

Kenya - Malaria Indicator Survey 2015

**National Malaria Control Programme (NMCP) - Ministry of Health, Government of
Kenya, Kenya National Bureau of Statistics (KNBS) - Ministry of Health,
Government of Kenya**

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Sampling

Sampling Procedure

The 2015 KMIS sample was designed to produce estimates for key indicators for the country as a whole, for urban and rural areas separately, and for each of the malaria epidemiologic zones: highland epidemic; lake endemic; coast endemic; semi-arid, seasonal; and low risk.

The sampling frame used for the 2015 KMIS was the Fifth National Sample Survey and Evaluation Program (NASSEP V) master sampling frame, which is created and maintained by KNBS for household-based surveys in Kenya. Development of the frame started in 2012. It contains a list of all enumeration areas (EAs) created for the 2009 census and covers the entire country. The frame is split into four equal subsamples, from one of which the 2015 KMIS sample was drawn. Kenya is administratively divided into 47 counties, created in the 2010 Constitution; within the frame, each county is stratified into urban and rural areas and is contained within one or two of the five malaria endemic zones.

The survey used a two-stage stratified cluster sampling design. In the first stage, 246 clusters (131 rural, 115 urban) were selected with equal probability from the NASSEP V. The second stage involved selection of a uniform sample of 30 households using systematic sampling from each of the selected clusters. Prior to household selection, all the clusters were updated by KNBS. This entailed undertaking a household listing in each of the selected clusters in order to update the list of residential households within it. As part of the listing, KNBS also updated the necessary maps and recorded the geographic coordinates of each cluster. Only selected households were interviewed, and replacement of nonresponding households was not allowed.

For further details of the sample design, see Appendix A of the final report.

Response Rate

A total of 7,313 households were selected for the study, of which 6,667 were occupied at the time of fieldwork. Of these, 6,481 households were successfully interviewed, yielding an overall household response rate of 97 percent.

Weighting

Because of the nonproportional allocation of the sample to the different counties and the possible differences in response rates, sampling weights are required for any analysis using the 2015 KMIS data. This approach ensures the actual representativeness of the survey results at a national as well as domain level. Since the 2015 KMIS sample is a two-stage stratified cluster sample selected from a master sample, sampling weights were calculated based on sampling probabilities separately for each sampling stage, including the master sample selection probabilities, and for each cluster.

The design weight is adjusted for household nonresponse and individual nonresponse to get the sampling weights for households and for women, respectively. Nonresponse is adjusted at the sampling stratum level. For the household sampling weight, the household design weight is multiplied by the inverse of the household response rate, by stratum. For the women's individual sampling weight, the household sampling weight is multiplied by the inverse of the women's individual response rate, by stratum. After adjusting for nonresponse, the sampling weights are normalized to get the final standard weights that appear in the data files. The normalization process is done to obtain a total number of unweighted cases equal to the total number of weighted cases at the national level, for the total number of households and women. Normalization is done by multiplying the sampling weight by the estimated sampling fraction obtained from the survey for the household weight and the individual woman's weight. The normalized weights are relative weights, which are valid for estimating means, proportions, ratios, and rates, but not valid for estimating population totals or for pooled data.

Questionnaires

Overview

Three types of questionnaires were used in the 2015 KMIS: a Household Questionnaire, a Woman's Questionnaire, and a Biomarker Questionnaire. These questionnaires were developed by the Roll Back Malaria Monitoring and Evaluation Reference Group in collaboration with ICF International. The questionnaires were adapted for use in Kenya by the KMIS Technical Working Group and were translated into Kiswahili. A team from ICF International programmed the questionnaires into the tablet computers for data collection.

