



Data Review Meetings in Five U.S. President's Malaria Initiative-Funded Countries

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Tajrina Hai, Yazoumé Yé
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MEASURE Evaluation
University of North Carolina at Chapel Hill
123 West Franklin Street, Suite 330
Chapel Hill, NC 27516 USA
Phone: +1-919-445-9359
measure@unc.edu
www.measureevaluation.org

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Cover photo

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ABBREVIATIONS

DRC	Democratic Republic of the Congo
Global Fund	Global Fund to Fight AIDS, Tuberculosis and Malaria
NMCP	national malaria control program
PMI	U.S. President's Malaria Initiative

INTRODUCTION

As malaria continues to pose a public health burden, malaria-endemic countries increasingly rely on routine health information systems, including surveillance systems, and other tools to optimize malaria prevention and treatment, particularly at the subnational level. These systems identify areas or population groups most affected by malaria and target resources to communities most in need (World Health Organization, 2017). Routine health information systems often face data quality issues that limit their use by service providers and decision makers to improve health services (Chilundo, et al., 2004). To address these issues, national malaria control programs (NMCPs) from several malaria-endemic countries began conducting data review meetings at subnational levels (e.g., counties; health facilities) to review and improve the data quality of these systems.

NMCPs conduct data review meetings with subnational levels to give feedback on the quality of malaria data from routine health information systems and use the data to improve service delivery. These data review meetings are held regularly—often quarterly or monthly. Subnational levels that participate in these meetings range from the lowest level, or the health facility, to intermediate levels, such as districts, provinces, or states, depending on the country’s health infrastructure. Other stakeholders, including partners, may participate in and provide input for these meetings. Information on how countries conduct data review meetings is limited and not publicly available. MEASURE Evaluation—a project funded by the United States Agency for International Development and the U.S. President’s Malaria Initiative (PMI)—conducted an assessment to understand better the processes and tools used in data review meetings in five malaria-endemic countries.

METHODS

To understand how data review meetings are conducted in a sample of malaria-endemic countries, MEASURE Evaluation reviewed the processes in five countries—the Democratic Republic of the Congo (DRC), Kenya, Liberia, Madagascar, and Mali. These countries were selected because MEASURE Evaluation had malaria resident advisors and staff working there during the study period—September 2018 to February 2019—and because NMCPs in these countries conduct regular data review meetings, providing an understanding of the processes that are similar across malaria-endemic countries.

MEASURE Evaluation conducted the following tasks to assess the current processes and tools used in data review meetings:

- A desk review of existing data quality tools and data review meeting documents, including protocols, standard operating procedures, and meeting minutes
- Interviews with key informants to understand the procedures for conducting data review meetings, obtain data quality tools and protocols (if they existed), and understand how these tools can be improved

Desk Review

MEASURE Evaluation searched databases for peer-reviewed and gray literature, using a combination of automated and manual searches, to identify data quality tools and documents that exist for data review meetings. Using databases and digital libraries, such as MEDLINE (via PubMed), Google Scholar, and SCOPUS, we searched for terms such as “data quality,” “malaria,” and “vector-borne/mosquito-borne disease.” We also searched for publications on data quality tools and data review meetings through the following websites: MEASURE Evaluation; the Global Fund to Fight AIDS, Tuberculosis and Malaria (Global Fund); United States Agency for International Development; and the RBM [Roll Back Malaria] Partnership to End Malaria, among others. In addition, we asked resident advisors and in-country staff to provide any documents, including tools and protocols, on how NMCPs conduct data review meetings and review the quality of malaria data. Appendix 1 lists the data review tools and documents received, by country.

Key Informant Interviews

MEASURE Evaluation interviewed resident advisors and in-country staff in each of the five countries on the key processes for conducting data review meetings. NMCP staff provided information to these resident advisors and in-country staff on their data review meeting processes. Some of the sample questions asked included the following: when and how long data review meetings were held, which subnational levels attended the data review meetings, existence of a protocol, tools used to collect data and monitor data concordance, indicators reviewed, trends analyzed, data used for service delivery decisions, development of an action plan, and gaps. The purpose of the questions was to identify the processes and procedures in place for conducting data review meetings that were not available through the desk review. Appendix 2 provides the responses to these and other questions, by country. In addition, MEASURE Evaluation asked which malaria indicators were collected and reviewed. Indicators collected, by country, are shown in Appendix 3.

