisite software, and capacity building at the district level. Ultimately, the project never progressed to implementation due to the operational challenges and complexities involved.

Githeko et al. (2014) included topography and the shape of the valleys in another model to predict malaria epidemics in the highland of East Africa. Although the model is applicable at these sites, it is limited by the malaria control tools in place. Most of the existing models are climate variable based and do not take into account the control tools and immunity of the population. In addition, the models are site specific, and a country-wide application is limited. Studies conducted in seasonal transmission zones of Garissa and Wajir suggested that atypical environmental conditions can herald a malaria outbreak (Maes, et al., 2014). This should then alert responsible stakeholders about the need to act rapidly and preemptively with appropriate and wide-scale vector control interventions to mitigate the risk. Studies in Baringo County also found a time lag of two months between the peak of climatic variable and malaria transmission (Kipruto, et al., 2017).

Rapid Response

Minimising the impact of a malaria epidemic relies on early and timely response with implementation of effective control measures at the point of detection (Kirinyet, Ngetich, & Juma, 2016; Githeko & Ototo, 2017). Early detection should be matched by early response. Overall, rapid response to malaria epidemics and upsurges of malaria cases has not been timely or well-coordinated. This is attributed to weak epidemic detection and consequently lack of rapid response. The EPR focus area at NMCP has been working closely with DSRU and partners to address these

challenges. No major malaria epidemics have occurred in Kenya in the recent past, although there were increases in malaria cases in Marsabit, Turkana, and West Pokot. Response teams responded promptly to these increases in malaria cases. The following paragraphs highlight some of the epidemic response activities conducted during malaria upsurges reported in the recent past in different counties.

In early 2016, the United Nations High Commissioner for Refugees alerted the Centers for Disease Control and Prevention (CDC) in Kenya to a significant increase in malaria cases in the Kakuma Refugee Camp. The camp, located in the north-western part of Turkana County, is home to approximately 200,000 refugees, with an additional 10,000 local residents living near the camp. As a result, CDC Kenya's Global Migration and Malaria Programs conducted a rapid assessment of malaria epidemiology and control measures. The team confirmed that a malaria outbreak had occurred from December 2015 to March 2016, which stretched the response capabilities of the camp's health clinics. The camp health team conducted an IRS campaign in the camp to respond to the outbreak. The team also distributed enough long-lasting insecticidal nets (LLINs) to achieve universal coverage. This collaborative effort by the United Nations High Commissioner for Refugees , CDC, and nongovernmental organisations led to the procurement of more than 70,000 bed nets, protecting nearly 30,000 homes, schools, and other structures in the camp (CDC-Kenya, 2016).

In 2017, there was a prolonged drought in Kenya, followed by heavy rains in October. This caused heavy flooding, resulting in an upsurge of malaria cases in Turkana County (Turkana East, Turkana North, and Kirbish sub-counties) and Marsabit County (North Horr sub-county). In partnership with MENTOR Initiative, the MOH implemented large-scale vector control activities in communities at high risk of malaria. This initiative reinforced effective case management services through technical training of health workers and public health staff on diagnosis and management of malaria and other vector-borne diseases. Vector control commodities (LLINs), essential diagnostics (rapid diagnostic tests), and antimalarial medicines were rapidly stocked. In addition, weekly malaria surveillance and reporting in high-risk areas was reinforced, and integrated information and education campaigns were conducted (MENTOR Initiative, 2018).

A number of partners working in collaboration with the MOH responded to malaria outbreaks in Turkana, Baringo, and Marsabit Counties in 2017. UNICEF, in partnership with the Kenya Red Cross and the MOH, undertook a two-month emergency response initiative that provided primary healthcare services to all children under five years of age and pregnant women in arid and semi-arid counties. This partnership provided the essential package of care through integrated health services by mapping and supporting outreach services and functional health facilities to ensure that children under five years of age and pregnant women were targeted. Community health volunteers were also deployed to households for hygiene promotion, disease prevention, and referrals where necessary, to meet an increased demand in integrated health and nutrition services (https://www.unicef.org/kenya/media_20421.html).

Human Resource Training and Capacity Building

Currently, the EPR focal area at NMCP has been focusing on planning and skills development for counties. The training aspects focused on providing technical support for preparing annual EPR plans and updating the epidemic thresholds for the counties. It is expected that the counties will then scale this down to the sub-counties. Further, the unit has been providing technical support in malaria outbreak investigation and confirmation. This support has been provided in all of the 26 epidemic-risk counties. On average, five staff per county were trained annually from 2014 to 2017. This training was conducted just before the beginning of long rainy seasons. With devolution, there is a need to have an EPR team and plan at the sub-county and lower levels. This activity, however, has been hampered by limited funds for the financial year 2017/2018. The 26 counties were not able to cascade this training and planning to the sub-counties due to lack of funding. To increase capacity for EPR, there is need to include subcounty level staff in the training offered by NMCP.

In the past, collaborative efforts from the NMCP, KEMRI, and MoH trained staff from the highland epidemic prone counties on piloting prediction and decision support for epidemic preparedness and response. The Kenya Meteorological Department, the Kenya Medical Research Institute (KEMRI), and NMCP have been running an

epidemic prediction model (Githeko, et al., 2014), and monthly bulletins and results are shared with the NMCP. The Inter-Governmental Authority on Development Climate Prediction and Application Centre also runs a regional seasonal climate outlook in which the NMCP participates, and the outcome helps plan the EPR.

Over the years, capacity for the national EPR focal person has been built on in-depth analysis of the entomological, epidemiological, and meteorological data to develop early warning and detection systems for malaria epidemics. However, local county use of data for decision making has been challenging, and routine monitoring of malaria upsurges is largely inconsistent. This is further confounded by inadequate human resources at the county and sub-county levels.

Governance and Partnerships

Partnerships are fundamental to improving coordination of malaria control activities and initiatives. The current KMS (2009–2018) does not have an EPR-specific technical working group (TWG). The technical aspects of EPR are supported by the other TWGs (case management; vector control; surveillance, monitoring, evaluation, and operational research [SMEOR]; advocacy, communication, and social mobilisation; and malaria in pregnancy). An epidemic management steering committee is constituted on an ad hoc basis whenever there is a likelihood of an epidemic. This steering committee comprises relevant MOH units and malaria partners. The purpose of this committee is to mobilise resources for prevention and response and to provide oversight and coordination for epidemic response and containment. Routinely, the NMCP EPR focal point works closely with the DSRU on weekly surveillance and response for reported malaria outbreaks. There are no scheduled meetings, but there are health and nutrition quarterly meetings during which the programme is represented and malaria outbreaks may be discussed.

Partners who have supported malaria EPR include WHO, the UK Department for International Development, USAID, UNICEF, and the Red Cross. The UK Department for International Development has supported surveillance, which also generates data used for malaria epidemics. Currently, there is a strong collaboration between NMCP and KEMRI, through which EPR research-related needs could be addressed.

Strategic Annual Planning

Strategic and annual business plans for malaria EPR form part of NMCP's operational plan. Countyspecific malaria EPR plans are updated annually. Annual business plans outline malaria EPR budgets, activities, roles, and responsibilities. These plans are part of the overall NMCP business plan.

Involvement of Communities in Preventative Interventions

Community perceptions and acceptability is critical for the implementation, sustainability, and ownership of any epidemic preparedness plan. Currently, there are no preparedness teams at the community level, and communities have not been significantly involved. Community involvement and participation in malaria EPR was not expressly captured in the current malaria strategy.

Results

Achievement of Key Performance Indicators and Targets

The NMCP revised the National Malaria Strategy in 2014. Part of the revision entailed ensuring that all malaria epidemic-prone districts have the capacity to detect outbreaks and are prepared to respond to malaria epidemics annually through capacity strengthening for EPR by 2018. To date, no functional MEWS has been developed in Kenya, although some epidemic-prone counties have informal detection and reporting. Response and control of malaria epidemics in the past has not been well coordinated. Overall, the performance for the EPR objective in the revised KMS 2009–2018 was 26.3 percent. The performance of the two strategies under this objective was 34 percent

and 23 percent (Table 9.1). A number of targets and tasks in the KMS were not achieved due to funding challenges and lack of clear specifications on the role of the national and county governments in implementing EPR tasks (Table 9.2). Further, a few of the targets were unclear and could not be verified because there was no evidence that they were conducted.

Table 9.1: Level of achievement for performance indicators

Strategy	Performance score	Main achievements	Key challenges
Strengthen early detection systems for malaria epidemics in epidemicprone and seasonal transmission areas	34%	Staff were trained on MEWS	Limited funding Unclear tasks and activities Some targets were not phrased clearly
Strengthen capacity for EPR	22.8%	Counties were trained on EPR plans and the plans developed	Limited funding Unclear tasks and activities Some targets were not phrased clearly

Table 9.2: Performance EPR indicators in the KMS

Indicator	Target- 2017	Achievement	Comments
Proportion of sub-counties in epidemic-prone and seasonal transmission areas with at least five sentinel sites	100%	40%	Total: 26 counties, 126 sub-counties (50 highland/epidemic-prone and 76 seasonal transmission), of which 50 had the required 5 EPR sentinel health facilities
Proportion of sentinel health facilities in targeted epidemic-prone and seasonal transmission areas for monitoring and reporting current thresholds	100%	40%	Analysis was done at a sub-county level by a surveillance officer. The sentinel site lacks capacity, due to staff shortages and high staff turnover.
Proportion of target counties and sub-counties with reviewed malaria EPR plans	100%	100% at county level, 0% at subcounty level	When split in two, the indicator achievement was 100% for counties and 0% for sub counties. Counties did not cascade EPR plans to sub-counties due to devolution challenges and lack of resources.
Proportion of malaria epidemics detected and reported within two weeks of surpassing action threshold	100%	100%	All seven upsurges/outbreaks were reported and responded to in two weeks Need to revise indicator to: responded within two weeks
Proportion of detected epidemics properly managed as per the EPR guidelines	100%	-	Source of data was post epidemic evaluation reports, which were not done, although all seven outbreaks were responded to and contained

Performance in Implementing

Mid-term review Recommendations: Only 67 percent of the EPR mid-term review recommendations were fully implemented. Some of the indicators presented were not appropriately stated (SMART) and could not be measured at the end of the strategy period. In addition, some of the indicators and activities that were meant to be conducted by the county and sub-counties were included in the KMS. In this case, it was not clear how NMCP would be evaluated on these indicators in if these two levels failed to undertake the activities.

Epidemic Reporting, Reviews, and Evaluations

At the time of this review, there was no formal system of recording reported epidemics, and some local outbreaks may have gone unreported. Although there were documented reports on response to reported epidemics, the outbreak response teams usually ignored the requirement to do a post-mortem after the epidemic.

During outbreaks, facilities and sub-counties are required to submit line list data of cases and deaths occurring. A detailed study of health facilities in Eldoret West sub-county in Uasin Gishu County showed that reporting rates were above 90 percent. However, only a third of the 45 health facilities surveyed plotted the trend lines for the malaria cases reported. Generally, consistent plotting, detection, and local decision making is a challenge for health facilities and worsens in health facilities in the seasonal transmission zones. EPR strategies are relatively new in these zones, compared to the highland epidemicprone areas, which have a long history of monitoring, reporting, and responding to malaria epidemics.

Analysis of EPR Strengths, Weaknesses, Opportunities, and Threats

A strengths, weaknesses, opportunities, and threats (SWOT) analysis of the EPR thematic area was conducted.

Table 9.3: Summary of the SWOT analysis

Strengths	Weaknesses
▪ Existence of a functional integrated disease surveillance system ▪ Sentinel sites for monitoring malaria cases in EPR zone ▪ Strong linkages among the NMCP,DSRU, public health emergency, Health Emergency Response and Disaster Management, meteorological department, and Inter-Governmental Authority on Development Climate Prediction and Application Centre ▪ Availability of systems to address epidemics and emergencies: DSRU, Health Emergency Response and Disaster Management, national operation centre	▪ Poor decision making to match early detection and response ▪ Inadequate human resources and capacity for EPR ▪ Weak epidemic detection and prediction ▪ Lack of a regular malaria EPR coordinating mechanism (TWG) ▪ Unclear roles and responsibilities between DSRU and NMCP ▪ Lack of post-epidemic assessment ▪ Limited community involvement and participation ▪ Inadequate support for EPR from MOH and partners ▪ Lack of an operationally functional MEWS ▪ Weak operational research in EPR

Opportunities	Threats
▪ Universal Health Coverage agenda an opportunity to improve response in epidemic situations ▪ WHO Global Technical Strategy for Malaria ▪ Partners supporting malaria control ▪ Devolved health services ▪ Availability of technology and innovations ▪ Climate change action plan 2018/22 emphasized malaria ▪ Availability of global climate funding mechanisms ▪ Community health structures in place ▪ Existence of research institutions to conduct research on malaria EPR	▪ Frequent industrial actions by health workers (malaria upsurges in 2017 were due to breakdown of health services because of prolonged health workers strike) ▪ Migrant and mobile populations ▪ Non-prioritisation of EPR activities, especially at county level ▪ Climate change and variability

Success Stories, Best Practices, and Facilitating Factors

The fact that there has not been a major malaria epidemic in the period under review is a major success story. DSRU, through sub-county surveillance coordinators, provides data for plotting thresholds at local levels. In addition, NMCP has been receiving weekly surveillance bulletins that help in assessing the malaria situation in the country. There is also a strong collaboration between the NMCP and counties for training and EPR planning. Strong collaboration among NMCP, DSRU, partners, and counties has led to a timely response to some reported upsurges in malaria cases. Collaboration between NMCP and the Kenya Meteorological Department has resulted in information that is used for predicting malaria upsurges.

