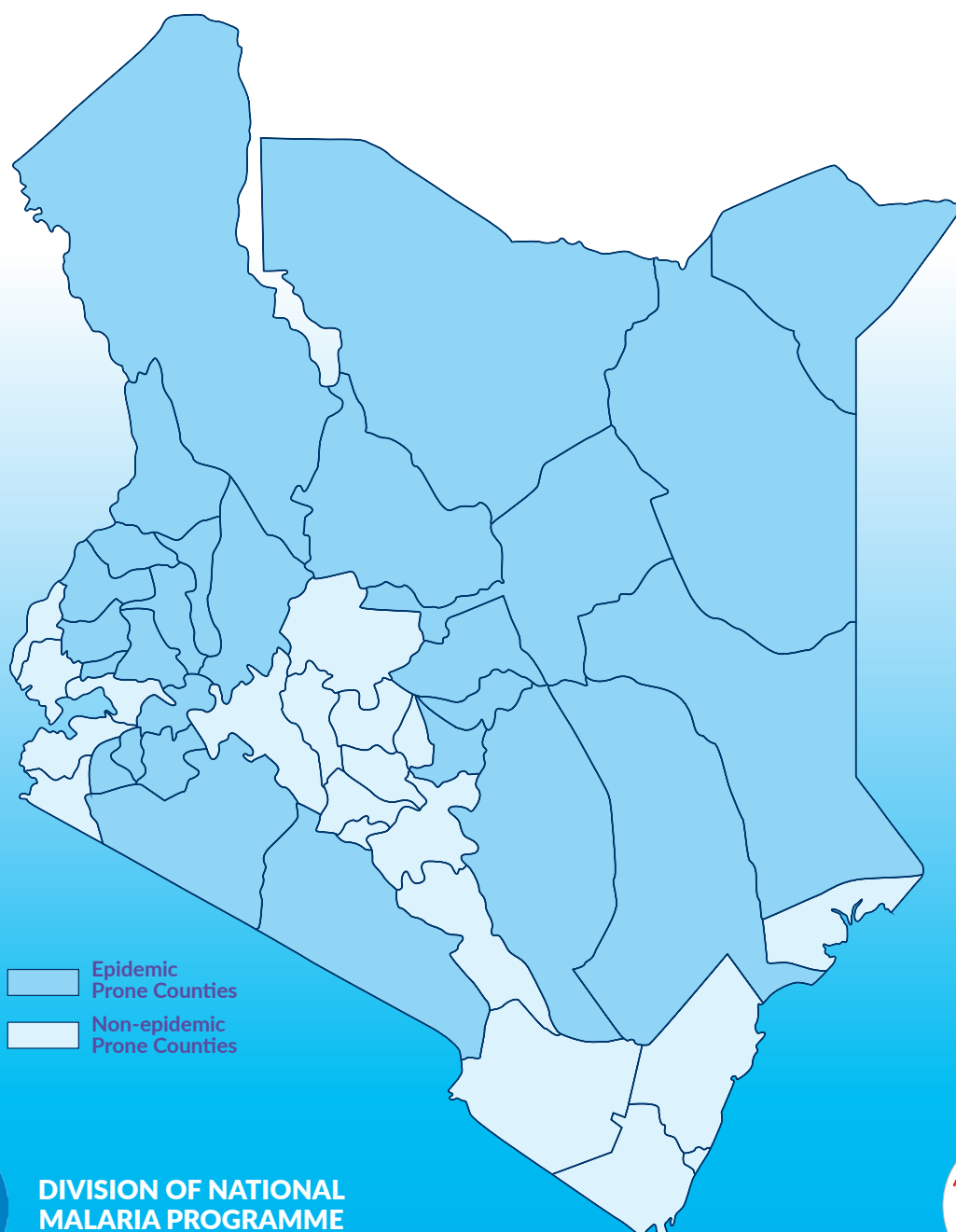




Ministry of Health

Malaria Epidemic Preparedness and Response Rapid Assessment Report

NOVEMBER 2019



DIVISION OF NATIONAL
MALARIA PROGRAMME





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ACKNOWLEDGMENTS

Epidemic preparedness and response is one of the key strategies for malaria control and elimination. In Kenya, 26 counties and 127 sub-counties are stratified as epidemic-prone because of the unstable nature of malaria epidemiology in those areas. Between February and March 2019, the Division of National Malaria Programme (DNMP)—with support from the United States Agency for International Development (USAID)- and the U.S. President’s Malaria Initiative (PMI)-funded MEASURE Evaluation project—facilitated training and development of malaria epidemic preparedness plans in all the counties and sub-counties prone to malaria epidemics.

The DNMP, in collaboration with the division of disease surveillance and response, undertook a rapid assessment of malaria epidemic preparedness and response capacity in 10 counties in November 2019. The purpose of the assessment was to establish strengths and weaknesses in epidemic preparedness and response in selected counties. This report presents the process, methods, and findings of the assessment.

The rapid assessment would not have been possible without the support of USAID/PMI through the MEASURE Evaluation project. As the national malaria programme, we sincerely appreciate this support. Specifically, we acknowledge the support of Dr Mildred Shieshia and Dr Daniel Wacira, of USAID/PMI, for their guidance, and of the MEASURE Evaluation project team, led by Dr Abdinasir Amin, for their operational and technical support.

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ABBREVIATIONS

ACT	artemisinin-based combination therapy
AL	artemether lumefantrine
CDH	county director of health
CHC	community health committee
CHMT	county health management team
CHU	community health unit
CHV	community health volunteer
DDSR	Division of Disease Surveillance and Response
DNMP	Division of National Malaria Programme
EPR	epidemic preparedness and response
IEC	information, education, and communication
IRS	indoor residual spraying
LLIN	long-lasting insecticidal net
MOH	Ministry of Health
PMI	U.S. President's Malaria Initiative
RDT	rapid diagnostic test
RRT	rapid response team
SBC	social and behaviour change
USAID	United States Agency for International Development





EXECUTIVE SUMMARY

Malaria epidemics usually occur in the western highlands and the arid and semi-arid regions of Kenya. These epidemics are characterised by high morbidity and mortality. Malaria epidemic preparedness and response (EPR) is geared towards the reduction of morbidity and mortality during epidemics through timely detection and response. A malaria programme review conducted in 2018 revealed suboptimal performance on EPR indicators and activities. Thus, the Division of National Malaria Programme (DNMP)—with support from the United States Agency for International Development (USAID)- and the U.S. President’s Malaria Initiative (PMI)-funded MEASURE Evaluation project—conducted malaria EPR planning and review workshops for 127 sub-counties in 26 epidemic-prone counties in Kenya. The workshops were conducted between January and March 2019 to build the capacity of health managers to set thresholds to monitor and detect epidemics early and initiate appropriate responses. Rapid assessment visits were conducted in November 2019 to assess the level of preparedness and response to malaria epidemics in the counties and sub-counties trained. Ten of the counties trained were randomly selected for the rapid assessment.

A rapid assessment tool was developed through a consultative process involving the DNMP, the Division of Disease Surveillance and Response (DDSR), and MEASURE Evaluation. The tool assessed the level of preparedness and response to malaria epidemics in the counties and subcounties selected. The objectives of the rapid assessment were to assess vulnerability to malaria epidemics in the selected counties and establish the level of preparedness and readiness of counties and sub-counties to respond to detected outbreaks and their resource needs to respond to potential epidemics.


Two multidisciplinary teams were formed to conduct the assessment. The teams comprised programme officers from the DNMP, DDSR, Kenya Medical Supplies Authority (KEMSA) and MEASURE Evaluation project staff. These teams were accompanied by the respective county/sub-county malaria control coordinators during the assessment. Data were collected through paper-based checklists that were administered at the county, sub-county, health facility, and community levels. For each level, pre-epidemic preparedness, epidemic response, and post-epidemic response were assessed.

The results of the rapid assessment showed generally reliable coordination structures across all levels. Support for basic operations and logistics for epidemic response was lacking across all the levels. None of the four levels assessed gave reliable estimates of the proportion of available emergency funds mobilised to respond to the epidemics. Shortage of trained health workforce and increased workload, especially during epidemics, were reported across all levels. Stakeholder support for malaria EPR was generally limited, with most of the counties and sub-counties reporting no malaria-specific partners. Stockouts of malaria commodities were reported across all levels. Emergency orders made during the epidemic were delayed or not delivered.

Field response during the epidemic phase was well organised, with most counties and sub-counties deploying rapid response teams (RRTs) and establishing outbreak committees. Critical response activities, such as testing, treatment, and referral of cases, were done in all areas that had experienced epidemics after the EPR training. Targeted distribution of long-lasting insecticidal nets (LLINs) and focalised indoor residual spraying (IRS) were conducted in a few areas. Some facilities were using field stain instead of the recommended Giemsa stain for microscopy slides, which could lead to false positives. All the levels assessed had pre-designed social and behaviour change (SBC) messages that were adapted and deployed to areas that had experienced an epidemic. Community communication channels, such as barazas, school health programmes, dialogue days, mother support groups, and interpersonal communication, were commonly used to deploy the messages. However, post-epidemic assessment was poorly performed across all levels.

The rapid assessment made the following recommendations:

- ♦ Strengthen resource mobilisation for EPR activities.
- ♦ Improve commodity security for malaria EPR.
- ♦ Enhance malaria surveillance to avert epidemics and provide timely response.

- 
- ◆ Strengthen notification of onset of an epidemic and declaration of its end.
 - ◆ Encourage regular monitoring of natural events and population movements, which could trigger malaria outbreaks.
 - ◆ Conduct post-epidemic assessment as soon as the epidemic is declared over to review the outbreak response and document lessons learnt for better management of potential epidemics.
 - ◆ Enhance prompt national-level technical and operational support to areas experiencing epidemics.

In conclusion, the malaria EPR training workshops had a positive impact on some aspects of EPR at the county and sub-county levels. Greater efforts need to be put in place to increase the capacity of health facilities and community health units to effectively respond to malaria epidemics. Efforts to build capacity for EPR should focus on improving the weak areas identified in the assessment.



INTRODUCTION

Malaria remains a major public health problem, particularly in sub-Saharan Africa, which carries 90 percent of the global burden of this disease (World Health Organization, 2015). In Kenya, the disease accounted for 18.7 percent of all outpatient consultations, based on data from the routine health information system. Malaria transmission and infection risk across geographic regions in Kenya is determined largely by altitude, rainfall patterns, and temperature. Malaria epidemics in Kenya occur in two malaria epidemiological zones; the western highlands, where malaria is seasonal with year to year variation, and the arid/semi-arid lowlands of the northern and south-eastern parts of the country, which experience short periods of intense malaria transmission during the rainy seasons (National Malaria Control Programme, Kenya National Bureau of Statistics, & ICF International, 2016; Ministry of Health [MOH], 2019). The epidemics are associated with unusual climatic conditions, such as rainfall accompanied by other factors like suitable temperatures that favour breeding and longer survival of the malaria vectors (MOH, 2019). Malaria epidemics are preventable with proper planning, preparedness, and timely response. Effective surveillance systems are necessary for early detection of malaria epidemics, which are normally preceded by increased incidence of the disease.

Malaria is one of the priority diseases for integrated disease surveillance and response and falls under the category of diseases of public health importance. Malaria EPR remains a priority in disease surveillance and response, with a main objective of reducing associated epidemics and reducing morbidity and mortality that occur during epidemics through early detection and response. A total of 127 sub-counties spread across 26 counties in the western highlands and the arid/semi-arid zones are classified as malaria epidemic-prone areas in Kenya (MOH, 2016). Figure 1 shows the epidemic and nonepidemic counties in Kenya.

In recent years, malaria epidemics have occurred in different parts of the country. In September and October 2017, malaria upsurges were reported in nine counties: Baringo, Isiolo, Mandera, Marsabit, Samburu, Tana River, Turkana, Wajir, and West Pokot. More than 2,000 adults and children were diagnosed with the disease. More than 50 fatalities occurred from these upsurges, and more than 400 people were hospitalised. Marsabit was the worst hit county, with 26 reported deaths and 1,300 adults and children diagnosed with malaria (Mulambalah, 2018). In 2019, Baringo and West Pokot Counties, along with some parts of Turkana County, were again hit by malaria epidemics.