RESULTS

Frequency and Duration of Data Review Meetings

The frequency and duration of data review meetings varied across countries. The DRC hosts monthly data review meetings; other countries conduct quarterly data review meetings. For most countries, data review meetings last one day; Liberia's data review meetings last two hours. The NMCP primarily hosts the data review meetings in the DRC, Liberia, and Madagascar. In Kenya, the county hosts the data review meetings in conjunction with the NMCP.

Subnational Participation and Support

Data review meetings occur at multiple levels. In Mali, the district hosts quarterly data review meetings for community health facilities, and the health regions host biannual data review meetings attended by the NMCP and districts. In Kenya, counties host data review meetings that are attended by the subcounties. In Liberia, the NMCP conducts data review meetings that are attended by Montserrado County only because this county is the most populous. In the DRC, the provinces host data review meetings for their health zones, and the health zones host data review meetings for health facilities.

The number of subnational and health facility representatives who attend data review meetings differed across countries, ranging from 15 to 40 health facilities or subnational representatives. In the DRC, approximately 20 health facilities attend the monthly data review meetings. In Madagascar, approximately 38 health facilities attend the quarterly data review meetings. In Kenya, on average, 15 subcounties attend the county-led, quarterly data review meetings.

External partners from other health programs also took part in the data review meetings. Most countries received outside funding from donors such as PMI and the Global Fund to conduct these meetings and received technical support from organizations such as MEASURE Evaluation and the International Medical Corps.

Data Sources, Indicators, and Trend Analyses

Data sources that were reviewed for concordance varied across countries, but several similarities exist. All countries review their health registers and DHIS2. Some countries reported looking at additional systems such as Gesis in Madagascar and a monthly reporting form in Mali. Except for Madagascar, data are compared across data sources during data review meetings. Madagascar reviews data concordance between health centers and districts outside the data review meetings.

Countries review different malaria indicators during their data review meetings (see Appendix 2). Most countries look at suspected and confirmed cases of malaria, treatment, antenatal care, distribution of long-lasting insecticide-treated nets, diagnostic indicators, and mortality due to malaria. Madagascar and the DRC looked at the number of severe anemia cases. Data on completeness and timeliness of report submission by subnational levels to the national level are collected; these data quality indicators for reporting are shared through a monthly bulletin in Kenya, Madagascar, and Mali. Countries differ on specific malaria indicators reviewed, but all review completeness and timeliness of report submission by subnational levels.

The DRC, Kenya, Madagascar, and Mali analyze trends of malaria services at their subnational levels. The DRC evaluates malaria trends among health zones and provincial health divisions. In Kenya, PMI-supported subcounties evaluate trends. In Madagascar, PMI-supported health districts evaluate trends. In Mali, trends are evaluated at the regional review meetings by the regional health centers and the NMCP, but not at the district-level meetings. For countries that analyze trends, the trends are evaluated against malaria targets. Not all countries review malaria trends against outcomes and services, and even among those countries that do, only select facilities are reviewing malaria trends.

Existence of Protocols

Countries do not have a stand-alone protocol for conducting data review meetings, but some countries have included these protocols in other documents. For example, the DRC, Kenya, and Mali have guides and reports that briefly describe how to conduct data review meetings. Madagascar developed protocols for conducting data quality reviews at different subnational levels, including district and community levels, but it does not have a protocol for reviewing data quality at data review meetings.

Regarding details on how to conduct data review meetings, the DRC's guidance document on data use provides the most granular details of the documents reviewed. This guidance document provides information on how often the meetings should occur, data sources that should be reviewed, the three phases to conduct the meeting (before, during, and after), calculation of indicators, presentations that should be shared during the meeting, and the development of an action plan (MEASURE Evaluation, 2018). Other countries submitted sample meeting minutes and presentations by subnational levels but not a protocol. Kenya provided a report on the effectiveness of data review meetings held in selected counties.