Operational Research

There have been efforts from individual institutions to investigate preparedness and response to malaria epidemics in the epidemic-prone areas (Kirinyet, Ngetich, & Juma, 2016; Maes, et al., 2014). However, little operational research has been done on malaria EPR. One key area of interest is developing functional models that account for enabling and confounding factors to accurately predict malaria epidemics.

Key Issues and Challenges

Even though significant achievements have been made in malaria EPR, a number of challenges still persist. One major issue facing malaria EPR is inadequate funding to support EPR activities at national, county, and sub-county levels. Currently there are limited inter-county and cross-county collaborations. Other challenges identified include the following:

- Limited use of available data for decision making for planning and response
- Limited post-mortem assessment of reported outbreaks
- Limited capacity for malaria EPR at county and sub-county levels and high turnover of the few trained staff
- Low prioritisation of EPR at all levels
- Lack of EPR coordination mechanisms (e.g., TWG)
- Complex collaboration mechanisms between national and county governments brought about by devolution
- Limited malaria early warning models, leading to lack of accurate and operational early warning tools
- Knowledge gaps in the interactions among climate, vectors, environmental, social factors, and the disease
- Weak EPR surveillance, especially in the seasonal transmission counties

- Unclear description of responsibilities of communities, leading to limited community engagement in malaria EPR
- Unclearly defined EPR roles and responsibilities between NMCP and DSRU
- Limited reporting of EPR activities conducted at county and sub-county levels to the national level
- Low quality (completeness, timeliness and accuracy) of routine epidemiological data for epidemic prediction and detection

Recommendations

- Integrate malaria EPR with surveillance at the national, county, and sub-county levels.
- At NMCP, integrate EPR activities into the SMEOR TWG and re-profile EPR functions into surveillance activities.
- Revise SMEOR TWG terms of reference, surveillance manuals, guidelines, and SOPs to include EPR functions.
- Build infrastructural and human resource capacity at EPR sentinel sites to be able to routinely provide timely, accurate, and reliable data to set and monitor epidemic thresholds.
- National, county, and sub-county teams should include EPR strategies in their broader surveillance activities to ensure coordinated implementation and resource mobilisation.
- Include strategies for strengthening forecasting and prediction, MEWS, research and technology, innovation, and multi-sectoral collaboration.
- Include risk communication, training and mentorship, coordination mechanisms, guideline review, and resource mobilisation in EPR capacity-building strategies.
- Include the following in EPR response strategies: rapid assessment; timely response and coordination; vector control (IRS and LLINs); case management; advocacy, communication, and social mobilisation; and community engagement.

Conclusions

Findings of this review indicate that malaria EPR objective was not implemented optimally in the last phase of the KMS 2009–2018. There were obvious systemic, operational, and coordination challenges between the national and county governments in implementing EPR activities. Prioritisation of routine EPR activities, especially at the county level, was low. This was further compounded by lack of funding for EPR strategies in the KMS 2009–2018. In view of this, the previous recommendations were made to improve the strategic direction of EPR in the next KMS.

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Chapter 10:
Surveillance, Monitoring and Evaluation, and Operational Research

Key Messages from This Chapter

- Chapter 10 provides a review of the epidemiology of malaria and performance of the surveillance, monitoring, evaluation, and operational research thematic area in ensuring that malaria indicators were routinely monitored and evaluated during the period 2013–2017. Objective 4 of the strategic plan aimed at ensuring that all malaria indicators were routinely monitored and evaluated by 2018.
- A wealth of information had been made available through the completion of surveys, production of surveillance bulletins, evaluation of malaria control interventions, and availability of data from routine health information systems and quality of care facility-based assessments. More efforts will be needed to ensure that good quality data are available from routine health information systems, including monitoring of trends in inpatient malaria morbidity and mortality, which is hampered by lack of complete and accurate data.
- Functional monitoring and evaluation structures are required at the county level to address gaps in data management systems, improve surveillance capacity, and enhance the use of data for decision making. Funding gaps, processes, and health information systems need to be addressed to ensure availability of appropriate reporting tools to both public and private sectors at all times.
- To achieve a strong malaria surveillance system, enhanced coordination and collaboration, especially with the Ministry Health Information System Unit, Disease Surveillance and Response Unit, Health Research and Development Unit, and Community Health Strategy Unit, will be critical.

Introduction

Background

Malaria remains a public health concern in Kenya, even in the context of reducing prevalence nationally. Three-quarters of the population are at risk of the disease, with children under five and pregnant women considered to be at highest risk. Increasing prevalence in children ages 10–14 implies that school-age children will be an important group requiring special focus in management of the disease. More importantly, the burden of the disease in the country is not homogenous, and variations are observed in the different epidemiological zones. Many areas in the country are now under very low transmission, and efforts must now be concentrated in the assembly of high-quality, complete, and timely routine data to track trends in disease patterns. Pillar three of the Global Technical Strategy (GTS) for malaria 2016–2030 speaks to the transformation of malaria surveillance into a core intervention.

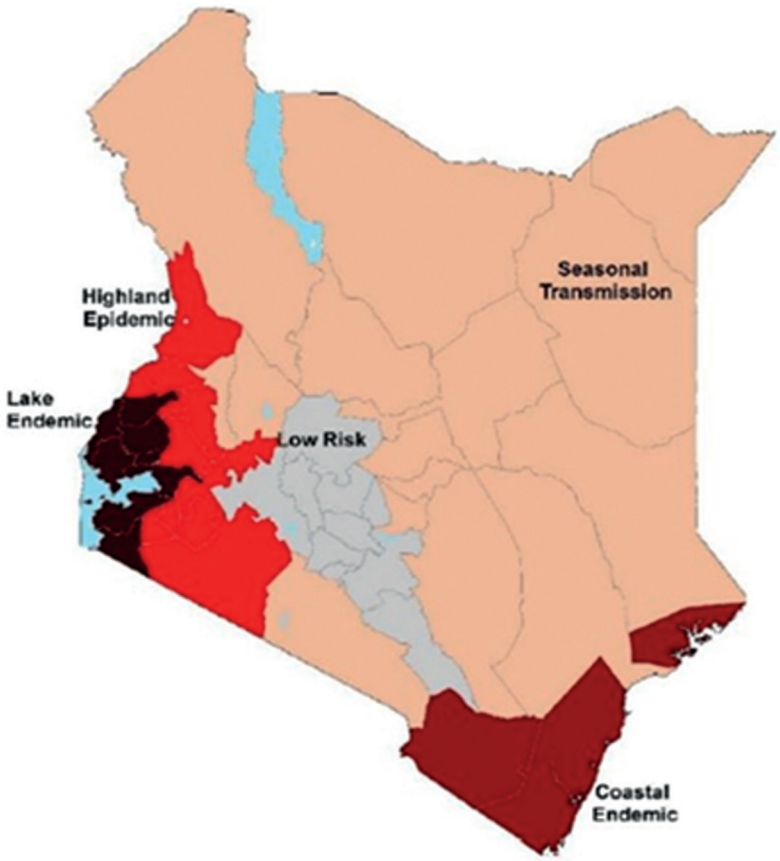
Surveillance has been identified as the basis of operational activities in settings of any level of transmission. In settings where malaria is being eliminated, recording, reporting, and investigating all malaria cases have become a critical component in the malaria surveillance systems.

Kenya has over time given prominence to surveillance in the strategies to control malaria. A lot has been done in procuring data from various sources for analysis of trends, stratification, and planning of malaria interventions. This report presents a review of the epidemiology of malaria and performance of the surveillance, monitoring, evaluation, and operational research (SMEOR) thematic area in ensuring that malaria indicators are routinely monitored and evaluated during the period 2013–2017.

The Epidemiology of Malaria in Kenya

To accelerate progress towards a malaria-free Kenya, the National Malaria Strategy 2009–2017 proposed targeting different mixes of interventions based upon malaria prevalence by district. In 2012, the first detailed national malaria control and epidemiological profile was developed (Figure 10.1) that stratified counties into varying levels of malaria endemicity driven by altitude, rainfall patterns, and temperature, as well as malaria prevalence. This information guided the implementation of malaria interventions in the different epidemiological zones as provided in the national malaria policy. In a review of 47 malariaendemic countries in 2012, Kenya represented one of very few sub-Saharan countries with a strategic plan based on strong epidemiological stratification that allowed for the vast differences in the sub-national risks of malaria (Ministry of Health [MOH], 2016a; Omumbo, et al., 2013).

Figure 10.1: County malaria endemicity map based on population adjusted estimates of P. falciparum prevalence (PfPR2-10) showing five transmission zones



Source: The epidemiology and control profile of malaria in Kenya: Reviewing the evidence to guide the future of vector control. Nairobi, Kenya: MOH, June 2016

Malaria Parasite Prevalence

In 2015, countrywide survey data for the period 1980 to 2015 were assembled and used for mapping malaria parasite prevalence. The data included the following national, community, and school surveys:

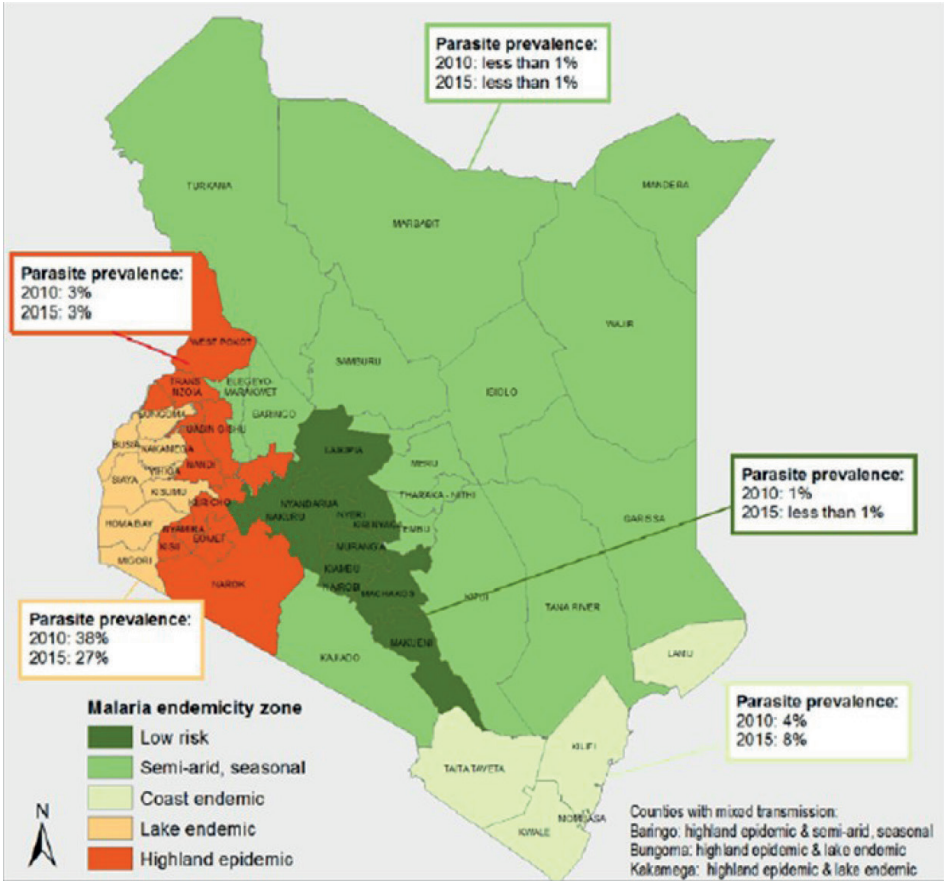
- Surveys conducted by the Division of Vector-Borne Disease from 1980 to1984
- Malaria Indicator Survey (MIS) 2007
- National school surveys 2009–10
- MIS 2010
- Partial national school surveys 2014
- MIS 2015

Of all infections detected, *P. falciparum* was the predominant species (92 percent), followed by *P. malariae* (6%) and *P. ovale* (2%) (MOH, 2016a). There were four cases of *P. vivax* described at Nganja in Kwale (Sutherland et al., 2011) and Asembo Bay in Siaya (KEMRI-Centers for Disease Control and Prevention [CDC], 2015, unpublished data). The predominance of *P. falciparum* infections was evident in the MIS 2015, where 7 percent of children had pure *P. falciparum* infections, and an additional 1 percent was infected with *P. falciparum* in combination with *P. malariae*, *P. ovale*, or both. Less than 1 percent of children had pure *P. malariae* or *P. ovale* infections (National Malaria Control Programme [NMCP], et al., 2016).

The national prevalence of malaria in children under five, as diagnosed by microscopy, declined from 8 percent in 2010 to 5 percent in 2015, largely driven by a decline in the lake endemic zone from 27 percent in 2010 to 17 percent in 2015. Results from the MIS 2015 show that malaria prevalence was highest among children ages 10–14 (11%) followed by children ages 5–9 (10%). Overall, malaria prevalence continues to be much higher in the lake endemic zone, but the rate among children ages 6 months to 14 years was remarkably lower in 2015 (27%) than in 2010 (38%) (NMCP, et al., 2016).

In contrast, for the same age group, an increase in malaria prevalence was observed in the coast endemic zone from 4 percent in 2010 to 8 percent in 2015 (Figure 10.2). Other variations in parasite prevalence among children ages 6 months to 14 years included a higher prevalence in rural areas (10%) compared to urban areas (3%).

