

Rwanda - Demographic and Health Survey 2014 - 2015

National Institute of Statistics of Rwanda (NISR) - Government of Rwanda

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Sampling

Sampling Procedure

Sample Design

The sampling frame used for the 2014-15 RDHS was the 2012 Rwanda Population and Housing Census (RPHC). The sampling frame consisted of a list of enumeration areas (EAs) covering the entire country, provided by the National Institute of Statistics of Rwanda, the implementing agency for the RDHS. An EA is a natural village or part of a village created for the 2012 RPHC; these areas served as counting units for the census.

The 2014-15 RDHS followed a two-stage sample design and was intended to allow estimates of key indicators at the national level as well as for urban and rural areas, five provinces, and each of Rwanda's 30 districts (for some limited indicators). The first stage involved selecting sample points (clusters) consisting of EAs delineated for the 2012 RPHC. A total of 492 clusters were selected, 113 in urban areas and 379 in rural areas.

The second stage involved systematic sampling of households. A household listing operation was undertaken in all of the selected EAs from July 7 to September 6, 2014, and households to be included in the survey were randomly selected from these lists. Twenty-six households were selected from each sample point, for a total sample size of 12,792 households. However, during data collection, one of the households was found to actually be two households, which increased the total sample to 12,793. Because of the approximately equal sample sizes in each district, 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 household 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 15-59 who either were permanent household residents or were visiting the night before the survey were eligible to be interviewed.

In the subsample of households not selected for the male survey, anemia and malaria testing were performed among eligible women who consented to being tested. With the parent's or guardian's consent, children aged 6-59 months were tested for anemia and malaria in this subsample. Height and weight information was collected from eligible women, and children (age 0-5) in the same subsample. In the subsample of households selected for male survey, blood spot samples were collected for laboratory testing of HIV from eligible women and men who consented. Height and weight information was collected from eligible men. In one-third of the same subsample (or 15 percent of the entire sample), blood spot samples were collected for laboratory testing of children age 0-14 for HIV.

The domestic violence module was implemented in the households selected for the male survey: The domestic violence module for men was implemented in 50 percent of the household selected for male survey and domestic violence for women was conducted in the remaining 50 percent of household selected for male survey (or 25 percent of the entire sample, each).

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

Response Rate

A total of 6,249 men age 15-59 were identified in this subsample of households. Of these men, 6,217 completed individual interviews, yielding a response rate of 99.5 percent.

Weighting

Due to the non-proportional allocation of the sample to the different provinces and to their districts and the possible differences in response rates, sampling weights are required for any analysis using the 2014-15 RDHS-V data to ensure the actual representative of the survey results at national level and as well as at domain level. Since the RDHS sample is a two-stage stratified cluster sample, sampling weights were calculated based on sampling probabilities separately for each sampling stage and for each cluster.

The final sampling weights were normalized in order to give the total number of un-weighted cases equal to the total number of weighted cases at national level, for both household weights and individual weights. The normalized weights are relative weights which are valid for estimating means, proportions and ratios, but not valid for estimating population totals

and for pooled data. The sampling weights for HIV testing were calculated in a similar way, but the normalization of the HIV testing weights is different compared to the individual survey weights. The HIV testing weights are normalized for women and men together at the national level, in order that the HIV prevalence rates calculated for both sexes combined are valid. Sampling weights for the domestic violence surveys were calculated based on the number of eligible respondents in the households selected for domestic violence module, for male and female surveys respectively.

A number of sets of weights were calculated:

- one set for all households selected for the survey
- one set for the women's individual survey
- one set for households selected for the male survey
- one set for the male individual survey
- one set for women selected for the domestic violence survey
- one set for men selected for the domestic violence survey
- one set for women's HIV testing
- one set for men's HIV testing
- one set for HIV testing for children 0-14 years

Also the number of weighted cases by using the normalized weight has no direct relationship with the survey precision because it is relative. Especially for oversampled areas, the number of weighted cases is much smaller than the number of un-weighted cases which is directly related to survey precision.

For further details on sampling weight, see Appendix A.4 of the final report.