Kenya also shared a report discussing how subnational levels, mainly counties and health facilities, were trained to conduct data review meetings. This report described the process for targeting stakeholders, steps to conduct the meeting, identification of key indicators, how to transform data into informational presentations, and tracking of action plans after the data review meetings. The assessment found that data review meetings increased demand for data use, improved adherence to guidelines for malaria treatment, promoted the appropriate use of treatment, improved commodity management, and increased knowledge of surveillance (MEASURE Evaluation, 2017).

Rewards and Sanctions for Data Quality

Some countries rewarded subnational levels for high data quality; none of the countries sanctioned subnational levels for low data quality. The NMCP in DRC and MEASURE Evaluation in Mali provided infrastructure (e.g., computers; high-speed Internet connection, tablets) to health facilities that performed the best in data quality at the annual review meeting. Although the NMCP in Madagascar had plans to implement rewards for health facilities with high data quality and sanctions for health facilities with low data quality, there was no funding to carry them out.

Data Use and Action Plan

Four of the five countries—the DRC, Kenya, Madagascar, and Mali—mentioned that data were used to make service delivery decisions at the data review meetings and that an action plan was developed at these meetings. Kenya mentioned that although an action plan is developed, it is often not revisited at the next data review meeting. In the documents received, MEASURE Evaluation found action plans in the DRC, Kenya, and Mali that included activities for improving data quality and using the data reviewed at data review meetings to improve service delivery (MEASURE Evaluation; MEASURE Evaluation, 2018; National Malaria Control Program, 2016).

Gaps

Although some processes are in place for conducting data review meetings, gaps remain. Respondents shared that it would be helpful to have a standard guide for conducting data review meetings. The guide should include indicator definitions and provide recommendations on how to follow up after data review meetings through the action plan. Some countries, such as the DRC, have a protocol for conducting data review meetings, but others do not. Respondents shared that it would be helpful to have a separate guidance document that NMCPs and subnational levels could refer to for the conduct of data review meetings.

CONCLUSION

This assessment found that data review meetings are held regularly in these five PMI-funded countries (the DRC, Kenya, Liberia, Madagascar, and Mali) and provide a forum for subnational levels to review their data quality, but these meetings can be improved. These meetings are driven by the NMCP with some external support from partners. Subnational levels that attend the meetings differ and are based on the country's infrastructure. Although the data quality of malaria indicators is reviewed at the meetings, not all countries look at the trends of outcomes and services. Furthermore, some countries have protocols on conducting data review meetings, but these are embedded in reports or other guidance documents. Developing standard guidelines for conducting data review meetings that include best practices from across countries—including processes for planning and conducting data review meetings, reviewing data quality and indicators, and developing and following through on action plans—can help malaria-endemic countries run data review meetings more efficiently. The countries recommended having separate guidelines for conducting data review meetings that they can use and adapt to their specific contexts. Improving data review meetings that bring together national and subnational levels will streamline the data validation process and optimize data use.

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APPENDIX 1. LIST OF DATA REVIEW MEETING TOOLS AND DOCUMENTS RECEIVED, BY COUNTRY OR ORGANIZATION