Figure 10.2: Parasite prevalence rates among children 6 months to 14 years in 2010 and 2015, by endemicity



Source: Report on Kenya Health Sector Strategic Plan 2014-2018 mid-term review

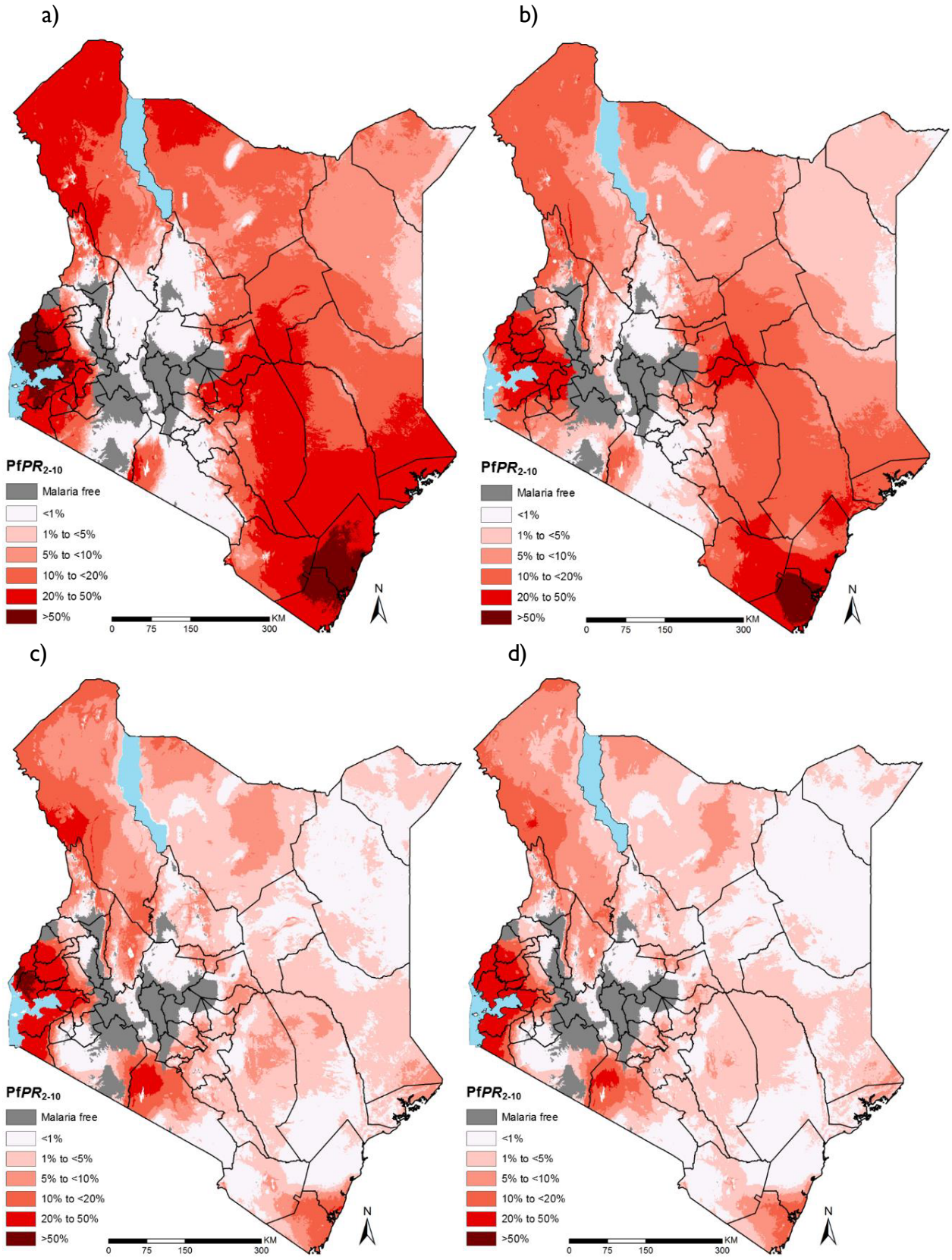
Malaria Endemicity

The mapping of malaria parasite prevalence in 2015 incorporated the development of county epidemiological profiles that provide information on variations in malaria risk and intervention coverage by sub-county to allow for better malaria control planning at the county level. In particular, the countrywide survey data for the period 1980 to 2015 were modelled using geostatistical methods to develop continuous malaria risk maps from predictions of age-corrected mean P. falciparum prevalence in children ages 2–10 (PfPR2-10) for the years 2000, 2005, 2010, and 2015 at 1×1 spatial resolutions (Figure 10.3) (MOH, 2016a). The work was made possible through funding from UK Department for International Development (DFID) to the LINK project, a partnership between London School of Hygiene and Tropical Medicine and the Kenya Medical Research Institute (KEMRI) Wellcome Trust Research Programme's Information for Malaria project (www.inform-malaria.org).

The maps indicate progression to a wider coverage of <5 percent PfPR2-10, especially in the period 2010–2015. All counties in the lake endemic area in 2015 were under low to moderate transmission risks of between 5 and <50 percent and appear to have transitioned from high transmission. In 2000, 13.2 percent of Kenya's population lived in areas where PfPR2-10 was greater than 50 percent, and by 2015 there were no areas with PfPR2-10 >50 percent (Figure 10.4).

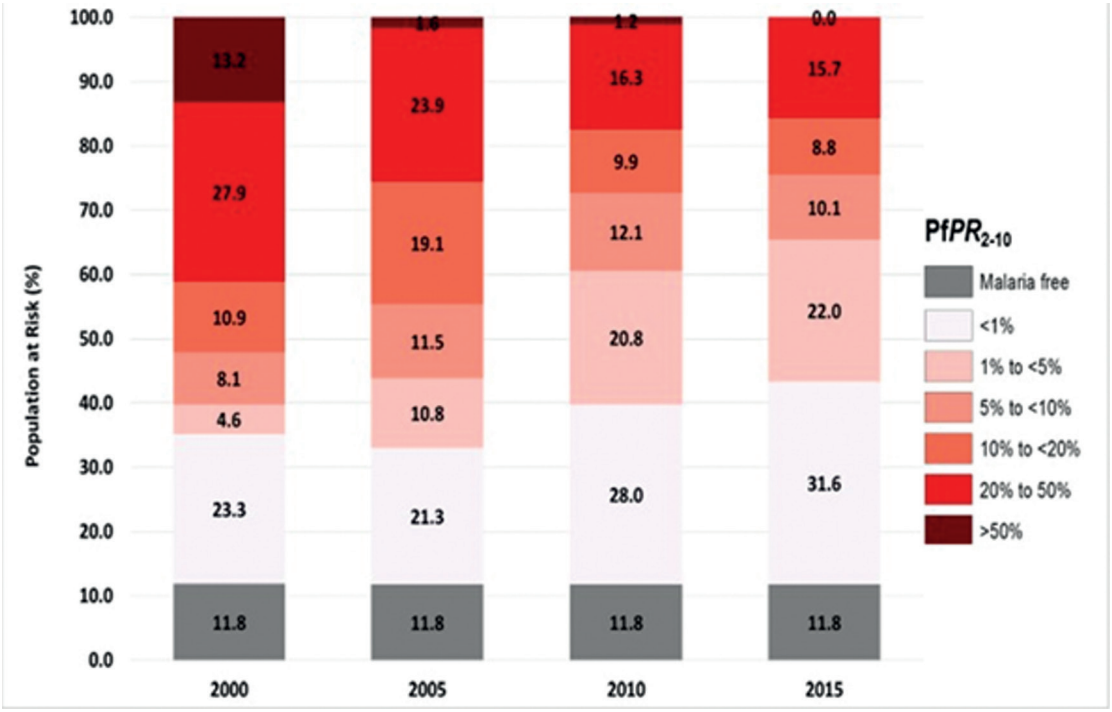
These data shows that the epidemiology and risk of malaria in Kenya is declining. Increased resources available to malaria control in the period 2003–2005 resulted in scaled up delivery of malaria interventions, which may have contributed to the declining transmission as well as the reductions in prevalence of malaria parasitaemia and decline in all-cause under-five mortality (MOH, 2016b).

Figure 10.3: Maps of population adjusted PfPR2-10 at 1×1 km spatial resolution by sub-county in a) 2000, b) 2005, c) 2010, and d) 2015



Source: The epidemiology and control profile of malaria in Kenya, June 2016

Figure 10.4: Changing population at risk of malaria by PfPR2-10 endemicity from 2000 to 2015



Source: The epidemiology and control profile of malaria in Kenya, June 2016

Trends in Malaria Morbidity and Mortality

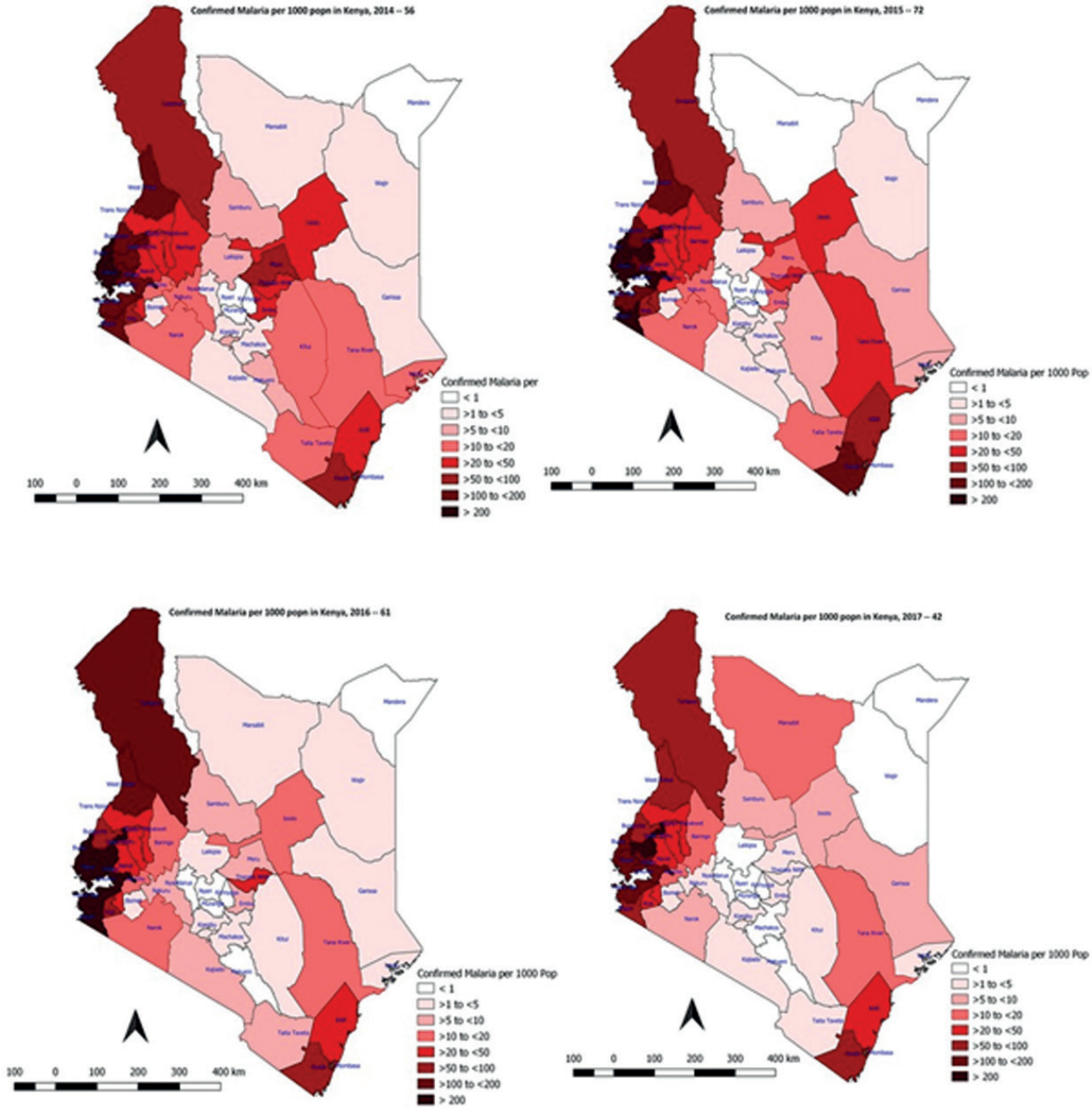
Impact of the expansion of malaria interventions has recorded progress, with a more than 30 percent decrease in total confirmed outpatient malaria cases per 1,000 between 2013 and 2017 (Table 10.1). However, the values were not adjusted to account for reporting rates in the routine health information system (HIS) and rarely included the private sector. The decline is observed across the country, with upsurges in few areas such as Marsabit County and almost constant trends in lake and coast endemic areas, especially in 2016–2017 (Figure 10.5). Some counties in the low-risk areas in the central highlands and Mandera County in the north-eastern part of the country have experienced <1 case per 1,000 population over years.

These changes are experienced globally, where malaria case incidence decreased by 18 percent, from 76 to 63 cases per 1,000 between 2010 and 2016. In the African region, the incidence reduced by 20 percent, from 256 to 206 cases per 1,000 population at risk between 2010 and 2016. In this period, Africa recorded a reduction of 37 percent in mortality due to malaria (World Health Organization [WHO], 2017). Despite the progress, malaria remains a priority globally, as reflected in the GTS 2016–2030 for malaria, with a vision for a world free of malaria.

More than 31 million people, representing 70 percent of the population, in Kenya are at risk of malaria. In the 2013 Kenya burden of disease study, malaria was ranked eighth among the top 10 leading causes of death and disability, with HIV, lower respiratory infections, diarrheal diseases, and tuberculosis in the first four ranks (MOH & WHO, 2016). During the mid-term review of the Kenya Health Sector Strategic Plan (KHSSP) in 2016, it was determined that malaria accounted for 31 percent of all outpatient diagnoses in 2012–13, 26 percent in 2013–14, 20 percent in 2014–15, and 18 percent in 2015–16 (MOH & WHO, 2016).