The Household Questionnaire was used to list all the usual members and visitors in the selected households. Some basic information was collected on the characteristics of each person listed, including age, sex, and relationship to the head of the household. The main purpose of the Household Questionnaire was to identify women age 15-49 eligible for the individual interview and children age 6 months to 14 years eligible for anaemia and malaria testing. The Household Questionnaire also collected information on characteristics of the household's dwelling unit, such as the source of water, type of toilet facilities, materials used for the floor, roof, and walls of the house, ownership of various durable goods, and ownership and use of mosquito nets. In addition, this questionnaire was used to capture some information on attitudes about malaria.

The Woman's Questionnaire was used to collect information from women age 15-49 on background characteristics, reproductive history for the last 6 years, antenatal care and preventive malaria treatment for the most recent birth, fever prevalence and treatment among children under age 5, and knowledge and attitudes regarding malaria treatment and prevention.

The Biomarker Questionnaire was used to record haemoglobin measurements and results of malaria rapid diagnostic testing for children age 6 months to 14 years. The questionnaire was filled in by the field teams' health workers and transcribed into the tablet computer by the household interviewer.

Data Collection

Data Collection Dates

Start	End	Cycle
2015-07-06	2015-08-15	N/A

Data Collection Mode

Face-to-face [f2f]

DATA COLLECTION NOTES

Training of Field Staff

The main survey training took place from June 25 to July 4, 2015 in Nakuru. A total of 133 trainees participated in the training. These included 25 team supervisors, 50 interviewers and 50 health workers (25 clinicians and 25 laboratory technologists) and 8 reserves. The training schedule included sessions on survey background, interviewing techniques, the questionnaire, and testing procedures.

Team supervisors and the interviewers were trained on the content of the questionnaires, consent procedures, interviewing skills, and collection and transfer of data using the tablets. Health workers were trained on consent procedures, on conducting the anaemia and malaria testing, as well as making the thick and thin blood smears. The clinicians were trained on administering artemether lumefantrine to those who tested positive for malaria, according to the national guidelines, and in how to refer complicated malaria cases.

As part of the training, there was a day of practice in eight urban and four rural clusters not included in the sample survey. The KNBS County Statistical Office in Nakuru provided support in identifying local cluster boundaries.

Fieldwork

Fieldwork took a period of 6 weeks from July 6 to August 15, 2015. Twenty-five teams, each comprised of a supervisor, two interviewers, a clinician, and a laboratory technologist, completed the fieldwork. Each team was allocated clusters in the different counties according to their local language competency. The teams spent an average of 3 days in a cluster.

Details of the assigned clusters and sampled households were provided to field teams to enable them to properly identify the selected households; in each cluster, field teams were facilitated by the KNBS County Statistical Officer and a village guide. Where eligible respondents were absent from their home, a minimum of two additional callback visits were made on different days to facilitate the participation of the respondents. A courier service provided timely transport of the thick and thin blood smears from the field to the lab. Taking blood samples can be a sensitive issue in some communities. Therefore, sampled clusters received information about the KMIS through informational advertising and mass media.

Fieldwork was closely supervised by a team of national coordinators from NMCP and KNBS who visited the teams in the field to ensure that the survey was conducted according to the protocol and to provide solutions to any challenges encountered.

Data Processing

Data Editing

The 2015 KMIS used ASUS Transformer T100 tablet computers with data entry programs developed in CSPro by The DHS Program at ICF International. Tablets were Bluetooth-enabled to facilitate the electronic transfer of household assignment among field team members and the transfer of completed questionnaires to team supervisors for transfer to the central office. Code division multiple access wireless technology via Internet File Streaming System (IFSS) developed by The DHS Program was used to transfer encrypted data from the field to the central office in Nairobi. Each tablet was fitted with a micro-SD card for encrypted data back-up.

To facilitate communication and monitoring, each field worker was assigned a unique identification number. In the central office, data received from the field team supervisors' tablets were registered and checked against any inconsistencies and outliers. Data editing and cleaning included range checks and structural and internal consistency checks. Any anomalies were communicated to the respective team through their team supervisor. The corrected results were re-sent to the central processing office.