Document name	Author	Year	Document type	Document description	Country or organization
Atelier de revue regionale des données paludismes du premier semestre 2018 koulikoro	National Malaria Control Program (NMCP), Mali	2018	Meeting minutes	Meeting minutes for the workshop of Koulikoro region reviewing malaria data for first half of 2018	Mali
Completeness of malaria indicator data reporting via the District Health Information Software 2 in Kenya, 2011–2015	Sophie Githinji, Robinson Oyando, Josephine Malinga, Waqo Ejersa, David Soti, Josea Rono, Robert W. Snow, Ann M. Buff, and Abdisalan M. Noor	2017	Journal article	Journal article looking at the completeness of malaria indicator data reporting from the DHIS2 software in Kenya	Kenya
Compte rendu de la réunion d'analyse des données PNLP	Health Province Division, Tanganyika, Democratic Republic of the Congo (DRC)	2018	Meeting minutes	Meeting minutes from the NMCP data analyses meeting at the province level	DRC
Data quality review: A toolkit for facility data quality assessment, modules 1–3	World Health Organization	2017	Toolkit	Toolkit that proposes a unified approach for data quality	World Health Organization
Guide d'orientation sur la tenue des réunions de coordination et d'analyse des données dans les divisions provinciales de la santé et PNLP appuyées par PMI	MEASURE Evaluation		Guide	Guide for coordinating and conducting data analyses in provincial health divisions supported by the President's Malaria Initiative	DRC
Improving data quality through implementation of centers of excellence in the Democratic Republic of the Congo	MEASURE Evaluation	2018	Brief	Brief describing how the centers of excellence in the DRC improved data quality	MEASURE Evaluation
Malaria surveillance: Report on continuous medical education of health workers	MEASURE Evaluation PIMA	2017	Report	Report on continuing medical education for health workers	Kenya
Methods and processes for conducting data quality assessments	United States Agency for International Development	2014	Toolkit	Report providing guidance on the methods and processes for conducting data quality assessments	United States Agency for International Development

Document name	Author	Year	Document type	Document description	Country or organization
Performance improvement plan for Kuria West	Kuria West Subcounty, Kenya	2016	Excel file	Action plan developed from a data review meeting for Kuria West Subcounty, in Kenya	Kenya
Protocol for the review of data quality and use of malaria data at health facilities	NMCP, Madagascar	2018	Protocol	Protocol on conducting data quality assessments at the health facilities	Madagascar
Protocol for the review of data quality and use of malaria data at regional levels and health districts	NMCP, Madagascar	2018	Protocol	Protocol on conducting data quality assessments at the regional levels and health districts	Madagascar
Protocol for the review of data quality and use of malaria data at the community level	NMCP, Madagascar	2018	Protocol	Protocol on conducting data quality assessments at the community level	Madagascar
Revue régionale des données sur le paludisme premier semestre 2018	Souleymane Dagnio, Thierno Hady Traore Charge, Gabriel Guindo	2018	Presentation	Presentation describing the malaria situation in the Segou Region, Mali, in the first half of 2018	Mali
Routine data quality assessment tool, user manual	MEASURE Evaluation	2017	Manual	Manual for using the routine data quality assessment tool	MEASURE Evaluation
Surveillance data review meetings in malaria-endemic counties in Kenya	MEASURE Evaluation PIMA	2017	Report	Report summarizing data and performance review meetings that occurred in PIMA-targeted counties	Kenya

APPENDIX 2. RESPONSES ON THE PROCESS OF DATA REVIEW MEETINGS, BY COUNTRY

Country	Democratic Republic of Congo	Kenya	Liberia	Madagascar	Mali
Data review meeting activity					
Are data review meetings being held?	Yes	Yes	Yes	Yes, at national level	Yes, for routine and surveillance data
When are data review meetings being held?	Monthly	Quarterly	Quarterly	Quarterly	Quarterly data review meetings are conducted at the district level. Biannual data review meetings are conducted at the regional level. The National Directorate of Health leads an annual meeting at the national level before developing the annual report of health statistics.
How long are the data review meetings?	One day	One day	Two hours	One day	Quarterly meetings at the district levels are held for two days. The biannual meeting at the regional level is held for one day.
What subnational levels attend the data review meetings?	Health zones, health facilities	Subcounties	Montserrado County	Health region	Health regions, districts