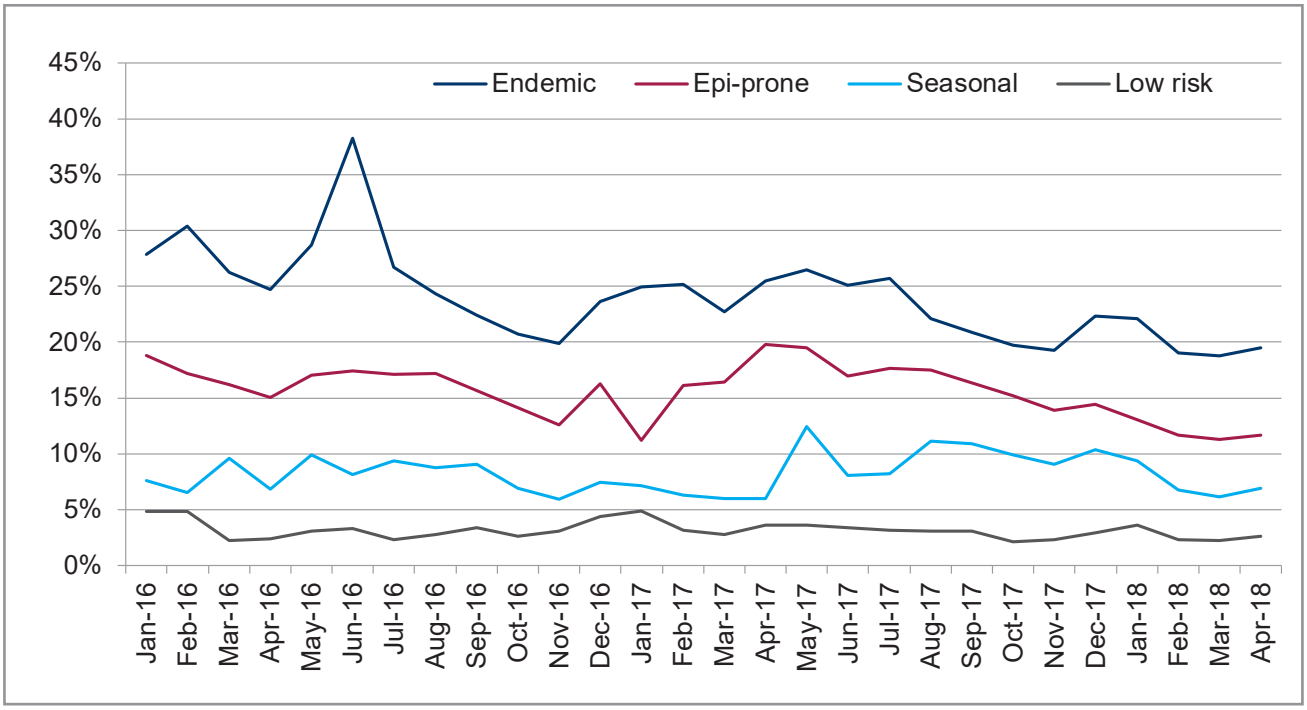
- Test positivity rate (TPR) at health facility level has remained constant over years, averaging 33 percent in the period under review (Table 10.1). Monthly data for the period 2016–2018 show varying rates by endemicity, with the low-risk areas reporting less than 5 percent continuously (Figure 10.6). The annual blood examination rate was 17.5 percent in 2016 and 18.4 percent in 2017.

Figure 10.5: Declining total confirmed malaria cases per 1,000



Source of data: District Health Information Software, version 2 (DHIS2)

Figure 10.6: Trends in slide positivity rate by endemicity



Source of data: HIS

Progress Towards Epidemiological Impact of the KMS

The overall goal of the Kenya Malaria Strategy (KMS) 2009–2018 was to reduce morbidity and mortality caused by malaria in the various epidemiological zones by two-thirds of the 2007–2008 level by 2017.

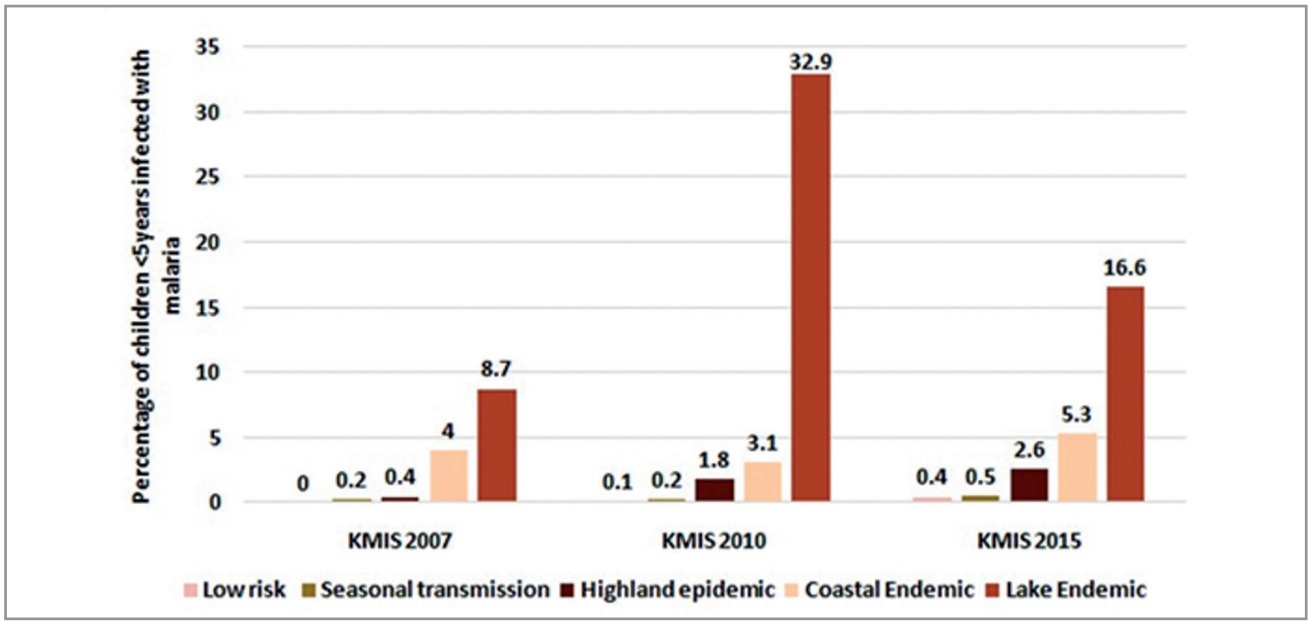
Tracking of the goal was based on the national prevalence of malaria among children 6–59 months whose baseline estimate in 2007–2008 was 3.5 percent (Division of Malaria Control [DOMC], Kenya National Bureau of Statistics [KNBS], & National Coordinating Agency for Population Development, 2009). In the MIS 2015, the prevalence was 5 percent, almost two times higher than the baseline value. On the other hand, there was progress in the indicator on "malaria parasitaemia prevalence rate among children under five in lake endemic areas (by microscopy)" from 27 percent in 2010 to 17 percent in 2015. Although there was a 17 percent prevalence rate in 2015 (compared to a 17 percent target in 2017), a more recent survey would have been useful in determining whether the 2017 target was achieved, given varying trends observed over time. Figure 10.7 shows the trend in malaria prevalence (according to microscopy) between 2007 and 2015.

From routine health facility information, there was notable progress in reducing the total confirmed outpatient malaria cases from 57 in 2012–2013 to 36 per 1,000 population in 2017. However, the estimates were not adjusted to account for reporting rates. These data are mainly from the public sector only and unlikely to capture all malaria cases.

No comprehensive data could be put together to show trends in inpatient morbidity and mortality due to low completeness of inpatient data nationally and the fact that classification of morbidity and mortality has not been fully standardised. Thus, the available data cannot be used to track inpatient mortality due to malaria.

There is a need to prioritise investment in surveillance so as to yield accurate tracking of progress in epidemiological indicators.

Figure 10.7: Malaria parasite prevalence among children 6–59 months



Source: Impact evaluation report, 2016

KMS Epidemiological Indicators and Targets

The strategy proposed 10 epidemiological indicators, as shown in Table 10.1. This section analyses progress towards attainment of the impact targets, appropriateness of the indicators, and inclusion of baselines and targets.

The epidemiological indicators reflect the goal of the strategy with reference to measurement of morbidity and mortality and address the existing epidemiology, with particular reference to children under five and prevalence in the high-burden lake endemic areas. Indicators on test positivity rates and on proportion of suspected malaria cases tested were included to describe quality of diagnosis and to help with interpretation of observed trends in malaria incidence.

Other than the one prevalence indicator measured through surveys every three years, data for the indicators were sourced from routine surveillance on either a monthly or quarterly basis. Seven of the 10 indicators had baseline values. Targets were set for all indicators to assess performance at the mid-term in 2013 and at the end of the strategy in 2017–18 and reflected the anticipated reduction in morbidity and mortality. Table 10.2 shows progress towards achieving the set epidemiological targets.

A few highlights on the epidemiological indicators include the following:

- Data on number of patients tested are available for the period 2016–2017 and have been used to calculate the annual blood examination rate.
- The present number of confirmed malaria cases identified through passive surveillance per 1,000 population are presented and have not accounted for reporting rates and estimated number of cases, as suggested in the WHO surveillance reference manual (WHO, 2018).
- No comprehensive data could be put together to show trends in inpatient morbidity and mortality due to low completeness and poor quality of inpatient data nationally.
- Implementation of "test, treat, and track" guidelines in 2009 led to the expansion of diagnostic capacity that explains the change between the 2007 baseline value and observed values for the indicator "total clinical outpatient malaria cases" during the review period.
- There were no comprehensive data on number of suspected malaria cases during the period under review.
- There were no recent data on prevalence because the last MIS was conducted in 2015.

Table 10.1: Extract of the KMS performance framework

Indicators	Data sourcea	Responsibility	Frequency	Baseline		Targets (2013–2017)				
				Data	Source/ year	2013	2014	2015	2016	2017
Inpatient malaria cases among children <5yrs [per 1,000 persons per year]	Routine surveillance	NMCP monitoring and evaluation (M&E)/HIS	Quarterly	None	HIS	3	-	-	-	2
Total inpatient malaria cases [per 1000 persons per year]	Routine surveillance	NMCP M&E/ HIS	Quarterly	4	HIS 2008/2009	3	-	-	-	2
Inpatient malaria deaths among children <5yrs [per 1,000 persons per year]	Routine surveillance	NMCP M&E/ HIS	Quarterly	None	HIS	2	-	-	-	1
Total inpatient malaria deaths [per 1,000 persons per year]	Routine surveillance	NMCP M&E/ HIS	Quarterly	4	HIS 2008/2009	2	-	-	-	1
Confirmed outpatient malaria cases at health facility level among children <5yrs [per 1,000 persons per year]	Routine surveillance	NMCP M&E/ HIS	Monthly	138	HIS 2012/2013	138	-	-	-	92
Total confirmed outpatient malaria cases at health facility level [per 1,000 persons per year]	Routine surveillance	NMCP M&E/ HIS	Monthly	57	HIS 2012/2013	57	-	-	-	38
Total clinical outpatient malaria cases at health facility level among children <5yrs [per 1,000 persons per year]	Routine surveillance	NMCP M&E/ HIS	Monthly	277	HIS 2007	164	-	-	-	92
Percentage of suspected malaria cases tested using a parasitological based test	Routine surveillance	NMCP M&E/ HIS	Monthly	60	HIS 2013	60	-	-	-	100
Slide/rapid diagnostic test (RDT) TPR at health facility level	Routine surveillance	NMCP M&E and lab/HIS	Monthly	None	-	27	-	-	-	13
Malaria parasitaemia prevalence rate among children <5yrs in lake endemic areas (by microscopy); disaggregated by sex	Survey	NMCP M&E/ KNBS	Every 3 years	3.3b	MIS 2007	26.8 (MIS 2010)	-		-	17

a Using the HIS reported total outpatient malaria cases per 1000; change between 2015 and 2017 with baseline estimate given as 57 per 1000 (HIS 12/13)

bIndicator was revised in 2014 to assess prevalence in lake endemic zone but the baseline value was not changed to reflect the same; 3.3 percent was the national prevalence. In 2007 the endemic areas of coast and lake endemic were treated as one stratum and only separated in 2009

Table 10.2: Achievement of epidemiological impact targets

Indicator	Baseline (source)	Achievement					Endline 2017 target	Comments
		2013	2014	2015	2016	2017		
Inpatient malaria cases among children <5yrs [per 1,000 persons per year]	None	-	-	-	-	-	2	Data not available
Total inpatient malaria cases [per 1,000 persons per year]	4 (HIS 2008/2009)	-	-	-	-	-	2	Data not available
Inpatient malaria deaths among children <5yrs [per 1,000 persons per year]	None	-	-	-	-	-	1	Data not available
Total inpatient malaria deaths [per 1,000 persons per year]	3 (HIS 2008/2009)	-	-	-	-	-	1	Data not available
Confirmed outpatient malaria cases at health facility level among children <5yrs [per 1,000 persons per year]	138 (HIS 2012/2013)	-	129	170	129	75	92	-46% change between 2017 and baseline; due to declining prevalence, target was achieved
Total confirmed outpatient malaria cases at health facility level [per 1,000 persons per year]	57 (HIS 2012/2013)	49	51	74	63	36	38	-37% change between 2017 and baseline
Total clinical outpatient malaria cases at health facility level among children <5yrs [per 1,000 persons per year]	277 (HIS 2007)	-	74	46	83	77	92	-72% change between 2017 and baseline estimate
Percentage of suspected malaria cases tested using a parasitological based test	60% (HIS 2013)	-	-	-	-	-	100%	No consolidation of suspected malaria cases in routine HIS; denominator missing
Slide/RDT TPR at health facility level	None	31	32	34	32	35	13%	No baseline estimate; remained constant over the years and target not achieved
Malaria parasitaemia prevalence rate among children <5yrs in lake endemic areas (by microscopy); disaggregated by sex	3.3 (MIS 2007)	26.8 (MIS 2010)		17			17%	Declining malaria prevalence observed in the lake endemic area; no recent data on prevalence

Methods

SMEOR

The SMEOR focus area was recognised as a supporting intervention for the National Malaria Strategy 2009–2017. One of the objectives of this strategy was to strengthen surveillance, monitoring, and evaluation systems so that key malaria indicators are routinely monitored and evaluated in all malaria endemic districts. To achieve this, the programme sought to strengthen capacity for malaria surveillance, reinforce facility and school-based malaria sentinel surveillance, strengthen malaria data management systems and enhance efficiency of data collection and reporting, conduct and support community and facility-based surveys, conduct operational research and translation of results to policy, and build capacity in surveillance and monitoring and evaluation (M&E).