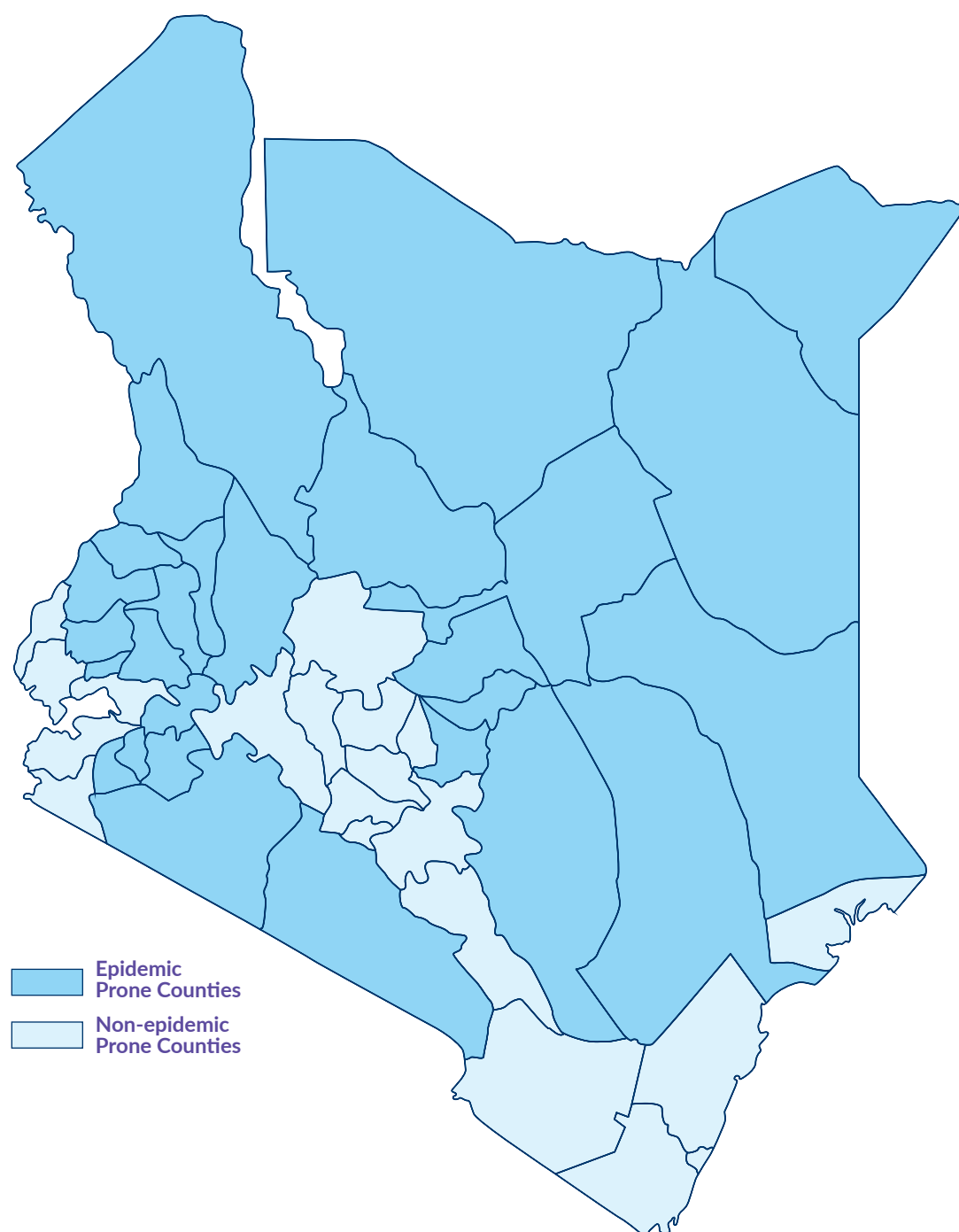
In response to these recurring epidemics, the DNMP, with support from the USAID- and PMI-funded MEASURE Evaluation project, conducted EPR training workshops for health managers in all epidemic-prone counties and sub-counties. The workshops, conducted between January and March 2019, targeted county and sub-county malaria control and disease surveillance coordinators. A total of 320 health managers were trained on how to set thresholds to monitor increases in confirmed malaria cases and develop EPR plans. The managers were guided to select five sentinel health facilities representing the local malaria epidemiology in their respective sub-counties and set weekly epidemic monitoring thresholds using data from the five preceding years. The managers were expected to monitor the weekly confirmed malaria cases against the set thresholds to detect abnormal increases and take necessary actions to avert epidemics.

In October 2019, the DNMP, in collaboration with the DSRU and with technical support from MEASURE Evaluation, developed a standard rapid assessment tool to assess the level of preparedness and response to malaria epidemics in epidemic-prone areas. The tool was used to assess EPR capacity in 10 of the 26 counties trained in 2019. The 10 counties were randomly selected to represent both the western highlands and seasonal malaria transmission zones.





Figure 1. Epidemic-prone and nonepidemic-prone counties in Kenya



Objectives of the Rapid Assessment

The specific objectives of the assessment were as follows:

- ♦ To assess vulnerability to malaria epidemics in the selected counties
- ♦ To establish the level of preparedness and readiness of counties and sub-counties to respond to and contain detected outbreaks
- ♦ To assess county and sub-county capacity and resource needs to respond to potential epidemics



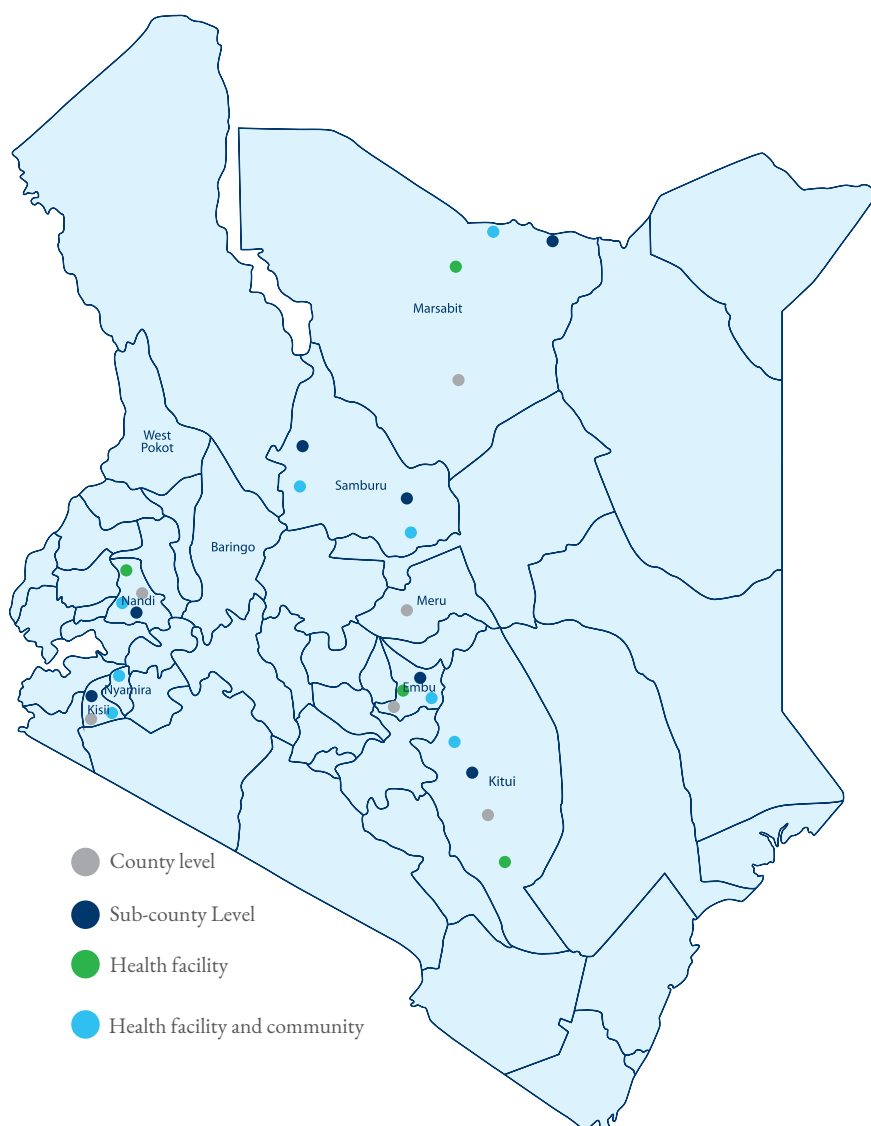
METHODS

Selection of Study Sites

Ten out of the 26 epidemic-prone counties trained in 2019 were randomly selected for the rapid assessment. Five of the counties were in the western highlands (Baringo, Nandi, Kisii, Nyamira, and West Pokot), and the other five were in the seasonal transmission zone (Embu, Kitui, Marsabit, Meru, and Samburu) Figure 2 shows the 10 counties assessed and location of some of the places visited.

A letter was sent to the county directors of health (CDHs) in the 10 selected counties explaining the purpose of the assessment. The letter requested the CDHs to allow the national team to conduct the exercise in selected health facilities and community health units (CHUs) and to interview the county and sub-county health management teams. Health facilities and CHUs that had experienced malaria epidemics in the six months prior to the assessment (May to November 2019) were purposively selected in consultation with the county health management teams (CHMTs). If no such facility was identified in the county or sub-county, a facility that was considered a malaria hotspot was selected. Only public health facilities were included in the assessment.

Figure 2. Counties assessed in November 2019





Development of Assessment Tools

A rapid assessment tool was developed through a consultative process involving the DNMP, DDSR, and other stakeholders. A two-day workshop was held on 2 and 3 October 2019 to develop the tool. The draft tools were revised during a review workshop for EPR guidelines held from 7 to 11 October 2019. A small team comprising of DNMP, DSRU and MEASURE Evaluation experts was selected to finalise the tool on 14 October. The team finalised four checklists to assess EPR capacity across the community, health facility, sub-county/county, and national levels (Annex 1). Most of the questions on the checklists were closed-ended with yes/no responses or tick boxes. The checklists included a few open-ended questions to document key challenges and recommendations from each section.

Each checklist had three sections covering three phases of the epidemic cycle: pre-epidemic, epidemic, and post-epidemic. Table 1 summarises the key aspects assessed in each phase.

Table 1. Key aspects included in the rapid assessment checklist

Phase	Key components	What was assessed
Pre-epidemic phase	Coordination structures	<ul style="list-style-type: none"> ◆ Availability of EPR guidelines and annual work plans ◆ Inclusion of EPR in the annual work plans ◆ Existence, membership, and training of RRTs ◆ Stakeholder groups for malaria
	Surveillance structures	<ul style="list-style-type: none"> ◆ Availability and use of meteorological information ◆ Routine entomological surveillance ◆ Epidemic thresholds to monitor and detect outbreaks
	EPR preparedness	<ul style="list-style-type: none"> ◆ Stock status before epidemic onset and social behaviour change
Epidemic phase	Outbreak notification and declaration	<ul style="list-style-type: none"> ◆ How the epidemic was notified ◆ When it was officially declared ◆ Who declared the outbreak
	Coordination structures and field response	<ul style="list-style-type: none"> ◆ Existence and membership of response teams and resource mobilisation
	Enhanced surveillance	<ul style="list-style-type: none"> ◆ Outbreak case definitions ◆ Daily line listing and reporting to higher levels ◆ Preparation of situational reports ◆ Feedback across the different levels
	Social behaviour change and information, education, and communication materials	<ul style="list-style-type: none"> ◆ Existence of social behaviour change messages, adoption, dissemination, and channels used
Post-epidemic phase	End of outbreak declaration	<ul style="list-style-type: none"> ◆ How the end of epidemic was determined ◆ Who declared the end of the epidemic
	Post-epidemic review meeting and report	<ul style="list-style-type: none"> ◆ Post-epidemic meeting held ◆ When it was held ◆ Post-epidemic report developed and disseminated
	Post-epidemic recommendations	<ul style="list-style-type: none"> ◆ What recommendations were made ◆ Implementation of post-epidemic recommendations





Composition of the Rapid Assessment Teams

Two teams conducted the assessment in the seasonal transmission and highland epidemic zones. Each team comprised the following members:

- ♦ 2 DNMP programme officers (group leader and one other officer)
- ♦ 1 DDSR programme officer
- ♦ 1 Kenya Medical Supplies Authority officer
- ♦ 2 MEASURE Evaluation staff

The teams were accompanied to the field visits by the respective county/sub-county malaria control coordinators.

Data Collection, Management, and Analysis

The assessment teams administered paper-based checklists to the in-charges of the selected health facilities and to community health assistants at the CHUs. At the sub-county level, the teams administered the checklists to selected members of the health management team: the sub-county medical officer of health, sub-county malaria control coordinator, sub-county pharmacist, and sub-county disease surveillance coordinator. At the county level, the teams administered the checklist to the CHMT, specifically to the CDH, county pharmacist, county malaria control coordinator, and county disease surveillance coordinators.

All data were entered, cleaned, coded, and analysed in Microsoft Excel. Simple frequency distribution tables were generated to summarise the number and percentage of responses for each question and results presented in charts and figures.





Assessment of EPR at the CHU Level

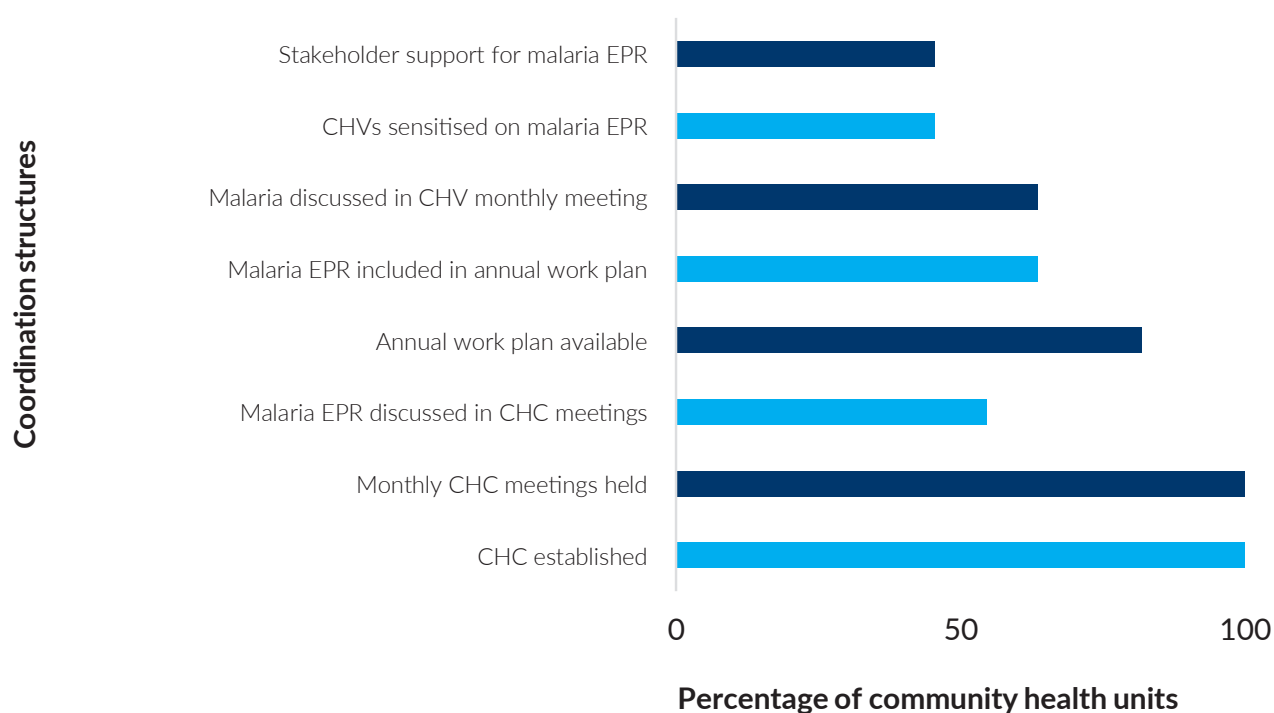
Pre-Epidemic Preparedness at the CHU Level

Eleven CHUs were assessed for pre-epidemic preparedness across the 10 counties. This section presents the results of the analysis of coordination structures, surveillance, and SBC at the community level.

