Liberia - Demographic and Health Survey 2013

Liberia Institute of Statistics and Geo-Information Services (LISGIS) - Ministry of Health and Social Welfare (MOHSW)

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Sampling

Sampling Procedure

Sample Design
The sampling frame for the 2013 LDHS was developed by the Liberia Institute of Statistics and Geo-Information Services (LISGIS) after the 2008 National Population and Housing Census (NPHC). The sampling frame is similar to that used for the 2009 and 2011 Liberia Malaria Indicator Surveys (LMIS), except that the classification of localities as urban or rural was updated through the application of standardized definitions. The sampling frame excluded nomadic and institutional populations such as residents of hotels, barracks, and prisons. Notably, the sampling frame for the 2013 LDHS differs markedly from that used for the 2007 LDHS, which was based on the 1984 NPHC. Taken together, these differences may complicate data comparisons between surveys.

The 2013 LDHS followed a two-stage sample design that allowed estimates of key indicators for the country as a whole, for urban and rural areas separately, for Greater Monrovia and other urban areas separately, and for each of 15 counties. To facilitate estimates of geographical differentials for certain demographic indicators, the 15 counties were collapsed into five regions as follows:
North Western: Bomi, Grand Cape Mount, and Gbarpolu
South Central: Montserrado, Margibi, and Grand Bassa
South Eastern A: River Cess, Sinoe, and Grand Gedeh
South Eastern B: River Gee, Grand Kru, and Maryland
North Central: Bong, Nimba, and Lofa

Regional data were presented in the 2007 LDHS, the 2009 LMIS, and the 2011 LMIS. However, in contrast with these past surveys, the South Central region now includes Monrovia. Thus, data presented for the South Central region in this report is not directly comparable to that presented in the 2007 LDHS, the 2009 LMIS, or the 2011 LMIS.

The first stage of sample selection involved selecting sample points (clusters) consisting of enumeration areas (EAs) delineated for the 2008 NPHC. Overall, the sample included 322 sample points, 119 in urban areas and 203 in rural areas. To allow for separate estimates of Greater Monrovia and Montserrado as a whole, 44 sample points were selected in Montserrado; 16 to 26 sample points were selected in each of the other 14 counties.

The second stage of selection involved the systemic sampling of households. A household listing operation was undertaken in all the selected EAs from mid-September to mid-October 2012. From these lists, households to be included in the survey were selected. Approximately 30 households were selected from each sample point for a total sample size of 9,677 households. During the listing, geographic coordinates (latitude and longitude) were taken in the center of the populated area of each EA using global positioning system (GPS) units.

Because of the approximately equal sample sizes in each region, the sample is not self-weighting at the national level, and weighting factors have been added to the data file so that the results will be proportional at the national level.

All women age 15-49 who were either permanent residents of the selected households or visitors who stayed in the household the night before the survey were eligible to be interviewed. In half of the households, all men age 15-49 who were either permanent residents of the selected households or visitors who stayed in the household the night before the survey were eligible to be interviewed. In the subsample of households selected for the male survey, blood samples were collected for laboratory testing to detect HIV from eligible women and men who consented; in this same subsample of households, height and weight information was collected from eligible women, men, and children 0-59 months.

Further details on the sample design and implementation are given in Appendix A of the final report.

Response Rate

A total of 9,677 households were selected for the sample, of which 9,386 were occupied. Of the occupied households, 9,333 were successfully interviewed, yielding a response rate of 99 percent.

In the interviewed households, 9,462 eligible women were identified for individual interview; of these, complete interviews were conducted with 9,239 women, yielding a response rate of 98 percent. In the subsample of households selected for the male survey, 4,318 eligible men were identified and 4,118 were successfully interviewed, yielding a response rate of 95 percent. The lower response rate for men was likely due to their more frequent and longer absences from the household.

Weighting

Due to the nonproportional allocation of the sample across domains and urban-rural areas, and the differential response rates, sampling weights must be calculated using all analyses of the LDHS results to ensure that survey results are representative at both the national and domain level. Since the LDHS sample is a two-stage stratified cluster sample, sampling weights are based on sampling probabilities calculated separately for each sampling stage and for each cluster.

The design weight is adjusted for household non-response and individual non-response to get the sampling weights for households and for women and men, respectively. Non-response 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. For the men's individual sampling weight, the household sampling weight for the male sub-sample is multiplied by the inverse of the men's individual response rate, by stratum. After adjusting for non-response, 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, women, and men. Normalization is done by multiplying the sampling weight by the estimated sampling fraction obtained from the survey for the household weight, the individual woman's weight, and the individual man's weight. The normalized weights are relative weights that are valid for estimating means, proportions, ratios, and rates, but they are not valid for estimating population totals or pooled data. The sampling weights for HIV testing are calculated in a similar way, but the normalization of the HIV weights is different. The individual HIV testing weights are normalized at the national level for women and men together so that HIV prevalence estimates calculated for women and men together are valid.