Questionnaires

Overview

Three types of questionnaires were used in the 2014-15 RDHS: the Household Questionnaire, the Woman's Questionnaire, and the Man's Questionnaire. They are based on questionnaires developed by the worldwide DHS Program and on questionnaires used during the 2010 RDHS. To reflect relevant issues in population and health in Rwanda, the questionnaires were adapted during a series of technical meetings with various stakeholders from government ministries and agencies, nongovernmental organizations, and international donors. The questionnaires were translated from English into Kinyarwanda.

The Household Questionnaire was used to list all of the usual members and visitors in the selected households as well as to identify women and men eligible for individual interviews. Basic information was collected on the characteristics of each person listed, including relationship to the head of the household, sex, residence status, age, and marital status along with survival status of children's parents, education, birth registration, health insurance coverage, and tobacco use.

The Woman's Questionnaire was administered to all women age 15-49 living in the sampled households.

The Man's Questionnaire was administered to all men age 15-59 living in every second household in the sample. It was similar to the Woman's Questionnaire but did not include questions on use of contraceptive methods or birth history; pregnancy and postnatal care; child immunization, health, and nutrition; or adult and maternal mortality.

Data Collection

Data Collection Dates

Start	End	Cycle
2014-11	2015-04	N/A

Data Collection Mode

Face-to-face [f2f]

DATA COLLECTION NOTES

PRETEST

A pretest was conducted from August 25 to September 22, 2014. Thirty-four individuals (17 women and 17 men) participated in the four-week pretest training and fieldwork practice for the 2014-15 RDHS. The majority of participants had worked in previous RDHS surveys. Training was conducted by representatives from the NISR, the MOH, the RBC Malaria and Other Parasitic Diseases Division, the RBC HIV division, and the RBC NRL, with technical assistance from ICF International. UNICEF provided training on the early childhood development module. Classroom instruction was provided during the first three weeks, and pretest fieldwork took place over five days in three rural villages and two urban villages. After the fieldwork, a debriefing session was held with the pretest field staff, and modifications to the questionnaires were made based on lessons drawn from the exercise.

TRAINING OF FIELD STAFF

The main training for the 2014-15 RDHS started on October 5, 2014, and ended on November 2, 2014. A total of 136 participants from across the country were invited to participate in the training. They were selected based on merit. Eighty-eight of the participants were female, and 48 were male. From October 6-25, the training focused on the questionnaires. These sessions were conducted by NISR trainers with support from ICF International. Class presentations by trainers were followed by mock interviews, group practice, and role playing among participants in the classroom. Guest speakers and experts (e.g., from the MOH, the RBC, and UNICEF) made brief presentation on the national health strategies related to nutrition, contraception, malaria, maternal and child health, the HIV voluntary counseling and testing component, and early childhood development before the questionnaire training session corresponding to each of these topics. This led to an understanding among fieldworkers that items included in the questionnaire would be useful in evaluating these health topics.

All participants were trained on the questionnaires through October 26. From October 27-30, 34 participants identified as health technicians were separated and trained on biomarkers. Meanwhile, the remaining participants continued to be trained on the questionnaires. Training on biomarkers was provided by representatives from the NRL with support from ICF International. Health technicians learned how to withdrawal blood samples for HIV testing, how to prepare blood slides for malaria testing, and how to conduct anemia and rapid malaria testing. In addition, procedures for handling and packaging dried blood spots and slides were reviewed and demonstrated. Training on taking anthropometry measurements (weight and height) was also covered in detail. Training included PowerPoint presentations to illustrate procedures and emphasized practice among lab technicians in order to ensure accuracy.

At the end of the main training, 17 teams were formed, each consisting of a team leader, a field editor, a health technician, a male interviewer, and three female interviewers. Team leaders received additional training on how to identify the selected households and different subsamples, data quality control procedures, and fieldwork coordination. Field editors received additional training on how to edit the questionnaires and on data quality control procedures.

FIELDWORK

Data collection for the 2014-15 RDHS was carried out by 17 field teams from November 9, 2014, to April 8, 2015. Each team was provided a vehicle with a driver. All questionnaires and blood specimens were transferred to the NISR office every 3-4 days by 10 supervisors from the NISR and NRL/RBC who also coordinated and supervised fieldwork activities. ICF International provided technical assistance during the entire five months of data collection period.