Coordination Structures

Nine CHUs (81.8%) had annual work plans, of which seven (63.6%) included malaria EPR (Figure 3). All CHUs had established community health committees (CHCs). Six CHUs (54.5%) discussed malaria EPR in their monthly CHC meetings. All CHUs held monthly meetings for community health volunteers. Only five (45.5%) CHUs had community health volunteers (CHVs) sensitised on malaria EPR. Five (54.5%) CHUs had stakeholder support for malaria EPR activities. Stakeholders mentioned included UNICEF, Concern Worldwide, Kenya Red Cross, and Network for Ecological Agriculture Development, in Kisii County.

Figure 3. Coordination structures for malaria EPR at 11 CHUs



Surveillance

Three CHUs (27.3%) had updated lay case definition surveillance charts. Community health reporting tools were available in most of the CHUs: household register (90.9%), CHV monthly reporting referral tools (81.8%), and chalkboard (72.7%). Nine CHUs (81.8%) said that they regularly captured malaria data using the tools. Eight CHUs (72.7%) regularly submitted the reports to the community health assistant and regularly received feedback. Only two (18.2%) of the CHUs had programmes in place to monitor population movements and natural events to predict malaria epidemics (Figure 4).

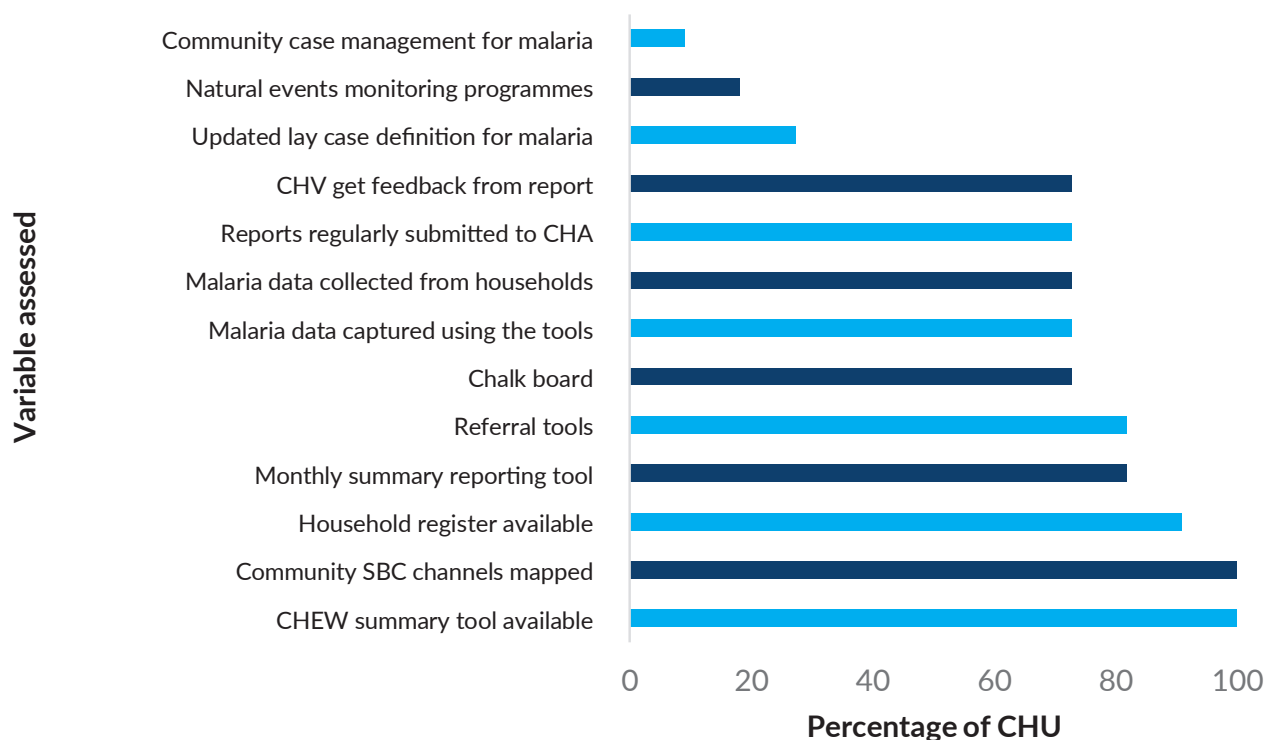
Community Case Management and SBC

Only one CHU tested and treated malaria at the community level (community case management for malaria). All the CHUs assessed had mapped channels for communication in their communities.





Figure 4. Surveillance and SBC at 11 CHUs



Epidemic Response at the CHU Level

Only six CHUs had experienced a malaria epidemic in the six months prior to the time of assessment. The CHUs were in Baringo, Marsabit, Nandi, Nyamira, and Samburu counties.

Three of the CHUs learnt about the epidemic from the health facility, and one CHU detected it from the number of suspected malaria cases referred. Two CHUs had adequate malaria EPR commodities during the epidemic (Figure 5). None of the CHUs assessed had adequate funds for operations during the epidemic.

CHVs in all six affected CHUs were sensitised on malaria EPR. Only one CHU had a temporary treatment centre set up during the epidemic. Three CHUs held outbreak meetings attended by health facility staff, a public health officer, a community health assistant and other community leaders. Four CHUs received support from the link health facility and the sub-county within one week of onset of the epidemic.

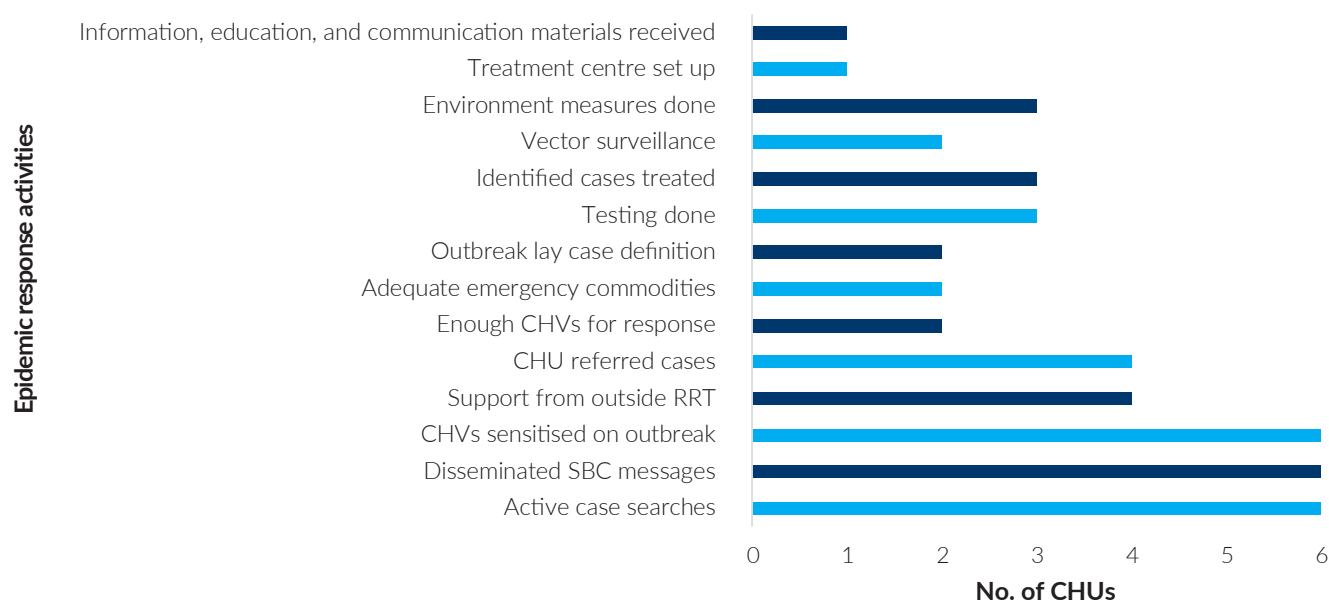
Testing and treatment was done in three of the CHUs. All CHUs referred cases to health facilities. Targeted distribution of LLINs was done in two CHUs, and three received an outbreak case definition. Five CHUs reported sending reports on the epidemic and receiving feedback from the health facility. All six CHUs conducted active case searches during the outbreak. Only two CHUs carried out enhanced vector surveillance.

Challenges reported across the six CHUs during the epidemic phase included difficulties in accessing health services due to heavy rains and vast distances, commodity stockouts, mistrust of CHVs by the community members, and community preference for injections as opposed to the recommended first line oral treatment for malaria.





Figure 5. CHU response to malaria epidemic



Post-Epidemic Assessment at the CHU Level

None of the six CHUs declared a formal end of the epidemic. However, four CHUs noticed the end of the epidemic through the reduced number of cases and referrals. Three CHUs conducted a post-epidemic review, and two of those wrote a report. One of the CHUs shared the report with the sub-county. Overall recommendations from the post-epidemic reports were to strengthen SBC messages, drain water, conduct larval source management, improve case identification, and improve the availability of stocks. One CHU recommended IRS, citing its success in previous years.

Assessment of EPR at the Health Facility Level

Pre-Epidemic Preparedness at the Health Facility Level

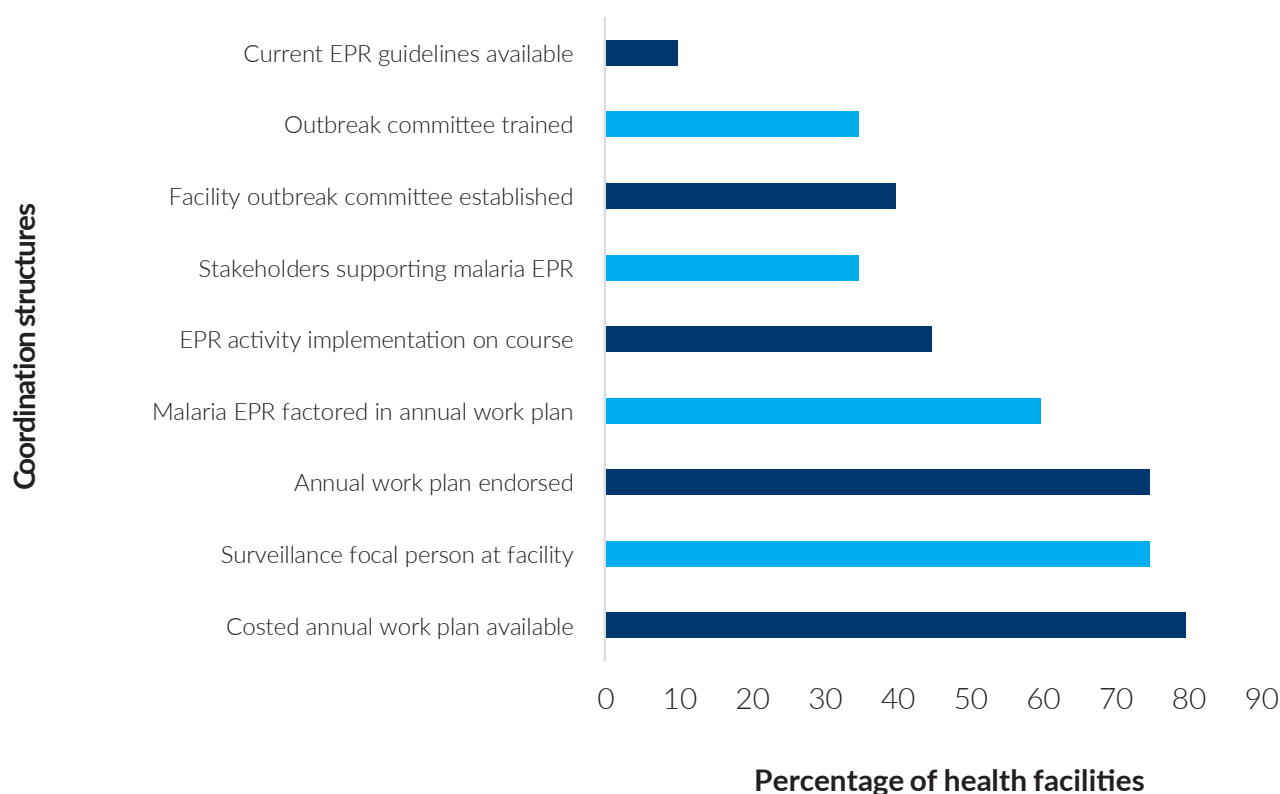
Coordination Structures

Twenty health facilities were assessed across the 10 counties (Table 1). Eighty percent of the health facilities had costed annual work plans, but only 60 percent of them factored malaria EPR into the annual work plan. Seventy-five percent of the health facilities had designated focal persons for malaria surveillance. Only 40 percent of the health facilities had established outbreak committees, and stakeholder support for malaria EPR was only available in 35 percent of the facilities (Figure 6).





Figure 6. Coordination structures for malaria EPR at health facilities



Surveillance

Twenty-five percent of health facilities regularly received meteorological information and used it to forecast malaria outbreaks (Figure 7). Eighty-five percent of the health facilities had the weekly surveillance data reporting tool and used it to make weekly reports. Fifty-nine percent of the health facilities received feedback from the weekly surveillance reports and shared it with other health workers. However, only 25 percent of the health facilities prepared malaria threshold charts from the weekly data. Only four health facilities regularly updated the weekly threshold charts and interpreted or shared feedback on the thresholds. Seventy-five percent of the health facilities had standard malaria case definition charts. The current malaria case management guidelines were available in 65 percent of the health facilities. Seventy-five percent of the health facilities had procurement plans, and 73 percent factored emergency commodities for malaria epidemics.