Further details on the sample weight calculation are given in Appendix A.4 in the final report.

Questionnaires

Overview

Three questionnaires were used for the 2013 LDHS: the Household Questionnaire, the Woman's Questionnaire, and the Man's Questionnaire. These questionnaires are based on MEASURE DHS standard survey questionnaires and were adapted to reflect the population and health issues relevant to Liberia. Input was solicited from various stakeholders representing government ministries and agencies, nongovernmental organizations, and international donors.

Given that there are dozens of local languages in Liberia, most of which have no accepted written script and are not taught in the schools, and given that English is widely spoken, it was decided not to attempt to translate the questionnaires into vernaculars. However, many of the questions were broken down into a simpler form of Liberian English that interviewers could use with respondents.

The Household Questionnaire was used to list all the usual members of and visitors to selected households. Some basic demographic information was collected on the characteristics of each person listed, including his or her age, sex, education, and relationship to the head of the household. For children under age 18, survival status of the parents was determined. The data on age and sex of household members obtained in the Household Questionnaire were used to identify women and men who were eligible for individual interview and HIV testing. The Household Questionnaire also collected information on characteristics of the household's dwelling unit, such as the source of water, type of toilet facility, materials used for the floor of the house, ownership of various durable goods, ownership and use of mosquito nets, and information on household out-of-pocket health-related expenditures. The Household Questionnaire was also used to record height and weight measurements of children 0-59 months and eligible adults. Also recorded was whether or not eligible adults consented to HIV testing.

The Woman's Questionnaire was used to collect information from all eligible women age 15-49.

The Man's Questionnaire was administered to all men age 15-49 in the subsample of households selected for the male survey in the 2013 LDHS sample. The Man's Questionnaire collected much of the same information as the Woman's Questionnaire, but was shorter because it did not contain a detailed reproductive history or questions on maternal and child health.

Data Collection

Data Collection Dates

Start	End	Cycle
2013-03	2013-07	N/A

Data Collection Mode

Face-to-face [f2f]

DATA COLLECTION NOTES

Training of Field Staff
Six women and nine men participated in a training to pretest the LDHS survey protocol from 20 August to 7 September 2012. Most participants had worked on various LDHS survey activities previously, including the 2007 LDHS, or were employed by LISGIS. Trainers were staff from LISGIS and MEASURE DHS. Ten days of classroom instruction were provided. Additionally, pretest field practice took place over four days in both rural and urban locations. Following field practice, a debriefing session was held with the pretest field staff, and modifications to the questionnaires were made based on lessons drawn from the exercise.

The recruitment of the LDHS field staff began in October 2012. The positions were advertised via announcements on bulletin boards in LISGIS headquarters and all LISGIS county offices. Minimum requirements of applicants included a high school diploma, fluency in English, and familiarity with one or more local dialects. A total of 3,662 applications were received from all counties. Vetting of all applications was done over a two-week period; 1,339 candidates were short-listed to sit for aptitude testing. Two aptitude tests were arranged. The first occurred in November 2013; those who passed were eligible for a second aptitude test, which was administered in January 2013. One thousand and sixty-four candidates sat for the first test, and 564 candidates sat for the second test. Based on the outcome of the second test combined with prior survey experience and other intangibles, a total of 128 persons (82 females and 46 males) were invited to the main training.

The field staff main training took place over four weeks (11 February to 8 March 2013). The training was conducted following MEASURE DHS training procedures, which included class presentations, mock interviews, tests, and field practice. Trainers included LISGIS staff who participated in the LDHS pretest; staff from MOHSW, WHO, and Planned Parenthood Association of Liberia; and staff from ICF International.

Out of those persons who were recruited and attended the main training, 65 women and 31 men were selected to carry out field work. Among this group, 16 persons were selected as team supervisors and 16 persons were selected as field editors; all others served as interviewers. Team supervisors and field editors were provided with additional training in methods of field editing, data quality control procedures, and fieldwork coordination.

Fieldwork
Data collection was carried out by 16 field teams, each consisting of one team supervisor, one field editor, three female interviewers, one male interviewer, and one driver. On each team, one of the female interviewers and the male interviewer were also tasked with biomarker collection (conducting height and weight measurements and blood collection for HIV testing from eligible respondents). Five senior staff members from LISGIS and a senior staff member from NACP coordinated and supervised the fieldwork activities. Participants in fieldwork monitoring also included a resident advisor, a survey technical specialist, and a senior data processing specialist, all of whom worked directly for the MEASURE DHS project.

Data collection took place over a four-month period from 10 March to 19 July 2013. For logistical reasons, including the difficulty in reaching the clusters located in the Southeast during the rainy season, fieldwork was divided into three phases:
• Phase I: Maryland, Grand Kru, Sinoe, River Gee, Grand Gedeh
• Phase II: Lofa, Bong, Nimba, Grand Bassa, River Cess
• Phase III: Margibi, Montserrado, Greater Monrovia, Bomi, Gbarpolu, Grand Cape Mount

At least three teams were assigned to each county.

