Malawi - MDG Endline Survey 2013-2014

United Nations Children's Fund, National Statistical Office of Malawi

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Sampling

Sampling Procedure

The primary objective of the sample design for the MDG Endline was to produce statistically reliable estimates of most indicators, at the national level, for urban and rural areas, and for the twenty seven districts of the country: Chitipa, Karonga, Nkhatabay, Rumphi, Mzimba, Kasungu, Nkhotakota, Ntchisi, Dowa Salima, Lilongwe, Mchinji, Dedza, Ntcheu, Mangochi, Machinga, Zomba, Chiradzulu, Blantyre, Mwanza, Thyolo, Mulanje, Phalombe, Chikhwawa, Nsanje, Balaka and Neno district. Urban and rural areas in each of the twenty seven districts were defined as the sampling strata.

A multi-stage, stratified cluster sampling approach was used for the selection of the survey sample.

The target sample size for the Malawi MDG Endline Survey was calculated as 1,050 households per district. For the calculation of the sample size, the key indicator used was 'Children under-five who received antimalaria treatment".

The number of households selected per cluster for the MES was determined as 25 households, based on a number of considerations, including the design effect, the budget available, and the time that would be needed per team to complete one cluster. Dividing the total number of households by the number of sample households per cluster, it was calculated that 42 sample clusters would need to be selected in each district.

Equal allocation of the total sample size to the twenty seven districts was used. Therefore, 42 clusters were allocated to each district except Blantyre and Lilongwe where 45 clusters were allocated to each to allow for a larger sample size because these two districts contain the major urban centers in the country, with the final sample size calculated as 28,500 households. In each district, the clusters (primary sampling units) were distributed to the urban and rural domains proportionally to the size of urban and rural populations in that district. The table below shows the allocation of clusters to the sampling strata.

The 2008 census frame was used for the selection of clusters. Census enumeration areas were defined as primary sampling units (PSUs), and were selected from each of the sampling strata by using systematic PPS (probability proportional to size) sampling procedures, based on the number of households in each enumeration area from the 2008 Population and Housing Census frame. The first stage of sampling was thus completed by selecting the required number of enumeration areas from each of the twenty-seven districts, separately for the urban and rural strata.

Since the sampling frame (the 2008 census) was not up-to-date, a new listing of households was conducted in all the sample enumeration areas prior to the selection of households. For this purpose, listing teams were formed who visited all of the selected enumeration areas and listed all households in the enumeration areas. Household listing was undertaken by 15 teams. In each team there were four listers, one supervisor and a driver. Listing started in July 2013 and was completed in October 2013.

Large EAs with 300 or more households were subdivided into 2 or 3 segments of which only one segment was selected randomly and listed. The procedure for segmentation was that upon arrival in a large EA that needed segmentation, the listing team first toured the EA and did a quick count to get the estimated number of households in the EA. It was important to adopt segment boundaries that were easily identifiable and selection of a sample segment was carried out as follows:

The team drew a location map of the entire EA. Using clear boundaries such as roads or rivers, the EA was divided into 2 or 3 segments of roughly equal size; on the location map of the EA the team showed the boundaries of the newly created segments and numbered the segments sequentially. For each segment, a quick count of the number of dwellings was done.

Using the Segmentation form the household lister recorded the identification information of the EA, the segment numbers, and the size of each segment in the appropriate areas provided such as the number of dwellings, percentage and cumulative percentage. Then the cumulative percentage was compared with the random number that was generated for each EA. The team selected the first segment for which the cumulative percentage was greater than or equal to the random number given.

Lists of households were prepared by the listing teams in the field for each enumeration area. The households were then sequentially numbered from 1 to n (the total number of households in each enumeration area) at the National Statistical Office, where the selection of 25 households in each enumeration area was carried out using random systematic selection procedures. The survey also included a questionnaire for individual men that was to be administered in one third of the sample of households, which were randomly selected for interviews with all eligible men.

The sampling procedures are more fully described in "Malawi MDG Endline Survey 2013-2014 - Final Report" pp.442-446.

Response Rate

Of the 28,479 households selected for the sample, 27,030 were found to be occupied. Of these, 26,713 were successfully interviewed for a household response rate of 99 percent.