Pre-Outbreak Response

Six facilities (30%) had reached malaria alert threshold levels. Response actions undertaken included feedback to affected areas (five facilities), data quality assurance and external quality assurance for slide microscopy (five facilities), description of cases (two facilities), focalised IRS (one facility), and environmental modification (two facilities).

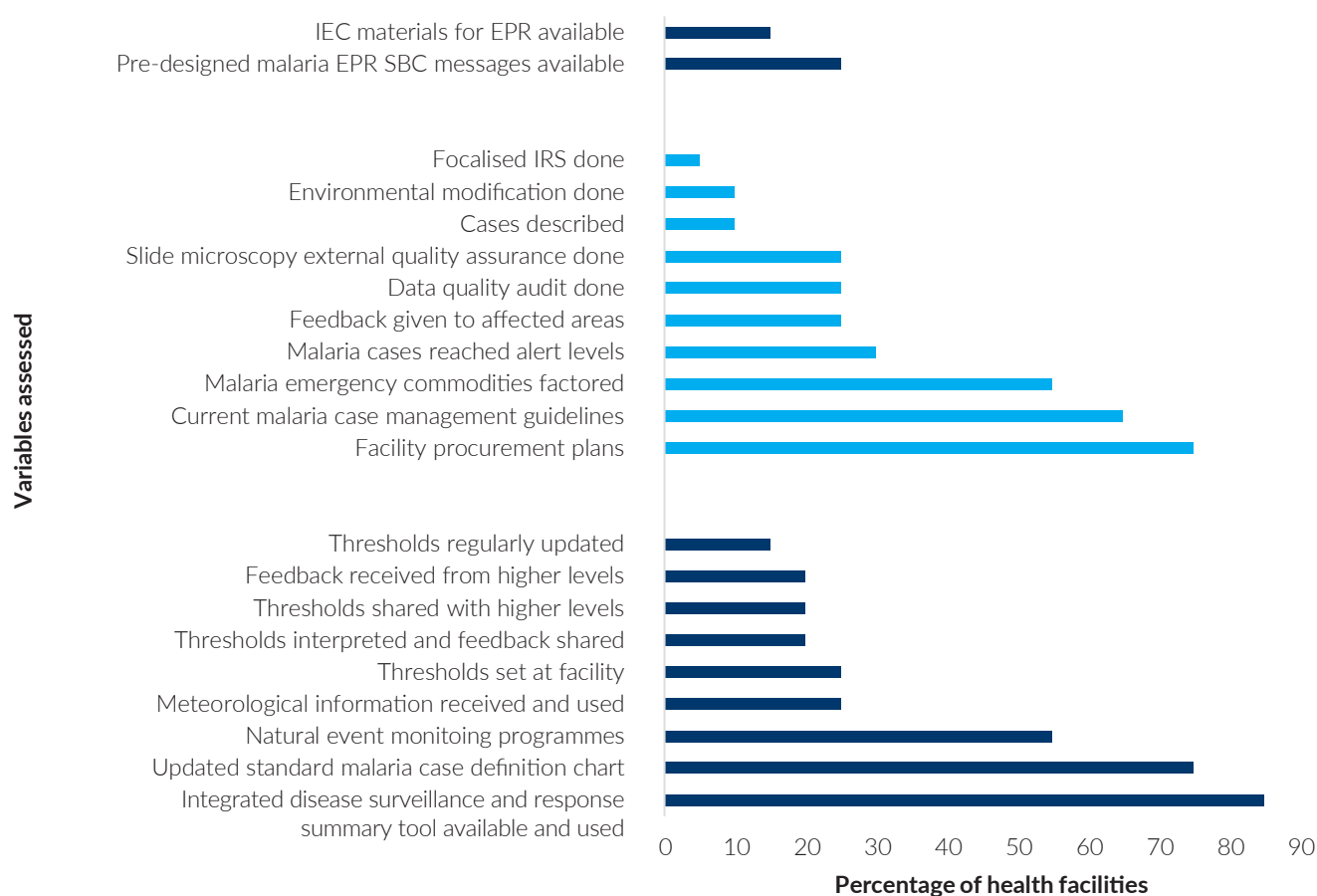
SBC

Only five (25%) of the health facilities had a pre-designed malaria SBC package, and information, education, and communication (IEC) materials were available in only three (15%) of the health facilities.





Figure 7. Surveillance, case management, and SBC at the health facility level



Assessment of the Epidemic Response at the Health Facility Level

Five health facilities (Konyao in West Pokot, Aldai in Nandi, Matongo health centre in Kisii, Tinga health centre in Nyamira, and Lkuroto Government of Kenya dispensary) had experienced recent epidemics. All five epidemics were detected by the health workers following increased referrals, high confirmed malaria cases, and increased use of antimalarials. None of the facilities made an official declaration of the epidemic. All five facilities formed an outbreak response committee, comprising membership from the following departments: clinical, laboratory, surveillance/health records and information, pharmacy, and nursing. Three of the health facilities received stakeholder support to respond to the epidemic. Only one facility reported receiving funds for response operations during the epidemic, but it was not clear what proportion of the budgeted emergency fund was availed.

Four health facilities had inadequate stocks of routine malaria supplies (artemisinin-based combination therapies [ACTs] and rapid diagnostic tests [RDTs]) at the onset of the outbreak. Only two of these facilities received adequate supplies to respond to the epidemics. One health facility set up a temporary treatment centre. Health facilities received clinical support to respond to the epidemic from the county and sub-county. Arrival time for the RRT ranged from three days to one month. All five health facilities did testing, treatment, and external quality assurance as part of the epidemic response. Four health facilities received an outbreak case definition and used it. Two health facilities prepared and sent outbreak line lists, but none received any feedback. None of the health facilities prepared daily situation reports from the line lists. Four facilities disseminated epidemic SBC messages using interpersonal communication and community networks, and two facilities distributed IEC materials for malaria during the epidemics.





Challenges experienced in responding to the outbreaks included commodity stockouts, personnel shortages, and heavy workloads. Other challenges experienced included lack of LLINs for targeted distribution, poor accessibility, and lack of operational vehicles for response and referral.

Post-Epidemic Assessment at the Health Facility Level

Only one facility declared an end of the epidemic, which was done 30 days after its onset. Declaration of end of the epidemic was informed by the reduced number of cases and consumption of malaria commodities. Two facilities held post-outbreak review meetings, and one prepared a report. The report recommended the introduction of community case management and improvement of community sensitisation on malaria epidemics. Challenges experienced in the post-outbreak phase included commodity stockouts and lack of knowledge on post-epidemic evaluation.

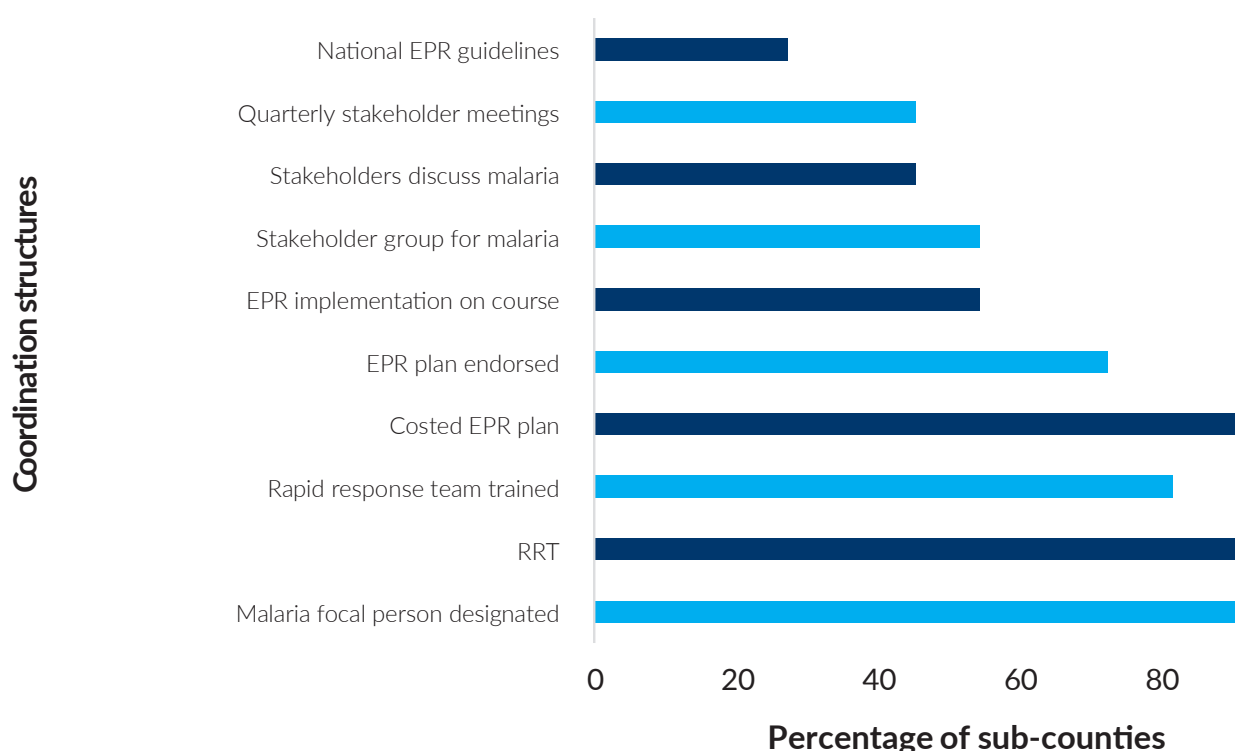
Assessment of Malaria EPR at the Sub-County Level

Pre-Epidemic Preparedness at the Sub-County Level

Coordination Structures

Eleven sub-counties were assessed using the pre-designed checklist. Three sub-counties had the national malaria EPR guidelines (27.3%). All sub-counties had a costed malaria EPR plan, eight (72.7%) of which had been endorsed. Implementation of the plan was on course in six (54.5%) sub-counties. All sub-counties had a dedicated malaria focal person and an RRT. The RRTs comprised the following departments: clinical, laboratory, surveillance, pharmacy, and environmental health. Six sub-counties (54.5%) had stakeholder groups for malaria control. Stakeholders mentioned were Population Services Kenya, UNICEF, and the Red Cross. Five sub-counties (45.5%) discussed malaria EPR during their quarterly stakeholder meetings (Figure 8).

Figure 8. Coordination structures for malaria EPR at the sub-county level





Surveillance

Five sub-counties (45.5%) regularly received meteorological information and used it to forecast malaria outbreaks. Two sub-counties (18.2%) conducted routine entomological surveillance and used the results to predict malaria outbreaks. Nine sub-counties (81.8%) regularly received updated weekly malaria thresholds from sentinel health facilities, but only five (45.5%) routinely reviewed them and gave feedback to the reporting health facilities. Only two sub-counties (18.2%) had programmes in place to monitor population movements and natural events to predict malaria epidemics (Figure 9).

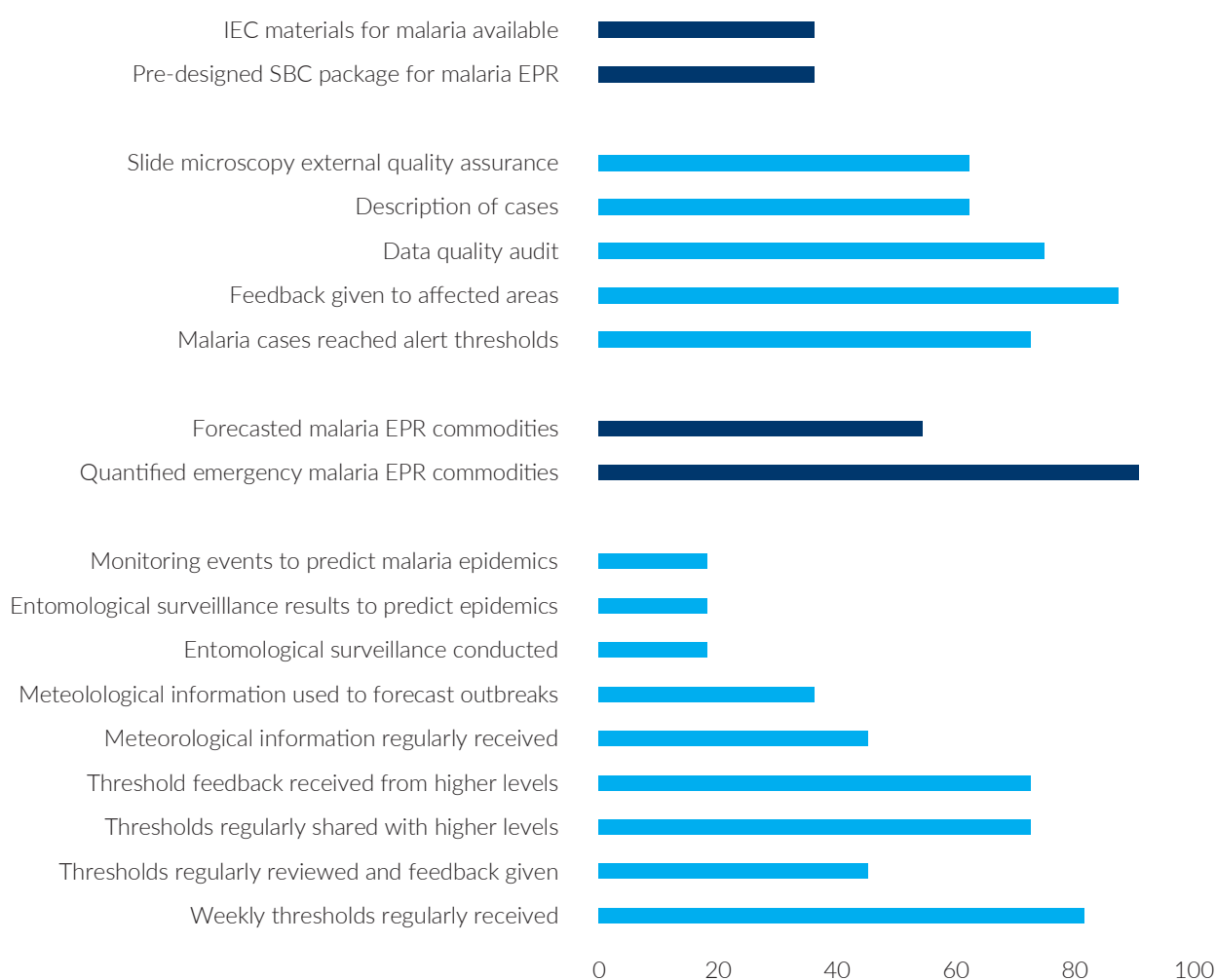
Pre-Outbreak Response

Malaria cases had reached alert thresholds in eight sub-counties (72.7%). Responses undertaken included feedback to affected areas (87.5%), data quality audit (75%), and description of cases and external quality assurance for slide microscopy (62.5%). Quantification of emergency commodities for malaria was done in 10 counties, but only 6 sub-counties did forecasting of the commodities.