Country	Democratic Republic of Congo	Kenya	Liberia	Madagascar	Mali
How many subnational levels attend the data review meetings?	The national level meeting includes the National Malaria Control Program (NMCP) and partners and no subnational levels. At the provincial-level data review meetings, each province and their health zones, on average 24 health zones per district, attend. For data review meetings at the health zone level, health facilities attend; on average, there are 20 health facilities per health zone.	Data review meetings conducted by the county include all the subcounties. On average, 15 subcounties attend the county-led data review meetings.	Seven health districts regularly attend the quarterly data review meetings, hosted by the NMCP.	In 2018, organized three quarterly data review meetings at the national level, with an average of 35 participants. Three subnational data review meetings were held at the regional level, with an average of 38 health districts participating.	Between 15 and 20 participants attend the data quarterly review meetings at the district, regional, and central levels.
Who is hosting the data review meeting?	NMCP, provinces	NMCP, county	NMCP	NMCP	The districts hosts quarterly review meetings attended by community health facilities. The health regions host biannual review meetings attended by the districts and by the NMCP.

Country	Democratic Republic of Congo	Kenya	Liberia	Madagascar	Mali
Is there a data review meeting protocol?	No, but there is a guide to conducting meetings that includes data review meetings.	No, but there is a report from MEASURE Evaluation's website that outlines how PIMA assists some counties in conducting data review meetings.	No	Yes, there is a protocol for reviewing the quality and use of malaria data at the subnational levels, including the district and community levels. The protocol contains questionnaires assessing data use and also has a draft action plan template.	No, but there are terms of reference for each level.
Are other partners being invited to the data review meeting?	Yes	Yes	Yes	Yes	Yes, other health programs are invited to meetings for district-level data reviews.
What tools are the countries using to collect data?	Health registers, DHIS2	Health registers, DHIS2	Health registers, DHIS2	Health registers, GESIS, DHIS2 (pilot)	Health registers, monthly data reporting form (known as RMA), and DHIS2
Are tools being compared to ensure data concordance?	Yes	Yes	Yes	Yes	Yes
Where are tools being compared to ensure data concordance?	At the data review meeting	At the data review meeting	At the data review meeting	Between health center registers and aggregated reports at the health district level	At data review meetings for district and regional levels

Country	Democratic Republic of Congo	Kenya	Liberia	Madagascar	Mali
Are malaria indicators reviewed at the data review meetings?	Yes	Yes	Yes	Yes	Yes, at the district-level data review meetings, indicators for malaria, HIV, and tuberculosis are reviewed. The regional data review meetings are focused on malaria data.
Are the subnational levels evaluating malaria trends?	Yes	Some subnational levels, particularly President's Malaria Initiative (PMI)-supported, are evaluating trends.	No	In some PMI-supported health districts	No
Are data evaluated against malaria targets?	Yes	Yes, data are validated against national targets (e.g., 100 percent treatment of confirmed malaria cases, 80 percent of pregnant women received intermittent preventive treatment in pregnancy)	No	Yes, performance framework adopted as part of NMCP strategic plan 2018-2022, contains key performance indicators with targets against which to measure progress	No, not at the subnational level. The NMCP reviews targets biannually at the regional level.

Country	Democratic Republic of Congo	Kenya	Liberia	Madagascar	Mali
Are subnational levels with high data quality rewarded? Are subnational levels with low data quality sanctioned?	Yes, provinces and health zones at the annual review meetings are rewarded with computers, high-speed Internet, or other infrastructure paraphernalia.	No	No	No. There were plans to implement rewards and sanctions for facilities with high and low data quality, but there was no funding to implement these activities.	Yes. MEASURE Evaluation provides rewards for health facilities for the best data quality at the end of the year. This includes computers, tablets, and other infrastructure paraphernalia. The NMCP does not provide the rewards.
Is the national level sharing the data quality of reporting from subnational levels?	No	Yes. The national malaria bulletin disaggregates key indicators by county to show the data quality.	No	Yes, through malaria bulletin and during national data review meetings	Through a monthly bulletin that has still yet to be distributed from the national to the subnational level
Are data used to make service delivery decisions at the data review meeting?	Yes	Yes	No	Yes, but this can be improved.	Yes
Is a performance improvement plan developed during the data review meeting for subnational levels to follow?	Yes	Yes	No	Yes, a performance plan is shared with the local team.	Yes
Who is funding these meetings?		PMI, President's Emergency Plan for AIDS Relief	Global Fund	Global Fund	Global Fund