In the interviewed households, 25,430 women (age 15-49 years) were identified. Of these, 24,230 were successfully interviewed, yielding a response rate of 95 percent within the interviewed households. The survey also sampled men (age 15-49 years), but required only a subsample. All men (age 15-49 years) were identified in every third sample household. In these households, a total of 7,818 men (age 15-49 years) were listed in the household questionnaires. Questionnaires were completed for 6,842 eligible men, which corresponds to a response rate of 88 percent within eligible interviewed households.

There were 19,285 children under age five listed in the household questionnaires. Questionnaires were completed for 18,981 of these children, which corresponds to a response rate of 98 percent within interviewed households. Overall response rates of 94 percent, 87 percent and 97 percent are calculated for the individual interviews of women, men, and under-5s, respectively.

Generally, household response rates were high (98 percent or higher) within urban and rural areas and across the three regions. The response rates for eligible women, men and under 5s within rural and urban areas do not differ much.

Weighting

The 2013-14 Malawi MICS sample is not self-weighting. Essentially, by allocating equal numbers of households to each of the regions, different sampling fractions were used in each region since the sizes of the regions varied. For this reason, sample weights were calculated and these were used in the subsequent analyses of the survey data.

The major component of the weight is the reciprocal of the sampling fraction employed in selecting the number of sample households in that particular sampling stratum and PSU.

Since the number of households in each enumeration area (PSU) from the 2010 Census frame used for the first stage selection and the updated number of households in the enumeration area from the listing are generally different, individual overall probabilities of selection for households in each sample enumeration area (cluster) were calculated.

A final component in the calculation of sample weights takes into account the level of non-response for the household and individual interviews. The adjustment for household non-response in each stratum is equal to: 1/RRh.

Where RRh is the response rate for the sample households in stratum h, defined as the proportion of the number of interviewed households in stratum h out of the number of selected households found to be occupied during the fieldwork in stratum h.

The non-response adjustment factors for the individual women, men, and under-5 questionnaires were applied to the adjusted household weights. Numbers of eligible women, men, and under-5 children were obtained from the roster of household members in the Household Questionnaire for households where interviews were completed.

The design weights for the households were calculated by multiplying the inverse of the probabilities of selection by the non-response adjustment factor for each enumeration area. These weights were then standardized (or normalized), one purpose of which is to make the weighted sum of the interviewed sample units equal to the total sample size at the national level. Normalization is achieved by dividing the full sample weights (adjusted for nonresponse) by the average of these weights across all households at the national level. This is performed by multiplying the sample weights by a constant factor equal to the unweighted number of households at the national level divided by the weighted total number of households (using the full sample weights adjusted for nonresponse). A similar standardization procedure was followed in obtaining standardized weights for the individual women, men, and under-5 questionnaires. Adjusted (normalized) weights varied between 0.037810 and 10.867746 in the 1,140 sample enumeration areas (clusters).

Sample weights were appended to all data sets and analyses were performed by weighting households, women, men, or under-5s with these sample weights. Since interviews with eligible men were conducted in one-third of the selected households, the sample weight for men includes an additional factor of 3, in addition to the nonresponse adjustment factor.

Questionnaires

Overview

The questionnaires for the Generic MICS were structured questionnaires based on the MICS5 model questionnaire with some modifications and additions. Household questionnaires were administered in each household, which collected various information on household members including sex, age and relationship. The household questionnaire includes List of Household Members, Education, Child Labour, Child Discipline, Household Characteristics, Insecticide Treated Nets, Indoor Residual Spraying, Water and Sanitation, Handwashing, and Salt Iodization.

In addition to a household questionnaire, questionnaires were administered in each household for women age 15-49, men age 15-49 and children under age five. The questionnaire was administered to the mother or primary caretaker of the child.

The women's questionnaire includes Woman's Background, Access to Mass Media and Use of Information/Communication Technology, Fertility/Birth History, Desire for Last Birth, Maternal and Newborn Health, Post-natal Health Checks, Illness Symptoms, Contraception, Unmet Need, Attitudes Toward Domestic Violence, Marriage/Union, Sexual Behaviour, HIV/AIDS, Maternal Mortality, Tobacco and Alcohol Use, and Life Satisfaction.

The men's questionnaire includes Man's Background, Access to Mass Media and Use of Information/Communication Technology, Fertility, Attitudes Toward Domestic Violence, Marriage/Union, Sexual Behaviour, HIV/AIDS, Circumcision, Tobacco and Alcohol Use, and Life Satisfaction.