SBC

Only four sub-counties (36.4%) had pre-designed SBC packages and IEC materials for malaria EPR.

Figure 9. Surveillance, pre-epidemic response, and SBC at the sub-county level





Epidemic Response at the Sub-County Level

Outbreak Notification

Four sub-counties (Aldai, Nyamira South, Pokot North, and Samburu East) had experienced malaria epidemics in the six months preceding the assessment. All four epidemics were notified, three of them through calls from health facilities and one from a mobile outreach clinic. Increased workload and high consumption of artemether lumefantrine (AL) led to detection of the outbreaks. Notification was immediate in Nyamira South Sub-County, one week in Aldai, two weeks in Pokot North, and one month in Samburu East.

Coordination of Response

All four sub-counties formed an outbreak committee that met weekly, except the Nyamira South committee, which met monthly. Similar to the pre-epidemic phase, the committee comprised membership from clinical, laboratory, surveillance, pharmacy, environmental health, health records, nursing, and public health departments. Two sub-counties (Pokot North and Samburu East) had stakeholder support during the epidemics.

Stock Status at Onset of Outbreak

Nyamira South and Samburu East had adequate stocks of ACT at onset of outbreak; Aldai and Pokot North had inadequate stocks of ACTs. All except Pokot North had adequate stocks of artesunate at the onset of outbreak. Nyamira South and Samburu East had adequate stocks of RDTs, Aldai had inadequate stock of RDTs, and Pokot North had a total stockout of RDTs. All four sub-counties were adequately stocked for microscopy reagents. All sub-counties received requests for emergency malaria EPR supplies and processed and forwarded them to the MOH within two to four weeks. Aldai and Samburu East received adequate and timely supplies of the commodities ordered, but Nyamira South and Pokot North did not receive any of the supplies ordered.

Field Response

None of the sub-counties had adequate funds for operations during the outbreak. Three sub-counties deployed an RRT to the outbreak sites. Pokot North did not deploy an RRT due to operational challenges but made telephone calls to the affected areas. The RRTs were deployed 7 days after the outbreak notification in Aldai, 30 days later in Samburu East, and 60 days later in Nyamira South. Nyamira South and Samburu East received support from the national RRT. Response activities included testing and treatment in all four sub-counties, external quality assurance for slide microscopy in three sub-counties, health education in three sub-counties, focalised IRS in Pokot North, and targeted LLIN distribution in Samburu East.

Enhanced Surveillance

One sub-county (Nyamira South) received an outbreak case definition from the national MOH; Aldai developed its own case definition. Nyamira South was the only sub-county that conducted active case finding. Samburu East was the only sub-county that received line lists from affected areas, but it did not share them with higher levels. None of the sub-counties prepared situation reports during the outbreak, and vector surveillance was conducted in Nyamira South only.

SBC

Only two sub-counties (Aldai and Pokot North) adapted and deployed pre-designed SBC messages to the affected population through interpersonal communication, health talks, mass media, community networks, and dialogue and action days. None of the sub-counties distributed IEC materials to the affected regions during the epidemic.

Post-Epidemic Assessment at the Sub-County Level

None of the sub-counties declared a formal end of the epidemic, and none of them conducted post-epidemic assessment.





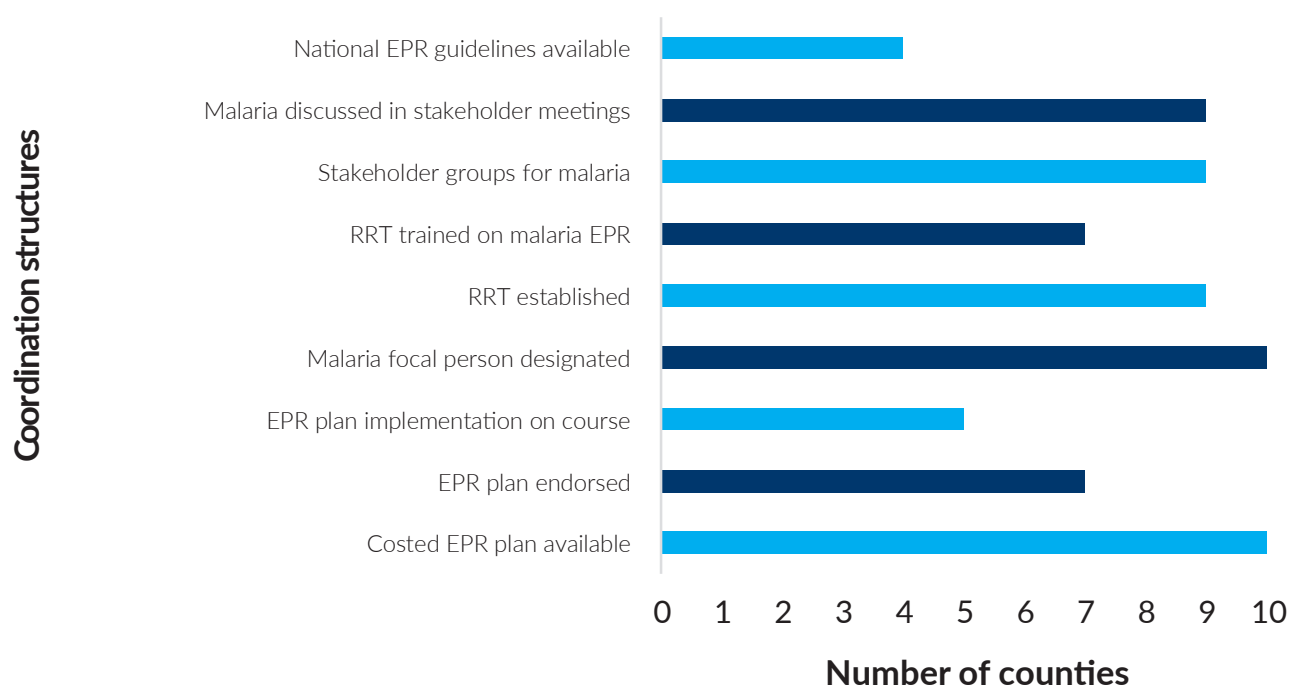
Assessment of Malaria EPR at the County Level

Pre-Epidemic Preparedness at the County Level

Coordination Structures

Only four counties (Baringo, Kisii, Nyamira, and West Pokot) had the national malaria EPR guidelines. All 10 counties assessed had costed malaria EPR plans, 7 of them had the plans endorsed, and 4 implemented them as planned (Figure 10). All the counties had a designated malaria focal person and an established RRT with members from clinical, laboratory, surveillance, pharmacy, environmental health, epidemiology, health promotion, health records, nursing, and public health departments. Eight counties had the RRT trained on malaria EPR. Nine counties had malaria stakeholders' groups, which met quarterly and discussed malaria EPR. The key stakeholders included Amref Health Africa, Population Services Kenya, and the Kenya AIDS NGOs Consortium.

Figure 10. Coordination structures for malaria EPR at the county level



Surveillance

Eight counties routinely received meteorological information and used it to forecast malaria outbreaks (Figure 11). Only three counties (Kisii, Nandi, and Nyamira) routinely conducted entomological surveillance and used the results to predict malaria outbreaks. All 10 counties reported receiving updated weekly malaria threshold data from sentinel surveillance sites and reviewing and giving feedback to relevant officers. Eight counties regularly shared the weekly thresholds with the national level, and five of them received feedback. Five counties had programmes to monitor population dynamics and natural events to predict malaria epidemics. Events monitored were conflicts, flooding, and nomadic migration.

Emergency Commodities, Pre-Outbreak Response

Eight counties conducted forecasting and quantification of emergency commodities for malaria epidemics. Seven counties had malaria cases that reached alert levels. Response actions undertaken included data quality audits (seven counties), feedback to affected areas (six counties), description of cases (three counties), and targeted distribution of LLINs (one county).

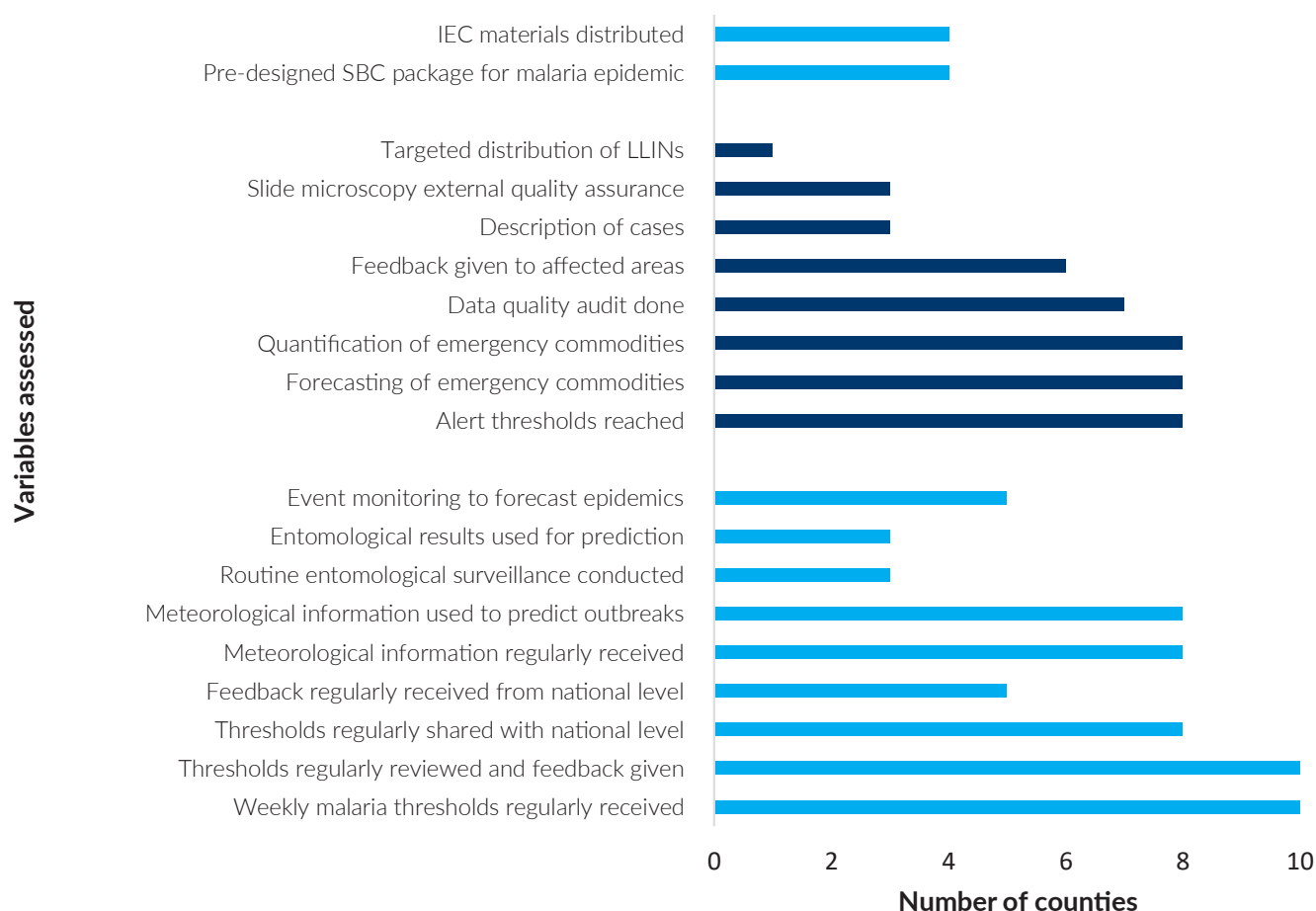




SBC

Four counties (Baringo, Kitui, Marsabit, and West Pokot) had a pre-designed SBC package and IEC materials for malaria epidemics.

Figure 11. Surveillance, pre-epidemic response, and SBC at the county level



Epidemic Response at the County Level

Epidemic Notification

Seven counties (Baringo, Kitui, Marsabit, Nandi, Nyamira, Samburu, and West Pokot) experienced malaria epidemics during the six months preceding the assessment. West Pokot was in an active epidemic at the time of the assessment. Three counties (Baringo, Nandi, and West Pokot) detected the outbreak through thresholds, and the others were notified by health facilities and communities. Health facilities detected the epidemics through increased consumption of AL and high test positivity rates. All outbreaks were officially notified, except the one in Nyamira South. Official notification of the epidemic from the time of onset varied, from one week in Marsabit, Nyamira, and Samburu to three weeks in Kitui. Official declaration of the outbreak was made by the county executive committee in Baringo County, the CDH in Kitui and Nandi Counties, and the CHMTs in the other four counties.





Coordination of Epidemic Response

All counties formed an outbreak response committee, except Samburu, where the county disease surveillance coordinator mobilised the community to respond to the epidemic. The outbreak response committees had membership from clinical, laboratory, surveillance, pharmacy, health records, and public health departments. Three of the outbreak response committees met weekly, one met quarterly, and two held ad hoc meetings. Four counties (Baringo, Marsabit, Nyamira, and West Pokot) had stakeholder support during the outbreak. Stakeholders who supported included the Kenya Red Cross, Action Against Hunger, Amref Health Africa, the Irrigation Department, and other government ministries.