Data Collectors

Name	Abbreviation	Affiliation
Liberia Institute of Statistics and Geo-Information Services	LISGIS	Ministry of Health and Social Welfare (MOHSW)

Data Processing

Data Editing

All questionnaires were returned to the LISGIS central office in Monrovia for data processing, which consisted of office editing, coding of open-ended questions, data entry, and editing computer-identified errors. The data were processed by a team of 12 data entry clerks, two data editors, one data entry supervisor, and two administrators of questionnaires; the latter checked that the clusters were completed according to the sample selection and that all members of the household eligible for individual interview were identified. Secondary editing was led by an LDHS coordinator. Several LISGIS staff took on the responsibility of receiving the blood samples from the field and checking them before sending them to the Montserrado Regional Blood Bank for storage. Data entry and editing using CSPro software was initiated in April 2013 and completed in late August 2013.

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 on the part of either the interviewer or the respondent, and data entry errors. Although numerous efforts were made during the implementation of the 2013 Liberia Demographic and Health Survey 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 2013 LDHS 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 between 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 2013 LDHS 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. The Jackknife repeated replication method is used for variance estimation of more complex statistics such as fertility and mortality rates.

The Taylor linearization method treats any percentage or average as a ratio estimate, r = y/x, where y represents the total sample value for variable y, and x represents the total number of cases in the group or subgroup under consideration.

Further details on sampling errors calculation are given in Appendix B of the final report.

Other forms of Data Appraisal

Data quality tables were produced to review the quality of the data:
- Household age distribution
- Age distribution of eligible and interviewed women
- Completeness of reporting
- Births by calendar years
- Reporting of age at death in days
- Reporting of age at death in months
- Completeness of information on siblings
- Sibship size and sex ratio of siblings

Note: The tables are presented in APPENDIX C of the final report.

Related Materials

Questionnaires

2013 Liberia Demographic and Health Survey Household Questionnaire

Title	2013 Liberia Demographic and Health Survey Household Questionnaire
Author(s)	Liberia Institute of Statistics and Geo-Information Services (LISGIS)
Date	2013-01-11
Country	Liberia
Language	English
Filename	Liberia_2013_DHS_hh_questionnaire.pdf

2013 Liberia Demographic and Health Survey Woman's Questionnaire

Title	2013 Liberia Demographic and Health Survey Woman's Questionnaire
Author(s)	Liberia Institute of Statistics and Geo-Information Services (LISGIS)
Date	2013-01-11
Country	Liberia
Language	English
Filename	Liberia_2013_DHS_women_questionnaire.pdf

2013 Liberia Demographic and Health Survey Man's Questionnaire

Title	2013 Liberia Demographic and Health Survey Man's Questionnaire
Author(s)	Liberia Institute of Statistics and Geo-Information Services (LISGIS)
Date	2013-01-11
Country	Liberia
Language	English
Filename	Liberia_2013_DHS_men_questionnaire.pdf

Reports

Liberia Demographic and Health Survey 2013 Report

Title	Liberia Demographic and Health Survey 2013 Report
Author(s)	Liberia Institute of Statistics and Geo-Information Services (LISGIS), Monrovia, Liberia Ministry of Health and Social Welfare, Monrovia, Liberia National AIDS Control Program, Monrovia, Liberia ICF International Inc., Rockville, Maryland, USA
Date	2014-08-01
Country	Liberia
Language	English

Table of contents

Filename http://dhsprogram.com/pubs/pdf/FR291/FR291.pdf

Liberia Demographic and Health Survey 2013 Key Findings

Title	Liberia Demographic and Health Survey 2013 Key Findings
Author(s)	The DHS Program
Date	2014-08-01
Country	Liberia
Language	English
Description	This report summarizes the findings of the 2013 Liberia Demographic and Health Survey (LDHS), which was implemented by the Liberia Institute of Statistics and Geo-Information Services (LISGIS).
Filename	http://dhsprogram.com/pubs/pdf/SR214/SR214.pdf

Fast Facts from The 2013 Liberia Demographic and Health Survey

Title	Fast Facts from The 2013 Liberia Demographic and Health Survey
Author(s)	The DHS Program
Date	2014-08-01
Country	Liberia
Language	English
Filename	http://dhsprogram.com/pubs/pdf/DM58/DM58.pdf

Results from the 2013 Liberia Demographic and Health Survey

Title	Results from the 2013 Liberia Demographic and Health Survey
Author(s)	The DHS Program
Date	2014-08-01
Country	Liberia
Language	English
Filename	http://dhsprogram.com/pubs/pdf/HF54/HF54.pdf

Technical documents

Reading and Understanding DHS Tables

Title	Reading and Understanding DHS Tables
Author(s)	The DHS Program
Date	2014-08-01
Country	Liberia
Language	English
Filename	http://dhsprogram.com/pubs/pdf/DM56/DM56.pdf