Data Appraisal

Estimates of Sampling Error

The estimates from a sample survey are affected by two types of errors: nonsampling errors and sampling errors. Nonsampling errors are the results of mistakes made in implementing data collection and data processing, such as failure to locate and interview the correct household, misunderstanding of the questions by either the interviewer or the respondent, and data entry errors. Although numerous efforts were made during the implementation of the 2015 Kenya Malaria Indicator Survey (KMIS) to minimize this type of error, nonsampling errors are impossible to avoid and difficult to evaluate statistically.

Sampling errors, on the other hand, can be evaluated statistically. The sample of respondents selected in the 2015 KMIS is only one of many samples that could have been selected from the same population, using the same design and expected size. Each of these samples would yield results that differ somewhat from the results of the actual sample selected. Sampling errors are a measure of the variability among all possible samples. Although the degree of variability is not known exactly, it can be estimated from the survey results.

Sampling error is usually measured in terms of the standard error for a particular statistic (mean, percentage, etc.), which is the square root of the variance. The standard error can be used to calculate confidence intervals within which the true value for the population can reasonably be assumed to fall. For example, for any given statistic calculated from a sample survey, the value of that statistic will fall within a range of plus or minus two times the standard error of that statistic in 95 percent of all possible samples of identical size and design.

If the sample of respondents had been selected as a simple random sample, it would have been possible to use straightforward formulas for calculating sampling errors. However, the 2015 KMIS sample is the result of a multi-stage stratified design, and, consequently, it was necessary to use more complex formulas. Sampling errors are computed in either ISSA or SAS, using programs developed by ICF International. These programs use the Taylor linearization method of variance estimation for survey estimates that are means, proportions, or ratios.

Note: A more detailed description of estimate of sampling error is presented in APPENDIX B of the survey report.

Other forms of Data Appraisal

Data Quality Tables

- Household age distribution
- Age distribution of eligible and interviewed women
- Completeness of reporting

Note: See detailed data quality tables in APPENDIX C of the report.

Related Materials

Questionnaires

Kenya Malaria Indicator Survey 2015, Household Questionnaire

Title Kenya Malaria Indicator Survey 2015, Household Questionnaire
 Author(s) Malaria Control Unit Kenya National Bureau of Statistics
 Country Kenya
 Language English
 Filename Kenya_2015_MIS_hh_questionnaire.pdf

Kenya Malaria Indicator Survey 2015, Woman's Questionnaire

Title Kenya Malaria Indicator Survey 2015, Woman's Questionnaire
 Author(s) Malaria Control Unit Kenya National Bureau of Statistics
 Country Kenya
 Language English
 Filename Kenya_2015_MIS_woman_questionnaire.pdf

Kenya Malaria Indicator Survey 2015, Biomarker Questionnaire

Title Kenya Malaria Indicator Survey 2015, Biomarker Questionnaire
 Author(s) Malaria Control Unit Kenya National Bureau of Statistics
 Country Kenya
 Language English
 Filename Kenya_2015_MIS_biomarker_questionnaire.pdf

Reports

Kenya Malaria Indicator Survey 2015, Report

Title Kenya Malaria Indicator Survey 2015, Report
 Author(s) National Malaria Control Programme, Ministry of Health, Nairobi, Kenya Kenya National Bureau of Statistics, Nairobi, Kenya ICF International, Rockville, Maryland, USA
 Date 2016-04-01
 Country Kenya
 Language English

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Filename <http://dhsprogram.com/pubs/pdf/MIS22/MIS22.pdf>

Fast Facts from The 2015 Kenya Malaria Indicator Survey

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 Author(s) The DHS Program
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 Country Kenya
 Language English
 Filename <http://dhsprogram.com/pubs/pdf/DM81/DM81.pdf>

2015 Malaria Indicator Survey Fact Sheet

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Other materials

Reading and Understanding Tables from the 2015 Kenya Malaria Indicator Survey (KMIS)

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 Country Kenya
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