Stock Status at the Onset of the Outbreak

Three counties (Kitui, Nandi, and Nyamira) had adequate stocks of ACTs, artesunate, and RDTs at the onset of the epidemic. West Pokot did not have any stocks of ACTs, RDTs, or artesunate at the onset of the outbreak. All counties, except Nyamira and West Pokot, received requests for emergency commodities within the first month of the outbreak. Although four counties processed and forwarded the emergency orders to the MOH, only one county (Marsabit) received the supplies requested. None of the counties had sufficient funds for operations during the outbreak. Baringo County reported that 40 to 50 percent of the budgeted emergency funds were available, but accessing the funds was a challenge.

Field Response

Three counties deployed RRTs to the affected areas. In Baringo, the county leadership, including the governor and county executive committee, visited the affected areas. The RRT in Baringo was deployed three weeks after the onset of the outbreak. Baringo received support from the national RRT 3 weeks after the onset of the epidemic, and West Pokot received support from the national RRT 60 days after the onset of the epidemic. Response activities undertaken included testing, treatment, slide microscopy for external quality assurance, and focalised IRS in Baringo and Kitui Counties. In addition, Baringo County undertook targeted distribution of LLINs and health education through local radio stations.

Surveillance

Three counties received outbreak case definitions from the MOH. Five counties conducted active case searches. Four counties received daily line lists from the outbreak areas but gave no feedback to the areas. Baringo and Kitui shared the line lists with the MOH. Baringo received feedback on the line lists from the national level and prepared and shared the daily situation reports. Baringo and West Pokot Counties conducted enhanced vector surveillance during the outbreak.

SBC

All counties, except Samburu and Marsabit, adapted and deployed pre-designed SBC messages. Only one county (Baringo) distributed IEC materials for malaria EPR during the epidemic.

Post-Epidemic Assessment

Only two counties (Kitui and Marsabit) declared the end of the epidemic. Kitui County held a post-outbreak review meeting five days after the end of the epidemic was declared. Kitui also prepared a report on the outbreak and shared it with senior county health management. The report recommended improvements on commodity management during epidemics.

Challenges Experienced

The rapid assessment identified several challenges at different levels of the health system that impede preparedness and response to malaria epidemics. The challenges at each level are discussed in the following sections.





Challenges at the CHU Level

Challenges experienced at the community level included the following:

- ◆ Shortage of malaria commodities (ACTs, RDTs and LLINs)
- ◆ Insecurity in some counties
- ◆ Inadequate number of CHVs
- ◆ Inaccessibility due to vast areas and harsh weather conditions
- ◆ Limited resources for operations
- ◆ Delays in payment of CHV allowances/stipends
- ◆ Lack of training in community case management and sensitisation on malaria EPR
- ◆ Low net use and misuse, especially in nomadic communities

Overall, in the seasonal transmission counties, malaria was not considered a priority, and awareness about the disease was low. There were few partners supporting malaria EPR at the community level. Other challenges included vast villages with poor road networks, making referral for complicated malaria difficult. Some communities did not trust the knowledge of CHVs. In West Pokot, the community perceived the treatment of malaria with injectables to be better and sought care from private clinics where quality of care was not controlled. Adherence to treatment regimen was another major challenge in West Pokot. Patients often shared drug dosages due to long distances to health facilities. In Kitui County, high turnover of CHVs was singled out as a major challenge.

Challenges at the Health Facility Level

Across all counties, stockouts of malaria commodities (RDTs, ACTs, LLINs, and microscopy reagents) was mentioned. Some counties reported a lack of LLINs in outbreak areas. This was associated with mass distribution of LLINs during the 2017 election year. Personal details collected as part of household registration for the mass LLIN distribution were feared to be used to rig elections. As a result, several community members in West Pokot did not receive LLINs in 2017, impeding universal coverage. Healthseeking behaviour and adherence to treatment were identified as major challenges in most of the counties.

Shortages of staff, especially laboratory-based personnel, and increased workload, coupled with a lack of basic infrastructure, exacerbated the situation during epidemics. In Moyale Sub-county, for example, only 1 of the 29 peripheral health facilities had a laboratory technologist. Some health facilities reported using field stain instead of Giemsa stain for malaria microscopy.

Insecurity in some counties made implementing preparedness and response activities very difficult. One of the facilities assessed in Baringo County was on high security alert and could only operate for a few hours a day. Insecurity challenges were also reported in parts of Marsabit, Samburu, and West Pokot Counties. Accessibility hampered response to malaria epidemics, making it difficult to reach affected communities in good time. Poor road networks and heavy rains further complicated response activities in remote areas.

Challenges at the Sub-County Level

Heavy rains, coupled with insecurity, impeded the capacity of counties and sub-counties to prepare for and respond to malaria epidemics. Inadequate funding and resources for operations hampered response activities such as supply of emergency commodities and deployment of the RRTs. Pokot North, for example, did not deploy an RRT due to transport challenges.





Low staffing levels and high staff turnover were reported across all sub-counties. Stockouts of malaria commodities and a lack of diagnostic capacities were common challenges in all sub-counties. The sub-counties often lacked sufficient commodities to redistribute during an outbreak. Supplies of emergency commodities were often delayed due to the processes involved in obtaining them.

Challenges at the County Level

The counties reported shortages of healthcare staff and industrial actions as major challenges. Epidemics coinciding with periods of industrial action resulted in increased mortality due to delayed or no response. Other challenges reported at county level included stockouts of malaria commodities, inadequate funds for response operations, lack of emergency supplies and response, lack of sensitisation for healthcare workers, delayed ordering and supply of emergency commodities, and poor access to healthcare occasioned by insecurity and vastness of affected areas.

Some CHMTs in the seasonal transmission zone noted that the current classification of malaria epidemiological zones did not consider pockets of high transmission in the vast regions generally regarded as low seasonal transmission. This limited the amount of resources allocated for malaria in the seasonal transmission zones both by the county governments and other stakeholders. Partner support in these areas was limited because malaria was considered a low-priority disease. This also explains why most of the EPR plans were not funded.

Suboptimal surveillance, characterised by a lack of reporting tools, low reporting, incomplete data, and inconsistent submission of reports, made it difficult for the CHMTs to take timely actions to avert and respond to epidemics. Similar to the sub-county level, logistics were a key challenge. The lack of functional utility vehicles and other logistical resources made it difficult to promptly deploy RRTs.

Poor quantification of commodities, especially in the seasonal transmission areas, led to expiry of ALs and RDTs due to the low incidence of malaria. Marsabit and Samburu Counties reported challenges related to human population movements due to nomadic pastoralism, making epidemic response difficult due to large numbers of people in remote, hard-to-reach areas.





DISCUSSION

The EPR rapid assessment highlighted the levels of preparedness and vulnerabilities across 10 counties in the western highlands and seasonal malaria transmission zones in Kenya. Overall, there were reliable coordination structures across all levels. These included availability of annual work plans, designated malaria and surveillance focal persons, and establishment of RRTs and outbreak committees across all levels. Costed EPR plans were available in all counties and sub-counties. This could be attributed to malaria EPR planning and review workshops conducted across all epidemic-prone counties and sub-counties in early 2019. Implementation of the EPR plans was low, however, due to a lack of funding. To strengthen implementation, future EPR activities should be incorporated into the malaria sub-programme with a specific budget line.

Resource mobilisation was weak across all the levels. The lack of basic operations and logistics support for epidemic response were a major challenge across all the levels. None of the four levels assessed gave reliable estimates of the proportion of available emergency funds mobilised to respond to the epidemics. Even if funds were allocated, accessing them remained a challenge. This was evidenced by delays in the deployment of RRTs to areas hit by epidemics. In Pokot North and Samburu East Sub-counties, for example, the RRTs could not be deployed due to a lack of resources. County and sub-county public health emergency committees should be strengthened and allocated sufficient funds to respond to epidemics. Structures to ensure that the funds are easily accessible when needed should be established at both county and sub-county levels.

The shortage of a trained health workforce and increased workload, especially during epidemics, were reported across all levels. Mobilisation of staff from adjacent health facilities should be encouraged in epidemic situations. Marsabit County reported adopting an innovative strategy of increasing the health workforce during epidemics by deploying students in medical training colleges and interns to provide care under supervision to affected areas.

Stakeholder support for malaria EPR was generally limited, with most of the counties and sub-counties reporting no malaria-specific partners. Malaria was considered a low-priority disease in most of the areas assessed, despite epidemics recurring in some of the counties. The seasonal transmission counties expressed concerns over the blanket classification of vast areas that ignored the micro-ecological factors that favour malaria transmission in small pockets within the region. Updated malaria county profiles showing malaria risks at the sub-county level are needed to target interventions and mobilise resources for malaria control in small pockets of high transmission in the vast seasonal malaria transmission and highland epidemic-prone areas.

Stockouts of malaria commodities were reported across all levels. Assessment of three-month stock status before the onset of epidemics showed inadequate stocks of malaria commodities (ACTs, RDTs, artesunate, and laboratory reagents). To address this issue, CHMTs suggested that they should be allowed to buy essential malaria commodities from alternative sources during epidemics and when stocks are not available at the central stores of the Kenya Medical Supplies Authority (KEMSA). Counties should continue conducting capacity building in forecasting and quantification of these commodities with the sub-counties and health facilities to improve timeliness in making orders and requests. This can help improve the time it takes to avail these commodities to the health facilities.

Emergency orders made during the epidemics were delayed or not delivered. Standard practice is for counties and sub-counties to ensure sufficient buffer stocks at all health facilities and make orders for emergency commodities when needed. Emergency commodities are usually stored at the national level to minimise expiries and facilitate easy transfer to areas where they are needed. Many of the orders made were not delivered on time, and some commodities, especially RDTs, were out of stock. The national level should support counties to access emergency supplies during epidemics by ensuring fast processing and delivery of the orders. Development partners should also come on board to support epidemic response in remote, hard-to-reach, and often insecure areas.





Field response during the epidemic phase was well organised, with most counties and sub-counties deploying RRTs and setting up outbreak committees. Counties and sub-counties provided support to the affected areas. Only one county indicated receiving support from the national level, however, which came two months after the onset of the epidemic. Critical response activities, such as testing, treatment, and referral of cases, were done in all areas affected by recent epidemics, but very few temporary treatment centres were set up in the areas hit by the epidemics. Enhanced surveillance during epidemic periods was generally weak across all levels. Few epidemic-hit areas prepared daily line lists and situational reports. The few areas that prepared the line lists did not share them with higher levels or give feedback to those reporting. The EPR training module in the surveillance curriculum should include a unit on line listing and preparation of situational reports.

Targeted distribution of LLINs and focalised IRS were conducted in a few areas. IRS was perceived to be an effective intervention and was carried out in schools, often without the recommended insecticides, equipment, and technical support. Pokot North Sub-county, for example, conducted IRS in schools using Deltamethrin, which was not recommended for use in IRS due to resistance. Counties were advised to seek guidance from the DNMP before undertaking any IRS activity.

Some of the health facilities assessed lacked basic infrastructure for proper diagnosis of malaria. Some facilities were using field stain instead of the recommended Giemsa stain for microscopy slides. This could lead to over-diagnosis of malaria due to false positives. Although most of the units assessed had disease surveillance focal persons and outbreak response teams or RRTs, outbreak notification at onset and declaration of its end was weak across all the levels. Without official declaration of onset and end of an outbreak, it is difficult to mobilise or re-assign resources to areas where they are most required.

Programmes to monitor natural events and population movements likely to be associated with epidemics were rare across all levels. Malaria outbreaks mostly occur among nomadic pastoralists in semi-arid counties. High morbidity and mortality due to malaria have been reported among these populations since 2017. Monitoring nomadic migration and weather patterns is important for forecasting and predicting malaria epidemics in these areas.

Overall, all levels assessed had pre-designed SBC messages that were adapted and deployed to epidemic hit areas. Community communication channels, such as barazas, school health programmes, dialogue days, mother support groups, and interpersonal communication, were commonly used to deploy the messages. Use of pre-designed messages to promote adherence to recommended treatment and prevention methods should be encouraged. Unlike the SBC messages, few of the levels assessed had available IEC materials for distribution.

Post-epidemic assessment was poorly performed across all levels. Few levels declared the end of the epidemic, and health workers noticed the end of the epidemic based on the reduced number of cases and consumption of malaria commodities. The importance of post-epidemic assessment should be emphasised in EPR training. The national level should follow up with CHMTs of areas affected by epidemics to ensure that post-epidemic assessment is done and documented at all levels. Implementation of recommendations made from previous epidemics should be followed up on and used to guide the response in subsequent epidemics.





Recommendations

In view of the results presented and the discussion in the preceding section, the EPR rapid assessment makes the following recommendations:

- ♦ **Resource mobilisation for EPR activities should be strengthened.** The Kenya malaria programme review of 2018 recommended establishing malaria as a sub-programme within the county health structures with its own budget. Malaria EPR activities should have a budget line under the malaria sub-programme.
- ♦ **Commodity security for malaria EPR should be enhanced.** Emergency commodities for malaria should be availed when needed. The national level should support counties affected by epidemics to access emergency commodities from the central stores. Operational challenges leading to delays in processing and delivering the orders should be identified and addressed. Continued capacity building for county and sub-county staff on commodity forecasting and quantification should be strengthened to ensure that health facilities are adequately stocked in the pre-outbreak and outbreak periods.
- ♦ **Surveillance to avert and respond to epidemics should be enhanced.** Threshold setting and monitoring should be cascaded down to health facilities in epidemic areas to enable them to plot and monitor weekly malaria cases against pre-developed threshold charts. The malaria EPR module should include a unit on line listing and preparation of situational reports during the epidemic phase. Tools for line listing and templates for situational reports should be availed as soon as an epidemic is declared.
- ♦ **Notification of onset of an epidemic and declaration of its end should be strengthened.** Senior managers and county leadership should be encouraged to take up the role of onset notification and declaration of its end to advocate for support and mobilise resources to respond to the outbreak. If necessary, templates should be provided to gather the data required to inform the notification and key ideas on drafting the notification statements.
- ♦ **All levels should be encouraged to regularly monitor natural events and population movements that could trigger epidemics in their areas.** Such events include migration patterns, heavy rains, conflicts, and drought. Human activities, such as dam construction, brick making, irrigation, and infrastructural developments that could trigger epidemics, for example by increasing mosquito breeding sites or attracting workers from malaria-endemic regions, should be monitored.
- ♦ **Capacity for post-epidemic assessment should be strengthened at all levels.** A post-epidemic review meeting should be held as soon as the epidemic is declared over to assess and document the successes and challenges experienced during the response. Higher levels should follow up to ensure that the post-epidemic assessment meeting is held and minutes or reports are shared.
- ♦ **Prompt national-level technical and operational support should be enhanced to support counties facing epidemics.** Only 1 of the 10 counties assessed received support from the national level during the epidemic phase. Some of the recurring challenges mentioned across the different levels could have been addressed if the national response team was on the ground promptly.