Country	Democratic Republic of Congo	Kenya	Liberia	Madagascar	Mali
Who is providing additional support to these meetings?	MEASURE Evaluation	MEASURE Evaluation PIMA, PMI implementing partners, Global Fund	Not applicable	MEASURE Evaluation	MEASURE Evaluation supports quarterly data review meetings in selected districts. International Medical Corps supports the three-day annual data review meeting that includes reviewing surveillance data.
What gaps do you think a data review meeting guideline can address?		Guide that includes indicator definitions and also provides recommendations for how to follow up after data review meetings (e.g., action plan)		Standardization of procedures across country for comparison, guide local team to address key points during review that need urgent actions	Follow-up of action plans and how results of the data review meetings can be captured to document improvement in data quality

APPENDIX 3. MALARIA INDICATORS COLLECTED, BY COUNTRY

Indicator	Democratic Republic of the Congo			Kenya			Liberia			Mali			Madagascar		
	Indicator collected	Indicator reviewed at data review meeting	Data source	Indicator collected	Indicator reviewed at data review meeting	Data source	Indicator collected	Indicator reviewed at data review meeting	Data source	Indicator collected	Indicator reviewed at data review meeting	Data source	Indicator collected	Indicator reviewed at data review meeting	Data source
Number of malaria cases															
Number of clinical (suspected) malaria cases in children <5 years	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X		Health register, DHIS2
Number of clinical malaria cases in persons ≥5 years	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X		X		Health register, DHIS2
Number of confirmed malaria cases in children <5 years	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X		X		Health register, DHIS2
Number of confirmed malaria cases in persons ≥5 years	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X		Health register, DHIS2
Artemisinin-based combination therapy (ACT) treatments															
Number of patients <5 years treated with ACT	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X		Health register, DHIS2
Number of patients ≥5 years treated with ACT	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X		Health register, DHIS2
Number of facilities with no stockouts of ACTs	X	X	Health register, DHIS2	X	X	Health register, DHIS2				X	X	Health register, DHIS2	X		Health register, DHIS2
Antenatal care (ANC) and intermittent preventive treatment in pregnancy (IPTp)															
Number of new ANC clients	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2
Number of ANC clients who received first dose of IPTp	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2
Number of ANC clients who received	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2

Indicator	Democratic Republic of the Congo			Kenya			Liberia			Mali			Madagascar		
	Indicator collected	Indicator reviewed at data review meeting	Data source	Indicator collected	Indicator reviewed at data review meeting	Data source	Indicator collected	Indicator reviewed at data review meeting	Data source	Indicator collected	Indicator reviewed at data review meeting	Data source	Indicator collected	Indicator reviewed at data review meeting	Data source
second dose of IPTp															
Number of ANC clients who received third dose of IPTp	X	X	Health register, DHIS2	X		Health register, DHIS2	X	X	Health register, DHIS2				X		Health register, DHIS2
Long-lasting insecticide-treated nets (LLINs)															
Number of LLINs distributed at ANC clinics	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X		Health register, DHIS2
Number of LLINs distributed at child health clinics	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X		Health register, DHIS2
Diagnostic test indicators															
Number of malaria blood slides examined in children <5 years	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X		Health register, DHIS2
Number of malaria blood slides examined in persons ≥5 years	X	X	Health register, DHIS2, hospital registers	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X		Health register, DHIS2
Number of positive malaria blood slides in children <5 years	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X		Health register, DHIS2
Number of positive malaria blood slides in persons ≥5 years	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X		Health register, DHIS2
Number of malaria rapid diagnostic tests examined	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X		Health register, DHIS2
Number of positive malaria rapid diagnostic tests	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X		Health register, DHIS2
Morbidity and mortality indicators															
Number of children <5 years	X	X											X	X	Health register, DHIS2