SMEOR's importance was prominent in the KMS 2009–2018 (revised 2014) that identified malaria surveillance as a core intervention area for malaria control and allocated on average 7 percent funding of the total malaria budget to the annual M&E work plan (Figure 10.8). The objective in this strategy was rephrased to reflect a focus on SMEOR's core functions and read "to ensure that all malaria indicators are routinely monitored, reported, and evaluated in all counties by 2018," with eight strategies identified, as shown in Table 10.3. Major achievements during the mid-term review in 2013–2014 included development and dissemination of the malaria M&E plan, development of a malaria surveillance curriculum, development and use of support supervision manual and tools, and malaria surveillance training of trainers in epidemic-prone and seasonal transmission zones.

With the training of 60 staff on M&E and 20 others on Stata and SPSS, capacity for M&E at national level was considered enhanced, and there was a need to expand this capacity to the county level. A notable achievement during the mid-term review was the integration of routine malaria surveillance and logistics management data into DHIS2; this resulted in increased reporting rates from 40 percent to 70 percent as of 2013–2014 (NMCP, 2014a).

Figure 10.8: Budget for M&E annual work plan, KMS 2009–2018 (revised 2014)

		BUDGET ESTIMATE IN KSHS				Grand Total
KMS Objective Focus		**2014/15**	**2015/16**	**2016/17**	**2017/18**	
Objective 1: Malaria Preventive Interventions	Total Budget	9,477,560,362	4,166,070,834	6,364,835,077	7,906,179,538	27,914,645,811
M&E Component	327,361,752	332,481,946	29,430,427	669,787,146	1,359,061,271	
Objective 2: Case Management	Total Budget	4,847,031,160	4,189,506,473	4,934,932,577	4,363,091,088	18,334,561,297
M&E Component	115,994,300	115,994,300	115,994,300	115,994,300	463,977,200	
Objective 3: Epidemic Preparedness and Response	Total Budget	44,033,600	20,234,350	20,234,350	20,234,350	104,736,650
M&E Component	33,349,350	15,186,350	15,186,350	15,186,350	78,908,400	
Objective 4: Surveillance, M&E and Op. Research	Total Budget	459,558,723	224,970,295	228,427,564	394,415,102	1,307,371,685
Objective 5: Advocacy, Communication and Social Mobilization	Total Budget	857,400,464	363,423,850	368,459,850	358,423,850	1,947,708,014
M&E Component	70,093,700	60,337,000	60,337,000	60,337,000	251,104,700	
Objective 6: Program Management	Total Budget	1,799,140,244	1,877,999,590	1,994,201,250	2,218,169,039	7,889,510,122
M&E Component	128,163,470	154,526,862	207,182,126	300,099,360	789,971,818	
Total Budget		17,484,724,554	10,842,205,391	13,911,090,668	15,260,512,967	57,498,533,580
Total M&E Budget Component			1,134,521,295	903,496,753	656,557,767	1,555,819,258
M&E Budget as a proportion of Total Malaria Budget		6%	8%	5%	10%	7%

Source: Kenya Malaria M&E Plan 2009–2018 (revised 2014)

Table 10.3: Strategies in Objective 4 of the KMS 2009–2018 (revised 2014)

Objective 4: To ensure that all malaria indicators are routinely monitored, reported, and evaluated in all counties by 2018
1) Strengthen malaria monitoring and evaluation systems
2) Conduct and facilitate health facility surveys
3) Conduct and support community surveys
4) Strengthen school-based malaria sentinel surveillance
5) Facilitate operational research and translation to policy
6) Strengthen malaria data management systems
7) Human resource capacity building in surveillance, monitoring, and evaluation
8) Conduct and support entomological surveillance

Policy and Guidance

The national malaria policy 2010 provides that *"the Government of Kenya shall ensure M&E of malaria activities are guided by a comprehensive M&E plan; that M&E becomes an integral and relevant part of malaria control with adequate resources to its implementation; that there is efficient monitoring and evaluation of the strategic approaches to malaria prevention and control; and that joint annual performance reviews of operational plans are conducted."*

The policy also recommends promotion and support for targeted operational research, engagement with research partners to translate research into policy, and promotion of effective channels for communication and dissemination of research findings (DOMC, 2010). SMEOR has been largely guided by the malaria M&E plan that links to the malaria policy and whose components include the following:

- Strengthening routine monitoring systems through human resource and technical capacity development for M&E
- Enhancing HIS/integrated disease surveillance and response (IDSR)/logistics management information system (LMIS) capacity to provide routine data for malaria control
- Supporting the Pharmacy and Poison Board (PPB) for nationwide roll-out of pharmacovigilance and regular post-market surveillance of malaria medicines and further investments in drug efficacy monitoring, insecticide resistance monitoring, and malaria sentinel surveillance
- Evaluating the impact of malaria control interventions through investment in MIS, the Kenya Demographic and Health Survey (KDHS), health facility surveys, entomological surveys, and operational research

The first malaria M&E plan was developed in 2009 to accompany the National Malaria Strategy (NMS) 2009–2017 as a condition for Global Fund round 4 phase 2 funds disbursement (DOMC, 2009a). This was reviewed in 2013/2014 as part of the mid-term review of the NMS 2009–2017. A 2013 M&E capacity assessment, conducted by the United States Agency for International Development (USAID)-funded MEASURE Evaluation PIMA project, informed specific revisions, namely, the inclusion of a data demand and use plan, a chapter outlining implementation of data quality audits (DQAs), and plans for developing M&E capacity.

The revised M&E plan was aligned with the health sector M&E framework 2014–2018, whose development was guided by laws and policies such as the Constitution of Kenya 2010, the County Government Act 2012, the Kenya Health Policy 2014-2030, and the KHSSP 2014-2018.

Organisation of Service Delivery

The SMEOR focal unit has been coordinating monitoring and evaluation of the KMS as guided by the M&E plan, which envisions the following:

Monitoring:

- Internal performance monitoring meetings to be held on a quarterly basis to review progress of implementation against targets in the annual business plan, to address implementation bottlenecks and to refocus as necessary
- At the stakeholder level:
  - Semi-annual stakeholder performance meetings held at national and county levels to address any constraints to implementation and refocus activities if needed
  - Quarterly coordination meetings with respective implementing partners in line with the governance mechanisms for the multi-sector approach. Implementation groups include counties; health sector programmes; non-health sector ministries and organisations; academic and research institutions; private sector organisations; civil society organisations; professional societies; and parliament.

Control and audit:

- Conduct annual DQAs in collaboration with HIS

Annual review meetings:

- Stakeholder meetings to review achievements against targets and milestones in the strategic plan and in the annual business plans
- Meetings define priorities for the subsequent financial year

Programme evaluation:

- Two evaluations held at mid-term and at the end of a strategy to assess progress and performance of the programme (NMCP, 2014a)

During the period under review, the SMEOR unit was therefore responsible for collation and management of data from various sources, including surveillance, evaluation of programme implementation and impact, analysis, generation, and dissemination of reports for different actors. SMEOR's routine data collection efforts were guided by the Kenya Health Information System Policy 2014–2030 through the sector's M&E framework that has adopted integration of HIS tools and reporting to DHIS2.

The HIS vision and mission qualifies the kind of information to be used in decision making, and a health sector data quality assurance protocol is in place to operationalise provision of high-quality information as stated in the mission. The protocol was the basis for the assessments of quality of malaria data at health facilities. In addition to the tools and guidance on conduct of DQAs, the protocol lays out data quality improvement strategies at different levels, including the development and monitoring of data quality improvement plans (Government of Kenya, 2014).

Challenges with the unit's service delivery included the following:

- Reliance on national HIS and the Disease Surveillance and Response Unit (DSRU) to ensure the availability of reporting tools and routine data
- Lack of a system to manage the various datasets and information in cases in which information is available in reports or publications. Table 10.4 gives a description of the data collection systems.

Table 10.4: Description of data collection systems for malaria indicators

Data collection system	Function to NMCP	Description
Routine health information system (DHIS2)	Collect routine malaria data at health facility and community levels	▪ Data are captured in paper-form reporting tools at health facility and community levels. ▪ Community health volunteers are responsible for collecting integrated health information from households and submitting to the community health extension workers on a monthly basis. ▪ Community health extension workers are attached to local health facilities and are charged with ensuring that the data are available at the facilities for further collation into DHIS2. ▪ Aggregate data are then fed into DHIS2 on a monthly basis by facilities in tier 3 and above and at sub-county records offices for lower-level facilities without access to the system. ▪ DHIS2 reporting is under the autonomy of county governments and guidance of the HIS unit in the Division of Monitoring & Evaluation, Health Research Development, and Informatics.
IDSR	Collect routine malaria surveillance data	▪ 35 priority diseases that are epidemic prone, targeted for elimination or eradication, or are of public health importance selected for reporting. ▪ Health facilities detect, confirm, and record these diseases on pre-designed forms and submit to the sub-county disease surveillance coordinator on a weekly basis. ▪ Weekly reports from health facilities are submitted through various modes, including SMS, email, or hand delivery of hardcopy reports. ▪ Aggregated data from the sub-county are then fed to the electronic IDSR system that is now integrated with DHIS2. ▪ Weekly malaria laboratory data are also collected from health facilities with capacity for microscopy or RDTs. ▪ Response to and control of malaria epidemics are coordinated by DSRU with support from the malaria programme Epidemic Preparedness and Response and SMEOR units. ▪ Weekly surveillance and monitoring of key meteorological indexes are conducted in 37 high-risk sub-counties during epidemic-risk months.
Indoor residual spraying (IRS) monitoring	Document assessments of IRS for malaria control	▪ Pre- and post-spray assessments are conducted during IRS cycle. ▪ Entomological and insecticide resistance monitoring is done on a routine basis. ▪ Data on spraying coverage, population protected by IRS, and net coverage and usage are also collected during the assessments.
Insecticide-treated nets/ long-lasting insecticidal nets (LLINs) tracking	Data on net coverage	▪ Routine data on the insecticide-treated nets/LLINs distributed through antenatal clinics and child welfare clinics are captured using HIS data collection tools. ▪ MIS and other related surveys provide information on outcome indicators.

Data collection system	Function to NMCP	Description
Microscopy and RDT reporting	Reports laboratory results	▪ Microscopy data are captured through the weekly surveillance reports in IDSR that is now integrated with DHIS2. ▪ RDT consumption is reported in the malaria medicines reporting tool using the LMIS that is also housed in DHIS2. ▪ integration has enabled calculation of slide positivity rate using the number of confirmed malaria cases reported in DHIS2 and the number of slides done as reported in LMIS.
Artemisinin-based combination therapies (ACTs) and RDT consumption data	Data on antimalarial consumption and RDTs distributed	▪ Data are captured in paper-form registers on a daily basis and aggregated on summary forms on a monthly basis. ▪ Sub-county pharmaceutical facilitators enter the aggregated data in LMIS, which has been integrated with DHIS2.
Pharmacovigilance	Reports on drug adverse reactions	▪ Responsibility of the PPB ▪ Spontaneous reporting of adverse drug reactions is done using a standard form (suspected adverse drug reaction reporting form) to PPB or the nearest health authority.
School-based malaria surveys	Estimates of parasite prevalence in children ages 6–14	▪ KMS 2009–2018 determines that the school-based surveys be conducted on an annual basis. ▪ Surveys conducted under the umbrella of the school health programme alongside helminth surveys.
Community-based surveys	Estimates of prevalence rates, LLIN and intermittent preventive treatment in pregnancy (IPTp) coverage	▪ KDHS and MIS are done in collaboration with KNBS. ▪ Biannual entomological surveys to establish malaria vector distribution, abundance, behaviour, and infection are undertaken in collaboration with vector-borne disease unit and counties. ▪ Analysis of the samples is normally done by the national reference unit at KEMRI. ▪ Data are used in updating the malaria entomological profile. ▪ Vector susceptibility to insecticides is evaluated on a regular basis to inform choice of insecticides for vector control.
Facility-based surveys	Assessments on: ▪ Quality of care at health facilities ▪ Availability of malaria products ▪ Quality of routine data (DQA)	▪ Outpatient quality of care assessments conducted twice a year. ▪ Surveys monitor levels and trends in health system readiness and in quality of inpatient malaria case management. ▪ Assessment conducted on availability of ACTs and RDTs, and quality of dispensing practices in the private retail drug outlets. ▪ Data quality assessments and support supervision at health facility level. ▪ Therapeutic efficacy studies conducted in collaboration with research institutions. ▪ Pre- and post-market surveillance of RDTs—sampled kits tested regularly against known standards at the national quality control laboratory. ▪ National Quality Control Laboratory also tests pre-market batches of malaria medicines entering the public sector ▪ PPB conducts regular integrated post-market surveillance of medicines.

Data collection system	Function to NMCP	Description
Operational research	Defined questions to respond to specific data needs	▪ Operational research agenda outlines proposed surveys/studies in key areas, including social behavioural research in malaria control, entomological studies, changes in malaria transmission, and cost-effectiveness analysis of different combination of control interventions among other emerging questions relevant to malaria control. ▪ Surveys are conducted in collaboration with research institutions.
Programme monitoring	Programme reporting and collation of data and information from various data sources	▪ Malaria information acquisition system (MIAS) was developed as a tool to monitor the malaria business plan and implementation of activities, as well as report on programmatic and budgetary performance. ▪ It was designed to serve as a repository for the malaria programme, consolidating data from DHIS2, IDSR, laboratory information system, and operational research.