Limitations of the Assessment

This assessment had several limitations. It was conducted in counties that were randomly selected. Purposive sampling was done to identify sub-counties, health facilities, and CHUs that had experienced recent epidemics, but this was not possible in some counties. Consequently, only a few of those assessed were eligible to complete the epidemic and post-epidemic checklists. In the future, the rapid assessment should be conducted in places that are known to have had a recent epidemic.





The rapid assessment checklists had not been pretested, and weaknesses on the tools were noted during the assessment. The checklists should be reviewed, revised, and updated before they are adopted as standard tools for use in the future.

The sample of health facilities and CHUs selected was small and cannot be generalised for all 26 epidemicprone counties in Kenya. Results of this assessment should therefore be interpreted in context.

Conclusions

Malaria EPR training workshops impacted some aspects of preparedness and response at county and subcounty levels. However, significant efforts still need to be put in place to ensure that health facilities and CHUs are adequately prepared to respond to malaria epidemics. Malaria EPR training workshops need to continue annually, with more emphasis placed on the weak areas identified—that is, surveillance for epidemic detection and notification, mobilisation of resources, and post-epidemic assessment. More efforts are needed in post-epidemic assessment to document lessons learnt and ensure enhanced preparedness in the future.





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ANNEX 1. RAPID ASSESSMENT CHECKLISTS

DIVISION OF NATIONAL MALARIA PROGRAMME

MALARIA EPIDEMIC PREPAREDNESS AND RESPONSE RAPID ASSESSMENT CHECKLIST COUNTY/SUB-COUNTY LEVEL

General Instructions

This questionnaire has three sections corresponding to the different phases of an epidemic/outbreak. The pre-epidemic section is to be completed if the visit is conducted before an outbreak occurs.

The epidemic section is to be completed during an ongoing outbreak. The pre-outbreak section may also be completed to assess how prepared the affected region was before the outbreak occurred.

The post-epidemic section is to be completed after an outbreak is over. The pre-outbreak and epidemic sections may also be completed to assess preparedness and response activities of a past epidemic.

SECTION 1: PRE-EPIDEMIC PHASE

1. Coordination structures

- a. Do you have the current national malaria EPR guidelines? ☐ Yes ☐ No
- b. Is there a costed county/sub-county malaria EPR plan? ☐ Yes ☐ No
- c. If yes, has the plan been endorsed? ☐ Yes ☐ No
- d. If yes, is the implementation of the plan on course? ☐ Yes ☐ No
- e. Do you have county/sub-county malaria focal persons? ☐ Yes ☐ No
- f. Do you have a county/sub-county outbreak rapid response team (RRT)? ☐ Yes ☐ No
- g. If yes, list the members?

Cadre	Yes	No
Clinical		
Laboratory		
Surveillance		
Pharmacy		
Environmental health		
Others (Specify) _____		

- h. Has the county/sub-county RRT been trained on malaria EPR? ☐ Yes ☐ No
- i. Is there a county/sub-county stakeholder group for malaria? ☐ Yes ☐ No
- j. Is malaria EPR discussed in the stakeholder meetings? ☐ Yes ☐ No
- k. If yes, how frequently do the stakeholders meet? _____ Days



2 Surveillance

- a. Do you receive regular meteorological information? ☐ Yes ☐ No
- b. If yes, do you use the information to forecast malaria outbreaks? ☐ Yes ☐ No
- c. Do you routinely conduct malaria entomological surveillance? ☐ Yes ☐ No
- d. Do you use the entomological surveillance results to predict malaria outbreaks? ☐ Yes ☐ No
- e. Do you regularly receive updated weekly malaria thresholds from malaria sentinel surveillance sites? ☐ Yes ☐ No
- f. If yes, do you regularly review the thresholds and give feedback? ☐ Yes ☐ No
- g. Do you regularly share updated weekly malaria thresholds with the higher levels? ☐ Yes ☐ No
- h. If yes, do you receive feedback? ☐ Yes ☐ No
- i. Are there activities in place to monitor population dynamics and natural events that can be used to predict malaria epidemics? ☐ Yes ☐ No

3 Emergency commodities for malaria epidemics

- Was forecasting of emergency commodities for malaria epidemics done? ☐ Yes ☐ No
- Was quantification for emergency commodities for malaria epidemics done? ☐ Yes ☐ No

4 Pre-outbreak response

- a. Have malaria cases reported reached the set alert threshold? ☐ Yes ☐ No
- b. If yes, were the following done?

Activity	Yes	No
Feedback to the affected areas		
Data quality audit		
Description of the cases		
Slide microscopy EQA		
Focalized IRS		
Targeted distribution of LLINs		
Environmental modification		

5 Social Behavior Change (SBC) Activities

- a. Do you have a pre-designed malaria epidemic SBC package? ☐ Yes ☐ No
- b. Do you have IEC materials for malaria EPR? ☐ Yes ☐ No

6 What challenges do/did you experience with preparedness for malaria epidemics? (list)

7 How best can these challenges be addressed? (list)



SECTION 2: EPIDEMIC PHASE

1 Outbreak notification

a. How did you get to know about the current outbreak?

- ☐ Malaria thresholds
☐ Health facility
☐ Community
☐ Media
☐ MOH
☐ Other (specify) _____

b. How many days had the outbreak been on by the time you became aware of it? _____ Days

c. Who made the official declaration/notification of the outbreak?

- ☐ CS
☐ DG
☐ CEC/COH
☐ CDH
☐ SCSMOH
☐ Other (specify) _____

2 Coordination of response

a. Has the county/sub-county outbreak committee been formed? ☐ Yes ☐ No

b. If yes, who are the members?

Cadre	Yes	No
Clinical		
Laboratory		
Surveillance		
Pharmacy		
Environmental health		
Others (Specify) _____		

c. How frequently is the outbreak committee meeting held?

d. Was there stakeholders' support during the outbreak? ☐ Yes ☐ No

3 Mobilization of resources

- a. What was the three-month stock status of the following routine malaria supplies at the onset of outbreak?

Name	Adequate	Inadequate	None
(i) ACT			
(ii) Artesunate			
(iii) mRDTs			
(iv) Microscopy reagents			

- b. Did you receive requests/orders for the emergency malaria EPR supplies from the outbreak region? ☐ Yes ☐ No
- c. How many days after the onset of the outbreak did you receive the requests? _____ Days
- d. If yes, did you process and forward the requests to the MOH? ☐ Yes ☐ No
- e. How many days after the onset of the outbreak did you forward the requests? _____ Days
- f. Did you get any emergency malaria EPR supplies from the MOH? ☐ Yes ☐ No
- f. What was the stock status of the following emergency malaria EPR supplies delivered compared to your request?

Name	Adequate	Inadequate	None
(i) ACT			
(ii) Artesunate			
(iii) mRDTs			
(iv) Microscopy reagents			

- g. Were the supplies delivered timely for the response? ☐ Yes ☐ No
- h. Did you have adequate funds for the operations during the outbreak? ☐ Yes ☐ No
- i. What proportion of the budgeted emergency fund was available for response? (*amount available for response/ budgeted emergency fund*)

4 Field response

- a. Were the RRT members deployed to the field to provide support? ☐ Yes ☐ No
- b. If yes, who were the members?

Cadre	Yes	No
Clinical		
Laboratory		
Nurse		
Surveillance		
Pharmacy		
Environmental health		
Health promotion		
Epidemiologist		
Entomologist		
Community health services		
Others (Specify)		



- c. How many days after the outbreak notification were the RRT members deployed to the field? _____ Days
- d. Was your county/sub-county supported by the national RRTs during the outbreak? ☐ Yes ☐ No
- e. If yes, who were the members?

Cadre	Yes	No
Clinical		
Laboratory		
Nurse		
Surveillance		
Pharmacy		
Environmental health		
Health promotion		
Epidemiologist		
Entomologist		
Community health services		
Others (Specify) _____		

- f. How many days after the notification of the outbreak did the national RRT provide support? _____ Days
- g. Were the following activities undertaken during response?

Activity	Yes	No
Testing		
Treatment		
Slide microscopy for EQA		
Focalized IRS		
Targeted distribution of LLINs		
Environmental modification		
Others (Specify) _____		

5 Enhanced surveillance

- a. Did you get an outbreak case definition from the national MOH? ☐ Yes ☐ No
- b. If no, did you develop and disseminate an outbreak case definition? ☐ Yes ☐ No
- c. Were active case searches undertaken? ☐ Yes ☐ No
- d. Were updated line lists (MOH503) from the outbreak region received daily? ☐ Yes ☐ No
- e. If yes, were the line lists shared with the national MOH? ☐ Yes ☐ No





- f. Did you get feedback from the national MOH on the shared line lists? ☐ Yes ☐ No
- g. Did you prepare daily situation reports (SITREPS) from the line lists received? ☐ Yes ☐ No
- h. If yes, did you share the SITREPS with the outbreak sites? ☐ Yes ☐ No
- i. Was vector surveillance enhanced during the outbreak? ☐ Yes ☐ No

6 Social Behavior Change (SBC) activities

- a. Did you adapt and deploy the pre-designed SBC messages to the affected population? ☐ Yes ☐ No

- b. If yes, what channels were used?

Interpersonal communications

Health talks

Mass media (radios, television, newspapers)

Community networks - CHVs, churches, barazas, schools

Others (specify) _____

- c. Did you distribute malaria IEC materials to the outbreak region? ☐ Yes ☐ No

7 What challenges did you face in responding to the outbreak? (list)

8 How best do you think these challenges could be addressed? (list)





SECTION 3: POST-EPIDEMIC PHASE

1 Was the end of outbreak officially declared/notified?

☐ Yes ☐ No

2 If yes, who made the declaration?

☐ CS

☐ DG

☐ CEC/COH

☐ CDH

☐ SCMOH

☐ Other (specify) _____

3 Did you hold a post-outbreak review meeting?

☐ Yes ☐ No

4 How many days after the end of the outbreak was the review meeting held? _____ Days

5 Was a post-outbreak report prepared?

☐ Yes ☐ No

6 If yes, with whom was the post-outbreak report shared?

7 What were the report recommendations?

8 Are report recommendations being implemented by the following teams?

EPR ☐ N/A ☐ Yes ☐ No

Case management ☐ N/A ☐ Yes ☐ No

Vector control ☐ N/A ☐ Yes ☐ No

SBC ☐ N/A ☐ Yes ☐ No

What challenges did you experience during the post-epidemic activities? (list)

How best can these challenges be addressed? (list)

II. OTHER COMMENTS

Do you have any other comments regarding the outbreak that have not been mentioned in the evaluation?





MALARIA EPIDEMIC PREPAREDNESS AND RESPONSE RAPID ASSESSMENT CHECKLIST HEALTH FACILITY LEVEL

SECTION 1: PRE-EPIDEMIC PHASE

1. Coordination structures

- a. Do you have the current national malaria EPR guidelines? ☐ Yes ☐ No
- b. Do you have a costed health facility annual work plan (AWP)? ☐ Yes ☐ No
- c. If yes, has the AWP been endorsed? ☐ Yes ☐ No
- d. Is malaria EPR factored in the health facility AWP? ☐ Yes ☐ No
- f. (If Yes) Is the implementation of the plan on course? ☐ Yes ☐ No
- g. Do you have a health facility disease surveillance focal person? ☐ Yes ☐ No
- h. Do you have a health facility outbreak committee? ☐ Yes ☐ No
- i. If yes, list the members?

Cadre	Yes	No
Clinical		
Laboratory		
Surveillance		
Pharmacy		
Environmental health		
Others (Specify)		

- j. Has the health facility outbreak committee been trained on malaria EPR? ☐ Yes ☐ No
- k. Are there facility level stakeholders supporting malaria EPR? ☐ Yes ☐ No

2. Surveillance

- a. Do you receive regular meteorological information? ☐ Yes ☐ No
- b. If yes, do you use the information to forecast malaria outbreaks? ☐ Yes ☐ No
- c. Have you prepared the malaria threshold chart for the current year? ☐ Yes ☐ No
- d. If yes, do you regularly update the threshold charts? ☐ Yes ☐ No
- e. Do you interpret and share feedback with the health care workers in the facility? ☐ Yes ☐ No
- f. Do you regularly share updated weekly malaria thresholds with the higher levels? ☐ Yes ☐ No
- f. If yes, do you receive feedback? ☐ Yes ☐ No
- g. Do you have MOH 505 weekly summary tool? ☐ Yes ☐ No
- h. If yes, do you use it to make weekly reports? ☐ Yes ☐ No
- j. Do you get regular feedback on the weekly reports through MOH 505? ☐ Yes ☐ No
- k. Is the feedback regularly shared with the rest of the health care workers? ☐ Yes ☐ No
- l. Do you have the updated standard malaria case definition chart? ☐ Yes ☐ No





m. Are there programs in place to monitor and report events in the facility that can be used to predict malaria epidemics (e.g., increased anti-malarial prescriptions, test positivity rates, blood transfusion of febrile cases)?