The children's questionnaire includes Child's Age, Birth Registration, Early Childhood Development, Breastfeeding and Dietary Intake, Immunization, Care of Illness, and Anthropometry.

The questionnaires are based on the MICS5 model questionnaire. From the MICS5 model English version, the questionnaires were customised and translated into Chichewa and Tumbuka and were pre-tested in Kasungu district during October 2013. Based on the results of the pre-test, modifications were made to the wording and translation of the questionnaires. In addition to the administration of questionnaires, fieldwork teams tested the salt used for cooking in the households for iodine content, observed the place for handwashing, and measured the weights and heights of children age under 5 years. Details and findings of these observations and measurements are provided in the respective sections of the report.

Data Collection

Data Collection Dates

Start	End	Cycle
2013-11	2014-04	N/A

Data Collection Mode

Face-to-face [f2f]

DATA COLLECTION NOTES

Training for the fieldwork was conducted for 28 days in November 2013. Training included lectures on interviewing techniques and the contents of the questionnaires, and mock interviews between trainees to gain practice in asking questions. Towards the end of the training period, trainees spent 4 days in practice interviewing in rural communities around the training site in Chiradzulu district.

The data were collected by 32 teams; each was comprised of 4 interviewers, one driver, one editor, one measurer and a supervisor. Fieldwork began in November 2013 and finished in April 2014.

Data Collectors

Name	Abbreviation	Affiliation
Zimbabwe National Statistics Agency	ZIMSTAT	

SUPERVISION

There is one supervisor for each of the 32 data collection teams in the field.

Data Processing

Data Editing

Data were entered using the CSPro software, Version 5.0. The data were entered on 30 desktop computers and carried out by 30 data entry operators and 4 data entry supervisors. For quality assurance purposes, all questionnaires were double-entered and internal consistency checks were performed. Procedures and standard programs developed under the global MICS programme and adapted to the MES questionnaire were used throughout. Data processing began simultaneously with data collection in December 2013 and was completed in May 2014. Data were analysed using the Statistical Package for Social Sciences (SPSS) software, Version 21. Model syntax and tabulation plans developed by UNICEF were customized and used for this purpose.

Data Appraisal

Estimates of Sampling Error

Sampling errors are a measure of the variability between the estimates from all possible samples. The extent of variability is not known exactly, but can be estimated statistically from the survey data.

The following sampling error measures are presented in this appendix for each of the selected indicators:
- Standard error (se): Standard error is the square root of the variance of the estimate. For survey indicators that are means, proportions or ratios, the Taylor series linearization method is used for the estimation of standard errors. For more complex statistics, such as fertility and mortality rates, the Jackknife repeated replication method is used for standard error estimation.
- Coefficient of variation (se/r) is the ratio of the standard error to the value (r) of the indicator, and is a measure of the relative sampling error.
- Design effect (deff) is the ratio of the actual variance of an indicator, under the sampling method used in the survey, to the variance calculated under the assumption of simple random sampling based on the same sample size. The square root of the design effect (deft) is used to show the efficiency of the sample design in relation to the precision. A deft value of 1.0 indicates that the sample design of the survey is as efficient as a simple random sample for a particular indicator, while a deft value above 1.0 indicates an increase in the standard error due to the use of a more complex sample design.
- Confidence limits are calculated to show the interval within which the true value for the population can be reasonably assumed to fall, with a specified level of confidence. For any given statistic calculated from the survey, the value of that statistic will fall within a range of plus or minus two times the standard error (r + 2.se or r – 2.se) of the statistic in 95 percent of all possible samples of identical size and design.

For the calculation of sampling errors from MICS data, programs developed in CSPro Version 5.0, SPSS Version 21 Complex Samples module and CMRJack have been used.

The results are shown in the tables that follow. In addition to the sampling error measures described above, the tables also include weighted and unweighted counts of denominators for each indicator. Given the use of normalized weights, by comparing the weighted and unweighted counts it is possible to determine whether a particular domain has been under-sampled or over-sampled compared to the average sampling rate. If the weighted count is smaller than the unweighted count, this means that the particular domain had been oversampled. Sampling errors are calculated for indicators of primary interest, for the national level, for urban and rural areas, and for all three regions. Three of the selected indicators are based on households members, 12 are based on women, 3 are based on men, and 4 are based on children under 5.