Data Collectors

Name	Abbreviation	Affiliation
National Institute of Statistics of Rwanda	NISR	Government of Rwanda

Data Processing

Data Editing

The processing of the 2014-15 RDHS data began as soon as questionnaires were received from the field. Completed questionnaires were returned to NISR headquarters. The numbers of questionnaires and blood samples (DBS and malaria slides) were verified by two receptionists. Questionnaires were then checked, and open-ended questions were coded by four editors who had been trained for this task and who had also attended the questionnaire training sessions for the field staff. Blood samples (DBS and malaria slides) with transmittal sheets were sent respectively to the RBC/NRL and Parasitological and Entomology Laboratory to be screened for HIV and tested for malaria.

Questionnaire data were entered via the CSPro computer program by 17 data processing personnel who were specially trained to execute this activity. Data processing was coordinated by the NISR data processing officer. ICF International provided technical assistance during the entire data processing period.

Processing the data concurrently with data collection allowed for regular monitoring of team performance and data quality. Field check tables were generated regularly during data processing to check various data quality parameters. As a result, feedback was given on a regular basis, encouraging teams to continue in areas of high quality and to correct areas of needed improvement. Feedback was individually tailored to each team. Data entry, which included 100 percent double entry to minimize keying errors, and data editing were completed on April 26, 2015. Data cleaning and finalization were completed on May 15, 2015.

Data Appraisal

Estimates of Sampling Error

The estimates from a sample survey are affected by two types of errors: (1) nonsampling errors, and (2) 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 2014-15 Rwanda Demographic and Health Survey (RDHS) 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 2014-15 RDHS is only one of many samples that could have been selected from the same population, using the same design and identical 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.

A 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 2014-15 RDHS sample is the result of a multi-stage stratified design, and, consequently, it was necessary to use more complex formulae. The computer software used to calculate sampling errors for the 2014-15 RDHS is a SAS program. This program used the Taylor linearization method for variance estimation for survey estimates that are means or proportions. 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.

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
- Age distribution of eligible and interviewed men
- Completeness of reporting
- Births by calendar years
- Reporting of age at death in days
- Reporting of age at death in months
- Nutritional status of children based on the NCHS/CDC/WHO International Reference Population
- Nutritional status of children based on the NCHS/CDC/WHO International Reference Population
- Prevalence of anemia in children in 2005
- Prevalence of anemia in women in 2005
- Prevalence of anemia in children in 2007-08
- Prevalence of anemia in women in 2007-08
- Rotavirus and pneumococcal vaccinations by source of information
- Rotavirus and pneumococcal vaccinations by background characteristics
- Support for learning
- Adult mortality rates
- Smoking

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

Related Materials

Questionnaires

Rwanda Demographic and Health Survey 2014-15, Household Questionnaire

Title Rwanda Demographic and Health Survey 2014-15, Household Questionnaire
 Author(s) National Institute of Statistics of Rwanda Ministry of Health Ministry of Finance and Economic Planning
 Country Rwanda
 Language English
 Filename Rwanda_2014_DHS_hh_questionnaire.pdf

Rwanda Demographic and Health Survey 2014-15, Woman's Questionnaire

Title Rwanda Demographic and Health Survey 2014-15, Woman's Questionnaire
 Author(s) National Institute of Statistics of Rwanda Ministry of Health Ministry of Finance and Economic Planning
 Country Rwanda
 Language English
 Filename Rwanda_2014_DHS_woman_questionnaire.pdf

Rwanda Demographic and Health Survey 2014-15, Man's Questionnaire

Title Rwanda Demographic and Health Survey 2014-15, Man's Questionnaire
 Author(s) National Institute of Statistics of Rwanda Ministry of Health Ministry of Finance and Economic Planning
 Country Rwanda
 Language English
 Filename Rwanda_2014_DHS_man_questionnaire.pdf

Reports

Rwanda Demographic and Health Survey 2014-15, Report

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 Author(s) National Institute of Statistics of Rwanda, Kigali, Rwanda Ministry of Finance and Economic Planning, Kigali, Rwanda Ministry of Health, Kigali, Rwanda The DHS Program, ICF International, Rockville, Maryland, USA
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Other materials

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