Human Resources, Training, and Capacity Development

The SMEOR focal unit is adequately staffed to undertake its M&E mandate with many skill sets among staff, namely, an epidemiologist/public health specialist, statistician, medical entomologist, health records officer, and a data manager. It also hosts residents and interns in the Field Epidemiology & Laboratory Training Programme. The 2013 M&E capacity assessment for the programme determined that there was no specific plan for building human resource capacity in M&E, and recommended recruitment of a capacity building officer in addition to development of the capacity building plan (DOMC & MEval PIMA, 2013).

During a repeat of the M&E capacity assessment in 2017, the organisational capacity index had increased from 65 percent in 2013 to 81 percent, indicating an overall improvement in status and quality of the programme's M&E system. Figure 10.9 shows that most of the tools, systems, structures, and processes were already established at baseline in 2013 and were improved or maintained to a relatively high standard at endline in 2017 (MEval PIMA, 2017). The assessment report also indicates that the programme has become more technically autonomous in organisational development, human capacity for M&E, partnerships and governance, and data demand and use capacity areas. However, it is still lacking a capacity building officer.

An assessment of individual M&E capacity at the programme showed overall improved competencies from entry level and skill in 2013 to master and expert levels in 2017 (Figure 10.10). Although the findings indicate good competencies for data analysis, staff ability to use statistical methods with geographic information system applications need to be strengthened. This will be important with increasing demand for spatial analysis of malaria data and estimation of sub-national burden of disease.

Capacity building is a key responsibility of the national government to county. Inadequate M&E capacity at the county and sub-county levels includes limited capacity to analyse data, lack of capacity to translate data into actionable information, insufficient use of data to inform decision making, challenges with target setting, inability to interpret indicators, weak data management systems, and irregular supply of reporting tools. To sustain overall capacity building in the context of devolution, there is a need to have a cost of human capacity developing plans, training databases, and strategies that list training needs and existing capacity of targeted staff at all levels.

To address malaria surveillance as a key intervention, NMCP developed a malaria surveillance curriculum in 2013 and trained more than 4,000 health workers across the 47 counties. The curriculum addresses routine review of malaria-specific data by use of defined WHO indicators and dashboards. In eight counties, post-training activities included identification and orientation of county malaria surveillance champions, publishing of malaria surveillance bulletins, mentorship, and conduct of routine data review meetings (MEval PIMA, 2017).

Figure 10.9: Status of capacity areas at the malaria programme

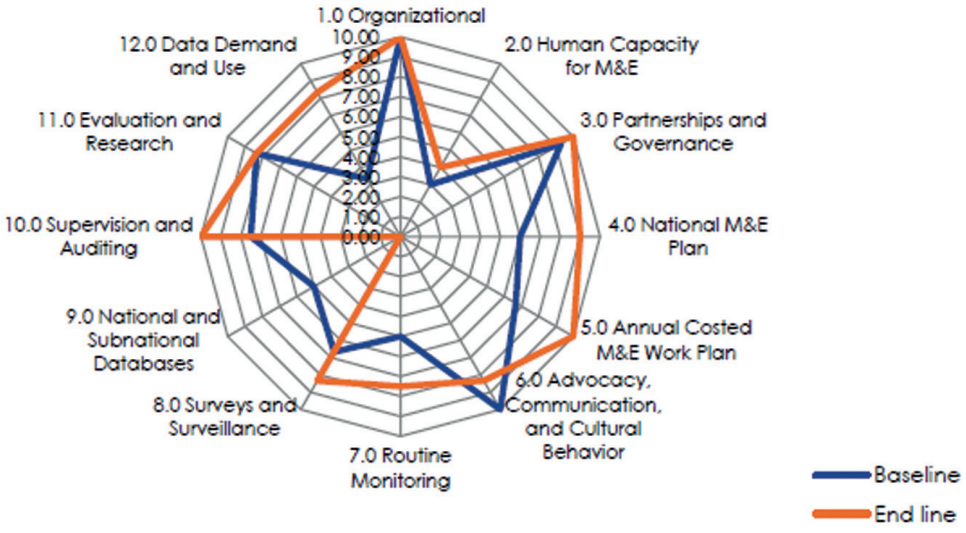


Figure 10.10: SMEOR individual staff M&E competencies between baseline (2013) and endline (2017)

Source: NMCP M&E Capacity Assessment 2017

Results

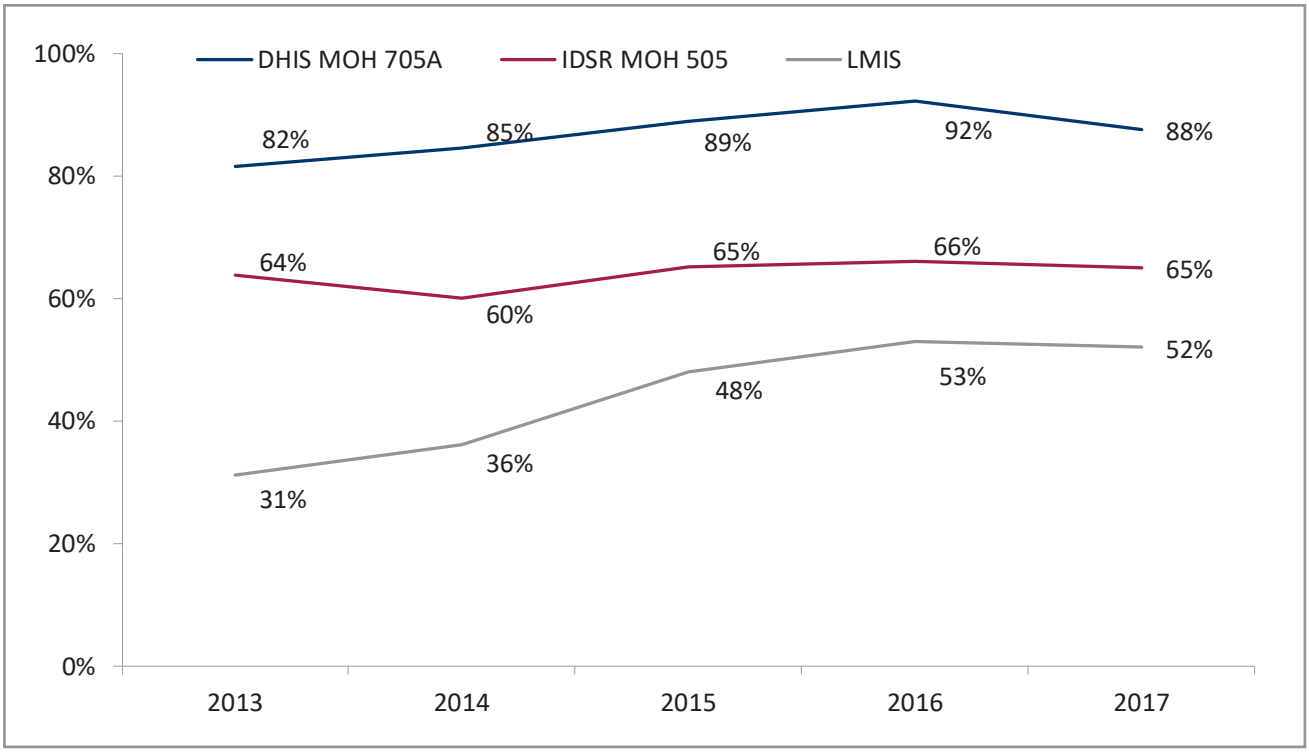
Achievement of Key Performance Indicators and Targets

There are three key indicators for Objective 4 on SMEOR: (1) proportion of health facilities sending timely reports on malaria disease surveillance, (2) proportion of counties using malaria surveillance data to produce a malaria profile, and (3) proportion of counties conducting entomological surveillance in endemic and epidemic-prone areas.

During the period under review, DHIS2 reporting rates were high (above 80%), 10 percent higher than the value observed during the mid-term review, but they did not achieve the 100 percent target by 2017 (Figure 10.11). Other notable improvements in DHIS2 include recent reporting of individual-level inpatient data by some facilities, but the completeness of the data is still low, and classification of morbidity and mortality has not been fully standardised. Thus, the available data cannot be used to track malaria inpatient morbidity and mortality.

County malaria profiles were produced by the NMCP at the national level and disseminated to the counties. For this reason, the second indicator on proportion of counties producing malaria profiles cannot be measured as envisioned in the performance framework. Entomological surveillance was carried out beyond the proposed endemic and epidemic-prone areas and covered 87 percent of the counties countrywide in 2017.

Figure 10.11: Reporting rates by sources of malaria surveillance data



The objective-level implementation rate was low at 60 percent. Two of the strategies, school-based malaria surveillance and malaria data management systems, scored 0 percent, contributing significantly to the overall low performance. Main advances and challenges in implementation of the strategies are summarized in Table 10.5.

Table 10.5: Summary of performance by strategy

Strategy	Score	Main advances	Key challenges
To strengthen malaria M&E	57.5%	▪ There is a comprehensive M&E system with structures for coordination and strong M&E partnerships. ▪ More than 4,000 health workers across the 47 counties were trained in malaria surveillance. ▪ Exemplary generation and use of malaria surveillance information on a routine basis at both national level and in select counties.	▪ Lack of malaria surveillance guidelines and tools ▪ Poor data quality despite conduct of DQAs; no action on recommendations by the facilities/sub-counties/counties ▪ Lack of systematic availability of appropriate reporting tools at health facility and community levels ▪ Lack of reporting by most private sector care providers
Conduct and facilitate health facility surveys	50.0%	▪ Data from repeat surveys indicate improvements in quality of care ▪ Informs on gaps, especially in health facility readiness to provide quality care ▪ Initiated inpatient survey in faith-based hospitals in 2017 ▪ Supportive supervision conducted in 47 counties in 2017 and in 41 counties in 2016	▪ On DQAs and supportive supervision, there were challenges with disbursements of funds between national and county levels, but this has since been resolved by re-routing the funds to the African Medical Research Foundation. ▪ Implementation of supportive supervision and DQA activities is primarily supported by external financial resources. ▪ There is a need to package the wealth of information into key messages for actors beyond facilities and donors. ▪ Reporting of progress in laboratory assessments and pharmacovigilance not readily available within SMEOR unit. This implies weak coordination of the activity between PPB and NMCP and also between SMEOR and case management units. While these data are reported separately through PPB, there is need for collaboration and joint working between PPB and NMCP. ▪ During the period under review, no reports have been made regarding malaria medicines adverse reactions. ▪ Identified gaps in molecular data for the drug efficacy studies; notable delayed implementation.
Conduct and support community surveys	76.0%	▪ MIS 2015 was done. Findings were disseminated, and together with KDHS informed the impact evaluation and programme performance review. ▪ Conducted a post-mass LLIN survey in 2017.	▪ MIS 2017 was not conducted. ▪ No publications/policy briefs as envisioned in the outcome indicators.

Strategy	Score	Main advances	Key challenges
Strengthen school-based malaria sentinel surveillance	0.0%	▪ MIS surveys in 2010 and 2015 provide parasite prevalence in school age children.	▪ No survey in the period under review; last survey was done in 2013 and a compilation of the surveys among children ages 2–9 as well as community prevalence surveys were key in measuring impact of malaria control interventions as indicated in the impact evaluation report.
Facilitate operational research and translation of research findings to policy	43.3%	▪ SMEOR maintained an updated operational research agenda. It was reviewed in March 2018 to incorporate research questions that would inform bottlenecks in implementation of activities under each objective in the KMS 2009–2018.	▪ Financial constraints to implement research following withdrawal of DFID funding. ▪ Weak coordination of research beyond DFID funding; no documentation of what has been done. ▪ Inadequate translation of findings to policy; only one policy brief developed in the period under review.
Strengthening malaria data management systems	0.0%	▪ Minor updates were done.	▪ MIAS was not used due to inadequate change management processes to allow its acceptability and effective use within the programme.
Human resources capacity building in surveillance, monitoring, and evaluation	77.5%	▪ Use of M&E capacity assessment tool in 2013 and 2016 gives an indication of M&E capacity improvements ▪ Strong M&E system in place	▪ Gap in capacity for data analysis and use among new staff ▪ Lack of human capacity building plan ▪ Inadequate post-training follow-up (mentoring and support for enhanced data analysis and use) across the country
Conduct and support entomological surveillance	68.1%	▪ Countrywide coverage—entomological surveillance training in all counties, 2 rounds of surveillance in 41 counties ▪ Entomological surveys in 2016 and 2017 in 38 counties ▪ updated entomological profile in place	▪ Lack of testing kits, hence susceptibility testing for insecticides not done ▪ No plans to incorporate impact level entomological indicators in the entomological surveillance

Implementation of Mid-Term Review Recommendations

Twenty-five percent of the recommendations were fully implemented, 63 percent were partially implemented, and 12 percent were not implemented. The recommendations included the following:

- Review M&E plan and disseminate to counties
- Hold quarterly technical working group (TWG) meetings and include all stakeholders
- Facilitate supportive supervision at county and sub-county levels
- National level to carry out mentorship activities at county level
- Conduct school-based malariometric surveys in epidemic-prone and endemic areas
- Build capacity of the county health management teams to conduct Quality of Care (QOC) assessments

- Update MIAS to include surveillance data, partnership and training data, surveys, and data acquired from HIS
- Institute use of MIAS at NMCP level
- Collaboration for pharmacovigilance and post-market surveillance
- Conduct entomological surveys
- Ensure timely reports to inform policy on insecticide resistance monitoring
- Integrate health provider and facility inventory for malaria diagnosis and treatment into quality assurance/quality control
- Hold national malaria forum every two years
- Train health workers on malaria surveillance
- Train county staff on M&E
- Provide tools and software after training to ensure continuous capacity and experience

Performance Indicators and Targets

The review conducted an analysis on inclusion and appropriateness of SMEOR outcome indicators in the KMS 2009–2018. This focused on the three key indicators for Objective 4 and outcome indicators for each strategy in Objective 4. The three indicators had baseline values and targets that were set to assess performance on an annual basis.