☐ Yes ☐ No

n. Do you have the current national malaria case management guidelines?

☐ Yes ☐ No

o. If yes, do you use it to guide case detection?

☐ Yes ☐ No

3 Emergency commodities for malaria epidemics

a. Do you have a facility procurement plan?

☐ Yes ☐ No

b. Have the emergency commodities for malaria epidemics been factored in the plan?

☐ Yes ☐ No

4 Pre-outbreak response

a. Have the reported malaria cases ever reached the alert levels?

☐ Yes ☐ No

b. If yes, were the following done?

Activity	Yes	No
Feedback to the affected areas		
Data quality audit		
Description of the cases		
Slide microscopy EQA		
Focalized IRS		
Targeted distribution of LLINs		
Environmental modification		

5 Social Behavior Change (SBC) activities

a. Do you have a pre-designed malaria epidemic SBC package?

☐ Yes ☐ No

b. Do you have IEC materials for malaria EPR?

☐ Yes ☐ No

6 What challenges do/did you experience with preparedness for malaria epidemics? (list)

7 How best can these challenges be addressed? (list)





SECTION 2: EPIDEMIC PHASE

1 Outbreak notification

a. How did you get to know about the current outbreak?

- ☐ Surveillance (malaria thresholds)
- ☐ Healthcare workers (clinicians, pharmacy, laboratory, etc.)
- ☐ County/Sub-County
- ☐ Community - CHV, leaders, etc.
- ☐ Media
- ☐ MOH
- ☐ Other (specify) _____

b. How many days had the outbreak been on by the time you became aware of it?

c. Who made the official declaration/notification of the outbreak? (Tick where applicable.)

- ☐ CS
- ☐ DG
- ☐ CEC / COH
- ☐ CDH
- ☐ SCMOH
- ☐ HF in-charge
- ☐ Other (specify) _____

2 Coordination of response

a. Has the health facility outbreak committee been formed? ☐ Yes ☐ No

b. If yes, who are the members?

Cadre	Yes	No
Clinical		
Laboratory		
Surveillance		
Pharmacy		
Environmental health		
Others (Specify)		

c. How frequently is the outbreak committee meeting?

d. Was there stakeholder support during the outbreak? ☐ Yes ☐ No



3 Mobilization of resources

a. What was the three-month stock status of the following routine malaria supplies at the onset of outbreak?

Name	Adequate	Inadequate	None
(i) ACT			
(ii) Artesunate			
(iii) mRDTs			
(iv) Microscopy reagents			

b. Did you make requests/orders for the emergency malaria EPR supplies? ☐ Yes ☐ No

c. How many days after the onset of the outbreak did you make the requests? _____ Days

d. If yes, did you forward the requests to the county/sub-county? ☐ Yes ☐ No

e. Did you get any emergency malaria EPR supplies from MOH? ☐ Yes ☐ No

f. What was the stock status of the following emergency malaria EPR supplies delivered compared to your request?

Name	Adequate	Inadequate	None
(i) ACT			
(ii) Artesunate			
(iii) mRDTs			
(iv) Microscopy reagents			

g. Were the supplies delivered timely for the response? ☐ Yes ☐ No

h. Did you have adequate funds for the operations during the outbreak? ☐ Yes ☐ No

i. What proportion of the budgeted emergency fund was available for response? (*amount available for response / budgeted emergency fund*)

4 Field response

a. Were the healthcare workers sensitized on the outbreak? ☐ Yes ☐ No

b. How many days after the outbreak were the HCWs sensitized? _____ Days

c. Did you have enough HCWs required for the response? ☐ Yes ☐ No

d. Were there temporary treatment centres set up during the outbreak? ☐ Yes ☐ No

e. Was your health facility supported by the sub-county/county/national RRTs during the outbreak? ☐ Yes ☐ No

f. If yes, which cadre as per the following levels? (Tick as appropriate.)

Cadre	Sub-county		County		National	
	Yes	No	Yes	No	Yes	No
Clinical						
Laboratory						
Nurse						
Surveillance						



Cadre	Sub-county		County		National	
	Yes	No	Yes	No	Yes	No
Pharmacy						
Environmental health						
Health promotion						
Epidemiologist						
Entomologist						
Community health services						
Others (Specify) _____						

g. How many days after the onset of the outbreak did the first RRT support arrive? _____ Days

h. Were the following activities undertaken during response?

Activity	Yes	No
Testing		
Treatment		
Slide microscopy for EQA		

5 Enhanced surveillance

a. Did you get malaria outbreak case definition from the sub-county/county /national MOH? (tick as appropriate.)

Sub-county ☐

County ☐

National/MOH ☐

b. If no, did you develop and use an outbreak case definition?

☐ Yes ☐ No

c. Were outbreak line lists (MOH503) updated daily?

☐ Yes ☐ No

d. If yes, were the line lists shared with the sub-county/county?

☐ Yes ☐ No

f. Did you get feedback on the shared line lists?

☐ Yes ☐ No

g. Did you prepare daily situation reports (SITREPS) from updated line lists?

☐ Yes ☐ No

h. If yes, did you share the SITREPS with the HCWs?

☐ Yes ☐ No

6 Social Behavior Change (SBC) activities

a. Did you adapt and use the pre-designed SBC messages at the HF?

☐ Yes ☐ No

b. If yes, what channels were used?

☐ Interpersonal communications

☐ Health talks

☐ Community networks - CHVs, churches, barazas, schools

☐ Others (specify) _____

c. Did you distribute malaria IEC materials to the outbreak region?

☐ Yes ☐ No





7 What challenges did you face in responding to the outbreak? (list)

8 How best do you think these challenges could be addressed? (list)





SECTION 3: POST-EPIDEMIC PHASE

1 How did you detect the end of the outbreak?

☐ Using malaria thresholds

☐ Case counts

Others (specify) _____

2 Was the end of outbreak officially declared/notified?

☐ Yes ☐ No

3 If yes, who made the declaration?

☐ CS

☐ DG

☐ CEC/COH

☐ CDH

☐ SCMOH

☐ HF in-charge

☐ Other (specify) _____

4 Did you have a post-outbreak review meeting?

☐ Yes ☐ No

5 How many days after the end of the outbreak was the review meeting held? _____ Days

6 Was a post-outbreak report prepared?

☐ Yes ☐ No

7 If yes, with whom was the post-outbreak report shared?

8 What were the report recommendations?

9 Are report recommendations being implemented by the following teams?

EPR ☐ N/A ☐ Yes ☐ No

Case management ☐ N/A ☐ Yes ☐ No

Vector control ☐ N/A ☐ Yes ☐ No

SBC ☐ N/A ☐ Yes ☐ No

10 What challenges did you experience during the post-epidemic activities? (list)





11 How best can these challenges be addressed? (list)

IV. Other comments

Do you have any other comments regarding the outbreak that have not been mentioned in the evaluation?





MALARIA EPIDEMIC PREPAREDNESS AND RESPONSE RAPID ASSESSMENT CHECKLIST COMMUNITY LEVEL

SECTION 1: PRE-EPIDEMIC PHASE

1 Coordination structures

- a. Do you have a community health unit (CHU) annual work plan (AWP)? ☐ Yes ☐ No
- b. Is malaria EPR part of the Community Health Unit AWP? ☐ Yes ☐ No
- c. Do you have a community health committee (CHC)? ☐ Yes ☐ No
- d. If yes, how regularly do they meet?

- e. Is malaria EPR part of the agenda of the CHC meeting? ☐ Yes ☐ No
- f. Have the community health volunteers (CHV) been sensitized on malaria EPR? ☐ Yes ☐ No
- g. Do you have monthly CHV review meeting? ☐ Yes ☐ No
- g. Is malaria part of the agenda of the CHV review meeting? ☐ Yes ☐ No
- h. Are there stakeholders supporting community malaria EPR activities? ☐ Yes ☐ No

2 Surveillance

- a. Do you have updated lay case definition surveillance charts? ☐ Yes ☐ No
- b. Are the following CHIS tools available?
 MOH 513 (Household register) ☐ Yes ☐ No
 MOH 514 (CHV monthly reporting tool) ☐ Yes ☐ No
 MOH 515 (CHEWS summary) ☐ Yes ☐ No
 MOH 516 (Chalk board) ☐ Yes ☐ No
 MOH 100 (Referral tool) ☐ Yes ☐ No
- c. If yes, are malaria data captured using the tools? ☐ Yes ☐ No
- d. Do you regularly collect malaria data from the households? ☐ Yes ☐ No
- e. If yes, are reports regularly submitted to the CHA? ☐ Yes ☐ No
- f. Do you get regular feedback on the reports submitted to the CHA? ☐ Yes ☐ No
- g. Are there programs in place to monitor and report population and natural events that can be used to predict malaria epidemics? ☐ Yes ☐ No
- h. Is the CHU undertaking community case management for malaria? ☐ Yes ☐ No
- i. If yes, do you use the CHU daily activity register for malaria commodities? ☐ Yes ☐ No
- j. Do you submit monthly reports using the monthly summary form for malaria commodities? ☐ Yes ☐ No

3 Social Behavior Change

- a. Have you mapped channels of communication in the community? ☐ Yes ☐ No

4 What challenges do/did you experience with preparedness for malaria epidemics? (List);



5 How best can these challenges be addressed? (list)

SECTION 2: EPIDEMIC PHASE

1. Outbreak notification

a. How did you get to know about the current outbreak?

☐ Health facility

☐ Community

☐ Media

☐ MOH/County/Sub-County

☐ Other (specify) _____

2 Coordination of response

a. Are you holding community outbreak meetings?

☐ Yes ☐ No

b. If yes, who is attending?

Cadre	Yes	No
Clinical		
Laboratory		
Surveillance		
Pharmacy		
Community health assistant		
Public health officer		
Others (Specify)		

c. How frequently are the community outbreak meetings held

d. Is there any stakeholder support during the outbreak?

☐ Yes ☐ No

3 Mobilization of resources

a. Did you make requests/orders for the emergency malaria EPR supplies from the health facility? ☐ Yes ☐ No

b. Did you get any emergency malaria EPR supplies from the HF? ☐ Yes ☐ No

c. If yes, how much of the following emergency malaria EPR supplies did you receive?

Name	Adequate	Inadequate	None
(i) ACT			
(ii) Artesunate			
(iii) mRDTs			
(iv) Microscopy reagents			



- e. Were the supplies delivered timely for the response? ☐ Yes ☐ No
- f. Did you have adequate funds for the operations during the outbreak? ☐ Yes ☐ No
- g. What proportion of the budgeted emergency fund was available for response?
(amount available for response/budgeted emergency fund)

4 Field response

- a. Were the CHVs sensitized on the outbreak? ☐ Yes ☐ No
- b. How many days after onset of the outbreak were the CHVs sensitized? _____ Days
- c. Did you have enough CHVs required for the response? ☐ Yes ☐ No
- d. Were there temporary treatment centres set up during the outbreak? ☐ Yes ☐ No
- e. If yes, did they have adequate HCW workers? ☐ Yes ☐ No
- f. Did they have adequate emergency malaria EPR commodities? ☐ Yes ☐ No
- g. Was your CHU supported by the health facility/sub-county/county/ national RRTs during the outbreak?
☐ Yes ☐ No
- h. If yes, which level did they come from? (Tick as applicable.)
- ☐ National
- ☐ County
- ☐ Sub-County
- ☐ Health facility
- i. How many days after the onset of the outbreak did the first RRT support arrive? _____ days
- j. Were the following activities undertaken during response?

Activity	Yes	No
Testing (mRDTs/microscopy)		
Treatment		
Case referrals		
Focalized IRS		
Targeted distribution of LLINs		
Environmental modification		
Others (Specify)		

5 Enhanced surveillance

- a. Did you get an outbreak malaria lay case definition? ☐ Yes ☐ No
- b. If no, did you develop and use any outbreak case definition? ☐ Yes ☐ No
- c. Were active case searches undertaken? ☐ Yes ☐ No
- d. Were outbreak case reports made daily? ☐ Yes ☐ No
- e. If yes, were the reports sent to the health facility? ☐ Yes ☐ No





- f.** Did you get feedback from the health facility on the submitted reports? ☐ Yes ☐ No
- g.** Did you analyze the daily report? ☐ Yes ☐ No
- h.** If yes, did you share the analysis with the community? ☐ Yes ☐ No
- i.** Was vector surveillance enhanced during the outbreak? ☐ Yes ☐ No

6 Social Behavior Change (SBC) activities

- a.** Did you disseminate SBC messages to the community? ☐ Yes ☐ No
- b.** If yes, what channels were used?
- ☐ Interpersonal communications
- ☐ Community networks - CHVs, churches, barazas, schools
- ☐ Others (specify) _____
- c.** Did you receive any IEC materials from the health facility? ☐ Yes ☐ No
- d.** Did you distribute malaria IEC materials to the community? ☐ Yes ☐ No

7 What challenges did you face in responding to the outbreak? (list)

8 How best do you think these challenges could be addressed? (list)





SECTION 3: POST-EPIDEMIC PHASE

1 How did you detect the end of the outbreak?

☐ Case counts

☐ Others (specify) _____

2 Was the end of outbreak officially declared/notified? ☐ Yes ☐ No

3 If yes, who made the declaration?

☐ CS

☐ DG

☐ CEC/COH

☐ CDH

☐ SCMOH

☐ HF in-charge

☐ Others (specify) _____

4 Did you have a post-outbreak review meeting? ☐ Yes ☐ No

5 Was a post-outbreak report prepared? ☐ Yes ☐ No

6 If yes, with whom was the post-outbreak report shared?

7 What were the report recommendations?

8 Are report recommendations being implemented by the following teams?

EPR ☐ N/A ☐ Yes ☐ No

Case management ☐ N/A ☐ Yes ☐ No

Vector control ☐ N/A ☐ Yes ☐ No

SBC ☐ N/A ☐ Yes ☐ No

9 What challenges did you experience during the post-epidemic activities? (list)

10 How best can these challenges be addressed? (list)





III. Other comments

Do you have any other comments regarding the outbreak that have not been mentioned in the evaluation?



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