Other forms of Data Appraisal

A series of data quality tables are available to review the quality of the data and include the following:
- Age distribution of the household population
- Age distribution of eligible and interviewed women
- Age distribution of eligible and interviewed men
- Age distribution of children in household and under 5 questionnaires
- Birth date reporting: Household population
- Birth date and age reporting: Women
- Birth date and age reporting: Men
- Birth date and age reporting: Under-5s
- Birth date reporting: Children, adolescents and young people
- Birth date reporting: First and last births
- Completeness of reporting
- Completeness of information for anthropometric indicators: Underweight
- Completeness of information for anthropometric indicators: Stunting
- Completeness of information for anthropometric indicators: Wasting
- Heaping in anthropometric measurements
- Observation of birth certificates
- Observation of vaccination cards
- Observation of women’s health cards
- Observation of bednets and places for handwashing
- Respondent to the under-5 questionnaire
- Selection of children age 1-17 years for the child labour and child discipline modules
- School attendance by single age
- Sex ratio at birth among children ever born and living
- Births by calendar years
- Reporting of age at death in months
- Completeness of information on siblings
- Sibship size and sex ratio of siblings

The results of each of these data quality tables are shown in appendix D in document "Malawi MDG Endline Survey 2013-2014 - Final Report" pp.495-520.

Related Materials

Questionnaires

MICS 5 Changes to MICS5 Questionnaires since June 9, 2013

Title	MICS 5 Changes to MICS5 Questionnaires since June 9, 2013
Language	English
Filename	http://mics.unicef.org/tools

Malawi MDG Endline Survey 2013-14 - Questionnaire

Title	Malawi MDG Endline Survey 2013-14 - Questionnaire
Author(s)	National Statistical Office of Malawi United Nations Children's Fund (UNICEF)
Country	Malawi
Language	English
Filename	Malawi 2013-14 MICS (MDG Endline Survey)_English_Questionnaire.pdf

Reports

Malawi MDG Endline Survey 2013-14 - Report

Title	Malawi MDG Endline Survey 2013-14 - Report
Author(s)	National Statistical Office of Malawi United Nations Children's Fund (UNICEF)
Country	Malawi
Language	English
Filename	https://mics-surveys-prod.s3.amazonaws.com/MICS5/Eastern%20and%20Southern%20Africa/Malawi/2013-2014/Final/Malawi%202013-14%20MICS%20%28MDG%20Endline%20Survey%29_English.pdf

Malawi MDG Endline Survey 2013-14 - Key Findings

Title	Malawi MDG Endline Survey 2013-14 - Key Findings
Author(s)	National Statistical Office of Malawi United Nations Children's Fund (UNICEF)
Country	Malawi
Language	English
Filename	https://mics-surveys-prod.s3.amazonaws.com/MICS5/Eastern%20and%20Southern%20Africa/Malawi/2013-2014/Key%20findings/Malawi%202013-14%20MICS%20%28MDG%20Endline%20Survey%29%20KFR_English.pdf

Technical documents

MICS 5 Survey Plan Template

Title	MICS 5 Survey Plan Template
Language	English
Filename	http://mics.unicef.org/tools

MICS 5 Supply Procurement Instructions

Title	MICS 5 Supply Procurement Instructions
Language	English
Filename	http://mics.unicef.org/tools

MICS 5 Fieldwork Duration, Staff, Data Processing and Supply Estimates Template

Title	MICS 5 Fieldwork Duration, Staff, Data Processing and Supply Estimates Template
Language	English
Filename	http://mics.unicef.org/tools

MICS 5 Indicator List

Title	MICS 5 Indicator List
Language	English
Filename	http://mics.unicef.org/tools

MICS 5 Changes to Indicator List since June 9, 2013

Title	MICS 5 Changes to Indicator List since June 9, 2013
Language	English
Filename	http://mics.unicef.org/tools

MICS 5 Sample Size Calculation

Title	MICS 5 Sample Size Calculation
Language	English
Filename	http://mics.unicef.org/tools

MICS 5 Household Selection Template

Title	MICS 5 Household Selection Template
Language	English
Filename	http://mics.unicef.org/tools

MICS 5 Manual for Mapping and Household Listing

Title	MICS 5 Manual for Mapping and Household Listing
Language	English
Filename	http://mics.unicef.org/tools

MICS 5 Sample Weight Calculation Template

Title	MICS 5 Sample Weight Calculation Template
Language	English
Filename	http://mics.unicef.org/tools