The second indicator, regarding counties producing malaria profiles, could not be measured because NMCP produced all 47 county malaria profiles using survey data at the national level and disseminated them to the counties. The use of the term malaria profile in the indicator is ambiguous; some counties are using malaria surveillance data to produce bulletins, fact sheets, and profiles. Entomological sentinel surveillance sites are selected as three sub-counties per county to achieve the result and to determine appropriate coverage.

The indicator on "counties conducting entomological surveillance" should be measured with reference to sub-county and disaggregated by county. Table 10.6 shows progress towards achieving the set targets and provides detailed remarks of this analysis for each indicator.

Table 10.6: Objective 4 achievement of outcome targets for key indicators

Strategy	Indicator	Baseline (source)	Achievement					Endline 2017 target	Comments
			2013	2014	2015	2016	2017		
Objective: Ensure that all malaria indicators are routinely monitored, reported, and evaluated in all counties by 2017	Proportion of health facilities sending timely reports on malaria disease surveillance	83	82	85	89	92	88	100	SMART indicator; source of reporting rates is DHIS2; often includes reporting of DHIS2, IDSR, and LMIS tools; did not achieve 100% target
	Proportion of counties using malaria surveillance data to produce a malaria profile	0	-	-	-	-	-	100	Indicator does not reflect the right level as compared with the intended result; NMCP produced all the 47 county malaria profiles
	Proportion of counties conducting entomological surveillance in endemic and epidemic-prone areas	0	-	-	-	94	87	90	SMART indicator; source is activity reports; surveillance not done in Garissa, Wajir, and Mandera; in addition surveillance was not done in Baringo, Turkana, and Elgeyo Marakwet due to security concerns
Strategy 1: To strengthen malaria monitoring and evaluation	Proportion of facilities reporting monthly		82	85	89	92	88	-	Indicator not specific on reporting timeliness/ completeness or both; no targets
	Proportion of counties conducting DQA		-	-	-	76	98	-	No targets; no baseline estimates
Strategy 2: Conduct and facilitate health facility surveys	Proportion of planned health facility surveys done		2/34	2/2	2/2	5/65	4/4	-	Indicator not specific; targets missing; no baseline estimates; may not be measured the same way consistently; no clear reference on number planned

Strategy	Indicator	Baseline (source)	Achievement					Endline 2017 target	Comments
			2013	2014	2015	2016	2017		
Strategy 3: Conduct and support community surveys	Proportion of scheduled surveys successfully completed		-	-	-	-	-	-	Not specific; no targets; no baseline estimate; MIS, KDHS, impact evaluation, and post-mass LLIN survey were conducted during the period
	Number of publications resulting from the surveys							-	Not specific; no targets; no baseline estimate
	Number of policy briefs resulting from the surveys							-	Not specific; no targets; no baseline estimate
Strategy 4: Strengthen school-based malaria sentinel surveillance	Proportion of planned malariometric surveys done by research institutions		100	0	0	0	0	-	Not specific; no baseline estimate; no targets in M&E plan but should be one survey per year; there have been no surveys done since 2013
	Proportion of county malariometric surveys assisted by national level			0	0	0	0	-	Not specific; no targets; no baseline estimate
	Parasite prevalence in school children			-	-	-	-	-	Data not available
Strategy 5: Facilitate operational research and translation of research findings to policy	Number of studies for which results were presented			-	-	-	-	-	Not specific—consider revising to "number of studies for which results were presented to the NMCP TWGs"; NMCP will have to create a database of studies presented
	Number of policy briefs developed from study results						1	-	Not specific; no targets; no baseline estimates
	Number of publications resulting from studies						3	-	Not specific—consider "number of publications/abstracts with policy implications resulting from studies"; indicator represents intended result
	Number of abstracts presented at conferences							-	Not specific; no targets; no baseline estimates

Strategy	Indicator	Baseline (source)	Achievement					Endline 2017 target	Comments
			2013	2014	2015	2016	2017		
Strategy 6: Strengthening malaria data management systems	Proportion of Malaria Control Unit staff reporting through MIAS		0	0	0	0	0	-	Indicator represents the intended result; not specific—missing frequency of reporting, hence it is too broad; no targets; no baseline estimates
	Proportion of Malaria Control Unit staff using MIAS for planning and budgeting		0	0	0	0	0	-	Not specific—missing frequency of the use of MIAS for planning and budgeting; re-order to be first indicator for this strategy; no targets; no baseline estimates
Strategy 7: Human resources capacity building in surveillance, monitoring, and evaluation	Proportion of Malaria Control Unit staff with capacity for data analysis and use		-	-	-	-	-	-	Indicator represents the intended result of the strategy; not specific on defined data analysis capacity; not time bound; no targets; no baseline estimates; denominator data not defined—20 staff at the programme were trained in use of Stata and SPSS
	Proportion of counties with capacity for data analysis and use		-	-	-	-	-	-	Indicator represents the intended result of the strategy; not specific on defined data analysis capacity; not time bound; no targets; no baseline estimates; consider indicators to demonstrate data use
Strategy 8: Conduct and support entomological surveillance	Updated national entomological profile					Yes	Yes	-	Indicator not SMART; consider "availability of an up-to-date national entomological profile"
	Proportion of targeted counties carrying out entomological surveys		-	-	-	81	81	-	No longer in targeted counties; intended coverage is all 47 counties; 38 out of 47 surveys in 2016 and 2017; targets not specified; no baseline estimates

Surveys and Assessments Conducted in the Period 2013–2017

An up-to-date research agenda is in place and aligned with the programme objectives in addressing emerging issues for each thematic area. During the period under review, mass net distribution was conducted in 23 counties in 2014–2015. Consequently, a survey was conducted in 2017 to evaluate post-mass net distribution. A separate evaluation of the mass net distribution in West Pokot was conducted in 2015. In addition, an assessment of the feasibility of continuous net distribution using the community-based approaches was done in 2015, comparing baseline (2013) and endline indicators of net coverage and use, with a focus on Busia County.

Facility-based surveys have been conducted on a biannual basis, with eight rounds of surveys completed during the period 2013–2017. In 2016, NMCP initiated and expanded QOC evaluations to include survey monitoring levels, trends in health systems readiness, and quality of inpatient malaria case management in all 47 county referral hospitals. Two rounds of surveys were completed in 2016. In 2017, the prolonged industrial action by health workers caused a shift of healthcare-seeking to faith-based hospitals and therefore the two rounds of surveys were conducted at faith-based hospitals in 43 counties.

An assessment on availability of ACTs and RDTs, and quality of dispensing practices in the private retail drug outlets was conducted in 2016. Table 10.7 provides a summary of interventions related to SMEOR and the assessments and surveys conducted during the period under review.

Table 10.7: Summary of monitoring, evaluation, and reporting efforts during the period 2013–2017

Year	Milestones
2013	▪ Devolution of health services to county level and the creation of county health management teams to manage health services ▪ Mid-term programme review of the NMS 2009–2017 ▪ Malaria surveillance identified as a core intervention area in malaria control ▪ Malaria surveillance curriculum developed for health workers ▪ First detailed national malaria control and epidemiological profile launched ▪ One round of the outpatient malaria case management survey conducted in June
2014	▪ Demographic and Health Survey conducted ▪ National malaria forum held in Nairobi ▪ May–June, PSI TRac National Household Survey ▪ Two rounds of the outpatient malaria case management survey conducted in February and September ▪ National health facility malaria prevalence survey
2015	▪ MIS conducted ▪ Household survey following free universal mass net distribution in West Pokot ▪ More than 4,000 health workers from 13 epidemic-prone and seasonal transmission sub-counties trained in malaria surveillance and epidemic preparedness ▪ Assessment of the feasibility of continuous net distribution using the community-based approaches ▪ Two rounds of the outpatient malaria case management survey conducted in April and November

Year	Milestones
2016	▪ Initiated biannual surveys monitoring levels and trends in health systems readiness and in quality of inpatient malaria case management at all 47 county referral hospitals ▪ One round of the outpatient malaria case management survey conducted in June ▪ Assessment on availability of ACTs and RDTs, and quality of dispensing practices in the private retail drug outlets ▪ Data quality assessments in 231 sub-counties ▪ Supportive supervision at sub-county and facility level ▪ Regional meetings to disseminate MIS 2015 results, county profiles, and results of quality of care assessments
2017	▪ Two rounds of surveys to monitor quality of inpatient malaria case management at faith-based hospitals in 43 counties; change to faith-based hospitals was necessitated by the shift of healthcare-seeking to faith-based hospitals due to the prolonged 2017 industrial action by health workers ▪ Two rounds of the outpatient malaria case management survey conducted in February and September ▪ Survey to evaluate post mass net distribution conducted ▪ Data quality assessments in 305 sub-counties and 2,192 health facilities ▪ Support supervision at sub-county and facility level

Information Use

Information use is key to achieving M&E objectives and strengthening organisational, behavioural, and technical aspects that support availability of quality data. SMEOR has provided leadership in promoting data use. Production of quarterly surveillance bulletins at national level, initially with technical and financial support from MEASURE Evaluation PIMA, has now been fully transitioned to the programme. Similar capacity has been built at county level, with 11 counties (Kisumu, Homabay, Kakamega, Migori, Siaya, Vihiga, Bungoma, Busia, Narok, Kericho, and Bomet) actively producing surveillance bulletins on a routine basis. The surveillance bulletins have been used to inform decisions at national and county levels. The review have identified a few examples where information from surveillance bulletins or surveillance data review meetings was used to inform key decisions at county level (see case studies in text boxes).

In addition to the bulletins, the programme prepared quarterly and annual performance reports as part of monitoring the annual business plan. Dissemination of information was done during malaria stakeholder forums held semi-annually, during special launches of specific M&E products such as MIS reports, during World Malaria Day, at health sector meetings, and also shared via email or posting on the programme website (www.nmcp.or.ke). The SMEOR focal unit through the TWG has largely met its objective on establishing modalities for feeding M&E results into strategic directions, such as the use of epidemiological profiles in defining malaria control strategies by zones.

Case Examples on Information Use at the County Level

In Kisumu County, antenatal care (ANC) coverage did not equal the IPTp coverage. This gap represented a "missed opportunity" for IPTp. In the third issue of the Kisumu County malaria bulletin, February 2016, the downward trend in uptake of IPTp triggered an interrogation of data ANC uptake, where it was noted that increases in ANC uptake did not translate to improvements in IPTp uptake. It was determined that this was due to stock-outs of the commodity in most health facilities. A decision was made to procure the commodity at the county level and increase advocacy through the community health strategies.

A success story by the Tupime Kaunti project was documented in a May 2018 newsletter. Following malaria data review meetings at the facility level, and in a bid to enhance the quality of weekly malaria-specific data, the county leadership started a WhatsApp group with the county disease surveillance officers. The officers were required to post weekly data onto this forum and a snapshot of their capture in DHIS2. This project rewarded the best performing officer with airtime. As a result, there was an improvement in reporting rates, from 65 percent in January 2018 to 98 percent in April 2018. The project also offers technical and logistic support to conduct data review meetings at facility and subcounty levels.

Coordination and Collaboration

The malaria M&E plan serves the programme and partners, coordinating efforts of all malaria stakeholders. Implementation of the M&E plan and coordination of SMEOR activities has been through the M&E and operational research TWGs that met quarterly. Although financial support was not required for meetings, some support was provided to enable participation of stakeholders from sub-national levels (MECAT 2017). Terms of reference and membership for the M&E and operational research TWGs are provided in Figure 10.12. The TWG held regular meetings with full participation from the members, reflecting a strong M&E partnership. Meetings were clearly documented and action points were mostly implemented.

SMEOR has worked closely with the county malaria control coordinators (CMCCs) at the county level, providing capacity building in M&E and technical support for supervision and analysis of malaria surveillance data. The role of CMCCs at the county level includes coordinating malaria control activities; ensuring timely submission of data to HIS/logistics management information system/laboratory systems, monitoring various malaria indicators, conducting support supervision, and coordinating partnerships in both the public and private sector.

Coordination of M&E in the health sector is governed by a national M&E TWG hosted in the sector's M&E unit and with representation from all counties, programmes, and stakeholders. The inter-governmental subcommittee on health established a working group on M&E and supportive supervision to enable tracking of capacity strengthening and performance across the 47 counties.

The SMEOR focal unit had a good working relationship with other units and departments in the Ministry of Health, non-health sectors, and partners. Implementation of some of the activities under strategic objective four was dependent on external entities such as HIS and DSRU units. Continued strengthened collaboration will be critical to achieving a strong malaria surveillance system.