Indicator	Democratic Republic of the Congo			Kenya			Liberia			Mali			Madagascar		
	Indicator collected	Indicator reviewed at data review meeting	Data source	Indicator collected	Indicator reviewed at data review meeting	Data source	Indicator collected	Indicator reviewed at data review meeting	Data source	Indicator collected	Indicator reviewed at data review meeting	Data source	Indicator collected	Indicator reviewed at data review meeting	Data source
with severe anemia															
Number of children <5 years who died from malaria	X	X	Health register, DHIS2	X		Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X		Health register, DHIS2
Number of all persons who died from malaria	X	X	Health register, DHIS2	X		Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X		Health register, DHIS2
Additional indicators															
Number of clinical malaria cases in pregnant women	X	X	Health register, DHIS2							X	X	Health register, DHIS2	X		Health register, DHIS2
Number of confirmed malaria cases in pregnant women	X	X	Health register, DHIS2	X		Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X		Health register, DHIS2
Number of stockouts of IPTp	X	X	Health register, DHIS2	X	X	Health register, DHIS2							X		Health register, DHIS2
Number of stockouts of LLINs	X	X	Health register, DHIS2	X	X	Health register, DHIS2							X		Health register, DHIS2
Number of pregnant women treated with ACT for uncomplicated malaria										X	X	Health register, DHIS2	X		Health register, DHIS2
Number of pregnant women treated with ACT for severe malaria										X	X	Health register, DHIS2	X	X	Health register, DHIS2
Number of patients <5 years treated with ACT for uncomplicated malaria				X	X	Health register, DHIS2				X	X	Health register, DHIS2	X		Health register, DHIS2

Indicator	Democratic Republic of the Congo			Kenya			Liberia			Mali			Madagascar		
	Indicator collected	Indicator reviewed at data review meeting	Data source	Indicator collected	Indicator reviewed at data review meeting	Data source	Indicator collected	Indicator reviewed at data review meeting	Data source	Indicator collected	Indicator reviewed at data review meeting	Data source	Indicator collected	Indicator reviewed at data review meeting	Data source
Number of patients <5 years treated with ACT for severe malaria										X	X	Health register, DHIS2	X	X	Health register, DHIS2
Number of patients ≥5 years treated with ACT for uncomplicated malaria				X	X	Health register, DHIS2				X	X	Health register, DHIS2	X		Health register, DHIS2
Number of patients ≥5 years treated with ACT for severe malaria										X	X	Health register, DHIS2	X	X	Health register, DHIS2
Number of ACT stockouts at health facilities (for uncomplicated and severe malaria, separately)										X	X	Health register, DHIS2	X		Health register, DHIS2
Number of malaria blood slides examined in pregnant women										X	X	Health register, DHIS2	X	X	Health register, DHIS2
Number of patients ≥5 years who died from malaria				X		Health register, DHIS2				X	X	Health register, DHIS2	X		Health register, DHIS2
Number of pregnant women who died from malaria										X	X	Health register, DHIS2	X		Health register, DHIS2
Number of stockouts of sulfadoxine-pyrimethamine				X	X	Health register, DHIS2				X	X	Health register, DHIS2	X		Health register, DHIS2
Number of confirmed malaria cases	X		DHIS2	X	X	DHIS2							X		Health register, DHIS2

Indicator	Democratic Republic of the Congo			Kenya			Liberia			Mali			Madagascar		
	Indicator collected	Indicator reviewed at data review meeting	Data source	Indicator collected	Indicator reviewed at data review meeting	Data source	Indicator collected	Indicator reviewed at data review meeting	Data source	Indicator collected	Indicator reviewed at data review meeting	Data source	Indicator collected	Indicator reviewed at data review meeting	Data source
per 1,000 persons															
Subnational data quality indicators															
Number of health facilities reporting on time	X		DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X		Health register, DHIS2
Number of Health facilities reporting with complete data	X		DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X	X	Health register, DHIS2	X		Health register, DHIS2

MEASURE Evaluation

University of North Carolina at Chapel Hill

123 West Franklin Street, Suite 330

Chapel Hill, North Carolina 27516

Phone: +1-919-445-9359 • measure@unc.edu

www.measureevaluation.org

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