Figure 10.12: Terms of reference for M&E and operational research TWGs

Monitoring and Evaluation Technical Working Group

Purpose: To agree on mechanisms for monitoring and evaluating progress against strategic objectives and assess research needs and implications of emerging evidence

Terms of reference	Chair	Membership
■ To agree on methods for measuring the indicators for malaria as stipulated by the Kenya Malaria Strategy ■ To identify the logistical and resource issues associated with applying the proposed methodology and make recommendations on the way forward ■ To advise on the surveillance modalities for malaria control ■ To advise on methods and routes for disseminating the results of monitoring and evaluation and ensuring they are taken into account during strategic planning and review ■ To identify and advise on emerging evidence and implications for policy and strategy ■ To report regularly to MICC	Head, NMCP	NMCP, HMIS, KNBS, NCAPD, PMI, PSK, KeNAAM, DSRU, WHO, UNICEF, VBDU, KEMRI Partners, CDC, MEVAL, JPHEIGO, RHU, CHU, NCAHU, MSH, National Universities, ICIPE, AMREF, PPB, Technical Planning and Coordination, KEMSA, HPU, DEH, CHAI

Operation Research Technical Working Group

Purpose To coordinate malaria research activities and assess policy implications of emerging evidence

Terms of Reference	Chair	Membership
■ To advise on needs for malaria research to support the Kenya Malaria Strategy implementation ■ To set a prioritized research agenda for malaria control in Kenya as well as review progress in the various on-going research activities ■ To mobilize partners and advocate for funds for the malaria research agenda ■ To develop, and oversee the implementation of a strategy for dissemination of research finding relevant to the Kenya Malaria Strategy implementation ■ To monitor, collate and disseminate emerging research evidence nationally and internationally in relation to policy issues in the Kenya Malaria Strategy ■ To provide a theme and stewardship for the biennial Kenya National Malaria Forum ■ To report regularly to the MICC	KEMRI	KEMRI, KEMRI Partners (CDC, Walter Reed Project, Wellcome Trust) NMCP, public universities, VBDU, HRU, ICIPE, AMREF, KeNAAM, Development partners (PMI/USAID, WHO, UNICEF, World Bank,) JPHEIGO, MACEPA, PSK, MEVAL, MSH

Source: KMS 2014–2018 (Revised 2014)

Quality Assurance

Quality of routine health information remains a challenge that needs to be addressed. DQAs have been undertaken on a routine basis as described in the M&E plan and as provided in the annual M&E work plans. Conduct of the audits included building capacity for county staff to be able to undertake the exercise. It was noted that implementation of action points to ensure data quality improvements was the main challenge that needed to be addressed by the counties.

However, a number of factors need to be reviewed and addressed at a national level, namely:

- Review of processes and systems to ensure the quality of the audits undertaken. For example, notable uniform results in all sub-counties in a county is an indication that something went wrong with either the audit tool or the audit process.
- Separately document challenges, especially in areas where there are consistent gaps. This may necessitate a follow-up assessment whose method may be defined by the observations of the audit findings. The action plans as given do not provide an analysis of the bottlenecks.
- Use the assessment summary, designed as a scorecard, as an informational tool for the targeted leadership level. However, this needs to be accompanied with clear action points from the bottleneck analysis.
- Create guidance on the flow of the DQA feedback within the county. Counties need to be sensitised on the DQA protocol and guided to customise the proposed processes and strategies to their settings.

The programme has guidelines and tools for supportive supervision and has implemented supportive supervision with support from the Global Fund through the principal recipient. The exercise involved sub-county management teams visiting a select number of health facilities (30% of the total) and counties offering supportive supervision to all sub-county management teams and to the county referral hospitals. In addition to assessing reporting and quality of malaria-specific service delivery, the targeted subcounties and health facilities were given access to policies, technical skills, and relevant M&E information during the supervision visits.

Strengths, Weaknesses, Opportunities, and Threats

During one of the thematic group meetings, the team assessed the unit's capabilities as well as strengths, weaknesses, opportunities, and threats (SWOT). The SWOT matrix is provided in Table 10.8.

Table 10.8: SWOT analysis matrix

Strengths	Opportunities
▪ Strong leadership with high level of organisational efficiency ▪ Expertise in the SMEOR unit and in the TWGs ▪ Outstanding improvements in the M&E system, with success stories such as the production of surveillance bulletins at national and county levels ▪ Strong collaborative research networks ▪ Excellent technical support from partners ▪ Strong M&E partnerships ▪ Good working relationship with peers (health records and information officers, CMCCs) at county level ▪ Good working relations with other TWGs in the programme and in the Ministry ▪ Strong commitment from donors	▪ Prioritisation of universal health care in the country ▪ Existence of a health Act (2017) ▪ GTS 2016–2030) that prioritises surveillance ▪ The council of governors has a vibrant health desk to address health issues ▪ Value proposition to counties—packaging the programme well ▪ Innovations in information technology offer great opportunities to revolutionise M&E functions (e.g., data collection and reporting) ▪ Kenya has a vibrant research community and is a leading producer of malaria research publications. The research community contributes substantially to the malaria operational research TWG. ▪ Opportunity for sharing or disseminating information through the Maarifa Centre hosted by the council of governors

Weaknesses	Threats
▪ Insufficient funding for operational research, especially after withdrawal of DFID, which was the main donor for operational research ▪ Programme management tool (MIAS) not being used as intended ▪ Inadequate translation of research findings to policy ▪ Failure to achieve deliverables beyond the unit's mandate ▪ Lack of harmonised revision of reporting tools ▪ Weak data management systems at county level, resulting in poor-quality data ▪ Insufficient use of data for decision making at county level ▪ Inadequate human resource capacity, especially at county level	▪ Inadequate funds ▪ Overreliance on donors coupled with shrinking resource envelope ▪ Lack of political goodwill to support surveillance and M&E activities ▪ Bureaucracies affecting M&E interventions ▪ Lack of prioritisation of malaria interventions at county level ▪ Restrictive data sharing policies by some entities ▪ Lack of HIS legal framework ▪ Reliance on other systems/units to accomplish tasks (e.g., HIS, IDSR) ▪ Long reporting systems

Successes, Best Practices, and Facilitating Factors

This section highlights the successes, best practices, and facilitating factors identified in the review. Key successes identified included the following:

- Successful implementation of the comprehensive M&E plan
  - Conducted an MIS with the involvement of all key partners.
  - Completed the planned facility-based surveys on QOC
  - Completed the entomological surveys as planned and implemented extensive entomological surveillance
  - Updated the research agenda to align with the programme objectives and address emerging issues
  - Enabled better engagement with national and county-level partners in both joint planning and implementation of activities, resulting in efficient use of resources through the M&E reference planning document
  - Improved knowledge of and adherence to standards that define malaria surveillance data management through malaria surveillance training in all 47 counties
  - Implementation of DQAs as outlined in the M&E plan, increasing capacity of counties to conduct the audits
- Strong M&E partnerships, collaborative research networks, and efficient coordination
  - Strong representation in the SMEOR TWG from partners and other MOH departments, including the private sector. M&E coordination meetings held quarterly.
  - Coordination with other departments and entities that collect relevant data, including county-level data
- Increased capacity for analysis and interpretation of malaria surveillance data at national and county levels resulted in the production of routine surveillance bulletins
  - Regular use of malaria data to produce the bulletins resulted in improved quality of data
- The programme has been applauded in the KHSSP mid-term review report for producing and making available county-specific data
- Improved county structure with a malaria control coordinator and M&E TWGs, which have enhanced data flow and reporting
- Integration of IDSR with HIS has improved weekly reporting of malaria data and strengthened availability of routine data

- Guidance from WHO on malaria surveillance and especially monitoring of malaria indicators using surveillance graphs has facilitated use of malaria data
- Availability of the cost of annual M&E plans

Key Issues and Challenges

Key challenges documented in the review were as follows:

- Lack of programme reporting by programme officers within the NMCP through the MIAS
- Insufficient data analysis capacity at the programme level
  - New staff members need basic training and all require capacity to use statistical methods with geographic information system applications to inform visualisation of data collected at all levels
- Funding for operational research is insufficient, although the research agenda is able to identify areas for research for informing programming
- Lack of cooperation by most members of the research community to report progress on implementation of research agenda and sharing results of the research findings
- Prolonged delays in implementation of the malaria drug efficacy monitoring studies, which have not been finalized since 2013 in a country where these are supposed to be conducted every two years
- Unavailability of testing kits that resulted in a lack of susceptibility testing for insecticides
- Inadequate translation of research findings to policy as evidenced by the unavailability of policy briefs during the period under review
- Lack of malaria surveillance guidelines, which were planned for development as early as 2013
- Unavailability of appropriate reporting tools at the county level, leading to a lack of reporting by private facilities, low reporting at health facility and community level, and inconsistent data capture in cases where old and new tools are in circulation
- Inadequate investments by counties to implement follow up on actions highlighted in DQAs
- Lack of reporting by the private sector care providers through the national health information systems
- Lack of HIS regulation (the minimum mandatory reporting requirements and defining roles of national and county levels)
- Low reporting and poor quality of inpatient data that hampers availability of malaria morbidity and mortality data from the health facilities
- Inadequate M&E capacity at county level, specifically capacity in documentation, data management, data analysis, and data use

Lessons Learnt

- Devolution implied that more effort in communication and coordination will be required.
- High staff turnover at county level calls for continuous capacity building.
- More should be done beyond the routine DQAs to ensure that action plans are implemented.
- There is need for a system to routinely follow up on the availability of appropriate tools for reporting.

Recommendations

The recommendations from this review as are follows:

- Prioritise investment in epidemiological and entomological surveillance in line with the requirements of the GTS and WHO malaria surveillance M&E reference manual (WHO, 2018).
- Advocate for increased investments in SMEOR at both national and county levels to achieve better quality information for decision making.
- Use stratification for targeting of interventions. At a minimum, this should be done by subcounty, although the best is to do this is by facility. This will also allow a non-blanket approach to interventions across the country, especially in low transmission areas.
- Incorporate relevant entomological indicators (vector species diversity, ecology, and bionomics) to enable updating of the malaria transmission map.
- Strengthen health facility sentinel surveillance to improve availability of inpatient morbidity and mortality data. In particular, invest in building capacity for classification and coding of morbidity and mortality in Levels 4 and 5 health facilities.
- Ensure routine conduct of susceptibility testing for insecticides and identify mechanisms to speed up therapeutic efficacy testing.
- Enhance coordination and collaboration of health departments/units and relevant partners through TWGs and during implementation and review of strategies and activities.
- Conceptualize interventions beyond "event/one-off" activities to ensure sustained achievement of expected outcomes.
- Scale up production of malaria surveillance bulletins in all counties to enhance data ownership and use of information for decision making.
- Strengthen collaboration between the programme and research community to allow information sharing of findings for public health use, especially for research on items listed on the programme research agenda.
- Develop a human resource capacity-building plan to guide investments in building and sustaining surveillance and M&E capacity (including capacity in data demand and use to inform programmatic decisions) at national and county levels.
- Ensure purposive documentation of policy briefs.
- Strengthen malaria surveillance, including development of guidelines and tools, to guide its implementation in the context of reducing disease incidence.
- Anchor programme implementation monitoring and information repository tool at programme management level and enforce its use.
- Advocate for HIS to encourage private sector participation and engagement of nongovernmental organisations at the programme level, including in the M&E TWG.
- Strengthen programme monitoring at all levels.
- Explore the use of technology and innovative approaches for reporting.

Analysis from the 10 Focus Counties

- There are general improvements in 2015/2016 reporting rates following the roll-out of malaria surveillance training and maybe due to stability of county governments' operations.
- Variable slide positivity rates across the counties with no particular trends to allow generalisation of the rates over time which may explain why the national estimate has been stagnant at 33 percent in the period under review. The observed differences by county reflect the endemicity classification, higher in endemic zones and lower in the low risk areas, except for Turkana County.
- Declining risk of malaria across the 10 counties. Nationally, 13.2 percent of Kenya's population lived in areas where PfPR2-10 was greater than 50 percent in 2000, and by 2015 there were no areas with PfPR2-10 >50 percent.
- Varied and interesting interpretation of the decline of fever cases tested positive for malaria during the Busia and Kisii County end-term review of strategic plans. In Busia, there was mention of the industrial action by health workers, and in Kisii, this was explained as due to declining incidence of the disease. There is need to build capacity in interpretation of indicators.

Conclusions

There is a noted decline in malaria prevalence in the lake endemic areas, which is likely to change transmission to an unstable state with increased likelihood of epidemics. To stem the slight increase in prevalence in the coast endemic areas, continued focused intervention efforts remain critical. It is also increasingly important to identify hot spots at the sub-county level to target interventions in the low transmission areas. This means conducting malaria interventions with granularity to the health facility at a minimum. Data gaps in epidemiological impact indicators, such as number of suspected malaria cases and inpatient morbidity and mortality, need to be addressed in the next strategy.

Availability of a comprehensive M&E plan and the cost of the annual M&E work plans facilitated coordination and implementation of strategies within the mandate of the SMEOR unit. Strong M&E partnerships have been key in resource mobilisation and technical support, especially through the collaborative research networks. A wealth of information has been made available through the conduct of surveys, production of surveillance bulletins, evaluation of malaria control interventions, and through routine HIS and QOC facility-based assessments. There is need to package this information into "digestible" information products, such as publications and policy briefs, to expand their use.

As surveillance is enhanced and more M&E products are made available, there will be a need to develop knowledge management practices within the programme.

On the other hand, monitoring of trends in malaria morbidity and mortality is hampered by lack of complete and accurate data from routine HIS. There is an opportunity to strengthen health facility sentinel surveillance to improve availability of inpatient morbidity and mortality data. For mortality-specific information, a focus on Levels 4 and 5 hospitals will give a representative sample of country inpatient deaths due to malaria. As transmission declines, strengthening routine HIS will support malaria M&E with complete, timely, and accurate data to track malaria transmission. The existence of a health act can facilitate availability of a legal framework to enhance reporting through the national health information system by all health facilities in both the public and private sectors.

The GTS 2016–2030 is built on three pillars, the third of which is "transform malaria surveillance into a core intervention." This calls for an effective HIS; efficient disease surveillance systems; ability of surveillance to track and manage every case; robust entomological and drug efficacy surveillance; compulsory notification of all confirmed cases of infections in public and private care facilities, including at border points; identification of gaps in programme coverage; and assessment of impact of interventions (WHO, 2016).

Strengthened collaboration with other departments and units in the Ministry, multi-sectors, and the counties, as well as cross-border collaboration of malaria programmes, will be necessary to achieving an efficient surveillance system. The county is a focal point for routine reporting through the collection and collation of data from peripheral health facilities; therefore, setting up functional M&E structures at the county level is essential in ensuring strong malaria surveillance systems and that good quality data are available.

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